Author's response to reviews

Title: Can testing of six individual muscles represent a screening approach to upper limb neuropathic conditions?

Authors:

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Author's response to reviews: see over
Thank you very much for constructive comments.

I have addressed them all and also subjected the manuscript to a revision of the English language. I think that the manuscript has improved considerably following the revisions made.

Below my to point to point comments to the two reviewers’.

Best wishes

Jørgen Riis Jepsen

Referee 1:

Methods
Patients
1. 1st para. Please reword the description of the patients’ complaints. It’s not clear, starting “In 22”.
Ad 1. This has been clarified in the revised text.

2. Were patients selected from consecutive referrals? Or were they included in the sample as a sample of convenience?
Ad 2. Patients were selected as consecutive referrals. This has been clarified in the revised text.

3. Was the person selecting patients separate to the examiners?
Ad 3. Yes the person selecting the patients was separate to the examiners. We excluded 17 patients because they were known from earlier contacts or because they had problems concerning communication, had undergone previous upper limb surgery, or had an appearance suggesting easily recognizable disease such as severe asthma or disabling low back disease. Fifteen patients refused participation. For capacity reasons (max. one
study patient/day), ten patients comparable to the study patients with respect to disease pattern and severity were additionally excluded. This has been clarified in the revised text.

4. It would be useful to know more about the patients and their symptoms. E.g. duration of symptoms, severity, diagnosis etc.
   Ad 4. I have briefly described the patients in the revised text.

5. Did all patients have neurological disorders? Did those with lower limb problems have neurological disorders that could have affected their upper limbs? A few more details would clarify this information. Perhaps this information is included in the other publications related to this study? But this might not be available to all readers of this paper. This is particularly important in a diagnostic accuracy study. If all patients with symptoms had neurological deficits, and asymptomatic limbs had no deficits, then the diagnostic accuracy is inflated. This is probably the case in this study. Conversely accuracy would be reduced if many patients had symptoms, no neurological deficit (e.g. musculoskeletal disorder), and hence no weakness. It would be important to have a mix of patients with upper limb symptoms, with and without neurological disorders. Only then could the diagnostic accuracy be determined. The principles of STARD would be helpful to follow for a study of diagnostic accuracy, as this paper is.
   Ad 5. I agree in the concerns of the referee. In the result section, I write that the two examiners found weakness in one or more muscles in 35 and 32, respectively, out of 38 symptomatic limbs. No weakness was found in 31 and 22, respectively, out of 44 non-symptomatic limbs. This would suggest a neurologic component in the majority of symptomatic limbs and the absence of a neurologic component in most (but not necessarily all) non-symptomatic limbs. Consequently, this finding suggests that there are only few symptomatic upper limb musculoskeletal disorders without a neurological component in this sample of patients with work-related health problems. This observation differs from the general perception with regard to work-related upper limb disorders and is therefore discussed in the discussion section in the revised manuscript. We did not record lower limb problems in this project.

Methods
6. As this study was part of a larger study, it is important to know how the sequence of testing occurred. If the examiners were able to conduct other tests prior to the 6 muscle tests, perhaps they had an idea of potential nerve injury and were therefore unintentionally biased?

Ad 6. This is true. Although I present the outcome of testing of six muscles only this is a part of a study that comprised an assessment of a larger number of neurological items (the function of 16 muscles, the sensibility in 7 territories, and the nerve-mechanosensitivity at 20 locations). The examination started with manual muscle testing followed by sensory testing and finally nerve trunk palpation. Still, however, it cannot be excluded that bias may have occurred from certain outcomes of other tests than the six muscles. This weakness is discussed in the discussion section in the revised manuscript.

7. Under construct validity, is it possible that non-neurological disorders also present with muscle weakness? Eg. a painful shoulder may induce weakness of certain movements, but this would not be present in all 6 muscles?

Ad 7. This is true. The examination of strength cannot stand alone. If use of a certain muscle is painful so that the patient cannot exert full strength this may be due to a tendinitis and accompanied by soreness of the structure. However, the identification of weaknesses of several muscles with a pattern in accordance with anatomical facts (such as innervation patterns of a peripheral nerve) would suggest a neurological condition to be more likely than a non-neurological disorder. Furthermore, the identification of mechanical allodynia at the location along the nerve trunk where according to the pattern of weakness a nerve affliction may be located would be more reassuring with regard to the identification of a focal neuropathic condition. This is discussed in the discussion section.

Results

8. 1st para. The author should be careful about over-amplifying the reliability of their examination. The median result was 0.58, while reliability of some muscle testing was 0.46, which indicates only moderate reliability for some muscles.

Please give 95% confidence intervals for the kappa scores.

Ad 8. The word highly has been deleted. Confidence intervals of kappa-values have been entered in table 1 and the Result section in the revised manuscript.
Conclusions
9. I would recommend toning down some of the statements. For example the 4th para is more of a discussion point, rather than a conclusion of the study. The final para should be adjusted or removed, as its not possible to say how prevalent muscle weakness, is based on the current study.

