Reviewer's report

Title: Validation of a new test that assesses functional performance of the upper extremity and neck (FIT-HaNSA) in patients with shoulder pathology

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Reviewer: Jolanda Luime

Reviewer's report:

General

Shoulder pathology has a substantial impact on quality of life [1-5] that is lasting[6,7], as only 59% of shoulder complaints resolve within 12 months [8]. The effect of shoulder pain studies is most often evaluated using self-reported measures. These include disease-specific quality-of-life measures [29,30], joint-specific pain/disability measures [31] and regional measures [32,33]. Selfreport measures have the advantage of being patient-centered and relatively easy and inexpensive to apply. They provide an important perspective on patient status. However, studies conducted in different upper extremity clinical populations [34-37], and specifically, shoulder problems [4,38,39] agree that the relationship between selfreported disability and actual physical impairment or functional performance is moderate [40]. It is now generally accepted that they provide complimentary information that might support either clinical reasoning or outcome assessment. While numerous selfreport measures are available, relatively little work has been conducted defining performance-based tests that would assess functional endurance.

A current gap in shoulder evaluation is the availability of a simple protocol that can be used to assess functional performance over a spectrum of patients with shoulder pathology. Therefore, our purpose was to develop and test a clinically viable test protocol that would fill this gap. Specifically, we were interested in an instrument that might be useful to assess change over time and distinguish between meaningful subgroups within clinical populations having disorders affecting the upper extremity and neck.

The shoulder joint helps position the hand in a large arc of space for performance of functional tasks and provides a stable proximal base for distal muscle actions and sensory inputs. This functionality is dependent on sustained muscle activity and maintenance of sufficient proximal control so that functional tasks can be initiated and continued to task completion. Pain, lack of muscle strength, lack of muscular endurance, impaired proprioception, or failure in muscular control/co-ordination may, in isolation or combination, be responsible for inability to perform the required sustained activity. Thus, isolated physical impairments, like muscle or ROM deficits, do not directly or completely explain impaired functionality.

Strength and stability are essential to shoulder function. Given the key role of muscles in establishing shoulder stability, mobility, and function, it is not surprising that the strength of specific muscle groups is typically viewed as a key outcome measure when evaluating shoulder conditions. Quantitative measures of isometric [4,9-12] and isokinetic [4,11-23] strength have been described to dictate the functionality of muscles in different muscle actions. It has been demonstrated that shoulder strength and general health status are related in person with shoulder pathology [4], suggesting that impairments in muscle are important contributors to overall health and, thus, worthy of evaluation. Range of motion (ROM) [24] is also frequently reported in outcome studies, although its relationship to function has been less clearly defined [25]. Pain is a key factor in evaluating the impact of MSK disorders and response to treatment. In fact, pain has been a primary focus of systematic reviews looking at diagnosis [26], prognosis [6], and treatment effectiveness [27,28]. These reviews have indicated deficits in current literature, in particular the need for validated outcome measures to improve the validity of clinical trials addressing shoulder pain [27].
We searched for a validated test that would assess functional performance of the upper extremity and neck during sustained use. While a variety of such tests have been described for hand function [41-46], most tasks involve minimal shoulder movement, nor were they developed or validated to assess patients across a spectrum of shoulder conditions. An exception, is the test developed by Hughes et al. [47], the Simple Shoulder Endurance Test, a custom-made test where subjects were required to manipulate bolts from a sitting position. Progressive weighting of the arm was used to induce fatigue and a single test position and task were included. The test-retest reliability of this test protocol was 0.59 (Pearson r). The authors concluded the test was promising, but acknowledged reliability was below recommended levels. There have been no reports of this test being used with patients. A variety of work simulators are commercially available that might be used to create “functional test protocols”, although there has been little report of these in the literature. There are also reports of “endurance” or “fatigue” protocols that can be used on isokinetic dynamometers [48-51], although most last less than 2 minutes, suggesting they do not assess the physiologic pathways used in most sustained work or functional activity.

Page 4
The introduction still doesn’t bring me in an easy way to the objectives of the study. Please see suggestion to restructure the introduction in the attachement. Besides, it would be easier to state the objectives in a few sentences like we aim (i) to develop a test protocol that requires coordinated movement and positioning of the upper extremity and neck across different tasks that simulate elements of functional activity and (ii) to test its validity and reliability in a first phase diagnostic study. I would leave the rest of the information to be written in the method section.

Page 7
The section on participants is confusing. Previously 12 volunteers were mentioned among which the protocol was developed. Part 1 starts with the heading ‘protocol development’???

“Part 3 “
There is a problem with all of the diagnosis mentioned here. Most physical examination test lack validity to come to these diagnosis or their validity is not tested in the population you are describing here. There is very limited evidence about the use of sequential testing in shoulder disorders. This makes it complicated to reproduce the study with similar findings

Page 8
Analyses: It would be nice just to phrase this section without the numbering.

Results
Could you please present the confidence interval around the number of seconds?

Protocol development
Second sentence: please add “The mean times to stop the tasks 1, 2, 3 because of pain....”

Nineth sentence: It is not clear from the text what is meant by “The percentage of shoulder functional ability”

Validation
Please add the confidence intervals around the mean time

Discussion
Wouldn’t it be better to say in the first sentence: This study describes the development of a new functional performance test for shoulder pain patients and provides preliminary results for its validity and reliability.
Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

Discretionary Revisions (which the author can choose to ignore)