



EZ-IO Intraosseous Vascular Access System Guideline

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| Version | • 1.0 |
| Approved By | • Medical Director |
| Author | • Clinical Effectiveness Lead (Out of Hospital Cardiac Arrest) |
| Date Issued | • August 2017 |
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| Authorised Staff | <ul style="list-style-type: none"> • Paramedic <input checked="" type="checkbox"/> • Specialist Paramedic <input checked="" type="checkbox"/> • Advanced Paramedic <input checked="" type="checkbox"/> |
| Guidance | • EZ-IO needle insertion |

Introduction

This is a guide to explain the indications, contra-indications and use of the EZ-IO vascular access system.

Background

Intraosseous (IO) access provides a rapid solution to vascular access in paediatric and adult patients where establishing IV access is difficult. IO access allows administration of all commonly used drugs and fluid infusions.

Current Resuscitation Council (UK) guidelines recommend use of IO access in shocked or arrested patients where more than two attempts at intravascular (IV) access have failed, or more than 90 seconds have passed in attempting IV access

This guideline is intended to be used as a point of reference for staff after they have completed EZ-IO vascular access system training provided by the Education and Professional Development Department. This training has been integral to the Diploma of Higher Education in Paramedic Practice since 2011, and has been delivered as part of Learning in Practice. Paramedics who have not received this training

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should contact their local training team to arrange for this to be facilitated.

Indications for EZ-IO

Patients in shock, cardiac and respiratory arrest where it has not been possible to achieve IV access as outlined. Examples of shocked patients may include Burns, Seizures, Overdose or Polytrauma where IV access is not achieved.

IO Access is painful for patients & should be reserved for emergency situations where the administration of drugs or fluids will be administered immediately after securing access, and other attempts at IV access have failed or are obviously going to be extremely difficult

Contraindications to EZ-IO use

- Fracture at or proximal to insertion site.
- Vascular injury in same limb as insertion site.
- Previous orthopaedic procedure (e.g. prosthetic joint) at or near proposed insertion site (look for surgical scars).
- Local infection at site
- IO attempt at same site in last 24 hours (risk of extravasation)
- Inability to recognise landmarks for insertion (consider another insertion site)
- NB EZ-IO should **not** be used for sternal insertion.

Insertion Sites – Adult

Many sites are described but consideration has to be given to ease of access to the device during resuscitation and in transit.

The preferred site for insertion of EZ-IO is the head of humerus as it provides for more rapid infusion of drugs and fluids and is more accessible during transport.

If there are injuries to the upper limbs then the proximal tibia should be considered as an alternative site.

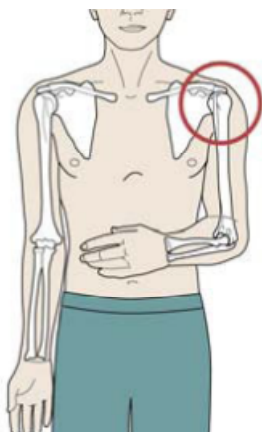
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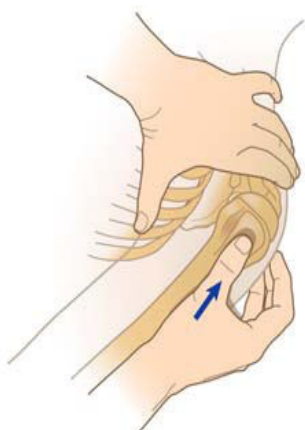
Site Identification: Adult Humeral head

The patient should be in a supine position

Expose shoulder and rotate the humerus, bringing the palm/hand across towards the centre of the patient's abdomen. The forearm should rest on the abdomen and chest (with the patient in this position you may immediately note the humeral head on the anterior-superior aspect of the upper arm or anterior-lateral shoulder).



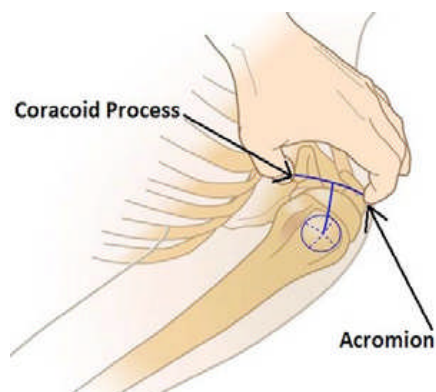
Palpate and identify the mid-shaft humerus and continue palpating toward the proximal aspect or humeral head. As you near the shoulder you will note a small protrusion. This is the base of the greater tuberosity insertion site.



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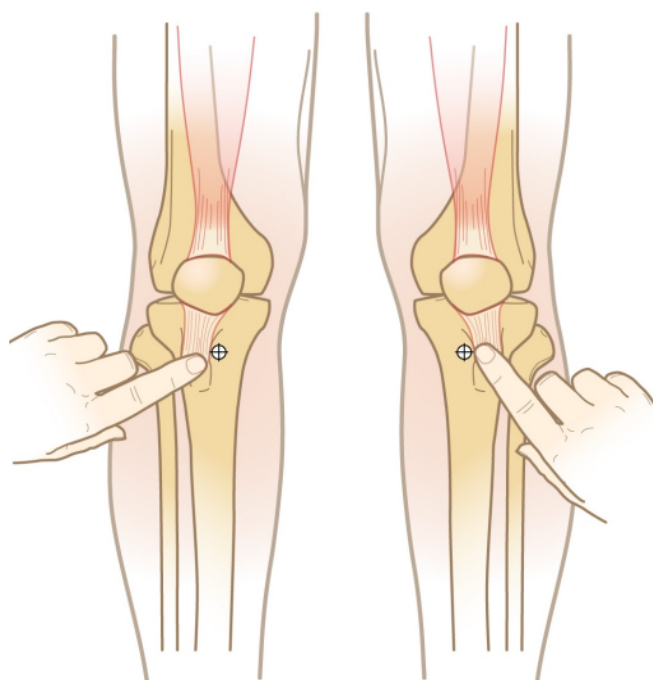
With the opposite hand you may consider “pinching” the anterior and inferior aspects of the humeral head while confirming the identification of the greater tuberosity with other landmarks. This will ensure that you have identified the midline of the humerus itself.



