

# **A BRIEF SYNOPSIS OF THE RESEARCH ON CERVICAL AND LUMBAR TRACTION, DISTRACTION AND DECOMPRESSION**

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Primitive forms of spinal decompression have been utilized for many years, they were called traction, distraction, or axial distraction. With the advancement of technology today's doctors have an increased ability to help patients with more challenging conditions such as herniated, protruded, bulging, and degenerative discs.

This has become one of the "hottest topics" in health involving the spine in the 21<sup>st</sup> century. In many instances, spinal decompression therapy is a viable alternative to surgery and long-term use of pain medications.

*Below are some selected research references in the field of Spinal Decompression Therapy:*

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## **Spinal Decompression Rehydrates The Discs**

*"Distraction results in disc rehydration, stimulated extracellular matrix gene expression, and increased numbers of protein-expressing cells."*

**Guehring T, et al.: 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.**

**Spine. 2006 Jul 1;31(15):1658-65**

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## **90% Reduction of Herniation with Decompression Therapy**

*"Serial MRI of 20 patients treated with the decompression table shows in our study up to 90% reduction of subligamentous nucleus herniation in 10 of 14. Some rehydration occurs detected by T2 and proton density signal increase. Torn annulus repair is seen in all."*

**Journal of Neuroimaging. Paper presented to the American Society of Neuroimaging, Orlando, Florida 2-26-98.**

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## **86% Improvement (Good to Excellent) with Decompression**

*"Eighty-six percent of ruptured intervertebral disc (RID) patients achieved 'good' (50-89% improvement) to 'excellent' (90-100% improvement) results with decompression. Sciatica and back pain were relieved." "Of the facet arthrosis patients, 75% obtained 'good' to 'excellent' results with decompression."*

**Shealy, N. et al.: Decompression, Reduction, and Stabilization of the Lumbar Spine: A Cost-Effective Treatment for Lumbosacral Pain. American Journal of Pain Management Vol. 7 No. 2 April 1997**

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## **86% Reported Immediate Resolution of Symptoms with Decompression**

*"Results showed that 86% of the 219 patients who completed the therapy reported immediate resolution of symptoms, while 84% remained pain-free 90 days post-treatment. Physical examination findings showed improvement in 92% of the 219 patients, and remained intact in 89% of these patients 90 days after treatment."*

**Gionis, T. et al.: Surgical Alternatives: Spinal Decompression. Orthopedic Technology Review. 2003; 6 (5).**

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## **Spinal Decompression Delivers Good-Excellent Results in 82% of Patients**

*77 patients verified on pre-post MRI with signs and symptoms of herniation, underwent non-surgical intervention including pelvic traction. Changes in herniation and good-excellent symptomatic improvements were noted in over 82%. The authors draw the conclusion improving the discs contact with the blood supply accounts for healing of herniation.*

**Komari H, et al.: The Natural History of Herniated Nucleus with Radiculopathy. Spine 21: 225-229, 1996**

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## **70% of Herniations Retracted & Over 93% Experienced Good Improvements!**

*30 patients with lumbar herniations were tractioned in a CT scanner at >50% body weight for 20 min. Herniation retraction occurred in 70% and good clinical improvements were seen in over 93%. The authors concluded improved blood flow was the source of healing. Additionally they speculated previous studies showing traction doesn't create negative intradiscal pressures perhaps used too light a force.*

**Onel,D et. al.: CT Investigation of the effects of Traction on Lumbar Herniation. Spine 14: 82-90,1989.**

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## **86% Had Good-Excellent Outcomes With Spinal Decompression**

*100 patients with disc syndrome unresponsive to manipulation were treated with high force traction (+80 lb). 86% of patients had good-excellent outcomes 12 had poor outcomes but most had pain for an extended duration.*

**Parsons, WB Cumming, JDA: Traction in Lumbar Disc Syndrome. Can Med Jour 77:7-10,1957.**

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## **Spinal Decompression Provided Good-Excellent Results in 86% of Patients**

*58 subjects had an inclusive conservative program including traction (when initially shown to reduce leg symptoms). Overall 86% had good-excellent results.*

**Saal, JA Saal, JS: Nonoperative Treatment of Herniated Lumbar Disc w/ Radiculopathy. Spine 14 (4): 431-437, 1989.**

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## **Disc Protrusions “Lessened Considerably” with Spinal Decompression**

*3 patients with a ruptured lumbar disc had contrast medium and radiographic images taken during and after a lumbar traction procedure. The protrusions were shown to lessen considerably with the 30 minute prone traction sessions and a dimpling of the outer annulus suggested a negative intradiscal force was created.*

**Mathews, JA: Dynamic Discography: A Study of Lumbar Traction. Annl of Phys Med, IX (7), 265-279, 1968.**

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## **Traction with Exercises Showed Considerable Improvement in 90% of Cases.**

*Intermittent supine traction with +50% body-weight, (10) 20 minute sessions with added exercises showed considerable improvement in over 90% of the 62 patients.*

**Lidstom, A Zachrisson M: PT of the low back pain and sciatica. Scan Joul of Rehab Med, 2: 37-42, 1970.**

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## **Good-Excellent Results in 55% of Patients With Neurological Signs**

*40 patients with neurological signs were treated with traction on a friction free table with 55-70 lbs for 20 minutes. Good-excellent results were seen in 55%.*

**Hood, LB Chrissman, D: Intermittent Traction in the Treatment of Ruptured Disc Phys Ther 48: 21, 1968.**

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## **Decompression and Manipulation: Substantial Relief in Over 85% of Patients.**

*A controlled trial of traction with manipulative techniques. Traction force Applied at –100 lbs for 20 minutes leading to substantial relief in over 85%.*

