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Exploring the Relationship Between Lumbar Lordosis and Low Back Pain: Biomechanical, Clinical, and Research Perspectives

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ABSTRACT

Introduction: People all around the world suffer from Low Back Pain (LBP), a common musculoskeletal condition that has serious socioeconomic repercussions. Among various biomechanical factors, lumbar lordosis plays a critical role in spinal load distribution and posture. However, its exact relationship with LBP remains debated, necessitating further investigation.

Aim: This study aims to explore the relationship between lumbar lordosis and LBP, examining anatomical, biomechanical, and clinical perspectives. It also highlights current treatment approaches and future research directions.

Materials and Methods: A thorough literature review was carried out with the aid of sources including Google Scholar, PubMed, and Scopus. Studies examining the biomechanics of lumbar lordosis, its variations, and their association with LBP were analysed. Both cross-sectional and longitudinal studies were included, along with reviews on rehabilitative interventions and surgical treatments.

Results: Findings indicate that deviations in lumbar curvature (hyperlordosis or hypolordosis) may contribute to abnormal spinal loading, leading to LBP. However, the association is not linear and depends on a number of variables, including posture, age, muscular strength, and degenerative changes. Rehabilitation programmes focusing on core stability, posture correction, and ergonomic interventions show promising outcomes, while surgical interventions remain reserved for severe cases.

Conclusion: Although lumbar lordosis plays a significant role in spinal biomechanics, its direct causative role in LBP remains inconclusive. Future research should focus on longitudinal studies, AI-driven diagnostics, and personalised rehabilitation strategies to enhance clinical outcomes.

Keywords: Lumbar lordosis, Low back pain, Spinal biomechanics, Postural alignment, Rehabilitation, Musculoskeletal disorders, Spinal stability

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