

Clinical Procedures Manual for remote and rural practice

Supporting clinical practice in the bush

5th edition



RPHCM
Remote Primary Health Care Manuals



CENTRAL AUSTRALIAN
ABORIGINAL CONGRESS
ABORIGINAL CORPORATION



Alice Springs, 2022

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Preface

People who live in remote, rural and isolated areas experience higher levels of trauma, and delays to treatment associated with location and geography. Remote health practitioners not only provide emergency care, but as part of a primary health care service also perform a wide range of clinical procedures on site. The *Clinical Procedures Manual for remote and rural practice* is designed to support this practice.

Remote Primary Health Care Manuals logo

The RPHCM logo, developed by Margie Lankin, tells this story:

The people out remote, where they use the manuals, are coming into their health service. They are being seen from one of the manuals ... desert rose, the colours of the petals. The people sitting around are people who use the manuals – men and women. People who are working for Indigenous health... doctors and nurses and health workers. Messages are being sent out to the community from the clinic, from the people, to come into the clinic to be seen. Messages about better health outcomes. People are walking out with better plans, better health, better health outcomes.

About this manual

The fifth edition of the *Clinical Procedures Manual for remote and rural practice (CPM)* has been produced as part of the suite of Remote Primary Health Care Manuals (RPHCM), through a collaboration between CRAN*Plus*, Central Australian Aboriginal Congress, the Central Australian Rural Practitioners Association, and Flinders University. The other manuals in the suite are the *CARPA Standard Treatment Manual (STM)*, the *Minymaku Kutju Tjukurpa Women's Business Manual (WBM)*, and the *Medicines Book for Aboriginal and Torres Strait Islander Health Practitioners (Medicines Book)*.

The advanced practice skills needed to work in these areas can be developed and maintained through the Remote Health Practice Program at Flinders University Rural and Remote Health, and the Remote Emergency Care (REC) and Maternity Emergency Care (MEC) courses run by CRAN*Plus*. Information on remote health training is available from the RPHCM website <https://remotephcmmanuals.com.au/>.

Support for remote practitioners and their families is available through Bush Support Services, offered through CRAN*Plus*. This includes the free, confidential 24 hour Bush Support Line — 1800 805 391.

Your input

Feedback is an essential component of keeping the manuals ‘by the users for the users’. Please submit your suggestions and comments via the online feedback form at www.remotephcmmanuals.com.au

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Contributors

Thank you to the practitioners, from all over Australia, who volunteered their time and expertise to ensure the manual remains evidence-based, relevant, practical and user-friendly. More information about the review process and a list of the editorial committee members, project team members and the primary and secondary reviewers who contributed to the review of this edition can be found at <http://www.remotephcmmanuals.com.au/home.html>

Using the Clinical Procedures Manual

Use of the *Clinical Procedure Manual* is not intended to replace clinical judgement, expertise, or appropriate referral. It does not support practitioners to work beyond their level of competence or confidence or outside their scope of practice or health service policy.

Remember that clinical procedures can be invasive, painful, and frightening. Always be reassuring and encouraging, explain calmly what you are doing, and take your time.

In using this manual it is assumed that

You know the meaning of, and are able to do, the following

- A sterile (aseptic) technique
- Draw up and give common injections
- Safely throw away (dispose of) sharps and syringes
- Cardiopulmonary resuscitation (CPR)

BEFORE doing any procedure you have

- Taken a full medical history and done a physical examination
- Explained the procedure to the person and/or their carer and gained informed consent
- Ensured patient privacy
- Talked with someone more experienced than you when
 - ▶ This is suggested by the guideline
 - ▶ You are unsure of the clinical management
 - ▶ It is a clinically serious situation
- Used your clinical guidelines to give pain relief, sedation, antibiotics, tetanus injections etc as needed

AFTER finishing a procedure you will

- Record everything in the person's file notes, and in other documents as required by the condition or local policies
- Give the appropriate advice, instructions and warnings to the person, and arrange follow-up or handover.

The procedures

Procedures are written in dot point form, and are usually under 4 headings:

- **Title** — what the procedure is and why it is done
- **Attention** — lists dangers and warnings, general do's and don'ts, and handy tips to help with the procedure
- **What you need** — lists equipment and medicines needed in the order that they are used, and equipment/medicines that may be needed

- **What you do** — explains procedure in the order it is done, makes helpful comments as it goes along, highlights important facts

Always begin by reading whole procedure, and carefully checking points listed under Attention.

When options are given they are listed in order of preference. Only move down the list if earlier options are not available, or are not acceptable to the person or their carer

The symbols

The symbols found in boxes at the beginning of a section or procedure are reminders about common equipment and tasks.



Light — you need a bright light to do this procedure.



Gloves — put on clean, nonsterile gloves for personal and patient protection.



Mask — use a mask for personal protection.



Eye protection — use glasses/goggles for personal protection.



Sterile technique — use sterile (aseptic) technique and 3 minute hand wash before putting on sterile gloves.



Pathology — label, pack and store pathology specimens and fill in forms.



Sharps disposal — throw away needles and other used sharps safely.

Terms

Indigenous

Due to space restrictions in this manual the term Indigenous is used to mean both Aboriginal and Torres Strait Islander Australians. We use this inclusive term respectfully and apologise for any offence it may cause.

Abbreviations

Abbreviations and acronyms may be used without explanation. There is an abbreviation list which includes acronyms.

Urgent medical consult

Medical advice must be sought as soon as possible.

Medical consult

A medical consult involves seeking advice and/or authorisation for treatment from a doctor, appropriately qualified nurse practitioner, midwife or specialist. It occurs while the patient is present and may be in person or by telehealth, eg phone, radio, videoconference.

Medical follow-up

A medical follow-up is an assessment of the patient by a doctor, appropriately qualified nurse practitioner, midwife, or specialist. It would usually involve making an appointment for the person to return to the clinic or visit the practitioner at a future time.

Medicines

Medicines are named for their active ingredients. Where a brand name for a medicine or other product is used it is in italics, and usually in brackets.

The mention of specific products does not imply that they are endorsed or recommended in preference to others of a similar nature that are not mentioned.

Supporting resources

- Remote Area Health Corps Introduction to remote nursing scope of practice e-learning module
- Austroads Assessing fitness to drive resources

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1. Working in remote clinics

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Cultural safety

Primary health care in remote and rural Australia often involves working with culturally diverse and socio-economically disadvantaged groups. To provide effective health care, practitioners must be committed to providing culturally appropriate services.

Good practice requires practitioners to recognise the broader social determinants of health, and particularly how a lack of access to health services detrimentally affect those living 'on country'.

Culturally appropriate health care

Incorporates cultural awareness, cultural safety/security and cultural competence

- **Cultural awareness** — developing knowledge about a particular people or cultural group. Includes their history, traditions, belief system/s, language/s, geographical features
- **Cultural safety/security** — creating an environment that is safe for people, where there is no insult or harassment, imposition, or denial of a person's identity. It is about living and working together with dignity and respect for differences
 - Indigenous people working in the clinic and broader community (eg ATSIHPs, ALOs, clinic board members) can influence how the health service operates and ensure it is a safe environment for patients
- **Cultural competence** — a commitment to engage respectfully with people from other cultures. It requires the ability to identify and challenge one's own cultural assumptions and prejudices, and one's values and beliefs

Tips

- Always show respect and consideration. Ask local experts about appropriate forms of respect for your community
- Remember that medical procedures can be invasive, frightening, painful
- Always maintain dignity, privacy, confidentiality for patients
- Public rather than private settings may be more suitable for some people, on some occasions. Make sure the person is able to make an informed choice
- It is not always the patient who gives the history or makes decisions — this may be the role of others, usually relatives
- Be aware of local time (eg school bell, shop hours) and local activities (eg sports carnival, ceremonies). These may also influence whether the person can attend appointments

Cultural beliefs

- Traditional concepts and understandings around health and healing remain strong in remote Indigenous communities
- In many cases Indigenous people will use traditional healers and traditional medicines before presenting to the clinic. It is very important to acknowledge and respect this. Traditional medicines/therapies can work in conjunction with Western medicine
- Be aware of non-verbal body language and gestures — pointing, hand signals, eye contact. May have very different meanings for patient and practitioner
- Culture can influence the way people react to stressful or traumatic situations, including wailing, silence, inflicting harm on others or self-harming after traumatic events such as death

Effective communication

- English can be a second or third language for Indigenous Australians
 - Ask if person would like an interpreter to assist
 - Using family members to interpret can be sensitive. Be cautious, let person guide you. Using local Indigenous staff may be an option, if appropriate
- Don't assume that conversations conducted in English have the same meaning for practitioner and patient
- Don't try to speak a language learnt in another community. Similar sounding words can have different meanings and may be offensive
- Hearing problems, common in all age groups, can make communication more difficult
- Don't shout. Always speak clearly and warmly

Consider how you question patients

- Direct questions can be considered rude. Consider getting permission if you need to ask a lot of questions
 - Only ask one question at a time and allow person lots of time to consider it
 - Be aware that they may be thinking about it in their own language before responding
- Avoid double negatives (eg 'You don't do nothing like that, do you')
- Be wary of ready agreement. It can be a sign of misunderstanding, or simple courtesy
- Silence is often OK, give people plenty of time to answer. But remember that silence can also mean misunderstanding, or that practitioner is on culturally unsafe ground

- Make detailed notes of what person says about themselves, so you have accurate records for the future, so you don't need to ask same questions again

Loss and grief

- Indigenous communities may follow some or all of these practices after a death
 - Deceased person's name should not be spoken
 - Deceased person's house is smoked, painted or vacated
 - Special rituals undertaken
 - Certain relatives of deceased may choose not to speak
 - Relatives of the deceased may live outside the community to mourn. May need special clinic visits
 - In some communities 'sorry business' (grieving) involves self-inflicted injury (sorry cuts) and family fighting
 - Payback may be part of grieving/healing process

At end of consult, check that

- What you're doing is respectful of the person's needs and wishes
- You have understood what the person has told you, and cleared up any uncertain points
- Person has understood what you have said to them and can repeat any instructions you have given them

Remember

- People generally want to do what is best for themselves and their families
- Conflicting priorities and past experiences can impact on their decisions
- Important to respect and support person's decisions, even when they challenge your clinical advice
- In the long term, relationships and trust between practitioners, patients and families enable quality health care

Travelling in remote areas

This is a guide only — all staff should follow their own organisations travel policy

Attention

- Motoring deaths in remote are most commonly single vehicle roll-overs caused by driving too fast or driver fatigue, often while not wearing a seat belt
- Weather, road/sea and vehicle/boat conditions, driver tiredness and inexperience make remote travel more dangerous than urban travel
- Treat remote travel seriously and follow procedures, even on short trips. If you do not, you will endanger yourself, your patients and people who go to look for you

Two essential safety precautions for travelling in remote areas

1. **Carry enough drinking water** for you and your passengers, as well as fuel, spare tyre and tools
 2. **Give person/service at destination an estimated time of arrival (ETA) and route details**
- **Do not** change your travel plans or route once you have given an ETA without telling the person expecting you. Not turning up when expected may be the only sign that you are in trouble and need rescuing and they will need to know where to look

What you need to know

About the vehicle (or boat)

- Where spare set of vehicle keys kept
- Organisational policies regarding use of the vehicle
- If it has been regularly serviced
- How to
 - Do a basic vehicle or boat check
 - Fill both tanks with fuel, change over tanks, prime fuel pump
 - Check spare tyre, change a tyre, use jack/tools
 - Change tyre pressure for hard/soft surfaces
 - Use 4-wheel-drive gears, engage hubs
 - Set up UHF/HF radio antenna, use radio or satellite phone
 - Troubleshoot marine engines

Basic safe driving principles

- **Do not** eat/drink, use radio/phone, change music when driving
- Keep both hands on wheel at 10 and 2 o'clock positions
- Don't wrap thumbs around steering wheel. If you hit a big rock and wheel spins suddenly, it can break your thumbs
- Keep your eyes on the road when talking
- Wear seat belts, use baby/child restraints
- Don't drive when tired, upset or hungry. Wait until next day if necessary

Dirt roads are always dangerous

- Recommended maximum speed for 4-wheel-drive ambulances on dirt or gravel is 80km/hr
- Adjust speed to allow for slippery conditions in the wet or for poor road surfaces — eg bull dust, corrugations
- Never drive outside your personal level of skill (comfort zone). Drive at 60km/hr all the way if you want to. Don't let passengers pressure you
- Colleagues also have the right to tell you if they don't feel safe with your driving skills
- Try not to drive at night or into setting sun. If it can't be avoided — take someone with you to help watch out for livestock and native animals

What you need

Properly equipped vehicle

- Spare tyre
- Fit for purpose jack and wheel brace
- Adequate drinking water for all vehicle occupants
- First aid kit and other emergency equipment — eg fire extinguisher and emergency triangle
- Appropriate communication device — eg mobile phone, satellite phone
- When travelling longer distances, or to very remote areas, consider adding the below equipment
 - Second spare tyre
 - Additional food and water supplies
 - Other communication device including any charging requirements — eg UHF radio, personal locator beacon (spot tracker/ EPIRB/ GPS)
 - Vehicle recovery equipment — eg snatch strap and shackles
 - Vehicle emergency breakdown equipment, including spare parts
 - Long range fuel tank or supplementary fuel

Properly equipped boat

- Working engine/motor
- Bungs in right places
- Radio/communications
- Compass, other navigational aids
- Safety equipment
 - Lifejackets, V-sheet, first aid kit
 - Flares, water dye, Emergency Positioning Infra Red Beacon (EPIRB)
 - Tarpaulin — to use as a makeshift sail or temporary cover
 - Oars, anchor, ropes
 - Torch, mirror

What you do before travelling

Vehicle check

- Fuel. If 2 tanks, fill both. Use alpine grade diesel in cold climates
- Fan belt tight
- Radiator and battery water, hydraulic fluid levels
- Clean windscreen and lights
- Tyres and spares — inflated, minimum 3mm tread, wheel nuts tight but able to be undone
- Wheel-changing gear, tools, safety equipment for your area
- First aid kit, torch
- Make sure following are working — UHF/HF radio or satellite phone, lights, brakes, wipers, dash instruments, trip meter, horn

Boat check

- Bungs in place
- Fuel — full tanks plus half as much again as spare
- Correct load — **do not** overload
- Radio/satellite phone, compass and/or navigational aids all working
- Safety equipment on board

Personal check

- Enough water and food for driver and passengers. When travelling in remote, dry, hot areas take extra drinking water. Will be needed if you have to wait for help or change a tyre
- Sun protection — cream, hat, sunglasses etc
- Personal breakdown kit — small torch, matches, sunscreen, snack food, fishing tackle, multi-purpose penknife, insect repellent, book etc

Weather and conditions check

- Check weather and road/sea conditions with local people, police and/or road/maritime services
- Allow for road/sea/weather conditions when making your ETA

Make a travel plan

Before and during the trip

- Work out which route to take, who will come with you
- Tell person/service at your destination
 - Time you expect to depart (ETD)
 - Time you expect to arrive (ETA)
 - **Remember:** Allow an extra 1½–2 hours for tyre changes or problems
- Plan a halfway stop to take a break and call person/service with UHF/HF radio or satellite phone to let them know where you are, everything is OK

As you are leaving

- Set trip meter, so that if there are any incidents on the road, you can tell emergency services your exact distance from base
- Make sure **you, your passengers, patients on stretchers are all wearing seat belts, restraining belts**

At end of trip

- Tell person/service at destination you have arrived. Searches have been conducted for people who were safe at home but forgot to report in

Tips to avoid driving tired

Before you drive

- Get a good night sleep
- Avoid driving at night
- Arrange to share driving if you can
- Plan to take regular breaks from driving (use rest areas)
- Find out if any medicine you are taking may affect your driving
- Monitor your level of alertness and concentration

If you feel tired when driving

- Pull over for a break in a safe place
- Pull over for a nap (20 minutes works best)
- Even if you don't feel tired, take regular breaks to avoid becoming tired
- Remember that sleep is the only way to overcome tiredness
- Swap drivers if you can

Accidents and breakdowns

- Use UHF/HF radio or satellite phone to arrange emergency recovery vehicle
- If UHF/HF radio or phone damaged in accident — need to wait until ETA passed and people come looking for you
- If passing vehicle stops — use their radio/phone or send message with them but stay with your vehicle

ALWAYS follow these basic rules

- **Stay with vehicle. Do not** try to walk for help
- Find nearby shade, conserve water
- If you think aircraft might be searching for you — clear some ground and mark SOS in big letters. Use clothes, rocks, colourful equipment, etc
- If aircraft flies overhead — run/walk quickly across ground waving your arms to attract attention
- If you have **absolutely no choice** but to leave vehicle — leave note telling rescuers direction you headed, day and time you left, how you will mark trail — eg 'Will leave red-coloured cloth in branches of mulga trees'

Consult by telephone, satellite phone, or radio

Attention

- Make sure you know how clinic/vehicle radio or satellite phone works in case there are problems with normal phones. Keep instruction manuals handy for new staff

In every consultation, including emergencies

- Speak clearly and slowly
 - Allow for time delay after each sentence if needed
- Use simple terms, and numbered body/hand charts Figure 1.1 to 1.5 to describe issue, eg
 - Position of lump
 - Position of pain
 - Place (site) of injury
- Always **recheck** management plan with consulting doctor, especially at night when everyone is tired

Numbered body and hand charts

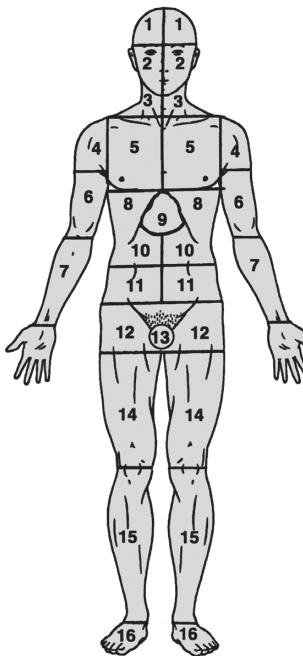


Figure 1.1
Front

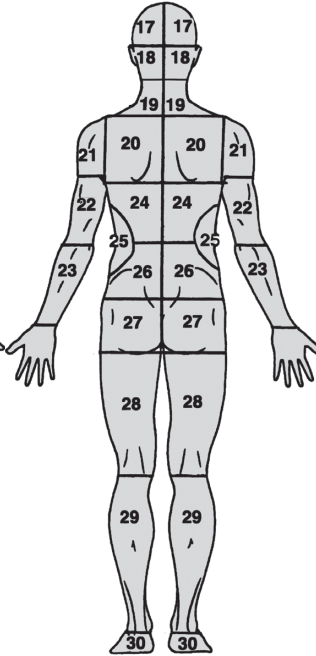


Figure 1.2
Back



Figure 1.3
Side

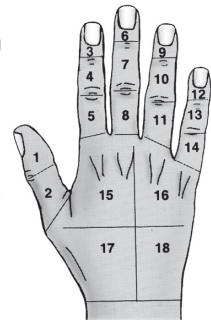


Figure 1.4
Back of hand

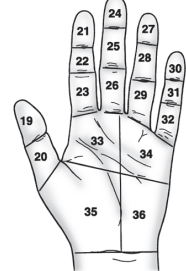


Figure 1.5
Palm of hand

What you do

Before ringing doctor on call

- **Do not** delay calling in life threatening emergencies
- Do as much assessment as possible and practical — see Clinical assessment of adults, Clinical assessment of children
- Have file notes with you

Use ISBAR to help work through consultation logically and communicate clearly

- **I**dentify
 - Who you are talking to (name and role for file notes)
 - Who you are (name, role), community where you are calling from, contact details
 - Person you are talking about — name (and carer's name if child), date of birth, patient record number, their location if different from yours, eg they could be at an outstation and calling the clinician for a consult
- **S**ituation — why you are calling
 - Is it urgent
 - Any abnormal observations, POC test results
- **B**ackground
 - Patient's story — name, age, current complaint, relevant history
 - Procedures or treatments already tried, any outcomes
- **A**ssessment
 - What you think the problem is — be clear, state the obvious, indicate how concerned you are
- **R**equest
 - What do you want them to do — advice, review, refer, evacuate
 - Repeat back — ask doctor to repeat all management and medicine orders, confirm roles and responsibilities and restate plan
- **If not happy with advice**
 - Tell doctor straight away and explain why. Always try to maintain a professional relationship and to come to a mutually agreed plan
 - If still concerned — ask the doctor to involve their senior medical officer within the retrieval service — follow local policy/practices
 - If the above is not facilitated, ring the on-call doctor service call intake and ask to be put through to the senior medical officer on call to resolve disagreement
- **Record in file notes** — full name of consulting doctor, their advice, what you have agreed to do

If person being evacuated

- Get permission from person and/or family for evacuation
- Consider local conditions that may affect evacuation — weather, condition of road/airstrip, night lighting on airstrip
- Which mode of evacuation is most suitable
 - ▶ Emergency — aerial medical service, road ambulance
 - ▶ Non-emergency — mail or charter plane, bus, private car, ferry, other transport
- Is medical and/or family escort needed
- Any risks for person, escort or transport provider — alcohol, sniffing volatile substances, risk of violence, risk of condition deteriorating
- **Medical consult** about
 - ▶ Will this problem, or underlying condition make person unwell if they fly
 - ▶ Antiemetic to stop vomiting, especially if hot weather, windy conditions, rough or windy road, choppy seas. Best given at least 20 minutes before travelling
 - ▶ Pain relief if needed
- Check you understand evacuation plan before you finish phone/radio call
- See Evacuations for how to prepare

Evacuations

Check

- How to contact the doctor on call or retrieval organiser
- Usual method of evacuation
- Who is available to assist in an emergency
- Any equipment you need to take
- How to access airstrip — keys or lock code
- Who is responsible for airstrip maintenance
- What vehicle is used for emergencies
- Phone and/or satellite number in emergency vehicle
- If you have a 2-way or UHF radio, ensure it is turned on and set to channel 13

Preparing the patient

- Person or family or guardian agree to evacuation
- Record next of kin contact details
- Discuss with doctor on call or flight organiser if an escort is appropriate. Escort should be organised and briefed before departure to meet transport vehicle/flight. **Will need escort weight and medical record number**
- Infants and children **must** have an adult escort over 18 years old
- Luggage limited to one soft bag under 7kg including clothing, money, phone
- Wrap pathology in absorbent material (eg 'Bluey') and seal in plastic pathology bag
- Make sure patient and escort are in best condition possible — pain relief, antiemetic, sedation, other pre-flight medicine needed, fluids replaced, urinary catheter in, oxygen on, etc
- Ensure person goes to toilet before starting journey
- Ensure there is at least one well functioning cannula
- Take medical items person might need for flight — another bag of IV fluid, infusions, bottle of ORS made-up for child/adult with diarrhoea
- If person needs oxygen while waiting — they will need it during transfer
- Take oxygen cylinder with you in vehicle running at the rate you need
- Have portable oxygen cylinder for transfer between vehicle and aircraft
- Get paperwork ready, photocopy or print 2 copies of file notes (1 for flight crew, 1 for person), include any faxed confirmation of orders given over the phone
- Agree what monitoring should be undertaken whilst waiting transport and whilst en route in ambulance or clinic

Important

- Have a **recent weight of person**, if patient weighs over 130kg — see Evacuating overweight patients
- Check patient and/or escort is not carrying any **dangerous items** (eg cigarette lighters, matches) or **weapons** (eg knife, firearm, item for self-defence)
- If condition of patient changes whilst awaiting transport or they become uncooperative and/or risk to crew or aircraft (eg person with psychosis, dementia, or affected by drugs or alcohol) — **medical consult** with doctor responsible for transport
- Babies and small children must be secured with a restraint for their age (eg infant car seat, or child restraint) — advise emergency responder/controller when first making contact

Evacuating by air**Preparing for aircraft landing and take-off**

- Discuss with retrieving team the timing of going to airport/meeting — often patient and any escort are taken to airstrip. Coordinate ETA
- Pilot may call via satellite phone or UHF radio (channel 13) to ask if airstrip safe and ready or about weather conditions — rain, level of cloud cover in surrounding hills, etc

Airstrip inspection procedure ('strip check')

- **Only do this if requested by pilot or retrieval organiser**
- **Identify wind direction** — aircraft always land into the wind
- **Check the runway surface**
 - Drive a stiffly sprung vehicle (eg 4WD) up and down airstrip at 75km/hr — should be smooth with no potholes
 - Drive heavy vehicle (eg 4WD) in zigzag pattern at less than 15km/hr along whole length of airstrip — if you slide, slip or tyre tracks are more than 2cm deep (10 cent coin) surface is not safe for landing
- Check condition day or night — is it safe, surface hard and smooth, free of people, animals, vehicles, branches, large rocks, etc
- **Check twice for animals**
 - Ensure no animals in airstrip area
 - If airstrip fenced, shut the gate
- **Check windsock** — not tangled
- **No objects within 30m of airstrip** — do not park at either end of runway
- **Ensure UHF radio on channel 13** — pilot may contact to confirm airstrip is safe and ready, or you may need to alert pilot to problem with airstrip. If no response from pilot, call emergency responder/controller to advise via phone or satellite phone

Rules for aircraft arrival and departure

- Person opening gate to airfield for an evacuation is responsible for people entering airfield
- All people and vehicles to remain behind gate until aircraft door is opened, propellers have stopped turning and rotating beacon light is off
- If no fences — people and vehicles must keep at least **30m** from aircraft
- **No smoking**
- Vehicles
 - ▶ Have headlights on park — do not blind pilot
 - ▶ **Do not** reverse vehicle toward aircraft unless directed to by crew member
 - ▶ Park vehicle at least **5m** from aircraft with engine off when loading/unloading person
 - ▶ Keep parallel with aircraft — **do not** drive across front or rear of aircraft
 - ▶ **Do not** walk under aircraft wings
- Pilot will not start aircraft engine until all people and vehicles are behind fence and gate or 30m away
- Remain at airstrip until aircraft has taken off safely — if there are problems with person or aircraft they may return



Figure 1.6

Night time procedures

- **Review general airstrip inspection procedure ('strip check')**
- **Never point lights at aircraft**
- **Identify wind direction** — aircraft always land into the wind
- **Lighting**
 - ▶ Most airstrips have solar or electric lights already lit
 - ▶ If needed, place portable lights or flares at 90 metre intervals
 - ▶ Light flares at least 30 minutes before the aircraft's arrival
 - ▶ Start lighting the flares at the end where the aircraft will land first
- **Windsock**
 - ▶ If the windsock has its own lighting, turn it on
 - ▶ If not — do not attempt to light the windsock
- **Second check of the airstrip**
 - ▶ 5 minutes before the aircraft is due to arrive check the strip again to ensure no animals have entered the area
- **Parking**
 - ▶ Park your vehicle pointing **INTO the wind**
 - ▶ Turn your headlights on high beam and **hazard lights on**
 - ▶ No vehicle to be parked at either end of the runway
 - ▶ All vehicles to be kept at least **30 metres away** from side of airstrip

- ▶ If possible, park as close as reasonably possible to the windsock
- ▶ If unable to park near windsock park in clear location at least 30 metres away from side of airstrip
- **After aircraft departure**
 - ▶ Flares/lights must be left lit for 30 minutes in the event the aircraft must return to land due to an emergency

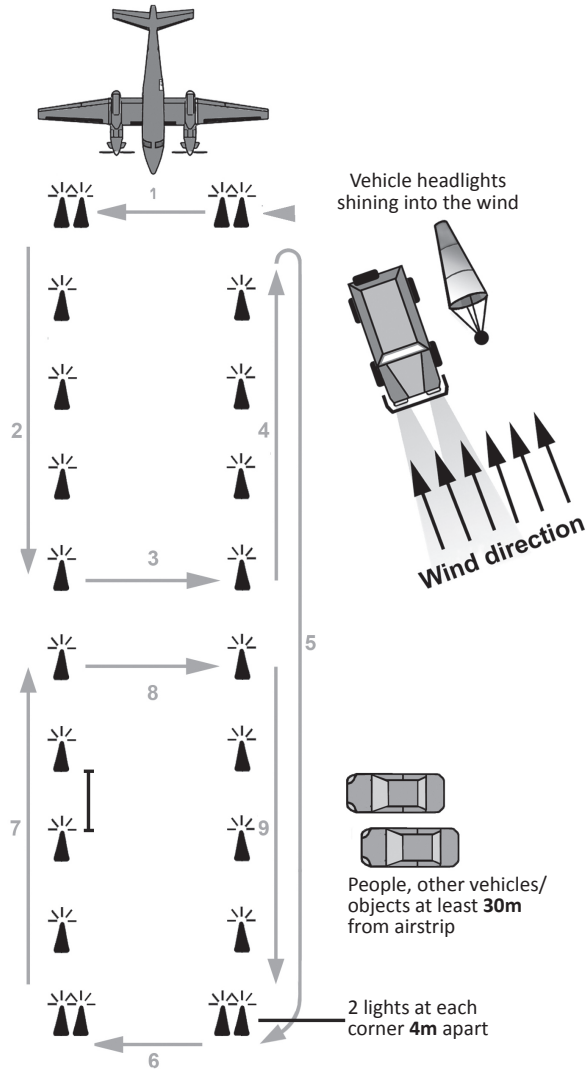


Figure 1.7

Helicopters

- **Do not** approach helicopter until rotors have stopped turning
 - Approach within the 9 to 3 o'clock position only — Figure 1.8
 - Stop and wait well clear of rotor arcs until pilot has seen you
 - Make sure pilot or crew member aware of your intention by giving a **thumbs up** signal, wait for **thumbs up** reply before going further
- **Never** go toward rear of helicopter, even if it is shut down, unless directed to do so by a crew member — Figure 1.8
- On sloping ground, approach and depart on downhill side — Figure 1.9

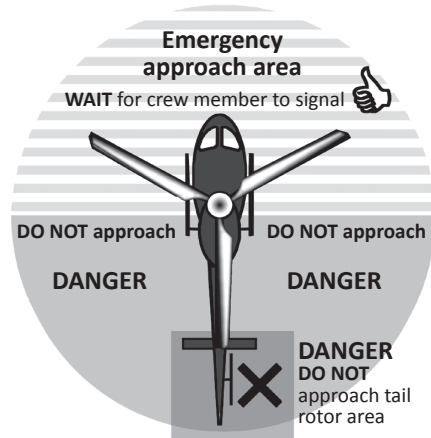


Figure 1.8

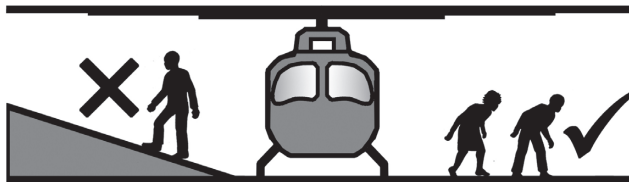


Figure 1.9

- Under rotor arcs — duck (crouch down) — Figure 1.9. **Do not** wear hats, make sure you carry loose items securely — **do not** chase loose items
- Be careful of long objects such as IV poles. **Do not** carry pointing upward
- **If blinded by dust from rotor downwash** — stop and sit on ground until dust clears or help arrives

Evacuating by road or water

Attention

- **Principles are the same as for evacuating by air**
- **Medical consult** especially if patient condition changes at any time
- Doctor on call will advise service to be used, where pickup will occur and when
- Ensure you have a communication plan or similar

What else you do

- Check your vehicle/boat and that you have enough fuel, light working, etc
- Ensure enough people to assist/drive — family member or extra staff
- Monitor patient until hand over to ambulance/boat/hospital

If doing a 'halfway meet' (rendezvous)

- Advise doctor on call and receiving party regarding
 - Your vehicle type and registration, satellite phone number and when you are leaving the clinic/community, handover is complete and have returned to clinic/community
- When you see an ambulance coming towards you, stop vehicle in a safe place on side of road. **Do not** park on crests of hills or on corners
- **At night** — ambulance and clinic staff can pass each other on the road
 - Slow down if a vehicle approaches and check for red and blue lights
 - If it is an ambulance — flash your headlights or turn on your own flashing lights then pull over safely
- **Medical consult** if patient condition changes at any time
- Do a set of observations before handing over
- Take care driving back especially at night. Be aware of
 - Fatigue
 - Road conditions
 - Wild animals or stock on the road

Evacuating overweight patients

- If **patient weight over 130kg** measure patient width (Figure 1.10) and advise on-call doctor/retrieval service to enable best mode of transport to evacuate patient
- If **patient weight over 180kg** measure patient width (Figure 1.10) and advise on-call doctor/retrieval service, best mode by road as special equipment and transport is required for safe patient handling

How to measure patient width

- While on a bed/stretcher, lie the patient flat (or as flat as possible) with
 - Elbows at their sides
 - Hands resting on their chest
- Measure the overall bed width (BW) in centimetres
- Calculate the patient's widest upper body width in centimetres
- **Upper Body Width** = $BW - (A_1 + A_2)$
- Calculate the patient's widest point near the hips in centimetres
- **Lower Body Width** = $BW - (B_1 + B_2)$
- Document **Upper** and **Lower Body Widths**

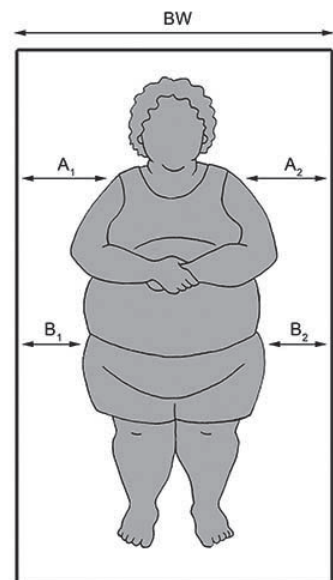


Figure 1.10

Supporting resources

- Airstrip safety video

Infection control

Standard and transmission-based precautions

- Standard precautions minimise the risk of transmission of health care related infections
- Transmission-based precautions are used as well as standard precautions when standard precautions alone are not sufficient to prevent the spread of an infectious agent
- Transmission-based precautions are based upon the mode of transmission of the infectious agent

Standard precautions

- Apply to all patients regardless of their diagnosis or presumed infection status
- Must be used in the handling of
 - Blood (including dried blood)
 - All other body fluids/substances (except sweat), regardless of whether they contain visible blood
 - Non-intact skin
 - Mucous membranes
- Consist of
 - Hand hygiene before and after all contact
 - Use of personal protective equipment, which may include gloves, impermeable gowns, plastic aprons, masks, face shields and eye protection
 - Safe use and disposal of sharps
 - Use of aseptic 'non-touch' technique for all invasive procedures, including appropriate use of skin disinfectants
 - Reprocessing of reusable instruments and equipment
 - Routine environmental cleaning
 - Waste management
 - Respiratory hygiene and cough etiquette
 - Appropriate handling of linen

Transmission-based precautions

- Transmission-based precautions (TBP) are used **in addition** to standard precautions when standard precautions alone may be insufficient to prevent transmission of infection
- The type of TBP applied is based upon the mode of transmission of the pathogen
- For diseases that have multiple routes of transmission, more than one TBP category is applied

Table 1.1 Transmission-based precautions required according to route of transmission

Infection control measures	Route of transmission		
	Airborne	Droplet	Contact
Gloves	As per standard precautions	As per standard precautions	For all manual contact with patient, associated devices and immediate environmental surfaces
Impermeable apron/gown	As per standard precautions	As per standard precautions	When healthcare worker's clothing is in substantial contact with the patient, items in contact with the patient, and their immediate environment
P2 Respirator Refer to AS/NZS 1715 for additional information	Yes	Not required	Not required
Mask (surgical-style) Refer to AS 4381:2015 for additional information	No (P2 respirator)	Yes	As per standard precautions
Goggles/face shields	As per standard precautions	As per standard precautions	As per standard precautions

Supporting resources

- Hand Hygiene Australia website
- Donning and doffing poster

2. Clinical assessment and management

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Clinical assessment of adults



- **If emergency or person seems very unwell go straight to Early recognition of sepsis**
- If clinical assessment conducted in custody — refer to your health service policy

Attention

- **Culturally safe approach**
 - Make person feel comfortable
 - Consider gender issues
 - Consider need for interpreter
 - Are appropriate family members present if needed
- **Holistic and comprehensive**
 - Consider whole person — context of their lives, families and community
 - Be guided by population health principles (ie accessibility, public participation, health promotion, appropriate technology and intersectoral cooperation)
 - Explore the person's illness experience, impacts, treatment goals
 - Consider chronic conditions/on-going health problems/age-appropriate screening
 - Be guided by context and environment
- **Systematic**
 - History informs examination
 - History, then observations or physical exam
- **Share power with person**
 - Ensure partnership between clinician and person
 - Negotiate history taking and management plan with person
 - Encourage person to share in decision making and own their own health
 - Build person's self-reliance and health literacy
- **Provide coordination and continuity of care**
 - Recognise shared care
 - Succinct, pertinent, person focused documentation
 - Send summaries to nominated services
 - Coordinate complex care
 - Collaborate with colleagues
 - Utilise recall systems

- **Encourage clinical reasoning**
 - Considers age and place, risk of person, what is most likely and what you can't afford to miss
 - Use problem solving approach to reach diagnostic hypothesis
- **Promote clinical safety and quality**
 - Work within individual's scope of practice
 - Use endorsed best practice treatment protocols (RPHCMs), quality improvement processes and procedures

What you need

Equipment

- Clinical record (file notes, electronic medical record)
- Clinical manuals
- Stethoscope
- Thermometer
- BP machine with range of cuff sizes
- O₂ sats monitor with range of probe sizes
- Scales and stadiometer (height measurement)
- Tape measure
- Blood glucose meter
- Blood collection equipment
- Urine pots, urine dip sticks
- Education materials about condition and/or treatment (eg displays, models, pamphlets)
- POC testing as available (eg ECG, Hb, chronic conditions monitoring)

What you do

Before starting consult

- Check clinical record for
 - Current and past medical and surgical history
 - Current scripts and recent medications
 - Allergy status
 - Last set of observations and pathology tests
 - Any outstanding actions or overdue recalls
- Make sure you are in a place not to be disturbed, comfortable, well lit, private room and adequately equipped
- Consider own *AND* person's safety

Consultation procedure

- **Open consult** — greet person by name, introduce yourself and establish rapport — consider 4Fs – family, football, food (as in hunting) and fun
- Offer interpreter if necessary
- **General impressions** — consider person's appearance, demeanour, speech, hearing, gait, posture, body symmetry, any tremors, odour, dental care, skin condition and interactions with others
- Check name, next of kin and DOB
- If person different gender — check if health professional of different gender needed

Reason for presentation — Acute / Non-acute

- Story of why they presented today
- Establish concerns and expectations
- Listen, encourage, don't interrupt and use SILENCE

History — acute presentation

If person seems very unwell go straight to Early recognition of sepsis

OLDCARTS

O nset — when did it start

L ocation — where does it hurt, where is problem

D uration — how long, had it before, what happened then

C haracteristics — description of pain, problem

A ggravating factors — anything that makes it worse

R elieving factors — anything that makes it better

T reatments — what have they tried, what do they think it is, how it is impacting on them and others, anything else

S igns and symptoms (other) — other problems, quick systems review, anything else you need to know to look after them

- Have they had contact with someone different, been doing anything different lately (eg travel, work, activities)
- **If you can't work it out** — work backwards. What were they doing, what did they eat/drink this morning, last night, yesterday
- Explain what you are doing/thinking, why you need to ask more questions

History — non-acute presentation

Current health review

- Immunisation status
- Appetite, nausea, change in weight
- Physical activity — when, what, how often
- Sleep patterns, energy
- Smoking/alcohol/other substance use — how much, how long, quitting experience
- Urine, bowels, periods, sexual health
- Emotional wellbeing — motivation, enjoyment, more or less happy, looking forward to anything, anxiety, self harm, domestic/family violence — ‘Do you ever feel unsafe’

Medicines

- Prescribed — how long, what, when, why, any problems
- Over the counter, herbal, traditional, other people’s
- Contraception

Allergies

- What happens when exposed

Past medical history — from patient, relatives, other clinics, hospital records

- Illnesses — as child/adult, psychological
- Accidents, injuries, family violence
- Chronic conditions
- Hospital admissions, operations
- Gynaecological/obstetric — menstrual cycle, STI’s, number of pregnancies, number of live births, child spacing, contraception

Family medical history — partner, children, parents, siblings, grandparents

Social history — home situation, education, occupation, income source, marital/de facto status, mobility, environmental issues, family violence, cultural supports and responsibilities

Clinical examination

- Use look, listen, feel, discuss
- Rapid physical assessment
 - Look for signs of chronic conditions
 - General appearance (alert, dehydrated, febrile, wasted) including gait and speech
 - Calculate REWS — AVPU, RR, O₂ sats, pulse, BP, Temp
 - Weight, BGL
- Examine nails and both hands — nicotine staining, scars, clubbing, tremor, swollen joints, cool peripheries, fungal infections
- Eyes — jaundice, anaemia, cataracts
- Mouth and tongue, hydration, dental care
- Jugular venous pressure
- Auscultate heart sounds and anterior breath sounds
- Lean person forward, observe respirations, auscultate lungs, palpate for tenderness
- Lie person flat, observe, auscultate and palpate abdomen
- Inspect/palpate both legs for swelling, perfusion, pulses and oedema
- Use history to determine any detailed examinations needed of relevant systems
 - Skin exam
 - Eye assessment
 - Ear exam
 - Mouth, throat, teeth and gums exam
 - Lungs and respiratory system exam
 - Abdominal exam
 - Rectal exam
 - Foot exam
- Investigations as determined from history and examination
 - Other investigations as needed — U/A, pregnancy, Hb, ECG, BMI, waist circumference
 - POC testing as available and relevant
 - Offer appropriate screening tests — Adult Health Check, STI check — man, woman

Examination findings

Consider

- Reason for presentation
- Other likely health issues
- Age/place/risk — persons risk given their age and the setting
- What things are often missed/can't be missed
- What is most likely
- Seek further advice — **medical consult** as needed

Discuss

- Summarise and reflect on findings with person
- Explore person's knowledge and clarify — include long and short term implications
- Use opportunities for brief intervention and health promotion as appropriate

Negotiate management plan

- Use best practice treatment protocols for management guidelines
- Discuss goals/priorities and negotiate management (including referrals) with person and significant others as appropriate — confirm management plan is acceptable to person and family
- Consider context and environment in negotiating management plan
- Plan long term management for identified risk factors, public health/preventive health issues and screening
- Ask if there are other questions, encourage and reassure
- Provide appropriate illustrated or written resources
- Agree on follow-up

Close consultation

- Cover contingencies — ensure person knows when to return, how to contact services if needed
- Check person understanding and agreement of management plan
- Provide referrals, prescriptions/medicines as needed

Documentation

- Update persons record using organisations documentation process (eg SOAP, SODAF)
- Update required recalls using organisations process
- Send letters/summaries/referral to other services identified by person

Reflect on consult

- How did it go
- What did you notice about person, about yourself or your reactions
- Identify any learning needs, remember self-care

Clinical assessment of children



- **If emergency or child seems very unwell go straight to**
 - ▶ Early recognition of sepsis (STM)
 - ▶ See Acute assessment of unwell children under 5 years (STM)

Attention

- A child's parent or guardian should always be present to provide legal consent and help with communication and on-going care
- Keep child development chart on clinic wall for easy reference

What you need

- See Equipment list

What you do

Before starting consult

- Check file notes for
 - ▶ Paediatrician letters
 - ▶ Operations, hospitalisations, accidents, injuries
 - ▶ Mother's health in pregnancy, birth and neonatal problems
 - ▶ Immunisation status, medicines and allergies
 - ▶ Any overdue recalls
- Ensure privacy, have a comfortable, well lit and adequately equipped room
- Have toys or paper and pencils to occupy child
- Consider own *AND* person's safety

Starting consult

- **Open consult** — greet child and parent/carer by name and introduce yourself
- Check name, next of kin, DOB, record name of parent/carer and who is legal guardian

Reason for presentation

- If new problem — start by taking a history
- If review or follow-up — check file notes for earlier consult and follow-up plan
- If child has chronic condition
 - Check file notes for latest letters from specialists and management plans
 - Check recall register for scheduled follow-up
 - Take history, examine child with focus on chronic disease
- Establish concerns and expectations with child and carer

History taking

- When did child start getting sick
- What was the first thing parent/carer noticed
- How has the child acted since then
- Has the child been eating and drinking
- What does the child usually eat and drink
- Any vomiting, diarrhoea, cough, rash or fever
- Any change in urine output and bowel actions
- Any concerns about child's development including
 - At school — specific problems, interactions with peers
 - Behaviour — enuresis (bladder control), temper tantrum, thumb sucking, pica (abnormal eating of non-food items), nightmares
- Any other concerns
- Social issues — who is in the family, income, food supply, washing facilities for child, pets
- Environment — smoke exposure, domestic violence, child safety, can they swim, heating and cooling of home, refrigeration, insect screens, dust control

Clinical examination

To assess young child properly you must undress them. Young child may be more comfortable sitting on parent/carers lap

Observe — before touching

- Appearance — tone, interactivity, consolability, look and gaze, speech or cry
- Conscious state
- Work of breathing — body position/posture, abnormal airway sounds, nasal flaring, sternal/intercostal recession/indrawing, tracheal tug, respiratory rate
- If crying — character of cry (eg irritable, high pitched, whimpering)
- Circulation — skin colour, rash, musculoskeletal tone

Head-to-toe exam — do ENT exam last, likely to upset child

- Fontanelle — sunken, bulging
- Eyes — colour, discharge
- Head/hair — scalp sores/lumps, hair clean, thick/sparse
- Neck — look and feel for lymph nodes
- Chest — remove clothing
 - Look at work of breathing (eg indrawing, nasal flaring)
 - Listen for heart sounds (eg murmur)
 - Listen for breath sounds (eg crackles, wheeze)
- Abdomen — soft, check for tenderness, masses, guarding, bowel sounds
- Genital area — nappy rash, lesions, testes descended in boys
- Skin — look all over for bruises, sores, other lesions
- Check hydration/dehydration — fontanelle, mucous membranes
- Look in ears with otoscope
- Look in mouth at teeth, tongue and throat
- Calculate REWS — AVPU, respiratory distress, RR, O₂ sats, pulse, central capillary refill time, Temp
- Weight, BGL
- Hb, U/A, B/P if indicated — see Clinical measurements

Negotiate management plan

- After determining problem, get advice from doctor or more experienced member of health team if needed before making a final management plan
- See STM protocols for management of specific problems
 - Acute assessment of breathing problems in children
 - Acute assessment of unwell child
 - Diarrhoea
 - Ear and hearing problems
 - Child neglect, abuse and cumulative harm
 - Urine problems — 2 months to 12 years
 - Infant, child, youth growth (0-15 years)
- Talk with child and parent/carer about plan
- If helpful — write plan down for parent/carer
- If referral needed — talk with parent/carer about this
- If giving medicine — provide medicine and discuss with parent/carer
 - Give or watch parent/carer give first dose if possible. Explain how often and how long to give
 - Advise parent/carer where to store medicine, any side effects, warnings

Close consult

- Cover contingencies — ensure parent/carer knows when to return, how to contact services if needed
- Check parent/carer and child understanding and agreement with management plan
- Provide referrals, prescriptions/medicines as needed

Documentation

- Update persons record using organisations documentation process (eg SOAP, SODAF)
- Update required recalls using organisations process
- Send letters/summaries/referral to other services identified by parent/carer

Reflect on consult

- How did it go
- What did you notice about person, about yourself or your reactions
- Consider self-care, learning needs

Supporting resources

- Charter of rights for children in healthcare

Clinical measurements

Normal temperature range

- **Do not** use tympanic thermometer if person has hole in eardrum

Table 2.1 Normal temperature ranges

How taken	Normal temp (°C)
Oral (mouth)	36.5–37.5 °C
Axillary (under arm)	36.0–37.0 °C
Rectal	37.0–37.8 °C
Tympanic (ear)	36.8–37.8 °C

Respiratory rate (RR) and heart rate (pulse)

- Listen to heart sounds in same places as you do an ECG
- If heart sounds unusual or different from other children or adults
 - Get colleague to check
 - Check notes to see if detected before. If new — **refer** for assessment

Table 2.2 Respiratory rate and pulse rate by age

Age	Respiratory rate range (breaths/min)	Pulse rate range (beats/min)
Newborn	25–60 breaths/min	120–185 beats/min
3 months	25–60 breaths/min	115–180 beats/min
6 months	20–55 breaths/min	110–180 beats/min
1 year	20–45 breaths/min	105–180 beats/min
2 years	20–40 breaths/min	95–175 beats/min
4 years	17–30 breaths/min	80–150 beats/min
6 years	16–30 breaths/min	75–140 beats/min
8 years	16–30 breaths/min	70–130 beats/min
10 years	15–25 breaths/min	60–130 beats/min
12 years	15–25 breaths/min	60–120 <i>OR</i> pregnant 80–110 beats/min
14 years	14–25 breaths/min	60–115 <i>OR</i> pregnant 80–110 beats/min
17 years and over	14–25 breaths/min	60–115 <i>OR</i> pregnant 80–110 beats/min

Royal Children's Hospital (2020) Acceptable ranges for physiological variables

Taking BP reading — adults

Attention

- **Never** check BP on limb with AV fistula
- Normal BP for an adult varies depending on gender, age and levels of fitness
- As a general principle
 - Systolic pressure should be less than 130mmHg
 - Diastolic pressure should be less than 80mmHg
- Best if person has
 - **Not** smoked or drunk tea, coffee or caffeine soft drinks for 30 minutes
 - Been sitting quietly for at least 10 minutes
- If part of cardiovascular examination or no previous recording — check BP on both arms
 - Attention to difference in recording (if any) and then use the arm with the higher reading

What you do

- Choose right sized cuff for person's arm
 - Depends on length and circumference (width) of upper arm. Inflatable air bladder in cuff must have —width at least 40% of arm circumference and length at least 80% of arm circumference. Almost long enough to go all the way around arm
- Sit person comfortably with arm resting on table or pillow, just above level of their waist
- Make sure air bladder is flat, fixed firmly and right over artery in upper arm
- If manual recording make sure
 - Stethoscope bell is put right over brachial artery in elbow crease
 - Manometer/mercury needle level on zero when you start to blow up cuff
- If you can't hear systolic or diastolic sounds the first time — make sure you let all the air out of cuff, **wait one minute** before trying again
- Adults diastolic (last sound you hear) reading is taken from time **sound disappears**

Taking BP reading — children

Attention

- Try to take BP when child content. If child upset — may need to repeat when settled
- Cuff needs to cover $\frac{2}{3}$ of child's upper arm. If cuff too narrow or too wide — reading may be wrong

Remember: Diastolic reading taken in children when sound changes from clear to muffled (sound sometimes continues to 0 in children)

What you do

- Follow same general principles as for adults
- Diagnosis of high BP requires high measurement on more than 1 occasion
- **BP depends on height** — Table 2.3 and Table 2.4. Assume child is on 50th percentile for height and adjust target if child is very short or very tall
 - ▶ Subtract 5mmHg for children on the 5th percentile height-for-age
 - ▶ Add 5mmHg for children on 95th percentile height-for-age
- **Medical consult** if BP outside of target

Table 2.3 BP — girls under 18 years (percentiles)

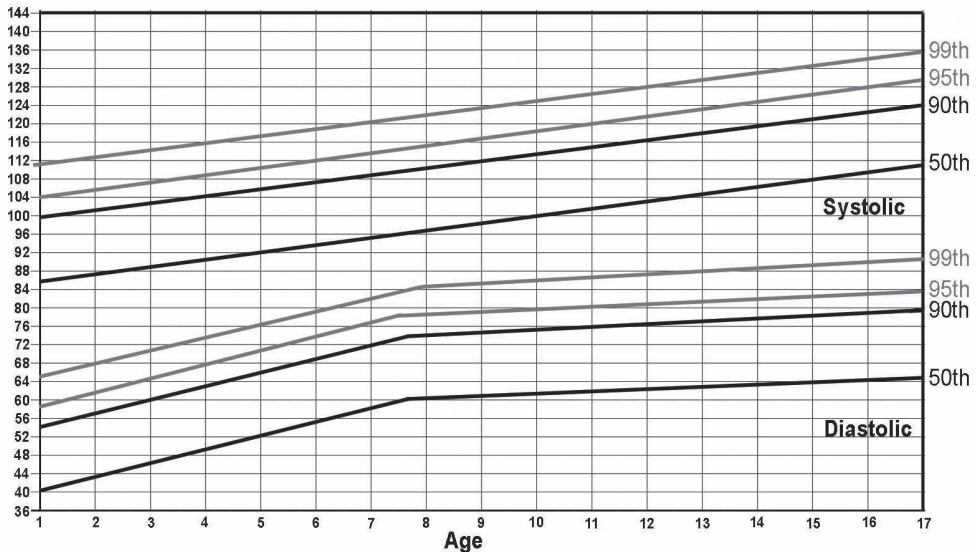
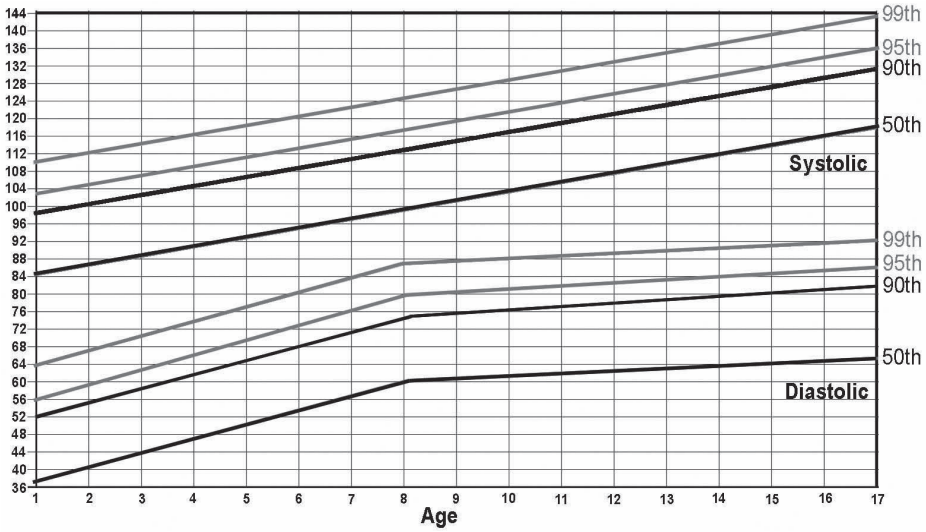


Table 2.4 BP — boys under 18 years (percentiles)



Body measurements — adults

Body mass index (BMI) and waist circumference are better indicators of disease risk than weight

Calculating Body Mass Index (BMI) for adults

What you need

- Correctly calibrated standing scales
- Something to measure height accurately (eg stadiometer)

What you do

- Calculate BMI — weight (kg) ÷ height² (m)
 - ▶ For example — 82kg ÷ (1.63 × 1.63m) = 82 ÷ 2.66 = 30.83 OR see Table 2.5
- See Table 2.6 for interpretation and actions

Table 2.5 BMI chart for men and women over 18 years

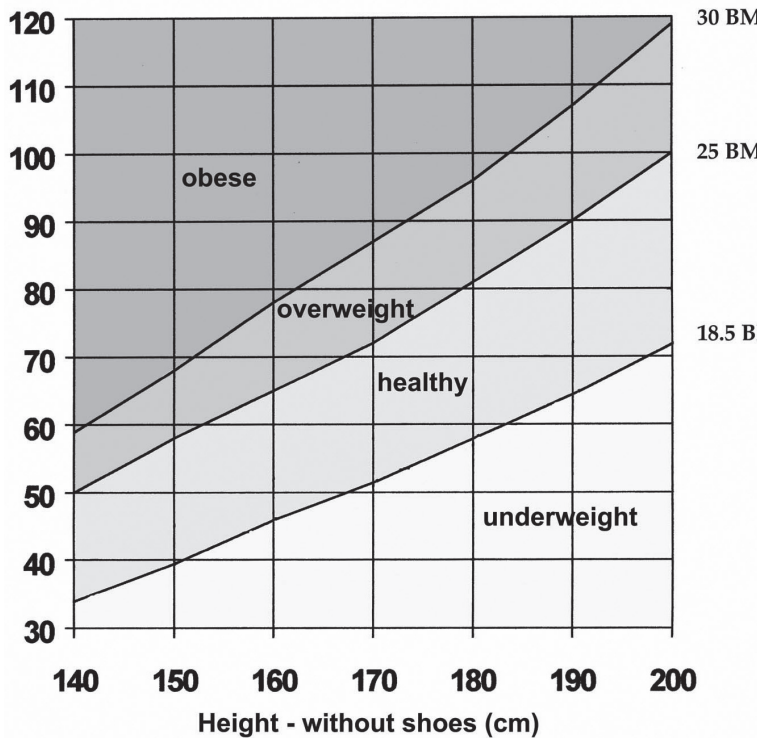


Table 2.6 BMI Interpretation and actions

BMI	What it means	What to do
Less than 18.5	Underweight	<ul style="list-style-type: none"> • Medical consult • Advise healthy eating, keeping active • Refer to dietitian
18.5-24.9	Healthy weight	<ul style="list-style-type: none"> • Advise healthy eating, keeping active
25-29.9	Overweight	<ul style="list-style-type: none"> • Advise to lose weight or not gain more weight — healthy eating, increased activity
30 or more	Obese	<ul style="list-style-type: none"> • Medical consult • Advise to lose weight — see management of obesity (STM) • Refer to dietitian

Measuring waist

- **Do not** use waist measurement for children under 10 years or pregnant women. For children 10-17 years, use waist for height ratio.
- Some people have normal BMI but bigger than normal waist circumference. This is a risk — advise to lose weight, be active

Attention

- Adults can have a normal BMI but still have an unhealthy abdominal fat (pot belly) or have a higher BMI because of muscular build. A higher BMI may be more acceptable for people over 65 years
- Large waist measurement associated with increased risk of some cancers, heart disease and type 2 diabetes

What you do

- Put tape between lowest rib and top of hipbone, roughly in line with the belly button — Figure 2.1
- Make sure tape is snug, without pressing into skin. Keep it even, don't let it slope down on one side
- Ask person to breathe out normally and measure against skin
- See Table 2.7 for interpretation of results and actions

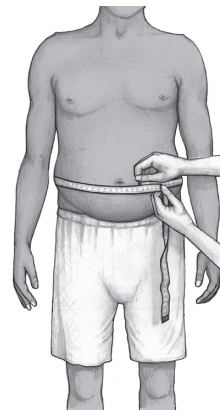


Figure 2.1

Table 2.7 Waist circumference interpretation and actions

Waist circumference (cm)	What it means	What to do
Male less than 94 Female less than 80	Normal	<ul style="list-style-type: none"> • Maintain healthy weight — healthy eating, keep active
Male 94–102 Female 80–88	Increased risk of chronic disease	<ul style="list-style-type: none"> • Keep active • Not gain more weight
Male more than 102 Female more than 88	Greatly increased risk of chronic disease	<ul style="list-style-type: none"> • Lose weight — healthy eating, increased activity • Refer to dietitian

Measuring growth in children and youth

- Check weight *AND* length/height
- Also check
 - Head circumference — 0–2 years
 - BMI — 2–17 years
 - Waist for height ratio — 10–17 years

Weight

- Measure and record weight in file notes at each visit
- Babies, children under 2 years — on baby scales, naked (no nappy or singlet)
- 2–5 years — on adult scales, wearing dry nappy or underpants only
- 5 years and over — on adult scales in light clothing and no shoes

Length or height

- Babies and children under 2 years — lying down (length) with 2 people holding, using fixed board or measuring mat, without nappy
- 2 years and over — standing up (height) using stadiometer, without shoes. Record to nearest 0.1cm

Waist for height

- Use for children and youth over 10 years to assess risk of chronic disease
- Measure waist on a horizontal line 2cm above belly button
- Divide waist measurement (cm) by height (cm)
- **Refer** for further assessment if result more 0.5

BMI

- Calculate BMI — weight (kg) ÷ height² (m)
 - For example — 22kg ÷ (1.1 × 1.1m) = 22 ÷ 1.22 = 18
- Plot BMI on chart by age and gender
 - Below -2 z score for age and gender — underweight
 - Above +1 z score for age and gender — overweight (5–19 years), risk of overweight (2–5 years)
 - Above +2 z score for age and gender — obese (5–19 years), overweight or obese (0–5 years)
 - *OR* use WHO Anthro calculator to work out z score

Table 2.8 BMI-for-age — girls 2–5 years (z score)

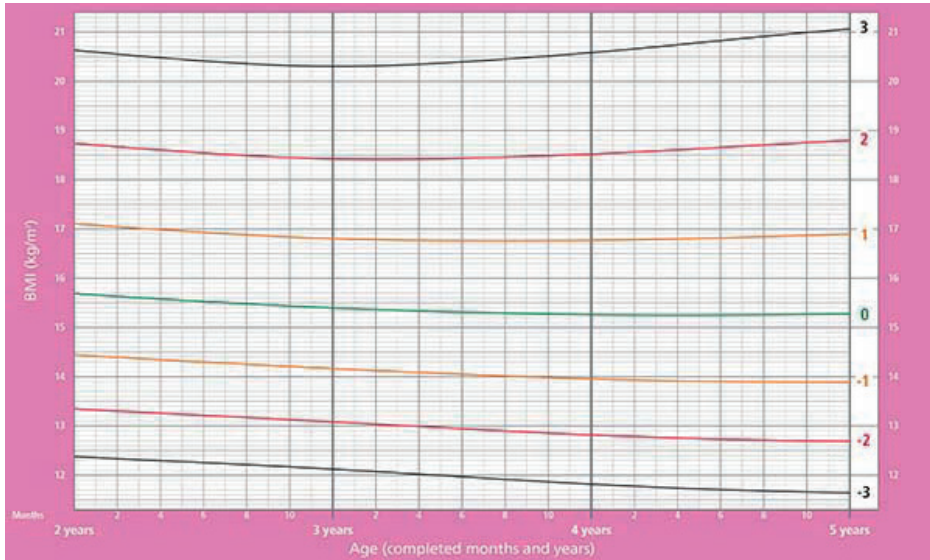


Table 2.9 BMI-for-age — boys 2–5 years (z score)

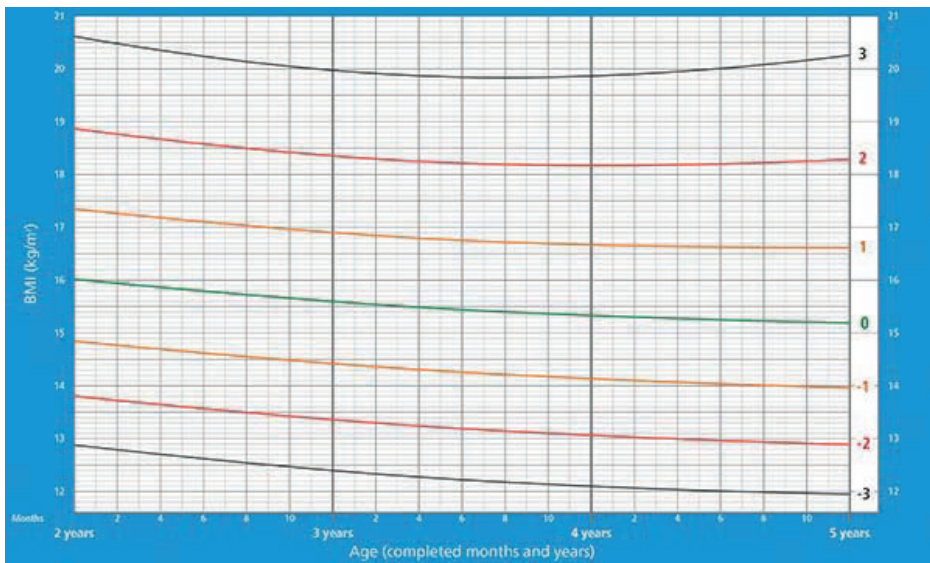


Table 2.10 BMI-for-age — girls 5–19 years (z score)

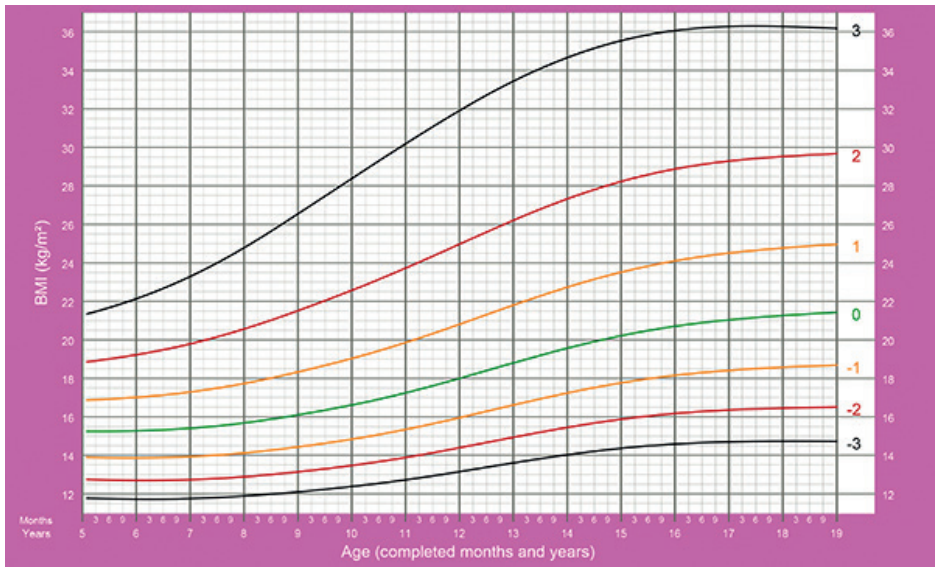
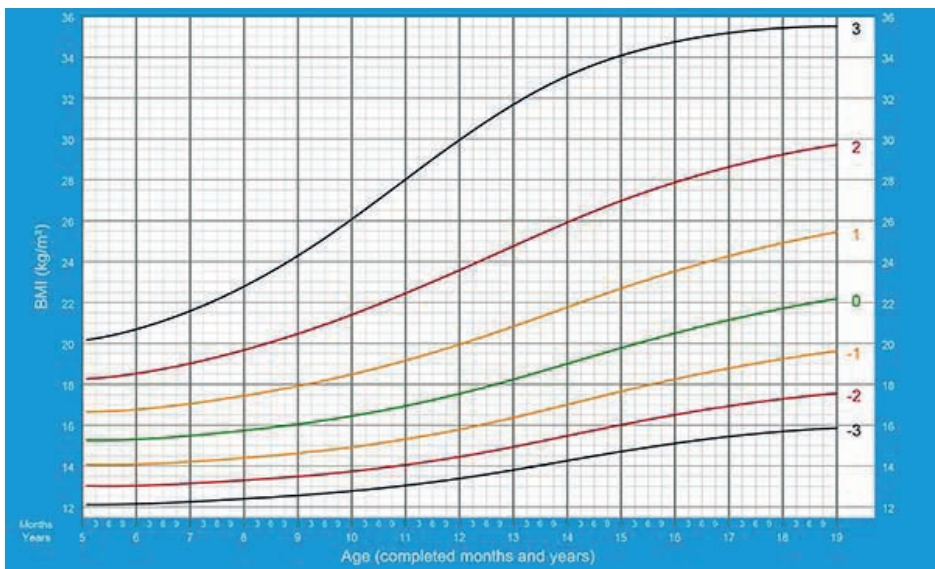


Table 2.11 BMI-for-age — boys 5–19 years (z score)



© WHO BMI-for-age charts. <https://www.who.int/tools/growth-reference-data-for-5to19-years/indicators/bmi-for-age> August 2022. Used with permission.

