

A clinical update on lumbar disc degeneration

Phillip Ebrall

Abstract: This short paper, by way of an update, summarises several new learnings taken from a quiz published in Medscape based on the work of Ravi Ponnappan.

Six questions of evidence-based relevance worthy of inclusion in the standard 'low back' workup of Chiropractic physicians should now include (i) did you suffer from a brain tumour in childhood?, (ii) what are your lipid profiles?, (iii) are you diabetic?, (iv) what is your blood pressure?, (v) do you smoke?, and (vi) is your BMI above normal for your somatotype?

I conclude this overview with the point that platelet-rich plasma in the treatment of patients with lumbar disc herniation is safe and effective.

This represents a non-surgical alternative for patients with lumbar disc degeneration should Chiropractic Adjustments not produce the desired outcomes.

Indexing Terms: Chiropractic; Low Back Pain; lumbar disc degeneration; childhood brain tumour; diabetes; lipid profiles; patient history.

Introduction

This paper is based on Ravi Ponnappan's most recent work on Lumbar Disc Disease. (1) The clinical points I give in this paper are those identified and described by Ponnappan and published by Medscape as a *Rapid Review Quiz: Risk Factors and Lumbar Disc Disease Management* for clinicians.

In my view these points add new matters to be included in the Chiropractic patient work-up for presentation of low back pain. I believe it is wise to take note of these points with a view to incorporating them in your patient work-up.

I emphasise this is not my original work; my role has been to recognise its value in the clinical environment of Chiropractic and to present it in a manner which has relevance. Should you wish to discover your current level of ignorance you take the Medscape quiz

Chiropractors are well aware that LBP presentations account for between 40

... lumbar disc protrusions between L4 and L5 and extrusions between L3 and L4, L4 and L5, and L5 and S1 were significantly more common among the brain tumour survivors ...'



and 50% of patient presentations, (2) but may know less about *Lumbar disc disease* as a common cause of pain and disability and one now being credited for a large amount of lost productivity in the workforce. (3) The lifetime prevalence of low back pain is 80%, with disk disorders being the most common cause of adult low back pain. The most consistent risk factor for degeneration is increasing age. (4)

Points of interest

I now summarise the key points of interest from Ponnappan which may be worth including in your patient history questions.

History of brain tumours in childhood

A cross-sectional comparative study (5) aimed to investigate lumbar disc degeneration observed on MRI results from survivors of radiation therapy-treated childhood brain tumours vs an age- and sex-matched population control group. The researchers found signal changes consistent with early and more advanced disc degeneration in survivors who underwent irradiation for tumour treatment as a child than age-matched controls. They also found that disc degeneration was more severe in people who were treated in adolescence.

Specifically, the researchers observed that, compared with controls, childhood brain tumour survivors had higher Pfirrmann grades at all lumbar levels. They also observed that lumbar disc protrusions between L4 and L5 and extrusions between L3 and L4, L4 and L5, and L5 and S1 were significantly more common among the brain tumour survivors, and these patients had significantly more high-intensity zone lesions.

Dyslipidemia, diabetes, hypertension, elevated BMI, and smoking

A systematic review (6) aimed to clarify the influence and significance of various medical comorbidities as risk factors for disc degeneration and disc herniation. The researchers found that modifiable factors for intervertebral disc degenerations and herniations included dyslipidemia, diabetes, hypertension, elevated BMI, and smoking. They also found that nonadjustable risk factors included female gender; age > 50 years; familial predisposition; and associated comorbidities, such as arthritic changes in other joints, atherosclerosis, and history of back injuries.

Other research in a US cohort (7) confirmed the association between hypercholesterolemia and degenerative lumbar spine conditions. Evidence also supported a specific relationship between diabetes and lumbar disc herniation.

Clinical data and lumbar MRI findings

Centralisation, (8) a phenomenon in which lower-extremity symptoms progressively lessen from the distal to proximal direction, is associated with a better prognosis in patients with lower back pain. A cross-sectional study aimed to compare degenerative findings on MRI of patients with sciatica classified as centralizers or noncentralizers on the basis of the *McKenzie Method of Mechanical Diagnosis and Therapy*. The researchers found that noncentralizers were significantly more disabled than centralizers and had significantly more severe back pain. However, centralizers had more severe

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MRI findings of degeneration. They observed no differences in disc contour changes or nerve root stenosis on MRI between the groups, nor was there any significant difference in leg pain intensity.

Does platelet-rich plasma injection benefit patients with lumbar disc herniation?

An analysis (9) of clinical and imaging outcomes aimed to evaluate the clinical efficacy and imaging outcomes of combined percutaneous endoscopic lumbar discectomy and platelet-rich plasma in the treatment of patients with lumbar disc herniation. The researchers found that the combined technique was safe and effective, but that platelet-rich plasma alone was also safe and effective. Although it did not prevent disc degeneration or reherniation completely, use of platelet-rich plasma both delayed disc degeneration and promoted disc remodelling on subsequent MRI evaluation.

