

Standardised test protocol (Constant Score) for evaluation of functionality in patients with shoulder disorders

Ilija Ban¹, Anders Troelsen¹, David Høyrup Christiansen², Susanne Wulff Svendsen² & Morten Tange Kristensen³

ABSTRACT

INTRODUCTION: The Constant Score (CS), developed as a scoring system to evaluate overall functionality of patients with shoulder disorders, is widely used but has been criticised for relying on an imprecise terminology and for lack of a standardised methodology. A modified guideline was therefore published in 2008 with several new recommendations, but a standardised test protocol was not included.

Also, this new version has not been translated into Danish. The aims of the present study were to develop a standardised English test protocol for the newly modified CS, and to translate and cross-culturally adapt this version into Danish.

MATERIAL AND METHODS: An English test protocol was developed and translated into Danish at two independent centres according to international recommendations. Consensus on a preliminary version was achieved. The subjective part was tested on six patients, while two physiotherapists gave feedback on the objective part. Relevant items were culturally adapted and rephrased, and a simple standardised test protocol was developed.

RESULTS: Only minor inconsistencies in the translations were found. A few questions and words had to be rephrased due to cultural and linguistic differences. One of the authors of the modified CS approved both the English and the Danish test protocol.

CONCLUSION: A simple test protocol of the modified CS was developed in both English and Danish. With precise terminology and definitions, the test protocol is the first of its kind. We suggest its use internationally for standardised assessment of the CS. Testing of validity, reliability and responsiveness of both versions needs to be done in future research.

FUNDING: not relevant.

TRIAL REGISTRATION: not relevant.

As treatment modalities for shoulder diseases evolve and new treatments are introduced, the need for assessment of functional outcome is increasing. The Constant Score (CS) [1] was among the first shoulder score systems developed and is considered the most commonly used scoring system for evaluation of various disorders of the shoulder [2]. The CS assesses subjective and objective shoulder function with respect to: A: pain; B: ac-

tivities of daily living; C: range of motion and D: strength (Figure 1). The CS is often used to evaluate treatment progress and to compare results of clinical trials for several specific shoulder disorders [2-4]. The European Society for Surgery of the Shoulder and Elbow (ESSSE) and the Journal of Shoulder and Elbow Surgery recommend the CS for use in research on shoulder disorders [2, 5]. Nevertheless, it has been criticised for relying on imprecise terminology and for diffuse definitions of methodology in the original description of the score [2, 6, 7]. Thus, a standardised test protocol is not available. This has left room for different interpretations and use of the score between centres [7]. To address these weaknesses, Constant et al published a guideline paper in 2008 with recommendations for modifications of the original CS [2]. However, no standardised test protocol was included in these new recommendations and the validity and usefulness of the score therefore remains questionable. The need for a standardised test protocol was further emphasised in a 2010 systematic review of the psychometric properties of the CS [8]. Moreover, the CS revised in accordance with the newly modified guideline has not been translated and adapted into Danish.

The aims of the study were: 1) to develop an easy-

ORIGINAL ARTICLE

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FIGURE 1

Assessment of Constant Score (strength assessment).



to-use test protocol in English for the CS with a detailed accompanying methodology guideline and 2) to translate and cross-culturally adapt this new test protocol of the CS into Danish.

MATERIAL AND METHODS

An English test protocol of the CS that included all sub-elements of the score according to the original [1] and the modified guideline [2] were developed at two independent centres in Denmark (Figure 2 and Figure 3). Consensus was then achieved. The test protocol was kept simple, and a detailed methodology guideline was made as a supplement to the protocol.

Next, the CS was translated into Danish at both centres using the agreed English version (see Figure 4 for the Danish version). The translation at each centre followed the principles of the ISPOR Task Force for translation and cultural adaptation [9].

