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Grand Rounds: Pre-Game Warm-Up Chiropractic Adjustments of IVD Herniations

Guest Lecturer: David Graber, DC, DACBSP
Moderator: James Demetrious, DC, DABCO

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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. > 25 years - NCMIC Speakers' Bureau for >12 years - Northeast College of Health Sciences PostGradDC  Editorial - Editorial Reviewer for journals <i>Spine</i>, <i>Annals of Internal Medicine</i>, and <i>Clinical Anatomy</i> - Former Managing Editor of <i>Journal of Chiropractic Orthopedists</i>	 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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Chiropractic Adjustments and IVD Herniations

John Knab, M.D.



John Knab, M.D. · 1st

I can figure out why you hurt, and how to help. Without drugs. Without sur...

1d · 0

Call me old school, but when I have a new patient with what appears to be a "hot" chemical radiculopathy from a "leaky disc" (shown here at both L4/5 and L5/S1) I use low dose local anesthetic and steroid transforaminal ESI to both diagnose and treat the patient before me. Usually they feel better, things settle down and we can proceed with PRP in 6-8 weeks (if needed and if patient wants to).

This is a 40 something male, sudden onset radic, sx's in left leg (L3+ L4 > L5 dermatome/s) including numbness and pain after playing pickleball. ER --> Ruled out DVT (?!?) oral steroids meh. PT too painful.

In this case, immediately after TFE L4/5 and L5/S1 he had 80% immediate relief off the table (+ relief from the ropivacaine) but ZERO relief from the steroid at 4 days....

So, since he's interested in non-surgical treatment options, and with seemingly very little to no relief from therapeutic portion of the extradiscal/epidural steroid, would you:

- Go straight to intradiscal LR-PRP (Lutz method)
- See how the patient does with "extradiscal"/FSU approach before ID
- Go straight to Discseel
- Look at facets, SI and other potential sources of "pseudoradiculopathy"
- More steroids 🍌

Thanks!



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Chiropractic Adjustments and IVD Herniations

BMJ Open Association between chiropractic spinal manipulation and lumbar disc herniation and radiculopathy: retrospective cohort study using United States' data

Robert James Trager¹,² Clinton J Daniels³,⁴ Jaime A Perez,⁴ Regina M Casaberry,² Jeffrey A Dusek^{1,5}

Objective: Chiropractic spinal manipulation therapy (CSMT) and lumbar disc herniation (LDH) and lumbar radiculopathy (LR) have been associated with reduced odds of surgery. However, limited research has examined the relationship between these findings. We hypothesised that adults receiving CSMT for newly diagnosed LDH or LR would have reduced odds of lumbar discectomy over 1-year and 2-year follow-up compared with those receiving other care.

Design: Retrospective cohort study.

Setting: US inpatient patient (US health insurance network (HIN)) dataset, January 1, 2012, ending date from 2017.

Participants: Adults age 18–65 with newly diagnosed LDH or LR (ICD-9-CM 86.01–86.03, 86.04–86.05, 86.06–86.07, 86.08–86.09, 86.10–86.11, 86.12–86.13, 86.14–86.15, 86.16–86.17, 86.18–86.19, 86.20–86.21, 86.22–86.23, 86.24–86.25, 86.26–86.27, 86.28–86.29, 86.30–86.31, 86.32–86.33, 86.34–86.35, 86.36–86.37, 86.38–86.39, 86.40–86.41, 86.42–86.43, 86.44–86.45, 86.46–86.47, 86.48–86.49, 86.50–86.51, 86.52–86.53, 86.54–86.55, 86.56–86.57, 86.58–86.59, 86.60–86.61, 86.62–86.63, 86.64–86.65, 86.66–86.67, 86.68–86.69, 86.70–86.71, 86.72–86.73, 86.74–86.75, 86.76–86.77, 86.78–86.79, 86.80–86.81, 86.82–86.83, 86.84–86.85, 86.86–86.87, 86.88–86.89, 86.90–86.91, 86.92–86.93, 86.94–86.95, 86.96–86.97, 86.98–86.99, 87.00–87.01, 87.02–87.03, 87.04–87.05, 87.06–87.07, 87.08–87.09, 87.10–87.11, 87.12–87.13, 87.14–87.15, 87.16–87.17, 87.18–87.19, 87.20–87.21, 87.22–87.23, 87.24–87.25, 87.26–87.27, 87.28–87.29, 87.30–87.31, 87.32–87.33, 87.34–87.35, 87.36–87.37, 87.38–87.39, 87.40–87.41, 87.42–87.43, 87.44–87.45, 87.46–87.47, 87.48–87.49, 87.50–87.51, 87.52–87.53, 87.54–87.55, 87.56–87.57, 87.58–87.59, 87.60–87.61, 87.62–87.63, 87.64–87.65, 87.66–87.67, 87.68–87.69, 87.70–87.71, 87.72–87.73, 87.74–87.75, 87.76–87.77, 87.78–87.79, 87.80–87.81, 87.82–87.83, 87.84–87.85, 87.86–87.87, 87.88–87.89, 87.90–87.91, 87.92–87.93, 87.94–87.95, 87.96–87.97, 87.98–87.99, 88.00–88.01, 88.02–88.03, 88.04–88.05, 88.06–88.07, 88.08–88.09, 88.10–88.11, 88.12–88.13, 88.14–88.15, 88.16–88.17, 88.18–88.19, 88.20–88.21, 88.22–88.23, 88.24–88.25, 88.26–88.27, 88.28–88.29, 88.30–88.31, 88.32–88.33, 88.34–88.35, 88.36–88.37, 88.38–88.39, 88.40–88.41, 88.42–88.43, 88.44–88.45, 88.46–88.47, 88.48–88.49, 88.50–88.51, 88.52–88.53, 88.54–88.55, 88.56–88.57, 88.58–88.59, 88.60–88.61, 88.62–88.63, 88.64–88.65, 88.66–88.67, 88.68–88.69, 88.70–88.71, 88.72–88.73, 88.74–88.75, 88.76–88.77, 88.78–88.79, 88.80–88.81, 88.82–88.83, 88.84–88.85, 88.86–88.87, 88.88–88.89, 88.90–88.91, 88.92–88.93, 88.94–88.95, 88.96–88.97, 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99.76–99.77, 99.78–99.79, 99.80–99.81, 99.82–99.83, 99.84–99.85, 99.86–99.87, 99.88–99.89, 99.90–99.91, 99.92–99.93, 99.94–99.95, 99.96–99.97, 99.98–99.99, 100.00–100.01, 100.02–100.03, 100.04–100.05, 100.06–100.07, 100.08–100.09, 100.10–100.11, 100.12–100.13, 100.14–100.15, 100.16–100.17, 100.18–100.19, 100.20–100.21, 100.22–100.23, 100.24–100.25, 100.26–100.27, 100.28–100.29, 100.30–100.31, 100.32–100.33, 100.34–100.35, 100.36–100.37, 100.38–100.39, 100.40–100.41, 100.42–100.43, 100.44–100.45, 100.46–100.47, 100.48–100.49, 100.50–100.51, 100.52–100.53, 100.54–100.55, 100.56–100.57, 100.58–100.59, 100.60–100.61, 100.62–100.63, 100.64–100.65, 100.66–100.67, 100.68–100.69, 100.70–100.71, 100.72–100.73, 100.74–100.75, 100.76–100.77, 100.78–100.79, 100.80–100.81, 100.82–100.83, 100.84–100.85, 100.86–100.87, 100.88–100.89, 100.90–100.91, 100.92–100.93, 100.94–100.95, 100.96–100.97, 100.98–100.99, 101.00–101.01, 101.02–101.03, 101.04–101.05, 101.06–101.07, 101.08–101.09, 101.10–101.11, 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102.44–102.45, 102.46–102.47, 102.48–102.49, 102.50–102.51, 102.52–102.53, 102.54–102.55, 102.56–102.57, 102.58–102.59, 102.60–102.61, 102.62–102.63, 102.64–102.65, 102.66–102.67, 102.68–102.69, 102.70–102.71, 102.72–102.73, 102.74–102.75, 102.76–102.77, 102.78–102.79, 102.80–102.81, 102.82–102.83, 102.84–102.85, 102.86–102.87, 102.88–102.89, 102.90–102.91, 102.92–102.93, 102.94–102.95, 102.96–102.97, 102.98–102.99, 103.00–103.01, 103.02–103.03, 103.04–103.05, 103.06–103.07, 103.08–103.09, 103.10–103.11, 103.12–103.13, 103.14–103.15, 103.16–103.17, 103.18–103.19, 103.20–103.21, 103.22–103.23, 103.24–103.25, 103.26–103.27, 103.28–103.29, 103.30–103.31, 103.32–103.33, 103.34–103.35, 103.36–103.37, 103.38–103.39, 103.40–103.41, 103.42–103.43, 103.44–103.45, 103.46–103.47, 103.48–103.49, 103.50–103.51, 103.52–103.53, 103.54–103.55, 103.56–103.57, 103.58–103.59, 103.60–103.61, 1

Chiropractic Adjustments and IVD Herniations

PLOS ONE

RESEARCH ARTICLE

Association between chiropractic spinal manipulation for sciatica and opioid-related adverse events: A retrospective cohort study

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OPEN ACCESS

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Data Availability Statement: The original de-identified data are available for review upon request. The data are available for review upon request.

Introduction: Chiropractic spinal manipulation (CSM) for sciatica is a common treatment. However, some evidence suggests that these patients have a lower risk of any type of adverse drug event. We hypothesized that adults receiving CSM for sciatica will have a reduced risk of opioid-related adverse drug events (ORADEs) over a one-year follow-up compared to matched controls not receiving CSM.

