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Intraosseous (IO) access involves inserting a needle into the intramedullary space enabling the administration of medications and/or fluids. The intramedullary cavity is composed of vascular rich sinusoids that promote the rapid transportation of medications and/or fluids into the general circulation via the intramedullary venous system.

IO access is an invasive procedure and should only be considered when intravenous access is not available or feasible. Appropriate consideration must be given to its requirements in the pre-hospital setting.

The EZ-Io® is a battery powered intraosseous access device suitable for use in all age groups.

**Indications**
- Emergent access for the administration of drugs and/or fluids when IV access is unavailable.

**Contraindications**
- Known bone pathology including fracture/s of the insertion site limb.
- Whenever possible avoid sites of burn, infection or localised cellulitis.

**Complications**
- Infection
- Drug/fluid extravasation into superficial tissues (e.g. compartment syndrome)
- Fracture and/or epiphyseal plate damage
- Air embolus
1. Identify appropriate insertion site. Options include:

**Adults (＞12 years) Promixal humerus**

a) Place the patient's hand over the abdomen (to abduct the elbow and internally rotate the humerus).

b) Place the ulnar aspect of one hand vertically over the axilla.

c) Place the ulnar aspect of the opposite hand along the midline of the upper arm laterally.

d) Place your thumbs together over the arm to identify the vertical line of insertion.

e) Palpate deeply as you climb up the humerus to the surgical neck. The insertion site is the most prominent aspect of the greater tubercle, 1–2 cm above the surgical neck.
Procedure – Intraosseous – EZ-IO®

**Adults (> 12 years)**

**Promixal tibia**

a) Extend the patient’s leg.
b) The insertion site is approximately 2 cm medial to the tibial tuberosity, or approximately 3 cm below the patella and approximately 2 cm medial, along the flat aspect of the tibia.

c) The insertion site is approximately 1 cm medial to the tibial tuberosity, or just below the patella and slightly medial, along the flat aspect of the patella.

**Distal tibia**

a) Extend the patient’s leg.
b) The insertion site is approximately 3 cm proximal to the most prominent aspect of the medial malleolus, along the flat central aspect of the tibia.

**Paediatric (infant/child) Proximal tibia:**

a) Extend the patient’s leg.
b) Gently pinch the tibia between your fingers to identify the centre of the medial and lateral boarders.

c) The insertion site is approximately 1 cm medial to the tibial tuberosity, or just below the patella and slightly medial, along the flat aspect of the patella.
2. Clean the intended insertion site with a 2% Chlorhexidine/70% Isopropyl Alcohol swab using a ‘back and forth’ motion in two different directions (cross hatch method) for 15 seconds in each direction (total 30 seconds).
3. If clinically appropriate, allow insertion site to completely dry.
4. Prime Easy-Connect® extension set with sodium chloride 0.9%.
5. Attach the EZ-IO® needle to the driver and ensure it is securely seated.
6. Remove and discard the EZ-IO® needle set safety cap.
7. Position driver at insertion site:
   - **Humerous**: 45-degree angle to the anterior plane and posteromedial.
   - **Tibial (distal/proximal)**: 90-degree angle to the centre of the bone.
8. Push the needle set tip through the skin until the tip rests against the bone - ensure 5mm of the catheter is visible.
9. With a steady downward pressure gently squeeze the driver’s trigger to penetrate the bone cortex.
10. Release driver’s trigger and stop insertion process when:
   - a sudden ‘give’ or ‘loss of resistance’ is felt upon entry into the medullary space; or
   - desired depth is obtained.
11. Stabilise hub and remove power driver.
12. Remove stylet and immediately dispose of in a sharps container.
13. Place the EZ-Stabilizer® dressing over the catheter hub.
15. Remove adhesive from the back of the EZ-Stabiliser® dressing and apply to skin.
16. Change to Consider administration of IO lidocaine 1% (lidocaine 1%) for analgesia (refer to **DTP: Lidocaine 1% (lidocaine 1%)**).
17. Confirm by flushing the catheter with sodium chloride 0.9%:
   - **Adults**: 5–10 mL
   - **Paediatrics**: 2.5 mL
18. Administer medications and/or fluids as necessary.
19. Frequently monitor the insertion site for extravasation.

### Additional information
- The potential for exposure to blood and body fluids during this procedure is **HIGH**. All precautions that serve to minimise risk to the clinician and patient are to be applied.
- Clinicians must remain vigilant when administering drugs via this route. It may take longer for the drug to take effect and it is important to avoid a cumulative toxic dose.
- In the event of EZ-IO® driver failure, officers may disconnect the driver and gently manually twist the needle into the medullary space.
- Under **NO** circumstances is the EZ-IO® to be used in the sternum.
- All IO needles should be removed within 24 hours of insertion.\[1\]

### NUMBER OF ATTEMPTS
- This procedure is limited to **one** attempt in each limb.
Additional information

BATTERY INDICATOR ALERTS (when trigger activated)

- **Solid green** – sufficient power
- **Blinking red** – 10% of battery life remaining, order replacement.