Author's response to reviews

Title: Clinimetric evaluation of methods to measure muscle functioning in patients with non-specific neck pain: a systematic review.

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Version: 2 Date: 12 July 2008

Author's response to reviews: see over
Dear dr. Zauner,

Herewith I am pleased to submit our revisions of our manuscript “Clinimetric evaluation of ways of measuring muscle function in patients with non-specific neck pain: a systematic review (ref. no: Ref: MS: 5227981501909567)

Thank you for the opportunity to address the concerns of the reviewers. I have listed the changes we have made in a point-to-point response in italics. Furthermore we adjusted the background section of our abstract and added additional information as advised. We would like to thank the reviewers for their valuable comments and quick responses and would like to express our sincere gratitude to their comments. We believe it resulted in a better readable manuscript.

Thank you for considering publication of our manuscript in the journal of BMC musculoskeletal disorders.

With kind regards

Chantal de Koning
Response letter to reviewer's comments

Reviewer 1: Dr. Chiu

Results
Muscle endurance test short neck flexors
How did they measure the time in seconds are they reliable?
CdK: In all the included articles time was measured with a stopwatch, no specific information was stated of the reliability of using the stopwatch. We added this in the manuscript.

Two comments were made on the description of “quality” of the study design. Why is the description of the study design rated as 'sufficient' in muscle endurance test of the short neck flexors and why is the study design of included studies for dynamometry rated as ‘incomplete’?
CdK: When reviewing the included articles we assessed the methodological quality of the studies. These criteria were: type of included subjects or patients, whether or not the examiners were representative, experience of the examiners, the test-retest interval, blinding aspects and whether or not appropriate statistics were used. The text in the manuscript is adjusted according to these methodological criteria and were specified.

What are the three instruments included for dynamometry?
CdK: The studies contained three different kind of instruments, a Penny and Giles hand-held myometer, a portable dynamometer and a modified Sphygmomanometer dynamometer. We added this in the manuscript

Discussion
P.14 “The patient in crook-lying and monitoring the chin tuck can be advised…..” The authors should emphasis the importance of head lift for the endurance test but not the chin tucks.
CdK: Thank you for this useful comment.

P.15 “The cervical PILE test can be recommended as a functional lifting test…. More details should be given to justify this according to table 3.
CdK: ? In table 3 can be seen that the cervical PILE test had a positive rating and the timed weighted overhead test gets a doubtful rating.

P.15 “Three studies ….but information on the study design is lacking”
What information is lacking, please elaborate.
CdK: In the results section of the craniocervical flexion test is explained which information on the study design of the included articles is lacking. This information is provided in the discussion section

P15. “the validity of the test has not been investigated”
Contrast group comparison is a test of validity e.g. study 22 and others.
CdK: In study reference no. 22 forty subjects were used (20 healthy subjects and 20 subjects with chronic neck pain). The patients with neck pain had a poorer performance on the test, more studies also stated this (studies with reference no. 28 and 29). However in these studies the reliability of the instrument was determined in small sample sizes and incomplete study design.

How about other test e.g. Dynamometry and manual test, the author should
give some comments on these tests based on what they found.

cdk: Thanks for this comment; the text in the first paragraph of the discussion section is adjusted according to this comment.

reviewer 2: dr vernon

minor essential revisions: in "background", line 15, the term "physical therapists" should be changed to "musculoskeletal practitioners". in my opinion, the BMC-MSK is a multi-disciplinary journal and should not reflect the interests of only one of the MSK professions (unless there is sufficient justification, which is not present here).

discretionary revisions: the authors may wish to provide a flow chart of the study flow (inclusion/exclusion), although their description in the text is quite adequate.
cdk: We appreciate this valuable comment on our review and changed the term physical therapists in "musculoskeletal practitioners".
we described the in- and exclusion of potential relevant studies in detail as also stated by the reviewer. we believe that adding a flow chart is much more of the same. However, if the editor prefers a flowchart we will provide a flow chart

reviewer 3: dr sterling.

background: I suggest start new paragraph with Panjabi et al.
cdk: We agree with this suggestion and accordingly done.

the sentence 'neck muscle function consists among other aspects of muscle strength, endurance and proprioception' does not make sense. Can you reword.
cdk: The purpose of this sentence was to explain the different aspects of functioning of the musculoskeletal system of the neck. Obviously it has no additional value; therefore we deleted this sentence.

should the muscle endurance test of the short neck flexors be called the Grimmer test. I have not heard this terminology before. I suggest it be called short neck flexor endurance test or similar.
cdk: This is a good comment we struggled with and were happy to change the terminology as suggested by dr. Sterling.

the discussion is somewhat disjointed. Attention to paragraphing is required. For example paragraph 5 seems to be a continuation of paragraph 4. They need linking together. There are also no page numbers making it difficult to provide direction here!

cdk: We followed the advise of the reviewer.

paragraph 2. the aim of both tests is different. Can you explain this further? How are they different?
cdk: The difference between these two tests is that the craniocervical flexion test is used to evaluate muscle function of the deep cervical flexors by making upper cervical flexion. The muscle endurance test of the short neck flexors evaluates both superficial and deep muscle function by adding a head lift to the test to upper cervical flexion. We agree with this critical remark and adjusted these sentences as suggested. We adjusted the text as followed: The craniocervical flexion test [29] was developed to evaluate the muscle endurance of the deep neck flexor muscle system for its contribution to cervical segmental
stabilisation. Muscle endurance test of the cervical short muscle function is designed to evaluate the function of the superficial and deep short neck flexors

Reference 66 was an attempt to validate the carniocervical flexion test. You have mentioned this study but can you explain why it was not investigating validity.

CdK: The literature has shown that reduced EMG activity has been found in patients with neck pain in this test. The literature is not conclusive on the reliability of EMG measures. Jull et al (2002) found that reproducibility of EMG variables in the sternocleidomastiod and anterior scalene muscles is adequate. Oksanen et al (2007) showed adequate intra tester reliability for surface EMG from the cervical erector spinae and the sternocleidomastoideus muscles.

However, repeatability has not yet been shown for electromyography for the deep cervical muscles (falla et al, 2004). Moreover, in our review is stated that the construct validity of this test not yet has been investigated. We changed the text in Although other studies relate an altered electromyographic amplitude of the deep and superficial neck flexors to changes occurring on the craniocervical flexion test [9, 67], and poorer performance on the craniocervical flexion test is seen in patients with chronic neck pain [22, 29], different clinimetric aspects of this test have not been investigated thoroughly. Elektromyography of the superficial neck muscles has been shown wat dan? – volgens mij vergeet je een stukje tekst [38, 68] but for measuring deep cervical flexor muscles with electromyography evidence for reproducibility is lacking [67].

De oorspronkelijke bedoeling was om in discussie om aan te geven dat ondanks dat met elektromyography is aangetoond dat bij chron np patient verminderde aanspanning is van
diepe nekflexoren bij cranio-cervicale flexie test de construct validiteit zoals wij dat
onderzocht hebben niet is aangetoond. Mijn tekst voorstel:

Other studies relate an altered electromyographic amplitude of the deep and superficial neck flexors to changes occurring on the craniocervical flexion test [9, 67]. Elektromyography of the superficial neck muscles has been shown to be reproducible [38, 68] but when measuring deep cervical flexor muscles with electromyography evidence for reproducibility is lacking [67]. Therefore, amongst other clinimetric aspects, the validity of the craniocervical flexion test is still doubtful and the craniocervical flexion test is not yet advised for measuring the endurance of the short neck flexors.