Abstract

Background

Patients receiving chiropractic spinal manipulation (CSM) for spinal pain are less likely to be prescribed opioids, and some evidence suggests that these patients have a lower risk of any type of adverse drug event. We hypothesized that adults receiving CSM for sciatica will have a reduced risk of opioid-related adverse drug events (ORADEs) over a one-year follow-up compared to matched controls not receiving CSM.

Methods

We searched a United States (US) claims-based data resource (Diamond Network, TruHealth, Inc.) for more than 218 million patients, yielding data ranging from 2009 to 2020. We included patients aged ≥ 18 years with sciatica, excluding those post-spinal surgery, prior anesthesia, serious pathology, high risk of ORADEs, and an ORADE < 1 year prior. Patients were divided into two cohorts: (1) CSM and (2) usual medical care. We used propensity score matching to control for confounding variables associated with ORADEs. Comparative outcomes were analyzed by calculating risk ratios (RRs) and 95% confidence intervals (CIs) for the incidence of ORADEs and oral opioid prescription between cohorts.

Results

272,471 patients per cohort remained after matching. The incidence of ORADEs over 1-year follow-up was less in the CSM cohort compared to the usual medical care cohort (CSM: 0.00%, usual medical care: 0.30%), yielding an RR of 0.0 (95% CI: 0.00–0.30). $P < .001$.

PLOS ONE | <https://doi.org/10.1371/journal.pone.0271863> January 18, 2023

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PLOS ONE

Chiropractic and opioid-related adverse events

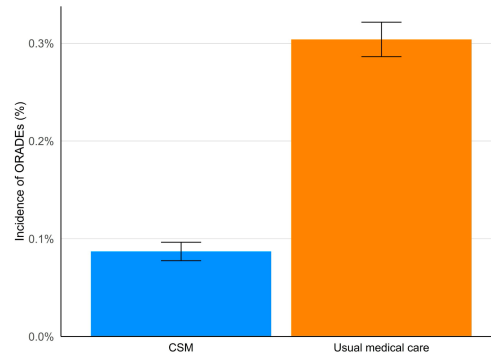


Fig 2. Incidence of opioid-related adverse events (ORADEs) after propensity matching. Incidence in the chiropractic spinal manipulation (CSM) cohort (blue) is lower than that of the usual medical care cohort (orange). The 95% confidence intervals do not overlap, suggesting a meaningful difference between cohorts.

<https://doi.org/10.1371/journal.pone.0271863.g002>



James Demetrius, DC, DABCO - PostGradDC.com

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Chiropractic Adjustments and IVD Herniations

PTJ: Physical Therapy & Rehabilitation Journal | Physical Therapy, 2023;103:1-9

<https://doi.org/10.1080/09690967.2023.2280007>

Advance access publication date June 28, 2023

Original Research



First Provider Seen for an Acute Episode of Low Back Pain Influences Subsequent Health Care Utilization

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Table 2. Episode Length and Costs of Care*

	Emergency Department	Primary Care	Surgery	Portal of Entry			
				Specialty Care	Chiropractic	Physical Therapy	Other
N	2895 (9.7%)	15,199 (51.0%)	2475 (8.3%)	2692 (9.0%)	4971 (16.7%)	1226 (4.1%)	348 (1.2%)
Episode length (mean, 95% CI), d	58.21 (55.64–60.83)	75.77 (74.37–77.16)	74.57 (71.21–77.93)	110.62 (105.49–115.76)	79.03 (75.66–82.41)	61.81 (57.86–65.75)	82.29 (72.90–91.68)
Episode length (median, IQR), d	35 (10, 79)	49 (20, 97)	49 (21, 97)	68 (30, 136)	35 (10, 95)	37 (18, 77)	53 (23, 108)
LBP-related spending (mean, 95% CI)	\$3,182.02 (\$3,102.06–\$3,261.99)	\$2,912.22 (\$2,789.01–\$3,035.44)	\$4,146.25 (\$3,870.92–\$4,421.47)	\$2,048.57 (\$1,863.05–\$2,234.09)	\$992.37 (\$913.11–\$1,071.64)	\$1,925.34 (\$1,689.64–\$2,161.04)	\$4,030.24 (\$2,687.91–\$5,372.56)
Low back costs (median)	\$39,000	\$78,000	\$98,000	\$56,000	\$43,100	\$83,000	\$84,000
Total cost of care (mean, 95% CI)	\$20,028.23 (\$18,902.67–\$21,153.80)	\$16,609.48 (\$16,163.41–\$17,055.56)	\$17,825.38 (\$16,794.17–\$18,856.60)	\$17,300.99 (\$16,247.62–\$18,354.36)	\$7,761.63 (\$7,305.72–\$8,217.54)	\$11,612.13 (\$10,586.49–\$12,637.78)	\$20,294.55 (\$16,588.91–\$24,000.19)
Total cost of care (median)	\$39,412.01	\$78,836.44	\$88,144.52	\$58,546.22	\$33,334.08	\$57,166.24	\$88,385.46

*IQR = interquartile range; LBP = low back pain.



James Demetrius, DC, DABCO - PostGradDC.com

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Grand Rounds: Chiropractic Adjustments and IVD Herniations

David Graber, DC, DACBSP

Diplomate, of the American Chiropractic Board of Sports Physicians

www.PostGradDC.com

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David Graber, DC, DACBSP



Dr. David Graber is a nationally known presenter who has developed and taught over 30 courses on spinal and extremity adjusting techniques, low tech rehabilitation, the science of manipulation and manual care, contextual healing, and other topics.

He is a diplomate of the American Board of Chiropractic Sports Physicians, and serves on the board of directors of the Association of New Jersey Chiropractors (ANJC).

He was the 2012 ANJC Chiropractor of the Year, and is in full-time practice in Parsippany, New Jersey.

He blogs on chiropractic and clinical topics at: drgraber.wordpress.com. He can be reached at: DrDavidGraber@gmail.com.

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Grand Rounds – Chiropractic Adjustments and IVD Herniations

David I. Graber, DC, DACBSP

INSTRUCTOR: DAVID GRABER, DC, DACBSP

MODERATOR: JAMES DEMETRIOUS, DC, DABCO

DATE: JUNE 3, 2025

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David I. Graber, DC, DACBSP

- ▶ 1985 graduate NYCC; DACBSP, 1996
- ▶ Former NYCC Assistant Instructor of Diagnosis and Technique
- ▶ Board Member, Association of New Jersey Chiropractors, 2011- present.
- ▶ Chiropractor of The Year, 2012 - Association of New Jersey Chiropractors.
- ▶ National presenter for the Chiropractic profession.
- ▶ Created and presented over 25 courses
- ▶ Practices in Parsippany, NJ
- ▶ Facebook, LinkedIn, Bluesky:
 - ▶ David I Graber DC
 - ▶ Chiropractic Practice Research
- ▶ Website:
 - Drgraber.wordpress.com



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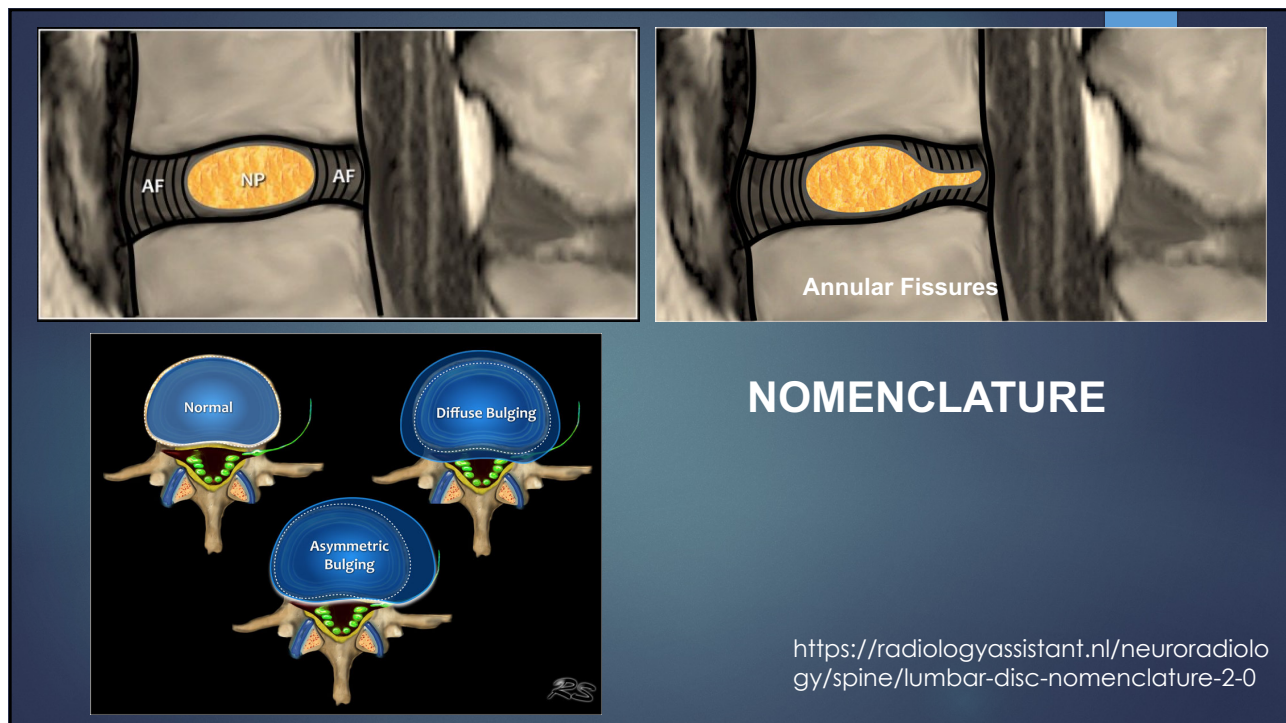
David I Graber DC DAC3SP 2024

