Vertebrogenic Pain

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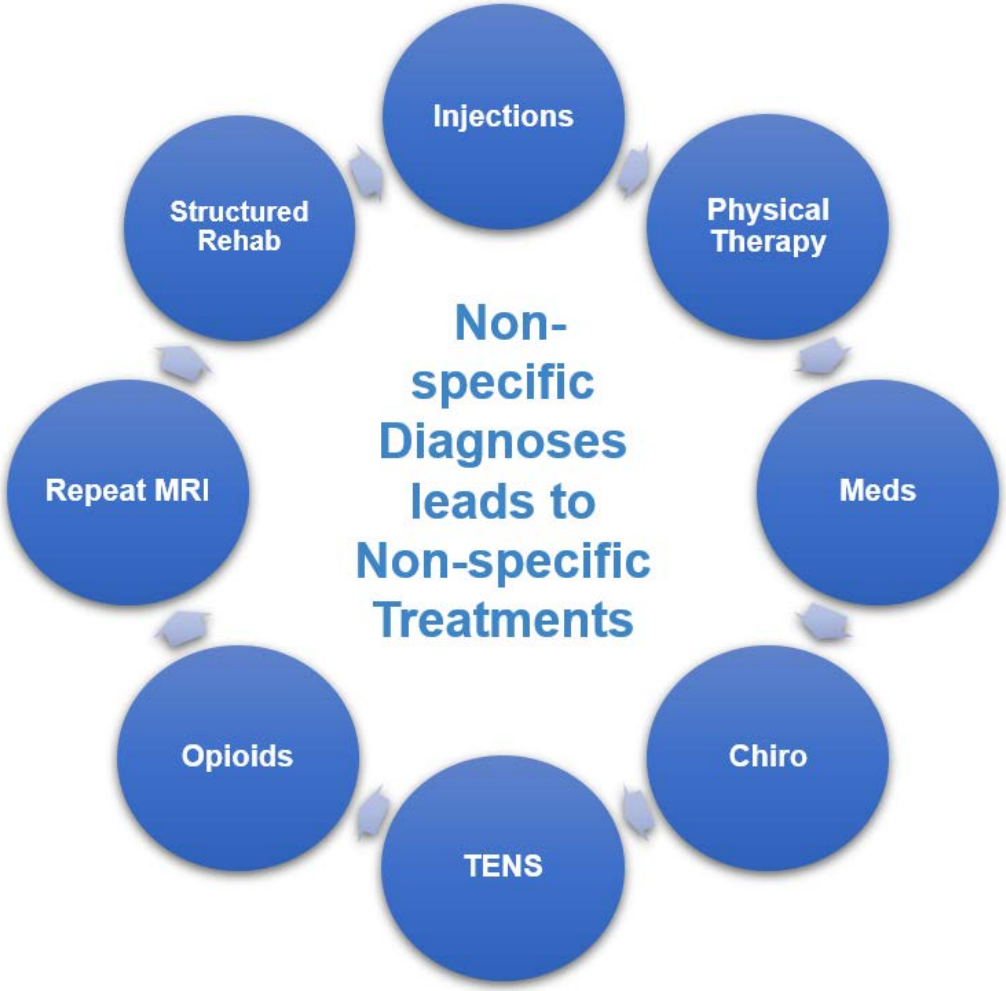
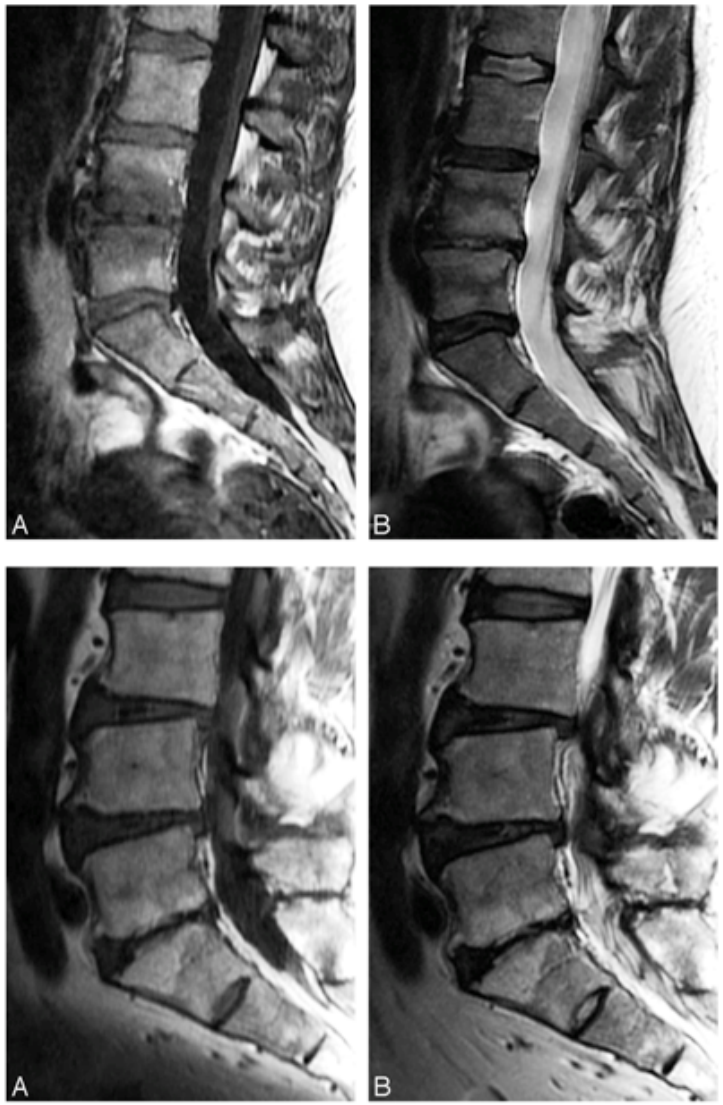
Historic Classification of Chronic Low Back Pain (CLBP)

