

Narrative Review of -Physiotherapy Prospects of Lordosis

Ms. Jasmina Yasmin¹, Mr. Aminul Islam Ahmed²,
Mr. Rekib Uddin Ahmed³, Dr. Pooja Saikia⁴

¹Student, Physiotherapy, Univeristy of Science and Technology

²Assistant Professor, Physiotherapy, University of Science and Technology

Abstract

Lordosis is a spinal postural deformity characterized by an excessive inward curvature of the lumbar or cervical spine, with lumbar hyperlordosis being the most prevalent form. Alterations in normal spinal curvature can lead to biomechanical dysfunction, postural imbalance, muscle weakness, pain, reduced mobility, and impaired functional performance. Factors such as poor posture, obesity, pregnancy, muscular imbalance, sedentary lifestyle, and congenital abnormalities contribute significantly to its development and progression. As a non-invasive and patient-centered approach, physiotherapy plays a pivotal role in the prevention, assessment, and management of lordosis.

Objective: The purpose of this narrative review is to critically examine the current literature on lordosis and to evaluate the scope, effectiveness, and clinical prospects of physiotherapy interventions in improving spinal alignment, reducing pain, restoring function, and enhancing quality of life among affected individuals.

Methods: A comprehensive literature search was conducted using electronic databases including PubMed and Google Scholar. Relevant peer-reviewed studies published between 2020 and 2026 were reviewed. The selected literature focused on the pathophysiology, assessment, biomechanical implications, associated musculoskeletal conditions, and physiotherapeutic management of lordosis. Findings were synthesized descriptively to identify prevailing evidence, clinical outcomes, and emerging trends in rehabilitation.

Results: The reviewed evidence suggests that physiotherapy interventions, including postural correction exercises, stretching, strengthening programs, core stabilization training, manual therapy, pelvic tilt correction, taping techniques, and patient education, contribute significantly to the management of lordosis. These interventions have been shown to reduce pain intensity, improve lumbopelvic stability, enhance muscle activation, optimize spinal alignment, and improve functional capacity. Recent studies further highlight the effectiveness of targeted rehabilitation approaches in populations with chronic low back pain, pregnancy-related postural changes, obesity, and age-related musculoskeletal decline.

LORDOSIS- Introduction-

Lordosis is a postural condition characterized by an excessive inward curvature of the spine, commonly affecting the lumbar and cervical regions. A normal lordotic curvature helps maintain posture, balance, flexibility, and shock absorption during movement. When the curvature becomes exaggerated, it may lead to postural imbalance, pain, muscle weakness, stiffness, and functional limitations.

Lumbar lordosis is the most common type and is often associated with anterior pelvic tilt, weak abdominal muscles, and tight lower back or hip flexor muscles. Individuals with lordosis may experience low back pain, reduced spinal mobility, fatigue, and difficulty in performing daily activities. This narrative review aims to study the prospects of physiotherapy in the management of lordosis and review the effectiveness of different physiotherapy interventions in improving posture and functional outcomes in individuals with lordosis.^{1,3}

RESEARCH QUESTIONS-

1. What is the effect of posterior pelvic tilt taping on lumbar lordosis angle, abdominal muscle thickness, pain intensity, and disability in individuals with chronic nonspecific low back pain and hyperlordosis?
2. How does pelvic stabilization during the Straight Leg Raise (SLR) test influence the accuracy of hamstring flexibility assessment and its relationship with lumbar lordosis and pelvic tilt?
3. What is the effect of core stabilization exercises on lumbopelvic rhythm, lumbar lordosis angle, and pain intensity in individuals with chronic nonspecific low back pain?
4. What is the relationship between spino-pelvic parameters (pelvic incidence, pelvic tilt, and lumbar lordosis) and sagittal balance in individuals with chronic low back pain?
5. What is the association between skeletal muscle mass (sarcopenia), lumbar lordosis, and chronic low back pain in elderly individuals?
6. What is the effect of postural and physiotherapy-based interventions (including exercise programs, prenatal exercises, and corrective training) on lumbar lordosis angle and pain outcomes in populations with biomechanical alterations such as pregnancy, obesity, and spinal deformities?

