

# Intraosseous infusion

**Intraosseous infusion** in cases where it is necessary to ensure access to the bloodstream which cannot be ensured even with a line. All drugs, including solutions and blood derivatives, can be administered intraosseously. The speed of onset of action is comparable to central venous access. It is most often used in pre-hospital care, in hospitals it can help in urgent situations, especially if it is not possible to cannulate the central vein reliably and quickly.

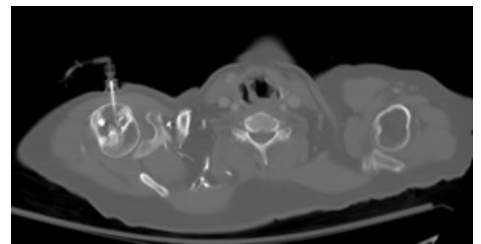
A certain disadvantage is the **painful application**, the need for special cannulae and **the limited time** of possible use - 6-12, exceptionally a maximum of 24 hours of use are mentioned. The pain during bone penetration is overestimated, it is comparable or less than skin puncture with a wider cannula (Gronych 2014).

## Indication

- impossibility of inserting an intravenous cannula (two unsuccessful attempts in an emergency situation)
- cardiopulmonary resuscitation
- shock of any etiology
- status epilepticus

## Contraindications

- osteogenesis imperfecta
- osteopetrosis
- fractura tibiae or other bones chosen for puncture
- patient refusal
- injection site infection, previous orthopedic surgery
- intra-abdominal and pelvic injuries from intended bony entry in the inferior vena cava basin



Intraosseous Infusion

## Approches

- humeral head (suitable for resuscitation)
- proximal part of the tibia at the site of *tuberositas tibiae* (children < 6 years)
- distal femur
- calcaneus (newborns and children < 6 months)

## Proximal tibial procedure

- the patient is in the supine position
- We support the slightly bent lower limb so that the lower leg rests on a firm base (i.e. to ensure good stabilization of the lower leg)
- the injection site is the proximal part of the tibia, approximately 2 cm medial and 2 cm proximal (**distal in children**) from the *tuberositas tibiae*, strict aseptic conditions must be ensured during the procedure
- perpendicular to the long axis of the bone, we penetrate the bone matrix and penetrate the bone marrow with a helical movement (penetration into it is associated with a loss of resistance), the depth of injection is usually 1-1.5 cm

## After introducing

- the needle is in the correct position when it rests firmly in the bone and when we aspirate the marrow
- in a conscious patient, we very slowly apply 2 ml of local anesthetic
- if we think we are in the right position, but the bone marrow cannot be aspirated, we flush the needle with 10 ml (children 2-5 ml) of physiological solution and observe whether there is an arching
- first bolus forcefully within 5 sec loosening of trabecular bone (No flush = no flow)
- if everything is without problems, fix the needle and cover it sterilely

## Complications

- superficial infections
- osteomyelitis
- subperiosteal infusion
- compartment syndrome
- transient appearance of blasts in peripheral blood
- needle dislocation and subsequent bleeding
- according to some authors, fat embolism in adult patients
- damage to growth cartilage in children

## Video

<mediaplayer width='500' height='300'><https://www.youtube.com/watch?v=KHXSfh2ZRDM></mediaplayer>

# Links

## References

- ŠEVČÍK, Pavel, et al. *Intenzivní medicína*. 3. edition. Galén, 2014. 1195 pp. pp. 100. ISBN 9788074920660.
- HAVRÁNEK, Jiří: *Intraoseální infuze*. (upraveno)
- [Gronych, Luděk 2014](#)
- [Leták výrobce pro lokalizaci návrtu na humeru](#)
- [Kubalová, Jana 2017](#)

## Related articles

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