

Computed tomographic study analysing functional biomechanics in the thoracolumbar spine of horses with and without spinal pathology

Baudisch et al. (2024), in *Anatomia, Histologia, Embryologia*

Products

Computed Tomography (CT) for thoracolumbar spine biomechanics.

Hospital / Authors

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Clinical Background

Thoracolumbar pathologies, such as ORSPs and spondylosis, restrict spinal motion and affect performance in horses. CT imaging enables precise analysis of these conditions for targeted rehabilitation.

Aim of Study

To analyze thoracolumbar spinal biomechanics using CT imaging, focusing on ROM, the impact of ORSPs and spondylosis, and interspinous pressure during motion.

Cohort Study

CT imaging was performed on 23 equine thoracolumbar spines (T8-L4), aged 2-29 years, mounted in a mechanical rig. Motion patterns were tested under controlled torques, comparing normal and pathological spines.

Results

- **Range of Motion (ROM) varied by anatomical location and torque direction**, with **maximum motion** at **T9-T10**. **Spondylosis** and overriding spinous processes (**ORSPs**) significantly **reduced ROM**.
- **Inconsistent axial rotation** during **lateral bending** differed from prior studies, showcasing **CT's precision** in detecting subtle biomechanical patterns.
- **Grade 5 ORSPs** and **spondylosis** severely **restricted flexion** and **extension**, with **rotation less affected** but still measurable.
- **No significant interspinous pressure changes** were found in **normal specimens**, ruling out **compartment syndrome** during **maximal extension**.

Summary

- **Detailed biomechanical insights** were achieved, showing how **ROM varies** with **anatomical location** and **pathological changes**.
- **Severe limitations** caused by **spondylosis** and **ORSPs** emphasize the importance of **early and precise diagnosis**.
- **Understanding these changes** supports the development of **targeted rehabilitation strategies**, improving equine health and performance.
- **CT imaging remains unparalleled** for analyzing **thoracolumbar motion** and **pathology**, setting a **benchmark** for future studies.