# INTRAOSSEOUS INFUSION ● 1/2

## INDICATIONS

- Severely ill baby when immediate vascular access needed, a UVC is not feasible and peripheral access not possible (maximum 2 attempts)
- Cardiac arrest
- allows rapid expansion of circulating volume
- gives time to obtain IV access and facilitates procedure by increasing venous filling

## CONTRAINDICATIONS

- Fractures in target bone
- Previous orthopaedic surgery near insertion site
- Previous IO insertion in target bone within the preceding 48 hr
- At insertion site:
- infection
- loss of skin integrity
- inability to locate landmarks or excessive tissue
- Osteogenesis imperfecta (if using a manual Cook needle only)

## EQUIPMENT

- EZ-IO drill and needles (3–39 kg: 15 mm pink) or Cook needle
- <3 kg use 18–21 G butterfly needle
- 5 mL syringe with extension and 3-way tap to aspirate and confirm correct position
- 10 mL sodium chloride 0.9% flush
- 20 mL syringe to administer fluid boluses
- Infusion fluid

***For manual insertion, infiltrate skin with lidocaine 1% (preservative free) up to 3 mg/kg (0.3 mL/kg) if patient responds to pain***

## PROCEDURE

***Never place your/assistant's hand under tibia during insertion to avoid staff injury***

**EZ-IO**

1. Locate landmarks
2. Aseptic non-touch technique: clean site
3. If conscious administer local anaesthetic, lidocaine 1% (preservative free) subcutaneously
4. Choose short pink hub needle and attach to drill magnetically
5. Hold drill and needle at 90° to skin surface and push through skin without drilling, until bone is felt
6. Push drill button and drill continuously and push until there is loss of resistance – there is a palpable give as needle breaches the cortex
7. Remove drill and unscrew trocar
8. If possible aspirate the marrow
9. Attach pre-prepared connection tube
10. Secure needle (with EZ-IO fixator if available)
11. If awake, give lidocaine 1% (preservative free) 0.5 mg/kg (0.05 mL/kg) over 2 min through IO, leave 1 min then flush with sodium chloride 0.9% 2 mL
12. Proceed with required therapy
13. If EZ-IO drill power fails, repeated clockwise-anticlockwise twisting with gentle pressure allows manual insertion

**Cook needle**

1. Locate landmarks
2. Aseptic non-touch technique: clean site
3. If conscious administer local anaesthetic, lidocaine 1% (preservative free)
4. Stabilise the lower limb laterally, insert needle at 90° to skin surface. Direct needle caudally from the epiphyseal plate at an angle of approximately 60° to the long axis of the tibia
5. Advance needle firmly; needle entry into the marrow cavity is accompanied by a loss of resistance, sustained erect posture of the needle without support and free fluid infusion
6. Attach 5 mL syringe and confirm correct position by aspirating marrow (may be omitted in patients with circulatory arrest), take any bloods required
7. Infuse fluid using 20 mL syringe and IV cannula extension set (with Leur-lock ends)

# INTRAOSSEOUS INFUSION ● 2/2

**Preferred site**

| *Avoid fractured bones and limbs with fractures proximal to possible sites* |
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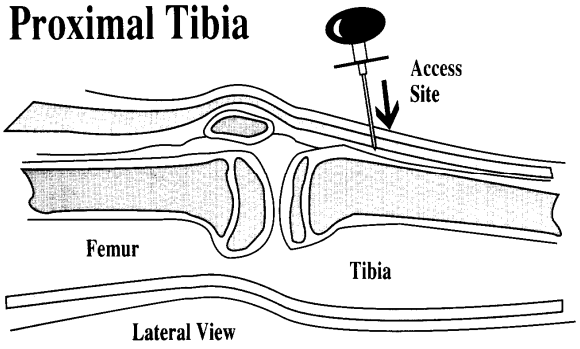
***Proximal tibia***

- Identify anteromedial surface of tibia approximately 1 cm below tibial tuberosity
- Direct needle away from knee at approximately 90° to long axis of tibia

**Access site on proximal tibia – lateral view**




## COMPLICATIONS

**Infrequent (<1%) and include:**

- Bleeding
- Infection
- revert to central or peripheral venous access as soon as possible
- Extravasation
- Subperiosteal infusion
- Bone marrow embolism
- Dislodgement
- Skin necrosis
- Compartment syndrome
- observe and measure limb circumference regularly
- palpate distal pulses and assess perfusion distal to IO access site
- Pain from rapid infusion: give lidocaine 1% (preservative free) 0.5 mg/kg (0.05 mL/kg) over 5 min