- Relied upon subjective testing and diagnosis by exclusion
- 85% of patients classified as ‘Non-specific CLBP’
- Current ICD-10 Classification reflects non-specific paradigm
- Poor diagnostic criteria and classification hamper research efforts and clinical treatment of specific sub-groups of CLBP patients

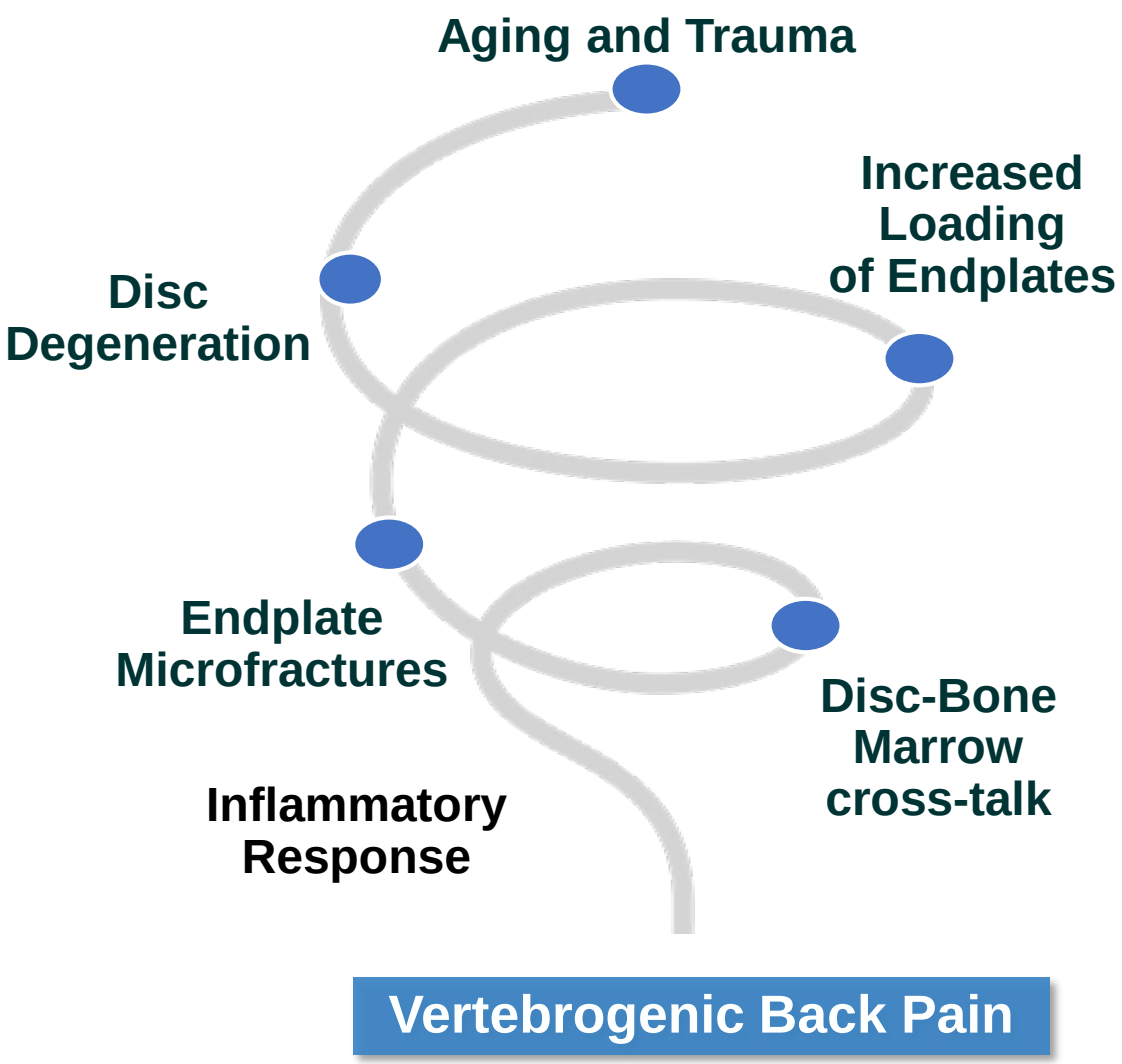


Identification of CLBP Biomarkers Create Need for New Classification

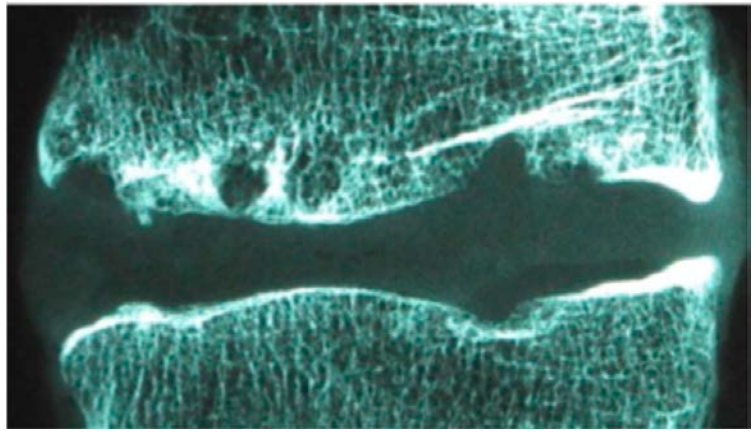
- Vertebral endplate (vertebrogenic) pain, diagnosed using objective MRI findings of Modic changes and endplate defects, represents a new, specific sub-group of CLBP patients that can be treated
- Best research estimates that 15% of CLBP patients have vertebrogenic pain
- Specific ICD-10 CM codes for vertebrogenic pain will allow identification and tracking of these patients and will aid future research



