

3 Giving fluids (rehydration)

Dehydration in children.....	80
Putting in nasogastric tube.....	82
Putting in IV cannula and starting a drip	85
Putting in IV butterfly needle	87
Putting in intraosseous needle	89

Dehydration in children

Working out % dehydration for children

- If child has weight (when well) recorded in file notes in last week, then % weight loss is about the same as % dehydration
 - % dehydration = % weight loss = $(\text{recent well weight} - \text{today's weight}) \div (\text{recent well weight}) \times 100$
 - **Example:** Weight last week was 13.5kg and weight now is 12.6kg
 $(13.5 \text{ minus } 12.6) \text{ divided by } 13.5 = 0.067$
 Multiply by 100 to make % — gives 6.7%. Moderate dehydration

Fluid rates for treating dehydration

Table 3.1: Dehydration and fluid rates

Dehydration	Review	Fluid rate	Method
Less than 5% (mild)	<ul style="list-style-type: none"> • 12 hourly • 6 hourly (minimum) if under 6 months • Care for at home. Ask carer to return if lots of diarrhoea, child thirsty or lethargic 	<ul style="list-style-type: none"> • Extra fluids/ORS AND 10ml/kg after diarrhoea • Continue breastfeeding/milk formula/diet • Free access to water 	Oral – spoon, cup, syringe, bottle, iceblock
5–10% (moderate)	<ul style="list-style-type: none"> • Check every 30 minutes, full review of hydration status in 2 hours • If no better – medical consult 	<ul style="list-style-type: none"> • Small frequent doses ORS – 10–20ml/kg/hr • Continue breastfeeding/milk formula/diet 	Oral or NGT
More than 10% (severe)	<ul style="list-style-type: none"> • 10 minutes • Send to hospital 	<ul style="list-style-type: none"> • Bolus of 0.9% normal saline, 20ml/kg as fast as possible • If no better in 10 minutes – 10ml/kg as fast as possible • If no better in 10 minutes – another 10ml/kg as fast as possible • 10ml/kg/hr during evacuation to hospital 	IV or IO

Making up oral rehydration salts (ORS)

Attention

- **Do not** use any fluid other than water when making up ORS solution
- Best to use pre-packed ORS sachets and measuring containers
- **Do not** dilute ready-made ORS
 - Changes make-up of salts and sugars in solution, may not rehydrate well enough
- Only make your own ORS if ready-made or pre-packed not available
 - Important to get **right measurements of salt, sugar and water**. Don't be tempted to think 'more is better'

What you need

- 1L container filled with clean drinking water
- Normal (standard) sized tablespoon
- Normal (standard) sized teaspoon
- Sugar
- Salt

What you do

- Wash your hands
- Add to 1L of water in container
 - 2 level tablespoons of sugar
 - ½ teaspoon of salt
- Mix well with spoon

Putting in nasogastric tube



Used to

- Give fluids to dehydrated child
- Remove air and fluid from stomach after trauma or obstructed bowel
- Give medicines to child

Attention

- In hot weather, cool tube in freezer for 10–15 minutes to make it firm

What you need

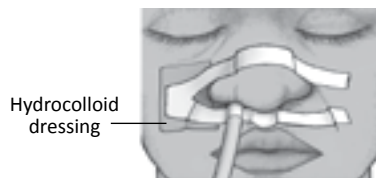
- If child — helper to wrap and hold them
- Correct size nasogastric tube — adult 12–16, child 6–8
- Water-based lubricant
- Local anaesthetic or **lignocaine 2% gel** (for adults)
- Small strip of hydrocolloid dressing, eg *Duoderm*
- Cloth tape
- Pencil torch
- Blue litmus paper (good colour, not faded)
- Stethoscope
- 20ml syringe
- Vomit bowl (if person awake)
- Marking pen
- Sticky tape
- Drainage bag, if needed

What you do

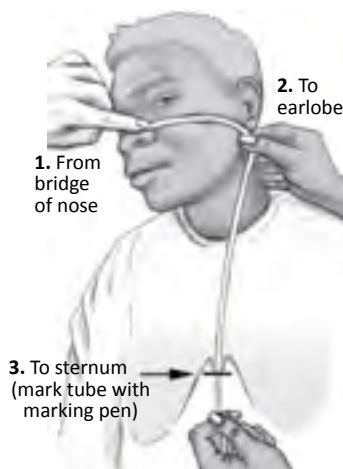
- Stick small strip of hydrocolloid dressing on cheek on same side of nose as tube is going — F 3.1
- Cut cloth tapes long enough to tie around person's head plus a bit extra
- Cut strip of sticky tape long enough to go around tube and stick to person's nose and to hydrocolloid dressing on cheek — F 3.1

