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A New Anatomical and Functional Perspective of the Scapula as a Mechanical Hub in Human Movement: Insights from Scapular Dyskinesis in Tension-Type Headache (TTH)

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Question/Objective

The scapula plays a pivotal role as a biomechanical hub in human movement, facilitating force transmission between the spine, upper limb, and thoracic cage. Emerging evidence suggests that altered scapular dynamics—termed *scapular dyskinesis*—may contribute to musculoskeletal dysfunctions beyond the shoulder complex, including tension-type headache (TTH), the most prevalent form of primary headache.

Objective: To investigate the patterns of scapular motion in individuals with TTH and explore the functional implications of scapular dyskinesis in the context of postural imbalance and cervicoscapular dysfunction.

Methods

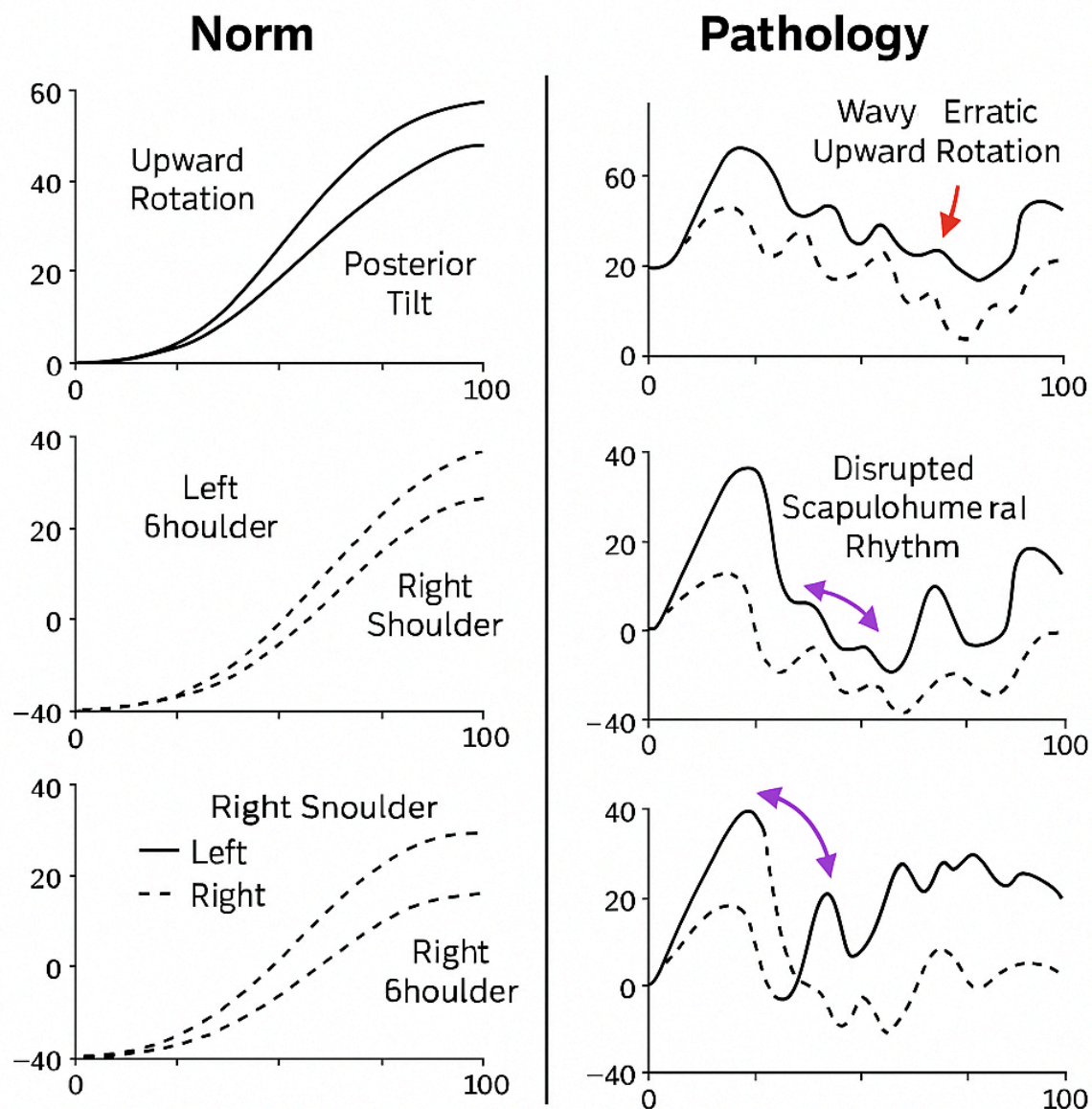
Using the ShowMotion™ 3D kinematic analysis system, we assessed scapular motion in a series of patients diagnosed with TTH. Each case included pre- and post-treatment comparisons of upward rotation and posterior tilt during shoulder elevation. Visual patterns were analyzed for symmetry, smoothness, timing, and range of motion. All patients reported associated postural alterations and chronic headache symptoms.

Results

Using the ShowMotion™ 3D kinematic analysis system, we assessed scapular motion in a series of patients diagnosed with TTH. Each case included pre- and post-treatment comparisons of upward rotation and posterior tilt during shoulder elevation. Visual patterns were analyzed for symmetry, smoothness, timing, and range of motion (figure). All patients reported associated postural alterations and chronic headache symptoms.

Conclusions

This study supports a novel integrative view of the scapula as a dynamic mechanical hub whose dysfunction may contribute to tension-type headache through disrupted postural and neuromuscular control.

Fig. 1**Conflict of interest**

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