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Non-Surgical Decompression

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James Demetrious, DC, DABCO

Clinician

- Active Practice >38 years
- Diplomate, American Board of Chiropractic Orthopedists
- Diplomate, International Academy of Neuromusculoskeletal Medicine

Publications

- Over 31 Peer-Reviewed chiropractic journal articles.
- Many Contributions to NCMIC Examiner and Podcast

Educator

- Post-Grad. > 24 years
- NCMIC Speakers' Bureau for>10 years
- Northeast College of Health Sciences
- **PostGradDC**

Editorial

- Editorial Reviewer for journals *Spine*, *Annals of Internal Medicine*, and *Clinical Anatomy*
- Former Managing Editor of *Journal of Chiropractic Orthopedists*

Honors

- Academy of Chiropractic Orthopedists Distinguished Service and Fellow Awards
- American College of Chiropractic Orthopedists Outstanding Achievement Award

Community

- Lower Cape Fear Hospice, Board Member
- Founder, Past-President Wilmington Autism Society
- Optimists Club – Safety Officer

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Reflecting

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Class Outline

- Epidemiology
- Prevalence
- Non-Surgical Decompression
- New Studies
- How Does NS Decompression Work
- Cases

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Purpose...Initial Chiropractic Care Saves Lives

REVIEW ARTICLE — SPINE SURGERY AND RELATED RESEARCH

Prediction and Mechanisms of Spontaneous Resorption in Lumbar Disc Herniation: Narrative Review

Zili Zeng[1], Jun Qin[1], Liang Guo[1], Takashi Hirai[2], Zhiheng Gui[2], Tao Liu[2], Chen Su[2], Daiyang Yu[2] and Mengmeng Yan[2]

1) Department of Orthopedics, University-Town Hospital of Chongqing Medical University, Chongqing, China
2) Department of Orthopaedic and Spine Surgery, Tokyo Medical and Dental University, Tokyo, Japan

Abstract:
The major symptoms of lumbar disc herniation (LDH) are low back pain, radiative lower extremity pain, and lower limb movement disorder. Patients with LDH suffer from great distress in their daily life accompanied by severe economic hardship and difficulty in self-care, with an increasing tendency in the aging population. PubMed and the Cochrane Central Register of Controlled Trials were searched for relevant studies of spontaneous resorption or regression in LDH after conservative treatment and for other potential studies, which included those from inception to June 30, 2023. The objective of this narrative review is to summarize previous literatures about spontaneous resorption in LDH and to discuss the mechanisms and influencing factors in order to assess the probability of spontaneous resorption by conservative treatment. Spontaneous resorption without surgical treatment is influenced by the types and sizes of the LDH, inflammatory responses, and therapeutic factors. If the lumbar disc herniated tissue comprises a higher percentage of cartilage or modic changes have been shown on magnetic resonance imaging (MRI), resorption in LDH is prevented. The bull's eye sign on enhanced MRI, which is a ring enhancement around a protruding disc, is a vital indicator for easy reabsorption. In addition, the type of extrusion and sequestration in LDH could forecast the higher feasibility of natural reabsorption. Moreover, the higher the proportion of protrusion on the intervertebral disc tissue within the spinal canal, the greater the likelihood of reabsorption. Therefore, which illustrates the feasibility of conservative treatments for LDH. Nonsurgical management of LDH with clinical symptoms is recommended by the authors.

Keywords:
Spontaneous resorption, Lumbar disc herniation (LDH), Mechanisms of resorption, Conservative treatment

Spine Surg Relat Res 2024; 8(3): 235-242
dx.doi.org/10.22603/ssrr.2023-0152

- Conservative treatment and radiological follow-up may be the most appropriate initial treatment option for patients **without** progressive neurological dysfunction, rectal bladder impairment, or refractory pain.
- This helps to improve patient prognosis, decrease the financial burden on patients, and ultimately reduce national healthcare costs.

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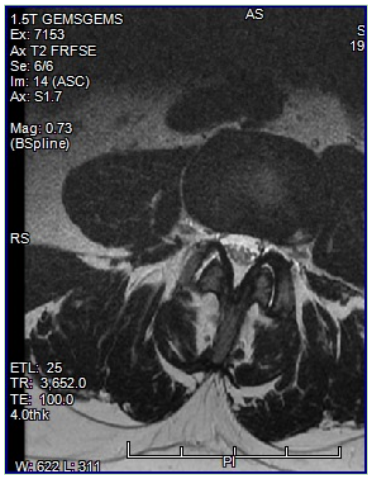
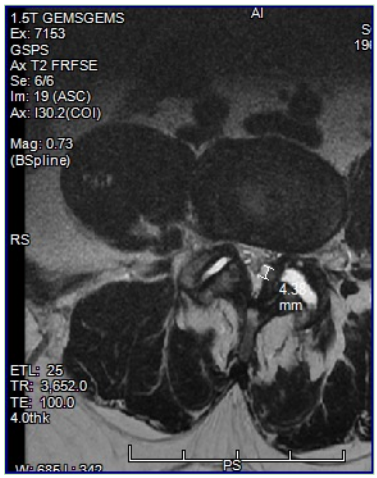
Instructive Case: 50-year old Fireman…





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Epidemiology of Care

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HEALTH SERVICES RESEARCH: PDF ONLY

Initial Choice of Spinal Manipulation Reduces Escalation of Care for Chronic Low Back Pain among Older Medicare Beneficiaries

Whedon, James M. DC, MS[a]; Kizhakkeveettil, Anupama BAMS (Ayurveda), MAOM, PhD[a]; Toler, Andrew WJ. MS[a]; Bezdjian, Serena PhD[a]; Rossi, Daniel[a]; Uptmor, Sarah DC[a]; MacKenzie, Todd A. PhD[b]; Lurie, Jon D. MD, MS[b]; Hurwitz, Eric L. DC, MS, PhD[a]; Coulter, Ian PhD[a]; Haldeman, Scott DC, MD, PhD[a]

Author Information

SPINE: May 11, 2021 - Volume - Issue -
doi: 10.1097/BRS.0000000000004118

- **Adverse Drug Events (ADEs)**:
  - 18.3% of patients who received opiate therapies suffered adverse events.
  - <1% of patients who receive SMT experience and adverse effect.
- **Opioid Dependence or Abuse:**
  - 14.3% of patients who received opiates developed opioid dependence or abuse.
  - Only 0.3% of patients who receive SMT developed opioid dependence or abuse.
- **The authors concluded that the likelihood of ADEs is 42 times higher for the initial choice of opiate therapies versus the initial choice of SMT.**

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PMCID: PMC4258106
NIHMSID: NIHMS641685

Early Predictors of Lumbar Spine Surgery after Occupational Back Injury: Results from a Prospective Study of Workers in Washington State

Benjamin J. Keeney, PhD,[#] Deborah Fulton-Kehoe, PhD, MPH,[†] Judith A. Turner, PhD,[∫^] Thomas M. Wickizer, PhD,[‡] Kwun Chuen Gary Chan, PhD,[◇˙] and Gary M. Franklin, MD, MPH[†˙¶]

42.7% of workers who first saw a surgeon had surgery, in contrast to only 1.5% of those who saw a chiropractor.

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EDITORIAL

Editorials represent the opinions of the authors and JAMA and not those of the American Medical Association.

The Increasing Morbidity of Elective Spinal Stenosis Surgery

Is It Necessary?

Eugene J. Carragee, MD

SURGICAL TREATMENT OF OLDER PATIENTS WITH SEVERE and protracted symptoms from neurogenic claudication or radicular pain syndromes can provide rapid improvement. The most common clinical presentation, spinal and unreliable. Poor bone quality and metabolic disease made achieving a long fusion unlikely due to high rates of pseudarthrosis, instrumentation failure, and recurrent deformity.

During the last 10 years, a combination of innovations has made certain technical aspects of complex adult deformity surgery more feasible. Instrumentation is less likely to break or

In the Medicare population studied by Deyo et al,10 surgeon reimbursement for a simple decompression for spinal stenosis is approximately US **$600 to $800**, whereas the reimbursement for a complex fusion may be **10-fold greater.**14

Author Affiliation: Stanford University School of Medicine, Stanford, California. **Corresponding Author:** Eugene J. Carragee, MD, Stanford University Medical Center, Stanford Medicine Outpatient Center, 450 Broadway St-Pavil, Redwood City, CA 94063 (carragee@stanford.edu).

(Reprinted) JAMA, April 7, 2010—Vol 303, No. 13 **1309**

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Surgical Neurology International

SNI: Spine, a supplement to *Surgical Neurology International*

OPEN ACCESS

Editor: Nancy E. Epstein, MD Winthrop University Hospital, Mineola, NY, USA

For entire Editorial Board visit http://www.surgicalneurologyint.com

The risks of epidural and transforaminal steroid injections in the Spine: Commentary and a comprehensive review of the literature

Nancy E. Epstein

The Albert Einstein College of Medicine, Bronx, 10461, and Chief of Neurosurgical Spine and Education, Department of Neuroscience, Winthrop University Hospital, Mineola, NY, 11501

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Available FREE in open access from: http://www.surgicalneurologyint.com/text.asp?2013/4/3/74/109446

Results: Multiple recent reports cite contaminated epidural steroid injections resulting in meningitis, stroke, paralysis, and death. The Center for Disease Control (CDC) specifically identified 25 deaths (many due to Aspergillosis), 337 patients sickened, and 14,000 exposed to contaminated steroids. Nevertheless, many other patients develop other complications that go unreported/underreported: Other life-threatening infections, spinal fluid leaks (0.4-6%), positional headaches (28%), adhesive arachnoiditis (6-16%), hydrocephalus, air embolism, urinary retention, allergic reactions, intravascular injections (7.9-11.6%), stroke, blindness, neurological deficits/paralysis, hematomas, seizures, and death.

Conclusions: Although the benefits for epidural steroid injections may include transient pain relief for those with/without surgical disease, the multitude of risks attributed to these injections outweighs the benefits.

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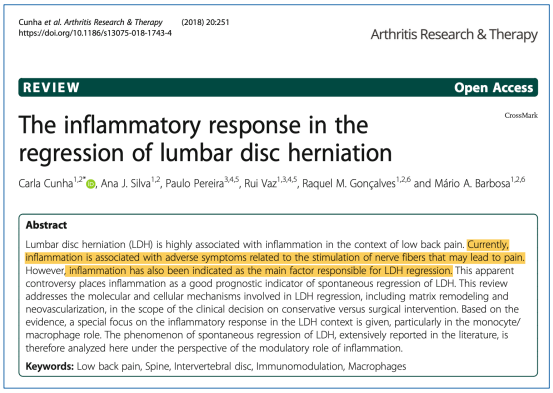
Epidemiology



Cunha et al. Arthritis Research & Therapy (2018) 20:251
https://doi.org/10.1186/s13075-018-1743-4

Arthritis Research & Therapy

REVIEW Open Access

The inflammatory response in the regression of lumbar disc herniation

Carla Cunha[1,2*], Ana J. Silva[1,2], Paulo Pereira[3,4,5], Rui Vaz[1,3,4,5], Raquel M. Gonçalves[1,2,6] and Mário A. Barbosa[1,2,6]

Abstract

Lumbar disc herniation (LDH) is highly associated with inflammation in the context of low back pain. Currently, inflammation is associated with adverse symptoms related to the stimulation of nerve fibers that may lead to pain. However, inflammation has also been indicated as the main factor responsible for LDH regression. This apparent controversy places inflammation as a good prognostic indicator of spontaneous regression of LDH. This review addresses the molecular and cellular mechanisms involved in LDH regression, including matrix remodeling and neovascularization, in the scope of the clinical decision on conservative versus surgical intervention. Based on the evidence, a special focus on the inflammatory response in the LDH context is given, particularly in the monocyte/macrophage role. The phenomenon of spontaneous regression of LDH, extensively reported in the literature, is therefore analyzed here under the perspective of the modulatory role of inflammation.

Keywords: Low back pain, Spine, Intervertebral disc, Immunomodulation, Macrophages

- Lumbar disc herniation (LDH) is a major contributor to low back pain and affects around 9% of all people worldwide, with a high associated economic burden and a tendency to increase as the population ages [1].

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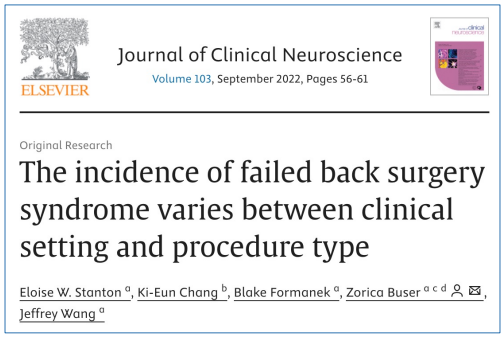
Epidemiology



ELSEVIER

Journal of Clinical Neuroscience
Volume 103, September 2022, Pages 56-61

Original Research

The incidence of failed back surgery syndrome varies between clinical setting and procedure type

Eloise W. Stanton [a], Ki-Eun Chang [b], Blake Formanek [a], Zorica Buser [a c d], Jeffrey Wang [a]

- The overall rates of lumbar spine surgery that result in worsened or new pathologies are estimated to be between 10 and 40% [7].

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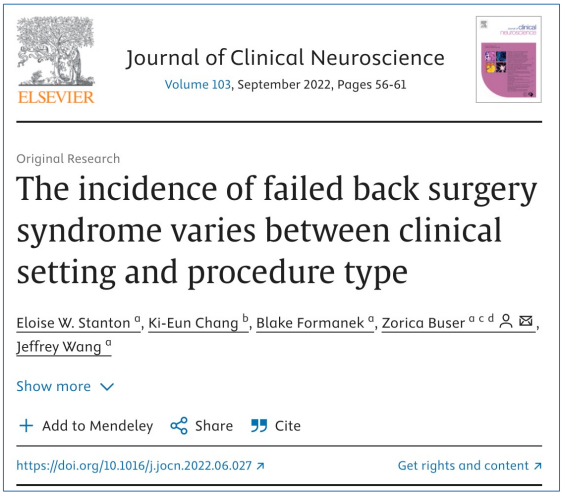
Epidemiology



Journal of Clinical Neuroscience
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Original Research

The incidence of failed back surgery syndrome varies between clinical setting and procedure type

Eloise W. Stanton [a], Ki-Eun Chang [b], Blake Formanek [a], Zorica Buser [a c d], Jeffrey Wang [a]

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- From 2010 to 2017, 102,047 patients underwent lumbar fusion or decompression surgery (54% decompression procedures, 36% posterior fusions, and 8.9% anterior fusions).
- 5.4% of patients were diagnosed with FBSS within six months of the index procedure, and 8.4% were diagnosed with FBSS within twelve months.

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Prevalence in the Asymptomatic Population

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The New England
Journal of Medicine

Volume 331 JULY 14, 1994 Number 2

MAGNETIC RESONANCE IMAGING OF THE LUMBAR SPINE IN PEOPLE WITHOUT BACK PAIN

Maureen C. Jensen, M.D., Michael N. Brant-Zawadzki, M.D., Nancy Obuchowski, Ph.D., Michael T. Modic, M.D., Dennis Malkasian, M.D., Ph.D., and Jeffrey S. Ross, M.D.

- 36% of 98 asymptomatic subjects had normal discs at all levels.
- 52% of the subjects have a bulge at at least one level.
- 27% had a protrusion.
- 1% had an extrusion.
- 38% had one abnormality at more than one intervertebral disc.

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Spine
SPINE Volume 40, Number 6, pp 392-398

DIAGNOSTICS

Abnormal Findings on Magnetic Resonance Images of the Cervical Spines in 1211 Asymptomatic Subjects

Hiroaki Nakashima, MD,* Yasutsugu Yukawa, MD,† Kota Suda, MD,‡ Masatsune Yamagata, MD,§ Takayoshi Ueta, MD,¶ and Fumihiko Kato, MD†

Study Design. Cross-sectional study.
Objective. The purpose of this study was to determine the prevalence and distribution of abnormal findings on cervical spine magnetic resonance image (MRI).
Summary of Background Data. Neurological symptoms and abnormal findings on MR images are keys to diagnose the spinal diseases. To determine the significance of MRI abnormalities, we must take into account the (1) frequency and (2) spectrum of structural abnormalities, which may be asymptomatic. However, no large-scale study has documented abnormal findings of the cervical spine on MR image in asymptomatic subjects.
Methods. MR images were analyzed for the anteroposterior spinal cord diameter, disc bulging diameter, and axial cross-sectional area of the spinal cord in 1211 healthy volunteers. The age of healthy volunteers prospectively enrolled in this study ranged from 20 to 70 years, with approximately 100 individuals per decade, per sex. These data were used to determine the spectrum and degree of disc bulging, spinal cord compression (SCC), and increased signal intensity changes in the spinal cord.
Results. Most subjects presented with disc bulging (87.6%), which significantly increased with age in terms of frequency, severity, and number of levels. Even most subjects in their 20s had bulging discs, with 73.3% and 78.0% of males and females, respectively. In contrast, few asymptomatic subjects were diagnosed with SCC (5.3%) or increased signal intensity (2.3%). These numbers increased with age, particularly after age 50 years. SCC mainly involved 1 level (58%) or 2 levels (38%), and predominantly occurred at C5–C6 (41%) and C6–C7 (27%).
Conclusion. Disc bulging was frequently observed in asymptomatic subjects, even including those in their 20s. The number of patients with minor disc bulging increased from age 20 to 50 years. In contrast, the frequency of SCC and increased signal intensity increased after age 50 years, and this was accompanied by increased severity of disc bulging.
Key words: magnetic resonance image (MRI), abnormal findings, asymptomatic, cervical, disc degeneration, disc bulging, spinal cord compression, increased signal intensity, cervical myelopathy, aging, cross-sectional study.
Level of Evidence: 2
Spine 2015;40:392–398

agnetic resonance image (MRI) is a useful tool for

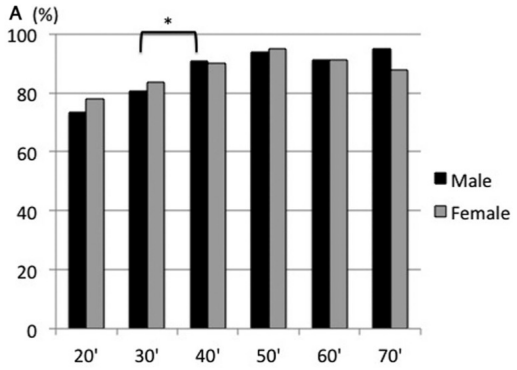

Figure 2. Frequency distribution of disc bulging in asymptomatic subjects. A, Frequency distribution of disc bulging with age and sex. B, Frequency distribution of the number of levels involved in disc bulging. C, Impact of age and sex on disc displacement (mm). Values are mean + SD. *$P < 0.05$, †$P < 0.001$. SD indicates standard deviation.

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Spine
DIAGNOSTICS
SPINE Volume 40, Number 6, pp 392-398

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Figure 4. Spine magnetic resonance imaging T2-weighted sagittal image of a 77-year-old asymptomatic male. There is fusion of the C5 and C6 vertebrae, and local kyphosis at C4–C6. Spinal cord compression detected at C4–C5 and C5–C6, with high-signal intensity change at C5–C6.

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Spine
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Abnormal Findings on Magnetic Resonance Images of the Cervical Spines in 1211 Asymptomatic Subjects

Hiroaki Nakashima, MD,* Yasutsugu Yukawa, MD,† Kota Suda, MD,‡ Masatsune Yamagata, MD,§ Takayoshi Ueta, MD,¶ and Fumihiko Kato, MD†

Of 1,230 healthy volunteers:

- 87.6% of asymptomatic subjects presented with disc bulging.
- 73.3% of males in their 20s had bulging discs.
- 78% of females in their 20s had bulging discs.
- 5.3% of asymptomatic subjects were diagnosed with spinal cord compression.
- 2.3% of asymptomatic subjects had increased signal intensity within the spinal cord.

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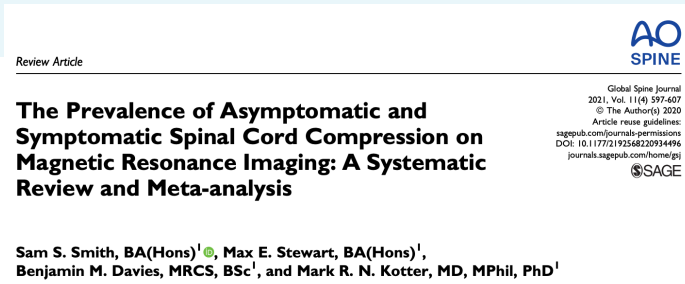

Review Article

AO SPINE

Global Spine Journal
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The Prevalence of Asymptomatic and Symptomatic Spinal Cord Compression on Magnetic Resonance Imaging: A Systematic Review and Meta-analysis

Sam S. Smith, BA(Hons)[1], Max E. Stewart, BA(Hons)[1], Benjamin M. Davies, MRCS, BSc[1], and Mark R. N. Kotter, MD, MPhil, PhD[1]

- The pooled estimate of spinal cord compression (SCC) in the healthy population was 24.2%.
- Smith et al defined factors to investigate the potential sources of heterogeneity, we identified increasing age (>60 years: 35.3%),
- European/North American (39.7%) populations or populations with potential symptoms of myelopathy more likely to identify SCC (81.3%) and this rose to 86% in populations with myelopathic features..

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Original Article

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Relationship Between Endplate Defects, Modic Change, Facet Joint Degeneration, and Disc Degeneration of Cervical Spine

Su-Hun Lee[1,2], Dong Wuk Son[1,2], Jun-Seok Lee[1,2], Soon-Ki Sung[1,2], Sang Weon Lee[1,2], Geun Sung Song[1,2]

[1]Department of Neurosurgery, Pusan National University Yangsan Hospital, Pusan National University School of Medicine, Yangsan, Korea
[2]Research Institute for Convergence of Biomedical Science and Technology, Pusan National University Yangsan Hospital, Yangsan, Korea

- These results indicate that FD is a degeneration that occurs independently, rather than as a result of other degenerative factors, and negates the "disc degeneration precedes facet joint osteoarthritis" hypothesis in the cervical spine.
- Conclusion: Our results may indicate that FD is a degeneration that occurs independently, rather than as a result of other degenerative factors.