Measure length of nasogastric tube needed

- **For adults**
 - Hold tube upside down. Measure from bridge of nose, to earlobe, to bottom of breast bone (sternum). Mark tube with marking pen — F 3.2



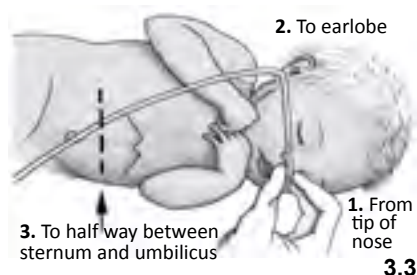
3.1



3.2

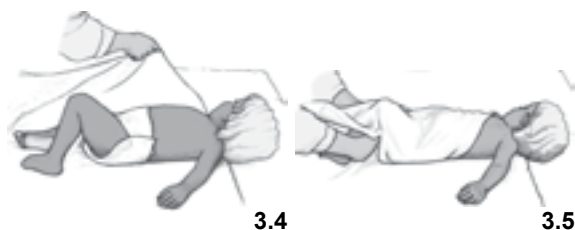
- **For infants and children**

- Hold tube upside down. Measure from tip of nose, to earlobe, to half way between bottom of breast bone (sternum) and umbilicus. Mark tube with marking pen — F 3.3



- **Prepare child**

- Wrap child as shown — F 3.4 – F 3.7
- If child restless — put on bandage mittens, so when you unwrap them, they don't pull tube straight out



- **Position head**

- Infants — bend head forward a little
- Adults — keep head straight or tilted back slightly



- **Put tube in**

- Attach 20ml syringe to end of tube
 - Can put small piece of blue litmus paper in syringe before attaching
- Lubricate tip of nasogastric tube or wet under tap
- Tell person it is normal to feel urge to gag, reassure them
- Keeping tube in straight line, gently push it back through chosen nostril — F 3.8, F 3.9
- Feed tube down back of throat, into food pipe (oesophagus) until pen mark reaches front of nose
 - If person awake — ask to swallow hard
- If person seems to be choking — take tube out straight away. Calm person/carer, 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

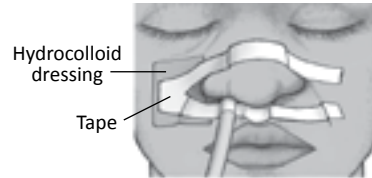


Check tube in stomach

- Pull back (aspirate) small amount of fluid with 20ml syringe. Check fluid acidity with blue litmus paper, turns pink/red if tube in right place
- If you can't pull back fluid for testing
 - Fill syringe with air, connect to tube
 - Put stethoscope just below breast bone (over stomach), push in air and **listen for 'whoosh' and/or bubbling sound**
- If you can't aspirate fluid or hear sound of air in stomach — pull tube out and try again

Now

- Plug end of nasogastric tube with stopper
- If tube in right place — tape properly to hydrocolloid dressing — F 3.10
- If still not secure — leave cloth tape in place and/or use more sticky 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



3.10

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) or drip (if fluids needed).

Attention

- **Make sure you are putting needle into vein**, not into artery or nerve
- Can use vein in side of neck (external jugular), but if you go too close to chest you can cause a pneumothorax
- Always lie person down in case they faint
- If person has had mastectomy or 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 — think about IO needle (*p89*)

- Biggest veins usually found
 - On back of hand and side of wrist — F 3.11
 - On inside crease of elbow — F 3.12
 - Just in front of inside ankle bone — F 3.13
 - On inner forearm — common in men
 - In groin (femoral vein) — in emergency only
- Look at, then feel (palpate) and bounce vein. Big (prominent) veins may not be the best
- Lower arm/leg to below level of the heart to help fill veins
- If cold — put hand in bowl of warm (not hot) water for about 5 minutes to help find vein
- If small child — ask helper to squeeze evenly around arm with their hands instead of using tourniquet



3.11



3.12



3.13

What you need

- Helper if possible
- Sterile dressing pack — to use as sterile area
- Bluey
- Tourniquet
- Alcohol swabs
- Sticky tape
- 8cm x 6cm piece of see-through sticky dressing
- Drip stand or somewhere to hang fluid bag, if needed
- Sterile bung or prepared intravenous giving set, short extension and IV fluids
- 10ml **normal saline** in syringe