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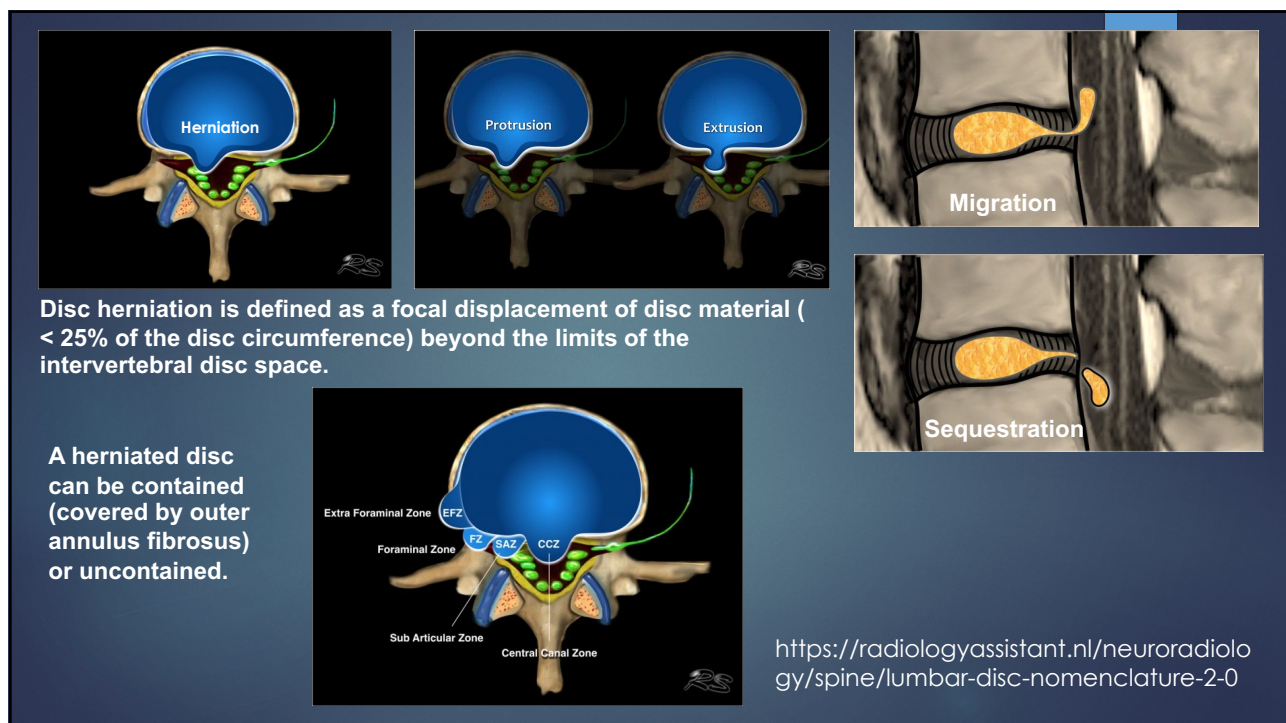
Meanwhile, in the
backroom of a
Chiropractic College.....



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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

David I. Graber, DC, DACRSP

ABSTRACT

BACKGROUND AND PURPOSE: Degenerative changes are commonly found well as those with back pain. We sought to estimate the prevalence, by age, systematic review studying the prevalence of spine degeneration on imaging.

MATERIALS AND METHODS: We performed a systematic review of article (imaging) in asymptomatic individuals from published English literature through selected age groupings by decade (20, 30, 40, 50, 60, 70, 80 years), determining

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%

^a Prevalence rates estimated with a generalized linear mixed-effects model for the age-specific prevalence estimate (binomial outcome) clustering on study and adjusting for the midpoint of each reported age interval of the study.

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Review Article

Global Spine Journal
2021, Vol. 11(4) 597-607
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DOI: 10.1177/2192568220934496
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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, BSc¹, and Mark R. N. Kotter, MD, MPhil, PhD¹

David I. Graber, DC, DACRSP

- The pooled estimate of SCC in the **healthy population** was **24.2%**.
- Increasing age (>60 years: **35.3%**)
- European/North American (**39.7%**)
- Populations **with potential symptoms** of myelopathy more likely to identify SCC (**81.3%**)

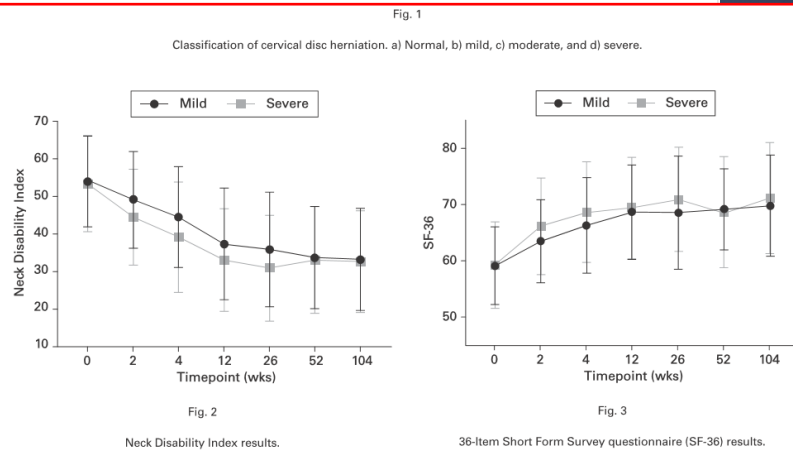
Smith SS, et al. The Prevalence of Asymptomatic and Symptomatic Spinal Cord Compression on Magnetic Resonance Imaging: A Systematic Review and Meta-analysis. Global Spine Journal. 2021;11(4):597-607

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■ SPINE

The type of cervical disc herniation on MRI does not correlate to clinical outcomes



Yang X, Arts MP, Bartels RHMA, Vleggeert-Lankamp CLA. The type of cervical disc herniation on MRI does not correlate to clinical outcomes. *Bone Joint J.* 2022;104-B(11):1242-1248. doi:10.1302/0301-620X.104B11.BJJ-2022-0657.R2

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Original Article

Does Size Matter? An Analysis of the Effect of Lumbar Disc Herniation Size on the Success of Nonoperative Treatment

Anmol Gupta, BS¹, Shivam Upadhyaya, MD¹, Caleb M. Yeung, MD¹, Peter J. Ostergaard, MD¹, Harold A. Fogel, MD¹, Thomas Cha, MD¹, Joseph Schwab, MD¹, Chris Bono, MD¹, and Stuart Herschman, MD¹

Abstract

Study Design: Retrospective study.

Objective: In this study, we examined whether the size of a lumbar disc herniation within 2 years after obtaining an initial magnetic resonance imaging (MRI) scan occupied a larger percentage of the spinal canal would not predict the need for surgery.

Methods: Using the ICD-10 code M51.26, we identified patients at our institution from 2015 to 2016, who received a diagnosis of primary lumbar radicular pain. Patients with at least 6 weeks of nonoperative management. Patients experiencing progressive motor neurological deficits were excluded from analysis. On the axial view of an MRI, the following measurements were made on the canal and the herniated disc along the anterior-posterior axis, the

.....results from this analysis suggest that there is no correlation between the size of a lumbar disc herniation and the likelihood that a patient will require surgery after 6 weeks of nonoperative management. It serves as a reminder for clinicians and patients to exhibit patience in the treatment of lumbar disc herniations.



Global Spine Journal

2020, Vol. 10(7) 881-887

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David I. Graber, DC, DACCS

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Article

CLINICAL
REHABILITATION

Clinical Rehabilitation
1-12
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DOI: 10.1177/0269215514540919
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The probability of spontaneous regression of lumbar herniated disc: a systematic review

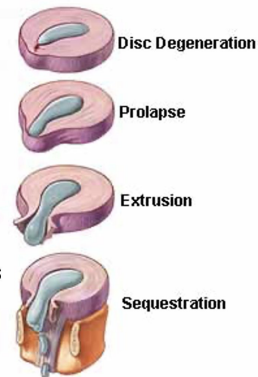
Chun-Chieh Chiu¹, Tai-Yuan Chuang²,

The rate of spontaneous regression was found to be:

- 96% for disc sequestration
- 70% for disc extrusion
- 41% for disc protrusion
- 13% for disc bulging.