Do not attempt insertion medial to the greater tuberosity as the axillary vessels and brachial plexus may be at risk

Site identification: Adult Proximal Tibia

Extend the leg. The insertion site is approximately 2cm medial to the tibial tuberosity, or approximately 3cm below the patella and approximately 2cm medial, along the flt aspect of the tibia



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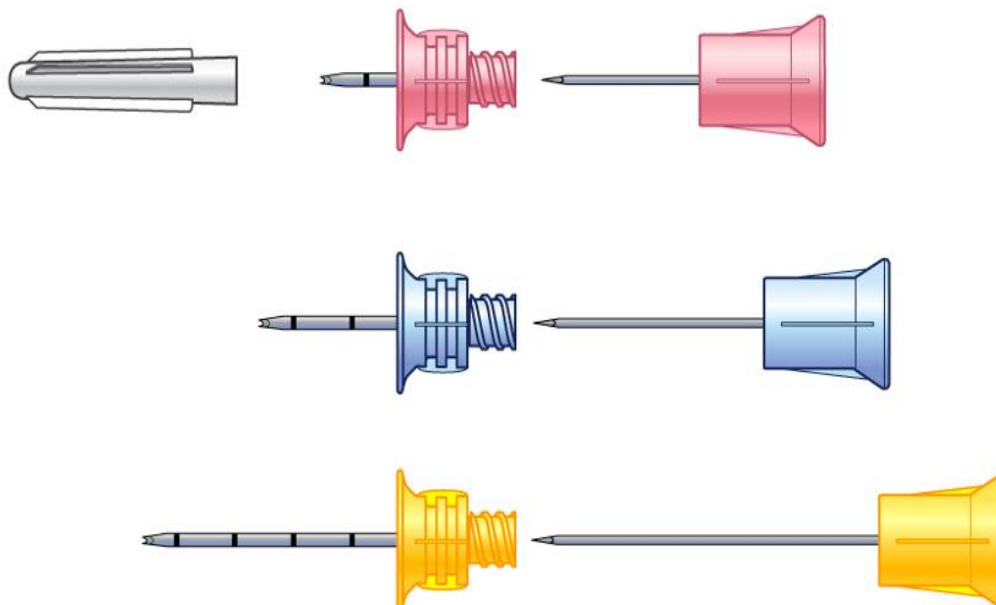
Insertion sites – Infant/Child

Site Identification Proximal Tibia

Extend the leg. Insertion site is approximately 1cm medial to the tibial tuberosity, or just below the patella (approximately 1cm or one finger width) and slightly medial (approximately 1cm or one finger width), along the flat aspect of the tibia. Pinch the tibia between your fingers to identify the centre of the medial and lateral borders.

Needle Selection

- The needle selection is based on weight and age; the red needle for 3-39kg (Paediatrics) and the blue and yellow for >40kg.
- Soft tissue depth can be estimated by palpating the insertion site when deciding whether to use a blue or yellow needle for proximal tibia insertion in an adult.
- The yellow needle should be used for all proximal humerus insertions in patients >40 kg (or children over 12)



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Insertion Technique

- Ensure standard PPE
- Clean area with suitable antiseptic: 2% chlorhexidine in alcohol
- Select the correct IO needle for the patient/site.
- Position driver at insertion site with needle set at 45-degree angle to the skin surface for the humeral head and a 90 – degree angle to the skin surface for the proximal tibia. Gently inject the needle set until needle tip touches bone. Do not activate the drill mechanism until the needle tip touches the bone as this may cause the needle to ‘skid’ along the bone rather than penetrate the cortex.
- Briefly pause and ensure at least 5mm of device is visible above skin prior to drilling. (At least one black line is visible on the needle)
- Penetrate bone cortex by squeezing the trigger and applying gentle steady downward pressure. Do not apply too much pressure as this may cause the driver to stall.
- Release trigger and stop insertion when a sudden “give” is felt upon entry into the medullary space.
- Remove driver and stylet while holding IO device steady. Dispose of the stylet safely in the sharps box
- Apply stabiliser dressing
- Attached primed extension tube with 3-way tap; do not attach syringe directly to IO needle.
- Protect the sterile connections at all times.
- Prior to flush attempt aspiration of small amount of bone marrow. Be aware that bone marrow will not always be aspirated.
- Flush with 10ml of normal saline. Failure to appropriately flush may result in limited or no flow.
- Fluids should be administered via a 50ml syringe and 3-way tap. During infusion observe regularly for subcutaneous swelling, indicating displacement of the IO device.

Complications

- Failure to enter marrow cavity usually due to selection of a needle that is too short
- Through and through penetration (more likely with paediatric patients)
- Local tissue necrosis due to excessive force/compression of tissues.
- Local infection/osteomyelitis.

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Storage and cleaning

The EZ-IO vascular access system should be stored in the primary response bag to ensure immediate availability during time critical emergencies

After use the EZ-IO driver should be surface wiped with tuffie 5 wipes prior to being returned to the soft storage case

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