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ORIGINAL RESEARCH
SPINE

Systematic Literature Review of Imaging Features of Spinal Degeneration in Asymptomatic Populations

W. Brinjikji, P.H. Luetmer, B. Comstock, B.W. Bresnahan, L.E. Chen, R.A. Deyo, S. Halabi, J.A. Turner, A.L. Avins, K. James, J.T. Wald, D.F. Kallmes, and J.G. Jarvik

CONCLUSIONS: Imaging findings of spine degeneration are present in high proportions of asymptomatic individuals, increasing with age. Many imaging-based degenerative features are likely part of normal aging and unassociated with pain. These imaging findings must be interpreted in the context of the patient's clinical condition.

AJNR Am J Neuroradiol 36:811–16 Apr 2015

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Table 2: Age-specific prevalence estimates of degenerative spine imaging findings in asymptomatic patients[a]

Imaging Finding	Age (yr)						
	20	30	40	50	60	70	80
Disk degeneration	37%	52%	68%	80%	88%	93%	96%
Disk signal loss	17%	33%	54%	73%	86%	94%	97%
Disk height loss	24%	34%	45%	56%	67%	76%	84%
Disk bulge	30%	40%	50%	60%	69%	77%	84%
Disk protrusion	29%	31%	33%	36%	38%	40%	43%
Annular fissure	19%	20%	22%	23%	25%	27%	29%
Facet degeneration	4%	9%	18%	32%	50%	69%	83%
Spondylolisthesis	3%	5%	8%	14%	23%	35%	50%

AJNR Am J Neuroradiol 36:811–16 Apr 2015

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ORIGINAL RESEARCH
SPINE

MRI Findings of Disc Degeneration are More Prevalent in Adults with Low Back Pain than in Asymptomatic Controls: A Systematic Review and Meta-Analysis

W. Brinjikji, F.E. Diehn, J.G. Jarvik, C.M. Carr, D.F. Kallmes, M.H. Murad, and P.H. Luetmer

- This meta-analysis of epidemiologic studies demonstrates that MR imaging evidence of disc bulge, disc degeneration, disc extrusions and protrusions, Modic 1 changes, and spondylolysis had significant associations with low back pain in adult patients 50 years of age or younger.
- The association between these degenerative findings and pain should not be interpreted as causation.
- These imaging findings may be considered as candidate biomarkers for low back pain in younger patients (younger than 50 years of age).
- The role of these findings in determining treatment strategies or prognosis of low back pain has not been established.

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ORIGINAL RESEARCH
SPINE

MRI Findings of Disc Degeneration are More Prevalent in Adults with Low Back Pain than in Asymptomatic Controls: A Systematic Review and Meta-Analysis

W. Brinjikji, F.E. Diehn, J.G. Jarvik, C.M. Carr, D.F. Kallmes, M.H. Murad, and P.H. Luetmer

Outcomes

Outcome	No. of Studies	OR (95% CI)	Prevalence Asymptomatic	Prevalence Symptomatic	*P* Value[a]	I^2 (%)
Annular fissure	6	1.79 (0.97–3.31)	11.3% (9.0%–14.2%)	20.1% (17.7%–22.8%)	.06	59
High-intensity zone	4	2.10 (0.73–6.02)	9.5% (6.7%–13.4%)	10.4% (8.0%–13.4%)	.17	72
Central spinal canal stenosis	2	20.58 (0.05–798.77)	14.0% (10.4%–18.6%)	59.5% (54.9%–63.9%)	.32	94
Disc bulge	3	7.54 (1.28–44.56)	5.9% (3.8%–8.9%)	43.2% (38.2%–48.2%)	.03	90
Disc degeneration	12	2.24 (1.21–4.15)	34.4% (31.5%–37.5%)	57.4% (54.8%–59.8%)	.01	89
Disc extrusion	4	4.38 (1.98–9.68)	1.8% (0.1%–3.7%)	7.1% (5.4%–9.4%)	<.01	0
Disc protrusion	9	2.65 (1.52–4.62)	19.1% (16.5%–22.3%)	42.2% (39.3%–45.1%)	.00	62
Modic changes	5	1.62 (0.48–5.41)	12.1% (9.6%–15.2%)	23.2% (21.7%–27.3%)	.43	65
Modic 1 changes	2	4.01 (1.10–14.55)	3.2% (0.7%–9.4%)	6.7% (4.2%–10.4%)	.04	0
Spondylolisthesis	4	1.59 (0.78–3.24)	3.2% (1.8%–5.8%)	6.2% (4.4%–8.7%)	.20	0
Spondylolysis	2	5.06 (1.65–15.53)	1.8% (0.0%–5.3%)	9.4% (6.6%–12.4%)	<.01	0

[a] *P* values are computed from the meta-analysis of ORs. Prevalence data are provided for reference but are not meant for statistical comparison.

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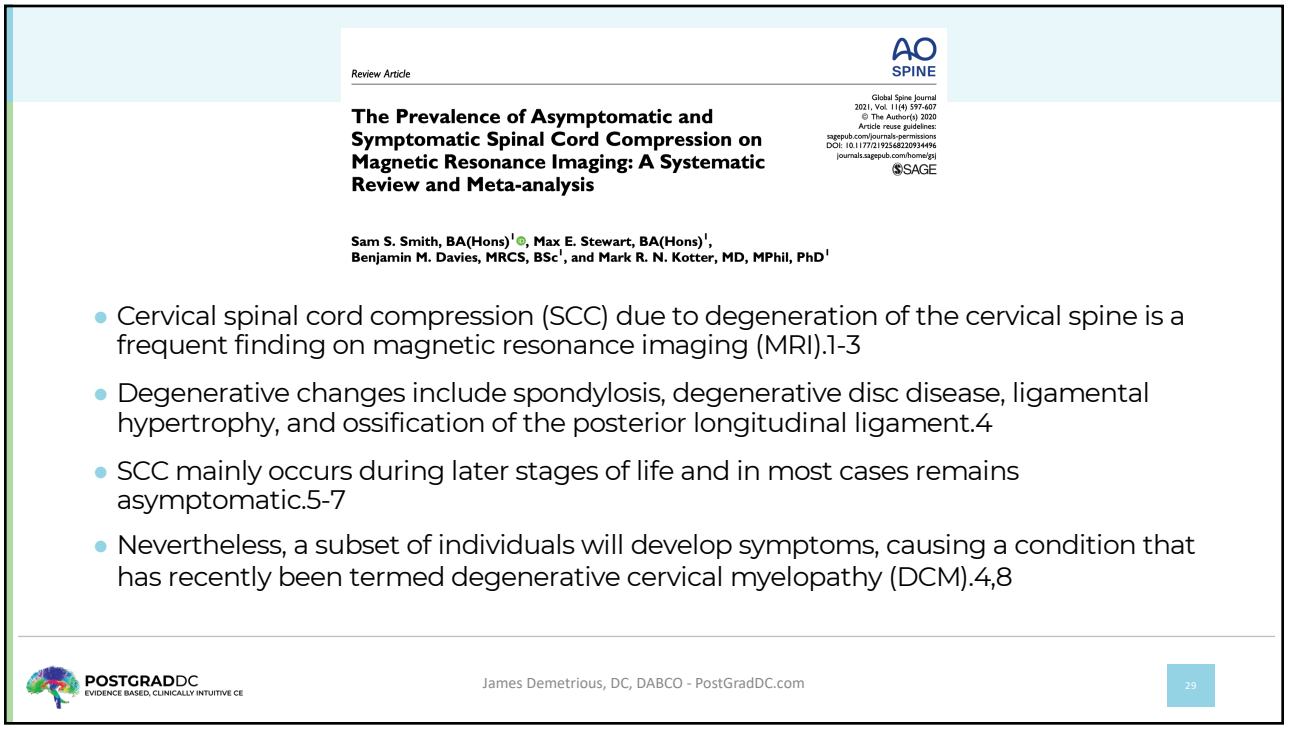
Review Article
AO SPINE
The Prevalence of Asymptomatic and Symptomatic Spinal Cord Compression on Magnetic Resonance Imaging: A Systematic Review and Meta-analysis
Global Spine Journal
2021, Vol. 11(4) 597-607
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Sam S. Smith, BA(Hons)[1], Max E. Stewart, BA(Hons)[1], Benjamin M. Davies, MRCS, BSc[1], and Mark R. N. Kotter, MD, MPhil, PhD[1]
Cervical spinal cord compression (SCC) due to degeneration of the cervical spine is a frequent finding on magnetic resonance imaging (MRI).1-3
Degenerative changes include spondylosis, degenerative disc disease, ligamental hypertrophy, and ossification of the posterior longitudinal ligament.4
SCC mainly occurs during later stages of life and in most cases remains asymptomatic.5-7
Nevertheless, a subset of individuals will develop symptoms, causing a condition that has recently been termed degenerative cervical myelopathy (DCM).4,8
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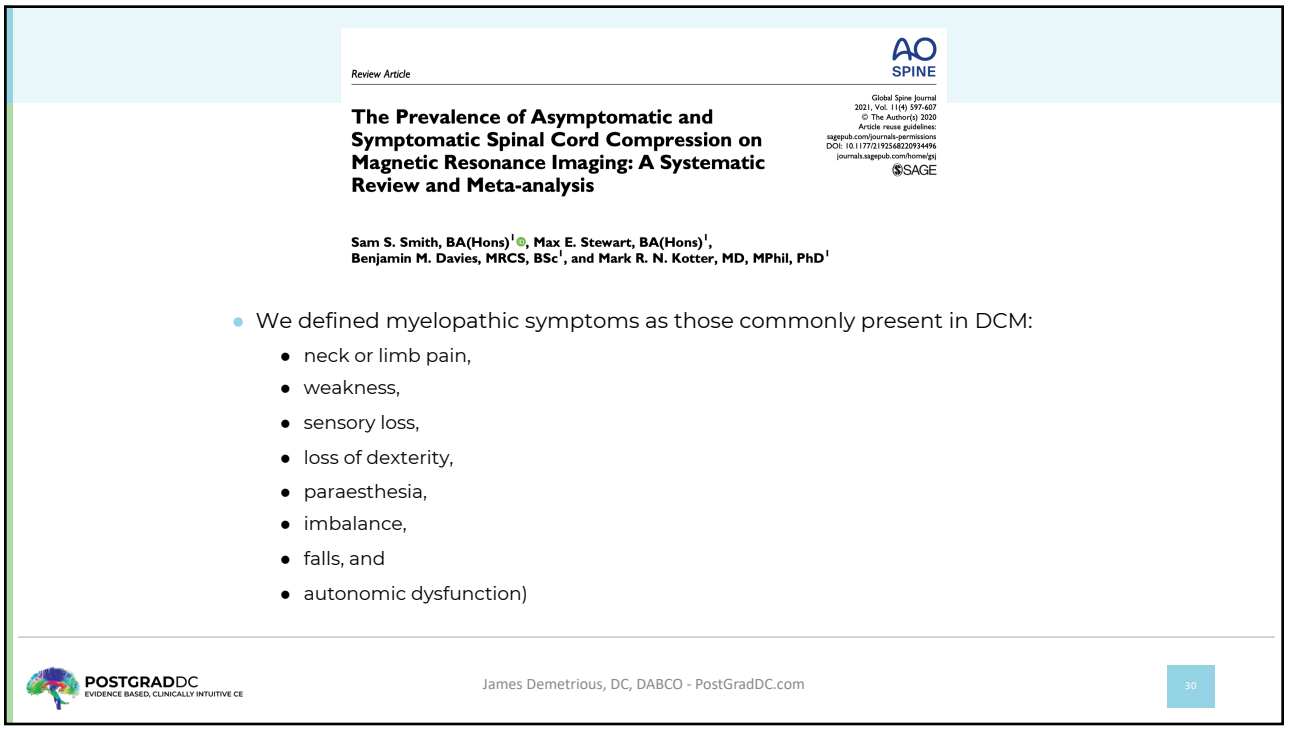
Review Article
AO SPINE
The Prevalence of Asymptomatic and Symptomatic Spinal Cord Compression on Magnetic Resonance Imaging: A Systematic Review and Meta-analysis
Global Spine Journal
2021, Vol. 11(4) 597-607
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SAGE
Sam S. Smith, BA(Hons)[1], Max E. Stewart, BA(Hons)[1], Benjamin M. Davies, MRCS, BSc[1], and Mark R. N. Kotter, MD, MPhil, PhD[1]
We defined myelopathic symptoms as those commonly present in DCM:
neck or limb pain,
weakness,
sensory loss,
loss of dexterity,
paraesthesia,
imbalance,
falls, and
autonomic dysfunction)
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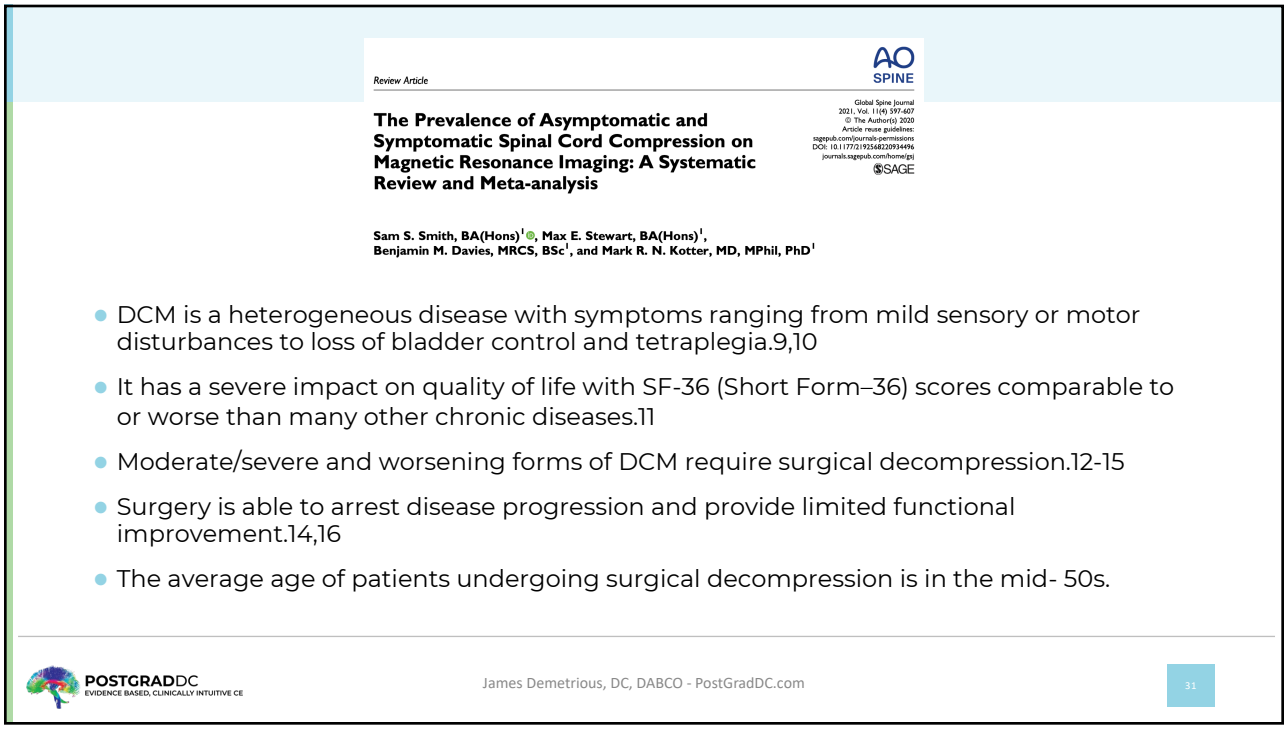
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SAGE
Sam S. Smith, BA(Hons)[1], Max E. Stewart, BA(Hons)[1], Benjamin M. Davies, MRCS, BSc[1], and Mark R. N. Kotter, MD, MPhil, PhD[1]
DCM is a heterogeneous disease with symptoms ranging from mild sensory or motor disturbances to loss of bladder control and tetraplegia.9,10
It has a severe impact on quality of life with SF-36 (Short Form–36) scores comparable to or worse than many other chronic diseases.11
Moderate/severe and worsening forms of DCM require surgical decompression.12-15
Surgery is able to arrest disease progression and provide limited functional improvement.14,16
The average age of patients undergoing surgical decompression is in the mid- 50s.
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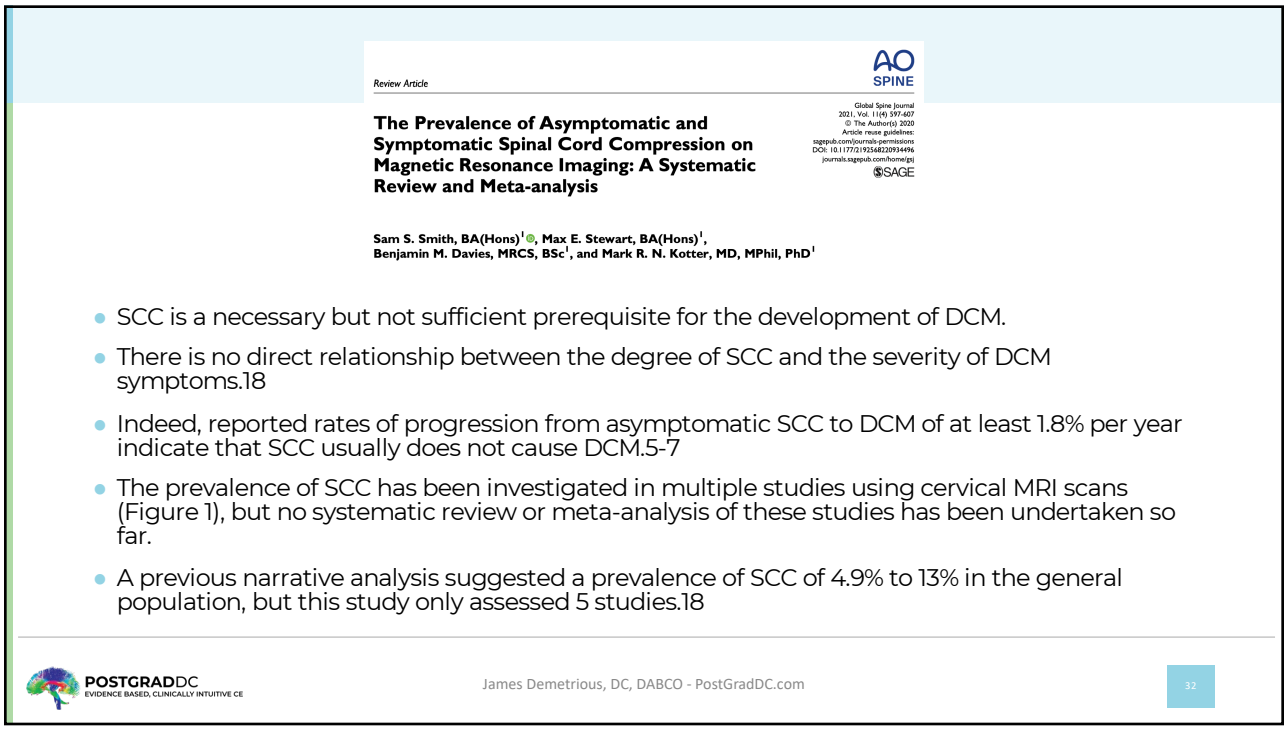
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SAGE
Sam S. Smith, BA(Hons)[1], Max E. Stewart, BA(Hons)[1], Benjamin M. Davies, MRCS, BSc[1], and Mark R. N. Kotter, MD, MPhil, PhD[1]
SCC is a necessary but not sufficient prerequisite for the development of DCM.
There is no direct relationship between the degree of SCC and the severity of DCM symptoms.18
Indeed, reported rates of progression from asymptomatic SCC to DCM of at least 1.8% per year indicate that SCC usually does not cause DCM.5-7
The prevalence of SCC has been investigated in multiple studies using cervical MRI scans (Figure 1), but no systematic review or meta-analysis of these studies has been undertaken so far.
A previous narrative analysis suggested a prevalence of SCC of 4.9% to 13% in the general population, but this study only assessed 5 studies.18
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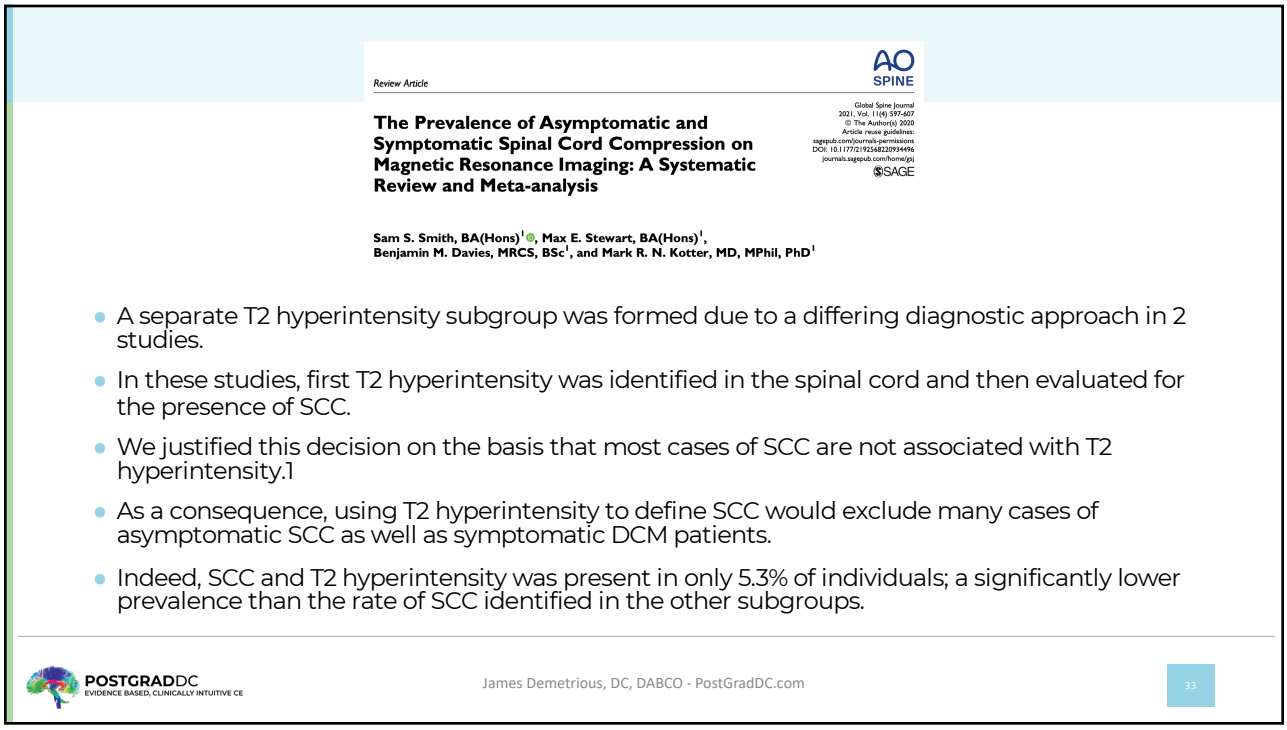

- A separate T2 hyperintensity subgroup was formed due to a differing diagnostic approach in 2 studies.
- In these studies, first T2 hyperintensity was identified in the spinal cord and then evaluated for the presence of SCC.
- We justified this decision on the basis that most cases of SCC are not associated with T2 hyperintensity.1
- As a consequence, using T2 hyperintensity to define SCC would exclude many cases of asymptomatic SCC as well as symptomatic DCM patients.
- Indeed, SCC and T2 hyperintensity was present in only 5.3% of individuals; a significantly lower prevalence than the rate of SCC identified in the other subgroups.

