


Is Pain Alone an Indication for Spine Surgery

Adriaan Louw, PT, PhD (c), M.App.Sc (physio), CSMT



Should Pain-Alone be an Indication for Spine Surgery?







9) I perform surgery for LBP

| | |
|-----|----------|
| No | 15 votes |
| Yes | 86 votes |


Surgeons: YES

- Various international standards
- They are doing it (Chou R, Baisden J, Carragee EJ, Resnick DK, Shaffer WO, Loeser JD. Surgery for low back pain: a review of the evidence for an American Pain Society Clinical Practice Guideline. *Spine*. May 1 2009;34(10):1094-1109.) (Euro Spine)
- So what?
 - Evidence for LS for axial pain very limited
 - Spine Surgery US: > \$30 billion/year
- They believe it (vs. actual results) Graz B, Wietlisbach V, Porchet F, Vader JP. Prognosis or "curabo effect?": physician prediction and patient outcome of surgery for low back pain and sciatica. *Spine*. Jun 15 2005;30(12):1448-1452; discussion 1453.






Patients: "Maybe" and "Not Sure"



- **General population: Negative view of LS** (Puentedura, Louw and Landers 2012)
- **Preoperative expectations not met** (Toyone, Tanaka T, Kato D, Kaneyama R, Otsuka M. Patients' expectations and satisfaction in lumbar spine surgery. *Spine (Phila Pa 1976)*. Dec 1 2005;30(23):2689-2694.)
- **Bad news travels**
- **Even after surgery high levels of fear** Louw A, Louw Q, Crous LCC. Preoperative Education for Lumbar Surgery for Radiculopathy. *South African Journal of Physiotherapy*. July 2009 2009;65(2):3-8.
- **Internet**



Add to this...

- Increased use of Internet by spine patients seeking answers...



1. Garcia, R. M., P. J. Messerschmitt, et al. (2009). "An evaluation of information on the Internet of a new device: the lumbar artificial disc replacement." *J Spinal Disord Tech* 22(1): 52-57.
2. Hering, K., J. Harvan, et al. (2005). "The use of a computer website prior to scheduled surgery (a pilot study): impact on patient information, acquisition, anxiety level, and overall satisfaction with anesthesia care." *AANA J* 73(1): 29-33.
3. Louw, A., Q. Louw, et al. (2009). "Preoperative Education for Lumbar Surgery for Radiculopathy." *South African Journal of Physiotherapy* 65(2): 3-8.
4. Morr, S., N. Shanti, et al. (2010). "Quality of information concerning cervical disc herniation on the Internet." *Spine J* 10(4): 350-354.

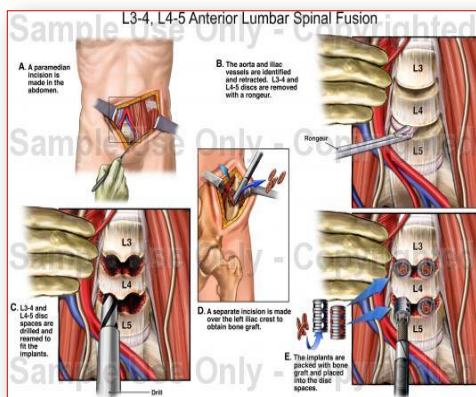


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So What?

- Less than 10% of relevant web sites were determined to be of high-quality.

- Greene DL, Appel AJ, Reinert SE, Palumbo MA. Lumbar disc herniation: evaluation of information on the internet. *Spine (Phila Pa 1976)*. Apr 1 2005;30(7):826-829.

