

Arrow EZ-IO Intraosseous Vascular Access System

Competency Template (Annotated)

IDENTIFIES INDICATIONS FOR USE

For adult and pediatric patients any time vascular access is difficult to obtain in the proximal humerus, proximal and distal tibia in adults and pediatric patients and the distal femur in pediatric patients in emergent, urgent or medically necessary situations for up to 24 hours.

IDENTIFIES CONTRAINDICATIONS

- Fracture in target bone
- Previous, significant orthopedic procedure at insertion site, prosthetic limb or joint
- IO access or attempted IO access in target bone within previous 48 hours
- Infection at area of insertion
- Excessive tissue (severe obesity) and/or absence of adequate anatomical landmarks

PREPARES FOR PROCEDURE/OBTAINS SUPPLIES

- EZ-IO Power Driver
 - EZ-IO Needle Set
 - EZ-Connect Extension Set
 - EZ-Stabilizer Dressing (included in Plus Packs or available separately)
 - Non-sterile gloves*
 - Cleansing agent of choice*
 - Luer lock syringe with sterile normal saline flush (5–10 ml for adults, 2–5 ml for infant/child)*
 - NeedleWISE Sharps Block
 - Additional Equipment/Supplies if Indicated/Ordered:
 - 2% preservative & epinephrine-free lidocaine (intravenous lidocaine)
 - Intravenous fluid
 - Infusion pressure pump or pressure bag, tubing, 3-way stop cock
 - Supplies for lab samples
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- Explains procedure to patient/family
 - Indicates intent to obtain assistance if needed
 - Performs hand hygiene

**indicate supplies that are not included in all EZ-IO kits*

INSERTION SITE IDENTIFICATION

Proximal Humerus (Adult)

1. Uses either method below, adduct elbow, rotate humerus internally:
 - Places the patient’s hand over the abdomen with arm tight to the body.
 - Places the arm tight against the body, rotates the hand so the palm is facing outward, thumb pointing down
2. Places palm on the patient’s shoulder anteriorly to identify the “ball” under the palm as the general target area
3. Places the ulnar aspect of one hand vertically over the axilla and the ulnar aspect of the other hand along the midline of the upper arm laterally
4. Places the thumbs together over the arm to identify the vertical line of insertion on the proximal humerus
5. Palpates deeply up the humerus to surgical neck then moves 1-2 cm proximal to the most prominent aspect of the greater tubercle

Proximal Tibia (Adult)

1. Extends patient’s leg
2. Palpates insertion site approximately 2 cm medial to the tibial tuberosity, or approximately 3 cm below the patella and approximately 2 cm medial, along the flat aspect of the tibia

Distal Tibia (Adult)

1. Palpates insertion site approximately 3 cm proximal to the most prominent aspect of the medial malleolus
2. Palpates the anterior and posterior borders of the tibia to assure insertion site is on the flat center aspect of the bone

Distal Femur (Infant/Child)

1. Secures the leg out-stretched to ensure the knee does not bend
2. Identifies the patella by palpation. Identifies the insertion site just proximal to the patella (maximum 1 cm) and approximately 1 cm medial to midline

Proximal Humerus (Infant/Child)

1. Places the patient’s hand over the abdomen (elbow adducted and humerus internally rotated)
2. Places palm on the patient’s shoulder anteriorly to identify the “ball” under the palm as the general target area
3. Places the ulnar aspect of one hand vertically over the axilla and the ulnar aspect of the other hand along the midline of the upper arm laterally
4. Places the thumbs together over the arm to identify the vertical line of insertion on the proximal humerus
5. Palpates deeply up the humerus to surgical neck then moves 1–2 cm proximal to the most prominent aspect of the greater tubercle

Proximal Tibia (Infant/Child)

1. Extends patient’s leg. Palpates the tibia to identify the medial and lateral borders
2. Identifies the insertion site approximately 1 cm medial to the tibial tuberosity, or just below the patella (approximately 1 cm) and slightly medial (approximately 1 cm), along the flat aspect of the tibia

Distal Tibia (Infant/Child)

1. Identifies insertion site approximately 1–2 cm proximal to the most prominent aspect of the medial malleolus
2. Palpates the anterior and posterior borders of the tibia to assure insertion site is on the flat center aspect of the bone

NEEDLE SET SELECTION

- Considers patient's weight and anatomy
 - EZ-IO 45 mm Needle Set (yellow hub) considered for proximal humerus insertion in patients ≥ 40 kg and/or excessive tissue over any insertion site
 - EZ-IO 25 mm Needle Set (blue hub) considered for patients ≥ 3 kg
 - EZ-IO 15 mm Needle Set (pink hub) considered for patients approximately 3–39 kg

INSERTION

- Uses aseptic technique
- Prepares supplies
 - Inspects needle set packaging to ensure sterility, checks expiration date on package
 - Attaches normal saline filled syringe (5–10 ml adult, 2–5 ml infant/child) to extension set, Primes tubing; leaves the syringe attached, set unclamped

Adult responsive to pain: Primes EZ-Connect Extension Set with lidocaine. Notes that the priming volume of the EZ-Connect Extension Set is approximately 1.0 ml

Infant/child responsive to pain: Primes EZ-Connect Extension Set with lidocaine; priming volume of the EZ-Connect Extension Set is approximately 1.0 ml. For small doses of lidocaine, considers administering by carefully attaching syringe directly to needle hub (prime EZ-Connect Extension Set with normal saline)

Adult or infant/child unresponsive to pain: Primes EZ-Connect Extension Set with normal saline. Attaches normal saline filled syringe (5–10 ml adult, 2–5 ml infant/child) to Extension Set

- Cleans insertion site by per protocol; stabilizes the extremity for insertion
- Attaches Needle Set to EZ-IO Power Driver and removes Safety Cap from Catheter

ADULT INSERTION TECHNIQUE

- Proximal Humerus – Adult**
 1. Aims the Needle Set at a 45-degree angle to the anterior plane and posteromedially
 2. Gently presses needle through the skin until the tip touches the bone. The 5 mm black mark must be visible above the skin prior to insertion
 3. Squeezes the trigger and applies gentle steady pressure. In the event of Driver failure, disconnects the Power Driver, grasps the Needle Hub by hand and advances it into the medullary space while twisting back and forth
- Tibia – Adult**
 1. Aims the needle set at a 90-degree angle to the bone
 2. Gently presses needle through the skin until the tip touches the bone. The 5 mm black mark must be visible above the skin prior to insertion
 3. Squeezes the trigger and applies gentle steady pressure. In the event of Driver failure, disconnects the Power Driver, grasps the Needle Hub by hand and advances it into the medullary space while twisting back and forth

INFANT/CHILD INSERTION TECHNIQUE

Proximal Humerus – Infant/Child

1. Aims the Needle Set tip at a 45-degree angle to the anterior plane and posteromedial
2. Gently presses needle through the skin until the tip touches the bone. The 5 mm black mark must be visible above the skin prior to insertion
3. Squeezes the trigger and applies gentle steady pressure. In the event of Driver failure, disconnects the Power Driver, grasps the Needle Hub by hand and advances it into the medullary space while twisting back and forth

Femur and Tibia – Infant/Child

1. Aims the Needle Set at a 90-degree angle to the bone
2. Gently presses needle through the skin until the tip touches the bone. The 5 mm black mark must be visible above the skin prior to insertion
3. Squeezes the trigger and applies gentle steady pressure. In the event of Driver failure, disconnects the Power Driver, grasps the Needle Hub by hand and advances it into the medullary space while twisting back and forth

INSERTION COMPLETION

- Stabilizes hub and removes Driver and Stylet. Places Stylet in an appropriate sharps container
- Places the EZ-Stabilizer Dressing over the Catheter hub
- Attaches primed extension set, firmly secures to Catheter hub with clamp open
- Removes adhesive from back of EZ-Stabilizer Dressing and applies dressing to skin.
- Confirms placement. Flushes the EZ-IO Catheter with normal saline (5–10 ml for adults; 2–5 ml for infants/children). May require multiple flushes.
- Prior to flush, considers 2 % preservative-free and epinephrine-free lidocaine IO for patients responsive to pain – follow institutional protocols/policy

ADULT RESPONSIVE TO PAIN – RECOMMENDED ANESTHETIC

Reviews manufacturer’s lidocaine instructions for use prior to administration and observes recommended cautions/contraindications to using 2 % preservative free and epinephrine free lidocaine (intravenous lidocaine):

1. Confirms lidocaine dose per institutional protocol
2. Primes EZ-Connect Extension Set with lidocaine. Notes that the priming volume of the EZ-Connect Extension Set is approximately 1.0 ml
3. Slowly infuses lidocaine (typically 40 mg) IO over 120 seconds
4. Allows the lidocaine to dwell in IO space 60 seconds
5. Flushes with 5–10 ml normal saline
6. Slowly administers an additional dose of lidocaine IO (typically 20 mg) over 60 seconds. Repeat PRN

Considers systemic pain control for patients not responding to IO lidocaine.

- ADULT UNRESPONSIVE TO PAIN
Flushes the IO catheter with 5–10 ml of normal saline. If patient develops signs indicating responsiveness to pain, refers to adult recommended anesthetic technique

- INFANT/CHILD RESPONSIVE TO PAIN – RECOMMENDED ANESTHETIC
Reviews manufacturer’s lidocaine instructions for use prior to administration and observes recommended cautions/contraindications to using 2 % preservative free and epinephrine free lidocaine (intravenous lidocaine):
 1. Confirms lidocaine dose per institutional protocol
 2. Primes EZ-Connect Extension Set with lidocaine.
 - Notes that the priming volume of the EZ-Connect Extension Set is approximately 1.0ml
 - For small doses of lidocaine, considers administering by carefully attaching syringe directly to Catheter hub (prime extension set with normal saline).
 3. Slowly infuses lidocaine IO over 120 seconds. Typical initial dose is 0.5mg/kg, NOT to exceed 40 mg
 4. Allows lidocaine to dwell in IO space 60 seconds
 5. Flushes with 2–5 ml of normal saline
 6. Slowly administers subsequent lidocaine (half the initial dose) IO over 60 seconds. Repeat PRN

Considers systemic pain control for patients not responding to IO lidocaine.

- INFANT/CHILD UNRESPONSIVE TO PAIN
Flushes the IO catheter with 2–5 ml of normal saline. If patient develops signs indicating responsiveness to pain, refers to infant/child recommended anesthetic technique

- Delivers medication and fluids as ordered. Administers medications in same dose, rate, and concentration as given via peripheral IV. For optimal flow, infuses with pressure
- Verifies placement/patency prior to all infusions
- Uses caution when infusing hypertonic solutions, chemotherapeutic agents, or vesicant drugs
- Stabilizes and monitors site and limb for extravasation or other complications
 - For **proximal humerus insertions**, secures arm in place across the abdomen, or in adducted position (with the patient’s arm close to body) using immobilizer or alternate method
 - For **distal femur insertions**, stabilizes extremity and secures site with leg outstretched to ensure knee does not bend using leg board or alternate method
 - For **proximal and distal tibia insertions**, minimizes potential for catheter movement when necessary with use of leg board in pediatric patients; uses caution in moving patients
- Documents date and time on wristband and places on patient

REMOVAL TECHNIQUE

- Removes EZ-Connect
- Lifts and removes EZ-Stabilizer adhesive dressing
- Using a sterile luer-lock syringe as a handle, attaches to hub of catheter, maintains alignment and rotates clockwise while pulling straight up. Do NOT rock or bend the catheter on removal.
- Disposes of catheter with syringe attached in an approved sharps container
- Dresses site per institutional protocol/policy

SOURCES/REFERENCES available at www.teleflex.com/ezioeducation

ARROW EZ-IO Intraosseous Vascular Access Competency/Skills

Department: _____ Competency # _____

Name of Learner: _____ Date _____

Mode of Competency		Method of Instruction		Assessment of Competency	
S	Simulated return demo	P	Protocol/Procedure review	0	Not competent
A	Actual performance	I	Inservice	1	Minimal, needs review
V	Verbal explanation	S	Self-learning	2	Competent with mentor/educator only
W	Written test	D	Demonstration	3	Proficient, may perform independently
C	Case Study	C	Clinical practice	4	Expert, able to act as resource to others

PERFORMANCE CRITERIA	MODE	METHOD	ASSESSMENT	INITIALS
States indications for IO access				
States contraindications for IO access				
Identifies patient, answers patient/family questions				
Gathers/prepares equipment/supplies				
Assesses for potential pain response prior to insertion				
Correctly identifies insertion site				
Correctly identifies appropriate needle set				
Performs IO access procedure for insertion using appropriate technique				
Confirms placement and flushes catheter				
Follows steps correctly for lidocaine administration				
Reassesses and confirms patency of IO catheter				
Removes the IO catheter				

Mentor/Educator:

Name / Title: _____ **Signature** _____ **Initials** _____ **Date** _____

Name / Title: _____ **Signature** _____ **Initials** _____ **Date** _____

Learner Signature _____ **Date** _____

The use of any medication, including lidocaine, given IV or IO is the responsibility of the treating physician, medical director or qualified prescriber and not an official recommendation of Teleflex Incorporated or its subsidiaries. Teleflex is not the manufacturer of lidocaine, and the user should be familiar with the manufacturer's instructions or directions for use for all indications, side-effects, contraindications, precautions and warnings of lidocaine. Teleflex disclaims all liability for the use, application or interpretation of the use of this information in the medical treatment of any patient. Lidocaine dosing recommendations were developed based on research; for additional information, please visit www.eziocomfort.com

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