VOIE INTRA-OSSEUSE

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Pourquoi?

- Difficulté d'obtenir VVP = Augmentation morbi/mortalitée.

- Plus la VVP est nécessaire, plus c'est difficile et long de l'obtenir :
  - Hypovolémie, ACR…
  - Jusqu'à 30% d'échec vs 4% en général
  - Ajoute 10-15 min pour pose

- Nécessité d'un accès rapide.

Avantages

- Simple à apprendre
- Rapide à poser
  - 1,5 min VIO vs 3,6 min VVP (Paxton et al. J Trauma 2009)
- Réseau vasculaire riche et non collabable
- Tous les médicaments
- Possibilité de bilan
- Pharmacocinétique comparable à VVP

Comparison of intraosseous versus central venous vascular access in adults under resuscitation in the emergency department with inaccessible peripheral veins☆

Bernd A. Leidel[a,c,*], Chlodwig Kirchhoff[b], Viktoria Bogner[b], Volker Braunstein[b], Peter Biberthaler[b], Karl-Georg Kanz[b]

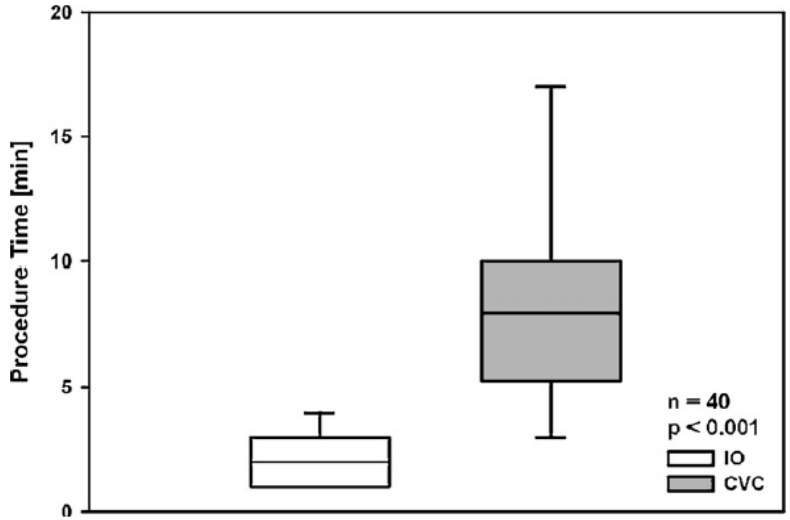


Table 2
Success rate and procedure time.

	IO ($n=40$)	CVC ($n=40$)	p
Success rate on first attempt (%)	34/40 (85)	24/40 (60)	0.024
95% CI, percentage	74–96	45–75	
Procedure time median, min	2.0	8.0	<0.001
Procedure time $Q_{0.25}$–$Q_{0.75}$, min	1.0–3.0	5.5–10.0	
Procedure time IQR, min	2.0	4.5	
Procedure time, min–max, min	1.0–4.0	3.0–17.0	
95% CI, min	1.0–3.0	4.0–13.0	

IO: intraosseous, CVC: central venous catheterisation; $Q_{0.25}$: lower quartile, 25%, $Q_{0.75}$: upper quartile, 75%, IQR: inter quartile range.

Intraosseous Versus Intravenous Vascular Access During Out-of-Hospital Cardiac Arrest: A Randomized Controlled Trial

Rosalyn Reades, MD, Jonathan R. Studnek, PhD, NREMT-P, Steven Vandeventer, EMT-P, John Garrett, MD

2011

Annals *of* Emergency Medicine

Vascular Access Site	Initial Success, % (95% CI)	Displacement, % (95% CI)	Overall Success, % (95% CI)
Total sample, n=182	71 (65–78)	9 (5–14)	62.1 (55–62)
Intention-to-treat analysis*			
Humeral IO, n=51	71 (58–83)	20 (8–31)	51 (37–65)
PIV IO, n=67	49 (37–61)	6 (0–12)	43 (31–55)
Tibial IO, n=64	95 (90–100)	5 (0–10)	91 (83–98)
As-treated analysis*			
Humeral, n=42	64 (49–79)	24 (11–37)	40 (25–56)
PIV, n=63	46 (33–58)	5 (0–10)	41 (29 (54)
Tibial, n=77	96 (92–100)	5 (0–10)	91 (84–97)

*$P<.001$.

