May 17th, 2007

The Editor in Chief
BMC Musculoskeletal Disease

Dear Sir or Madam

We wish to re-submit the following article

The pectoralis minor length test: a study of the intra-rater reliability and diagnostic accuracy in subjects with and without shoulder symptoms.

to BMC Musculoskeletal Disease following revision of the manuscript.

We have completed a review of the manuscript based on the input from the three reviewers which we have found very helpful and have incorporated their suggestions in the revised version of our paper.

The following changes have been made in the revised manuscript:

**Reviewer EB – Discretionary Point 1**
Thank you for this suggestion the title has been revised to:
The pectoralis minor length test: a study of the intra-rater reliability and diagnostic accuracy in subjects with and without shoulder symptoms.

**Reviewer EB Point 1**
Information on the importance of reliability in context with this investigation has been added in the introduction section.
The section on diagnostic accuracy has been shortened and transferred to both the methods section and into Table 7.

**Reviewer EB Point 2**
Point 2.1 Shoulder area has been defined as the C4 / C5 dermatome
Point 2.2 Additional comments relating to the subjects arm position have been added to the method section.
Point 2.3 the word rigid has been added before the term plastic transparent right angle has been added in the method section. In addition to this an additional sentence has been added which details that careful attention was made to ensure the right angle did not bend.

**Reviewer EB Point 3**

Thank you for the very detailed explanation and guidance on the ICC results. The statistical analysis section and the subsequent statistics have been recalculated.
The following changes have been made in the Statistical Analysis section:
**Statistical analysis**
The reliability of the measurements was analyzed using intraclass correlation coefficients (ICC), 95% confidence intervals (CI) and standard error of measurement (SEM). The descriptive statistics, ICC (Model 2), 95% CI and the SEM statistics were analyzed using SPSS† version 14 software. The analysis of reliability involved determining the reliability of (i) the first measurement and for (ii) the mean of the 3 measurements. Portney (2000) has described 6 different equations for calculating ICC, and has argued that Model 2 should be used when wishing to confidently generalize the findings of a reliability trial of a particular measurement to equally trained clinicians, and Model 3 should be selected when an investigator is interested in establishing the reliability of a measurement procedure for one specific data collection experience without the intention to generalize the findings to equally trained clinicians (Portney 2000, page 562). As such ICC Model 2 was used in the analysis. Using SPSS† version 14 software, ICC Model (2,1) was analyzed by selecting the options; two-way random, single measure, absolute agreement and Model (2,3) was analyzed by selecting; two-way random, average measure, absolute agreement.

Reviewer EB Point 4
As suggested a brief summary of the findings of the tables has been added to the results section.

Reviewer EB Point 5
As recommended information from the original discussion section has been edited and reduced. However additional information has been added as suggested by reviewer JB.

Reviewer EB Minor Essential Revisions Point 1
Consistency between the terms rater and observer. The term ‘observer’ has been replaced with ‘rater’.

Reviewer EB Minor Essential Revisions Point 2
The word ‘unilateral’ has been added to the methods section

Reviewer EB Minor Essential Revisions Point 3
The first sentence of the results section has been re-written to: ‘Ninety subjects were recruited for this investigation’ The word ‘categories’ has been changed to ‘diagnoses’.

Reviewer EB Minor Essential Revisions Point 4
Page 7 para 3, line 7- The paragraph has been re-written and the word ‘investigating’ has been removed.

Reviewer EB Minor Essential Revisions Point 5
Discussion: ‘Category of pathology’ has been changed to ‘type of pathology’

Reviewer EB Minor Essential Revisions Point 6
Tables 7 and 8 have been renumbered.

Reviewer JB –Point 1
Thank you for highlighting these two very relevant articles. The section before the aims of the current study has been amended to;

… has investigated the reliability of the pectoralis minor length test in subjects with and without shoulder symptoms and the diagnostic accuracy of the test in subjects with shoulder symptoms.
In addition to this reference to the publications (Borstad and Ludewig 2005, and, Borstad 2006) have been included.

In addition to this as with the original submission our conclusions are that although the pectoralis minor length test as described by Sahrmann may be measured reliably by one rater we do not recommend that it should be used and as such provide no justification for its continued use in clinical practice, or current or future research.

**Reviewer JB –Point 2**

Re: Page 4 the 2x2 analysis

Thank you for these comments. The wording of this section has been changed. After the first sentence an additional sentence which reads: At present there is no gold standard reference test for the measurement of pectoralis minor length, has been added. And after the definition of the test the following has been added: For the purposes of this investigation and to attempt to establish a relationship between pectoralis minor length and symptoms a negative pectoralis minor length test was defined as a table to posterior acromion measurement of less than or equal to 2.6 cm, and a positive test as being a measurement greater then 2.6cm.

As recommended the term ‘diagnosis’ has been replaced with “an attempt to establish a relationship”.

**Reviewer JB Minor Point 1**

The line on the original page 5 has been changed to “patients with symptoms”

**Reviewer JB Minor Point 2**

Page 7 para 2 line 6- ‘that’ has been changed to ‘than’

Page 7 para 3, line 7- The paragraph has been re-written and the word ‘investigating’ has been removed.

Page 9, para 3, line 4 The authors names have been added.

**Reviewer JB Discretionary Points**

The line on the original page 5 has been changed to “patients with symptoms”

**Reviewer JB Discretionary Points**

Too much analysis: The original analysis of 1 versus 3 measurements, the corresponding results and tables have been removed.

**Reviewer JFdeB Point 1**

The statement ‘excellent clinical reliability’ has been removed from the conclusions section in the abstract.
Reviewer JFdeB Point 2
The line on the original page 5 has been changed to “patients with symptoms”

Reviewer JFdeB Point 3
Point 3a Shoulder area has been defined as the C4 / C5 dermatome
Point 3b The final line in the inclusion/ exclusion criteria makes reference to previous shoulder surgery being an exclusion criteria and reads: For subjects without symptoms additional exclusion criteria were; a history of fractures, treatment or surgery to the lumbar, thoracic, cervical spine and upper limbs.
Point 3c Further clarification is made in the ‘Results’ section regarding the diagnoses for the subgroups of shoulder pathology. An additional sentence has been added and reads: Patients were referred from orthopaedic surgeons and general practitioners and the diagnoses written on the referral were recorded.

Reviewer JFdeB Point 4
The word “scapular” has been changed to “scapula” in the original page 11, 3rd paragraph, 3rd last line.

Reviewer JFdeB Point 5
In the last paragraph (before the conclusion) the sentence has been changed to: However, postural theory involving the identification of a muscle imbalance, such as a short pectoralis minor does not restrict itself to only one category of pathology, and the assumption is that if an imbalance is identified it should be corrected as it has been postulated that the imbalance may cause or contribute to the presenting symptoms.
In an attempt to better clarify the clinical reasoning process used by clinicians when a muscle imbalance has been identified.

Thank you for considering this manuscript.
Yours sincerely,

Jeremy Lewis

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