Ad 9. The 4th para has been moved to the discussion and the last sentence in the last para has been deleted in the revised manuscript.

Minor Revisions:
Title
10. Perhaps the title is not completely descriptive of the study, since weakness by itself is not diagnostic?

Ad 10. I have changed the title to: Can testing of six individual muscles represent a screening approach to upper limb neuropathic conditions?

Background
11. Para 3. It’s not certain for all readers what is meant by case definitions. Perhaps an example would clarify for the reader

Ad 11. The concept has been explained in the revised manuscript.

12. Para 6 its not clear how the background for testing only 6 muscles arose. The authors suggest that previously 9 muscles, then 8 muscles were required for diagnosis. The authors adapted this to 6, but no explanation is given. A brief explanation would be useful to know why 6 and not 9, or 8 muscles are now required.

Ad 12. In the revised manuscript (Background), I have explained the reason for selecting the six muscles.

Discussion
13. The discussion section regarding weakness in the 2nd para, the meaning is a little unclear.

Ad 13. I have changed the wording in the revised manuscript in order to enhance clarity.
14. Under “standards for comparison” please reference the final sentence of the 2nd para.
Ad 14. In the revised manuscript I have rephrased the sentence and entered two new references.

15. Under limitations, the 3rd and 4th para are not so relevant to the present study, more a lament on the state of clinical practice, and so could be left out.
Ad 15. I agree in this statement. However, I would like to keep this text because it is in fact very common among clinicians to focus on the symptomatic area and a few locations of nerve afflictions (in particular in the carpal tunnel and cervical roots) and to ignore other locations that may well be more important.

16. The last para before the conclusion is probably not necessary and could be removed.
Ad 16. The para has been removed in the revised manuscript.

17. Table 4
This table is not clear to me. I am not certain why the numbers in brackets are included, as these are from the previous study?
Ad 17. The numbers in brackets are from the previous study. This is indicated in the footer to the table with reference to the previous study.

18. It is not clear from the figures and the description in the table of the exact direction of force that was applied for each muscle test. For example was ECRB wrist extension/radial deviation or pure extension? It would be very helpful for some information about grading.
Ad 18. In the original manuscript I referred to the previous articles for a detailed description of each muscle test. In the revised manuscript I have repeated this description so that the reader knows exactly how the testing was performed.

Minor issues not for publication:
Abstract
19. First para, please correct to …, this study deals with the value….
Ad 19. Corrected
Conclusion
20. Please correct to ….but a confirmative diagnosis requires….
   Ad 20. Corrected

Background
21. Suggest change “approach” for examination
   Ad 21. Changed

22. There are a couple of sweeping statements regarding diagnosis in the 2nd para that should be supported by references. Eg electrophysical agents and imaging of no use in diagnosis.
   Ad 22. Sentence rephrased.

23. Para 4 Person first language is preferred
   Ad 23. Sentence rephrased

24. Para 5 2nd sentence needs revising “suffering motor and sensory functions” ?
   Ad 24. Sentence rephrased

25. Para 5 and 6 Probably best not to use the word “significant” out of a statistical connotation
   Ad 25. Sentence rephrased

26. Para 6 and remainder of paper Suggest changing greater pectoral for Pectoralis major
   Ad 26. Changed

Method
27. What is the experience/qualifications of the examiners?
   Ad 27. A brief description has been entered in the Method section.

Discussion
28. Replace “golden” with gold
Ad 28. Replaced.

29. Please correct “epikondylitis”
Ad 29. Corrected.

30. Please correct the final sentence of the 1st para of Upper limb Neuropathy. The meaning is not clear.
Ad 30. The sentence has been rephrased.

The 2nd para (has been deleted)

31. Table 1 Please check spelling eg “tights”. Please change 90# flexion…. to “90# shoulder flexion” Please do the same for the other muscle tests.
Ad 31. Corrected.

Referee 2

1) Note in the Introduction or Discussion that:
32. a) others have sought to parsimoniously characterize the status of upper limb muscle strength using indexes of 3 (Motricity Index) or 5 (Motor Index Score) muscle actions. While focused on patients with different problems (ie, stroke & spinal cord injury) I think they should at least be mentioned in passing.
Ad 32. This has been briefly mentioned in the methods section of the revised manuscript.

33. b) manual muscle testing is notoriously insensitive to strength impairments. Consequently, patients with scores of 5/5 may have impairments of 25% or more.
Ad 33. I agree. Minor degrees of impaired strength may not be recorded by manual muscle testing. This is mentioned in the revised manuscript with reference.
34. 2) Report on all aspects of validity, not just agreement. Specifically report sensitivity, specificity, + predictive value, and negative predictive value.

*Ad 34. The positive and negative predictive values have been mentioned in the result section.*

Ad 35. 3) Use people first language. For example, refer to "patients with upper limb..." rather than "upper limb patients."

*Ad 35. Corrected.*