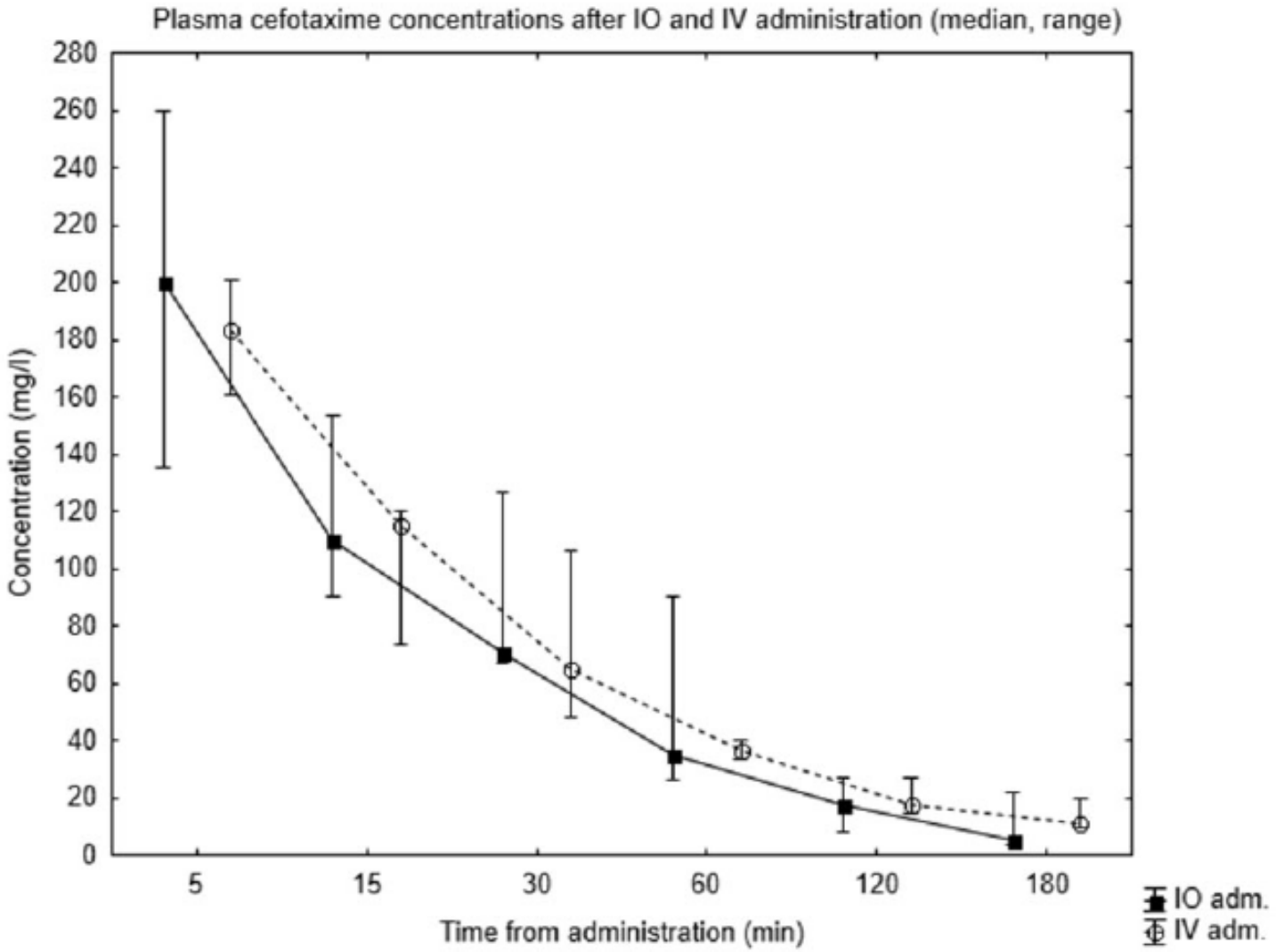
Table 4. Analysis of secondary outcomes by assigned access site.

