

EL DORADO COUNTY EMS AGENCY

FIELD PROCEDURES

Effective: July 1, 2015

Reviewed: July 2015, 2017, 2019

Revised: July, 2015

Scope: ALS – Adult/Pediatric



EMS Agency Medical Director

INTRAOSSEROUS INFUSION

PURPOSE:

To establish immediate vascular access in the critically ill or injured adult or pediatric patient. Intraosseous infusion provides rapid access to the circulatory system to provide fluid resuscitation and cardio tonic medications.

INDICATIONS:

Adult and pediatric patients in which vascular access is difficult to obtain in emergent, urgent, or medically necessary cases.

COMPLICATIONS:

- Local infiltration of fluids and/or medications into the subcutaneous tissue from improper needle placement
- Possible fat or bone emboli
- Osteomyelitis may be found when device is left in over 24 hours

CONTRAINDICATIONS:

- Recent fracture of involved bone (fluid may extravasate into SQ tissue)
- Infection at the site selected for insertion
- Excessive tissue at insertion site with the absence of anatomical landmarks
- Previous significant orthopedic procedures in insertion area (prosthetics)
- Previous IO within 24 hours on that extremity
- Compromised extremity

CONSIDERATIONS:

Flow rate: Ensure the administration of a rapid and vigorous 10ml flush with normal saline prior to infusion "**NO FLUSH=NO FLOW**". Repeat syringe bolus (flush) as needed.

Pain: In patients responsive to pain, 2% preservative free lidocaine should be administered for pain before infusing any fluids into the IO.

***Adult dose:** 2 mL (40 mg)

***Pediatric dose:** 0.5 mg/kg).

Lidocaine **MUST** be administered slowly to prevent it from being sent directly into the central circulation. Medication intended to remain in the medullary space as a local anesthetic.

2nd dose: If a second dose is required for pain management it will be half the initial dose at 20 mg and again administered very slowly.

EDCEMS has approved the EZ-IO and the Bone Injection Gun (B.I.G.) devices for use in El Dorado County. Contactors may use either as long as they have received training in their respective choice.

EZ-IO® GUIDELINE:

EQUIPMENT NEEDED:

- EZ-IO® driver
- EZ-IO® needle sets: 15mm (3-39 Kg), 25mm (40 Kg and greater) and 45mm (excessive tissue)
- Chlorahexadine swab/prep
- EZ-Connect® or IV extension tubing extension set
- 10 mL syringe
- Normal saline
- Pressure bag or infusion pump (may use BP cuff @ 300 mmHg)
- EZ-Stabilizer® for pediatric and proximal humeral insertions

PROCEDURE:

1. USE STANDARD PRECAUTIONS.
2. Assemble the needed equipment.
3. Fill syringe with 10 mL normal saline and prime EZ-Connect/extension tubing (leaving syringe attached to EZ-Connect port). If patient is responsive to pain, prime EZ-Connect/extension tubing with 2% lidocaine (40 mg for adults or 0.5 mg/kg for peds). Keep in mind the tubing holds 1cc of fluid.
4. Locate an appropriate insertion site:

A non-traumatized humerus

Adult: Identify the greater tubercle insertion site approximately two finger widths inferior to the coracoid process and the acromion. All humeral insertions on adult patients should be done with the 45mm needle to reduce accidental dislodgement. If you have difficulty locating landmarks use 2nd choice instead.

Pediatric: Same as adult insertion site, but if you have difficulty locating landmarks use 2nd choice instead.

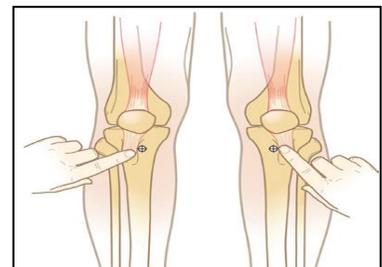


A non-traumatized proximal tibia

Adult: The insertion site is one finger width medial to the tibial tuberosity.

Pediatric: Less than 12 kg or without an identifiable tibial tuberosity: The insertion site is two centimeters distal from the patella and then medial along the flat aspect of the tibia.

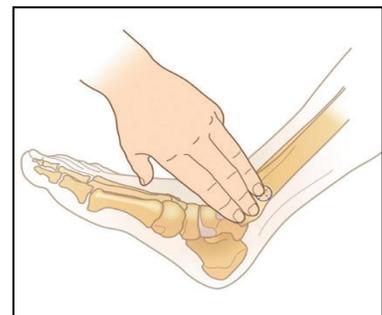
Pediatrics with an identifiable tibial tuberosity: The insertion site is the same as for adults.



A non-traumatized distal tibia

Adult: The insertion site is two centimeters proximal to the medial malleolus and positioned midline on the medial shaft making certain you are at the flat center aspect of the tibia. This can be confirmed by palpating the anterior and posterior borders of the distal tibia and feeling for the flat aspect of the bone.

Pediatric: The insertions site is the same as for adults.



5. Position the patient so that the site is accessible (for humeral insertions – adduct humerus with arm against patients body resting on gurney or backboard. Forearm resting on the abdomen).
6. Prepare the insertion site using aseptic technique. Allow to air dry thoroughly.
7. A “snap” should be felt when the needle is fully seated on the driver. Do not touch the patient or the EZ-IO needle with the hand that touches the driver.
8. Stabilize site and remove needle cap.
9. Position the driver at the insertion site with the needle set at a 90-degree angle to the bone surface. Gently pierce the skin with the needle set and insert EZ-IO needle until it touches the bone. **IMPORTANT:** Keep hand and fingers away from needle set.
10. Penetrate the bone cortex by squeezing driver’s trigger and applying gentle, consistent, steady, downward pressure(allow driver to do the work).

