



Section 14: Appendix 2: Medical Procedures

SECTION 14: INTRAOSSEOUS INFUSION

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ADULT INTRAOSSEOUS INFUSION:

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
<ul style="list-style-type: none"> • Wt. >40 kg • Unable to access peripheral IV 	<ul style="list-style-type: none"> • Altered level of consciousness • Arrhythmias • Burns • Cardiac / respiratory arrest • Dehydration • Head Injury • Hypotension • Seizures • Traumatic Injuries / shock • Other medical conditions when immediate vascular access is required 	<ul style="list-style-type: none"> • Fracture of the tibia or humerus • Previous orthopedic procedures • Pre-existing medical condition • Infection at the insertion • Inability to locate landmarks • Excessive tissue over the insertion site

PROCEDURE: EZ IO Adult Device: (For providers trained in technique)

1. Select site:
2. Tibia (1st choice) medial to the tibial tuberosity on flat plane of tibia.(standard or long bariatric needle)
3. Humerus (2nd choice) upper lateral humeral head, outer aspect. (use the 45 mm bariatric needle)
4. Provide routine medical care.
5. Locate the anatomical site and prep with betadine and / or alcohol.
6. Load the needle onto the driver.
7. Firmly stabilize the leg near (not under) the insertion site.
8. Firmly press the needle against the site at a 90^o angle and operate the driver. Use firm, gentle pressure.
9. As the needle reaches the bone, stop and be sure that the 5 mm marking on the needle is visible; if it is, continue to operate the driver.
10. When a sudden decrease in resistance is felt and the flange of the needle rests against the skin, remove the driver and remove the stylet from the catheter.
11. Do not attempt to aspirate bone marrow. (may clog needle and tubing)
12. Use a syringe to infuse 0.9% normal saline.
13. If no S/S of infiltration are found, attach the IV line and infuse fluids and medications as normal. (IV bag will need to be under pressure)
14. Secure the needle and dress the site.

Consider use of 45 mm length IO needle for bariatric patients or patients with excessive tissue over the insertion site. Use the 45 mm bariatric needle for all humeral head insertions.

PROCEDURE: Adult IO Manual Placement:

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1. Expose the lower leg.
2. Identify the tibial tubercle (bony prominence below the knee cap) on the proximal tibia. The
3. Insertion location will be 1 - 2 cm (2 finger widths) below this and medially.
4. Prep the site as per peripheral IV site.
5. Insert needle at 90 degree angle to the skin surface, approximately one to two finger breadths distal to the tibial tuberosity. With a straight steady push and / or rotary motion, push needle through subcutaneous tissue and bone until a drop or pop is felt.
6. Remove the trocar and attach the IV.
7. Once the needle has reached the bone marrow, saline should be injected via syringe to clear needle.
8. Observe for signs of subcutaneous infiltration.
9. The needle should feel firm in position and stand upright without support.
10. Stabilize and secure the needle.
11. Infusion via this route is the same as venous access without limit to rate of administration, drugs pushed or fluid type infused, pressure infuser may be necessary to facilitate flow.
12. Document the procedure, time, and result (success) on the patient care report (PCR).



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SECTION 14: INTRAOSSEOUS INFUSION-Cont.

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PEDIATRIC INTRAOSSEOUS INFUSION:

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
<ul style="list-style-type: none"> Life threatening illness or injury in a child 6 years of age (72 months) after effective ventilation is established 	<ul style="list-style-type: none"> Unresponsive Cardiopulmonary arrest Decompensated shock This procedure is indicated primarily in children less than 8 years old 	<ul style="list-style-type: none"> A pediatric patient who is conscious or responsive to pain A pediatric patient who is 7 years old or older Gross infection, osteomyelitis, or cellulitis at the intended site (use the other leg if possible) Fracture at or above the intended site (use the other leg if possible) Unsuccessful IO attempt (use the other leg if possible)

PROCEDURE: May use manual IO Device or EZ IO Pediatric Device

- Expose the lower leg.
- Identify the tibial tubercle (bony prominence below the knee cap) on the proximal tibia. The insertion location will be 1-2 cm (2 finger widths) below this and medially.
- Prep the site as per peripheral IV site.
- Attempt to have feet in flexed position. Stabilize leg as needed.
- Needle insertion varies between 70 and 90 degree angle to the skin surface, approximately one to two finger breadths distal to the tibial tuberosity. With a straight steady push and / or rotary motion, push needle through subcutaneous tissue and bone until a drop or pop is felt.
- Remove the trocar and attach the IV.
- Once the needle has reached the bone marrow, saline should be injected via syringe to clear needle
- Observe for signs of subcutaneous infiltration.
- The needle should feel firm in position and stand upright without support.
- Stabilize and secure the needle.
- Infusion via this route is the same as venous access without limit to rate of administration, drugs pushed or fluid type infused, pressure infuser may be necessary to facilitate flow.
- Document the procedure, time, and result on the patient care report (PCR).

KEY POINTS

- An IO can administer any medication or fluid that can be administered by an IV.
- Consider using a three-way stopcock, and a syringe with the IV tubing. Use the “pull-push” method to infuse fluid for small bolus in infants / children.
- A blood pressure cuff or pressure infuser may have to be used to apply pressure to the IV bag to maintain an adequate flow rate.
- An IO may be attempted prior to attempting an IV if the patient is in cardiac arrest or is in decompensated shock and requires immediate access.
- If attempt unsuccessful remove needle and apply pressure to site for 5 minutes.
- Intraosseous infusions of fluids may cause subcutaneous infiltration, osteomyelitis, or subcutaneous infections if not placed properly.