Secondary Outcomes, Median (IQR)	Humeral IO, n=51	PIV, n=67	Tibial IO, n=64
Total number of attempts*	1 (1–2)	1 (1–2)	1 (1–1)
Time to initial success, min*	7.0 (3.9–10)	5.8 (4.1–8)	4.6 (3.6–6.2)
Time to drug administration after success, min	7.7 (5.2–12.2)	7.6 (5.1–9.7)	6.5 (4.8–8.6)
Amount of fluid infused, mL*	400 (200–650)	800 (500–1,000)	400 (250–550)

*$P<.001$.

Intraosseous and intravenous administration of antibiotics yields comparable plasma concentrations during experimental septic shock

G. Strandberg[1], A. Larsson[2], M. Lipcsey[1], J. Michalek[3] and M. Eriksson[1]



Does Intraosseous Equal Intravenous?
A Pharmacokinetic Study

Daniel D. Von Hoff MD, FACPa, John G. Kuhn Pharm D, FCCP, BCOPb, Howard A. Burris III MD, FACPc, Larry J. Miller MDd,*

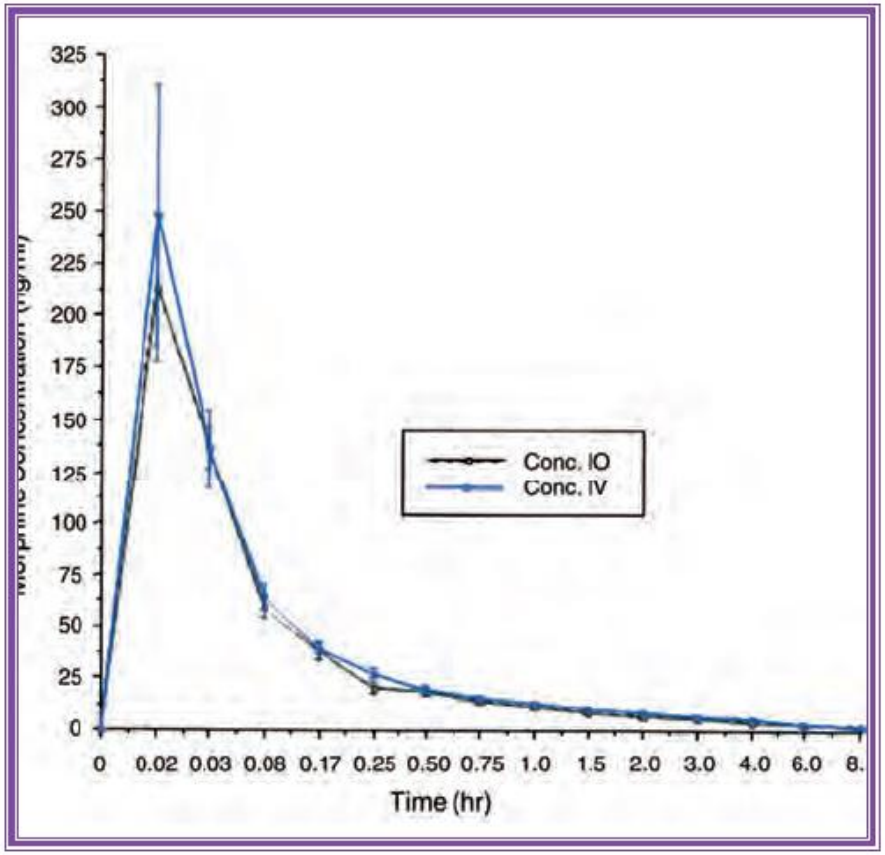


Fig. 5 Plasma concentration (mean F SEM) vs time curve (0-8 hours) of morphine sulfate in 14 subjects after a 5mg bolus of morphine sulfate administered intraosseously (dashed line) or intravenously (solid line).