**Mathews JA et. al.: Manipulation and traction for Lumbago and Sciatica. Physio Pract 4: 201, 1988.**

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## **Targeting a Specific Disc Can Get Vertebra Separation At Specific Levels**

*Subjects were subjected to a supine angled traction force of up to 100 lbs. with x-ray examination. A rope angle of 18 degrees revealed separation greatest at L4-5 (Note: we speculate a more acute angle -10 degrees affords greater separation at LS-S 1). The separation was obvious up to T 12-L 1 with total elongation of the spine approaching +5mm. The vertebra separation is greater on the posterior vs. anterior aspect of the vertebra.*

**Colachis S, Strohm BR: Effects of Intermittent Traction on Vertebral Separation. Arch of Phys Med & Rehab, 50: 251-258, 1969.**

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## **Trial of Four Patients Resulted in Complete Resolution of Symptoms with Traction**

*Three weeks of the above described traction method to large volume herniations resulted in complete resolution of symptoms in 4 patients.*

**Constatoyannis C, et. al.: Intermittent Cervical Traction for Radiculopathy Due to Large-Volume Herniations. JMPT, 25 (3) 2002.**

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## **Traction Focused On Target Levels Enhance Distraction At Specific Levels**

*The application of supine lumbar traction with adherence to several specific characteristics including progression to a peak force and altering the angle of pull from 10 degrees (L5 -S 1) to 30 degrees (L3) enhanced distraction at specific levels.*

**Shealy N, Leroy P: New Concepts in Back Pain Management. AJPM (1) 20:239-241 1998.**

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## **Decompression Showed Good-Excellent Results in 71% of “Difficult” Cases**

*A retrospective analysis of over 770 cases, many assumed to be unresponsive to previous therapies showed a 71 % good-excellent success rate with -20 treatments on the prone VAX-D traction device. All patients treated prone with 65-95 lbs. of force 3-5 times per week.*

*Letchuman R, Deusinger RH: Comparison of sacrospinalis myoelectric activity and pain levels in patients undergoing static and intermittent lumbar traction. Spine 18(10): 1361-1365, 1993*

*This study was used to determine muscular guarding/contraction of Paraspinals with intermittent vs. static traction. Improved comfort noted in the intermittent traction group.*

**Gose E, Naguszewski W&R: Vertebral axial Decompression for Pain associated With Herniated and Degenerated Discs or Facet syndrome: an Outcome Study. Neuro Research, (20) 3, 186-190, 1997.**

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### **64% Reduced Intra Disc Pressure (IDP) with Traction.**

*Intervertebral pressure was recorded before and during traction. 62% of prolapsed discs showed negative pressure prior to traction. 64% reduced IDP with traction and was related to distraction distance. In 19% of prolapsed discs the pressure actually increased, demonstrating the disruption to the hydrostatic mechanism occurring with complete annular damage and prolapse.*

**Chen YG, Li FB, Huang CD: Biomechanics of traction for lumbar disc prolapse. Chinese Ortho; Jan(1): 40-2, 1994.**

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### **Cervical Intermittent Traction Shown Effective In Relieving Pain**

*Cervical intermittent traction was shown to be effective in relieving pain, increasing frequency of myoelectric signals and improving blood flow in effected muscles.*

**Nanno M: Effects of intermittent cervical traction on muscle pain. EMG and flowmetric studies on cervical paraspinals. Nippon Med J; Apr;61(2):137-47, 1994.**

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### **Full or Partial Reduction in Herniation in 72.4% of Cases**

*29 patients and seven healthy volunteers had intermittent traction while in MR. Substantial increase in vertebral length was seen. Full herniation reduction in 3 and partial in 18 was reported.*

**Chung TS, Lee YJ et al: Reducibility of cervical herniation: evaluation at MRI during cervical traction with a nonmagnetic device. Radiology Dec; 225(3):895900, 2002.**

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### **Traction May Result In Retraction of Herniations in About 40% of Cases.**

*The authors analysis shows loads not greater than those occurring in everyday life cause loss of stability of the disc and allow lateral nucleus displacement. The model indicates conservative therapy by traction may result in retraction of hernia by about 40%.*

**Dietrich M et al: Non-linear finite element analysis of formation and treatment of disc herniation. Proc Inst Mech Eng; 206(4):22531,1992.**

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### **Significant Negative Pressure is Recorded with Axial Traction**

*Significant negative pressure (-100mm Hg) was recorded at L4/5 disc in three volunteers as axial traction was administered. Negative pressure was recorded at -50 pounds tension perhaps representing a minimal threshold force. Patients were prone and harnessed.*

Ramos G, Martin Wm: Effects of axial decompression on intradiscal pressure. *J Neuro* 81: 350-353, 1994.

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## **Distraction with Chiropractic Care Provide Less Time Off Work and Save Costs**

*A negative myelogram but a positive CT for an L5 disc protrusion is presented. Five months of medical care preceded chiropractic care; the insurance company involvement in a case where treatment mode is changed from usual orthodox medical procedures of epidural steroid injection and physical therapy to chiropractic distraction manipulation is detailed. Finally, the clinical outcome of the case is provided. At the end of 6 weeks of care the patient returned to his full work duties as a truck driver. His range of motion of the thoracolumbar spine were full and normal and his straight leg raises were positive right at 70 degrees and left at 60 degrees. He had taut hamstring muscle that required constant stretching so as to not mimic a positive straight leg raise sign. This case shows that time off work and cost were both reduced by chiropractic care.*

**Cox JM: Lumbosacral disc protrusion: a case report. *Journal of Manipulative and Physiological Therapeutics* 8(4): 261-266 (December 1985)**

