



COMBAT MEDIC/CORPSMAN
TACTICAL COMBAT CASUALTY CARE

MODULE 10:
SHOCK
RECOGNITION AND
MANAGEMENT
SKILL INSTRUCTIONS

24 JAN 21



**Committee on
Tactical Combat
Casualty Care
(CoTCCC)**

SALINE LOCK (FIELD-RUGGEDIZED) INSTRUCTION

TASK: Insert a saline lock (field-ruggedized)
CONDITION: Given a scenario in the Tactical Field Care phase where you encounter a casualty with radial pulses and significant injuries
STANDARD: Obtain intravenous (IV) access for the casualty in 5 minutes or less
EQUIPMENT: IV set with saline lock, needle/catheter, tape and/or transparent film dressing, An IV constricting band, alcohol or povidone-iodine pad(s), syringe, saline, and a sharps container

PERFORMANCE MEASURES: step-by-step instructions

NOTE: Consider body substance isolation.

NOTE: If a Combat Lifesaver is available, direct them to assist.

- 01** Gather, prepare, and inspect equipment.
 - 02** Explain the procedure to the casualty and determine known allergies by checking medical tag or asking the casualty (if conscious).
 - 03** Apply an IV constricting band at least 2 inches above the probable venipuncture site.
 - 04** Select a desirable vein for IV placement.
 - 05** Clean the site with alcohol or a povidone-iodine pad.
 - 06** Open 18-gauge needle/catheter and inspect or if using blood products, use at least a 16-gauge needle/catheter.
 - 07** Hold the needle/catheter at a 20- to 30-degree angle, bevel up, over the top of the chosen vein.
 - 08** Pierce the skin and advance the needle/catheter until blood is visualized in the flash chamber.
 - 09** Decrease the angle of the needle/catheter to 10–15 degrees and advance it 1/8 of an inch.
 - 10** Advance the catheter over the needle until the hub touches the skin or until significant resistance is felt.
 - 11** Place a finger (nondominant hand) over the vein at the catheter tip by palpating from the bottom of the hub and advancing to the tip; occlude the vein, preventing blood from flowing out of the catheter.
 - 12** Remove the needle and secure it in a sharps container.
 - 13** Attach the saline lock connector (with your dominant hand) to the catheter hub. If using a Luer lock-type saline lock, attach a syringe with sterile fluid (twisting syringe until seated).
 - 14** Release the tamponade from the occluded vein.
 - 15** Remove the IV constricting band.
 - 16** Clean the surface of the saline lock with alcohol or a povidone-iodine pad.
 - 17** If using a Luer lock-type saline lock, aspirate to confirm patency, and flush the catheter with 5 ml of sterile fluid.
- OR**
- If using a standard saline lock, insert a syringe with its attached needle, aspirate, and flush the catheter with 5 ml of sterile IV fluid.
- 18** Remove the syringe and secure it in a sharps container. If using a Luer lock-type saline lock, remove and dispose of the syringe.
 - 19** Observe the site for signs of infiltration.
 - 20** Apply a transparent film dressing, covering the catheter and the saline lock connector.
NOTE: Transparent film can be applied before flush, if necessary, to maintain control of the saline lock; exact order of these steps may vary depending on tactical situation and other factors.
 - 21** Document all findings and treatments on a DD Form 1380 TCCC Casualty Card and attach it to the casualty.

FAST1® STERNAL INTRAOSSEOUS (IO) DEVICE INSTRUCTION

TASK: Insert a FAST1 IO device

CONDITION: Given a scenario in the Tactical Field Care phase where you encounter a casualty with significant injuries, altered mental status, absent radial pulses, or significant risk of shock that requires fluid resuscitation; you have made two peripheral vascular access attempts that have failed; and you are required to administer a sternal IO

STANDARD: Initiate sternal IO access to the casualty within 3 minutes

EQUIPMENT: A FAST1 IO infusion system, alcohol or povidone-iodine pad(s), saline/syringe, and sharps container

PERFORMANCE MEASURES: step-by-step instructions

NOTE: Consider body substance isolation.

NOTE: If a Combat Lifesaver is available, direct them to assist.