Indications

- Adultes : 2nde intention
  - Echec de pose VVP après 90s ou 2 essais
  - Patient nécessitant un abord veineux urgent

- Enfant : 2nde voire 1ère intention
  - ACR
  - Défaillance

Contents lists available at ScienceDirect

Resuscitation

journal homepage: www.elsevier.com/locate/resuscitation

European Resuscitation Council Guidelines for Resuscitation 2015 Section 3. Adult advanced life support

Jasmeet Soar[a,*], Jerry P. Nolan[b,c], Bernd W. Böttiger[d], Gavin D. Perkins[e,f], Carsten Lott[g], Pierre Carli[h], Tommaso Pellis[i], Claudio Sandroni[j], Markus B. Skrifvars[k], Gary B. Smith[l], Kjetil Sunde[m,n], Charles D. Deakin[o], on behalf of the Adult advanced life support section Collaborators[1]

Intraosseous route. If intravenous access is difficult or impossible, consider the IO route. This is now established as an effective route in adults.[357–365] Intraosseous injection of drugs achieves adequate plasma concentrations in a time comparable with injection through a vein.[366,367] Animal studies suggest that adrenaline reaches a higher concentration and more quickly when it is given intravenously as compared with the intraosseous route, and that the sternal intraosseous route more closely approaches the pharmacokinetic of IV adrenaline.[368] The recent availability of mechanical IO devices has increased the ease of performing this technique.[369] There are a number of intraosseous devices available as well as a choice of insertion sites including the humerus, proximal or distal tibia, and sternum. We have not done a formal review of devices or insertion sites as part of the 2015 Guidelines process. The decision concerning choice of device and insertion site should be made locally and staff adequately trained in its use.

Resuscitation 95 (2015) 223–248

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Resuscitation

journal homepage: www.elsevier.com/locate/resuscitation

European Resuscitation Council Guidelines for Resuscitation 2015 Section 6. Paediatric life support

Ian K. Maconochie[a,*], Robert Bingham[b], Christoph Eich[c], Jesús López-Herce[d], Antonio Rodríguez-Núñez[e], Thomas Rajka[f], Patrick Van de Voorde[g], David A. Zideman[h], Dominique Biarent[i], on behalf of the Paediatric life support section Collaborators[1]

Vascular access

Vascular access is essential to enable drugs and fluids to be given, and blood samples obtained. Venous access can be difficult to establish during resuscitation of an infant or child. In critically ill children, whenever venous access is not readily attainable, intra-osseous access should be considered early, especially if the child is in cardiac arrest or decompensated circulatory failure.[187–193] In any case, in critically ill children, if attempts at establishing intra-venous (IV) access are unsuccessful after one minute, insert an intra-osseous (IO) needle instead.[190,194]

Contre Indications

- Fracture du site de ponction
- Lésion vasculaire sus-jacente
- Brûlure ou infection cutanée du site de ponction
- Prothèse orthopédique (genou ou épaule)
- VIO posée récemment sur le même site

Sites d'insertion

- Humérus proximal
- Tibia proximal
- Tibia distal
- Fémur distal (avant 6 ans)
- Sternal
- (Iliaque)

Dispositifs Manuels

← Aiguille Cook

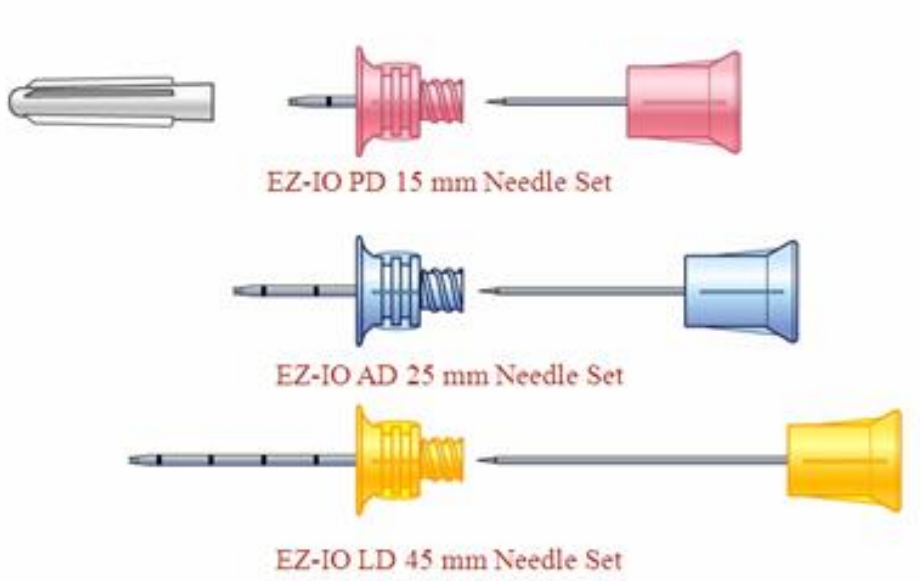
Trocart Jamshidi →

Dispositif à propulsion

← Bone Injection Gun (BIG)

