

INTRAOSSEOUS — (EZ IO)

1. Level: AEMT, Paramedic, RN (special training required)
2. Purpose: To provide rapid intravascular access
3. Indications:
 - 3.1. Cardiac arrest after unsuccessful IV attempt or in cases of no suitable EJ or other IV site following assessment. If IO is attempted prior to IV, document the rationale in the treatment comments section of the ePCR for not attempting a peripheral IV prior to initiating IO.
 - 3.2. Patients in extremis that requires vascular access for time-critical medication and/or fluid bolus administration, when you are unable to obtain a peripheral IV access after two attempts or 90 seconds. The following indications should only be considered after other interventions have been provided.
 - 3.2.1. Life-Threatening Opiate Overdose—Only if Naloxone IN/IM has been ineffective and IV access cannot be established.
 - 3.2.2. Status Epilepticus—If Midazolam IN/IM has been ineffective and IV access cannot be established
 - 3.2.3. Hypoglycemia—Administration of Dextrose 50% or D5W when Glucagon IM/IN has been ineffective and IV access cannot be established
 - 3.2.4. Critical 2nd and 3rd degree burns or multi-systems trauma patients requiring fluid resuscitation when IV access cannot be established
 - 3.2.5. Other patients requiring immediate vascular access for medication and/or fluid bolus administration when medications via the IN/IM route have been ineffective
4. Contraindications:
 - 4.1. Patients < 3 kg
 - 4.2. Prior orthopedic surgery at or near the insertion site
 - 4.3. Suspected fracture in extremity identified for insertion
 - 4.4. Previous IO insertion attempt at the site
 - 4.5. Extremity that is compromised by vascular disease, bone disease, obvious trauma or overlying skin or bone infection
 - 4.6. Unidentifiable landmarks for insertion (excessive pretibial tissue is a relative contraindication)
 - 4.7. Conscious with stable vital signs
5. Procedure:
 - 5.1. Identify landmark
 - 5.1.1. Humeral Head (adults only)—Most prominent aspect of the greater tubercle, 1 to 2 cm above the surgical neck.
 - 5.1.1.1. Adduct the patient's hand and locate the greater tubercle next to the head of the humerus (NOTE: To prevent accidental removal of the device, following the procedure immobilize the patient's arm).
 - 5.1.1.1.1. Prepare the EZ IO driver and needle. Use a 45 mm needle for humeral head insertion.
 - 5.1.1.1.2. Cleanse the area with alcohol swab.
 - 5.1.1.1.3. Stabilize the arm and insert the IO device.
 - 5.1.1.1.4. Point needle set tip at 45° angle to the anterior plane and posteromedial

