March 2024

# Biological sex is a predictor of pretibial subcutaneous tissue depth for intraosseous catheter insertion

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## Abstract

### Introduction
Intraosseous (IO) vascular access is most commonly used when critical patients need rapid establishment of vascular access. They have shown high rates of successful placement, with the proximal tibia showing the highest first-attempt success rates. Proper establishment of vascular access requires a needle properly sized to enter the bony cortex and stay there. In this study, we analyzed demographic associations with pre-tibial subcutaneous tissue depth (PTSTD).

### Methods
The PTSTD was calculated using computed tomography (CT) images of adult (≥ 18 years old) patients. Variables including side, age, sex, height, weight, BMI, hypertension, diabetes mellitus, atherosclerosis, coronary artery disease, and osteoarthritis were analyzed statistically.

### Results
368 patients were included in the final data analysis. Patient body mass index, height and weight showed a statistically significant impact on PTSTD overall, and between <20 mm and 40 mm > x > 20 mm and < 20 mm and > 40 mm groups. Only height displayed a statistically significant effect between 40 mm > x > 20 mm and > 40 mm group. Sex displayed a statistically significant effect on PTSTD.

### Conclusions
Female sex and higher BMI appear to be related to increased soft tissue thickness in this patient population. Longer catheters may be needed for some obese patients, especially females.