

INTRAOSSIOUS NEEDLE INSERTION - ED - SCH

PROCEDURE [®]

DOCUMENT SUMMARY/KEY POINTS

- Intraosseous (IO) access is the recommended technique for circulatory access in cardiac arrest.
- In decompensated shock IO access should be established if vascular access is not rapidly achieved (if other attempts at venous access fail, or if they will take longer than ninety seconds to carry out.)
- Absolute contraindications to IO needle insertion are:
 - Fracture of selected bone.
 - Previous unsuccessful attempt at intra-osseous access of same bone within 24 hours.
- Relative contraindications to IO needle insertion are
 - Infection at selected site.
 - Vascular compromise to selected limb.
 - Pelvic fracture.
 - Osteogenesis Imperfecta
- Permanent injury may result from the placement of an IO needle into the growth plate in a child

This document reflects what is currently regarded as safe practice. However, as in any clinical situation, there may be factors which cannot be covered by a single set of guidelines. This document does not replace the need for the application of clinical judgement to each individual presentation.

Approved by:	SCHN Policy, Procedure and Guideline Committee	
Date Effective:	1 st November 2020	Review Period: 3 years
Team Leader:	Nurse Educator	Area/Dept: Emergency Services SCH

CHANGE SUMMARY

- Use of stabiliser dressings with EZ-IO needle sets
- Patients responsive to pain - consider administration of 1% lignocaine (preservative free) IO for pain relief prior to 0.9% sodium chloride flush
- Removal of IO needle guidelines included

READ ACKNOWLEDGEMENT

- All ED clinical staff: nurses and medical officers need to understand and acknowledge this document.

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Indications

- IO access is the recommended technique for circulatory access in cardiac arrest.
- In decompensated shock IO access should be established if vascular access is not rapidly achieved (if other attempts at venous access fail, or if they will take longer than ninety seconds to carry out.)
- The exception is the newborn, where umbilical vein access continues to be the preferred route

Contraindications

Absolute




- Fracture of selected bone.
- Previous unsuccessful attempt at intraosseous access of same bone within last 24hrs.


Relative

- Infection at selected site.
- Vascular compromise to selected limb.
- Pelvic fracture
- Osteogenesis Imperfecta




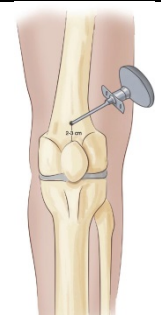
Paediatric Considerations

Intraosseous Cannula Selection


EZ-IO Needle Sets Selection					
Picture	Colour	Needle Length	Gauge	Indication	Comment
	Pink	15mm	15 Gauge	-3-39kg -Broselow tape size	
	Blue	25mm		->40kg -smaller patients with thicker soft tissue	
	Yellow	45mm		->40kg with excessive tissue	Not Kept in SCH PED

Manual IO Needle					
Picture	Colour	Needle Length	Gauge	Indication	Comment
	Grey	30mm	16 Gauge	Paediatric IO insertion	Only size kept in SCH PED

Paediatric Intraosseous Insertion Sites

Paediatric IO Insertion Sites		
<i>Permanent injury may result from the placement of an IO catheter into the growth plate therefore it is always important to maintain a reasonable distance from the growth plate to avoid its inadvertent penetration.</i>		
Site		Description
Proximal Anteromedial Tibia	 <p>Growth Plate</p> <p>3-39Kg</p>	<p>Insertion site is 1 finger width (1-3cm) below the tibial tuberosity on the medial side. The IO needle should be inserted perpendicular to the flat centre aspect of the bone.</p> <p>In small Children if you are unable to locate the tibial tuberosity then the insertions site is 2 finger widths below the patella on the medial side.</p>
	 <p>>40kg</p>	
Distal Anteromedial Tibia		<p>The distal anteromedial tibia is another site because it is a flat piece of bone without muscle over it.</p> <p>The insertion site is located approximately 1-2 finger widths proximal to the most prominent aspect of the medial malleolus.</p>
Distal Femur		<p>Midline approximately 2-3cm above the external condyle with the leg in extension</p>