Supporting resources

- WHO — Measuring and weighing a child
- WHO Anthro calculator

3. Trauma and emergencies

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Preparation for trauma and emergencies

Attention

- Familiarise yourself with the organisations equipment, procedures, check lists and schedules
- Remote areas use satellite phones, mobile phones and radios. Make sure all staff know how these work and how to operate them in an emergency
- Practise emergency procedures (mock emergency) so you are all prepared
 - Get as many people as possible involved so all know their role
 - Being prepared helps staff feel more confident and leads to better care

Portable equipment

Remote Emergency Kit

Essential equipment for emergencies outside the clinic

- Stock for 2–3 casualties. **Do not** overfill
- Keep all equipment stored together in one place, don't use for other purposes
- Have laminated check lists of contents and adhere to checking and replacement schedules
- Have a notice stored with equipment advising
 - What other items to take and where they are stored
 - Where emergency medicines are stored (eg fridge, pharmacy)
 - Where scheduled medicines are stored (eg safe, secured area)

Suggested Contents

- Clinical protocol manuals (eg *CPM*, *STM*, *WBM*)
- Clipboard with paper, pens and trauma forms
- Triage cards if available
- Airway
 - Suction — tubing, connectors
 - Yankauer suckers
 - Y suction soft flexible catheters — all sizes
 - Airways — oropharyngeal, nasopharyngeal, laryngeal mask — all sizes
 - Cervical spine collars — all sizes or multi-size, sandbags
- Breathing
 - Portable oxygen equipment with tubing
 - Bag-valve-masks with oxygen attachment — adult, child, infant sizes
 - Stethoscope
 - Oxygen masks — adult, child and infant sizes

- ▶ Non-rebreather masks — adult and child sizes
- ▶ Nebuliser masks — adult and child
- ▶ 14G non-retractable cannula for needle decompression
- Circulation
 - ▶ 2% chlorhexidine in 70% alcohol wipes
 - ▶ Tourniquet
 - ▶ IV cannula — 16, 18, 20, 22, 24 gauge
 - ▶ Intraosseous devices — adult and child
 - ▶ IV bungs, extension tubing, IV dressings
 - ▶ Syringes — 10ml, normal saline to flush
 - ▶ IV giving sets
 - ▶ Tape
 - ▶ Crepe bandages and combine dressing
 - ▶ Trauma scissors
 - ▶ Small sharps container
- Gadgets
 - ▶ Pen torch
 - ▶ BP (sphygmomanometer) with multiple cuff sizes
 - ▶ O₂ sats monitor
 - ▶ Blood glucose kit
 - ▶ Suture kit
 - ▶ Watch with second hand

Extras kits — in separate container

- Medication per organisation policy including needles and syringes to draw up and administer
- PPE — eyewear, masks, gloves, gowns
- Snake bite — heavy weight conforming bandages
- Dressing — dressing packs, skin preparation, slings, safety pins, tape
- Limb splints — all sizes
- Nasogastric — sizes 10Fr, 12Fr, 14Fr, pH paper
- Urinary catheter — sizes 10G, 12G, 14G, drainage bags, lubricant, catheter syringe
- Intubation
- Chest drain
- Birth and resuscitation equipment — see Women's Business Manual
- Defibrillator and monitoring equipment — see Life Support DRSABC

Ambulance contents

- Emergency and local contact numbers
 - Doctor, retrieval service, ambulance
 - Hospital
 - Ambulance satellite phone number
 - Your mobile phone number
 - Your radio call signal
- Local community and regional maps
- Oxygen and suction
- Stretcher with blanket and pillow
- Scoop stretcher and straps
- Tissues
- Vomit bags
- Rubbish bags
- Body bags
- Reflective vests
- Torch and spare batteries
- Hazard triangles
- Drinking water
- Small tarp

Remote clinic emergency area

- Hands free phone, phone numbers for doctor and emergency services
- Clock with second hand
- Freestanding emergency stretcher/bed with IV poles
- **3-drawer emergency trolley**
 - **On top** — monitor and defibrillator, sharps container, documentation paperwork, frequent observations and fluid balance charts
 - **Drawer 1** — Airway equipment including mini-tracheostomy kit if available
 - **Drawer 2** — Breathing equipment including non-retractable cannula
 - **Drawer 3** — Circulation equipment including snake bite bandages and intraosseous devices
 - **Bottom** — reflex hammer, defibrillator supplies including range of BP cuffs and O₂ sat finger probes
- PPE
- ECG
- Oxygen and suction equipment (including spanner for changing cylinders)
- POC Test equipment
- Examination light
- BLS and ALS wall charts, paediatric dosing and equipment sizes charts

Responding to remote emergency call-out

When advised of an emergency situation, get all available information **before** responding — this will guide what and how much equipment to take. Use mnemonic METHANE to remember important details

- **M**ajor incident
- **E**xact location — which road and how far away, any identifying features nearby (eg 'on Corrugated Highway, 1km past Mt Lonely turn-off')
- **T**ype of incident
- **H**azards, present and potential (eg chemical/fuel spills, power lines)
- **A**ccess to scene
- **N**umber, severity and type of casualties
- **E**mergency services already present and required

Helpers

- Follow your organisation's protocols about who to call and what help to take (eg doctor, police, local emergency services RFDS, St John Ambulance)
- Advise other staff and volunteers if needed — consider
 - Someone to come with you possibly in a separate vehicle
 - Someone to stand by clinic radio/phone and coordinate communications
 - Someone to get clinic ready if you are likely to bring people back

Take

- Helper/s — leave room in ambulance for casualties
- Remote emergency kit
- Medication kit
- PPE kit
- Any other relevant kit
- For safety and comfort consider
 - Water
 - Insect repellent, sunscreen
 - Hat, sturdy footwear, protective clothing
 - Snack bar, fruit

Before Leaving

- Check incident location — do you know how to get there
- Check someone knows where you are going, time you expect to arrive (ETA) and when you will call again
- Check vehicle — water, fuel, tools, spare tyres
- Check all required medical emergency equipment on board
- Test phone call/radio check from vehicle

- Clarify who is team leader and helpers role/s
- Consider bathroom break and food

At Scene

- Park as close as safely possible to protect you and the scene
- Switch on hazard warning lights and put on reflective clothing
- If on or near road — ask helper to manage traffic and put out hazard triangles if available
- Take deep breath, have a good look, work out who is in charge, what has happened and what your priorities are

Remember: If police/rescue/SES/fire brigade present — they are in charge of scene. Wait for them to declare it safe for you to approach

- Contact clinic/doctor — quickly tell them exactly where you are, what is happening. Ask them to pass on to any others responding
- Work out which casualties to triage first (deal with). See — Assessing trauma — primary and secondary survey
- Ask others to help
 - Record what you do
 - Clear up rubbish — sharps go straight into container
 - Carry spare equipment back to make room in ambulance for patients

Follow-up

- Record what you have done in each person's file notes
- Refuel and restock ambulance, restock Remote Emergency Kit
- Have a cup of tea, consider debrief with colleagues and emergency workers
- If you or your colleagues feel upset or traumatised by what you have seen or done — ask for help from your manager *and/or* use Bush Support Services 1800 805 391
- Don't be too hard on yourself. You can only do your best in very difficult circumstances and learn from the experience

Supporting resources

- Retrieval medicine courses for doctors
- Remote emergency courses for nurses and doctors

Assessing trauma — primary and secondary survey



Life-threatening injuries are more likely if

- Bad car crash — roll over, thrown from car, car badly damaged, someone killed or car going more than 60km/hr
- Motorcyclist
- Pedestrian hit by a vehicle
- Fall from more than 1m *OR* fall from horse, ladder, bicycle
- Explosion
- Pulse more than 100/min or less than 50/min (adult)
- More than 1 fractured bone, especially femur or humerus
- Coma scale score less than 14

Signs of shock

- Increased RR
- Pulse weak and fast (adult more than 100bpm or difficult to feel. Older people with heart problems may not get fast pulse)
- Central capillary refill longer than 2 seconds
- Pale, cool, moist skin
- Restless, confused, drowsy, occasionally unconscious
- Low BP for age or relative to person's previously recorded values

Multiple casualty events

- If more than one of you — decide who is in charge (the leader) before you arrive at scene
- Stop before entering the scene
- Get an overview — what happened, where are the victims, safe access, what could happen next
- Call for help — what resources are required
- Identify dangers
- Mitigate risks to prevent more accidents or trauma and keep you safe
- Take charge and identify possible assistants
- Identify line of approach — where to start, which way to walk through and where to finish

- Multiple casualty triage (help the most with what you have — may mean not helping the most injured to save the most lives). Allocate jobs if helpers, keep moving
 - Immediate need — bleeding and breathing difficulties, primary survey
 - Impending deterioration
 - Walking wounded and uninjured
 - Deceased — including those who cannot maintain an airway in coma position
- If no evidence of trauma — see Life support — DRS ABC
- Task an assistant to care for walking wounded and nominate a safe place for them — shelter, out of harm's way, good access
- When able to do so have another careful sweep to find concealed victims
- Participate in a debrief when appropriate

Trauma assessment has 2 main parts

Primary survey — rapid examination to find and start managing life-threatening injuries

- Look for most life-threatening injuries first
- Keep rechecking person's condition as you go through examination
 - If they get worse — go back to ABC D
 - If level of consciousness falls — see A — Airway and cervical spine

Secondary survey — do after life-threatening problems dealt with

- If they get worse — go back to ABC D

Primary survey — using DRS ABC DE

D – Danger — make sure scene is safe

Medical consult — let doctor know you are responding to a potentially serious situation and will update them. Make sure they know where you are going and what communication options you are likely to have on scene

- To prevent more accidents and keep you safe
 - Park your vehicle safely, put on fluoro vest or jacket and PPE
 - If on road — have someone manage traffic and crowd, put out hazard signs
 - Check for dangers — alcohol-fueled mob, car engine running, leaking petrol/chemicals/battery and anyone smoking, electricity cables, undeployed airbags

Scene survey — consider mechanism of injury

- What happened
- If vehicles involved
 - How many, what state are they in — accidents at high speeds (over 60km) usually cause more serious injuries
 - Any casualties outside vehicles — thrown from vehicle or taken out, pedestrians
 - If deceased person — may be other people with serious injuries
- If drowning victim — risk of hypothermia, remove wet clothing, dry and warm person as soon as possible — **do not** delay CPR if needed
 - Hypothermia may mask signs of life. If this a possibility — continue CPR

R – Response

- Your response to scene (eg multiple casualty or single person incident)
- Person's response to you

S – Send for help

- If you need help — send for it straight away
- **Medical consult** early — let doctor know you are responding to a potentially serious situation
- If doctor on standby — call as soon as you arrive. Talk with them as much as you can

Start with person with most life-threatening injury in most circumstances

A – Airway and cervical spine

- Airway **most important** but try to protect cervical spine. Use manual in-line immobilisation until able to apply alternative methods in accordance with local protocols (eg foam collar and light weight bolsters)
- Risk of spinal injury — diving injury, dumped in heavy surf, life threatening injury mechanism — see Immobilising the spine
- If only one or two rescuers use modified HAINES technique to roll person
- Check for face, jaw and neck injuries that may cause blocked airway

If unconscious or having trouble breathing

Open airway

- Adult or child
 - **Do not** tilt head backward. May be neck injuries
 - Use head tilt/chin lift. Place one hand on the forehead. The other hand is used to provide chin lift. The head (not the neck) is tilted backwards. Grip chin and gently lift it up — Figure 3.1



Figure 3.1

- ▶ *OR* jaw thrust. Hold jaw at point under ears, push upward and forward until chin juts out and airway opens — Figure 3.2
- Infant (under 1 year)
 - ▶ Put folded towel or nappy under shoulders and back — Figure 3.3



Figure 3.2

Clear airway

- Remove visible solid material using 2 ‘hooked’ fingers in downward sweeping motion
- For liquid (blood, vomit, water) use suction if available *OR* log-roll *OR* HAINES roll onto side, open mouth, turn downward to allow to drain using gravity
- If unconscious after drowning — expect vomit. Put in recovery position to clear airway — Figure 3.4
- To keep airway open, may need nasopharyngeal airway or oropharyngeal airway — Figure 3.5

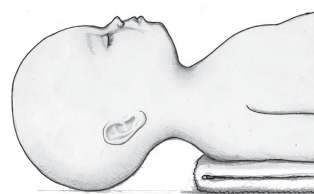


Figure 3.3

If airway still not open

- Consider LMA, intubation (only if more than one of you)



Figure 3.4

If airway open

- **If not breathing — go straight to B – breathing**
- **If person starts to vomit — log-roll into recovery position — Figure 3.4**
- **If breathing and no other obvious life-threatening problems — immobilise cervical spine in accordance with local protocols**

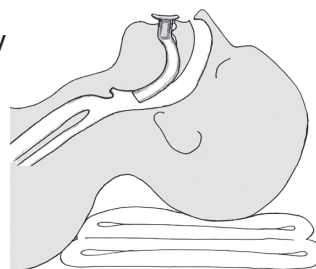


Figure 3.5

If talking OK and breathing normally and if conscious and cooperative

- If you can, kneel down with knees gently but firmly bracing either side of head — Figure 3.6. Protects spine by stopping them moving head and neck when you talk to them
- Tell person to keep their head still — not to move or shake head to say ‘yes’ or ‘no’ to your questions
- Check if person knows you are there — call to them, ask their name



Figure 3.6

- Airway probably clear
 - ▶ Give **oxygen** to target O₂ sats 94–98% *OR* if moderate/severe COPD — 88–92%
 - ▶ See C — Circulation and controlling bleeding

B – Breathing

Look

- At person's bare chest — cut off clothing but keep warm
 - ▶ Are they breathing, how fast, how deeply, is it normal for age
 - ▶ Are both sides of chest moving the same, does one side suck in while other moves out
 - ▶ Do they look like they are working hard
- Is trachea (windpipe) straight (in midline)
 - ▶ If tension pneumothorax — may be pushed away from affected side
- Bulging/swollen neck veins may be caused by tension pneumothorax
- Chest wounds. Log-roll if unexplained breathing difficulty — look for hidden wounds

Listen

- Any unusual noises — grunting, gasping, snoring, wheezing, whistling

Feel

- Is chest moving. One or both sides
- Is trachea (windpipe) in middle of throat — Figure 3.7
- For subcutaneous emphysema (crackling feeling under skin)
- For broken ribs. If no visible injury, gently squeeze chest from sides and from front and back.
 - ▶ Note tenderness

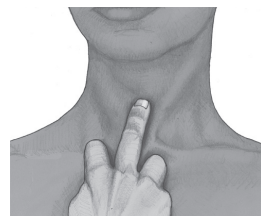


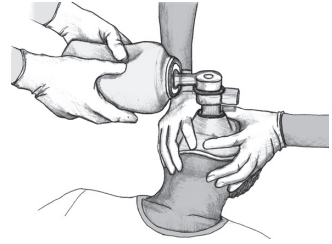
Figure 3.7

If not breathing and pulse not easily felt

- Start CPR — See Life support — DRS ABC
- Look for and treat reversible causes — tension pneumothorax, severe haemorrhage, hypoxia, hypothermia
- If many casualties — leave and manage other seriously injured people first (triage as deceased)

If unconscious with slowed/inadequate breathing but pulse easily felt

- Probably head injury
- Support breathing with bag-valve-mask — Figure 3.8 *OR* mouth-to-mouth with mouth guard
 - 15 breaths/min child, 10 breaths/min adult

**Figure 3.8****If having trouble breathing**

- Check airway still open
- Give **oxygen** to target O₂ sats 94–98% *OR* if moderate/severe COPD — 88–92%
 - Non-rebreather mask 10–15L/min *OR* bag-valve-mask at 15L/min, if skilled to do so
- Check again for serious chest injury
 - Tension pneumothorax
 - Sucking chest wound
 - Rib fractures, flail chest
- These are all **emergencies**. Treat as needed
 - Needle decompression
 - Seal sucking chest wound
 - Chest drain
 - Assist breathing (bag-valve-mask)

If breathing normally

- Give **oxygen** to target O₂ sats 94–98% *OR* if moderate/severe COPD — 88–92%
- See C – Circulation and controlling bleeding

C – Circulation and controlling haemorrhage (bleeding)

- Assess colour and temperature of skin
- Palpate a central pulse — femoral or carotid
- Assess central capillary refill
- **Look** for and **control** external bleeding
- Put firm pressure with hand or pad to stop bleeding — Figure 3.9
- If bleeding artery/vein
 - Try putting on pressure first
 - If ongoing bleeding — see figure of 8 sutures
 - If amputation or uncontrollable arterial bleeding in limb — use BP cuff tourniquet or military tourniquet if available
- Consider hidden bleeding — chest, abdomen, pelvis, long bones, back
 - If cause of shock not identified — stabilize pelvis first then log-roll on to side to check back for penetrating injury if not done before

**Figure 3.9**

- If evidence of pelvic fracture — stabilise pelvis
- Put in IV cannula, largest possible and start IV fluid, consider intraosseous needle if no IV access. Insert 2nd cannula if time
- Run fluids — fluid balance chart
 - ▶ Adult — **normal saline** as fast as possible
 - ▶ Child — **normal saline** bolus at 20mL/kg (doses)
 - ▶ Newborn — **normal saline** bolus at 10mL/kg (doses)
 - ▶ If you can't weigh child — check for recent weight in file notes *OR* use age
 - ▶ If drowning victim — use warm IV fluid

If no pulse and unresponsive

- If many casualties — leave and manage other seriously injured people first (triage as deceased)
- If no other seriously injured people — start CPR. See Life support — DRS ABC

Check ABC under control before starting D. If not — go back and restart resuscitation steps.

D – Disability — head and/or spinal injury

- Do rapid check for level of consciousness using **AVPU**. If only P or U — may need airway protection
 - ▶ **Alert** — eyes open, understanding, following commands, talking. Tell them not to move their head
 - ▶ **Voice** — not alert but responds to voice
 - ▶ **Pain** — responds only to pain - if only small response (eg low groan without opening eyes) — treat as unresponsive
 - ▶ **Unresponsive** — unconscious, not responding
- To test for pain response - apply for 15 seconds but no more than 30 seconds
 - ▶ Firmly squeeze muscle on top of shoulder with thumb and 2 fingers (trapezius squeeze) — Figure 3.10
 - ▶ *OR* press bony ridge along top of eye (supraorbital pressure) — Figure 3.11 — **do not** do this if they have facial fractures
- Check pupils — same size, do they react to light by constricting (getting smaller)
- BGL



Figure 3.10

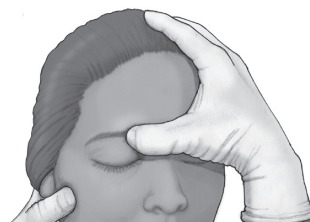


Figure 3.11

E – Expose and examine

- To check for significant injuries, take as much clothing off person as you can. Always protect dignity, respect culture and keep warm
- Start at top, work down and around, front then back. Look, feel, listen
- Only examine back if no other cause for breathing difficulty or shock found
- By end of primary survey you will have checked face, neck, chest, abdomen, pelvis (including genitals), arms, legs and back (if required) for immediate life-threatening injuries
- Check surface person is lying on
 - If very hot — can cause burns
 - If very cold — can cause hypothermia
- Cover with blanket or sheet

Secondary survey

- Don't start until ABC DE complete and no-one with more serious injuries
- Check **top** to **bottom**, **front** and **back** so you don't miss life-threatening injury
- Make notes of what you find as you go
- Always keep checking ABC D under control before moving onto next step

3 parts to secondary survey

- History
- Examination
- Treatment

History using DeMIST, AMPLE, PQRST

- Can be done at same time as examination
- Record what you are told by witnesses, what you see for yourself, what person tells you

Document (DeMIST)

- **D**escription of incident
- **M**echanism of injury
- **I**njuries sustained
- **S**igns and **S**ymptoms
- **T**reatment so far

Then ask questions (AMPLE)

- **A**llergies
- **M**edicines or current illness
- **P**ast history of illnesses, injuries, surgical operations, times in hospital
- **L**ast time they ate or drank
- **E**vent — what happened to cause the injuries (eg vehicle accident, burns)

To find out how severe a symptom is ask (PQRST)

- Provoking/Palliating factors — what makes it worse or better
- Quality — what is it like
- Region and Radiation — where is it, does it spread or stay in one place
- Severity — how bad is it
- Timing — when did it start, is it there all the time

Examination

- Calculate age appropriate REWS
 - **Adult** — AVPU, RR, O₂ sats, pulse, BP, Temp
 - **Child** (less than 13 years) — AVPU, respiratory distress, RR, O₂ sats, pulse, central capillary refill time, Temp
- Weight, BGL
- Head-to-toe exam
- **Look** — use eyes, torch, auroscope, ophthalmoscope
- **Listen** — with ears, stethoscope
- **Feel** — with your hands for injuries, percuss chest

Head (scalp) and face

- Symmetry
- Wounds, deformities, bruising, bleeding, swelling, depressions in bones
- Blood or fluid draining from ears or nose
- Feel for tenderness. Ask about pain, numbness and tingling
- Eyes and lids
 - Pupil reactions
 - Bleeding or bruising
 - Check vision with fingers and hands
- Mouth opening, teeth, tongue, jaw clench, tenderness
- Hoarseness or stridor
- Coma scale score

Neck

- Using in-line immobilisation, open cervical collar if used, inspect neck
- Wounds, deformities, bruising, swelling
- Large swollen (distended) neck veins
- Position of trachea — in middle of throat or pushed to one side
- Tenderness, especially midline at back
- Air under the skin (subcutaneous emphysema)
- Refit cervical collar as required by local protocols

Chest

- Breathing — RR and effort
- Chest movement — same on both sides, symmetrical rise and fall
- Wounds, deformities, bruising, swelling, depressions in bones
- Listen to chest sounds with stethoscope — is air coming into lungs properly on both sides
- ECG to exclude heart trauma

Abdomen

- Wounds, bruising or swellings on skin, swelling of whole abdomen (distension)
- Palpate for tenderness, rigidity, guarding — may be bleeding in abdomen

Pelvis, rectum, genitals — consider person's privacy and dignity

- **Do not** do vaginal or rectal exam unless skilled, know what to look for
- Wounds, deformities, bruising
- Bleeding from urethra
- Bleeding in or around scrotum, rectum, vagina
- Signs of pelvic fracture
- Man with priapism (erection) — could indicate spinal injury

Arms and legs

- Wounds, deformities, bruising, swelling
- Shortening or rotation of lower limbs — hip/pelvic fracture
- Tenderness
- Check peripheral pulses — Figure 3.12
- Temperature of limbs, hands and feet (hot or cold)
- Capillary refill
- Screen for sensory loss with light touch all peripheries

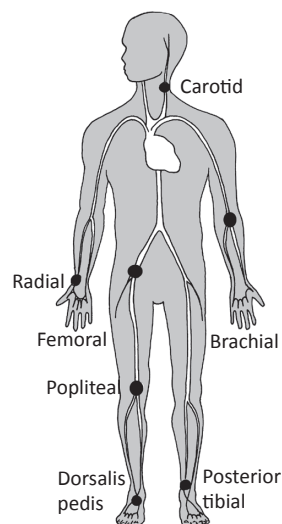


Figure 3.12

Back — if helpers to log-roll

- Log-roll to check back — take off clothes to see properly
- Wounds, deformities, bruising, swelling, depressions in bones
- Tenderness
- Bleeding from anus

Treatment

- Pain relief as needed, positioning, splints, analgesia
- Fluids — consider nil by mouth — check IV and fill in fluid balance chart
- Put in nasogastric tube if
 - ▶ Severe multi-trauma
 - ▶ Severe abdominal injury
 - ▶ Quadriplegia, paraplegia
 - ▶ Head injury
 - ▶ Child with air swallowing and abdominal distention
 - ▶ **Do not** put in if facial injuries or suspected fracture at base of skull (black eyes, bruising behind the ear, or blood or fluid draining from the ears or nose). Use orogastric tube after intubation
- Put in indwelling urinary catheter if
 - ▶ Fluid resuscitation needed
 - ▶ Immobilised or trouble voiding
 - ▶ Impaired level of consciousness
 - ▶ **Do not** put in if signs of urethral or bladder injury (eg blood in urethra, bruised scrotum)
- If needed — close wounds, dress wounds, splint injuries
- Record findings including Temp, pulse, RR, BP, O₂ sats, REWS, coma scale score, pupils, neurovascular observations, wounds. Get paperwork in order
- Monitor person. Use cardiac monitor and/or oximetry, if you have them
- Get person ready to send to hospital
 - ▶ Consider antiemetic for nausea, more pain relief
 - ▶ Tetanus prophylaxis if indicated
 - ▶ Consider antibiotics for compound fractures, facial fractures, base of skull fractures, wounds with lots of tissue injury or dirt — **medical consult**

Application of a military tourniquet



Used for

- Life threatening extremity bleeding that
 - Can't be immediately controlled with application of pressure
 - *OR* when providers have equally urgent competing priorities for persons care (eg loss of airway, severe limb haemorrhage)
- A crushed lower limb about to be released

Irreversible ischaemia time depends on comorbidities, duration of shock and extent of tissue trauma

Attention

- **Do not** place too close to the wound — severed artery may have retracted. Position at least 5cm from wound
- **Do not** place over a joint
- **Do not** cover with bandage, clothing or blankets

What you need

- One or two military tourniquets

What you do

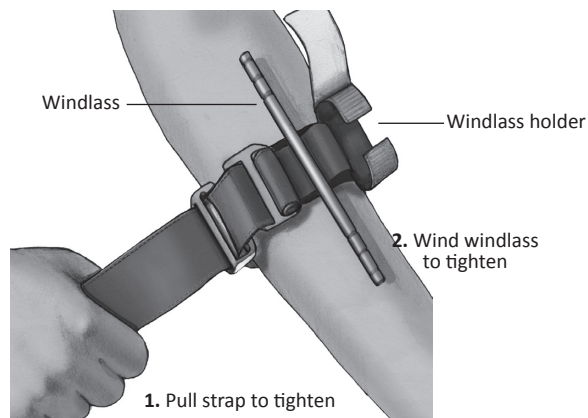


Figure 3.13

- Release windlass from its holder
- Roll out the velcro strap
- Pass velcro strap around limb at least 5cm proximal to the wound (between the wound and the heart)

- Feed strap fully through buckle and tighten
- Wind the windlass firmly then secure in its holder
- When the bleeding stops mesh velcro surfaces together and around the windlass in its holder
- Record time of tourniquet application
- Continue with primary survey — ABCDE
- Once you saved the life, try and save the limb — **medical consult**
 - If help at hand *AND* vascular access secured and stabilised — when bleeding stopped, pack wound tightly and straighten fractures so that a trial of tourniquet release can be made
- Provide appropriate analgesia
- Arrange evacuation
- **Medical consult** about
 - Plan to release tourniquet if transport times go beyond 2 hours
 - Antibiotics
- Regularly and frequently recheck for haemorrhage as well as the tourniquet's tightness and position
- Keep injured part in view — not concealed under blankets as further haemorrhage may go unnoticed
- If tourniquet placed for release of a crushed lower extremity, keep securely in place until right conditions for advanced resuscitation — CPR, intubation, IV fluids and monitoring

Keeping airway open and assisting breathing



- **Emergency life-saving procedures** to keep person's airway open when unable to maintain it themselves (eg unconscious or semiconscious)
- **For newborn** — see Newborn resuscitation (WBM)

Open, clear and maintain airway

What you need

- Suction equipment
- Oropharyngeal airway
- Nasopharyngeal airway
- Oxygen equipment with non-rebreather or ordinary face mask

Open airway

- **Do not** delay log roll if vomit or debris in mouth — log roll and clear mouth immediately — if proficient use HAINES roll
 - In an unconscious person — clearing blocked airway takes priority over protecting spine
- For unresponsive adult or child — open the airway using the head tilt-chin lift — chin lift preferred in trauma, head tilt may damage spinal cord
- For an infant, open airway — placing head in neutral position and lift jaw (jaw thrust)



Figure 3.14

Head tilt/Chin lift

- Place one hand on the forehead. The other hand is used to provide Chin Lift. The head (not the neck) is tilted backwards. Grip chin and gently lift it up — Figure 3.14



Figure 3.15

Jaw thrust

- Hold jaw at point under both ears, push upward and forward until chin juts out and airway opens — Figure 3.15

Infant in neutral position

- Head may be tilted backwards very slightly with a gentle movement — Figure 3.16

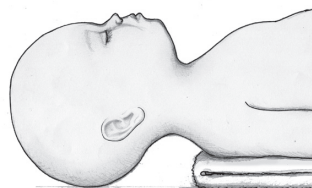


Figure 3.16

Clear airway

Passive

- If breathing normally and no risk of spinal injury — put unconscious person in recovery position to help protect airway — Figure 3.17. Rest person's head on extended arm to help neck alignment



Figure 3.17

Finger sweep

If unconscious person vomits or debris in the mouth

- First roll onto side
- Use something tough (eg bite block) between molars if available
- Only do finger sweep if
 - ▶ Person unconscious
 - ▶ Suction or long-nose or angled forceps not available
 - ▶ Debris obvious and close to opening of mouth — **do not** finger sweep if debris not visible
- With gloves on, use 2 fingers to gently clear person's mouth of dirt, vomit, broken teeth, loose dentures (leave well fitting ones in place)
- Be careful not to push anything further back and block airway

Suction

- **Do not** touch back of throat — this can make person vomit
- If you have suction equipment — put Yankauer sucker at side of person's mouth. Suck out any fluid — be careful not to damage teeth, tongue, back of throat

Keep airway open

Attention

- **Do not** use nasopharyngeal airway if
 - ▶ Broken nose or cheekbones
 - ▶ Bruising behind ears, blood and/or clear fluid coming from ears or nose, any signs of skull fracture — consider how person was injured
- Choose type of airway to use
 - ▶ Oropharyngeal airway — only used for unconscious person
 - ▶ Nasopharyngeal airway — better for semiconscious person

What you do

Oropharyngeal airway

Choose right sized airway. Should reach from front teeth to angle of jaw — Figure 3.18, or corner of mouth to earlobe

- **For adults**

- ▶ Open mouth and gently push airway in upside down with tip pointing up
- ▶ Push airway back along roof of mouth, turn it over to slip the rest of the way over tongue — Figure 3.19

- **For small child (under 8 years)**

- ▶ Use wooden spatula to push tongue down, gently push airway straight in

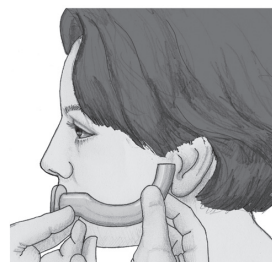


Figure 3.18

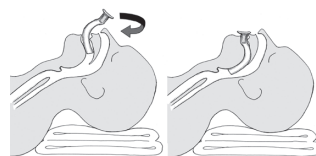


Figure 3.19

Nasopharyngeal airway

- Choose right sized airway. Measure from tip of nostril to angle of jaw (or front of ear lobe) — Figure 3.20
- Approximate sizes
 - ▶ Average height woman/short man — size 6
 - ▶ Average height man/tall woman — size 7
 - ▶ Tall person — size 8



Figure 3.20

Inserting airway

- **If needed put safety pin through flange** (or tie piece of long, thin string or tape under flange) to stop airway falling back into nose once in place
- Lubricate airway — can use persons saliva
- Gently push tip of airway straight back into biggest nostril
- Push along base of nose and into back of throat until flange and safety pin rest against nostril — Figure 3.21. Don't push upward
 - ▶ If resistance — take out and try other nostril

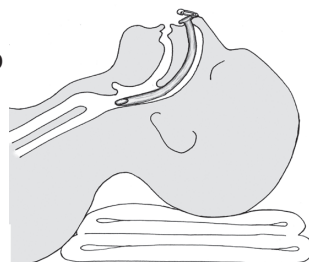


Figure 3.21

Assisting breathing

Sniffing position — Figure 3.22

- Extends head and flexes neck
- Take care if cervical spine could be damaged
- Cushion from shoulder to occiput (back of head)
- Ear canal level with sternal notch
- Support the head by chin lift or put finger against the chin

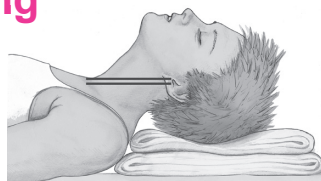


Figure 3.22

Ear canal in line with sternal notch

Giving oxygen

Attention

- If in shock give high flow oxygen – 15L/min non-rebreather mask
- In other cases only give oxygen to target O₂ sats 94–98% *OR* if moderate/severe COPD 88–92%
- Take care not to give too much oxygen — may cause harm

Mask

- Use mask for oxygen delivery for all trauma and severely ill people
- Choose right sized mask for person's face. Person will get less oxygen if mask doesn't fit well
- **Non-rebreather mask** with reservoir bag
 - Keep adult and paediatric non-rebreather masks in emergency pack
 - Give **oxygen** at 15L/min adult, 10–15L/min child, 10L/min infant. Mask won't work properly if rate lower
 - Reservoir bag must be filled before you put mask on face
- **Oxygen mask** — simple face mask, *Hudson* mask
 - Give **oxygen** at 5–10L/min

Remember: Non-rebreather masks need higher flow rates — consider how much oxygen you have, how many people need it, how long it will last

Bag-valve-mask — manual ventilation

Attention

If not used properly bag-valve-mask will not give enough oxygen. If you are not confident about using this equipment — do mouth-to-mask or mouth-to-nose resuscitation at 15 breaths/min

- Bags come in 3 sizes — adult, child, preterm. Clinics need all 3
- Mask must
 - Fit firmly around nose, chin, sides
 - Not leak when bag squeezed
- Best with 2 operators — second person can get a better fit/seal with mask

- Reservoir bag will only inflate (fill up) with high-flow oxygen. Fill reservoir bag first
 - ▶ Give **oxygen** at 12–15L/min for adult, 8L/min for child, 3L/min for infant

What you need

- Helper
- Oropharyngeal or nasopharyngeal airway in place
- Oxygen equipment with tubing connected
- Suction equipment with rigid nozzle (eg Yankauer sucker)
- Correct size mask and bag

What you do

- **Clear and open airway**
- If person unconscious — put in oropharyngeal or nasopharyngeal airway
- Select correct sized mask — Adult 4 or 5, child 3, infant 00 or 0/1 or 2

1 operator

- If using oxygen — connect tubing to bag and turn on **oxygen** at 15L/min adult, 8L/min child, 3L/min infant
- Stand/sit/kneel at top of person's head
- Put head in sniffing position to open airway
- Hold bag in dominant (main) hand. Put mask over face with other hand
- Keep index finger and thumb on mask. Hold under jaw with last 3 fingers — Figure 3.23
- Try to keep seal all around mask
- Squeeze bag — watch **to make sure person's chest rises with each squeeze**. If any problem — check airway, head position, equipment
- Ventilate at 15 breaths/min. Count slowly to get this right (eg 1 — and 2 — and 3 — etc)
 - ▶ Don't go too fast, don't overfill lungs

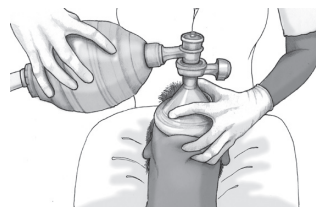


Figure 3.23

2 operators

- As above, except 1 person uses both hands to hold mask on and keep airway open, and other squeezes bag — Figure 3.24

If further assistance needed **AND** person

unconscious — see Advanced airway management

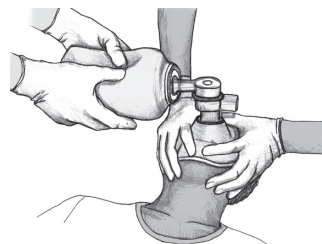


Figure 3.24

Advanced airway management



Advanced airway management skills are needed. Person must be unconscious for all these procedures

Laryngeal mask airway (LMA)

- Used for unconscious person to make sure they have enough oxygen or as alternative to endotracheal intubation
- 2 types of LMAs available
 - ▶ Gel cuff — **preferred if available**
 - ▶ Inflatable cuff
- Should take no more than 30 seconds to put in — about as long as you can hold your breath
- Can be done by 1 person
- In unconscious person, replace oropharyngeal/nasopharyngeal airway with LMA if
 - ▶ Obstructing despite positioning and simple airway opening manoeuvres
 - ▶ *OR* able to ventilate but remains in coma

Attention

Risks of using LMA

- If not unconscious — may cause gagging, vomiting or spasm of larynx (rare)
- Doesn't fully protect against aspiration
- If tube is in wrong place — fills stomach with air
- Can be dislodged accidentally — needs constant monitoring
- If trauma, protect cervical spine when putting in the LMA — **airway comes first**
- Remember support inadequate ventilation with bag-mask-valve ventilation

Positioning head

- Put head in neutral position — Figure 3.25
 - ▶ *OR* sniffing position

If cervical spine injuries suspected — take great care when positioning head



Figure 3.25

- When inserting LMA — support head in neutral position — see Manual in-line immobilisation
- Once airway adequate/secure put on cervical collar
- Reassess airway

Gel cuff technique

There are several brands, become familiar with yours. The technique for all brands of gel cuffs is the same. Inflatable cuff LMA's — refer to manufacturers instructions.

What you need

- 1–2 helpers if available
- Person on oxygen by non-rebreather mask with monitoring attached
- Rigid sucker attached to tubing within reach and turned on
- Flexible suction tubes within reach
- Bag-valve-mask with oxygen connected
- Right size disposable LMA
- Water-based lubricant
- Adhesive tape to secure LMA to face (eg 2.5cm brown *Elastoplast*)
- Stethoscope
- End tidal CO₂ detector if available

What you do

- Select LMA. Suggested size guide
 - ▶ Size 5 — adult large (more than 70kg)
 - ▶ Size 4 — adult normal (51–70kg)
 - ▶ Size 3 — adult small (30–50kg)
 - ▶ Size 2 — child (5–29kg)
 - ▶ Size 1 — neonate (less than 5kg)
- Apply a thin smear of lubricant to both surfaces of the cuff
- Pre-oxygenate for 2 minutes with firmly applied bag-valve-mask *OR* non-rebreather mask
- Open the mouth with your non-dominant hand
- Hold LMA by stem so opening faces tongue — Figure 3.26
- Push the LMA along hard palate and down until it stops — may be a slight give as it slides into final position
- Tip of mask is now seated in upper oesophageal sphincter above the larynx — Figure 3.27

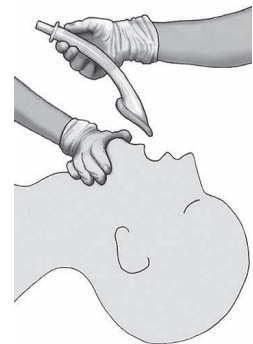


Figure 3.26

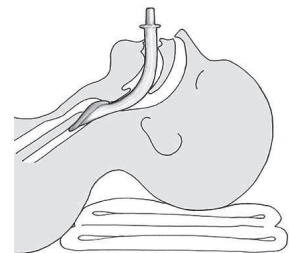


Figure 3.27

- Attach CO₂ detector between tube and bag -valve-mask unit if available
- Connect bag-valve-mask to tube with **oxygen** running at 12–15L/min
- Deliver assisted breath
- Listen with stethoscope over lungs and epigastrium, watch chest wall to see if it expands on inflation
- If stomach gurgles, chest doesn't expand — LMA is in wrong place
 - Pull it out
 - **Hyperventilate with oxygen by bag and mask for at least 1 minute before trying again**
- Secure to face with tape. Skilled operator must keep hands on LMA until securely taped
- Continue manual bag-valve-mask ventilation unless person is breathing well for themselves

Intubation — with endotracheal tube

- Only used when person **unconscious**, airway obstructed and can't be established by other methods including simple airway opening manoeuvres or LMA
- Needs 2 or more trained practitioners

Attention

- You need a helper to do this procedure
- Putting in endotracheal tube **should take approximately 20 seconds but no more than 30 seconds** — about as long as you can hold your breath
- **Always double check that tube is in right place** — if it isn't person can quickly die

Risks of intubation include

- Oesophageal intubation and death if not fixed quickly
- Tube dislodgement and occlusion resulting in death if not fixed promptly
- Right main bronchus intubation which results in left lung collapse and underventilation
- Regurgitation and aspiration
- Chipped or dislodged teeth
- Bruised lips

Cricoid pressure can be used to help prevent regurgitation of stomach contents. Only use if asked to by person doing procedure

If cervical spine injuries suspected — take great care when positioning head

- Helper must support head in sniffing position
- Limit movement of head and neck — see Manual in-line immobilisation

What you need

- 1–2 helpers if possible
- Person on oxygen by non-rebreather mask with monitoring attached
- Rigid sucker attached to tubing within reach and turned on
- Flexible suction tubes within reach
- Bag-valve-mask with CO₂ detection device fitted and oxygen connected
- PEEP valve fitted to bag resuscitator if available (start at 3–5mmHg or cm of H₂O)
- Laryngoscope — usually a size 3 or 4 curved blade, sometimes straight blade for children. Check that light is bright
- Endotracheal tube of correct size

A quick way to choose size is to match to diameter of person's little finger

- Women — 7.0–7.5mm id (internal diameter)
- Men — 8.0–8.5mm id
- Children — $(\text{age} \div 4) + 4$ (for uncuffed tubes — reduce by a half size for cuffed tubes)
- Disposable introducer stylet to stiffen tube (recommended)
- 10mL syringe
- Long-nose/Magill forceps (may be needed)
- Water-based lubricant
- Cloth tape long enough to tie around tube then around base of head
- End tidal CO₂ detector if available
- Oropharyngeal airway
- Stethoscope

What you do

- Position sucker within reach of right hand
- Put in lubricated stylet within ETT. Ensure it is 15mm short of the leading edge of ETT and not poking through — kink it over at top to stop it slipping in too far
- Test cuff then fully deflate
- Lubricate cuff
- Test blade light
- Attach oximeter, rhythm monitor, BP cuff
- Attach nasal prongs for apnoeic oxygenation at 15L/minute (only if there are two oxygen sources)
- Put head in sniffing position
- In trauma ask helper to support head — see Manual in-line immobilisation
- Pre-oxygenate for 2 minutes with firmly applied bag-valve-mask *OR* non-rebreather mask

- Turn on sucker
- If using cricoid pressure ask skilled person to apply until cuff inflated
- Remove oropharyngeal airway
- Open person's mouth using fingers of right hand
- Hold laryngoscope in left hand, put blade into right side of mouth, push tongue to left
- Advance toward base of tongue, at the same time push lower lip away from blade with finger

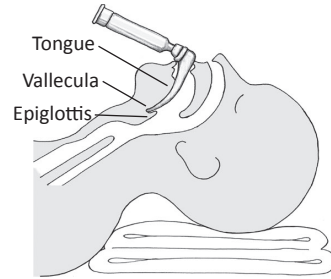


Figure 3.28

- **Using curved blade**
 - ▶ Slide tip of blade into groove between base of tongue and pharyngeal surface of epiglottis (vallecula) — Figure 3.28
- **Using straight blade** — cover the epiglottis with the blade
 - ▶ Maintain angle of 45° to horizontal, lift to expose glottic opening. **Do not** tilt against teeth for leverage
- Should be able to clearly see vocal cords — Figure 3.29
- If you can't see vocal cords — try **BURP** (Backward Upward Rightward Pressure) on thyroid cartilage
- If you still can't see vocal cords — **do not** put in tube
 - ▶ Stop procedure, continue bag-valve-mask ventilation, re-adjust positioning
- Put in endotracheal tube from the right side of the mouth until you see cuff pass between vocal cords
 - ▶ In average-sized adult, between 19–23cm at front teeth
- Remove laryngoscope while holding tube — heel of hand stabilised on person's cheek
- Remove introducer while holding tube
- Inflate cuff with just enough air (5–10mL) to seal it within person's airway
- Attach bag resuscitator

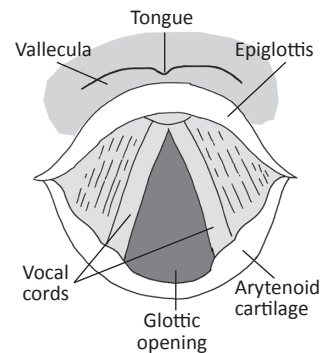


Figure 3.29

- Holding ETT in position with heel of your hand resting softly on the person's cheek, give several breaths and confirm placement by observing for chest rise and fall, fogging of the ETT and CO₂ detection by colour change (colourimetric device) or waveform
- Hold tube until it is tied in
- Ventilate — **oxygen** running at 12–15L/min — Figure 3.30
- Ensure CO₂ detector between ETT and bag resuscitator
- Look for
 - ▶ Chest movement
 - ▶ Rectangular CO₂ trace
 - ▶ *OR* if using a colourimetric detector — cyclical colour changes from purple to yellow to purple with ventilation
- Listen for
 - ▶ Air entry over top of both lungs (apices)
 - ▶ Gurgling at epigastrium (tube in the oesophagus)
- Use enough **oxygen** to maintain O₂ sats at 94–98% *OR* if moderate/severe COPD 88–92%
- If stomach gurgles *OR* no CO₂ or colour change *OR* chest doesn't expand — tube is in wrong place
 - ▶ Use suction with large soft catheter through endotracheal tube to suction out air and fluids then deflate cuff and pull out
 - ▶ **Give oxygen by bag-valve-mask for at least 1 minute before trying again**
- If no gurgling and chest expands
 - ▶ Listen to top of both lungs to check for air entry
 - ▶ If only 1 side of chest inflating — release air from cuff, pull tube back 1–2cm and reinflate
 - ▶ Listen again
- Release cricoid pressure
- Recheck position of depth marker, tie tape around tube then around base of head to secure
- Continue manual ventilation with bag and mask as per CPR schedule

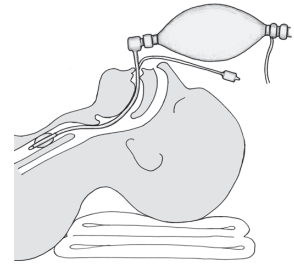


Figure 3.30

Emergency cricothyroidotomy — mini-tracheostomy

For wide bore airway over trocar device eg Quicktrach *OR* Cricothyroidotomy with scalpel

Finding the cricothyroid membrane

- Cricothyroid membrane is below thyroid cartilage (Adam's apple) and above cricoid cartilage — Figure 3.31, Figure 3.32
- Practice on yourself
 - ▶ Put finger on Adam's apple and swallow to feel it go up and down
 - ▶ Now slide your finger down to just below Adam's apple — Figure 3.33
 - ▶ Small dip here indicates cricothyroid membrane. Pressure is uncomfortable and you may want to cough or gag

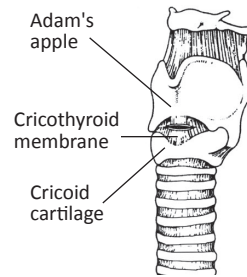


Figure 3.31

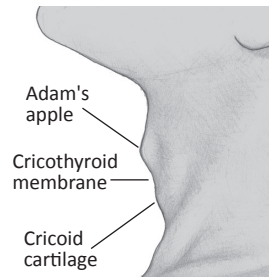


Figure 3.32

Mini-tracheostomy — cricothyroidotomy with trocar kit

Attention

- Use for children over 5 years and adults
- Follow the instructions related to the product you are using
- If you have a kit make yourself familiar with it before the need arises
- Device is made to fit a bag-valve-mask unit
- For **puncture site** — see Finding the cricoid membrane
- Be ready for moderate soft tissue resistance when advancing airway catheter
- Do not delay to apply antiseptic or clean site if unconscious

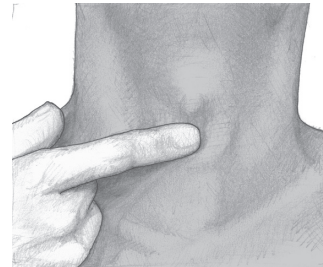


Figure 3.33

What you need

- Mini-tracheostomy kit — Figure 3.34
 - ▶ Needle trocar cannula unit
 - ▶ Scalpel
 - ▶ Suction catheter
 - ▶ Adaptor
 - ▶ Tape
- 5mL syringe
- Normal saline
- Pulse oximeter

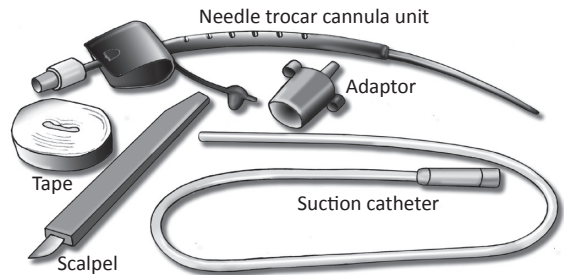


Figure 3.34

What you do

Prepare patient and kit

- Hyperextend neck with the head over the end of the bed or rolled blankets under the shoulders
- If kit contains cuffed unit — fully deflate
- Draw up 2mL saline in a 5mL syringe and attach to needle trocar cannula unit if time permits (filling the 5ml syringe with 1–2mL of saline will allow you to see air bubbles when the airway is entered)
- Hold set in dominant hand
- Stand beside person so windpipe is held between non-dominant thumb and middle fingers
 - ▶ If right handed, stand on left of the person

Mini-tracheostomy

- Locate cricoid membrane from below with non-dominant index finger
 - ▶ Aiming towards feet, puncture the membrane at 60–90° and aspirate air (bubbling)
 - ▶ Advance the needle cannula unit 10–12mm at 45° while aspirating air
 - ▶ Hold the persons head, neck and shoulders firmly
 - ▶ Slide the airway cannula over the needle trocar into the trachea
- Hold airway cannula in position with non-dominant hand and remove trocar needle
 - ▶ Inflate cuff if present
 - ▶ Attach adaptor
- Attach bag-valve-mask and ventilate slowly (every 6 seconds — watch for chest rise and fall)
 - ▶ Monitor for rising oxygen saturation
 - ▶ Secure with strap provided or tape
 - ▶ Elevate head to 30° unless blood pressure is low

Cricothyroidotomy with scalpel

Use for children over 12 years and adults

Use when no other way to keep airway open *AND* person **unconscious**

Attention

- **Do not** use if person under 12 years old — unless needle cricothyroidotomy and jet ventilation fails
- **Do not** delay to apply antiseptic or clean site
- For **incision site** — see Finding the cricoid membrane
- Average adult carina (end of trachea) is only 9cm below cricoid membrane — put in tube to about 6cm

What you need

- Gloves
- Goggles
- Scalpel — preferably size 10
- Airway device — tracheostomy tube *OR* Mini Trach tube *OR* size 6 ETT, *OR* prepared oxygen tubing or other firm tubing
 - Can use oxygen tubing as alternate airway by cutting the end off and cutting a small hole about 15cm from the end
- Padding to hyperextend neck
- Artery forceps
- Oxygen tubing and bag-valve-mask
- Pulse oximeter

What you do

- Prepare airway device
- Hyperextend the neck — position head off the end of the bed or pillow under shoulders
- Stand beside — preferably with non-dominant hand towards person's feet
- Locate cricoid membrane with non-dominant index finger, either holding trachea (from below, preferred) — or Adam's apple (from above) — swap sides to hold Adam's apple
- **Do not** let go until airway established
- In one movement, with blade directed horizontally across trachea, stab cricothyroid membrane and drag (cut) toward you 20mm — Figure 3.35
- Widen opening with artery forceps — Figure 3.36 or gloved little finger



Figure 3.35

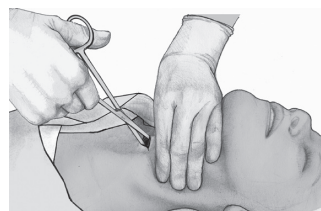


Figure 3.36

- Put in airway aiming toward feet — stabilize your hand on person's chest and **do not let go of tube** for anything
- Give **oxygen** at 15L/min
 - If using tracheostomy tube, ETT, *Mini Trach* tube — attach bag-valve
 - If using prepared oxygen tubing — attach to oxygen source
- Jet ventilation with oxygen tubing
 - Thumb over hole for 1 second on — 6 seconds off
- Check O₂ sats with pulse oximeter
- Person may require sedation as they start waking up — be prepared

Supporting resources

- Airway-LMA insertion iGel instructional video
- Needle cricoidotomy and jet ventilation instructional video

Chest procedures



Sealing a 'sucking' chest wound

Emergency life-saving procedure to manage chest cavity with open wound

Attention

- **Do not** use gauze or combine to seal wound, may cause tension pneumothorax
- Never take out object that is sticking into chest (eg knife, spear)
- Person will need
 - IV cannula
 - **Oxygen** to target O_2 sats 94–98% *OR* if moderate/severe COPD 88–92%
 - Probably a chest drain

What you need

- Sterile gloves
- Piece of thin, flexible, waterproof paper or material a bit bigger than wound (eg *Op-site* or defibrillator pad packet, thin strong paper)
- Tape

What you do

- Put on sterile gloves
- Cover wound with waterproof paper and seal well with tape on 3 sides, leaving bottom edge free — Figure 3.37
 - Forms vacuum seal around wound when person breathes in but lets air in chest cavity escape when person breathes out
 - Allows blood to drain from wound
- If object sticking into chest — bandage to make firm and secure but still open on one side
- Watch for tension pneumothorax

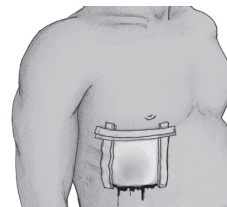


Figure 3.37

Needle decompression of tension pneumothorax

Emergency life-saving procedure to let out air trapped in chest cavity when lung collapsed. Makes breathing easier and improves BP

Need to act very quickly

Attention

If/when plastic cannula blocks the tension pneumothorax can come back. Put in new cannula as needed, close to the original position

Look for

- **Signs of injured side of chest (localising signs)**
 - ▶ Tenderness, bruising, crepitus/crackling on palpation
 - ▶ Hollow sound when tapping
 - ▶ Reduced air entry, reduced movement
 - ▶ Trachea (windpipe) has moved away from this side (deviation). Often hard to see/feel
- **Generalised signs**
 - ▶ Severe shortness of breath
 - ▶ Person very frightened
 - ▶ Diaphoretic (heavy sweating)
 - ▶ Bulging of neck veins — late sign
 - ▶ Severe shock — pre-terminal sign
 - ▶ Cardiac arrest with pulseless electrical activity (PEA) — terminal sign

What you need

- Gloves (sterile not necessary — life-threatening problem)
- Alcohol wipes
- 14G non-retractable cannula (several)
- 20mL syringe (optional)

What you do

- If person conscious — explain procedure
- Leave person in position they find most comfortable
- Give **oxygen** to target O₂ sats 94–98% *OR* if moderate/severe COPD 88–92%
 - ▶ Non-rebreather mask 10–15L/min
- Find site for needle — space between second and third ribs (intercostal space) in mid-clavicular line — Figure 3.38

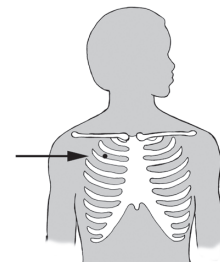


Figure 3.38

- Clean site with alcohol wipe
- Put in cannula to full length at 90° to chest wall and just above upper edge of third rib (to avoid neurovascular bundle) — Figure 3.39
- Can use 20mL syringe attached to cannula needle.
 - Allows release of air on entry to pleural space
- If air doesn't whoosh out when you put needle in
 - Make sure you are in injured side. See signs of injured side of chest above
 - If confirmed in the injured side — try another location closer to armpit (laterally) in same rib space
- Remove metal needle, leaving plastic cannula in place. Shouldn't need to be taped
- Check breathing regularly to make sure it is improving
- Put in proper chest drain as soon as possible. Leave cannula in until then

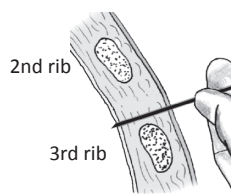


Figure 3.39

Chest drain

Intercostal chest drain lets out air or blood trapped in chest cavity and makes breathing easier

- Use after doing needle decompression
- If person stable, can be delayed until help arrives

Attention

- **Never** use big metal trocar that comes with chest drain to make hole in chest
- Always put drain into chest by going directly above **top** of lower rib. There are blood vessels and nerves along bottom of ribs
- If haemothorax — blood may come down drain tube as well as air

What you need

- Helper
- Marking pen
- Sterile dressing pack
 - Sterile gloves
 - Sterile gauze
 - **Povidone-iodine** or **chlorhexidine** in alcohol antiseptic solution
 - Sterile towels/drapes
 - Sterile scalpel
 - 10mL syringe and long 23G needle
- 2 ampoules (10mL) of **lidocaine (lignocaine) 1%** + **adrenaline (epinephrine) (1:100,000)**

- 2 long artery forceps (eg large *Kelly* haemostats)
- Intercostal drain plus
 - Heimlich valve *OR* underwater seal device
 - Suture set with 3.0 silk/nylon/prolene for skin closure
 - Strong suture for securing tube — size 1 mersilene or size 2 silk
 - Vented urine/fluid collection bag, set and tubing
 - 2 large clear dressings
- **Intercostal catheter.** Size guide — use smaller size for draining air, larger size for draining blood/fluid
 - Newborn 8–12G
 - Infant 12–16G
 - Child 16–24G
 - Adolescent 20–32G
 - Adult 28–32G



Figure 3.40

What you do

- If person conscious — explain procedure
- Position person, supported by pillows with hand behind head on injured side to expose as much of chest and axilla (underarm) as possible — Figure 3.40
- Attach available monitoring equipment (eg BP, ECG, O₂ sats) put in IV cannula
- Give **oxygen** to target O₂ sats 94–98% *OR* if moderate/severe COPD 88–92%
 - Non-rebreather mask 10–15L/min
- Painful procedure — give morphine IV as analgesic and sedative
- Mark site with marking pen — Figure 3.41
 - Fourth or fifth intercostal space just anterior (in front) of mid-axillary line (lower middle of armpit)
- Count rib spaces at front and follow them backward to mid-axillary line with finger. Fourth space is about 3 finger widths below armpit, above level of nipple — Figure 3.41
- Lay out equipment — **not** metal trocar
- Use forceps to clamp tube closed at far end
- Open Heimlich valve, check which end connects to intercostal drain — it is marked Figure 3.42 *OR* prepare underwater drain following manufacturer instructions

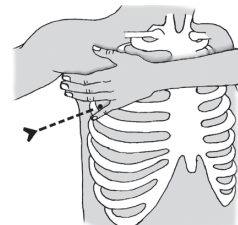


Figure 3.41

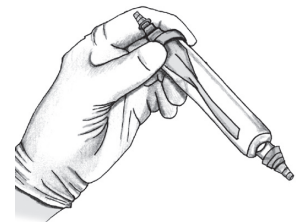


Figure 3.42

- Clean site, drape with sterile towels if possible
- Infiltrate with 10mL (adult) **lidocaine (lignocaine) + adrenaline (epinephrine)** with needle and syringe. Aim to anaesthetise area in intercostal space about 4–6cm wide
 - ▶ Give in 2 lots, checking for withdrawal of blood each time
 - ▶ Give 5mL just under skin
 - ▶ *THEN* give 5mL along top edge of rib below (to avoid neurovascular bundle) — Figure 3.43, Figure 3.44
 - ▶ When air aspirated you have reached pleural cavity
 - ▶ Begin infiltrating as you withdraw needle slowly so anaesthesia includes pleura

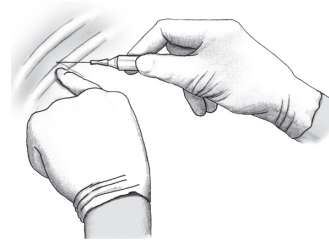


Figure 3.43

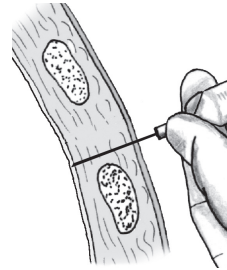


Figure 3.44

Remember: Anaesthetic takes a few minutes to work

To put in drain

- Use scalpel to make 3–5cm incision through skin, above and parallel to rib below — Figure 3.45
- Use artery forceps to blunt dissect. Open and close against muscle to separate tissue down to pleura — Figure 3.46
 - ▶ Support forceps so you are not too forceful — Figure 3.47

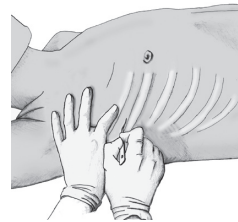


Figure 3.45

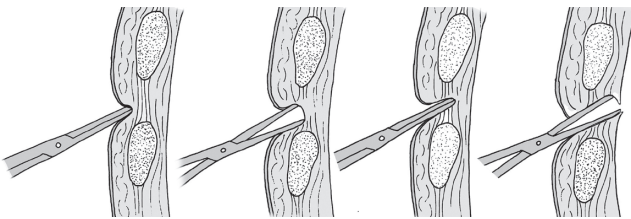


Figure 3.46



Figure 3.47

- ▶ Will feel a pop and change in resistance as you enter pleural cavity
- ▶ Open forceps in all directions to enlarge hole

- Replace forceps with gloved finger — Figure 3.48
 - ▶ Sweep finger around gently in all directions to clear away any tissue — Figure 3.49
 - ▶ Make sure you are in chest cavity by feeling the inside surface of ribs with fingertip. You may or may not feel the lung against your finger
- Guide tip of tube in beside gloved finger and aim drain up toward top of lung. Use forceps to help — Figure 3.50
- Push drain **at least** 2cm past last hole seen in tube. More if person has more fat

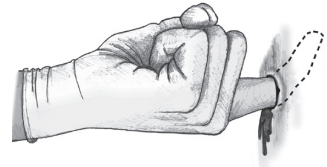


Figure 3.48

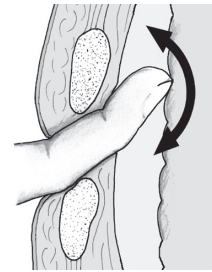


Figure 3.49

To connect Heimlich valve or underwater seal

- Look for fogging in tube this is a good sign
- Connect Heimlich valve *OR* underwater seal
- Release forceps clamping end of tube
- Check for valve flapping *OR* bubbling/swinging of water
- Collect blood or fluid in vented urine/fluid bag
 - ▶ Leave bag vent open to allow draining air to escape. If no vent — cut small hole at top

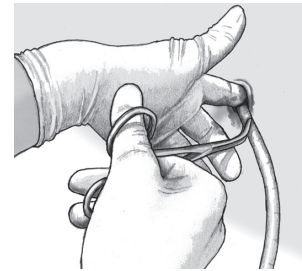


Figure 3.50

To make drain secure

- Close wound each side of drain with interrupted sutures
 - ▶ Tie long ends of suture material firmly around tube to hold in place. **Do not** use purse string suture
 - ▶ *OR* suture tube in place with separate 1.0/2.0 silk or polyester (eg *Mersilene*) stitch 1cm from wound edge. Tie knot compactly, tight enough to indent tube
 - Cover with see-through dressing
 - Make sure tube not kinked
 - Check valve still flapping *OR* water still bubbling/swinging
- Re-expanding lung is painful. May require extra morphine now

Immobilising the spine



Generally accepted that immobilising spine during treatment, movement or transfer will stop more damage to existing injuries (eg broken neck or spine) — but limited evidence that immobilisation alters outcomes. If trying to immobilise spine gets in the way of other activities (eg maintaining airway) — delay immobilisation

Immobilise spine

- Any time there is suspicion of spinal injury *OR* if trauma and any of the following —
 - ▶ Limb weakness, numbness, tingling (neurological concerns)
 - ▶ Reduced coma scale score
 - ▶ Mid-line cervical spine tenderness
 - ▶ Painful injury that may mask (distract from) spinal injury - if evidence of spinal injury
 - ▶ Intoxication (unless person is resistant) - if evidence of spinal injury

No need to immobilise spine

- For extraction from vehicle if alert and cooperative, no neurological symptoms and person able to get out by themselves, even if they have minor head wound or neck discomfort— reassess once they are out
- Stab or gunshot wounds to head or neck, but no signs of spinal injury

Attention

- Immobilised person cannot look around and cannot sit up or roll over to vomit — requires constant vigilance, never left alone, suction always ready, ensure they can see your face when communicating
- Consider lateral trauma position as a safer alternative to supine especially if on your own or during transport
- Back boards and scoop stretchers are for extrication only – remove as soon as possible to prevent pressure injury, especially in patients with paralysis or intubated patients

Manual in-line immobilisation

Attention

- **Keep head and neck in-line with spine at all times**
- Ask helper to look after person and their head, even after collar on and/or immobilised by straps
 - Give reassurance
 - Monitor breathing and level of consciousness
 - Person may become unstable or vomit
- Make sure back pockets are empty, nothing caught under person
- Mind your back when lifting, bend your knees
- Read manufacturer's instructions, practise using boards and stretchers
 - Many types of stretchers
 - For scoop stretcher — know how to make leg support longer or shorter, take 2 halves apart, put back together

What you need

- Helpers
- Light-weight cushioning or rolled towels to support head
- Folded blankets, sheets, towels etc for extra padding
- Cervical collar, measured for right size
- Scoop stretcher or immobilisation board
- Triangular bandages. Use ordinary ones if you have nothing else



Figure 3.51

What you do

- Apply collar — see below
- Log-roll onto side, check back, put board/stretcher under person, log-roll onto back on board/stretcher
- Put light-weight cushioning or rolled towels either side of head
- **Secure person so their body can't move in any direction**
- **Do not** restrict breathing, cut off blood or nerve supply to hands or feet, flatten IV lines etc
- Straps secured to board/stretcher, firm but not tight
- Strap body, with arms across chest, **before** strapping head
- Fix chin strap across collar's rigid frame and secure to board/stretcher — Figure 3.51
- Unstrap forehead **before** making any changes to torso position
- Always tie feet together before strapping rest of legs
- When board/stretcher picked up, check there is no movement of person or loosening of straps
- Remove rigid back board on transferring to a mattress — ambulance or clinic

Taking off crash helmet

Attention

- Airway **always** takes priority. Need to remove helmet to fully assess and maintain airway, assess head and neck
- **Note:** Some emergency services have a policy of not taking off helmets before person reaches hospital unless there is no airway

What you need

- Helper 1
- Helper 2

What you do

- Lie person flat on back if you can
- Tell person what you are doing

Helper 1

- Keep head still with
 - Knees on either side of head
 - Hands on either side of helmet with fingers hooked lightly underneath — Figure 3.52

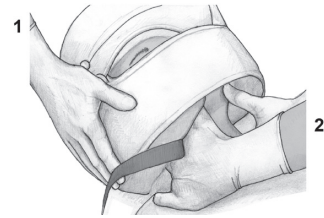


Figure 3.52



Figure 3.53

Helper 2

- Cut or undo chin strap
- Put thumbs on upper jaw with fingers around back of lower head (not covered by helmet), stabilise head — Figure 3.52
- Be prepared for weight of head, don't let head drop back when helmet comes off

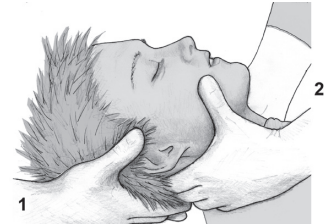


Figure 3.54

Helper 1

- If person wearing glasses — let go of helmet and take glasses off
- Grip helmet under lower edge on either side, very gently expand it outward
- At same time tilt helmet forward slightly (to pass over back of skull) and use backward and forward movement to 'walk' helmet over nose and off head — Figure 3.53
- Be very gentle, it may take some minutes to remove helmet
- **Helper 1** takes over from **Helper 2** — Figure 3.54, manually immobilises neck in in-line position — Figure 3.55



Figure 3.55

Measuring and putting on cervical collar

Emergency procedure to prevent further damage to cervical spine (neck) after trauma

Collars are packaged flat, need to be made up into circular band. Can look confusing when you are stressed. Measure and put on cervical collars as part of your routine emergency practice

Use collar type currently recommended in your jurisdiction

Attention

- **Make sure you keep neck immobilised** while you measure and fit collar. Someone needs to keep hold of head until whole body fully immobilised
- **Cervical collar must fit properly** — not too big or too small. Person must not be able to move head inside collar
- Putting on cervical collar only the first step. To complete immobilisation — see Manual in-line immobilisation

Semi-rigid collars

What you do

Measure person for collar

- Tell person what you are doing — even if unconscious
- Ask them to stay very still, **not** try to help
- Clear the skin of all jewellery and debris, eg glass fragments
- With head in neutral position, draw imaginary line from top of shoulders and another from tip of chin. Use your fingers (or measuring tool in pack) to measure space between top of shoulder and chin — Figure 3.56
- Choose right collar size by measuring same distance from lower edge of rigid plastic to black fastener on side — Figure 3.57 *OR* follow instructions in pack
- Make up collar into circular band (follow instructions)
- Fold in velcro band to prevent it sticking to hair, seat, glass, dirt etc
- **Ask helper to keep holding either side of head**

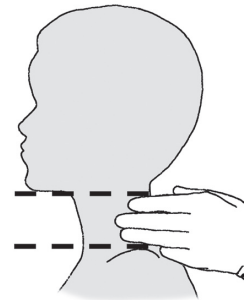


Figure 3.56

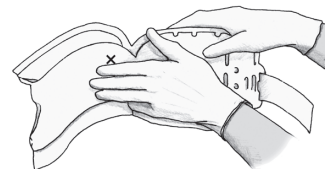


Figure 3.57

THEN

- Slide chin piece up chest wall until chin supported properly, with head still in neutral position — Figure 3.58
- Keeping firm, gentle grip on collar around neck and under chin (to keep head still), slide back of collar band around/under neck and bring velcro band round to fasten
- *OR* If person obese or has lots of thick hair — may be easier to slide back of collar band around neck first — Figure 3.59, then position chin piece and fasten velcro band
- Tighten velcro until chin and neck fully supported — Figure 3.60
- Check position and fit



Figure 3.58

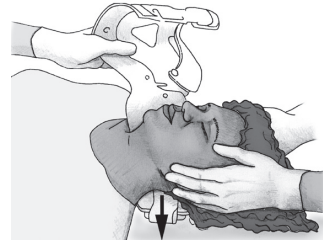


Figure 3.59



Figure 3.60

Check

- Collar on straight — nose, chin, collar, umbilicus in straight line
- Collar holding person's head in neutral position — neck not hyperextended (tilted backward)
- Chin resting securely on hard plastic chin support of collar
- Ears not trapped under collar
- Collar not pinching skin on shoulders or squeezing neck

If there are any problems — start again

Soft Collars

Soft cervical collar provide some support to the neck in trauma, may assist with comfort and provides both a tactile and visual cue for the person and clinicians that there is concern for cervical spine injury. There are different brands. Be familiar with the brand that your service uses

What you need

- At least one helper — preferably two helpers
- Appropriately sized soft collar

What you do

- Clear the skin of all jewellery and debris, eg glass fragments
- Ask the person to slowly turn the neck and head to a midline position. If unconscious, while protecting airway patency, gently turn the head to a neutral and midline position — do not force
- Maintain this position manually with helper's hands either side of the head — Figure 3.61
- Measure from the chin to the sternal notch and select the appropriately sized collar — matching that distance with the width of the collar at the chin support/depression — Figure 3.61, Figure 3.62
- Slide the collar behind the neck from the person's right until the velcro strap is clearly visible — Figure 3.63
- Secure the velcro strap — Figure 3.64
- Assess airway patency
 - ▶ Look — for mask fogging and clearing, any sternal/rib recession, colour, oxygen saturation or capnography (if applied)
 - ▶ Listen — for stridor, gurgling
 - ▶ Feel — for air movement, resistance if using self-inflating resuscitator



Figure 3.61

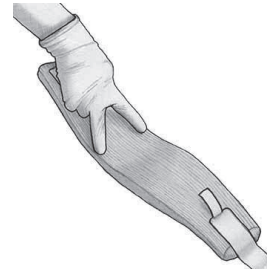


Figure 3.62



Figure 3.63



Figure 3.64

Immobilising neck using cervical collar

Attention

- If person still in vehicle and unable to get themselves out or has weakness or sensory disturbance — use extrication device
- **Ideally neck should stay in neutral position.** If bent or rotated when found — move gently to neutral position and immobilise
- If airway not compromised — **do not** move head if
 - ▶ By doing so, their airway becomes blocked
 - ▶ It makes their neck spasm
 - ▶ It gives them more pain
 - ▶ It causes numbness or tingling of arms or legs
 - ▶ It causes loss of limb movement
- If any of above — support head in that position



Figure 3.65

What you do

If person lying on back (supine) and head can be put in in-line neutral position

- Put knees either side of head to stop it moving — Figure 3.65, check response and airway
- Put hands either side of head with index fingers in notch between upper teeth and lower jaw — Figure 3.66. Don't cover ears
- Gently bring head into line with spine and shoulders (neutral position)
- Measure and fit cervical collar
- Support head with cushioning/rolled blankets or towels
- Make sure cushioning secured/taped
- Have someone keep their knees or hands either side of head — Figure 3.67



Figure 3.66

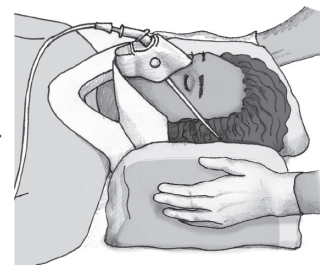


Figure 3.67

Log-rolling person

If person needs to be turned over (eg to check back or to put on back board) — use 'log-roll' technique

Attention

- **Minimum of 3 people needed when log-rolling** to keep head, neck and body in straight line and protect spine from further injury. **Do not** try with less.
- If its urgent, eg unconscious and vomiting, and only one or two of you, use Lateral trauma position

What you do

If person lying on back (supine) and head can be put in in-line neutral position

- Put on a cervical collar
- **Helper in charge (Leader)**
 - ▶ Supports head and neck throughout roll
 - ▶ Ensures helpers all roll person at the same time
- **Other helpers**
 - ▶ Put board/stretcher beside person, if using
 - ▶ Put person's arms by sides, palms turned inward or flexed over their chest
 - ▶ Kneel on one side of person, hold legs or part of body — Figure 3.68 (if only 2 helpers see hand positions Figure 3.70)
- **Leader** calls to roll person when everyone in position
- **Helpers** roll person onto side toward helpers, keeping head, neck, upper back, lower spine in straight line — Figure 3.69
- Roll back onto board/stretcher if needed



Figure 3.68



Figure 3.69

If person lying on stomach (prone)

- **Helper in charge (leader)**
 - ▶ Supports head and neck in position head is facing — Figure 3.70 throughout the roll
 - ▶ Ensures helpers all roll person at the same time
- **Other helpers**
 - ▶ Put board/stretcher beside person, if using
 - ▶ Put person's arms by sides, palms turned inward
 - ▶ Kneel beside person, hold legs or part of body — Figure 3.70
- **Leader** calls to roll person when everyone in position
- **Helpers** roll person onto side, **away** from direction head is facing, keeping head, neck, upper back, lower spine in straight line — Figure 3.71
- Keep rolling until person on back on board/stretcher, if using
- Put on cervical collar



Figure 3.70



Figure 3.71

Lateral trauma position (modified HAINES roll)

Lateral trauma position or modified HAINES (High Arm IN Endangered Spine) position provides airway protection for an unconscious person with suspected spinal injury

Attention

Used when only one or two responders available — roll and position person on their side without a cervical collar

What you do

- Start with a supine person
- Kneel alongside the chest
- Take the arm that's furthest from the responder and extend it above the person's head
- Bend the near arm across the persons chest with the hand on their opposite shoulder — Figure 3.72
- Flex both knees and roll the person away so the responder is at the persons back and both lower limbs are flexed — Figure 3.73
- Support persons head as they roll
- Adjust position for alignment and stability



Figure 3.72



Figure 3.73

Using long boards — from lying position

Person lying on back, cervical collar fitted

Attention

- Make sure back pockets empty, nothing caught between person and stretcher
- Make sure scoop stretcher is properly orientated — head at head end
- Scoop stretcher comes apart down centre of its length. Each half can be put under person lying on back without need to log-roll

What you do

- Put padding (eg towels, clothing) on board where bottom, heels, elbows will go. Need padding for bumpy ride ahead
- If not using scoop stretcher — log-roll person onto side, put board underneath, roll onto board
- Secure body (torso) and arms with straps
- Secure head
- Keep head and neck in-line with spine
- **Do not** flex backward — Figure 3.74 or forward — Figure 3.75
- Padding may be needed to keep neck and spine in neutral position
 - ▶ Under head for adults and older children — Figure 3.76
 - ▶ From under shoulders to buttocks for child under 7 years — Figure 3.77
- Put light-weight cushioning or rolled towels either side of head
- Put more padding under elbows and heels
- Tie feet together
- Put rolled blankets either side of legs (if room) before strapping, to stop sideways movement
- Using 4–6 helpers, lift board evenly. Someone stays at head of board to watch for and prevent movement of head and neck during lift
- **If movement** — fix strapping
- Put board evenly onto stretcher trolley



Figure 3.74



Figure 3.75



Figure 3.76



Figure 3.77

Using extrication device — from sitting in vehicle

Note: If the person is sober/cooperative and able to self-extricate, self-extrication is safer, even if they have neck or back pain — then assess and manage as potential spinal injury

What you need

- 3 people, more if you have them
 - ▶ **Helper 1 = head supporter**
 - ▶ **Helper 2 = device fitter**
 - ▶ **Helper 3 = lifter**
- Extra helpers to lift person out of vehicle

What you do

- Work out best way to remove person after they have been strapped to device (eg side doors, back or front window) — depending on state of crashed vehicle

Helper 1

- Get behind person (if possible)
- Put hands either side of head, with thumbs against back of head and fingers over each cheek in notch between upper teeth and lower jaw — Figure 3.78. Don't cover ears
- Bring head in-line with spine and shoulders (neutral position)
- Support head while Helper 2 fits cervical collar, then device (*below*)



Figure 3.78

Helper 2

- Fit cervical collar, undo seat belt
- Release and position all straps on extrication device
- Put device into place down length of person's back
- Extra padding may be needed behind head and/or shoulders to support head and spine in neutral position
- Firmly strap person to device
 - ▶ Start with middle strap around torso
 - ▶ Then lower torso
 - ▶ Then straps under buttocks and between legs. Pull straps firmly, take care not to include gear stick
 - ▶ Finish with forehead strap
- Check person firmly supported
- Take over supporting head from Helper 1

Helper 1

- Come around to front of person, hold and support head from this position so Helper 2 can let go
- Keep holding person's head as they are taken out

Helpers 2 and 3

- Prepare to remove person as worked out earlier
 - *Examples:* Take off vehicle door, bend door right back against side of frame, take glass out of back window

THEN

- Put person straight onto ambulance/vehicle stretcher in device. Try not to move them any more than you have to
- Unclip straps around groin and hips, try to straighten legs. Check person's condition again — **ABC**
- Leave device in place if not needed for another person. Strap person to long board or stretcher before moving them again
- Have 2 helpers help guide head of stretcher as loaded into ambulance

Immobilisation for a snake bite

Use for sea and land snake bites, funnel web spider bites, blue ringed octopus and cone shell stings

Attention

- **Do not** wash, cut or drain wound or apply suction
- Use this procedure for bite on limb
- If bitten on head or torso — just bandage bite site
- Keep person calm, reassured and lying or sitting still
- Work quickly, don't bother to remove clothing

What you need

- 3 or more 10–15cm tension/elastic compression bandages if not available — use crepe bandages
- Splint
- Tape
- Marker/pen for marking bite site
- Stretcher

What you do

- Wrap first bandage over bite site — Figure 3.79
- Start second bandage at fingers or toes and wrap bandage/s firmly up limb as far as possible — Figure 3.80
 - ▶ Include fingers/toes in bandaging to stop them moving and moving muscles
 - ▶ Leave tips of fingers/toes visible to check circulation
 - ▶ Mark bite or sting site on bandage — Figure 3.80
- Bandage firmly as for sprain — hard to put in fingers under bandage but not tight enough to cut circulation
- Aim is to prevent spread of venom by
 - ▶ Stopping muscle, limb, joint movement
 - ▶ Compressing lymphatic vessels
- Use last bandage/s to bind limb to splint — Figure 3.81 and Figure 3.82

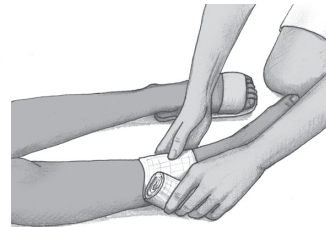


Figure 3.79

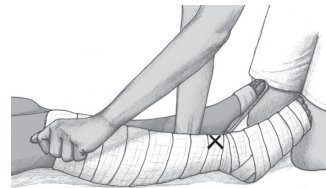


Figure 3.80

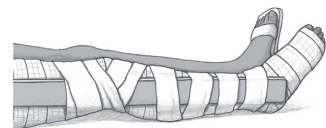


Figure 3.81



Figure 3.82

- Bites to arm or hand. Put arm in sling to stop movement — Figure 3.82
 - Have elbow bent
- Bites to leg or foot. If no splint handy — tie legs together — Figure 3.83
- Now immobilise whole person — use stretcher if available

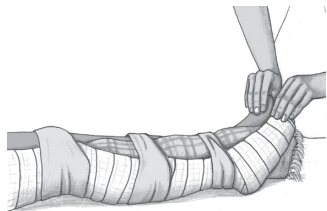


Figure 3.83

4. Giving fluids (rehydration)

Putting in nasogastric tube (NGT).....	95
Putting in IV cannula and starting a drip.....	99
Putting in butterfly IV needle.....	101
Putting in intraosseous needle.....	103

Putting in nasogastric tube (NGT)



Used to

- Give fluids or medicines
- Remove air and fluid from stomach — to stop vomiting

Attention

- **Do not use in traumatic head injury or if any signs of skull fracture**

Table 4.1 Tube type and size

Reason for NGT	Age	Tube size
Feeding	any	single lumen (8-10Fr)
Emptying stomach	under 5 years	single lumen (8-10Fr)
	over 5 years	double lumen (10-12Fr)
	children over 12 years and adults	double lumen (12-16Fr)

In hot weather consider cooling tube in fridge/freezer to make it firm and aid with insertion

What you need

If child — helper to wrap and hold them

- Wrapping cloth
- Bandages for mittens in small child
- Small strip of hydrocolloid dressing
- Correct size nasogastric tube — see Table 4.1
- Water-based lubricant
- 20mL syringe
- Cloth tape
- Paper tape
- Marking pen
- Pencil torch
- pH test strips
- Vomit bowl if person awake
- Drainage bag — if needed

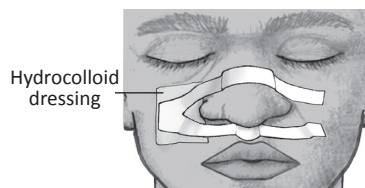


Figure 4.1

What you do

- Stick small strip of hydrocolloid dressing on cheek on same side of nose where tube is going — Figure 4.1
- Cut cloth tapes long enough to tie around person's head plus a bit extra
- Cut strip of paper tape long enough to go around tube and stick to person's nose and to hydrocolloid dressing on cheek — Figure 4.1