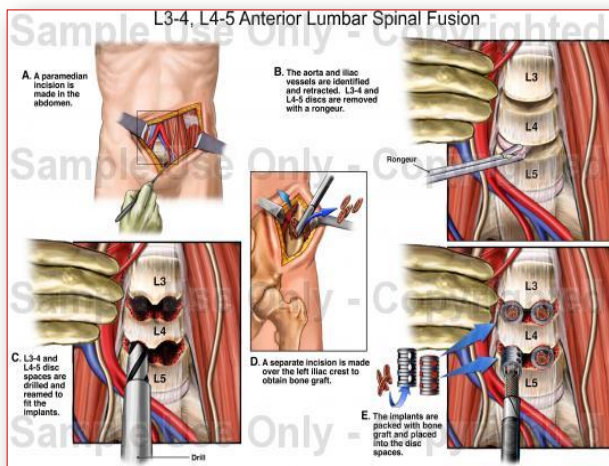


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The immediate effect of viewing images prior to lumbar surgery*

- Adriaan Louw, PT, M.App.Sc (physio)
- Lorimer Moseley, PT, Hons., PhD
- Cesar Fernandez, PT, DO, MS, PhD
- Terry Cox, PT, DPT

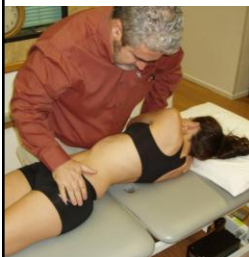
* Study in progress



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Physical Therapists: NO

- **Surgeons do not send for postop rehab** (McGregor AH, Burton AK, Sell P, Waddell G. The development of an evidence-based patient booklet for patients undergoing lumbar discectomy and un-instrumented decompression. *Eur Spine J.* Mar 2007;16(3):339-346; Louw A, Diener I, Butler DS, Puentedura E. Preoperative Education for Lumbar Surgery: A Survey of US Spine Surgeons (2012) – Accepted for publication)
- **We tend to see the “failed cases”** (Louw A, Louw Q, Crous LCC. Preoperative Education for Lumbar Surgery for Radiculopathy. *South African Journal of Physiotherapy.* July 2009;65(2):3-8)
- **We know the outcomes are not that good** (Lots of references)
- **Not trained to see surgery patients**



Therapy

We are not trained to treat these patients...

- 73% of therapists surveyed reported NO training in PT school on rehabilitation of postoperative spine patients
- Implies personal struggle with these patients:
 - In 3 out of the 4 categories related to pain, therapists with less clinical experience rated it statistically significant higher to know more about pain, compared to therapists with more clinical experience

Louw A, Louw Q, Crous LCC. Preoperative Education for Lumbar Surgery for Radiculopathy. *South African Journal of Physiotherapy*. July 2009;65(2):3-8.



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Pain Scientists: HECK NO



- **Some issues to consider**

1. Pain is not an input



Wade, D., *Why physical medicine, physical disability and physical rehabilitation? We should abandon Cartesian dualism.* Clin Rehab, 2006. 20: p. 85-90.



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2. You can have pain and no tissue injury



Haldeman S. Presidential address, North American Spine Society: failure of the pathology model to predict back pain. *Spine*. 1990;15(7):718-724.

Emotional Pain uses the same brain circuitry as physical pain

- Flor, H. *The image of pain.* in *Annual scientific meeting of The Pain Society (Britain)*. 2003. Glasgow, Scotland.
- Flor, H., *The functional organization of the brain in chronic pain,* in *Progress in Brain Research, Vol 129,* J. Sandkühler, B. Bromm, and G.F. Gebhart, Editors. 2000, Elsevier: Amsterdam.
- Casey, K.L. and M.C. Bushnell, *Pain imaging.* Pain: Clinical Updates, 2000. 8: p. 1-4.
- Petrovic, P. and M. Ingvar, *Imaging cognitive modulation of pain processing.* Pain, 2002. 95(1-2): p. 1-5.
- Moseley, G.L., *Widespread brain activity during an abdominal task markedly reduced after pain physiology education: fMRI evaluation of a single patient with chronic low back pain.* Aust J Physiother, 2005. 51(1): p. 49-52.