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

What you do

- If drip needed, write date and time on IV bag sticker with marker
 - Connect IV fluids to line, prime line with fluid, let out any air bubbles
- Choose vein you are going to use, put bluey underneath
- Lay out dressing pack and equipment. Wash hands, put on non-sterile gloves
- Wipe site with alcohol swab and let dry
- Put on tourniquet, ask person to make a fist and hold and then relax *OR* use helper's hands to squeeze child's limb
- Wait for vein to swell
- Carefully loosen plastic cannula from around needle base. May have to twist a little if stuck tight — F 3.14
- Put cannula back in place, making sure metal needle tip can be seen outside plastic cannula
- Pull person's skin down, to hold vein still — F 3.15
- Hold IV cannula with needle bevel facing upwards, at 20–30° angle to skin
 - 20° for small vein, 30° for deep vein
- Lower cannula to nearly level with skin, gently push 6mm into vein. If cannula inserted too deeply — may go right through vein
- Watch for back-flow of blood into cannula, at same time slide cannula up vein another 6mm so right in vein
- Press firmly on skin above plastic cannula. Press with your thumb or use arch made by your thumb and forefinger around limb — F 3.16
- Undo tourniquet **then** take out needle
- Secure cannula with piece of tape
- 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. Run IV fluids as needed
- Put on see-through dressing. Need 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 in vein, not in tissue



3.14



3.15



3.16

Putting in IV butterfly needle



Good for giving one-off doses of IV medicines, taking blood from small children and people with small thin veins, if you can't get IV cannula in.

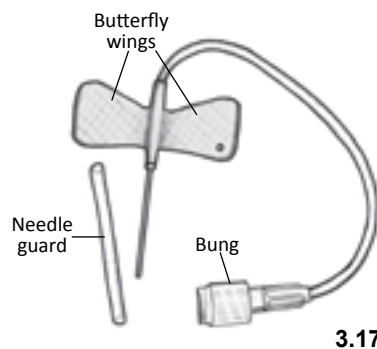
Attention

- **Make sure you put needle into vein**, not into artery or nerve
- Always lie person down in case they faint

- If young child — think about wrapping them first (p83)
- Can use same veins as for IV cannula (p85) and smaller veins in back of hands, feet, ankles, scalp
- If butterfly needle to be left in place — remember that sharp point of needle can puncture vein, especially if person restless. Check site often for swelling and/or redness and pain

What you need

- Helper if you have one
- Butterfly needle with plastic tubing and screw-down bung of right size — F 3.17
- Sterile dressing pack — to use as sterile area
- Bluey
- Tourniquet
- Alcohol swabs
- Sticky tape
- 8cm x 6cm piece of see-through stick-on dressing, if needed
- 10ml syringe of **normal saline** if giving IV medicines or attaching IV infusion
- IV bag sticker and drip stand or somewhere to hang fluid bag, if needed



What you do

- If drip needed, write date and time on IV bag sticker with marker
 - Connect IV fluids to line, prime line with fluid, let out any air bubbles
- Choose IV injection site, put bluey underneath
- Lay out dressing pack and equipment. Wash hands, put on non-sterile gloves
- Wipe site with alcohol swab and let dry
- Put on tourniquet *OR* use helper's hands to squeeze child's limb
- Drape site with sterile towels, wait for vein to swell

- Unscrew bung ¼ 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 — F 3.18
- Angle needle with bevel upwards, parallel to skin, then down into vein — F 3.19
- Blood will flow back into needle and plastic tubing. Tighten bung



3.18

If taking blood

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



3.19

If giving IV medicine or IV infusion

- Flush using 10ml syringe of **normal saline**
- Let blood flow 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 — check site for signs of redness, swelling, pain

Putting in intraosseous needle



Emergency life-saving procedure. Needle put into bone marrow space to give fluids or antibiotics. Used when you can't get IV cannula in.

Types of IO needles/devices

- Several different types of IO needles and devices available
 - Traditional IO needles consisting of trocar and IO needle, eg *Cook, Jamshidi*
 - Spring-loaded IO devices use spring to insert IO needle, eg *FAST1, BIG*
 - Drill IO devices use battery powered drill to insert IO needle, eg *EZ-IO*
- Spring and drill devices make it easier and quicker to insert IO needle
 - Use same sites and basic principles as traditional IO needle

Attention

- The following are basic principles. **Always** check manufacturer's instructions for your device
- Practise regularly with IO device and fresh chicken thighs so you know how to use in an emergency. Keep one needle open for this purpose
- Can look frightening to parent/carer so explain what you need to do, reassure them it is standard procedure
- If small child — can use ordinary large 16–19G injection needle, but easier with proper sized, pre-packaged, sterile IO needle and handle
- If person very unwell — may not need local anaesthetic before procedure. Check before you start
- If IV fluid leaks out of site you tried before — stop with firm pressure over area

Do not put IO needle into broken bone, through burnt or badly infected skin.

