

Changes of the intervertebral disc under traction therapy with the GammaSwing device

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Introduction

Traction therapy is widely used for the treatment of symptoms caused by low back pain. The therapeutic device "GammaSwing" (Fig. 1) is a traction system, developed by the Austrian orthopaedist Dr. Ferdinand Gundolf, which allows patients to be pulled up to a free-hanging position using slings which are fixed to the lower legs (Fig. 2). During therapy a swinging movement with a frequency of up to 100 oscillations per minute can be applied in any chosen position.

The aim of this retrospective study was to determine alterations of the intervertebral discs during a series of traction therapies with the GammaSwing device in patients with vertebral complaints, in particular low back pain, and to correlate them with the clinical course of the disease.

Conclusion

The radiologically determined changes of the intervertebral discs and the nerve roots observed in the course of a dynamic traction treatment with the GammaSwing device suggest that by this treatment not only beneficial clinical effects, but also favourable changes of the vertebral structures can be achieved.

On the basis of these results it appears to be meaningful to perform a treatment series with dynamic traction therapy in patients with low back pain.

Methods and Materials

MR and CT images taken before and after a treatment series with the GammaSwing device were independently assessed by two experienced radiologists regarding degenerative changes of the intervertebral discs and classified with a scoring system (modified to Pfirrmann et al.) to evaluate disc morphology and grade of nerve root affection (Tab. 1). Thereafter these results were correlated with the clinical routine parameters (numerical pain scale, measure according to Schober and finger-floor distance, patient satisfaction with the treatment, and adverse effects).

Disc degeneration	Grade	Morphology	Grade	Localisation	Grade	Nerve root affection	Grade
hyperintense	0	Normal	0	Normal	0	no	0
hyperintense, with horizontal bandage	1	Protrusion	1	Center	1	suspected	1
intermediate signalintensity	2	Extrusion (Prolaps)	2	right/left: far lateral	2	affection	2
hypointense, normal to decreased height	3	Migration	3	right/left: posterolateral	3	displacement	3
hypointense, collapsed	4	Sequester	4	right/left: foraminal	4		

Table 1: Scoring System (modified to Pfirrmann et al. - Magnetic resonance classification of lumbar intervertebral disc degeneration. Spine, 26:1873-1878, 2001.)



Fig. 1: GammaSwing

Fig 2: Free hanging position of GammaSwing therapy

Results

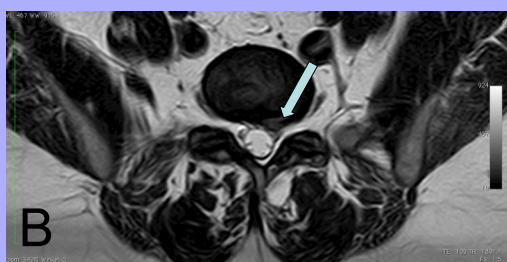
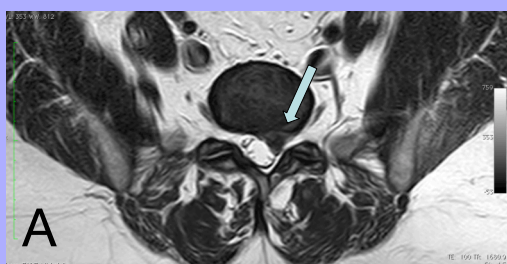


Fig 3: ax. TSE T2W

MR images of a patient (A.W.) before (A) and after (B) GammaSwing treatment. The morphology grading changed from grade 4 (sequester) to grade 2 (prolapse).

A total of 28 patients (16 males, 12 females; age between 28 and 69; mean value 50.5 years) with vertebral complaints, particularly low back pain, who underwent a therapy series with the GammaSwing device were included in the study. The MR and CT images revealed changes in Disc degeneration ($p < 0.06$), Disc morphology ($p < 0.00$) and Nerve root affection ($p < 0.00$). Assessment of the clinical parameters revealed a marked improvement, in particular in pain arising from the vertebral column.

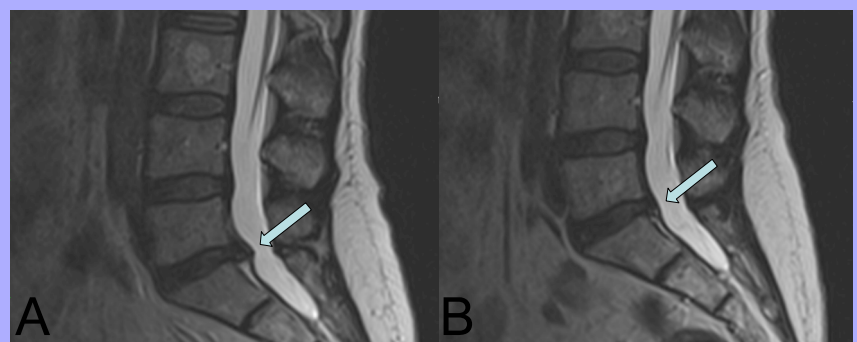


Fig 4: sag. TSE T2W

MR images of a patient (C.D.) before (A) and after (B) GammaSwing treatment. The morphology grading changed from grade 2 (prolapse) to grade 1 (protrusion).