

Exploring the relationship between kinesiophobia and spinal movement velocity in axial spondyloarthritis

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Summary

This study examined the association between fear of movement and peak spinal movement velocity in 21 patients over a one-year period. While no significant associations were found between kinesiophobia and peak spine velocity during flexion/extension and rotation, trends suggested that expansion of this dataset to a larger sample size and over a longer period may detect whether higher kinesiophobia correlates with slower movement.

Introduction

Axial spondyloarthritis (AxSpA) is a chronic inflammatory disease affecting the spine and sacroiliac joints, causing pain, stiffness, and reduced mobility. Many AxSpA patients report fear of movement (kinesiophobia), which influences pain perception, physical activity, and quality of life, as pain-related thoughts can exacerbate this fear, prompting movement avoidance and affecting disease progression [1]. Pain-related fear is associated with slower task performance in chronic low back pain conditions [2]. No longitudinal study has explored the impact of kinesiophobia on movement in AxSpA. It is hypothesised that individuals with higher levels of kinesiophobia will exhibit slower initial spine movement velocities and average velocities, with a greater increase in velocity between the first and second repetitions.

Methods

As part of an ongoing study, 21 of 27 patients completed three biomechanical assessments of spinal movements over a year at 6-month intervals. Each session participants completed the Tampa Scale for Kinesiophobia (TSK) and three repetitions of spine flexion/extension and axial rotation at their preferred speed. Movement was assessed using a 3D motion capture system (Qualisys) with markers placed on the pelvis and spine segments. Inverse kinematics was applied to calculate spinal range of motion and velocity, with whole spine values determined by summing the contributions of the pelvis, lumbar, lower thoracic, and upper thoracic regions. Peak velocity during the first repetition, difference in peak velocity between the first and second repetition and average velocity for the each session were calculated for flexion, extension, and rotation. Linear mixed-effects models, with participant as a random effect (individual intercept) were used to examine the relationship between velocity outcomes and TSK scores.

Results and Discussion

The analysis found no significant associations between TSK and differences in first and second peak velocity during extension ($p = 0.922$), flexion ($p = 0.482$), or right rotation ($p = 0.659$), though left rotation approached significance ($p = 0.058$).

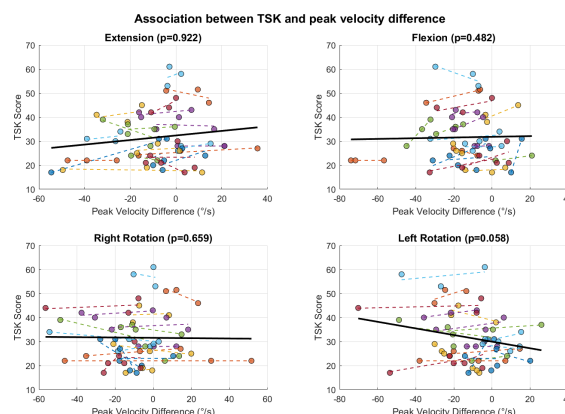


Figure 1: Association between TSK and peak velocity differences

First repetition peak velocity and average velocity over all three repetitions were not significantly associated with TSK for any movement ($p > 0.150$). The trend observed in rotation for peak velocity differences may reflect the impact of pain-related fear during unfamiliar movements, leading to guarded movement patterns [3]. Left rotation was the first direction tested during the assessment, which may indicate that the initiation of movement is slower due to fear. Unlike flexion and extension, isolated spinal rotation is less commonly performed in daily activities and is not typically assessed by standard mobility metrics for axSpA patients. Additionally, trunk movements in the transverse plane require higher muscular activation and control compared to sagittal plane movements, which are often assisted by gravity [4].

Conclusions

In conclusion, no significant link was found between kinesiophobia and spinal movement velocity in AxSpA patients. The trend in left rotation suggests fear of movement may affect complex, less familiar movements, highlighting the need for further research to develop rehabilitation strategies that improve quality of life by managing kinesiophobia.

References

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