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## **Evidence for the Benefit of Distraction and Manipulation Care for Discs**

*An overview of Cox® distraction manipulation protocols is presented including diagnosis and treatment decision making in low back pain and sciatica cases and proper utilization of flexion distraction in treating lumbar spine and lower extremity pain. In addition, the outcome of 1,000 cases involving low back and/or leg pain treated with chiropractic adjusting (92% utilizing flexion distraction) is presented. A qualitative clinical and literature review provides the basis of the overview of diagnostic and treatment protocols. A descriptive case series design was used to collect outcome information on 1,000 patients with low back and/or leg pain; patients were pooled from two separate studies. Patients were treated by 30 different chiropractors, and a minimum of 20 cases was supplied by each physician. A descriptive review of cases showed that less than 4% of patients with low back or leg pain were candidates for surgery. Less than 9% of patients reached the chronic stage of care. The mean number of days to maximum improvement under care was 29, and the average number of treatments to maximum improvement was 12. The results of this study provide some evidence for the use of chiropractic management, particularly flexion distraction manipulation, in the treatment of back pain problems due to a variety of mechanical causes.*

**Cox, JM, Feller JA, Cox JA: Distraction Chiropractic Adjusting: Clinical Application, Treatment Algorithms, and Clinical Outcomes of 1000 Cases Studied. *Topics in Clinical Chiropractic* 1996; (3)3:45-59, 79-81**

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## **Decompression Reduces Disc Protrusion**

*Cyriax, Quillette, and Kramer hypothesized that as the vertebrae in the spine are distracted, a negative pressure develops in the disc, and sucks back a protrusion. The present study shows that the decrease in the intradiscal pressures may provide the opportunity for the reduction in the disc bulge during the*

*flexion-distraction procedure. Ramos et al. reported decreases in the intradiscal pressures during Vertebral Axial Decompression (VAD) procedure on three patients measured intraoperatively. The result of the present study are in general agreement with the study reported by Ramos and Martin. Andersson et al. reported increases in the intradiscal pressures at L3-L4 disc on four volunteers during active and passive traction. A possible reason for the increase in the intradiscal pressures could be that the muscles of the in vivo subjects could have been contracting while under active and passive traction. Work is in progress to monitor the muscle activity during in vivo situations of treating the patients using the flexion-distraction procedure.*

**Gudavalli MR, Cox JM, Baker JA, Cramer GD, Patwardhan AG: Intervertebral disc pressure changes during the flexion-distraction procedures for low back pain. Presented at and in the proceedings of the International Society for the Study of the Lumbar Spine Meeting, June 1997, Singapore.**

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### **Significant Decrease in Intradiscal Pressure with Distraction**

*We observed a significant decrease in intradiscal pressure during the flexion distraction procedure for low back pain. The pressure has increased during extension motion of the table. The pressures have increased during right lateral motion whereas the pressures have decreased during the left lateral motion. During circumduction the pressures have decreased during the left lateral and flexion motions, where as they have increased during right lateral and flexion combined motions. In all of the motions the pressures returned to their original values when the spine was brought back to the initial prone position. One of the reasons for the increase and decrease during lateral motions is due to the fact that the transducer was inserted some what right laterally from the center of the disc. The results clearly show that the pressures are affected during different motions of the spine associated with the motions of the table. Even though the present study is limited to one cadaver, the results are very interesting and studies with more number of cadavers and studies on animals can give further insight into the changes in the pressures at different regions of the spine.*

**Gudavalli MR, Cox JM, Baker JA, Cramer GD, Patwardhan AG: Intervertebral disc pressure changes during a chiropractic procedure. Accepted for presentation and publication at the ASME IMECE 97 Bioengineering Convention, November 16-21, 1997, Dallas, Texas. -Advances in Bioengineering 1999; BED, vol. 39, pgs 187-188.**

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### **Distraction Shows Significant Decrease in Intradiscal Pressure**

*We observed a significant decrease in intradiscal pressure during the flexion distraction procedure for low back pain. When the discs were not pressurized, the pressures went below 0 mm Hg. When the discs were pressurized, the decrease in the intradiscal pressures was much larger, suggesting that in patients with higher intradiscal pressures, the decrease may be much higher during the treatment. The pressures returned to their original values when the spine was brought back to the initial prone position. Quillette(2), and Kramer (3) hypothesized that as the vertebrae in the spine are distracted, a negative pressure develops in the disc, and sucks back a protrusion. Ramos et al. (4) reported on the intradiscal pressure during Vertebral Axial Decompression (VAD) procedure on three patients measured intraoperatively. The results showed that the disc pressures reduced during the VAD therapy. They demonstrated that the disc pressures can go as low as 160 mmHg. The results of the*

present study are in general agreement with the study reported by Ramos and Martin (4). Anderson et al. (5) reported the intradiscal pressures at L3-L4 disc on four volunteers during standing, lying, active traction, and passive traction. The findings showed an increase in the disc pressure during both active and passive traction. The results from the present study do not agree with the results reported by Anderson et al. (5). A possible reason could be that the muscles of the in vivo subjects could have been contracting while under active and passive traction. Work is in progress to monitor the muscle activity during in vivo situations of treating the patients using flexion-distraction procedure.