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- 5.1.1.1.5. Push the needle tip through the skin until the tip rests against the bone
- 5.1.1.1.6. The 5 mm mark must be visible above the skin for confirmation of adequate needle length
- 5.1.1.1.7. Gently drill into the humerus 2 cm or until the hub reaches the skin
- 5.1.1.1.8. Place the stylet in a sharps shuttle or container.
- 5.1.1.1.9. Confirm placement.
- 5.1.1.1.10. Connect primed EZ-Connect
- 5.1.1.1.11. Slowly administer 2.5 ml of 2% Lidocaine to conscious adult patients.
- 5.1.1.1.12. Flush the EZ-IO with 10 ml of normal saline.
- 5.1.1.1.13. Connect tubing, wrap a pressure infuser around IV bag and inflate to achieve adequate flow rate.
- 5.1.1.1.14. Set IV drip rate.
- 5.1.1.1.15. Dress site with 4X4 and monitor for adverse reactions.
- 5.1.2. Proximal Tibia
 - 5.1.2.1. Palpate the inferior aspect of the patella.
 - 5.1.2.2. Measure two finger widths below the patella to find the tibial tuberosity (bony prominence of the superior tibia).
 - 5.1.2.3. Measure one finger width medially from the tibial tuberosity to find the correct EZ-IO insertion site. This should be a flat aspect of the medial superior tibia.
 - 5.1.2.3.1. Prepare the EZ IO driver and needle.
 - 5.1.2.3.2. Cleanse the area with alcohol swab.
 - 5.1.2.3.3. Stabilize the arm/leg and insert the IO device.
 - 5.1.2.3.4. Stop once you feel the pop indicating that you have entered the bone.
 - 5.1.2.3.5. Remove the driver from the needle hub and remove the stylet.
 - 5.1.2.3.6. Place the stylet in a sharps shuttle or container.
 - 5.1.2.3.7. Confirm placement.
 - 5.1.2.3.8. Connect primed EZ-Connect.
 - 5.1.2.3.9. Paramedics may administer 2.5 cc of 2% Lidocaine slowly to conscious adult patients. Conscious pediatric patients should receive 0.5 mg/kg of 2% Lidocaine.
 - 5.1.2.3.10. Flush the EZ-IO catheter with 10 cc of normal saline.
 - 5.1.2.3.11. Connect tubing, wrap a pressure infuser around IV bag and inflate to achieve adequate flow.
 - 5.1.2.3.12. Set IV drip rate.
 - 5.1.2.3.13. Dress site with 4X4 and monitor for adverse signs.
- 5.1.3. Distal Femur (Pediatrics Only)
 - 5.1.3.1. Secure the leg out-stretched to ensure the knee does not bend.
 - 5.1.3.2. Identify the patella by palpation.

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- 5.1.3.3. The insertion site is just proximal to the patella (maximum 1 cm) and approximately 1-2 cm to the midline (one finger width above and medially to the patella).
 - 5.1.3.3.1. Prepare the EZ IO driver and needle.
 - 5.1.3.3.2. Cleanse the area with alcohol swab.
 - 5.1.3.3.3. Stabilize the arm/leg and insert the IO device.
 - 5.1.3.3.4. Stop once you feel the pop indicating that you have entered the bone.
 - 5.1.3.3.5. Remove the driver from the needle hub and remove the stylet.
 - 5.1.3.3.6. Place the stylet in a sharps shuttle or container.
 - 5.1.3.3.7. Confirm placement.
 - 5.1.3.3.8. Connect primed EZ-Connect.
 - 5.1.3.3.9. Paramedics may administer Lidocaine slowly to conscious adult patients. Conscious pediatric patients should receive 0.5 mg/kg of 2% Lidocaine. Also consider proximal tibia site for conscious pediatric patients.
 - 5.1.3.3.10. Flush the EZ-IO catheter with 10 cc of normal saline.
 - 5.1.3.3.11. Connect tubing, wrap a pressure infuser around IV bag and inflate to achieve adequate flow.
 - 5.1.3.3.12. Set IV drip rate.
 - 5.1.3.3.13. Dress site with 4X4 and monitor for adverse signs.
6. Considerations:
 - 6.1. Awake, competent patients have the right to refuse.
 - 6.2. When in doubt, contact on-line medical control.
 - 6.3. Use with caution with patients on warfarin (Coumadin) and Enoxaparin (Lovenox).
 - 6.4. Apply yellow wristband.
 - 6.5. Do not attach a syringe to an inserted EZ-IO catheter to facilitate a flush or to administer medication and/or fluid. Directly attaching a syringe to an inserted EZ-IO catheter may generate forces capable of dislodging the catheter resulting in the possibility of extravasations.
 - 6.6. The EZ-IO is not intended for prophylactic use.
7. Removal:
 - 7.1. Support the patient's arm / leg.
 - 7.2. Simultaneously connect a sterile luer lock syringe to the hub of the catheter.
 - 7.3. Once connected, rotate the syringe and catheter clockwise while gently pulling.
 - 7.4. When the catheter has been removed, immediately dispose of it in a sharps container.