

**7.09 ~~12~~ Adult and Pediatric Vascular Access with Intraosseous (IO) Line Placement Device**  
**EMSAC JUNE 2026**

ALS

**INDICATION**

- Pediatric and adult patients in cardiopulmonary arrest, shock/poor perfusion, severe burns or critically unstable; AND peripheral intravenous (IV) access is not possible or cannot be achieved quickly (e.g. ~~2 peripheral IV attempts in or less than~~ **<90 seconds**)
- ~~Critically ill or injured patients~~
  - ~~Cardiac arrest or impending arrest~~
  - ~~Severe Hypotension with profound shock and poor perfusion;~~
  - ~~Acute deteriorating level of consciousness.~~

~~If vascular access cannot be established via peripheral IV in 2 attempts or less than 90 seconds (in scenarios listed above), then proceed with either IO or see protocol [7.13 Vascular Access with Pre-Existing Vascular Access Device](#)~~

**PRECAUTION**

- Infection overlying the placement site ~~to bone and/or splint distal to insertion site;~~
- Inadequate or difficult to identify anatomic landmarks

**CONTRAINDICATION**

- Deformity, suspected fracture on the placement limb
- Known prior orthopedic ~~procedure (total knee or shoulder replacement) or amputation~~
- Site of previous IO attempt
- ~~Previous IO attempt in same extremity;~~
- ~~Pre-existing condition affecting extremity such as burns or infections;~~
- ~~Patient is not critically ill or injured~~

## TECHNIQUE

### 1. Locate the insertion site:

Site of Access	Specific Guidelines	Notes	Anatomic Site Diagram
Proximal Humerus	<ul style="list-style-type: none"> <li>Position patient hand overlying abdomen and elbow close to body.</li> <li>Palpate greater tubercle of the humerus with thumb.</li> <li>Insertion site is 1-2cm above surgical humerus neck.</li> <li>Needle angled at 45° angle towards the opposite hip.</li> </ul>	<ul style="list-style-type: none"> <li>Preferred site for adults</li> <li>Optimal site for faster, higher-flow drug delivery <del>high flow and quick drug update</del></li> <li>Less painful than proximal tibia</li> </ul>	<p>Slight Downward Angle</p>
Proximal Tibia	<ul style="list-style-type: none"> <li>Extend the leg. Palpate tibial tuberosity.</li> <li>Insertion site is 90° along the flat aspect of the tibia (~3cm below patella and ~2cm medially)</li> </ul>		
Distal Femur	<ul style="list-style-type: none"> <li>Extend the leg. Palpate the patella</li> <li>Insertion site is just proximal to the patella and ~1-2cm medial to midline</li> </ul>	<ul style="list-style-type: none"> <li><b>Pediatric ONLY.</b> Preferred pediatrics &lt;6 years of age</li> </ul>	<p>Growth Plate</p>

### 2. Assemble needed equipment

- Select appropriate size needle. This is determined by the depth of subcutaneous tissue overlying the bone surface, not the size of the patient—**one black line** (marker 5mm from the hub) should be visible following insertion

Needle Length	Color	Guidelines size will vary on patient anatomy
15mm (15 gauge)		3-39kg
25mm (15 gauge)		>39kg
45mm (15 gauge)		>39kg with excessive tissue or adult humerus

4. Immobilize limb and prep site with approved aseptic technique
5. Insert the IO needle
  - a. Penetrate the bone cortex by squeezing the driver's trigger and applying gentle, consistent, downward pressure
  - b. Release trigger when a sudden "give or pop" is felt upon entry into the bone and the desired depth is obtained (a second "pop" suggests penetration of the posterior bone cortex, which may result in extravasation if used)
6. Stabilize the catheter hub and remove the driver from the needle
7. Remove stylet by turning anti-clockwise and dispose of stylet in sharps container
8. Secure the site
9. Connect primed IV tubing
  - a. In a conscious patient, slowly flush over 120 seconds, 2% lidocaine (~~0.5mg/kg;~~ max dose 50mg)
10. Monitor for complications. If infiltration occurs or needle is removed, stop the infusion, remove the needle, and apply a pressure bandage to the IO site.

#### DOCUMENTATION

1. EMS Personnel responsible for procedure (eprocedures.09 and eprocedures.10)
2. Time of insertion
3. Procedure site
4. Device type and size
5. Initial and serial vital signs
6. Patient reassessment post-procedure
7. Complications, if applicable