



**Southern Minnesota Regional Trauma
Advisory Committee (SMRTAC)**

Regional Practice Management Guideline

<i>Intraosseous Puncture and Infusion for EMS</i>	
Adult and Pediatric Practice Management Guideline	Effective: June, 2018
Contact: SMRTAC Coordinator	Last Reviewed: June 21, 2018

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) © 9th 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/

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° - 20° from the vertical) upward towards the patient's head. The needle should not be angled downward toward the patella.



Figure 2
Securing the IO:

