

"We Need Vascular Access Now" Intraosseous Access



Disclosure

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Use of IO Access in ANZ

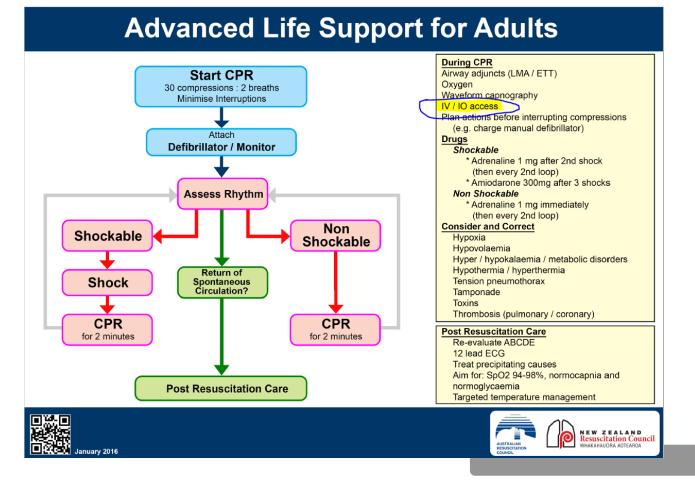
• Emergent, urgent or medically necessary situations



What Australian Guidelines & Standards Support IO Usage

• 2016 Australian Resuscitation Guidelines (ARC Guidelines)

https://resus.org.au/guidelines/





The Australian Resuscitation Guidelines

2.2 Access to Circulation

Access to the circulation with a peripheral intravenous (IV) cannula should be attempted if not already present. However, valuable time should not be wasted (more than 60 seconds) with repeated unsuccessful attempts at cannulation because alternative safe and ready access to the circulation is possible via the intraosseous route (IO)¹ [Class A; LOE III-1] (ANZCOR Guideline 12.6) or less effectively via the respiratory tract (endotracheal tube, ETT)¹.

ANZCOR Guideline 12.2

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A better way to care



Dr Keeperman: An International Perspective on IO

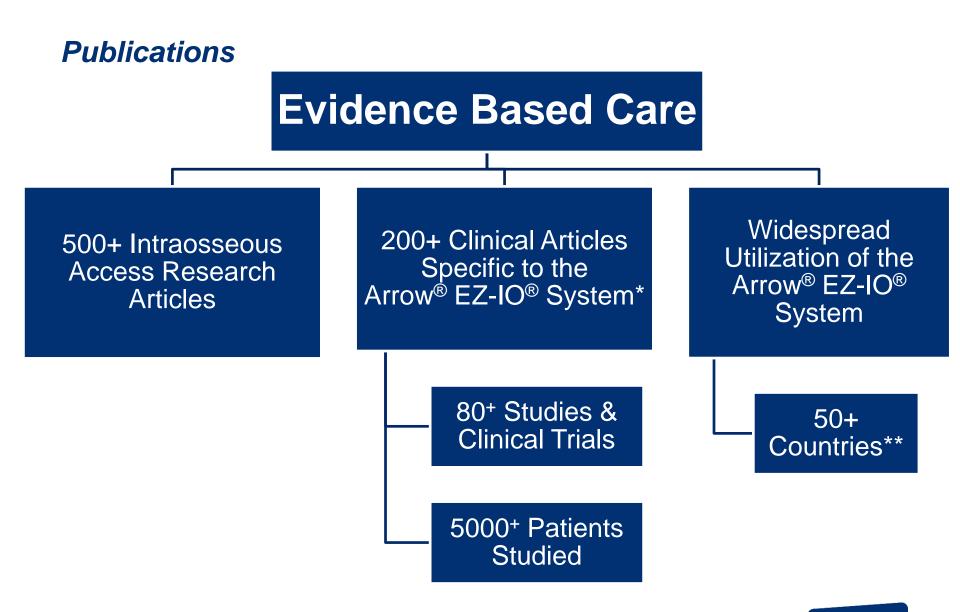
- History of IO Access
- What evidence is there to support IO Access
- How does IO Access provide timely access to the circulatory system
- What are the sites for IO Access and the tips for practice
- How do we expand scope of practice for all health professionals to include IO Access

Intraosseous Vascular Access History



Global Leaders: Emergency & Critical Care

American Heart
Association (AHA)European
Resuscitation Council
(ERC)International Liaison
Committee on
Resuscitation
(ILCOR)

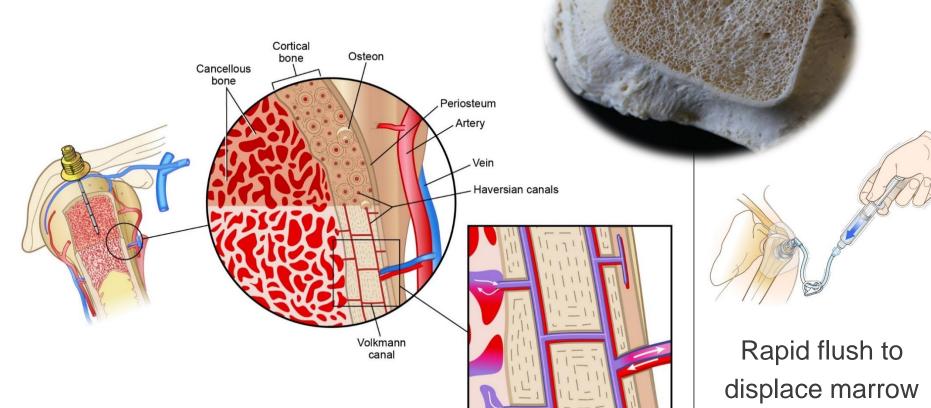


*Internal clinical evidence summary on file. **IMS Data and internal business data on file. THE TELEFLEX

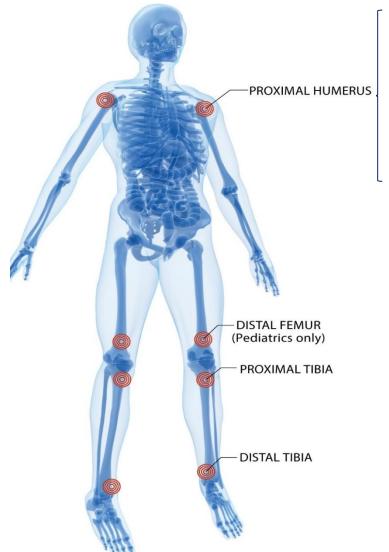
ACADEMY

Anatomy and Physiology

Highly vascular, non-collapsible access



Intraosseous Access



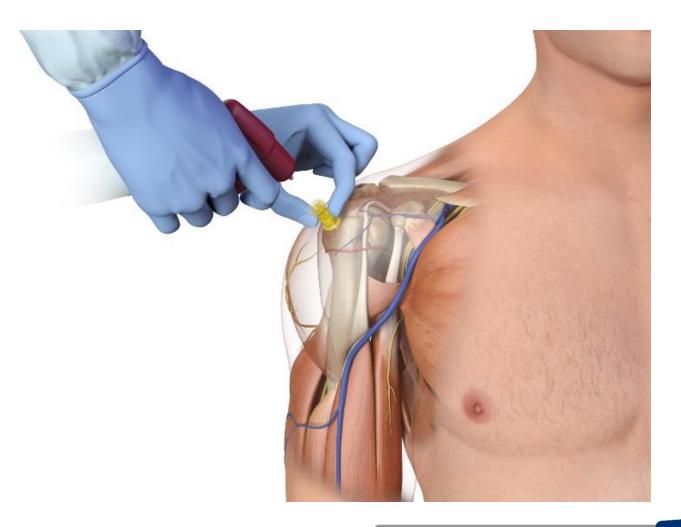
- 3 seconds to heart with medication/fluids^{1*}
- Flow rates average >5 L/hr under pressure^{2*}
- Lower insertion & infusion pain^{2*†}
- Less medication required for pain management^{2*†}

*Based on EZ-IO[®] System Adult proximal humerus data. [†]Compared to EZ-IO[®] System tibial insertions.



Intraosseous Insertion Devices

- Manual
 - Indicated for use in adult and pediatric patients in emergencies
 - Adults: sternal, proximal humerus, proximal and distal tibia sites
 - Pediatrics: tibia sites
- Power Driven
 - Indicated any time vascular access is difficult or impossible to obtain in emergent, urgent or medically necessary situations for up to 72 hours
 - Adults: proximal humerus, proximal and distal tibia sites
 - Pediatrics: proximal humerus, distal femur, proximal and distal tibia sites
 - Greater than 3 kg
- Spring Loaded
 - Indicated for use in adult and pediatric patients in emergencies
 - Adults: sternal, proximal humerus and tibia sites
 - Pediatrics: tibia sites
 - 3-12 years of age



Wampler D, Schwartz D, Shumaker J, Bolleter S, Beckett R, Manifold C. Paramedics successfully perform humeral EZ-IO intraosseous access in adult out-of-hospital cardiac arrest patients. *Am J of Emerg Med* 2012;30:1095-9. doi:10.1016/j.ajem.2011.07.010^{TS}

- Evaluation of first time success rates for humeral placement in the prehospital environment
 - Power Driven IO used for study
 - 247 Cardiac Arrest Patents
 - First attempt success rates 91%

Ross EM, Mapp J, Kharod CU. Time to Epinephrine in Out-of-Hospital Cardiac Arrest: A Retrospective Analysis of Intraosseous Versus Intravenous Access. *Ann Emerg Med* 2016;68(4s):S61

- Study to determine out of hospital time to epinephrine using the intraosseous route compared to peripheral intravenous access
 - Three years of retrospective data
 - Proximal humerus was the most used IO site with a first time success rate of 95.6%
 - Proximal humerus with lower complication rate than the tibia
 - Time to administration of epinephrine faster in the IO group than peripheral IV

Barnard EBG, Moy RJ, Kehoe AD, Bebarta VS, Smith JE. Rapid sequence induction of anesthesia via the intraosseous route: a prospective observational study. *Emerg Med J* 2014;doi:10.1136/emermed-2014-203740

- Evaluated use of intraosseous vascular access for delivery of rapid sequence intubation (RSI) drugs
 - Data collected from 34 patients at a combat hospital in Afghanistan
 - Intraosseous access established in proximal humerus, tibia and sternal sites
 - All placements successful on first attempt
 - First pass intubation success 97%
 - Cormack-Lehane (C-L) laryngoscopical grade view of 1 was reported 91%

Reades R, Studneck J, Garrett J, Vandeventer S, Blackwell T. Comparison of first-attempt success between tibial and humeral intraosseous insertions during out-of-hospital cardiac arrest. *Prehosp Emerg Care* 2011;15(2):278- 81.doi:10.3109/10903127.2010.545

- Describes a prehospital clinical study comparing IO first-attempt success between humeral and tibial sites
 - Of 88 cardiac arrest patients analyzed, 58 and 30 IO access attempts were made in the tibia and humerus, respectively
 - Study reported poor success and high dislodgement rates in the proximal humerus
 - EMS providers did not use any securing method for the IO catheters
 - EMS providers received IO product training by EMS agency educators

Philbeck TE, Miller LJ, Montez D, Puga T. Hurts so good; easing IO pain and pressure. *JEMS* 2010;35(9):58-69*

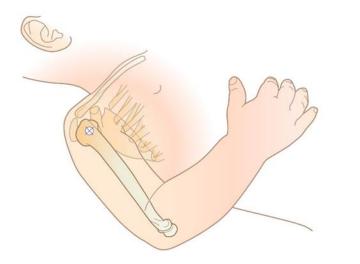
- Study designed to compare lidocaine's effect on pain during fluid infusion through the tibial and humeral IO routes and to determine infusion flow rates
 - Adequate IO infusion rates with minimal and tolerable pain
 - 40 mg of preservative-free lidocaine may be needed; followed by a rapid normal saline syringe flush of at least 10 mL and another 20 mg of lidocaine
 - For less overall pain due to IO infusion, and greater infusion flow rates, the proximal humerus should be strongly considered, using a longer IO needle set

*This article combines the data from two abstracts:

 Miller L, Philbeck T, Montez D, Puga T. A two-phase study of fluid administration measurement during intraosseous infusion- *Ann Emerg Med* 2010;56(3):S151
 Miller L, Philbeck T, Montez D, Puga T. Volunteer studies of pain management during intraosseous infusion. *Ann Emerg Med* 2010;56(3):S141

Identify the proximal humerus:

Place the patient's hand over the abdomen (elbow adducted and humerus internally rotated)





Alternative Positioning

- Elbow against the body
 Adducted
- Rotate the hand medially
 - Palm facing outward
 - Thumb pointing down
- Palpate site in usual manner



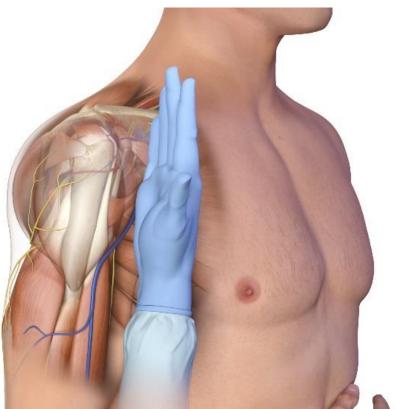
The insertion site is on the most prominent aspect of the greater tubercle, 1-2 cm above the surgical neck

