PREDISPOSITION OF LUMBAR SPINE JOINTS TO OSTEOARTHRITIS AND DEGENERATIVE CHANGES ACCORDING TO CONSTITUTIONAL BODY TYPE

Gaipov Dilmurod Abdurasulovich

Tashkent Medical Academy

Abstract: This thesis investigates the influence of constitutional body type on the susceptibility of lumbar spine joints to osteoarthritis and degenerative changes in women. Women with endomorphic body types, characterized by higher body mass and broader skeletal proportions, were found to have increased facet joint width, reduced intervertebral disc height, and a higher prevalence of osteophytes, indicating greater risk for degenerative spinal changes. Mesomorphic women demonstrated intermediate morphometric and degenerative characteristics, while ectomorphic women exhibited narrower facet joints, taller intervertebral discs, and lower prevalence of osteophytes, suggesting relative protection against early degeneration. These findings underscore the importance of considering constitutional body type in preventive strategies, clinical assessment, and personalized interventions to maintain spinal health and reduce the risk of lumbar osteoarthritis in women.

Keywords

Lumbar spine, osteoarthritis, degenerative changes, constitutional body type, facet joints, intervertebral discs, skeletal morphology, women's health, musculoskeletal system, body composition

Introduction

The susceptibility of lumbar spine joints to osteoarthritis and degenerative changes is influenced by a variety of intrinsic and extrinsic factors, among which constitutional body type plays a significant role. Constitutional types, determined by skeletal structure, body composition, and biomechanical characteristics, affect the distribution of mechanical loads on the vertebral column and the resilience of intervertebral discs and facet joints. Variations in vertebral geometry, ligamentous support, and muscle mass across different body types can predispose certain individuals to early degenerative processes and osteoarthritic changes.

Lumbar spine osteoarthritis is a progressive degenerative disorder characterized by the narrowing of intervertebral disc spaces, osteophyte formation, and facet joint hypertrophy. These structural changes can result in chronic lower back pain, reduced mobility, and diminished quality of life. Research has indicated that individuals with certain constitutional types—such as those with increased body mass or specific skeletal proportions—may experience higher mechanical stress on lumbar joints, accelerating degenerative changes.

Understanding the relationship between constitutional body type and the predisposition of lumbar spine joints to osteoarthritis and degeneration is crucial for preventive strategies, early diagnosis, and personalized management of spinal disorders. This study aims to investigate the correlation between constitutional types and the morphological and degenerative characteristics of lumbar spine joints, providing insights into risk assessment and targeted intervention in clinical practice.

Main Part

1. Influence of Constitutional Body Type on Lumbar Spine Joint Degeneration

Lumbar spine joint degeneration and osteoarthritis are influenced by mechanical load distribution, vertebral geometry, and ligamentous and muscular support. Constitutional body type, defined by skeletal structure, body mass, and biomechanical proportions, plays a key role in determining how stress is distributed across the lumbar vertebrae and facet joints. Individuals with a heavier or more endomorphic constitution are often exposed to higher axial loads, which may accelerate facet joint hypertrophy, intervertebral disc narrowing, and osteophyte formation. Conversely, individuals with an ectomorphic or slender body type may experience relatively lower joint stress but could be predisposed to decreased vertebral bone density and early degenerative changes due to reduced muscular support.

In this study, women were categorized into three main constitutional types: ectomorphic, mesomorphic, and endomorphic, according to standard anthropometric measurements. Lumbar spine joint morphometry and degenerative changes were assessed using MRI and radiographic imaging at L3–L5 levels. The analysis included facet joint width, intervertebral disc height, presence and size of osteophytes, and joint surface area. The relationship between body type and degenerative parameters was evaluated to identify patterns of susceptibility.

Table 1. Lumbar Spine Morphometry and Degenerative Changes by Constitutional Body Type (Mean ± SD)

Constitutional Type	Sample Size	Facet Joint Width (mm)	Intervertebral Disc Height (mm)	Osteophyte Presence (%)	Joint Surface Area (mm²)
Ectomorphic	25	15.8 ± 1.2	8.3 ± 0.6	20%	118.5 ± 9.8
Mesomorphic	30	16.9 ± 1.4	7.7 ± 0.7	35%	124.2 ± 10.5
Endomorphic	28	18.3 ± 1.6	6.9 ± 0.8	60%	132.1 ± 11.2

Analysis of Results

The data indicate that endomorphic women showed the highest susceptibility to degenerative changes, including increased facet joint width, reduced disc height, and more frequent osteophyte formation. Mesomorphic women demonstrated intermediate values, while ectomorphic women had narrower facet joints, higher disc height, and the lowest prevalence of osteophytes. These findings suggest that constitutional type significantly influences the biomechanical environment of the lumbar spine, affecting the progression of osteoarthritis and degenerative joint changes. Maintaining optimal musculoskeletal support through exercise and posture management may help mitigate these risks, particularly in endomorphic individuals.

Conclusion

This study demonstrates a clear relationship between constitutional body type and the susceptibility of lumbar spine joints to osteoarthritis and degenerative changes in women. Endomorphic women, characterized by higher body mass and broader skeletal proportions, exhibited increased facet joint width, reduced intervertebral disc height, and a higher prevalence of osteophyte formation, indicating a greater risk for lumbar spine degeneration. Mesomorphic women showed intermediate characteristics, while ectomorphic women displayed narrower facet joints, taller intervertebral discs, and lower osteophyte prevalence, suggesting relative protection against early degenerative processes.

These findings highlight the importance of considering constitutional body type in the assessment of lumbar spine health. Early preventive interventions, including targeted exercise programs, posture management, and weight control, may reduce the risk of osteoarthritis and degenerative changes, particularly in individuals with endomorphic body types. Understanding the interplay between skeletal structure and spinal biomechanics can inform personalized clinical strategies for the prevention, diagnosis, and management of lumbar spine disorders in women.

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