

# Spinal Intervention Efficacy on Correcting Cervical Vertebral Axes of Rotation and the Resulting Improvements in Pain, Disability and Psychosocial Measures

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## ABSTRACT

**Objectives:** Mean axes of rotation [MAR] of cervical joints are an effective measure of spine pathology. Khan Kinetic Treatment [KKT] is known to relieve symptoms, but its biomechanical effects have not been quantified. This study assesses KKT efficacy using MAR correction and its associated effects.

**Methods:** The intervention applies vibrations via stylus to a bony landmark of the spine. Using sagittal plane cervical X-rays, pre-post intervention MARs were computed for 44 patients with chronic neck pain. The study was randomized, single blinded, and sham controlled for outcome measure comparisons. Mechanical input was assessed using a load cell and vertebral acceleration and the outcome measures were: 1. cervical MARs, 2. self-reported neck pain, 3. neck disability index scores, and 4. psycho-social assessments.

**Results:** 1. Average peak force on vertebrae during treatment was 10.3 N and the average peak acceleration was 2.19G, 2. KKT improved pain and neck disability scores significantly over shams, 3. KKT corrected 62 percent of abnormal MARs with significantly larger MAR vector magnitude differences [pre-post] at the C5-6 level than shams, 4. in patients without changes in MAR locations, KKT significantly improved neck disability scores above shams, 5. MAR correction was significantly related to improving both pain and neck disability across all subjects.

**Conclusions:** We present biomechanical evidence of spinal "re-alignment" and its ability to improve both pain and neck disability. Capacity to improve neck disability despite no change in MAR locations indicates that MAR correction, while effective, is not the sole mechanism behind the interventions success.

**KEYWORDS:** Pain, axes of rotation, disability, spine, biomechanics, assessment