- 01** Gather, inspect, and prepare equipment.
- 02** Spike intravenous (IV) bag and properly prepare IV tubing (see Administration of Intravenous (IV) and Intraosseous (IO) Fluids Instruction, steps 1–8).
- 03** Locate suprasternal notch landmark.
- 04** Clean site with alcohol or povidone-iodine pad.
- 05** Remove the top half of the target patch backing first, place the target patch at the landmark, and remove the bottom half of the target patch backing.
- 06** Recheck the location of the target patch by verifying that the target zone is on the midline over the manubrium.
- 07** Remove the cap from the FAST1 device and place the bone needle cluster into the target zone of the target patch.
- 08** Maintain the introducer perpendicular to the sternal surface.
- 09** Apply increasing pressure along the introducer axis until release is felt and heard.
- 10** Gently remove the introducer by pulling straight back.
- 11** Push the needles of the introducer into the accompanying sharps foam plug, reattach the sharps protection cap to secure the needles, and dispose of in a sharps container.
- 12** Connect the infusion tube to the right-angle connector on the target patch.
- 13** Connect the syringe, aspirate to confirm needle is in the marrow (should see flash of blood-tinged material) and flush the infusion tube with 5 ml of sterile IV solution.
NOTE: This is necessary to flush the bone plug or any obstructing tissue.
- 14** Connect the IV infusion tubing and initiate flow of fluids.
- 15** Attach the protective dome to the target patch and secure with tape.
- 16** Administer IV fluids and/or medications as needed.
- 17** Document all findings and treatments on a DD Form 1380 TCCC Casualty Card and attach it to the casualty.

EZ-IO® (HUMERUS) INTRAOSSEOUS (IO) DEVICE INSTRUCTION

TASK: Insert an EZ-IO access device (manually or mechanically) into the humerus

CONDITION: Given a scenario in the Tactical Field Care phase where you encounter a casualty with significant injuries, altered mental status, absent radial pulses, or significant risk of shock that requires fluid resuscitation; and two peripheral vascular access attempts have failed and you are required to establish IO access

STANDARD: Initiate IO access with an EZ-IO device to the casualty's humerus within 3 minutes

EQUIPMENT: EZ-IO vascular access system, alcohol or povidone-iodine pad(s), saline/syringe (10 ml), and sharps container

PERFORMANCE MEASURES: step-by-step instructions

NOTE: This skill instruction is **specific to the humeral insertion site**.

NOTE: Consider body substance isolation.

NOTE: If a Combat Lifesaver is available, direct them to assist.

- 01** Gather, prepare, and inspect equipment.
- 02** Spike intravenous (IV) bag and properly prepare IV tubing (see Administration of Intravenous (IV) and Intraosseous (IO) Fluids Instruction, steps 1–8).
- 03** Prime the IO extension tubing with saline using aseptic technique.
- 04** Have the casualty place their hand over their umbilicus and adduct the casualty's arm.
NOTE: This causes medial rotation of elbow and humerus and provides greater prominence of the insertion site.
- 05** Palpate the greater tubercle of the proximal humerus and then the surgical neck below that landmark. The ideal insertion site is 1 cm above the surgical neck.
NOTE: The surgical neck of the humerus is just below the greater tubercle of the proximal tubercle (and should feel like a golf ball on a tee).
- 06** Clean site with alcohol or povidone-iodine pad.
- 07** Locate the proper EZ-IO cartridge. If using a mechanical driver, open the EZ-IO cartridge and attach the needle set to the driver; you should feel a "snap" as the small magnet connects.
NOTE: The adult-size EZ-IO cartridge is colored yellow.
- 08** Prepare the manual EZ-IO needle by removing the needle safety cap. If using the mechanical driver, remove the cap by momentarily powering the driver while holding the cap.
NOTE: Keep hands and fingers away from the needle.
- 09** While holding the driver or the needle set in your dominant hand, stabilize the arm near the insertion site with your nondominant hand.
- 10** IO driver of the needle set should be placed at a 45-degree angle to the plane of the arm.
- 11** Gently pierce the skin and power or manually advance the needle set until the needle tip touches the bone.
- 12** With consistent steady downward pressure, twist the needle set back and forth (or squeeze the driver's trigger) until you penetrate the bone cortex.
NOTE: An obvious give or pop is felt when the desired depth is obtained.
- 13** Unscrew the stylet counterclockwise and remove stylet from catheter. If using a mechanical driver, gently remove the drill from the needle.
- 14** Place the stylet in a sharps container.
- 15** Secure the site with an EZ-IO stabilizer, if available.
NOTE: If a stabilizer is unavailable, secure with bulky dressing and tape to prevent elevated extension tubing from becoming dislodged during casualty care or movement.

