Reviewer’s report

Title: Altered motor control patterns in whiplash and chronic neck pain.

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Reviewer: Bernadette Murphy

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REVIEW
Authors: Astrid Woodhouse and Ottar Vasseljen
Title: Altered motor control patterns in whiplash and chronic neck pain.
Journal: BMC Musculoskeletal Disorders

1. Is the question posed by the authors well defined?
The main purpose of this paper was to investigate motor control deficits in a WAD group compared to the two control groups in relation to conjunct motion, JPE, ROM and ROM variability.

2. Are the methods appropriate and well described?
Yes, the authors have used a 3Space Fastrak system and gone to considerable effort to address limitations in measuring ROM and JPE in previous studies. The addition of a non WAD control group is a great strength.

3. Are the data sound?
Yes, means and confidence intervals are shown and the measurements were the average of 3 or 4 repetitions for each measure. The authors didn’t state how they determined whether their subject numbers were adequate but it was a case control design with a set time frame and the data don’t suggest a type II error so I am satisfied with the data.

4. Does the manuscript adhere to the relevant standards for reporting and data deposition?
Yes, although there are a number of minor grammatical errors throughout the manuscript, which need correction.

5. Are the discussion and conclusions well balanced and adequately supported by the data?
The discussion supports the data and does not go beyond its own findings. The paragraph in the introduction which reads “While this points to centrally mediated somatosensory alterations in WAD, it is not clear whether motor areas are also affected. If such changes exist, altered motor control or kinaesthetic sense should be present in WAD, which would also provide important information for clinicians” needs to be corrected. Kinaesthetic sense is primarily a somatosensory function, not a motor area function-revise paragraph
6. Are limitations of the work clearly stated?
The authors don’t really address the limitations of their own work, but they went
to considerable effort to address limitations of previous studies in their study
design and this is clearly stated. It is at the discretion of the authors to include the
limitations of their own study.

7. Do the authors clearly acknowledge any work upon which they are building,
both published and unpublished?
The authors clearly acknowledge work by others in the field.

8. Do the title and abstract accurately convey what has been found?
The title “Altered motor control patterns in whiplash and chronic neck pain” is
accurate. It would have been helpful to see the aim stated at the end of the
background paragraph in the abstract. This is a minor essential revision.

9. Is the writing acceptable? There are several minor grammatical errors which
are minor essential revisions in the introduction but otherwise the writing is very
good.

Minor Essential Revisions
It would like to see the aim stated at the end of the background paragraph in the
abstract. This is a minor essential revision.

The paragraph in the introduction which reads “While this points to centrally
mediated somatosensory alterations in WAD, it is not clear whether motor areas
are also affected. If such changes exist, altered motor control or kinaesthetic
sense should be present in WAD, which would also provide important information
for clinicians” needs to be corrected. Kinaesthetic sense is primarily a
somatosensory function, not a motor area function-revise paragraph

Minor Grammatical corrections
Page 1 line 1 “Persistent whiplash associated disorders (WAD) (has) been
associated” s/b “(have) been associated”
Page 4-line 1-“Whiplash associated disorders (WAD) have been studied mainly
in comparison with…” this should read “in comparison to”
Page 4, lines 7-9 “There are consistent findings of hypersensitivity and
widespread pain in WAD compared to healthy subjects [4-7],( also contrasting
WAD from) non-traumatic chronic…” phrase in parentheses should read “…and
when comparing WAD patients to…”
Page 4, line 13-14 “There is conflicting evidence for the presence of kinaesthetic
change in WAD patients, as (for) head repositioning or joint position error (JPE)
in comparison to healthy controls” (for) should be replaced with “measured by”

Page 4 final paragraph “There is consistent documentation for reduced standing
balance and increased sway in WAD patients compared to healthy subjects
Small differences, and only for difficult balance tasks, have been found between WAD and non-traumatic neck pain patients.

Page 5, line 4 “those that control the trunk [28]. WAD patients are presented with reduced cervical” should read “WAD patients present with…”

Page 6. line 1 “Conjunct motion at end of primary range was investigated in” should read conjunct motion at the end…”

Page 11 line 5-7 “Differences between groups in conjunct motion and maximal cervical ROM were analyzed by general linear modelling (GLM) and post-hoc by Tukey-Kramer multiple comparison test. Conjunct motion was analyzed both without introduction of:”

Additions added in parentheses “Differences between groups in conjunct motion and maximal cervical ROM were analyzed by general linear modelling (GLM) and post-hoc by (the) Tukey-Kramer multiple comparison test. Conjunct motion was analyzed both (with and without) without introduction of”

Page 11, line 12 add “the” before Kruskall-Wallis e.g. “Thus, the non-transformed values are reported. (The)Kruskall-Wallis test”

**Level of interest:** An article of importance in its field

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I have no competing interests.