



## Intraosseous Infusion Adult and Pediatric– EZIO

APPROVED: \_\_\_\_\_

EMS Medical Director

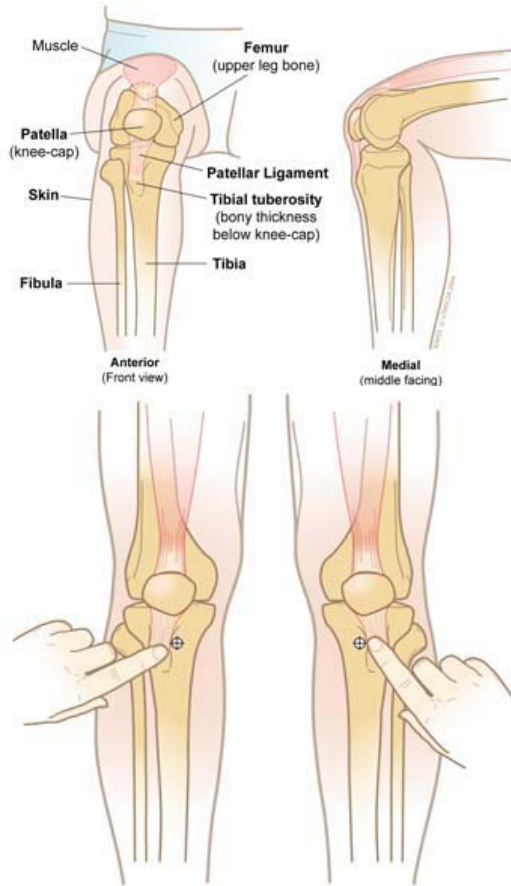
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EMS Administrator

1. Goals/Introduction:
  - 1.1 Intraosseous (IO) infusion provides an effective alternative means of providing fluids and medications for severely ill patients in whom intravenous access is not possible. It should be considered in any unconscious or seriously ill or injured person in whom IV access cannot be established in a timely fashion.
  - 1.2 IO can be considered first line attempt for access in patients in cardiopulmonary arrest or patients in extremis when fluids or medications must be administered immediately.
2. Indications:
  - 2.1 Any ALS patient for whom immediate fluid or medication treatment is indicated and shall have at least one of the following:
    - 2.1.1 Altered mental status
    - 2.1.2 Respiratory compromise
    - 2.1.3 Hemodynamic instability
3. Absolute Contraindications:
  - 3.1 Established IV line or if one can be established in a timely fashion
  - 3.2 A patient who does not require **immediate** fluid or medication therapy. **IO insertion shall not be performed for prophylaxis.**
  - 3.3 Fracture of bone selected for IO infusion
  - 3.4 Inability to identify landmarks for procedure

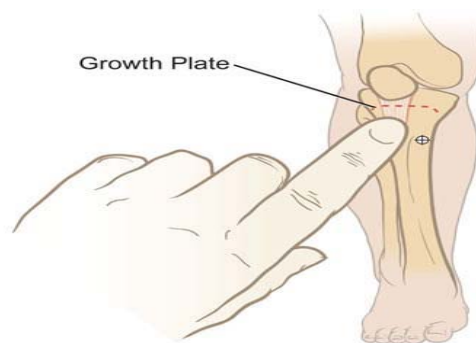
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- 3.5 Known previous orthopedic procedure or preexisting medical disease (such as tumor or significant peripheral vascular disease) of the bone selected for IO infusion
- 3.6 Severe burn or infection at the site of insertion
4. Equipment
  - 4.1 Alcohol and betadine pads/swabs
  - 4.2 EZ-IO® Driver
  - 4.3 EZ-IO AD® (>40 kg) or EZ-IO PD® Needle Set (3-39kg);
  - 4.4 EZ-Connect® or Standard Extension Set
  - 4.5 IV infusion set, flushed and ready to go
  - 4.6 10 cc filled with normal saline for immediate flush
  - 4.7 2% lidocaine (cardiac lidocaine at 100 mg/5 mL)
  - 4.8 2X2's if needed to pad the needle
  - 4.9 pressure bag for infusing fluids in adults
5. Procedure
  - 5.1 Select insertion site:  
Adult proximal tibia: Measure one fingerbreadth medial to the tibial tuberosity, along the flat aspect of the medial tibia