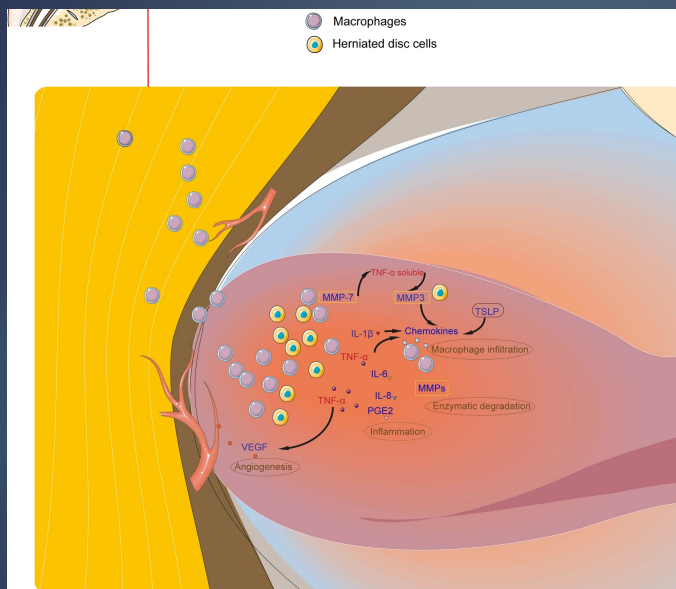
The rate of complete resolution of disc herniation was 43% for sequestered discs and 15% for extruded discs

Timeframes of studies generally between 3 months to 1 year



David Gruber, DC, DACRSP

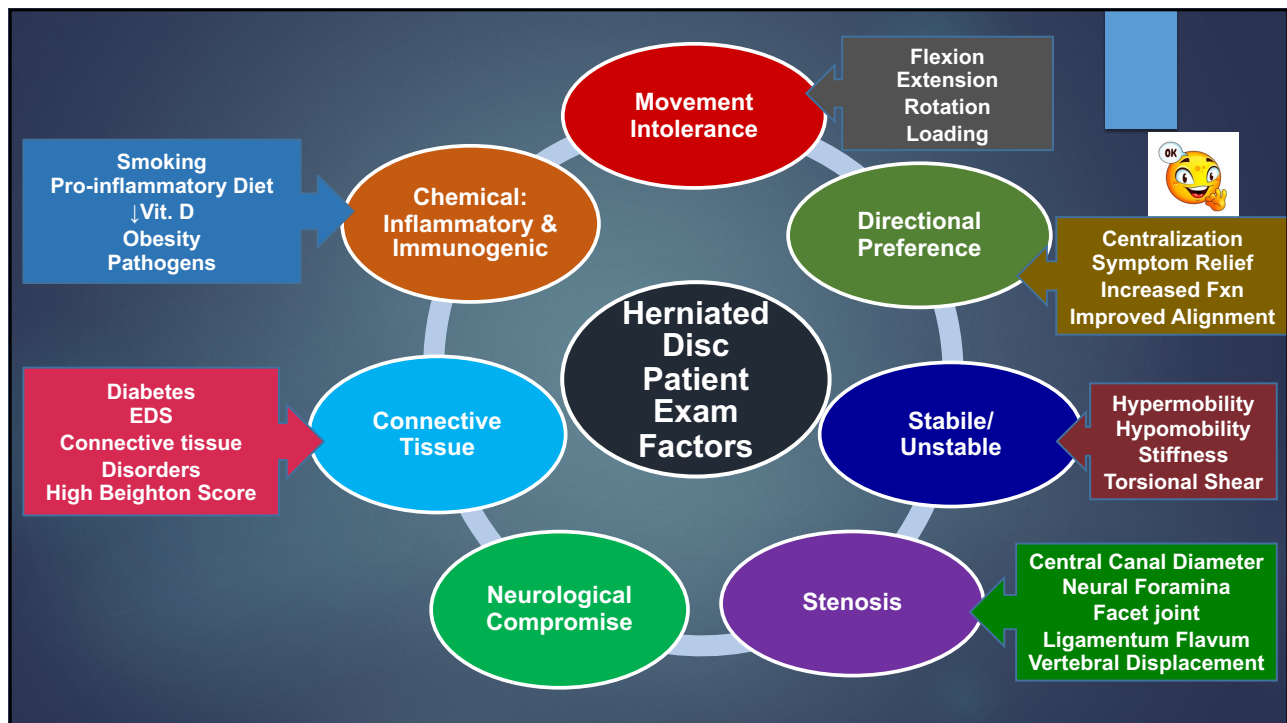
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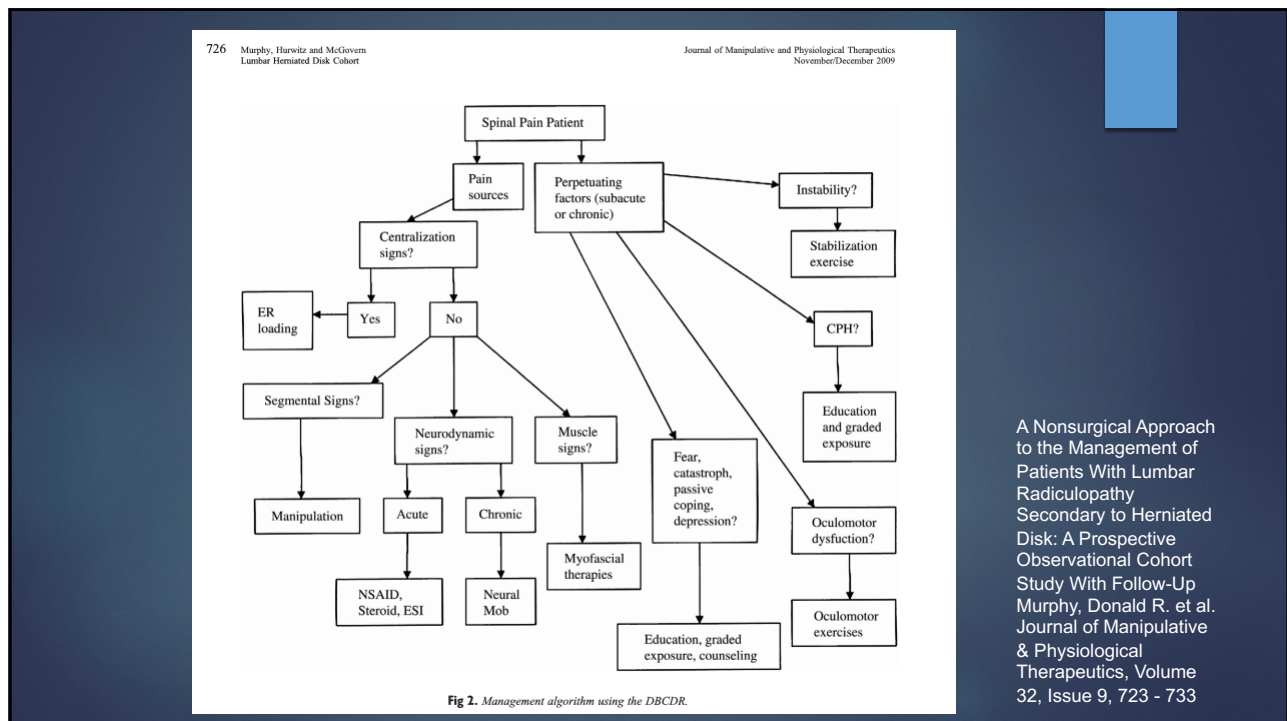
The main mechanism of reabsorption of herniated disc. A herniated intervertebral disc causes macrophages to infiltrate the intervertebral disc tissue, and the macrophages interact with the intervertebral disc cells to release TNF-α, VEGF, IL-8, IL-6, IL-1β, MCP-1, and MMPs. These cytokines interact to promote resorption of the herniated disc. The illustration elements are from Servier Medical Art (<https://smart.servier.com/>)

Yu, P., Mao, F., Chen, J. et al. Characteristics and mechanisms of resorption in lumbar disc herniation. *Arthritis Res Ther* 24, 205 (2022). <https://doi.org/10.1186/s13075-022-02894-8>

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ISSN 0008-3194 (p)/ISSN 1715-6181 (e)/2023/7-18/\$2.00/©JCCA 2023

Should you adjust that herniated disc? Thoughts from a chiropractor/molecular scientist

W. Mark Erwin, DC, PhD¹⁻³



Low back pain accounts for the most years of disability of any malady worldwide but many disc herniation (DH) and degenerative disc disease (DDD) resolve with conservative methods. Tissue sources of pain affecting the degenerated herniated disc have been identified, with changes secondary to the influence of inflammation figuring prominently among them. Due to the proven linkage of inflammation to the pain and progression of disc degeneration, anti-inflammatory/anti-catabolic and

le disque dégénératif/herniaire ont été identifiées, les changements secondaires à l'influence de l'inflammation figurant en bonne place parmi elles. En raison du lien avéré entre l'inflammation et la douleur et la

**Treat the patient with the condition.
Treat the patient for the condition.**

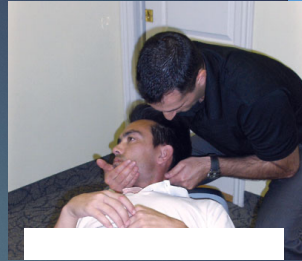
- Chester Wilk

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ORIGINAL ARTICLES

OUTCOMES FROM MAGNETIC RESONANCE IMAGING—CONFIRMED SYMPTOMATIC CERVICAL DISK HERNIATION PATIENTS TREATED WITH HIGH-VELOCITY, LOW-AMPLITUDE SPINAL MANIPULATIVE THERAPY: A PROSPECTIVE COHORT STUDY WITH 3-MONTH FOLLOW-UP

Cynthia K. Peterson, RN, DC, MMedEd,^a Christof Schmid, DC,^b Serafin Leemann, DC,^b Bernard Anklín, DC,^b and B. Kim Humphreys, DC, PhD^c



David I. Graber, DC, DACCP

- ▶ 50 patients. HVLA cSMT on the affected side at the symptomatic level as assessed by MRI.
- ▶ CMT frequency was 3 to 5 times per week for the first 2 to 4 weeks, then 1 to 3 times per week until patient was asymptomatic.
- ▶ No reported adverse events.
- ▶ At 2 weeks, 55.3% were "improved," 68.9% at 1 month and 85.7% at 3 months. Acute patients reported faster improvement.
- ▶ 76.2% of the subacute/chronic patients were improved at 3 months.

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- ▶ Subjects were 18-65 years of age.
- ▶ No contraindications to cervical SMT.
- ▶ Neck pain and moderate to severe arm pain in a dermatomal pattern, sensory, motor or reflex changes corresponding to the involved nerve root.
- ▶ Orthopedic examination showing at least one of the following: positive upper limb tension tests, positive cervical distraction test, positive Spurling test, or cervical rotation < 60 degrees (2).