**Gudavalli MR, Cox JM, Baker JA, Cramer GD, Patwardhan AG: Intervertebral Disc Pressure. Changes During a Chiropractic Procedure. Abstract from the Proceedings of the Bioengineering Conference, Phoenix.**

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## **Distraction Appropriate for Patients Antalgic Forward Position Due to Back Pain**

*A Grand Rounds discussion of a patient suffering from severe low back pain with pain radiating into the left thigh. The patient occasionally gets "stuck" in a position where he is leaning forward and to the right, and he must slowly work out his back in order to straighten up again. Dr. Cox discusses the examination of the patient, the possible pain generators for the patient's pain, and the Cox Distraction Adjusting procedures recommended for the case. Algorithms of decision making and treatment protocol are presented for Cox® Distraction diagnosis and care of an acute low back pain patient. As well, discussion of potential sources of the pain is presented. Many references cited.*

**Cox JM et al: Grand Rounds Discussion: Patient with acute low back pain. Chiropractic Technique 1999; 11(1):1-17**

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## **Distraction Aids in Care**

*Algorithms of the standard of care for Cox® Distraction are presented and explained. Automated axial distraction, the newest ability of Cox® Technique protocol, is introduced in a very technical, step-by-step fashion with illustrations as to hand positioning as well as instrument use. AAD eases the distraction procedures for the physician and provides a smooth adjustment for the patient.*

**Cox JM I, Cox JM II: Cox automated axial distraction manipulation. Canadian Chiropractor 1999; 4(1):26-33**

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## **Distraction Procedures Also Effective For Cervical Spine (as Well as Lumbar)**

*Cox® Distraction procedures for the cervical spine and thoracic spine are a natural outgrowth of its application to the low back. This technical overview of Cox® Distraction procedures for the cervical and thoracic spine is intended to introduce this form of care for patients intolerant of classic rotatory thrust techniques due to such anatomical and pathological findings as degenerative disc disease,*

vertebral artery syndrome, disc herniation, blocked vertebra, occipitalization, scoliosis, other congenital defects, as well as for patients who just cannot be high velocity adjusted.

**Cox JM I, Cox JM II: Cox Distraction Manipulation Procedures for the Cervical Spine. Florida Chiropractic Association Journal 1999; Jan/Feb: 42-44**

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## **Distraction & Manipulation to Help Radicular Pain from Synovial Cysts**

*Chiropractic distraction manipulation and physiological therapeutic care relieved 2 patients with low back and radicular pain attributed to MRI-confirmed synovial cysts of the lumbar spine. This treatment may be an initial conservative treatment option for synovial cysts with careful patient monitoring for progressive neurologic deficit which would necessitate surgery. Distraction manipulation may be a safe and effective conservative treatment of synovial cyst causing radicular pain; further data collection of clinical outcomes is warranted.*

**Cox JM, Cox II, JM: Chiropractic Treatment of Lumbar Spine Synovial Cysts: A Report of Two Cases. Journal of Manipulative and Physiological Therapeutics 2005; 28(2):143-147.**

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## **Distraction Helpful with Radiculopathy**

*Patients with radiculopathy did significantly better with FD. There were no significant differences between groups on the Roland Morris and SF-36 outcome measures. Overall, flexion–distraction provided more pain relief than active exercise; however, these results varied based on stratification of patients with and without radiculopathy and with and without recurrent symptoms. The subgroup analysis provides a possible explanation for contrasting results among randomized clinical trials of chronic low back pain treatments and these results also provide guidance for future work in the treatment of chronic low back pain.*

**Gudavalli R, Cambron JA, McGregor M et al: A randomized clinical trial and subgroup analysis to compare flexion–distraction with active exercise for chronic low back pain. European Spine Journal 2006; 15: 1070-1082**

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## **Chiropractic Care Alone helpful for Chronic Low Back Pain**

*During a one-year followup, participants previously randomized to physical therapy attended significantly more healthcare visits than those participants who received chiropractic care.*

**Cambron GA, Gudavalli MR, McGregor M et al: Amount of health care and self-care following a randomized clinical trial comparing flexion-distraction with exercise program for chronic low back pain. Osteopathy and Chiropractic 2006; 14:19**

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## **Distraction Effective in Reducing Pain, Better Than Physical Therapy**

*In this first trial on flexion distraction care, flexion distraction was found to be more effective in reducing pain for 1 year when compared to a form of physical therapy.*

**Cambron GA, Gudavalli MR, Hedecker D et al: One-Year Follow-Up of a Randomized Clinical Trial Comparing Flexion Distraction with an Exercise Program for Chronic Low-Back Pain. J of Alternative and Complementary Medicine 2006; 12(7): 659-668**

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## **Distraction Shows Great Promise for Treatment of Cervical Radiculopathy**

*A 34-year-old female presented to a chiropractic office with severe, unremitting, cervical, shoulder, and arm pain of several months' duration. Past medical history, clinical evaluation, and plain-film radiographs revealed findings consistent with Klippel Feil syndrome. The radiographs revealed a C2/3 block vertebrae, atlas assimilation, and premature degenerative changes consistent with the syndrome. Treatment consisted of cervical flexion-distraction manipulation and adjunctive therapies. This patient felt relief after the first treatment and experienced a complete resolution of her symptoms after eight treatments performed over a period of 2 months. Klippel-Feil syndrome is an anatomical entity that results in premature cervical degenerative changes, which may cause radiculopathy. Flexion-distraction manipulation performed to the cervical spine is a relatively new clinical procedure, which shows great promise for the treatment of cervical radiculopathy.*

**Kruse RA, Schliesser J, DeBono VF: Klippel-Feil Syndrome with radiculopathy. Chiropractic management utilizing flexion-distraction technique: A case report. J of the Neuromusculoskeletal System 2000;8(4):124-31**

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## **Distraction May be an Effective Treatment for Severe Cervical Stenosis**

