



CG003 Intraosseous access

1. Key Recommendations for operational use			
For use by: All teams: Internet: Yes			
1	Patients	<ul style="list-style-type: none"> Critical illness without IV access. Multiple unsuccessful attempts at IV access. 	
2	Contraindications	<ul style="list-style-type: none"> Fracture or vascular injury in same limb. Previous orthopaedic procedure (eg prosthetic joint) at or near insertion site <ul style="list-style-type: none"> look for surgical scars. Local infection at site. Inability to recognise landmarks for insertion. Previous IO access at same site within previous 24 hours. 	
3	Potential Sites	<ul style="list-style-type: none"> Right proximal humerus is the preferred site (access in transit). Alternatives: Proximal tibia, Distal tibia. Consider distal femur in children. 	
4	Site Identification (Adult: Humeral head)	<ul style="list-style-type: none"> Position patient's hand on their abdomen Identify the midline of greater tuberosity Do not attempt insertion medial to the greater tuberosity: the axillary vessels and brachial plexus may be at risk 	
5	Needle selection	<ul style="list-style-type: none"> Yellow needle: >40 kg, excessive tissue, humerus Blue: ≥ 3 kg Pink: 3-39 kg 	
6	Insertion Technique	<ul style="list-style-type: none"> Clean area with 2% chlorhexidine Prime extension line Push needle through skin until needle tip touches bone. Ensure at least 5mm (black line) of needle is still visible above skin prior to drilling. Drill with gentle pressure until give is felt or depth obtained Apply stabiliser dressing Attached primed extension tube with 3-way tap Do not attach syringe directly to IO device Flush with 10ml of normal saline (5ml for children) <ul style="list-style-type: none"> No flush = no flow Consider slow 2-4mL 1% lidocaine flush in conscious patient Administer fluids with a 50ml syringe via a 3-way tap Consider 20ml syringe if significant resistant apparent with 50ml Observe regularly for subcutaneous swelling: indicating displacement 	



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2. Document History			
Reference Number	CG003		
Version	2		
Writing group (Lead author in bold)	Jenny Adams	Paramedic	BASICS Scotland
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Date issued	7th December 2020	V1 October 2017 - October 2020	
Date for review	December 2023		
Distribution	BASICS Scotland		✓
	Medic 1		✓
	Mountain rescue teams		✓
	Referring centres via service websites		✓
	Rural GPs Association of Scotland		✓
	SAS	Air Ambulance	✓
		Specialist Services Desk	X
	ScotSTAR	EMRS West	✓
		EMRS North	✓
		Paediatric	✓
Neonatal		X	
Tayside Trauma Team		✓	





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3. Scope and purpose

- Overall objectives:

To ensure appropriate familiarisation and use of EZ-IO intraosseous access devices. Intraosseous (IO) access provides a rapid solution to vascular access in adult and paediatric patients where establishing IV access is difficult or impossible.

- Statement of intent:

This guideline is not intended to be construed or to serve as a standard of care. Adherence to guideline recommendations will not ensure a successful outcome in every case, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care aimed at the same results. The ultimate judgement must be made by the appropriate healthcare professional(s) responsible for clinical decisions regarding a particular clinical procedure or treatment plan.

- Feedback:

Comments on this guideline can be sent to: sas.cpg@nhs.scot

- Equality Impact Assessment:

Applied to the ScotSTAR Clinical Standards group processes.

- Guideline process endorsed by the Scottish Trauma Network Prehospital, Transfer and Retrieval group.





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4. Explanatory Statements		
4.1 Patients	Authors' recommendation	Level [Reference]
<ul style="list-style-type: none"> • <i>Critical illness without IV access</i> • <i>Multiple unsuccessful attempts at IV access</i> <p>IO access allows administration of all commonly used drugs and fluid infusions. Guidelines recommend consideration of IO if IV access is difficult or impossible. Time frame for moving to IO access should be assessed as a balance between condition of patient and perceived difficulty of access. Intraosseous injection of drugs achieves adequate plasma concentrations in a time comparable with injection through a vein.</p>	Conditional	Guideline [1,2]
4.2 Contraindications		
<ul style="list-style-type: none"> • <i>Fracture or vascular injury in same limb.</i> • <i>Previous orthopaedic procedure (eg prosthetic joint) at or near insertion site</i> <ul style="list-style-type: none"> - <i>look for surgical scars.</i> • <i>Local infection at site.</i> • <i>Inability to recognise landmarks for insertion.</i> • <i>Previous IO access at same site within previous 24 hours.</i> 	Conditional	Manufacturer's guideline [3]
4.3 Potential sites		
<ul style="list-style-type: none"> • <i>Right proximal humerus</i> <i>is the preferred site (access in transit)</i> <p>This is the opinion of the writing group based on ease of access in transit and is consistent with the SAS clinical guideline [4]</p> <ul style="list-style-type: none"> • <i>Alternatives: Proximal tibia, Distal tibia</i> • <i>Consider distal femur in children</i> 	GPP Conditional	[3,4]
4.4 Site identification		
<ul style="list-style-type: none"> • <i>Position patient's hand on their abdomen</i> • <i>Identify the midline of greater tuberosity</i> • <i>Do not attempt insertion medial to the greater tuberosity as the axillary vessels and brachial plexus may be at risk</i> 	Conditional	Manufacturer's guideline [3]
4.5 Needle selection		
<ul style="list-style-type: none"> • <i>Yellow needle: >40kg, excessive tissue, humerus</i> • <i>Blue: ≥ 3kg</i> • <i>Pink: 3-39kg</i> 	Conditional	Manufacturer's guideline [3]



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4.6 Insertion technique	Authors' recommendation	Level [Reference]
<ul style="list-style-type: none">• Clean area with 2% chlorhexidine• Prime extension line• Push needle through skin until needle tip touches bone.• Ensure at least 5mm (black line) of needle is still visible above skin prior to drilling.• Drill with gentle pressure until give is felt or depth obtained• Apply stabiliser dressing• Attached primed extension tube with 3-way tap• Do not attach syringe directly to IO device• Flush with 10ml of normal saline (5ml for children)<ul style="list-style-type: none">- No flush = no flow- Consider slow 2-4mL 1% lidocaine flush in conscious patient• Administer fluids with a 50ml syringe via a 3-way tap• Consider 20ml syringe if significant resistant apparent with 50ml• Observe regularly for subcutaneous swelling: indicating displacement	Conditional	Manufacturer's guideline [3]

5. References

1. NICE guideline [NG39]: Major trauma: assessment and initial management. February 2016
2. <https://www.resus.org.uk/resuscitation-guidelines/adult-advanced-life-support/>
3. <http://www.teleflex.com/en/usa/ezioeducation/documents/8082Rev02FDAIntraosseousInfusionSystemIFUATH.pdf>
4. EZIO Clinical guideline. Scottish Ambulance Service. August 2017