Do not use excessive force: In some patients insertion may take greater than 10 seconds, if the driver sounds like it is slowing down during insertion; reduce pressure on the driver to allow the RPM’s of the needle tip to do the work.

In the unlikely event that the battery on the driver fails paramedics may manually finish inserting the EZ-IO needle set. Grasp the needle set and, rotate arm, while pushing the needle into the intraosseous space. This may take several minutes.

11. Release the driver’s trigger and stop the insertion process when a sudden “give or pop” is felt upon entry into the medullary space or when desired depth is obtained.
12. Remove EZ-IO power driver from needle set while stabilizing the catheter hub and remove stylet from catheter by turning counter-clockwise and immediately dispose of stylet in appropriate biohazard sharps container.

***NEVER** return used stylet or cartridge to the EZ-IO kit.

13. Secure site with EZ-stabilizer and connect primed EZ-connect to exposed luer-lock hub.
14. Confirm placement with a syringe bolus of 10 mL *normal saline.

*If the patient is responsive to pain, the paramedic may consider 2% lidocaine without preservatives for anesthetic effect prior to the 10mL normal saline flush.

15. Assess for potential complications.
16. Disconnect 10 mL syringe from EZ-connect extension set and connect to primed IV tubing and begin infusing utilizing a pressure delivery system.
17. Dress site, secure tubing, and monitor intraosseous site and patient condition.

BONE INJECTION GUN (B.I.G.) GUIDELINE:

EQUIPMENT NEEDED:

- B.I.G. device Adult or Pediatric (newborn to 12 years-old)
- Chlorahexadine swab/prep
- 3 way stopcock
- IV extension tubing extension set
- 10 mL syringe
- Normal saline
- Pressure bag or infusion pump (may use BP cuff @ 300 mmHg)
- Transpore tape

PROCEDURE:

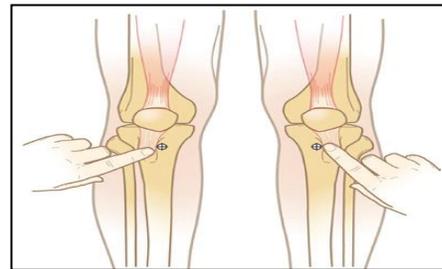
1. USE STANDARD PRECAUTIONS.
2. Assemble the needed equipment.
3. Fill syringe with 10 mL normal saline and prime extension tubing and 3-way stopcock (leaving syringe attached to stopcock port). If patient is conscious, prime tubing with 2% lidocaine (40 mg for adults or 0.5 mg/kg for peds).
4. Locate an appropriate insertion site:

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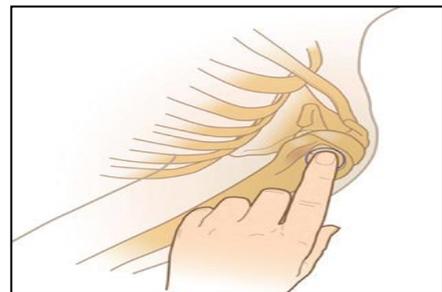
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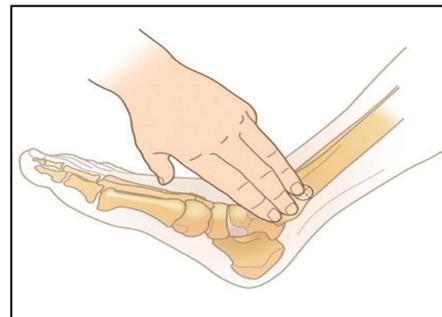
Pediatric: Same as adult insertion site, but if you have difficulty locating landmarks use 3rd choice instead.



A non-traumatized distal tibia

Adult: The insertion site is two centimeters proximal to the medial malleolus and positioned midline on the medial shaft making certain you are at the flat center aspect of the tibia. This can be confirmed by palpating the anterior and posterior borders of the distal tibia and feeling for the flat aspect of the bone.

Pediatric: The insertions site is the same as for adults.



5. Position the patient so that the site is accessible (for humeral insertions – adduct humerus with arm against patients body resting on gurney or backboard. Forearm resting on the abdomen).
6. Prepare the insertion site using aseptic technique.

7. Position the B.I.G. with one hand to the site and pull out the safety latch with the other hand.
8. Trigger the B.I.G. at 90 degrees to the surface.
9. Remove the B.I.G.
10. Pull out the trocar and fix the cannula with the safety latch.
11. Connect the infusion set with a stopcock to a standard IV set with the use of a 100ml saline bag. Adjust flow or inject medications.
12. If lidocaine was given, consider second bolus at half the initial dose (20 mg for adults) for pain relief.
13. Utilize pressure (pressure bag or infusion pump) for continuous intraosseous infusions.
14. Dress site, secure tubing, and monitor intraosseous site and patient condition.

****The non-traumatized humerus is the preferred site for responsive patients.**

INTRAOSSSEOUS LINES WILL NOT BE ESTABLISHED AS PRECAUTIONARY.

All other uses of the intraosseous route require a base station order.

There will be only one attempt per extremity at establishing an intraosseous infusion. No more than two (2) total attempts will be allowed for intraosseous infusion. Scene time will not be delayed for intraosseous infusion attempts. Generally, make one attempt at scene; the second en route. Any deviation from one attempt on scene must be documented as to the reason.