METHODOLOGY

Study Design

The present study was designed as a narrative review to comprehensively examine and synthesize the available literature related to lordosis and its physiotherapeutic management. The review aimed to explore the causes, biomechanical changes, clinical manifestations, associated musculoskeletal conditions, and physiotherapy interventions used in the management of lumbar lordosis. A narrative review approach was adopted to critically analyze and organize findings from various clinical and research studies.

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Data Sources

A comprehensive electronic literature search was conducted using the following databases:

1. Google Scholar
2. PubMed

These databases were selected due to their extensive coverage of peer-reviewed journals and high-quality research in physiotherapy, rehabilitation, orthopedics, biomechanics, and musculoskeletal sciences.

Search Strategy

The literature search was conducted for studies published between January 2015 and May 2026 to include recent developments in the assessment and management of lumbar lordosis.

The following keywords and search combinations were used:

1. “Lumbar lordosis”
2. “Hyperlordosis”
3. “Lumbar spine posture”
4. “Low back pain and lumbar lordosis”
5. “Pregnancy and lumbar lordosis”
6. “Pelvic tilt and lumbar lordosis”
7. “Pelvic floor muscles and lumbar lordosis”
8. “Kyphosis and lumbar lordosis”
9. “Core stability and lumbar lordosis”
10. “Postural correction”
11. “Physiotherapy management of lumbar lordosis”
12. “Exercise therapy for lordosis”
13. “Lumbar spine biomechanics”
14. “Lumbopelvic alignment”
15. “Manual therapy and lordosis”

Boolean operators such as AND, OR, and NOT were used to refine the search strategy. Filters were applied for publication year, English language, and peer-reviewed journal articles.

Inclusion Criteria

Studies were included if they met the following criteria:

1. Published between June 2020 and May 2026.
2. Peer-reviewed journal articles.
3. Studies investigating cervical lordosis, lumbar lordosis, or hyperlordosis.
4. Studies examining spinal alignment, pelvic alignment, posture, pain, or functional outcomes associated with lordosis.
5. Studies evaluating physiotherapy assessment methods and treatment interventions.
6. Articles published in English.
7. Research conducted on children, adults, athletes, pregnant women, or elderly populations.

Exclusion Criteria

Studies were excluded if they:

1. Were published before June 2020.
2. Were editorials, conference abstracts, letters, or non-peer-reviewed publications.
3. Did not directly investigate lordosis or spinal sagittal alignment.
4. Were animal or cadaveric studies without clinical relevance.
5. Focused solely on surgical management without physiotherapy implications.
6. Were duplicate publications.

Study Selection Process

The study selection process consisted of four stages:

1. Identification – Studies were identified through database searches using predefined keywords.
2. Screening – Titles and abstracts were reviewed for relevance.

3. Eligibility – Full-text articles were assessed according to inclusion and exclusion criteria.
4. Inclusion – Eligible studies were included in the final qualitative synthesis.

Data Extraction and Synthesis

Data from selected studies were extracted and organized into the following themes:

1. Definition and classification of lordosis
2. Pathophysiology of lordosis
3. Postural and musculoskeletal implications
4. Pregnancy-related lordosis and low back pain
5. Assessment techniques
6. Physiotherapy interventions
7. Recent advances in lordosis management

The findings were synthesized descriptively to identify patterns, similarities, inconsistencies, and research gaps.

Database Evaluation

The selected studies were obtained from Google Scholar and PubMed. These databases were chosen due to their extensive coverage of peer-reviewed and evidence-based literature related to physiotherapy and musculoskeletal sciences.

Database Insight – Google Scholar

Google Scholar was used as a primary database due to its wide coverage of peer-reviewed journals, research articles, and systematic reviews. It helped identify relevant studies related to lordosis, spinal alignment, pelvic tilt, low back pain, and physiotherapy interventions published between June 2020 and May 2026.

Recent advances in relation to lumbar lordosis-

Effect of Posterior Pelvic Tilt Tapping on abdominal muscle thickness and Lumbar Lordosis in Individuals With Chronic Low Back Pain and Hyperlordosis:A Single-Group,Repeated-Measures Trial-

Ali Bozorgmehr et al. conducted a study to evaluate the effect of Posterior Pelvic Tilt Taping (PPTT) using Kinesio tape in individuals with chronic low back pain and hyperlordosis. The tape was applied over the rectus abdominis and external oblique muscles to encourage posterior pelvic tilt and improve spinal alignment. The results showed a significant reduction in lumbar lordosis angle, pain intensity, and disability, which persisted even after tape removal. The study concluded that PPTT is a useful adjunct physiotherapy technique for managing hyperlordosis by improving posture, reducing pain and disability, and enhancing abdominal muscle function. The study concluded that PPTT is a useful adjunct physiotherapy technique for managing hyperlordosis by improving posture, reducing pain and disability, and enhancing abdominal muscle function.

