Intraosseous (IO) access is an option only when IV access is unavailable. Once established, IO is as effective in delivering medications and fluids as IV.

Indications:

Intraosseous (IO) access is only for use during cardiac arrest, the hemodynamically unstable critically ill or injured patient, or authorization from MCP. In pediatric cardiac arrest, IO is the preferred route if no IV access has been established.

Contraindications:

-Fracture of the bone at the proposed intraosseous site.
-History of Osteogenesis Imperfecta
-Current or prior infection at proposed intraosseous site.
-Previous intraosseous insertion or joint replacement at the selected site

A. Procedure-Bone Injection gun (BIG)

ALS

1. Prepare equipment:
   a) 12 cc syringe with needle.
   b) BIG Adult (Blue) >12 years or Pediatric (Red) – see below:
   c) Antiseptic prep.

	Proximal Tibia
Infants 0 to 3 years of age	0.5 – 0.7 cm
Pediatrics 3 to 6 years of age	1.0 – 1.5 cm
Pediatrics 6 to 12 years of age	1.5 cm

2. Select site:
   a) The preferred site is the antero-medial surface of the proximal tibia.

PLACEMENT

- Locate the tibial tuberosity and place your finger on the round protrusion of the bone.
- Move your finger 2cm medially
- Move your finger 1cm distally (toward the foot)

- Withdraw 10 mL of fluid from the IV solution.
- Prep the site.
- ***In pediatric (red) applications, adjust the depth gauge on the BIG for the appropriate patient age.***
- Grasp firmly the distal 1/3 of the BIG and apply firm continuous pressure to the injection site.
- Remove the safety device while maintaining firm continuous pressure and squeeze until the BIG discharges.
- Remove the stylette.
- Place the syringe with IV fluid on the BIG needle and infuse fluid (10 mL) then attempt aspiration to confirm proper needle placement.
- Carefully observe for signs of infiltration, especially in the posterior aspect of the leg.
- If the needle is properly placed, there will be little or no resistance when infusing the fluid from the syringe.
- Secure needle with the device provided or tape as practical and possible.
- All fluids and drugs must be administered by syringe bolus or pressure infusion (manual or with a BP cuff). This will be done via the port in standard IV tubing.

b) Secondary sites include:

- The flat area just above the medial malleolus.
- The distal anterior femur midline, 3 cm above the external condyles.

B. Procedure-EZ-IO

ALS

APPROVED SITES:

Proximal Tibia- (Preferred site for adult and pediatric patients)

The proximal tibia insertion site is approximately 2 cm below the patella and approximately 2 cm medial to the tibial tuberosity (depending on patient's anatomy). Aim the needle set at a 90-degree angle to center of the bone.

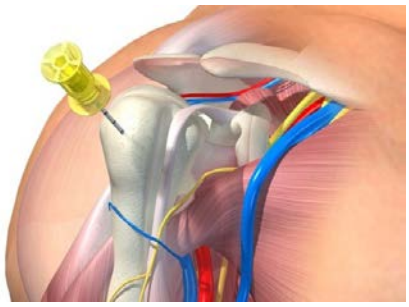
Proximal Humerus- (Adults only)

The proximal humerus insertion site is located directly on the most prominent aspect of the greater tubercle. Ensure that the patient's hand is resting on the abdomen and that the elbow is adducted (close to the body). The hand may be pronated on the side of the body if unable to bend or move the

arm. Slide thumb up the anterior shaft of the humerus until you feel the greater tubercle, this is the surgical neck. Approximately 1 cm (depending on patient anatomy) above the surgical neck is the insertion site. This is the preferred site for patients who are responsive to pain. Once the insertion is completed secure the arm in place to prevent movement and accidental dislodgement of the IO catheter. Point the needle set tip at a 45-degree angle to the anterior plane and posteromedial.

Distal Femur-(Pediatric only)

Secure the leg out-stretched to ensure the knee does not bend. Identify the patella by palpation. The insertion site is just proximal to the patella (maximum 1cm) and approximately 1-2 cm **medial** to midline. Aim the needle set at a 90-degree angle to center of the bone.



Proximal Humerus-(Adults only)

Proximal Tibia

Distal Femur (Pediatric only)

PLACEMENT:

1. Locate an insertion site.

2. Clean the insertion site.

3. Select the appropriate needle.

   Medium (blue) 25 mm needle: weight ≤ 40 kg

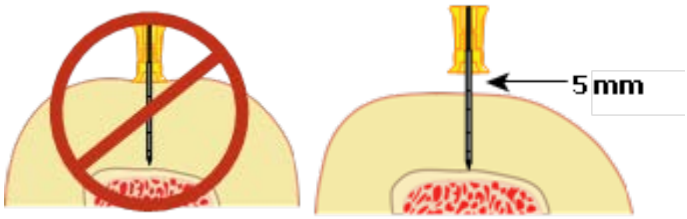
   Large (yellow) 45 mm needle: weight > 40 kg and patients with excessive tissue over insertion sites.

4. Remove the needle from the case. Attach the needle onto the power driver, and make sure that is securely seated.

5. Remove and discard the needle set safety cap from the needle.

6. Insert the EZ-IO needle onto the site.

7. Prior to pressing the trigger, push needle through skin until tip touches bone. Five (5) mm of the catheter (at least one black line) must be visible outside the skin.



8. Squeeze trigger and apply moderate steady pressure.

Pediatrics:

Release trigger when sudden “give” or “pop” is felt, indicating entry into medullary space.

Adult:

Advance Needle Set approximately 1-2 cm after entry into medullary space; in Proximal Humerus for most adults Needle Set should be advanced 2 cm or until Hub is flush or against the skin.

9. Remove the power driver and needle stylet.

10. Confirm that the catheter is stable and secure with EZ-Stabilizer.

11 Attach a primed EZ-connect extension set to the Hub, firmly secure by twisting clockwise.

12. Flush the EZ-IO with normal saline (0.9% Sodium chloride) (5-10 ml for adults; 2-5 ml infant/child).

a. Prior to flush, aspirate slightly for visual confirmation of bone marrow.

b. Failure to appropriately flush the EZ-IO Catheter may result in limited or no flow. Repeat flush as needed.

c. Once EZ-IO Catheter has been flushed, administer fluids or medications as indicated.

13. Attach a pressure infuser (if needed).

14. Following the administration of any IO medications, flush the IO line with IV fluid.

15. Document the procedure, on the electronic patient care report (ePCR)