What you need

- Helper
- Clean towel
- Bluey
- Sterile dressing pack
- **Povidone-iodine** antiseptic solution
- Sterile extra gauze swabs
- IV line primed with **normal saline**
- 5ml **normal saline** in syringe
- Local anaesthetic, syringe and needles, if needed
- **Lignocaine 1%**
- Device, if using

- IO needle in correct size
 - Adult 12G
 - Child 16G, or wide bore injection needle 16–19G
- Sterile gloves
- Clean polystyrene cup
- Paper tape
- Bandages x 3 and/or other equipment to secure needle

What you do

- Put rolled up towel under knee to hold leg still
- Lay out dressing pack and equipment
- Wash hands and put on sterile gloves
- Clean site and drape with sterile towels
- Put in local anaesthetic, if using
- Insert needle by hand (*below*) or with device (*p91*)
- Aspirate blood sample if needed
- Flush needle to clear any bits of bone or marrow
 - If unconscious — use 5ml **normal saline**
 - If conscious — use **lignocaine 1%** then 5ml **normal saline**
 - 15–30kg — 1ml **lignocaine 1%**
 - Over 30kg — 2ml **lignocaine 1%**
 - May be hard with smaller needle. If flush won't go in — need to start again
- Connect IV line, start drip
- If drip doesn't start running
 - Jiggle needle gently to see if this helps
 - *OR* Use 10ml syringe to inject amount of bolus needed
- When infusion running, carefully check above, below, behind needle site for swelling. Swelling means fluid going into tissues instead of bone marrow space

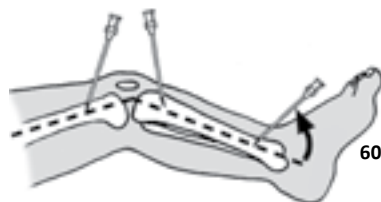


3.20

If inserting by hand

Always angle needle at 60° away from joint — F 3.20.
 Avoids damage to growth plates (epiphyses) in children's bones.

- Choose site — F 3.21
- Use firm, **slow** rotating motion of hand and wrist (like a corkscrew), not direct push downwards. Helps stop you pushing needle right through bone, or bending needle



3.21

- Use non-dominant hand to stabilise limb — F 3.22. Keep bone stable, skin tight
- With handle of needle in palm of your dominant hand, hold shaft of needle about 1cm from point — F 3.22
- Start at 90° (right angle) to bone until needle 'bites', then angle needle at 60° away from joint. **Slowly** and firmly push it in using back and forth screwing motion
- You will feel a 'give' and a 'crunch' when needle goes through bone into marrow. Needle should now stand on its own
- Hold plastic collar firmly while you take out inner metal needle (trocar)
- Secure needle (p92)



3.22



3.23

If using 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
- For child — dial barrel for correct needle length by age
- Locate insertion point and stabilise leg
- Position device on chosen location at 90° (right angle) to bone, hold coloured barrel firmly with non-dominant hand — F 3.23
- Remove safety latch — F 3.23, put somewhere safe
- Position dominant hand with fingers under wings, palm over barrel — F 3.24. Push down gently and firmly, have arm straight to reduce kickback
- Lift device up and off site, then remove trocar by twisting and pulling upward. If tight — use artery forceps
- Stabilise cannula with safety latch — F 3.25, then tape down and secure (p92)



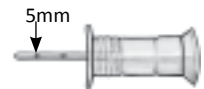
3.24



3.25



3.26



3.27

If using drill

- Attach correct sized needle, remove safety cap — F 3.26
- Locate insertion point and stabilise limb
- Insert needle to 5mm mark — F 3.27, at 90° (right angle) to bone — F 3.28
- Operate drill until you hear the 'pop'



3.28

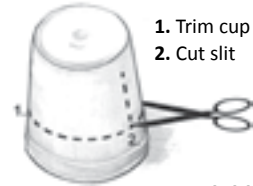
- Hold needle set and remove drill — F 3.29
- Unscrew stylette and remove from catheter
- Secure needle (*below*)



3.29

To secure needle

- Cut bottom off polystyrene cup, then make slit down side— F 3.30
- Put cup around needle and tubing, tape cup together again
- Bandage or tape in a figure of eight around leg and cup — F 3.31
- Rolled bandages can be used either side of cup to give more support, or instead of cup
- Splint leg — F 3.31



1. Trim cup
2. Cut slit

3.30



3.31

Clinical Procedures Manual for remote and rural practice, 3rd ed (2014), updated 30-Sept-2014.
Note: Online versions of the manuals are the most up-to-date.