

“Lumbar spine disc heights and curvature: upright posture vs. supine compression harness,,

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INTRODUCTION:

Spinal lengthening in microgravity is thought to cause back pain in astronauts. A spinal compression harness can compress the spine to eliminate lengthening but the loading condition with harness is different than physiologic conditions. Our purpose was to compare the effect of spine compression with a harness in supine position on disk height and spinal curvature in the lumbar spine to that of upright position as measured using a vertically open magnetic resonance imaging system.

METHODS:

Fifteen healthy subjects volunteered. On day 1, each subject lay supine for an hour and a baseline scan of the lumbar spine was performed. After applying a load of fifty percent of body weight with the harness for thirty minutes, the lumbar spine was scanned again. On day 2, after a baseline scan, a follow up scan was performed after kneeling for thirty minutes within the gap between two vertically oriented magnetic coils. Anterior and posterior disk heights, posterior disk bulging, and spinal curvature were measured from the baseline and follow up scans.

RESULTS:

Anterior disk heights increased and posterior disk heights decreased compared with baseline scans both after spinal compression with harness and upright posture. The spinal curvature increased by both loading conditions of the spine.

DISCUSSION:

The spinal compression with specially designed harness has the same effect as the physiologic loading of the spine in the kneeling upright position. The harness shows some promise as a tool to increase the diagnostic capabilities of a conventional MR system.

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