



**REGION 11
CHICAGO EMS SYSTEM
PROCEDURE**

Title: Pediatric Intraosseous (IO) Insertion - Manual

Section: Medication Administration/Access

Approved: EMS Medical Directors Consortium

EMS Level: ALS

PEDIATRIC INTRAOSSEOUS (IO) INSERTION - MANUAL

INDICATIONS

If a child presents meeting **all** of the following criteria, paramedics should immediately gain vascular access through the intraosseous route:

- AGE: 6 years or less
- PRESENTATION: Shock, arrest, impending arrest
- LOC: Unconscious, non-responsive to verbal stimuli
- UNSUCCESSFUL IV's: Two quick IV attempts have been unsuccessful or no peripheral veins are readily apparent or obtainable. In full cardiac arrest - may attempt intraosseous as first procedure.

CONTRAINDICATIONS

- If history is known, bone disorders such as osteogenesis imperfecta and osteopetrosis (excessive calcification causing spontaneous fractures)
- Cellulitis at the site
- Recently fractured bones due to extravasation of blood/fluid into the subcutaneous tissue
- If two attempts are unsuccessful

EQUIPMENT

- Bone marrow aspiration needle (size 15-18 ga.)
- 3 ml non-luer lock or luer lock and adapter syringe
- Normal saline IV solution; regular IV tubing
- Tape
- Sterile gloves
- Towel roll

PROCEDURE

1. Support the child's leg on towel roll. Externally rotate leg slightly.
2. Select insertion site:
 - a. Preferred site: Anteromedial tibia, two fingerbreadths below the tibial tuberosity.
 - b. Second choice: Distal one-third of the femur, two fingerbreadths above the patella
(Note: This site is more difficult to penetrate)
3. Find the landmarks by palpating approximately two fingerbreadths below the tibial tuberosity. Move fingers inward to medial plane of bone.



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4. Using aseptic technique, put on sterile gloves and clean skin using a circular motion starting at the center and moving outward from the insertion site.
5. Place the bone marrow needle at a 90° angle away from the epiphyseal plate (POINT TIP OF NEEDLE TOWARD THE FOOT).
6. Insert the needle with firm downward pressure using a rotary motion to penetrate the skin and subcutaneous tissues and then the periosteum and bone cortex.
7. A “pop” or sudden loss of resistance will herald entrance into the medullary cavity. A child of less than 4 years old will only require a penetration depth of 2-4 mm.
8. Remove stylet from needle and aspirate with 3 ml syringe. A flashback or aspiration of bone marrow (looks like dark blood) will confirm proper placement. Do not aspirate more than 1 ml of bone marrow.

Occasionally, no bone marrow can be aspirated because:

- a. The needle may not be in the medullary cavity because it went completely through the bone;
 - b. The point of the needle is in the cortex of the bone;
 - c. The distal opening may be lying against a small piece of bone. Try turning the needle in a semicircular motion to clear the obstruction.
9. Immediately flush needle with Normal Saline once proper placement is confirmed. Attach IV tubing and begin IV infusion. IV fluid should flow freely without significant subcutaneous infiltration. Fluid challenges in children should be calculated at 20 ml NS/Kg of body weight.
 10. To secure needle: the needle should remain stabilized with little assistance. The flange of the needle depth guard should be adjusted by screwing it down until it is flush with the skin. Tape needle in place.
 9. Restrain child as necessary to protect site and reassess site for displacement or infiltration.