FAST-X →

Dispositifs automatiques



Site Huméral

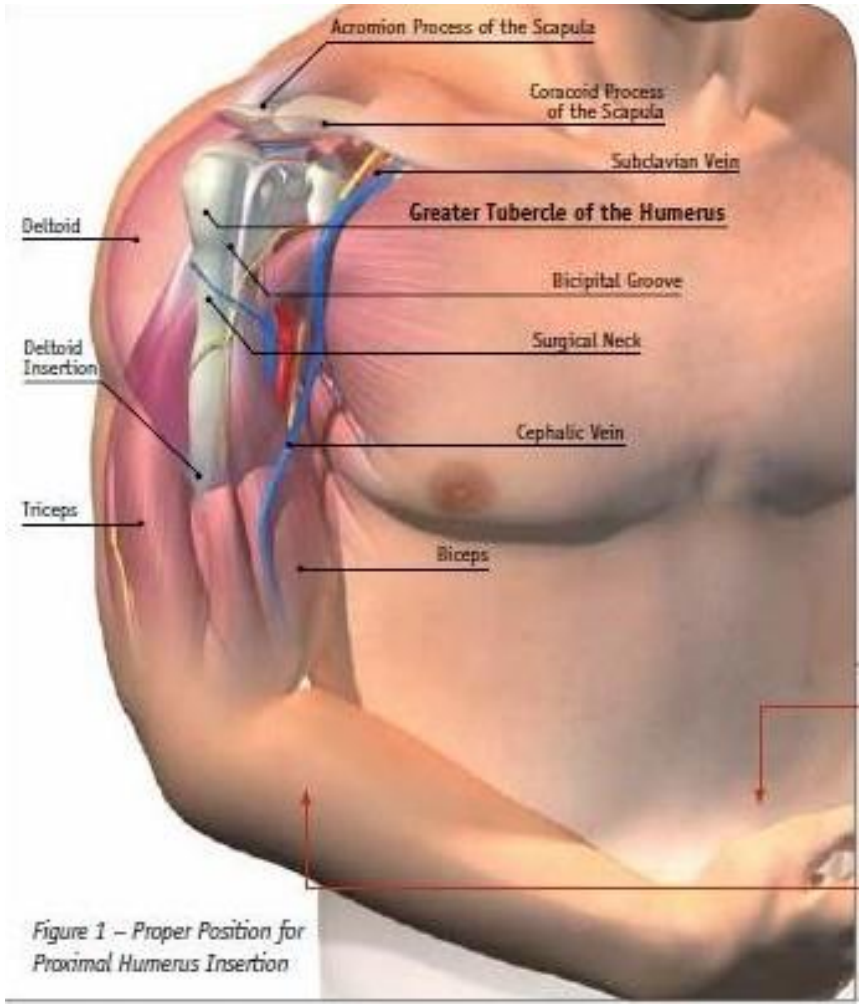
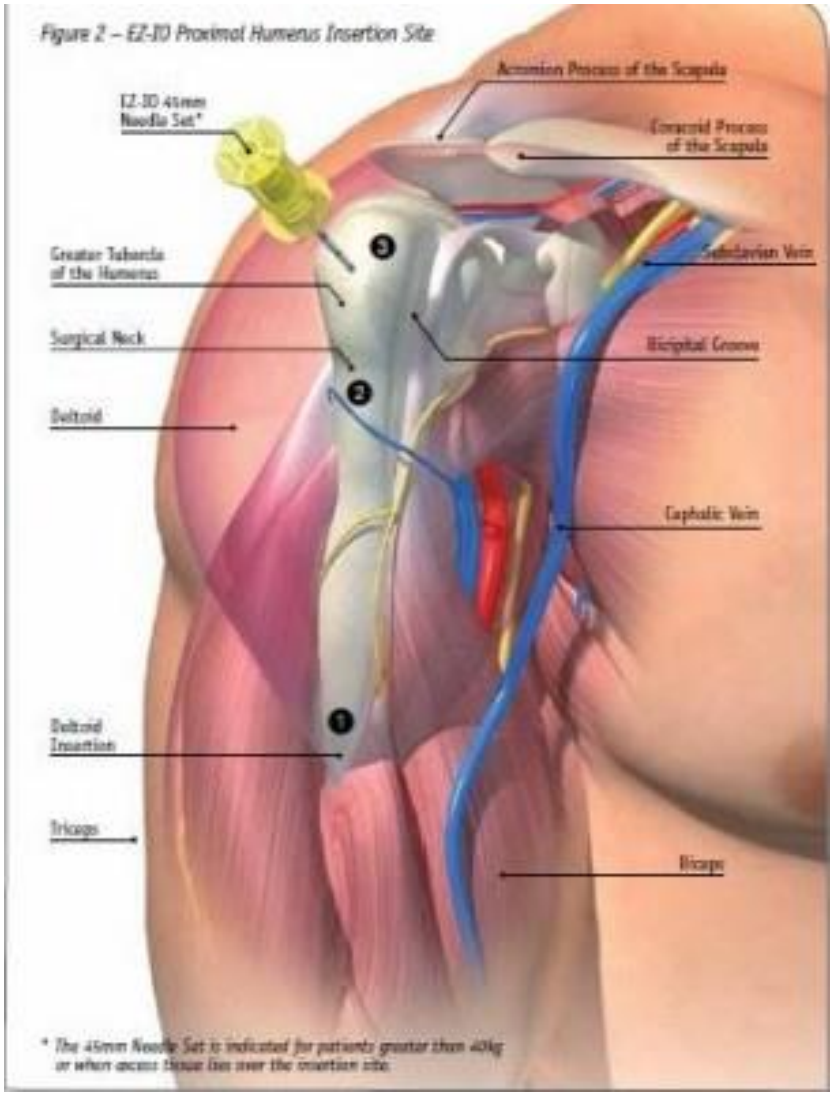