Place your palm on the patient's shoulder anteriorly

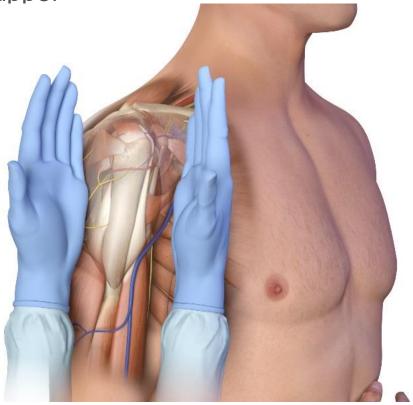
- The area that feels like a "ball" under your palm is the general target area
- You should be able to feel this ball, even on obese patients, by pushing deeply



Place the ulnar aspect of one hand vertically over the axilla

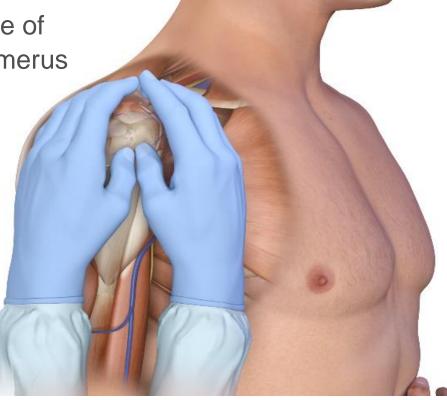


Place the ulnar aspect of the opposite hand along the midline of the upper arm laterally.



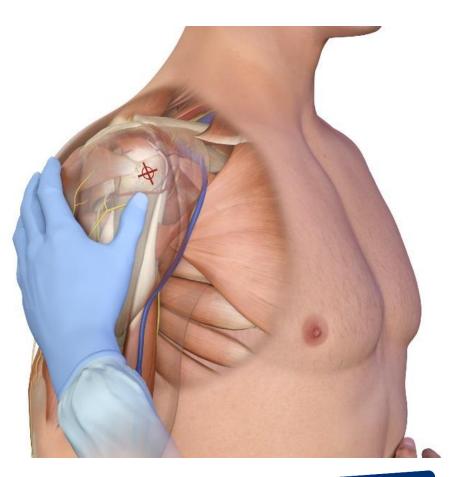
Place your thumbs together over the arm.

• This identifies the vertical line of insertion on the proximal humerus



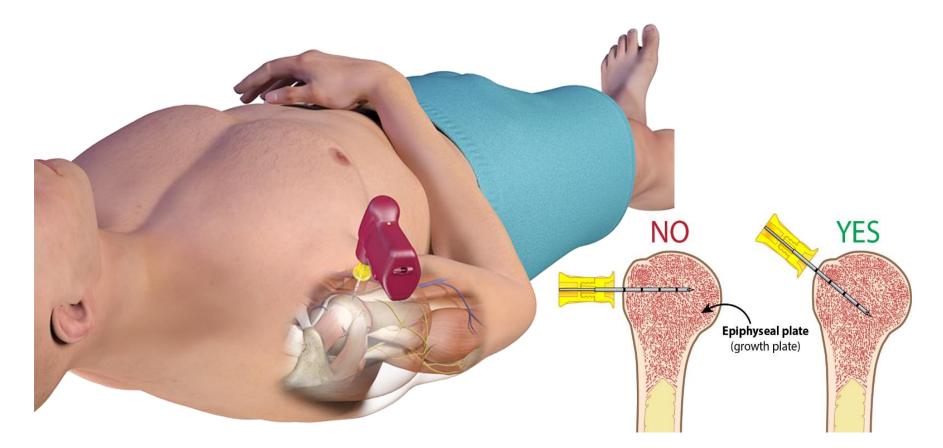
Palpate deeply as you climb up the humerus to the surgical neck.

 It will feel like a golf ball on a tee – the spot where the "ball" meets the "tee" is the surgical neck