The translation process involved the following seven steps:

1. Independent forward translation by three bilingual health professionals at each centre and one professional translator. The persons involved all had Danish as their native language and some of them had prior experience with translation of outcome measures.
2. Consensus on a preliminary forward translation was achieved.
3. Cognitive pretesting to determine the acceptability and comprehensibility of the translation was performed at each centre. Six patients (two men and four women, mean age 47 years) diagnosed with shoulder rotator cuff/impingement syndrome and undergoing subacromial decompression and two physiotherapists participated.
4. Evaluation and revision of the translation were performed based on the result of the cognitive debriefing from the two centres and feedback from the health professionals involved.
5. An independent back translation was performed at each centre by a bilingual health professional with English as a native language. The back translators were not familiar with the original modified guidelines. The back translations were harmonised in agreement between the two centres.
6. The back translation was forwarded to one of the original authors of the modified guideline (Dr. Jens Ole Sjøbjerg) for review and verification. The reviewer was Danish and also reviewed the Danish version.
7. The main translators from each centre and the project manager compared the final back translation with the original guideline. Final adjustments

were incorporated and consensus on the Danish and English versions of CS was achieved.

Trial registration: not relevant.

RESULTS

We encountered several difficulties in defining the properties of some of the sub-elements of the score when developing the standardised test protocol for CS. As an example, the modified guideline recommends using a visual analogue scale with a sliding cursor to assess the subjective sub-elements of pain and activities of daily living [2]. This visual analogue scale was constructed specifically for the guideline paper, where it is depicted, but is not commercialised and therefore not available for use in clinical practice. Instead, we chose to include a 15-centimetre "paper" visual scale both for pain and for activities (Figure 2). This procedure can be directly implemented in all settings as a usual ruler is used for calculating points. Also the modified Constant et al guideline introduced a time-period (last 24-hours) to assess pain, but did not introduce a time-period for the assessment of activities of daily living. We therefore added a time-period (within the past week) to assist patients in their evaluation of their activities of daily living (Figure 2). The Constant guideline also recommends that some sub-elements of the objective range of motion (ROM) part are assessed with the subject seated to avoid spinal tilting, whereas there is no recommended positioning for other sub-elements of the ROM testing. As item C4 of the ROM testing is performed with the hand/arm behind the back, it is considered appropriate to perform this part standing. We therefore chose to deviate from the guideline and recommend the standing position for all ROM tests, as it reflects normal clinical assessment, and as we believe that it will reduce the risk of different handling during testing (Figure 3).

We found only minor inconsistencies between the two forward translations into Danish, and consensus was achieved in all cases without much difficulty (see Figure 4). Due to cultural and linguistic differences between the English and Danish languages, a few questions and words were rephrased to facilitate adaptation into Danish. Most of the linguistic differences were found in the subjective parts of the score.

The testing of the preliminary version on patients revealed a few interpretation difficulties with some of the "subjective" questions. The more difficult problem had to do with the interpretation of "... your normal work ..." (Item B2) in patients who were not employed (Figure 2). We rephrased the sentence to "... your normal daily work ..." thereby implying that "daily work" does not have to be related to employment. A few unemployed patients who participated in the validation



FIGURE 2

Subjective part of the English Constant Score test protocol.

Test Protocol for the Constant Score
(After, Constant CR et al. J Shoulder Elbow Surg; March/April 2008)

Patient data (sticker)	Diagnosis _____ Right: ____ Left: ____.			
	Consultation date:	<input type="checkbox"/> Preop. <input type="checkbox"/> 3 months <input type="checkbox"/> 1 year	<input type="checkbox"/>	<input type="checkbox"/> 6 months <input type="checkbox"/> ____ year
Tel No. _____				

