REGION 11 CHICAGO EMS SYSTEM PROCEDURE	Title: Intraosseous (IO) Insertion – EZ-IO
	Section: Medication Administration/Access
	Approved: EMS Medical Directors Consortium
	Effective: August 1, 2022

INTRAOSSEOUS (IO) INSERTION EZ-IO - ALS

INDICATIONS:

- Vascular access in a critical patient including shock, peri-arrest, or cardiac arrest after two unsuccessful peripheral intravenous attempts.

CONTRAINDICATIONS

- Fracture of the bone selected for IO infusion
- Excessive tissue and/or absence of adequate anatomical landmarks
- Infection at the site selected for insertion
- Inability to identify landmarks
- IO access or attempted IO access in target bone within previous 48 hours
- Prosthesis or orthopedic procedures near insertion site

APPROVED IO INSERTION SITES:

- Proximal tibia
- Distal tibia
- Proximal humerus

EQUIPMENT:

- EZ-IO driver
- EZ-IO needle: Pink (15 mm, 15 gauge), Blue (25 mm, 15 gauge), or Yellow (45 mm, 15 gauge)
- Alcohol swab
- Saline flush
- EZ-Stabilizer kit (dressing and extension set)
- Sharps container

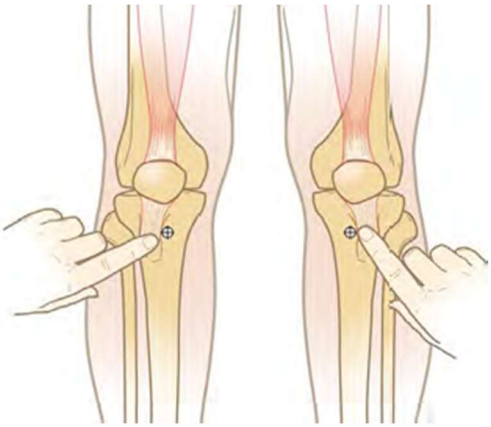
PROCEDURE:

1. Apply personal protective equipment: gloves.
2. For administration of IV medication or fluid, check the five rights of medication administration.
    a. Right patient
    b. Right medication
    c. Right dosage/concentration
    d. Right time
    e. Right route
3. Select appropriate insertion site.

4. Clean insertion site with alcohol swab.
5. Select appropriate needle size and load onto EZ-IO driver
6. Stabilize extremity.
7. Aim the needle at a 90 degree angle to the flat surface of the bone for the tibia and a 45 degree angle above the horizontal plane for the humerus.
8. Gently press needle through the skin until the tip touches the bone. The 5 mm black mark on the needle set must be visible above the skin prior to insertion.
9. Squeeze the trigger and apply gentle steady pressure.
10. Drill until loss of resistance is felt and the needle enters the medullary space.
11. Stabilize hub and remove driver.
12. Remove stylet from catheter and place in sharps container. The needle should feel firmly seated in the bone (this is the first confirmation of placement).
13. Place the EZ-Stabilizer dressing over the catheter hub.
14. Attach extension set and firmly secure to catheter hub with the clamp open.
15. Remove adhesive from back of EZ-Stabilizer dressing and apply dressing to skin.
16. Attach saline flush and aspirate for blood and/or bone marrow (this is the second confirmation of placement). The inability to aspirate blood from the catheter hub does not mean the insertion was unsuccessful.
17. Flush the EZ-IO Catheter with a saline flush.
18. Assess for signs of infiltration including redness, swelling, or pain around site.
19. Reaffirm medication with Medication Administration Cross Check (MACC).
20. Administer the medications or fluids as indicated.
21. If placement is not confirmed by adequate flush of saline, remove the IO needle and attempt an alternate site. There should be a maximum of two attempts.
22. Document the procedure, medication dose, and clinical response.