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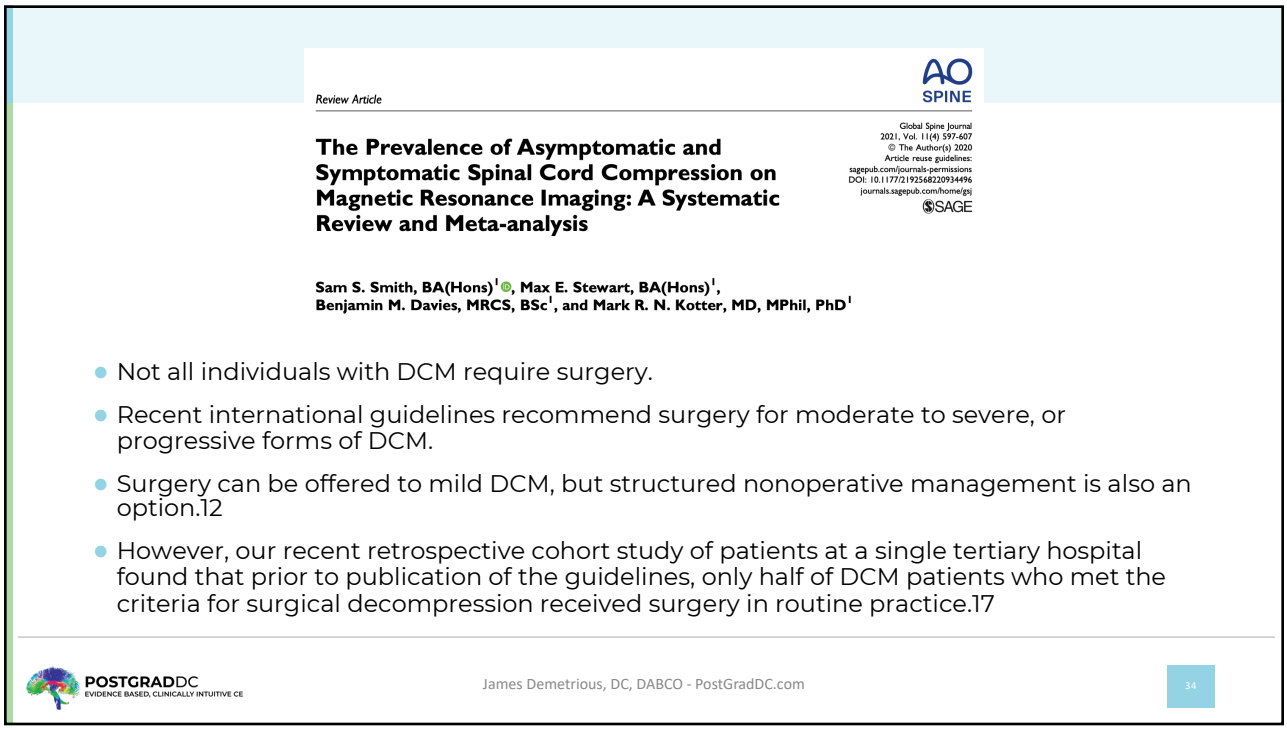

- Not all individuals with DCM require surgery.
- Recent international guidelines recommend surgery for moderate to severe, or progressive forms of DCM.
- Surgery can be offered to mild DCM, but structured nonoperative management is also an option.12
- However, our recent retrospective cohort study of patients at a single tertiary hospital found that prior to publication of the guidelines, only half of DCM patients who met the criteria for surgical decompression received surgery in routine practice.17

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Complications of Cervical IVD Surgery

Failure in Cervical Spinal Fusion and Current Management Modalities

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Edward M. Reece, MD, MBA, FACS, FAAP[1,2] Michelle Kelly, PA-C[2] Mervin Nunez, PA-C[2]
Sebastian J. Winocour, MD, MSc, FACS[2] Alexander E. Ropper, MD[1]

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Semin Plast Surg 2021;35:10–13.

- Failed fusion in the cervical spine is a multifactorial problem stemming from a combination of patient and surgical factors.
- Surgical risks for failed fusion include the number of segments fused, anterior versus posterior approach for fusion, the type of bone graft, and the instrumentation utilized.
- Many symptomatic cases of failed fusion (pseudarthrosis) result in pain, neurological deficits, or loosened hardware necessitating a revision surgery consisting of extending the prior construct and utilizing additional allografts or autografts to augment the fusion.
- Given the relatively mobile nature of the cervical spine, pseudoarthrosis (either known or anticipated) must be recognized by the spine surgeon, and steps should be considered to optimize the likelihood of future fusion.
- This consists of both performing a rigid fixation and using appropriate bone graft to enhance the environment for arthrodesis.

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Complications of Cervical IVD Surgery

Dysphagia	Infection	Neck pain
Cerebrospinal fluid leak	Nerve injury	Esophageal Perforation
Muscle weakness or spasms	Paralysis	Adjacent segment disease
Failed fusion	Vascular injury	Changes in spinal curve
Difficulty in walking	Infrequently reported complications	Pain going down your arms
Reaction to anesthesia	Bleeding, major blood vessel injury	Chronic pain
Failure to heal	Fever	Fusion failure, also known as pseud...
General surgery risks	Headache	Horner syndrome

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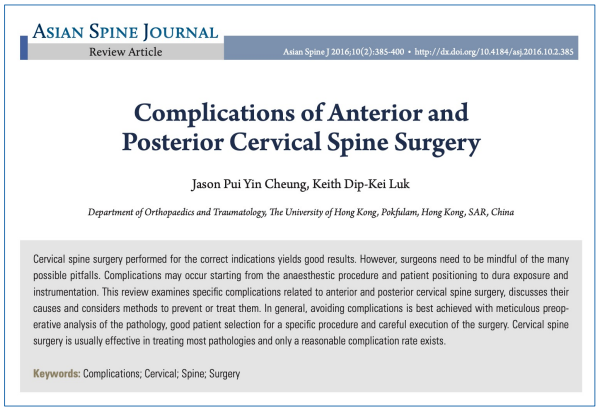
Complications of Cervical IVD Surgery



ASIAN SPINE JOURNAL
Review Article
Asian Spine J 2016;10(2):385-400 • http://dx.doi.org/10.4184/asj.2016.10.2.385

Complications of Anterior and Posterior Cervical Spine Surgery

Jason Pui Yin Cheung, Keith Dip-Kei Luk

Department of Orthopaedics and Traumatology, The University of Hong Kong, Pokfulam, Hong Kong, SAR, China

Cervical spine surgery performed for the correct indications yields good results. However, surgeons need to be mindful of the many possible pitfalls. Complications may occur starting from the anaesthestic procedure and patient positioning to dura exposure and instrumentation. This review examines specific complications related to anterior and posterior cervical spine surgery, discusses their causes and considers methods to prevent or treat them. In general, avoiding complications is best achieved with meticulous preoperative analysis of the pathology, good patient selection for a specific procedure and careful execution of the surgery. Cervical spine surgery is usually effective in treating most pathologies and only a reasonable complication rate exists.

Keywords: Complications; Cervical; Spine; Surgery

- **General complications:**
  - Anesthesia and positioning
  - Bone grafting,
  - Wound infection in discitis,
  - Cervical pin traction,
  - Dural, tear and CSF leak.

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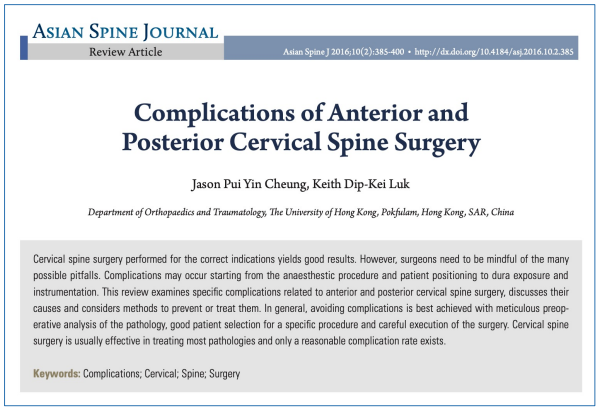
Complications of Cervical IVD Surgery



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Keywords: Complications; Cervical; Spine; Surgery

- **Anterior surgical exposure:**
  - Recurrent laryngeal, superior laryngeal, and hypoglossal nerve injuries,
  - Esophageal injury,
  - Vertebral and carotid artery injuries,
  - Tracheal injury.

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Complications of Cervical IVD Surgery

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Keywords: Complications; Cervical; Spine; Surgery

- **Posterior surgery:**
  - Injury to spinal cord and nerve roots,
  - Screw fixation,
  - Posterior occiptocervical instrumentation
  - C-5 palsy,
  - Spring break closure – Hinge fracture,
  - Post-laminectomy kyphosis,
  - Minimally invasive surgery.

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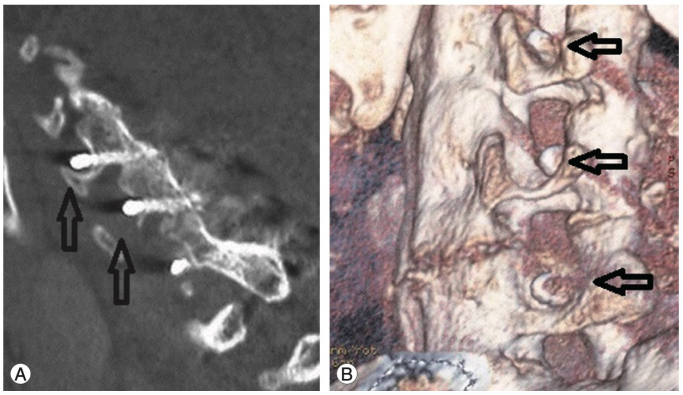

Fig. 3. Postoperative **(A)** lateral computed tomography (CT) scans and **(B)** three-dimensional CT reconstruction showing penetration of the lateral mass screw into the exiting nerve root foramen (arrows). As the patient was asymptomatic, these screws were left *in-situ*.

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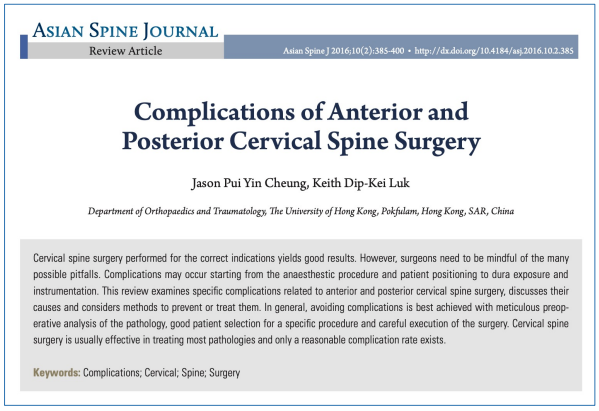
Complications of Cervical IVD Surgery



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Keywords: Complications; Cervical; Spine; Surgery

- **Anterior surgery:**
  - Injury to spinal cord and nerve roots,
  - Corpectomy,
  - OPLL
  - Adjacent segment degeneration,
  - Pseudoarthrosis,
  - Cervical disc arthroplasty.

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Complications of Cervical IVD Surgery

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Complications of Spinal Instrumentation

Phillip M. Young, Thomas H. Berquist, Laura W. Bancroft, Jeffrey J. Peterson

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Recipient of a Certificate of Merit award for an education exhibit at the 2005 RSNA Annual Meeting. Received April 5, 2006; revision requested August 9; revision received September 29 and accepted October 10. All authors have no financial relationships to disclose.

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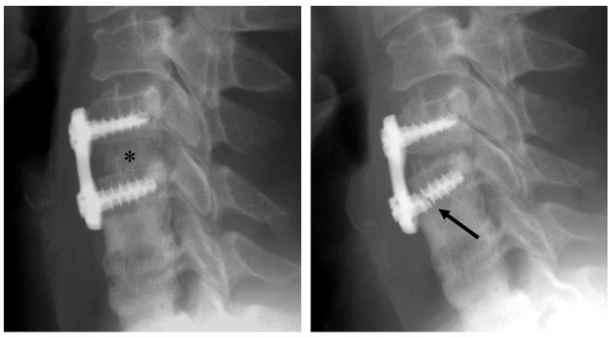
Complications of Cervical IVD Surgery

- Radiography has long been the standard method for evaluation of the fusion construct (Figs 6, 7).
- The assessment of fusion may be difficult, but, typically, signs of bridging bone should occur by 6–9 months after surgery.
- Ray (8) defined six criteria for assessing the solidity of fusion at radiography (Table).
- These criteria have not been externally validated, but they have gained clinical acceptance and are useful for interpreting postoperative radiographs.



a. b.

Figure 7. Resorption of nonunited graft material and hardware fracture. **(a)** Initial postoperative lateral radiograph demonstrates anterior plate and screw fixation of C4 to C5 with an interverte-bral bone graft (*). Note the excellent graft incorporation at the levels of previous anterior fusion (C5 to C6 and C6 to C7); hardware was removed from those levels during surgical fusion of C4 to C5. **(b)** Extension radiograph obtained at 13-month follow-up demonstrates resorption of the graft material and fracture of the inferior screw (arrow).

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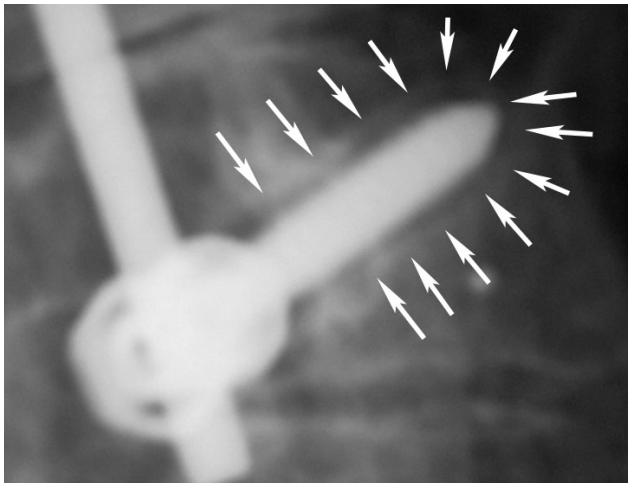
Complications of Cervical IVD Surgery

- In addition to postoperative radiography, **multidetector CT with multiplanar reformatting of image data can be extremely useful for presurgical planning; it has the capability to provide exquisitely detailed depiction of hardware and graft materials** (Fig 8).



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Post-Surgical Sequelae

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Post-Surgical Sequelae

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Failed Back Surgery Syndrome

AI Overview

Lumbar disc surgery can have a number of adverse effects, including:

- Nerve injury: This can include new numbness or weakness in one or both legs, or even paralysis.
- Bleeding: This can include bleeding inside the spinal column, or epidural bleeding.
- Blood clots: These can form in the veins of the legs, which is called Deep Venous Thrombosis (DVT).
- Infection: This can occur at the incision site.
- Spinal fluid leak: This can occur during surgery.
- Reaction to anesthetic agents: This can occur during surgery.
- Migration of a fusion cage or bone graft: This can happen soon after surgery, before the cage or graft is firmly attached by bone growth.
- Recurrent disc herniation: This can occur after surgery.

Other issues that can occur after lumbar disc surgery include back pain, stiffness, and soreness. It can take 4 to 6 weeks to regain mobility and function, and 6 months to a year for the back to fully improve.

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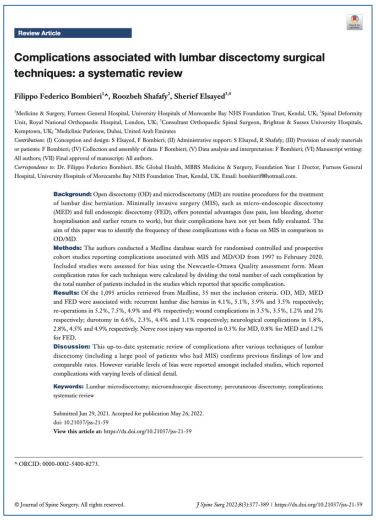
Complications of Lumbar IVD Surgery



Review Article

Complications associated with lumbar discectomy surgical techniques: a systematic review

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[1]Medicine & Surgery, Furness General Hospital, University Hospitals of Morecambe Bay NHS Foundation Trust, Kendal, UK; [2]Spinal Deformity Unit, Royal National Orthopaedic Hospital, London, UK; [3]Consultant Orthopaedic Spinal Surgeon, Brighton & Sussex University Hospitals, Kemptown, UK; [4]Medclinic Parkview, Dubai, United Arab Emirates

Contributions: (I) Conception and design: S Elsayed, F Bombieri; (II) Administrative support: S Elsayed, R Shafafy; (III) Provision of study materials or patients: F Bombieri; (IV) Collection and assembly of data: F Bombieri; (V) Data analysis and interpretation: F Bombieri; (VI) Manuscript writing: All authors; (VII) Final approval of manuscript: All authors.

Correspondence to: Dr. Filippo Federico Bombieri. BSc Global Health, MBBS Medicine & Surgery, Foundation Year 1 Doctor, Furness General Hospital, University Hospitals of Morecambe Bay NHS Foundation Trust, Kendal, UK. Email: bombieri@hotmail.com.

Background: Open discectomy (OD) and microdiscectomy (MD) are routine procedures for the treatment of lumbar disc herniation. Minimally invasive surgery (MIS), such as micro-endoscopic discectomy (MED) and full endoscopic discectomy (FED), offers potential advantages (less pain, less bleeding, shorter hospitalisation and earlier return to work), but their complications have not yet been fully evaluated. The aim of this paper was to identify the frequency of these complications with a focus on MIS in comparison to OD/MD.

Methods: The authors conducted a Medline database search for randomised controlled and prospective cohort studies reporting complications associated with MIS and MD/OD from 1997 to February 2020. Included studies were assessed for bias using the Newcastle-Ottawa Quality assessment form. Mean complication rates for each technique were calculated by dividing the total number of each complication by the total number of patients included in the studies which reported that specific complication.

Results: Of the 1,095 articles retrieved from Medline, 35 met the inclusion criteria. OD, MD, MED and FED were associated with: recurrent lumbar disc hernias in 4.1%, 3.1%, 3.9% and 3.5% respectively; re-operations in 5.2%, 7.1%, 4.9% and 4% respectively; wound complications in 1.5%, 3.5%, 1.2% and 2% respectively; durotomy in 6.6%, 2.3%, 4.4% and 1.1% respectively; neurological complications in 1.8%, 2.8%, 4.5% and 4.9% respectively. Nerve root injury was reported in 0.3% for MD, 0.8% for MED and 1.2% for FED.

Discussion: This up-to-date systematic review of complications after various techniques of lumbar discectomy (including a large pool of patients who had MIS) confirms previous findings of low and comparable rates. However variable levels of bias were reported amongst included studies, which reported complications with varying levels of clinical detail.

Keywords: Lumbar microdiscectomy; microendoscopic discectomy; percutaneous discectomy; complications; systematic review

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View this article at: https://dx.doi.org/10.21037/jss-21-59

^ ORCID: 0000-0002-5400-8273.

Table 3 Classification of complications of lumbar discectomy by category

Complication	Criteria
Durotomy	Any intraoperative injury to the dura plus postoperative CSF leak and meningocele
Nerve root injury	Any intraoperative nerve root injury or displacement
Neurological complications	Worsening of pre-existing motor or sensory symptoms and new postoperative symptoms (including symptomatic nerve root injury)
Wound complications	Superficial wound infections (including cellulitis) and deep wound infections (including spondylodiscitis), wound haematoma, poor wound healing and dehiscence.
Recurrent discopathy	Relapsing disc herniation
Re-operation	Any re-operation regardless of indication during the postoperative period
Other	Surgical errors* and medical complications**

*, surgical errors: exploration of wrong vertebral level, surgical equipment failure and iatrogenic vessel injury; **, medical complications: thrombotic events, bleeding requiring blood transfusion, urinary tract infections and urinary retention. CSF; cerebrospinal fluid.

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Complications of Lumbar IVD Surgery

Cureus

Open Access Original Article

DOI: 10.7759/cureus.49963

Postoperative Evaluation of Pain and Disability in Patients Undergoing Spinal Discectomy

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Abstract

Background: A spinal discectomy surgery (SDS) is a common surgical procedure performed to treat lumbosacral radiculopathy.

Aim: To evaluate postoperative patterns of pain and disability in patients undergoing spinal discectomy.

Methods and materials: This investigation was a retrospective longitudinal review of prospective information gathered from 543 enrolled patients for lumbar radiculoplasty. The study participants were divided into two categories: Category 1 (SDS) comprising patients of lumbar radiculoplasty managed with SDS (n=270) and Category 2 (non-SDS) comprising patients of lumbar radiculoplasty managed with therapy other than SDS (n=273). It included study participants taking medication for pain control including opioids and non-opioids and physiotherapy for strengthening lower back muscles. At baseline, three months, 12 months, and 24 months after surgery, patient-reported information was gathered. Leg pain magnitude, back pain magnitude, and pain-related impairment were the key outcome metrics of interest.