*A 60 year old male presented with complaints of pain and limited motion in his neck, with pain and weakness in his left shoulder and arm. These symptoms began after a fall approximately 4 months prior. His previous allopathic care included medication and physical/occupational therapy, which provided no significant relief. Cervical plain film radiographs demonstrated degenerative changes and the magnetic resonance imaging revealed multilevel central stenosis. The patient was treated with flexion-distraction manipulation, which provided significant relief of his subjective and objective findings. Cervical stenosis with resultant radicular and neurological complaints may be difficult to manage with both conventional allopathic and chiropractic treatment. Flexion distraction manipulative therapy may be an effective treatment option for these often difficult cases.*

**Kruse RA, Gregerson D: Cervical Spinal stenosis resulting in radiculopathy treated with flexion distraction manipulation: A case study. J of the Neuromusculoskeletal System 2002;10(4):141-7**

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## **Support for the Use of Distraction for the Cervical Spine.**

*Background: Although flexion distraction performed to the lumbar spine is commonly utilized and documented as effective, flexion distraction manipulation performed to the cervical spine has not been*

adequately studied. Subjective: To objectively quantify data from the Visual Analogue Scale (VAS) to support the clinical judgment exercised for the use of flexion distraction manipulation to treat cervical radiculopathy.

**Schliesser JS, Kruse RA, Fleming Fallon L: Cervical radiculopathy treated with chiropractic flexion distraction manipulation: a retrospective study in a private practice setting: JMPT2003; 26(9):592-596**

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## **Distraction & Manipulation Effective for Difficult Stenosis Cases**

*A 60 year old male presented with complaints of pain and limited motion in his neck, with pain and weakness in his left shoulder and arm. These symptoms began after a fall approximately 4 months prior. His previous allopathic care included medication and physical/occupational therapy, which provided no significant relief. Cervical plain film radiographs demonstrated degenerative changes and the magnetic resonance imaging revealed multilevel central stenosis. The patient was treated with flexion-distraction manipulation, which provided significant relief of his subjective and objective findings. Cervical stenosis with resultant radicular and neurological complaints may be difficult to manage with both conventional allopathic and chiropractic treatment. Flexion distraction manipulative therapy may be an effective treatment option for these often difficult cases.*

**Kruse RA, Gregerson D: Cervical Spinal stenosis resulting in radiculopathy treated with flexion-distraction manipulation: A case study. J of the Neuromusculoskeletal System 2002;10(4):141-7**

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## **Manipulation and Distraction Show Promise for Cervical Radiculopathy**

*Background: Although flexion distraction performed to the lumbar spine is commonly utilized and documented as effective, flexion distraction manipulation performed to the cervical spine has not been adequately studied. Subjective: To objectively quantify data from the Visual Analogue Scale (VAS) to support the clinical judgment exercised for the use of flexion distraction manipulation to treat cervical radiculopathy. Design and setting: A retrospective analysis of the files of 39 patients from a private chiropractic clinic that met diagnostic criteria for inclusion. All patients were diagnosed with cervical radiculopathy and treated by a single practitioner with flexion distraction manipulation and some form of adjunctive physical medicine modality. Main outcome measures: The VAS was used to objectively quantify pain. Of the 39 files reviewed, 22 contained an initial and post treatment VAS score and were therefore utilized in this study. Results: This study revealed a statistically significant reduction in pain as quantified by visual analogue scores. The mean number of treatments required was  $13.2 \pm 8.2$ , with a range of 6 to 37. Only 3 persons required more treatments than the mean plus 1 standard deviation. Conclusion: The results of this study show promise for chiropractic and manual therapy techniques such as flexion distraction, as well as demonstrating that other, larger research studies must be performed for cervical radiculopathy.*

**Schliesser JS, Kruse RA, Fleming Fallon L: Cervical radiculopathy treated with chiropractic flexion distraction manipulation: a retrospective study in a private practice setting: JMPT2003; 26(9):592-596**

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## **Distraction a Viable Form of Conservative Care for Cervical Disc Syndromes**

*Objective: To discuss the non-surgical treatment of a cervical disk herniation with flexion distraction manipulation. Clinical Features: A case study of cervical disk syndrome with radicular symptoms is presented. Magnetic resonance imaging revealed a large C5-C6 disk herniation. Degenerative changes at the affected level were demonstrated on cervical spine plain film radiographs. Intervention and Outcome: The patient received treatment in the form of flexion distraction manipulation and adjunctive therapies. A complete resolution of the patient's subjective complaints was achieved. Conclusion: Flexion distraction has been a technique associated with musculoskeletal conditions of the lumbar spine. Flexion distraction applied to the cervical spine might be an effective therapy in the treatment of cervical disk herniations. Although further controlled studies are needed, treatment of cervical disk syndromes with flexion distraction might be a viable form of conservative care.*

**Kruse RA, Imbarlina F, DeBono VF: Treatment of cervical radiculopathy with flexion distraction. J Manipulative Physiological Therapeutics 2001;24(3):206-209**

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## **Distraction & Manipulation Helpful for Lumbar Disc Prolapse**

*A case report is discussed in which a clinically diagnosed case of an L4-L5 nuclear disk prolapse with a sequestered fragment was certified by computerized axial tomography and magnetic resonance imaging at the initiation of the treatment period. It was treated with flexion-distraction manipulation, hot and cold fomentation, positive galvanism, a lumbosacral support, nutritional supplementation, and abstinence from sitting and exercises. Four weeks after initiation of treatment, the patient was asymptomatic. Eight weeks after initiation of treatment, and 6 weeks after the original scan, magnetic resonance imaging certified a reduction in the size of the prolapse within the vertebral canal. An 11 month follow-up examination indicated the patient had no exacerbations of her condition and all objective findings were negative.*