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“Nociception is neither necessary or sufficient for pain”



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3. Injury does NOT have to hurt



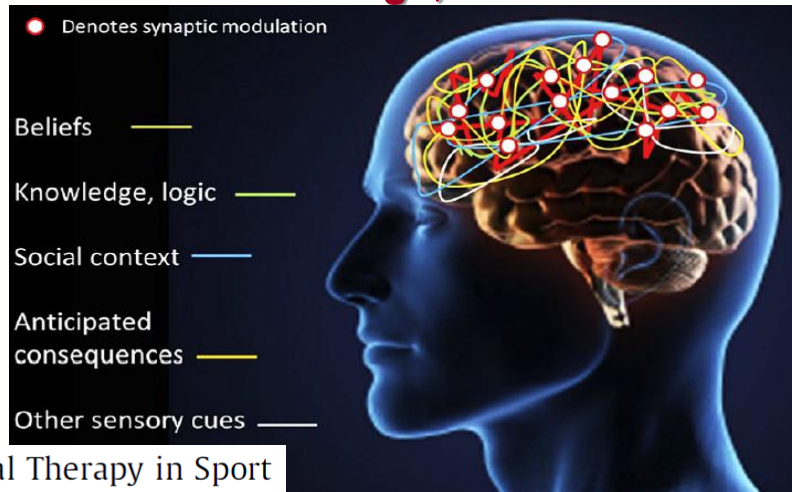
Credit: Yonhap / AP

SHARE

MENU

A nail rests in a South Korean man's skull in December 2004. He'd sought help for a bad headache and upon discovery said it likely happened four years earlier.

4. Developing Pain is modulated by beliefs, knowledge, etc.



Physical Therapy in Sport

Masterclass

A neuroscience approach to managing athletes with low back pain

Emilio J. Puentedura^{a,b,*}, Adriaan Louw^b

One of my favorites

- Patients who underwent discectomy and shown their “bad disc” material recovered significantly better than those who were not shown their excised disc material
 - Leg pain (91.5 vs 80.4%; $p < 0.05$)
 - Back pain (86.1 vs 75.0%; $p < 0.05$)
 - Limb weakness (90.5 vs 56.3%; $p < 0.02$)
 - Paraesthesia (88 vs 61.9%; $p < 0.05$)
 - Reduced analgesic use (92.1 vs 69.4%; $p < 0.02$)



Tait MJ, Levy J, Nowell M, et al. Improved outcome after lumbar microdiscectomy in patients shown their excised disc fragments: a prospective, double blind, randomised, controlled trial. *J Neuro/Neurosurg Psychiatry*. Sep 2009;80(9):1044-1046.

5. Pain is a Perception of Threat

- “Ruptured Disc”
- “Bulging Disc”
- “Instability”
- “Disc Disease”
- “High Intensity Zone”
- “Modic Changes”

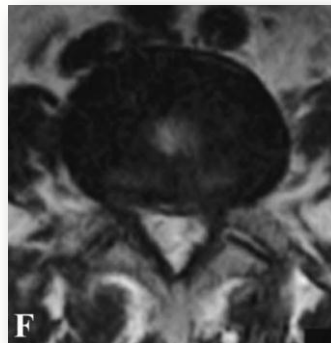


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Disc Bulges Reabsorb

- **Several studies have shown disc bulges reabsorb over time**

1. Autio, R. A., J. Karppinen, et al. (2006). "Determinants of spontaneous resorption of intervertebral disc herniations." *Spine* 31(11): 1247-1252.
2. Komori, H., A. Okawa, et al. (1998). "Contrast-enhanced magnetic resonance imaging in conservative management of lumbar disc herniation." *Spine* 23(1): 67-73.
3. Komori, H., K. Shinomiya, et al. (1996). "The natural history of herniated nucleus pulposus with radiculopathy." *Spine* 21(2): 225-229.
4. Masui, T., Y. Yukawa, et al. (2005). "Natural history of patients with lumbar disc herniation observed by magnetic resonance imaging for minimum 7 years." *J Spinal Disord Tech* 18(2): 121-126.
5. Yukawa, Y., F. Kato, et al. (1996). "Serial magnetic resonance imaging follow-up study of lumbar disc herniation conservatively treated for average 30 months: relation between reduction of herniation and degeneration of disc." *J Spinal Disord* 9(3): 251-256.



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40% of “normals” have a bulging disc on MRI and NO LBP

- Videman T, Battie MC, Gibbons LE, Maravilla K, Manninen H, Kaprio J. Associations between back pain history and lumbar MRI findings. *Spine*. Mar 15 2003;28(6):582-588.
- Alyas F, Turner M, Connell D. MRI findings in the lumbar spines of asymptomatic, adolescent, elite tennis players. *Br J Sports Med*. Nov 2007;41(11):836-841; discussion 841.