Results: The mean postoperative visual analog scale (VAS) score for leg pain at three-month follow-up was 4.3±1.2 in study participants in SDS and 8.1±1.3 in the non-SDS category. The VAS score was lower in the SDS category showing greater reduction in postoperative pain with statistically meaningful results (p<0.001). The mean postoperative VAS score at 12-month follow-up was 2.8±1.1 in study participants in SDS and 7.9±1.5 in the non-SDS category. The VAS score was lower in the SDS category showing greater reduction in postoperative pain with statistically meaningful results (p<0.001). The mean postoperative VAS score at 24-month follow-up was 1.7±1.2 in study participants in SDS and 7.1±1.1 in the non-SDS category. The VAS score was lower in the SDS category showing greater reduction in postoperative pain with statistically meaningful results (p<0.001).

Conclusion: It was observed that after discectomy, patients suffering from lumbar radiculopathy have significant pain and disability recovery. According to these results, only a small percentage of individuals exhibit negative results at the level of impairment.

- It was observed that after discectomy, patients suffering from lumbar radiculopathy have significant pain and disability recovery.
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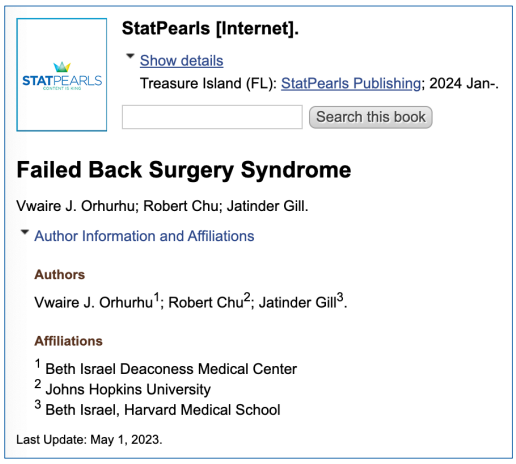
Failed Back Surgery Syndrome



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Failed Back Surgery Syndrome

Vwaire J. Orhurhu; Robert Chu; Jatinder Gill.

Author Information and Affiliations

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Vwaire J. Orhurhu[1]; Robert Chu[2]; Jatinder Gill[3].

Affiliations

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[3] Beth Israel, Harvard Medical School

Last Update: May 1, 2023.

Enhancing Healthcare Team Outcomes ?

interprofessional pain clinics are the gold standard in the setting of treatment for patients with complex chronic pain syndromes such as failed back surgery syndrome. The interprofessional care team in these clinics consists of pain physicians, nurses, psychologists, psychiatrists, physical therapists, pharmacists, and occupational therapists. The integration of different members of the healthcare team results in close communication between experts in distinct methodologies of treating chronic pain and promotes a biopsychosocial approach to the patient's pain.[2]

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Failed Back Surgery Syndrome

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Failed Back Surgery Syndrome

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[2] Johns Hopkins University
[3] Beth Israel, Harvard Medical School

Last Update: May 1, 2023.

Treatment / Management

Therapies for the treatment of failed back surgery syndrome broadly split into conservative (physical therapy or medication) and aggressive (interventional or surgical) management. Conservative management should always be the first option before invasive techniques in patients without indications for emergency surgery.[5]

Studies of conservative treatment specifically for failed back surgery syndrome are rare, and the studies that do exist are often contradictory.[18] Common

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Post-Surgical Sequelae

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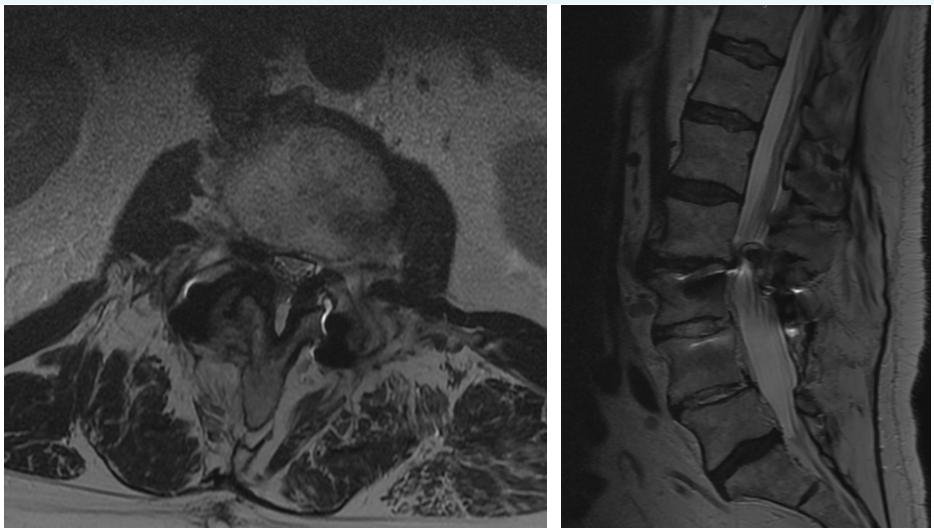
Post-Surgical Sequelae



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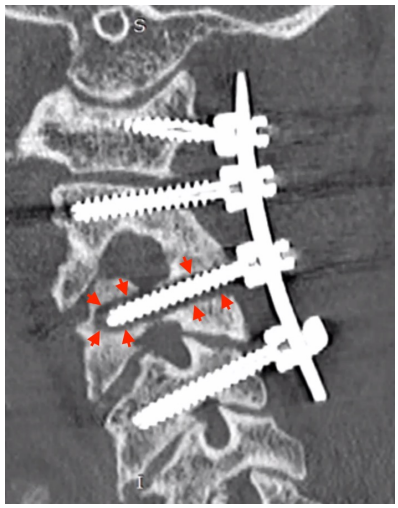
Post-Surgical Sequelae



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Instructive Case: 51-year-old Executive

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Means of Non-Surgical Decompression

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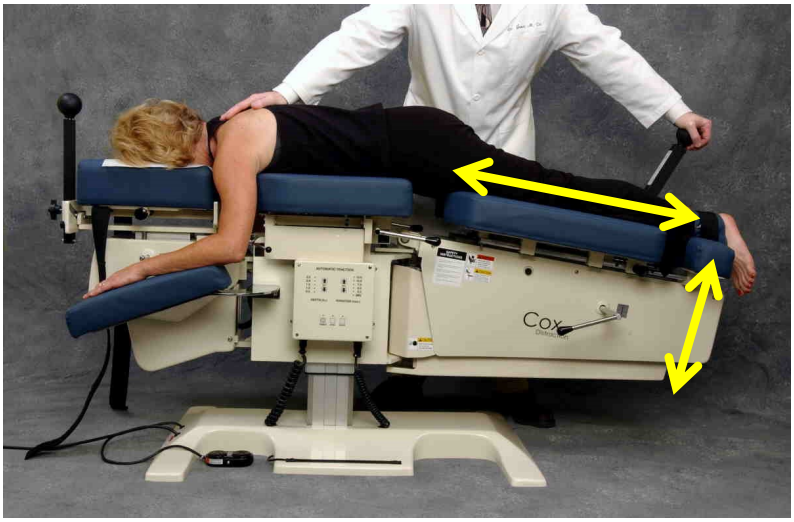
Cox Technic



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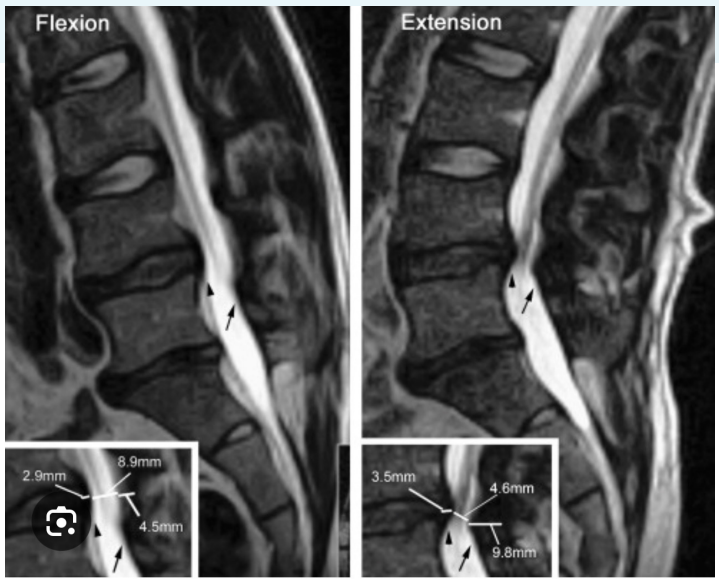

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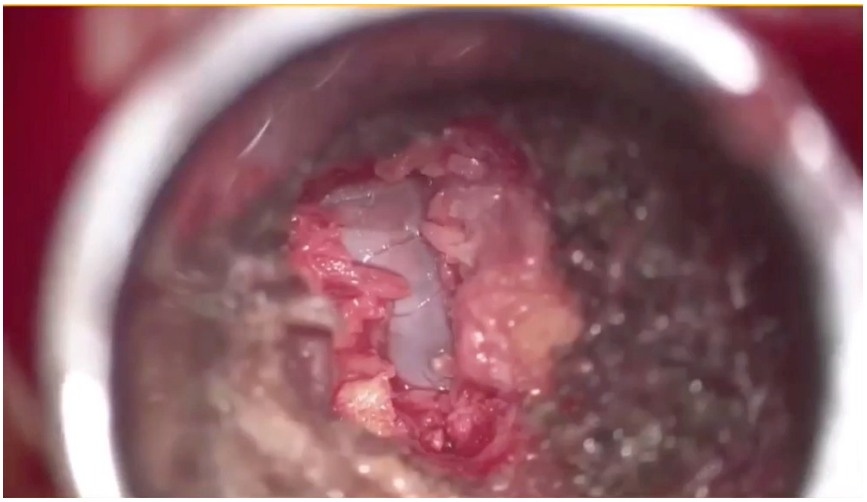
What is the Effect of Chiropractic on CSF Flow?



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Leander Table

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Barnes Table

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Intermittent Decompression - Chattanooga Triton DTS

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Intermittent Decompression - Chattanooga Triton DTS

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Intermittent Decompression - Chattanooga Triton DTS

- **Cervical Spine:**
  - Max/Min. Levels:
    - ♂ - 25-32#/12-16#
    - ♀ - 20-28#/10-14#
  - Hold/Release Times: 30 sec./20 sec.
  - TX Time: 5-10 minutes

Caution/Disclaimer

Care parameters are patient dependent and require the assessment of the treating doctor. The above recommendations should not be considered standard of care.

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Intermittent Decompression - Chattanooga Triton DTS

- **Lumbar Spine:**
  - Max/Min. Levels:
    - ♂ and ♀: +/- 50% body weight/50% of Max.
  - Hold/Release Times: 30 sec./20 sec.
  - TX Time: 5-10 minutes

Caution/Disclaimer

Care parameters are patient dependent and require the assessment of the treating doctor. The above recommendations should not be considered standard of care.

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DRX-9000

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DOC

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Ergo-Flex

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Home Traction?

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Gizmos?

Standing
Ready for Lumbar Traction

Seated
During Lumbar Traction Session

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Gizmos?

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Gizmos?

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Gizmos?

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Risks / Contraindications

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Cervical Traction

Karl R. Abi-Aad; Armen Derian.

Author Information and Affiliations

Authors

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Affiliations

[1] Mayo Clinic
[2] Mayo Clinic

Last Update: August 8, 2023.

- **Risks of Traction**
  - **There are no scientific reports that accurately describe the contraindications and relative contraindications for cervical traction. Probable contraindications and/or relative contraindications to cervical or lumbar traction include the following:**
  - Acute torticollis
  - Aortic Aneurysm
  - Active peptic ulcer disease
  - Diskitis
  - Old age
  - Osteomyelitis
  - Osteoporosis
  - Ligamentous instability
  - Primary or metastatic tumor
  - Spinal cord tumor
  - Myelopathy
  - Pregnancy
  - Severe anxiety
  - Untreated hypertension
  - Vertebral-basilar artery insufficiency
  - Midline herniated nucleus pulposus
  - Restrictive lung disease
  - Hernia

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Risks / Contraindications

- **Spinal traction is a non-invasive treatment for back pain that can cause side effects, but these are usually mild and temporary:**
  - Pain
  - Headache
  - Stiffness
  - Discomfort
  - Fatigue
  - Dizziness
  - Nausea

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Some New Studies

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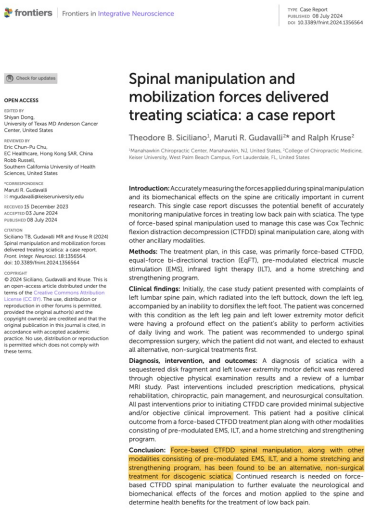
Chiropractic Studies



frontiers | Frontiers in Integrative Neuroscience

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Spinal manipulation and mobilization forces delivered treating sciatica: a case report

Theodore B. Siciliano[1], Maruti R. Gudavalli[2]* and Ralph Kruse[2]

[1]Manahawkin Chiropractic Center, Manahawkin, NJ, United States, [2]College of Chiropractic Medicine, Keiser University, West Palm Beach Campus, Fort Lauderdale, FL, United States

Introduction: Accurately measuring the forces applied during spinal manipulation and its biomechanical effects on the spine are critically important in current research. This single case report discusses the potential benefit of accurately monitoring manipulative forces in treating low back pain with sciatica. The type of force-based spinal manipulation used to manage this case was Cox Technic flexion distraction decompression (CTFDD) spinal manipulation care, along with other ancillary modalities.

Methods: The treatment plan, in this case, was primarily force-based CTFDD, equal-force bi-directional traction (EqFT), pre-modulated electrical muscle stimulation (EMS), infrared light therapy (ILT), and a home stretching and strengthening program.

Clinical findings: Initially, the case study patient presented with complaints of left lumbar spine pain, which radiated into the left buttock, down the left leg, accompanied by an inability to dorsiflex the left foot. The patient was concerned with this condition as the left leg pain and left lower extremity motor deficit were having a profound effect on the patient's ability to perform activities of daily living and work. The patient was recommended to undergo spinal decompression surgery, which the patient did not want, and elected to exhaust all alternative, non-surgical treatments first.

Diagnosis, intervention, and outcomes: A diagnosis of sciatica with a sequestered disk fragment and left lower extremity motor deficit was rendered through objective physical examination results and a review of a lumbar MRI study. Past interventions included prescription medications, physical rehabilitation, chiropractic, pain management, and neurosurgical consultation. All past interventions prior to initiating CTFDD care provided minimal subjective and/or objective clinical improvement. This patient had a positive clinical outcome from a force-based CTFDD treatment plan along with other modalities consisting of pre-modulated EMS, ILT, and a home stretching and strengthening program.

Conclusion: Force-based CTFDD spinal manipulation, along with other modalities consisting of pre-modulated EMS, ILT, and a home stretching and strengthening program, has been found to be an alternative, non-surgical treatment for discogenic sciatica. Continued research is needed on force-based CTFDD spinal manipulation to further evaluate the neurological and biomechanical effects of the forces and motion applied to the spine and determine health benefits for the treatment of low back pain.

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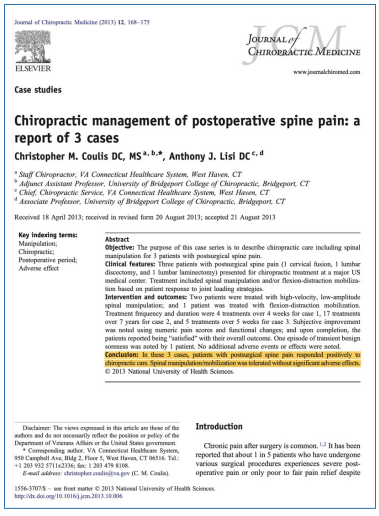
Chiropractic Studies



Journal of Chiropractic Medicine (2013) 12, 168–175

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JOURNAL of CHIROPRACTIC MEDICINE

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Case studies

Chiropractic management of postoperative spine pain: a report of 3 cases

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[b] *Adjunct Assistant Professor, University of Bridgeport College of Chiropractic, Bridgeport, CT*
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Received 18 April 2013; received in revised form 20 August 2013; accepted 21 August 2013

Key indexing terms:
Manipulation;
Chiropractic;
Postoperative period;
Adverse effect

Abstract
Objective: The purpose of this case series is to describe chiropractic care including spinal manipulation for 3 patients with postsurgical spine pain.
Clinical features: Three patients with postsurgical spine pain (1 cervical fusion, 1 lumbar discectomy, and 1 lumbar laminectomy) presented for chiropractic treatment at a major US medical center. Treatment included spinal manipulation and/or flexion-distraction mobilization based on patient response to joint loading strategies.
Intervention and outcomes: Two patients were treated with high-velocity, low-amplitude spinal manipulation; and 1 patient was treated with flexion-distraction mobilization. Treatment frequency and duration were 4 treatments over 4 weeks for case 1, 17 treatments over 7 years for case 2, and 5 treatments over 5 weeks for case 3. Subjective improvement was noted using numeric pain scores and functional changes; and upon completion, the patients reported being "satisfied" with their overall outcome. One episode of transient benign soreness was noted by 1 patient. No additional adverse events or effects were noted.
Conclusion: In these 3 cases, patients with postsurgical spine pain responded positively to chiropractic care. Spinal manipulation/mobilization was tolerated without significant adverse effects.

Disclaimer: The views expressed in this article are those of the authors and do not necessarily reflect the position or policy of the Department of Veterans Affairs or the United States government.

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Introduction

Chronic pain after surgery is common.[1,2] It has been reported that about 1 in 5 patients who have undergone various surgical procedures experiences severe postoperative pain or only poor to fair pain relief despite

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http://dx.doi.org/10.1016/j.jcm.2013.10.006

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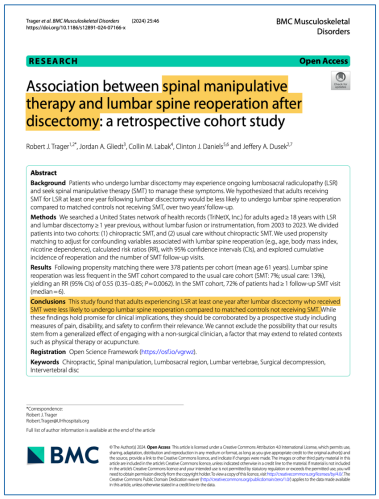
Chiropractic Studies



Trager et al. BMC Musculoskeletal Disorders (2024) 25:46
https://doi.org/10.1186/s12891-024-07166-x

BMC Musculoskeletal Disorders

RESEARCH Open Access

Association between spinal manipulative therapy and lumbar spine reoperation after discectomy: a retrospective cohort study

Robert J. Trager[1,2*], Jordan A. Gliedt[3], Collin M. Labak[4], Clinton J. Daniels[5,6] and Jeffery A. Dusek[2,7]

Abstract

Background Patients who undergo lumbar discectomy may experience ongoing lumbosacral radiculopathy (LSR) and seek spinal manipulative therapy (SMT) to manage these symptoms. We hypothesized that adults receiving SMT for LSR at least one-year following lumbar discectomy would be less likely to undergo lumbar spine reoperation compared to matched controls not receiving SMT, over two years' follow-up.

Methods We searched a United States network of health records (TriNetX, Inc.) for adults aged ≥ 18 years with LSR and lumbar discectomy ≥ 1 year previous, without lumbar fusion or instrumentation, from 2003 to 2023. We divided patients into two cohorts: (1) chiropractic SMT, and (2) usual care without chiropractic SMT. We used propensity matching to adjust for confounding variables associated with lumbar spine reoperation (e.g., age, body mass index, nicotine dependence), calculated risk ratios (RR), with 95% confidence intervals (CIs), and exploited cumulative incidence of reoperation and the number of SMT follow-up visits.

Results Following propensity matching there were 378 patients per cohort (mean age 61 years). Lumbar spine reoperation was less frequent in the SMT cohort compared to the usual care cohort (SMT: 7%; usual care: 13%), yielding an RR (95% CI) of 0.55 (0.35–0.85; $P = 0.0062$). In the SMT cohort, 72% of patients had ≥ 1 follow-up SMT visit (median = 6).

Conclusions This study found that adults experiencing LSR at least one-year after lumbar discectomy who received SMT were less likely to undergo lumbar spine reoperation compared to matched controls not receiving SMT. While these findings hold promise for clinical implications, they should be corroborated by a prospective study including measures of pain, disability, and safety to confirm their relevance. We cannot exclude the possibility that our results stem from a generalized effect of engaging with a non-surgical clinician, a factor that may extend to related contexts such as physical therapy or acupuncture.

Registration Open Science Framework (https://osf.io/vgrvw).

Keywords Chiropractic, Spinal manipulation, Lumbosacral region, Lumbar vertebrae, Surgical decompression, Intervertebral disc

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Chiropractic Studies

Comparative Study > J Manipulative Physiol Ther. 2011 Jul-Aug;34(6):408-12.
doi: 10.1016/j.jmpt.2011.05.011.

Chiropractic management of postsurgical lumbar spine pain: a retrospective study of 32 cases

Ralph A Kruse [1], Jerrilyn Cambron

Affiliations + expand

PMID: 21807265 DOI: 10.1016/j.jmpt.2011.05.011

Abstract

Objective: Although chiropractic manipulation is commonly used for low back pain, applying this procedure to the patient with postlumbar spine surgery has not been adequately studied. The purpose of this retrospective chart review is to report on the results of chiropractic management (including Cox flexion distraction technique) of patients with postsurgical lumbar spine pain to determine the change in reported pain based on surgical type.

Methods: Ten years of patient files from one chiropractic practice were electronically screened for lumbar spine surgery occurring before presenting for chiropractic care. Of the 58 patients with a postsurgical diagnosis, 32 files contained all pertinent components for this study including treatment with Cox flexion distraction manipulation (in addition to adjunct procedures) for at least 2 weeks and pretreatment and posttreatment pain measures using the Numeric Pain Scale (NPS) that ranged from 0 (no pain) to 10 (worst pain imaginable).

Results: A change was observed in the mean pretreatment and posttreatment NPS pain scores of 6.4 to 2.3, a reduction of 4.1 of 10. The mean number of treatments was 14, with a range of 6 to 31. When stratified by surgical type, the mean change in pain was most remarkable in patients who underwent a surgery that combined lumbar discectomy, fusion, and/or laminectomy, with an average NPS pain reduction of 5.7 of 10. No adverse events were reported for any of these postsurgical patients.

