



TBIOMECHANICAL ANALYSIS AND MODELING OF DIFFERENT TRACTION PATTERNS IN ADOLESCENT IDIOPATHIC SCOLIOSIS SUBJECTS

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ABSTRACT

Objective: Traction is a valuable treatment for Adolescent idiopathic scoliosis; however, assessing its biomechanical effects, particularly with new methods, presents challenges. This study aims to explore the biomechanics using finite element analysis, with the goal of enhancing safety and effectiveness.

Methods: Based on CT images, two different boundary and loads were applied to simulate two traction methods. The effects of these two traction methods on stress and deformation of lumbar vertebral bodies and intervertebral discs were compared.

Results: Under two traction methods, the stress was concentrated on the posterior side. Multi-point traction resulted in higher stress and deformation, and concentrated stress on the convex side as well. However, there is some stress concentration on the vertebral arch, which may lead to injury.

Conclusion: Compared to longitudinal traction, multi-point traction can better reduce stress on the vertebral bodies and intervertebral discs, focusing the pulling force on the concave side and achieving greater deformation. Multi-point traction might better suit specific patients needing more correction and pressure relief compared to longitudinal traction.

Keywords: Finite element, Adolescent idiopathic scoliosis, Lumbar stress, Traction methods, Multi-point traction