Reviewer's report

Title: Neurophysiologic effects of spinal manipulation in patients with chronic low back pain

Version: 1 Date: 28 May 2011

Reviewer: Gregory Cramer

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Major Compulsory Revisions
1. The methods used to identify/recruit the asymptomatic subjects (Page 5, Lines 10-12) needs to be described.

2. The section “Study Participants Descriptive Statistics” is incomplete. The age range, mean age, and BMI for both the LBP and asymptomatic subjects should be provided separately, rather than combining the groups and estimating the values (e.g., the current paper reports these results in the statement, “…and on average both groups were ~23-24 years old with a BMI of 23”). This could be done as a table if preferred. Alternately, a table showing the values for each subject with the values for the “matched” subject in the same row could be provided. At a minimum, further description of the values for each group and the similarity or lack of similarity should be described. If the values for the two groups are different, the reasons for the differences and how the differences may or may not have affected the results should be provided.

Minor Essential Revisions
1. The authors should discuss why chronic low back pain (LBP) was chosen, rather than acute LBP. The neurophysiologic responses may be different between these two groups so the reason for choosing chronic LBP should be discussed, even if the discussion is brief.

2. The method used to determine if an audible joint sound was present during the SMT needs to be described in the paper. That is, did the person performing the SMT record whether or not an audible sound was heard, and if so when was the finding was noted (e.g., immediately after the procedure). Also, was the patient asked if he/she heard a joint sound, and if so, was the patient blinded to the response of the clinician?

3. The outcome measures reported in the section of the Results entitled, “Study Participants Descriptive Statistics” (i.e., visual analog scale[s], lifestyle change imposed from LBP, Roland Morris Disability Questionnaire, and Tampa Scale for Kinesiophobia) should be described in the Methods along with when these instruments were administered, and how these outcomes were summarized for reporting in the Results.

4. Also, in the section “Study Participants Descriptive Statistics,” several clinical values (VAS, Roland Morris, etc.) are reported for the LBP group only.
Applying these outcomes were not assessed for the asymptomatic subjects. Either the values for the asymptomatic subjects should be provided or a brief reason why these values were not obtained should be provided (i.e., how were the “asymptomatic subjects” determined to be asymptomatic; one or several questions administered, etc.).

5. Page 9, Line 24 – change “4 participants with LBP” to “5 participants with LBP” (i.e., the LBP and asymptomatic subjects without an audible sound during SMT should total nine subjects, based on the statement immediately preceding these values).

6. Page 12, Lines 8-15 – This is a very long run-on sentence, please revise.
7. Page 12, Line 12 – change “interneurones” to “interneurons”
8. Figures 4 and 5 are of poor quality (i.e., blurry) at least on the pdf. The quality of these important figures should be checked and if necessary improved.

Discretionary Revisions
1. Add term “audible joint sound” or “audible release” to Key Words even though this is not a MeSH term. Because the key finding was related to audible joint sounds, adding this term to the Key Words should help those interested in audible joint sounds find the paper more easily.

2. Page 3, Line 10 – change “little” to “less.” There is a growing body of basic science research related to mechanisms of action of spinal manipulative therapy (SMT), as evidenced by the work of authors such as Pickar, Triano, Khalsa, Henderson, Ross, Cramer, and others.

3. Page 3, Line 20 – add “to” between “used” and “treat”

4. Page 5, Study Participants: Further detail on the nature of the subject screening and history and physical examination procedures for determining inclusion/exclusion of participants would be helpful. That is, how was initial screening conducted, did the study use the standard history and physical examination procedures of the clinical facility or were these procedures unique to this study; if a specialized examination was performed, what was emphasized in the exam, were the history and physical examination conducted on the same day of primary data collection for the study or a separate day, and when was informed consent administered.

5. Page 6, Line 11 – “nasinon” should be “nasion”

6. Page 8, Line 8 – “participation” should be “participants”

7. Page 8, Line 21 – “level” should be “level”

8. Page 10, Line 10 – suggest “virtually no” be changed to “few.” For example, H-Reflex studies on LBP subjects have been performed by Dishman et al. (referenced in the paper) and Cramer et al. Other studies assessing various neurologic outcomes as primary or secondary outcome measures likely exist as well.

9. Page 11, End of Line 20 through Line 22: This is one of the most important statements in the Discussion, yet one of the most awkwardly written sentences in
the (otherwise well-written) paper.

10. Page 12, Lines 4-6 – the reason for the changes in reflex activity associated with subjects having the audible release during SMT could also be that the joint surfaces in the audible release joints may gap (separate) more suddenly during SMT. This increased rapidity of joint gapping may be related to the production of an audible release (may answer why some joints have an audible release and others do not). The increased rapidity of joint gapping could be due to break-up of small adhesions present even in normal joints or due to increased muscle or connective tissue tension surrounding those joints before SMT. Consequently, “restoring motion to a joint segment” or increased speed of motion in a joint segment could conceivably be related to the production of an audible release and the subsequent changes in reflex activity found by these investigators.

11. Page 15, Lines 4 and 7 – change “secured” to “secure”

12. Legend of Figure 6, Line 6 – change “(s)” to “(S)” (upper case to match figure)

13. Page 9, Line 6 – change Participants to Participants’ in the subtitle of this line.

**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 received NIH/NCCAM funding for a study assessing cavitation (audible joint sounds) during spinal manipulative therapy (Grant #3R01 AT000123-06S2).