Does Pelvic Incidence Influence the Morphology of the Sacroiliac Joint?

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Pelvic Incidence is defined as the angle between the perpendicular line to the upper plate of S1 at its midpoint and the line between this point and the center of bicoxofemoral line, it describes the position of femoral heads in relation to sacrum. Recently some authors described a direct correlation between high values of PI and large AP pelvic axis (horizontal pelvis) and a wide pelvic ring [1]. Also the acetabular orientation is influenced by PI ; high values of PI means a more vertical acetabulum. Having regard to the relationship between PI and the main structures involved in the load transfer, to date no studies that correlate the morphology of the Sacroiliac Joint (SiJ) and PI were performed. The aim of this study is to evaluate the different morphology of the auricular surface of the sacrum comparing two groups of healthy young people with low (<40°) and high (>40°) PI. We retrospectively analysed 51 consecutive young (between 20 and 35 y.o.) people. After the evaluation of PI the sample was divided into two groups: 31 people belong to the group A (PI < 40°) and 20 people belong the the group B (PI >40°). The following morphological parameters of the SiJ were analysed: length of long axis (LLA), length of short axis (LSA), length of oblique axis (LOA), ratio between long and short axis (RLSA), angle between axis (ABA) and surface; global shape of the joint was evaluated; two new parameters were introduced, SiJ Tilt (SiJT), defined as the angle between the vertical line and the long axis of the SiJ and SiJ Slope (SiJS), defined as the angle between the horizontal line and the short axis of the SiJ. We found a strong statistically significant correlations (p-value 0.05) between PI and RLSA, shape, ABA, SiJT and SiJS; a weaker correlations (p-value 0.10) between PI and LLA, LSA were observed; no statistically significant correlation between PI and LOA and surface were observed. The results underline that there is a strong correlation between pelvic morphology and SiJ anatomy. Further studies, about the different pattern of forces distribution among SiJ, will need to be performed to have a better knowledge that could help to understand the biomechanics and pathophysiology of normal and pathological SiJ.

References

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