**Neault CC: Conservative management of an L4-L5 left nuclear disc prolapse with a sequestered segment. J of Manipulative and Physiological Therapeutics 1992;15(5):318-321**

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## **Distraction Helpful for Multilevel Disc Degeneration**

*A case of a 61-year-old female with low back, hip and sciatic pain since for five years has been bedridden or restricted to the sofa prior to care is presented. Onset of the pain was gradual and worsened recently, interfering with work, sleep and rest. Lying flat on her back helped. Pain radiated to both calves at time, left more than right. The physician diagnosed her as having multi-level disc degeneration and degenerative joint disease with significant subluxation of the thoracolumbar spine. She was most symptomatic of a large, medial, contained L5/S1 disc protrusion with S1 nerve root compression. After four weeks of Cox® Distraction therapy, she reported no leg or back pain. She is able to walk and function again much to the delight of her family and the confusion of her friends.*

**Hayden RA: Multilevel degenerative disc disease: a case study. Georgia Chiropractic Journal 1996;April: 6-7:34**

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## **Distraction Relieves 75% of Spondylolisthesis Patients**

*Stable Spondylolisthesis 75% Relieved of Pain with Cox® Distraction Hawk C, Azad A, Phongphua C, Long CR: Preliminary study of the effects of a placebo chiropractic treatment with sham adjustments. J of Manipulative And Physiological Therapeutics 1999; 22 (7): 436-43*

*13 of 18 Low Back Patients Felt Greater Positive Effect of Flexion Distraction over Placebo*

**Cox JM, Trier K: Chiropractic adjustment results correlated with spondylolisthesis instability. J of Manual Medicine 1991;6:67-72**

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## **Severe, Multilevel Canal Stenosis Managed with Distraction & Manipulation**

*To discuss the case of a patient with severe, multilevel central canal stenosis who was managed conservatively with flexion-distraction manipulation; to introduce a cautious approach to the application of treatment, which can reduce the risk of adverse effects and might make an apprehensive doctor more comfortable treating this condition; and to propose a theoretic mechanism for relief of symptoms through use of chiropractic manipulation. Clinical Features: A 78-year-old man had low back pain and severe bilateral leg pains. Objective findings were minimal, yet magnetic resonance imaging demonstrated severe degenerative lumbar stenosis at L3-L4 and L4-L5 and to a lesser degree at L2-L3. Intervention and Outcome: Flexion-distraction manipulation of the lumbar spine was performed. Incremental increases in traction forces were applied as the patient responded positively to care. He experienced a decrease in the frequency and intensity of his leg symptoms and a resolution of his low back pain. These improvements were maintained at a 5-month follow-up visit. Conclusion: Successful management of symptoms either caused by or complicated by lumbar spinal stenosis is presented. Manipulation of the spine shows promise for relief of symptoms through improving spinal biomechanics. Further study in the form of a randomized clinical trial is warranted.*

**Snow G: Chiropractic management of a patient with lumbar spinal stenosis. JMPT 2001; 24(4): 300-304**

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## **Manipulation & Distraction for Lumbar Disc Herniation**

*Chiropractors need a non-surgical, conservative approach to treat low back pain with sciatica as an alternative to and before beginning the more aggressive, and potentially hazardous, surgical treatment. There is some support for the idea that lumbar disc herniation with neurological deficit and radicular pain does not contraindicate the judicious use of manipulation. Although significant questions remain for the evaluation and treatment of lumbar radiculopathy (sciatica) with disc herniations) there is ample evidence to suggest that a course of conservative care, including spinal manipulation, should be completed before surgical consult is considered. Ice was applied to a patient's lower back for 5 minutes, followed by flexion-distraction mobilization done by placing a hand contact over the L4 spinous process and using the pelvic section of the table to distract the lumbar spine between the L4-L5 segment. This procedure was repeated three times with each distractive process held for 20 seconds. The patient was told to lie on her back at home with her knees bent in a "90/90" position whenever possible. She was instructed to get up only for bathroom use. One week after this appointment, she reported that her lower back pain was almost gone and that the leg pain no longer*

bothered her. Treatment again consisted of lumbar flexion distraction and long axis distraction of the lower extremity. At this point, side posture rotary manipulation was added to her treatment plan.

**Bergmann TF, Jongeward BV: Manipulative therapy in lower back pain with leg pain and neurological deficit. J Of Manipulative and Physiological Therapeutics 1998; 21(4):288-294**

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## **Distraction Significantly Relieves Disc Protrusion**

*The authors present a case of a 24-year-old Hispanic hyperkyphotic male with a complaint of acute low back pain as the result of a bending and pulling injury. The patient presented with a marked right laterally flexed antalgic lean and appeared to be in severe pain. Radiographs revealed an L6 vertebra with hypoplastic lumbosacral articular facets and spina bifida occulta. The patient also had radicular compression symptomatology on physical exam. He was treated with flexion distraction for three treatments with a significant decrease in symptomatology. The significance of this case is that flexion distraction may also be useful in the treatment of conditions with inherent instability such as in the case presented.*

**Husbands DK, Pokras R: 1991 year-end compendium: The use of flexion-distraction in a lumbosacral posterior arch defect with a lumbosacral disc protrusion: a case study. ACA J of Chiropractic 1991; December, pgs 21-24**

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## **Distraction Outcomes Much Better Than Placebo**

