



## Southern Minnesota Regional Trauma Advisory Committee (SMRTAC)

### Regional Practice Management Guideline

#### *Intraosseous Puncture and Infusion for EMS*

<b>Adult and Pediatric Practice Management Guideline</b>	<b>Effective: June, 2018</b>
<b>Contact: SMRTAC Coordinator</b>	<b>Last Reviewed: June 21, 2018</b>

#### **Purpose**

To describe the use of intraosseous (IO) puncture and infusion for pediatric and adult trauma patients.

#### **Definitions**

Intraosseous access should be used on any patient in need of vascular access when the patient has circulatory compromise.

#### **Policy Statements**

- 1) Indications for obtaining Intraosseous access include
  - a. Cardiopulmonary arrest
  - b. Any critical emergency where peripheral venous cannulation is unobtainable within 90 seconds
  - c. Oral, transmucosal, intramuscular or inhalation routes are not adequate to meet the patients need for fluids and/or medications
- 2) Contraindications for IO use
  - a. Fractures- do not place IO below fracture site; use an alternative site
  - b. Open injury- do not place IO below any open injury; use an alternative site
  - c. Infection
  - d. Osteogenesis imperfecta
- 3) Do not use IO for greater than 24 hours

#### **Procedure Statements**

- 1) Identify the appropriate site for EZ IO™ placement (Table 1 and Figure 1)
  - a. Be sure to avoid the growth plate in the pediatric patient
  - b. Patient must be 3 kg or greater
- 2) Equipment for EZ IO™ insertion
  - a. EZ IO™ insertion device
  - b. 3 sizes available:
    - Pink (15 mm), weight 3-39 kg (7- 87 lbs)
    - Blue (25 mm), weight >40 kg (>88 lbs)
    - Yellow (45 mm), for adult patients who have excessive tissue over the targeted insertion site

- If the sternum is selected for access, assure that a sternal device is used (only in patients 18 yrs and older)
  - c. Alcohol swab or ChloroPrep
  - d. 10 ml syringe for aspiration
  - e. 10 ml syringe with 0.9% saline for flush
  - f. IV extension set
  - g. Clean gloves
- 3) Procedure for placement of IO with the EZ IO™ mechanical device
    - a. Use aseptic technique
    - b. Clean skin of the chosen site, allow to dry
    - c. Stabilize the chosen extremity
    - d. Attach the compatible IO needle to the end of the device
    - e. Initially at a 90 degree angle pierce the skin with the IO needle until it touches the bone surface with a gentle push. Insure the 5 mm mark is visible after puncture.
    - f. There may be a “give” as the needle enters the bone marrow cavity, release the trigger
    - g. Detach the needle from the device
    - h. Remove the inner stylet
  - 4) Confirm placement by
    - a. Aspirate marrow contents. Marrow may not always be aspirated
    - b. Prior to flush, For conscious patients , consider use of Lidocaine per local protocol
    - c. Infuse 10 ml of 0.9% saline rapidly and ensure there is no evidence of swelling or extravasation
  - 5) Once position confirmed
    - a. Secure IO in place (Figure 2)
    - b. Connect the needle to the intravenous tubing and begin fluid resuscitation
    - c. Continue to monitor for complications
  - 6) Fluid administration
    - a. Include a 3 way stop cock between extension and drip set for accurate fluid administration for pediatric patients

## **Resources/Links**

Advanced Trauma Life Support for Doctors (ATLS) © 9<sup>th</sup> Edition

Bailey, Pamela, MD (2017). Intraosseous Infusion. Up to Date  
<https://www.uptodate.com/contents/intraosseous-infusion>

Intraosseous Access <http://kidshealthwa.com/guidelines/intraosseous-access/>

Intraosseous Access [http://www.rch.org.au/clinicalguide/guideline\\_index/Intraosseous\\_access/](http://www.rch.org.au/clinicalguide/guideline_index/Intraosseous_access/)

Tay, Ee Tein MD (2017). Intraosseous Access. Medscape.  
<http://reference.medscape.com/article/80431-overview>

## **Table 1**

### **Intraosseous cannula placement site by patient age**

**Prepared by: SMRTAC leadership**

**Approvals: SMRTAC PI Subcommittee; SMRTAC**  
 June 21, 2018

Patient Age	Intraosseous site
Infant (under 1 year)	Proximal tibia; Distal femur
Children (1-12 years)	Proximal tibia; Distal tibia or fibula
Skeletally immature adolescent (12-18 years)	Proximal tibia; Distal tibia or fibula
Over 18 years	Proximal tibia; Proximal humerus; Distal tibia or fibula; Sternum

**Figure 1**

**Insertion sites:**

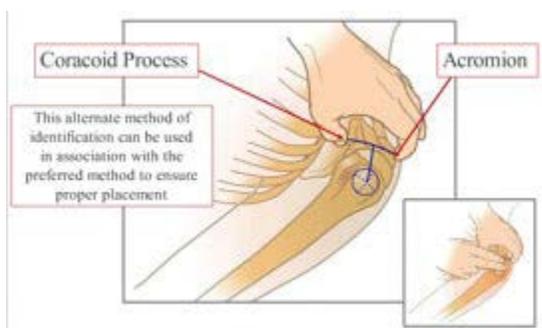
- Proximal tibial site (preferred site for pediatrics):



- Preferred method for humeral insertion site:

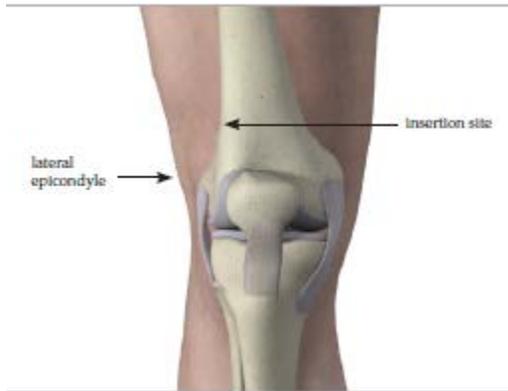


- Alternative method for humeral insertion site:



- Femur, **only authorized and used by Pediatric Specialty Team:**

1. Lower third of femur, approximately 3 cm above the lateral femoral epicondyle.
2. Midline, either perpendicular to the bone or angled slightly ( $10^{\circ}$ - $20^{\circ}$  from the vertical) upward towards the patient's head. The needle should not be angled downward toward the patella.



**Figure 2**  
**Securing the IO:**