Measure length of nasogastric tube needed

Table 4.2 Measure tube and position person

	Adults	Infants and children
Measure length NGT	<ul style="list-style-type: none"> • Hold tube upside down. Measure from bridge of nose, to earlobe, to bottom of sternum (breastbone) • Mark tube with marking pen — Figure 4.2 	<ul style="list-style-type: none"> • Hold tube upside down. Measure from tip of nose, to earlobe, to halfway between bottom of sternum (breastbone) and umbilicus • Mark tube with marking pen — Figure 4.3
Position	<ul style="list-style-type: none"> • Keep head straight or tilted back slightly • If conscious have person sitting 	<ul style="list-style-type: none"> • Wrap child as shown — Figure 4.4 to Figure 4.7 • If child restless — put bandage mittens on so when you unwrap them they don't pull tube straight out • Bend head forward a little

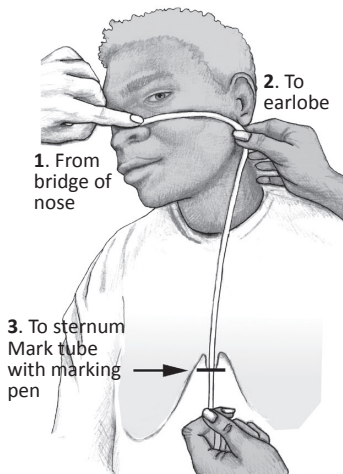


Figure 4.2

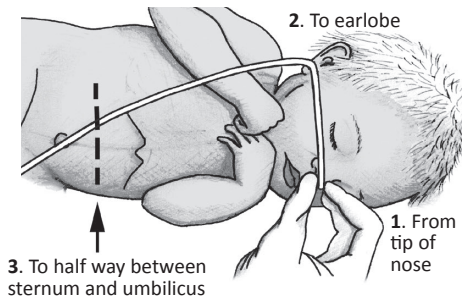


Figure 4.3

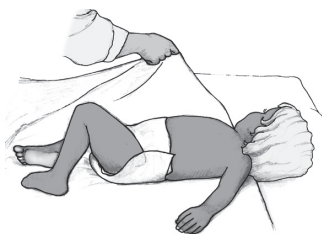


Figure 4.4



Figure 4.5



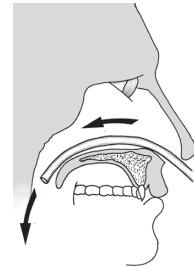
Figure 4.6



Figure 4.7

Put in tube

- Attach 20mL syringe to end of tube
- Lubricate tip of nasogastric tube or wet under tap
- Tell person it is normal to feel urge to gag and reassure them
- Keeping tube in straight line, gently push it back through chosen nostril — Figure 4.8 and Figure 4.9
- Feed tube down back of throat into oesophagus (food pipe) until pen mark reaches front of nose
 - If person awake — ask them to swallow a few times
- If person seems to be choking — take tube out straight away. Calm person/carer and try again
- Look in mouth with pencil torch as you push tube down. If tube coiled in back of mouth — take out and try again
- If small child — make sure they can't pull tube straight out
 - Put cloth tape around tube and tie behind head
 - *OR* put piece of tape around tube and stick to cheek or nose temporarily

**Figure 4.8****Figure 4.9****Check tube in stomach**

- Confirm placement via x-ray. If x-ray not available do pH testing with pH test strip
 - **Do not** use litmus paper for pH testing
- Pull back (aspirate) small amount of fluid with 20mL syringe
- Drop fluid onto pH strip — placement confirmed if pH 1.0–4.0
- If unable to pull back fluid or if pH greater than 4.0 — advance tube 5cm and retest
- If pH still greater than 4.0 — either pull tube out and try again or repeat testing in 30 minutes
- If you can't pull back fluid for testing — pull tube out and start again
- If unable to confirm placement by pH testing — **medical consult**

Securing tube

- If tube in right place — tape properly to hydrocolloid dressing — Figure 4.10
- If still not secure — leave cloth tape in place and/or use more paper tape to stick tube to forehead so end hangs over ear and/or pin it onto their clothes — out of sight if child
- When you unwrap infant be ready to stop them pulling tube straight out

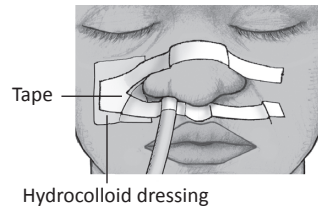


Figure 4.10

Using nasogastric tube for fluid replacement

- For fluid rate — see Diarrhoea (STM)

Using nasogastric tube for drainage

- Plug end of nasogastric tube with stopper or attach to drainage bag to allow free drainage

Putting in IV cannula and starting a drip



Used to give IV fluids *AND/OR* medicines. IV cannula connected to

- Bung — if no fluids needed
- Drip — if fluids needed

Attention

- **Make sure you are putting needle into vein not into artery or nerve**
- **Always lie person down in case they faint**
- If person has had mastectomy or dialysis fistula — use other side
- If person critically unwell or in cardiac arrest and putting in IV cannula likely to be difficult or take too long — consider intraosseous needle
- Big veins sometimes not the best as they can roll
- Avoid areas of flexion
- Biggest veins usually found
 - ▶ On inner forearm — common in men
 - ▶ On back of hand and side of wrist — Figure 4.11
 - ▶ Just in front of inside ankle bone — Figure 4.12
- Look at the vein and then feel vein
- Lower arm/leg below level of the heart to help fill veins
- If cold — warm body part by using a warm compress or warm water to help find vein

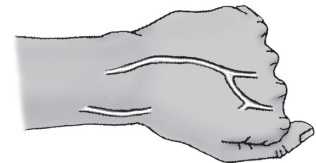


Figure 4.11



Figure 4.12

What you need

- Helper if possible
- Bluey
- Tourniquet
- Sterile dressing pack — to use as sterile area (optional)
 - ▶ 10mL normal saline in syringe
 - ▶ Chlorhexidine 2% in isopropyl alcohol 70% swab or solution
 - ▶ Tape
 - ▶ 8cm × 6cm transparent IV site dressing
 - ▶ IV bag sticker and drip stand or somewhere to hang fluid bag if needed
 - ▶ Sterile bung, prepared and primed intravenous giving set, short extension and IV fluids

- Intravenous cannula of right size
 - ▶ 22–24G infants and children
 - ▶ 20G adults
 - ▶ 16G adult trauma, resuscitation or shock — for rapid fluid resuscitation

What you do

- If drip needed — write date and time on IV bag sticker
 - ▶ Connect IV fluids to line, prime line with fluid and let out any air bubbles
 - ▶ Choose vein you are going to use and put bluey underneath
- Lay out dressing pack and equipment. Wash hands and put on gloves
- Clean site with skin cleanser as per local guidelines
- Put on tourniquet *OR* use helper's hands to squeeze child's limb
 - ▶ Wait for vein to swell
 - ▶ Pull person's skin down to hold vein still — Figure 4.13
- Hold IV cannula with needle bevel facing upward at a 20–30° angle to skin. 20° for superficial vein, 30° for deep vein. Put into vein and see flashback of blood
 - ▶ Lower cannula to nearly level with skin and gently push 6–12mm into vein
 - ▶ Slide teflon cannula fully up vein while holding trocar still
- Press firmly on skin above plastic cannula. Press with your thumb or arch made by your thumb and forefinger around limb — Figure 4.14
- Undo tourniquet **then** take out needle/trocar
 - ▶ Use piece of tape to secure cannula and label with date and time inserted
 - ▶ Flush with 5–10mL **normal saline** to make sure you are in vein. Should be no swelling above cannula site
 - ▶ Connect bung or IV line to cannula and run IV fluids as needed
 - ▶ Put on see-through dressing — to check site for redness or swelling
 - ▶ Tape IV line to skin in a loop, bandage lightly over cannula and tubing
 - ▶ May need to splint area to stop movement
- If person complains of pain or pressure — check cannula is in vein not tissue

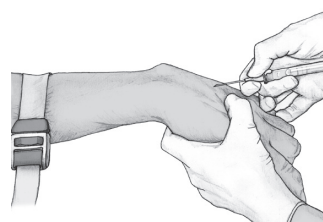


Figure 4.13

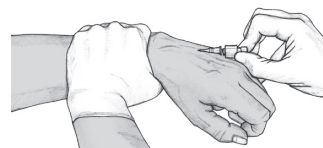


Figure 4.14

Putting in butterfly IV needle



Good for venepuncture and medicine administration in people with small, thin veins

Attention

- **Ensure needle is not inserted into artery or over a nerve**
- **Always lie person down in case they faint**
- If young child — consider wrapping them first
- Can use same veins as for IV cannula or smaller veins in back of hands, feet, ankles or scalp
- If using for subcutaneous infusion — use an area with good depth of subcutaneous fat (eg abdomen)

What you need

- Helper if possible
- Bluey
- Tourniquet
- Sterile dressing pack to use as sterile area (optional)
 - ▶ Chlorhexedine 2% in isopropyl alcohol 70% swab or solution
 - ▶ Butterfly needle with plastic tubing and screw-down bung of right size — Figure 4.15
 - ▶ Syringe
- Blood tubes as required
- Tape
- 8cm × 6cm transparent IV dressing, if needed
- 10mL normal saline in syringe if giving IV medicines or attaching IV infusion
- IV bag sticker and drip stand or somewhere to hang fluid bag if needed

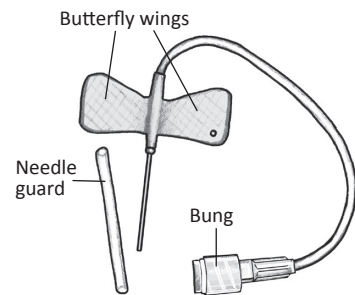


Figure 4.15

What you do

- If medications is to be infused prepare and label infusion bag label
 - Connect IV fluids to line. Prime line with fluid and let out any air bubbles
 - Choose insertion site and put bluey underneath
 - Lay out dressing pack and equipment
- Wash hands and put on gloves
 - Clean site with skin cleanser as per local guidelines
 - Put on tourniquet *OR* use helper's hands to squeeze child's limb
 - Wait for vein to swell
 - Unscrew bung $\frac{1}{4}$ turn before inserting needle. Lets blood flow back into tubing during insertion so you know you are in vein
 - Fold up wings of butterfly to get good grip — Figure 4.16
 - Angle needle with bevel upward, parallel to skin then down into vein — Figure 4.17
 - Blood will flow back into needle and plastic tubing. Tighten bung



Figure 4.16



Figure 4.17

If taking blood

- Take screw top off bung, connect syringe or have syringe attached before starting. May need to tape butterfly wings to skin to stop movement
 - Take enough blood to fill blood tubes needed

If giving IV medicine or IV infusion

- Gently flush using 10mL syringe in a pulsatile (push-pause) motion with 10mL sodium chloride (**normal saline**) *OR* as per medication order or local guidelines
- Small babies need smaller volume (2mL)
- Let blood flow most/all the way back to bung before connecting to drip
- Then take off tourniquet and tape butterfly 'wings' firmly to skin
- If leaving butterfly needle in place for an infusion
 - Check skin at site for signs of redness, swelling or pain
 - Place small cotton wool ball or gauze underneath hub of the cannula to prevent pressure areas
- Remove butterfly needle as soon as infusion completed

Putting in intraosseous needle



Emergency life-saving procedure. Needle put into bone marrow space to give fluids, antibiotics and other medicines

Used when

- No IV cannula access — adults and children
- Urgent requirement for fluid and/or drug administration (eg cardiac arrest, hypovolemia, shock)

Do not use

- Side of body with definite fractured bones (compartment syndrome risk)
- Limbs with possible proximal fractures
- Sites of previous attempts
- Overlying skin infection
- Through burnt skin
- Person with osteogenesis imperfecta (brittle bone disease)
- Person with osteopetrosis (fracture risk)

Types of intraosseous needles/devices

- All devices use similar insertion sites and follow same basic principles
 - ▶ Spring-loaded and drill devices are easier and quicker to use
 - ▶ Drill devices use battery powered drill to put in intraosseous needle (eg *EZ-IO*)
 - ▶ Spring-loaded devices use spring to put in intraosseous needle (eg *FAST1*, *BIG*)
 - ▶ Traditional intraosseous needles use trocar and intraosseous needle (eg *Cook*, *Jamshidi*)

Attention

Always check manufacturer's instructions for your device. The following are basic principles only

- **Do not** tape over manufacturer's securing devices — follow the instructions
- Manual intraosseous needle should only be used if no other devices available
- Practice regularly on fresh chicken thighs or fresh uncooked eggs so you know how to use in emergency
- Can look frightening to parent/carer so explain what you need to do and reassure them it is standard procedure
- If person very unwell — local anaesthetic not required
- If IV fluid leaks out of site you tried before — stop with firm direct pressure

Proximal tibia insertion site

- Feel for bump on the shin under the kneecap (tibial tuberosity)
- Adult — go 2cm across toward other leg (medially)
 - ▶ Then 1cm **down** for **drill** (eg EZ-IO) **and manual devices** — Figure 4.18
 - ▶ If using **spring loaded device** (eg BIG) then go 1cm **up** — Figure 4.19

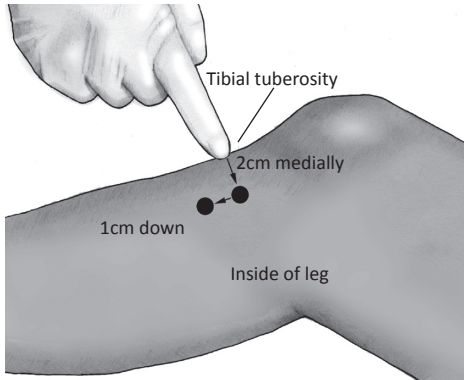


Figure 4.18

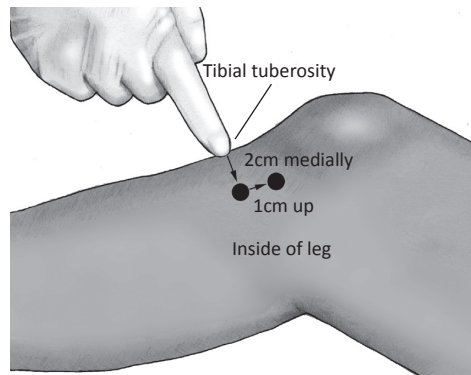


Figure 4.19

- Child — go 1cm under bump, then 1cm across toward other leg (medially) — Figure 4.20

You are trying to avoid the joint

Distal tibia insertion site

- 3cm proximal to the most prominent aspect of the medial malleolus
- Place one finger directly over the medial malleolus then move — 2cm proximal
- Palpate the anterior and posterior borders of the tibia to ensure that the insertion site is on the flat central aspect of the bone

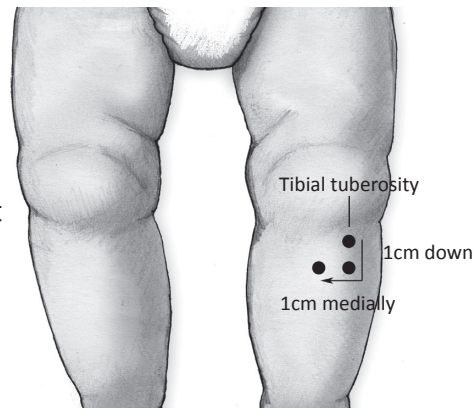


Figure 4.20

Femoral insertion site

- Anterolateral surface, 3cm above lateral condyle

Proximal humerus insertion site

- Slide thumb up the anterior shaft of the humerus until feel the greater tubercle. This is the surgical neck
- 1cm above the surgical neck is the insertion site
- The person's hand should rest palm down on their abdomen with the elbow abducted
- In small children the greater tubercle is poorly developed and may be impalpable

What you need

Table 4.3 Device types

Intraosseous drill (eg EZ-IO) and appropriate size needle kit	Spring-loaded intraosseous (eg <i>BIG</i>)	Manual intraosseous needle in correct size
Make sure you check inside packet for securing devices	Adult — blue Large babies and children — red	Adult 12G Child 16G or wide bore injection needle 16–19G

- Helper
- Clean towel
- Bluey or sterile dressing pack
 - Povidone-iodine or chlorhexidine or alcohol wipes
 - Sterile gloves
 - Local anaesthetic (lidocaine 1%), syringe and needles if needed
 - 5mL normal saline in syringe
 - See-through sticky dressing
 - Sterile extra gauze swabs
- IV line primed with normal saline
- Splint

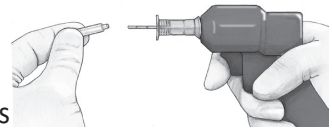


Figure 4.21

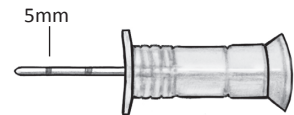


Figure 4.22

What you do

- Use rolled up towel under knee to help stabilise insertion site if needed
- Locate insertion site
- Lay out dressing pack and equipment
- Wash hands and put on sterile gloves
- Clean site
- Put in local anaesthetic if using
- Put in intraosseous needle — see If using drill, Spring-loaded device or Manual insertion

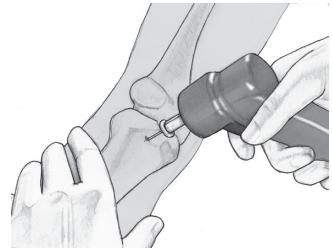


Figure 4.23

If using drill

- Attach correct sized needle and remove safety cap — Figure 4.21
- Intraosseous needle set
 - 45mm (humerus insertion or excessive tissue)
 - 25mm (above 40kg)
 - 15mm (3–39kg)
- Put in needle to 5mm mark — Figure 4.22 at 90° (right angle) to bone — Figure 4.23
- Operate drill until you hear the ‘pop’
- Hold needle set and remove drill — Figure 4.24



Figure 4.24

- Unscrew trocar and remove from catheter
- Secure needle with stabiliser if provided *OR* see Secure needle

Spring-loaded device

- Choose device
 - ▶ Blue for adults — use on proximal tibia or humerus
 - ▶ Red for children — use on proximal tibia
- Remove device from package, face device (in direction of arrow) away from person and user
- Wind red device to select the correct age (0–3, 3–6, 6–12 years old)
- Position gun on chosen location at 90° (right angle), hold coloured barrel firmly with non-dominant hand — Figure 4.25
- Remove safety latch — Figure 4.25 and put somewhere safe
- Position dominant hand with fingers under wings and palm over barrel — Figure 4.26. Push down firmly, have arm straight to reduce kickback
- Lift device up and off site gently, then remove trocar by twisting and pulling upward. If tight — use artery forceps
- Stabilise cannula with safety latch — Figure 4.27, Figure 4.28

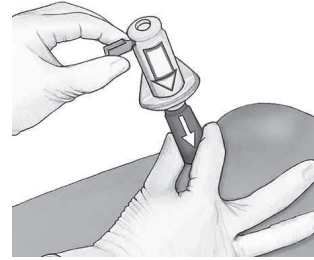


Figure 4.25

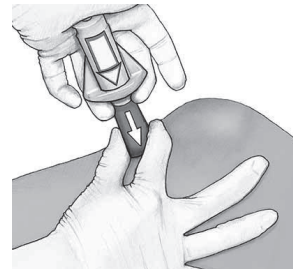


Figure 4.26

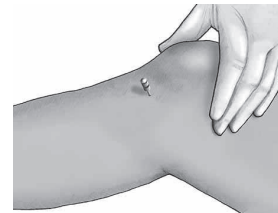


Figure 4.27

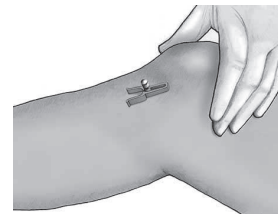


Figure 4.28

Manual insertion

Always angle needle at 60° away from joint – Figure 4.29. Avoids damage to growth plates (epiphyses) in children’s bones.

- Choose site — Figure 4.30

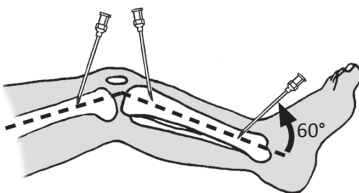


Figure 4.30

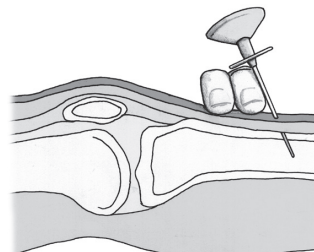


Figure 4.29

- With handle of needle in palm of your dominant hand, hold shaft of needle about 1cm from point — Figure 4.31
- Use non-dominant hand to stabilise limb — Figure 4.31. Keep bone stable and skin tight
- With handle of needle in palm of your dominant hand, hold shaft of needle about 1cm from point — Figure 4.31
- Start at 90° (right angle) to bone until needle 'bites' then angle needle at 60° away from joint. **Slowly** and firmly push and grind it in using clockwise and anti-clockwise screwing motion of wrist and hand

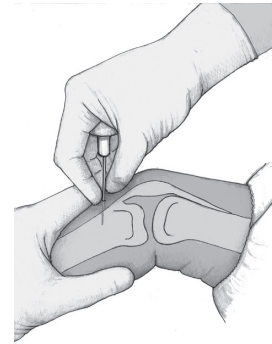


Figure 4.31

- You will feel a 'give' and a 'crunch' when needle goes through bone into marrow. Needle should now stand on its own
- Hold outer needle firmly while you take out trocar (inner needle)
- Aspirate and start bolus and medicine
- Secure needle

Aspirate and start bolus and medicine

- Aspirate blood sample if needed (often difficult) — suitable for blood culture bottles, bedside glucometers, and handheld I-STAT instruments
- Flush needle with **normal saline** to clear any bits of bone or marrow
- If conscious — use **lidocaine (lignocaine) 1%** then 5mL **normal saline**
 - ▶ 15–30kg — 1mL lidocaine (lignocaine) 1%
 - ▶ Over 30kg — 2mL lidocaine (lignocaine) 1%
- To give bolus to baby or child — use 20mL syringe to give 10–20mL as IV push
- Connect IV line — often difficult to get to run freely — use 20mL syringe as IV push
 - ▶ Alternatively IV hand pumps, pressure bags or pump/syringe driver
 - ▶ Flow rates at proximal humerus superior to proximal tibia
- When infusion running, carefully check above, below and behind the needle site for swelling. Swelling may mean fluid going into tissues. Stop and start again at another site

Secure needle

- Use tool supplied with device — allows for checking needle and site
- If no tool supplied or using manual insertion — secure by placing see-through dressing on either side of needle
- Splint leg

5. Pathology

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Storing and transporting pathology specimens



Attention

- **To collect, store and transport pathology correctly you MUST be in contact with your laboratory** — visit them when in town and find out about particular issues for your region or clinic
- **Do not** collect specimens that are not needed (eg test already done in past 3 months) — unless **follow-up** is required
- Collection of pathology is part of providing a service to patients — take care to do it right
 - Right person, Right test, Right tube, Right process, Right storage, Right transport, Right recall system
- Results need to be followed up whether you are there or not especially abnormal results — use clinic recall systems
- All pathology specimens must be treated as a biohazard during collection, storage and transport
- All specimens **must be** labelled correctly or laboratory will throw them away
- **Must** use packing and specially made container to transport specimen samples by air (IATA packing instructions 650)
 - Commercial airlines and air retrieval services must abide by these regulations
 - Check and follow your local protocols or courier may refuse to take them

What you do

- Label all specimens
- Follow instructions on sticky label on tube/swab container or slide holder
- If using pre-printed identification labels, make sure you add **exactly** what the specimen is (eg swab from left eye)
- Minimum information needed on labels
 - Full name including skin/bush names as recorded on file notes
 - Date of birth
 - Exactly what specimen is (eg blood, wound swab)
 - Date specimen collected

- Make sure all screw/push tops are firmly in place
- All specimens are stored in sealed biohazard plastic bag inside sealed container
- Store as needed at room temperature *OR* refrigerated (in fridge) *OR* frozen (in freezer)
- Completed pathology forms must be kept with specimens but not in same compartment in case of leakage. Use plastic sleeve on side of pathology bag

To transport specimens

- **Frozen specimens**
 - ▶ Need to be well frozen before travel
 - ▶ To protect label during freezing — put sticky tape over label *OR* cut finger off disposable rubber glove and put specimen container inside
 - ▶ Put tube into yellow top urine jar, fill with cold water and freeze
 - ▶ Transport tube in jar between 2 ice bricks, must stay frozen in transit
 - ▶ Pack as per fridge specimens below
- **Fridge specimens**
 - ▶ Put absorbent material (such as blueys) in biohazard bags with specimens in case of leakage — Figure 5.1
 - ▶ Put into recommended transport container/esky with wrapped ice brick in base and another on top
 - ▶ Seal lid as instructed or with waterproof tape
- **Room temperature specimens**
 - ▶ As above — without ice bricks
- **Label all containers clearly with**
 - ▶ Place, date, time of packing, and destination
 - ▶ Biohazard sticker (in Australia UN3373) — Figure 5.2. If no sticker — write it in big letters using black marker
- Make sure courier knows what contents are. This is so they will not be left in a hot place and will be delivered to laboratory as soon as possible



Figure 5.1



Figure 5.2

Collecting blood samples



Taking blood samples using needles, cuvettes, test strips

Attention

***Vacutainer* barrel and needle is the safest way to take blood. This helps prevent needle stick injuries**

- You must be in contact with your laboratory to collect samples using the right tube and to store and transport pathology correctly
- Warm cloth will improve blood flow to needle site
- **Do not** use cuff or tourniquet for more than 1 minute
- Instead of using tourniquet on small children, ask helper to squeeze evenly around limb with hands taking care to avoid any needle stick injury
- If person had mastectomy or fistula — use other side
- Always let skin dry completely after wiping with alcohol

If you don't have *Vacutainer* equipment or veins thin or difficult to find — use ordinary 21G needle and syringe or butterfly needle, both are hard to control with wriggling child and you will need help

What you need

- Tourniquet, blood pressure cuff or helper's hand
- Alcohol wipes
- *Vacutainer* barrel and needle
 - OR syringe and 21–25G needle
 - OR butterfly (scalp vein) needle, 21–25G with screw-top bung
- Blood tubes — type depends on test
- Tray for standing tubes upright
- Slides and holder if making blood slide
- Gauze swab or cotton wool ball
- Small sticking plaster
- Centrifuge for spinning samples (if needed)
- Sharps container

What you do

- If taking more than one sample — follow Table 5.1

Table 5.1 Order of blood collection

Order	Contents	Test
Take first ↓ Take last	Aerobic Anaerobic	• Blood cultures — paired tubes or bottles
	Sodium citrate	• Clotting studies — INR, APTT, PT
	Gel – gives clotted blood for serum	• UEC, creatinine, calcium, phosphate, magnesium • LFT, TFT • CRP • CK, LD • Uric acid (urate), lipids, alcohol • Iron studies, vitamin B12, folate • PSA, other tumor markers • Drugs, hormone levels, viral antibody screens, serum EPG, troponin
	Heparin	• Clozapine, perhexiline • Cholinesterase, transketolase • Cell surface markers, cytogenetics
	EDTA 10mL	• Blood group and cross match • Renin, ACTH • CMV culture/DNA PCR
	EDTA 4mL	• FBC, ESR, Hb, Hb electrophoresis, red cell folate, haemochromatosis study, viscosity • HbA1c • Ciclosporin, tacrolimus • Viral load/RNA PCR • Mercury, lead
	Fluoride EDTA	• Glucose, alcohol, lactate, homocysteine

4 ways to take blood from vein

1. Using *Vacutainer* needle and barrel

- Connect needle to barrel — Figure 5.3

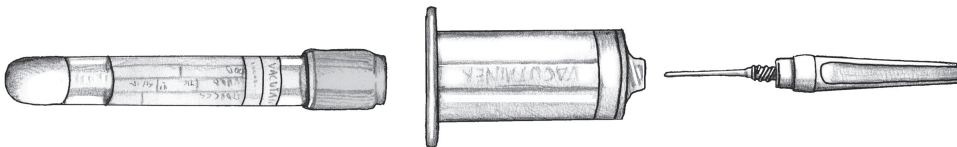


Figure 5.3

- Choose site
 - If elbow crease — put arm straight, rest on pillow/table covered with bluey
- Put on tourniquet *OR* squeeze with helper's hand *OR* use adult/paediatric cuff inflated to 80mmHg

- Stretch skin over site, feel for swollen vein. Choose the one that **feels** biggest — may not be easiest to see
- Clean site with 70% alcohol wipe and let dry
- Use main (dominant) hand. With bevel of needle facing up, push needle in along vein
- When needle in vein, use other hand to steady *Vacutainer* barrel against skin before putting first blood tube into barrel — Figure 5.4

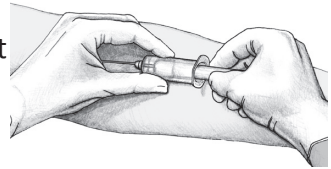


Figure 5.4

- Push tube into barrel until grey puncture needle has gone through tube's rubber stopper. Blood will flow into vacuum sealed tube on its own
- Wait until blood has stopped flowing into tube
- Steady *Vacutainer* barrel against skin with one hand, take out blood tube with other
- Some blood tubes need mixing straight away so invert tube once and stand up in tray — Figure 5.5 before putting next tube in barrel
- Do this until all tubes have been filled
- Take last tube out of barrel — unless also making a blood slide

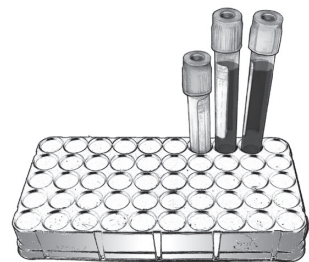


Figure 5.5

- Then undo tourniquet
- Now take needle out of vein
- Put pressure over bleeding site using dry gauze swab or cotton wool ball
- Ask person to press on site. If using arm — keep straight to prevent bruising

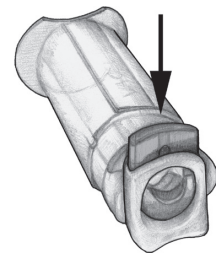


Figure 5.6

- **Do not** take used needle off a syringe or *Vacutainer* barrel with your fingers
 - ▶ Use needle release device if *Vacutainer* has one — Figure 5.6 and Figure 5.7
 - ▶ *OR* use groove at top of sharps container to unwind or pull off needle
 - ▶ *OR* put both syringe or barrel and needle straight in to sharps container

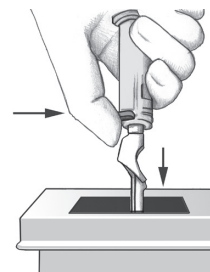


Figure 5.7

- When bleeding from needle site has stopped, put on small sticky plaster or cotton wool ball and paper tape

2. Using butterfly needle

- See butterfly needle

3. Using ordinary needle and syringe

- Connect needle and syringe — size according to vein
 - 25G for small children, 21G for adult
- Put needle into vein. See — Using Vacutainer needle and barrel
- Take amount of blood you need to fill blood tubes then undo tourniquet
- Take out needle, put pressure over bleeding site using gauze swab or cotton wool ball, ask person to press on site
- Carefully push needle through rubber stopper of first tube. Blood will flow into tube by itself
- Wait until flow stops, take needle out, invert tube, stand tube upright in tray. Do this until all tubes filled
- When bleeding from needle site stopped, put on small sticky plaster or cotton wool ball and paper tape

4. Using needle only — good for small veins in children or the elderly

- Take rubber stoppers off tubes (be careful not to tip them), stand in tray
- Put needle into vein — Figure 5.8. See — Using Vacutainer needle and barrel
- Let blood drop into tube — Figure 5.9 until you have amount needed
- Undo tourniquet, take out needle and press firmly on site with cotton wool ball
- Put stoppers back into tubes, make sure they are tight, invert tubes, stand tubes upright in tray
- When bleeding from needle site stopped, put on small sticky plaster or cotton wool ball and sticky tape



Figure 5.8

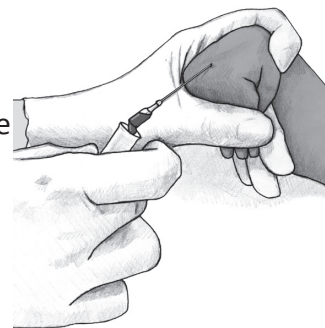


Figure 5.9

For all 4 methods

- Make sure all tubes are correctly labelled
- Spin (centrifuge) tubes if needed, put in pathology bag
- Check pathology form/s put in bag with labelled tubes
- Store and transport as needed. Some samples may need to be refrigerated

Common blood tests

Whole blood (eg FBC)

- Use EDTA tubes, usually purple or pink top
- As soon as blood taken, mix well by inverting tube
- Store and transport under refrigeration — try to send same or next day

Serum separated test (eg UEC)

- Use plain/white top or SST/yellow top (gel-filled) tubes
- **After collection** stand bloods for at least 10 minutes. Bloods need to stand upright first to clot before being spun or may get false results
- **Spin** (centrifuge) at 4200RPM for 10 minutes until serum completely separated by gel. Properly separated serum/cells in tubes will last up to 1 week if stored correctly
- **Store** in fridge and transport with ice bricks

Plasma

PTH

- Use special white top PPT tube containing EDTA
- Mix well by inverting tube several times
- If more than 1 day delay getting tube to pathology — spin (centrifuge) tube
 - ▶ **Do not** separate or freeze the plasma
- Collect 1 SST tube for calcium testing at the same time — even if not requested

INR

- Use blue sodium citrate tubes
- For test to work properly you must
 - ▶ Collect right amount of blood — fill to line indicated on tube
 - ▶ Make sure tube is in date — old tubes are not accurate
- If using butterfly needle —
 - ▶ First draw blood down empty butterfly tubing using any tube (plain one will do) then discard tube. Otherwise some blood remains in butterfly tubing and you won't collect right amount
 - ▶ Change to blue top tube
- As soon as blood taken, mix well by inverting tube
- You have 4 hours to get blood to pathology. If any chance of delay — sample must be spun, plasma separated and frozen
 - ▶ Spin (centrifuge) as soon as you can for 20 minutes
 - ▶ Lift **carefully** out of centrifuge so plasma stays separated

- ▶ Take tube top off, gently pipette clear yellowy plasma into 5mL plain screw cap tube. Be careful not to collect any red cells. If you do — put plasma back, re-spin
- ▶ Freeze and transport — **must stay frozen in transit**

Blood for testing glucose levels, including OGTT

- Use sodium fluoride–potassium oxalate/grey top tubes
- As soon as blood taken, mix well by inverting tube 6–8 times
- Store and transport under refrigeration
- Some laboratories require samples to be spun and plasma separated as described above as soon as possible (not frozen) — check with your laboratory

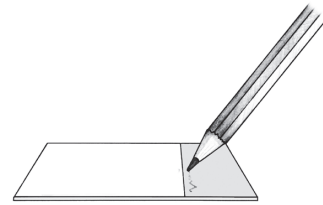


Figure 5.10

Making a blood slide

What you need

- Pencil and pen
- Clean, dust free glass slide with frosted end
- Another slide to use as spreader
- Slide holder

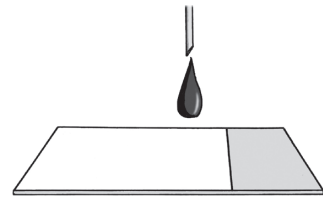


Figure 5.11

What you do

- Label slide holder with pen, label frosted end of slide with pencil — Figure 5.10

For thin film

- Need enough blood to make thin 4cm smear
- **If using Vacutainer** — leave tube on needle as you take it out of arm, drop blood from needle tip onto slide — Figure 5.11
- **If using syringe** — put drop of blood from needle onto slide before filling tubes
- Holding spreader at 45° angle, gather blood into one spot — Figure 5.12
- Using **just one movement**, push blood steadily back down slide — Figure 5.13

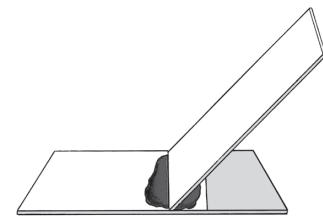


Figure 5.12

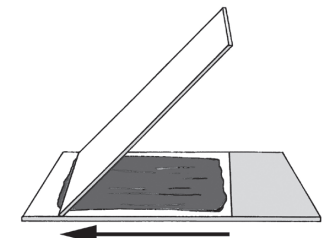


Figure 5.13

For thick film (eg malaria parasites)

- Using *Vacutainer* or syringe put 3 drops of blood on slide — 1 in middle, 1 on either side in a triangle shape — Figure 5.14
- In 1 circular movement, use corner of spreader to join drops up and make round shape about 1cm (10mm) across — Figure 5.15

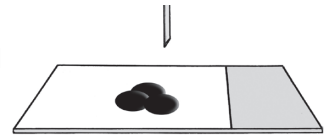


Figure 5.14



Figure 5.15

For both thin and thick smear

- **Leave slide to air dry**, put into slide holder
- Make sure it is correctly labelled
- Store and transport under refrigeration

Blood cultures**Attention**

If collecting blood cultures to send to hospital with person — write in letter/referral, ring hospital to let them know it is coming

- Blood culture bottles for adults may be larger than those for small children, depending on brand — need to stock both
- Store bottle in cool place, less than 25°C (eg pharmacy or fridge)
- On each bottle, check use-by/expiry date, colour of fluid, rubber stopper intact
- Use new, clean needle for each bottle

What you need

- 2 blood culture bottles (10mL or child size), aerobic and anaerobic
- Alcohol swab
- 20mL syringe
- 3 × 21G needles — 1 for taking blood, other 2 for putting blood into 2 bottles
- Artery forceps to take needle off syringe
- Tray for standing bottles upright

What you do

- Take off metal or plastic seals/caps
- Wipe rubber stoppers with alcohol wipe, let dry completely
- Choose injection site, take blood using 20mL syringe and 21G needle
 - Take enough blood for both bottles — about 15mL (6–8mL each) for 10mL bottles

- ▶ Using forceps or sharps container lid device, carefully take needle off syringe. Don't contaminate end of syringe. Put needle in sharps container
- ▶ **Put on new sterile 21G needle**, pierce rubber stopper to fill first blood culture bottle. If bottle not vacuum sealed — push blood into bottle **gently**
- ▶ **Change needle again**, fill second bottle the same way
- Mix well by inverting each bottle, stand upright in tray
- Make sure bottles are correctly labelled
- Store and transport at room temperature — remember to send with person in emergency

Oral glucose tolerance test

75g oral glucose tolerance test (OGTT)

Attention

Remember: People who are acutely unwell (eg have a fever) may show incorrect reading

- Record any medicines person is taking, these may affect test
- Do **fasting test** in morning. Tell person
 - ▶ Not to eat or drink anything except water for 8–12 hours before test
 - ▶ They will have to wait in clinic for 2 hours
 - ▶ Not to eat or smoke during test — water is OK, but no tea, coffee, snacks
 - ▶ To rest for 30 minutes before test, keep resting during test

What you need

- Pathology form
- Blood collection equipment
- Calibrated glucose meter
- Pre-mixed solution containing 75g glucose *OR* 75g Glucose Challenge solution in 300mL water
- 2–3 grey top/sodium fluoride–potassium oxalate tubes, label with time collected and
 - ▶ Fasting or 0 hour
 - ▶ At 1 hour, if needed (eg 24–28 weeks pregnant)
 - ▶ At 2 hours

What you do

Collecting blood — each time

- Collect blood specimen in tube, add time taken to label
- Put drop of blood from tip of needle on glucose meter testing strip to check blood glucose levels.
- On pathology form — record glucose meter BGL test result, note if fasting

Conducting test

- Take first blood specimen in tube labelled 'Fasting' or '0 hour'
- Give person glucose solution to drink in front of you. Should drink it all within 5 minutes
- At 1 hour if needed (eg 24–28 weeks pregnant), take second blood specimen in 'At 1 hour' labelled tube
 - Mix well with oxalate by inverting 5–10 times
- At 2 hours, take second/third blood specimen in tube labelled 'At 2 hours'
 - Mix well with oxalate by inverting 5–10 times
- Give person a cup of tea and something to eat

Then

- Make sure tubes are correctly labelled
- Store and transport blood tubes under refrigeration

Collecting blood from babies and children



Attention

Ways to collect blood from babies and children

- Skin puncture — heel or finger
- From arm, hand, foot, ankle site using *Vacutainer*, ordinary needle and syringe, butterfly needle — see Collecting blood samples

Skin puncture — heel or finger

Attention

Do not do finger prick tests on children less than 6 months old — use heel instead

- Make sure finger or heel pink and warm so blood flows easily — keep lower than body
- If cold and blood won't flow — warm finger or heel with warm water
- **Do not** squeeze/milk heel or finger — can change results of some tests. Just let blood drip out
- See Figure 5.16 for correct place to prick heel or finger



Figure 5.16

What you need

- Someone to hold child
- Alcohol wipe
- Lancet or lancet pen to prick skin
- Depending on test — cuvette, collection blotter, test strip or microtainer blood tubes (for small babies)
- Gauze swab or cotton wool ball
- Small sticking plaster

What you do

- Choose site — Figure 5.16
- Wipe site with swab and let dry completely
- Firmly hold finger/heel, prick with lancet
- Wipe away first drop of blood with gauze swab or cotton wool ball

Note: Pressing **firmly against skin** will help get a better puncture and blood flow

For haematology tests

- Make a blood slide
- If more than 1 day delay getting blood slide to pathology — also take tube of blood and send in with slide

For microtainer

- Hold end of vent (on top of tube) up to blood drop on finger/heel, wait until blood flows in. Stop for a few seconds, then do it again
- Roll microtainer between your palms to mix anticoagulant with the blood, so it doesn't clot

For test strip/blotter

- Put single drop of blood on strip/blotter. Make sure test area doesn't touch skin. For blotter, fill circles using as many drops as needed
- Gently press puncture site with dry gauze swab or cotton wool ball for a few seconds, cover with sticking plaster if needed

Using cuvette

- See Testing haemoglobin

Testing for diabetes mellitus — blood glucose and HbA1c



Attention

Do not do finger prick tests on children under 6 months — use heel instead

- Make sure you know how your machines work, how to prepare sample and read result. Read manufacturer's instructions
- Finger/heel must be very clean and dry
- Let blood drop form on its own, or apply gentle pressure if needed. Squeezing will give incorrect results

Testing BGL with glucose meter

Attention

- Work through these steps when teaching person to self-monitor BGL with a glucose meter

What you need

- Warm water and soap to wash finger/heel
- Test strip
- Glucose meter — calibrated if needed
- Lancet and lancet devices *OR* single use lancet
- Gauze swab or cotton wool ball
- Small sticking plaster

What you do

- Wash finger/heel with soap and warm water, rinse, dry well. Must be completely dry
- Hold finger/heel pointing downward, prick with lancet — Figure 5.17
 - ▶ Pressing firmly against skin beforehand may help get better puncture and blood flow
- Let a drop of blood form
- Put test strip in glucose meter and wait for machine to register it is ready for blood



Figure 5.17

- Being careful not to touch skin — touch test strip to drop of blood and let strip fill completely
- Put firm pressure on puncture site to stop bleeding, put on sticking plaster
- If screen shows an error *OR* very high or low reading — do test again

Testing HbA1c with point of care (POC Test) test (where available)

Attention

- Only staff who have been trained should do POC testing

What you need

- Warm water and soap to wash finger
- POC testing machine
- HbA1c testing cartridges
- HbA1c sample holder
- Single use lancet *OR* lancet and lancet device
- Tissue
- Cotton wool

What you do

- Have person wash hands with soap and water, dry thoroughly
- Puncture finger — Figure 5.17. Let drop of blood form
- Touch tip of sample holder to drop of blood until capillary tube is completely full
- Wipe away any extra blood on outside of tube with edge of a folded tissue
- On flat surface, push sample holder into testing cartridge until it clicks into place — curved edge must face outward
- When machine shows 'ready' — calibrate cartridge. Run bar code down channel
- Open door of machine, put testing cartridge into slot — bar code must face right. Press down on cartridge with 2 fingers until it clicks into place
- Result will display on screen in about 6 minutes (depending on model of machine)

Testing haemoglobin



- There are 2 methods for POC measuring of haemoglobin — non-invasive haemoglobin monitors (eg Masimo Rad or Pronto) and invasive haemoglobinometers (eg HemoCue)
- Non-invasive haemoglobin (Hb) monitoring is recommended to quickly and accurately check children and adults at risk of anaemia during routine screening and acute illnesses without using blood
- Most health services now have non-invasive haemoglobin monitors as standard equipment — follow the manufacturers product information for the monitor used at your clinic

Attention

- **Do not** use non-invasive monitoring on people with oedema of the fingers (eg kidney disease, pregnancy) — use HemoCue monitor for POC test or do FBC pathology

For non-invasive monitoring (eg Masimo Rad or Pronto)

- Follow instrument manufacturer's recommendations
- Place sensor onto the 5th (little) finger of the persons non-dominant hand — this is the preferred site, other fingers can be used if needed
- For children under 10kg place onto big toe, extreme movement can cause inaccurate results — use HemoCue if needed
- **Do not** use under bright light (eg direct sunlight or surgical light) — move away from direct light source and cover finger with a cloth when taking measurement if required

For invasive haemoglobinometer (eg HemoCue)

- **Do not** do finger prick tests on children under 6 months — use heel instead. For healthy children first routine Hb test is at 6 months
- **Do** ask for help from a more experienced practitioner if you are having trouble getting enough blood to do this procedure — you need a full drop of blood for the test to work properly

- Finger/heel must be very clean and dry, remove nail polish and trim long nail — see Figure 5.18 for correct place to prick
- Hand or foot needs to have good blood flow — warm if needed
- Let blood drop form on its own — **do not** squeeze



Figure 5.18

- ▶ Haemoglobinometer reads Hb by colour of blood. If you squeeze to get blood you have extra serum, if skin left wet you have extra water and the reading will be wrong
- For reliable results use cuvettes from bottle
 - ▶ Opened less than 3 months ago. Write use-by date on bottle when you open
 - ▶ With lid firmly on. If lid off — throw bottle away

What you need

- Non-invasive haemoglobin monitor
- OR if not available
- Lancet
- Swab and/or warm water to clean finger/heel
- Calibrated haemoglobinometer
- Clean cuvette
- Clean gauze swab or cotton wool ball
- Small sticky plaster

What you do

- Follow manufacturer instructions for non-invasive haemoglobin monitor
- Check sensor is connected to machine and cable is not twisted or damaged
- Turn on power and type in persons demographics if prompted
- Press 'measure SpHb' button
- Record reading — note some machines will only display and hold data for 5 minutes
- Turn off machine and clean with multi-purpose disinfectant wipe or soft damp (not wet) cloth. Machine does not need sterilising
- OR if not available use haemoglobinometer
 - If site dirty — wipe with swab and/or clean water and let dry completely
 - Loosely hold finger or heel pointing downward — **do not** squeeze
 - Prick finger or heel using lancet — let drop of blood form
 - ▶ Pressing firmly against skin can give better puncture and blood flow

- Wipe away first 3 drops of blood
- Let fourth drop form, put cuvette tip into middle of drop, let cuvette fill by itself — Figure 5.19. Blood will flow easily into collection area
- If drop not big enough the first time — **do not add to it**. Start again with different finger or heel
- Check there are no air bubbles
- Wipe excess blood off outside of cuvette, quickly put into Hb machine, wait for reading
- Put firm pressure on puncture site to stop bleeding, put on sticking plaster
- If screen shows error *OR* unexpected reading — do test again. May be bubble in blood in cuvette chamber or dirty monitor in machine
 - ▶ If still unsure about result — recalibrate machine or take venous blood

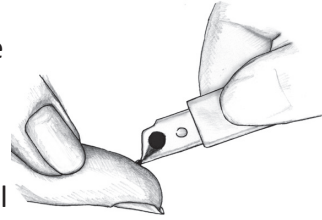


Figure 5.19

Collecting body fluids, viral cultures, skin specimens



Collecting sputum specimens

Attention

- **Remember, fresh is best — send to town within 3 days (72 hours)**
- Sputum is thick and slimy — coughed from deep in throat and lungs
 - If specimen thin and watery or contains bits of food — throw away
- Take **3 samples over 24 hours** (8 hours apart)
 - Cytology for cancer testing
 - AFB for tuberculosis (TB) testing
- Collect sputum for TB outside, away from other people — **do not** collect in toilet or communal space

What you need

- Sterile specimen jars

What you do

For MC&S (1 sample)

- Label specimen jar 'MC&S'
- Ask person to take several deep breaths, cough hard and spit into specimen jar. Do first thing in morning, or at time of consultation if urgent
- Store and transport under refrigeration within 3 days (72 hours)

For AFB or cytology (3 samples)

Collect samples at least 8 hours apart. Important to include early morning sample

- Give person 3 specimen jars labelled
 - Day 1 — Morning
 - Day 1 — Afternoon
 - Day 2 — Morning
 - *OR* can collect 1 straight away, 1 early next morning, 1 afternoon of second day (label with date and time collected)
- Ask person to take several deep breaths, cough hard, and spit into specimen jar

- **AFB**
 - Keep specimens out of sunlight. If room bright — put in brown paper bag then in biohazard bag
 - Keep cool and store in fridge if delay in transport — transport within 3 days (72 hours)
- **Cytology**
 - Store and transport under refrigeration within 3 days (72 hours)

Viral culture/smear

Attention

- Contact your local laboratory as viral kit types used differ across jurisdictions
- Store and use according to manufacturers instructions
- Check use-by dates — do not use out of date kits

What you need

- Viral collection kit — cotton swab, glass slide and holder, viral transport medium (VTM), sterile No. 23 scalpel blade
- Pencil and pen

What you do

- Label glass slide with pencil, label transport medium container with pen
- Lift top off blisters, pustules or scabs with point of scalpel blade
 - Rub base of sore (lesion) with cotton swab, then roll swab onto 2 wells (indents) on glass slide
- Let swab air dry, put into VTM
- Check slide is correctly labelled
- Store and transport VTM at room temperature
- Store and transport slide under refrigeration

Skin scrapings

Scabies

Attention

- To find scabies mite you need to find burrows and track marks
- Sores usually called scabies don't contain mite or its eggs — they are part of the allergic reaction

What you need

- Pencil and pen
- Glass slide and holder
- Blunt blade or wooden spatula
- Paraffin oil
- Magnifying glass

What you do

- Label glass slide with pencil, label holder with pen
- **Do not** scrape sore/pustule
- Use magnifying glass to find burrow and track mark sites
 - ▶ Using blunt blade or wooden spatula, scrape firmly from edge of site, collect as much skin as possible
 - ▶ May have to scrape hard to take off top of lump
 - ▶ Keep scraping until tiny flecks of blood are seen
- Repeat in at least 3 different places
- Put scrapings onto slide, leave to air dry, cover with a few drops of paraffin oil
- Check slide is correctly labelled
- On pathology request form — ‘Scabies microscopy’
- Store and transport at room temperature

Fungal lesions

What you need

- Yellow top (urine) container or appropriate container, labelled
- Pen
- Sterile scalpel blade — **do not** send any sharp scraping object with the specimen

What you do

- With blade at right angles to skin, scrape scaly edge of sore/lesion
- Hold open container underneath to catch flakes
- For large or multiple sores/lesions scrape in several places
- Put lid on container, check it is correctly labelled
- Store and transport at room temperature
- On pathology request form put ‘Fungal M&C on skin scrapings’ and also request ‘Scabies microscopy’ if suspected

Collecting swabs



See — Storing and transporting pathology specimens

Making slides

Attention

- Take slides out of holders, make sure they are ‘frosted side up’
- Write on frosted end of glass slide in pencil — pen ink will rub off or smear, fixative spray will wash ink off
- Be gentle — pressing too hard or rubbing backward and forward can destroy microscopic cells
- Make sure slides are dry before putting back into holders and snapping them shut — use rubber band or tape if catch won’t hold

What you need

- Clean glass slide with frosted end
- Sharp pencil, pen
- Cardboard or plastic slide holder
- Swab

What you do

- Label frosted end of slide with pencil, label slide holder with pen
- Take specimen, gently **roll swab once only** along glass slide — Figure 5.20 and Figure 5.21. Don’t press down or rub backward and forward
- **Always** leave to air dry
- When dry, put slide into holder, secure catch. Make sure slide correctly labelled

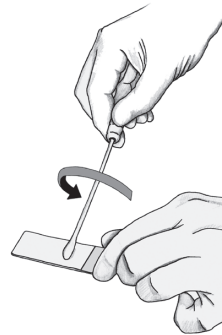


Figure 5.20



Figure 5.21

Wound swabs

What you need

- Sharp pencil, pen

MC&S

- Transport medium swab
- 0.5mL sterile normal saline
- Glass slide with frosted end, slide holder

NAAT

- *Aptima* or sterile dry swab

What you do

- Label frosted end of slide with pencil, label slide holder and swab container with pen

MC&S

- If wound dry (no pus) — wet tip of swab with sterile normal saline
- Starting at centre of wound, roll dry swab gently to edges, collecting any discharge on the way
- Gently **roll** swab **once** along glass slide — Figure 5.20 and leave to air dry
- Put swab into transport medium container, close firmly
- When slide dry, put into holder and secure. Make sure slide correctly labelled
- Store and transport at room temperature

NAAT

- Start at centre of wound, roll dry swab gently to edges. Collect any discharge
- Put swab back into container
 - If using *Aptima* swab — remove lid, put swab in tube — Figure 5.22. Break off handle at groove — Figure 5.23, leaving swab in tube



Figure 5.22

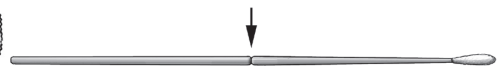


Figure 5.23

- Make sure swab container correctly labelled, closed tightly
- Store and transport at room temperature

Collecting eye, ear, nose, throat swabs

Attention

- Do throat swabs as quickly as you can so person doesn't gag
- If swabbing both eyes, ears or nostrils — need separate swabs and clearly labelled slide for each side (eg 'left eye' and 'right eye')

What you need

MC&S

- Wooden spatula/tongue depressor (for throat)
- Transport medium swab
- 0.5mL sterile normal saline
- Pencil and pen
- Glass slide with frosted end, slide holder
- Penlight torch

NAAT for eye, nose or throat

- Wooden spatula/tongue depressor (for throat)
- Penlight torch (for throat)
- *Aptima* or dry swab (flocked if available)

Nasal NAAT for influenza and other respiratory viruses

- Dry swab (flocked if available)

What you do

- Label frosted end of slide with pencil, label slide holder and swab container with pen

MC&S

- Wet tip of swab with sterile normal saline

For eye

- Tilt head back
- Hold lower eyelid down, ask person to look upward
- Run swab tip very gently along inside of bottom eyelid, from inner to outer corner of eye —
Figure 5.24

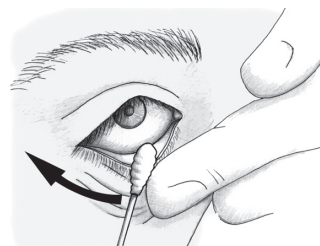


Figure 5.24

For ear

- Tilt head to one side
- Straighten ear canal
- Put swab about 0.5–1cm into ear canal
- Gently turn it around (rotate), take it out

For nose

- Push nose upward as shown — Figure 5.25
- Put swab up into nostril about 3cm, **parallel to roof of mouth** not to outside of the nose
- Gently turn swab around twice, take it out



Figure 5.25

For throat

- Tilt head back a little
- Hold down tongue with spatula/tongue depressor
- Look at throat with penlight to pick site/s — pus or red area
- Ask them to say 'aaghhh'
- Quickly rub swab over any pus or red areas on back of throat — Figure 5.26

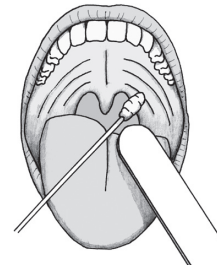


Figure 5.26

For all

- Gently **roll** swab **once** along glass slide — Figure 5.20, leave to air dry
- Put swab into transport medium container, close firmly
- When slide dry put into holder and secure
- Make sure all labelling is correct, store and transport swab and slide at room temperature

NAAT

- Roll swab for eye, nose or throat on slide as above
- Put swab back into container
 - ▶ If using *Aptima* swab — remove lid, put swab in tube — Figure 5.22. Break off handle at groove — Figure 5.23, leaving swab in tube
- Make sure swab containers correctly labelled, closed tightly
- Store and transport at room temperature

Vaginal and cervical swabs

- Low vaginal — see Self collected lower vaginal swabs (WBM)
- High vaginal and cervical — see Collecting samples — Swabs for STI (WBM), Cervical Screening

Collecting penile swabs

What you do

- Swab can be collected by practitioner or patient
- Swab opening of penis as for collecting wound swabs

Genital sore (ulcer) swabs

What you need

- *Aptima* or dry swab
- Sterile needle (for herpes-like sores)

What you do

- Swab base of sore or scab
- For herpes-like sores (blisters) gently burst with sterile needle, swab fluid
- Put swab back into container
 - ▶ If using *Aptima* swab — remove lid, put swab in tube — Figure 5.22.
Break off handle at groove — Figure 5.23, leaving swab in tube
- Make sure swab container correctly labelled, closed tightly
- Request 'Genital ulcer — herpes, syphilis, donovanosis NAAT

Collecting anal swabs for STIs

What you need

- 2 swabs
 - ▶ **NAAT** — *Aptima* or dry swab
 - ▶ **MC&S** — Amies transport medium swab
- Clean paper sheet or bluey

What you do

Both swabs

- Put clean paper sheet or bluey on bed
- Ask person to lie on left side with knees drawn up
- Gently put end of swab 1–2cm inside anus just past anal ring
- Run swab once around inside of anus
- Avoid faecal contamination as much as possible
- Put swab back into container
 - If using *Aptima* swab — remove lid, put swab in tube — Figure 5.22. Break off handle at groove — Figure 5.23, leaving swab in tube
- Make sure swab containers correctly labelled, closed tightly

Self-collected swabs

- For swab with transport medium (eg *Aptima*, *Amies*)
 - Remove container, leave swab in original packet
 - Do not give container to person
- For dry swab — leave swab in original container, break seal
- Give swabs to person and explain
 - Wash hands
 - Squat down, stand with one leg up on toilet seat or chair or sit on toilet with legs apart and lean forward
 - Take first swab from container or packet — **do not** touch swab tip with hands or any other object
 - Put tip of swab 1–2cm inside anus just past anal ring
 - Run swab once around inside of anus
 - Remove swab, put back into container or packet
 - Repeat specimen collection with second swab, put swab back into container
 - Wash hands, return swabs
- When person returns swabs
 - If swab in packet — put into transport tube
 - Make sure swab containers correctly labelled, closed tightly

Collecting urine



Two types of urine specimens collected

- **First-void urine**
 - First 20mL of urine stream. Can be collected any time of day but best collected first thing in the morning or at least 4 hours after last urination
 - NAAT to test for gonorrhoea, chlamydia, and trichomonas
 - **Mid-stream urine (MSU)**
 - Urine collected after allowing first part of urine stream to pass into the toilet. Usually need about 20mL
 - Albumin creatinine ratio (ACR) — protein secreted into urine from kidneys
 - Microscopy, culture and sensitivity (MC&S) — shows bacteria in urine
- If collecting urine for drug screening — follow same procedure as MC&S — doesn't have to be mid-stream

Attention

- Store urine dipsticks at less than 30°C and low humidity. May need to be in air-conditioned room
- If it takes 12 hours or more for urine sample to reach pathology — also use dip slide for MC&S
- Do ACR when person well. Best in morning after fasting — less false positive results from protein meals, exercise, infection
- For MC&S you need plain urine, may also need dip slide, stained sample
- Won't need all these tests every time — check which ones you need
- Give person paper bag to carry urine containers through public areas in clinic

Collecting specimens from older children and adults

What you need

- Private toilet area for person to pass urine
- Clean gauze swabs/sterile saline wipes
- Sterile water
- Clean paper towel

- 2 × yellow top sterile specimen jars labelled '1' and '2' — Figure 5.27
- Paper bag to carry collected specimen
- If delay of 12 hours or more before reaching pathology
 - Dip slide
 - 5mL plain sterile container
 - Formalin solution
 - Pipette



Figure 5.27

What you do

Ask person to

- Wash genital area with gauze swabs or sterile saline wipes, rinse with sterile water, dry with clean paper towel
- Catch first lot of urine in jar 1 (about 20mL)
- Catch second lot of urine in jar 2 (about 20mL)

For NAAT to test for gonorrhoea, chlamydia, trichomonas (jar 1)

- At least 8mL of urine in jar 1
- Store and transport under refrigeration

For MC&S (jar 2)

- **Plain sample** — at least 8mL of urine in jar 2
- **Dip slide** (if needed) is POC Test agar plate, its purpose is avoiding misleading impressions produced by growth of organisms in urine sample between collection and arrival at laboratory
 - Pipette small amount of urine from jar 2 over dip slide, screw top on tightly
- **Stained sample** (if needed) is a method to find cancer cells, renal (nephron/tubular) cells in the urine
 - Pipette 5mL urine from jar 2 into 5mL plain sterile container, add 3 drops of formalin, screw top on tightly
 - *OR* pipette urine into urine stain tube if available
- Make sure all samples are correctly labelled
- Store and transport jar 2 and the 5mL container under refrigeration
- Store and transport dip slide at room temperature

Finger tap method for newborns and young babies

- Safe and easy method of urine collection using bladder stimulation
- Can use for babies up to 6 months old — depending on how heavy they are

Attention

- Baby should have a good feed 15–20 minutes before trying this procedure
- Babies often wee when genital area cleaned — be ready to catch some

What you need

- 2 practitioners
- Soap and water for washing genitals
- Clean gauze swabs or cotton wool balls
- Sterile water for rinsing
- Clean paper towel
- Sterile specimen jar
- If delay of 12 hours or more before reaching pathology —
 - Dip slide
 - 5mL plain sterile container
 - Formalin solution
 - Pipette

What you do

- Wash genital area well with soap and water using clean swabs or cotton wool balls
 - For boys — gently pull back foreskin (don't force it)
 - For girls — clean gently around labial folds
- Rinse well with sterile water, dry well with clean gauze swab or paper towel
- First practitioner holds baby up by underarms, legs dangling
- Second practitioner uses 1 or 2 fingers to gently tap the suprapubic area at a rate of 100 taps per minute for 30 seconds — Figure 5.28
- If baby doesn't pass urine — gently rub lower back (lumbar area) in circular motion for 30 seconds — Figure 5.29
- Alternative method is to gently rub the lower abdomen for a few minutes using a circular motion with a gauze soaked in cold water with specimen jar ready to catch urine
- Repeat until mid-stream sample is caught — Figure 5.30. Usually within 5 minutes
- If finger tap method doesn't work —
 - Give baby another feed and try again

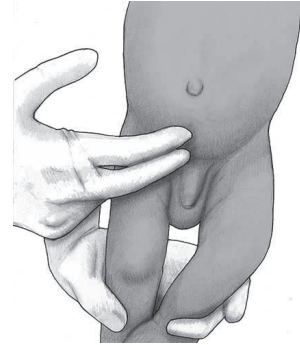


Figure 5.28



Figure 5.29

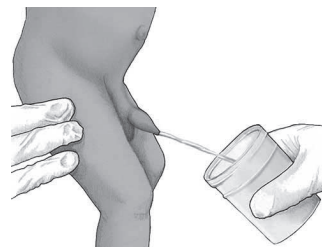


Figure 5.30

Collecting faeces and parasites



Faeces specimens

Attention

- **Remember, ‘fresh is best’ — must send to pathology lab within 3 days**
- Usually 3 specimens collected over 3 days, from separate bowel movements. If transport a problem — may only be able to collect 1 or 2
- **Do not** contaminate specimen with urine
- If person menstruating or has bleeding piles (haemorrhoids) — **do not** collect specimens for faecal occult blood testing (FOBT)
- If using specific faecal occult blood test (FOBT) tubes — **do not** empty out liquid already in tubes

Not all communities have daily transport services. Try to collect each specimen in the 24 hours before transport leaves. Repeat 3 times or as needed

What you need

- Sterile brown top faeces jar, or tube with scoop (usually built into lid), or use ordinary sterile specimen jar and wooden spatula
 - If available, use as a second specimen pot or tube, an ova, cysts and parasites (OCP) container also containing preservative
- Bed pan (disposable if you have one), nappy, plastic container or cling wrap over toilet seat to catch sample

What you do

- Label jars/tubes
- For infection (diarrhoea)
 - Scoop some faeces from pan, nappy or container into tube — about the size of a cherry *OR* pour in if runny
 - Screw lid on tightly
 - Request “Faeces MC&S and multiplex NAAT”
 - If you suspect worms — also request “OCP, strongyloides”
 - Interpreting results — **medical consult**

- For possible cancer — faecal occult blood test (FOBT)
 - Collect 3 specimens from 3 separate bowel movements
 - Put in 3 separate, labelled tubes
 - Request FOBT
- Store and transport as soon as possible at room temperature.

