Roussouly classification

Lumbar lordosis

Type 1

The distal arch is almost absent, the apex is very low, close to L5 and LL is quite constructed by only the proximal arch. Lumbar lordosis is short and, therefore, the kyphosis is long, with an extension on the thoraco-lumbar area. In summary, it is a non-harmonious back with thoraco- lumbar kyphosis and short hyperlordosis. Low pelvic incidence.

Type 2

The distal arch is low; it is longer but flat, close to a straight line. It is a harmonious flat back. Mean sacral slope (35° - 45°), low pelvic incidence.

Type 3

Lumbar lordosis is well balanced between its two arches. It is a harmonious regular back. High sacral slope (> 45°), high pelvic incidence.

Type 4

The distal arch is highly increased in angle and number of vertebrae; length and curvature of lumbar lordosis increase. It is a harmonious hypercurved back. High pelvic incidence. [1].

A total of 70 asymptomatic participants (36 women and 34 men) without regular physical activity were categorized according to the four subtypes of sagittal alignment proposed by Roussouly. All participants underwent magnetic resonance imaging of the lumbar spine (1.5T) and panoramic radiography of the spine. The degree of disc degeneration was graded using T2-weighted images according to the Pfirrmann classification. Spinopelvic parameters and vertebral curvatures were measured on digital panoramic radiographs using Surgimap software. Interobserver analyses for the Pfirrmann classification and spinopelvic parameters were assessed using the weighted Kappa and intraclass correlation coefficient (ICC), respectively.

The Kappa associated with disc degeneration classification was 0.79 (95% confidence intervals 0.72-0.87). The ICCs were excellent, with small confidence intervals for all spinopelvic parameters. The type II group (flat lordosis) showed a higher frequency of degenerated discs at L4-L5 (P=0.03) than the type IV group (long and curved lumbar spine). No significant differences in disc degeneration were observed among the four subtypes at the other disc levels. We found a negative, moderate correlation between the spinopelvic parameters and the occurrence of disc degeneration in the type II group.

The Roussouly subtype II sagittal alignment is significantly associated with disc degeneration at L4-L5 in asymptomatic young adults. The results support the hypothesis that spinal sagittal alignment plays a role in early disc degeneration [2].

1)
Roussouly P, Pinheiro-Franco JL. Biomechanical analysis of the spino-pelvic organization and adaptation in pathology. Eur Spine J. 2011 Aug 2;20(S5):609-18.

2)
Menezes-Reis R, Bonugli GP, Dalto VF, da Silva Herrero CF, Defino HL, Nogueira-Barbosa MH. Association Between Lumbar Spine Sagittal Alignment and L4-L5 Disc Degeneration Among Asymptomatic Young Adults. Spine (Phila Pa 1976). 2016 Sep 15;41(18):E1081-7. doi: 10.1097/BRS.0000000000001568. PubMed PMID: 26987107.