David I. Graber, DC, DACCSIP

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Manipulation in the presence of cervical spinal cord compression: a case series.

- Murphy, Hurwitz, Gregory . JMPT 2006 Mar-Apr;29(3):236-44.

- ▶ 19 were treated HVLA manipulation.
- ▶ 9 with low-velocity muscle energy technique.
- ▶ 1 patient was treated with both methods.
- ▶ Average patient-rated improvement 70.0%.



David I. Graber, DC, DACCSIP

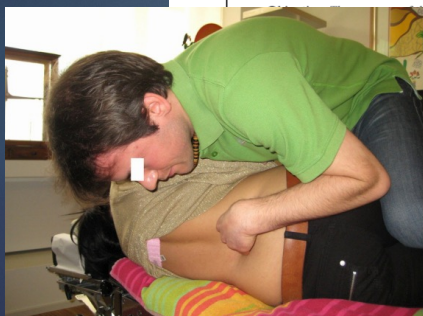
- There were no major complications AND no new neurologic symptoms or signs were seen in any of these patients.

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OUTCOMES OF ACUTE AND CHRONIC PATIENTS WITH MAGNETIC RESONANCE IMAGING–CONFIRMED SYMPTOMATIC LUMBAR DISC HERNIATIONS RECEIVING HIGH-VELOCITY, LOW-AMPLITUDE, SPINAL MANIPULATIVE THERAPY: A PROSPECTIVE OBSERVATIONAL COHORT STUDY WITH ONE-YEAR FOLLOW-UP

Serafin Leemann, DC,^a Cynthia K. Peterson, RN, DC, MEd,^b Christof Schmid, DC,^a Bernard Anklin, DC,^a and B. Kim Humphreys, DC, PhD^c

ABSTRACT



- At 3 months, 90.5% of patients were “improved” with 88.0% “improved” at 1 year.
- Acute patients improved faster by 3 months
- 81.8% of chronic patients reported “improvement” with 89.2% “improved” at 1 year.
- There were no adverse events reported.

spinal manipulation reported clinically relevant improvement. (*J Manipulative Physiol Ther* 2019;57:155-165)
Key Indexing Terms: Intervertebral Disc Displacement, Lumbar Vertebrae Manipulation, Spinal, Chiropractic

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SYMPTOMATIC, MRI CONFIRMED, LUMBAR DISC HERNIATIONS: A COMPARISON OF OUTCOMES DEPENDING ON THE TYPE AND ANATOMICAL AXIAL LOCATION OF THE HERNIA IN PATIENTS TREATED WITH HIGH-VELOCITY, LOW-AMPLITUDE SPINAL MANIPULATION



Marco Ehrler, B. Med.,^a Cynthia Peterson, DC, MMedEd.,^b Serafin Leemann, DC,^c Christof Schmid, DC,^c Bernard Anklin, DC,^c and B. Kim Humphreys, DC, PhD^d

ABSTRACT

Objective: The purpose of this study was to compare the outcomes of patients with symptomatic, MRI confirmed, lumbar disc herniations depending on the type and anatomical axial location of the hernia in patients treated with high-velocity, low-amplitude spinal manipulative therapy (SMT).
Methods: MRI and treatment outcomes were compared using a numerical rating scale (NRS) at baseline, 1 month, 3 months, and 1 year. One radiologist, blinded to treatment outcome, reported relevant improvements. A *t*-test and ANOVA compared results.
Results: A higher proportion of patients with sequestrations reported clinically relevant improvements at 1 month compared to extruded disc herniation patients.
Conclusions: Patients with sequestrations had greater pain reduction at 1 month compared to extruded disc herniation patients. There were no adverse events from spinal.

- Most patients had either lumbar disc extrusions or sequestrations.
- A higher proportion of patients with sequestration reported clinically relevant improvements.
- Patients with disc sequestrations had greater pain reduction at 1 month compared to extruded disc herniation patients.
- There were no adverse events from spinal.

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W. H. Kirkaldy-Willis J. D. Cassidy

Spinal Manipulation in the Treatment of Low-Back Pain

SUMMARY

Spinal manipulation, one of the oldest forms of therapy for back pain, has mostly been practiced outside of the medical profession. Over the past decade, there has been an escalation of clinical and basic science research on manipulative therapy, which has shown that there is a scientific basis for the treatment of back pain by manipulation. Most family practitioners have neither the time nor inclination to master the art of manipulation and will wish to refer their patients to a skilled practitioner of this therapy. Results of spinal manipulation in 283 patients with low back pain are presented. The physician who makes use of this resource will provide relief for many patients. (Can Fam Physician 1985;31:535-540)

SOMMAIRE

Les manipulations vertébrales, qui sont l'une des formes les plus anciennes de traitement pour la lombalgie, ont, dans la majorité des cas, été l'apanage de professions autres que médicales. Au cours de la dernière décennie, la recherche fondamentale et clinique sur les manipulations s'est accélérée et a pu démontrer qu'il existe une base scientifique pour justifier le traitement de la lombalgie par la manipulation. La plupart des médecins de famille manquent soit de temps, soit d'intérêt pour maîtriser l'art des manipulations et préfèrent référer leurs patients aux praticiens possédant l'expérience de cette forme de traitement. Cet article présente les résultats de manipulations vertébrales chez 283 patients souffrant de lombalgie. Le médecin qui utilise cette forme de traitement contribuera au soulagement de nombreux patients.

Key words: Spinal manipulation, low back, pain

TABLE 5
Results of Spinal Manipulation in 60 Patients with Nerve Root Entrapment Syndrome

Average duration of pain	7.2 yrs.
Average length of follow-up	14.0 mo.
Results:	
Grade 1	25%
Grade 2	25%
Grade 3	17%
Grade 4	33%

TABLE 6
Results of Spinal Manipulation in Ten Patients with Nerve Root Entrapment Syndrome with Lumbar Instability

Average duration of pain	11.5 yrs.
Average length of follow-up	12.6 mo.
Results:	
Grade 1	40%
Grade 2	10%
Grade 3	20%
Grade 4	30%

TABLE 7
Results of Spinal Manipulation in 11 Patients with Central Spinal Stenosis Syndrome

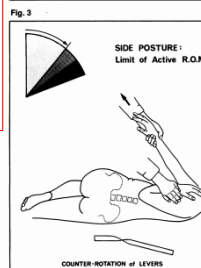
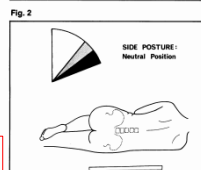
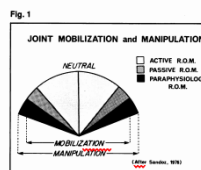
Average duration of pain	16.9 yrs.
Average length of follow-up	7.0 mo.
Results:	
Grade 1	18%
Grade 2	18%
Grade 3	18%
Grade 4	46%

CAN. FAM. PHYSICIAN Vol. 31, MARCH 1985
Hospital, University of Saskatchewan, Saskatoon, SK, S7N 0X0.

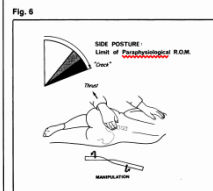
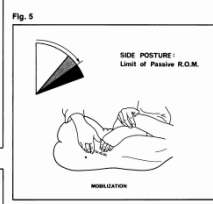
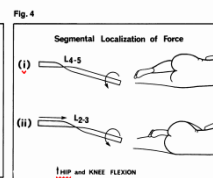
BACK PAIN is one of the commonest presenting complaints in office practice: almost 80% of the general population will experience low back pain during adult life. At any given time, 20-30% of adults suffer from low back pain.^{1,2} In industry, disorders of the lower back account for four hours per year per worker of lost productivity, and rank

lost productivity in the work place.³ Despite the high frequency and enormous cost of low back pain, the causes and effective therapeutic programs remain highly problematic. Part of this problem is due to the nature of low back pain: it is a common, self-limiting disorder with a high rate of recurrence.⁴ Moreover, the many different causes of back pain are not always readily apparent. In fact, with the exception of back pain and sciatica resulting from entrapment of the spinal nerve root by degenerative

pain is a difficult matter. We attempt to group back pain patients into syndrome categories on the basis of their history, pain distribution, physical examination and radiographic findings.⁴ By this approach, we try to identify the predominant pain-producing lesion and direct our treatment accordingly. Although this method is clinically useful, it does not necessarily reflect true pathogenesis. Since most low back pain is idiopathic, the effects of many commonly applied therapies remain highly spec-



CAN. FAM. PHYSICIAN Vol. 31, MARCH 1985



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J. Phys. Ther. Sci. 31: 668-683, 2019

The Journal of Physical Therapy Science

Original Article

Effects of the flexion-distraction technique and drop technique on straight leg raising angle and intervertebral disc height of patients with an intervertebral disc herniation

HYUNJU OH, PhD, PT¹⁾, SEOKJOO CHOI²⁾, SANGYONG LEE, PhD, PT³⁾, JOUN CHOI, PhD, PT³⁾, KWANSUB LEE, PhD, PT⁴⁾

Eur Spine J (2006) 15: 1070-1082
DOI: 10.1007/s00586-005-0021-8

ORIGINAL ARTICLE

Mansi Ram Gudavalli
Jerrilyn A. Cambers
Marion McGregor
James Jodicka
Michael Keenum
Alexander J. Ghanayem
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A randomized clinical trial and subgroup analysis to compare flexion-distraction with active exercise for chronic low back pain

Received: 8 December 2004
Revised: 18 August 2005
Accepted: 1 November 2005
Published online: 8 December 2005
© Springer-Verlag 2005

Abstract Many clinical trials on chiropractic management of low back pain have neglected to include specific forms of care. This study compared two well-defined treatment protocols. The objective was to compare the outcome of flexion-

less of which group they were allocated to ($P < 0.01$). Subjects randomly allocated to the flexion-distraction group had significantly greater relief from pain than those allocated to the exercise program ($P = 0.01$). Subgroup analysis indi-

J. Phys. Ther. Sci. 30: 536-539, 2018

The Journal of Physical Therapy Science

Original Article

The effects of flexion-distraction and drop techniques on disorders and Ferguson's angle in female patients with lumbar intervertebral disc herniation

HYUNJU OH, PhD, PT¹⁾, SANGYONG LEE, PhD, PT²⁾, KWANSUB LEE, PhD, PT³⁾, MUGEUN JEONG, PhD, PT⁴⁾

<https://www.coxtechnic.com/doctors/publications>

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Mechanism of Disc Injury



- ▶ Repetitive flexion combined with rotation and axial loading are most significant forces involved in injuring discs.