A. Pain	POINT
<p>Score the highest pain level you have experienced in your shoulder during ordinary activities within the last 24 hours. (0-15 points) (Indicate by setting a mark on the line)</p> <p>(Points are calculated by the equation: $15 - x = \text{score}$; X is the measured distance (cm) from "no pain" to the mark (use a ruler). If decimal then round up or down to closest integer, i.e: 1,4 cm = 1 point and 1,5 cm = 2 points)</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">No Pain</div> <div style="flex-grow: 1; border-bottom: 1px solid black; position: relative;"> <div style="position: absolute; right: 0; top: 50%; transform: translateY(-50%); text-align: center;">Intolerable pain</div> </div> </div>	
<p>B. Activities of daily living, the next 4 questions deal with everyday activities you experienced over the last week.</p>	
<p>1. Is your sleep disturbed by your shoulder? (0-2 points) (Tick one box)</p> <p>(points are given in brackets)</p> <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> <input type="checkbox"/> Undisturbed sleep (2) <input type="checkbox"/> Occasional disturbance (1) <input type="checkbox"/> Every night (0) </div> </div>	
<p>2. How much of your normal daily work does your shoulder allow you to perform? (0-4 points) (Indicate by setting a mark on the line)</p> <p>(The score is given by measuring the distance (cm) from "All" to the mark (use a ruler)) : 0-3 = 4 point , >3-6 = 3 point , >6-9 = 2 point , >9-12 = 1 point , >12-15 = 0 point</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">All</div> <div style="flex-grow: 1; border-bottom: 1px solid black; position: relative;"> <div style="position: absolute; right: 0; top: 50%; transform: translateY(-50%); text-align: center;">None</div> </div> </div>	
<p>3. How much of your normal recreational activity does your shoulder allow you to perform? (0-4 points) (Indicate by setting a mark on the line)</p> <p>(The score is given by measuring the distance (cm) from "All" to the mark (use a ruler)) : 0-3 = 4 point , >3-6 = 3 point , >6-9 = 2 point , >9-12 = 1 point , >12-15 = 0 point</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">All</div> <div style="flex-grow: 1; border-bottom: 1px solid black; position: relative;"> <div style="position: absolute; right: 0; top: 50%; transform: translateY(-50%); text-align: center;">None</div> </div> </div>	
<p>4. To which level can you use your hand comfortably? (0-10 points) (Tick one box)</p> <p>(points are given in brackets)</p> <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> <input type="checkbox"/> Below the waist (0) <input type="checkbox"/> Up to waist (2) <input type="checkbox"/> Up to the xiphoid/sternum (4) <input type="checkbox"/> Up to neck (6) <input type="checkbox"/> Up to top of the head (8) <input type="checkbox"/> Above the head (10) </div> </div>	
<p>Overall score for A+B (subjective subtotal, 0-35 points)</p>	



FIGURE 3

Objective part of the English Constant Score test protocol.

Test Protocol for the Constant Score (After, Constant CR et al. J Shoulder Elbow Surg; March/April 2008)