Figure 1 – Proper Position for Proximal Humerus Insertion

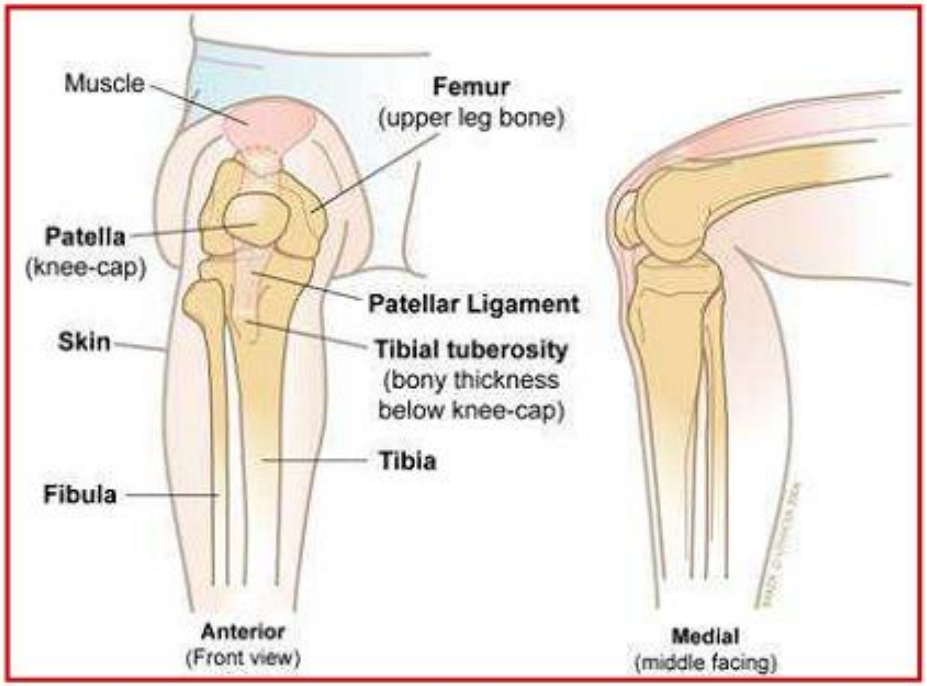
- Bras adduction/rotation interne (main sur l'ombilic)
- Repérer tubercule majeur