Anal swabs for threadworm

Attention

- Arrange to collect samples early in morning before person uses toilet or washes

What you need

- Clean paper sheet or bluey
- See through (transparent) sticky tape
- Wooden tongue depressor
- Immersion oil (transparent oil used in microscopy)
- Microscope
- Microscope slide

What you do

- Put clean paper sheet or bluey onto bed
- Ask person to lie on left side with knees drawn up
- Fold strip of tape over end of wooden tongue depressor, sticky side out
- Separate person's buttocks. Press end of tongue depressor against skin around anus in several places
- Lift tape up off depressor, put drop of immersion oil under middle, then replace. Will make tape more transparent
- Threadworms can be seen with naked eye
 - 2–13mm long, oval, slightly asymmetrical, cream or pearly-white in colour
- If you have microscope — put tape on slide, sticky side down
 - Look for threadworm eggs using 40x objective

6. Medicines

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Managing a remote clinic dispensary

Access to the drug storage room must be restricted to AHPRA registered staff who are able to possess and supply medicines

Room design

- Big enough to store
 - Medicines for chronic disease and acute imprest separately
 - Individual patient labelled medicines and/or dose aids
- Space for 2 fridges
- Lockable door, duress alarm, security screens on all windows, no public access, telephone with external line
- Good lighting
- Constant room temperature (less than 25°C) with good air circulation. Air conditioners should be connected to back-up power supply
- Shelving — clearly labelled, enough room to store and display medicines
 - If shelving above shoulder height — non-slip step or two-rung ladder
- Workbench with waterproof top, large enough for at least 2 practitioners to prepare medicines for dispensing
 - If workbench low — adjustable swivel chair on wheels
- Computer with access to internet and electronic file notes
- Label printer
- Stainless steel sink, elbow control taps, soap dispenser, paper towel holder
- Equipment for dispensing medicines — purified water, measuring devices, medicine cups, paper cups, syringes, tablet cutters, mortar and pestle (for crushing tablets), tablet counter (eg triangle)
- Equipment for packaging medicines — dose aids, labels, cartons, bottles, time of day (sun and moon) stickers, warning labels
- Containers for return of unwanted medicines (RUM)

Lockable safe

- Safe attached to wall, large enough to store all controlled drugs and prescription medicines that can be misused (eg benzodiazepine, codeine)
- Drug register for recording supply and use of all restricted S4 and S8 medicines
 - In some states/territories you need 2 separate safes and books

Cold storage areas

- 2 fridges — should be large enough to allow free air circulation around medicines
 - ▶ 1st for storing vaccines — purpose built vaccine fridge
 - ▶ 2nd for all other medicines needing refrigeration
- Both monitored twice a day for temperature — should be between 2–8°C
 - ▶ Plugged into back-up power supply
 - ▶ If the fridges can not be stored in the drug storage room — must be lockable and remain locked when not in use
 - ▶ Display current Vaccine Cold Chain Graph

Reference manuals

- Medicine specific books — print or electronic versions
- Examples include
 - ▶ *Australian Medicines Handbook* (essential)
 - ▶ *Australian Injectable Drugs Handbook* (essential)
 - ▶ *Australian Immunisation Handbook* (essential)
 - ▶ *Australian Therapeutic Guidelines*
 - ▶ *Don't Rush to Crush*
 - ▶ *Medicines Book for Aboriginal and Torres Strait Islander Health Practitioners*
- Best-practice guidelines — (eg *Standard Treatment Manual*, *Women's Business Manual*)

Ordering medicines

- Supplying pharmacies should provide written procedures and forms for ordering impromptu and chronic diseases medicines. Contact pharmacy if these are not available
- Submit orders for wet season or events (eg ceremonies, sports carnivals, mass treatment programs, clinical trial) in advance, to give pharmacy time to organise stock

Stock management

Remember: Check medicine stocks in your emergency kit and ambulance as well

- Store and transport medicines at recommended temperatures — under 25°C for shelf medicines, 2–8°C for fridge medicines
- Unpack and store medicines as soon as possible after delivery
 - Store in categories by active ingredient in alphabetical order
 - Label shelves with generic names of medicines
 - Document how your medicine stock is organised to make it easier for all staff, including visiting doctors, nurses
- Work with supplying pharmacist to develop and regularly review imprest list
 - Use local guidelines and protocols to help decide what medicines to keep
 - Keep order quantities at levels that reflects twice your order period usage, for example if you order monthly — keep 2 months worth of stock. This covers you for any delays in delivery or unexpected high use
- If using imprest list — keep list in same order as medicines on shelves. Makes it easy to fill your order. Fill imprest list as you check along shelf
- Keep medicine containers neat and clean so easy to find, labels easy to read
- Circle use-by/expiry date on new stock or write clearly on container
- Put new stock behind current stock — try to make sure older stock (first to expire) is used first
- If use-by/expiry date only printed on outer package, keep stock inside package until it is going to be used
 - *OR* if items must be taken out of original packaging — write use-by/ expiry date on each separate item
- Stock should be regularly checked for short-dated or expired stock, check the policy for this process. Make this part of your routine clinic checklist
 - Try to use, or redistribute in region, any stock that will expire soon
 - Dispose of expired stock according to organisation policy

Supporting resources

- NACCHO Medicines Management Network and Resources

Storing and transporting vaccines and medicines

Attention

- Vaccines must be stored and transported within the recommended temperature range of +2°C to +8°C at all times — aim to store vaccines at +5°C
- Most vaccines are destroyed by freezing, and are sensitive to heat
- If not stored at correct temperature (cold chain breach) — vaccines will not work as well and people may not be immunised
- Vaccines will arrive with a temperature monitoring device (eg TagAlert). Ensure you know how to read it — contact pharmacy if instructions unclear
- Know what monitoring system to use when vaccines are used away from the clinic — (eg coolers, ice packs, thermometers/data loggers)
- Clinics must have a written policy for vaccine management. Designate 1-2 people to look after vaccines. Refer to the 'Strive for 5' national vaccine storage guidelines — keep copies available

Vaccine Storage

Vaccine fridge

- **Purpose built vaccine refrigerator** plugged into back-up power supply, if available
- Label power supply 'DO NOT turn off power or disconnect this refrigerator'
- Clear (glass) door, clearly labelled shelves or baskets so you can see what's inside without opening door
- Warning sticker on glass door 'STOP Do not open door until you know which vaccines you need and where they are located'
- Temperature probe on inside, temperature monitor on outside
- Monitors supplied with vaccines (if appropriate)
- Minimum of one heat and one freeze monitor on each shelf
- Vaccines stored away from sides, top and bottom to allow for circulation of air
- Stock rotated — new stock behind current stock

Remember:

- Vaccines used outside main clinic must be transported and monitored as per national vaccines storage guidelines ('Strive for 5')

- Only vaccines, blood products or antivenoms are stored in vaccine fridge
- **Do not store food or other goods in vaccine fridge**

Cold Chain Breach

- Temperature monitoring device will indicate freezing or heat exposure
- Check highest and lowest fridge temperatures twice a day, before opening fridge for first time and at end of the day — record on temperature graph chart
- If big variations from 2–8°C temperature range — find out why. May be the weather, power supply, fridge, thermometer/monitor problem
- Adjust fridge settings slightly if you need to, but don't make sudden, drastic changes. Fridge temperature controls can be tricky
- If vaccines are too warm or too cold when they arrive *OR* if recorded fridge temperatures are outside 2–8°C range (**cold chain breach**) — store where they will not be used, follow cold chain breach procedure *AND* talk with pharmacy or state vaccine centre to find out what to do with them
- **Fix problems as soon as you can to stop loss of vaccines and possibility of giving vaccines that won't work**

Power cuts

- **Do not open fridge door**
- If you know power is going off for more than a few hours
 - ▶ Take vaccines out, close door quickly
 - ▶ Surround or wrap vaccines loosely in insulating material (eg polystyrene chips, shredded paper, bubble wrap, newspaper) put in esky
 - ▶ **Do not** let bare ice bricks touch vaccines — may freeze
 - ▶ Put esky back in fridge with ice bricks, keep door closed, keep heat and freeze sensitive monitors with vaccines

Supporting resources

- 'Strive for 5' national vaccine storage guidelines

Giving medicines



Make sure you are *legally* allowed to give the medicine

Remember: Right patient, Right medicine, Right dose, Right route, Right time, Right documentation, Right to refuse

What you do — follow the RIGHTS for giving medicines

RIGHT patient

- Make sure you have right patient and right set of records
 - Ask patient's name, date of birth, bush name, next of kin
 - Check patient's name and date on prescription

RIGHT medicine

- Check name and spelling of medicine against prescription
- Check use-by/expiry date on package
- Is it safe for this person — **always** ask about allergies, pregnancy, breastfeeding, other medicines, medical problems (eg kidney problems)
 - Could it interact with other medicines the person is taking
- Is it in your protocol manual (eg *STM*, *WBM*)
- Look up in reference manual (eg *AMH*, *Medicines Book*). What is it, how does it work, what is it used for
- Are you allowed to give the medicine or do you need to contact doctor or pharmacist

RIGHT dose

- Check dose on prescription and in reference manual (eg *AMH*, *STM*, *WBM*)
- Check strength — medicine can be packaged in a range of different strengths and forms
- Measure dose carefully using proper equipment
- If dose is by weight — check person's weight. **Always** weigh children
- Watch and help parent/carer give first dose to children

RIGHT route

- Check how to administer (give) medicine
 - Oral — tablets, syrups, sublingual, buccal
 - Injection — IM, IV, subcut
 - On the skin — transdermal, topical

RIGHT time

- Check how and when medicine should be taken — night, morning, with food, on empty stomach
- Use times that are meaningful to the person

RIGHT documentation

- Record medicine administered/supplied in file notes. Include active ingredient, dose, frequency, quantity supplied — (eg dicloxacillin 500mg 4 times a day (qid), 24 caps)

RIGHT to refuse

- Person may not want to take medicine you give them
- Make sure person knows reason for the medicine so they can make an informed decision
- If person doesn't want to take medicine — try to find out why, a different medicine may be appropriate
- If person still doesn't want to take medicine — always document this

Label medicine

See example of completed medicine label — Figure 6.1

- Written in red on white background — **KEEP OUT OF REACH OF CHILDREN**
- Name (active ingredient) of medicine, strength (eg microgram, mg, g) and form (eg liquid, tablet, capsule)
- Total number of tablets or amount of liquid in package
- How to take, dose and number of times a day — 'Take 2 tablets 3 times a day'
- Name of patient
- Name, address, phone number of clinic
- Your name or initials, date you gave out medicine, medicine use-by/ expiry date (take from original packet), prescription reference number (if your clinic uses these)

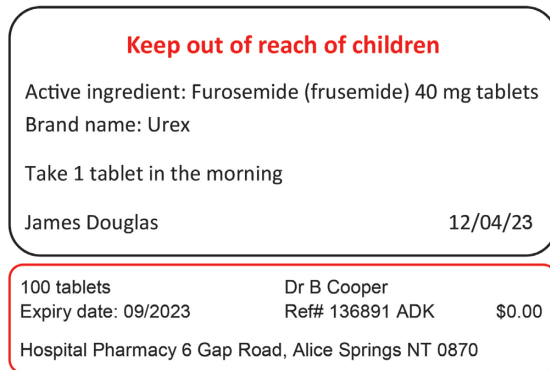


Figure 6.1

- Special directions — ‘Take with food’, ‘Keep in fridge’
 - Use warning stickers if your dispensary has them
 - Use medicine time stickers for people with poor english or eyesight
 - Morning/evening — Figure 6.2
 - Middle of the day — Figure 6.3
 - Night time, before bed — Figure 6.4



Figure 6.2

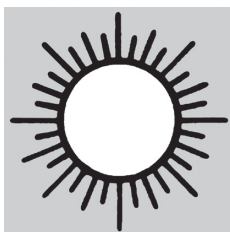


Figure 6.3



Figure 6.4

Check what you have done and document

- Record in file notes, hand-held record for travellers, in register (eg Schedule 8), if needed
- Make sure file notes include
 - Name of medicine, date and time of supply
 - Reasons for giving
 - Name of person ordering medicine, or protocol used
 - Strength and amount (quantity) given (eg 2mg in 4mL, 20 × 500mg tabs)
 - Way it is given (route) — (eg by mouth/oral or by injection into muscle/IM)
 - Dosing instructions — (eg ‘Take 1 tablet 3 times a day’)
 - Counselling given, including any possible side effects
 - Name and designation of person supplying medicine

Before giving medicine make sure person knows

- Why they are taking the medicine
- Possible side effects and what to do about them
- When and how to take it
- How to store it (eg in fridge, away from children)
- What will happen if they don’t take it
- What other things to do to manage condition (eg exercise)
- Ask them to repeat what you told them to make sure they understand

Check

- Are tests needed (eg blood tests)
- Does person need to come back to clinic and when

Dose administration aids

Includes dosette boxes, blister packs, sachets

Filling dose administration aids (dose aids, DAA)

Do not

- **Do not** get distracted when filling dose aid. Focus on the job
- **Do not** use dose aid label to refill aid — it may have an old prescription
- **Do not** put packets back onto shelves or throw away empty containers until dose aid has been checked

Attention

- **For medicine safety** — best to have dose aids filled by pharmacy if possible (eg sachets, blister packs)
- Dose aid must be labelled **“KEEP OUT OF REACH OF CHILDREN”**
- If person visiting from another community — ask if they have a copy of their prescription/s. If not check electronic health record or ask their clinic to send current copy

What you need

- Up-to-date prescription or file notes
- Dose aid
- Pen
- Medicine/s — take **extra care** to find the right medicine

What you do

- Check right person and right prescription or file notes
- Clean reusable dose aid. Most slide out at side for easier cleaning and refilling
- Clean and tidy preparation area, ensure hands clean

Dose aid label

- You must check every time dose aid is filled
 - ▶ Full name of person
 - ▶ Name and strength of medicine
 - ▶ Amount to give, how to give, how often
 - ▶ Name of clinic where usually filled
 - ▶ Label and any changes to medicines are clear. If not — use new label

Filling dose aid

- Put in medicines one at a time. Follow current prescription in same order
- Put medicine packet back into basket or move to one side
 - **Do not** put packets back onto shelves or throw away empty containers until dose aid has been checked
- Record in file notes — date, your name and designation, name of person checking, whether dose aid was given to person or stored for later collection
- Check again you have right person, they understand how to use dose aid
- **Before sealing** check filled dose aid by asking another staff member to check medicine/s in dose aid using the process described below. If not possible — do a second check yourself
- Write on sticker across end of dose aid — date, your name, clinic name

Checking filled dose aid

What you do

- Check
 - Medicine used has not expired
 - Both original medicine packet and label on dose aid match prescription
 - One full day's medicine by emptying out cell/s and refilling from prescription, checking colours from original packets if needed
 - Each of the other cells for **same number and colour** (eg 2 small white + 2 large white + 1 yellow + 1 blue/white capsule = 6)
- Sign and date record of dose aid check in file notes or on prescription. Make sure person filling dose aid has also signed file notes or prescription
 - Document number of doses given and expected completion date (when refill needed)
- Close dose aid and seal if possible. Some reusable dose aids can be sealed by putting a sticker across opening end. Initial and date sticker

Medicine by delivery type

Attention

- If medicine has bitter taste — have person suck on an ice cube before taking
- Give children sultanas, fruit, orange juice to help cover unpleasant taste

Giving tablets

Attention

- **Do not crush enteric-coated tablets or slow-release tablets.** If not sure — check prescription or refer to a reference manual

What you do

- To halve tablets
 - Only halve tablets that have a line — Figure 6.5
 - Use a tablet cutter or sharp knife on clean piece of paper towel
- To crush tablets
 - Check manufacturer's instructions or *Don't rush to crush* resource to see if this is OK
 - Crush between 2 spoons or use mortar and pestle. Mix with honey and/or give with a drink of water



Figure 6.5

Giving syrups

What you do

- If syrup not premixed — add exact amount of sterile water prescribed on bottle. If sterile water not available — use clean tap water
 - Use graduated measure or syringe for exact measurements
- Shake syrup bottle to mix well. Watch for powdery lumps
- Put medicine cup on bench and bend down so cup at eye level to check you are pouring out exact amount. If amount small — use syringe

Giving medicines under tongue (sublingual) or inside cheek (buccal)

Attention

- Sublingual medicines may only be effective for a certain period of time after opening (eg 3 months) —
 - **Do not** use if packet open and has no date or has been open too long
- When opening new packet, write date of opening on it
- Get person to wet tablet with saliva and put under tongue. Wait for it to dissolve. If any tingling — tell them to put in cheek instead

Putting medicine patches onto skin (transdermal)

Attention

- Follow instructions for individual patches — see *AMH*
- Make sure old transdermal patch removed — some are replaced straight away, others need to stay off for 10–12 hours (eg glyceryl trinitrate)
- Rotate site used for patches
- Check how long new patch should stay on — may be hours or days
- Wear gloves *OR* if too difficult to put on patch wearing gloves — wash hands straight afterwards so you don't absorb any medicine yourself
- Dispose of patch safely — follow policy for medicine type in the patch

What you do

- Clean, carefully dry new site. If person hairy — shave area so patch sticks
- Write time and date applied on edge of patch
- Take foil off patch, smooth patch onto site sticky-side down
- If person very sweaty or weather hot or humid — put plastic see-through dressing or paper tape over patch to keep in place

Giving medicine through nasogastric tube

- See — Putting in nasogastric tube

Attention

Tube must be in right place before you start giving medicine

What you need

- pH test strip to test tube's position
- 10–20mL syringe barrel — you don't need plunger
- Medicine in a medicine cup
- 20mL of tap water in a cup

What you do

- Test that tube is in stomach — see Putting in nasogastric tube
- Fold small piece of nasogastric tube over to clamp it off
- Take out tube stopper/plug, connect syringe barrel to tube
- Pour dose of medicine into syringe barrel
- Unfold tube, hold tube and syringe up high to let medicine flow down tube. **Do not** force with syringe plunger
- When empty, add 10–20mL of water to syringe barrel, hold it up to flush. When empty, fold tube over again to clamp it off
- Take off syringe, unfold tube, put back stopper/plug

Giving rectal suppositories

Attention

- **Do not** let suppository get too warm, will soften and be hard to put in

What you do

- Ensure privacy
- Lie person on left side
- Take suppository out of packet, lubricate pointy end
- Separate buttocks, ask person to breathe deeply and try to relax
- Gently push suppository into anus (pointed end first), to length of your finger — Figure 6.6
 - Adults and older children — use forefinger
 - Younger children and infants — use little finger
- Do again if second suppository needed
- Take out finger, gently hold buttocks together until urge to pass faeces stops
- Wipe area with tissues

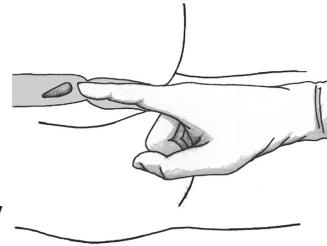


Figure 6.6

Giving injections



Attention

- To prevent needle stick injuries, always carry injections in plastic tray or kidney dish and have sharps container close by

Before giving injection

- Always check file notes, ask person about allergies or adverse reactions
- Remember the RIGHTS before giving any medicine
- Always check manufacturer's instructions
- If injection site dirty or bloody — wash with soap and water

Preparing injection

- Draw up solution, put drawing up needle in sharps container
- Put on fresh, sterile needle to give injection except insulin syringes — needles can't be removed

To stop injection stinging

- Before giving — clean site with Chlorhexidine 2% in isopropyl alcohol 70% wipes, let dry completely
- After giving — use gauze or cotton wool to press down firmly on site

Angle and depth of injections — Figure 6.7

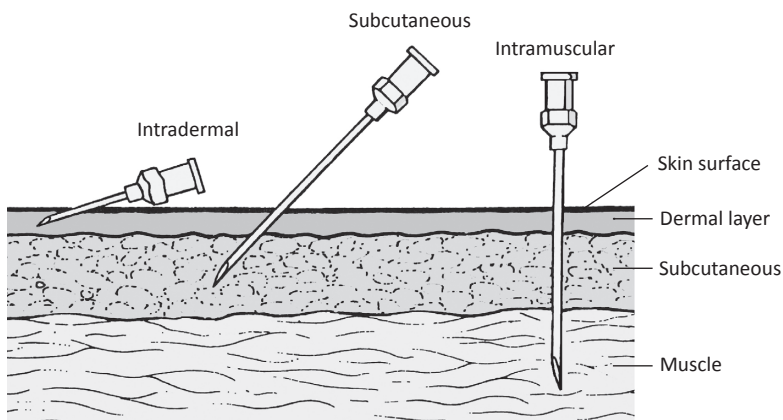


Figure 6.7

Injection sites

Subcutaneous (subcut) or intramuscular (IM) injection sites

- Anterolateral (outside) thigh (vastus lateralis), baby or toddler — Figure 6.8
- Anterolateral (outside) thigh (vastus lateralis), child or adult — Figure 6.9
- Deltoid (upper arm) — Figure 6.10
 - ▶ **Do not** use for children under 12 months
 - ▶ Best site for small injections in adults

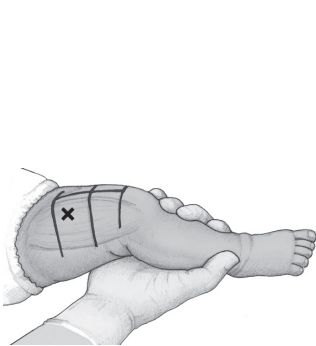


Figure 6.8



Figure 6.9

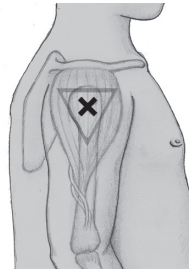


Figure 6.10

IM injection sites

- Ventrogluteal
 - ▶ Better than gluteal (buttock) as less risk of damage to nerves or blood vessels
 - ▶ Best site for large injections in adults
 - ▶ Child — lie over carer's knee, upper leg flexed — Figure 6.11

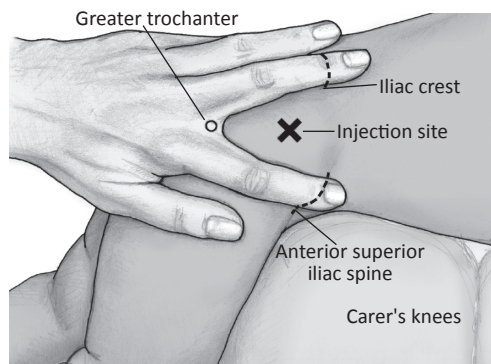


Figure 6.11

- ▶ Adult — Figure 6.12 OR lie on side, upper leg flexed and forward

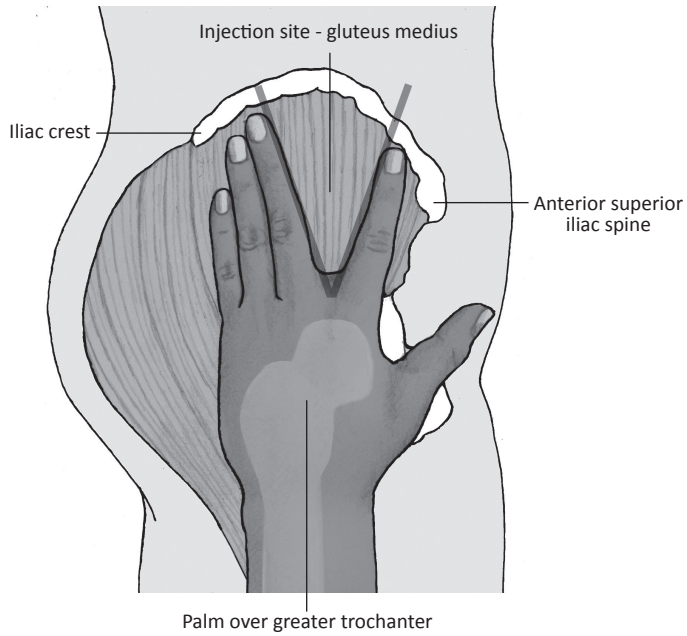


Figure 6.12

- Gluteal (buttock) — Figure 6.13
 - ▶ **Do not use for babies, toddlers, small preschool children**

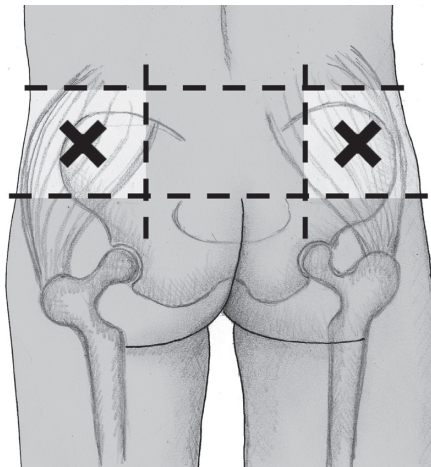


Figure 6.13

Intradermal injections

Attention

- Used for Mantoux test or Mycobacterium bovis (Bacillus Calmette and Guerin [BCG] strain) vaccine
- First check person's Mantoux status
- Only give Mantoux test or BCG immunisation if authorised to do so
- Mantoux test — usually given in inner forearm — Figure 6.14
- BCG immunisation
 - Give in deltoid area (upper arm)
 - Check regional guidelines to see if right or left arm used
- **Do not** cover Mantoux test or BCG immunisation injection site with dressing

What you need

- Injection tray
- Insulin syringe
- Gauze swab
- Injection solution

What you do

- Choose injection site, clean if needed, let dry completely
- Draw up solution
- Hold syringe with needle lying flat to skin and bevel edge facing up
- Slide needle under skin until it disappears, then a little further so it goes into intradermal tissue. Keep level with skin — Figure 6.14
- Slowly inject solution until you see wheal (raised area)
- If wheal is not appearing — **do not** repeat dose — adjust needle position and continue injection
- **Do not** put pressure on site after taking out needle. Ask person to blow on area until it dries
- **Do not** rub site or put on sticking plaster. Leave open to air

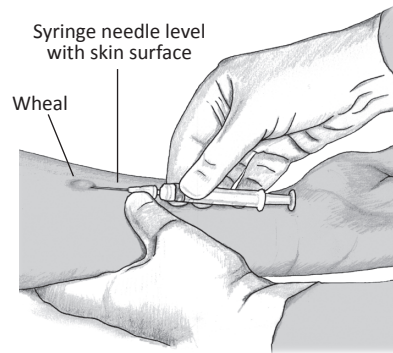


Figure 6.14

Subcutaneous injections

Attention

- If person has daily injections (eg insulin for diabetes) — change injection site often.
- Only suitable for small volumes (0.5ml - 1ml) water soluble medicines

What you do

- For angle and depth of injection — Figure 6.7
- For injection sites — see Figure 6.8, Figure 6.9
 - Fatty pad below umbilicus can also be used in diabetes

Subcutaneous cannula

Attention

- Used for people in palliative care or who can't swallow medicines
 - More comfortable than repeated IM or IV injections
 - Less likely to become infected
- **Do not** use metal butterfly needles. Less comfortable and site needs to be changed more often
- Subcut catheter system (eg *Intima*)— Figure 6.15 allows regular administration of medicine by
 - Injecting into side portal
 - *OR* Continuous infusion through syringe driver
- If catheter system not available use 22–24G cannula
- Rotate sites. Make a plan using sites that allow person the most movement



Figure 6.15

What you do

Choose site

- **Do not use**
 - Breast tissue or skin folds
 - Portacath or CVC sites
 - Stoma sites
 - Tumour masses, tumour nodules, oedematous areas
 - Scar tissue, mastectomy sites
 - Bony areas

- Consider these sites
 - Intercostal spaces on anterior chest wall
 - Above pectoralis muscle
 - Anterior abdominal wall — **do not** use if ascites, abdominal disease, oedema
 - Upper arm — **do not** use if bed-bound and needs frequent turning
 - Outer thigh
 - Above shoulder blades — good if person restless or disorientated

Put in subcut catheter system or cannula

- Trim hairs if needed
- Clean site with Chlorhexidine 2% in isopropyl alcohol 70% wipes, allow to dry
- Prime line with sterile water or normal saline
- Lift fold of skin between forefinger and thumb, put in full length of cannula at 30° angle
- Tape down butterfly flaps with transparent film dressing
- Remove metal insert, put in sharps container
- Attach injectable bungs to outlets (if not already there)

Follow-up

- Label site with date of insertion, record site in file notes
- Check site regularly and before giving medicine for swelling, redness, leakage
 - If present — change site straight away
 - If not present — change site in 7–10 days

Intramuscular injections

Attention

- Using small bore needle causes more pain, as more pressure needed
- Usually use 25mm long needle, may need larger if obese. Use 16mm for small babies

What you do

- Choose site — Figure 6.8 — Figure 6.13
 - If repeat injection — use different site to last time
- Position limb so muscle being injected into is relaxed
- Ventrogluteal
 - Child — lie over carer's knee, upper leg flexed
 - Adult — if adult prefers to stand Figure 6.12 OR lie on side, upper leg flexed and forward

- Gluteal (buttock) — stand bent forward with hands on bed *OR* lie on stomach (prone) with foot on same side turned inward
 - ▶ If person large or tall — suggest lying down, won't hurt themselves or you if they faint
- Outside thigh — lie on back (supine) with toes pointing straight up
- Upper arm — sit with elbow bent and forearm supported
- Clean site if needed, let air dry
- Pull skin tight, or use Z-track method — put in needle quickly at 90° to skin
- If giving in gluteal (buttock) — pull back plunger a little to make sure you are not in blood vessel. If blood seen — change site
- Slow steady injection
- Remove needle quickly, apply pressure to injection site

To lessen pain of thick injections — (eg Bicillin L-A) (benzathine benzypenicillin, penicillin G), procaine benzylpenicillin (procaine penicillin)

- These injections are very painful. Best to have helper, person may try to grab syringe
- Consider individualised strategies for managing pain, fear and distress
- Mix well by shaking
 - ▶ *OR* Warm and mix by rolling syringe in your hands for 1 minute
- Use needle provided with pre-loaded syringe
 - ▶ **Do not** change to smaller bore needle, more likely to get blocked
 - ▶ **Do not** pre-load needle — leave hollow part of needle empty
- Before injecting
 - ▶ Put ice pack on site
 - ▶ Press **hard** on site with thumb and count to thirty (30–60 seconds)

Z-track injections

Attention

- Use for
 - ▶ Thick injection fluids (eg Bicillin L-A) — can leak out through large bore needle track
 - ▶ Iron injections — can permanently stain skin if solution leaks out

What you do

- Choose site
- Larger/older children and adults — IM into
 - ▶ Ventrogluteal — Figure 6.12
 - ▶ *OR* Buttocks — Figure 6.13
- Small children — IM into
 - ▶ Anterolateral (outside) thigh — Figure 6.8, Figure 6.9
 - ▶ *OR* Ventrogluteal — Figure 6.11
- Pull skin down from chosen site, hold in this spot — Figure 6.16
- Put needle into muscle and give injection slowly
- When finished, leave needle in place for about 10 seconds. This stops medicine solution leaking out onto skin surface
- Take needle out, let go of skin — this will make Z-track — Figure 6.17

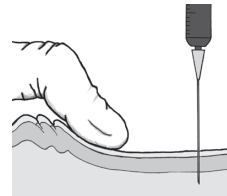


Figure 6.16

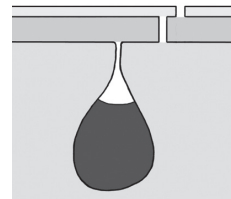


Figure 6.17

Giving medicines to babies and young children



What you do

For infants

- Use dropper or syringe to put one drop at a time onto tongue and wait for them to swallow — Figure 6.18
- *OR* use syringe nozzle between gums and cheek to give small amounts at a time — wait for swallow reflex
- *OR* if breast fed — use syringe nozzle between breast and side of baby's mouth to give small amounts at a time — Figure 6.19



Figure 6.18

For young children

- Hold in positions shown — Figure 6.20, Figure 6.21, Figure 6.22
 - If kicking — put legs between carer's thighs and ask carer to hold tight
- For medicine — use syringe or cup. If cup, keep medicine cup to lips, so if child spits out syrup you can catch it and give it to them again
- A fruit syrup may be used to improve the taste of medicine but makes the volume larger
- Older children can be taught to swallow tablets where the dose allows. This is more reliable dosing and easier for parent and child



Figure 6.19



Figure 6.20



Figure 6.21



Figure 6.22

Supporting resources

- Teaching children to swallow pills poster

Giving IV medicines by injection



Also see — Putting in IV cannula

Attention

- **Do not** give medicine if cannula site painful, red, swollen — re-site cannula
- Always refer to Australian Injectible Drugs Handbook
- Some IV medicines should be given very slowly — check before use

What you need

- Infusion bag — if used, connect to primed IV line
- Infusion pump (if required)
- Medicine prepared correctly in syringe or infusion bag
 - ▶ Medicine label — to be put on infusion bag
- IV flush (usually normal saline)
- Needles *OR* connections that go into IV bung (if needed)
- Chlorhexidine 2% in isopropyl alcohol 70% wipes

What you do

- Before giving medicine — check person ID
- Always check file notes, ask person about allergies or adverse reactions
- Remember the RIGHTS before giving any medicine
- Always check manufacturer's instructions
- If giving medicine directly into IV cannula
 - ▶ Clean bung with chlorhexidine 2% in isopropyl alcohol 70% wipe for 30 seconds, let dry
 - ▶ Flush IV cannula with normal saline for patency
 - ▶ Give prepared medicine according to manufacturer's instructions
 - ▶ Monitor for reactions to medicine or pain around cannula. If either happen — stop immediately
 - ▶ Flush IV to clear cannula of medicine
- If giving medicine into infusing line
 - ▶ Find IV bung on IV line
 - ▶ Clean bung with chlorhexidine 2% in isopropyl alcohol 70% wipe for 30 seconds, let dry
 - ▶ Give prepared medicine according to manufacturer's instructions using infusion pump if required

- ▶ Monitor for reactions to medicine or pain around cannula. If either happen — stop immediately
- ▶ When finished — take needle/connection out of bung
- ▶ Restart IV slowly to flush, then return to infusion rate needed
- If giving medicine as IV infusion
 - ▶ Clean bung with chlorhexidine 2% in isopropyl alcohol 70% wipe for 30 seconds, let dry
 - ▶ Flush IV for patency
 - ▶ Connect new primed IV line attached to infusion bag
 - ▶ Put medicine label on infusion bag
 - ▶ Give prepared medicine according to manufacturer's instructions using infusion pump if required
 - ▶ Monitor for reactions to medicine or pain around cannula. If either happen — stop immediately
 - ▶ When finished, remove IV line, if required
 - ▶ Flush IV to clear cannula of medicine

Giving iron by IV infusion



Also see — Putting in IV cannula

Attention

- **Do not** use in first 3 months of pregnancy
- **Procedure only applies to giving ferric carboxymaltose (eg Ferinject) which must be ordered by a doctor**
- Clinician trained in basic life support must stay with person during infusion
- Have anaphylaxis kit and emergency equipment ready in case of reaction (rare)
- If any signs of adverse reactions — **stop infusion straight away**
- Monitor for risk of extravasation (fluid in the tissues) which causes permanent and disfiguring skin staining
- IV site must be carefully chosen and IV cannula patency must be absolutely secure to minimise risk of extravasation
- Can safely be administered by
 - Slow IV bolus injection
 - IV infusion using a gravity feed giving set
 - IV infusion using an IV infusion pump

What you need

- Ferric carboxymaltose (eg *Ferinject*)
 - Ferric carboxymaltose available in 2mL (100mg iron) and 10mL (500mg iron) vials
- IV cannula — 18G–20G for adult, 22G–24G infants and children
- Required volume of normal saline
 - 10mL normal saline ampoule *OR* 50mL normal saline
- Drawing up equipment — 10mL syringe, 18G needles × 2
- IV giving set *OR* gravity feed giving set *OR* 20mL syringe
 - IV infusion pump (if needed)
 - Additive labels/IV bag sticker
- Chlorhexidine 2% in isopropyl alcohol 70% wipes
- Tape
- Bluey
- Tourniquet
- See-through dressing

What you do

- Check Temp, pulse, BP, RR, cannula site
 - Before starting infusion
 - 5 minutes after starting infusion
 - When infusion complete
- Discuss risks of infusion with person (eg extravasation) and gain consent
- Select IV cannula site to avoid flexion — antecubital fossa, wrist or back of hand. Distal forearm is preferable
 - Choose largest possible cannula — 18-20G for adult, 22-24G for infants and children
 - Put in IV cannula, check and secure with tape
 - Flush with saline to make sure you are in a vein. **If patency is uncertain, iron infusion cannot be given**
 - Put see-through dressing over cannula
- Work out dose of ferric carboxymaltose, amount of normal saline needed — Table 6.1
 - Adult — see relevant anaemia protocol
 - Child — **medical consult**

Table 6.1 Dilution for ferric carboxymaltose (*Ferinject*)

Iron dose	Ferric carboxymaltose (<i>Ferinject</i>) volume	Sodium chloride 0.9% volume
200–500mg	4–10mL	100mL
500–1,000mg	10–20mL	100mL

- Work out infusion rate of ferric carboxymaltose — Table 6.2

Table 6.2 Maximum infusion time

Slow IV bolus injection	IV infusion using a gravity feed giving set <i>OR</i> pump
<ul style="list-style-type: none"> • Dose 100–200mg iron — 100mg/min • Dose 200–500mg iron — 100mg/min • Dose 500–1,000mg iron — maximum infusion time 15 minutes 	<ul style="list-style-type: none"> • Dose 100–200mg iron — maximum infusion time 3 minutes • Dose 200–500mg iron — maximum infusion time 6 minutes • Dose 500–1,000mg iron — maximum infusion time 15 minutes

- Ask another practitioner to check
 - Dose, infusion rate
 - That you have correct form of iron solution — **do not** use iron polymaltose
 - Check vials have no sediment
- Wash hands and put on gloves
- Draw up dose of ferric carboxymaltose and add to correct sized normal saline infusion bag
 - Tip bag up and down (invert) several times to make sure the contents are well mixed
 - Fill out additive label and stick onto infusion bag
 - Put together IV giving set, prime line with fluid, let out any air bubbles
 - Attach giving set to IV infusion pump *OR* hang gravity feed bag
 - Connect and run iron infusion
- If any signs of irritation around cannula or adverse reaction, **stop infusion** — **medical consult**
- Person should stay at clinic for at least 30 minutes after end of infusion
- Check temp, pulse, BP, RR before they leave clinic

Giving oxygen

Table 6.3 **Oxygen flow rates**

Oxygen delivery system	Oxygen flow rate — Infant under 1 year	Oxygen flow rate — Child 1–9 years	Oxygen flow rate — 10 years and over	Examples of medical conditions
Nasal prongs / cannula (not humidified)	1–2L/min	1–2L/min	2–4L/min	<ul style="list-style-type: none"> • Bronchiolitis • Mild pneumonia • COPD
	Target O ₂ sats — 94–98%			
Simple mask (eg <i>Hudson</i> mask)	5–10L/min			<ul style="list-style-type: none"> • Bronchiolitis • Pneumonia • Chest pain with hypoxia or breathlessness • Moderate asthma
	Target O ₂ sats — 94–98%			
Non-rebreather mask	10L/min	10–15L/min	15L/min or more	<ul style="list-style-type: none"> • Critically ill but adequate breathing — shock, major trauma, sepsis
	Target O ₂ sats — 94–98%			
	Make sure flow from wall/cylinder to mask is enough to keep reservoir bag fully inflated during whole respiratory cycle (inspiration and expiration)			
Air-entrainment (venturi) mask	Variable L/min	Variable L/min	Variable L/min	<ul style="list-style-type: none"> • COPD • Bronchiectasis • Morbid obesity
	Target O ₂ sats — 88–92%			
Bag-valve-mask (BVM)	15L/min	15L/min	15L/min	<ul style="list-style-type: none"> • Respiratory arrest • Cardiac arrest • Inadequate spontaneous ventilation
	Target O ₂ sats — 100%			

How much oxygen to give (adult and child)

- Important to check person's response to oxygen treatment often, and increase or decrease if needed. If not sure — **medical consult**
- Aim for O₂ sats of 94–98%
- If improving — use less oxygen via nasal prongs
- If not breathing, or very poor respiratory effort — use bag-valve-mask at 8–15L/min
- If critically unwell — use non-breather mask at 10–15L/min
- If condition such as chest pain or respiratory condition (eg pneumonia, asthma) — first use simple oxygen mask (eg *Hudson* mask) at 5–10L/min
- If moderate/severe COPD — use nasal prongs or air-entrainment (venturi) mask and less oxygen — aim for O₂ sats of 88–92%

Oxygen delivery devices

Nasal prongs/cannula — Figure 6.23

- Uses
 - Oxygen needed for long periods. Lets person eat, drink, talk
 - Babies/young children with pneumonia who won't tolerate face mask
- Flow rate
 - 2L/min = 28% inspired oxygen concentration
 - 4L/min = 36% inspired oxygen concentration



Figure 6.23

Simple mask — Figure 6.24

- Uses
 - Adults/older children with pneumonia or other moderate respiratory illness
- Flow rate
 - 5–6L/min = 40% inspired oxygen concentration
 - 7–8L/min = 60% inspired oxygen concentration
 - **Need to give over 4L/min (child) or 6L/min (adult) to remove expired air from mask and prevent rebreathing of CO₂**
 - **Giving over 10L/min does not increase percentage of oxygen given**

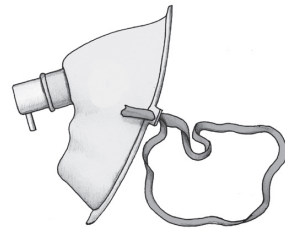


Figure 6.24

Non-rebreather mask — Figure 6.25

- Uses (for high flow oxygen)
 - Critically ill but adequate breathing — shock, major trauma, sepsis
- Before using — make sure
 - Reservoir bag full
 - Mask seals properly around mouth and nose (strap tight)
- Flow rate
 - 15L/min = 85–90% inspired oxygen concentration

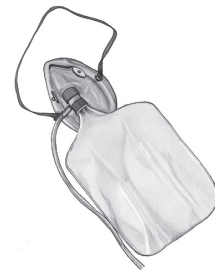


Figure 6.25

Air-entrainment (venturi) mask — Figure 6.26

- Uses
 - Acute exacerbation of COPD
- Flow rate
 - Gives 24%, 28%, 31%, 35%, 40%, or 60% inspired oxygen concentration
 - Oxygen must be set at recommended flow rate for required concentration
 - Flow rate listed on valve

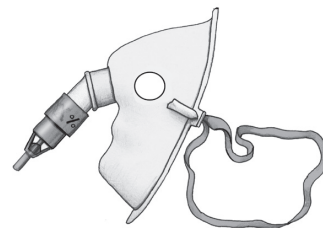


Figure 6.26

Bag-valve-mask — Figure 6.27

- Uses (for positive pressure ventilation)
 - Not breathing (apnoea), cardiac arrest, inadequate respiratory effort
- Before using — make sure
 - Valve opens properly
 - Reservoir bag full
 - Mask seals properly around mouth and nose (essential)
 - Airway open (essential)
- Flow rate
 - 15L/min = 90–100% inspired oxygen concentration

**Figure 6.27**

Calculating medicine doses and drip rates

Dose calculations

- Dosages often written as amount/kg/dose (eg 25mg/kg/dose)
 - ▶ This means a dose is made up of 25mg for each kg of body weight
- **Dose needed = amount of mg/kg × weight of person in kg**

Example

- ▶ Amount in mg/kg is 25mg/kg, weight of person is 12kg
- ▶ Dose needed = 25 (mg/kg) × 12 (kg) = 300mg

Table 6.4 Calculating doses

TABLETS	
Number of tablets needed = dose needed [a] ÷ strength of tablet [b]	<i>Example:</i> Dose needed is 15mg [a] Strength of tablet is 10mg [b] Number of tablets = 15mg ÷ 10mg = 1.5 = 1½ tablets
MIXTURES OR INJECTIONS — small volume IM or IV push	
Volume needed (mL) = (dose needed [a] ÷ strength of mixture or injection [b]) × volume this strength is in mL [c] OR $\frac{\text{dose needed (a)} \times \text{volume this strength is in mL (c)}}{\text{strength of mixture or injection (b)}}$	<i>Example 1:</i> Dose needed is 300mg [a] Strength is 250mg/5mL [b/c] Volume needed = (300 ÷ 250) × 5mL = 1.2 × 5 = 6mL OR Volume needed = $\frac{300 \times 5}{250} = 6\text{mL}$
	<i>Example 2:</i> Dose needed is 20mg [a] Strength is 30mg/mL [b/c] Volume needed = (20 ÷ 30) × 1 = 0.67mg × 1 = 0.67mL

Dosage examples given in mg, but same formulas can be used for other strengths (eg microgram). Must use same unit for strength and for dose needed (eg mg and mg, microgram and microgram)

Quick calculations

- **Dose needed** = amount of medicine per kg × body weight (kg)
- **Number of tablets needed** = dose needed ÷ strength of tablet
- **Volume of mixture or injection needed (mL)** =
$$\frac{\text{dose needed}}{\text{strength of mixture or injection}} \times \text{volume this strength is in (mL)}$$

Drip rate and infusion rate calculations

Table 6.5 Calculating drip rates and infusion rates for IV fluids

GRAVITY ADMINISTRATION SET	
Remember: Check drop rate on infusion set packet (eg 20 drop/mL, 60 drop/mL)	
Rate (drops/minute) = (total volume of solution (mL) [a] × number of drops/mL [b]) ÷ time in minutes [c]	Example Volume of fluid to give is 1,000mL (1L) [a] Set delivers 20 drop/mL [b] Time to give is 5 hours = 5 × 60 = 300 minutes [c] Rate (drops/min) = (1,000mL × 20 drops/mL) ÷ 300min = 20,000 drops ÷ 300 = 67 drops/min
INFUSION PUMP — setting dials	
Remember: Always check instructions for your machine	
Rate (mL/hr) = total volume of solution (mL) [a] ÷ time in hours [b]	Example Volume of medicine is 5mL, volume of fluid is 1000mL (1L). Total volume of solution to give is 1,005mL [a] Time to give is 5 hours [b] Rate (mL/hr) = 1,005mL ÷ 5 hours = 201mL/hr

Units and concentrations

- 1 litre (L) = 1,000 millilitres (mL)
- 1 gram (g) = 1,000 milligrams (mg)
- 1 milligram (mg) = 1,000 micrograms
- 1% solution = 1g of solute dissolved in 100mL of solution
- 1:1,000 = 1g solute dissolved in 1,000mL of solution = 1mg solute dissolved in 1mL of solution

Converting units

- Grams (g) to milligrams (mg) = g × 1,000
 - OR Move decimal point 3 numbers to right (1g = 1.000g = 1,000mg)
- Milligrams (mg) to grams (g) = mg ÷ 1,000
 - OR Move decimal point 3 numbers to left (1mg = 0001.0mg = 0.001g)
- Milligrams (mg) to micrograms = mg × 1,000
 - OR Move decimal point 3 numbers to right (1mg = 1.000mg = 1,000microgram)
- Micrograms to milligrams (mg) = microgram ÷ 1,000
 - OR Move decimal point 3 numbers to left (1microgram = 0001.0microgram = 0.001mg)
- Litres (L) to millilitres (mL) = L × 1,000
 - OR Move decimal point 3 numbers to right (1L = 1.000L = 1,000mL)

Inhalation devices for respiratory medicines



Only common delivery devices are included here — see supporting resources for other devices and for videos and guides demonstrating the use of devices

Attention

- Help person become familiar with their own medicine
- Always check package insert for specific instructions about person's device
- Make sure your clinic has emergency supply of extra inhalation devices for people living and travelling in remote and rural communities
- If person's condition doesn't improve with normal medicine — follow asthma or COPD action plan
 - If they don't have plan — talk with health team about developing one

Puffer (metered dose inhaler/MDI)

- Aerosol inhaler that gives medicine straight to airways as fine mist — Figure 6.28. Many different medicines in aerosol form

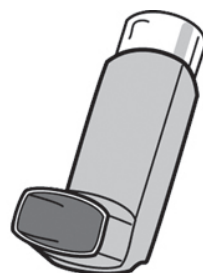


Figure 6.28

Attention

- Best if used with a spacer
- Tell person — when device empty
 - Throw away in sealed bag or container
 - **Do not** throw on fire. Pressurised — could explode
- To clean — take metal canister out. Wash plastic holder/mouthpiece in warm soapy water, rinse, air dry. Put canister back

What you do

Using without a spacer

- Take cap off mouthpiece, shake inhaler for 10 seconds
- Check dose counter if it has one
- Breathe out completely, tilt head back slightly
- Put mouthpiece between teeth without biting, close lips to form good seal
- Put finger on top of canister, press once firmly and at the same time take a slow deep breath all the way in

- Hold breath for 5 seconds or as long as comfortable, hold breath while taking mouthpiece out of mouth
- Breathe out slowly away from mouthpiece
 - If another dose (puff) needed — wait 1 minute then repeat
- Put mouthpiece cap back on, store inhaler in cool place

Using with a spacer

- See Spacer devices for respiratory medicines

Turbuhaler

- Dry powder inhaler — Figure 6.29

Attention

- **Do not** shake
- **Do not** get *Turbuhaler* wet — to clean use dry clean cloth to wipe device and mouthpiece
- **Do not** blow into *Turbuhaler*. Breathe out away from mouthpiece



Figure 6.29

What you do

- Remove cover, check dose counter
- Hold *Turbuhaler* upright while priming — twist grip right around and then back until click heard
- Breathe out away from mouthpiece
- Put mouthpiece between teeth without biting, close lips to feel good seal
- Breathe in strongly and deeply
- Breathe out gently away from mouthpiece, replace cover

Nebuliser

- Used in clinic with oxygen for severe and life threatening asthma — Figure 6.30

Attention

- **Nebulisers carry a high risk of transmitting infection because they generate aerosol droplets and should only be used if absolutely necessary. Wear full PPE**
- Bronchodilators (relievers) work as well with puffer and spacer as with nebuliser. Only use nebuliser for severe cases
 - 12 puffs salbutamol = 5mg salbutamol

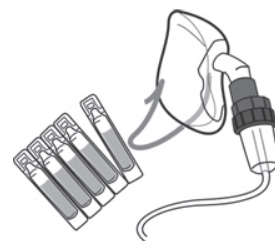


Figure 6.30

What you do

- Check strength of medicine in nebule to be used with nebuliser — most come in more than one strength
- Different nebuliser solutions can be mixed in bowl (eg salbutamol with ipratropium)
- Dilute with **normal saline** if needed

HandiHaler

- Used to deliver tiotropium powder from capsule — Figure 6.31

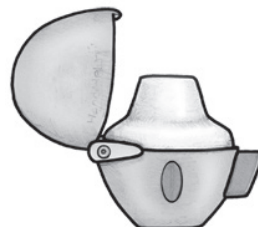


Figure 6.31

Attention

- **Do not** swallow capsules. Breathe in contents using *HandiHaler* — Figure 6.31
- **Do not** breathe into device
- To clean — wipe daily with clean dry cloth. Wash whole device as needed, allow to air dry

What you do

- Open cap, open mouthpiece, put fresh capsule in chamber
- Close mouthpiece until it clicks, to pierce capsule
- Press green piercing button in once only and release (do not shake)
- Breathe out gently away from mouthpiece
- Put mouthpiece between teeth without biting and close lips to form good seal
 - ▶ Breathe in slowly and deeply, so capsule vibrates
 - ▶ Keep breathing in as long as comfortable
 - ▶ Hold your breath while taking mouthpiece out of your mouth
 - ▶ Breathe out gently away from mouthpiece
- Put mouthpiece back into mouth and repeat
- Open mouthpiece, remove used capsule, close mouthpiece and cap

Accuhaler

- Dry powder inhaler — Figure 6.32

Attention

- Hold accuhaler horizontally when loading and taking dose, or medicine may be dislodged
- **Do not** shake
- **Do not** breathe into device or leave cover open — moisture will get in
- **Do not** get wet — to clean use dry clean cloth to wipe device and mouthpiece

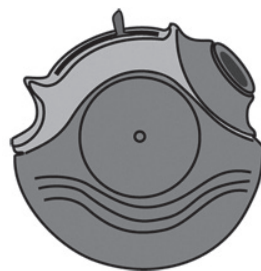


Figure 6.32

What you do

- Check dose counter
- Open using thumb grip
- Holding horizontally, load dose by sliding lever until it clicks
- Breathe out gently away from mouthpiece
- Put mouthpiece in mouth and seal lips, breathe in steadily and deeply
 - Hold breath for about 5 seconds or as long as comfortable
 - While holding breath, remove inhaler from mouth
 - Breathe out gently away from mouthpiece
- Close cover to click shut

Ellipta

- Dry powder inhaler — Figure 6.33

Attention

- Every time you slide cover down a dose is loaded
 - Dose is lost if you open and close cover without inhaling the medicine
- **Do not** shake
- **Do not** breathe out into device
- Dispose of device 6 weeks after opening
 - **Do not** get wet — to clean use dry clean cloth to wipe device and mouthpiece

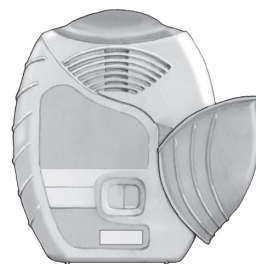


Figure 6.33

What you do

- Check dose counter
- Slide cover down to see the mouthpiece. Should hear a click
- Breathe out gently — away from inhaler
- Close your lips firmly around mouthpiece so lips fit over curved shape of mouthpiece
 - Don't block air vents with your fingers
- Take 1 long, steady, deep breath in through mouth
 - Remove inhaler from your mouth and hold your breath for 5 seconds or as long as comfortable
 - Breathe out slowly and gently away from mouthpiece
- Slide cover up over the mouthpiece
- If another dose (puff) needed — wait 30 seconds then repeat
- After use — rinse mouth thoroughly with water then spit out

Supporting resources

- National Asthma Council website
 - 'How to use' devices videos
 - Inhaler technique for people with asthma or COPD booklet
 - Asthma and COPD medicines poster

Spacer devices for respiratory medicines



Spacers are used with a puffer to

- Increase the amount of medication deposited in the lungs
- Reduce medication being deposited in the mouth and back of the throat
- Reduce oral side effects — eg oral thrush, hoarse voice
- Make it easier to coordinate the action of using a puffer and breathing in

Encourage for all users, especially children and the elderly. Spacer is as effective as nebuliser with less chance of cross infection

Attention

- Everyone using a spacer needs to know how to make bush spacer — **may save a life**
- Keep spacers of each size in clinic for people to practise with
- Each puff is sprayed into spacer and inhaled before next puff — ie only spray 1 puff at a time into spacer

All spacers (including bush spacers) should be

- **Primed before first use** — reduces static charge on inside so medicine won't stick, works more effectively
 - ▶ Wash spacer in warm water with a little dishwashing detergent
 - ▶ **Do not** rinse
 - ▶ Leave to air dry
- **Maintained**
 - ▶ Wipe mouthpiece/mask with damp cloth — daily or after each use
 - ▶ Wash in warm soapy water, don't rinse, leave to air dry — once a month and after respiratory tract infections
 - ▶ Don't wash more often or more medicine will stick to walls of spacer
 - ▶ Spacers should be checked every 6-12 months for cracks and faulty valves

What you need

- Spacer — check best size for person, one they will use/carry with them
- Person's puffer/aerosol inhaler with prescribed medicine
- Mask — tightly fitting face mask can be used with spacer for people who cannot form a close seal around the spacer mouthpiece — eg young children or people with cognitive impairment

What you do

Two methods

- Single breath — one slow deep breath then hold
- Multiple breaths (tidal breathing) — used if cannot coordinate actions and breathing (eg children) or during an acute flare-up

Single breath

1. Take cap off puffer, hold upright and shake for 10 seconds — Figure 6.34
2. Put puffer mouthpiece into hole in spacer — Figure 6.35
3. Hold spacer horizontally (long ways) with one hand and puffer with other hand — Figure 6.36
4. Seal lips around spacer mouthpiece or fit mask — breathe out gently
5. Press puffer canister once only — Figure 6.37
6. Breathe in slowly and deeply — Figure 6.38 . Hold breath for 5 seconds or for as long as comfortable
7. Remove spacer from mouth and breathe out gently
8. Repeat steps for as many puffs as prescription says
9. Take puffer off spacer, put cap back on puffer mouthpiece

Tidal breathing (multiple breaths)

- Follow steps 1–5 above
- Breathe in and out normally for 4 breaths
- Remove spacer from mouth and breathe out gently
- Repeat steps if needed
- Take puffer off spacer, put cap back on puffer mouthpiece

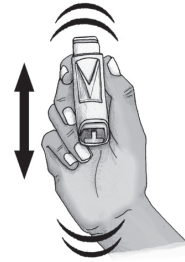


Figure 6.34

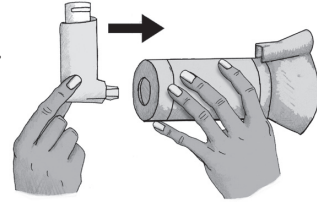


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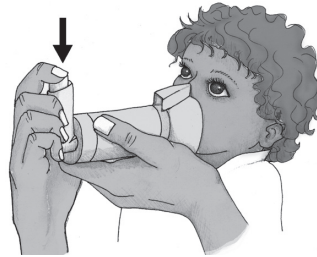


Figure 6.36



Figure 6.37



Figure 6.38

To make emergency bush spacer

What you need

- 1 × 500–600mL plastic water or soft drink bottle — Figure 6.39
- Scissors or soldering iron

What you do

- Soften bottom plastic soft drink/water bottle in hot water
- Cut or melt hole the same size and shape as inhaler mouthpiece into bottom of bottle
- Fit inhaler into hole — Figure 6.40
- Use as above



Figure 6.39



Figure 6.40

Supporting resources

- How to use a puffer with a spacer poster

7. Skin

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Skin examination



Attention

- Consider who is the most culturally appropriate person to perform a skin examination — based on preference, gender, kinship
- Only do full examination when necessary — in many cases a targeted examination is best

What you do

Ask about (OLD CARTS)

O nset — slow or sudden, associated with injury or event, food or drug use

L ocation — where is it

D uration — how long has it been there, had it before, changing over time

C haracteristics — itchy, bleeding, painful, red, swollen, crawling sensation

A ggravating factors — what makes it worse (eg worse when touched)

R elief — what helps

T ried — what have they already tried, what worked before

S igns and symptoms (other) — done anything lately that's different, travel, contact with people with a rash, recent weight loss/gain, joint pain, feeling unwell, fever, cough, eating and drinking (what and how much), medicines used

Do full head-to-toe exam

- Ask person to undress, leave underwear on
- Don't forget to look inside mouth and at soles of feet
- Ask about lesions on scalp, areas covered by underwear. Check with consent

Look and check for

- Overall condition and colour of skin
- Condition of hair and nails
- Any differences in colour or appearance of arms, legs, hands, feet. Compare sides
- Hydration — skin turgor. Lightly pinch loose piece of skin
 - Does skin return to normal straight away or stay pinched

- Any swelling or redness
 - Oedema — legs, feet, hands, bottom, face. Does pressing leave a dent (pitting)
 - Sores, lumps or rashes
- Burns, scars or bruises
- Blanching — press skin with piece of glass (eg slide) or acrylic (eg clear plastic ruler) and note if rash fades

Bleeding into skin appears as red-purple blotches/spots that don't blanch under pressure — note if lesions are raised. Pinpoint lesions are petechiae, larger lesions are purpura

Swollen nodes

- Look at neck for lumps, swelling, any obvious pulsating
- Palpate (feel) head and neck with both hands. Take care with the elderly, infant's fontanelle — especially if less than 18 months
- Start at tip of chin, feel around under jaw to below ears, then feel down muscles at each side of neck to end of collarbone — Figure 7.1
- Gently feel behind ears for enlarged nodes, move along to nape of neck, gently follow muscle line down to shoulders
- Also feel axillae (armpits) and groin

Feel skin temperature — hot, sweaty, cold, clammy

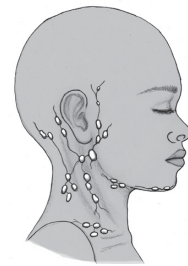


Figure 7.1

Rash or lesion

- Colour — red, purple, pale, multi-coloured, blanching or not
- Size of lesions, distribution over body
- Any of
 - Acanthosis nigricans — dark, velvety discoloration in folds of skin usually in the back of the neck, armpit, groin. May indicate insulin resistance — Figure 7.2
 - Atrophy — loss of thickness of epidermis, dermis, other tissue
 - Blister/vesicle — skin bleb filled with fluid
 - Crust — dried serum, thick mass of skin scales, or both
 - Cyst — deep fluid-filled cavity
 - Erosion — partial loss of epithelium or mucous membrane



Figure 7.2

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- ▶ Erythema — redness
- ▶ Excoriation — scratch marks scoring epidermis
- ▶ Fissure — crack or split in epidermis
- ▶ Lichenification — thickening of skin surface, looks like leather
- ▶ Macule — flat spot. Can see but can't feel it
- ▶ Nodule — lump deeply set in skin
- ▶ Papule — small, dome-shaped, may be skin coloured
- ▶ Plaque — raised solid flat spot, usually larger than 1cm
- ▶ Pustule — skin bleb filled with pus
- ▶ Scale — flaky
- ▶ Ulcer — total loss of skin or mucous membrane

Lump or mass

- Location — involves skin, muscle, tendon, bone
- Movement — easy/hard to move, loose, fixed to surrounding structures
- Size — draw around edge with pen, then measure
 - ▶ Shape — regular/irregular, a/symmetrical (un/even), defined/diffuse edges
 - ▶ Shade — dark, light, variegated (multi-coloured), different colours
- Signs of inflammation — red, painful, pus, crusting, dry, moist
- Surface edge and consistency — looks different to skin around it
- Feel — hard, soft, smooth, rough, fluctuant (like liquid) in boil/cyst

When assessing for melanoma — look for

- **A symmetry** — uneven
- **B order** — irregular
- **C colour** — uneven
- **D iameter** — more than 5mm
- **E volving** — changing size and colour

Do

- Measure and describe clearly in file notes
- Take digital photo (with consent) with paper measuring tape, ruler, or paper with measurements beside
- Keep a copy with file notes, email to specialist for further advice

Supporting resources

- Skin conditions visual treatment guide

Cutting and draining an abscess



Attention

Do not attempt procedure if

- Abscess large
- Person very sick from bacterial infection
- Abscess around the spine
- Abscess over major organ, bone, joint, nerve, face or feet in person with diabetes — **specialist consult** for treatment instead

What you need

- Chlorhexidine
- 2–5mL lidocaine (lignocaine) 1%
- 5mL syringe, 18G, 21G and 25G needles
- 20mL syringe
- Normal saline
- 2 × sterile dressing packs
 - Extra sterile gauze swabs
- Sterile
 - No. 23 scalpel blade and handle
 - Artery forceps
 - Wound probe
 - Combine pad
- Tape to secure
- Pathology equipment (if culture needed)

What you do

Preparation and local anaesthetic

- Lay out first dressing pack, chlorhexidine, equipment for local anaesthetic (lidocaine)
- Wash hands, put on sterile gloves
- Clean site, drape with sterile towels from dressing pack
- Draw up local anaesthetic with 18G needle

- Maximum safe dose of lidocaine (lignocaine) 1% is 3mg/kg up to 200mg (20mL)
 - Lidocaine (lignocaine) 1% is 10mg/mL
 - **Do not** repeat the maximum dose within 1.5 hours
 - **Do not** use solutions containing adrenaline (epinephrine) for fingers, toes, penis
- Anaesthetise over top of abscess by inserting 25G needle just under and parallel to surface of the skin
- Inject anaesthetic into intradermal tissues very superficially — **not** into abscess cavity
- Use gentle pressure to infiltrate the skin — you will see the skin blanching (going pale) as anaesthetic spreads out
- Wait for anaesthetic to work (10 minutes), clear away first dressing pack
- Lay out second dressing pack, instruments, normal saline, 20mL syringe, extra gauze

Incision and dressing

- Make cut across abscess for its whole length — not just small hole
- Take swab for MC&S if needed
- Mop out pus with gauze
 - Open up cavity (hole) using gauze swab wrapped around forceps or sterile gloved finger
 - Break up chambers inside abscess, make sure all the pus runs out
- Using 20mL syringe with 18G **blunt** needle and **normal saline**, flush out hole until pus has gone
- Pack hole with sterile gauze pads soaked in **normal saline** to level of skin
 - **Do not** pack too tightly
 - Count packing swabs, record in file notes
- Cover with non- adherent, absorbent dressing
- Ask person to return in 24 hours to check dressing. If not full of pus or dirty — leave in place for another 24 hours, then remove. Count packing swabs
- If delayed granulation or signs of infection — see Wound dressings for follow-up

Injuries — fingers



Taking out splinters

Attention

- Wood splinters (eg from mulga) common in remote areas
- Can become infected if left in skin, especially if large
- If deep — consider underlying structures

What you do

Very small, shallow splinters

- If visible, attempt removal with fine tweezers
- If splinter remains — put on drawing dressing for 1–2 days. Splinter may come out on its own

Larger splinters

- Sit or lie person comfortably
- Lay out dressing pack and equipment
- Wash hands, put on sterile gloves
- Clean site, drape with sterile towels
- Give local anaesthetic — wait 3–5 minutes for LA to work before starting the procedure or ring block if needed
- Spear splinter with fine needle, lever out of skin
 - ▶ OR cut skin with scalpel over length of splinter and then pull it out with forceps
 - ▶ OR if wound shallow and splinter has jagged edges that will tear the flesh if pulled back through entry site — cut opening at base of splinter, pull it through with forceps
 - ▶ Suture if needed or leave open if risk of infection and review in 3 days
- OR if splinter under fingernail or toenail and unable to easily grasp end of splinter with tweezers — Figure 7.3
 - ▶ Use sharp scissors to cut small V shaped area out of nail over splinter — Figure 7.4
 - ▶ Pull splinter out with small forceps — Figure 7.5

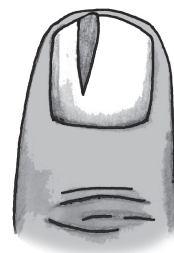


Figure 7.3

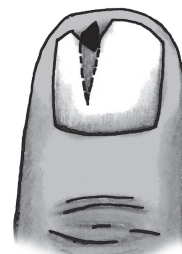


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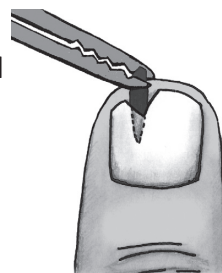


Figure 7.5

Taking ring off finger

Attention

If finger swollen from illness or injury — rings must be taken off to stop loss of blood supply to finger

- If a lot of pain — ring block may be needed
- If following methods fail — ring may need to be cut off using metal ring cutters (best) or wire cutters (if nothing else)

What you need

- Soap or grease
- Dental tape, fine string, mersilk
- Paperclip or fine wire

What you do

- Rub soap or grease finger, try to slide ring off

If that doesn't work

- Slide paperclip or fine looped wire under ring and loop dental tape through bend. Pull one end of tape through under ring — Figure 7.6
- Hold tape end A and wind tape end B around finger toward fingertip, covering middle joint — Figure 7.7
- Hold tape end B tightly, pull tape end A straight back over ring toward fingertip, unwinding tape — Figure 7.8

Pressure of tape wound evenly around whole finger helps to reduce swelling. Ring should slide over tape as tape unwinds

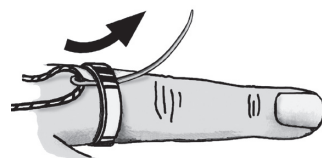


Figure 7.6

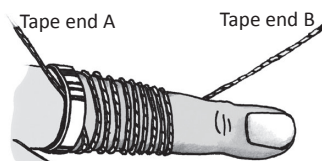


Figure 7.7

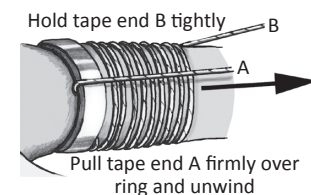


Figure 7.8

Taking out fish hooks

Attention

- Large hooks may need surgical removal — **medical consult**

What you need

- Strong string
- Sterile gloves
- Sterile dressing pack
 - Chlorhexidine antiseptic solution
 - Lidocaine (lignocaine) 1%, syringe and needles if needed
 - Extra 5mL syringe and 16–18G needle
 - Sterile suture set and sutures, if needed
- Pair of wire cutters, if needed
- Pair of pliers
- Goggles (fish hooks can become missiles!)
- Dressing

What you do

- Sit or lie person comfortably
- Clean area with chlorhexidine
- Lay out dressing pack and equipment
- Wash hands, don PPE including gloves and goggles, put on sterile gloves
- Clean site, drape with sterile towels
- Give local anaesthetic — wait 3–5 minutes for LA to work before starting the procedure or if trained and competent ring block
- Following curve of hook, push barb end of hook all the way through skin until it is easily seen — Figure 7.9
 - Cut off shank — Figure 7.10, pull hook out through exit hole
 - OR Cut off barb — Figure 7.9, pull hook out through entry hole — Figure 7.10
- OR Loop some string or fishing line around hook where it enters skin
 - Push down on hook shank while giving firm, sharp tug on string to pull out hook — Figure 7.11. **Be bold!** — be careful of flying hook, keep out of its path and wear eye protection

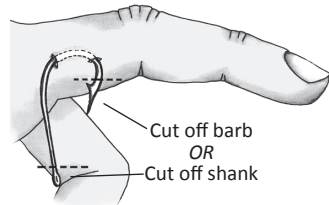


Figure 7.9

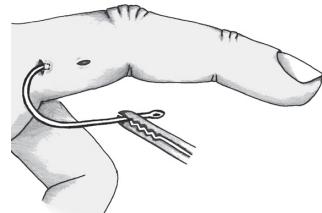


Figure 7.10

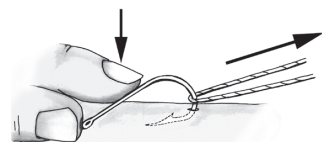
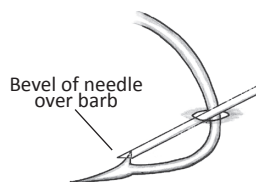
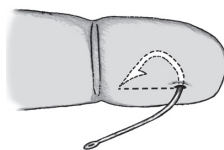
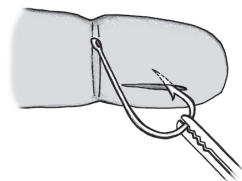


Figure 7.11

- ▶ *OR* Push 16–18G needle attached to small syringe through hook entry site so needle bevel is over barb point — Figure 7.12. Bring both needle and hook back out through entry site
- *OR* Make small cut in line with curve of hook — Figure 7.13
 - ▶ Pull hook out gently through hole — Figure 7.14
 - ▶ Suture if needed
- Clean puncture sites with normal saline *OR* water — apply a dry dressing if required — give education on wound care

**Figure 7.12****Figure 7.13****Figure 7.14**

Injuries — fingernails and toenails



Attention

- Always better to keep nail in place if possible. Can be used to splint injury by taping back onto nail bed
- Try not to damage nail base, so nail will grow back evenly
- **If diabetes — medical consult before proceeding**

Letting out blood from under nail (subungual haematoma)

Attention

- Use if blood is not clotted (fluid) and covers only part of area under nail
- If blood fills **whole** area underneath nail — nail may need to be removed, or lifted to suture underneath
- Hot end of needle or paperclip should go just under nail surface and not touch nail bed. Painless if done properly
- Tell person discoloured part of nail will usually grow out over 4–6 months. If enough of nail bed injured — nail will drop off, new nail grows in over 4–6 months

What you need

- 19–21G needle
 - *OR* ordinary paperclip and hot flame source (eg lighter, candle, spirit lamp)
- Sterile dressing pack
- Normal saline
- Sterile gloves
- Dressing, if needed

What you do

- Wash hands and put on sterile gloves
- Pierce nail — use gentle rotating motion with needle to make 1 or 2 holes in nail
- *OR* as per **local health guidelines** — unfold 1 end of paperclip and hold over flame until red hot — Figure 7.15



Figure 7.15

- ▶ Quickly move paperclip to nail. Hold at 90° (right angle) and press down lightly into haematoma (centre of blood)
- ▶ Don't push too hard, let paperclip burn through nail. You will feel it give way, blood will ooze out, pain will lessen — Figure 7.16
- Gently squeeze nail area to get all the blood out
- Lay out dressing pack and equipment
- Clean site with **normal saline** and dress if needed

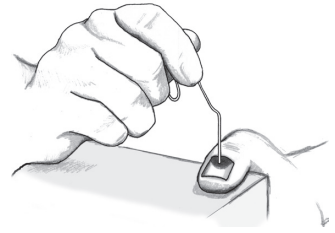


Figure 7.16

Letting out pus from paronychia (next to or under nail)

Attention

- All procedures following need **ring block anaesthetic**
- Soak finger or toe in warm water for 10 minutes to soften tissue around nail

What you need

- Equipment for ring block
- Sterile dressing pack
- Chlorhexidine antiseptic solution
- Sterile gloves
- Finger dressing

AND

- Sterile scalpel blade and handle (for procedure A)
- Sterile gauze soaked with normal saline (for procedure A)
- Sterile fine artery forceps (for procedures B, C)
- Sterile small metal retractor (for procedure C)
- Sterile pair of sharp scissors (for procedure C)
- Vas gauze (for procedure C)

What you do

- Lay out dressing pack and equipment
- Wash hands and put on sterile gloves
- Clean site and drape with sterile towels
- If trained and competent — give ring block

Pus beside nail (procedure A)

- Cut with scalpel over area of pus — Figure 7.17
- Clean out pus from wound
- If deep — pack with **normal saline** soaked gauze ribbon
- Dress wound and keep dry

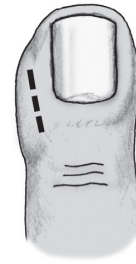


Figure 7.17

Pus at bottom of nail (procedure B)

- Lift eponychial fold with artery forceps to release pus — Figure 7.18
- Dress wound and keep dry

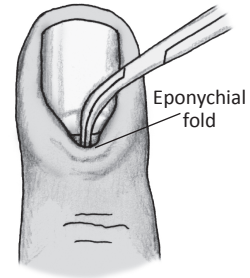


Figure 7.18

Pus under nail itself (procedure C)

- Pierce nail using hot paperclip method — not over nail base. Pus will flow out and nail can stay in place
- May need to repeat several times to keep hole open

OR

- Push eponychial fold back until you can see nail base, hold in place with retractor. You may need helper
- Lift nail base away from nail bed — cut off small area to let pus out if needed — Figure 7.19
- Dress with vas gauze, keep dry

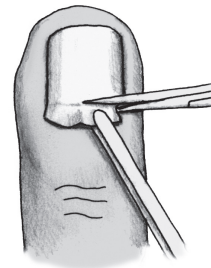


Figure 7.19

Removing a tick



Attention

- Try to avoid tick bites
 - ▶ Stay away from areas with lots of ticks
 - ▶ When in area with ticks, wear clothes that cover your skin (eg long-sleeved shirt)
- Remove ticks as soon as you can
- **Do not** squeeze, crush or puncture tick's body — its fluids may contain infectious agents
- Need to remove mouth parts of tick, not just body
- On east coast of mainland Australia and Tasmania ticks can carry a bacteria that causes tick typhus
 - ▶ If fever and rash develop within 1 week of removing tick — report to PHU
- Only try to kill tick before removing it if using alternate tick removal method

What you need

- Sterile dressing pack to use as clean work area
- Normal saline
- Tick remover or pointed tweezers, preferably curved
- **Do not** use normal household tweezers — they will squeeze the contents of the tick into the blood stream
- Anaesthetic drops (eg tetracaine (amethocaine) 1%) if tick is in ear

What you do

For ticks on skin

- Lay out dressing pack and equipment
- Grasp tick firmly by its mouth parts, as close to skin as possible — Figure 7.20
- Pull up to remove
- Clean bite area and your hands well with soap and water or alcohol wipe

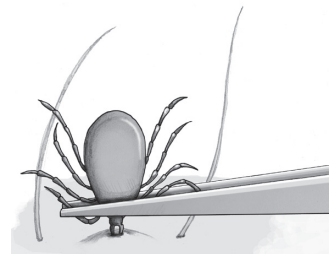


Figure 7.20

For ticks in ear

- If safe to do so — remove as for ticks on skin
- *OR* Try washing out with anaesthetic drops

Alternate tick removal

May be preferable to kill the tick in place. Removing ticks by force may increase the likelihood of allergic reaction

- Large ticks — apply freezing agent containing ether (eg *Tick off*) to tick
 - ▶ Wait 10 minutes for tick to die
 - ▶ Remove tick by its mouth parts using fine tipped forceps or tick remover
- Small ticks or tick larva — apply cream containing permethrin (eg *Lyclear*) to tick
 - ▶ Apply cream at least twice, waiting 1 minute between applications
 - ▶ Wait for ticks or larva to die or cover with band-aid and leave overnight
 - ▶ Remove tick by its mouth parts using fine tipped forceps or tick remover

Wound assessment



Use this procedure to assess wounds for specialist advice and/or to help decide which dressings are best

- Consider health, cultural and environmental factors that could impact on wound healing
- Expert advice is always helpful, essential if wound is chronic. Most major hospitals have a dedicated wounds nurse
 - ▶ Contact by email, MMS (mobile phone), webcam, telehealth etc
 - ▶ Check what information your specialist service needs so images and information are appropriate

Always ask permission before photographing and sending images or arranging a webcam link up, preferably with written consent

Check — person

- Calculate age appropriate REWS
 - ▶ **Adult** — AVPU, RR, O₂ sats, pulse, BP, Temp
 - ▶ **Child** (less than 13 years) — AVPU, respiratory distress, RR, O₂ sats, pulse, central capillary refill time, Temp
- Weight, BGL
- Things that can affect healing
 - ▶ Medical — diabetes, heart disease, kidney disease, transplant, cancer, rheumatoid arthritis, anaemia, bowel disease, vascular disease, autoimmune disease, TB
 - ▶ Lifestyle factors — smoking, alcohol, illicit drug use, diet, lack of exercise, hygiene
 - ▶ Nutritional status — BMI, waist measurement, recent history of weight gain or loss, hair and skin changes
 - ▶ Age
- Previous wounds and outcomes
- Allergies, sensitivities
- Medicines — over the counter, traditional/bush, prescribed. In particular immunosuppressants, NSAIDs, cytotoxics, steroids, antibiotics
- Results — MC&S, biopsy, x-ray, doppler

- Psychosocial
 - Anxiety, depression, other mental health problems — may impact on ability to manage wound. Consider cognitive assessment
 - Impact of wound on lifestyle, ability to participate in treatment program
- Consider
 - Pain assessment — acute and chronic
 - Assessment of mobility, falls, skin integrity
 - Vascular assessment
 - Sensory assessment

Check — wound

Record all findings, wound measurements and tracings in person's file

- Type — trauma, surgical, burn, pressure, infected, chronic
- Cause of original wound
- How long have they had it — acute wound becomes chronic if it fails to respond to treatment within 4 weeks
- Location
- Size — length, width, depth, circumference
 - To measure depth of cavity or sinus — use cotton tip applicator or sterile non-metal wound probe
 - To record wound area — cover with cling wrap or sterile plastic, trace with waterproof marker, redraw onto grid

Use colours to help you identify the different conditions in a wound

- Pink = epithelialisation tissue (new skin growing over the wound)
- Red = granulation tissue (healthy tissue in the wound)
- Green = may indicate infection, wound may have been colonised by bacteria
- Yellow = sloughy tissue (dead tissue that may be wet or dry)
- Black = necrotic (dead tissue that is drying out, and is brown, leathery or hard)

You may also see

- Overgranulation or hypergranulation — red tissue that is higher than skin level
- Exposed tendon or bone

Use TIME to help you assess wound and consider dressings

Tissue

Inflammation/ Infection

Moisture

Edge of wound

Look at wound bed (uppermost visible layer of wound) for

Tissue — is it viable (good) or non-viable (bad)

- If sloughy or necrotic (bad tissue) — remove by dressing choice (eg hydrogel) or debridement
- Gangrene of toes (dry black areas, pulseless) — **medical consult**
- If tissue healthy — continue using same dressing

Inflammation/Infection

- Look for signs of infection — swollen, hot, red, tender, increase in exudate (ooze), green areas, darker skin may have darker colour around edge of wound
- If infection present
 - Wash with antiseptic
 - Clean with saline
 - Take swab send for MC&S and commence antibiotics
 - Use antimicrobial dressings
- If no infection — use normal dressings to help with healing

Moisture — is wound too wet or too dry

- If too wet — use dressing that will soak up moisture (eg seaweed, alginate)
- If too dry — use dressing that adds moisture (rehydrates) (eg gel)
- If moisture balanced — keep using same dressing
- **Do not** rehydrate gangrene — **specialist consult**

Edge of wound

- Are edges of wound healing (coming together)
 - If no — consider why. Consider general health, diet, dressings
 - If yes — keep using same dressing
- If edges further apart after 2–4 weeks. The wound is chronic — **medical consult**

Take digital photograph of wound

- Ask person for consent as per local policy
- If possible, photograph wound before removing dressing — allows specialist to assess exudate (ooze) and type of dressing
- Irrigate (clean) wound with normal saline
- Put ruler or tape (or mark 1cm on piece of paper) next to wound
 - Use disposable ruler/tape to avoid cross contamination
- Make sure wound is well lit but don't use flash. This can cause reflection
- If background included in picture — use neutral pale colour without any lines or other objects
- If able to print photograph — write date, name, DOB, HRN (Health Record Number), type and current problem with the wound and history (eg diabetes, cardiac, foot pulse, leg swelling) on hard copy and keep in file notes
- Send images, patient information, your assessment to specialist for advice

Wound dressings



Attention

- **Do not** use hydrogen peroxide
- **Do not** swab wound with cotton wool
- **Do not** let wounds dry out. Heal faster and better when kept moist — exception is dry gangrene
- Use normal saline to clean wounds
- Only use antiseptic solution if needed to wash dirty or infected wounds — chlorhexidine preferred
- Syringe irrigate with normal saline or povidone iodine
- Throw away
 - Chlorhexidine aqueous solution (water-based) 24 hours after opening
 - Chlorhexidine alcohol solution 7 days after opening

Remember:

- If it is wet you need to control the exudate (ooze)
- If it is dry you need to hydrate the wound only (except dry gangrene on toes)
- Consider the whole person, the whole story
- If in doubt — **wound specialist consult**

What you do

- Before dressing wound —
 - Consider other problems that could affect healing
 - Assess the wound
 - Have a management plan
- Irrigate wound gently with normal saline
- Use gauze to remove slough
- When trimming wounds — remove smallest amount of skin/tissue possible
- **Do not** trim wound if no foot and/or leg pulses — not enough blood for healing, a small cut while trimming may cause the wound to get worse

- Select appropriate dressing — see Table 7.1 and How to manage and dress different types of wounds

Table 7.1 Wound dressings

Type of wound	Dressing	What dressing does
<ul style="list-style-type: none"> • Dry necrotic • Sloughy or clean 	<ul style="list-style-type: none"> • Hydrogel (eg <i>Solosite</i>, <i>Intrasite</i>) 	<ul style="list-style-type: none"> • Rehydrates wounds • Removes dry slough • Removes necrotic tissue
<ul style="list-style-type: none"> • Wet sloughy or clean 	<ul style="list-style-type: none"> • Calcium alginate (eg <i>Sorbsan</i>, <i>Kaltostat</i>) 	<ul style="list-style-type: none"> • Absorbs exudate • Removes wet slough
<ul style="list-style-type: none"> • Wet or dry • Shallow wounds — primary dressing 	<ul style="list-style-type: none"> • Foam (eg <i>Allevyn</i>, <i>Biatain</i>) 	<ul style="list-style-type: none"> • Absorbs exudate • Protects low exudate wounds
<ul style="list-style-type: none"> • Wet to very wet 	<ul style="list-style-type: none"> • Exudate manager (eg <i>Zetuvit</i>, <i>Mesorb</i>) 	<ul style="list-style-type: none"> • Absorbs exudate • Provides protection
<ul style="list-style-type: none"> • Dry to lightly moist 	<ul style="list-style-type: none"> • Film island dressing (eg <i>Opsite post op</i>, <i>Asguard clear island</i>) 	<ul style="list-style-type: none"> • Protects wounds • Maintains moist environment
<ul style="list-style-type: none"> • Dry to lightly moist • Shallow wounds only 	<ul style="list-style-type: none"> • Hydrocolloid (eg <i>Comfeel</i>, <i>Duoderm</i>) <p>Do not use on top of other dressings</p>	<ul style="list-style-type: none"> • Rehydrates wounds • Removes dry slough and necrotic tissue
<ul style="list-style-type: none"> • Wet and sloughy 	<ul style="list-style-type: none"> • Hypertonic saline (eg <i>Mesalt</i>, <i>Curasalt</i>) <p>Do not use on painful wounds</p> <p>Do not sit on good skin — cut to size</p>	<ul style="list-style-type: none"> • Cleans and removes wet slough
<ul style="list-style-type: none"> • Inflamed wet or dry • Infected wet or dry 	<ul style="list-style-type: none"> • Silver coated dressing (eg <i>Acticoat</i>, <i>Acticoat Flex</i>) <p>Do not use if thick slough or necrotic tissue</p>	<ul style="list-style-type: none"> • Reduces infection and inflammation
<ul style="list-style-type: none"> • Offensive smelling • Infected sloughy • Infected wet or dry 	<ul style="list-style-type: none"> • Cadexomer iodine (eg <i>Iodosorb</i> ointment, <i>Iodosorb</i> paste) • Wet — use ointment • Dry — use powder <p>Do not use on children under 12 years or pregnant women</p> <p>Do not use when allergy to iodine</p>	<ul style="list-style-type: none"> • Cleans wound • Reduces infection
<ul style="list-style-type: none"> • Colonised wet or dry (sloughy/necrotic — but not actively infected) 	<ul style="list-style-type: none"> • Enzye alginogel (eg <i>Flaminal hydro</i>, <i>Flaminal forte</i>) • Wet — use <i>Flaminal Forte</i> • Dry — use <i>Flaminal Hydro</i> <p>Do not use on very wet wounds</p>	<ul style="list-style-type: none"> • Reduces bacterial load of wound • Cleans wound that may become infected without treatment