C. Movement		POINT																															
<p>Four different active and pain-free movements of the arm are performed i.e. if the arm can be lifted to 140 degrees with pain and 110 degrees without pain in 1 +2 then a range of motion of 110 degrees is recorded.</p> <p>The tester first shows the desired movement, which the test subject then performs. All exercises are done with the test subject standing with their feet pointing directly forwards and a shoulder width apart.</p>																																	
<p>1+2 Forward and lateral elevation are recorded with a long-armed goniometer. Movements are performed only by the affected arm. (0-20 points)</p> <p>Reference points are the arm's axis and procesus spinosi of columna thoracalis.</p> <table border="1"> <thead> <tr> <th></th> <th>0-30</th> <th>31-60</th> <th>61-90</th> <th>91-120</th> <th>121-150</th> <th>151 -</th> <th>Range of motion (degrees)</th> </tr> </thead> <tbody> <tr> <td>Flexion</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td rowspan="2"></td> </tr> <tr> <td>Abduction</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>0</td> <td>2</td> <td>4</td> <td>6</td> <td>8</td> <td>10</td> <td>Point</td> </tr> </tbody> </table>			0-30	31-60	61-90	91-120	121-150	151 -	Range of motion (degrees)	Flexion								Abduction								0	2	4	6	8	10	Point	
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<p>3 External rotation performed without help and the hands should be placed behind and above the head without touching the head. (0-10 point)</p> <p>Movements are performed by both arms simultaneously but recorded only for the affected side, starting with "hands behind head, elbows forward".</p> <p>The movements must be performed painlessly. (2 points are given for each separate completed movement)</p>		<table border="1"> <tbody> <tr> <td><input type="checkbox"/></td> <td>Hands behind head, elbows forward.</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Hands behind head, elbows back</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Hands to the top of the head, elbows forward</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Hands to the top of the head, elbows back</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Full elevation of the arms</td> </tr> </tbody> </table>	<input type="checkbox"/>	Hands behind head, elbows forward.	<input type="checkbox"/>	Hands behind head, elbows back	<input type="checkbox"/>	Hands to the top of the head, elbows forward	<input type="checkbox"/>	Hands to the top of the head, elbows back	<input type="checkbox"/>	Full elevation of the arms																					
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<p>4 Internal rotation is performed without help and where the subject use their thumb to point the anatomic landmarks specified to the right. (0-10 point)</p> <p>Movements are performed only by the affected arm, starting with "outer thigh".</p> <p>The movements must be performed painlessly (points are given in brackets)</p>		<table border="1"> <tbody> <tr> <td><input type="checkbox"/></td> <td>Lateral aspect of the thigh (0)</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Behind the buttock (2)</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Sacroiliac joint (4)</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Waist (6)</td> </tr> <tr> <td><input type="checkbox"/></td> <td>12th thoracic vertebra (8)</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Interscapular level (10) (Between the shoulder blades)</td> </tr> </tbody> </table>	<input type="checkbox"/>	Lateral aspect of the thigh (0)	<input type="checkbox"/>	Behind the buttock (2)	<input type="checkbox"/>	Sacroiliac joint (4)	<input type="checkbox"/>	Waist (6)	<input type="checkbox"/>	12th thoracic vertebra (8)	<input type="checkbox"/>	Interscapular level (10) (Between the shoulder blades)																			
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<p>D Strength (0-25 point) Strength is measured with a dynamometer. The test is done with the test subject standing with their feet pointing directly forwards and a shoulder width apart.</p> <p>The arm should be abducted 90 degrees in scapulas plane. If the arm cannot be elevated to 90 degrees a score of 0 points is given. The wrist is pronated so the palm faces down and the elbow is stretched as much as possible. The strap of the dynamometer should be placed around the wrist of the test subject so that it lies over the long head of the ulna.</p> <p>The test subject is instructed to push maximally upwards for 5 seconds.</p> <p>Verbal encouragement is given simultaneously: Ready 3-2-1 push..push..push</p> <p>The score is calculated from the highest score of 3 attempts, each performed with at least a 1 minute interval. The score corresponds to the force in pounds (max 25 points). If the strength is measured in kilograms, calculate scores by multiplying by 2.2</p> <table border="1"> <thead> <tr> <th></th> <th>1st attempt</th> <th>2nd attempt</th> <th>3rd attempt</th> <th>Best score</th> </tr> </thead> <tbody> <tr> <td>Strength (lbs/kg)</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			1 st attempt	2 nd attempt	3 rd attempt	Best score	Strength (lbs/kg)																										
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Overall score for C+D (objective subtotal, 0-65 points)																																	
Total Constant Score A+B+C+D (0-100 points)																																	



FIGURE 4, PAGE 1

Danish version of the Constant Score test protocol.

Constant Score Copenhagen Denmark 2011
(Efter, Constant CR et al. J. Shoulder Elbow Surg ;Arch/April 2008)

Patientdata (label)	Diagnose _____ Hø: _____ Ve: _____														
	Kontroldato:	<table border="1"> <tr> <td><input type="checkbox"/></td> <td>Præopr.</td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td>3 måneder</td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td>1 år</td> <td><input type="checkbox"/></td> </tr> </table>	<input type="checkbox"/>	Præopr.	<input type="checkbox"/>	<input type="checkbox"/>	3 måneder	<input type="checkbox"/>	<input type="checkbox"/>	1 år	<input type="checkbox"/>	<table border="1"> <tr> <td><input type="checkbox"/></td> <td>6 måneder</td> </tr> <tr> <td><input type="checkbox"/></td> <td>____ år</td> </tr> </table>	<input type="checkbox"/>	6 måneder	<input type="checkbox"/>
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<input type="checkbox"/>	6 måneder														
<input type="checkbox"/>	____ år														
Tlf nr.															