Refresher

The following points and illustrations are taken from the '*Recommendations of the combined task forces of the North American Spine Society, the American Society of Spine Radiology, and the American Society of Neuroradiology*' published in 2014. (10, 11)

Bulging disc

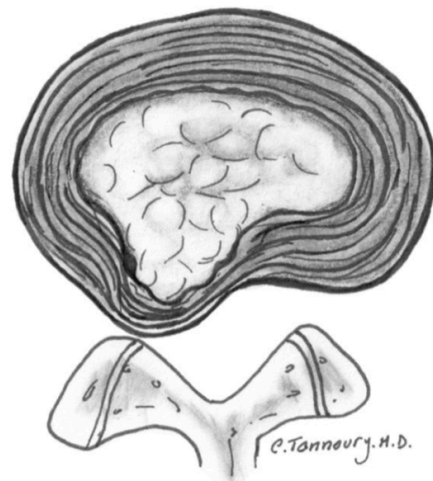
Fardon et al note '*The presence of disc tissue extending beyond the edges of the ring apophyses, throughout the circumference of the disc, is called "bulging" and is not considered a form of herniation. Asymmetric bulging of disc tissue greater than 25% of the disc circumference often seen as an adaptation to adjacent deformity, is also not a form of herniation. In evaluating the shape of the disc for a herniation in an axial plane, the shape of the 2 adjacent vertebrae must be considered*'.

Herniated discs may be classified as a '*protrusion*' or an '*extrusion*':

Protrusion

In accord with these new understandings, '*Protrusion is present if the greatest distance between the edges of the disc material presenting outside the disc space is less than the distance between the edges of the base of that disc material extending outside the disc space*'. (Figure 1, (10))

Fig 1: This herniated disc is categorised as protruded (10). The outer fibres of the disc are protruding into a space beyond the normal disc boundary, in a focal manner and not as a broad-based 'bulge'. In this illustration the disc has protruded into the IVC and the proximal IVF.



Fardon et al note: '*Herniation is broadly defined as a localised or focal displacement of disc material beyond the limits of the intervertebral disc space. The disc material may be nucleus, cartilage, fragmented apophyseal bone, annular tissue, or any combination thereof. The disc space is defined*

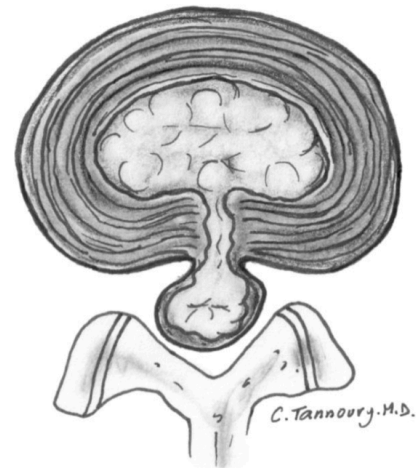
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11. Fardon DF, Williams AL, Dohring EJ, et al. Lumbar Disc Nomenclature: Version 2.0. *SPINE* 39(24): E1448 - E65. DOI: 10.1097/BRS.0b013e3182a8866d

craniad and caudad by the vertebral body end plates and, peripherally, by the outer edges of the vertebral ring apophyses, exclusive of osteophytes'. (10)

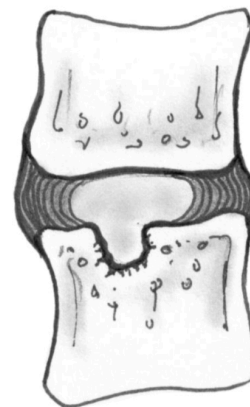
Extrusion

Similarly, 'Extrusion is present when, in at least one plane, any one distance between the edges of the disc material beyond the disc space is greater than the distance between the edges of the base of the disc material beyond the disc space or when no continuity exists between the disc material beyond the disc space and that within the disc space'. (Figure 2, (10))

Fig 2: This herniated disc is categorised as extruded (10). The outer fibres of the disc are protruding into a space beyond the normal disc boundary, in a focal manner and not as a broad-based 'bulge'. This illustration the disc has protruded into the IVC and the proximal IVF.



Fardon et al state that a herniated, extruded disc may be 'further specified or subclassified as sequestration if the displaced disc material has lost continuity completely with the parent disc'. The herniation in Figure 2 remains continuous with the disc. 'The term migration may be used to signify displacement of disc material away from the site of extrusion. Herniated discs in the craniocaudad (vertical) direction through a gap in the vertebral body end plate are referred to as intravertebral herniations (Schmorl nodes)'. (10, 11)



Conclusion

The key points of this extracted article have been excerpted and adapted from the *Medscape* articles *Lumbar Disc Disease*, (12) *Lumbar Degenerative Disc Disease*, (13) *Low Back Pain and Sciatica*, (14) and *Triamcinolone Acetonide Extended-Release Injectable Suspension*. (15)

It is regrettable that I find the Chiropractic literature is not reporting these diagnostic developments.

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