

	Policies and Procedures Title: INTRAOSSIOUS INFUSION – ASSISTING WITH INSERTION AND REMOVAL I.D. Number: 1186
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1. PURPOSE

- 1.1 Intraosseous access may be used in emergent situations in which intravenous access is not readily attained and fluid and/or medication administration is essential to the resuscitative effort.

2. POLICY

- 2.1 To provide prompt, effective access to the circulatory system in the severely injured or critically ill child or adult. It may be used in emergent situations in which intravenous access is not readily attained and fluid and/or medication administration is essential to the resuscitative effort.
- 2.2 All fluids and/or medications that can be administered via IV can be administered via the intraosseous (IO) route.
- 2.3 Intraosseous access will not be used if the following contraindications exist: osteogenesis imperfecta, osteogenesis petrosis, osteoporosis, infected burns, cellulitis, crush injury in the same limb, recently fractured bones at insertion site or previous intraosseous attempts in the same bone.
- 2.4 Intraosseous infusion is only used as a temporary measure in life-threatening situations until more conventional vascular access is obtained.
- 2.5 Insertion and removal of intraosseous needle is a physician's, or in designated areas, the certified RN's responsibility.

3. PROCEDURE

3.1 Equipment

Manual Insertion Equipment	Power Drill Method
<ul style="list-style-type: none"> • Disposable intraosseous needle • Under eighteen months – use #18g or smaller IO needle • Over eighteen months – use #18g or larger IO needle • Sterile gloves • 60 ml luer lock syringe • 10 ml luer lock syringe • 6 ml luer lock syringe • Lidocaine 2% ampule • Alcohol prep pad • Chlorhexidine swabs • 2X2 gauze • 1" tape • Ringer's lactate or normal saline IV solutions • Appropriate IV tubing • Large saline lock tubing • 3 way stop-cock • Pressure bag 	<ul style="list-style-type: none"> • Intraosseous needles: <ul style="list-style-type: none"> ○ 15 g 15mm (pink)(for 3 - 39 kg) ○ 15 g 25mm (blue)(for > 40 kg) ○ 15 g 45mm (yellow)(for excess tissue) • Content of IO needle set (which is the IO needle, extension set & wristband) • Pressure bag (if running by gravity and /or during medi-vacs) • Same supplies as Manual Method

3.2 Assemble equipment.

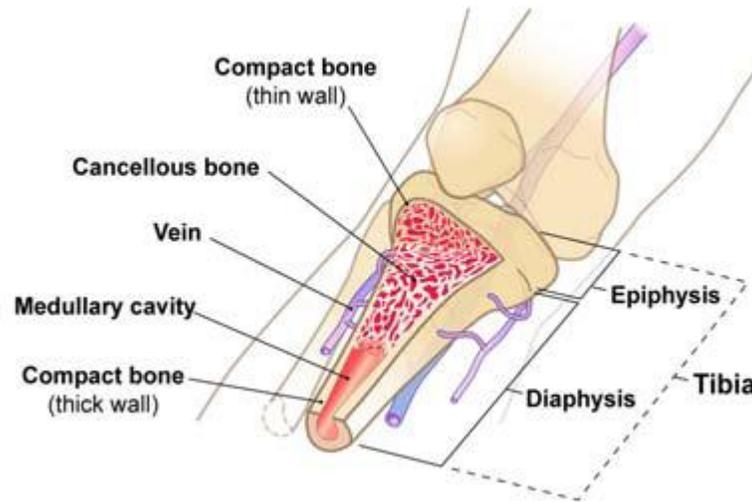
3.3 For adults, draw up 10 ml normal saline in 12 ml syringe. For Pediatrics draw up 5 ml normal saline in a 6 ml syringe. Connect IV extension tubing to a three way stopcock and flush with IV solution. If intraosseous needle is to be inserted into the bone of a conscious patient, obtain a physician's order for Lidocaine 2% to be added to the flush. The appropriate dose of Lidocaine 2% is:

- Adult – Lidocaine 2% 20-40 mg (2-4 ml)
- Pediatric – Lidocaine 2% 0.5mg/kg

3.4 Prepare the chosen site for IO insertion as for intravenous insertion with chlorhexadine swab.

3.5 If child or adult is conscious, assist physician as necessary to infiltrate site with local anesthetic.

- 3.6 Position and secure patient as instructed. Physician or certified Registered Nurse will introduce intraosseous needle using aseptic technique via the manual method or with the use of the power drill device.