- 16** Connect primed extension set through the 90-degree IO tubing to the Luer lock EZ-IO hub.
- 17** Aspirate to confirm needle is in the marrow (should see flash of blood-tinged material) and flush catheter with 10 ml flush using a rapid infusion.
- 18** Assess for signs of infiltration or complications.
- 19** Prepare for fluid or medication administration.
- 20** Document all findings and treatments on a DD Form 1380 TCCC Casualty Card and attach it to the casualty.

EZ-IO® (PROXIMAL/ANTERIOR TIBIA) INTRAOSSEOUS (IO) DEVICE INSTRUCTION

TASK: Insert an EZ-IO access device (manually or mechanically) into the proximal tibia

CONDITION: Given a scenario in the Tactical Field Care phase where you encounter a casualty with significant injuries, altered mental status, absent radial pulses, or significant risk of shock that requires fluid resuscitation; and two peripheral vascular access attempts have failed and you are required to establish IO access

STANDARD: Initiate IO access with an EZ-IO device to the casualty's proximal tibia within 3 minutes

EQUIPMENT: EZ-IO vascular access system, alcohol or povidone-iodine pad(s), saline, a 10 ml syringe, and a sharps container

PERFORMANCE MEASURES: step-by-step instructions

NOTE: This skill instruction is **specific to the proximal/anterior tibial insertion site**.

NOTE: Consider body substance isolation.

NOTE: If a Combat Lifesaver is available, direct them to assist.

- 01** Gather, prepare, and inspect equipment.
- 02** Spike intravenous (IV) bag and properly prepare IV tubing (see Administration of Intravenous (IV) and Intraosseous (IO) Fluids Instruction, steps 1–8).
- 03** Prime the IO extension tubing with saline using aseptic technique.
- 04** Locate the proper site for EZ-IO insertion, one finger width medial to the proximal tibial tuberosity (usually found 3 cm below the patella).
- 05** Clean the site with alcohol or povidone-iodine pad.
- 06** Locate the proper EZ-IO cartridge. If using a mechanical driver, open the EZ-IO cartridge and attach the needle set to the driver; you should feel a “snap” as the small magnet connects.
NOTE: The adult-size EZ-IO cartridge is colored yellow.
- 07** Prepare the manual EZ-IO needle by removing the needle safety cap. If using the mechanical driver, remove the cap by momentarily powering the driver while holding the cap.
NOTE: Keep hands and fingers away from the needle.
- 08** While holding the driver or the needle set in your dominant hand, stabilize the leg near the insertion site with your nondominant hand.
- 09** Position the driver or the needle set at the insertion site with the needle at a 90-degree angle to the surface of the bone.
- 10** Gently pierce the skin and power or manually advance the needle set until the needle tip touches the bone.
- 11** With consistent steady downward pressure, twist the needle set back and forth (or squeeze the driver's trigger) until you penetrate the bone cortex.
NOTE: An obvious give or pop is felt when the desired depth is obtained.
- 12** Unscrew the stylet counterclockwise and remove it from the catheter. If using a mechanical driver, gently remove the drill from the needle.
- 13** Place the stylet in a sharps container, if available.
- 14** Secure the site with an EZ-IO stabilizer, if available.
NOTE: If a stabilizer is unavailable, secure with bulky dressing and tape to prevent elevated extension tubing from becoming dislodged during casualty care or movement.
- 15** Connect the primed extension set through the 90-degree IO tubing to the Luer lock EZ-IO hub.
- 16** Aspirate to confirm needle is in the marrow (should see flash of blood-tinged material) and flush the catheter with 10 ml flush using a rapid infusion.
- 17** Assess for signs of infiltration or complications.
- 18** Prepare for fluid or medication administration.
- 19** Document all findings and treatments on a DD Form 1380 TCCC Casualty Card and attach it to the casualty.

EZ-IO® (DISTAL TIBIA) INTRAOSSEOUS (IO) DEVICE INSTRUCTION

TASK: Insert an EZ-IO access device (manually or mechanically) into the distal tibia

CONDITION: Given a scenario in the Tactical Field Care phase where you encounter a casualty with significant injuries, altered mental status, absent radial pulses or significant risk of shock that requires fluid resuscitation; and two peripheral vascular access attempts have failed and you are required to establish IO access

STANDARD: Initiate IO access with an EZ-IO device to the casualty's distal tibia within 3 minutes

EQUIPMENT: EZ-IO vascular access system, alcohol or povidone-iodine pad(s), saline, a 10 ml syringe, and a sharps container

PERFORMANCE MEASURES: step-by-step instructions

NOTE: This skill instruction is **specific to the distal tibial insertion site.**

NOTE: Consider body substance isolation.