- Gordon SJ, Yang KH, Mayer PJ, Mace AH, Kish VL, Radin EL. Mechanism of disc rupture: a preliminary report. *Spine* 1991;16(4):450-456

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- ▶ Spinal manipulation may involve flexion and/or rotation, but does not involve axial loading. Also, these forces are not applied repetitively over a long period of time.
- ▶ Small torsion torques showed no significant difference in intradiscal pressures or disc heights. (Yantzer, et al, 2007)
- ▶ Spinal manipulation did not exclusively reduce or increase cervical intradiscal pressure in cadaver specimens. (Wu, et al, 2012)

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Eur Spine J (2018) 27:1526–1537
<https://doi.org/10.1007/s00586-017-5325-y>



ORIGINAL ARTICLE

Chiropractic care and risk for acute lumbar disc herniation: a population-based self-controlled case series study

Cesar A. Hincapié^{1,2,3} • George A. Tomlinson⁴ • Pierre Côté^{5,6} • Y. Raja Rampersaud⁷ • Alejandro R. Jadad^{8,9} • J. David Cassidy³

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Abstract

Purpose Chiropractic care is popular for low back pain, but may increase the risk for acute lumbar disc herniation (LDH). Low back pain is a common early (prodromal) symptom of LDH and commonly precedes LDH diagnosis.

- LBP patients who received chiropractic care and then later experience acute herniation (LDH) requiring surgery.
- Compared them with those who had PCP visits.
- Found a stronger positive association between PCP visits and acute LDH with early surgery.
- Supports that LDH was not CMT related. Patients were in prodromal phase of an acute LDH that progressed (protopathic bias).

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CMT Forces Acting on The Spine:

Goldilocks Principle:

Too much or too little preload or bodyweight is counter-productive to a good HVLA adjustment.



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Supine Cervical Techniques



108-110 N (Van Zoest, 2003)



200 – 273 N (Wuest, 2010)



190.3 ± 85.5 N in living subjects

283.9 ± 53.6 N in cadavers (Symons, 2012)



136 – 193 N first thrust;

174 -407 N second thrust (Gorrell, 2020)



46.8 N to 125.4 N (Russel, 2024)

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frontiers | Frontiers in Bioengineering and Biotechnology

TYPE Original Research
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Rotation-traction manipulation induced intradiskal pressure changes in cervical spine—an *in vitro* study

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Jing Li^{1,2}, Wuyin Du³, Bochen Peng³, Guangwei Liu² and
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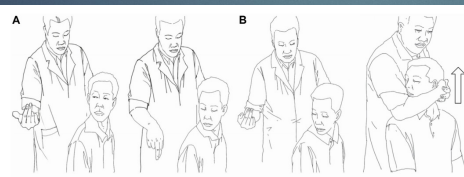
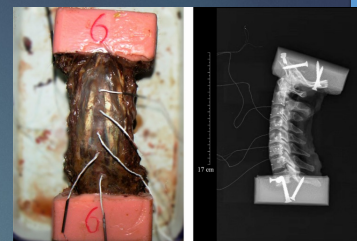


FIGURE 3
Procedure of RTM. (A) shows the subject's active rotary-position process of rotation-flexion-rotation under guidance. (B) shows a physiotherapist performing preload traction and upward-thrust.

IDP decreased as forces increased up to a point

- Caution when lifting and thrusting with force exceeding 250 N after applying 150 N of pre-traction - risk causing injury to the cervical spine. ~ 400 N = critical threshold.

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Gudavalli et al. *Trials* (2015) 16:259
DOI 10.1186/s13063-015-0770-6

TRIALS

RESEARCH Open Access

Development of an attention-touch control for manual cervical distraction: a pilot randomized clinical trial for patients with neck pain

M. Ram Gudavalli^{1*}, Stacie A. Salisbury¹, Robert D. Vining¹, Cynthia R. Long¹, Lance Corber¹, Avinash G. Patwardhan² and Christine M. Goertz¹

Hindawi Publishing Corporation
Evidence-Based Complementary and Alternative Medicine
Volume 2015, Article ID 954134, 10 pages
<http://dx.doi.org/10.1155/2015/954134>

Research Article

Intradiscal Pressure Changes during Manual Cervical Distraction: A Cadaveric Study

M. R. Gudavalli,¹ T. Potluri,² G. Carandang,² R. M. Havey,² L. I. Voronov,² J. M. Cox,³ R. M. Rowell,¹ R. A. Kruse,⁴ G. C. Joachim,⁵ A. G. Patwardhan,^{2,6} C. N. R. Henderson,⁷ and C. Goertz¹

(a) C5 contact

(b) T1 contact-generalized traction

FIGURE 3: Photographs showing hand contact on a patient during MCD procedures.

- ▶ Low force: 0 to 20 newtons (0 to 4 pounds)
- ▶ Medium force: 21 to 50 newtons (4 to 11 pounds)
- ▶ High force: 51 to 100 newtons (11 to 22 pounds)
- ▶ 3 sets of 5 reps @ C5 & Occiput
- ▶ AE less in Low Force; about equal in Med. & High Force

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Lumbar Side Posture

Table 1 - Force and Time Characteristics for Previous Studies of Side-Posture HVLA Thrusts on Humans^a

	Triano and Schultz ¹⁸ 1997 ^b	Triano et al ¹⁵ 2004 ^c	Myers et al ⁶ 2012	Van Zoest and Gosselin ²⁰ 2003 ^d	Gudavalli et al ²¹ 2013 ^e	Gudavalli and Rowell ²² 2014 ^e
Preload, N	–	–	–	66, 83	106.3	98.7
Peak load, N	496, 516, 385	488; 210, 321	273–441	237, 241	327.6	340.3
Loading duration, ms	–	–	–	182, 166 ms	261 ms	164 ms
Rate of loading, N/s	2177, 2483, 1807	–	–	–	1077.6	1595

Abbreviation: HVLA, high velocity low amplitude.

^a Not all studies reported all outcomes.

^b Triano and Schultz¹⁸: for *mamillary push*, *hypothernar ischial*, and *long lever lumbar* thrusts, respectively.

^c Triano et al¹⁵: experienced DCs; and 2 groups of untrained students, respectively.

^d Van Zoest and Gosselin²⁰: left and right sides, respectively.

^e Gudavalli also reported unloading durations and unloading rates of 509 milliseconds and 683 N/s²¹; and 746 milliseconds and 523 N/s.²²

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General Considerations

- ▶ **Spinal Manual Therapy Techniques have 5 Key Effects:**
 - ▶ Neuromodulation
 - ▶ Segmental decompression
 - ▶ Segmental mobilization
 - ▶ Neuro-fascial mobilization
 - ▶ Psychological/Emotional – comfort, caring, connection
- ▶ **Have a toolbox of techniques consisting of at least:**
 - ▶ One HVLA technique
 - ▶ One “Low Force” technique
 - ▶ One Decompression technique
 - ▶ One soft tissue technique

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USE THE BEST WAYS OF FINDING WHERE TO ADJUST

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- General Region:

- Posture
- Range of motion
- Leg Length Inequality
- Manual Muscle Testing for Strength
- Skin rolling Surface EMG for Flexion-relaxation phenomenon in lumbar region

- Specific Segment:

- Palpation for tenderness
- Pain provocation testing
- Motion Palpation to Localize ~ site of care
- Motion Palpation with Pain Provocation
- Stiffness by joint springing/ overpressure

Use a cluster of these



- Lakhani E, Nook B, Haas M, Docrat A., 2009
- Triano JJ, Budgell B, Bagnulo A, et al., 2013
- Cooperstein R, Young M, Haneline M, 2013
- Cooperstein, Robert & Young, Morgan, 2016
- Holt K, Russel D, Cooperstein R, Young M, Sherson M, Haavik H, et al, 2018
- Beynon A, Herbert J, Walker B, 2018
- Hariharan, K.V, et al. 2021
- Williams B, Gyer G, Micheal J, 2025

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The Site of The Adjustment



- ▶ The site of pain ≠ the site of Adjustment
- ▶ The site of pain ≠ the site of Adjustment
- ▶ The site of pain ≠ the site of Adjustment
- ▶ The site of pain may indicate the site of Adjustment
- ▶ Specificity is elusive- at least 3 segments move with a manipulation

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If Preload Causes Pain

- ▶ If end range movement causes pain (Provocative Testing), investigate before you manipulate – err on side of caution.
- ▶ In some cases (ie. inflammation) adjust the direction of no pain and free movement.
- ▶ Never use forceful or abnormal movements.
- ▶ Radiating pain or numbness into extremities during preload – do not administer CMT in that position.



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Cervical Manipulation and Disc Herniation

- ▶ Joint dysfunction at the level of the disc herniation is the target of manipulation.
- ▶ Avoid extension which narrows the IVF, and consider using a traction assisted CMT.
- ▶ Rotate toward the healthy side than the prolapsed side of the intervertebral disk during CSM.
- ▶ No manipulation at the level of disc herniation is indicated without joint dysfunction – other treatments are utilized.

