Reviewer’s report

Title: The effects of the Mulligan mobilisation "SNAG" in the lumbar flexion range of asymptomatic subjects as measured by the Zebris CMS20 3-D motion analysis system

Version: 3 Date: 27 May 2008

Reviewer: Toby Hall

Reviewer’s report:

Minor essential revisions

I would like to congratulate the authors of this paper for their efforts to pursue research related to clinical practice. The Mulligan Concept is a popular form of treatment worldwide but has received only minor attention in terms of research investigation. This study has been generally well carried out and should be published after the following considerations have been met. The clinical application of this paper is limited by the use of asymptomatic subjects. It would be nice to repeat this study on patients with lumbar flexion limitation and LBP.

1. The title and abstract should define the SNAG abbreviation.

2. The first and 2nd paragraph of the methods section has a mixture of tenses.

3. The quality of written English needs improving throughout the background and methods section. For example second line of “Sample” paragraph.

4. What was the treating clinicians level of experience with the Mulligan concept? This is important to know as it may be that the technique was not performed correctly, which might have been the explanation for lack of significance. For example the authors state: “by direct palpation via the therapist’s ulnar styloid process to the skin over the relevant spinous process as described by Mulligan (2004). This is not the correct technique as described by Mulligan. The pressure should have been applied through the ulnar border of the hand, specifically just distal to the pisiform. This is an important point that needs clarification. If a technique is to be investigated it needs to be done as recommended.

5. Further to this point how much force was applied?

6. Was the end position sustained?

7. Why was the seated position chosen? Seated SNAGS are usually reserved for patients with acute, more severe pain disorders, which was clearly not the case in this study. The standing position is more aggressive and likely to be effective in the treatment of stiffness, and is thus more likely to improve a normal joint range. Perhaps if the technique had been done in the standing position as the measurements were, the outcome may have been different.

8. SNAG’s are not usually performed with a 2 minute break between repetitions, or did I misunderstand what was intended here? It is unclear as to whether 10 movements were performed, or was it 10 sets or x number of movements?
All these points need clarification in the text.

9. In the discussion section the authors suggest that since in asymptomatic subjects no mechanical effect was found, then this suggests that in symptomatic subjects improvement indicates a neurophysiological effect. This speculation goes far beyond the scope of this study. No conclusions can be drawn about symptomatic subjects based on the current study. This section should be removed.

10. Similarly in the conclusion the authors assume that the reliability of the Zebris system will be improved by altering the fixation device but this is pure speculation and should also be removed.

11. The table legends can be improved. For example for Table 4 indicate whether this is for the reliability or the intervention arm of the study.

12. The photos are spoilt by the background clutter, which makes it difficult to see the model and equipment placement clearly. I recommend a blank background for photos. Further to this point I am sure Brian Mulligan would be critical of the photo of the Lumbar SNAG technique. The therapist’s hand placement on the vertebra is incorrect (see also comment earlier), as is the patient’s lack of support through their arms on their thigh. This is not as recommended in the Mulligan text (2004).

Level of interest: An article of limited interest

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 am a member of the Mulligan Concept Teachers Association which organizes and promotes teaching of the Mulligan Concept. I receive a teaching fee when conducting courses on the Mulligan Concept.