

**Abstract:**

**Aim:** Intraosseous (IO)-access plays an alternative route during resuscitation. Our study in preterm and term stillborns was performed to find alternative IO puncture sites beside the recommended proximal tibia.

**Methods:** The cadavers used were legal donations. 20 stillborns (mean: 29.2weeks, IQR 27.1-39.6) were investigated. Spectral-CT were analysed to calculate the diameter and circumferences of: i) proximal humerus ii) distal femur iii) proximal tibia iv) diaphyseal tibial. Contrast medium was applied under video documentation to investigate the drainage into the vascular system.

**Results:** In term newborns, diameter of the cortex of the proximal humeral head is  $12.1 \pm 1.8$  mm, distal end of the femur  $11.9 \pm 3.4$  mm and the proximal tibial bone  $12.0 \pm 2.4$  mm with cross-sectional diameter of  $113.5 \pm 19.7$  mm<sup>2</sup>,  $120.6 \pm 28.2$  mm<sup>2</sup> and  $111.6 \pm 29.5$  mm<sup>2</sup>, respectively. Regarding the preterm groups, there is a strong age-related growth in diameter and cross-sectional size. The diaphyseal area is the smallest in all measured bones with an age-dependent increase and is about half of that of metaphyseal diameters (proximal and distal) and about one third of that of metaphyseal cross sectional areas. The proximal femoral head region has the largest diameter of all measured bones with an egg-shaped formation with an extensive joint capsula. All investigated metaphyseal areas lack a clearly enclosed bone marrow cavity. Infusion of contrast medium into the distal femoral end and the proximal humerus head demonstrate the drainage of contrast medium into the central venous system within seconds.

**Conclusion:** Proximal humeral head and distal femoral end might be alternative IO areas which may lead to further IO puncture sites in neonates.

**Reference:**

Eifinger F, Scaal M, Wehrle L, Maushake S, Fuchs Z, Koerber F. Finding alternative sites for intraosseous infusions in newborns. *Resuscitation*. 2021 Apr 13:S0300-9572(21)00144-1. doi: 10.1016/j.resuscitation.2021.04.004. Epub ahead of print. PMID: 33862177.