Conclusions: The results of this study showed improvement for patients with low back pain subsequent to lumbar spine surgery who were managed with chiropractic care.

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Chiropractic Studies

Opioid Use Reduction in Failed Back Surgery Syndrome Patients at Three Months Utilizing Manual Spinal Decompression Manipulation

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Maruti Gudavalli, PhD[1]

Casey Rogers, DC[2]

[1] Keiser University College of Chiropractic Medicine, West Palm Beach, Florida
[2]Birmingham VA Medical Center, Birmingham, Alabama

Published: 2023
Journal of the International Academy of Neuromusculoskeletal Medicine
Volume 20, Issue 2

- Chiropractic interventions and spinal manipulation have demonstrated beneficial outcomes for patients with spinal pain following spinal surgery.26,27
- Additionally, patients with spinal pain who saw a chiropractor had half the incidence of filling an opioid prescription.28,29 Cox Technic Flexion Distraction Decompression (CTFDD) is a form of spinal manipulation that has been shown to benefit post-surgical spine pain cases.30,31
- **Conclusion:**
  - The results of this prospective study revealed a patient-reported reduction or discontinuation of opioid use during their initial three-month course of care.

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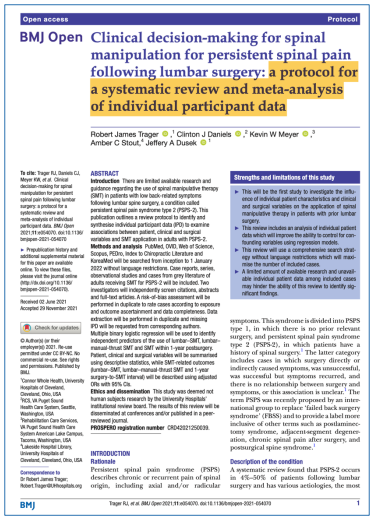
Chiropractic Studies



Open access Protocol

BMJ Open **Clinical decision-making for spinal manipulation for persistent spinal pain following lumbar surgery: a protocol for a systematic review and meta-analysis of individual participant data**

Robert James Trager ,[1] Clinton J Daniels ,[2] Kevin W Meyer ,[3] Amber C Stout,[4] Jeffery A Dusek [1]

ABSTRACT

Introduction There are limited available research and guidance regarding the use of spinal manipulative therapy (SMT) in patients with low back-related symptoms following lumbar spine surgery, a condition called persistent spinal pain syndrome type 2 (PSPS-2). This publication outlines a review protocol to identify and synthesise individual participant data (IPD) to examine associations between patient, clinical and surgical variables and SMT application in adults with PSPS-2.

Methods and analysis PubMed, OVID, Web of Science, Scopus, PEDro, Index to Chiropractic Literature and KoreaMed will be searched from inception to 1 January 2022 without language restrictions. Case reports, series, observational studies and cases from grey literature of adults receiving SMT for PSPS-2 will be included. Two investigators will independently screen citations, abstracts and full-text articles. A risk-of-bias assessment will be performed in duplicate to rate cases according to exposure and outcome ascertainment and data completeness. Data extraction will be performed in duplicate and missing IPD will be requested from corresponding authors. Multiple binary logistic regression will be used to identify independent predictors of the use of lumbar–SMT, lumbar–manual-thrust SMT and SMT within 1-year postsurgery. Patient, clinical and surgical variables will be summarised using descriptive statistics, while SMT-related outcomes (lumbar–SMT, lumbar–manual-thrust SMT and 1-year surgery-to-SMT interval) will be described using adjusted ORs with 95% CIs.

Ethics and dissemination This study was deemed not human subjects research by the University Hospitals' institutional review board. The results of this review will be disseminated at conferences and/or published in a peer-reviewed journal.

PROSPERO registration number CRD42021250039.

Strengths and limitations of this study

- This will be the first study to investigate the influence of individual patient characteristics and clinical and surgical variables on the application of spinal manipulative therapy in patients with prior lumbar surgery
- This review includes an analysis of individual patient data which will improve the ability to control for confounding variables using regression models.
- This review will use a comprehensive search strategy without language restrictions which will maximise the number of included cases.
- A limited amount of available research and unavailable individual patient data among included cases may hinder the ability of this review to identify significant findings.

INTRODUCTION

Rationale Persistent spinal pain syndrome (PSPS) describes chronic or recurrent pain of spinal origin, including axial and/or radicular symptoms. This syndrome is divided into PSPS type 1, in which there is no prior relevant surgery, and persistent spinal pain syndrome type 2 (PSPS-2), in which patients have a history of spinal surgery.[1] The latter category includes cases in which surgery directly or indirectly caused symptoms, was unsuccessful, was successful but symptoms recurred, and there is no relationship between surgery and symptoms, or this association is unclear.[1] The term PSPS was recently proposed by an international group to replace 'failed back surgery syndrome' (FBSS) and to provide a label more inclusive of other terms such as postlaminectomy syndrome, adjacent-segment degeneration, chronic spinal pain after surgery, and postsurgical spine syndrome.[1]

Description of the condition A systematic review found that PSPS-2 occurs in 4%–50% of patients following lumbar surgery and has various aetiologies, the most

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Chiropractic Studies

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Journal of Novel Physiotherapy and Physical Rehabilitation
ISSN: 2455-5487 DOI CC By

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Keywords: Intervertebral differential dynamics therapy; Low-level laser therapy; Non-surgical spinal decompression; Spinal manipulation; Lumbar disc herniation; Cervical disc herniation; Radiculopathy

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Research Article

Non-surgical Spinal Decompression an Effective Physiotherapy Modality for Neck and Back Pain

Abstract

Background: Non-surgical spinal decompression is a novel physiotherapy that improves on conventional traction by adding computer technology and it is commonly used along with other physiotherapy modalities. Indications include bulging or herniated discs, degenerative disc disease, facet syndrome, sciatica, neck pain and lower back pain.

The purpose of this practice-based observational study was to investigate the effectiveness of decompression for patients with radiculopathy or chronic spinal pain that failed to improve with conventional treatments. Patients were treated with 6 to 8 weeks of non-surgical spinal decompression therapy, including low-level laser therapy, superficial cold, home exercise and spinal manipulation if indicated. Starting and ending pain levels on a numerical pain scale were compared using a paired t-test to determine statistical significance.

Main findings: A sample of 41 cervical spine cases and 168 lumbar spine cases was analyzed. Ending pain scores for cervical spine cases (mean = 1.8, standard deviation = 1.8) were significantly less compared to the starting pain scores (mean = 6.0, standard deviation = 2.3), with a mean pain reduction of 4.2 ($p < 0.0001$). The average number of treatments was 13. Ending pain scores for lumbar spine cases (mean = 2.3, standard deviation = 2.6) were significantly less compared to the starting pain scores (mean = 6.6, standard deviation = 2.4), with a mean pain reduction of 4.3 ($p < 0.0001$) after an average of 15 visits.

Conclusion: Non-surgical spinal decompression brought statistically significant improvements in cervical and lumbar pain. Associated paresthesia and weakness also frequently improved. Further investigation of non-surgical spinal decompression, including long-term follow up and comparison to surgical decompression is encouraged.

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Intermittent Traction

Non-surgical Spinal Decompression: Patient Reported Outcomes Across Multiple Clinics

Shannon Schueren, Gina Ariza Medina, Nathan D. Schilaty

USF Health

INTRODUCTION

- Non-surgical spinal decompression (NSSD) is a therapeutic modality utilized in treatment of intervertebral disc (IVD) disorders as a non-invasive alternative to surgical interventions
- Little information is available on clinical outcomes and utilization associated with NSSD, leaving a significant gap in understanding its efficacy, safety profile, patient satisfaction rates, and long-term effects on diverse populations
- **OBJECTIVE:** Assess utilization and patient reported outcomes of NSSD across multiple clinics. This will provide valuable insights into real-world practices and impact of NSSD on patient care and satisfaction.

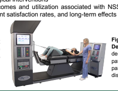

Figure 1. DRX9000 Spinal Decompression is a NSSD device designed to provide relief for patients suffering from low back pain, particularly those with IVD disorders.

METHODS

CONTACT
- A total of **86 clinics** that utilize NSSD were contacted to participate in the study, representing a diverse array of healthcare settings. The aim was to compile a rich dataset comprising detailed patient chart notes, demographic information, specifics of NSSD treatment protocols implemented within each clinic, as well as comprehensive pain and functional outcome assessments.

REVISION
- Chart notes were thoroughly reviewed by designated study personnel to extract pertinent data essential for subsequent analysis
- Following review, identified relevant data points were entered into REDCap platform to ensure accurate documentation
- Demographic information and treatment-related data were methodically tabulated and formatted to facilitate comprehensive examination and interpretation in line with the study objectives

STATISTICAL ANALYSIS
- Data analysis was conducted using *JMPPro 17*, a statistical software for data examination and interpretation
- Statistical tests employed were Chi-square tests, Fisher's Exact, Odds Ratio, and Matched Pairs t-test, enabling a thorough assessment of dataset
- Data significance was set *a priori* at $p<0.05$

RESULTS

- 239 patient chart notes were obtained across 4 private chiropractic clinics.

FEMALES	**42.3%**
MALES	**57.7%**
CRITERIA	**MEAN (SD)**
Age	53.4 (16.8)
Height (cm)	172.1 (12.0)
Weight (kg)	84. (22.3)

Table 1: Demographics. Mean height, weight, and age are reported alongside ratio of female to male patients

Treatment Characteristics	Mean (SD)
Time (min)	27.6 (2.4)
Total # of Sessions	23.9 (11.7)
Frequency (per week)	2.6 (0.9)
Force (N)	365.6 (141.5)

Table 2: Treatment Specifications. Mean time, number of sessions, frequency and maximum force across all clinics involved in study are shown. The average duration of treatment was 8+ weeks.

Length of Pain	Population %
0-3 months (acute)	38.2
3-6 months (sub-acute)	11.1
6-12 months (chronic)	12.0
1-5 years (chronic)	19.6
5+ years (chronic)	19.1

Table 3: Length of Current Pain. Percentage of study population presenting with acute, sub-acute, or chronic pain pre-NSSD.

- Pain was reduced by **-4.4** (confidence interval of 95%: -4.0, -4.7; **Fig. 2**), ($p<0.001$).

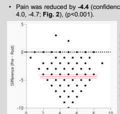

Figure 2: Pre- to post-NSSD treatment reported pain. Bland-Altman analysis of pre- to post-NSSD pain (Visual Analog Scale). Mean difference in pain (solid red line) is surrounded by 95% CI (red dashed line).

Activity of Daily Living (% affected)	Odds Ratio	95% Confidence (Lower, Upper)	Chi-Squared	p-value
Walking (48.3%)	5.2	1.9, 14.2	93.9	<0.001
Household Chores (30.0%)	15.3	5.0, 46.4	49	<0.001
Sex (11.6%)	68.5	8.1, 580.8	21.2	<0.001
Bathing (14.6%)	33.9	7.0, 164.4	24.5	<0.001
Dressing (19.1%)	22.9	4.8, 109.9	36.4	<0.001
Sitting/Standing (61.4%)	11.5	3.5, 38.1	113.3	<0.001
Eating (3.7%)	-	-	4	0.045
Using the Bathroom (9.7%)	-	-	18	<0.001

Table 4: Odds Ratio (improvement in ADLs). This table provides an overview of odds ratios for improvement in ADLs among patients who underwent NSSD. Dark green highlights indicate the most frequently reported ADL affected pre-NSSD, and red represents statistical significance change from pre- to post-NSSD.

	Myotome		Dermatome		Reflex	
Nerve Root	% affected	p-value	% affected	p-value	% affected	p-value
T12	0.4	0.5747	0	-		
L1	2.6	-	0.7	0.001		
L2	5.2	-	1.5	-		
L3	4.9	0.7518	3.0	<0.001		
L4	16.9	<0.001	15.0	<0.001	23.2	<0.001
L5	32.2	<0.001	21.0	<0.001	17.1	<0.001
S1	10.5	<0.001	12.0	0.003	24.7	<0.001

Table 5: Probability of improvement in peripheral neurological symptoms following NSSD. Probabilities of improvement in various neurological symptoms from pre- to post-NSSD as reported by providers. Green highlights indicate most frequently affected neurological sign. Red represents statistically significant change from pre to post treatment.

- Pre-NSSD MRI was available for 139 patient records (81.3%) and disc herniation was observed in 36.3% of images
- Pain was most frequently reported as centralized (43.4%) or radiating (53.9%) compared to peripheral (30.0%), and more commonly occurred on the left if peripheral or radiating (44.3%).

DISCUSSION

- Level of diagnosis was most often at **L4** (24.0%) affecting **L5** nerve root. Sitting/standing was most affected ADL.
- Treatment utilizing NSSD is effective in reducing patient-reported LBP and improving ADLs affected by low back pain. These findings indicate the importance of exploring its mechanisms and refining its application in clinical settings.
- Further evaluation regarding NSSD efficacy will be undertaken, signifying a commitment to ongoing research and improvement in addressing low back pain through innovative therapeutic approaches.

ACKNOWLEDGEMENTS

The authors acknowledge funding from Florida High-Tech Corridor, Excite Medical, Inc., and Florida Department of State Center for Neuromusculoskeletal Research. In addition, a special thanks to Excite Medical for coordinating between clinics and the research team.

NSSD decreases low back pain (-4.4) and improves functional outcomes, including activities of daily living.

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Intermittent Traction

Effects of segmental traction therapy on lumbar disc herniation in patients with acute low back pain measured by magnetic resonance imaging: A single arm clinical trial

Cite

Article type: Research Article

Authors: Karimi, Noureddin[a] | Akbarov, Parvin[a; b; *] | Rahnama, Leila[a]

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Correspondence: [*] Corresponding author: Parvin Akbarov, Department of Physiotherapy, University of Social Welfare and Rehabilitation Sciences, Koudakyar Ave, Daneshjo Blvd, Evin, Tehran, Iran. Tel.: +99 4552222003; E-mail:akberli222@gmail.com

Abstract: BACKGROUND: Low Back Pain (LBP) is considered as one of the most frequent disorders, which about 80% of adults experience in their lives. Lumbar disc herniation (LDH) is a cause for acute LBP. Among conservative treatments, traction is frequently used by clinicians to manage LBP resulting from LDH. However, there is still a lack of consensus about its efficacy. OBJECTIVE: The purpose of this study was to evaluate the effects of segmental traction therapy on lumbar discs herniation, pain, lumbar range of motion (ROM), and back extensor muscles endurance in patients with acute LBP induced by LDH. METHODS: Fifteen patients with acute LBP diagnosed by LDH participated in the present study. Participants undertook 15 sessions of segmental traction therapy along with conventional physiotherapy, 5 times a week for 3 weeks. Lumbar herniated mass size was measured before and after the treatment protocol using magnetic resonance imaging. Furthermore, pain, lumbar ROM and back muscle endurance were evaluated before and after the procedure using clinical outcome measures. RESULTS: Following the treatment protocol, herniated mass size and patients' pain were reduced significantly. In addition, lumbar flexion ROM showed a significant improvement. However, no significant change was observed for back extensor muscle endurance after the treatment procedure. CONCLUSION: The result of the present study showed segmental traction therapy might play an important role in the treatment of acute LBP stimulated by LDH.

Keywords: Low back pain, physical therapy modalities, traction, inter-vertebral disc herniation, magnetic resonance imaging

DOI: 10.3233/BMR-160741

Journal: Journal of Back and Musculoskeletal Rehabilitation, vol. 30, no. 2, pp. 247-253, 2017

Published: 2 March 2017

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Decompression Studies

Hindawi
International Journal of Clinical Practice
Volume 2022, Article ID 6343837, 9 pages
https://doi.org/10.1155/2022/6343837

Research Article

Effect of Nonsurgical Spinal Decompression on Intensity of Pain and Herniated Disc Volume in Subacute Lumbar Herniated Disc

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Received 11 March 2022; Revised 27 June 2022; Accepted 11 August 2022; Published 19 September 2022

Academic Editor: Aderito Seixas

Objective. Nonsurgical spinal decompression therapy (NSDT) is a conservative treatment for the lumbosacral herniated intervertebral disc (L-HIVD). This study aimed to evaluate the clinical effectiveness of the NSDT and change in disc volume through magnetic resonance imaging (MRI) in subacute L-HIVD. *Methods.* Sixty patients with subacute L-HIVD were randomized into either the decompression group (group D, $n = 30$) or the nondecompression group (group N, $n = 30$). In group D, NSDT was performed ten times in eight weeks. In group N, pseudodecompression therapy (no force) was performed with the same protocol. Lower back and lower leg pain intensities and functional improvements were measured by the visual analog scale and the Korean Oswestry Disability Index (K-ODI). The change in the lumbosacral disc herniation index (HI) was evaluated through a follow-up MRI three months after the therapy. *Results.* The lower leg pain intensity in group D was lower than that in group N at two months ($p = 0.028$). Additionally, there were significantly lower K-ODI scores in group D at two and three months ($p = 0.023$, 0.019) than in group N. The change in HI after the therapy was −27.6 ± 27.5 (%) in group D and −7.1 ± 24.9 (%) in group N, with a significant difference ($p = 0.017$). Approximately 26.9% of patients in group D and no patients in group N showed over 50% reduction in HI ($p = 0.031$). *Conclusion.* NSDT may be a suitable treatment option for conservative treatment of subacute L-HIVD.

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Decompression Studies

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Open Access Original Article

Corrected: Comparison of the Effectiveness of Traditional Motorized Traction and Non-surgical Spinal Decompression Therapy Added to Conventional Physiotherapy for Treatment of Chronic Low Back Pain

Sevda Adar [1], Onurhan Apaydın [1], Umit Dündar [1], Hasan Toktas [1], Hilal Yesil [1], Selma Eroglu [1], Nuran Eyvaz [1]

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Review ended 09/18/2024
Published 09/17/2024
Corrected 09/23/2024

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DOI: 10.7759/cureus.69610

This article has been corrected.

Correction date: September 25, 2024. Cite this correction as Adar S, Apaydın O, Dündar U, et al. (September 25, 2024) Correction: Comparison of the Effectiveness of Traditional Motorized Traction and Non-surgical Spinal Decompression Therapy Added to Conventional Physiotherapy for Treatment of Chronic Low Back Pain. Cureus 16(9): c195. doi:10.7759/cureus.c195.

This article has been corrected to replace an incorrect reference to DRX9000. The ISCS 2.0 Integrity Spinal Care System was used by the authors and has replaced the incorrect mention of the DRX9000 in the first sentence of the first paragraph under the subheader 'Spinal Decompression Group'. The authors and journal regret that this error was not identified and addressed prior to publication.

Abstract

Background: There are a limited number of studies comparing traditional motorized traction and non-surgical spinal decompression with other treatment options such as conventional motor traction in the treatment of low back pain caused by lumbar discopathy. This retrospective study aimed to compare the effectiveness of these treatments.

Methods: The retrospective data of patients diagnosed with lumbar discopathy who underwent physical therapy in our clinic were reviewed. Demographic data, duration of their symptoms, physical examination findings, lumbosacral magnetic resonance imaging (MRI) reports, method and duration of treatment, and visual analog scale (VAS) and Oswestry Disability Index (ODI) results were recorded.

Results: A total of 160 patients met the inclusion criteria. Their mean age was 44.6±12.4 (range 21-65) years, 57.5% (n=92) were female, and 42.5% (n=68) were male. There were no differences between the conventional physiotherapy, motorized traction, and spinal decompression groups in terms of age, duration of symptoms, and the number of sessions (p>0.05). In all three groups, the mean scores of VAS and ODI were significantly decreased in the pre-and post-treatment comparisons (p<0.005). The rates of change in VAS and ODI were higher in the traction group and spinal decompression group compared to the conventional treatment (p<0.005).

Conclusion: In patients with subacute and chronic lumbar discopathies, motorized traction and spinal decompression treatments added to conventional treatment were found to be more effective than conventional treatment alone. The results of spinal decompression and conventional motorized traction treatments appear to be similar.

Decompression Studies

Hindawi
Computational and Mathematical Methods in Medicine
Volume 2022, Article ID 5670303, 7 pages
https://doi.org/10.1155/2022/5670303

Research Article

Clinical Efficacy of Mechanical Traction as Physical Therapy for Lumbar Disc Herniation: A Meta-Analysis

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[2]*Department of Surgery, Hainan Cancer Hospital, Haikou, 570100 Hainan, China*
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Academic Editor: Xi Lou

Objective. This study is aimed at exploring the clinical effect of mechanical traction on lumbar disc herniation (LDH). *Methods.* Related literatures were retrieved from PubMed, Medline, Embase, CENTRAL, and CNKI databases. Inclusion of literature topic was comparison of mechanical traction and conventional physical therapy for lumbar disc herniation. Jadad scale was used to evaluate the quality of the included RCT studies. The Chi-square test was used for the heterogeneity test, and a random effect model was used with heterogeneity. Subgroup analysis and sensitivity analysis were used to explore the causes of heterogeneity. If there was no heterogeneity, the fixed effect model was used, and funnel plots were used to test publication bias. *Results.* Visual analog scale (VAS) in the mechanical traction group was lower than that in the conventional physical therapy group (MD = −1.39 (95% CI (-1.81, -0.98)), $Z = 6.56$, and $P < 0.00001$). There was no heterogeneity among studies ($Chi^2 = 6.62$, $P = 0.25$, and $I^2 = 24\%$) and no publication bias. Oswestry disability index (ODI) in the mechanical traction group was lower than that in the conventional physical therapy group (MD = −6.34 (95% CI (-10.28, -2.39)), $Z = 3.15$, and $P = 0.002$). There was no heterogeneity between studies ($Chi^2 = 6.27$, $P = 0.18$, and $I^2 = 36\%$) and no publication bias. There was no significant difference in Schober test scores between the mechanical traction group and the conventional physical therapy group (MD = −0.40 (95% CI (-1.07, 0.28)), $Z = 1.16$, and $P = 0.25$). There was no heterogeneity among studies ($Chi^2 = 1.61$, $P = 0.66$, and $I^2 = 0\%$) and no publication bias. *Conclusion.* Mechanical traction can effectively relieve lumbar and leg pain and improve ODI in patients with lumbar disc herniation but has no significant effect on spinal motion. The therapeutic effect of mechanical traction was significantly better than that of conventional physical therapy. Lumbar traction can be used in conjunction with other traditional physical therapy.