Straight Leg Raise Test: Influence of LumboSant and Assistant Examiner in Hip, Pelvis Tilt and Lumbar Lordosis

Santonja-Medina et al. studied the effect of pelvic stabilization during the Passive Straight Leg Raise (PSLR) test. The traditional PSLR method was compared with a modified technique using a LumboSant lumbar support and an assistant examiner to stabilize the pelvis and maintain lumbar lordosis. The findings showed that the traditional PSLR test overestimates hamstring flexibility due to compensatory posterior

pelvic tilt and flattening of lumbar lordosis during hip flexion. With proper stabilization, the PSLR angle was approximately 13° lower, providing a more accurate assessment of hamstring extensibility.

The authors concluded that pelvic stabilization improves the accuracy of hamstring flexibility testing and helps identify hamstring tightness that may contribute to altered pelvic alignment, lumbar lordosis, postural abnormalities, and low back pain.

The role of core stability exercises in Lumbopelvic combination-

Hamze Ayazi et al. conducted a study to investigate the effect of core stabilization exercises on lumbopelvic rhythm, lumbar lordosis angle, and pain in men with chronic nonspecific low back pain (CNSLBP). The study was carried out among 28 men aged between 30 and 50 years who were randomly divided into an experimental group and a control group. The experimental group participated in an 8-week core stabilization exercise program conducted three times per week for 45–60 minutes per session, while the control group did not receive any intervention. Lumbopelvic rhythm during trunk flexion and return movements was assessed using Kinovea software and smartphone video analysis, lumbar lordosis angle was measured using a flexible ruler, and pain intensity was evaluated using the Visual Analog Scale (VAS). The findings of the study showed that participants in the experimental group experienced a significant reduction in pain after completion of the exercise program compared with the control group.

The Effect Of A Child Birth Preparation Program Including Posture Correction And Stretching Movements On Lordosis And Lumbar Pain-

Tahereh Khalegi et al. studied the effects of a childbirth preparation program consisting of posture correction and stretching exercises on lumbar lordosis and low back pain in 66 pregnant women. The intervention group participated in six exercise sessions from 16–18 weeks to 35–37 weeks of pregnancy, while the control group received routine care.

The results showed that although lumbar lordosis increased in both groups during pregnancy, the increase was significantly lower in the exercise group. Women who participated in the program also experienced less lumbar pain compared to the control group.

Obesity As A Moderator Of Lumbar Spine Posture Change During Pregnancy-

Robert D. Catena et al. investigated whether lumbar lordosis consistently increases during pregnancy and examined the influence of obesity and body anthropometry on spinal posture. The longitudinal study followed 11 pregnant participants from approximately 10 to 38 weeks of gestation using motion capture analysis and anthropometric measurements. The findings demonstrated that lumbar lordosis was not significantly correlated with gestational age, challenging the traditional concept of universal “gestational lordosis.” Instead, body mass index (BMI), torso dimensions, and center of mass displacement were found to be stronger predictors of lumbar spine posture changes during pregnancy. Some participants showed increased lumbar curvature, while others demonstrated reduced or minimal changes, indicating substantial individual variation.

Effect of Lordosis in Relationship to Kyphosis-

.Effect Of Thoracic Kyphosis And Lumbar Lordosis On The Distribution Of Ground Reaction Forces On The Feet -

Żurawski et al. conducted a cross-sectional study to evaluate the relationship between sagittal spinal curvatures—thoracic kyphosis and lumbar lordosis—and the distribution of ground reaction forces on the feet in 211 children aged 8–12 years. Spinal posture was assessed using the DIERS Formetric 4D system, while plantar pressure distribution in both static standing and dynamic gait conditions was measured using

DIERS Pedoscan and Pedogait systems. The study found that increased thoracic kyphosis was significantly associated with a forward shift in plantar loading, characterized by increased forefoot pressure and reduced heel loading in static conditions. Similarly, lumbar lordosis showed strong correlations with foot loading patterns, where greater lordotic angles were linked with increased forefoot pressure, decreased heel pressure, and changes in foot contact surface area.