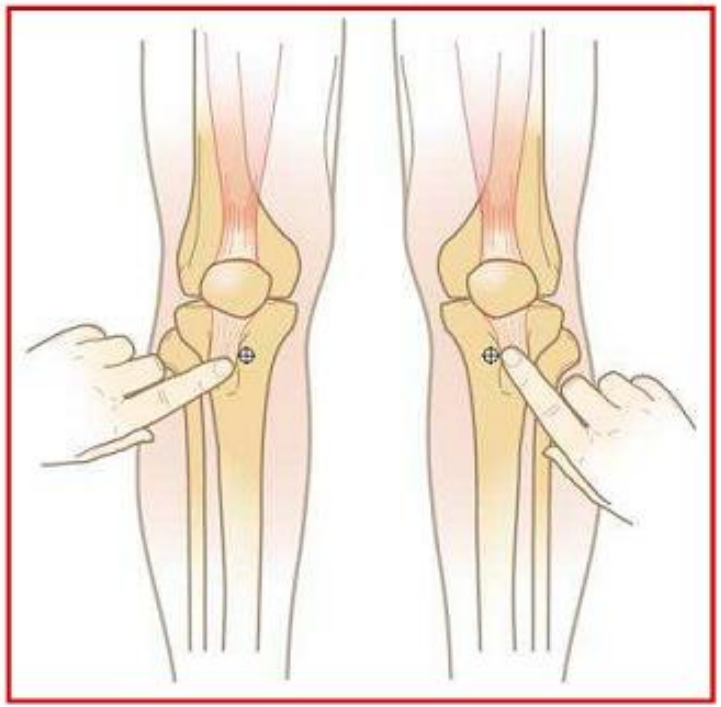
Site huméral



- Perpendiculaire à la peau
- Insertion 45° / plan horizontal

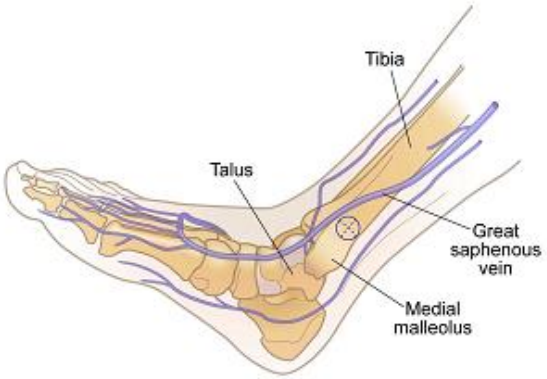
Site tibial proximal





Genou demi-fléchi (billot)
Repérer la rotule
Descendre sur tubérosité tibial
Un travers doigt en interne

Site tibial distal



Repérer la tubérosité tibial (malléole int)

Insertion 2-3 travers de doigt au dessus

Autre site

- Fémur inférieur : chez enfant

- Sternal (FAST-X) : manubrium sternal

Pose

- Choix matériel
- Choix du site, repères
- Asepsie
- Si conscient AL : Lidocaïne 2% sous cutanée et périoste
- Insertion perpendiculaire à la peau
- Laisser 5 mm d'aiguille visible
- Prolongateur et test d'aspiration (+/- bilan)

Pose

- Si patient conscient :
  - Injection Lidocaïne 2% : bolus 0,2 ml pour anesthésie (max 2 ml)
  - Flush NaCl : vérifier absence d'extravasation et résistance (2 ml + 8 ml)
- Si ACR :
  - Flush NaCl uniquement
- Passage perfusion sous pression (300 mmHg)

Critères de bonne mise en place

- Sensation de rupture de la corticale
- Aiguille immobile dans l'os
- Présence de sang/moelle osseuse à l'aspiration
- Injection sans résistance
- Pas d'extravasation

→ Si doute sur la pose, changer de site.

Complications

- Rare (moins de 1%)
- Extravasation sous cutanée (risque sd des loges)
- Infectieux : ostéite, abcès, cellulite… → retrait avant 24h
- Fractures (propulsions)

Conclusion

- Voie d'urgence
- Simple et rapide
- Même posologie IV et IO