

Anatomical Study of Superior Pubic Ramus Bone Corridor in Spaniard Population

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Purpose: Our objective was to study the dimensions of the superior pubic ramus bone corridor of Spaniard population to know the safety for 6.5-cm screw placement.

Methods: We have studied a cohort of 100 non-trauma patients who have had a pelvic CT scan. We selected the pelvis that corresponded to Spaniard citizens. People with skeleton illnesses or trauma were excluded. We finally obtained 67 patients (32-87), 32 males and 35 females. The sizing of the canal was based on the DICOM (Digital Imaging and Communications in Medicine) study of the standard multislice CT (Philips Brilliance 64, 0.625-mm slice thickness) performed to those patients in our hospital. By using image processing software (Osirix MD version 11.0), a 3-dimensional multiplanar rendering was done, using a Macintosh personal computer (Apple). It has been measured in an inlet position of the pelvis and in an outlet obturator oblique position. We measured the 7 zones corresponding to the width of the iliac side of the canal (zone I), the narrowest supra-acetabular part of the canal (zone III), we called zone II between I and III, the canal above the acetabular notch (zone IV), the canal above the obturator ring (zone VI), pubic tubercle (zone VI), and symphysis (zone VII). We also measured the length of the ilioinguinal canal and the minimal anterior and superior distance from the iliopubic rami to the vessels.

Results: The means of different zones were: zone I 1.93 ± 0.46 , zone II 1.25 ± 0.42 , zone III 0.72 ± 0.30 , zone IV 1.58 ± 0.34 , zone V 0.84 ± 0.22 , zone VI 0.53 ± 0.22 and zone VII 0.98 ± 0.29 . No statistically significant difference has been observed between males and females in zones I, II, III, and IV, but there are differences in zones V and VII. Zone III males mean 0.77 (0.39-1.4) and females 0.68 (0.32-1.59), zone V males 0.89 (0.53-1.18) and females 0.80 (0.45-1.43), and zone VI males 0.56 (0.23-1.05) and females 0.51 (0.16-1.16). The mean width in zone V in males is 0.89 ± 0.19 and for females 0.79 ± 0.24 . The mean in zone VII in males is 1.07 ± 0.3 and in females 0.90 ± 0.26 . Screw length mean in males was 11.26 ± 0.93 and in females 10.46 ± 1.23 , with a statistically significant difference. Anterior distance to vessels was mean $1.2 \text{ cm} \pm 0.37$ and superior distance to vessels mean $1.42 \text{ cm} \pm 0.5$. No difference was found between men and women.

Conclusion: The anterior column canal presents 3 narrow zones in which measures can be smaller than 6.5 cm for the introduction of an antegrade screw. It does not depend on the sex of the patient. Individual 3-dimensional anatomic study should be done before surgery in all cases to evaluate the canal width and optimal screw size.