How Does Decompression Work?

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Dynamic Stenosis

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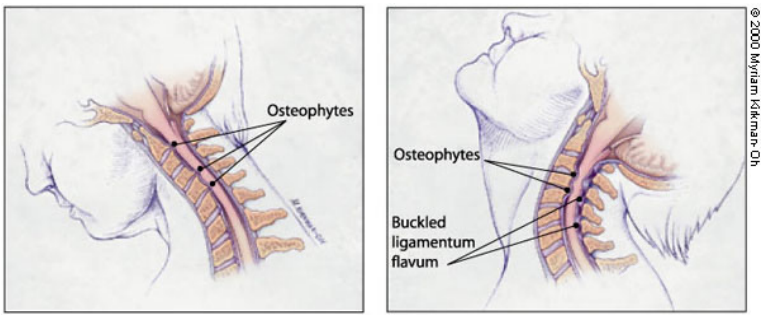
Dynamic Stenosis



Common signs of Central Canal Stenosis
·Atrophy of the hand musculature
·Hyperreflexia
·Lhermitte's sign (electric shock-like sensation down the center of the back following flexion of the neck)
·Sensory loss

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Dynamic Stenosis

Morphologic Changes in the Cervical Neural Foramen due to Flexion and Extension: In Vivo Imaging Study.

Kitagawa et.al. Spine. 29(24):2821-2825, December 15, 2004.

Conclusions. The present results are consistent with those of previous in vitro studies and may explain the clinical observation that cervical extension aggravates symptoms in patients with cervical radiculopathy and that flexion often relieves them.

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Upright MRI

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Upright MRI

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Upright MRI

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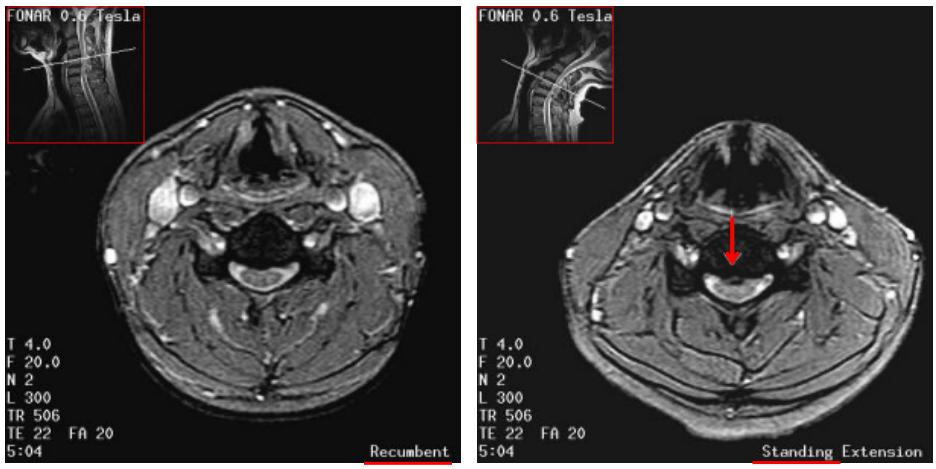
Upright MRI



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Safe? Traction or Compression?

J. Phys. Ther. Sci. 35: 270–275, 2023

The Journal of Physical Therapy Science

Case Study

Re-establishing the cervical lordosis after whiplash: a Chiropractic Biophysics® spinal corrective care methods pre-auto injury and post-auto injury case report with follow-up

Tim C. Norton, DC[1], Paul A. Oakley, DC, MSc[2]*, Deed E. Harrison, DC[3]

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[3] CBP NonProfit, Inc., USA

Fig. 2. Cervical extension traction. Seated compression-extension 2-way traction causes anterior longitudinal ligament, anterior intervertebral disc and anterior muscular tissue creep and plastic deformation to increase cervical lordosis.

Conflict of interest

Dr. Paul Oakley (PAO) is a paid consultant for CBP NonProfit, Inc.; Dr. Deed Harrison (DEH) teaches chiropractic rehabilitation methods and sells products to physicians for patient care as used in this manuscript.

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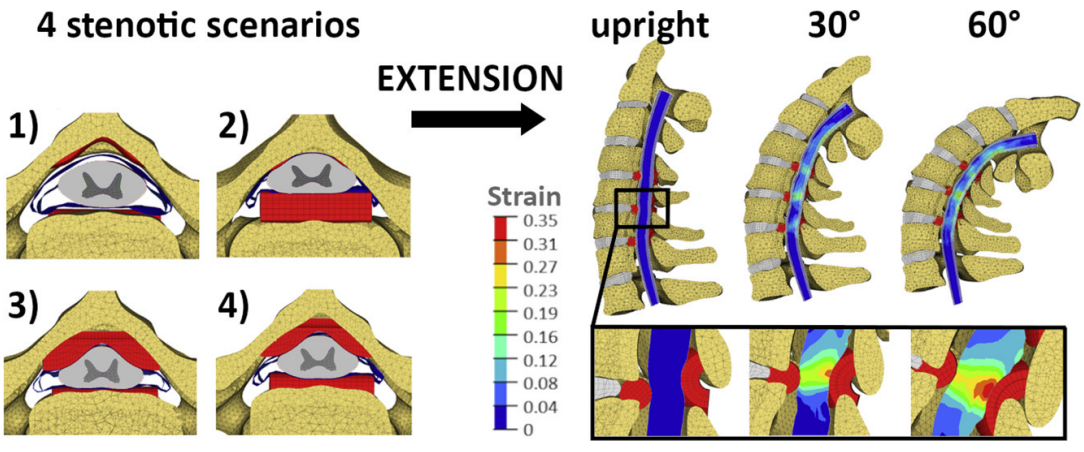
Safe? Traction or Compression?



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IVD Resorption

Clinical Case Report — Medicine — OPEN

Non-surgical treatment of giant tumor-like lumbar disc herniation based on enhanced MRI
A case series

Xueqiang Shen, PhD[a], Shun Lin, PhD[a], Hong Jiang, PhD[a], Jintao Liu, PhD[a], Pengfei Yu, PhD[a,*]

Abstract

Rationale: In recent clinical follow-up, it has been verified that resorption in lumbar disc herniation (LDH) could be of great curative effect in non-surgical treatment for LDH. However, reports of resorption in giant tumor-like LDH are rarely mentioned due to its risk of irreversible neurological damage which could be caused by long-term non-surgical treatment. In our clinical observations, we have found that enhanced MRI helps to distinguish LDH from intradural tumours and to predict the probability of resorption in LDH. We analyzed 8 patients with giant tumor-like LDH who underwent non-surgical treatment, and these patients had resorption during follow-up. All patients were examined with enhanced MRI before treatment, and the type of "bull's eye" sign classification was determined by images. The MRI protrusion volume(VP), resorption rate(RR%) and JOA scores of patients at the first visit and the last follow-up were recorded.

Patient concerns: 8 patients of Han ethnicity were admitted to the department of orthopedic complaining of low back pain for 1week to 12months. They were diagnosed with giant tumor-like LDH by enhanced MRI.

Diagnoses: These patients were diagnosed with giant tumor-like LDH.

Interventions: We adopted a non-surgical treatment plan for the patients, including taking oral non-steroidal anti-inflammatory agents and performing rehabilitation exercise. In consideration of the risk of irreversible neurological damage, patients were closely observed during treatment and follow-up. Once the following conditions occur, surgical treatment is required immediately: The symptoms are not significantly relieved after 3 to 6 months of non-surgical treatment; The symptoms are aggravated by non-surgical treatment; The clinical manifestations of cauda equina syndrome.

Outcomes: After treated with oral non-steroidal anti-inflammatory agents and rehabilitation exercise, the resorption was accompanied by clinical symptom relief. No neurological damage occurred in all patients, and the clinical symptoms did not recur in the subsequent follow-up.

Lessons: Clinicians should fully consider the possibility of resorption prior to surgical treatment in patients with giant LDH. We can predict the probability of resorption in patients with giant LDH based on enhanced MRI. For patients with a high probability of resorption, we can choose non-surgical treatment in the absence of progressive neurological impairment and cauda equina syndrome.

Abbreviations: AR% = herniated area as percentage of corresponding vertebral canal area, JOA = Japanese orthopaedic association, LDH = lumbar disc herniation, MRI = magnetic resonance imaging, RR% = resorption rate, VP = volume of protrusion.

Keywords: enhanced MRI, lumbar disc herniation, resorption, tumor-like

1. Introduction

Since Guinto et al [1] first identified the phenomenon of "disk regression" in herniated intervertebral disc through computed tomography follow-up, in 1984, scholars have conducted in-depth research on resorption of lumbar disc herniation (LDH) in the last 20 years, and the understanding of this phenomenon has made great progress. Without surgical

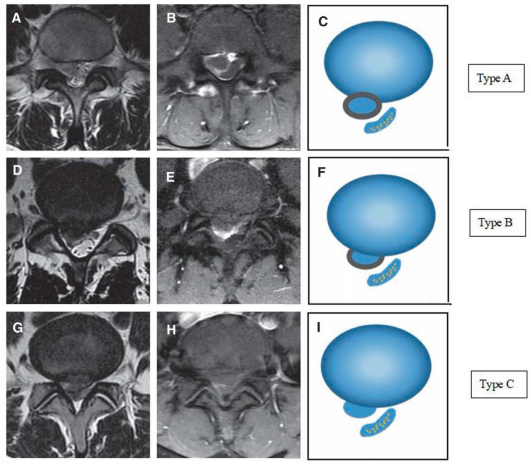

Figure 4. Classification of "bull's eye" sign on enhanced MRI. (A, D, G) Maximum level of the plain MRI T2WI horizontal view; (B, E, H) Maximum level of the enhance MRI T1WI horizontal view; (C, F, I) Schematic diagram of the protrusion ring enhancement area: type A, showing a complete "bull's eye" sign, the annular enhanced area surrounds the whole protruding nucleus pulposus; type B, showing an annular enhanced area partially surrounded the protruding nucleus pulposus; type C, there is no obvious annular enhancement around the protrusion. MRI = magnetic resonance imaging.

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IVD Resorption

■ REVIEW ARTICLE ■ SPINE SURGERY AND RELATED RESEARCH

Prediction and Mechanisms of Spontaneous Resorption in Lumbar Disc Herniation: Narrative Review

Zili Zeng[1], Jun Qin[1], Liang Guo[1], Takashi Hirai[2], Zhiheng Gui[2], Tao Liu[2], Chen Su[2], Daiyang Yu[2] and Mengmeng Yan[2]

1) Department of Orthopedics, University-Town Hospital of Chongqing Medical University, Chongqing, China
2) Department of Orthopaedic and Spine Surgery, Tokyo Medical and Dental University, Tokyo, Japan

Abstract:
The major symptoms of lumbar disc herniation (LDH) are low back pain, radiative lower extremity pain, and lower limb movement disorder. Patients with LDH suffer from great distress in their daily life accompanied by severe economic hardship and difficulty in self-care, with an increasing tendency in the aging population. PubMed and the Cochrane Central Register of Controlled Trials were searched for relevant studies of spontaneous resorption or regression in LDH after conservative treatment and for other potential studies, which included those from inception to June 30, 2023. The objective of this narrative review is to summarize previous literatures about spontaneous resorption in LDH and to discuss the mechanisms and influencing factors in order to assess the probability of spontaneous resorption by conservative treatment. Spontaneous resorption without surgical treatment is influenced by the types and sizes of the LDH, inflammatory responses, and therapeutic factors. If the lumbar disc herniated tissue comprises a higher percentage of cartilage or modic changes have been shown on magnetic resonance imaging (MRI), resorption in LDH is prevented. The bull's eye sign on enhanced MRI, which is a ring enhancement around a protruding disc, is a vital indicator for easy reabsorption. In addition, the type of extrusion and sequestration in LDH could forecast the higher feasibility of natural reabsorption. Moreover, the higher the proportion of protrusion on the intervertebral disc tissue within the spinal canal, the greater the likelihood of reabsorption. Therefore, which illustrates the feasibility of conservative treatments for LDH. Nonsurgical management of LDH with clinical symptoms is recommended by the authors.

Keywords:
Spontaneous resorption, Lumbar disc herniation (LDH), Mechanisms of resorption, Conservative treatment

Spine Surg Relat Res 2024; 8(3): 235-242
dx.doi.org/10.22603/ssrr.2023-0152

- **Mechanisms and Influence Factors of Spontaneous Resorption in LDH**
  - Mechanical traction
  - Dehydration reaction
  - Neovascularization in LDH resorption
  - MCs affect resorption
  - Autoimmune inflammatory response induced by IVD herniation tissue

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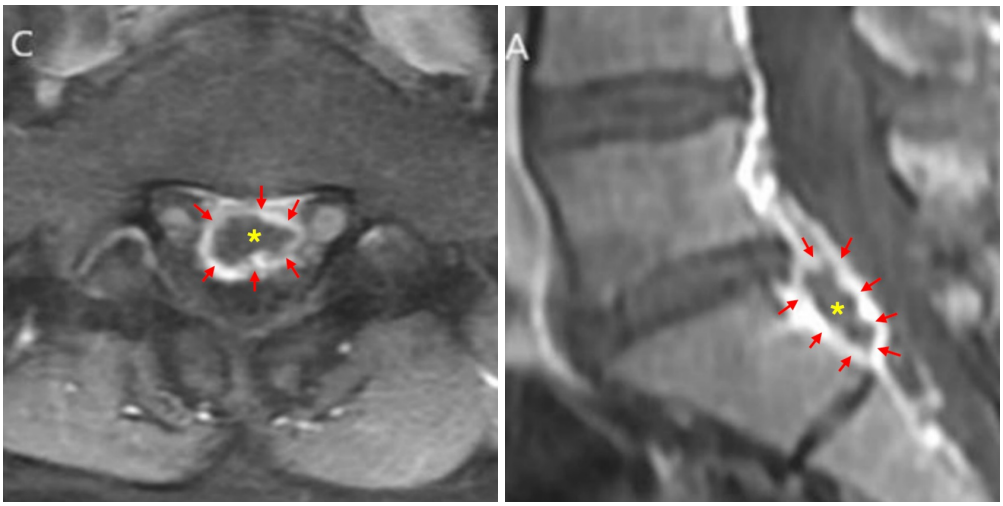
IVD Resorption



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IVD Resorption

■ REVIEW ARTICLE ■ SPINE SURGERY AND RELATED RESEARCH

Prediction and Mechanisms of Spontaneous Resorption in Lumbar Disc Herniation: Narrative Review

Zili Zeng[1], Jun Qin[1], Liang Guo[1], Takashi Hirai[2], Zhiheng Gui[2], Tao Liu[2], Chen Su[2], Daiyang Yu[2] and Mengmeng Yan[2]

1) Department of Orthopedics, University-Town Hospital of Chongqing Medical University, Chongqing, China
2) Department of Orthopaedic and Spine Surgery, Tokyo Medical and Dental University, Tokyo, Japan

Abstract:
The major symptoms of lumbar disc herniation (LDH) are low back pain, radiative lower extremity pain, and lower limb movement disorder. Patients with LDH suffer from great distress in their daily life accompanied by severe economic hardship and difficulty in self-care, with an increasing tendency in the aging population. PubMed and the Cochrane Central Register of Controlled Trials were searched for relevant studies of spontaneous resorption or regression in LDH after conservative treatment and for other potential studies, which included those from inception to June 30, 2023. The objective of this narrative review is to summarize previous literatures about spontaneous resorption in LDH and to discuss the mechanisms and influencing factors in order to assess the probability of spontaneous resorption by conservative treatment. Spontaneous resorption without surgical treatment is influenced by the types and sizes of the LDH, inflammatory responses, and therapeutic factors. If the lumbar disc herniated tissue comprises a higher percentage of cartilage or modic changes have been shown on magnetic resonance imaging (MRI), resorption in LDH is prevented. The bull's eye sign on enhanced MRI, which is a ring enhancement around a protruding disc, is a vital indicator for easy reabsorption. In addition, the type of extrusion and sequestration in LDH could forecast the higher feasibility of natural reabsorption. Moreover, the higher the proportion of protrusion on the intervertebral disc tissue within the spinal canal, the greater the likelihood of reabsorption. Therefore, which illustrates the feasibility of conservative treatments for LDH. Nonsurgical management of LDH with clinical symptoms is recommended by the authors.

Keywords:
Spontaneous resorption, Lumbar disc herniation (LDH), Mechanisms of resorption, Conservative treatment

Spine Surg Relat Res 2024; 8(3): 235-242
dx.doi.org/10.22603/ssrr.2023-0152

Relationship between the Time of Spontaneous Resorption of Herniated Material and the Types of LDH

- Many studies have shown that enormous ruptured tissue in LDH is resorbed more easily, whereas small ruptured tissues took longer36).
- Recently, researchers reported that the spontaneous regression rate of sequestration, extrusion, protrusion, and bulging was 96%, 70%, 41%, and 13%, respectively.
- As time passed, the rate of complete resorption in LDH was 43% for sequestration and 15% for extrusion21).
- The majority of massive LDHs resolved at variable points between 3 and 21 months46).
- The average time for spontaneous resorption was 9 months, which occurred the earliest in giant disc herniation than in other types of herniation 266).

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IVD Regeneration

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IVD Regeneration

Evidence for Skeletal Progenitor Cells in the Degenerate Human Intervertebral Disc

Risbud et al. Spine. 32(23):2537-2544, November 1, 2007.

Conclusion. The analytical data indicated that the pathologically degenerate human disc contained populations of skeletal progenitor cells.

These findings suggest that these endogenous progenitors may be used to orchestrate the repair of the intervertebral disc.

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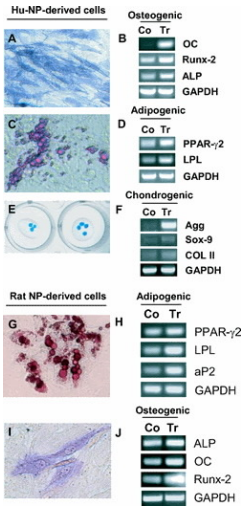
IVD Regeneration



Osteogenic, adipogenic, and chondrogenic differentiation of degenerate human nucleus pulposus (NP)-derived cells from a representative degenerate disc.

Cells were cultured in osteogenic, adipogenic, or chondrogenic media for 8, 21, or 14 days.

Risbud: Spine, Volume 32(23).November 1, 2007.2537-2544

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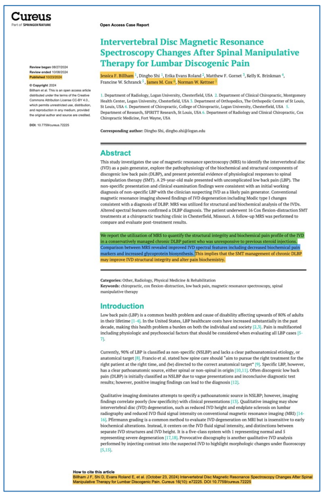
IVD Regeneration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Open Access Case Report

Intervertebral Disc Magnetic Resonance Spectroscopy Changes After Spinal Manipulative Therapy for Lumbar Discogenic Pain

Review began 08/27/2024
Review ended 10/08/2024
Published 10/23/2024

DOI: 10.7759/cureus.72225

Jessica F. Billham [1], Dingbo Shi [1], Erika Evans Roland [2], Matthew F. Gornet [3], Kelly K. Brinkman [4], Francine W. Schranck [5], James M. Cox [6], Norman W. Kettner [1]

1. Department of Radiology, Logan University, Chesterfield, USA 2. Department of Clinical Chiropractic, Montgomery Health Center, Logan University, Chesterfield, USA 3. Department of Orthopedics, The Orthopedic Center of St Louis, St Louis, USA 4. Department of Chiropractic, College of Chiropractic, Logan University, Chesterfield, USA 5. Department of Research, SPIRITT Research, St Louis, USA 6. Department of Radiology and Clinical Chiropractic, Cox Chiropractic Medicine, Fort Wayne, USA

Corresponding author: Dingbo Shi, dingbo.shi@logan.edu

Abstract

This study investigates the use of magnetic resonance spectroscopy (MRS) to identify the intervertebral disc (IVD) as a pain generator, explore the pathophysiology of the biochemical and structural components of discogenic low back pain (DLBP), and present potential evidence of physiological responses to spinal manipulation therapy (SMT). A 29-year-old male presented with uncomplicated low back pain (LBP). The non-specific presentation and clinical examination findings were consistent with an initial working diagnosis of non-specific LBP with the clinician suspecting IVD as a likely pain generator. Conventional magnetic resonance imaging showed findings of IVD degeneration including Modic type I changes consistent with a diagnosis of DLBP. MRS was utilized for structural and biochemical analysis of the IVDs. Altered spectral features confirmed a DLBP diagnosis. The patient underwent 16 Cox flexion-distraction SMT treatments at a chiropractic teaching clinic in Chesterfield, Missouri. A follow-up MRS was performed to compare and evaluate post-treatment results.

We report the utilization of MRS to quantify the structural integrity and biochemical pain profile of the IVD in a conservatively managed chronic DLBP patient who was unresponsive to previous steroid injections. Comparison between MRS revealed improved IVD spectral features including decreased biochemical pain markers and increased glycoprotein biosynthesis. This implies that the SMT management of chronic DLBP may improve IVD structural integrity and alter pain biochemistry.

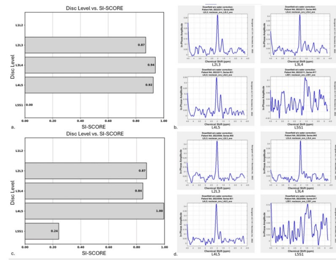

FIGURE 3: Improved proteoglycan levels at L5/S1 post-treatment, with spectral graphs highlighting significant recovery.

The SI score represents structural integrity and the quantity of proteoglycans present. In baseline analysis, the L5/S1 disc level of proteoglycans was too low to register (a) but saw a marked improvement in the post-treatment analysis (c). The spectral graphs of each disc level in baseline (b) and post-treatment (d) are shown, there is no graph data for the L1/2 level. Proteoglycan resonance is represented at 2 ppm, and below that, are the acids, predominantly lactate. Note the increased peak of proteoglycans in the post-treatment analysis (d) compared to the baseline analysis (b).

