

Quality of life in low back pain patients with MRI-lesions in spinal bone marrow and vertebral endplates (Modic-changes)

Clinical significance for outcome of spinal surgery?

Jensen, Tue Secher

Published in:
Scandinavian Journal of Pain

DOI:
[10.1016/j.sjpain.2013.11.003](https://doi.org/10.1016/j.sjpain.2013.11.003)

Publication date:
2014

Citation for pulished version (APA):

Jensen, T. S. (2014). Quality of life in low back pain patients with MRI-lesions in spinal bone marrow and vertebral endplates (Modic-changes): Clinical significance for outcome of spinal surgery? *Scandinavian Journal of Pain*, 5(1), 34-35. <https://doi.org/10.1016/j.sjpain.2013.11.003>

Go to publication entry in University of Southern Denmark's Research Portal

Terms of use

This work is brought to you by the University of Southern Denmark.
Unless otherwise specified it has been shared according to the terms for self-archiving.
If no other license is stated, these terms apply:

- You may download this work for personal use only.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying this open access version

If you believe that this document breaches copyright please contact us providing details and we will investigate your claim.
Please direct all enquiries to puresupport@bib.sdu.dk



Editorial comment

Quality of life in low back pain patients with MRI-lesions in spinal bone marrow and vertebral endplates (Modic-changes): Clinical significance for outcome of spinal surgery?

Tue Secher Jensen ^{a,b,*}

^a Spine Center of Southern Denmark, Lillebaelt Hospital, Institute of Regional Health Research, University of Southern Denmark, Østre Houvej 55, 5500 Middelfart, Denmark

^b Nordic Institute of Chiropractic and Clinical Biomechanics, Campusvej 55, 5230 Odense M, Denmark

In this issue of the *Scandinavian Journal of Pain*, Juhani Määttä and his coworkers report results from a study of 181 patients with low back pain (LBP) with or without sciatica referred to spinal surgery [1]. The aim of the study was to examine the association between Modic changes and health-related quality of life (HRQoL) an issue that has not been addressed on its own in patients referred to lumbar spine surgery.

1. What are Modic changes?

Modic changes are seen in magnetic resonance imaging (MRI) as changes in the vertebral endplate and subchondral bone marrow in the spine [2,3]. Modic changes type I are thought to represent an active, edematous/inflammatory and painful phase as compared to type II that is believed to represent a more stable and non-painful state [4–6]. Recent studies suggest that Modic changes, especially type I changes, may have therapeutic and prognostic value in patients with persistent LBP [7–9].

2. Modic changes in LBP

Previous research in Modic changes has primarily focused on the biological part of the bio-psycho-social model of LBP and very few studies (if any) have focused on the association between Modic changes and health-related quality of life which makes the study by Määttä et al. a worthwhile and interesting study with a novel approach.

In the search for clinically relevant subgroups among the large group of patients with non-specific LBP, Modic changes have come in focus as studies have shown that these changes are highly prevalent among adult patients with LBP as compared to LBP free individuals. Also, Modic changes are associated with LBP in study

populations from the general, working and clinical study populations as reported in a systematic review by Jensen et al. [10].

The clinical assumption, that the two types of Modic changes are clinically different, was used in the study by Määttä et al. where patients were classified according to the presence of “Type I” or “Type II” of Modic changes. Patients with Modic type I changes were classified as ‘Type I’ and those with Modic changes other than type I were classified as “Type II”. For evaluation of health-related quality of life, the authors used the RAND-36 (SF-36) which is the most commonly used instrument for measuring health-related quality of life in patient with chronic LBP [11].

3. Main findings of Määttä et al. [1] and why they are important

The study showed that Modic changes are common (46%) in patients referred to spinal surgery. This prevalence is very close to the median prevalence of 43% in LBP care seeking populations [10].

The most interesting finding of the study was that Modic changes ‘Type II’ were found to be positively associated with three of the four mental sub-scales of the SF-36 indicating a poorer mental status of HRQoL for patients in this group even after adjusting for age and sex. However, when adjusting also for duration of LBP and the ‘degeneration sum score’, only one mental sub-scale, the emotional functioning-scale, remained statistically significantly associated with Modic changes ‘Type II’.

As the authors themselves suggest, these results indicate that Modic changes type II themselves may not have a direct influence on HRQoL but that it is likely that they are a proxy for advanced degeneration of the spine and longer duration of pain. If Modic changes are indeed associated with poor mental health it is important that this is taken into account in the management of this type of patient as this is likely to have relevance in relation to the patients’ prognosis. Thus, it is well known that patients with depression have smaller improvements in HRQoL and disability after spinal surgery [14].

It is well known that LBP is considered a multi-factorial disorder and this study is a very good example of this complexity.

DOI of refers to article: <http://dx.doi.org/10.1016/j.sjpain.2013.08.003>.

