Comparison of Management Strategies and Outcomes for Upper vs. Lower Lumbar Fractures: A Systematic Review

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Abstract:

Background: Lumbar spine fractures represent a significant cause of morbidity, with management decisions ranging from conservative care to complex surgical interventions. The lumbar spine, anatomically divided into upper (T11-L2) and lower (L3-L5) segments, exhibits distinct biomechanical properties and neurological considerations. While general guidelines for lumbar fracture management exist, a comprehensive comparative analysis of outcomes based on fracture location (upper vs. lower lumbar) is less frequently addressed in a systematic manner.

Objective: This systematic review aimed to compare the current management strategies (conservative vs. surgical) and associated clinical, radiological, and neurological outcomes for fractures occurring in the upper lumbar spine (T11-L2) versus the lower lumbar spine (L3-L5).

Methods: A systematic search was conducted across PubMed, Embase, Scopus, and the Cochrane Library databases from inception to [Month, Year]. Keywords included "lumbar fracture," "thoracolumbar," "management," "conservative," "surgical," "upper lumbar," "lower lumbar," "T11-L2," "L3-L5," and "outcomes." Studies reporting on clinical outcomes (pain, function, neurological status), radiographic parameters (kyphotic angle, fusion rates), and complications for surgically or conservatively managed isolated lumbar vertebral fractures were included. Case reports, reviews, animal studies, and non-comparative series were excluded. Data extraction and quality assessment (e.g., using MINORS or Newcastle-Ottawa Scale) were performed by two independent reviewers.

Results: Our findings suggest distinct patterns in management and outcomes based on fracture location. Upper lumbar (T11-L2) fractures, often involving the thoracolumbar junction, demonstrated

a higher propensity for surgical intervention, particularly in cases of instability or neurological compromise. Surgical management in this segment often aimed at earlier mobilization and robust stabilization, with reported good neurological recovery in appropriately selected cases. Conversely, lower lumbar (L3-L5) fractures, though less common, frequently involve significant axial load-bearing structures.

Conclusion: The management of lumbar fractures varies significantly with anatomical location. Upper lumbar fractures frequently necessitate surgical intervention due to higher instability and neurological risk, while lower lumbar fractures, though often managed conservatively when stable, present unique long-term pain and functional challenges related to their loadbearing role.

Keywords:

Lumbar fracture, upper lumbar, lower lumbar, fracture management, systematic review, outcomes, thoracolumbar.