Association Between Lumbar Lordosis, Thoracic Kyphosis, And Muscle Activations During Different Lower Back Exercises-

Atalay et al. conducted an observational study titled “Association Between Lumbar Lordosis, Thoracic Kyphosis, and Muscle Activations During Different Lower Back Exercises” to examine how variations in sagittal spinal alignment influence trunk muscle activity during common rehabilitation exercises. The study included 22 healthy young adults divided into two groups: a hyperlordotic lumbar spine with increased thoracic kyphosis group and a normal spinal alignment group. Surface electromyography was used to measure activation of key thoracolumbar muscles (iliocostalis lumborum and longissimus thoracis) during prone thoracic extension, standard superman, and unstable superman exercises.

The results showed that individuals with normal spinal curvatures demonstrated significantly higher muscle activation in most muscles compared to those with hyperlordotic and kyphotic posture, suggesting that altered spinal alignment may reduce neuromuscular efficiency during trunk extension tasks.

Relationship lordosis in relationship to scoliosis-

Rubery et al. investigated the long-term effect of pelvic incidence–lumbar lordosis (PI–LL) mismatch on outcomes in patients who underwent spinal fusion for adolescent idiopathic scoliosis (AIS). The study reviewed 35 patients with a follow-up of more than 40 years after surgery.

The findings showed that PI–LL mismatch was the strongest predictor of long-term disability and. Patients with a PI–LL mismatch greater than 9° had worse outcomes, including increased pain, fatigue, depression, and reduced physical function.

Discussion-

From the narrative review it can be found that posterior pelvic tilting Posterior pelvic tilt taping helps in correcting excessive lumbar lordosis by providing proprioceptive feedback to the lumbopelvic region. . It facilitates activation of abdominal muscles such as the transversus abdominis and external oblique, improving muscle thickness and stability. This leads to better postural alignment and reduced anterior pelvic tilt. Clinically, it helps decrease pain intensity and functional disability in individuals with chronic nonspecific low back pain and hyperlordosis. Pelvic stabilization during the Straight Leg Raise (SLR) test improves the accuracy of hamstring flexibility assessment by preventing compensatory pelvic movements. Without stabilization, posterior pelvic tilt and lumbar flattening may falsely increase SLR range. It also helps in better understanding the relationship between hamstring flexibility, pelvic tilt, and lumbar lordosis. •Core stabilization exercises improve neuromuscular control of deep trunk muscles, enhancing coordination of the lumbopelvic region. They are effective in reducing pain intensity and improving functional stability in chronic nonspecific low back pain. Spino-pelvic parameters such as pelvic incidence, pelvic tilt, and lumbar lordosis are closely interconnected and essential for maintaining sagittal spinal balance. Any mismatch, especially between pelvic incidence and lumbar lordosis, leads to compensatory pelvic tilt changes. •Sarcopenia, or reduced skeletal muscle mass, is associated with decreased lumbar lordosis in elderly individuals. Weak abdominal and spinal muscles reduce spinal support and postural control. This leads to altered spinal alignment and increased mechanical stress on

lumbar structures. •Postural and physiotherapy-based interventions such as exercise therapy, prenatal exercises, and corrective training help in improving spinal alignment. They reduce excessive lumbar lordosis and improve muscular balance around the pelvis and spine.

Conclusion

The review concludes that physiotherapy plays an important role in the management of lordosis. Lordosis can affect posture, spinal alignment, mobility, and functional activities and is commonly associated with conditions such as low back pain, pregnancy, kyphosis, scoliosis, and altered hip biomechanics.

The reviewed literature suggests that physiotherapy interventions such as stretching, strengthening exercises, core stabilization, postural correction, and patient education are effective in reducing pain, improving posture, enhancing flexibility, and restoring functional independence. Early assessment and appropriate physiotherapy management may help prevent progression of the condition and improve the overall quality of life of individuals with lordosis. Further research is recommended to establish standardized treatment protocols and strengthen the evidence regarding the long-term effectiveness of physiotherapy interventions in individuals with lordosis.

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