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MRI's: Discs respond and look different between static and movement-MRI



Miyazaki M, Hong SW, Yoon SH, et al. Kinematic analysis of the relationship between the grade of disc degeneration and motion unit of the cervical spine. *Spine (Phila Pa 1976)*. Jan 15 2008;33(2):187-193.



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Time of Day impacts MRI Results

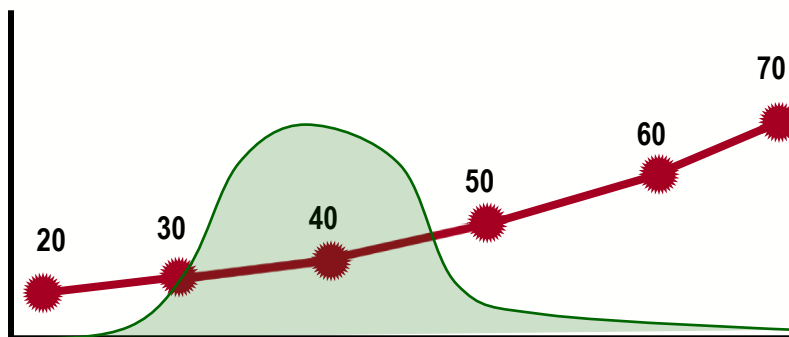
- Discs are swollen on average 20% more in the morning compared to evening. The time of day that an MRI is done may affect the results of the MRI

Malko JA, Hutton WC, Fajman WA. An in vivo magnetic resonance imaging study of changes in the volume (and fluid content) of the lumbar intervertebral discs during a simulated diurnal load cycle. *Spine*. May 15 1999;24(10):1015-1022.



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No Correlation Between LBP and DJD



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More info on imaging...

- **25-50% of general population:**

- Hypointense disc signal
- Annular tears
- High intensity zones
- Disc protrusions
- Endplate changes
- Zygapophyseal joint degeneration
- Asymmetry
- Foraminal stenosis.

Kjaer P, Leboeuf-Yde C, Korsholm L, Sorensen JS, Bendix T. Magnetic resonance imaging and low back pain in adults: a diagnostic imaging study of 40-year-old men and women. *Spine*. May 15 2005;30(10):1173-1180.



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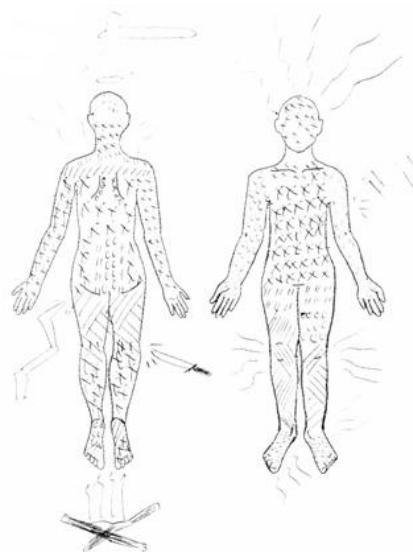
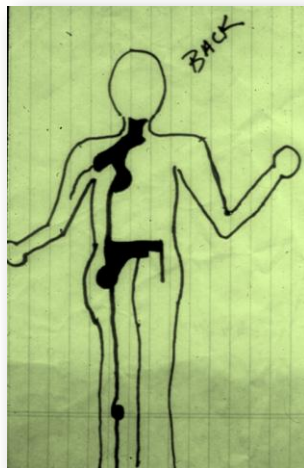
Modic Changes and LBP

- **27% of Type I and 89% of Type II – No LBP** (Toyone T, Takahashi K, Kitahara H, Yamagata M, Murakami M, Moriya H. Vertebral bone-marrow changes in degenerative lumbar disc disease. An MRI study of 74 patients with low back pain. *J Bone Joint Surg Br*. Sep 1994;76(5):757-764.)
- **Lot's of debate if Modic changes are correlated to discogenic LBP** (Rahme R, Moussa R. The modic vertebral endplate and marrow changes: pathologic significance and relation to low back pain and segmental instability of the lumbar spine. *AJNR. American journal of neuroradiology*. May 2008;29(5):838-842.)
- **30% of Type I and 86% of Type II – No segmental instability (F/E X-ray 3mm)** (Toyone T, Takahashi K, Kitahara H, Yamagata M, Murakami M, Moriya H. Vertebral bone-marrow changes in degenerative lumbar disc disease. An MRI study of 74 patients with low back pain. *J Bone Joint Surg Br*. Sep 1994;76(5):757-764.)