A. Smerte	POINT
<p>Angiv den værste grad af smerte du har oplevet i din skulder ved normale dagligdags aktiviteter, de sidste 24 timer. (0-15 point) (marker med streg på linjen) (Point udregnes efter ligningen: $15 - X = \text{point}$; X er den målte afstand (cm) fra "ingen smerter" til markeringen (brug en lineal). Decimaler rundes op eller ned til nærmeste heltal, eks. 1,4 cm = 1 point og 1,5 cm = 2 point)</p> <p>Ingen smerter ----- Værst tænkelige smerter</p>	
<p>B. Dagligdags aktiviteter, de næste 4 spørgsmål omhandler dagligdags aktiviteter, som du har oplevet den seneste uge.</p> <p>1. Er din nattesøvn forstyrret af din skulder? (0-2 point) (sæt et kryds)</p> <p>(Point er angivet i parentes)</p> <p><input type="checkbox"/> Nej (2) <input type="checkbox"/> Indimellem (1) <input type="checkbox"/> Ja, hver nat (0)</p>	
<p>2. Hvor meget af dit normale daglige arbejde tillader din skulder dig at udføre? (0-4 point) (marker med en streg på linjen) (Point udregnes ved at måle afstanden (cm) fra "alt" til markeringen (brug en lineal)): 0-3 = 4 point, >3-6 = 3 point, >6-9 = 2 point, >9-12 = 1 point, >12-15 = 0 point</p> <p>Alt ----- Intet</p>	
<p>3. Hvor meget af dine normale fritidsaktiviteter tillader din skulder dig at udføre? (0-4 point) (marker med en streg på linjen) (Point udregnes ved at måle afstanden (cm) fra "alt" til markeringen (brug en lineal)): 0-3 = 4 point, >3-6 = 3 point, >6-9 = 2 point, >9-12 = 1 point, >12-15 = 0 point</p> <p>Alt ----- Intet</p>	
<p>4. Op til hvilken højde kan du bruge din hånd uden ubehag? (0-10 point) (sæt et kryds)</p> <p>(Point er angivet i parentes)</p> <p><input type="checkbox"/> Under taljen (0) <input type="checkbox"/> Op til taljen (2) <input type="checkbox"/> Op til brystbenet (4) <input type="checkbox"/> Op til halsen (6) <input type="checkbox"/> Op til toppen af hovedet (8) <input type="checkbox"/> Over hovedet (10)</p>	
Samlet score for A+B (subjektive delmål)	

 FIGURE 4, PAGE 2

Danish version of the Constant Score test protocol.

Constant Score Copenhagen Denmark 2011 (Efter, Constant CR et al. J. Shoulder Elbow Surg ;Arch/April 2008)

C. Bevægelse		POINT																																
<p>Fire forskellige aktive og smertefrie bevægelser af armen udføres. Dvs. Kan armen løftes til 140 grader med smerte og 110 grader uden smerte i 1+2 så registreres et bevægeudslag på 110 grader.</p> <p>Tester viser først den ønskede bevægelse, hvorefter testpersonen udfører den. Alle øvelser laves med testpersonen stående med en skulder breddes afstand mellem fødder, der skal pege lige fremad.</p>																																		
<p>1+2 Fleksion og abduktion registreres med et langt goniometer. Bevægelserne udføres kun på skadet side. (0-20 point)</p> <p>Reference punkterne er armens akse og procesus spinosi af columna thoracalis.</p> <table border="1"> <thead> <tr> <th></th> <th>0-30</th> <th>31-60</th> <th>61-90</th> <th>91-120</th> <th>121-150</th> <th>151 -</th> <th>Bevægeudslag (grader)</th> </tr> </thead> <tbody> <tr> <td>Fleksion</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Abduktion</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>0</td> <td>2</td> <td>4</td> <td>6</td> <td>8</td> <td>10</td> <td>Point</td> </tr> </tbody> </table>			0-30	31-60	61-90	91-120	121-150	151 -	Bevægeudslag (grader)	Fleksion								Abduktion									0	2	4	6	8	10	Point	
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<p>D Styrke (0-25 point) Styrken måles med et dynamometer. Testpersonen skal være stående med en skulder breddes afstand mellem fødderne, der skal pege lige fremad. Armen skal være abduceret 90 grader i scapulas plan. Kan armen ikke eleveres til 90 grader gives 0 point. Håndleddet proneres så håndfladen vender ned ad og albuen strækkes mest muligt. Stroppen skal placeres omkring håndleddet på testpersonen så den ligger henover caput af ulna. Testpersonen instrueres i at presse maksimalt opad i 5 sekunder. Samtidigt gives verbal opmuntring: Klar 3-2-1 pres..pres..pres</p> <p>Scoren beregnes ud fra den højeste score af 3 forsøg, hver udført med mindst 1 minuts mellemrum. Scoren svarer til styrken i pund (max 25 point). Måles styrken i kilogram udregnes scoren ved at gange med 2.2</p> <table border="1"> <thead> <tr> <th></th> <th>1. forsøg</th> <th>2. forsøg</th> <th>3.forsøg</th> <th>Bedste score</th> </tr> </thead> <tbody> <tr> <td>Styrke (pund/kg)</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			1. forsøg	2. forsøg	3.forsøg	Bedste score	Styrke (pund/kg)																											
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Samlet score for C+D (objektive delmål)																																		
Samlet Constant Score A+B+C+D																																		