SI score: structural integrity score

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The IVF

Review Article on Full-endoscopic Spine Surgery

Micro-anatomical structures of the lumbar intervertebral foramen for full-endoscopic spine surgery: review of the literatures

Hisaaki Uchikado[1], Yasuhiko Nishimura[2], Gohsuke Hattori[3], Yukoh Ohara[4]

[1]Uchikado Neuro-Spine Clinic, Hakata, Fukuoka, Japan; [2]Department of Neurosurgery, Wakayama Koyo Hospital, Wakayama, Japan; [3]Department of Neurosurgery, Kurume University School of Medicine, Kurume, Fukuoka, Japan; [4]Department of Neurosurgery, Juntendo University, Tokyo, Japan

Contributions: (I) Conception and design: H Uchikado; (II) Administrative support: H Uchikado; (III) Provision of study materials or patients: H Uchikado, G Hattori; (IV) Collection and assembly of data: All authors; (V) Data analysis and interpretation: All authors; (VI) Manuscript writing: All authors; (VII) Final approval of manuscript: All authors.

Correspondence to: Hisaaki Uchikado, MD, PhD. 1-2-3 Naka, Hakata-ku, Fukuoka City 812-0893, Japan. Email: uchikado@me.com.

Abstract: Percutaneous endoscopic lumbar discectomy (PELD) is a minimally invasive spinal surgical technique. PELD can be performed via 2 routes, transforaminal (TF) or interlaminar. The TF approach is a well-established modality in the treatment of patients with herniated lumbar discs. This technique makes the most of the space within the intervertebral foramen where, as Kambin claimed, the safe approach to the lesion is possible. Knowledge of the lumbar artery with its branches and various ligaments of anatomies of the intervertebral foramen are needed to perform successful surgeries and to reduce complications.

Keywords: Full-endoscopic spine surgery (FESS); micro-anatomy; lumbar intervertebral foramen; lumbar canal stenosis; lumbar herniated disk

Submitted Sep 09, 2019. Accepted for publication Sep 29, 2019.
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Journal of Spine Surgery, Vol 6, No 2 June 2020 407

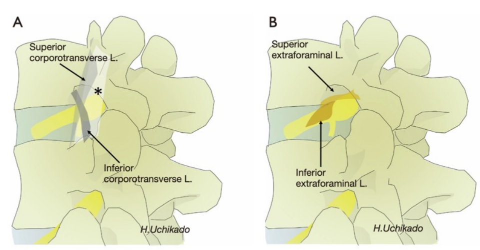

Figure 3 Schematic drawings of external ligaments of the intervertebral foramen. (A) Superior and inferior corporotransverse ligament (L), inter-transverse ligament (asterisk). (B) Superior and inferior extraforaminal ligament (L).

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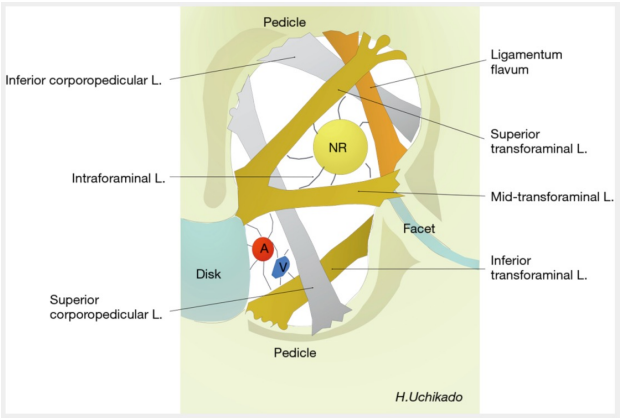

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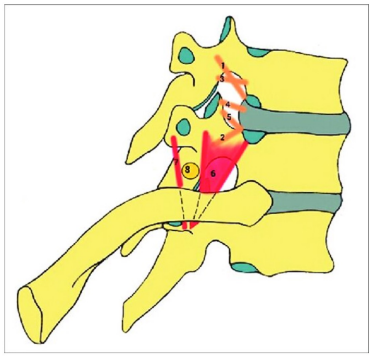

Figure

Caption

Figure 6: Schematic illustration depicting transforaminal and extraforaminal ligaments: corporopedicular 1: superior and 2: inferior ligament; 3: Superior transforaminal ligament; 4: mid-transforaminal ligament; 5: inferior transforaminal ligament; costotransverse 6: superior and 7: inferior ligament; 8: spinal nerve located in the extraforaminal space

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IVD A and P

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NUTRIENT SUPPLY AND INTERVERTEBRAL DISC METABOLISM

Grunhagen et al. JBJS. Volume 88 Supplement 2, April 2006, p 30–35.

- The disc of an adult human is virtually avascular, apart from a sparse penetration of capillaries and nerves into the outermost regions of the anulus 16.
- Thus, blood vessels at the margin of the disc are responsible for the supply of nutrients and the removal of wastes.
- The outermost regions of the disc are supplied by capillaries in the adjacent soft tissues.
- The nucleus, inner anulus, and part of the outer anulus 1,17 are supplied by a capillary network that arises from the vertebral arteries and penetrates the subchondral plate to terminate in loops at the bone-cartilage end-plate junction 18,19.

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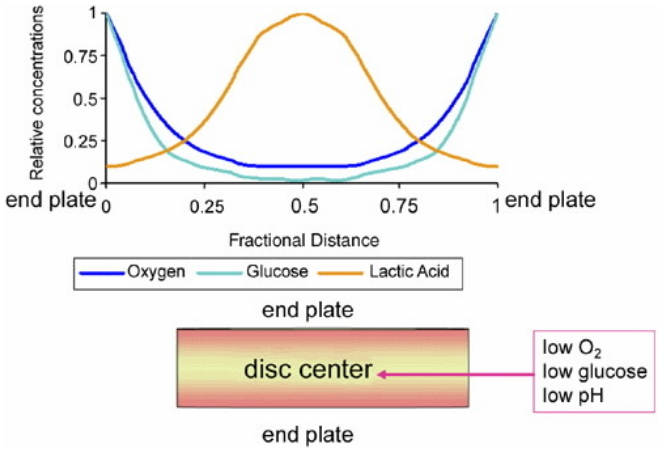
NUTRIENT SUPPLY AND INTERVERTEBRAL DISC METABOLISM

Grunhagen et al. JBJS. Volume 88 Supplement 2, April 2006, p 30–35.



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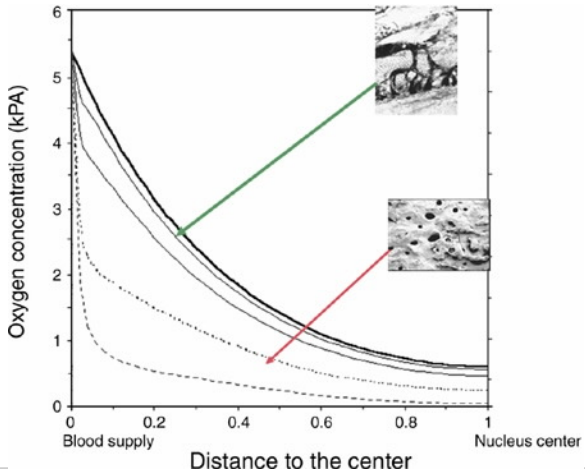
Grunhagen et al. JBJS. Volume 88 Supplement 2, April 2006, p 30–35.



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NUTRIENT SUPPLY AND INTERVERTEBRAL DISC METABOLISM

Grunhagen et al. JBJS. Volume 88 Supplement 2, April 2006, p 30–35.

- The capillaries are protected by a dense hyaline cartilage end plate that is lower in hydration than that of articular cartilage 30,31; it limits transport of large molecules into and out of the disc 32.
- In aging, degeneration, or disorders such as scoliosis, this end plate tends to calcify by unknown mechanisms; severe calcification acts as a barrier to nutrient transport and is thought to be a major factor in the development of disc degeneration 33.
- In scoliotic discs at least, cell death correlates with loss of nutrient supply and end-plate calcification 34,35.

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NUTRIENT SUPPLY AND INTERVERTEBRAL DISC METABOLISM

Grunhagen et al. JBJS. Volume 88 Supplement 2, April 2006, p 30–35.

- Nutrients move from the capillaries that supply the disc, through the cartilage end plates and the dense matrix of the disc, to the cells.
- For small solutes such as glucose, lactic acid, and oxygen, both experimental and modeling studies have shown that solute transport is accomplished mainly by diffusion 36–38; hence, the movement of fluid in and out of the disc as a result of the diurnal loading pattern has little direct influence on transport.
- Gradients in the concentration thus arise depending on the balance between the rate of supply of glucose or oxygen from the blood supply to the cells and the rate of cellular consumption 1,39,40.

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Spine
SPINE Volume 41, Number 7, pp 568–576

BASIC SCIENCE

Influences of Nutrition Supply and Pathways on the Degenerative Patterns in Human Intervertebral Disc

Qiaoqiao Zhu, BS,* Xin Gao, BS,† Howard B. Levene, MD, PhD,‡ Mark D. Brown, MD, PhD,§ and Weiyong Gu, PhD*·†

"Impairment of different nutrition pathways results in different degenerative patterns."

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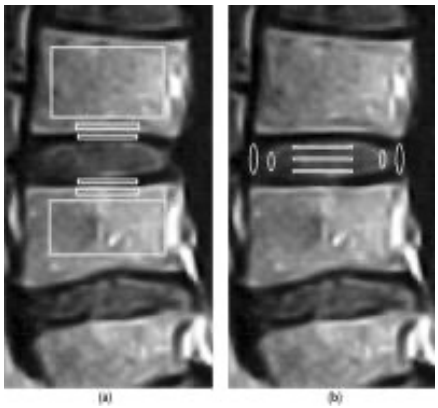
ISSLS Prize Winner: A Study of Diffusion in Human Lumbar Discs: A Serial Magnetic Resonance Imaging Study Documenting the Influence of the Endplate on Diffusion in Normal and Degenerate Discs.

Rajasekaran et al. Spine. 29(23):2654-2667, December 1, 2004.

Objectives. To document the temporal pattern of diffusion in normal human lumbar discs and to study the influence of the vascularity of bone and the status of endplate on diffusion in the normal and degenerate discs.

Methods. The diffusion pattern over 24 hours following gadodiamide injection was studied in 150 discs (96 normal and 54 degenerate). Signal intensity values for three regions of interest in bone (i.e., vertebral body, subchondral bone, and endplate zone) and seven in the disc were calculated, and normal percentiles of diffusion were derived for these regions.

Conclusions. Serial postcontrast magnetic resonance imaging studies offer a reliable method of assessing the diffusion of the discs and the functional status of the endplate cartilage. Endplate cartilage damage increases with age and produces considerable changes in diffusion. The present study has described reliable signs by which these damages can be identified in vivo. Aging and degeneration have been shown to be two separate processes by documenting clear-cut differences in diffusion.



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INTERNATIONAL JOURNAL of SPINE SURGERY

Pathomechanism and Biomechanics of Degenerative Disc Disease: Features of Healthy and Degenerated Discs

Sertac Kirnaz, Charisse Capadona, Marianne Lintz, Byumsu Kim, Rachel Yerden, Jacob L. Goldberg, Branden Medary, Fabian Sommer, Lynn B. McGrath, JR, Lawrence J. Bonassar and Roger Härtl

Int J Spine Surg 2021, 15 (s1) 10-25
doi: https://doi.org/10.14444/8052
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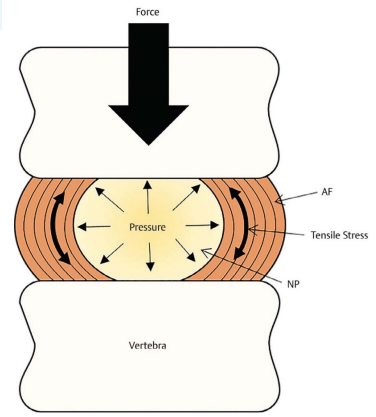

Figure 5. The intervertebral disc (IVD) undergoes load bearing, bending, flexing, and torsion while under mechanical stressors. The annulus fibrosus (AF) and the nucleus pulposus (NP) form the IVD within the intervertebral space to fill the joint and maintain disc height. When the IVD is undergoes the previously mentioned physical stress, then the NP reacts by resisting the downward force against it by pressing vertically back into the compression and radially into the AF. The pressure from the NP generates tensile stress on the AF in the direction of the organization of the fibers within the AF. Printed with permission from *Biological Approaches to Spinal Disc Repair and Regeneration for Clinicians.*[15]

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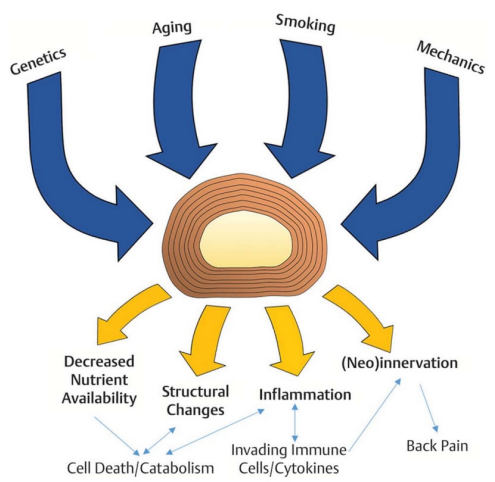

Figure 7. Degenerative disc disease (DDD) in a cascading multifactorial process involving the interaction of risk factors and pathophysiology. Printed with permission from *Biological Approaches to Spinal Disc Repair and Regeneration for Clinicians.*[186]

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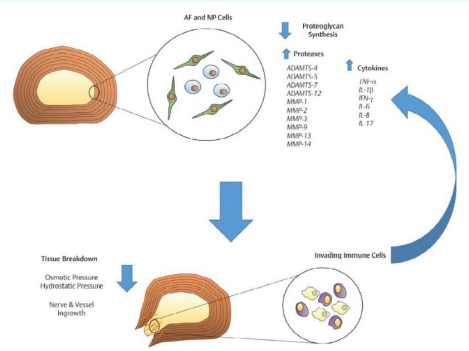

Figure 8. The physiological alterations to the disc are controlled directly by cells within the disc, which are caught in a closed degenerative cycle. These cells increase production of cytokines and proteases while decreasing production of proteoglycans, both of which are essential to the retaining the disc's height as well as maintaining the basic physical function of the intervertebral disc. The increase of proteases expedites the tissue degeneration process. The proteases also alter the extracellular environment, which incurs catabolic reaction and inflammation. This process results in the activation of nearby immune cells that exacerbates the inflammatory processes by continuing to increase cytokine production. The increase in cytokines enhances neovascularization and neoinnervation in the disc. Printed with permission from *Biological Approaches to Spinal Disc Repair and Regeneration for Clinicians.*[186]

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Rim Lesions

Acute Injuries to Cervical Joints. An Autopsy Study of Neck Sprain

Taylor JR, Twomey LT. *Spine* 1993

- 15/16 subjects who died of major trauma showed IVD endplate clefts or "Rim Lesions"
- MRI did not visualize all of these lesions.
- Suggested a source of pain.

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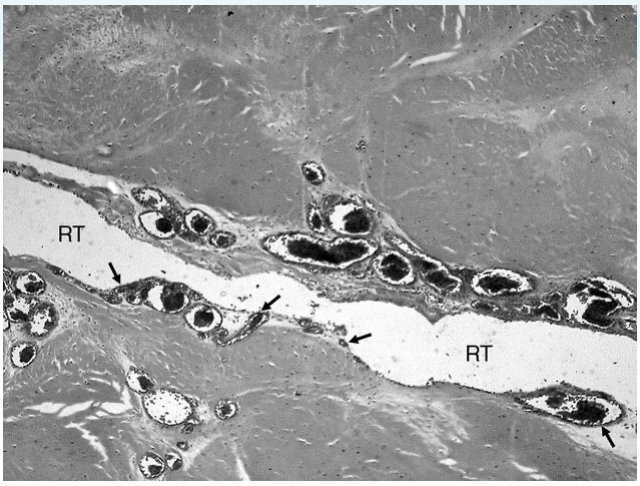

Neovascularization of a radiating tear (RT) in the L4–L5 disc showing that some vessels attached to the inner surface have walls composed only of a single layer of endothelial cells (arrows).

Vernon Roberts: Spine, Volume 32(25).December 1, 2007.2797-2804

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Cases

124

Instructive Case

James Demetrious, DC, FACO
4837 Carolina Beach Road, Suite 205
Wilmington, NC 28412
Telephone: (910) 790-8020

Please say that again

Mary Watson
Patient ID: 7237272 **DOB:** 04/12/1945 **Sex:** F **Account No.:**
Encounter ID: 238485 **Encounter Date:** 10/24/2017
Encounter Type: Office Visit

SUBJECTIVE:

Chief Complaint: The patient presents with complaints of neck, scapular and left upper extremity pain, numbness and tingling along the C5 and C6 dermatomes that began on October 2, 2017. The patient describes the pain as severe, constant with minimal relief despite several medical interventions.The patient denies weakness, gait abnormalities, bladder or bowel issues. She reports pain that disturbs her sleep throughout the night.

History Of Present Illness: On October 2, 2017, the patient underwent colonoscopy. Upon waking, she reported terrible pain affecting the left neck, scapula and arm. She reports that she sought care with her primary care physician, went to the hospital, was referred to a medical orthopedist and subsequently to a pain management physician. X-rays have been performed. The patient has been scheduled for electrodiagnostic studies, further x-rays and MRI of the cervical spine. She denies any prior complaints similar to this issue.

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Onset Date: 10/02/2017

Medical History: Review of the patient's past history reveals past diagnoses of arthritis, difficulty sleeping, sweats, loss of hearing, tinnitus, sinusitis, psoriasis, rapid heartbeat, rashes and hot flashes.

Surgical History: Patient has undergone hysterectomy, tonsillectomy and appendectomy.

Family History: Patient reports familial history that includes heart disease and sarcoidosis.

Social History: Patient is retired.
Smoking Status: Smoker
Patient currently uses a vapor device.

Current Medications: Tramadol, NSAIDs and Gabapentin have provided minimal relief.

Please say that again

OBJECTIVE:

Vital Signs:
Height: 69.00 in
Weight: 178.00 lbs
BMI: 26.28
Blood Pressure: 130/84 mmHg
Temperature: 98.60 F
Pulse: 74 beats/min

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Objective Notes:	Inspection of the patient revealed a pleasant 72-year-old female with guarded head and neck motion. She was alert and oriented x4.
	Chiropractic subluxations were noted affecting C5 and T2 as evidenced by decreased intersegmental motion and increased muscle tone affecting the paraspinal musculature upon palpation. Global ranges of motion of the cervical spine produced left upper extremity pain on extension, left lateral flexion and left rotation.
	Orthopedic assessment revealed signs that suggest cervical radiculopathy. Cervical compression, Spurling's test and Valsalva maneuver produced neck, scapular and upper extremity symptomatology. Bakody sign was positive indicating radicular symptomatology.
	Neurologic assessment was performed. Cranial nerve assessment was negative. Alteration of sensation to pinprick was noted along the C6 dermatome. 0/5 brachioradialis DTR on the left. Motor evaluation revealed 4/5 strength of wrist extension. Patient had a negative Hoffman sign. Babinski was not present.
	Cardiovascular and peripheral vascular assessments were negative. Examination of the shoulders revealed full range of motion without restriction, weakness or pain. No other abnormalities were noted.
Imaging:	Patient reports that she has undergone several x-rays of the neck and shoulder. Shoulder x-ray results were available to me through the Delaney record system revealing no acute abnormalities affecting the left shoulder. In addition, their system revealed that the patient has been scheduled for MRI and x-rays of the cervical spine on Thursday, October 19, 2017. I requested that the patient obtain images and reports for my assessment.

POSTGRADDC EVIDENCE BASED, CLINICALLY INTUITIVE CE

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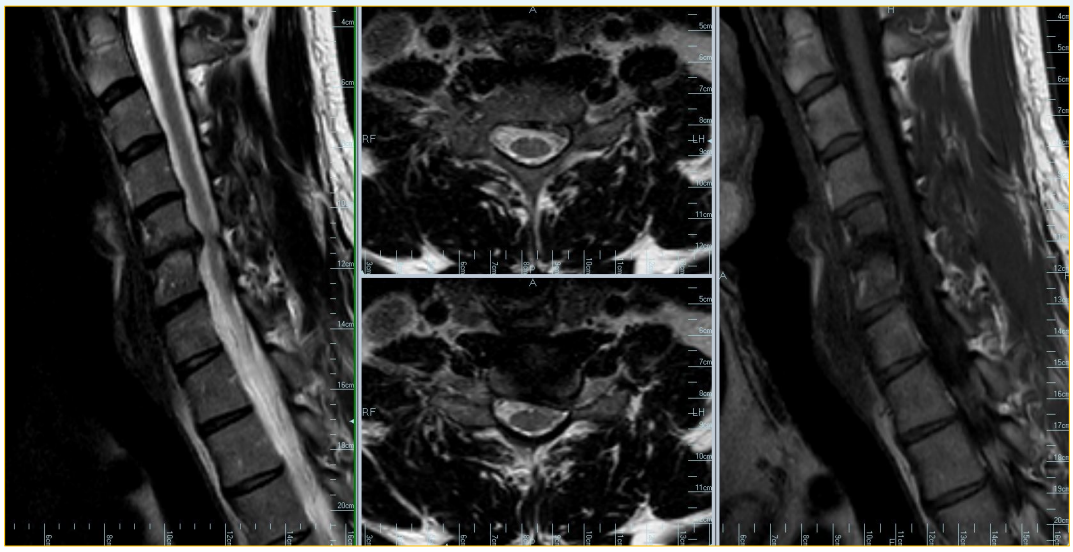

POSTGRADDC EVIDENCE BASED, CLINICALLY INTUITIVE CE

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ASSESSMENT:

Assessments:

ICD-10 Assessments:

Patient was provided a primary Medicare diagnosis of chiropractic subluxations, cervical radiculopathy and likely advanced degenerative joint disease producing central or foraminal stenosis. It is likely that the position during which her colonoscopy was performed provoked and inflamed this condition.

Imaging and MRI assessments should clarify any spinal contribution to her current symptomatology and rule out other space occupying lesions.

Patient reports that she was provided a diagnosis of Parsonage Turner syndrome by the pain management physician. I disagree with this assessment. The patient's symptoms and signs are not reflective of brachial neuritis and her symptomatic/clinical picture does not reflect this disorder. Rather, she shows very strong signs that suggest discrete C6 nerve root compromise.

Please say that again

We will monitor the patient's response to care utilizing weekly visual analog scales, pain drawings and the Neck Disability Index.