-Murphy (2008, 2006, 1999)

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Techniques Considerations For Cervical CMT with Cervical Myelopathy or Radiculopathy

- ▶ Cervical rotatory manipulation in the flexion position is less likely to injure the spinal cord, but caution is warranted when posterior vertebral osteophytes or disc herniations exist.
- ▶ Avoid undue extension in CMT technique. Careful with prone cSMT.
- ▶ Adjusting from A-P, with slight flexion and lateral flexion away from affected side opens the IVF.
- ▶ **Forced flexion stretches the spinal cord and should be avoided.**
- ▶ -Murphy, Hurwitz, Gregory (2006)

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Degenerative Cervical Myelopathy

- ▶ The most common examination abnormalities included:
 - ▶ Hyperreflexia (92%)
 - ▶ Hoffman sign (58%)
 - ▶ Clonus (42%)
 - ▶ Weakness, sensory deficit, and ataxia or balance deficit (33%).
- ▶ Avoid any cSMT until this diagnosis is evaluated further.
- ▶ -Trager, et al (2022)

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Cervical Radiculopathy & Referral: Exam

- ▶ Dermatome, Myotome, DTR's
- ▶ Cervical Radiculopathy Clinical Prediction Rule
- ▶ Arm Squeeze Test
- ▶ Anterior Cervical Doorbell Sign
- ▶ Scalene Test

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Tornado Test: 180° Cervical Circumduction Compression



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Cervical SMT: Avoid Over-Rotation!



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Case Report

Self Manipulated Cervical Disc Herniation and Spinal Cord Injury

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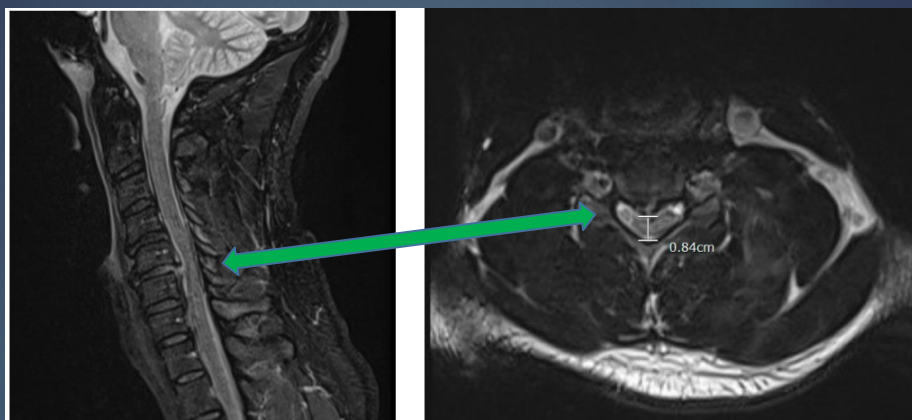
Received: 29 April 2019; Accepted: 27 May 2019;

“...he heard a loud crunching sound, followed by a sharp pain in his right arm and extending to his shoulders, and a throbbing c

TELL PATIENTS
NOT TO DO THIS!



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Figure 1. Preoperative MRI (STIR sequence sagittal (Figure 1a) and T2 axial (Figure 1b)) taken in the emergency department shows the pathology of C5–C6 posterior acute cervical disc herniation with increased signal in the posterior longitudinal ligament and severe spinal cord compression with cord signal change status post self-manipulation of neck. The encircled area also shows the protrusion of the posterior herniated disc causing spinal stenosis. MRI = magnetic resonance imaging.

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Use Multicomponent ROM to Decrease Rotation and Translation Shear

1. Oscillate & Cavitate

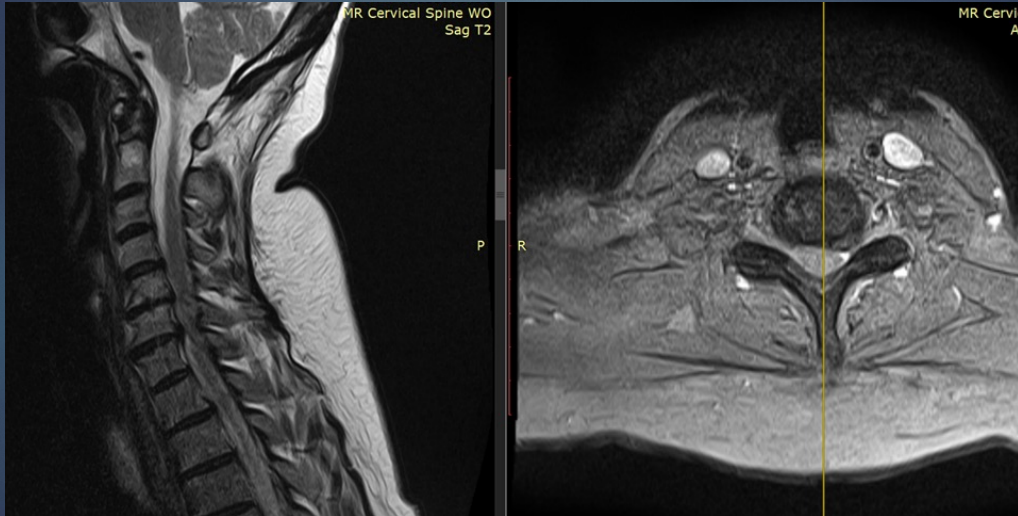


2. Load & Impulse

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Case Study: D



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Multicomponent CMT



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Distraction Thrust



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Occipital Lift



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Traction & Rotation



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AP Rotation

Note: Eyes look in direction of CMT



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Y-Strap Cervical Traction

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Upper Thoracic CMT

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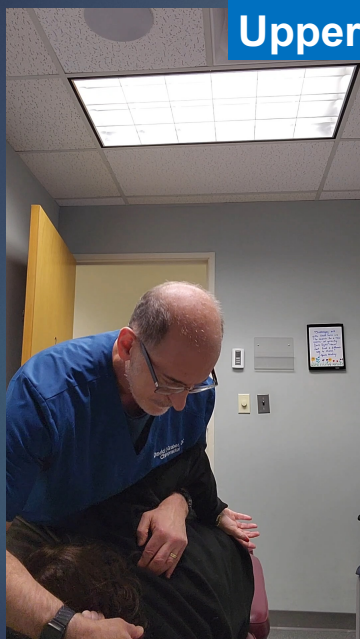
Upper Thoracic CMT



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Upper Thoracic CMT



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ScapuloThoracic Inferior Glide



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CostoTransverse Joints & ScapuloThoracic Articulation

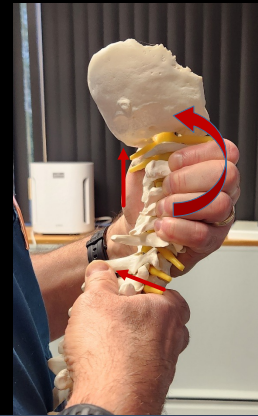


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Cervical Mobilization

1. Rotate away from pain side/disc bulge (here at right C5/6)
2. Traction
3. Contact spinous of inferior motion segment (C6) on the same side (here on the right)
4. Mobilize in Lateral Glide away from pain side (here right to left or right lateral glide)



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Sciatic Nerve Tension Tests

Slump Test: Sitting SLR w/ Nerve Tension Supine SLR with Nerve Tension



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Lumbar Tolerance Testing

Pain in Neutral: Compression Intolerant

Pain in Flexion: Flexion Intolerant

Pain in Extension: Extension Intolerant



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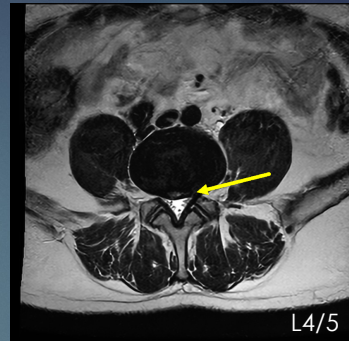
Case Study: K



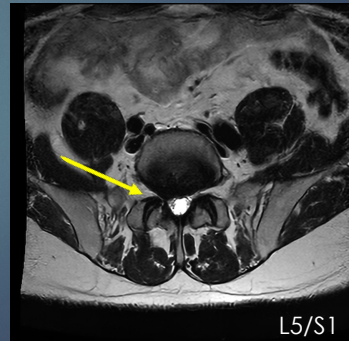
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Case Study: K



L4/5



L5/S1

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SIDE POSTURE CMT

How much torque on Lumbar spine is safe?
Test for lumbar torsion strain or annular injury.