- Consider whether dressing
 - Protects wound from secondary infection
 - Provides a warm, moist wound healing environment
 - Can be removed without damaging wound
 - Removes drainage and debris
 - Is free from particles and toxic products
- Cover dressing with crepe bandage to hide and protect wound if needed
- Encourage person to shower every day, except where dressings can't be wet
- Provide appropriate information so person/carer can help with wound care

How to manage and dress different types of wounds

- Do weekly tracing to make sure wound is healing (getting smaller)
- If wound continues to improve — continue with same plan/dressing
- If wound deteriorates or becomes bigger — reassess using TIME
- If wound continues to deteriorate — **wound specialist** or **medical consult**

Epithelising wounds — wounds that are healing over

- Protect and encourage healing
- Use a foam (eg *Allevyn*, *Biatain*) or film island dressing (eg *Opsite*, *Asguard*)

Granulating wounds — wounds with a red wound base — Figure 7.21

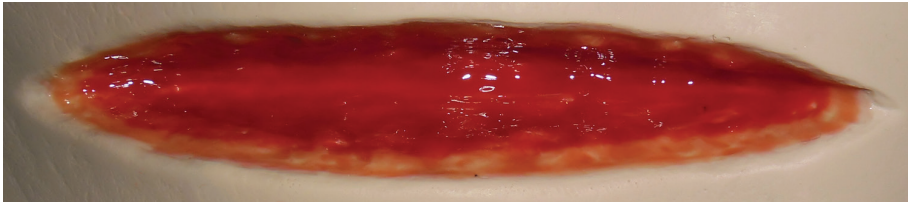


Figure 7.21

- **Do not** debride
- High exudate — use calcium alginate (eg *Algisite*)
 - Cover with foam (eg *Allevyn*, *Biatain*)
 - OR exudate manager (eg *Zetuvit*, *Mesorb*)
- Low exudate — use hydrogel (eg *Solosite*, *Intrasite*) to promote moist environment
 - Cover with secondary dressing that will keep in moisture (eg adhesive foam, hydrocolloid or film island dressing) — see Wound dressings table

Hypergranulation/overgranulation in wounds — wound tissue grows higher than skin level —

Figure 7.22

- Remove overgranulation by debridement
 - Check if person is on anticoagulant therapy (eg warfarin, enoxaparin, rivaroxaban)
- OR use caustic stick/silver nitrate stick to remove overgranulation
 - Apply paraffin to good skin for protection from nitrate stick
 - Then apply silver nitrate stick to overgranulation
- OR use pressure pad
 - Cover wound with thick gauze pad
 - Strap firmly in place with strips of non-woven dressing (eg *Fixomul*)
 - Cut strips in downward direction to the box to get non-stretch weave
 - Apply strips by pulling firmly in different directions

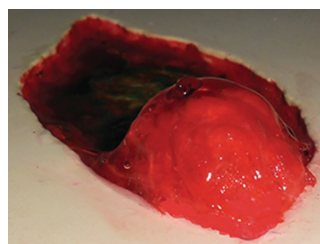


Figure 7.22

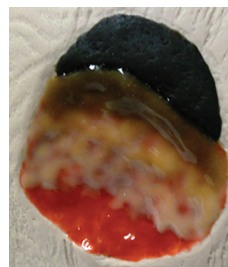


Figure 7.23

Necrotic wounds — wounds with dry dead tissue — Figure 7.23

- Check aetiology (cause and circumstances) of wound first (eg diabetes)
- Debride — but only if adequate pulses are present
 - Surgical debridement may be necessary — with sharp instrument
- Score thick necrotic tissue if necessary
 - Use scalpel to cut lines through top layer of thick eschar (dead tissue) to allow gel to absorb into dry hard tissue
- Needs hydration — use a hydrogel dressing (eg *Solosite*, *Intrasite*)
 - If no signs of bacterial infection use film island dressing (eg *Opsite*, *Asguard*) or hydrocolloid (eg *Comfeel*, *Duoderm*) to speed up rehydration
- **Do not** hydrate dry gangrene (black fingers or toes)
 - Paint with povidone-iodine (*Betadine*) and leave to dry — **wound specialist/medical consult**

Sloughy wounds — wounds with wet or dry sloughy tissue — Figure 7.24

- Need dressings that assist with autolytic (natural) debridement
 - Low exudate — use hydrogel (eg *Solosite*, *Intrasite*)
 - Moderate to high exudate — use hypertonic saline gauze (eg *Mesalt*, *Curasalt*). **Do not** use on painful wounds
 - High exudate — use calcium alginate (eg *Algisite*)

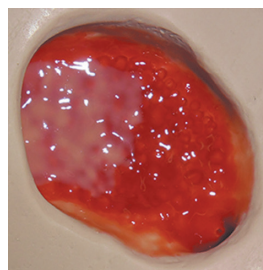


Figure 7.24

- May need sharp debridement which will speed up healing by stimulating the inflammatory response

Infected wounds — Figure 7.25

***Do not use cadexomer iodine if under 12 years, pregnant or breastfeeding**

- Need topical antimicrobial dressings
 - silver coated dressing (eg *Acticoat*) or cadexomer iodine* (eg *Iodosorb*)
 - ▶ Bite wounds/dirty, traumatic wounds — use silver coated dressing
 - ▶ Sloughy infected wounds — use cadexomer iodine*

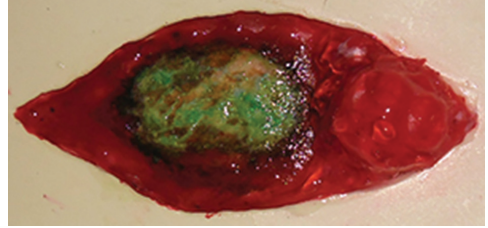


Figure 7.25

Do not use silver coated dressing on thick slough

- **Do not** use hydrocolloid (eg *Comfeel*, *Duoderm*) as a dressing cover
- High exudate
 - ▶ Silver coated dressing (eg *Acticoat*) with calcium alginate (eg *Algisite*) over the top
 - ▶ *OR* for small wounds — cadexomer iodine* powder (eg *Iodosorb*)
 - ▶ Cover with foam (eg *Allevyn*, *Biatain*) or exudate manager (eg *Zetuvit*, *Mesorb*) for absorbency
- Low exudate
 - ▶ Sheet of silver coated dressing (eg *Acticoat* sheet) — moisten twice a day, or wet daily while showering
 - ▶ Cover with non-woven dressing (eg *Fixomul*)
 - ▶ *OR* for small wounds — cadexomer iodine* ointment (eg *Iodosorb*) and cover with adhesive foam (eg *Allevyn*, *Biatain*) or film island dressing (eg *Opsite*, *Asguard*)

Remember:

- Silver coated dressing (eg *Acticoat*)
 - ▶ Broad-spectrum topical antimicrobial — works within 30 minutes
 - ▶ Has anti-inflammatory properties
 - ▶ Cannot debride thick slough or necrotic tissue
- Cadexomer iodine (eg *Iodosorb*)
 - ▶ **Do not** use if under 12 years, pregnant, breastfeeding
 - ▶ Stimulates wounds that are not healing (static) or chronic
 - ▶ Reduces colonisation / bioburden of wounds
 - ▶ Cleans sloughy infected wounds

Colonised wounds that are not actively infected

Use an enzymatic gel (eg *Flaminal*)

- Moderate exudate (eg *Flaminal Forte*)
 - ▶ Cover with adhesive foam (eg *Allevyn, Biatain*) or exudate manager
- Low exudate (eg *Flaminal Hydro*)
 - ▶ Cover with adhesive foam (eg *Allevyn, Biatain*) or film island dressing (eg *Opsite, Asguard*)

Wounds with high bioburden — a lot of dead or necrotic (non-viable) tissue, offensive odour but not actively infected

- Wash first with a wound anti-infective (eg *Prontosan*), rinse thoroughly with **normal saline**, then apply enzymatic gel (eg *Flaminal*)
- *OR* wash with **povidone-iodine** for 2 minutes, rinse thoroughly with **normal saline**, then apply enzymatic gel (eg *Flaminal*) or cadexomer iodine (eg *Iodosorb*)
- Povidone-iodine wash effective in reducing wound colonisation especially MRSA

Hydrocolloid dressing

(eg *Comfeel, Duoderm*)

- For wounds with no or low exudate
- Very good for friction burn/gravel rash. Change daily, it will lift out gravel you have not been able to remove

What you do

- Leave on for 3–7 days — change daily to remove gravel
- Change if there is leakage
- Can use tape to hold onto skin if needed

Non-woven adhesive

(eg *Fixomull, Hypafix, Mefix*)

- Use to hold dressings on or to protect healed burns from rubbing or friction (eg under bra straps)

Attention

- **Do not** use if skin is fragile or broken

What you need

- Non-woven dressing

Also need for removal

- **Do not** use *Zoff* adhesive remover
- Use non irritating silicone based adhesive remover (eg *Niltac*, *Remove*)
- If not available use oil — olive, vegetable, baby oil. **Do not** use peanut oil — potential allergic reaction
- Plastic cling wrap
- Bandage
- Sink, bath/shower

What you do

- Cut amount needed from roll, take off backing paper, put straight on healed burn/wound sticky side down
 - **Do not** overlap dressing by more than 2cm
 - **Do not** stretch dressing
- To cover joint — bend limb, put along line of long bones
- Explain to person/carer how to care for dressing
 - For first day — keep dry
 - If it gets wet — gently pat dry
 - After first day — wash gently with ordinary soap and water twice a day, pat dry. Do not soak in water
- Leave on for 5–7 days

To remove

- Silicone based adhesive remover (eg *Niltac*, *Remove* or *Brava*) *OR*
 - Soak dressing all over in oil
 - Wrap in cling wrap and cover with bandage
- Leave for 4 hours or more — can be left overnight
- Wash gently in shower/bath, remove dressing

Silver coated dressing

(eg *Acticoat*)

- Use for partial thickness burns at risk of infection, full thickness burns smaller than a 20 cent piece. See — Management of minor burns (STM)
- For animal or human bite or dirty injury to reduce risk of infection
- Coated with slow-release nanocrystalline silver. Keeps wound moist, kills bacteria, stops infection

Attention

- **Do not** use if person allergic to silver
- Water activates silver
- **Do not** use saline or salt water, will stop silver working (deactivate)
- Keep dressing moist not soaking

What you need

- Sterile water or clean tap water
- Silver coated dressing (eg *Acticoat*)
- Scissors
- Non-woven adhesive

What you do

- Set up sterile dressing area
- Cut piece of dressing a little bigger than wound
- Wet dressing with sterile or clean tap water then gently squeeze out
- Wait a few minutes to lessen stinging, then lay dressing on wound (blue side down for *Acticoat*)
- Cover with non-woven adhesive
- Tell person to wet dressing twice a day to activate silver. **Do not** use saline or salt water
- Check every day but **do not** open dressing. Wash any exudate (ooze) off dressing with clean or sterile water
- Leave for 3 days

To remove

- Wash in shower or with **normal saline** to loosen dressing
- *OR* use commercial silicone based adhesive remover (eg *Niltac*)
- **Do not** put oil on non-woven adhesive — not needed as only small amount in contact with healthy skin
- Brown or silver colouring on unburnt skin is not harmful and will wash off

Examining and cleaning a wound before closing



Attention

- All dirt, gravel, sand must be taken out of wound before suturing so it heals properly and doesn't get infected
- If there is a chance that foreign body could still be in — send for further examination before closing
- Giving antibiotics is not a substitute for proper cleaning of wounds
- Immunisation status — tetanus

What you need

- Hair clippers
- Sterile dressing pack
- Normal saline for cleaning
- 20mL syringe and 19G needle
- Sterile scissors with pointed ends
- Extra sterile gauze
- 2 pairs sterile gloves (new non-sterile gloves if sterile not available)

What you do

Examine

- Check sensory and motor nerve response before giving local anaesthetic + adrenaline (epinephrine) if wound actively bleeding
- **Do not** use local anaesthetic + adrenaline (epinephrine) for fingers, toes, penis
- Look carefully, explore wound and surrounding area for
 - ▶ Colour, warmth, sensation, movement, swelling
 - ▶ Size and shape
 - ▶ Clean, dirty (eg soil, glass)
 - ▶ Nerve injury
 - ▶ Damage to major blood vessels
 - ▶ Tendon injury
 - ▶ Deep muscle damage
 - ▶ Bone or joint involvement

Clean

- Procedure may be painful — Give local anaesthetic if needed before cleaning wound
- Clean site and drape with sterile towels
- Use forceps in pack to take out any dirt or debris in and around wound
- Flush wound with 500mL **normal saline** to wash out (irrigate) wound — use pressure to remove any visible dirt (contaminants)
- If dirty wound — use 20mL syringe and 19G needle to flush with antiseptic (eg povidone-iodine, chlorhexidine) before closing
 - May need to use more than 20mL antiseptic
- If chronic wound — consider specialised wound cleanser
- Put in a gloved finger into the wound to feel for deeper damage and foreign body
- Trim any torn skin edges with sterile scissors — only remove tissue/skin that you think is so badly damaged that it won't survive. Take off as little skin as possible
- Trim hair around wound if needed. **Do not** trim eyebrows (they may not grow back)

Giving local anaesthetic before closing a wound



Local anaesthetic (LA) used to numb area before doing painful procedure (eg suturing)

Attention

- **Do not** use local anaesthetic + adrenaline (epinephrine) for fingers, toes, penis
- 2–5mL of lidocaine (lignocaine) 1% usually needed for most procedures
 - ▶ **Maximum safe dose is 3mg/kg up to 200mg OR medical consult for higher dose**
 - ▶ Lidocaine (lignocaine) 1% is 10mg/mL
- If wound bleeding use **lidocaine (lignocaine) 1% + adrenaline (epinephrine) 1:100,000**
- **Topical anaesthetic** (skin) patches
 - ▶ **Do not** leave on for more than one hour — anaesthetic may be absorbed and cause symptoms such as dizziness, headache, fast pulse, cyanosis (blue skin), especially in children
- Before injecting, always pull back on (withdraw) syringe plunger to make sure you are not in vein/artery
- To lessen pain
 - ▶ Warm local anaesthetic to room temperature and inject s-l-o-w-l-y
 - ▶ Consider using anaesthetic spray on skin before first injection
 - ▶ Commence through the wound edge
- LA can be injected as needle pulled back out through tissue. Will anaesthetise all tissue in its path
 - ▶ If needle pulled out steadily and continuously — LA should not be injected into vein or artery — practice on a piece of meat
- ‘Fanning’ — technique used to inject wide area of tissue from single injection point
 - ▶ Needle put in at one spot then moved around in clockwise or anti-clockwise direction to anaesthetise a bigger area (eg sural (foot) nerve block, episiotomy)
- Wait 10 minutes for LA to work before starting procedure
 - ▶ Check area for feeling using sharp needle. Also gives person confidence
 - ▶ Ask person to feel around their own wound to give them confidence that local anaesthetic is working

Direct infiltration

Attention

- Try flushing wound with small amount of LA before first injection. Wait 2–3 minutes for this to work
- **Do not** go too deep with injection. Anaesthesia may be delayed or not work at all
- Aim to put needle below dermal layer of skin and above fat layer
- If needle in dermal layer — will be hard to press down syringe plunger. Take it out, try again a little deeper
- Scalp wounds may need bigger needle to infiltrate — tissue is tough

What you need

- Bluey
- Sterile dressing pack
- Normal saline for cleaning
- 2–5mL of lidocaine (lignocaine) 1%
- 5mL syringe, 21G needle for drawing up, 23G or 25G needle for injection
- Sterile gloves

What you do

- See Examining and cleaning a wound before closing
- Put bluey under site
- Lay out dressing pack, equipment
- Wash hands, put on sterile gloves
- Clean site, drape with sterile towels
- Draw up LA
- Starting at one end of wound, slide needle through wound edge under dermal layer and above fat — Figure 7.26, needle **a**
 - ▶ Pull back on plunger to check for vein/artery, then inject anaesthetic as you pull needle out. Will anaesthetise shaded area around **A** — Figure 7.26
 - ▶ Wait a few moments until anaesthetic is working, so person doesn't feel it, then push needle into anaesthetised area at tip of previous injection — Figure 7.26, needle **b**. Repeat injection as above
 - ▶ Keep doing this until wound is anaesthetised along its whole length, then repeat process on other side — Figure 7.26, needle **c** and needle **d**
 - ▶ If wound short — may only need 1 injection on each side
- Make sure ends of wounds also injected with LA
- Wait for anaesthetic to work. Use needle to test for feeling before you start suturing

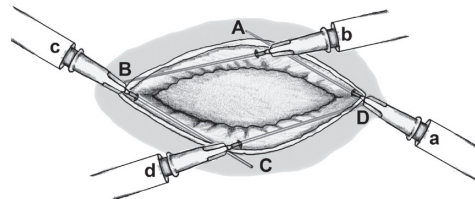


Figure 7.26

Parallel margin infiltration

Attention

- More painful than direct infiltration. Only use if wound very dirty and needle may take dirt further into tissue

What you need

- Bluey
- Sterile dressing pack
- Normal saline for cleaning
- 2–5mL of lidocaine (lignocaine) 1%
- 5mL syringe, 21G needle for drawing up, 25G needle for injection
- Sterile gloves

What you do

- See Examining and cleaning a wound before closing
- Put bluey under site
- Wash hands, put on sterile gloves
- Lay out dressing pack, equipment
- Clean site, drape with sterile towels
- Draw up LA
- Starting at one end of wound **about 4mm from edge**, push needle in, keeping **parallel** to wound edge — Figure 7.27, needle **a**
 - ▶ Pull back on plunger to check you are not in vein/artery, then inject anaesthetic as you pull needle out
 - ▶ Wait a few moments, push needle into anaesthetised area at tip of previous injection, inject as before — Figure 7.27, needle **b**
 - ▶ Keep doing this until wound anaesthetised along its whole length, then repeat process on other side — Figure 7.27, needle **c** and needle **d**
 - ▶ If wound short — may only need 1 injection on each side
- Make sure ends of wounds also injected with LA
- Wait for anaesthetic to work. Use needle to test for feeling before you start suturing

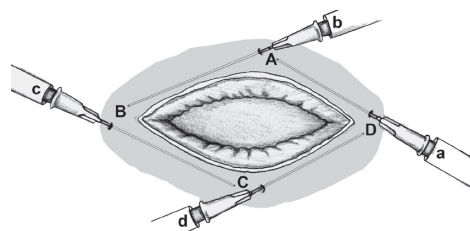


Figure 7.27

Closing a wound



- Consider best way to close wound
 - ▶ Sutures, staples, skin adhesive, adhesive strips, daily dressings to allow 'healing by second intention', delayed primary closure
 - ▶ Combination of methods (eg sutures and adhesive strips) especially on ragged wounds or thin skin
 - ▶ Tying clumps of child's hair together to close head wound. If hair too fine — spray with plastic skin to thicken
 - ▶ Give local anaesthetic if needed
- Immunisation status — tetanus
- Consider pain relief to take home — see Pain management (STM)
- Antibiotics — see STM Injuries — soft tissue, Bites — animal or human, Injuries — spear and knife (stab) wounds

Do not

- **Do not** close bite wounds
- **Plastic surgeon or other surgical specialist consult** for
 - ▶ Large wounds — best closed in theatre, or needing grafting
 - ▶ Severely contaminated wounds
 - ▶ Tendon, nerve, vessel damage
 - ▶ Open fractures, amputations, joint penetrations. Laceration over site of fracture — treat as open/compound fracture even if exposure of bone unlikely
 - ▶ Compression injuries — can cause extensive soft tissue and muscle damage that may not be obvious straight away
 - ▶ Puncture or high-pressure injection wounds (eg paint or grease gun) — can later develop widespread tissue injury
 - ▶ Concern about cosmetic outcome by patient or family
 - ▶ **Beware of wounds to chest or abdomen** — may involve organs underneath

Suturing

Suture materials

- Use smallest material possible, but strong enough to hold skin/tissue in place and close wound
- Choice depends on depth and location of wound, age and occupation of person, conditions that may delay healing

Table 7.2 Suture material sizes and removal times

Where used	Suture material size for adult (smaller for child)	Remove stitches
Face	5.0–6.0	3–5 days
Ear	5.0–6.0	10–14 days
Scalp	3.0	6–8 days
Hand	5.0	10–14 days
Limbs	3.0–5.0	12–14 days
Chest or abdomen	3.0–5.0	8–10 days
Back	3.0–5.0	12–14 days

Table 7.3 Suture material by wound type

Wound type	Suture material
Skin and scalp	<ul style="list-style-type: none"> • Nylon (eg <i>Ethilon</i>) • Monofilament nylon-like material such as polypropylene (eg <i>Prolene</i>, <i>Premilene</i>) • If available can use iridescent yellow sutures (eg <i>Radene</i>) for scalp — easy to see, tie, remove
Subcutaneous	<ul style="list-style-type: none"> • Dermal absorbable sutures • PGA (eg <i>Dexon</i>) • Polyglactin 910 (eg coated <i>Vicryl</i>)
Fascia (muscle)	• Dissolving or absorbable sutures (eg dacron, polyglactin 910, chromic gut)
Mucosa	• Dissolving or absorbable sutures 3.0–4.0 (eg polyglactin 910, chromic gut)

Putting in sutures

Attention

The bigger the area of skin/tissue being pulled together and the more strain on suture, the bigger the suture will need to be. Compromise is needed

- **Do not** shave eyebrows — may not grow back
- Make sure sutures are not too tight, too loose, too close together. Skin should not be puckered, buckled, gaping
 - Edges of wound should be slightly raised and pressing together (kissing), so healthy tissue meets healthy tissue

- Count how many sutures you put in, record in file notes
- Make sure person knows when sutures need to come out
- If wound in prominent place (eg face) — consider sending for specialist cosmetic consult
- Use of subcutaneous suture will take tension from skin sutures, minimise risk of wound breakdown and allow skin sutures to be removed earlier

Do not suture

- Dirty or infected wounds
- If there could be a fracture underneath
- Wounds more than 8 hours old
- Fingers — risk of damage with swelling. A couple of loose sutures are ok, close with adhesive strips if needed
- Deep wounds (especially in hands or feet) until you are sure there is no damage to tendons, nerves, deep muscle
- Coral cuts
- Stab wound (eg spear, knife)
- Gunshot wounds
- Anything you are not confident with, especially on face

What you need

- Sterile dressing pack
 - Extra sterile gauze
- Sterile gloves
- Sterile suture set — scissors, toothed forceps, needle holders
- Suture material needed
- Lidocaine (lignocaine) 1%
- Syringe and needles
- Wound dressing and tape

What you do

For all sutures

- Clean wound
- Give local anaesthetic
- Lay out dressing pack and equipment
- Wash hands, put on sterile gloves
- Check local anaesthetic working
- Suture using appropriate technique — see below
- Record number of sutures in file notes
- Dress wound

- Tell person
 - To keep wound dry for 48 hours — after this can shower and pat dry
 - **Do not** submerge in water
 - When to come back to have sutures removed — Table 7.2

Simple interrupted sutures

- Hold needle with needle holder — Figure 7.28 and Figure 7.29
- Start by putting **first suture in middle of wound**
- Put needle in at 90° (right angle) far enough from edge for skin not to tear, push down through skin
- Take big enough 'bite' to get under skin layers but not into deep fat or muscle — Figure 7.30
- Gently lift the skin on one side of the wound with the forceps and push needle through to the middle of the wound — Figure 7.31
- Pull suture material through leaving a 2–3cm strand on the entry side
- Re-grasp the needle and push it through the skin on the other side of the wound until it curves up and out, still at 90° (right angle) and same distance from wound edge as other side — Figure 7.32
- Pull the suture through — Figure 7.33
- Loop the suture material around the forceps 3 times — Figure 7.34 then grasp and pull the loose end of the suture through to make a knot — Figure 7.35

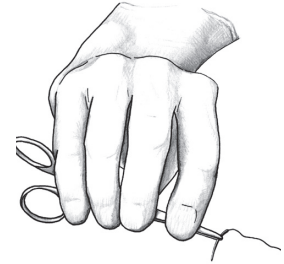


Figure 7.28

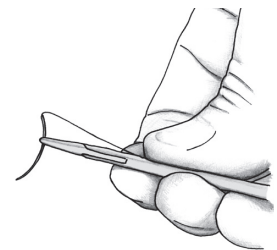


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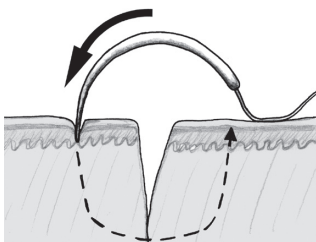


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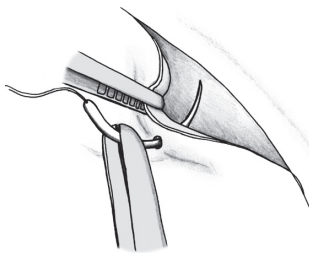


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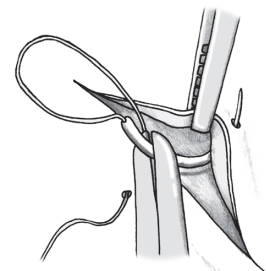


Figure 7.32

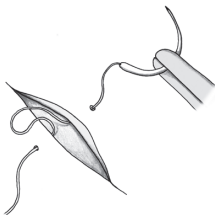


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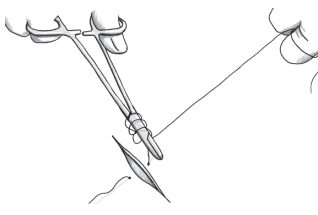


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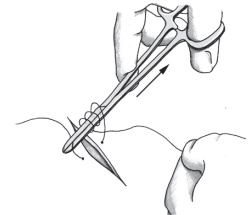


Figure 7.35

- Don't pull wound edges together too tightly, just enough so edges are slightly raised when they meet (kissing) — Figure 7.36
- Pull knot over to one side — Figure 7.37. Use same side for every knot
- Now do another knot looping the suture material once a round the forceps — Figure 7.38, Figure 7.39, Figure 7.40 . If knot slipping, do third tie to make it firm
- Cut both ends, leaving about 1.5cm
- Keep dividing wound in half with sutures until edges are together along whole length
- As the wound starts coming together you should be able to make a suture by pushing the needle through both sides of the wound in one movement — instead of piercing each side separately (as shown in Figure 7.31 and Figure 7.32)

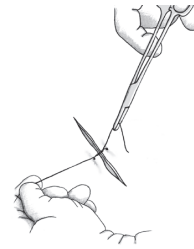


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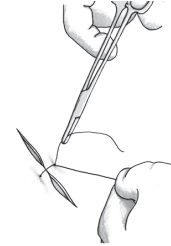


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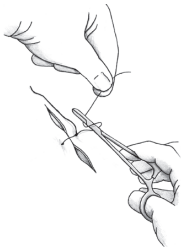


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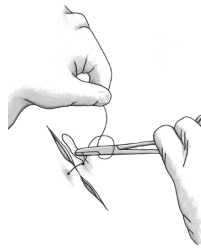


Figure 7.39

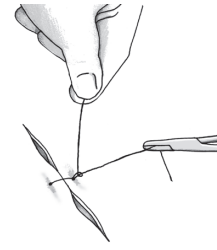


Figure 7.40

Figure of 8 sutures

Attention

- For artery that won't stop bleeding
- Good for scalp and head wounds
- Use size 2.0 suture material

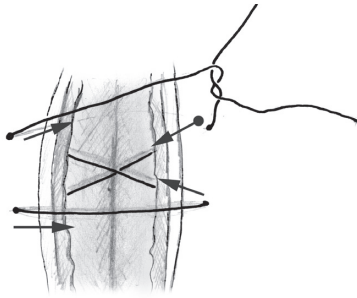


Figure 7.41

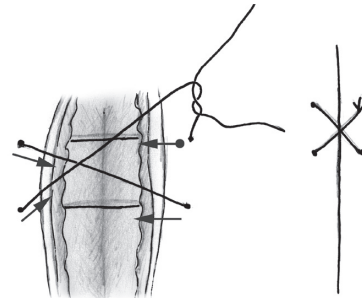


Figure 7.42

What you do

- Choice of 2 methods — Figure 7.41, Figure 7.42

Figure of 8 sutures, method 1

- Put in needle and direct diagonally down to opposite side of wound
- Exit wound and take suture material horizontally to original side of wound external to skin
- Put in needle and direct diagonally up to opposite side of wound
- Exit point will be horizontally across from first insertion point
- Tie off suture at original insertion point
- Example of continuous suture pattern — enter upper right, exit lower left, enter lower right, exit upper left
- Creates a cross within the tissue and 2 parallel lines on skin surface

Figure of 8 sutures, method 2

- Put in needle and direct horizontally to opposite side of wound
- Exit wound and take suture material diagonally down to original side of wound external to skin
- Put in needle and direct horizontally to opposite side of wound
- Exit point will be diagonally opposite first insertion point
- Tie off suture at original insertion point
- Example of continuous suture pattern — enter upper right, exit upper left, enter lower right, exit lower left
- Creates 2 parallel stitches within the tissue and a cross on skin surface

Mattress sutures — horizontal and vertical

Attention

- Vertical — good for anchoring ragged edges that tend to invert (fall into wound)
- Horizontal — good for wounds under tension

What you do

Vertical mattress

- Vertical sutures — see Figure 7.43 – Figure 7.47

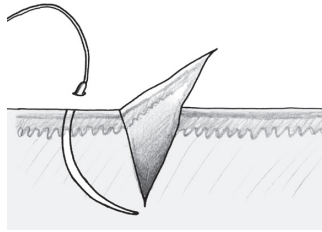


Figure 7.43

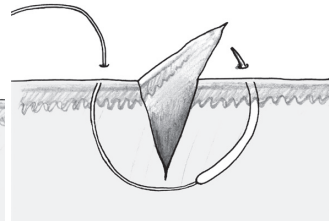


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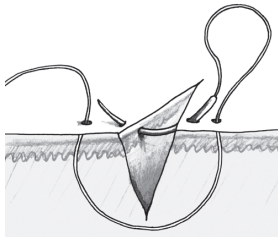


Figure 7.45

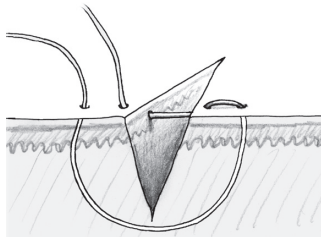


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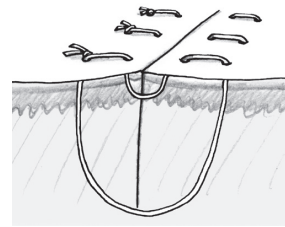


Figure 7.47

Horizontal mattress

- Horizontal sutures — see Figure 7.48 – Figure 7.51

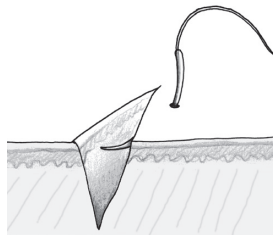


Figure 7.48

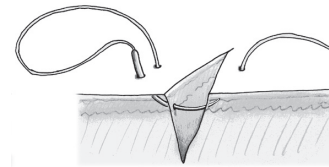


Figure 7.49

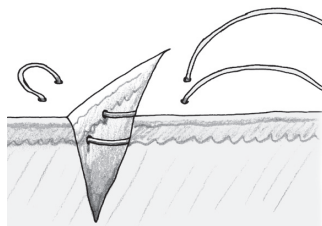


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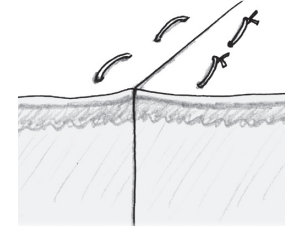


Figure 7.51

Suturing muscle

Attention

- Suture small tears in fascia (muscle sheath) or muscle may bulge (hernia)
- **Do not** use simple sutures on wounds across muscle. Will pull through muscle fibres

What you do

For transverse laceration (wound across muscle)

- Use absorbable material and horizontal mattress sutures to pull fascia together — Figure 7.52, Figure 7.53, Figure 7.54

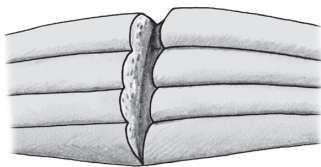


Figure 7.52

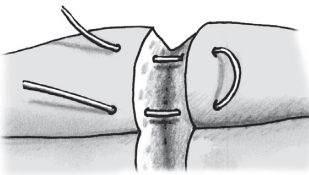


Figure 7.53

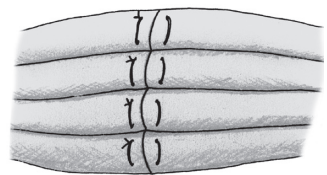


Figure 7.54

For longitudinal laceration (wound along muscle)

- Use absorbable material and simple interrupted sutures — Figure 7.55, Figure 7.56

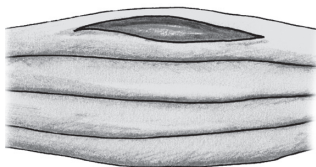


Figure 7.55

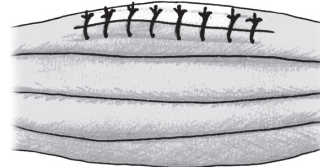


Figure 7.56

Suturing the scalp

Attention

- Always explore wounds carefully to check for fractures underneath
- Staples ideal for closing scalp wounds

What you do

- Use interrupted sutures. Large needle, size 3.0 strong material for tough scalp skin
- **If bleeding is a problem** — try closing wound quickly using large figure of 8 sutures, then apply pressure
- Yellow suture material (eg *Radene*) easier to see

Suturing an eyebrow

Attention

Do not shave off eyebrows. Regrowth unpredictable

- Make sure eyebrow lines up properly

What you do

- Close small wounds with simple sutures, size 5.0 non-absorbable material

Suturing a lip

Attention

- Vermilion border (where skin and lip join) usually needs sutures
- Mucosal surface may not need suturing if good blood supply and edges are joining well — but skin surface should be closed
- Inside of mouth only needs suturing if large, loose flaps of skin
- Use as few sutures as possible, lips can swell a lot

What you do

- If wound crosses edge of lip — first suture should be put through both edges of divided vermillion border — Figure 7.57

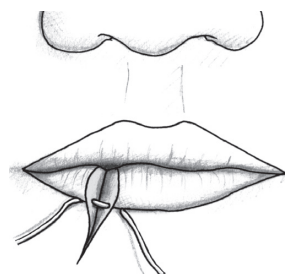


Figure 7.57

Suturing an ear

Attention

- **Do not** suture through cartilage — it will tear, high risk of infection
- **Do not** leave open with cartilage showing through skin edges — will not heal
- Make sure edges of ear line up exactly

What you do

For wounds with little or no cartilage damage

- If missing cartilage is less than 0.5cm — close skin with simple interrupted sutures
- Line up edges carefully

For wounds with cartilage damage

- Trim as little cartilage as possible. If needed, trim up to 5mm so skin edges can be brought together without too much stretching
- Suture skin together to cover cartilage and bring edges of cartilage together
- Perichondrium (fibrous outer cover of cartilage) needs to be included in suture so stitch will hold. **Do not** include cartilage

For wounds on front and back of ear (eg bite)

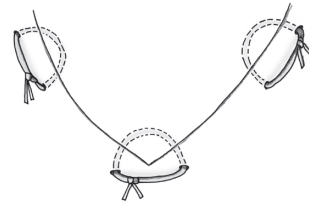
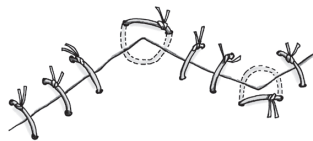
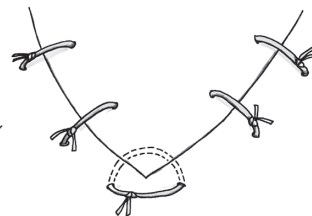
- Put first stitch on outer edge of ear, leaving a long thread
- Suture wound on front of ear
- Hold long thread on edge of ear with artery clip, pull ear forward so back of ear can be easily seen and reached
- Suture wound on back of ear

Suturing skin flaps, torn skin with ragged edges**Attention**

- Skin flaps tend to have thin skin edges, take care not to tear with needle
- Adhesive strips (eg *Steristrips*) may be better

What you do

- See examples of anchoring difficult angles — Figure 7.58, Figure 7.59, Figure 7.60, Figure 7.61

**Figure 7.58****Figure 7.59****Figure 7.60****Figure 7.61**

Staples

Quick and easy. Wounds need straight, sharp edges. Ideal for scalp wounds.

Attention

- **Do not** use for face or neck wounds, wounds with jagged edges, over creases or joints, hands or feet due to discomfort
- **Do not** use for people who may need CT or magnetic resonance imaging. Cause scan artifacts, may be removed by powerful magnetic field
- Same principles apply as for suturing wound
- In large full thickness wounds, underlying tissue will need to be sutured with dissolving sutures before stapling

What you need

- Sterile dressing pack
- Sterile skin forceps
- Stapling device, staples, staple remover
- Lidocaine (lignocaine) 1%
- Sterile gloves
- Dressing for wound

What you do

- Give local anaesthetic
- Lay out dressing pack and equipment
- Wash hands, put on gloves
- Check anaesthetic working
- Staple either from left side of wound or from the middle
- Bring wound edges together with forceps — Figure 7.62
- Edges of wound should be slightly raised and pressing together (kissing), so healthy tissue meets healthy tissue
- Hold stapling device at 40–65° — Figure 7.63
- Line up opening of wound with centre of marker on the stapler head — Figure 7.64
- Using gentle pressure, slowly squeeze trigger of stapling device to insert staple into skin
- Properly placed staple will sit slightly above skin — Figure 7.65

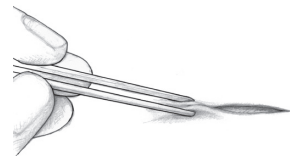


Figure 7.62



Figure 7.63

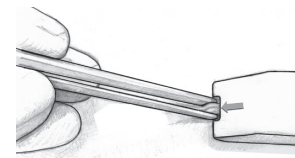


Figure 7.64

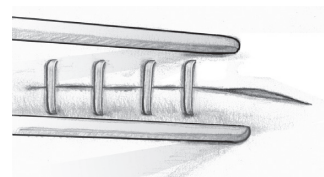


Figure 7.65

- Put staples 0.5–1cm apart until the wound is closed — Figure 7.66
- Put on antibiotic ointment if ordered and waterproof dressing
- Tell person
 - Come back next day for wound review, in 7–10 days for removal of staples
 - They can shower with stapled scalp wounds within a few hours



Figure 7.66

Skin adhesive

- Use on clean wounds with edges that meet easily, don't need deep sutures
- Best for small wounds, facial lacerations
- Anaesthetic not usually needed, good for children

Attention

- **Do not** use on moist skin (eg inside mouth)
- **Do not** get in wound. Uncomfortable, prevents healing
- Use as little as possible. Too much weakens it, uncomfortably hot when setting
- If using near eyes — protect eyes with pads

What you need

- Skin adhesive (eg *Histoacryl*, *Dermabond*, *Epiglu*)
- Dressing pack
- Normal saline
- Dry dressing
- Sterile gloves

What you do

- Lay out dressing pack and equipment
- Check manufacturer's instructions for how to apply — each is different
- Wash hands, put on sterile gloves
- Make sure wound is clean and dry
- Hold edges of wound together, apply very small amount of glue across join. Keep edges together for 30 seconds
- Put on simple dry dressing, check after 24 hours
- Tell person to come back to clinic if wound breaks open or gets infected
- Skin glue doesn't need to be removed, comes off by itself in 1–2 weeks

Adhesive strips

Attention

- Use only for clean superficial wounds
- Use care when applying to old or fragile skin — apply without tension at least 1cm apart to allow fluid to drain into dressing
- **Do not** use on moist wounds, hairy or sweaty areas

What you need

- Skin adhesive strips
- Wound closure tape
- Dressing pack
- Normal saline
- Dry dressing (eg island dressing film or cloth, adhesive foam dressing or fragile skin silicone foam dressing)

What you do

- Lay out dressing pack and wash hands
- Make sure wound is clean and dry
- Hold edges of wound together, without tension, edges 'kissing'
- Apply tape without stretching across middle of wound, then apply strips on either side usually 3mm apart
- Put on simple dry dressing, check after 24 hours
- Tell person to come back to clinic if wound breaks open or gets infected
- Keep clean and dry for 3–5 days — leave to come off by themselves

Taking out sutures and staples



Attention

- If taken out too soon — wound can open up again
- If left in too long — can be scarring, infection
- See Table 7.2 for suture removal times, staples usually removed after 7–10 days

What you need

- Sterile dressing pack
- Disposable gloves
- Normal saline
- For sutures — fine pointed/curved suture-cutting scissors or sterile stitch-cutter blade
- For staples — staple removing device
- Adhesive strips for any gaping in wound
- Non-stick dressing and sticky tape, if needed

What you do

- Check
 - ▶ Wound healed and closed
 - ▶ Signs of infection
 - ▶ Where sutures/staples are, how many. Check post op/surgeons instructions
 - ▶ Not absorbable/dissolvable sutures
- Lay out dressing pack and equipment
- Wash hands, put on disposable gloves
- Clean healed wound with normal saline, remove any dry or dead skin on sutures/staples
- Sutures
 - ▶ Hold knot securely with forceps
 - ▶ Cut suture close to skin on side away from knot, then pull out in direction of knot — Figure 7.67
 - ▶ **Do not** pull dirty part of suture through skin
 - ▶ If sutures small or close to skin — stitch-cutter blade may be easier to use

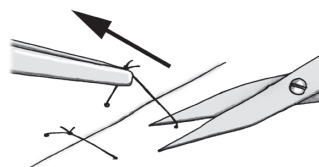


Figure 7.67

• **Staples**

- ▶ Slide bottom lip of staple removal device between staple and skin — Figure 7.68
- ▶ Bring 2 lips of staple removal device together — Figure 7.69. Staple bends and opens points of staple in skin — Figure 7.70
- ▶ Gently lift out staple, put into dressing tray
- First remove every second suture/staple, even if all to be removed
- If wound starts to gape — leave rest of sutures/ staples in. Clean and close with adhesive strips. Leave for another 1–2 days
- After sutures/staples removed — check approximation and healing of skin
- Put adhesive strips across wound if needed
- Dress if needed
- Wound care education

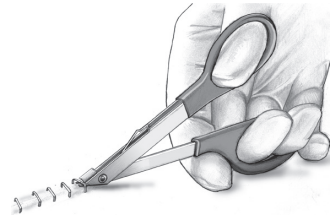


Figure 7.68

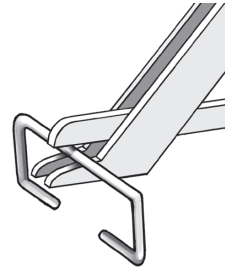


Figure 7.69

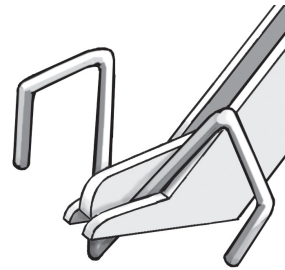


Figure 7.70

Nerve and ring blocks



Attention

- Before starting and when finished, always check hands/feet (peripheries) for colour, warmth, sensation, movement, swelling, peripheral pulses — to make sure no damage done to nerves, arteries or veins
- 2–5mL of **lidocaine (lignocaine) 1%** usually enough for most procedures, except where indicated
 - Check before using any more — see Giving local anaesthetic before closing a wound
- If longer duration needed (eg ongoing pain relief) — use **lidocaine (lignocaine) 2%** up to 3mg/kg without adrenaline (epinephrine) *OR* 7mg/kg with adrenaline (epinephrine)
 - **Do not** repeat maximum dose until after 90 minutes
- Always pull back on (withdraw) syringe plunger before injecting to make sure needle is not in vein or artery
- If there is a lot of resistance when injecting or it is very painful — withdraw needle by 0.5cm and then inject
 - Prevents damage caused by injecting straight into a nerve
- Massaging the injected area for 30 seconds can help improve anaesthesia
- Wait 3–5 minutes for local anaesthetic to work before starting procedure
 - Check area for feeling with sharp needle. Also gives person confidence

Do not

- **Do not** use lidocaine (lignocaine) + adrenaline (epinephrine) for fingers, toes, penis

What you need

- Marker or pen
- Sterile dressing pack
- Chlorhexidine and Povidone-iodine solution
- Lidocaine (lignocaine) 1% or 2%
- 5–10mL syringe, 10mL will be needed for foot and hand blocks
- 21G needle for drawing up the solution and 25G needles for injection
- Sterile gloves
- Small sticking plaster

What you do

For all procedures

- Put clean bluey under site
- Lay out dressing pack and equipment
- Wash hands and put on sterile gloves
- Clean site and drape with sterile towels
- Put in local anaesthetic and do procedure
- Cover with sticking plaster dressing if needed
- Check peripheries (hands/feet) for colour, warmth, sensation, movement, swelling, peripheral pulses
- Warn person they will have little or no feeling in area for a few hours, may need help

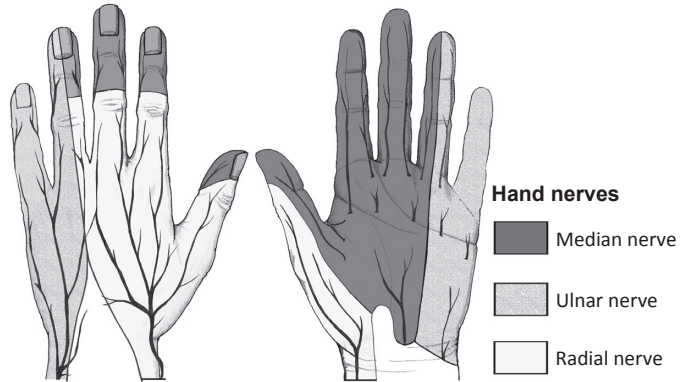


Figure 7.71

Finger nerve block

There are four nerve branches in each digit (including the thumb) — 2 along dorsal (the top) and 2 along palmar (the bottom) — Figure 7.71. Toes are similar

What you do

- Inject both sides of finger — Figure 7.72, Figure 7.73
- Inject **lidocaine (lignocaine) 1%** — 1–2mL

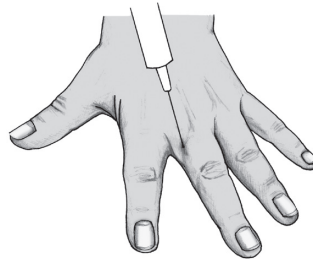


Figure 7.72

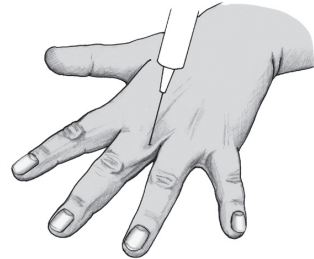


Figure 7.73

Thumb nerve block

What you do

- Thumb needs only one injection site, with needle angled in 2 directions — Figure 7.74, Figure 7.75
- Inject **lidocaine (lignocaine) 1%** — 1–2mL

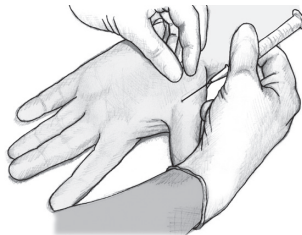


Figure 7.74

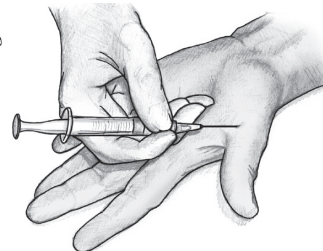


Figure 7.75

Hand — anatomy and infiltration sites

Figure 7.76 shows basic anatomy and structures you need to know to find right site for each injection

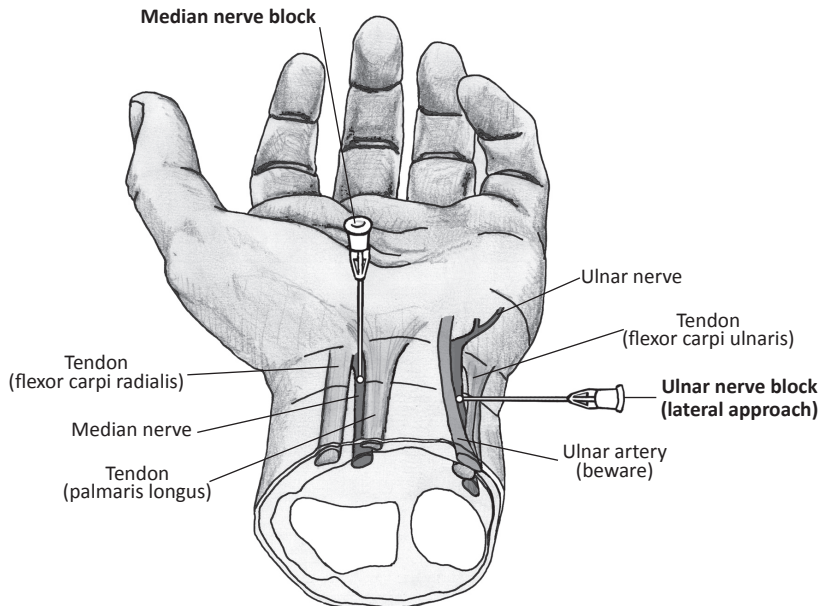


Figure 7.76

Attention

- **To find palmaris longus tendon** — ask person to put tip of thumb and little finger together and flex (bend) wrist forward. You will see tendon stand out in the middle of inner wrist
 - ▶ **Remember: Not everyone has this tendon**
- **To find flexor carpi ulnaris tendon** — ask person to flex (bend) wrist forward against resistance. Tendon can be felt easily at level of wrist crease, on little finger side, just below pisiform bone (bone at base of palm)

Hand — median nerve block

What you do

- Lay person's hand on flat sterile surface, palm up
- Find space between palmaris longus and flexor carpi radialis tendons, mark this spot with pen
- Hold syringe at 90° (right angle) to wrist and put needle between these tendons at level of ulnar and radius head and second wrist crease — Figure 7.76. Put needle in 1cm
- Pull back on plunger to check for vein/artery
- Inject **lidocaine (lignocaine) 1%** — 3–5mL, leaving small amount to keep injecting as you pull out needle

Hand — ulnar nerve block — lateral approach

What you do

- Lay person's hand on flat sterile surface, palm up
- Find site at level of wrist crease on little finger side of wrist, underneath flexor carpi ulnaris tendon — Figure 7.76. Mark with pen
- Hold syringe horizontally (on its side) toward site. Put needle in 1–1.5cm
- Pull back on plunger to check for vein/artery
- Inject **lidocaine (lignocaine) 1%** — 3–5mL, leaving a small amount to keep injecting as you pull out needle
- If you need to numb ulnar nerve for the back of the hand — Figure 7.76
 - ▶ Inject **lidocaine (lignocaine) 1%** — 2–3mL under skin on the back of the hand on ulnar (little finger) side in line with previous injection

Hand — radial nerve block

Attention

- **Do not infiltrate (inject) lidocaine (lignocaine) all the way around wrist.** Stop at the middle of the upper wrist — Figure 7.77

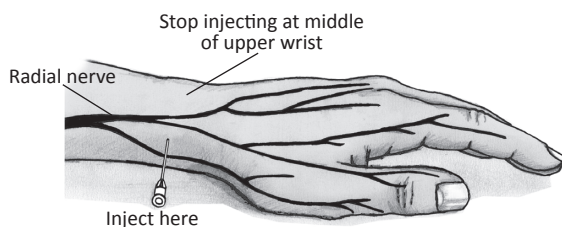


Figure 7.77

What you do

- Lay person's hand on flat sterile surface, palm down
- Find radial pulse at level of wrist crease, mark radial artery with pen so you can avoid it
- Draw up **lidocaine (lignocaine) 1%** — 5–10mL
- Put needle in 1–1.5cm, to side of radial artery (outside thumb edge, toward top of wrist) — Figure 7.77
 - ▶ Pull back on plunger to check for vein/artery — **beware of radial artery**
 - ▶ Inject **lidocaine (lignocaine) 1%** — 2–5mL
 - ▶ Pull out needle
- Wait a few moments for anaesthetic to work
- Point needle across the back of the hand toward the middle of the wrist
- Put needle in just under the skin (superficially) at about the mid-point of the wrist and still in line with wrist crease

- ▶ Inject **lidocaine (lignocaine) 1%** — 2–5mL
- ▶ Pull out needle
- May need 2 injections to reach mid-point of wrist depending on size of wrist — you are trying to create a continuous line of LA spreading up toward the mid-wrist
 - ▶ **Do not** inject any further than the mid-wrist

Toe nerve block

What you do

- Use same technique as for finger nerve block
- OR*
- Toes other than big one can be anaesthetised using one injection site because they are small and narrow
- Put needle in at entry site. Don't take needle right out when moving it from one side to the other — Figure 7.78 (see also Figure 7.74, Figure 7.75)

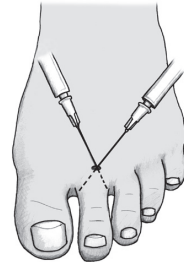


Figure 7.78

Foot nerve block

- 5 major nerves in foot
- Sural and posterior tibial nerve blocks most useful for procedures on sides and sole of foot

Foot — sural block

- Will anaesthetise **outside (lateral side) of foot and heel** — Figure 7.79. Injection is on the outside of ankle (lateral)



Figure 7.79

What you do

- Put needle in 1cm, behind lateral malleolus (outside ankle bone) to the side of and anterior (in front) of the achilles tendon — Figure 7.80
- Pull back on plunger to check for vein/artery
- Inject **lidocaine (lignocaine) 1%** — 3–5mL. Use fan-like pattern in shaded area — Figure 7.80

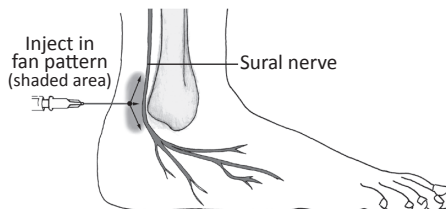


Figure 7.80

Foot — tibial (posterior) block

- Position the patient supine either lying on their back or sitting with legs extended
- Will anaesthetise **sole of foot** — Figure 7.81
- Injection is on medial (inside of) ankle



Figure 7.81

Attention

Beware of tibial artery

What you do

- Face person
 - Feel for tibial artery just behind medial malleolus (inside ankle bone)
 - Tibial nerve lies just behind artery. Mark spot with pen — Figure 7.82

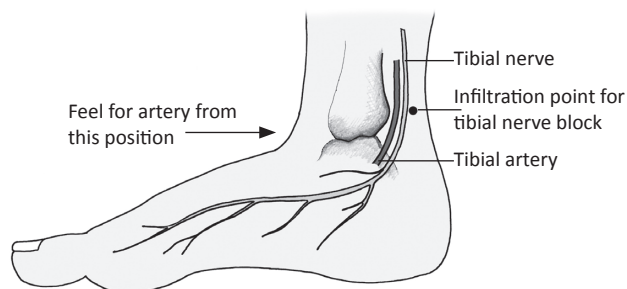


Figure 7.82

- Put needle in 1cm deep, in line with the inside medial malleolus (ankle bone)
 - Try to inject close to but not into the tibial artery
 - **Do not** go too deep or you may inject into nerve
- Pull back on plunger to check for vein/artery. **Beware of tibial artery**
- Inject **lidocaine (lignocaine) 1%** — 2–5mL

8. Eyes, ears, nose and mouth

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Checking near and distance vision

Attention

- Only need to do for 3 year olds and above
- Aim to find and record visual acuity (best vision) person can manage
- **Specialist consult** for any loss of vision

What you need

- Near-point chart for reading vision *OR* Table 8.1 printed *CPM* only
- Chart for distance vision
 - Tumbling E — Figure 8.1
 - Snellen (letters) — Figure 8.2
- Pinhole occluder — Figure 8.3

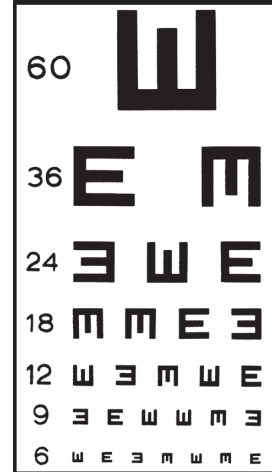


Figure 8.1



Figure 8.3

What you do

Check NEAR visual acuity (vision) first

- If person normally wears glasses for near tasks — do test with glasses on
- Ask person to keep both eyes open
- Have them hold near-point chart at distance they would normally hold things to read or do near tasks — usually 30–40cm
 - If you don't have a chart and are using a printed *CPM* — Table 8.1
- Record in file notes — N point score of smallest sized print they can read correctly and whether wearing glasses/contact lenses aided or unaided — eg Near vision = N8 unaided



Figure 8.2

Table 8.1 Near point scores using text in common use

N4	Medicine bottle labels	4 5 4 4
N5	Footnotes	1 4 7 2 5
N6	Telephone directory	2 5 9 8 6
N8	Newsprint	8 2 4 7 9
N10	Paperback book	1 0 5 7 8
N16	Children's book	6 9 3 1 2
N24	Large print book	1 3 5 2 7
N60	Newspaper headline	2 5 8 9 1

Important: This Table is only for use in printed manual — it cannot be used online or printed out as text size will not be correct

Check DISTANCE visual acuity (vision) next

- Put chart against a well-lit wall at about eye level
- Position person correct distance from chart — 6m or 3m depending on chart design
- If person normally wears glasses for distance — test with their glasses on
- Ask person to cover 1 eye with palm of their hand or piece of thick card while you test the other eye. Make sure they are not peeping or pressing their fingers against the eyeball
 - ▶ Cover right eye and check left eye *THEN* cover left eye and check right eye
- If using lettered chart
 - ▶ Ask person to read the first letter from each line, continue down until it becomes difficult, then read along the whole line
 - ▶ Continue down until they get more than half the line wrong
 - ▶ Line awarded is the last line they got at least half right
- If using tumbling E chart — ask person to show, with fingers of their spare hand, which way 'legs' of the 'E' are pointing
- Record vision as a fraction

Distance vision is recorded as a fraction (eg 6/5, 6/6, 6/12, 6/60)

- First number is the testing distance — this is a 6 even when using a 3m chart
- Last number is **smallest line** of text or symbols that person can read at least half correctly. The lines are numbered next to characters
- Record whether wearing glasses/contact lenses aided or unaided — eg Distance VA: Aided R 6/9, L 6/18

If person can't see top line of eye chart (6/60)

- Ask person to count fingers (CF) on your hand, while you gradually move closer to them, from 6m away to 1m away
- Record greatest distance at which they can count fingers as 'CF at (number of) metres' — eg If able to CF at 4m with left eye and no glasses — Distance VA: Unaided L CF 4m

If person can't count fingers

- Ask person if they can see hand movement (HM) while you gradually move closer to them, from 6m away to 1m away
- Record greatest distance at which they can see hand movement as 'HM at (number of) metres' — eg If able to see HM at 1m with right eye wearing glasses — Distance VA: Aided R HM 1m

If person can't see hand movement

- Check if they can see any light at all by shining penlight torch in eye
- Note whether 'LP' (light perception) or 'NLP' (no light perception) — eg If able to see light with right eye but not with left — Distance VA: Unaided R LP, L NLP

If vision worse than 6/6 (normal vision) — test again with pinhole occluder

- If you don't have made-up pinhole occluder — Figure 8.3
 - ▶ Pierce a sheet of paper or business card with 19G needle
 - ▶ *OR* use otoscope earpiece with an opening of about 1mm
- Ask person to hold pinhole occluder in front of eye to be tested and cover other eye. Tape pad over eye if needed
- Repeat distance visual acuity test through pinhole
- Do this again for other eye, if needed
- Record as for distance vision indicating 'with pinhole' (PH) — eg Distance VA: PH R 6/6, L 6/18
- When using pinhole occluder
 - ▶ If distance vision improves through pinhole — person has some refractive error (focussing problems). New glasses will help — **optometry consult**
 - ▶ If distance vision doesn't improve at all through pinhole — probably another cause (eye problem) for reduced vision. New glasses won't help — **eye specialist/optometry consult**

Eye procedures



Putting in eye drops and ointments

Attention

- Make sure tip of bottle/tube kept clean and does not touch eyelid, eye or lashes

What you do

- Ask person to lift chin and look up
- Pull down lower lid so pouch forms and put drops — Figure 8.4 or ointment — Figure 8.5 in pouch
- Write date opened on bottle or tube. Throw away when treatment finished or after manufacturer recommended time (usually on bottle or tube)



Figure 8.4

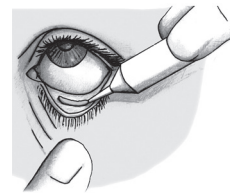


Figure 8.5

Irrigating (washing) eye — to remove burning chemical

Attention

- **Do not** try to neutralise alkali or acid burn with chemical antidote. Always use water or **normal saline**
- **Watch for respiratory distress** (breathing problems) from soft tissue swelling in upper airways after chemical burn to eye
 - **Do not** give person local anaesthetic eye drops to take away and use. Will not be able to feel further injury or damage

What you need

- Helper to hold the eyelid open or to irrigate
- Normal saline connected to IV giving set *OR* tap water in bottle, cup, syringe
- pH test strip or U/A test strip (showing pH)
- Anaesthetic eye drops (eg oxybuprocaine, tetracaine [amethocaine])
- Sterile cotton bud
- Fluorescein stain

What you do

- Start irrigating (washing) affected eye/s **immediately**
- Tell person to blink. Gets chemical out from under eyelid

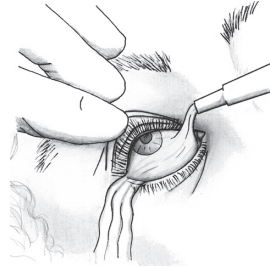


Figure 8.6

If outside clinic — hold eyelids apart and use gentle flow of water over eye from inside to outside —

Figure 8.6

If in clinic

- Give person or helper water to start irrigating eye. Tell them to keep doing this until you are ready
- Put in anaesthetic drops
- Set up IV giving set with 1L warmed **normal saline**
- Hold eyelids apart, use gentle flow of **normal saline** over eye from inside to outside — Figure 8.6
- **Do not** poke or touch anaesthetised eye. There will be no blink reflex
- Do single eversion of eyelid, then double eversion if you can. Wash tarsal plate (under eyelid) to reach fornix (upper eye) — Figure 8.7
- Gently pull down lower lid and wash white of eye
- Use moist cotton bud to take off any specks on eye surface, or matter in corners of eye

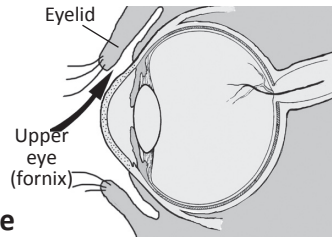


Figure 8.7

For alkali burns (eg lime, bleach, cement) **or acid burns** (eg battery fluid, toilet cleaner, rust remover)

- Will keep burning until completely removed
- Irrigate (wash out) eye for at least 30 minutes
- 5 minutes after stopping wash out, test pH of conjunctiva (eyeball) with pH test strip or pH pad on urine dipstick — Figure 8.8
 - ▶ If pH is not 7 — keep washing out until pH is 7 or same as unaffected eye. Recheck after each 1L fluid
 - ▶ Stop irrigation when pH is 7 in all parts of eye, including under eyelid
- If pH testing not available — keep irrigating
- **Alkalis may need to be washed out for 2–3 hours**
- When finished irrigating, do full eye assessment
- **Urgent specialist consult**

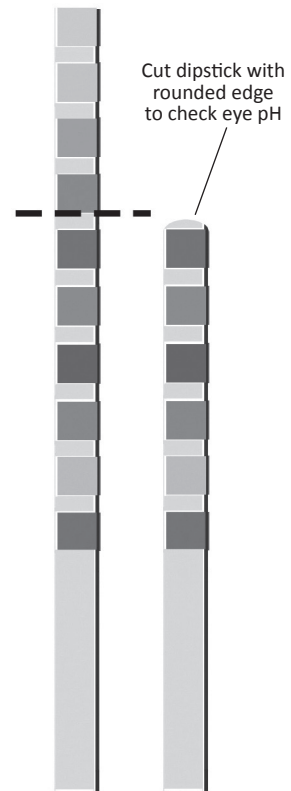


Figure 8.8

Single eversion of eyelid

Attention

- Use with every chemical injury, possible foreign body, trachoma check
- Very important to tell person what you are going to do. Some people are very sensitive to having eyelid everted. You will need their help

What you need

- Wooden applicator stick or cotton bud

What you do

- Person can sit or lie down. You sit or stand in front of them
- Ask person to tilt head back and **keep looking down**, try not to blink
- With one hand, take hold of eyelashes and gently pull eyelid forward. This breaks the suction between upper lid and eyeball — Figure 8.9
- With other hand, hold applicator stick across upper lid above lid fold — Figure 8.10
- Push down slightly on applicator stick and at same time pull upper eyelid out and up and back over stick
- When lid has been everted take applicator stick away and keep lid everted by holding lashes against eyebrow — Figure 8.11
- When finished
 - Ask person to blink eyelid back to normal
 - *OR* tell person to keep looking down while you gently fold eyelid down

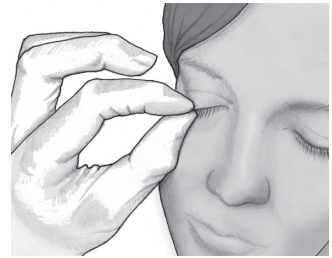


Figure 8.9

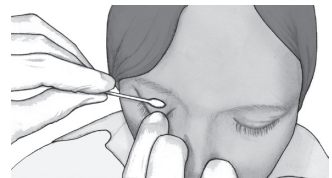


Figure 8.10

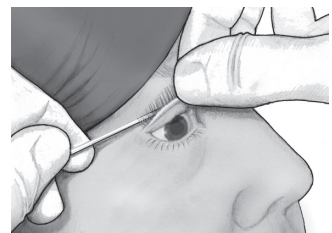


Figure 8.11

Double eversion of upper eyelid

Used when very top of eyeball needs to be seen or irrigated — chemical burns or objects on eye surface that can't be seen with single eversion

Attention

- If emergency (eg chemical burn) — keep irrigating until you put in drops then do procedure as quickly as possible so you can start irrigating again
- Procedure very painful — always use anaesthetic drops. Take about 2 minutes to work properly

What you need

- 2 sterile cotton buds
- Anaesthetic eye drops (eg oxybuprocaine, tetracaine [amethocaine])

What you do

- Put in **anaesthetic eye drops** and wait 2 minutes if not an emergency
- Do single eversion of eyelid — Figure 8.12
- Take second cotton bud and lift lower edge of inverted inner eyelid — Figure 8.13 so you can see very top of eyeball — Figure 8.14
- Lid will not stay in place on its own. Hold it up with cotton bud as you irrigate or take out foreign body

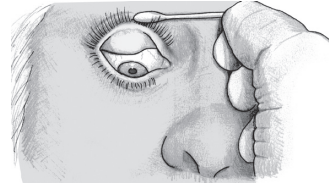


Figure 8.12

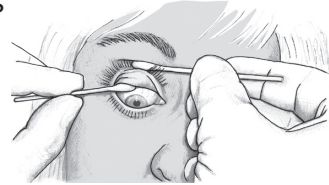


Figure 8.13

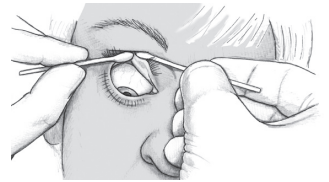


Figure 8.14

Making emergency eyelid retractor

Attention

- Safely made from standard sized paper clip
- Gives good view of cornea and eye ball unless serious swelling
- Surface of eye not sterile so retractor unlikely to introduce contaminants

What you need

- Standard sized paper clip — Figure 8.15



Figure 8.15



Figure 8.16



Figure 8.17

What you do

- Fold out ends of paper clip — Figure 8.16
- Turn up curved end — Figure 8.17
- Wipe clip with sterile wipe and let dry
- Use clip to hook up eyelid — Figure 8.18

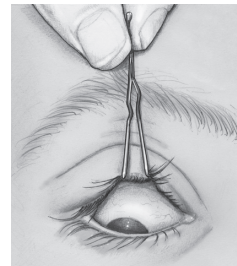


Figure 8.18

Fluorescein staining — to check for surface eye damage

Attention

- Store fluorescein drops in refrigerator. Warm to room temperature before use

What you need

- 10–20mL normal saline in 20mL syringe
- Ophthalmoscope. Blue filter is best then green
 - *OR* other bright light source (eg pencil torch)
- Fluorescein sodium 2% drops
 - *OR* fluorescein sodium ophthalmic strips (eg *Fluorets*)
- Sterile gauze swabs

What you do

- If pus or watery discharge — wash eye with **normal saline**
- Warn person that fluorescein may sting eye
- Put 1–2 **fluorescein drops** in small ‘pouch’ made in lower lid. **Do not** put straight onto cornea
- *OR* use **fluorescein strip**
 - Add drop of normal saline or anaesthetic to tip then touch to inner side of lower lid
- Ask person to blink
- Look at cornea with blue or green light from ophthalmoscope or slit lamp or bright light
 - If penetrating eye injury (perforation of eyeball) — will show fluid leak washing away fluorescein stain (waterfall effect) — **Urgent medical consult**
 - If new corneal injury or defect — will see pooling of bright, lime green colour (staining) in that area
 - Old corneal injury scars look opaque (whitish-grey) usually do not stain
- Record in file notes. Draw size, shape, position of injury/staining
- Gently wash out fluorescein with normal saline, clean around eye with tissues

Taking object off eye surface with irrigation or cotton bud

Attention

- **Do not** give person local anaesthetic eye drops to take away and use. Will not be able to feel further injury or damage
- If foreign body on cornea is central and over pupil — **needs to be removed in hospital**

What you need

- 2.5 magnification head loupe (fits around head and used to see small objects in eye)
- Bright light
- Normal saline in 20ml syringe or IV giving set. Use tap water in an emergency
- Sterile cotton bud, wet with normal saline or anaesthetic eye drops
- Anaesthetic eye drops (eg oxybuprocaine, tetracaine [amethocaine])
- Antibiotic eye ointment, if needed
- Eye pad, tape

What you do

- Eye assessment
 - ▶ Check vision
 - ▶ Look for other signs of injury, make sure object isn't sticking into eye
- Lie person down comfortably. Stabilise head. Use foam head ring, if available
- Use magnification loupe to magnify area
- Angle bright light at 45° to surface of eye
- Evert upper eyelid, look for foreign body/s
- Pull down lower eyelid, hold upper and lower eyelids apart
- Irrigate (wash out) eye to remove small objects not stuck to eye (non-adherent)
- Lift off objects sticking to eye surface with moist cotton bud
- If this doesn't work — put in 2 drops of **anaesthetic eye drops** and wait a few minutes for them to work
 - ▶ Do single or double eversion of eyelid
 - ▶ Sweep around under lid with wet cotton bud
- If you remove object
 - ▶ Check vision again
 - ▶ Check fluorescein staining, check for surface (corneal) damage. Will usually be small area
 - ▶ Put in **antibiotic eye ointment**, if needed

- ▶ Put on eye pad
- ▶ Ask person to come back next day for check
- If you can't remove object
 - ▶ Talk with eye specialist
 - ▶ *OR* If you are skilled — see Taking object off eye surface with needle

Taking object off eye surface with needle

Attention

- **Do not attempt until other methods have not worked**
- **Do not** attempt if object within 4mm of pupil — **needs to be removed in hospital**
- Cornea is tough. You will need firm steady approach to remove foreign body
- Make sure you lift out all of foreign body not just a small piece

What you need

- 2.5 magnification head loupe (fits around head, used to see small objects)
- Anaesthetic eye drops (eg oxybuprocaine, tetracaine [amethocaine])
- 25G needle on 2mL syringe (to use as handle)
- Antibiotic eye ointment or drops (eg chloramphenicol)

What you do

- Check vision
- Put in **anaesthetic eye drops**, wait 2 minutes
- Put on magnification loupe
- Put needle firmly onto 2mL syringe
- Ask person to keep both eyes open and fixate on distant target (eg door handle). This lessens eye movement
- Hold eyelids apart to stop blinking
- Brace hand holding syringe against side of head
- Put needle flat on cornea with **bevel facing away from cornea** (eye surface) to stop it scratching or sticking in
- Scrape an area slightly larger than object
- Gently lift under edge of object with bevel, then lift up and off eye surface — Figure 8.19
- Check vision again

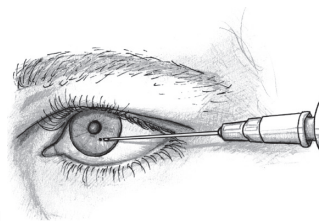


Figure 8.19

- Check fluorescein staining, look for eye surface (cornea) damage. Some is expected
- Give **antibiotic eye ointment or drops** to prevent secondary ulceration. Must give even if you were able to remove foreign body
- Put on eye pad until local anaesthetic drops have worn off — try to leave on for 1–2 hours, but at least 20 minutes
- Ask person to come back next day for check
- **If you can't remove object** — **specialist consult**

Putting on eye pads or shields

- Use eye pad to
 - Keep eyelids from moving over injured area and causing pain and friction
 - Protect eye after using anaesthetic drops
 - Keep light out of pupil dilated with drops
- Use eye shield to protect eye from compression

Attention

- **Do not** use pad on eye with bacterial or viral infection (eg ulcer, iritis, conjunctivitis)
- **Always** use pad on anaesthetised eye
- Eye pad needs to be comfortable but firm enough to stop eyelid movement
 - Tape pad on securely
 - Make sure skin around eye clean and dry before using tape
- Use eye shield **without** eye pad if
 - Penetrating eye injury
 - You suspect perforation — see Fluorescein staining

What you need

- 2 clean/sterile gauze eye pads or 2 ordinary gauze swabs folded in half
 - *OR* 1 gauze eye pad/gauze swab and 1 plastic eye shield (pressure patch) with elastic strap
 - *OR* 1 plastic eye shield with no eye pad
- 25mm paper tape

What you do

- If using ordinary gauze swabs — fold 1 in half
- Ask person to keep both eyes closed
- Put eye pad or folded swab over injured eye — Figure 8.20
 - Hold pad/swab in place (person can do this)
- Put second pad over top of first — Figure 8.21
 - Tape pad from forehead to top of cheek as tightly as possible with enough tape to cover whole pad. Check it is comfortable
- *OR* Cover first pad with plastic shield and tape in place — Figure 8.22
 - Shield needs to sit on brow and cheek, avoid pressure on the eye itself
 - Make sure it isn't too tight
- Change pad/s every 24 hours
- **If penetrating eye injury or suspected perforation** — apply eye shield **without** eye pad/gauze

If you don't have eye shield — make one by cutting bottom off polystyrene cup — Figure 8.23, Figure 8.24

Retinal photography

Retinal cameras capture digital images of the central retina which includes the optic nerve head and macular. Much easier than using direct ophthalmoscope. Images can be shared to monitor retinopathy or assist with decisions in emergencies

Diabetic photoscreening and monitoring

- If diabetes — should have a retinal check once every 12 months or sooner if known to have retinopathy
 - If overdue — take photos opportunistically
- Retinal photos **do not** replace the need for regular eye checks with eye specialists/optometrists

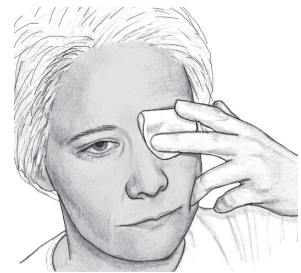


Figure 8.20

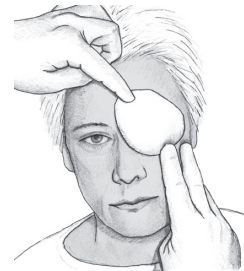


Figure 8.21

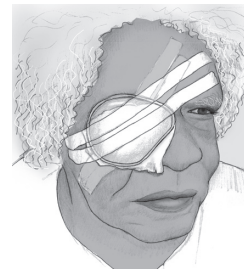


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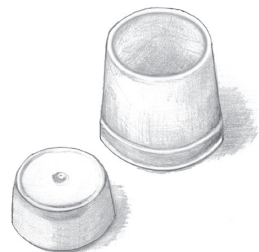


Figure 8.23

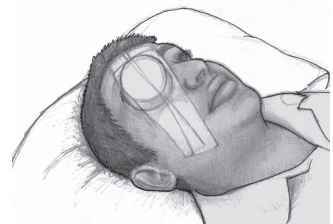


Figure 8.24

Acute care

- Unexplained vision loss (especially if sudden) *AND/OR* severe headaches – take photos
- Central retinal photographs **do not** show all the retina. There may be problems in the peripheral retina (eg retinal detachments) that can only be seen with an ophthalmoscope

Attention

- If the pupils are too small or if there are media opacities (eg corneal scarring, cataracts) it will not be possible to get clear photos

What you need

- Retinal camera

What you do

- Turn off all lights and make room as dark as possible, makes pupils get large
- Tell patient there will be a bright flash of light but nothing will touch or hurt the eye
- Photograph the eye you are most worried about first. Follow manufacturers instructions
- Photograph other eye
 - ▶ If the photograph of second eye is darker and blurry, wait 5 minutes for pupil to get large again then retake photo
- If photographs are dark and blurry — **medical consult** about using **tropicamide** dilating drops to try and get better quality photos
 - ▶ Using dilating drops can, very rarely, cause acute glaucoma. Tell patient to return if symptoms develop in next 24 hours
- If not trained to interpret photos — share with person who is (eg medical officer, optometrist, eye specialist)

Ear examination



- Check infants and children's ears whenever they come to the clinic
- Always look at 'good' ear first
- If you find anything abnormal or worrying — **medical/specialist consult**



Figure 8.25

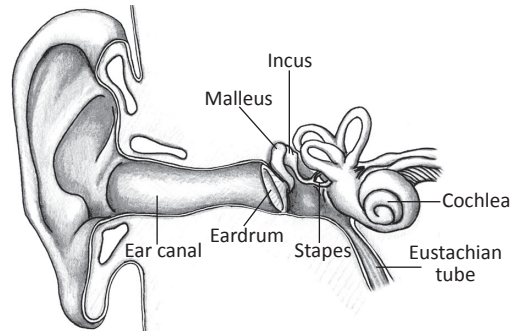


Figure 8.26

Anatomy of ear

Position person

Infants/toddlers

- Put infant/toddler on carer's lap. Have ear you want to check first facing outward
- Ask carer to stop any movement by
 - Tucking the child's arm under their armpit and holding the child's head firmly against their chest
 - With their other hand firmly hold child's body and other arm — Figure 8.27
- If child kicking — carer puts child's legs between their thighs and holds tight



Figure 8.27

Bigger children/adults

- Ask child to stand *OR* adult to sit comfortably and tilt their head slightly away from you — Figure 8.28



Figure 8.28

Check outside of ear

- Look at mastoid (bone behind ear) and area under ear crease for signs of infection and surgical scars
- Gently run hand over area — feel for heat, sponginess, swelling

Check ear canal

Attention

- Use new clean earpiece for each ear
- Dry mop any discharge (pus) before examining inside ear

If ear drum chronically stretched, retracted (sucked in), thinned — can look like a perforation (large hole) or defect

What you need

- Otoscope with right sized earpiece. Use largest size (adult or child) that fits comfortably in ear canal

What you do

- To straighten ear canal
 - Infants and toddlers — hold pinna (edge of ear) and pull gently down — Figure 8.29
 - Young children — pull pinna straight back — Figure 8.30
 - Older children and adults — hold top of ear and gently pull back and up — Figure 8.31
- Look at entrance to ear canal for pus (discharge), swelling, redness
- Hold otoscope like a pen — hold in left hand to examine left ear, right hand to examine right ear
- Otoscope handle can be pointing up or down
- Must brace otoscope to stop injury if person moves suddenly
 - Brace by putting your fist against cheek or head — Figure 8.32, Figure 8.33
- Gently put earpiece into ear canal — never force
- Look through earpiece as you go so you can see where you are putting it, and see behind any discharge (pus) or objects/foreign bodies

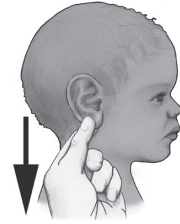


Figure 8.29

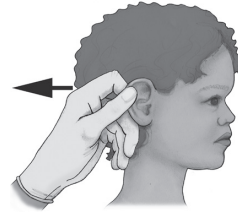


Figure 8.30



Figure 8.31



Figure 8.32



Figure 8.33

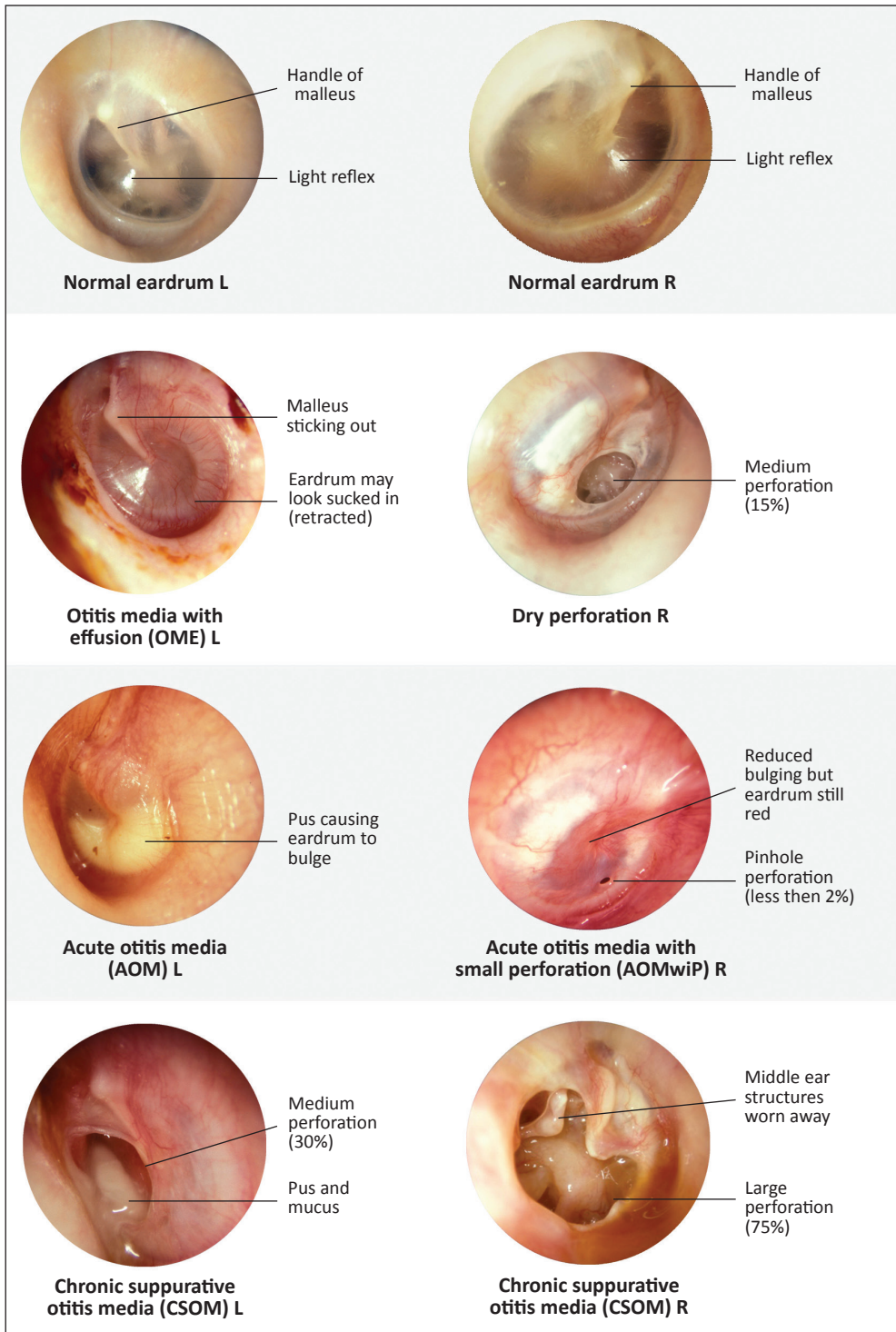


Figure 8.34

Photos provided by Dr Michael Hawke, Hawke Library.