Specific subset of LBP - Understood to be “Vertebrogenic”



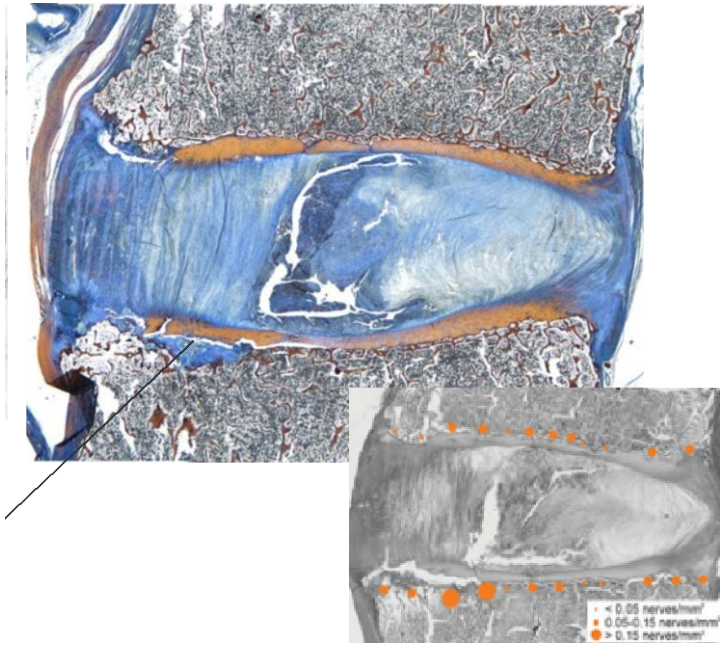
Damaged Endplates & Inflammatory Response



Vertebrogenic Pain is a paradigm shift in the science of CLBP

While the disc has historically been the accepted source of the majority of LBP, research confirms that the vertebral endplates are the cause of chronic low back pain in many patients

- Density of endplate and vertebral body innervation via the BVN is higher than that of the disc[2]
  - Only 30% of discs had neo-innervation of radial annular tear versus 90% of adjacent endplates[3]
  - 2x nerve density at endplate defects than radial tears[4]
- Nociceptors present in normal endplates and increase in damaged endplates in patients with severe low back pain[1]