*Thirty-two patients with subacute or chronic low back pain were randomly assigned to group A (flexion-distraction technique and trigger point therapy), group B (sham adjustment and effleurage massage), group C (flexion-distraction and effleurage), or group D (sham adjustment and trigger point therapy) for 6 weeks of treatment. The Roland Morris Questionnaire (RMQ) and the Pain Disability Index (PDI) were the outcome instruments of primary interest. RMQ median score changes were similar across groups. PDI median score changes at week 3 were greatest in group A, less in groups C and D, and least in group B. At week 6, group B still showed less change than the others.*

**Hawk C, Long CR: Use of a pilot to refine the design of a study to develop a manual placebo treatment. JNMS 2000;8(2):39-48**

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## **Distraction, Manipulation, & Physical Therapy Effective Combination for Discs**

*A 36-year-old mother of 2, previously healthy and athletic, presented with low back pain, sharp shooting pain down the side of her left leg, and a numb feeling in her toes. She stated that she was unable to toe raise or straighten her left leg at the knee. The CT scan indicated a central left disk herniation at the L5 to S1 level, which was abutting the ventral portion of the thecal sac and the left S1 nerve sheath. Treatment involved 9 therapy sessions over a 3 week period. Each session consisted of 4 modalities. Interferential electrotherapy with moist heat lasting 15 minutes was used to control pain. The interferential was set at a low frequency, 1 to 15 Hz, with approximately 20 mA intensity (for patient tolerance) to produce endorphin release and relieve hypertonicity. Manipulation of the lumbar spine and sacroiliac joints was done with the patient in side posture. This manipulative technic was*

well tolerated and not painful during or after the procedure. Finally, flexion traction of the specific vertebral segments was accomplished using a Lloyd flexion distraction table, in which a manual traction force was applied to the L5 spinous process in a cephalad direction while the table was flexed, producing additional traction force at the specific vertebral segment. The patient improved with each session. After the 9th session, the patient felt she had improved enough to discontinue treatment.

**Crawford MC: Chiropractic management of acute low back pain. Alternative Th H 1999; 5(1):112**

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## **Multimodal Approach Shows Benefit for Lumbar Disc Herniation**

*Objective: To describe the nonsurgical treatment of acute S1 radiculopathy from a large (12 × 12 × 13 mm) L5-S1 disk herniation. Clinical Features: A 31-year-old man presented with severe lower back pain and pain, paresthesia, and plantar flexion weakness of the left leg. His symptoms began 5 days before the initial visit and progressed despite nonsteroidal anti-inflammatory drugs and analgesic medication. An absent left Achilles reflex, left S1 dermatome hypesthesia, and left gastrocnemius/soleus weakness was noted. Magnetic resonance imaging demonstrated a large L5-S1 disk herniation. Intervention and Outcome: Initial treatment of this patient included McKenzie protocol press-ups to reduce and centralize symptoms, nonloading exercise for cardiovascular fitness, and lower leg isotonic exercises to prevent atrophy. Counseling was provided to reduce abnormal illness behavior risk. Later, flexion distraction and side-posture manipulation were provided to improve joint function. Sensory motor training, trunk stabilization exercises, and trigger point therapy were also used. He returned to modified work 27 days after symptom onset. A follow-up, comparative magnetic resonance imaging (MRI) study was unchanged. He was discharged as asymptomatic (zero rating on both the Oswestry and numerical pain scales) after 50 days and 20 visits, although the left S1 reflex remained absent. Reassessment 169 days later revealed neither significant symptoms nor lifestyle restrictions. Conclusion: This case demonstrates the potential benefit of a chiropractic rehabilitation strategy by use of multimodal therapy for lumbar radiculopathy associated with disk herniation.*

**Morris CE: Chiropractic rehabilitation of a patient with S1 radiculopathy associated with a large lumbar disk herniation. JMPT 1999; 22(1):38-44**

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## **Distraction Gains Credibility for Treatment of Disc Pain, Study Shows**

*Introduction: Flexion distraction has gained increased credibility as a therapeutic modality for treatment of low back pain. Although important work in the area has elucidated the intradiscal pressure profiles during flexion distraction, the accompanying neural responses have yet to be described. The purpose of this pilot study was to assess neural reflex responses to motion with three degrees of freedom applied to the lumbar spine and to evaluate H-reflex responses of the soleus. Methods. Subjects (n=4) were measured for Hmax reflexes determined from stimulus responses recruitment curves measured in neutral prone position, flexion, left and right lateral flexion, and axial rotation on a Cox adjusting table. The mean of 10 evoked Hmax waves expressed as a percentage of maximal M-wave was the criterion measure. Spinal range of motion was quantified by Metrecom digitization. Results. The data showed considerable variation in some movement ranges notwithstanding identical table positioning for all subjects (i.e. Flexion 3-12°). Mean Hmax/Mmax*

ratios were 65.5+-15, 65.5+-17, 62.8+-12, 59.6+-17 and 65.9+-19 for neutral, flexion, R. Lateral, L. Lateral flexion and R and L axial rotation respectively. The salient findings in the data were the non-existent H-reflex changes in lateral flexion and the significant suppression of neuromuscular activation in flexion (65+-16 vs 60+-15%;  $p < 0.05$ ) and ipsilateral rotation (65+-16 vs 59+-17%;  $p < 0.05$ ). Slight perturbations in numerous afferent receptors are known to significantly alter the H-reflex. The absence of measurable changes in lateral flexion may indicate that both slow and fast adapting receptors could be involved in lumbar motion. These preliminary findings suggest the need for further dynamic motion studies of the flexion distraction neurophysiology.