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Which Dermatome?



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Sham Surgery Just As Effective?

1. Buchbinder, R., R. H. Osborne, et al. (2009). "A randomized trial of **vertebroplasty** for painful osteoporotic vertebral fractures." *N Engl J Med* 361(6): 557-568.
2. Kallmes, D. F., B. A. Comstock, et al. (2009). "A randomized trial of **vertebroplasty** for osteoporotic spinal fractures." *N Engl J Med* 361(6): 569-579.
3. Moseley, J. B. (2002). "A controlled trial of **arthroscopic surgery** for osteoarthritis of the **knee**." *New Eng J Med* 347: 81-88.

The Efficacy of Sham Surgery in Orthopedics: A Systematic Review of the Literature.
Louw A, Diener I, Butler DS, Puentedura L and Fernandez de-Las Penas C. Submitted
for Publication 2012



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The Complexity of Pain

- Is Cervical Radiculopathy an indication for Surgery?



YES

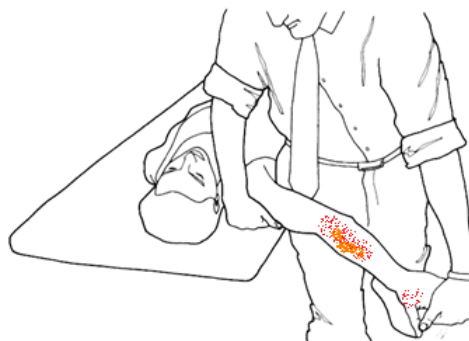
(Carragee EJ, Hurwitz EL, Cheng I, et al. Treatment of neck pain: injections and surgical interventions: results of the Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders. *Spine*. Feb 15 2008;33(4 Suppl):S153-169.) Wang MC, Kreuter W, Wolfla CE, Maiman DJ, Deyo RA. Trends and variations in cervical spine surgery in the United States: Medicare beneficiaries, 1992 to 2005. *Spine (Phila Pa 1976)*. Apr 20 2009;34(9):955-961; discussion 962-953. Weinstein JN, Lurie JD, Tosteson TD, et al. Surgical vs nonoperative treatment for lumbar disk herniation: the Spine Patient Outcomes Research Trial (SPORT) observational cohort. *JAMA*. Nov 22 2006;296(20):2451-2459. Bono CM, Ghiselli G, Gilbert TJ, et al. An evidence-based clinical guideline for the diagnosis and treatment of cervical radiculopathy from degenerative disorders. *The spine journal : official journal of the North American Spine Society*. Jan 2011;11(1):64-72.



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Diagnosing Radiculopathy

- Upper Limb Neurodynamic Tests 1A (Median) highest sensitivity for any physical test for cervical radiculopathy (Wainner RS, Fritz JM, Irrgang JJ, Boninger ML, Delitto A, Allison S. Reliability and diagnostic accuracy of the clinical examination and patient self-report measures for cervical radiculopathy. *Spine*. Jan 1 2003;28(1):52-62.)



Butler DS. *The Sensitive Nervous System*. Adelaide: Noigroup; 2000.



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SO...Theoretically – who needs surgery?



A



B



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But...

Coppieters MW, Ryan L, Chan KP, Hodges PW. Do patients' beliefs based on widespread medical information hinder accurate diagnosis? Paper presented at: 11th World Congress on Pain2005; Sydney.

“Muscle”



“Nerve”



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Straight Leg Raise is the Same

- SLR is worse if a patient thinks it's a test of nerve vs. test of muscle - Coppieters, 2006



Butler DS. *The Sensitive Nervous System*. Adelaide: Noigroup, 2000.



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Should Pain-Alone be an Indication for Spine Surgery?

- Our jobs are getting harder



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