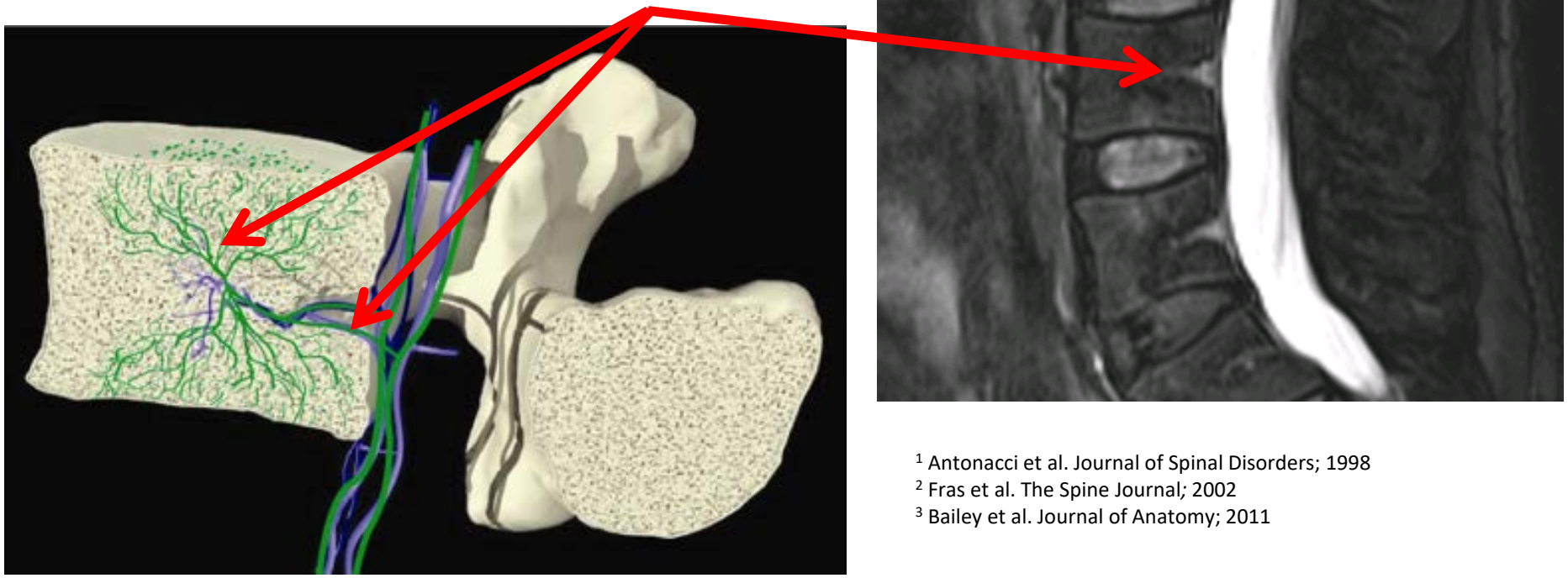
[1] Brown et al. JBJS; 1996
[2] Fagan A et al. ISSLS Prize Winner; 2003
[3] Dudli S et al. ISSLS Prize Winner; 2017
[4] Fields A et al. The Spine Journal; 2014

Modic changes and Endplate Defects are Specific Markers for CLBP

Study	Subjects	Age (y), range (mean)	Modic incidence, % (*n*)[a]	Sensitivity (%)	Specificity (%)	PPV (%)	NPV %
Braithwaite et al[111]	58	21–63 (42)	10.7 (31/290)	23.3	96.8	91.3	46.5
Ito et al[112]	39	21–57 (37)	8.9 (9/101)	21.7	94.9	55.5	80.4
Kokkonen et al[113]	36	20–58 (40)	37.9 (39/103)	40.5	63.6	42.9	61.4
O'Neill et al[114]	143	21–71 (43)	8.0 (37/460)	13.8	98.2	89.2	51.3
Thompson et al[115]	736	22–78 (43)	12.3 (302/2,457)	25.5	94.8	72.5	70.1
Weishaupt et al[116]	50	28–50 (42)	22.4 (26/116)	47.9	95.6	88.5	72.2

Anatomy of the Basivertebral Nerve

Anatomic studies and Immunohistochemical assays demonstrate that pain nociceptors at the vertebral endplate trace back to the basivertebral nerve, a branch of the sinuvertebral nerve[1-3]



[1] Antonacci et al. Journal of Spinal Disorders; 1998
[2] Fras et al. The Spine Journal; 2002
[3] Bailey et al. Journal of Anatomy; 2011

Conclusion

- Current science supports the need for greater specificity of low back pain
  - No existing ICD-10 CM codes adequately describes these patients.
- The diagnosis of vertebrogenic pain is based on the radiographic presence of a highly specific biomarker.
- Research estimates that vertebrogenic pain accounts for 15% of CLBP
- A specific ICD-10 CM code for vertebrogenic pain will assist with data mining and future research of Chronic Low Back Pain.
  - Current state: M54.5 – Low Back Pain
  - Proposed: M54.51 – Vertebrogenic Pain