Procedure & Technique

Manual IO Insertion	EZ-IO Power Driver IO Insertion
Equipment	
<ul style="list-style-type: none"> Manual IO needle Standard IV extension set 2% Chlorhexidine gluconate and 70% isopropyl alcohol swab sticks x2 1 x 5ml leuc lock syringe (for aspiration) 1 x 10ml leuc lock syringe with 0.9% Sodium Chloride for flush 3 way tap Clean non sterile gloves 	<ul style="list-style-type: none"> EZ-IO power driver Select appropriate size EZ-IO needle set - (see above comes with needle, stabiliser dressing, extension connector) 2% Chlorhexidine gluconate and 70% isopropyl alcohol swab sticks x2 1 x 5ml leuc lock syringe (for aspiration) 1x 10ml leuc lock syringe with 0.9% Sodium Chloride for flush 3 way tap Clean non sterile gloves
	
Procedure	
<ul style="list-style-type: none"> Use aseptic no touch technique and universal precautions as indicated Select insertion site Clean/prep skin and allow to dry Select appropriate IO needle (attach EZ-IO needle to power driver- magnetic connection – do not activate trigger) Stabilise limb Remove needle cap Pierce skin with the IO needle at a 90 degree angle until it touches the bone surface, ensure black line on needle is visible (<i>if not a longer length needle is required</i>) 	
<ul style="list-style-type: none"> Insert manual IO needle further with a firm rotatory motion, a “pop” or loss of resistance will be felt as the needle passes through the bone cortex - <i>Does not require excessive force</i> Remove the inner stylet from the needle and discard in sharps bin 	<ul style="list-style-type: none"> Squeeze the trigger until loss of resistance felt and release – <i>does not require excessive force</i> Detach the power driver from the needle Remove stylet and discard in sharps bin Secure with stabiliser dressing over IO cannula hub
Confirm placement by	
<ul style="list-style-type: none"> Loss of resistance during insertion Aspiration of marrow content (5ml syringe) OR Infusion of fluid without extravasation 	
If Responsive to pain on insertion of IO	
<p>Consider administration of 1% lignocaine 10mg/ml (preservative and adrenaline free) <u>over 1-2 minute</u> and <u>allow to dwell for 1 minute</u> prior to 0.9% sodium chloride flush.</p> <p>Initial dose: 0.5mg/kg - Max dose 40mg</p> <p>Repeat dose: 0.25mg/kg</p> <p><i>*This step will require extra equipment (1% lignocaine, 3-5ml leuc lock syringe, drawing up needle, medication labels)</i></p>	
<ul style="list-style-type: none"> Prime extension set with 0.9% Sodium Chloride and attach to cannula hub Tape extension set to limb to prevent pull on the IO needle Flush with 10mls of 0.9% Sodium Chloride (consider smaller volume if small baby) If no extravasation then fluid and/or medication can be given 	

IO Use & Ongoing Cares

- Pressure will generally be required to infuse fluid – manual infusion as opposed to pumps
- The person administering fluids/medications via IO is responsible for observing for signs of extravasation while infusing and if present discontinue use and remove IO
- Observations for signs of extravasation include around the site, the limb and perfusion to limb distal to IO site
- Replace IO needle with an intravenous line at the earliest convenient time
- Do not use IO access for greater than 24 hours
- EZ-IO Stylet and catheter are NOT Magnetic Resonance Imaging (MRI) compatible

Complications

Complications are minimised by replacement of the IO needle with definitive access - intravenous line or central venous line as soon as possible.

Complications include:

- Failure to enter the bone marrow, with extravasation or subperiosteal infusion
- Through and through penetration of the bone
- Osteomyelitis (rare in short term use)
- Damage to growth plate causing permanent damage
- Local infection, skin necrosis, pain, compartment syndrome, fat and bone microemboli have all been reported but are rare

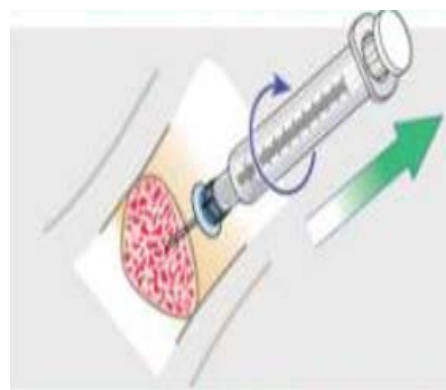
Removal of IO Needle

Remove IO needle if:

- extravasation occurs,
- inserted for 24hrs,
- IV access gained or no longer required

Procedure

- Stabilise patients extremity
- Connect a 10 sterile luer lock syringe to hub of catheter (acts as a handle)
- Rotate catheter clockwise – while pulling straight out (at a 90 degree angle – Do Not rock or bend needle)
- Once removed, immediately dispose of sharp in sharps bin
- Apply pressure to site as required and dressing



- Check site and limb regularly for signs of bleeding, ooze, infection
- Document in clinical notes

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