NOTE: If a Combat Lifesaver is available, direct them to assist.

- 01** Gather, prepare, and inspect equipment.
- 02** Spike intravenous (IV) bag and properly prepare IV tubing (see Administration of Intravenous (IV) and Intraosseous (IO) Fluids Instruction, steps 1–8).
- 03** Prime the IO extension tubing with saline using aseptic technique.
- 04** Locate proper site for EZ-IO insertion, two finger widths proximal to the medial malleolus on the distal tibia.
- 05** Clean site with alcohol or povidone-iodine pad.
- 06** Locate the proper EZ-IO cartridge. If using a mechanical driver, open the EZ-IO cartridge and attach the needle set to the driver; you should feel a “snap” as the small magnet connects.
NOTE: The adult-size EZ-IO cartridge is colored yellow.
- 07** Prepare the manual EZ-IO needle by removing the needle safety cap. If using the mechanical driver, remove the cap by momentarily powering the driver while holding the cap.
NOTE: Keep hands and fingers away from the needle.
- 08** While holding the driver or the needle set in your dominant hand, stabilize the leg near the insertion site with your nondominant hand.
- 09** Position the driver or the needle set at the insertion site with the needle at a 90-degree angle to the surface of the bone.
- 10** Gently pierce the skin and power or manually advance the needle set until the needle tip touches the bone.
- 11** With consistent steady downward pressure, twist the needle set back and forth (or squeeze the driver's trigger) until you penetrate the bone cortex.
NOTE: An obvious give or pop is felt when the desired depth is obtained.
- 12** Unscrew the stylet counterclockwise and remove it from the catheter. If using a mechanical driver, gently remove the drill from the needle.
- 13** Place the stylet in a sharps container, if available.
- 14** Secure the site with an EZ-IO stabilizer, if available.
NOTE: If a stabilizer is unavailable, secure with bulky dressing and tape to prevent elevated extension tubing from becoming dislodged during casualty care or movement.
- 15** Connect the primed extension set through the 90-degree IO tubing to the Luer lock EZ-IO hub.
- 16** Aspirate to confirm needle is in the marrow (should see flash of blood-tinged material) and flush catheter with 10 ml flush using a rapid infusion.
- 17** Assess for signs of infiltration or complications.
- 18** Prepare for fluid or medication administration.
- 19** Document all findings and treatments on a DD Form 1380 TCCC Casualty Card and attach it to the casualty.

TRANEXAMIC ACID (TXA) – ADMINISTRATION INSTRUCTION

TASK: Administer TXA

CONDITION: Given a scenario in the Tactical Field Care phase where you encounter a casualty with significant injuries who will likely need a blood transfusion (for example, presents with hemorrhagic shock, elevated lactate, one or more major amputations, penetrating torso trauma, or evidence of severe bleeding)

OR

If the casualty has signs or symptoms of significant traumatic brain injury or has altered mental status associated with blast injury or blunt trauma

STANDARD: Administer 2 gm of TXA through slow intravenous (IV) or intraosseous (IO) push as soon as possible but not later than 3 hours after injury

EQUIPMENT: TXA and established IV or IO access, syringe, needle measuring at least 1 inch, alcohol or povidone-iodine pad(s), and sharps container

PERFORMANCE MEASURES: step-by-step instructions

NOTE: Consider body substance isolation.

NOTE: If a Combat Lifesaver is available, direct them to assist.

- 01** Gather, prepare, and inspect equipment.
- 02** Explain the procedure to the casualty and determine known allergies by checking medical tag or asking the casualty (if conscious).
- 03** Verify the five rights of medication administration:
 1. Right patient
 2. Right medication
 3. Right dose and concentration
 4. Right time
 5. Right route
- 04** Check the IV line for patency.
- 05** Assess the IV/IO insertion site for redness, swelling, increased or decreased temperature, or bleeding.

NOTE: If any of these conditions are present, do not use this IV/IO for administering the IV/IO push medication and establish a new IV/IO access point.
- 06** Select a needle measuring at least 1 inch.
- 07** Select an appropriate size syringe for 2 gm of TXA.
- 08** Connect the needle to the syringe.