EZ-IO Learning Disc – Vidacaire (2007)

- 3.7 Physician or certified Registered Nurse will remove stylet from needle. As stylet is removed blood may flow back freely. Alternatively, proper placement may be confirmed by physician or certified Registered Nurse aspirating bone marrow contents (similar to blood). Assist as required.
- 3.8 Connect the extension set and manually flush the IO needle with 10 ml syringe (for adults) or 6 ml syringe (for pediatrics) of IV fluid mixed with the appropriate dose of Lidocaine 2%; connect intravenous infusion extension set with appropriate solution to the IO needle.
- 3.9 Dress site using sterile technique and secure tubing with tape.
- 3.10 Observe site for extravasation of fluid into the tissue (similar appearance as IV infiltration). Remember to assess the posterior aspect of the leg as well.
- 3.11 Intraosseous infusion should be observed for free flow. IO lines have higher resistance than intravenous lines and, therefore, may require higher infusion pressures. When infusing fluids via gravity, use a pressure bag to maintain flow.
- 3.12 Conventional vascular access should be obtained as soon as possible following successful resuscitation. The manual IO needle should be removed 6-12 hours post-insertion. The powered drill IO should be removed within 24 hours post-insertion.
- 3.13 **Monitor for complications**
- 3.13.1 **Extravasation:** This may result from the improper placement of the intraosseous needle into the surrounding soft tissue which is indicated by swelling and hardness near the site.
- 3.13.2 **Compartment Syndrome:** The power drill method decreases the possibility of extravasation which could cause compartment syndrome or tissue necrosis which can be avoided by frequent reassessment of the site.

- 3.13.3 **Epiphyseal Plate Injury:** There is a danger of epiphyseal plate injury in infants and children. Careful landmarking of the site and proper placement will circumvent this problem. This can be avoided by inserting the needle at a 10 to 20 degree angle caudal to the epiphysis.
- 3.13.4 **Fat Embolism:** Fat embolism related to IO insertion is a rare and extremely infrequent occurrence.
- 3.13.5 **Infection:** Osteomyelitis, cellulitis, subcutaneous abscesses and septicemia are examples of types of infections related to poor aseptic technique at time of insertion and length of time the intraosseous is left in place.
- 3.13.6 **Bone Injury:** Will occur with IO insertion. A bony defect may be noticed on x-ray which will usually heal in 30 to 40 days and is not of any clinical significance. It is recommended that x-rays be carried out as soon as possible on any bone where an IO puncture has occurred.
- 3.13.7 **Extreme Pain:** Although IO insertion looks painful, when inserted with a drill device, it is reported to be no more painful than an insertion of an 18g IV cathlon. There have been reports of increased pain with high-pressure infusions in conscious patients related to stimulation of pressure sensors within the bone. Pain on insertion and infusion can be minimized by injecting a preservative-free lidocaine prior to insertion or high pressure infusion.

3.14 Intraosseous Removal

- 3.14.1 Once reliable alternate venous access is established the intraosseous can be removed.
- 3.14.2 Remove the IV extension set from the IO needle. Attach an empty 6 or 12 ml syringe which will act as a handle to facilitate removal.
- 3.14.3 Maintain a 90 degree angle to the site from this point on.
- 3.14.4 While rotating the syringe and catheter clockwise slowly, gently pull the catheter out.
- 3.14.5 Dispose of the IO needle in the sharps container.
- 3.14.6 Hold direct pressure on the site if bleeding; otherwise cover the site with a bandaid.

3.15 Documentation

- 3.15.1 Insertion: Document date, time, site, type and size of needle, dose of lidocaine if used, name of person performing procedure and any complications encountered on code blue record, nursing transport record or nursing notes as applicable.
- 3.15.2 Removal: It is also required to document the date, time, site condition and any complications related to the removal of the intraosseous device.

4. REFERENCES

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Communicore. (2006). *Emergency vascular access: Technology, economics, and deployment in a multi-dimensional setting.*

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