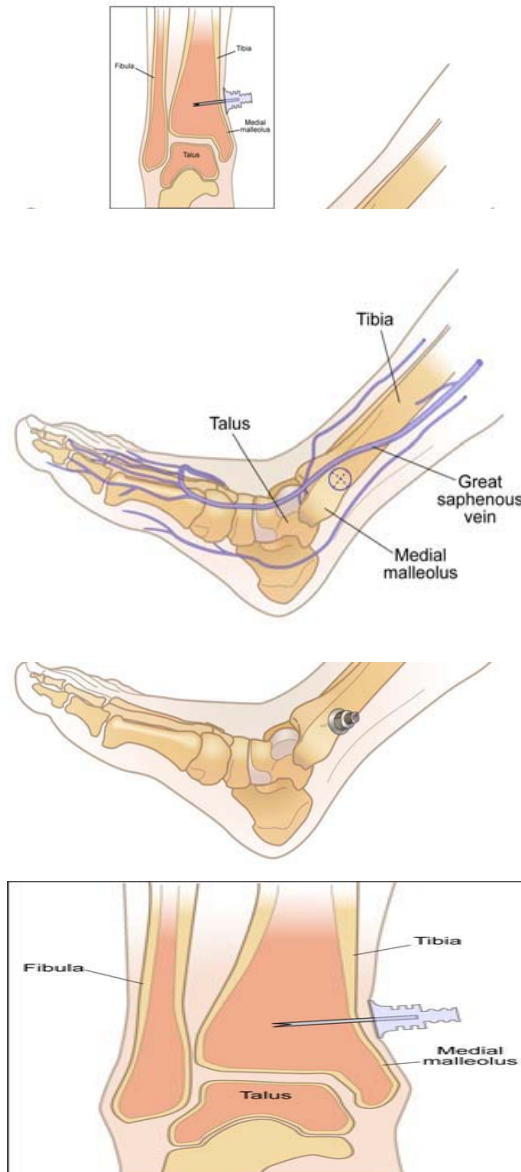


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Pediatric proximal tibia: one finger width distal to tibial tuberosity OR if unable to palpate tibial tuberosity, two finger widths below the patella along the flat aspect of the medial tibia



Adult distal tibia: two finger widths proximal to the medial malleolus and midline on the medial shaft



Pediatric distal tibia: one finger width proximal to the medial malleolus along the flat aspect of the medial distal tibia.



- 5.2 Prepare the skin site with alcohol and/or betadine
- 5.3 Prepare IO driver and needle set and load the needle onto the driver
- 5.4 Hold the IO driver in one hand and stabilize the leg near the insertion site with the opposite hand
- 5.5 Position the driver at the insertion site with the needle at a 90 degree angle to the surface of the bone



- 5.6 Before powering the driver on, insert the needle through the skin. When you feel the needle is hitting resistance from the bone, make sure the 5mm black line is still visible above the skin. Power the driver on while applying minimal pressure. Insert the needle until a change in resistance is noted. Remove the driver from the needle set and the stylet from the catheter. Attach the connection tubing.
- 5.7 For adult patients that respond to painful stimuli, slowly administer 40 mg of lidocaine (2 ml) of 2% lidocaine for cardiac use prior to infusing fluids. This may be titrated as for relief of pain up to a maximum of 100 mg. The initial bolus of lidocaine should be given **prior** to administration of the 10 ml saline flush. Allow the lidocaine to work for 30 – 60 seconds before administering fluids.
- 5.8 For children who respond to pain, slowly administer up to 0.5 mg/kg of lidocaine 2% for cardiac **prior** to administration of the 10 ml

saline flush. Allow the lidocaine to work for 30 – 60 seconds before administering fluids

- 5.9 Use a syringe to rapidly infuse 10 ml of NS – if no infiltration is seen, attach the IV line and infuse fluids and or medications as usual; for adults, the IV bag will need to be under pressure. If the flow through the IO line decreases after initial success consider repeating the flush.
- 5.10 Secure the needle by looping the tubing and taping it to the skin. If there is a gap between the flange and the patient's skin, the needle can be padded with 2/2s as needed to maintain the separation.
- 5.11 Monitor the compartment for signs of infiltration and stop all infusions if infiltration is suspected

## 6. Special Information and Complications

- 6.1 In pediatric and adolescent patients avoid growth plate areas that are present at both ends of the long bones.
- 6.2 If alternatives to IV or IO use of a medication are available, such as administering IM glucagon instead of dextrose for a hypoglycemic diabetic, the less invasive route of administration should be used prior to the EZIO

## 7. Complications:

- 7.1 Embolism
- 7.2 Subcutaneous infiltration
- 7.3 Fracture
- 7.4 Osteomyelitis (bone infection)

## 8. Documentation

- 8.1 Indication for procedure
- 8.2 Date, time, insertion site
- 8.3 IV attempts
- 8.4 IO attempts
- 8.5 IO catheter size
- 8.6 Confirmation of proper placement
- 8.7 Method of securing IO
- 8.8 Fluid or drugs administered
- 8.9 Presence or absence of complications

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**9. Transport Considerations**

- 9.1 Notify continuing EMS providers of the presence of the EZIO prior to moving the patient. Notify the receiving facility of the presence of the EZIO prior to moving to the hospital stretcher.