Reviewer's report

Title: Determinants of vertebral endplate changes: a magnetic resonance imaging study in middle-aged male workers

Version: 1 Date: 19 November 2007

Reviewer: Michele Battié

Reviewer's report:

General

The study purpose is clearly stated and limited related knowledge exists. The authors’ aim to identify factors associated with the presence of Modic changes and examine whether the same factors are associated with Modic changes and severe disc degeneration (including collapse of the disc space). There is current interest in endplate or Modic changes as findings that may be relevant to back pain and, with the exception of age and previous reports of associations with body weight and male gender, little is known about what factors influence their presence.

The current study is an extension of an earlier report on the association of Modic changes and low back pain or sciatica in the same study sample. The prevalence of Modic changes (Types 1, 2, and 3) for the study sample was reported in the earlier publication, but probably warrants some repeating in the present study. A main finding of the earlier study was that Modic changes at the L5-S1 level, where findings were most prevalent, were significantly associated with pain, but an association with pain was not apparent when looking at lumbar levels L1-2 through L4-5. Thus, the authors concentrated further on L5-S1 when looking at determinants of Modic changes in the current study.

The methods seem sufficiently detailed to allow replication. There can be criticisms about the accuracy of some of the self-reported history data, such as lifetime leisure activity, in particular, but this is a limitation of all studies interested in such long-term activity exposures. Also, despite the limitations of the activity measure, which could be expected to dilute associations, the variable was associated with Modic changes.

There is always a possibility of confounding in such studies by some unmeasured or unknown confounding factors, but the authors state that age was controlled in all association analyses and multivariable analyses allowed for control of several other possible confounders.

Generally, the paper is clearly written and adds to the accumulating findings on factors associated with Modic changes and, if the findings are replicated, raises questions about the presumed association between Modic changes and disc degeneration and implied differences in determinants of Type I and Type II changes.
Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

Table 3 provides the odds ratios with 95% confident intervals for associations between the independent variables and various categories of Modic changes. The category of Type I changes was not included because none of the independent variables was statistically significantly related. However, because of the importance the authors have given to type I changes and the conclusion drawn regarding differences in determinants of type I and II changes, it would be helpful to see the ORs and CIs for type I added to the table. Exclusively type I changes constitute the smallest Modic change category and face power issues, but similarities and differences in direction and degree of association as compared to other findings would be informative.

Also, there appears to be a mistake in the notations following Tables 3 and 4. Should the superscript “3,4” preceding “Subjects with both Modic I and II changes (n=23) or Modic I change (n=33) are excluded” be deleted? 3 and 4 are already used earlier in the notation to represent something else. Also, following superscript “b” should read ‘severe disc degeneration’ in both tables.

Discretionary Revisions (which the author can choose to ignore)

The title accurately portrays the primary purpose of the study and the abstract is clearly written. I would suggest, however, that the 3rd sentence of the “Results” paragraph be extended to clarify that 'exposure to whole-body vibration besides age was the only significant determinant for disc degeneration at L5-S1.' Also, the odds ratios would have more meaning if the unit change in the associated determinant were stated.

In the 3rd and final paragraph of the “Background” section, the authors note a focus on the L5-S1 level “because the association of Modic changes with pain symptoms seems so prominent at L5-S1 level {24}”. The authors should state that they are referring to their previous findings in the same study sample.

What next?: Accept after minor essential revisions

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable
**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**
I declare that I have no competing interests.