SITE SELECTION[1]

1. **Proximal Tibia**
   a. Extend the leg
   b. Palpate tibial tuberosity
   c. Insertion site is two centimeters or fingers medial to the tibial tuberosity on the flat aspect of the tibia

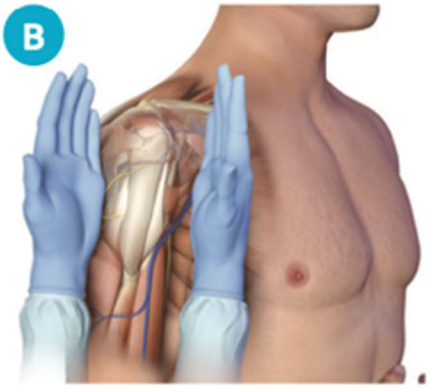


2. **Distal Tibia**
   a. Palpate medial malleolus
   b. Insertion site is two finger widths proximal to the most prominent aspect of the medial malleolus

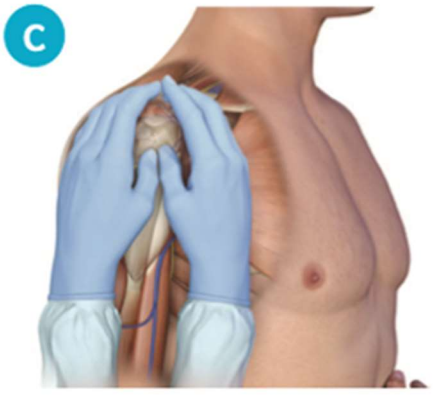
[1] Images courtesy of Teleflex Global Research and Scientific Services

3. **Proximal Humerus**

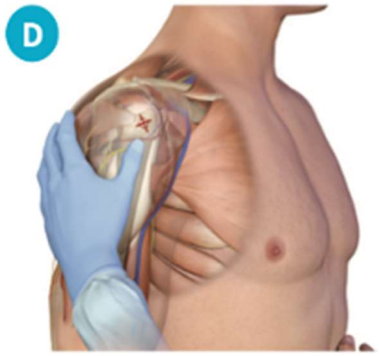
A: Place the patient's hand over the abdomen (elbow adducted and humerus internally rotated). Place your palm on the patient's shoulder anteriorly. The area that feels like a "ball" under your palm is the general target area. You should be able to feel this ball, even on obese patients, by pushing deeply.



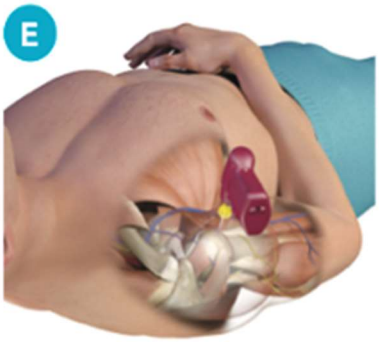
B: Place the ulnar aspect of your hand vertically over the axilla. Place the ulnar aspect of your other hand along the midline of the upper arm laterally.



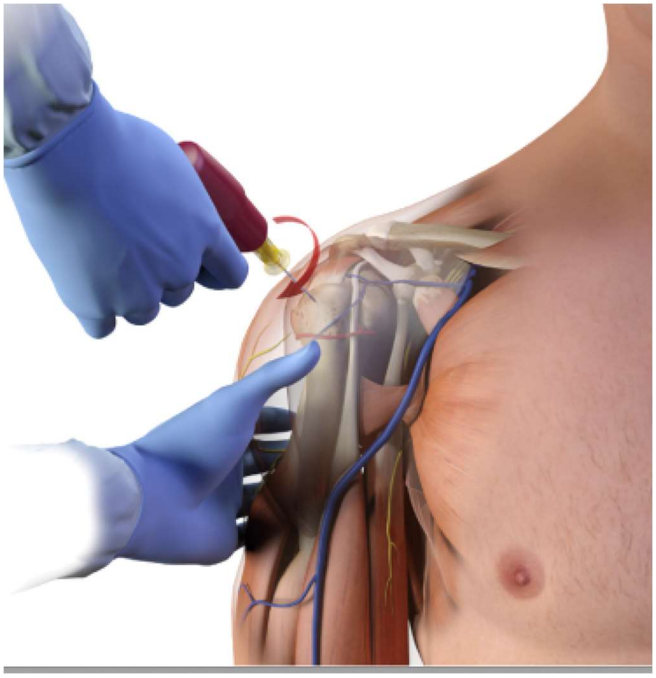
C: Place your thumbs together over the arm. This identifies the vertical line of insertion on the proximal humerus.

