Spinal Decompression: Frequently Asked Questions and Research

How does Spinal Decompression Therapy work?

Spinal decompression therapy (SDT) is a non-invasive, non-surgical treatment which reduces the internal pressure on the lumbar or cervical spinal discs through positioning and distraction. SDT utilizes a computerized, pneumatic table, on which patients lie supported by a lumbar and thoracic belting system. The table intermittently opens up, applying a very gentle and precise axial distraction and decompression to a select area of the spine. This decompression is usually held for a pre-set time (for example 45 seconds) and then released (25 seconds). Time and force settings are determined by the doctor and programmed into the table's computer. The "hold" time creates a negative pressure inside the affected discs. As the table cycles between hold and rest, fluid is driven in and out of the disc as the pressure gradient changes. This accelerates the exchange of oxygen, nutrients and waste products. **Studies show that SDT increases protein synthesis inside the disc and facilitates healing**.

What conditions respond well to Spinal Decompression?

For the properly selected patient, spinal decompression therapy can effectively treat the following conditions: **back and neck pain caused by degenerated or herniated discs, degenerated or damaged spinal joints, sciatica and other radiating pain symptoms**.

How do you decide who is a candidate for Spinal Decompression?

We carefully analyze any MRI's and X-ray's during a consultation and thoroughly review the case history. Furthermore, we perform a careful examination to determine a patient's suitability for spinal decompression and to uncover the possible presence of muscle firing disorders and specific core muscle weakness. I cannot overstress the importance of this last point. We have learned that very specific tests tell us whether or not a patient is a candidate for spinal decompression therapy, how to design their treatment and whether or not other therapies will be critical in reactivating a patient's core muscle firing and stabilization.

Research: Spinal Decompression

Spinal Decompression Shows Increased Healing and Protein Synthesis Inside Degenerated Discs

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Disc distraction shows evidence of regenerative potential in degenerated intervertebral discs as evaluated by protein expression, magnetic resonance imaging, and messenger ribonucleic acid expression analysis.

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STUDY DESIGN: An animal model of degeneration was used to **determine the effects of disc distraction**, and was evaluated with magnetic resonance imaging (MRI) as well as gene and protein expression levels.

OBJECTIVE: To investigate gene expression and MRI effects of distraction.

SUMMARY OF BACKGROUND DATA: Disc degeneration can result from hyper-physiologic loading. Distracted discs with degeneration **showed histologic signs of tissue recovery**. METHODS: There were 18 rabbits that underwent 28 days of compression (200 N) to induce moderate disc degeneration followed by 28 days of distraction (120 N; attached and loaded distraction device) or sham distraction (attached but unloaded distraction device). Comparison was performed with 56 days of compressed discs without distraction. Quantitative outcome measures were MRI signal intensity and gene expression analysis to determine: messenger ribonucleic acid levels for extracellular matrix genes, including collagen 1, collagen 2, biglycan, decorin, aggrecan, fibromodulin, and osteonectin; and matrix-regulative genes, including matrix metalloproteinase-13, tissue-inhibitor of matrix metalloproteinase-1, and bone morphogenetic protein (BMP)-2. Immunohistology was performed for collagen 2 and BMP-2 to label cells semiquantitatively by staining of the cell-surrounding matrix.

RESULTS: A total of 28 days of compression decreased signal intensity. Distraction over the same period reestablished physiologic signal intensity, however, a persistent reduction was found in sham distraction. Distraction resulted in gene expression **upregulation of collagen 1 (5.4-fold)**, collagen 2 (5.5-fold), biglycan (7.7-fold), and decorin (3.4-fold), while expression of fibromodulin (0.16-fold), tissueinhibitor of matrix metalloproteinase-1 (0.05-fold), and BMP-2 (0.15-fold) was decreased, as compared with 56 days compression. Distracted discs showed more BMP-2 (19.67 vs. 3.67 in 56 days compression) and collagen 2 (18.67 vs. 11.33 in 56 days compression) positive cells per field.
CONCLUSIONS: **Distraction results in disc rehydration, stimulated extracellular matrix gene expression,and increased numbers of protein-expressing cells**.

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Damaged Discs Can Regenerate

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Controlled distraction as a therapeutic option in moderate degeneration of the intervertebral disc -- an in vivo study in the rabbit-spine model

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AIM: The aim of this study was to investigate the effects of temporary distraction on a degenerated intervertebral disc to characterize regenerative changes associated with disc distraction. **METHOD**: New Zealand white rabbits (n = 32) were used for this experimental animal study. The rabbits were randomly assigned to one of five groups. 6 animals were loaded for 28 days using a custommade external loading device to stimulate disc degeneration (G2). In 6 animals the discs were first loaded for 28 days and after 28 days loading time the discs in six animals were treated as dynamic distraction with an external distraction device (G1). In six animals the discs were distracted for 28 days without previous loading (G5) and in six animals the discs were loaded for 28 days and afterwards the loading device was removed for 28 days for recovery without distraction (G3). Six animals were sham operated (G4) without application of axial load. After 28 to 56 days loading and distraction time, the animals were sacrificed and the lumbar spine was harvested for histological and radiographic analysis. Histology was performed according to a degeneration score and disc height was calculated radiographically. For the cell viability examination, the number of apoptotic cells was determined.

RESULTS: After 28 days of loading (G2), the discs showed a significant decrease in disc space of the treated segment. Histologically, a disorganization of the architecture of the annulus occurred. The number of dead cells increased significantly in the annulus and cartilage endplate. These changes were reversible after 28 days of distraction (G1). The disc thickness increased significantly to physiological levels as compared to the specimens from the 28 days loading group without distraction. **Histologically, the discs showed signs of tissue regeneration after 28 days of distraction (G1).** The number of apoptotic cells decreased significantly in comparison to the loaded discs without distraction (G2). **CONCLUSION**: The results of this study suggest **that disc regeneration can be induced by axial dynamic distraction** in the moderately degenerated rabbit intervertebral disc. The decompressed rabbit intervertebral discs showed signs of tissue recovery at the cellular and histological levels after temporary disc distraction.

More Studies Will Be Posted