

# **Radiographic analysis of the relationship between sagittal lumbopelvic alignment and acetabular undercoverage phenotype in patients with symptomatic hip dysplasia**

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## **INTRODUCTION:**

The relationship between sagittal lumbopelvic alignment and the dysplastic hip joint is currently at the forefront of scientific interest. The intention of this study was to analyze whether there is association between the morphology of the acetabulum in dysplastic hip joints and the sagittal lumbopelvic alignment.

## **METHODS:**

From September 2022 to March 2024, a total of 206 patients with hip dysplasia were examined. The hip joints of the patients were classified into anterolateral and posterolateral dysplasia morphologies. Additionally, the lumbopelvic sagittal alignment of those patients was analyzed and correlated with the phenotype of dysplasia. Furthermore, a multivariable linear regression analysis was conducted to assess the association of lumbopelvic sagittal alignment with additional independent factors.

## **RESULTS:**

It was demonstrated that the pelvic tilt (PT) significantly differs between anterolateral and posterolateral hip dysplasia phenotypes ( $16.84^\circ \pm 8.75^\circ$  vs.  $11.51^\circ \pm 6.63^\circ$ ,  $p = 0.0002$ ). Similar findings were shown for pelvic incidence (PI) ( $57.19^\circ \pm 12.96^\circ$  vs.  $50.75^\circ \pm 13.1^\circ$ ,  $p = 0.0031$ ). However, sacral slope (SS) appeared independent of the morphology of hip joint dysplasia ( $39.95^\circ \pm 11.27^\circ$  vs.  $39.13^\circ \pm 11.88^\circ$ ,  $p = 0.3441$ ). The association between a PT of  $>14.5^\circ$  and anterolateral dysplasia was identified as the most significant factor within the linear regression analysis.

## **DISCUSSION AND CONCLUSION:**

The results of this study underline a prevailing paradox in the dysplastic hip-spine association. Contrary to previous theories, pelvic tilt constitutes a component of the corresponding phenotype of dysplasia, rather than a compensatory tilt.