Look

- At walls of ear canal — check for swelling, sores, scratches, injuries
- For debris, wax or pus, objects/foreign bodies (eg flies, beads, old tissue, cotton wool)
- At condition of drum
 - Colour — grey, yellow, white
 - Dull or shiny
 - Bulging outward or inward
 - Bubbles/fluid behind drum
- See Ear examination chart

Test ear drum for movement

Attention

- **Do not** test drum for movement if ear too painful
- Only test eardrum you can see clearly
- If drum doesn't move — usually effusion (fluid in middle ear)
- Can be difficult to get a good seal with otoscope earpiece in young children
- Tympanometry can be used to test drum mobility and middle ear — if available and practitioner has training. **Do not** use on children under 6 months

What you need

- Otoscope with right sized earpiece
 - Use largest size (adult or child) that fits comfortably in ear canal
- Puffer (insufflation) bulb that connects to otoscope

What you do

Using puffer bulb

- Attach puffer bulb to otoscope
- Explain that they will feel pressure in ear but it shouldn't hurt
- Slightly compress the puffer bulb
- Gently push earpiece into outer canal as far as it will comfortably go, to make airtight fit
- Release the puff bulb — Figure 8.35
- Watch for fast movement of eardrum
- If none — do it again with a little bit more pressure on bulb until there is movement or you are certain it will not move. **Stop if it causes pain**
- Gently take out earpiece and throw it away



Figure 8.35

Popping ears — Valsalva manoeuvre

- Get person to hold fleshy end of nose to block it, at the same time try to blow out through their nose with their mouth closed — Figure 8.36
- Autoinflation devices may be useful for children
- If eardrum intact and normal — it will move. Ask person if one or both ears ‘popped’



Figure 8.36

Tympanometry

Tympanometry is a test that measures the function and movement of the eardrum and middle ear by creating variations of air pressure in the ear canal. The results of tympanometry are represented on a graph called a tympanogram. The test is usually quick and painless, unless the eardrum or middle ear are inflamed

Attention

- Only to be performed by appropriately trained staff
- Otoscopy must be performed before tympanometry
- **Do not** perform tympanometry if any
 - Ear pain
 - Ear drum is inflamed, bulging or perforated
 - Discharge or foreign objects in the ear canal
 - Within 6 weeks of ear surgery, or in accordance with medical advice
- Child cannot be speaking, sucking or swallowing during test
- If child not willing *OR* staff/parent have concerns — **medical consult**

What you need

- Suitable room with minimal external noise
- Tympanometer with spare batteries
 - 1000 Hz probe tone for infants under 6 months
 - 226 Hz probe tone for children 6 months and over
- Disposable ear tips of various sizes
- Tympanometry printer (fully charged) and spare paper rolls (as applicable)

What you do

- Select an ear tip slightly larger than external auditory canal
- For infants — hold pinna (edge of ear) and pull gently down — Figure 8.29
- For young children — pull pinna straight back — Figure 8.30
- Use other hand to put in probe into external auditory canal

- Create air-tight seal by gently rotating wrist towards the child's eye, so screen is on top and can be viewed
- Watch screen to confirm that seal has been achieved, then hold tympanometer still
- When test complete, remove ear probe by gently rotating wrist to break seal
- Record measurements (as displayed on the screen) for pressure, compliance and ear canal volume
- Repeat procedure on other ear

Interpreting results

Results are to be considered together with history and otoscopy (and audiology if applicable) to make clinical judgements about the need for referral and follow-up

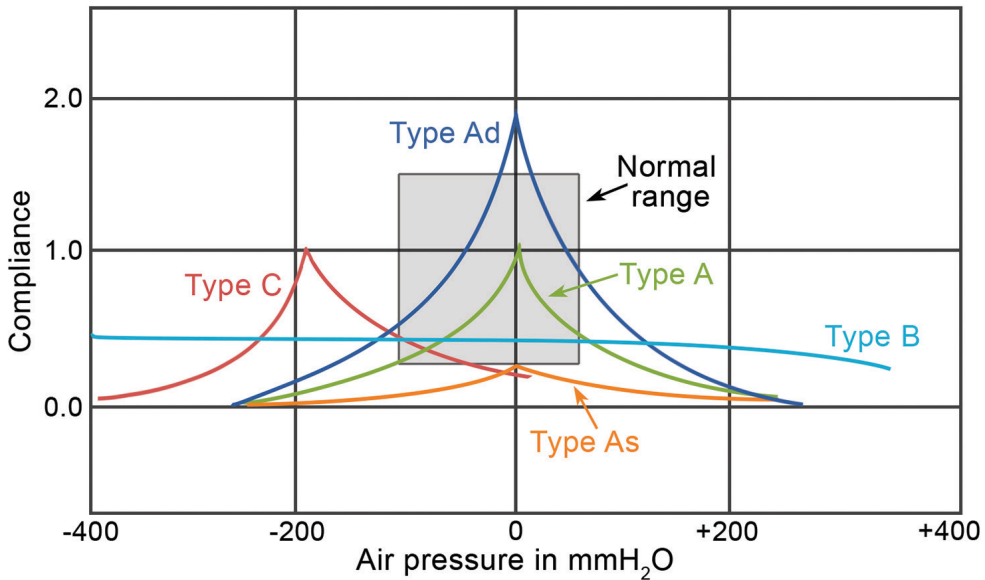
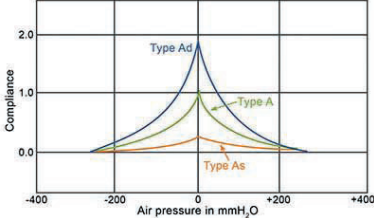
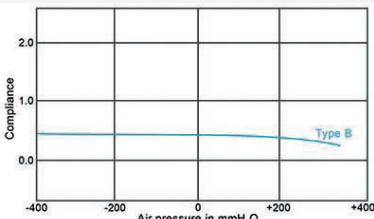
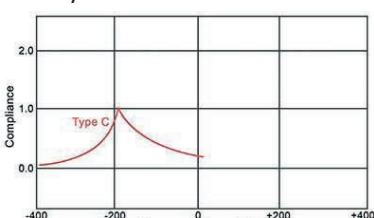


Figure 8.37 Types of tympanometry results

Table 8.2 Interpreting tympanometry results

Results are classified as below	Additional information
<p>Type A — Normal middle ear pressure peaks (+50 to –200 daPa) for children and normal compliance (0.3 to 1.5 cc)</p> 	<p>Type A tympanograms represent normal ear canal volume, middle ear pressure and compliance function</p> <ul style="list-style-type: none"> • Type A tympanogram result represents a properly functioning Eustachian tube and normal middle ear function • Type As (shallow) tympanogram result with normal ear pressure but reduced compliance may indicate normal middle ear function or may suggest a stiff middle ear system caused by ossicular fixation • Type Ad (deep) tympanogram result with normal ear pressure but increased compliance indicates a flaccid or hyper-mobile middle ear system. This may suggest an ossicular subluxation or a healed tympanic membrane perforation
<p>Type B — No compliance (no air pressure peaks), described as ‘flat’ tympanograms</p> 	<p>Type B tympanograms represents a deviation in ear canal volume, middle ear pressure and/or compliance function</p> <ul style="list-style-type: none"> • Type B tympanogram with normal ear canal volume usually indicates middle ear effusion. It may also indicate thickened tympanic membrane or perforation • Type B tympanogram result with high ear canal volume may indicate a tympanic membrane perforation, a patent grommet or T tube • Type B tympanogram result with low ear canal volume may indicate the probe is blocked by cerumen or a foreign body. It may indicate that the probe tip is against the side of the external auditory canal
<p>Type C — Abnormally low middle ear pressure indicating Eustachian tube dysfunction</p>  <p>Note: Abnormally low middle ear pressure - peak less than 200 daPa for children</p>	<p>Type C tympanograms represents a deviation in ear canal volume, middle ear pressure and/or compliance function</p> <ul style="list-style-type: none"> • Type C tympanogram result with normal compliance but low middle ear pressure indicates a Eustachian tube dysfunction without ear effusion • Type Cs (shallow) tympanogram result with reduced compliance and low middle ear pressure indicates Eustachian tube dysfunction with fluid and air in the middle ear • Type Cd (deep) tympanogram result with increased compliance and low middle ear pressure indicates ossicular subluxation, or healed tympanic membrane perforation with Eustachian tube dysfunction

Testing hearing

Attention

- Tuning fork tests not as accurate as audiometers but provide useful information, can be used by all health practitioners
 - Tuning fork tests easier to interpret if hearing problem only on one side
- **Do not** use tuning fork tests to assess children's hearing
 - Children with ear disease or hearing impairments must be referred for audiology

Weber test

Tests for one-sided conductive loss (loss of sound travelling through outer or middle ear) or sensorineural loss (nerve or hair cell damage in inner ear)

- Do Weber test before Rinne test

What you need

- A middle C (512Hz) tuning fork, best with wide base

What you do

- Strike tuning fork lightly against your hand or knee
- Keeping single bar of tuning fork up straight, put it against middle of person's forehead — Figure 8.38
- Ask person if tone sounds the same in both ears
 - If it does — record 'normal' in file notes
 - If it doesn't this is 'not normal' — record which ear heard loudest sound
- If one ear known to have hearing loss
 - If sound louder in problem ear — **conductive** loss in problem ear
 - If sound louder in good ear — **sensorineural** loss in problem ear



Figure 8.38

Rinne test

Compares air-conduction and bone-conduction hearing

- Do Rinne test after Weber test

What you need

- A middle C (512Hz) tuning fork, best with wide base

What to do

- Strike tuning fork against your hand or knee
- On left ear, put single bar on base of bone behind ear (mastoid process) — Figure 8.39
 - Count in seconds and ask person to tell you when sound stops. Remember how many seconds it took (bone conduction)
- Move tuning fork next to ear opening but **do not** touch ear — Figure 8.40
 - Count in seconds and ask person to tell you when sound stops again (air-conduction)
- Record both times
 - Number of seconds against bone
 - Number of seconds next to ear opening
- Do again for right ear
- Normal hearing if
 - Sound louder next to ear
 - Sound next to ear lasts twice as long as sound against bone
- Conductive hearing loss if
 - Sound louder against bone
 - Sound against bone lasts the same time or longer than sound next to ear



Figure 8.39



Figure 8.40

Ear procedures

Dry mopping ears with tissue spears

Removes pus, dries middle ear. Allows topical medicines to reach inflamed surfaces, makes ear conditions much less favourable for bacteria

Attention

- If discharging ears — get child to blow nose before and during procedure
- **Must** push tissue spears well into ear canal, near eardrum — about 2.5cm
- Don't worry about pushing spear in too far, tissue is soft and won't do any damage

What you need

- Toilet paper — Figure 8.41
- Waste bin close by
- Ear drops — as needed under guideline or prescription

What you do

- Take piece of toilet tissue, hold in one hand and twist from corner — Figure 8.42
- Use thumb and first finger of both hands to **twist** until spear is tight — Figure 8.43
 - ▶ **Do not** roll — rolled tissue is too thick and can't be put far enough into ear canal
- Break off tip (too floppy to use) and other end of spear. Spear should be about as long as your thumb — Figure 8.44
- Straighten ear canal
- Push tissue spear into ear with slight twist — Figure 8.45
- Stop pushing when tissue stops going in
 - ▶ OR child cries, coughs or blinks (about 2.5cm)
- If time leave spear in place to soak up pus



Figure 8.41

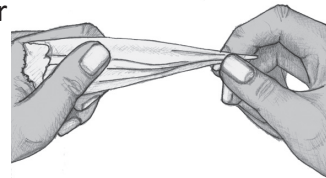


Figure 8.42

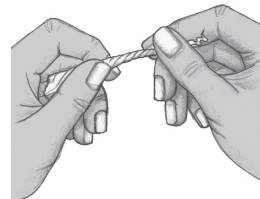


Figure 8.43

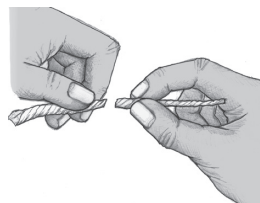


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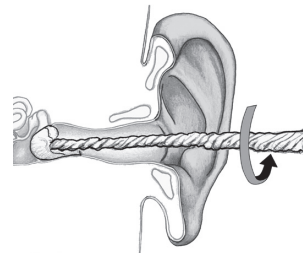


Figure 8.45

- Remove slowly, throw away. String of pus often connected to spear — Figure 8.46
- Do again with new spears until spear comes out dry. At first this may take some time but will get quicker as ear improves
- When ear is dry, put in ear drops
- Teach child's carer and older children to make and use tissue spears
- Pus re-forms in middle ear cavity within hours, do
 - ▶ At least 4 times a day to begin with
 - ▶ Then twice a day for 1 week
 - ▶ Then once a day for 1 month

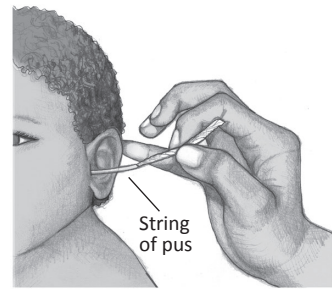


Figure 8.46

Syringing ear



Used to remove softened wax, foreign bodies, pus/debris from ear canal

Attention

- **Do not** syringe ear if pain in ear or recent trauma
- **Do not** use forceps to remove foreign body — may damage eardrum
- **Always** look in ear before syringing. If any pain — stop and look again
- Soften wax with softeners before syringing
- If CSOM — syringe with diluted **povidone-iodine 10%**
- Can drown and float out insects with oil or **tetracaine (amethocaine) 1%** instead
- If foreign body doesn't come out — may need to see specialist

What you need

- Otoscope and earpieces
- Bluey
- Gloves
- Kidney dish or similar (eg ice cream container) to collect run off
- Ear syringe *OR* 20mL plastic sterile syringe +/- tubing from scalp vein needle
- 20–50mL fresh warm water (body temperature)
- Dilute **povidone-iodine 10%**, if needed — mix 5mL (one teaspoon) in 100mL of fresh warm water

What you do

- Look in person's ear to find material to be removed
- Protect person's clothing with bluey, ask them to hold kidney dish under ear — Figure 8.47
- Fill syringe with warm water or dilute **povidone-iodine 10%**. Make sure all air is removed
- Straighten ear canal then put tip of syringe or plastic tubing into ear canal
- Aim up and back so water will run along roof of ear canal
- Push water/**povidone-iodine** into ear with smooth, firm pressure on plunger. Water/**povidone-iodine** will spiral around canal, flush out foreign bodies
- Repeat until canal clean
- If one angle of 'squirt' doesn't get object out — try another, but be gentle
- Dry mop ear when finished
- After syringing, ear drum often looks pink, blood vessels dilated



Figure 8.47

Putting in ear drops



Attention

- **Always** clean pus and foreign bodies out of ear first, so drops can reach middle ear — dry mop or syringe
- **Do not** put tip of bottle into ear canal — keep end clean

What you need

- Ear drops
- Gloves

What you do

- Sit person in comfortable chair
- Ask them to tilt head away from you
- Straighten ear canal
- Hold dropper just above ear canal, squeeze in right number of drops
- Pump or gently rub on skin flap in front of tragus (ear canal) to make drops run down into canal
- To help medicine stay in contact with ear canal, ask person to lie on their side or keep head tilted for 3–5 minutes. Can also put cotton ball in ear canal
- Do other ear, if needed

Putting in ear wick — to give drops



Attention

- **Always** clean pus and foreign bodies out of ear first, so drops can reach middle ear — dry mop or syringe
- If ear very swollen ear wick may hurt when first put in

What you need

- Ear wick (eg *Merocel Ear Wicks*, *Pope Otowick*)
- Ear drops
- Gloves
- Alligator forceps or tweezers

What you do

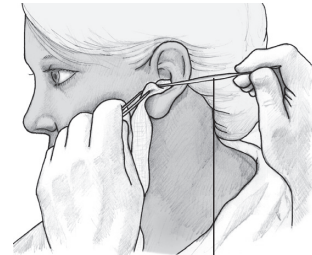
- Lie or sit person comfortably
- Open ear wick packet — keep ear wick clean and inside packaging
- Pick up wick with forceps
- Straighten ear canal with your other hand, if needed
 - ▶ Gently put wick into ear canal — leave end of the wick level with entrance to ear canal
 - ▶ Ask person to tilt their head away from you, put drops on end of the wick
 - ▶ Wick will swell up, fit more snugly and be comfortable
 - ▶ Reapply drops as needed
- Change wick after 2 days — can be left in place for up to a week if drops are applied regularly
 - ▶ May fall out itself if swelling goes down
- To remove — moisten wick with ear drops and gently pull out with forceps

Putting gauze wick into ear — to apply ointment



What you need

- Dressing pack
- Scissors
- Ribbon gauze — about 10cm
- Ointment to go on wick
- Gloves
- Clean probe or orange stick
- Ear-packing (angled) forceps



Orange stick

Figure 8.48

What you do

- Lie or sit person comfortably
- Lay out dressing pack and equipment
- Drape site with towels
- Cut about 10cm of ribbon gauze
- Put drops/ointment onto gauze, rub in with forceps
- Ask helper or person to straighten ear canal
 - ▶ Pick up gauze at one end with dressing forceps and about 1cm in from other end with packing forceps
 - ▶ With packing forceps, gently put gauze along line of canal as far as it will comfortably go
 - ▶ Ask helper/person to let go of ear. Gently hold gauze in place with probe or orange stick so it doesn't fall out — Figure 8.48
 - ▶ Pick up gauze again with packing forceps — about 2cm further along. Push gauze gently into ear canal to lay against gauze already there
 - ▶ Repeat until ear canal comfortably filled with gauze to level of canal opening
- Cut off any leftover gauze
- Leave 1–2 days then take out packing. Dry mop canal, repack if needed

If ear very tender and/or swollen

- Try putting nozzle of ointment tube straight onto 18G or 19G plastic IV cannula (without needle)
 - ▶ OR Put ointment into 2mL syringe — connect to plastic cannula
 - ▶ Looking with otoscope, guide cannula very gently to near eardrum, squeeze in ointment (this avoids air bubbles)
- After 2 days syringe with warm water
- Repeat if needed

Nasal packing



Use if nose bleed won't stop with simpler treatments

Anterior nasal packing

Attention

- **Do not** pack both nostrils without **medical consult** — can cause fatal arrhythmias
- Monitor person closely during and after nasal packing — see Nose bleeds (STM)
- Ask person to look straight ahead — tilting head back will make nasal cavity harder to see
- If using a commercial product, follow the instructions and seek help if unsure

Meroce/ nasal packing

Can use for both anterior and posterior epistaxis

What you need

- **10% local anaesthetic spray** or **phenylephrine-lidocaine (phenylephrine-lignocaine)** spray
- *Meroce/* nasal tampons pack
 - Anterior epistaxis — 8cm pack or 10cm pack trimmed to size with scissors
 - Posterior epistaxis — 10cm pack
- Normal saline

What you do

- Ask person to gently blow nose — clear out clots
- Spray topical anaesthetic up affected nostril
- Refer to product instructions to prepare and insert
- Once inserted check in mouth for blood trickling down back of throat

To remove

- *Merocel* nasal packing should be removed after 24–72 hours
- Wet end of pack with 10mL of **normal saline** or water
- Leave for 5 minutes
- Gently pull out with forceps

RapidRhino nasal packing

What you need

- **10% local anaesthetic spray** or **phenylephrine-lidocaine (phenylephrine-lignocaine) spray**
- *RapidRhino* nasal tamponade-balloon device — choose correct length for potential bleed site
- Sterile water in sterile bowl
- 20mL syringe
- Tape

What you do

- Ask person to gently blow nose — clear out clots
- Spray topical anaesthetic up affected nostril
- Refer to product instructions to prepare and insert
- Tape the protruding end of device to cheek
- Once inserted check in mouth for blood trickling down back of throat

To remove

- *RapidRhino* should be removed after 24–72 hours
- Deflate cuff and gently remove — monitor for further bleeding for 30 minutes

Gauze anterior nasal packing

Attention

- Hard to do properly — get help if you are not sure

What you need

- Prepared nasal pack (if available)
- OR
- **10% local anaesthetic spray** or **phenylephrine-lidocaine (phenylephrine-lignocaine) spray**
 - 1cm × 20cm sterile gauze soaked in **white petrolatum jelly** (eg *Vaseline*)
 - Nasal-packing forceps
 - Clean scissors — for cutting gauze
 - Paper tape

What you do

- Ask person to gently blow nose — clear out clots
- Spray topical anaesthetic up affected nostril
- Leave end of gauze outside nostril
- Use forceps to gently put soaked gauze as far as possible into nasal cavity and layer it back and forth until nostril completely packed —

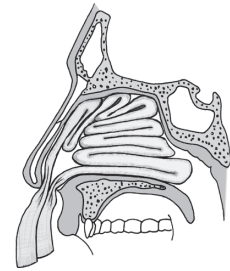


Figure 8.49

- Figure 8.49
- Leave at least last 3cms of gauze outside nose
- Cut off any extra gauze and tape both ends to face
- Check in mouth for blood trickling down back of throat
- If bleeding still won't stop — **only if experienced** consider doing posterior nasal packing
- Remove after 24–72 hours

Posterior nasal packing

Balloon catheter

Attention

- If person having trouble breathing — give **oxygen** to target O₂ sats 94–98% *OR* if moderate/severe COPD 88–92%
- Person will need sedation before this procedure
- **Medical consult** if trauma/suspected base of skull fracture

What you need

- **10% local anaesthetic spray** or **phenylephrine-lidocaine (phenylephrine-lignocaine)** spray
- Water based lubricant
- Small retaining catheter — no. 12 or 14 with 30mL balloon
- 10mL syringe
- 1cm gauze — *Vaseline* or vas-gauze pack
- Clean scissors (for cutting gauze)
- Tape

What you do

- Ask person to gently blow nose — clear out clots
- Spray topical anaesthetic up affected nostril
- Measure half way point between nasal septum and tragus of ear
- Lubricate tip of catheter

- Put in in straight direction along floor of nasal cavity towards ear lobe — to half way point
- Keep mouth open, you **MUST** be able to see the **TIP** of catheter in back of throat **BEFORE** inflating balloon
 - Inflate with 3mL air and pull catheter forward until it 'catches' in the back of the nose
 - Then inflate with up to 10 mL air, stopping when it gets too uncomfortable — Figure 8.50
- Gently pull catheter until resistance felt
- Put in gauze nasal pack
- Hold ends of gauze and catheter in place just outside nostril with tape or clamp (eg umbilical cord clamp). Cut off extra gauze, secure ends to face.
- Put piece of gauze between nose and clamp to keep catheter taut and prevent pressure sore
- If bleeding continues — take out catheter, try in other nostril
- Remove after 24–72 hours

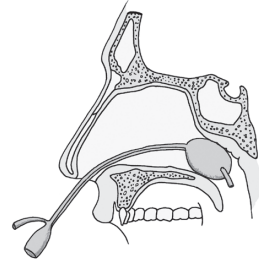


Figure 8.50

Mouth, throat, teeth and gums examination

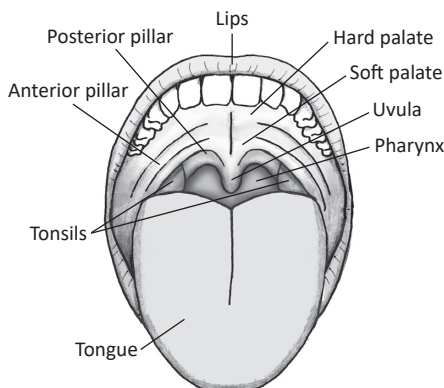


Figure 8.51

Attention

- When you examine mouth and throat don't forget teeth and gums
- If you find anything abnormal or worrying — **dental/medical consult**

What you need

- Torch or bright lamp
- Disposable wooden spatula

What you do

- Sit person in comfortable chair with good back support

Ask

- Anything in their mouth that worries them
- Any teeth loose or sore
- If they wear dentures (false teeth) — dentures should be removed when examining the mouth

Check

- Is voice hoarse
- Can you smell halitosis (bad breath)
- Ask person to stick out tongue — does it lie straight, even on both sides

Look

- At lips, all around inside of mouth, tongue — colour, lumps, swellings, ulcers, growths, white patches
- At gums for swellings, ulcers, growths, inflammation (pain or redness), and/or exposed, sensitive tooth roots
- Teeth — stained or dental caries (rotten), chipped or loose
 - ▶ Tap any tooth that looks decayed to see if this causes pain
- Back of throat
 - ▶ Ask person to open mouth, with tongue in normal position, say ‘aaghhh’
 - ▶ If you can’t see the back — press spatula firmly down on centre of tongue
 - ▶ Look at soft palate, posterior pillars, uvula, tonsils, pharynx
 - ▶ Check for colour, any white patches, redness, lumps, ulcers, growths

Feel

- For swollen lymph nodes

Protective dental procedures



- Effective fluoride varnish strategy needs coordinated, long-term, well documented approach
- Start at 18 months, do every 6 months until adulthood
- Helps reduce cavities/decay

Attention

- **Fluoride varnish is an S4 poison** — can only be applied by dentists, dental/oral health therapists, dental hygienists, general practitioners, nurses, and ATSIHPs who have received accredited training

Do not

- **Do not** use more than recommended amount of varnish
- **Do not** apply varnish if child has
 - ▶ Had varnish applied less than 3 months ago
 - ▶ Been treated for asthma in past week
 - ▶ Not taken their asthma medicine on the day
 - ▶ Been hospitalised for any allergic reaction in the past 12 months — reactions to fluoride varnish such as swelling and breathing difficulties are very rare but can happen

Do first

- Take time to gain child's trust — child will need to feel safe and comfortable
- Provide written information about the procedure if available



Figure 8.52

What you need

- 2–4 cotton rolls, for older children if tolerated
- Toothbrush, or use gauze wipes
- Gauze wipes
- Fluoride varnish and dosage pads if available
- **Fluoride varnish**
 - ▶ 0.25mL for children 18 months to 6 years, about the size of a pea, smaller than paracetamol tablet — Figure 8.52
 - ▶ Up to 0.4mL for 7 years and over
- Mini plastic (dappen) dish — Figure 8.52
- Applicator brush (if supplied) *OR* microbrush applicator — Figure 8.53



Figure 8.53

What you do

- Try to clean and varnish **all** surfaces of teeth
 - If not possible (eg young child too restless) — give priority to **front upper teeth**

Position person

Young child

- Sit child on parent/carer's lap facing you — Figure 8.54
- *OR* Sit child on parent/carer's lap facing them. Sit knee to knee with parent/carer and lie child back onto your lap — Figure 8.55

Older child

- Have child sitting or lying with head tilted back Figure 8.56

Clean teeth

- Gently brush teeth using wet toothbrush only with **no** toothpaste
 - Clean all surfaces of teeth using circular motion — Figure 8.57
- If no toothbrush available — use gauze to wipe teeth clean

Dry teeth and apply varnish

- Most important step. Try to get child to keep mouth open and tongue off teeth
- Keep wet cheeks, lips and tongue away from teeth
 - Put fingers or a finger and a thumb on either side of teeth
 - *OR* If tolerated put cotton roll between teeth and cheek/lip
- Dry 2–3 teeth at a time using gauze wipe — Figure 8.58
 - Start with upper front teeth, then upper back.
 - Lower front and lower back teeth last



Figure 8.54



Figure 8.55



Figure 8.56

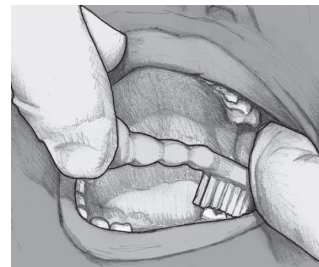


Figure 8.57

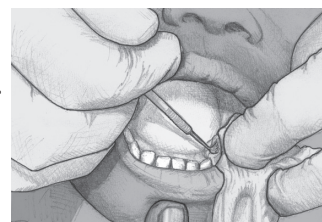


Figure 8.58

- Paint varnish onto dried teeth straight away using applicator —
Figure 8.59

- ▶ Apply to outside, inside and biting surfaces
- Check the tongue at intervals for any varnish, wipe away with gauze
- If using cotton roll, change when it becomes too wet
- Continue drying and painting 2–3 teeth at a time until all teeth have been varnished
- Finish by checking the tongue and wiping away any varnish

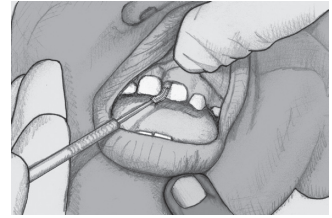


Figure 8.59

Tell parent/carer

- **Do not** brush child's teeth for 24 hours
- **Do not** pick at varnish — works best if left on for as long as possible, but will come off over next 1–2 days
- Varnish will help to protect teeth and prevent cavities
- Child can drink but mustn't eat for half an hour, then soft foods for the rest of the day
- Varnishes may be barely visible but will have a rough feel
 - ▶ *AND* may have a yellow colour that will last for the rest of the day
- Older children and teenagers may be put off by appearance, so make sure they understand it won't last long
- Reapply varnish in 6 months

Emergency dental kit

Instruments

- Sterile No. 4 dental mirrors (pack of 12) and handles (single use/disposable)
- Sterile dental tweezers (single use/disposable)
- Sterile cheek and tongue retractors
- Large syringes for irrigation
- Sterile suturing equipment
 - 3.0 plain resorbable suture (eg *Vicryl*, plain gut)

Medicines and remedies

- Dry socket dressing (eg *Alvogyl*)*
- Temporary filling material (eg *Cavit*)* — chewing gum or blu tak could also be used
- Oil of cloves (eugenol), small glass container to tip oil into
- **Topical anaesthetic** (eg prilocaine + lidocaine [lignocaine] cream)
- Dental pain relief
- **Normal saline**, sterile

* Important for clinics to keep in stock

Dressings

- Cotton pellets, or small pieces of cotton wool rolled in gloved fingers to same size as hole in tooth
- Sterile cotton gauze
- Cotton buds
- Gelatine sponge (eg *Gelfoam*)

Other

- Suction equipment *OR* cup and tissues for spitting
- Aluminium foil
- Sterile specimen jar (tooth or fragment storage)
- Milk

Personal protection

- Gloves, mask, goggles/glasses, gown

Temporary filling materials

- Used if hole in tooth sensitive, to replace lost filling for a short time
- If *Cavit* not available — use chewing gum or blu tak
- *Cavit* has consistency of plasticine, hardens in presence of water, will not last more than a few weeks or stay in chipped front tooth
- Will not help with toothache

Dental care procedures



Putting on a protective cover

Used to treat pain in tooth (brief sharp pain *OR* sharp pain then dull throb)
— see Dental and oral problems (STM)

Attention

- Pain most likely due to dental nerve (pulp) inflammation if
 - Open hole in tooth
 - Pain made worse by hot or cold foods, drinks, air
 - No swelling or fever

What you need

- **Dental pain relief**, oil of cloves (eugenol) — do not use oil of cloves in pregnancy
- Large syringe for irrigation. Filled with warm water (cold will cause pain)
- Sterile tweezers
- Suction equipment *OR* cup and tissues to spit into
- Cotton pellets (small balls of cotton wool rolled between gloved fingers)
- Temporary filling material (eg *Cavit*) — chewing gum or blu tak could also be used

What you do

- Give **dental pain relief** — not required for brief sharp pain
- Sit person in comfortable chair
- Remove food or debris from hole. Syringe with warm water or use tweezers
- Ask person to gargle and spit
- Dry hole with cotton pellet held in tweezers
- If pain not relieved — pick up hole-sized pellet of cotton wool, dip into oil of cloves, squeeze out excess, gently put in hole
 - Be careful, oil of cloves can sting gums or tongue
 - **Do not** use if pregnant, breastfeeding, under 12 years
- **If toothache — brief sharp pain *OR* severe sharp pain then dull throb** (mostly painful after eating or drinking)
 - Put temporary filling on index finger, push in firmly to fill hole
 - Filling will set after few minutes, but will keep putty-like softness. Can be dug out if needed. Won't last for more than a few weeks

- **If toothache — throbbing ache *OR* intense pain**
 - Don't fill tooth
 - Repeat oil of cloves application as needed
- Refer to dental service

Dressing a dry socket

Alveolitis (dry socket) is due to poor healing, not infection. Treatment will give symptom and pain relief

Attention

- **Will need pain relief before procedure**
- **Do not** use oil of cloves (eugenol). Will burn, won't give pain relief

What you need

- Paracetamol
- Large syringe for irrigation, filled with warm sterile normal saline. Cold will cause pain
- Suction equipment *OR* cup and tissues to spit into
- Sterile
 - Cotton gauze
 - Tongue retractor, helper to retract tongue
 - Dental mirror
 - Tweezers
- Pinch of dry socket dressing (eg *Alvogyl*)

What you do

- Give **paracetamol**
- Sit person in comfortable chair
- Use syringe to irrigate (gently wash) socket with **normal saline**
- Have person spit it out or use suction
- Dry area with gauze
- Use fingers or tweezers to push dry socket dressing (eg *Alvogyl*) into socket
 - Tell person it will smell and may taste bad, but they will feel a lot better
- Tell person to use warm salt-water mouthwash morning, night, and after food
- Check every 2–3 days. Repeat wash out, put in fresh dry socket dressing
- Tell person dressing can be left in place. Dressing generally self-eliminates

Treating a bleeding tooth socket — compression

Attention

If prolonged bleeding

- Check file notes for bleeding disorders, medicines that prolong bleeding
- Check history of dental extraction. Talk with dentist who took out tooth
- Usually occurs because blood in socket won't clot normally. Likely causes are
 - Person taking medicine that slows clotting (eg warfarin, heparin, aspirin)
 - Blood vessel trauma that prolongs bleeding — wide open sockets, soft tissue damage after difficult/multiple extractions
 - Bleeding at night. Large clot stops direct pressure, causes prolonged oozing
 - Kidney disease, especially if person has missed or delayed dialysis
- Ensure following post operative instructions. Common mistakes that result in inadequate pressure at the site of bleeding include
 - Placing gauze over the adjacent teeth, rather than at the site of bleeding
 - Using excessive amounts of gauze
 - Removing the gauze too soon to look at the bleeding site
 - Rinsing and spitting

What you need

- Paracetamol
- Sterile cotton gauze

What you do

- Give **paracetamol**
- Sit person upright and comfortably in chair
- Place a small folded gauze square or ball directly and firmly over the surgical wound
- Apply pressure — ask to bite down hard or otherwise press a finger firmly over the wound for 15 minutes, then check if the bleeding has stopped
- Advise patient
 - **Do not** keep rinsing or spitting
 - **Do not** use paper tissues or cotton wool
 - **Do not** remove the gauze too soon to look at the bleeding site
- **If bleeding continues** and you have skill needed — see Treating a bleeding tooth socket — suturing OR — **medical/dental referral urgently**

Treating a bleeding tooth socket — suturing

Stopping bleeding using adrenaline (epinephrine) injection and suturing

What you need

- Cotton bud
- Topical anaesthetic cream
- Local anaesthetic with adrenaline (epinephrine), dental syringe, dental needles
- Helper to retract tongue, cheek etc
- Sterile equipment
 - Tongue retractor
 - Dental mirror
 - Tweezers
 - Cotton gauze
 - Suture kit
- 3.0 plain gut suture
- Haemostatic agent, to stop blood flow (eg *Gelfoam*)

What you do

- Paint **topical anaesthetic** over injection site/s with cotton bud. Wait 1 minute
- Inject **local anaesthetic + adrenaline (epinephrine)** into surrounding soft tissue
- Wipe dry, remove any large clots, look for torn tissue or source of bleeding
- Put in suture by pushing needle right through **soft tissue only** from outside to inside of socket, then from inside to outside of socket — Figure 8.60
- Pull socket sides toward each other, knot suture firmly, and cut — Figure 8.61
- If haemostatic agent (eg *Gelfoam*) available. Use tweezers to gently push into socket and under suture to hold in place. Will mould into position
- Watch for 10 minutes
- If still bleeding — reapply finger pressure and gauze pack
- Recheck medical history — **dental consult**

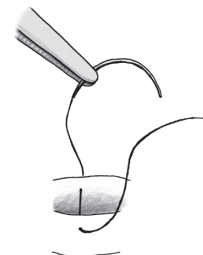


Figure 8.60

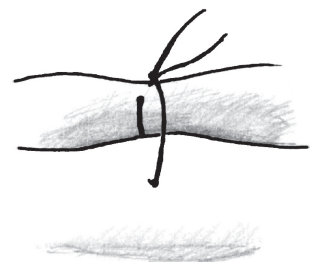


Figure 8.61

Lancing a pointing abscess

Attention

- Only lance abscess if sure it is needed, skilled and confident to do so
- Make sure abscess is clearly pointing. Can see pus just under skin (mucosa)
- **Do not** give local anaesthetic unless trained/skilled to do so
- **Do not** inject local anaesthetic into swelling. Will not anaesthetise area, can cause dangerous spread of infection
- Nerve block injections away from site of infection can be safe and effective
- Important that there is **immediate dental follow-up** care after this procedure to make sure the source of infection is removed, and to prevent a more serious and dangerous infection

What you need

- Sterile cotton gauze
- Cotton bud
- Topical anaesthetic cream
- Local anaesthetic (LA) for dental use, if required and trained/skilled
- Sterile No. 11 scalpel blade and handle
- Suction equipment *OR* cup and tissues to spit into
- Sterile suture kit
- 3.0 plain gut suture

What you do

- Give pain relief
- **Check medical history**
 - Bleeding disorders, medicines that prolong bleeding
 - If RHD, artificial heart valve, heart transplant, history of bacterial endocarditis, congenital heart problem — **medical/dental consult** about preventive antibiotics before starting procedure
- **If signs of spreading dental infection start antibiotics straight away — see Dental and oral problems (STM)**
 - **If person has trouble opening their mouth due to spreading infection — medical consult and send to hospital urgently**
- Sit or lie person down
- Dry area to be lanced with sterile gauze
- If using LA — use cotton bud to paint **topical anaesthetic** over lancing site or injection site. Wait 3 minutes before giving LA, if required

- Tell person you are about to lance abscess, ask them to keep calm and still
 - Plunge scalpel quickly in and out **exactly** where abscess is pointing
 - Use suction and gauze to soak up pus and blood
 - Let person relax, then ask person to rinse and spit
 - Put gauze pack over incision, have person close their mouth to hold in place
 - **If bleeding doesn't stop** — use simple suture to loosely close incision. Small incision should not need a suture
- Tell person to rinse with warm salty water 3–4 times a day
- Check daily
- **Dental consult** for extraction or root treatment within few days to prevent abscess reoccurring

Minor swelling or soreness after extraction

- Some pain and swelling is expected after extraction and/or oral surgery
- Infection is uncommon
- Swelling usually peaks 48–72 hours after extraction
- Sometimes retained tooth or bone fragments can cause symptoms

Attention

- Give **pain relief** first — may be all that is needed

What you need

- Paracetamol
- Sterile tweezers
- Warm sterile normal saline

What you do

- Give **paracetamol**
- If problem continues — **dental consult**
- May need to
 - Sit person in comfortable chair
 - Remove any bony fragments or debris with tweezers
 - Have person gargle with warm salt water and spit
- Tell person to use warm salt-water mouthwash morning, night, after food

Dental trauma



Tooth may be loosened, displaced, fractured by trauma

Attention

- Treatments for primary (baby) teeth and secondary (adult) teeth are different
- **Dental consult** first if possible
- Put tooth or tooth fragments to be taken to dentist in container of milk — cow's milk (fresh, powdered, long life) or breastmilk
- If milk not available — use saline or wrap in cling wrap

Broken tooth (fractured tooth crown)

What you need

- Sterile specimen jar
- Milk

What you do

- Give **pain relief** if needed
- Look for tooth fragment/s — may be in soft tissues
- If adult — broken pieces of tooth can be stuck back on by dentist at any time so keep safe and wet, in specimen jar containing milk
- If milk not available — use normal saline or wrap in cling wrap
- If child
 - Primary (baby) tooth — no immediate treatment, send for dentist follow-up
 - Secondary (permanent) tooth — send to dentist follow-up with broken pieces of tooth
- If tooth very sensitive — may help to mould (press) temporary filling over what is left of tooth in mouth
 - If no temporary filling material available — try chewing gum or blu tak

Loose or displaced tooth — adult or child

Attention

- **Person will need pain relief before this procedure**
- Tooth may be partially intruded (pushed up) or extruded (hanging down)
- Baby teeth usually left as they are. Baby teeth pushed back up into gum will usually re-erupt (grow out again) without help

- Displaced adult tooth must be put back in place or extracted (taken out)
- Loosened but undisplaced teeth are left alone
- Root canal treatment often needed later

What you need

- Paracetamol
- Hand mirror
- Small strip of aluminium foil

What you do

- Give **paracetamol**
- Sit person in comfortable chair
- Hold tooth firmly, move back to proper position
- Check bone and gum are in position
 - Ask person to close teeth together gently
 - Check that bite and appearance are normal, ask person to check too
- If both seem normal. Splint tooth in place with aluminium foil. Cut and mould single layer of foil over inside and outside of tooth and teeth next to it
- **Send person for dental follow-up as soon as possible**

Replacing knocked out adult tooth

Attention

Before starting procedure

- **Dental consult** — about whether local anaesthetic needed
- If RHD, artificial heart valve, heart transplant, history of bacterial endocarditis, congenital heart problem — **medical/dental consult** about preventive antibiotics before starting procedure.
- Person may need pain relief before this procedure

Replacing teeth

- Put tooth back as soon as possible, best within 1 hour
- **Do not** replace baby (primary) teeth. If not sure whether baby or adult tooth — try to put back, **dental consult**
- If you can't replace tooth — have person hold tooth between cheek and gum, or put in container of milk and send with person to dentist within 12 hours
 - **Do not** store in water
- Only replace whole tooth with root attached. If fragments — see Fractured tooth crown

What you need

- Cotton bud
- Topical anaesthetic
- Local anaesthetic, syringe, dental needles, if needed
- Normal saline, if tooth very dirty
- Milk
- Sterile
 - Mirror
 - Tweezers
 - Suture kit
- 3.0 plain gut suture
- Small strip of aluminium foil

What you do

- Give **pain relief**
- Sit person in comfortable chair
- Paint **topical anaesthetic** over injection site with cotton bud. Wait 1 minute
- Give **local anaesthetic** if needed, if skilled
- **Do not** touch root, only crown
- If tooth very dirty — hold crown, gently shake in **normal saline** to clean
 - If normal saline or milk not available — rinse tooth in water for less than 10 seconds
- If need to store before replacement
 - Have person hold tooth in mouth between cheek and gum *OR* put in container of milk or normal saline *OR* wrap in cling wrap
 - **Do not** let tooth dry out. **Do not** store in water
- Look at shape of tooth, and teeth beside gap
- Make sure tooth is right way around (eg front of tooth is to the front)
 - Firmly push tooth all the way back into gap
 - Gently shape (press) gum back around tooth
 - Hold tooth in place for a few minutes
 - Ask person to close teeth together, check tooth in right place, ie looks right, teeth meet properly
- Suture lacerations in gum if needed
- Splint tooth in place with aluminium foil. Mould single layer of foil all the way over tooth and teeth next to it
- Give antibiotics — see Dental and oral problems (STM)
- Immunisation status — tetanus
- Tell person to use **chlorhexidine 0.2%** mouthwash – 10mL. Rinse for 1 minute, 3 times a day
- **Send person to dentist urgently**

9. Chest and abdomen

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Lungs and respiratory system examination

Attention

- **When examining children**
 - ▶ Look before going near them with stethoscope or thermometer
 - ▶ RR and work of breathing most important indicators of chest infections in children
 - ▶ Listening to chest **not** a reliable way to diagnose chest infections — listening to the chest is only one part of assessment
- **Crepitus** — crackling sensation under skin caused by air leaking into tissues from airways or lungs
- **Crackles** (creps) sound like rubbing hair between fingers. Ask person to cough. May clear if caused by sputum in upper airways — won't clear if there is a lot of secretion
- Practise exam — know what normal chest looks, sounds, feels like
- If anything abnormal or worrying — **medical consult**

What you need

- Warm hands with short fingernails
- Warm stethoscope — warm between your hands
- Good ears. If you have hearing problem — use amplified stethoscope
- Pulse oximeter
- Other equipment as needed — peak flow meter, spirometer

What you do

- Respiratory system starts at tip of nose — examination needs to include ears, sinuses, nose, throat, nodes in neck and axillae (armpits), chest and hands

Ask about

- Nose — discharge, nostrils clear or blocked
- Cough — when it started, when it happens, any triggers
- Sputum — how much, colour (eg clear, yellow, green, bloody)
- Noisy breathing
 - ▶ Breathing out (wheeze)
 - ▶ Breathing in (stridor) — important, could be obstruction
- Shortness of breath — at rest, after activity, exercise
- Sore throat
- Chest pain or discomfort

- How they sleep — lying, sitting, how many pillows
 - ▶ Snoring that wakes others, stops breathing while asleep — could be OSA — see Breathing related sleep disorders (STM)
- Swollen legs (oedema)
- Pain in calves — with shortness of breath could be DVT, PE
- Smoking, exposure to cigarettes, e-cigarettes or domestic smoke
- Occupational history, exposure to asbestos, organic dusts, chemicals

Check

- Calculate age appropriate REWS
 - ▶ **Adult** — AVPU, RR, O₂ sats, pulse, BP, Temp
 - ▶ **Child** (less than 13 years) — AVPU, respiratory distress, RR, O₂ sats, pulse, central capillary refill time, Temp
- Weight, BGL
- Examine hands and look for clubbing — Figure 9.1
 - ▶ Increased curvature of nails
 - ▶ Loss of angle between nail and nail bed
 - ▶ Sponginess of nail bed and/or spreading (expansion) of end of fingers
- Check mouth for foreign body or upper airway obstruction
- Feel for swollen lymph nodes in neck and armpits
- Skin, hands, feet — are they warm, cool, sweaty, clammy

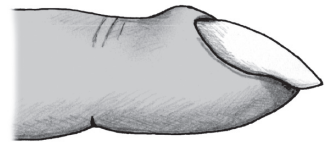


Figure 9.1

Expose chest and look

- Shape of chest (eg pigeon, barrel, concave)
- Breathing — look for
 - ▶ Distressed, agitated, short winded, panting, unable to lie down
 - ▶ Rhythmical or uneven
 - ▶ Chest moving the same on both sides (symmetry)
 - ▶ Excessive use of accessory muscles (eg intercostal muscles), indrawing, jugular vein distension
 - ▶ Talking in full sentences, single words, not at all. Number of words spoken a good indicator of shortness of breath
- Wounds, lumps, depressions on front/back of chest or neck

If small child or baby

- Alert, drowsy, lethargic
- Look at respiratory effort
 - ▶ How fast they are breathing, stopping breathing (apnoea)
 - ▶ Do nostrils flare (widen) a lot as they breathe in
 - ▶ Do ribs and sternum (breastbone) suck inward when they take a breath (indrawing), does abdomen move

- Able to feed or drink from breast or cup
- Dehydrated

Feel chest (palpate)

- Check position of windpipe (trachea). Put ring and index fingers on heads of clavicles, middle finger on windpipe — Figure 9.2
 - Is it in centre or moved to one side
 - Is there tracheal tug — notch at bottom of neck sucking in
- Using palms of hands, feel gently for any sore areas, swellings or retractions (dents) of chest wall and intercostal spaces (between ribs) — Figure 9.3
 - Feel for crepitus, especially around puncture wounds, drain sites
- Using pads of fingers feel over whole front and back of chest for lumps, scars, skin temperature, tone — Figure 9.4
- Should be no pain
 - If pain — consider broken ribs, muscle strain from coughing, collapsed lung

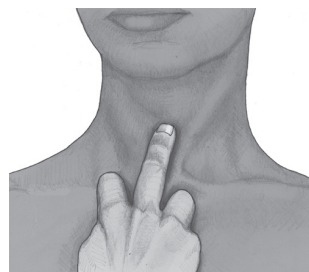


Figure 9.2



Figure 9.3

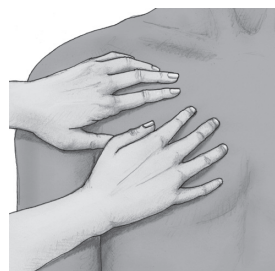


Figure 9.4

Measure chest expansion (symmetry)

Compare movement of both sides of chest wall (symmetry). If problem expanding (inflating) one or both lungs — may be fluid in pleural space, pneumonia, pneumothorax, etc.

- Put hands on person's back with tips of fingers below scapula, thumbs touching over spine — Figure 9.5
 - Ask person to take deep breath. Your thumbs and fingers should separate evenly, equally, at same time
- Note any difference in movement
- Look at clavicles (collar bones) from above, do they rise and fall equally

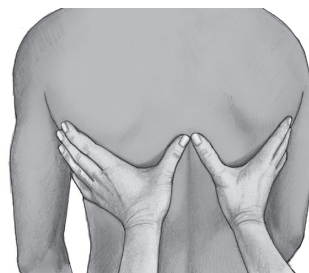


Figure 9.5

Percuss chest

- Use hands and hearing to find edges of lungs inside chest
 - 2 main sounds — resonant and dull, Table 9.1
 - Check if filled with air, fluid, solid matter

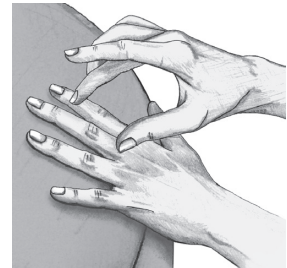
Table 9.1 Chest percussion sounds

Name	Sound	What it means
Resonant	Hollow sound — like when you percuss the stomach	Normal lung tissue
Very (hyper) resonant	Very loud — drum-like	Too much air in lung — emphysema, pneumothorax
Dull	Thud-like — like when you percuss top of the head	Fluid or pus in or around lung — consolidation, pleural effusion

Left front chest sounds dull over heart — from sternum to mid-clavicular line, at third or fourth rib space. Normal resonance again at sixth rib space

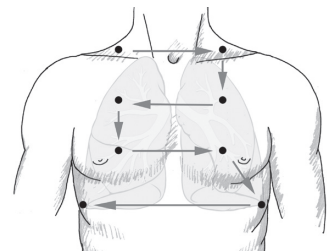
Practise on yourself

- Put non-dominant hand on top front of your chest with middle finger lying straight and flat
 - With tip of middle finger of dominant hand, tap briskly on non-dominant middle finger just below top joint — Figure 9.6
 - Tapping movement must come from wrist
 - Will hear resonant sound
- Repeat on top of head. You will hear dull sound

**Figure 9.6**

Percuss patient

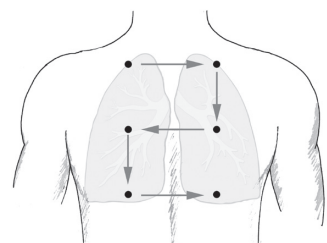
- Put hand firmly on chest, with straightened middle finger between ribs (in rib space)
- Follow percussion sequence for front — Figure 9.7 and back — Figure 9.8
- When percussing normal lungs, you hear resonant sound over most of lung

**Figure 9.7**

Listen to breath sounds (auscultation)

Stethoscope can only hear (penetrate) the lung approximately 5cm below the skin. Abnormalities that lie deeper might not result in an abnormal sound (eg large pneumonia but normal breath sounds).

- First listen quietly without stethoscope
 - Wheeze or whistle, wet or dry cough
 - Speaking in sentences, short phrases, or single words
- Sounds made by air passing through larger and smaller airways tell you about condition of lungs and pleural (chest) cavity
 - If normal lungs — soft sound as person inspires (breaths in), nothing as they expire (breath out)

**Figure 9.8**

- ▶ If pleural effusion (fluid) or pneumothorax (air around lung) — sounds usually decreased
- ▶ If fluid in lung (eg infection, heart failure) — crackles as person breathes in and sounds audible when breathing out. If person has lobar pneumonia, sounds increased, sound harsh — bronchial breathing
- ▶ If blockage in large airways — loud higher pitched sound when person breathes in (stridor)
- ▶ If blockage in smaller airways (eg asthma, bronchiolitis) — may hear higher pitched sound when person breathes out (wheeze)

If small child — always rely on what you can see

- Level of distress, breathing rate, effort, chest movements more reliable
- See Clinical examination of children

Put warm stethoscope diaphragm firmly onto skin. **Do not** listen through clothing — covers sounds and confuses findings

- Ask person to take regular, deep breaths through open mouth
- Follow same sequence as for percussion — Figure 9.7, Figure 9.8. Listen at each spot for one complete breath — in and out
 - ▶ Listen to back, compare one side of chest to other, then to front
 - ▶ See Table 9.2 for normal breath sounds
- If unusual breath sounds — note type, loudness, length, timing (breathing in or out)
 - ▶ Ask person to keep saying 'ninety nine' (99), listen for changes
- Check under arm for pleural rub (creaky leather sound), means pleura (membranes around lungs) inflamed and rubbing together

Table 9.2 Normal breath sounds

Where	Sound
Windpipe (tracheal — over trachea)	Harsh, high pitched
Large air tube (bronchial — over bronchi)	Loud, high pitched
Air sacs (vesicular — over alveoli)	Soft, low pitched

- Type of abnormal sound depends on where air flow is blocked, what is causing blockage — Table 9.3

Table 9.3 Abnormal breath sounds

Where	Sound	Example of causes
Larynx	Stridor — high pitched crowing, worse when breathing in	Croup, foreign body stuck in throat, blocked airway
Bronchus	Wheeze — high pitched, hissing, musical	Asthma, bronchitis, bronchiolitis
Alveolus	Crackles — coarse or fine	Coarse — pus, infection Fine — fluid, fibrosis

If breath sounds

- Not there — air not reaching alveoli (air sacs). Lung may have collapsed
 - Pneumothorax, bad infection, severe pulmonary oedema, severe asthma, COPD (usually the breath sounds are audible in asthma or COPD exacerbation, but patients can have a silent lung in severe obstruction)
- Less than normal — less air reaching alveoli (air sacs). Lung may contain fluid (pulmonary oedema)
- Unusual — check medical history for repeated chest infections and/or chronic chest disease, **medical consult**

Using peak flow meter

- Measures how well person breathes air out of lungs, how well their medicine is working
- Reduced peak flow can be due to lung disease or to person not understanding what they need to do
- Can tell you there is something wrong with lungs but not what it is
- If you know result when they are well — can help you decide if asthma or COPD worse than normal. Check file notes

Attention

- Teach person to blow from deep in lungs, not just from mouth
- Use the same device for the same person (results can differ with different brands)
- Ideal is to have a measurement of person at their best so any deterioration can be recorded

What you need

- Peak flow meter
- Disposable mouthpieces
- Person's inhaler medicine

What you do

- Ask person to sit up straight
- Put clean mouthpiece on meter
- Hold meter level (horizontal) with indicator facing upward. Make sure marker is on '0' (zero) or 'start'
- Ask person to
 - Take big breath in, get lungs as full as they can
 - Seal lips around mouthpiece, blow out as hard and as fast as they can
- Note result, put marker back to zero/start, do this twice more

- Record best (highest) result
- Ask person to take normal dose of reliever medicine
- Do procedure again after 15 minutes, record result
- Compare result with normal or ideal to decide if treatment working

Spirometry

- Measures lung function — how much air person can blow out, how fast lungs can be emptied
- If 6 years or over — necessary test for diagnosing COPD
- Can diagnose asthma when person is acutely unwell — in between attacks spirometry is normal
- Use with history and examination
- Need training to carry out procedure, experience to interpret

Attention

- **Do not** attempt spirometry if COVID suspected — may need to add extra viral filter to your handheld spirometer. Check your health service policy
- **Do not** attempt more than 6 blows
- **Do not** attempt if person had eye, chest, abdominal surgery, or pneumothorax in last 6 weeks
- **Must do procedure with greatest effort possible, no pausing**
 - If person coughs, takes extra breath, blocks mouthpiece with tongue — will not be accurate — must be done again
 - Effort may be reduced by chest pain, abdominal problems, fear of incontinence. Manage these risks to reassure patient
- Takes longer for people with airflow obstruction to fully breathe out
- **First** — demonstrate procedure to person. People usually get better with practice so later results may be more accurate

What you need

- Accurate calibrated spirometer
- Pre-calibrated single use mouthpieces may be preferred
- Use nose clips if available

What you do

- Person sits up straight with feet firmly on floor. Tell them to try not to lean forward during test
- Ask person to
 - Breathe in as deeply as they can
 - Seal lips around mouthpiece

- ▶ Blow air out as fast and as hard as they can, keep blowing until lungs feel completely empty
- When measuring breathing out (forced expiratory manoeuvre)
 - ▶ Adults and children over 10 years should blow out for 6 seconds or more
 - ▶ Children 10 years and under should blow out for 3 seconds or more
- You will need at least 3 good tests
 - ▶ If person too tired to do 3 good tests in a row — rest in between
- When 3 good tests — give 2 puffs of **salbutamol** (200 microgram) via spacer, wait 15 minutes, repeat spirometry and get another 3 good tests

Breathing function measurements

FVC (forced vital capacity)

- Maximum volume of air which can be forcefully exhaled (breathed out)
- Abnormal if less than 80% of predicted value based on age, height, gender
- FVC6 is forced expiratory volume in first 6 seconds. Can be used instead of FVC, especially if severe lung disease and takes a long time to exhale

FEV1 (forced expired volume in one second)

- Volume expired in first second of a forced expiratory manoeuvre
- Abnormal if less than 80% of predicted value based on age, height, gender

FEV1/FVC ratio

- Calculated by dividing FEV1 by FVC, usually expressed as percentage
- Reduced ratio (less than 0.7 or 70%) suggests airflow obstruction consistent with asthma, COPD, and sometimes bronchiectasis

Improvement in FEV1 following bronchodilator (eg salbutamol)

- If airflow obstruction — improvement in FEV1 of more than 12% *AND* at least 200mL after bronchodilator suggests
 - ▶ If lung function returns to normal — asthma
 - ▶ If obstruction remains — COPD or asthma/COPD overlap

‘Good’ spirometry test

To be classified as a ‘good’ test, spirometry needs to meet criteria for **acceptability** and **reproducibility**

Acceptability

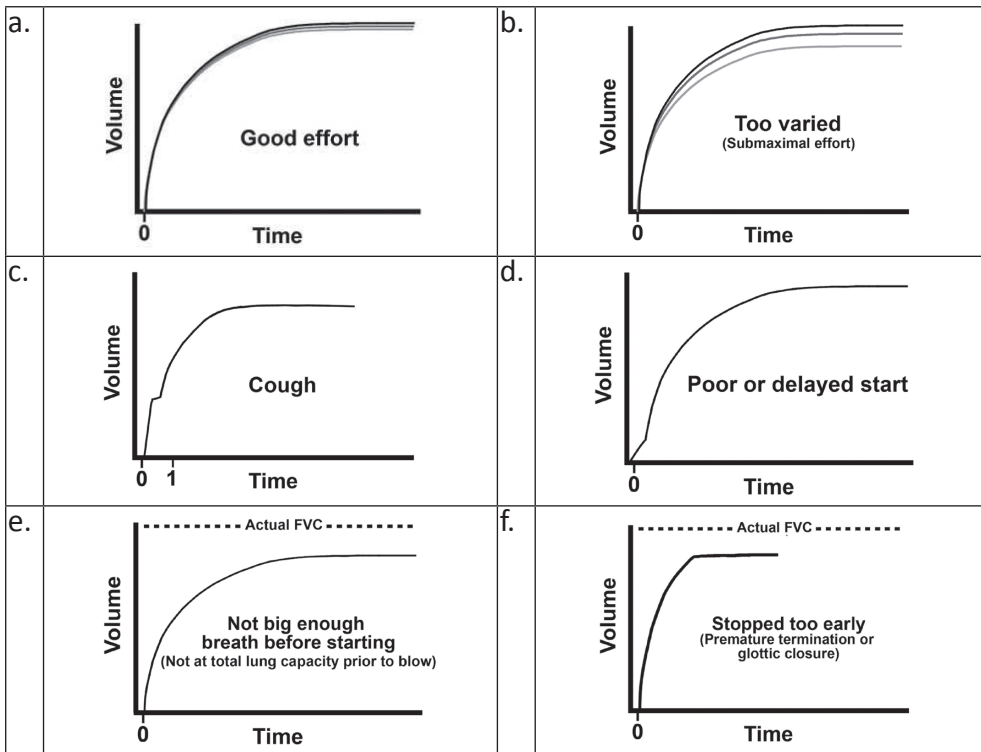
- Based on individual forced expiratory manoeuvre
- Best assessed by looking at both flow-volume and volume-time curves, and patient

- Blow of acceptable quality — Table 9.4 — good effort
 - ▶ Starts quickly — steep rise in flow-volume loop
 - ▶ At least 3 seconds if 7–10 years or 6 seconds if over 10 years
 - ▶ No cough (at least in first second)
 - ▶ Smooth continuous expiration with only 1 breath

Reproducibility

- Based on how similar 3 acceptable forced expiratory manoeuvres are compared to one another — before and after bronchodilator
- 2 **best** FVC results should be within 0.15L of one another
- 2 **best** FEV1 results should be within 0.15L of one another
- Highest FEV1 and FVC values should be used

Table 9.4 Examples of spiromograms



Supporting resources

- Strong wulyan (strong lungs) video
- Lung health for kids app

Chest physiotherapy

Chest physiotherapy procedures improve **airway clearance** by

- Improving ventilation, getting air behind sputum (secretions)
 - Deep breathing exercises, especially deep, slow breaths with breath hold
 - Sitting upright rather than ‘slumped’
 - Positive expiratory pressure (PEP) devices such as bubble PEP
 - Physical activity or movement that increases deep breathing
- Unsticking sputum from small airways
 - Chest percussion, vibration
 - Bubble PEP
- Moving sputum toward larger airways
 - Postural drainage positions, gravity assistance
 - Chest percussion and vibration
 - Huffing and other breathing exercises
- Clearing sputum
 - Coughing and swallowing for infants and young children
 - Coughing and spitting out for older children and adults

Physical activity may help airway clearance, prevent chest problems.

Short bursts of activity (eg running on the spot) through to playing sports

Attention

- **Do not** do chest physiotherapy if person
 - Very unwell
 - In early stages of chest infection/pneumonia — fever, fast breathing chest pain, coughing up blood
 - Having an asthma attack
- Start physiotherapy when fever gone or only mild, cough loose, RR in normal range or only slightly raised

Infants and young children with chronic lung disease or chest infection

Attention

Do not use head-down positions. Keep infants and young children flat or upright

What you do

- Sit or lie child on your lap or comfortable flat surface
- Use chest percussion (clapping) — slightly cupped hand should make hollow (drum-like) sound, not slapping
 - ▶ With child leaning forward on lap or over shoulder, percuss back of chest wall near shoulder, both sides — Figure 9.9
 - ▶ With child lying back against adult's chest, percuss front of chest wall near shoulder, both sides — Figure 9.10
 - ▶ With child lying on each side, percuss near armpit — Figure 9.11
 - ▶ With child lying on tummy, percuss near spine just under shoulder blade, both sides — Figure 9.12
- AND/OR vibration — gently squeeze and shake chest wall as child breathes out. Use same positions as percussion. Good if child coughs
- Try physical activities to improve airflow
 - ▶ Tickling, giggling, laughing
 - ▶ Jumping, short bursts of 20 star jumps, skipping for older children



Figure 9.9



Figure 9.10



Figure 9.11

Doing bubble PEP

- Bubble PEP aims to help
 - ▶ Move sputum from smaller to larger airways so it can be coughed up
 - ▶ Increase gas volume in alveoli (air sacs) that are underinflated due to sputum blocking airways

Attention

- Change water every time
- Wash tubing and bottle in warm soapy water, dry thoroughly after use. Use a clean **dry** bottle and tube each day
- Children may get dizzy if they take big breaths in and blow all way out with every breath. Just slightly bigger breaths than normal are best



Figure 9.12

What you need

- 2 tall 2L plastic bottles with or without a handle (eg milk bottle)
 - 1 for child, 1 for you to demonstrate with
- 2 pieces of thin walled tubing (eg suction tubing or garden drip line)
 - 50cm long × 1cm wide, with internal diameter more than 8mm
- Tape to hold tubing in place, if needed
- 2 bowls to sit bottles in, to catch any overflow
- Food colouring, detergent

What you do

- Put 10–15cm of water in bottle. Check amount with physio
- Thread tubing down through handle to base of bottle — Figure 9.13, or tape tubing in place
- Put bottle in bowl, leave top of bottle open
- Blow through tube to make bubbles — Figure 9.14. Add food colouring and detergent to make it fun
 - If too hard for child — tip out 2–3cm of water

Note: If child quite young — start with water only in case they suck by mistake.

