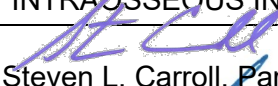
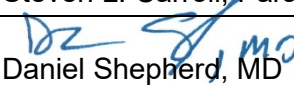


COUNTY OF VENTURA HEALTH CARE AGENCY	EMERGENCY MEDICAL SERVICES POLICIES AND PROCEDURES	
Policy Title: INTRAOSSEOUS INFUSION		Policy Number: 717
APPROVED: Administration:	 Steven L. Carroll, Paramedic	Date: September 1, 2017
APPROVED: Medical Director:	 Daniel Shepherd, MD	Date: September 1, 2017
Origination Date:	September 10, 1992	Effective Date: September 1, 2017
Date Revised:	April 13, 2017	
Date Last Reviewed:	March 11, 2021	
Review Date:	March 31, 2023	

- I. **PURPOSE:** To define the indications, procedure, and documentation for intraosseous insertion (IO) and infusion by paramedics.
- II. **AUTHORITY:** Health and Safety Code, Sections 1797.178, 1797.214, 1797.220, 1798 and California Code of Regulations, Title 22, Sections 100145 and 100169.
- III. **POLICY:** IO may be performed by paramedics who have successfully completed a training program approved by the EMS Medical Director.
 - A. **Training**
The EMS service provider will ensure their paramedics successfully complete an approved training program and will notify EMS when that is completed.
 - B. **Indications**
Patient with an altered level of consciousness (ALOC) or in extremis AND there is an urgent need to administer intravenous fluids or medications AND venous access is not readily available.
 1. Manual IO: For patients less than 8 years of age.
 2. EZ-IO device: For patients of all ages.
 - C. **Contraindications**
 1. Recent fracture (within 6 weeks) of selected bone.
 2. Congenital deformities of selected bone.
 3. Grossly contaminated skin or infection at the insertion site.
 4. Excessive adipose tissue at the insertion site with the absence of anatomical landmarks.
 5. IO in same bone within previous 48 hours.
 6. History of significant orthopedic procedures at insertion site (ex. prosthetic limb or joint).

IV. PROCEDURE:

A. Manual IO insertion

1. Assemble the needed equipment
 - a. 16-18 gauge IO needle (1.5 inches long)
 - b. Alcohol wipes
 - c. Sterile gauze pads
 - d. Two (2) 5 mL syringes and a primed IV line (with or without stopcock)
 - e. IV fluids: 500 mL NS only
 - f. Tape
 - g. Splinting device
2. Choose the appropriate insertion site. Locate the landmarks approximately 2 cm below the patella and 1 cm medial, on the anteromedial flat bony surface of the proximal tibia.
3. Prepare the site utilizing aseptic technique with alcohol wipe.
4. Fill one syringe with NS
5. To insert the IO needle:
 - a. Stabilize the site.
 - b. Grasp the needle with obturator and insert through skin over the selected site at a 90° angle to the skin surface.
 - c. Once the bone has been reached, continue to apply pressure rotating and gently pushing the needle forward.
 - d. When the needle is felt to 'pop' into the bone marrow space, remove the obturator, attach the empty 5 mL syringe and attempt to aspirate bone marrow.
 - e. For responsive patient infuse 2% cardiac lidocaine prior to fluid/medication administration for pain management:
0.5 mg/kg (max 40 mg) slow IVP over 60 seconds.
 - f. Attach the 5 mL syringe containing NS and attempt to flush the IO needle. If successful, remove the syringe, connect the IV tubing and secure the needle.
 - g. Infuse NS and/or medications.
 - h. Splint and secure the IO needle.
 - i. Document distal pulses and skin color to extremity utilized for IO insertion before and after procedure. Monitor for complications.

B. EZ-IO insertion

1. Assemble the needed equipment
 - a. Choose appropriate size IO needle
 - 1) 15 mm needle sets (pink): 3-39 kg
 - 2) 25 mm needle sets (blue): ≥ 40 kg
 - 3) 45 mm needle sets (yellow): For humerus insertion or patients with excessive adipose tissue at insertion site
 - b. Alcohol wipes
 - c. Sterile gauze pads
 - d. 10 mL syringe
 - e. EZ Connect tubing
 - f. IV fluids
 - 1) 3-39 kg: 500 mL NS
 - 2) ≥ 40 kg: 1 L NS
 - g. Tape or approved manufacturer securing device
2. Prime EZ Connect tubing with 1 mL fluid
 - a. If unresponsive use normal saline.
 - b. If responsive prime with cardiac lidocaine as instructed below.
3. Locate the appropriate insertion site. The proximal tibia site is preferred. The proximal humerus is an acceptable alternative for adult patients (18 years of older).
4. For a proximal tibia IO the correct insertion site is on the anteromedial flat surface of the proximal tibia.
 - a. Pediatric: 2 cm below the patella, 1 cm medial
 - b. Adult: 2 cm medial to the tibial tuberosity
5. The correct insertion site for the proximal humerus is on the most prominent portion of the greater tubicle, 1-2cm above the surgical neck.
6. Prepare the site utilizing aseptic technique with alcohol wipes.
7. To insert the EZ-IO needle at the proximal tibia:
 - a. Connect appropriate size needle set to the EZ-IO driver.
 - b. Stabilize the site.
 - c. Position the EZ-IO needle at 90° to the underlying bone and insert it into the skin. Continue to insert the needle until contacting the bone. Ensure at least one black band is visible above the skin.