**Bulbulian R, Dishman JD, Burke J: Neuroreflex modulation of the lumbar spine in flexion distraction. New York Chiropractic College, Seneca Falls, New York 13148. Presented at 5th World Federation of Chiropractic in Auckland, New Zealand. May 15-23, 1999**

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## **More Evidence for Distraction Gains Credibility for Treatment of Disc Pain**

*Background: Flexion distraction has gained increased credibility as a therapeutic modality for treatment of low back pain. Although important work in the area has elucidated the intradiskal pressure profiles during flexion distraction, the accompanying neural responses have yet to be described. Objective: The purpose of this pilot study was to assess neural reflex responses to motion with 3 degrees of freedom applied to the lumbar spine and to evaluate H-reflex responses of the soleus. Methods: Subjects (n = 12) were measured for H-maximum reflexes determined from stimulus response recruitment curves measured in neutral prone position. The mean of 10 evoked H-waves (at H-maximum stimulus intensity) were measured in neutral position, flexion, left and right lateral flexion, and axial rotation of the trunk on an adjusting table. H-reflexes were expressed as a percentage of maximal M-wave for the criterion measure. Spinal range of motion was quantified by digitization. Results: The data showed variation in some movement ranges, notwithstanding identical table positioning for all subjects. Mean H-reflex amplitude was decreased ( $15.2 \pm 5.8$  mV to  $13.8 \pm 5.8$  mV), and the H/M ratio was also decreased in flexion compared with neutral ( $55.0\% \pm 19.1\%$  to  $50.3\% \pm 19.4\%$ ;  $P < .05$ ). Conclusions: Trunk flexion is accompanied by inhibition of the motor neuron pool. Slight perturbations in numerous afferent receptors are known to significantly alter the H-reflex. The absence of measurable changes in lateral flexion and trunk rotation may indicate that both slow-and fast adapting receptors could be involved in lumbar motion. These preliminary findings suggest the need for further dynamic motion studies of the flexion distraction neurophysiologic condition.*

**Bulbulian R, Burke J, Dishman JD : Spinal reflex excitability changes after lumbar spine passive flexion mobilization. Journal of Manipulative and Physiological Therapeutics 2002; (Vol. 25, Issue 8, Pages 526-532**

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## **Distraction Shows Improvement in Severity of Symptoms**

*A study was conducted as a joint venture between Physicians First, an established chiropractic clinic, and Blue Cross and Blue Shield of Ohio. The purpose was to compile statistics on the effectiveness of chiropractic treatment of back injuries that might otherwise require surgical intervention. The study was composed of a total of 10 patients with diagnosed intervertebral disc syndrome. All 10 subjects*

*had received treatment from a medical doctor for the diagnosed conditions. The subjects were treated under a twelve week plan which included the utilization of Cox Distraction Technique. Post-treatment surveys revealed that all 10 patients reported improvement in the frequency and severity of symptoms.*

**Gallucci G [1438 S.O.M. Center Road, Mayfield Heights, OH 44124 --(216)461-4848]: The effectiveness of chiropractic treatment for disc syndrome. A Study by Blue Cross and Blue Shield of Ohio and Physicians First, Inc. (1996)**

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## **Distraction & Manipulation Offers Relief for Disc Herniations**

*Lumbar radicular symptoms can be caused by lumbar intervertebral disc herniations. If a disc injury is positively established through diagnostic imaging, surgery is a commonly recommended approach. Flexion/distraction manipulation is a therapeutic alternative that may offer relief for subjective complaints and elimination of objective signs. Success with this technique might spare the patient an operative procedure. This is a case report of one such incidence. Flexion-distraction manipulation is a treatment developed by James M. Cox. It is often used for lumbar disc injuries (herniation, bulges, etc.), and for other low back and lower extremity radicular conditions. The technique involves the use of a specialized table which allows for passive distraction, flexion, lateral bending, and rotation. These different planes of motion, along with the use of appropriate adjunctive therapy and exercises, allow for reduction of symptoms attributable to lumbar disc syndromes. Contraindications and indications for flexion/distraction manipulation have been identified and enumerated. Flexion/distraction manipulation is a treatment that should be investigated as a part of the algorithm for presurgical therapies of lumbar intervertebral disc injuries. This alternative in conservative care may be of benefit to a large number of patients. The surgical option for treating intervertebral disc herniations might be reduced with propagation of flexion/distraction manipulation. Eyerman, E. Simple pelvic traction gives inconsistent relief to herniated lumbar disc sufferers.*

**Guadagnino MR: Flexion-distraction manipulation of a patient with a proven disc herniation. J Of The Neuromusculoskeletal System 1997; 5(2):70-73**

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## **Decompression Reduces Symptoms & Improves Activity of Daily Living**

*"All but two of the patients in the study improved at least 30% or more in the first three weeks." "Utilizing the outcome measures, this form of decompression reduces symptoms and improves activities of daily living."*

**Gundersen, B, et al.: A Clinical Trial on Non-Surgical Spinal Decompression Using Vertebral Axial Distraction Delivered by a Computerized Traction Device. The Academy of Chiropractic Orthopedists, Quarterly Journal of ACO, June 2004**

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## **Decompression Provided a Complete Reduction of Herniation**

*Spinal Decompression Therapy "...allowed imbibition and complete reduction of the visualized herniation." "Spinal decompression therapy provided an effective means of treatment for this patient's symptoms resulting from discal herniation (extrusion) with associated impingement of the adjacent*

*nerve root." "MR imaging proved to be a useful and non-invasive technique in monitoring the efficacy of decompression therapy as it applies to this case." "Decompression of the spine proved to be superior to the other forms of conservative care when applied to our patient. The patients' results were both subjectively favorable and objectively quantified."*

**Yochum, et al.: Treatment of an L5-S1 Extruded Disc Herniation Using a DRX-9000 Spinal Decompression Unit: A Case Report. Chiro Econ, Vol 53: Issue 2.**