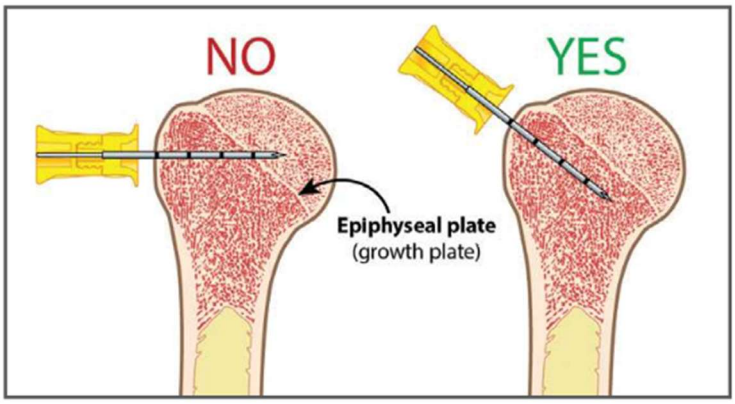


D: Palpate deeply up the humerus to the surgical neck. This may feel like a golf ball on a tee – the spot where the "ball" meets the "tee" is the surgical neck. The insertion site is 1 to 2 cm above the surgical neck, on the most prominent aspect of the greater tubercle.



E: Point the needle set tip at a 45-degree angle to the anterior plane and posteromedial.





NEEDLE SIZE SELECTION[2]

NEEDLE SELECTION

The needle sets do not have "adult" or "pediatric" sizes. Each needle set is US FDA-cleared with weight range guidelines. The single use sterile needle sets are 15 gauge, 304 stainless steel available in 3 lengths.

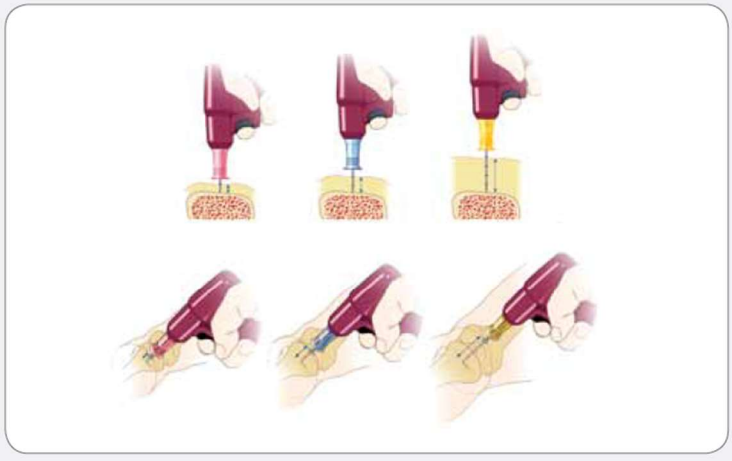
Clinical judgment should be used to determine appropriate needle set selection based on patient weight, anatomy and tissue depth overlying the insertion site.

With the needle set inserted through the soft tissue and touching bone, the 5 mm mark (at least one black line) must be visible outside the skin for confirmation of adequate needle set length prior to drilling.

15 mm 15 gauge
3–39 kg

25 mm 15 gauge
3 kg or over

45 mm 15 gauge
40 kg or over and/or excessive tissue depth



Clinical experience with the device will ultimately present a more rapid approach to needle set selection, but the 5 mm mark assists the clinician with establishing which needle set is appropriate for the patient.

[2] Image courtesy of Teleflex Global Research and Scientific Services