Series of breaths is best, not just single breaths

- Aim to build up to at least 8–12 bubble breaths in a row, or 1–2 minutes of bubble PEP breaths at a time
- After each set of breaths, let child have a break for a minute or so, then repeat bubble breaths
- Do bubbling for about 10 minutes, depending on child's age, respiratory condition

Now encourage variations

- Hum a tune. Each line = 1 full breath
- Blow your longest breath out at end of a set of breaths
- Gently press paper to coloured bubbles to make prints. Use different colour another day
- Encourage imaginative fun — make volcanoes or bubble flowers
- Play 'hide and seek' in the bubbles. Use a straw to blow away bubbles and find hidden object (eg small toy, key, ping pong ball)
- Slowly and carefully blow the 'world's biggest bubbles'



Figure 9.13



Figure 9.14

Older children and adults with chronic lung disease

Attention

Postural drainage

- Avoid head-down positions in people with enlarged abdomen, liver disease, high BP, cardiac problems, neurosurgery, raised intracranial pressure, recent facial, head or neck trauma, recent eye surgery, severe breathlessness, history or symptoms of reflux
- Need to know which lung is affected, which part contains sputum that needs drainage. Need full chest exam and x-rays
- Always start treatment with most damaged lung uppermost
- If too hard for person — shorten time spent in drainage position, but ask them to try and stay in position a bit longer each time they have a go
- Do at least once a day

What you need

- Surface that can be tilted — special bed, couch, stretcher, or copy ideas in pictures below, make sure person is safe
- Disposable cup or container to spit into, box of tissues

What you do

Postural drainage

- Ask person to lie in position that drains affected part/s of lung for 15–20 minutes, do breathing exercises at least 6 times in each position
 - ▶ Position in Figure 9.15 will drain bottom front of lungs
 - ▶ Positions in Figure 9.16 or Figure 9.17 will drain bottom sides of lungs
 - ▶ Positions in Figure 9.18 or Figure 9.19 will drain bottom back of lungs

Breathing exercises

Ask person to lie in position that drains affected part of lungs and breathe normally until comfortable lying in position.

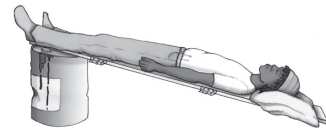


Figure 9.15

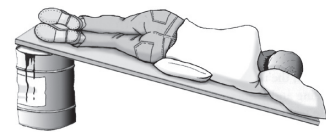


Figure 9.16

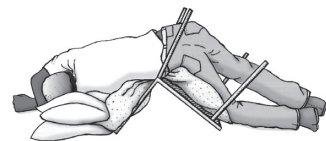


Figure 9.17

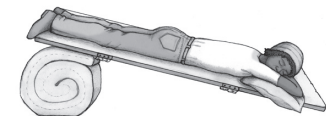


Figure 9.18

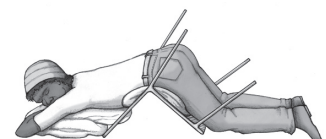


Figure 9.19

Then do breathing exercises — Active Cycle of Breathing Technique (ACBT)

- Deep breathing
 - ▶ Slow deep breath in, hold for 1–2 seconds, relaxed breath out
 - ▶ Repeat 2–3 times — percussion and vibrations can be added
 - ▶ Then relaxed quiet breathing (breathing control) for a few breaths
 - ▶ Repeat above cycle
- Huffs, quiet breathing and coughs
 - ▶ Then ask person to do 1 or 2 huffs
 - ▶ For a ‘huff’ ask the person to take a breath slightly bigger than normal and then force the air out quickly through an open mouth
 - ▶ Then do relaxed quiet breathing again
 - ▶ Continue this cycle until sputum has moved up airways far enough to be coughed out
 - ▶ For a cough — ask the person to take a big breath and cough. Repeat as needed

Repeat all the above until 2 cycles with a dry cough

Supporting resources

- Bronchiectasis physiotherapy toolbox

Abdominal examination



Attention

- Make person as comfortable as possible, respect privacy
 - Warm room, empty bladder
 - Gentle approach — start as far from painful area as you can
- Palpate/percuss for a reason, to answer question such as — is there guarding in right iliac fossa, mass in left upper quadrant, enlarged bladder
 - **Do not** poke or prod abdomen — palpate and percuss gently
 - **Do not** palpate/percuss longer than needed to answer question/s
- Watch person's face during examination to see if they have pain, keep them relaxed
- Mentally divide abdomen into 4 areas (quadrants), know what organs lie in each — Figure 9.20
 - Start examination well away from painful area, be sure to examine all quadrants, leave painful area/s to last
- Do examination in following order
 - **Look** — for abnormalities, asymmetry
 - **Auscultate** — listen for bowel sounds
 - **Percuss** — check for tenderness, size of organs, masses, air and/or fluid in abdomen (ascites)
 - **Palpate** — feel for masses, enlarged organs, tenderness, guarding, rigidity
- If you find anything abnormal or worrying — **medical consult**

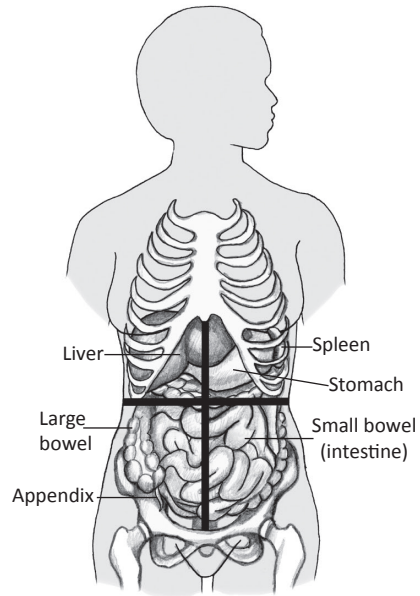


Figure 9.20

What you need

- Warm hands with short nails
- Stethoscope
- Waterproof/permanent marker
- Disposable tape measure
- Pain relief

What you do

- Lie person on back, arms by sides, pillow under head
- If person in distress/pain — give **pain relief** now

Look

- Does person look malnourished (very thin)
- Jaundice — check if whites of eyes look yellow
- Does abdomen move with respiration
- Signs of injury, bruising
- Prominent capillaries (spider naevi) or veins visible
- Abdomen swollen/distended
 - ▶ Where is fat/fluid lying — see Assessing ascites
 - ▶ Lumps, bulges, rashes, scars
 - ▶ Umbilicus — in midline, bulging out
- Pregnancy signs — linea nigra (brown discolouration from umbilicus to pubis), striae (stretch marks)
- Peristalsis (bowel moving under skin)
- Pulsing of aorta or femoral arteries

Do

Listen — with stethoscope (auscultation)

Don't spend a lot of time listening to abdomen. Interpretation of abdominal sounds is very individual, doesn't add much to clinical picture. Not a good discriminator, few or lots may be normal, can be serious abdominal pathology with normal sounds

- Listen for 30–60 seconds in area of umbilicus
 - ▶ If no bowel sounds heard — record as absent
 - ▶ If bowel sounds present — are they plentiful, if plentiful, loud and tinkling — may be obstruction
 - ▶ Lots of gurgling may come before diarrhoea, or may be normal

Percuss

- Use same technique as percussing chest
- Percuss very lightly at first, start as far from tender/painful area/s as possible, cover all quadrants
- Listen for
 - ▶ Hollow, tympany (drum-like sound) — normal over air filled organs (eg stomach, bowel)
 - ▶ Dullness (dull sound) — normal over enlarged liver or spleen, full bladder, uterus. These organs have no overlying bowel
- Use tape to measure
 - ▶ Distance liver or spleen extend below ribcage in mid-clavicular line
 - ▶ Height of bladder or uterus above pubic bone

To percuss liver

- Start in mid-clavicular line over lower right lung (just below nipple) then work down. Sound will be hollow over lung
- Use pen to mark where sound becomes dull as you pass over top edge of liver
- Start in right lower quadrant, percuss upward until hollow sound of bowel changes to dullness at bottom edge of liver
- Confirm bottom edge by light palpation, usually within 2cm of rib cage. Mark this point
- Measure between 2 marks

To percuss spleen

Can only percuss if enlarged. Need to distinguish from enlarged kidney or stomach tumour

- **Do not** percuss spleen if left upper quadrant pain/tenderness — might cause damaged/diseased spleen to rupture
- In mid-clavicular line, percuss upward from level of umbilicus
 - ▶ Enlarged spleen sounds dull on percussion
 - ▶ If covered by bowel — usually sounds hollow
- Confirm by light palpation. Mark this point
- In mid-clavicular line, measure from ribcage to mark

To percuss bladder

- Do after person has emptied bladder
- Start at pubic bone, percuss up toward umbilicus
- Enlarged bladder sounds dull
- Enlarged uterus and large ovarian masses also sound dull — may be mistaken for bladder

Palpate

- Always start palpation far away from where complains of pain, examine painful area last
- **2 types of palpation** — far more information gained from light palpation than deep palpation
 - **Light palpation** — use flat hand and feel with index finger (leading) edge. Press lightly in smooth, gentle movements. Will show up pain, tenderness, tense muscles, some masses, organs lying close to skin (eg liver, spleen, uterus, bladder)
 - **Deep palpation** — use more pressure and press deeper (up to 5–7cm if person obese). Can use both hands, one on top of the other. This will show up deep pain, masses, shape/size of deeper structures (eg kidneys, aorta)

To palpate liver

- Use light palpation to check area you marked during percussion
- Start from right lower quadrant, working upward 2–3cm at a time
- At each site, ask person to take a deep breath
 - If liver or gall bladder enlarged — will feel bottom edge being pushed down by diaphragm
- Normal liver often palpable 1–2cm below ribcage in mid-clavicular line
- Gall bladder tender if infected (cholecystitis)

To palpate spleen

In adults you only feel spleen if enlarged. Otherwise protected by lower left rib cage. Occasionally feel edge of normal spleen in children. Can be difficult to palpate and easily missed even when very enlarged

Spleen can be enlarged in

- Trauma (subcapsular haemorrhage)
- Leukaemia
- Myelofibrosis
- Certain infections — malaria, glandular fever (EBV)
- Cirrhosis (portal hypertension) occasionally complicated by enlarged spleen

If left upper quadrant tenderness — be very gentle palpating for spleen as injured/enlarged spleen can rupture easily

- Lie person on right side, facing you
- Sit down with right hand lying horizontally on abdomen at umbilicus
- Feel with leading edge of index finger. Press gently toward left lower rib cage as person breathes in
- Repeat 4–5 times, each time bringing hand a little closer to rib cage
- Measure in mid-clavicular line from ribcage

To palpate kidneys

- Kidneys and adrenal glands are deep, usually difficult to palpate
- Enlarged kidneys usually polycystic
- Kidney and adrenal tumours occasionally palpable, especially in children
- Lower pole of right kidney may be felt if person very thin
- **Right kidney**
 - ▶ Stand on person's right side, facing their head
 - ▶ At level of umbilicus, put left hand under person's back half way to midline, put right hand on right abdomen one hand's breadth from midline
 - ▶ Ask person to take a deep breath and hold for a moment
 - ▶ With flats of fingers, press up with left hand and down with right to 'capture' and bounce (ballot) kidney between them — Figure 9.21
 - ▶ As person breathes out, partially release pressure of right hand, may feel kidney slide back into original position
- **Left kidney**
 - ▶ Move to person's left side facing head, repeat procedure with hands in opposite positions



Figure 9.21

To palpate bladder

Pregnant uterus or large ovarian cyst/tumour can be mistaken for bladder

- Have person try to empty bladder
- Stand on person's right side. Starting above umbilicus use fingers of left hand to lightly palpate into lower abdomen
- Will only feel bladder if distended

Assessing ascites

Attention

- **Ascites** is excess fluid between abdominal organs and abdominal wall. Always abnormal
- If abdomen swollen — may be ascites

What you need

- Helper
- Waterproof/permanent marker
- Tape measure

What you do

Percussion wave test

- Person lies on back
- Ask helper to press down firmly in midline with side of hand — Figure 9.22
- Face person's head and put your hands either side of abdomen
- Tap side of abdomen with right hand. Check for 'ripple' or 'wave' of fluid across abdomen that you can see and feel with left hand — Figure 9.22

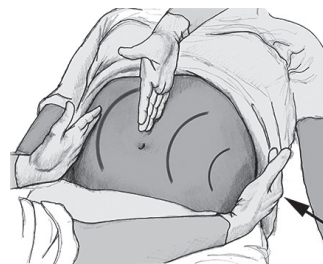


Figure 9.22

Shifting dullness test

- Person lies on back, stand to side of person
 - ▶ Percuss from umbilicus to side away from you
 - ▶ Normal air filled bowel — Figure 9.23 will sound hollow (tympany)
 - ▶ If fluid (ascites), hollow sound will change to dullness. Mark this point (transition point 1) — Figure 9.24
- Roll person onto side facing you, wait a minute for ascites to move down with gravity
 - ▶ Percuss from upper side of abdomen toward umbilicus
 - ▶ Mark point where hollow sound changes to dullness (transition point 2) — Figure 9.25
- If ascites, transition point marks will be at least 3cm apart — Figure 9.25

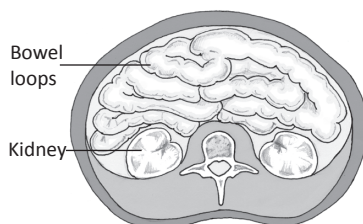


Figure 9.23

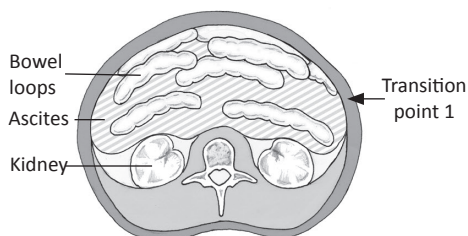


Figure 9.24

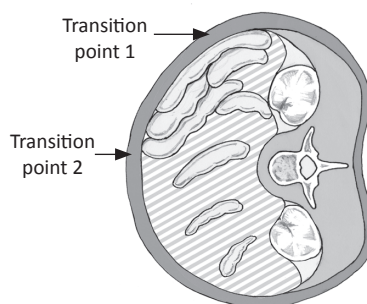


Figure 9.25

Rectal examination



Attention

- **Do not** do if fissures (splits in skin) around anus, or other painful conditions
- **Do not** perform on a child unless specifically requested and skilled
- Very important to explain procedure to person and obtain consent
 - Can be associated with extreme embarrassment, fear of pain or diagnosis of cancer
 - May be more at ease if accompanied by friend, relative, chaperone

Note: Tampons in female patients can feel like a tumour, so check first

What you need

- Paper sheets or blueys
- Well-fitting gloves
- Lubricant
- Tissues

What you do

- Ask person to empty bladder
- Put clean paper sheet or bluey on bed
- Have person lie on left side with knees drawn up, back to examiner
- Put on gloves, separate buttocks, inspect anus and surrounding area. Note any abnormality
- Ask the person to 'bear down' and note if prolapse etc
- Put lubricant on tip of finger and place over anus. Ask person to breathe in and out through open mouth, slowly and deeply
- Gently introduce the finger into anal canal, then rectum. Finger will reach 7–8cm with gentle pressure on the perineum
- Sweep finger to front of person (anteriorly) to feel for prostate in males (Figure 9.26), cervix in females (Figure 9.27)

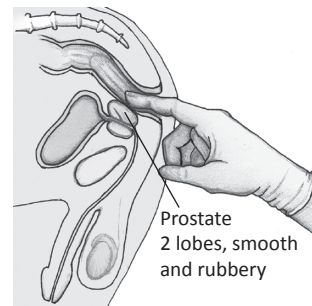


Figure 9.26

- Feel all the way around rectum, then back the other way until you have been around full circle — Figure 9.27

Check

- Haemorrhoids, fissures (splits), abrasions or fistulas (openings) around anus, in anal canal
- Painful or non-painful lumps seen on the outside or felt internally
- When bearing down — rectal or haemorrhoid prolapse, anal muscle tone (strength)
- For impacted faeces
- Check and describe condition of rectal wall
 - Hard, raised, ulcerated areas
 - Soft, spongy, velvety areas

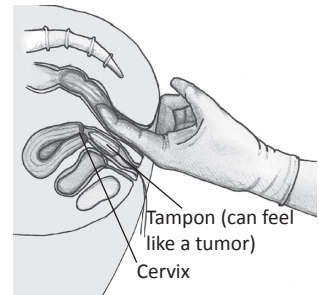


Figure 9.27

Check prostate

- About 3cm long, 2 lobes with central dip/sulcus (groove) — should feel firm, smooth and rubbery
- Will feel larger if man has full bladder
- Rough or craggy hard mass may mean malignant tumour (cancer)
- Enlarged smooth mass may mean benign hypertrophy (enlargement)
- Tender, lumpy, boggy mass may mean inflammation/prostatitis (infection)

Before finishing

- Slowly withdraw finger — check tip of glove for blood, mucus, pus, colour of faeces
- Wipe area with tissues

Male catheterisation



Attention

- **Do not** force catheter into urethra
- Aseptic procedure
- Check for latex allergy
- Male practitioner should do this procedure, if possible
- Tell person that inserting catheter will cause discomfort

What you need

- Sterile and non-sterile gloves
- Blueys
- Sterile catheterisation or dressing pack
- Normal saline for cleaning
- Urinary catheter with a balloon, or in/out catheter
 - Smaller the urethra, smaller the catheter
 - 14G or 16G for most men, 12G or less for younger boys
 - For enlarged prostates — a bigger catheter will be easier to put in than a smaller one (which is likely to turn back on itself and come back out the urethra)
- Clean dish to catch urine
- 2 × Sterile lignocaine anaesthetic catheterisation gel in pre-filled syringes, water-based lubricant (can help dilate the urethra)
- Sterile specimen jar, if needed
- Kelly Forceps or similar (ones in dressing pack usually too small)
- If indwelling catheter — 10mL syringe filled with sterile water, and catheter drainage bag

What you do

- Lie man on bed, put blueys under bottom, keep upper body covered
- Put on unsterile gloves, mask, goggles
- Lay out dressing pack and prepare equipment using aseptic technique
- Open catheter **outer packet**, drop catheter onto sterile area. **Do not** open inner plastic covering yet
- Put clean dish between man's legs
- Remove gloves, wash hands, put on sterile gloves

- Clean penis with cotton balls soaked in **normal saline**
 - ▶ Retract foreskin if needed
 - ▶ Clean glans (top of penis) in a circular motion, then wipe from top to base
- Drape with sterile towels
- Hold penis upright and gently squirt **lignocaine gel** into urethra × 2. Wait about 5 minutes for it to work before doing next step
- Open end of inner plastic cover to expose tip of catheter. **Do not** touch tip
- Hold catheter with forceps or by plastic cover so you don't touch it. Put into urethra — Figure 9.28
- Start with the penis at 90° and gently push catheter in until you meet resistance, then lower penis to 45° and continue until urine flows into collection dish
- Aboriginal men may be sub-incised along their urethra — so the urethral opening is ventral (underside of the penis) and the distance to the bladder is less
- Let about 500mL urine flow into dish, then clamp or kink catheter
 - ▶ After 5–10 minutes release and let flow finish
- Acute retention is a much more common presentation in men — be aware of potential for post-obstructive diuresis
- Collect urine specimen if needed, do U/A
- If catheter indwelling (to stay in)
 - ▶ Fill balloon with sterile water from syringe — amount needed is written on side of catheter
 - ▶ Withdraw catheter slightly until resistance felt
 - ▶ Connect urine drainage bag
 - ▶ Secure catheter — check it is not stretched tight when person moves

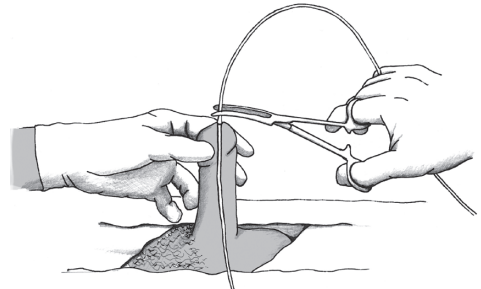


Figure 9.28

Reduction of a tight foreskin



Emergency procedure to loosen retracted, uncircumcised foreskin that has tightened around penis (paraphimosis) — Figure 9.29, Figure 9.30

Attention

- Can usually do manual reduction in boys.
More difficult in men
- Paraphimosis and reduction can be very painful — consider pain relief or light sedation, use compression and ice. The more effective the pain relief the better the chance of reduction
- **If you can't do reduction — medical consult** to send to hospital

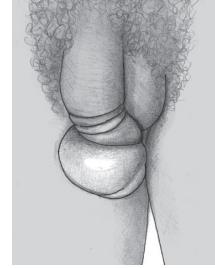


Figure 9.29



Figure 9.30

What you need

- Ice pack (eg crushed ice in disposable glove)
- Gauze
- Water-based lubricant
- Lignocaine gel
- Self-sticking compression bandage (eg *Coban*, *Nexcare*, *Andover co-flex*)

What to do

- While you are getting ready, apply ice pack
- Put lubricant on head of penis
- Using gauze pads, grip penis over swelling with firm pressure
- Hold until swelling goes down (person can do this)
- Reduce tight foreskin by pushing back on head of penis with thumbs and pulling foreskin forward with fingers — Figure 9.31

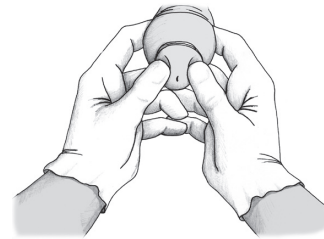


Figure 9.31

If unsuccessful, try compression technique

Compression technique

- Give oral pain relief (eg paracetamol) and ensure person is supported and comfortable
- If very painful — apply ice pack or lignocaine gel for topical pain relief
- Wrap self-sticking compression bandage over oedematous area (area swollen with fluid) starting from the penis tip
- Leave bandage on for 15 mins
- Remove bandage and try drawing the foreskin over the glans — Figure 9.31
- If unsuccessful, reapply the bandage for another 15mins and then try again
- If unable to do reduction — **medical consult** for surgical advice

Condoms

- New condom must be in place before any sexual contact
- If condom breaks or slips off penis
 - ▶ Offer both partners STI check — man, woman, young person
 - ▶ Consider emergency contraception

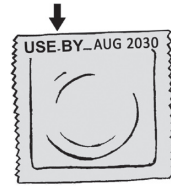


Figure 9.32

Offer to demonstrate how to use condom

- Check use-by date — Figure 9.32. Feel condom packet — should be ‘squashy’. Open carefully
- Hold tip of condom, squeeze air from tip — Figure 9.33
- Roll condom onto erect penis — Figure 9.34, Figure 9.35. Show on model of penis

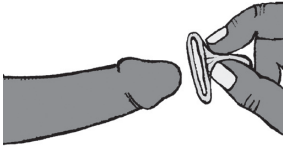


Figure 9.33

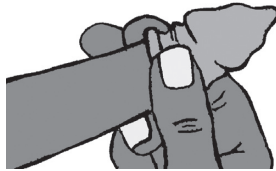


Figure 9.34

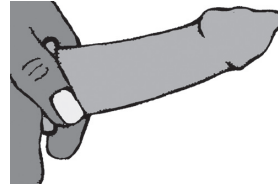


Figure 9.35

- Use water-based lubricant for anal sex or if extra lubrication needed for vaginal sex
 - ▶ **Do not** use oils or *Vaseline* — weaken rubber
- After man has ejaculated (passed sperm) while penis still hard, hold condom on penis, take penis out of vagina or anus slowly
- When penis soft remove condom — Figure 9.36
- Tie knot in condom — Figure 9.37, dispose of safely — put in rubbish bin
- Wipe excess sperm from penis
- For more information on male and female condoms — see Barrier contraception (WBM)

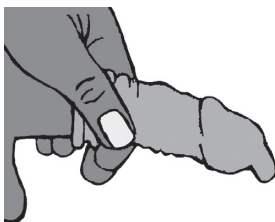


Figure 9.36

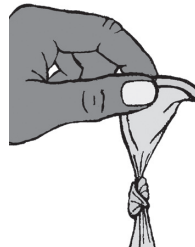


Figure 9.37

Continuous ambulatory peritoneal dialysis

Continuous Ambulatory Peritoneal Dialysis (CAPD) lets people with end-stage kidney disease take care of their dialysis needs in the community

- Uses peritoneal membrane — body's own naturally occurring semi-permeable membrane that lines the abdominal cavity
- Fluid is introduced into abdominal cavity through permanent PD catheter
- Excess water and solutes (body wastes) removed when fluid drains out
- Exchange of fluids occurs through one of a range of manual or automated methods and regimes
- Each exchange has a drain, fill and dwell phase

Attention

- **Always** shared care with peritoneal dialysis/renal unit
- Management plan should include how and when to contact the unit
- Biggest risk to patient is peritonitis. Usually caused by contamination of CAPD system. Can be life threatening, lead to dialysis failure
- If 3 or more contaminations in 6 months — **peritoneal dialysis/renal unit consult**

Contamination of CAPD system

Contamination of patient line

Main causes of contamination

- Most common — breakdown of sterile technique due to touching any of
 - End of transfer set/extension line when disinfection cap off
 - Inside of disinfection cap
 - Patient connection part of peritoneal dialysis solution set
- Using out of date stock
- Using equipment that doesn't have protective cover/cap
- Breakages in any part of delivery system
- Failure to use aseptic technique when injecting additives into peritoneal dialysis bags

What you do

If you suspect contamination of CAPD system

- Clamp PD catheter until transfer set/extension line changed or repaired
 - Use white PD catheter clamp
 - *OR* plastic scissor clamp with gauze between jaws and PD catheter

- If person hasn't taken antibiotics from kit and didn't bring them to clinic — **renal unit consult for antibiotics order. Give immediately**
- Work out how contamination happened, then decide what to do next
- Contact renal dialysis unit or on-call renal registrar/nephrologist if
 - Contaminated fluid could have entered peritoneal cavity — must be drained out and fresh exchange performed
- Transfer set/extension line must be changed due to any of
 - Set/line split
 - Disinfection cap off and end of set/line (dark blue piece) exposed
 - Exposed end of set/line (dark blue piece) touched
 - Set/line fallen off PD catheter at titanium connector

Hole or split in PD catheter

- Will be wet clothing — fluid leaking from tubing
- Caused by
 - Accidentally cutting catheter. **Do not** use scissors or sharp objects near catheter
 - Catheter caught in zipper
 - Catheter weakened by cleaning with alcohol wipes
 - Kink at titanium adaptor if taped incorrectly

What you do

- Clamp catheter on patient side of hole/split —
 - Use white PD catheter clamp
 - *OR* plastic scissor clamp with gauze between jaws and catheter
- **Peritoneal dialysis/renal unit consult** for further advice

Exit site infection

- Will be discharge/pus draining from exit site
- May be pain, redness, large amount of crusting
- PD catheter tunnel tract may also be infected. Redness, pain, swelling over part of catheter under skin
- May feel unwell, have poor appetite

What you do

- **Peritoneal dialysis/renal unit consult** for advice, especially if serious infection
- Clean exit site with **normal saline**
- Milk along tunnel tract, apply firm downward pressure over external cuff
- Swab purulent discharge that runs out — send for MC&S
- Continue daily exit site care

Disconnection of line at titanium adaptor

- Person needs to check that line firmly screwed onto titanium adaptor every day. After daily shower is a good time
- If line disconnects, peritoneal dialysis fluid will pour out

What you do

- Clamp catheter close to abdomen
 - Use white PD catheter clamp
 - *OR* plastic scissor clamp with gauze between jaws and catheter
- Cover exposed end with
 - Gauze — sterile or soaked in povidone-iodine
 - *OR* disinfection cap
- **Peritoneal dialysis/renal unit consult** for antibiotics order and further advice

Peritonitis

- **If you suspect peritonitis treatment must be started urgently — can be life threatening and will not get better without treatment — Urgent peritoneal dialysis/renal unit consult**
- Caused by —
 - Contamination or damage anywhere along CAPD system
 - Accidental disconnection of line at titanium adaptor
 - Exit site infection
 - If female — infection of genital tract
 - Constipation or diarrhoea

Ask

- If feeling very unwell
- Fever, uncontrollable shivering
- Poor drainage of PD fluid
- Abdominal pain, nausea, vomiting
- Diarrhoea, constipation
- If female — vaginal discharge

Check

- Calculate REWS — AVPU, RR, O₂ sats, pulse, BP, Temp
- Weight, BGL
- Head-to-toe exam with attention to
 - PD catheter and extension line for signs of damage, missing disinfection cap
 - Bag for colour of fluid

Do

- **Alert on-call nephrologist/renal registrar and medical consult about medicines**
 - Add IP medicines together to new bag of fluid after drain and ‘flush before fill’. Fluid must stay in body for 6 hours
 - Give pain relief
- If PD catheter damaged, do repair or line change — **peritoneal dialysis/renal unit consult**
- Carry out standard bag exchange
 - If dehydrated — use low strength glucose 0.55% (white ring pull)
 - Reduced volume may help abdominal discomfort

If fluid cloudy — take sample from bag

- Hang drain bag for at least 15 minutes
- Wipe bung of each culture bottle with alcohol wipe. Use new wipe for each bottle
- Wipe sampling port with new alcohol wipe
- Take
 - 1 × aerobic blood culture bottle (room temperature)
 - 1 × anaerobic blood culture bottle (room temperature)
 - 1 × EDTA tube (fridge not freezer)
 - 50mL in ‘red top’ (gamma sterilised) specimen container (fridge not freezer)
- Mark pathology form ‘**URGENT** Notify nephrologist/renal registrar’ send copy to peritoneal dialysis/renal unit. Request
 - White blood cell and differential count
 - Gram stain
 - MC&S

Other problems

Fibrin in effluent

Fibrin may be seen when peritoneal membrane irritated

- Usually seen with peritonitis
- May look like stringy threads in drain fluid, or egg white, or jellyfish as drain fluid cools
- Can block PD catheter if left untreated

What you do

- If effluent otherwise clear and **good drainage** — review in 24 hours
- If effluent clear and **poor drainage** — use **heparin** 1000 unit/L (2L bag needs 2000 unit) in all bags until no fibrin for 24 hours, drainage improved
- If not sure — **peritoneal dialysis/renal unit consult**

Difficulty draining in or out

- Caused by
 - Closed twist clamp on transfer set
 - Closed clamp on drain line
 - Frangible (inline seal) not broken completely
 - Kinks in drain/fill lines
 - Fibrin
 - Not enough gravity for flow
- May also be
 - Catheter tip floating up out of pelvis
 - Catheter trapped in loop of bowel or fold of peritoneum
 - Constipation

What you do

- Check tubing. Start from exit site and work outward looking for kinks, closed clamps, unbroken frangible, fibrin in drain fluid
- Check that infusion bag high enough and drainage bag low enough for gravity to help with filling and drainage. Ask person to stand, move around, bend forward and backward
- Ask person about recent bowel habits. If constipation — give **laxatives**
- If problem persists — **peritoneal dialysis/renal unit consult**

Fluid leak at exit site

Do not ignore — suspect if dressing and clothes become wet

What you do

- Clean exit site with **normal saline**
- Press firmly along line of catheter toward exit site
- Put glucose part of a U/A dipstick onto expressed fluid
 - If dipstick positive for glucose — drain fluid from peritoneal cavity
- **Peritoneal dialysis/renal unit consult**

Extruded dacron cuff

- First of 2 cuffs on PD catheter has come out. Part or all can be seen
- Caused by
 - Pulling or tugging on PD catheter
 - Exit site infection
 - Poor insertion technique
 - Large weight loss

What you do

- Secure PD catheter in natural fall line — never let it hang loose
- Clean twice daily. Never trim cuff back
- Treat exit site infection if needed
- **Peritoneal dialysis/renal unit consult**

Blood in effluent

- 1 teaspoon of blood in 2L of effluent can look like pure blood, don't panic
- Usually caused by
 - Trauma (straining, heavy lifting)
 - If female — period. Peritoneal membrane is open at fallopian tubes
- Can be sign of peritonitis

What you do

- Add **heparin** 1000 unit/L (2L bag needs 2000 unit) to all bags until fluid is clear
 - Can take up to 48 hours
 - Regular dialysis helps remove blood

Nausea and vomiting

- Can be early indication of peritonitis and can lead to dehydration
- Can be food poisoning or gastroenteritis. Check other family members

What you do

- Do bag exchange. If person dehydrated — use 0.55% glucose-strength bag
- Treat nausea and vomiting. Encourage person to rest, have small frequent sips of water and ice
- Review in 24 hours. If still unwell — **peritoneal dialysis/renal unit consult**
- May need to sample drain fluid

Dehydration

- May have
 - Low BP, headache, cramps, sunken eyes, dry cracked coated tongue, dizziness on standing
 - Weight below ideal body weight
- Caused by —
 - Not drinking enough
 - Using wrong glucose-strength bags — too strong
 - Vomiting or diarrhoea
 - Peritonitis, other infection, illness with fever

What you do

- Check level of dehydration. Increase oral fluids, may need IV rehydration
- Treat cause of dehydration
- Use lower than usual glucose-strength bag — 0.55%
 - If not available — use only 1.5%
- Only do 3 exchanges over next 24 hours
- **Peritoneal dialysis/renal unit consult**

Fluid overload

- May have
 - Weight above ideal body weight
 - High BP
 - Oedema (fluid build-up) in legs, face especially around eyes
 - Headache
 - Difficulty breathing, especially when lying flat
- Caused by
 - Drinking too much, using too much salt
 - Not draining fully
 - Using wrong glucose-strength bags — too weak

What you do

- **Peritoneal dialysis/renal unit or on-call renal registrar/nephrologist consult** for advice
 - If severe — can do rapid 4.25% glucose exchanges
- Make sure full drain occurring. Check person's draining method (technique)
- Do 5 exchanges in next 24 hours
- Treat constipation — slows drainage
- Check urine output — aim for 0.5mL/kg/hr
- Talk about diet and fluid intake. Advise person to drink less than 500mL/day, stop adding salt to food

Stress and depression

- Chronic illness, anaemia, doing dialysis 365 days a year, waiting on transplant list, all likely to reduce quality of life, cause stress and depression
- May have mood swings, lack of interest in anything, feel unable to cope, sleep longer than usual but do not feel rested

What you do

- Have person talk to someone — friend, partner, nurse, doctor, ATSIHP
- Contact renal unit. Some have psychosocial support workers, patient groups
- Review regularly

10. Musculoskeletal system

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Broken bones — simple and compound fractures



For joint injuries — see Reducing dislocated or pulled joints, Sprains and strains (STM)

Assessing and managing possible fractures

Related topic — Assessing trauma — primary and secondary survey

Do not

- **Do not** use the following (HARM) in first 2 days (48 hours) — may make associated soft tissue injuries worse —
 - ▶ Heat
 - ▶ Alcohol, aspirin, anti-inflammatory medicines
 - ▶ Running, strong exercise
 - ▶ Massage

Ask

- Pain — when it started, is it getting worse
- Swelling and disability
- How did it happen, were there any witnesses
- What caused the break
 - ▶ High speed (eg car accident) — could be more serious compound fracture
 - ▶ Low speed (eg simple fall) — could be underlying pathological cause (eg osteoporosis)
 - ▶ Repetitive movement causing pain (eg running) — could be stress fracture

Check

Compartment syndrome

- **Surgical emergency**
- Diagnosed using the Ps
 - ▶ Pain keeps getting worse even after pain relief, worse than expected for injury
 - ▶ Poor circulation (cool skin) — Pallor (hands, feet) and Pricking skin are late signs

- ▶ Passive movements make pain worse, especially bending toes or fingers back (extension)
- ▶ Paresthesia (tingling) and Progressive Paralysis follow
- ▶ **Do not** wait for loss of Peripheral Pulses — Figure 10.1. May be too late to save limb

Signs of fracture/dislocation

- Swelling
 - ▶ Most injuries swell. Keep checking to see how much swelling there is — very important if bandages, splints, casts or slabs used
 - ▶ If swelling happens very quickly — consider fracture, dislocation, ligament/tendon rupture and torn artery
- Skin — compound fracture will have break in skin
- Bones — at wrong angle (deformity), tender when palpated on *all* sides
 - ▶ **Do not** palpate obviously broken bone — causes pain
 - ▶ **Do not** try to produce bone grating (crepitus) — causes pain
 - ▶ Gently feel bones that may be broken
- Joints
 - ▶ On either side of injury (proximal and distal)
 - ▶ Abnormal shape (deformity) or movement
 - ▶ Movement — may be limited

Signs of problems caused by fracture/dislocation

- Cool or cold limbs — may mean arterial injury
- Peripheral pulses — Figure 10.1. Weak or none may mean damage to artery
- Sensation — reduced or altered feeling may mean nerve injury or compartment syndrome
- Worsening pain or muscle group feeling tense and firm — may mean compartment syndrome

Related injuries and complications

- Internal bleeding, organ damage, nerve damage
- Allergies or adverse reactions that will affect choice of analgesia, dressings, antibiotics

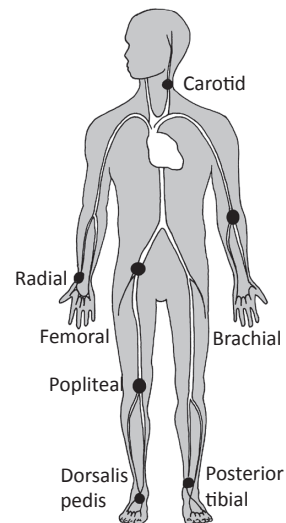


Figure 10.1

- Age
 - Children — consider greenstick fractures, growth plate injuries, physical abuse
 - Elderly — bones weakened by disease (eg osteoporosis, cancer) can break with very little force (pathological fractures). Injury may be caused by existing medical condition — fall due to dizziness, sepsis, arrhythmia, stroke, internal bleeding, medicines

Do

- **If signs of nerve or circulation problems** (cool, pulseless limbs)
 - Straighten limb, apply firm traction until pulse returns — maintain traction or apply splint and recheck pulse and capillary refill
 - **Medical consult** — consider nil by mouth and IV fluids
- Give **pain relief** — medicines (analgesics), splints
- Take off any jewellery, watches, rings. Keep them somewhere safe
- If you suspect compartment syndrome
 - Loosen bandages/slabs/splints
 - Keep limb level with heart
 - **Medical consult**
- Treat with **RICE** — relieves pain and swelling
 - **Rest** — immobilise broken limb using sling, splint/slab
 - **Ice** — apply ice or frozen peas for 15–20 minutes every 1–2 hours, then gradually less often over next 24 hours. **Do not** put frozen material directly on skin
 - **Compression** — apply compression bandage over splint/slab to reduce swelling, give support, immobilise. Bandage should be firm but not tight enough to cause pain. Put on during and after ice
 - **Elevation** — lift (elevate) in sling or with pillows after putting on splint/slab, to prevent swelling. Lower limb fracture should be higher than pelvis (STM)
- See Bandaging, Splinting, Slings, Plaster of Paris slabs
- See Fracture types

Keep checking

- **End of limb for signs of poor circulation** (blood supply) — see compartment syndrome
- Swelling — are bandages too tight

Compound fractures

If bone exposed to outside environment — compound or open fracture

- Bone does not always poke through skin, may just be small skin puncture
- Treat all wounds near broken bone as compound fracture — high risk of infection
- Treat facial fractures involving sinuses as compound fractures

Do not

- **Do not** poke or probe wound
- **Do not** suture wound if there could be fracture underneath, except for haemorrhage (bleeding) control
- **Do not** let person eat or drink anything — will need operation — consider IV fluids

Check

- Look for exposed bone
- Feel for distal pulse and sensation
- Immunisation status — tetanus

Do

- Control any bleeding — realign broken bone, apply pressure, suture if needed
- Clean and wash out wound with **normal saline** in syringe
- Cover wound with sterile, saline-soaked dressing
- Put on back slab or splint, depending on site of wound
- **Medical consult** about IV antibiotics and fluids — see Injuries — limbs (STM)

Fracture types

Fractured skull

- See Injuries – head (STM)

Fractured nose

- If nose broken and still crooked after 1 week or can't breathe through 1 side — may need to be straightened. **Medical consult** about surgery
- Broken nose usually sets by 2 weeks, so need to decide before then

Fractured jaw

- See Dental and oral problems (STM)

Fractured clavicle (collarbone)

- See Splinting

Fractured hand/arm

- See Splinting, Plaster of Paris (POP) slabs

Fractured fingers/toes

- See Splinting

Fractured ribs

- See Injuries — chest (STM)

Fractured pelvis

Note: Fracture at front of the pelvis (pubic rami) may present with no deformity or visible bruising, but tenderness and pain on weight bearing (standing and walking)

- It takes a lot of force to fracture pelvis
- If high impact trauma — often vascular, bladder and/or abdominal injuries as well

Do not

- **Do not** spring pelvis (pushing up and down on pelvic brim or iliac spines)
- **Do not** let person eat or drink anything — may need operation — consider IV fluids

Check

- Signs of haemorrhage (internal bleeding) — fast heart rate, low BP, poor perfusion (blood circulation). **Can be immediately life threatening**
- Calculate age appropriate REWS
 - ▶ **Adult** — AVPU, RR, O₂ sats, pulse, BP, Temp
 - ▶ **Child** (less than 13 years) — AVPU, respiratory distress, RR, O₂ sats, pulse, central capillary refill time, Temp
- Weight, BGL
- **Signs of shock**
 - ▶ Increased RR
 - ▶ Pulse weak and fast (adult more than 100bpm, child fast per age appropriate REWS) or difficult to feel, older people with heart problems may not get fast pulse
 - ▶ Central capillary refill longer than 2 seconds
 - ▶ Pale, cool, moist skin
 - ▶ Restless, confused, drowsy, occasionally unconscious
 - ▶ Low BP for age or relative to person's previously recorded values
- Posture — rotation/shortening of lower limb
- Pain around hips when moving
- Palpate for focal (localised) tenderness
- Blood coming from urethra, scrotal/perineal bruising
- Record if visible blood in the urine

Do

- If signs of shock — give high flow **oxygen**
- If multi-trauma without shock (eg chest or head injury) — give **oxygen** to target O₂ sats 94–98% *OR* if moderate/severe COPD 88–92%
- Splint — See splinting
- Put in IV cannula, largest possible. Start IV fluids to maintain blood volume and hydration
- Put in second cannula — largest possible
- **Medical consult**
- Consider indwelling urinary catheter — female, male

Fractured knee, ankle or foot

Check

- Use Ottawa rules (below) to help assess injury
- If x-ray not needed — see Sprains and strains (STM)

Ottawa knee rules

- Knee x-ray only needed if any of
 - ▶ Under 18 or over 55 years
 - ▶ Tenderness of patella (knee cap) only — no bone tenderness in other parts of knee
 - ▶ Tenderness at head of fibula
 - ▶ Unable to bend knee to 90°
 - ▶ Not able to weight bear straight after injury or when examined in clinic — takes 4 steps, can't weight bear twice on each leg even when limping

Ottawa ankle rules — Figure 10.2

- Ankle x-ray only needed if pain in malleolar zone *AND* any of
 - ▶ Bone tenderness at A — posterior edge (6cm) or tip of lateral malleolus
 - ▶ Bone tenderness at B — posterior edge (6cm) or tip of medial malleolus
 - ▶ Not able to weight bear straight after injury or when examined in clinic — takes 4 steps, can't weight bear twice on each leg even when limping

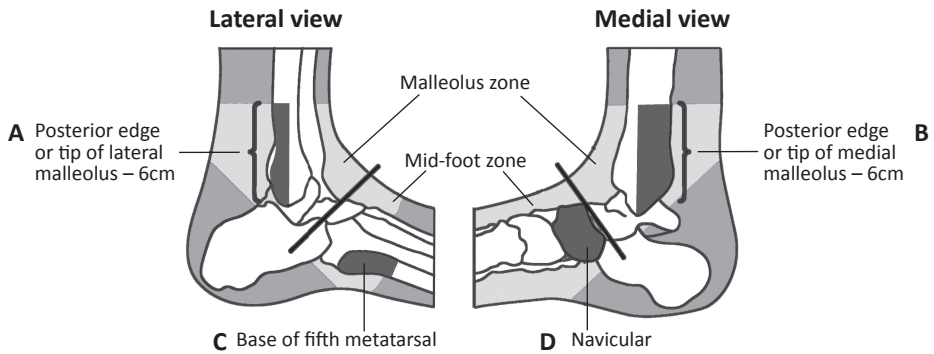


Figure 10.2

Ottawa foot rules — Figure 10.2

- Foot x-ray only needed if pain in mid-foot zone *AND* any of
 - ▶ Bone tenderness at C — base of 5th metatarsal
 - ▶ Bone tenderness at D — navicular
 - ▶ Not able to bear weight straight after injury or when examined in clinic — takes 4 steps, can't bear weight twice on each leg even when limping

Do

- If fracture likely — see Splinting, Plaster of Paris (POP) slabs

Bandaging



Attention

- **Check circulation and sensation** — after bandaging check hands/fingers, feet/toes for colour, warmth, sensation, movement, peripheral pulses
 - ▶ If any not normal — take off bandage
- Ask person if bandage is too tight or too loose
- Remember, the bigger the limb, the wider the bandage needed
- Start bandaging from inside of limb, wind bandage on so you cover a bit more than half the bandage you have just laid down

What you need

- Bandages for size of limb
- Tape to secure bandage

Bandaging a head

- Simple way to cover head wound using a triangular bandage — Figure 10.3, Figure 10.4

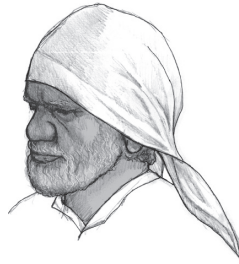


Figure 10.3



Figure 10.4

Bandaging an arm

- Apply bandage directly over wounded area with enough pressure to stop bleeding — Figure 10.5
- Check circulation and sensation

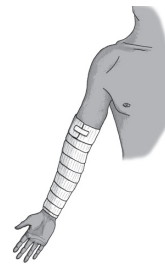


Figure 10.5

Bandaging a hand

- Wrap end of bandage around wrist twice
- Cross bandage over back of hand to between thumb and index finger — Figure 10.6
- Go around knuckles once — Figure 10.7
- Go over hand again, crossing from little finger to wrist — Figure 10.7
- Repeat until hand covered — Figure 10.8

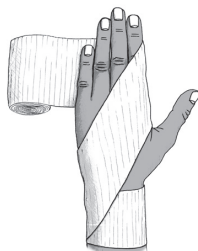


Figure 10.6

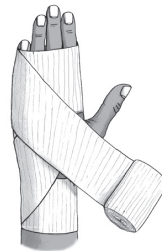


Figure 10.7

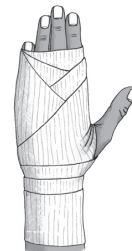


Figure 10.8

- Can use sling to rest hand after bandaging
- Triangular bandage can be used — good to control bleeding palm
 - ▶ Make hand into fist while holding combine or non-adherent dressing
 - ▶ Cover whole hand with triangular bandage, tie at wrist
- Check circulation and sensation

Bandaging a finger/toe

- Use stretchy tubular bandage
- Cut length 4 times longer than finger

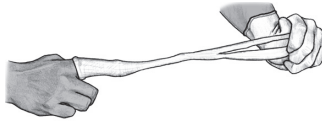


Figure 10.9



Figure 10.10

- Flatten tube, cut along length with scissors to about halfway down
- Put uncut end over finger, twist strip at fingertip — Figure 10.9
- Bring cut ends back over finger and tie around palm and wrist — Figure 10.10
- Make sure ends around wrist are wide. More comfortable, less risk of cutting off circulation
- Check circulation and sensation

Bandaging elbow or knee joint

- Have person bend elbow/knee slightly
 - ▶ Put pillow under thigh to help lift knee
- Wrap bandage around arm/leg below elbow/knee twice — Figure 10.11
- Go over inside of elbow/knee and around arm/leg above joint — Figure 10.12
- Go over inside of elbow/knee and around arm/leg below joint again — Figure 10.13
- Check circulation and sensation

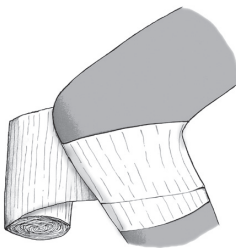


Figure 10.11

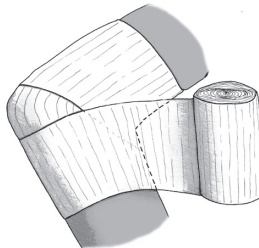


Figure 10.12

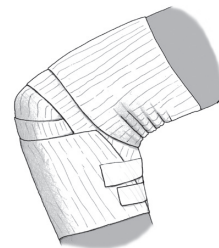


Figure 10.13

Bandaging a leg

- Apply bandage directly over wounded area with enough pressure to stop bleeding — Figure 10.14
- Check circulation and sensation

Bandaging a foot

- Wrap end of bandage around ankle twice
- Cross bandage over top of foot to little toe, then wrap around foot — Figure 10.15
- Come from under foot near big toe and cross over top of foot to ankle — Figure 10.16. Repeat — Figure 10.17
- Check circulation and sensation

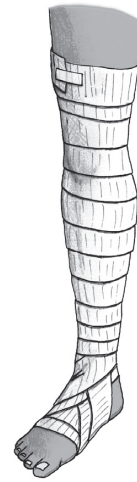


Figure 10.14



Figure 10.15



Figure 10.16



Figure 10.17

Bandaging wounds with protruding objects

- **Do not** take object (eg knife, spear, glass) out of wound
- **Do not** poke around in (probe) wound
- Put rolled bandage on each side of object to support it firmly — Figure 10.18
- Use figure of 8 technique and 2 more bandages to bandage around the 2 support rolls until object held firmly — Figure 10.19, Figure 10.20
- Check circulation and sensation

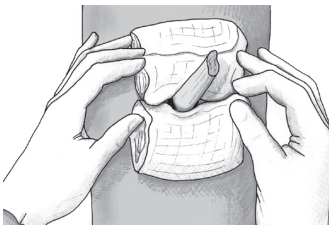


Figure 10.18

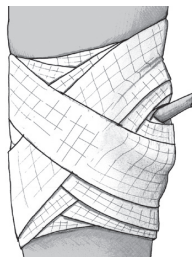


Figure 10.19

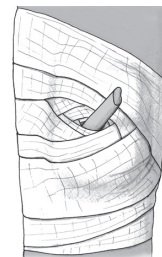


Figure 10.20

Slings



Used to support or lift up (elevate) arm after injury to arm or shoulder. Also for elevation to decrease bleeding and swelling

Attention

- Support injured arm throughout procedure
- When tying sling around neck
 - Use reef knot so knot lies flat
 - Knot to one side just above collar bone so no pressure on neck
- 5 minutes after putting on sling, check it hasn't come loose, stretched, dropped down, changed position
- If you don't have proper sling — use whatever you can find
 - Can use towels, sheets, bandages, etc, but watch for stretching
- **Check circulation and sensation** — after putting on sling check hands/ fingers for colour, warmth, sensation, movement, capillary refill, peripheral pulses
 - If any not normal — take off sling

Simple sling

What you need

- Triangular bandage
- Safety pin or tape

What you do

- Open out bandage and put under injured arm, pointed edge near elbow and long edge at middle of fingers so tips visible — Figure 10.21
- Tie ends of sling together at neck on same side as injured arm
 - Hand slightly higher than elbow — Figure 10.22
- Bring point of bandage around elbow and pin/tape down



Figure 10.21



Figure 10.22

Collar and cuff sling

What you need

- Triangular bandage

What you do

- Fold pointed edge of triangular bandage to long edge 3 times to make narrow bandage
- Make clove hitch (figure of 8) with 2 large loops, ends of bandage in the middle, one end pointing up and the other end pointing down — Figure 10.23
- Slide forearm of injured arm through loops with ends to the front — Figure 10.24
- Lift lower end up across the front of bandage, bring both ends up around person's neck
- Tie bandage on either side of neck, for best support or comfort
 - ▶ Hand close to opposite shoulder — Figure 10.25

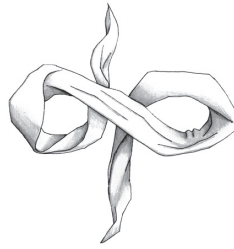


Figure 10.23

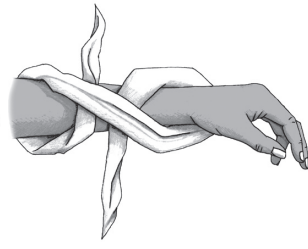


Figure 10.24



Figure 10.25

Elevation sling

What you need

- Triangular bandage
- Safety pin or tape

What you do

- Bend elbow on injured side so fingers point to opposite shoulder — Figure 10.26
- Lay triangular bandage over arm with pointed edge (B) near elbow and hand covered — Figure 10.26
- Bring lower long end (C) under arm — Figure 10.27 then around to uninjured shoulder
- Gently wrap long edge around injured arm and twist top end (A) around fingers — Figure 10.27
- Tie ends (A and C) together on uninjured side — Figure 10.28
- Fold point (B) and any loose fabric along injured arm under sling — Figure 10.28
- Safety pin/tape securely at elbow

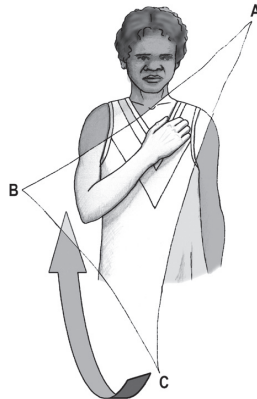


Figure 10.26



Figure 10.27



Figure 10.28

Splinting



Used to support and immobilise bone you suspect is broken, or for painful tissue damage.

Related topics — Assessing trauma - primary and secondary survey

Attention

- **Check circulation and sensation** — after putting on splint check hands/ fingers, feet/toes for colour, warmth, sensation, movement, capillary refill, peripheral pulses — Figure 10.1
 - If any not normal — take off splint
- **Padding** — use combines, shirts, jumpers, towels, blankets, cushions etc
- **Splints** — best if made for the job, but you can use any rigid or firm material
 - Can use thick folded blankets, sticks, cardboard boxes, rolled up newspapers
- **Bandages for splinting** — thick, strong triangular bandages used for slings are best, but ordinary bandages will do
- Splint needs to cover and immobilise joints on either side of injury/ fracture to prevent movement
- Tie all knots **away** from injured area
- Check bandages are not too tight or uncomfortable — ask person, check circulation

Splinting collarbone

What you need

- Padding
- 2 triangular or ordinary bandages

What you do

- Offer pain relief
- Person sits in comfortable chair
- Put padding under armpit on side of injury — Figure 10.29
- Tie first bandage around upper arm and chest — Figure 10.30
- Put on elevation sling — Figure 10.31 or collar and cuff sling to take weight of arm
- Check circulation and sensation in hand



Figure 10.29



Figure 10.30



Figure 10.31

Splinting upper arm — break not close to elbow

What you need

- Padding
- 3 triangular or ordinary bandages

What you do

- Offer pain relief
- Person sits on comfortable chair
- Put on a collar and cuff sling — Figure 10.32
- Put padding between arm and chest
- Tie one bandage around arm and chest below break, another above break — Figure 10.33
- Check circulation and sensation in hand



Figure 10.32



Figure 10.33

Splinting wrist or forearm

Attention

- Splint needs to go from elbow to fingertips

What you need

- Splint
- 3 triangular bandages

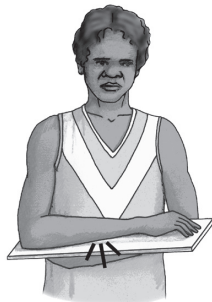


Figure 10.34



Figure 10.35



Figure 10.36

What you do

- Offer pain relief
- Person sits in comfortable chair
- Put forearm and hand on splint, palm downward — Figure 10.34
- Tie 1st bandage around arm and splint, between elbow and the break — Figure 10.35
- Tie 2nd bandage around hand and splint — Figure 10.35
- Use 3rd bandage to make simple sling — Figure 10.36
- Check circulation and sensation in hand

Splinting hand or finger/s

What you need

- Padding
- Splint
- 2 ordinary bandages
- 1 triangular bandage
- Tape or pin for bandage

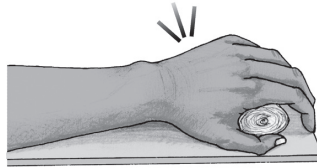


Figure 10.37

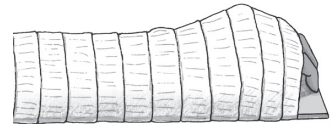


Figure 10.38

What you do

- Offer pain relief
- Person sits in comfortable chair
- Put injured hand on padded splint, palm down — Figure 10.37
- Put rolled bandage under palm to support it — Figure 10.37
- Secure the splint to the limb by securing it above the fracture and around the hand, below the fracture — Figure 10.38
- Put on elevation sling or simple sling to raise (elevate) hand/fingers
- Check circulation and sensation in fingers

Splinting single finger/toe

What you need

- 2 clean gauze swabs
- Splint — aluminium foam splint, 2 tongue depressors, sticks
- Paper dressing tape

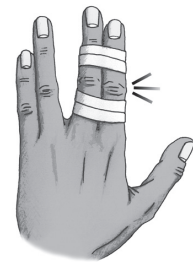


Figure 10.39

What you do

- Offer pain relief
- Tape broken finger/toe to next finger/toe — Figure 10.39 *OR* ones on either side if middle finger/toe ('buddy splint'). This will act as natural splint
 - ▶ Put strip of gauze between fingers/toes to protect skin if needed
- *OR* Put splints on both sides of straightened finger/toe, tape around splint and finger/toe
- Check circulation and sensation in fingers/toes

Pelvic stabilisation

- To reduce a pelvic fracture, provide mechanical stability to pelvis and reduce blood loss
- Early reduction and stabilisation of pelvic fractures can be lifesaving
- Apply compression around the pelvis by wrapping with a sheet or using a Pelvic Circumferential Compression Device (PCCD) such as the Pelvic Binder or Sam Sling
- Application of PCCDs are quick, safe, and easy. They can assist in stabilising the disrupted pelvic ring, decrease mobility, reduce bleeding and pain
- Application of pelvic binding has negligible adverse effects on patients later found not to have a pelvic fracture

Pelvic Sheeting

Used for rotationally unstable pelvic fractures

What you need

- Bed sheet or towel
- Helpers

What you do

- Offer pain relief
- Log-roll person with helpers. Put folded sheet/towel under their buttocks — between top of hip bones and buttock crease
- Roll person back onto folded sheet/towel, pull through so equal amount on each side — Figure 10.40
- Cross sheet/towel over hip bones, pull firmly in both directions so it tightly fits around and stabilises pelvis — Figure 10.41
- With helpers holding it in position, clamp sheet/towel at 4 points — Figure 10.42
- If no clamps available — use large safety pins or tie sheet to stretcher
- Check circulation and sensation in feet

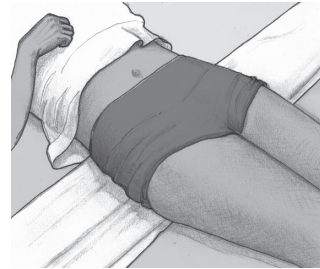


Figure 10.40

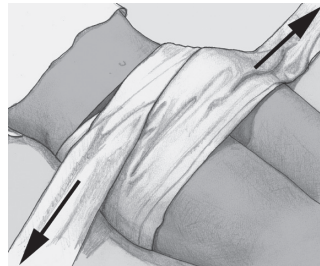


Figure 10.41

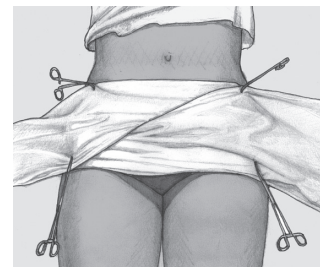


Figure 10.42

Pelvic Circumferential Compressive Device (PCCD)

Use this method or pelvic sheeting

PCCDs are most commonly used in pelvic fractures where there has been separation of the pelvic ring, particularly the symphysis pubis. The PCCDs are easy to apply, provide controlled pressure delivery and do not hinder ongoing resuscitation efforts

- The most effective application site is the greater trochanters and symphysis pubis regions (lower hips)
- The PCCD should be tightened to 180 Newtons which is equivalent to lifting an eighteen-kilo weight
- PCCDs are not without complications which include pressure areas and skin abrasions from friction on tightening

What you need

- PCCD
- Helpers

What you do

- Ensure the skin is clean and dry and wounds are covered
- Offer pain relief
- Place T-Pod belt orange side down on stretcher, position midline fold in centre of stretcher
- Line up the pelvic binder on the bed then log-roll the person onto the pelvic binder to minimise risk of skin injury
- The patient should be positioned on the belt, aligning upper edge of belt with person's iliac crest (upper hips)
- Position the T-POD splint with the midline of the splint at the greater trochanters (lower hips)
- Cut or fold the belt to allow a 15–20cm gap between the ends at the front
- Apply the Velcro pulley system to the front
- Pull the tab to apply tension equally in both directions on the pulley system
- Maintain a 15cm gap between the two ends of the strap and ensure that two fingers can be fitted under the splint when tension applied
- Secure the pull tab
- Check circulation and sensation in feet
- Record the date and time of application on the space provided

Splinting lower leg

What you need

- Padding or pillow
- 5 triangular or ordinary bandages

What you do

- Offer pain relief
- Support fractured area with pillow
 - *OR* Put folded padding between thighs and lower legs
- Tie ankles and feet together using figure of 8 bandage
- Tie 2nd bandage around both thighs
- Tie 3rd bandage around both knees
- Tie 4th bandage around both legs, above broken bone
- Tie 5th bandage around both legs, below broken bone — Figure 10.43
- Check circulation and sensation in feet

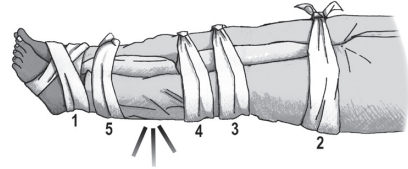


Figure 10.43

Splinting upper leg

What you need

- Padding
- 4 triangular or ordinary bandages

What you do

- Offer pain relief
- Put folded padding between thighs and lower legs
- Tie ankles and feet together using a figure of 8 bandage
- Tie 2nd bandage around both legs, above broken bone
- Tie 3rd bandage around both legs, below broken bone
- Tie 4th bandage around both knees — Figure 10.44
- Check circulation and sensation in feet

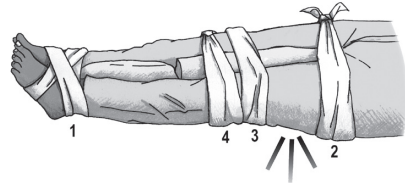


Figure 10.44

Plaster of Paris (POP) slabs



Used to immobilise injured limb or suspected fracture during transport, while waiting for x-ray, until swelling lessens. Can be used as main support for soft tissue injuries

Attention

- Examine carefully to accurately diagnose injury and need for immobilisation
- Give pain relief if needed before positioning limb, putting on plaster
- Slabs need to be wide enough to fit around curve of limb like a shallow bowl, but not cover more than $\frac{2}{3}$ of limb circumference — Figure 10.45
- **Check circulation and sensation** — after putting on plaster check hands/ fingers, feet/toes for colour, warmth, sensation, movement, capillary refill, peripheral pulses
 - If any not normal — **take slab off straight away**
- If person returns to clinic complaining of pain and/or fingers/toes show signs of poor blood or nerve sensation — **take slab off straight away**

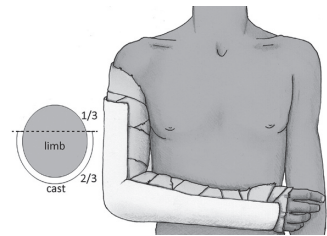


Figure 10.45

What you need

- A helper
- Plastic aprons — messy procedure, protect person's and your clothing
- Blueys or plastic covers
- Wide bowl or bucket deep enough for plaster bandage to be fully submerged in water — line with plastic bag
- Cool or slightly warm (tepid) water
 - **Do not** use hot water — plaster will set too fast, may cause thermal burns
 - **Do not** use very cold water — plaster will set too slowly
- Cotton or wool underlay (also called plaster wool)
- Crepe bandages (size depends on size of limb), tape
- Strong scissors or plaster shears
- **Plaster rolls**
 - 5cm for hands, 7.5cm for lower arms, 10cm for upper arms and legs
 - Need 5–10 layers of plaster depending on age and size — provide support but keep light

What you do

- Cover area around work site with blueys/plastic, put water nearby
- Put on protective aprons

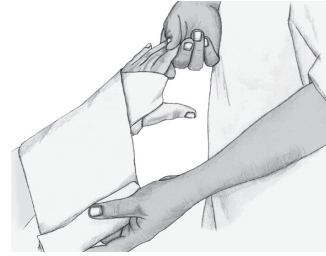


Figure 10.46

Protect skin

- Put on wool or cotton underlay
 - Lay gently around limb — Figure 10.46
 - Do not** pull tight, make creases or ridges
 - Each layer should overlap previous by about half. Usually 2 layers for arm, 3–4 layers for leg
 - Tear to shape around joints
 - Use 2 extra layers to protect joints or prominent areas
 - Bandage 5cm further than area plaster will cover, to fold back over rough ends

Position limb

- Make sure limb in right position **before** you start to plaster
- Keep limb in right position until plaster dries to avoid making creases that can damage skin, cause pressure areas
- Assistant can be used to help support end of limb (distally), if needed

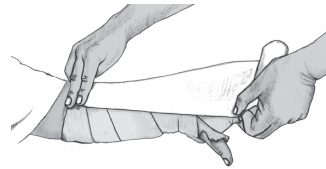


Figure 10.47

Measure and cut slab

- Measure length of slab with crepe bandage or tape measure — Figure 10.47
 - Measure uninjured limb if injury very painful
 - Allow extra 10% as plaster bandage shrinks when wet
- Lay dry plaster bandage on flat surface to measured length, layer backward and forward until right number of layers (usually 5–10) — Figure 10.48
- If plaster bandage not wide enough for limb — layers can be fanned out to widen slab — Figure 10.49
 - Fanning layers weakens slab, so use extra layers but no more than 20 — more than 20 can cause burns



Figure 10.48

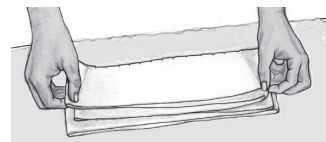


Figure 10.49

- Hold slab by edges to stop damage to plaster
- Fold plaster or cut plaster to accommodate thumb if needed
- Hold slab against limb to check size before putting in water

Wet the slab

- Lift slab by holding one end, lower into water until whole slab wet — Figure 10.50
- *OR* Hold long slabs (eg full arm) in concertina shape so they fit in water bowl — Figure 10.51
- Hold under water until bubbles stop
- Lift slab out by holding upright — Figure 10.52
- Run 2 fingers down length to squeeze out excess water



Figure 10.50

Apply slab

- Handle wet or dry plaster bandage with care or it will become damaged and weak
- Check position of limb, fingers/toes. Ask helper to hold, if needed
- Lay slab. Start at knuckles/wrist/toes (extremities) and go toward body — Figure 10.53
- **Use flat of your hands** to shape around joints and smooth as you go. Smooth from fingers/hands or toes/feet toward body
 - **Do not** use your fingers — can make dents in plaster that press into person's flesh
- Warn person slab will feel quite hot as it dries
- Fold ends of underlay back over ends of slab to protect skin
- Bandage around slab and limb with crepe bandage to keep slab firmly in place
- Bandage from end of limb/slab toward body
- Hold limb in correct position for 3–5 minutes. Plaster will reach full strength in 24–48 hours
- Put arm in sling or keep leg lifted (eg on pillows)
- Clear away equipment
 - Never tip POP waste down drain
 - Empty used water on garden, throw away POP waste left in bottom of bag lining water bowl/bucket
- Check circulation and sensation
- Organise specialist review

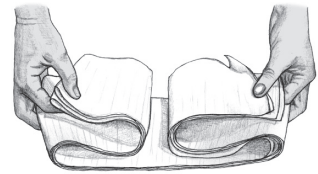


Figure 10.51

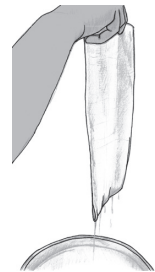


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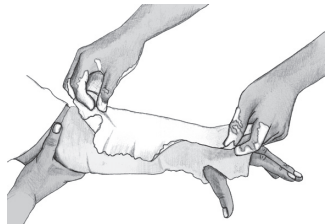


Figure 10.53

Types of slabs

- All plaster slabs are applied on the side with the break — to support and immobilise
- Make room for the thumb in arm slabs — see
 - Folding slab to accommodate thumb
 - OR Cutting slab to accommodate thumb

Folding slab to accommodate thumb

- Measure and layer plaster to make slab
- Fold down corner of slab — Figure 10.54
- Hold fold in place while lowering plaster into water — Figure 10.55
- Lay plaster on arm starting at knuckles with folded side on the thumb side — Figure 10.54
- Smooth plaster around thumb and across knuckles
 - For scaphoid bone or first metacarpal fracture — apply plaster around joint at base of thumb so it doesn't move but middle joint is free and can bend
 - For Colles or distal forearm fractures — thumb joint should move freely. Thumb and little finger can meet — Figure 10.56

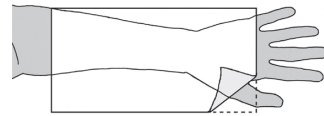


Figure 10.54



Figure 10.55



Figure 10.56

Cutting slab to accommodate thumb

Lower arm slab — scaphoid

Used for fracture of scaphoid bone or first metacarpal that hasn't moved out of alignment (not displaced). Also for soft tissue injury to/around thumb

- Put on underlay — around thumb, across palm to middle of elbow
 - Put 2 extra layers around thumb
- Measure inside of arm from centre of palm to 3 finger widths below crease of elbow
 - Elbow joint must move freely

- Make slab and cut to fit around thumb and clear knuckles — Figure 10.57
- Put arm and hand/fingers straight, flex wrist 20° — ask person to hold bandage as shown — Figure 10.58
- Joint at base of thumb shouldn't move but middle joint is free
- Thumb and 3rd finger should just meet — Figure 10.59

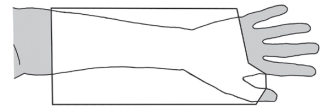


Figure 10.57



Figure 10.58

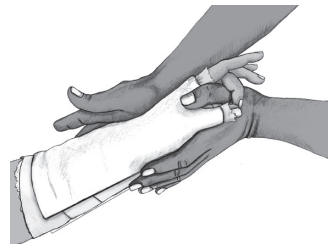


Figure 10.59

Lower arm slab — radial or universal

Used for Colles or distal forearm fractures

- Put on underlay — from middle of fingers to middle of elbow
 - ▶ Put 2 extra layers around wrist and thumb
- Measure from base of knuckle joints to 3 finger widths below elbow crease — elbow joint must move freely
- Make slab and cut to accommodate thumb — Figure 10.60 or Figure 10.61
- Position arm, hand, fingers straight
- Lay slab on back of forearm from base of knuckles to 3 finger widths below elbow crease
- With slab applied
 - ▶ Thumb joint should be able to move freely, thumb and little finger able to touch — Figure 10.56
 - ▶ All fingers should be able to bend

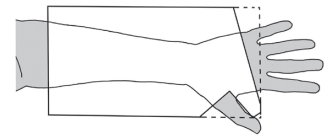


Figure 10.60

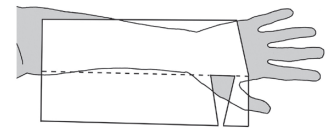


Figure 10.61

Full arm slab

Used for fracture of middle and proximal thirds of radius or ulnar or lower humerus that hasn't moved out of alignment (not displaced)

- Person sits in comfortable chair
- Get helper to hold person's elbow at 90°, fingers in air — Figure 10.62
- Put on underlay — from fingers to 3 finger widths below armpit, and another layer from tips of fingers to elbow
 - ▶ Put extra layer around elbow
 - ▶ Put 2 extra layers around wrist



Figure 10.62

- Measure from centre of palm, around outside of elbow, to 3 finger widths below armpit — Figure 10.63
- Make slab
 - Fold — Figure 10.54 or cut — Figure 10.60, Figure 10.61 to accommodate thumb, if needed
- Check limb in correct position

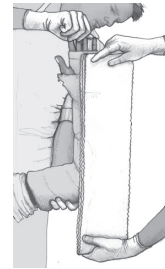


Figure 10.63

Lower leg slab

Used for fracture of distal tibia, fibula, tarsus or proximal metatarsals that hasn't moved out of alignment (not displaced). Also used for soft tissue injuries to lower leg or foot — Figure 10.64

- Person lies on bed on stomach with knee and ankle flexed (bent) to 90° — Figure 10.65
- OR Person sits up or lies back with injured foot over edge of bed and ankle flexed to 90°. Use rolled towel to flex knee slightly (15–20°) on injured side — Figure 10.66
- Put on cotton or wool underlay — from tip of toes to middle of knee
 - Put 2 extra layers around ankle
- Measure back of leg from base of toes to 3 finger widths below base of knee — Figure 10.67
- Make slab. Fan plaster if legs large, or only narrow plaster rolls available — but do not use more than 20 layers
- Check ankle at 90° and hold in position for several minutes until plaster sets — Figure 10.64

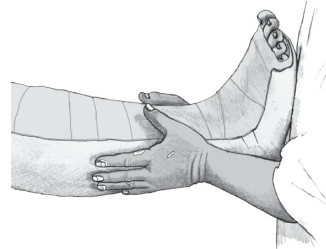


Figure 10.64

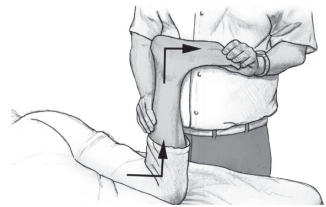


Figure 10.65



Figure 10.66

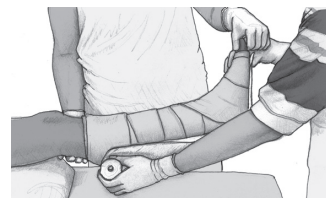


Figure 10.67

Taking off a cast



Fibreglass casts can only be taken off with plaster saw

Take off **Plaster of Paris (POP) casts** with

- Plaster saw (best)
- *OR* Plaster cutters (harder)
- *OR* Soak cast for 10–20 minutes, tear it apart bit by bit, soaking as you go (much harder)

Attention

- **If using saw** — always steady (brace) hand holding saw against plaster cast and/or work surface
- **Saw blade can cut person** or give a burning sensation on skin, so go carefully
- Avoid areas where bones protrude (stick out) such as ankle and wrist joints
- Do outside or in well-ventilated area — makes a lot of noise, dust, mess

What you need

- Plaster saw or plaster cutters
- Cold wet towel — soak in bowl of ice cubes
- Plaster spreaders or very strong wrists
- PPE for you and person
 - Hearing protection (ear muffs or plugs)
 - Goggles and masks — to protect eyes and lungs from dust particles

What you do

- For **plaster** make 1 cut down back of limb
- For **fibreglass** make 2 cuts, one down either side of limb (eg radial and ulna borders)

Using plaster saw

- Brace saw by resting knuckles on cast — Figure 10.68
- Cut plaster in short movements going down then up, then forward
- **Do not** push or drag blade — increases friction and heats saw blade more
- Saw blade gets very hot, can burn person. Stop every few minutes, cool blade with cold, wet towel
- Monitor cutting process by asking person if they feel any heat at cutting site
- **Stop** when you feel a slight give in plaster and plaster wool can be seen
- Split whole length of cast with saw



Figure 10.68

Using plaster cutters

- Start cutting from hand/foot end of cast, take care not to bruise skin and bone underneath