- d. Once contact with the bone is made, activate the driver and advance the needle with light steady pressure until the bone has been penetrated.
- e. Once properly placed, attach primed EZ Connect tubing and attempt to aspirate bone marrow.
- f. For responsive patients, slow infusion of 2% cardiac lidocaine **over 60 seconds** prior to fluid/medication administration for pain management.
 - 1) 3-39 kg: 0.5 mg/kg
 - 2) ≥40 kg: 40 mg
 - 3) Adjust for EZ-IO connector tubing
- g. Flush with 10 mL NS to assess patency. If successful, begin to infuse fluid.
- h. Splint the IO needle with tape or an approved manufacturer stabilization device.
- i. Document time of insertion on included arm band and place on patient's wrist.
- j. Document distal pulses and skin color before and after procedure and monitor for complications.
- k. Manual insertion can be attempted in the event of driver failure.

8. To insert the EZ-IO at the proximal humerus:

- a. Connect the yellow (45mm) needle to the EZ-IO driver.
- b. Locate and stabilize the site.
- c. Point the needle set tip at a 45-degree angle to the anterior plane and posteromedial. Insert the needle into the skin until you contact bone. Ensure at least one black band (5mm) is visible above the skin.
- d. Activate the driver and advance the needle with light, steady pressure until the bone has been penetrated.
- e. Once properly placed, attach primed EZ Connect tubing and attempt to aspirate bone marrow.
- f. For responsive patients, slow infusion of 2% cardiac lidocaine over 60 seconds prior to fluid/medication administration for pain management.
 - 1) 3 – 39 kg: 0.5 mg/kg

2) ≥ 40 kg: 40 mg

3) Adjust for EZ-IO connector tubing

- g. Flush with 10 ml NS to assess patency. If successful, begin to infuse fluid.
 - h. Splint the IO needle with tape or an approved manufacturer stabilization device. Maintain adduction of the arm and avoid extension of the shoulder.
 - i. Document time of insertion on included arm band and place on patient's wrist.
 - j. Document distal pulses and skin color before and after procedure and monitor for complications.

C. IO Fluid Administration

- 1. Active pushing of fluids may be more successful than gravity infusion. Use of a pressure to assist with fluid administration is recommended, and usually needed, but not required.
- 2. Fluid administration on smaller patients should be given via syringe boluses to control/monitor amount infused. Close observation of the flow rate and total amount of fluid infused is required.
- 3. If infiltration occurs or the IO needle is accidentally removed, stop the infusion, leave the connector tubing attached.

D. Documentation

- 1. Document any attempt(s) at establishing a peripheral IV prior to attempting/placing an IO infusion in the Ventura County Electronic Patient Care Report (VCePCR) system.
- 2. The site and number of attempts, success, complications, and any applicable comments related to attempting an IO infusion shall be documented on the VCePCR. Any medications administered shall also be documented in the appropriate manner on the VCePCR.

E. Quality Assurance

Each use of an IO infusion will be reviewed by EMS. Data related to IO attempts will be collected and analyzed directly from the VCePCR system.



VENTURA COUNTY EMERGENCY MEDICAL SERVICES AGENCY

Skills Assessment

Name _____ Agency _____ Date _____

- Demonstrates, proper body substance isolation
- States indication for EZ-IO use
- States contraindication for EZ-IO use
- Correctly locates target site
- Cleans site according to protocol
- Considers 2% cardiac lidocaine for patients responsive to pain
- Correctly assembles EZ-IO Driver and Needle Set
- Stabilizes the insertion site, inserts EZ-IO Needle Set, removes stylet and confirms placement
- Demonstrates safe stylet disposal
- Connects primed extension set and flushes the catheter
- Connects appropriate fluid with pressure infuser and adjusts flow as instructed
- Demonstrates appropriate securing of the EZ-IO
- States requirements for VC EMS documentation

Instructor Signature: _____ Date _____