NOTE: Inspect the needle and syringe for any defects.
- 09** Draw up an equivalent amount of air for the size of the TXA vial into the syringe.
- 10** Confirm the correct dose of TXA (2 gm).
- 11** Pop off the plastic cap on the top of the TXA vial.
- 12** Clean the top of the TXA vial with an alcohol or povidone-iodine pad.
- 13** With your nondominant hand, hold the TXA vial and insert the needle into the soft rubber portion of the vial:
 - (a) Start at a 45-degree angle with the needle bevel up.
 - (b) Change the angle to a 90-degree angle as the needle pushes through the rubber.

CAUTION: Take special care not to contaminate the syringe tip and the needle.
- 14** While holding the vial and the syringe together, invert them and bring them to eye level.
- 15** Inject the appropriate amount of air into the vial of TXA.
- 16** Withdraw the appropriate amount of TXA from the vial by drawing back slowly on the syringe plunger until the right medication volume is obtained, making sure that the needle tip is below the solution level

at all times to prevent drawing air into the syringe.

NOTE: The volume to be withdrawn is calculated based on medication dosage and the concentration in the vial.

- 17** Assess the syringe for air bubbles and the appropriate volume without withdrawing the needle from the vial:
 - (a) If air bubbles are present, invert the syringe and needle and tap/flick the syringe with your finger to release the air bubbles. Allow the bubbles to rise to the hub of the needle or tip of the syringe, and then eject the air.
 - (b) Adjust the needle tip to below the level of the fluid and withdraw more TXA until the correct dose is reached, if necessary.
- 18** Confirm that 2 gm of TXA is now in the syringe.
- 19** Withdraw the needle from the TXA vial.
- 20** Clean the IV/IO injection port with an alcohol or povidone-iodine pad.
- 21** If fluids are being infused, pinch the IV/IO line to stop the flow of fluid.
- 22** Insert the needle into the IV/IO injection port.
- 23** Administer 2 gm of TXA through slow IV/IO push over approximately 1 minute.
- 24** Withdraw the needle.
- 25** Detach the needle from the syringe and discard it into the sharps container.
- 26** Either open the IV/IO line to flush the line or flush with 10 ml of an appropriate fluid if infusing through an IV/IO lock.
- 27** Monitor the casualty for signs and/or symptoms of allergic reactions or other unusual reactions.
- 28** Document all findings and treatments on a DD Form 1380 TCCC Casualty Card and attach it to the casualty.

ADMINISTRATION OF INTRAVENOUS (IV) AND INTRAOSSEOUS (IO) FLUIDS INSTRUCTION

TASK: Administer fluids through an IV and/or IO route

CONDITION: Given a scenario in Tactical Field Care where a trauma casualty requires administration of fluids or lifesaving medications and already has established IV or IO access

STANDARD: Successfully administer fluids using an IV or IO route, completing steps 1–11 within 5 minutes, without causing further injury to the casualty

EQUIPMENT: IV or IO access, IV/IO fluids, IV/IO or blood tubing, 18-gauge needle/catheter (or 16-gauge if giving blood), and alcohol or povidone-iodine pad(s)

PERFORMANCE MEASURES: step-by-step instructions

NOTE: Consider body substance isolation.

NOTE: If a Combat Lifesaver is available, direct them to assist.

- 01** Gather all needed supplies.
- 02** Open the infusion set tubing and prepare the fluids to be infused.
- 03** Close the clamp on the tubing.
NOTE: The clamp could be a roller clamp or a snap clamp, depending on the tubing set.
- 04** Remove the cover from the spike of the tubing and the cover from the spike port of the fluid bag.
- 05** Spike the fluid bag with the tubing spike.
- 06** Hang the fluid bag or place it in a pressure bag.
- 07** Squeeze the drip chamber until it is about ½ full.
- 08** Open the tubing clamp to prime the tubing. Once the entire tube is visibly full of fluid, close the clamp.
- 09** Clean the IV saline lock or IO tubing extension with an alcohol or povidone-iodine pad.
- 10** Attach an 18-gauge needle/catheter or if using blood products, use at least a 16-gauge needle/catheter.
- 11** Insert the needle into the IV saline lock or IO extension set and secure it in place.
- 12** Initiate the flow of fluids.
- 13** Check for signs and/or symptoms of infiltration at the infusion site.
- 14** Monitor the casualty for signs and/or symptoms of allergic reactions or other unusual reactions.
- 15** Document all findings and treatments on a DD Form 1380 TCCC Casualty Card and attach it to the casualty.

Developed by the

JOINT TRAUMA SYSTEM

A Combat Support Division of the



DEFENSE HEALTH AGENCY