When cast split

- Open up cast using plaster spreaders — or a lot of wrist strength. You can also soak plaster to loosen it
- Cut through plaster wool with blunt-ended scissors and gently take off cast
- Check limb for bruises, lesions
- Wash with soap and water to remove dead skin or dirt

Tight cast

- If cast too tight but new one can't be put on in your clinic
 - ▶ Saw down 1 side, open cast with spreaders but **leave in place around limb**
 - ▶ Cut plaster wool with blunt-ended scissors
 - ▶ Pad between cut edges of plaster with cork, wads of gauze etc to stop it closing again, bandage
 - ▶ Send for replastering and review

Using crutches

Crutches are used to help stop person putting weight on injured limb, and/or Plaster of Paris cast or slab, especially before it has set

Attention

- Crutches should fit comfortably and cause no pain or tingling in arms or shoulders
- Crutches that are too long put pressure on armpit, can damage brachial plexus (large network of nerves running from neck to arm) causing crutch palsy (drop hands)
- Check crutches have all nuts, bolts, screws firmly in place and good non-slip rubber tips
- Person needs shoes with good grip
- Practise procedures yourself before teaching to others

What you do

Fit crutches

- With person standing upright on their good leg, make sure tops of crutches fit properly under their arms
 - Top of crutches should be 2–3 finger widths below armpit when standing straight
 - Person should not stoop down or lift shoulders up to make them fit
- Change height by moving position of bolt and nut on lower peg of wooden crutches, or using the push pins on aluminium crutches
- Hand grips should be level with top of hip
- Elbows should be a bit bent (15°) when holding hand grips

Demonstrate

- Shoulders should be slightly forward when using crutches
- Keep top of crutches tightly against sides using upper arms
- Take weight through hands, not under arms
- Don't rest armpits on top of crutches
- **Sitting to standing**
 - Good foot on ground close to edge of seat, bad foot just in front
 - Hold both crutches in 1 hand, use other hand to push up from chair
 - Lean forward and stand up
 - Put 1 crutch under each arm and stand up straight
- **Standing**
 - Hold crutches slightly to side of and just in front of feet

- **Walking**
 - ▶ Look ahead to where you are walking, don't look at feet
 - ▶ Put both crutches forward and bring bad foot level with crutches
 - ▶ Swing good foot just past crutches
 - ▶ Do this again — this is walking
 - ▶ To change direction hop around or take small steps in a circle. Do not pivot or twist on your uninjured foot
- **Standing to sitting**
 - ▶ Make sure good leg is right back against edge of seat
 - ▶ Take crutches from under arms, hold in 1 hand
 - ▶ Bend hips and knees, reach down to seat with other hand, keep bad foot slightly forward
 - ▶ Lower bottom onto seat
 - ▶ Keep crutches nearby, **do not** put weight on injured limb
- **Going upstairs**
 - ▶ Get as close to first step as you can, put good foot up onto first step
 - ▶ Lift crutches and bad foot up onto same step
 - ▶ If hand rail — put both crutches in 1 hand, hold rail with other
 - ▶ Do this again — one step at a time
- **Going downstairs**
 - ▶ Get as close to first step as you can, put crutches and bad foot down onto first step
 - ▶ Put good leg down onto same step
 - ▶ Do this again — one step at a time

Reducing dislocated or pulled joints



Used to reduce (put back) a joint knocked or pulled out of its proper place

Attention

- **Medical consult** before attempting reduction of dislocated joints if not experienced
- Need person to be relaxed and comfortable. Speak calmly, move slowly to reassure them. Give sedation if needed
- Always consider possibility of fracture
- Always check and document circulation and neurovascular (sensation) status before trying any manipulation/reduction
- When finished, **always check** peripheries (hands/feet) for colour, warmth, sensation, movement, swelling, capillary refill, peripheral pulse to make sure no damage to nerves, arteries, veins

Dislocated shoulder

Mostly seen in younger people following sports injury or fall

Attention

- Always suspect fracture, especially in older people
- Longer the shoulder left dislocated, more the limb will swell, muscle will spasm, making it harder to reduce
- Person will need sedation **unless** dislocation has just happened, or is recurrent. If so, first try gently without sedation
- **Do not** try if you suspect a fracture — x-ray first
- If attempted reduction doesn't work, or **posterior** dislocation suspected (eg from fall caused by seizure in epileptic person) — refer for x-ray, specialist treatment

Stimson manoeuvre and scapular manipulation

What you need

- Firm, high, narrow examination couch, stretcher, or bench top
- 2.5–5kg weight — sandbag, plastic bottle full of water
- If person sedated — may need sheet to tie them to couch

What you do

- Lie person face down on couch so injured shoulder right on edge, arm hanging straight down — Figure 10.69
- If person sedated — tie sheet around them and couch to make sure they don't roll off
- Strap/tie weight to wrist of injured arm
- Wait 20–30 minutes to see if traction weight reduces dislocation
- **Reduction may be helped by trying following steps in order —** Figure 10.69
 1. Apply gentle traction down on arm
 2. Turn arm outward (externally) until joint has 'clunked' back into position
 3. Turn arm inward (internally)

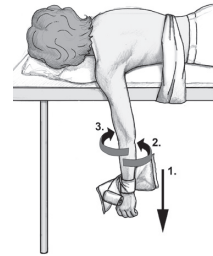


Figure 10.69

If this doesn't work, try scapular manipulation

- Leave weight in place
- Stabilise (support) upper part of scapula (shoulder blade) with one hand and push bottom tip of shoulder blade straight across toward spine (medially) as far as it will go — Figure 10.70
 - ▶ Can use thumb of supporting hand to help with push — Figure 10.71

Note: May be hard to tell when joint has gone back into position, as movement in arm and shoulder is very small. Ask person if it has worked

- Check circulation and sensation
- After reduction, strap arm with elevation sling
- Specialist review for follow-up, physiotherapy referral

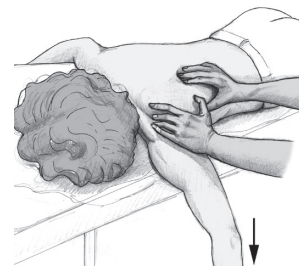


Figure 10.70



Figure 10.71

External rotation

What you need

- Firm, high examination couch or stretcher

What you do

- Person lies on back, arm close to side, elbow flexed (bent) to 90°
- Stand facing person on same side as the dislocation
- Grip elbow with one hand keeping it close to person's side. Hold wrist with other hand — Figure 10.72
- Ask person to SLOWLY let arm fall to the side (externally rotate). Guide movement with hand at wrist — Figure 10.73
- Tell person to stop if pain or spasm, support weight of arm for them until pain settles and muscles relax, then have them start movement again
- Full external rotation can take 5–10 minutes
- Shoulder may pop back into place without usual 'clunk'
 - ▶ Unless it is clear that the shoulder is back in place, continue until arm fully externally rotated
- If shoulder back in position — put arm across person's body, with hand on opposite shoulder.
- Strap in place with elevation sling
- Check circulation and sensation
- Specialist review for follow-up, physiotherapy referral
- If shoulder not back in position — see Milch technique. Person remains in same position

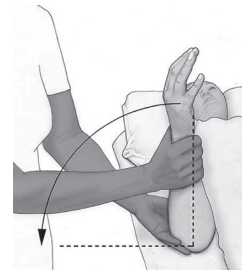


Figure 10.72



Figure 10.73

Milch technique

Attention

- Use immediately after unsuccessful attempt to reduce shoulder with external rotation

What you do

- Person remains on back with arm fully externally rotated — Figure 10.73
- Use your hands at elbow and wrist to move arm out to the side and toward overhead position. Keep elbow bent at all times — Figure 10.74
- When shoulder is at 90° move your hand from elbow to axilla (under arm) and use your thumb or fingers to push head of humerus up and into position — Figure 10.75
- If shoulder back in position — put arm across person's body, with hand on opposite shoulder. Strap in place with elevation sling
- Check circulation and sensation
- Specialist review for follow-up, physiotherapy referral
- If shoulder not back in position — **medical consult**

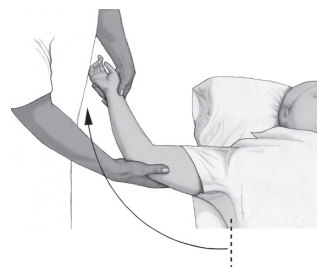


Figure 10.74



Figure 10.75

Pulled elbow (dislocated radial head) in small child

Attention

- Often caused by adult lifting child from ground while holding them below elbow (eg forearm, wrist, hand)
- Only do if clear story about how injury happened, otherwise send for x-ray
- Warn child's parents/carer that procedure may cause brief pain

What you do

- When child calm
 - ▶ Hold elbow, press your thumb on head of radius — Figure 10.76
 - ▶ With your other hand, hold wrist, then quickly and firmly twist arm from palm down to palm up (supination) — Figure 10.77 while keeping constant pressure on radial head
- Check circulation and sensation
- If still painful — put sling on to rest arm. Take sling off after 24 hours
- Check if child needs specialist review

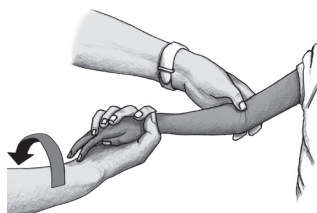


Figure 10.76



Figure 10.77

Dislocated elbow in adult

Attention

- **Always do x-ray first**
- If no distal (wrist) pulse — **medical consult** to send to hospital straight away. Get advice. May need to do reduction without x-ray
- Always check for fractures of radius bone

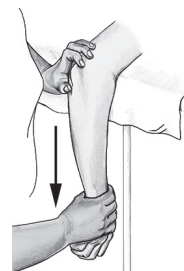


Figure 10.78

What you do

- Lie person on comfortable couch or flat surface off the floor so arm can hang over the side — Figure 10.78
- Check for wrist pulse
- Check movement and feeling in elbow, lower arm and hand. If poor — might be nerve damage
- Hold wrist, pull down slowly and continuously along line of forearm — Figure 10.78 until relaxed. May take a while
- When forearm muscles relaxed, use thumb and forefinger of your other hand to move olecranon (tip of elbow joint) down and toward middle (medially). Should put joint back into position — Figure 10.79
- If joint not back in position — **medical consult**
- Check circulation and sensation
- Put arm in collar and cuff sling, elbow needs to be kept bent at 90° for at least 1 week
- Specialist review for follow-up, physiotherapy referral

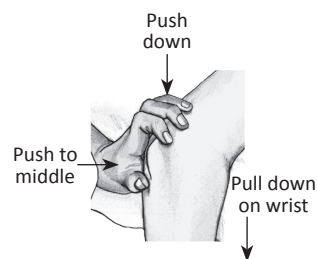


Figure 10.79

Dislocated interphalangeal joint (finger)

What you need

- Rough paper tape or plaster

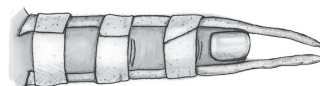


Figure 10.80

What you do

- Wrap paper tape around dislocated finger so you can get a good grip — Figure 10.80
- Stand facing person, firmly hold end of taped finger or ends of tape
- Ask person to lean backward while you hold finger or tape — Figure 10.81 . Dislocated joint should slip back into position
- If joint not back in position — **medical consult**
- Check circulation and sensation
- Splint injured finger to finger beside
- Check if person needs specialist review

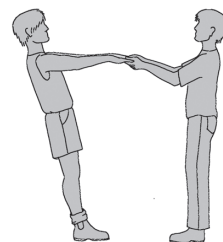


Figure 10.81

Lateral dislocation of patella (kneecap)

Most common in young people playing sports or from direct blow to knee

Attention

- If seen in elderly person — suspect fracture
- Only use this procedure if kneecap dislocated sideways to outside or inside of knee — push it back towards the middle of knee while pushing down on lower leg. Other dislocations very rare, need x-ray and specialist care
- Best to straighten leg quickly, as lessens pain and nervousness. If done slowly — person will tense leg muscles

What you need

- Examination couch
- Splint
 - Plaster of Paris and plaster wool for slab
 - Special knee immobiliser

What you do

- Sit person comfortably on couch, pillows supporting their back. Knee will be slightly bent from injury
- Hold kneecap — Figure 10.82
- With other hand — push down on lower leg, just below knee (to quickly straighten leg)
- **At the same time** push kneecap toward middle (medially) — Figure 10.82
- Kneecap should slide back into place over head of femur
- If kneecap not back in position — **medical consult**
- Check circulation and sensation
- Splint leg in straightened position, using knee immobiliser or plaster slab
- Specialist review for follow-up, physiotherapy referral

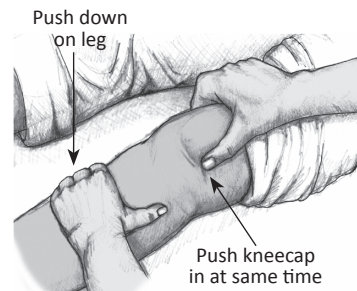


Figure 10.82

Joint aspirations and injections



Attention

- **Do not** do unless you have been trained. **Medical consult** prior to procedure
- Most common joints to be injected/aspirated are knees, shoulders
 - Principles for joint injection and aspiration the same
 - **Be aware** of risk of introducing infection — always use aseptic technique
- Before aspirating for diagnostic reasons — see Joint fluid analysis
- If aspirating for healing (therapeutic) reasons — remove most of the fluid
- Local anaesthetic not always needed. Depends on size of needle used
- Always put needle in parallel to joint surfaces to prevent damage to cartilage
- Use ultrasound guidance for shoulder injection if available

Note: Leave a bit of air in preloaded syringe. Air can easily be injected into joint but not tissue (strong resistance), helps you know if you are in joint

Circulation and sensation — when finished **always check** hands/feet (peripheries) for colour, warmth, sensation, movement, swelling, capillary refill, peripheral pulses to make sure no damage to nerves, arteries or veins.

Syringes and needle sizes

- Needle size depends on
 - Diagnostic or healing (therapeutic) aspiration
 - How much fluid and how thick
 - Size of joint
- Always use smallest needle size possible
 - For **aspiration** usually 21G
 - For **injection** usually 23G
- Needle length
 - Long — 32mm for shoulders or knees, 38mm for obese patients
- Needle and syringe size for aspiration of toe/finger — 25G needle and 3mL syringe

- Aspiration of knee/shoulder
 - 21G *OR* 18G needle/cannula if you expect thick or bloody fluid
 - 5mL syringe for diagnostic
 - 10–20mL syringe for healing (therapeutic) aspiration

Do not

- **Do not** do joint aspirations if
 - Bacteraemia present
 - Skin infection or severe dermatitis over joint
 - Joint too difficult to reach
 - Severe lack of blood clotting (coagulopathy)
 - Gout in big toe (classic first metatarsophalangeal gout), very painful, not needed for diagnosis
- **Do not** do steroid injection if
 - Bacteraemia present
 - Infectious arthritis
 - Close to bone infection (osteomyelitis)
 - Person having joint replacement surgery in less than a week
 - Bleeding into joint (haemarthrosis)

Indications (reasons) for joint aspiration

- **Therapeutic (to help with healing)**
 - To relieve symptoms (pain, swelling)
 - To help stop damage to joint caused by infection
- **Diagnostic**
 - To improve joint movement so swollen joint can be fully examined
 - To find reason for unexplained fluid build-up in joint

Types of effusions

Bloody effusions

- Traumatic — most common
 - Bloody aspirate indicates soft tissue or bony injury
 - Fat globules in bloody aspirate indicate joint fracture
 - Usually contain streaks of clotted blood
- Non-traumatic
 - Include haemophilia, anticoagulant therapy, malignant/benign tumours
 - Fluid is evenly bloody
 - May be caused by traumatic tap during joint aspiration — usually contains streaks and fresher looking blood
 - Don't need to send bloody aspirate to pathology unless you suspect septic arthritis, crystal arthropathy, malignant tumour

- **Non-traumatic effusions** are usually non-bloody. Send aspirate to pathology for diagnosis
- Single inflamed joint could be septic arthritis. Very damaging
 - 20% of people with septic arthritis don't have a fever
 - 20% of cases of septic arthritis involve more than one joint

What you need

- Blueys
- Sterile dressing pack
- Chlorhexidine 5% in 70% alcohol solution or povidone-iodine antiseptic solution
- Syringes and needles
- Sterile needle holder or haemostat clamp (to keep needle still when changing syringes)
- Small sticking plaster
- Compression bandage

May need

- Large pillow
- 3mL syringe preloaded with local anaesthetic and/or steroid for injection
- Yellow cap sterile specimen container for aspirate
- Crutches

Knee injection/aspiration — medial and superolateral approach

Attention

- Usually
 - Medial approach for injections and small (diagnostic) aspirations
 - Superolateral approach for large (healing/diagnostic) aspirations
- Use method you are most comfortable with

What you do

Medial approach

- Lie person on back with knee bent 45–90° over bluey-covered large pillow
- Find site for aspiration/injection — Figure 10.83
- Mark injection site by making indentation with tip of syringe
- Lay out dressing pack and equipment

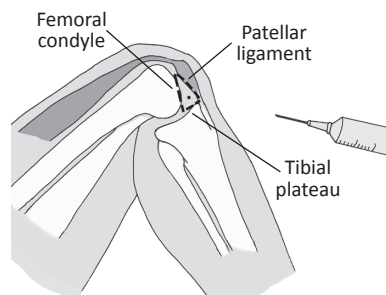


Figure 10.83

- Wash hands and put on sterile gloves
- Disinfect site and drape with sterile towels
- Put needle
 - ▶ Into triangular space made by edge of femoral condyle, tibial plateau (make sure you can palpate edge of tibial plateau) and patellar tendon, 1cm medial to patellar tendon — Figure 10.83
 - ▶ Behind patella, aiming for femoral notch. Direct inward and slightly backward toward person's thigh for 2–3cm

Superolateral approach

- Lie person on back with leg straight
- Put in needle 1–2cm above (superior) and 1–2cm to outside (lateral) of upper outer aspect of patella at 45° angle, and at 45° to skin surface — Figure 10.84

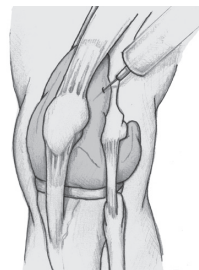


Figure 10.84

For both medial and superolateral approaches

- **If aspirating**
 - ▶ Connect aspirating needle and syringe
 - ▶ Put spare hand (or have helper put their hand) on thigh above knee, press distally to milk effusion into joint. Take care to keep area sterile
 - ▶ Put in needle, pushing in slowly while aspirating until you see fluid, then aspirate
 - ▶ Don't aspirate while needle being withdrawn through the skin. Can contaminate aspirate
- **If injecting**
 - ▶ Inject skin and deeper tissues at needle insertion site with **local anaesthetic**
 - ▶ Use sterile needle holder/forceps (with non-dominant hand in pencil grip) to hold needle in joint, disconnect syringe, attach steroid/lidocaine (lignocaine) syringe
 - ▶ Put needle gently into centre of insertion site, push in slowly while aspirating until you see fluid or hit bone. If bone hit — pull back slightly
 - ▶ Inject
- **If aspirating and injecting**
 - ▶ Do aspiration
 - ▶ Use sterile needle holder/forceps (with non-dominant hand in pencil grip) to hold needle in joint, disconnect aspiration syringe, attach steroid/lidocaine (lignocaine) syringe
 - ▶ Inject

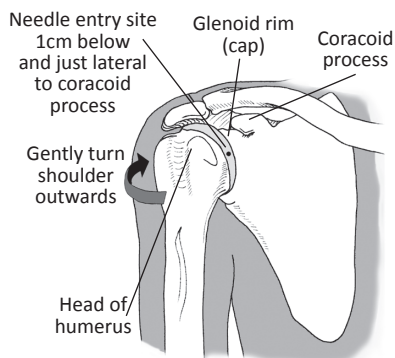
Now

- Take out needle, put firm pressure over site with thumb to stop any bleeding
- Put on sticking-plaster dressing
- If blood aspirated — put on firm bandage, arrange crutches
- Put aspirate into specimen jar, store and transport under refrigeration
- Check circulation and sensation

Shoulder joint injection/aspiration — lateral approach

What you do

- Sit person comfortably on chair or couch facing you, arm hanging loosely by side, palm turned forward
- To find site
 - ▶ Gently turn shoulder around from inside to outside to feel head of humerus
 - ▶ Find groove between head of humerus and glenoid rim
 - ▶ Needle entry site is in groove 1cm below and just lateral to coracoid process — Figure 10.85
- Mark site by indenting skin with tip of syringe
- Lay out dressing pack and equipment
- Wash hands and put on sterile gloves
- Clean front of shoulder
- Inject local anaesthetic into skin, if using
- Connect syringe to needle. If injecting only — remember to start procedure with smaller needle
- Put needle gently into shoulder at identified site. If you hit bone — pull back slightly
 - ▶ Aspirate fluid
 - ▶ Use sterile needle holder/forceps (with non-dominant hand in pencil grip) to hold needle in joint, disconnect aspiration syringe, attach steroid/lidocaine (lignocaine) syringe
 - ▶ Inject
 - ▶ Take out needle, put firm pressure over site with thumb to stop any bleeding
- Put on sticking-plaster dressing
- Put aspirate in specimen jar, store and transport under refrigeration
- Check circulation and sensation

**Figure 10.85**

Shoulder joint — subacromial bursa injection

Attention

- **Do not** inject into tendon. If needle enters tendon (gritty resistance) — pull out straight away
- Aim to inject into soft tissue that lines non-cartilaginous surfaces (subacromial bursa)
- If injection in right place — pain will be quickly relieved

What you need

- Sterile dressing pack
- Chlorhexidine 5% in 70% alcohol solution or povidone-iodine antiseptic solution
- Local anaesthetic and equipment (if using)
- 3mL syringe preloaded with lidocaine (lignocaine) 1% and 1mL of steroid for injection
- Long 23G or 25G needle
- Small sticking-plaster dressing

What you do

- Ask person to put affected arm behind their back, with backs of fingers touching far waistline
- Palpate acromial margin laterally or posterolaterally
 - ▶ Injection is below acromial margin, laterally, directed upward under acromion — aim for coracoid process

- Mark injection site by indenting with end of syringe
- Lay out dressing pack and equipment
- Wash hands and put on sterile gloves
- Clean site and drape with sterile towels
- Inject local anaesthetic into skin, if using
- Connect preloaded syringe and needle
- Guide needle tip into site, beneath acromion, angled slightly upward and parallel to acromial under surface — Figure 10.86

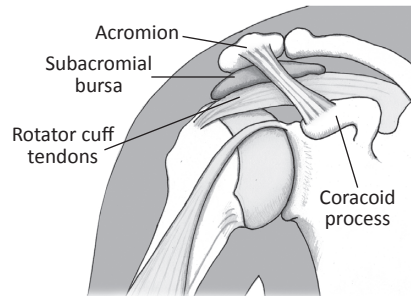


Figure 10.86

- Inject air you have left in syringe to see if you are in joint. If no resistance felt — inject **lidocaine (lignocaine)** and **steroid**
- Take out needle, put firm pressure over site with thumb to stop any bleeding
- Put on sticking-plaster dressing
- Check circulation and sensation

Steroid injection

- Steroid injections give pain relief
- Adding lidocaine (lignocaine) to steroid injection
 - ▶ Relieves pain at target site
 - ▶ Helps you work out if medicine has reached its target
 - ▶ Allows area to be re-examined while joint under anaesthesia
 - ▶ Helps to tell difference between local and referred pain
 - ▶ Gives volume to injection fluid
 - ▶ Distributes corticosteroid in large joints

Lidocaine (lignocaine) concentration

- More concentrated (eg 2%) for small joints needing smaller volume
- Less concentrated (eg 1%) for large joints needing larger volume

Attention

- Infection after injection rare. Prevented by making sure person knows how to keep site clean
- **Post-injection flare** (2–5%). Painful condition, starts 6–12 hours after injection, lasts 2–3 days. Easily confused with infection. Prevented by
 - ▶ Avoiding weight-bearing and vigorous activity with injected joint for 48 hours post-injection
 - ▶ Applying ice
 - ▶ NSAIDs — if no contraindications — see Pain management (STM)
- **Steroid dose**
 - ▶ Reduce dose for young people, the elderly, those in poor health
 - ▶ Be careful with short-acting steroids in people with diabetes. Risk of increased blood glucose levels for up to 3 weeks after injection

What you need

- See above What you need

AND

- 1mL betamethasone mixed with 3–5mL of lidocaine (lignocaine) 1%
- OR 1mL methylprednisolone mixed with 3–5mL of lidocaine (lignocaine) 1%
- 3mL syringe preloaded with lidocaine (lignocaine) and steroid
- Small joints (eg wrists, ankle) — consider stronger steroids in smaller volumes

What you do

- See *What you do* — knees or *What you do* — shoulders

Joint fluid analysis

- Send non-bloody fluid to pathology for cell count, gram stain, bacterial culture and if needed, special tests such as crystals, fluid-protein, fluid-glucose and fluid-LD levels
- Do cultures on all synovial fluids. Bacterial infections can look like/be present with joint disease

Collection

- Need a minimum of 2mL aspirate in sterile yellow container for gram stain, culture, WBC, crystals
- For diagnosis
 - If enough fluid, put 1–2.5mL in EDTA tube (purple lid) — gives more accurate analysis of WBC. Important if delay in transport
 - If septic arthritis suspected and enough joint fluid — put 2.5mL in blood culture bottle (aseptic technique)

Transport

- Best within 4 hours, but no later than 48 hours. Refrigerate if delay

Results

Joint fluid analysis will fall into one of 3 categories — Table 10.1

- Non-inflammatory
 - Degenerative (eg osteoarthritis, overuse syndrome)
 - Trauma, if no blood in fluid
- Septic (eg infective mono-arthritis)
 - Non-gonococcal bacterial arthritis
 - Gonococcal bacterial arthritis
- Inflammatory
 - Acute crystal arthropathy (eg gout, pseudogout)
 - Any type of arthritis

Synovial fluid findings

Table 10.1 Microscopic findings

MC&S	Normal	Non-inflammatory	Inflammatory	Septic
WBC per mm ³	Less than 200	200–2,000	2,000–150,000 (likely less than 75,000)	15,000–200,000 (likely more than 100,000)
PMN	Less than 10–25%	Less than 25%	Often more than 50%	More than 75%
Gram stain	–	–	–	+
Culture	–	–	–	+
Crystals	–	–	+	Possible

Chemicals (eg protein, glucose, LD) not routinely requested, need an extra 0.5mL aspirate

Stiff neck

Attention

Always consider meningitis in people complaining of a stiff neck

- Exclude more serious neck injury or injury (eg meningitis, vascular problem or fracture if trauma)
 - ▶ Meningitis
 - ▶ Vascular — ask about the **5D's** (dizziness, double vision, dysarthria (difficulty speaking) or dysphagia (difficulty swallowing), drop attacks) and **3 N's** (nausea, nystagmus, numbness around the mouth) — if present **medical consult**
 - ▶ Fracture — if a history of trauma, follow the Canadian C-spine rule to see if X-ray is needed or not
 - ▶ Screen for neurological symptoms (eg pins and needles, numbness or weakness in the arms) if neurological symptoms — **medical consult**
- Acute torticollis (wry neck) — sudden onset of severe neck pain with spasm of neck muscles. Causes person to bend or twist neck and head away from painful side
- May be caused by holding awkward position, often from day before (eg long distance driving), often occurs in children after sleeping
- Usually occurs on one side of neck, resolves by itself within a few days
- Common in young people — 12–30 years
- **Do not** drive when suffering from this condition
- For neck pain or stiffness due to idiopathic (non-traumatic) cause or traumatic cause (eg after a sporting injury or car accident)
 - ▶ Keep posture as normal as possible
 - ▶ Keep moving neck as much as pain will allow — gentle exercise will speed up recovery

Active movement and manual traction

Attention

- If person has pins and needles or numbness during procedure — **medical consult**

What you need

- Hot pack or ice pack — use what person tolerates best

What you do

- Lie person down in comfortable position with pillow supporting head
- Put hot/ice pack under neck
- Have person turn head toward painful side as far as possible and as pain allows, then return head to centre
- Have turn head towards non-painful side as far as possible, then return head to centre
- Repeat 10 times each side, with each repetition try to go a little further in each direction.
- If no improvement — rest where comfortable and advise simple pain relief (analgesia). Then try again a few hours later

Note: If this procedure does not relieve symptoms — try hold–relax procedure

Hold–relax

Attention

- Can be taught to person to do at home
 - ▶ Turn head toward or away from painful side, depending on which hurts less
 - ▶ Turning toward pain described, but technique the same for both



Figure 10.87

What you do

- Person sits in comfortable chair
- Turn head slowly and gently toward painful side until it starts to become uncomfortable, then stop
- Put one hand against side of head opposite to painful side
- Use other hand to steady neck — Figure 10.87
- Ask person to **turn** head against pressure of your hand — not push sideways
- Keep even, firm pressure against head so that they just can't turn their neck, not so hard that you move their head
- At the same time, ask person to take a deep breath and hold it, look upward to side where your hand rests
- Count 10 seconds then ask person to relax and breathe out
- Person should now be able to turn their head a little more toward painful side without your help
- Do this again 3–5 times in a row — there should be a great improvement in tension and pain
- Physiotherapy referral may be useful

Supporting resources

- My pain hub neck pain exercises
- Canadian C-spine rule

Feet



- Feet should be routinely checked and managed
- Referrals are important, however just referring problem feet to a podiatrist or high risk foot team is not good practice. The podiatrist may not come often, the high risk foot team may not see the person for weeks unless they are evacuated

High risk foot

Medical consult for High risk foot — two or more issues, may be one or both feet

- Peripheral neuropathy
- Peripheral vascular disease
- Foot deformity
- End stage renal failure
- History of foot amputations or foot wounds

Note: A high risk foot is one that requires urgent referral due to red flags OR charcot joint (see below) — refer to a high-risk foot team

Charcot foot

- Charcot foot or joint can occur when neuropathy (nerve damage) is present
- In acute phase bones suddenly become brittle allowing joints to be permanently deformed — Figure 10.89
- If managed early, deformity can be prevented. Once deformity occurs, limb prognosis poor

Signs of acute Charcot foot or joint

- Unilateral heat and swelling
- Neuropathy and no other cause for unilateral heat and swelling identified

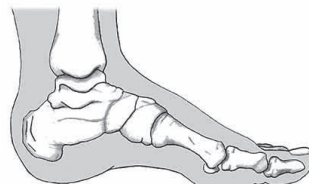


Figure 10.88
Normal foot



Figure 10.89
Charcot foot

Foot examination

What you need

- 10g monofilament — if not available, tissue/cotton wool for rough assessment
- Soap and water
- Scalpel blade and handle
- Nail clippers, single use best
- Single use nail file
- If active lesion — sterile blunt end probe

What you do

Ask

- Sensation of numbness, tingling, burning, weakness in feet
- Foot pain at night
- Cramping foot pain when walking
- Any foot wounds that take a long time to heal
- Medicines — antibiotics, dosing regime
- Access to footwear and how it is worn
- Ability to care for feet
 - Consider level of understanding, vision, can they reach feet

Look for

- Amputations
- Colour
- Shape both feet — compare
- Deformities — crooked toes, bunions, bony prominences
- Calluses, corns, hard skin, thick nails, cracks or fissures
- Wounds or blood in calluses
- Toe nail abnormalities, infections
- Footwear — fit and comfort

Feel for

- Temperature and/or swelling on both feet and near wounds
- Joint stiffness both feet

Foot pulses in both feet — should be 2 pulses in each foot

- One on top of foot — Figure 10.90
- One behind medial malleolus (inner ankle) — posterior tibial — Figure 10.91

Sensation using 10g monofilament — loss of protective sensation (ie neuropathy) if monofilament at more than one site cannot be detected

- Sit person with legs out straight, feet level, eyes closed
- Hold filament at 90° to skin, press hard enough to bend filament — Figure 10.92 then remove. Takes about 2 seconds
- Test 3 sites on each foot with filament (Figure 10.93) avoiding hard skin (callous) and wounds
- Ask if they can feel touch, and which foot you are touching



Figure 10.90

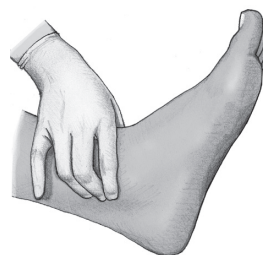


Figure 10.91

Foot management

- All anomalies — **medical consult**
- If person can't feel monofilament —
 - Record area of nerve damage (peripheral neuropathy)
 - Remind person they need to check and feel their feet every day
- Use nail clippers and file to reduce long, thick toenails
- Debride (remove thick hard skin) with scalpel or nail file to relieve pressure, prevent ulcers forming
- Calluses occurring over/under a joint or bony prominence need offloading — podiatry consult

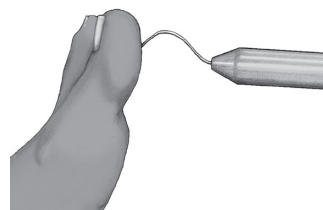


Figure 10.92



Figure 10.93

Wounds

Painless wounds are sign of peripheral neuropathy. Painful or traumatic wounds may be infected or ischaemic (have reduced blood flow)

- Probe wounds with sterile blunt end probe to check whether bone involved
- Wound care — regular inspection, debridement and dressings — see Wound dressings

- Give **antibiotics** as indicated — see Injuries — soft tissue (STM)
- Offload pressure as indicated — podiatry consult
- **Medical consult** — ensure good chronic disease management
- Podiatry consult
- X-ray referral if suspected bony involvement and/or chronic wounds

Follow-up

- People with **high risk foot** need
 - Management plan
 - To be taught daily foot care
 - 3 monthly foot checks
- People with feet at **low risk** (especially if new diagnosis of diabetes) need
 - To be taught daily foot care
 - Yearly foot checks

Daily foot care

Attention

- Talk about and show people as part of routine health checks
- Monitor foot care practices at every opportunity
- Daily foot care needs to be done **daily**
- Take care not to injure skin
 - **Do not** use sharp instruments (eg scissors, razor blades, graters)
- Advise to come to clinic if any wounds on feet
- Encourage wearing comfortable, soft-soled shoes to cushion and protect feet

What you need

- Soap
- Clean cloth
- Bucket
- Non-abrasive kitchen scourer
- Clean towel
- Simple moisturiser
- Nail clippers, single use best
- Single use nail file
- Simple dressings
- Clean socks and comfortable, soft-soled shoes

What you do

Show person how to

- Wash feet well with soap and cloth — Figure 10.94
 - Safer to do this seated with feet in bucket, not in shower
- Use scourer with soap and water to reduce thick skin
 - **Do not** use sharp instruments
- Gently dry all skin surfaces with towel — Figure 10.95
- Look at and feel both feet all over including between toes. Check for blisters, cracks, injuries, changes in skin colour, temperature, texture — Figure 10.96
- Rub moisturiser into dry skin
- Trim toenails straight across or follow natural curve — Figure 10.97
 - **Do not** cut down sides
- Use file to smooth edges, lessen thickness of nail
- Clean and cover small skin sores (blisters, scratches, cracks) with simple dressing to keep dirt out. If sores get smelly or sticky (infected) — go to clinic straight away



Figure 10.94



Figure 10.95

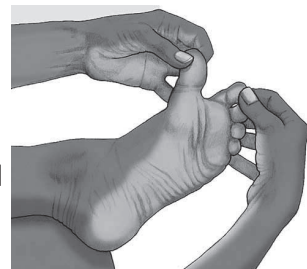


Figure 10.96



Figure 10.97

Tell person

- To care for their feet they need to
 - Do foot care every day
 - Have feet checked regularly by health team
 - Control diabetes — keep as active as possible, eat healthy food, take their medicines
- Protect feet by wearing socks and shoes. Thongs better than bare feet
 - Shake rubbish (eg sand, seeds, stones) out of shoes before putting on

Supporting resources

- Multidisciplinary high risk foot team — Alice Springs and Darwin Hospitals
- International Working Group for Diabetic Foot guidelines

11. General Topics

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Disability

People with a disability can get better or worse over time. Help is best when given early — but it is never too late to start

- If you suspect a child has a disability — do age-appropriate developmental assessment

Problems can include

- Communication, getting on with others
- Mobility, looking after themselves
- Home, school, work, community activities
- ‘Shame’, depression

Accessing Assistance

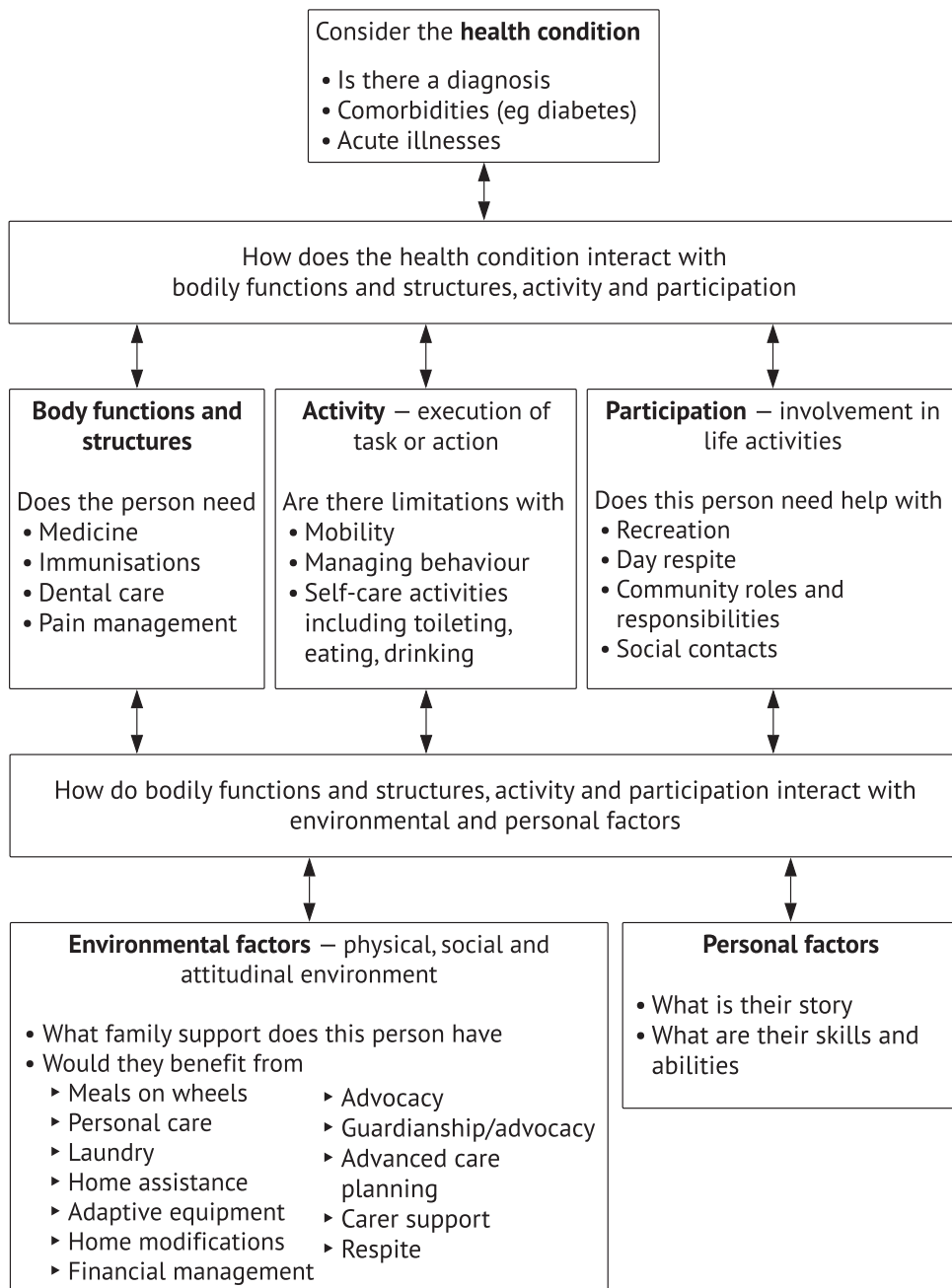
- Most people with disabilities in remote communities will be eligible for individualised funding through the NDIS
- Further support can be obtained from Community Connectors, NDIS coordinators for regional councils, Disability Advocacy Services and specialist disability services (eg mental health, Autism Australia)

Do

- Check file notes for previous management plan and specialist letters
- Encourage person to bring family member, friend, carer with them to clinic
 - Consent may be needed from parent, guardian, adult guardian
- Refer to multiprofessional team as needed for treatment or advice — OT, physio, speech therapist, social worker, psychologist, rehabilitation services, disability liaison officer, paediatrician, dietician, mental health team.
 - Consider telehealth
- Develop management plan — include issues in Flowchart 11.1
 - Consider local conditions, services and support available
 - Include whether the person is an NDIS participant, if so — record who the Coordinator of Supports (COS) is and any other authorised service providers (eg OT, physio, etc)
 - Goals — find out what person would like to work on, who can help. Activities will change as person gets better or worse
 - Support person to do as much as they can for themselves
- Arrange more than 1 appointment if visiting regional centre
- If returning from hospital, rehabilitation unit, respite — start discharge planning early with family meeting and updated management plan

Flowchart 11.1 Developing a community-based management plan for person with disability or older person living in Indigenous community

Identify the key worker/organisation



Supporting resources

- National Disability Insurance Scheme website

Palliative care

- Palliative care in the remote setting is delivered by primary health care providers, community organisations, and family
- Palliative care team (telehealth) can support a person to die on country
- Early care planning important — do not delay palliative care input because the person is still pursuing disease directed treatment

Communication and planning

Family meetings important. Consider

- Cultural advice from ATSIHPs — any taboos around death
- Is interpreter needed
- Are the right people involved — key family members or decision makers
- What do person and family want to know. Allow enough time to tell whole story, family may not fully understand diagnosis, past treatment
- Tell person and family about changes and what to expect, especially toward the end — person will get sicker, condition can change very quickly

Plan ahead

- Advance Care Plan or Advance Health Directive records person's decisions about where they want to die/finish up, their care and treatment — what they do or don't want
- Many very sick people don't want lots of tests or extra trips to hospital — only do if needed to make decisions about care and treatment
- Find out what the hospital plan is by checking with palliative care team/specialist and talk to the family about what treatment the hospital can do now
 - ▶ Sometimes when patients are very sick there is no more treatment that hospital can do
- Coordinated primary and specialist care, dedicated family carers, home care supports, medicines and equipment (local delivery options)
- A plan to get home again if they are in hospital
- If they want to die/finish up on country, put in plan that they should not go back to hospital once they get very sick. Talking about this with family ahead of time is important so everyone knows
 - ▶ Putting an alert in electronic database is good for the retrieval doctors to understand what the person wants, if they get sicker. They can change their mind — will need to tell hospital when this happens
- Needs of carer/s — respite, appropriate Centrelink income

Review management plans often, change as needed

Whole person care

- **Spiritual**
 - Cultural and religious needs
- **Social**
 - Respite options. Supports for person, family, community
 - Housing and equipment needs. Referral to OT for modifications and aids
 - Centrelink, superannuation entitlements, wills — do paperwork early while person has capacity
 - If not culturally appropriate for person to die at home other shelter will be needed — talk with ATSIHP, family elder
- **Emotional/Psychological**
 - Allow time and space to talk to person and family about worries
 - Deal with problems identified — may not be what you think problems are
- **Physical**
 - Ask about symptoms — may include pain, nausea, trouble breathing, sleeping problems, fatigue, bowel problems
 - To understand a person's performance state and prognosis, ask — is the person losing a lot of weight, are they spending more than half of the day lying down
 - Consider medical and non-medical methods for managing symptoms
 - Non-medicine treatments can help — company, massage, music, listening
 - Involve other health professionals to improve comfort for person and family — traditional healers, physiotherapist for mobility, OT for daily activities, speech pathologist for swallowing, nutritionist for dietary advice
 - Check medicines for side effects or interactions, if still needed
 - Only give medicines most important for palliative care

Pain management

- Assess pain by asking how bad it is, how they look, how they move around, what they can or can't do
- Chronic pain needs regular medicines at same time each day, and extra for when pain breaks through usual pain control. Palliative care team will advise
- Many people are scared of strong pain medicines. It is important to reassure them that these medicines are safe and can help sick people to do the things that are important to them

- Information for carer/family
 - Record what medicine person takes daily and how well it helps
 - Need to know how to use both regular and rescue/breakthrough pain medicines
 - How to accurately measure liquid medicines
 - Keep strong medicine safe in home, out of reach of children (eg locked tucker box)

Medicines

- Don't use repeated IM injections — they hurt
- Put in butterfly needle or subcut cannula, preferably in upper part of arm. Can be used for injections and continuous medicines with syringe and battery-driven pump
- Check that all medicines can be mixed together in same syringe before administration

Pain relief principles

- Palliative care is associated with many different symptoms (eg respiratory, gastrointestinal, psychological etc)
- May start with simple medicines (eg paracetamol)
- Talk to palliative care team about dose for stronger pain medicines
 - Give regular **short-acting opioids** (eg 4 hourly morphine mixture) and extra 'rescue' doses for 'breakthrough' pain for 1–2 days to work out total amount of pain relief needed
 - Amount of pain relief is converted to equivalent doses of **long-acting opioids** (oral or patch)
- Always have extra short-acting rescue medicine available for breakthrough pain (eg morphine mixture or oxycodone tablets)
 - If person needs more than 3 times a day — review doses of regular medicines
- Syringe Pump may be needed for medicines at end of life or if medicines for other symptoms are added
- Pain medicine can cause constipation — always give regular bowel medicines (eg docusate and senna)

Medicines for last days of life care

- **Palliative care team/medical consult** about medicines to ease symptoms
— Table 11.1

Table 11.1 Treating common symptoms at the end of life

Symptom	Medicine — as directed
Respiratory secretions	<ul style="list-style-type: none"> • Hyoscine butylbromide • Glycopyrrolate
Breathlessness	<ul style="list-style-type: none"> • Morphine • Benzodiazepine
Confusion or agitation	<ul style="list-style-type: none"> • Haloperidol • Midazolam • Olanzapine • Clonazepam
Nausea or vomiting	<ul style="list-style-type: none"> • Metoclopramide • Haloperidol • Ondansetron
Pain	<ul style="list-style-type: none"> • Morphine • Oxycodone • Buprenorphine

At the end — practical matters

- Important to prepare family — see Loss and grief
- Toward the end person gets weaker, stays in bed, stops eating and drinking, passes less urine. This is a natural process
 - Usually no need to give IV fluids or feed through nasogastric tube.
Reassure the family that this is not needed
- May have same level or increase in pain. If person can't speak — look for physical signs they are in pain, talk with family
- Will get new symptoms (eg confusion, noisy breathing, sleeping more)
- May see or hear deceased relatives — sign that person close to the end
- Physical comfort is important (eg mouth care, pressure care)
- If can't swallow — can give medicines subcut or under tongue
 - If family very distressed — someone else or clinician can give medicines
- Check with doctor and family about plans for death certificate, before person dies
- Consider removal of body — refer to local community protocol

Supporting resources

- Caresearch — end of life resources

Loss and grief

Grief is a normal response to loss. Loss may be a death or other things such as someone going/being away, loss of culture or identity, job or home. Can be a series of large or small losses over time. Can occur before the loss has happened (anticipatory grief)

Indigenous communities have high levels of grief because of the many deaths from illness and injury. Deaths that are sudden, violent, or involve young people often cause worse grief reactions. People at greater risk of grief reactions if there are also other stressors or worries, socially isolated, problems with depression, drug or alcohol misuse

Attention

Be sensitive to local culture. All communities are different. Aboriginal communities may follow some or all of these practices after a death

- Deceased person's name should not be spoken
- Deceased person's house is smoked, painted or vacated
- Special rituals undertaken
- Large numbers of people may gather for grieving and funerals
- Certain relatives of deceased have to be silent
- Relatives of the deceased may live outside the community to mourn. May need special clinic visits
- In some communities 'sorry business' (grieving) involves self-inflicted injury (sorry cuts) and family fighting
- Payback may be part of grieving/healing process

Do not

- **Do not** interfere in 'sorry business' unless asked
- **Do not** tell person to 'get over it', 'get on with it' or things like that

What you do

- Good communication before and after the loss helps with grief
- Explain that grief is normal, but time frame varies for different people and situations
- Allow person to express their grief. Listen, be caring
- Seeing or hearing voice or spirit of deceased person is not evidence of psychosis or mental illness unless family or cultural informant tells you it is outside normal cultural grief experience

- Talk with people involved in sorry business about using clean tools for cutting (eg rocks, razors) to reduce risk of infection
- Get advice from senior Indigenous person, ATSIHP about how to behave in culturally appropriate way
- Respect person's own way of deciding blame and cause of death — even if very different from your own
- Help explain health information if needed (eg from hospital, coronial reports)
- Ask person what would help them feel better (eg smoking the clinic)

Clinical

- Grief may result in physical symptoms including
 - Trouble concentrating
 - Trouble sleeping
 - Not feeling hungry, losing weight
 - Constipation, diarrhoea
 - Sometimes bereaved person feels pain or other symptoms where a deceased relative had their illness
- Symptoms usually settle by themselves, don't need medicine, talking about issue may help
- Sleeping tablets for short period (up to 3–4 nights) may help — **medical consult**
- If person remains very upset for a long time, can't function — may be worse grief reaction *OR* mental health problem — see Mental health assessment (STM) and consider grief counselling

Remember

- Look after yourself — you might also be grieving for person, or memories of an old grief might be restarted for you
- Attending funeral of person you looked after can be a sign of respect, help you to heal
- Talk with someone about your feelings — trusted senior worker, outside counsellor, Bush Support Services — 1800 805 391

Management plan

General principles

- The main focus of a management plan is to
 - Provide health information
 - Assist person to identify realistic and achievable goals so that they can manage their condition with support as needed
 - Individualise plan to person's goals, needs and circumstances
 - Coordinate persons care, support a self-management approach, link person to internal (community) and external (town) services

Management plans include

- Adult health assessment and care plans — Medicare item 715 — see Adult health check (STM)
 - Based on primary prevention strategies — engage with person, screen for risk factors, provide health promotion messages and Brief interventions
- Chronic conditions care plans — Medicare item 721
 - Based on secondary and tertiary prevention strategies to manage conditions and prevent or delay complications
- Team care arrangements — Medicare item 723
 - Coordinate persons care with other health professionals — diabetes educator, OT, physio, speech therapist, social worker, psychologist, rehabilitation services, disability liaison officer, paediatrician, dietitian, mental health team, alcohol and other drugs
- Consider access to non-government and Aboriginal organisations — disability services, respite services, childcare, domestic or family violence support service

Look in file notes

- Previous management plan
- Specialist letters
- Past medical history
- Pathology
- Medications

Ask

- Does the person believe they have a problem
- What person thinks might help
- Are they able to identify goals, what are their priorities

- About person's own resources — family, community, clinic, other services (eg mental health, drug and alcohol)
- About triggers for distress, dysfunction (eg relationship, money problems)

Consider: Are they ready to discuss risk factors, new diagnosis or health care needs — see Stages of change — Brief interventions

Do

- Develop management plan considering
 - Physical, psychological, social and environmental health
 - Carer support
 - Legal considerations
- Provide education about condition
- Set achievable goals, provide brief interventions
- Give relapse prevention strategies
 - Identify early warning signs and plan for what to do
 - Help person and family reduce relapse triggers — smoking, cannabis, volatile substance misuse, stress and worries — see Brief interventions
- Record who (person/service) is responsible for follow-up care and when this should happen

Physical health

- Check person is on appropriate recall registers
 - Adult health check, School-aged and young person's health check (6–17 years) or Child health check (0–5 years)
 - Combined check for chronic conditions
- Regular exercise and healthy diet
- Healthy sleep — cool wash before bed, regular sleep times, no smoking or drinks with caffeine (eg coffee, tea, cola) before bed
- Current treatments (eg prescription medicines, over the counter)
 - Check they are working, monitor side effects
 - Give tips for helping to remember to take medicines — take at same time of day, use dose aid, identify support people

Psychological health

- Supportive therapy
 - Develop supportive caring relationship with person
 - Allow them to talk about their worries/distress
- Problem solving and goal setting
 - Work toward some resolution of their immediate concern
 - Break down the pressures the person is feeling — address each one, start with ones that are easily resolved
 - Listen to what person has to say — take them seriously, respect them

- ▶ Give them power over their situation — focus on their strengths
- ▶ Encourage them to find things to do, people who can help
- ▶ Talk about the future
- Consider involving traditional healers. Family will advise and arrange
- Self-help strategies — use family/friends for support and rest, cultural activities (eg hunting, painting, spending time on country, bush medicines)
- Mental status assessment as needed
- Psychotherapy (eg CBT, narrative, interpersonal) — psychologist if needed
- Consider specialised programs if available — anger management, alcohol/drug rehabilitation, problem gambling

Social and environmental health

- Centrelink for benefits
- Employment opportunities — TAFE, school, further training
- Community programs — art centre, school, sport and recreation
- Safe place to sleep, enough food
 - ▶ Community services — housing, meals, laundry, personal care
- Does the person need ACAT (Aged Care Assessment Team) or NDIS referral
- Access to transport
- Identify family support — partner, significant others
- If carer needed
 - ▶ Make sure enough carers to keep person safe
 - ▶ Document what support they can provide (eg housing, food, childcare, time on country)
 - ▶ Record carers' contact details in patient file notes
 - ▶ Consider Centrelink (eg carer, pension), respite

Legal considerations

- Advocacy — Children's Commissioner, Ombudsman, domestic/family violence support service
- Guardianship, power of attorney
- Advance care planning, will, accessing superannuation
- Legal advice

Follow-up

- Follow-up will depend on health care needs and patient's individual needs and goals
- The management plan should outline when and who is responsible for follow-up care

Supporting resources

- National Disability Insurance Scheme website

Brief interventions

Every time a person is at the clinic, talk with them about issues or concerns they have about healthy lifestyle, or other health business. These short chances (as little as a couple of minutes) are ‘brief interventions’

- Brief interventions work — people are more likely to consider changing if health care workers talk with them about their issues and concerns
- Talk about any behaviour (good or bad) that affects health
 - Eating well, being more active
 - Drug use (eg smoking, marijuana, alcohol)
 - Looking after a chronic disease
 - Home problems (eg family violence)
- Person needs to want to change before any steps will be taken. You can't force people to change but you can raise awareness, share information, get person thinking about making changes, and support good choices and attempts to change
- The type of brief intervention provided depends on how ready person is to change
- Have printed material to support what you talked about — they may look at this at home
- If problem is severe — probably need more than a brief intervention, may need specialist services (eg counselling)

Communicating with clients

The way that practitioners communicate with their clients is an important part of brief interventions and helping people change behaviour

- Try to gain the person's trust and establish a relationship. Particularly important when working with pregnant women as this is a very sensitive time
- Conversational approach is best as lecturing and telling people what to do will not help to get the message across
- Important not to judge person — makes it harder to talk with them

Stages of change

Determining stage of change

There are 4 steps to use when doing a brief intervention about any issue

- **Step 1** — Raise issue you want to talk about
- **Step 2** — Ask if they have thought about changing
- **Step 3** — Decide on their stage of change based on what they tell you in step 2 — Table 11.2 — do brief intervention to suit. Record in file notes — stage of change and advice given
- **Step 4** — Next time you see them, ask how they are doing. Reinforce positive changes, do another brief intervention if you think stage of change different

Relapse

- Going back to previous behaviour (relapse) is common
- Help person not to be down on themselves, not to see this as a big failure
- Encourage person to learn from setback and get back to positive behaviour again

Table 11.2 Stages of change and brief interventions to suit — using alcohol as example

Stage of change	Type of brief intervention
Not ready to change OR Not worried	Strategies to try <ul style="list-style-type: none"> • I won't hassle you, but if you want to talk about it, I'm here • Can we talk about making sure you're safe when you drink
Thinking about changing	Strategies to try <ul style="list-style-type: none"> • Talk with person about <ul style="list-style-type: none"> ▶ What they see as good things about drinking ▶ What they see as 'not so good' things about drinking ▶ What happens when they drink, when they don't drink • While they think about it some more, maybe they could try cutting down a bit, or drinking light beer
Ready to change OR Doing it	Strategies to try <ul style="list-style-type: none"> • So you've decided to give up/cut down on alcohol (grog) — can we talk about your ideas <ul style="list-style-type: none"> ▶ Reinforce small steps • Talk about choices, support available <ul style="list-style-type: none"> ▶ Promote local groups (eg quit smoking, walking, exercise) • Help develop a plan. Find out about concerns, give information and any support you can • Invite them to come back
Sticking to it	Strategies to try <ul style="list-style-type: none"> • Ask how they are going. Check file notes for earlier discussions and activities <ul style="list-style-type: none"> ▶ Find out what is going well ▶ How are they avoiding triggers ▶ Talk about benefits of change — congratulate ▶ Offer support, invite them back

FRAMES

FRAMES is a set of 6 elements shown to make brief interventions more effective. FRAMES provides a useful checklist for planning how to do brief interventions better. The elements are

- **Feedback** — provide assessment results to person in positive way
- **Responsibility** — talk about person's responsibility for making changes
- **Advice** — give clear relevant advice about reducing harm, improving health and wellbeing
- **Menu** — work with person to create range of alternatives, options
- **Empathy** — use empathy as a counselling style
- **Support self-efficacy** — encourage person to be optimistic, and to believe that they can change

Other important ways of supporting change

- **Goal setting** — need to set realistic goals for changing problem behaviour
- **Follow-up** — reinforce behaviour change, make sure strategies are appropriate
- **Timing** — very important. Motivation is there when person thinking about change. People make changes when time is right for them

Getting messages across in other ways

- Display information about healthy lifestyles in clinic. Try to use local language in displays
- Keep and display useful phone numbers and/or addresses for people to find help for themselves
- Consider clinic policies that promote healthy lifestyle — smoke-free areas, dog-free clinics
- Consider example you set for people you work with and in community

5As approach – Ask, Assess, Advise, Assist, Arrange

Table 11.3 5As approach — using smoking as example

Ask	<ul style="list-style-type: none"> • About smoking <ul style="list-style-type: none"> ▶ If smokes or ever smoked — ask how many, how long ▶ If ex-smoker — when they stopped • If smoker — ask about quitting <ul style="list-style-type: none"> ▶ Tried to stop, want to stop, quitting now, thinking about it, previous attempts ▶ Check file notes to see what has been talked about or happened recently so you know what to ask. Record what you ask, are told, offer them materials. • If non-smoker — remind them about passive smoking and the need to keep smoke away from children, adults and pregnant women
Assess	<p>Readiness to quit. See Stages of change — Table 11.2</p> <p>Level of nicotine dependence</p> <p>Ask</p> <ul style="list-style-type: none"> • How long after waking do you have your first cigarette • How many cigarettes do you smoke a day • If tried to quit — did you have cravings or withdrawal symptoms • Smoking within 30 minutes of waking, smoking more than 10 cigarettes a day, history of withdrawal symptoms in previous quit attempts are all markers of nicotine dependence <ul style="list-style-type: none"> ▶ If first cigarette less than 30 minutes after waking — moderate to high dependence ▶ If first cigarette 30 minutes or more after waking — low to moderate dependence
Advise	<ul style="list-style-type: none"> • Give advice in a positive way to all people who smoke <ul style="list-style-type: none"> ▶ “Stopping smoking is the most important thing you can do to protect your health now and in the future — I know it’s hard to quit, but if you want to, I can help” • Give advice that means something to person — talk about how it makes their health problems worse, how it affects their children • Use additional information such as flip charts, pamphlets, other written or pictorial materials • Let person know that giving up smoking may cause cravings or nicotine withdrawal symptoms — but that these usually stop in a couple of weeks <ul style="list-style-type: none"> ▶ Symptoms can include feeling anxious, edgy, restless, down, hungry, trouble concentrating or sleeping ▶ Tell them to drink more water as it helps to lessen withdrawal symptoms • Talk about what symptoms they had last time and then brainstorm ways to address these if they happen again <p>Remember: People often try to quit a few times before stopping for good.</p>
Assist	<ul style="list-style-type: none"> • Offer support and treatment based on readiness to quit and level of nicotine dependence • Offer all people trying to quit <ul style="list-style-type: none"> ▶ Quit plan ▶ Counselling and support (eg Quitline) • If dependent — also offer medicine to help quit <ul style="list-style-type: none"> ▶ Nicotine replacement therapy (NRT) ▶ Urge reduction medicines (eg varenicline)
Arrange follow-up	<ul style="list-style-type: none"> • Congratulate and be positive about decision to quit, remind them of good things about not smoking • Review progress, problems, medicine use, and encourage to them continue to be smoke free • Talk about strategies to deal with situations where there would be pressure to smoke • If they do have a cigarette, don’t treat it as a failure. Talk about reasons and what they can learn from it. Encourage them to keep trying

Healthy lifestyle choices

Healthy food choices

Ask

- How much fruit and vegetables person eats each day
- How often person buys take-away food
- How much soft drink person has in a day
- How often person has bush tucker
- Does person know how to read labels on packaged food — dietitian can help
- About family and social factors that influence food choices

Do

Assess

- Home environment and financial concerns
- Access to healthy food and recreational facilities

Encourage people to

- Think about portion size — choose smaller serve (of soft drink etc)
- Eat a variety of foods each day with lots of vegetables, lean protein, healthy grains and make sure foods on the plate are as colourful as possible
- Eat more bush foods and locally grown food
 - ▶ Plant and animal bush foods are fresh and have plenty of nutrients
 - ▶ Most are low in fat, salt and sugar
 - ▶ Fruit and vegetables grown in the community are often cheaper, fresher
- Eat fruit and lots of different types and colours of vegetables every day.
Eat with lunch and dinner
- Eat some wholegrain and wholemeal breads, cereals, rice, pasta with every meal
- Choose water when thirsty

Eat less fatty food and fried food

- Eating too much fatty or fried food can make people put on too much weight, increases risk of diseases like diabetes, heart disease
- If buying take away food — choose salad, sandwich/roll, meat and vegetable dish
- Eat more lean meat and bush foods
- Cut all fat off meat before cooking, take skin off chicken

- Eat up to 2–3 serves of fish a week. Use fresh or canned in water
- Use canola or olive oil, polyunsaturated/monounsaturated oils or margarine. These are better fats, but still fats — only use small amounts

Eat and drink less sugar

- Try not to add sugar to tea and cereal. Don't add to Milo
- A lot of sugar is hidden in foods and drinks
- Too much sugar can cause tooth decay, weight gain

Eat less salt and salty foods

- Try not to add salt to your food
- Avoid foods with lots of salt added — tinned meats, sausages, hams, sauces, gravies, pies, sausage rolls, crisps, instant noodles

Follow-up

- **Refer** to dietitian
- Regularly assess goals and give nutrition education

Regular physical activity

Ask

- How often person exercises or is physically active, and for how long — including strength based activities
- What sort of physical activity person enjoys. How can they do it more often
- Who person could exercise/be active with on a regular basis
- What person would like to achieve and set realistic goals
- Consider a range of social and contextual factors that may influence an individual's level of physical activity

Do

Explain

- **Doing any physical activity is better than doing none**
 - If not doing anything now — start by doing a little bit, build up over time to recommended amount
- Be active on **most, preferably all, days** to reduce risk of diabetes, stroke, heart disease and some cancers. Can also help with emotional wellbeing
 - To reduce risk of diabetes, heart disease or stroke — do at least **30–60 minutes** of moderate activity (like walking) **5 days a week**
 - “That’s like walking to (*name a place in community*) and back”
- Also do some activity to **keep your muscles strong at least twice a week** (eg weights, push-ups)

- Lots of ways to keep physically active — walking, dancing, hunting, gardening, swimming, cleaning
- **Sitting down** for a long time (eg for painting, storytelling, playing cards, watching TV) can lead to increased risk of diabetes and other diseases
 - Break up long periods of sitting as often as possible
 - Stand up and walk around at least every 20 minutes
- **Pregnant women** should be encouraged to be active
 - To improve muscular strength and cardiovascular function
 - Reduce rates of hypertension and pre-eclampsia
 - Reduce pelvic and back pain, gestational weight gain, stress and depression, and delivery-related complications

Set achievable goals with person for more daily physical activity, consider

- Using an action plan, review at next health check
- Cognitive behavioural support and follow-up
- Additional social support (eg buddy system, involvement in a group activity)
- Brief discussion to decide on reasonable, attainable goals, and a follow-up consultation
- Review options for community sports and support (eg buddy system, contracts for exercise, group activities)

Healthy weight

- Advise people with healthy weight to avoid weight gain by
 - Staying active — aim to exercise at moderate intensity for about 1 hour a day
 - Choose amounts of nutritious food and drinks to meet their energy needs

Losing weight/overweight/obese

- For overweight or obese adults, even a small weight loss (3–5kg or 5–10% of body weight) can have health benefits
- Refer overweight/obese adults with a chronic disease to visiting dietitian to help with nutrition information and develop a weight management plan
 - Set realistic targets for weight loss — if target too hard to reach the person may not try
 - Weight loss can be quite slow — 0.5kg/week is good progress. Even stopping more weight gain is a step in the right direction
 - Overweight pregnant women should exercise and eat healthy foods but not try to lose weight until after the baby is born
- The best way to lose weight is to reduce energy intake **and** exercise more. Discuss a person's readiness for behavioural change by talking

about the person's interest and confidence in making changes, as well as the benefits and difficulties of weight management

- Advise to
 - Cut back on food and drinks that have no nutrients (eg soft drinks) or high energy foods (eg deep fried foods)
 - Start some moderate intensity exercise (eg walking). Progressively increase to about 1 hour a day, at least five days a week
 - Sit less
- **Remember:** People often try to lose weight a few times before changing their behaviours

Ask, Assess, Advise, Assist, Arrange (5A's approach)

Using diet and exercise as example

Ask

- About diet, exercise and changes in weight, previous diets
- How often person exercises or is physically active, and for how long including strength based activities
- What sort of physical activity person enjoys. How can they do it more often
- Who person could exercise/be active with on a regular basis
- About what person would like to achieve and set realistic goals
- Consider a range of social and contextual factors that may influence an individual's level of diet and physical activity

Assess

- Readiness to change diet and exercise — see Stages of change
- Degree of overweight/obesity and associated risks and other comorbidities

Advise

- Give advice in a positive way to all people who need to improve their diet and exercise
- Reducing at least 5% of body weight is one of the most important things a person can do to protect their health now and in the future
- Give advice that means something to person — talk about how it makes their health problems worse, have more energy to play with kids and grandkids
- Use additional information such as flip charts, pamphlets, other written or pictorial materials

Assist

- Offer support and treatment based on readiness to change and comorbidities
- Diet and exercise plan
- Counselling and support (eg dietitian)

Arrange follow-up

- Congratulate and be positive about decision to reduce weight, remind them of good things about improving their diet and increasing exercise
- Review progress, problems, encourage to them continue to improve their diet and exercise more
- Encourage them to keep trying

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Mnemonics

Mnemonic	Meaning
5As (brief interventions)	A sk, A ssess, A dvice, A ssist, A rrange
A M P L E (assessing trauma)	A llergies, M edicines or current illness, P ast history, L ast time they ate or drank, E vent – what happened to cause the injuries
A V P U (assessing trauma)	A lert, V oice, P ain, U nresponsive
B U R P (intubation)	B ackward, U pward, R ightward Pressure
C A R E (at accident sites)	C autions, C arry, C are, A nimals, R oad traffic management, E nvironment
De M I S T (assessing trauma)	D escription of incident, M echanism of injury, I njuries sustained, S igns and symptoms, T reatment so far
DRS ABC (life support)	D anger, R esponse, S end for help, A irway, B reathing, C irculation
DRS ABC DE (assessing trauma)	D anger, R esponse, S end for help, A irway, B reathing, C irculation, D isability, E xpose and E xamine
FRAMES (brief interventions)	F eedback, R esponsibility, A dvice, M enu, E mpathy, S upport self-efficacy
H A R M (avoid for 48 hours) (soft tissue injuries)	H eat, A lcohol/ A spirin/ A nti-inflammatories, R unning/strong exercise, M assage
HEADSS (interview guide for young people)	H ome, E ducation/ E mployment/ E ating/ E xercise, A ctivities & peers, D rugs, S exuality/ S uicide/ S afety/ S trengths/ S pirituality
I S B A R (phone consultation)	I dentify, S ituation, B ackground, A ssessment, R equest
M E T H A N E (to help remember important details of an incident)	M ajor incident, E xact location, T ype of incident, H azards, A ccess, N umber of casualties, E mergency services
O L D C A R T S (presenting complaint — history taking, skin examination)	O nsset, L ocation, D uration, C haracteristics, A ggravating factors, R elieving factors, T reatments, S igns and S ymptoms
Ps (compartment syndrome)	P ain gets worse, P assive movements, P aresthesia and P rogressive P aralysis, P oor circulation, loss of P eripheral P ulses
P Q R S T (assessing trauma)	P rovoking/ P alliating factors, Q uality, R egion and R adiation, S everity, T iming
R I C E (soft tissue injuries)	R est, I ce, C ompression, E levation (use in first 48 hours)
S N A P E (current health status)	S moking, N utrition, A lcohol and drugs, P hysical activity, E motional wellbeing
S O A P	S ubjective, O bjective, A ssessment, and P lan
S O D A - F (writing in notes)	S tory of presenting problem, O bservations and clinical examination, D iagnosis, A ction/management plan, F ollow-up

Abbreviations

°	degree
%	percent
ABC	airway, breathing, circulation
ACAT	aged care assessment team
ACBT	active cycle of breathing technique
ACR	albumin creatinine ratio
ACTH	adrenocorticotrophic hormone
AFB	acid fast bacilli
AHPRA	Australian Health Practitioner Regulation Authority
AIMhi	Australian Integrated Mental Health Initiative
ALS	advanced life support
AMH	Australian Medicines Handbook
APTT	activated partial thromboplastin time
ATSIHP	Aboriginal and Torres Strait Islander Health Practitioner
AV	arteriovenous
BCG	bacille Calmette–Guérin (vaccine for tuberculosis)
BGL	blood glucose level
BIG	bone injection gun
BLS	basic life support
BMI	body mass index
BP	blood pressure
BV	bacterial vaginosis
BVM	bag-valve-mask
Ca	calcium
C	centigrade
CAA	Civil Aviation Authority
CAPD	continuous ambulatory peritoneal dialysis
CARPA	Central Australian Rural Practitioners Association
CARPA STM	CARPA Standard Treatment Manual
CASA	Civil Aviation Safety Authority
CB	citizen band
CBT	cognitive behavioural therapy
CDC	Centre for Disease Control
CF	count fingers
CK	creatinine kinase
cm	centimetres
CMV	cytomegalovirus

CO₂	carbon dioxide
COPD	chronic obstructive pulmonary disease
COS	coordinator of supports (NDIS)
CPM	Clinical Procedures Manual
CPR	cardiopulmonary resuscitation
CRP	c-reactive protein
CSOM	chronic suppurative otitis media
CT	computed tomography
CVC	central venous catheter
DAA	dose administration aid
DNA	deoxyribonucleic acid
Dr	doctor
DVT	deep vein thrombosis
EBV	Epstein-Barr virus
ECG	electrocardiogram
EDTA	ethylenediaminetetraacetic acid
eg	exempli gratia – for example
eGFR	estimated glomerular filtration rate
ENT	ear, nose and throat
EPG	electrophoresis
EPIRB	emergency positioning infra-red beacon
ESR	erythrocyte sedimentation rate
ETA	estimated time of arrival
etc	et cetera – and so forth
ETD	estimated time of departure
ETT	endotracheal tube
F	figure
FBC	full blood count
FEV1	forced expiratory volume in 1 second
FG	French gauge (catheter measurement)
FOBT	faecal occult blood test
Fr	French gauge
FVC	forced vital capacity
FVC6	forced vital capacity in 6 seconds
G	gauge
g	gram
GPS	global positioning system
HACC	home and community care
Hb	haemoglobin

HbA1c	glycated haemoglobin
HBsAg	hepatitis B surface antigen
HF	high frequency
HM	hand movement
hr	hour
HRN	hospital record number
Hz	hertz
IATA	International Air Transport Association
ICC	intercostal catheter
id	internal diameter
ID	identification
IGT	impaired glucose tolerance
IM	intramuscular (in the muscle)
INR	international normalised ratio
IO	intraosseous (in the bone)
IP	intraperitoneal
IPP	intermittent positive pressure
IV	intravenous (in the vein)
kg	kilogram
KICA	Kimberly Indigenous Cognitive Assessment
km	kilometres
L	left
L	litre
LA	local anaesthetic
LD	lactate dehydrogenase
LFT	liver function test
LMA	laryngeal mask airway
LP	light perception
LVS	low vaginal swab
m	metres
M&C	microscopy and culture
MBA	multiple biochemical analysis
MC&S	microscopy, culture and sensitivity
MDI	metered dose inhaler
mg	milligram
min	minute
mL	millilitre
mm	millimetre
mmHg	millimetre of mercury

MMS	multimedia messaging service
MMSE	mini mental state examination
MRSA	methicillin-resistant Staphylococcus aureus
MSU	midstream urine
NAAT	nucleic acid amplification test
NDIS	National Disability Insurance Scheme
NGT	nasogastric tube
NLP	no light perception
No.	number
NSAID	non-steroidal anti-inflammatory drug
O₂	oxygen
O₂ sats	oxygen saturation
OCP	ova, cysts, and parasites
OGTT	oral glucose tolerance test
ORS	oral rehydration solutions
OSA	obstructive sleep apnoea
OT	occupational therapist
P	pulse
PBS	Pharmaceutical Benefits Scheme
PCB	polychlorinated biphenyl
PCEHR	personally controlled electronic health record
PCR	polymerase chain reaction
PD	peritoneal dialysis
PE	pulmonary embolus
PEA	pulseless electrical activity
PEP	positive expiratory pressure
pH	potential hydrogen
PH	pinhole
PHC	primary health care
PHU	Public Health Unit
physio	physiotherapist
POC Test	point of care
POP	plaster of Paris
PPE	personal protective equipment
PPT	plasma preparation tube
PSA	prostate specific antigen
PT	prothrombin time
PTH	parathyroid hormone
qid	quarter in die – 4 times a day

R	right
RAN	remote area nurse
REWS	remote early warning score
RFDS	Royal Flying Doctor Service
RHD	rheumatic heart disease
RM	remote midwife
RN	registered nurse
RNA	ribonucleic acid
RPM	revolutions per minute
RR	respiratory rate
RUM	return of unwanted medicines
SARS	severe acute respiratory syndrome
SES	State Emergency Service
SOS	distress signal
SST	serum separated test
STI	sexually transmitted infection
subcut	subcutaneous
T	temperature
TAFE	Technical and Further Education (vocational training)
TB	tuberculosis
TBP	transmission-based precautions
temp	temperature
TFT	thyroid function test
TGA	Therapeutic Goods Administration
TV	television
U/A	urinalysis (with dipstick)
UEC	urea, electrolytes, creatinine
UHF	ultra high frequency
UTI	urinary tract infection
v	volume
VA	visual acuity
VTM	viral transport medium
w	weight
WBC	white blood count
WBM	Women's Business Manual
WHO	World Health Organisation

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