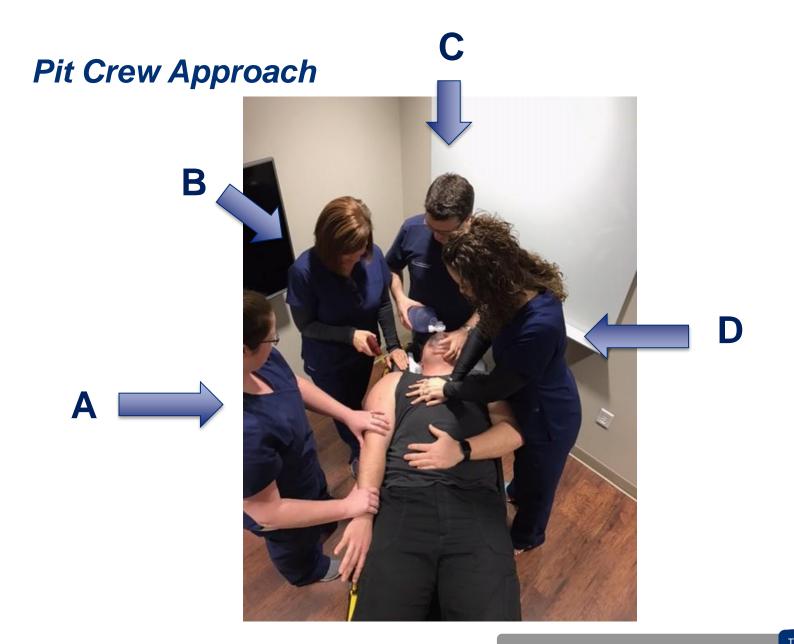
Proximal Humerus Insertion Angle

Point the needle tip at a 45° angle to the anterior plane and posteromedial



Clinical Conditions for IO Consideration

Shock		(Cardiac			Respiratory	
 Septic Trauma Burns Dehydration Anaphylactic Post-partum hemorrhage Neurologic Status epilepticus Stroke Head injury Altered mental status Encephalopathy 		 Dysrhyt Myocar CHF Chest p 	hmi dial	a Infarction			ory failure n (RSI) thmaticus nia
			 Therapeutic hypothermia IV Drug Users Infection Diabetic ketoacidosis Pediatric illness 				





Intraosseous Vascular Access

Contraindications

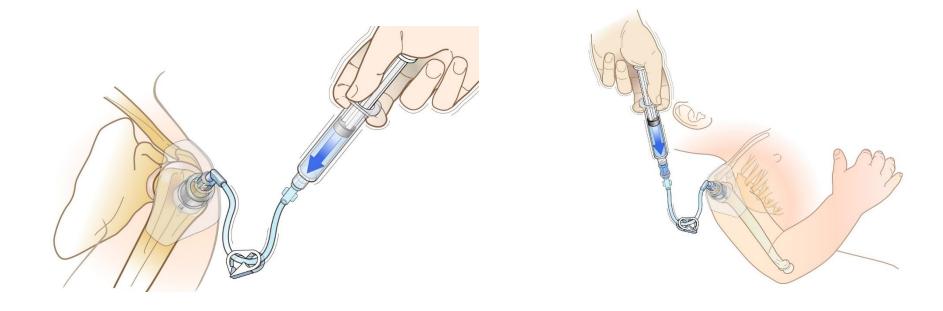
- Fracture of target bone
- Infection at area of insertion
- Inability to identify landmarks
- IO or attempted IO access in target bone within previous 48 hours
- Prosthesis or orthopedic procedure
 near insertion site



Rapid Normal Saline Flush

Adults: 5-10 mL

Children: 2-5 mL



Infusions and Medications

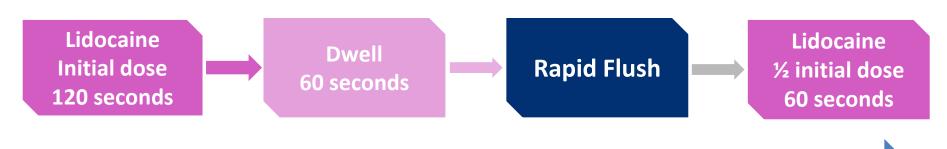
- For optimal flow infuse with pressure
- Administer medications in same dose, rate and concentration as given via peripheral IV³⁻⁶

IO Infusion Pain Management

2% lidocaine (preservative-free and epinephrine-free)

Adult: Typically 40 mg

Infant/Child: Typically 0.5 mg/kg (NOT to exceed 40 mg)



≥ 4 minutes total time

Observe cautions/contraindications for lidocaine, confirm dose per institution

Disclaimer: Selection and use of any medication, including lidocaine, given IV or IO is the responsibility of the treating physician, medical director, or qualified prescriber and is not an official recommendation of Teleflex Incorporated. The information provided is a summary of information found in the cited reference materials. This information is not intended to be a substitute for sound clinical judgment or your institution's treatment protocols. Teleflex Incorporated is not the manufacturer of lidocaine. Users should review the manufacturer's instructions or directions for use and be familiar with all indications, side effects, contraindications, precautions and warnings prior to administration of lidocaine or any other medication. Teleflex Incorporated disclaims all liability for the application or interpretation of this information in the medical treatment of any patient. For additional information please visit www.eziocomfort.com.

Intraosseous Vascular Access



Situations to consider IO vascular access

- Emergent, urgent or medically necessary situations
- Difficult Vascular Access (DVA)
- When delays to vascular access can negatively impact patient care
- To prevent multiple peripheral IV attempts
- To facilitate vein preservation

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