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Functional Status:

The patient is an acute distress. She needs relief as soon as possible.

PLAN:

Procedure Notes:

With the patient's consent, axial traction was performed utilizing computerized intermittent traction techniques. The patient reported relief during treatment and immediately subsequent to treatment.

Care Plan:

I have recommended chiropractic care at a frequency of three visits per week for the next 2-4 weeks. It is my hope that she will progressively improve during that time frame. Chiropractic care will be provided utilizing traction techniques that alleviate radicular symptomatology.

I have advised the patient to undergo prescribed imagin Please say that again to motor deficits and the severity of her symptomatology, this is reasonable and appropriate based upon the ACR criteria.

The patient has reported that she has a scheduled electrodiagnostic study this week. I would recommend that she undergo a trial of chiropractic care prior to undergoing this test.

I would recommend that she seek the care of her medical doctor. Medications prescribed thus far have been ineffective. I would defer to her medical doctors pertaining to her medications as she may benefit from anti-inflammatory measures to resolve nerve root inflammation, but due to inherent side effects, her medical doctors should make this decision. I will discuss with the patient supplemental and nutritional means to alleviate inflammation.

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Patient Instructions:	I discussed with the patient issues related to provocative postures that increase radicular symptomatology. I strongly recommended that she avoid and modify any activity of daily living that provokes radicular symptoms. I have discussed with her the utilization of pillows at ni[Please say that again]ay support her neck and head better and alleviate discomfort.
Informed Consent::	The patient provided consent for examination and treatment. Careful discussion was made pertaining to informed consent issues, related care, side effects and likelihoods. This report was dictated utilizing transcription software. Any errors in this report or subsequent reports are unintended.

James Demetrious, DC, FACO Date: 10/24/2017

[Provider]: James Demetrious, DC

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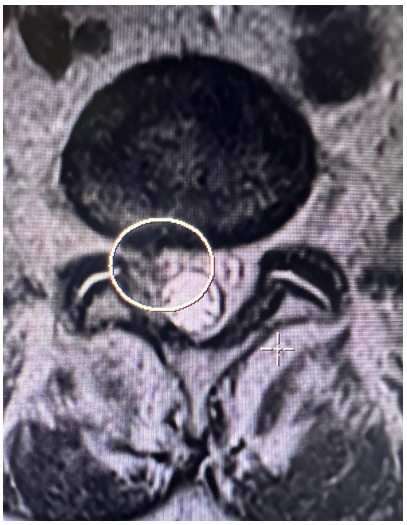
Instructive Case



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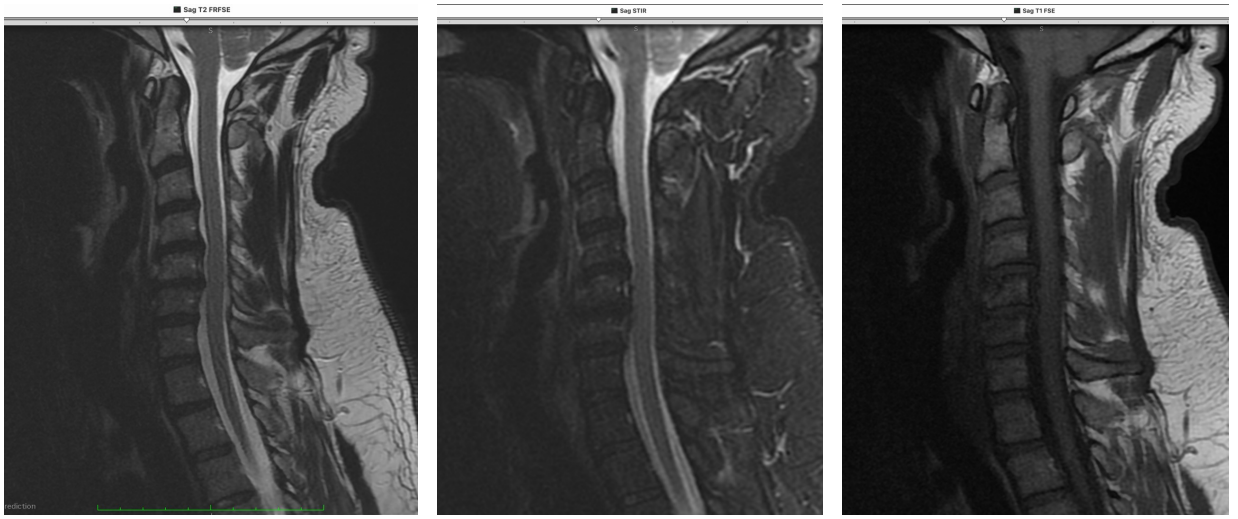
Instructive Case: 35-year-old male, right radiculopathy...



133

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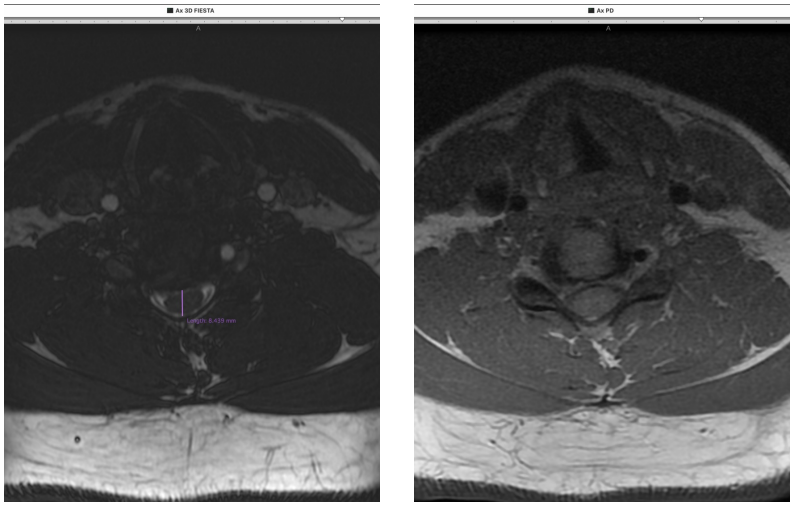
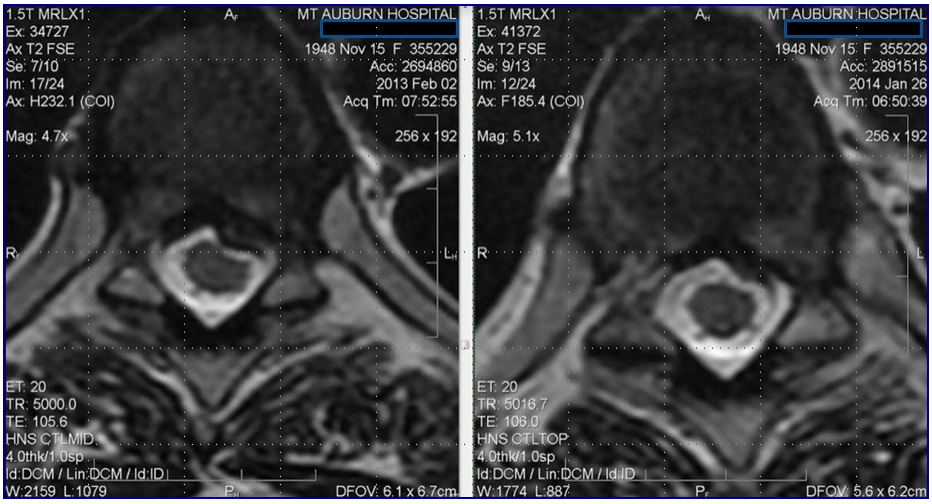


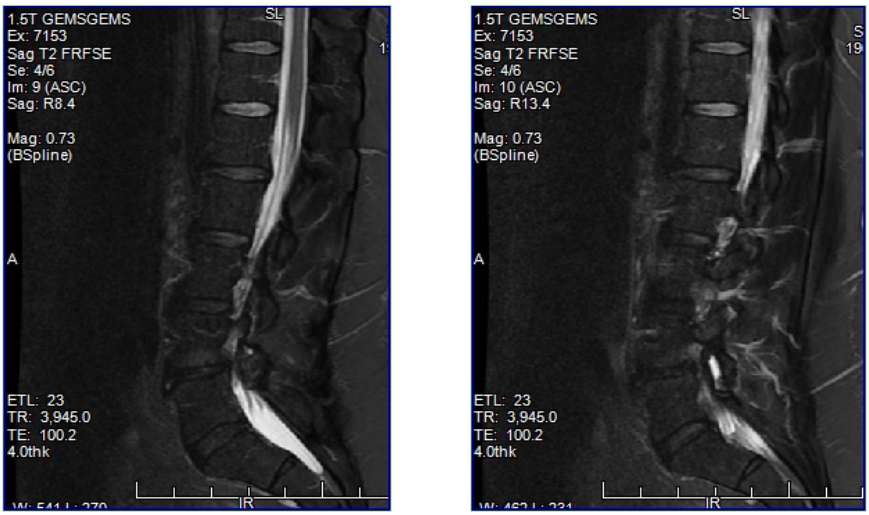
134

Instructive Case: 48-year old female...



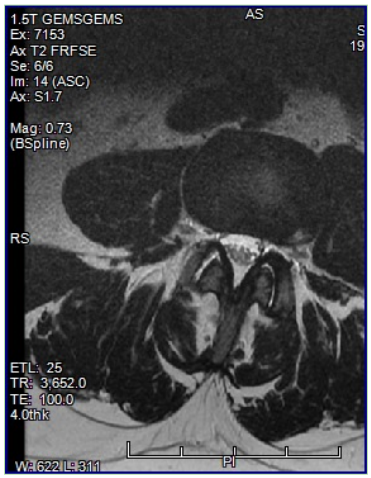
135

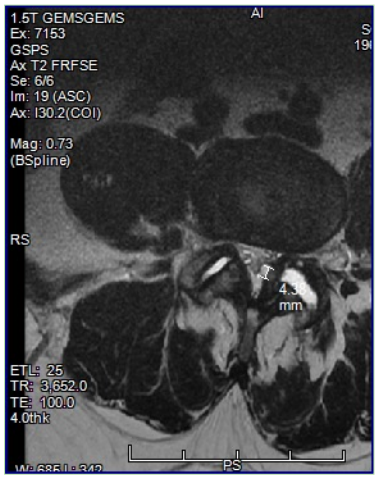
Instructive Case: 51-year old male...



136

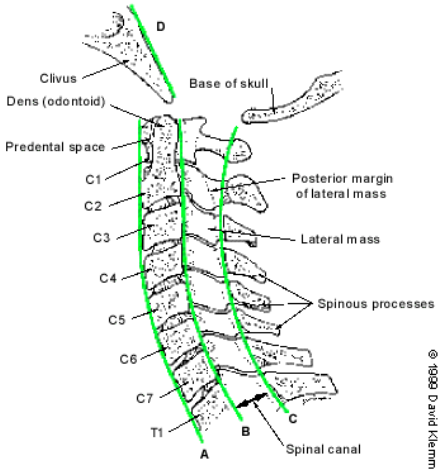
Instructive Case: 51-year old male …



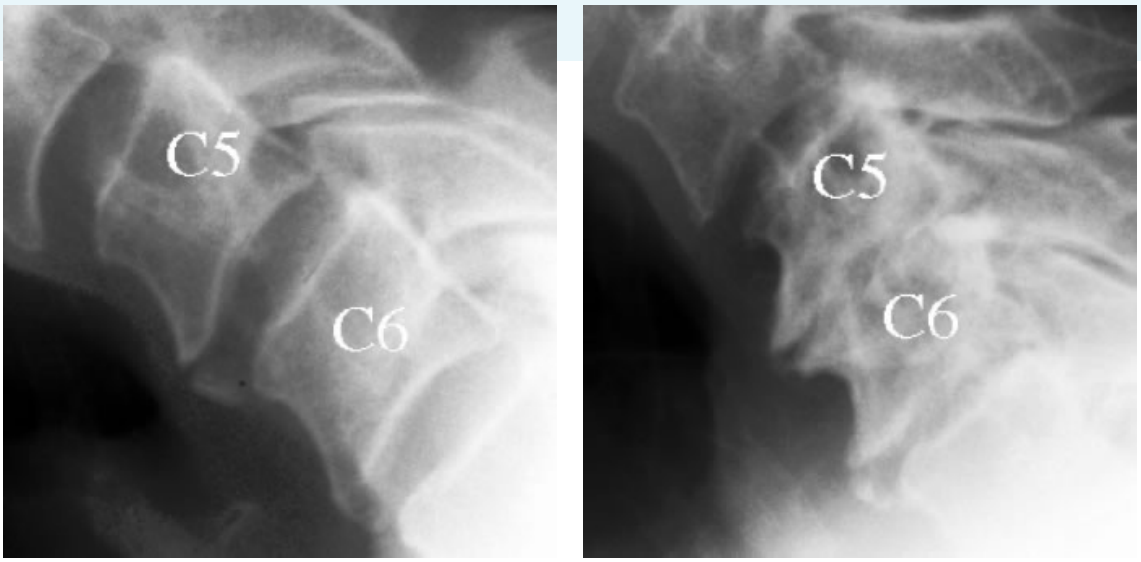


137

"MRI Vision"



138



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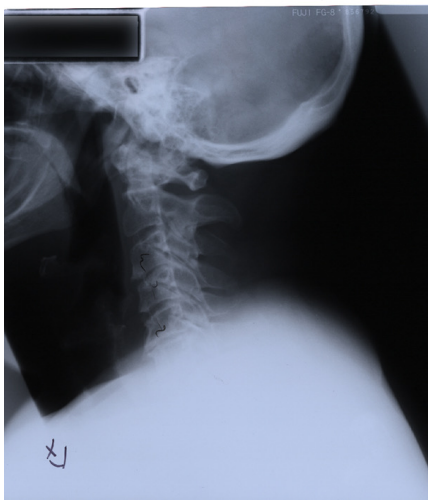
140




North York General Ho
11 Jan 2001
TA:90.0
SE 32/PSAT,LUMBAR SPINE F

141


North York General Ho
11 Jan 2001
SE 32/PSAT,LUMBAR SPINE F

142

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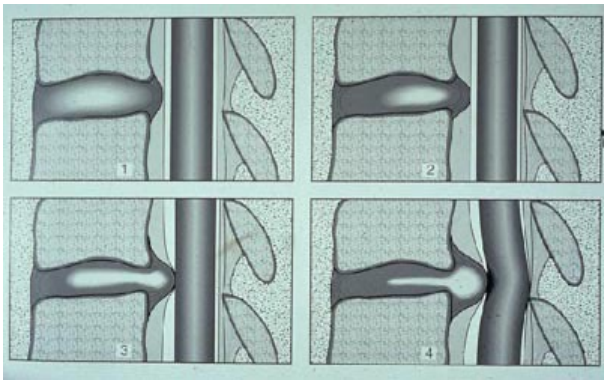

Rauschning Grading System for disc protrusions is based on the assessment of the normal specimens and actual disc herniations:

Grade 0: straight contour of the posterior annulus fibrosus.
Grade 1: small annulus fibrosus protrusion.
Grade 2: medium–size annulus protrusion obliterating 2/3 of the anterior epidural and subarachnoid spaces.
Grade 3: large disc protrusion dislocating the spinal cord posteriorly.
Grade 4: large disc protrusions compressing the spinal cord.

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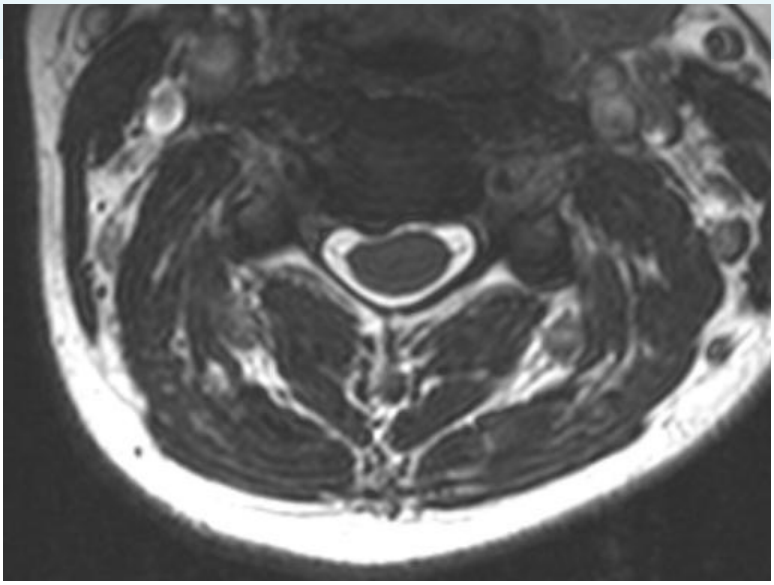
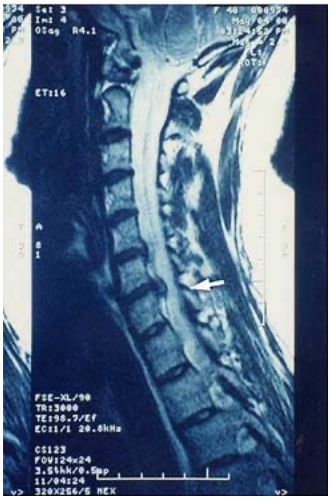


145



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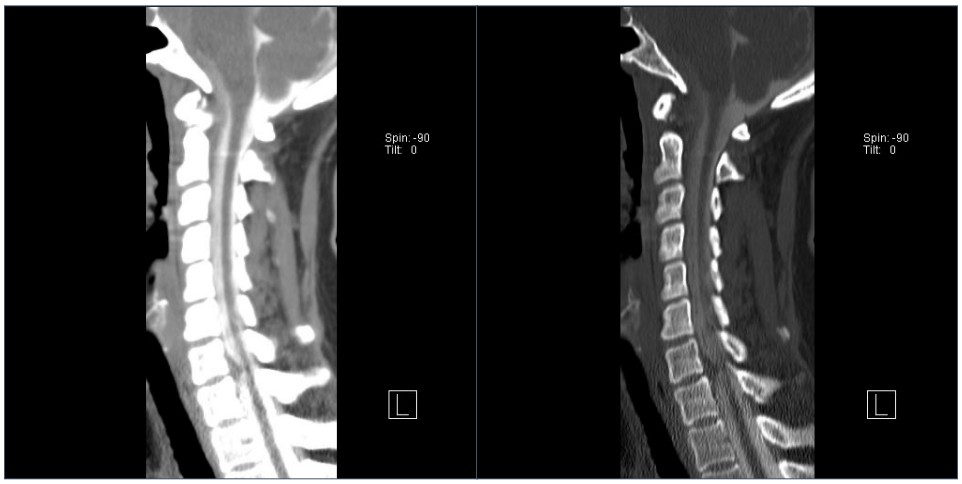
147



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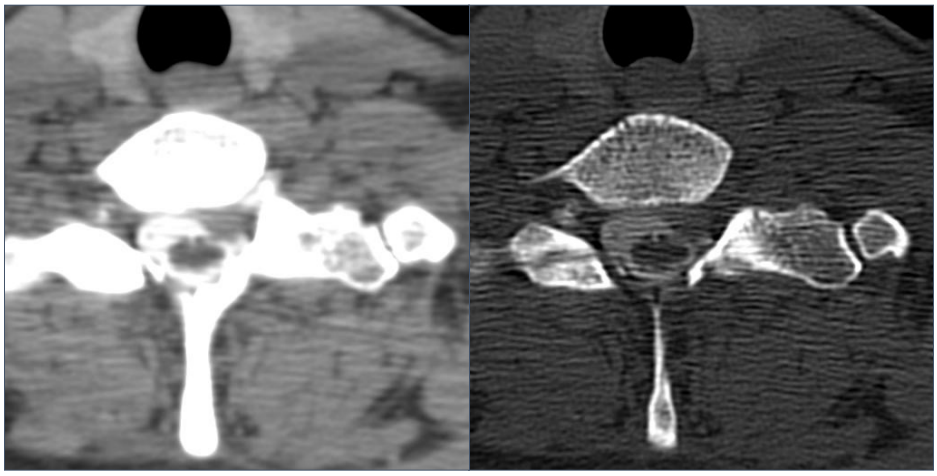

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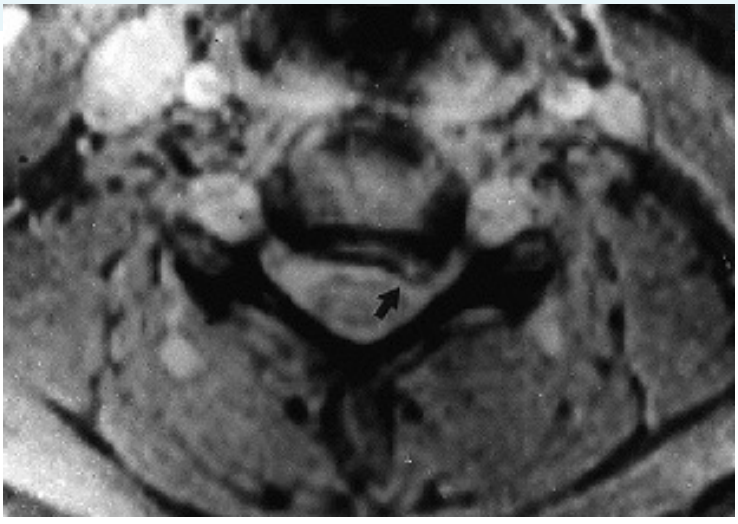

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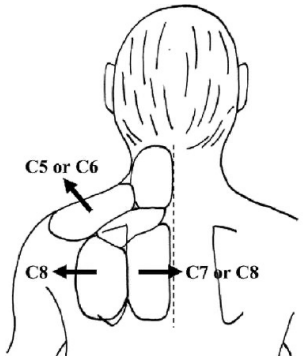
Cervical Roots as Origin of Pain in the Neck or Scapular Regions
Tanaka et al. *Spine*. Volume 31(17), 1 August 2006, pp E568-E573

- A prospective study was conducted to determine whether the pain in the neck or scapular regions in patients with cervical radiculopathy originates from the compressed root and whether the site of the pain is useful for diagnosing the level.
- It was confirmed through this study that scapular region pain is generally the initial symptom in radiculopathy and can persist alone before the arm or finger symptoms develop.
- Pain in the scapular region can originate directly in the compressed root, and the site of the pain is valuable for determining the localization of the involved root.



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Thank you!

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