* Corresponding author at: Rygcenter Syddanmark, Østre Houvej 55, 5500 Middelfart, Denmark. Tel.: +45 6348 4679; fax: +45 6348 4446.

E-mail address: tue.secher.jensen@rsyd.dk

Modic changes, disc degeneration, long duration of pain, and HRQoL are all factors that are associated with the presence of chronic LBP [9,12,13]. The results from the Määttä et al. study therefore support the importance of these factors in understanding their relationship to patients with LBP referred to surgery.

When investigating a multi-factorial disorder, such as non-specific LBP, it is important to include a sufficient number of study participants to be able to control for variables from all of the three overall model domains in the bio-psycho-social model. In the present study it was not possible to make more detailed sub-analyses which may have given more clear answers to the questions asked. However, the study [1] highlights the importance of a broader view on non-specific LBP as a multi-factorial disorder in both clinical practice and research.

4. Conclusion and implications

The results from this study suggest that it is worth noticing whether or not a patient referred for spinal surgery has Modic changes on MRI as the presence of Modic type II could be a marker for identifying patients who have poor mental health. Poor mental health also needs to be addressed in the management of these patients. However, the most important implication of this study is the emphasis on non-specific LBP being a multi-factorial disorder when dealt with in both research and clinical practice.

Conflict of interest

The author has no conflict of interest related to this Editorial comment.

References

- [1] Määttä J, Kautiainen H, Leinonen V, Niinimäki J, Järvenpää S, Koskelainen T, Mäkelä P, Pesälä J, Nyysönen T, Savolainen S, Airaksinen O, Kyllönen E, Cheung KMC, Karppinen J. Association of Modic changes with health-related quality of life among patients referred to spine surgery. *Scand J Pain* 2014;5: 36–40.
- [2] Modic MT, Steinberg PM, Ross JS, Masaryk TJ, Carter JR. Degenerative disk disease: assessment of changes in vertebral body marrow with MR imaging. *Radiology* 1988;166:193–9.
- [3] Modic MT, Masaryk TJ, Ross JS. Imaging of degenerative disk disease. *Radiology* 1988;168:177–86.
- [4] Albert HB, Kjaer P, Jensen TS, Sorensen JS, Bendix T, Manniche C. Modic changes, possible causes and relation to low back pain. *Med Hypotheses* 2008;70: 361–8.
- [5] Kuisma M, Karppinen J, Niinimäki J, Ojala R, Haapea M, Heliovaara M, Korpelainen R, Taimela S, Natri A, Tervonen O. Modic changes in endplates of lumbar vertebral bodies: prevalence and association with low back and sciatic pain among middle-aged male workers. *Spine* 2007;32: 1116–22.
- [6] 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* 1994;76: 757–64.
- [7] Albert HB, Sorensen JS, Christensen BS, Manniche C. Antibiotic treatment in patients with chronic low back pain and vertebral bone edema (Modic type 1 changes): a double-blind randomized clinical controlled trial of efficacy. *Eur Spine J* 2013;22:697–707.
- [8] Cao P, Jiang L, Zhuang C, Yang Y, Zhang Z, Chen W, Zheng T. Intradiscal injection therapy for degenerative chronic discogenic low back pain with end plate Modic changes. *Spine J* 2011;11:100–6.
- [9] Jensen RK, Leboeuf-Yde C, Wedderkopp N, Sorensen JS, Jensen TS, Manniche C. Is the development of Modic changes associated with clinical symptoms? A 14 months cohort study with MRI. *Eur Spine J* 2012;21:2271–9.
- [10] Jensen TS, Karppinen J, Sorensen JS, Niinimäki J, Leboeuf-Yde C. Vertebral endplate signal changes (Modic change): a systematic literature review of prevalence and association with non-specific low back pain. *Eur Spine J* 2008;17:1407–22.
- [11] Chapman JR, Norvell DC, Hermsmeyer JT, Bransford RJ, DeVine J, McGirt MJ, Lee MJ. Evaluating common outcomes for measuring treatment success for chronic low back pain. *Spine (Phila Pa 1976)* 2011;36:S54–68.
- [12] Cheung KM, Karppinen J, Chan D, Ho DW, Song YQ, Sham P, Cheah KS, Leong JC, Luk KD. Prevalence and pattern of lumbar magnetic resonance imaging changes in a population study of one thousand forty-three individuals. *Spine (Phila Pa 1976)* 2009;34:934–40.
- [13] Nakamura M, Nishiwaki Y, Ushida T, Toyama Y. Prevalence and characteristics of chronic musculoskeletal pain in Japan. *J Orthop Sci* 2011;16: 424–32.
- [14] den Boer JJ, Oostendorp RA, Beems T, Munneke M, Oerlemans M, Eve AW. A systematic review of bio-psychosocial risk factors for an unfavourable outcome after lumbar disc surgery. *Eur Spine J* 2006;15:527–36.