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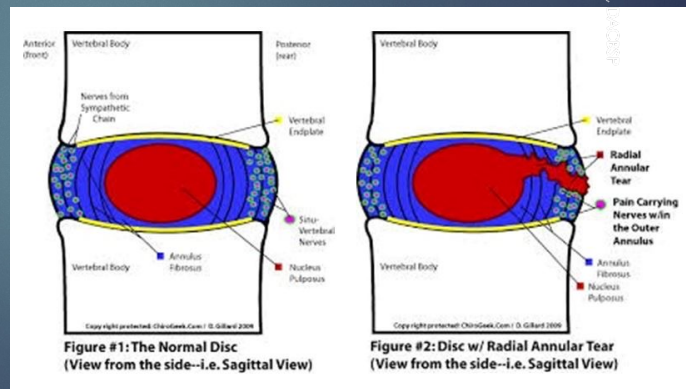
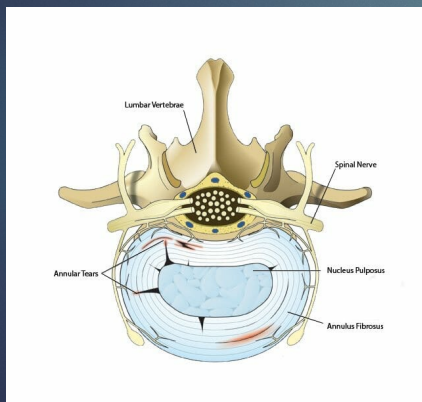


Figure #1: The Normal Disc
(View from the side--i.e. Sagittal View)

Figure #2: Disc w/ Radial Annular Tear
(View from the side--i.e. Sagittal View)

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Lumbar Torsion Test



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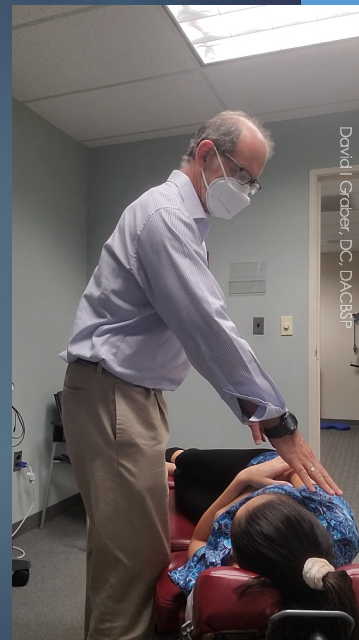
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Side Posture Lumbar & Sacroiliac Joint Adjustments

3 Common Errors:

1. Patient poorly positioned on table
2. Over rotation and "roll"
3. Not using hips and legs

SIDE POSTURE ≠ LUMBAR "ROLL"



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Side Posture Lumbar Lateral Flexion



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Sacroiliac CMT



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Thoraco-Lumbar Manipulation



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Quadratus Lumborum/ Lateral Myofascial Line Lateral Positional Traction



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Quadratus Lumborum/ Lateral Myofascial Line

PNF & MFR



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Lumbar Distraction

Lumbar Spine Flat - Flexion



Lumbar Spine Neutral - Lordosis



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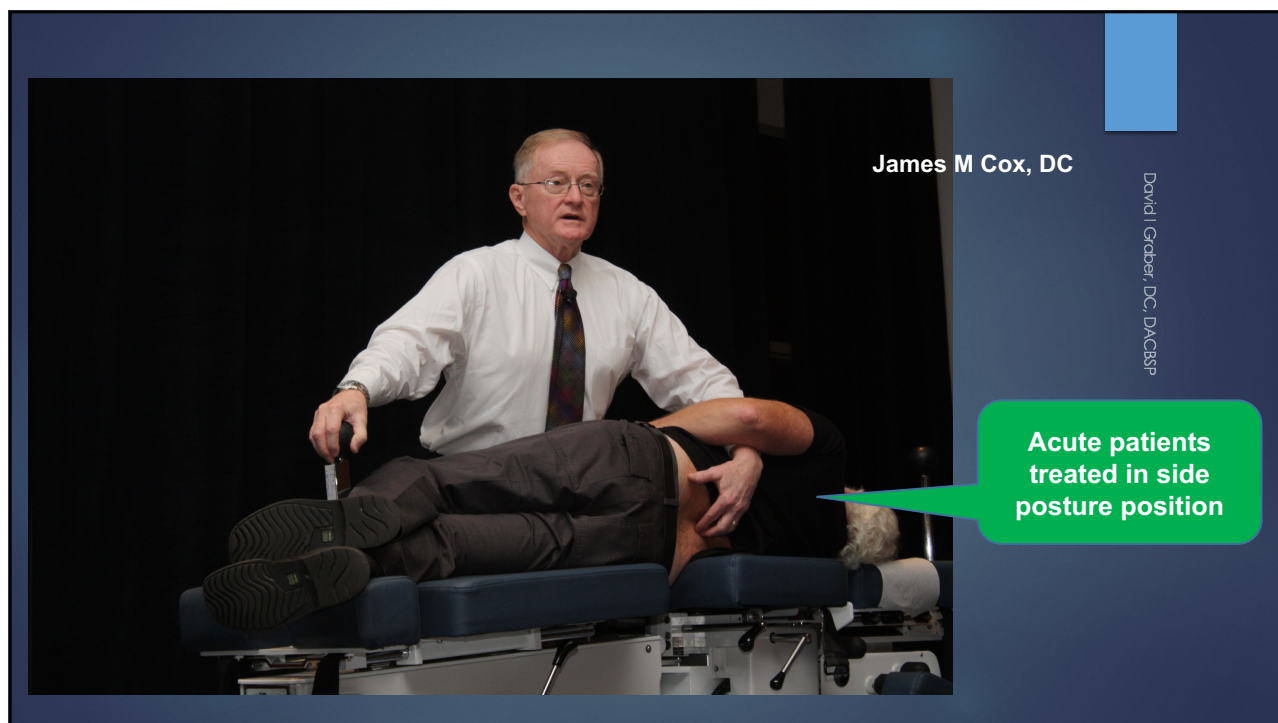
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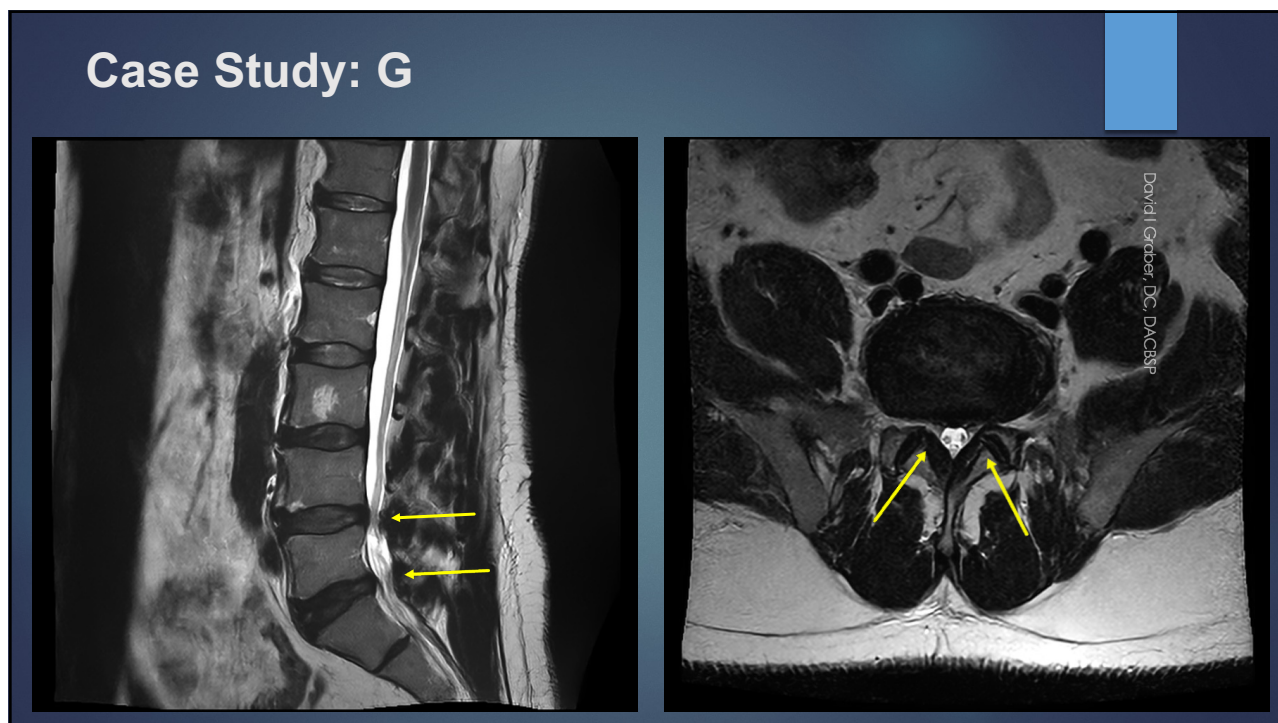


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Case Study: G



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Case Study: G



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Lumbar Assisted/Overpressure Extension Mobilization



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Extension Auto-Mobilization

Case Study: K



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Case Study: K



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Single Leg Traction Pull

In Lumbar
Neutral



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Sacroiliac Inferior Glide



In Lumbar Flexion

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Excellent for acute patients!

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Lumbar Prone Traction & "Wiggle" Manipulation



Excellent For Acute Cases

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Always Adjust With Heart!

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D.C.
DACBSP



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THANK YOU!

Please send a review or testimonial of this course!

Email: Drdavidgraber@gmail.com

Facebook: David Graber DC

Website: drgraber.wordpress.com



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Questions?

- Questions for Dr. Graber?
- Any concerns?
Any recommendations?
- Thoughts?



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Thank you!



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- **You must complete the Class Survey** to receive your **Certificate of Completion** and license renewal credit (for those doctors practicing in PACE-Approved states).
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 - **Click 'Submit.'**
 - **On the next page to appear, click 'Mark Complete.'**
- To access your course certificate of completion, go to PostGradDC.com, log onto your account, go to **My Account** and click on the class.
 - Your Certificate of Completion will be accessible in a PDF format.
- If you have any difficulty, contact us directly.

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The PostGradDC Certifications



The PostGradDC Certifications

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- Our coursework is approved by the **American College of Chiropractic Orthopedists**, the **International Academy of Neuromusculoskeletal Medicine**, and **PACE**.
- Each certification will entail **10 CE hours** of designated coursework.

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Upcoming Grand Rounds Schedule



The First Tuesday of the Month at 8PM EST

Upcoming Rounds

- July 1, 2025 – CAD Standard of Care
- August 5, 2025 – Cervicocranial Anatomy and Clinical Applications