found this rewording relevant. The physiotherapists had minor difficulties interpreting the score system, and some methodology instructions were rephrased. Overall, both patients and physiotherapists found the test protocol relevant and easy to complete.

Dr. Jens Ole Sjøbjerg approved the Danish as well as the back-translated English test protocol.

DISCUSSION

The CS, which was originally developed as a scoring system for the evaluation of functional outcome in patients with general shoulder disorders, is widely used internationally and recommended by the ESSSE, but at the same time often criticised for relying on imprecise terminology and for lack of a standardised, internationally accepted test protocol.

Based on the newly modified guideline for the CS [2], the present study provides clinicians with a standardised English test protocol in addition to a version for use in Denmark. A previous reliability review study of the CS [7] revealed considerable differences in seven test protocols of the CS used by various European shoulder units, and none of the protocols were sufficiently standardised. Notably, in a study published in 2012, Blonna et al [10] demonstrated that both inter- and intraobserver reliability improved significantly by using a standardised CS protocol, and the importance of standardisation has been further emphasized in other studies [2, 6]. The paper by Blonna et al did actually provide a standardised test protocol, but unfortunately they did not follow the new and modified guidelines provided by Constant et al in 2008, although reference was made to the study in the paper.

Thus, we are unaware of any official standardised test protocol for the CS including a version that follows the new recommendations [2]. To our knowledge, the test protocol presented in this paper (Figure 2 and Figure 3) is therefore the first of its kind that follows the new recommendations, and we recommend that it be used internationally as a standardised version as it includes precise definitions and descriptions of the scoring system as well as the method of assessment.

Still, we did identify several potential limits of the CS while developing the standardised test protocol. First of all, full standardisation of all items seems impossible, e.g. the standardisation of “painless” movements required when testing ROM and strength (Figure 3) seems difficult as pain differs in terms of type and location, and as some patients are “painless” owing to analgesics. Our test protocol does not solve this problem, but we emphasize that the interpretation of such ambiguous terms in the target population should clearly be reported when results are presented in future studies. Secondly, there are differences in the systems used for allocation of

points to sub-elements of the same score item, e.g. the visual scales used to assess the subjective elements of pain and activities related to daily living (Figure 2). Thus, the scale used to assess pain (item A) uses 0 and 15 as anchor points, as depicted in the guideline [2]. This means that the “length” on the scale which corresponds to a score of 0 and 15 points (from 0 to 0.49 and from 14.5 to 15), respectively, is but half the length allocated to the remaining points (1-14) on the scale. In comparison, the visual scale used to assess activities of daily living (items B2 & B3) ranges from only 0 to 4 points and has no anchor points, making the five scoring possibilities (0-4 points) equally represented by the same “length” (from point to point) on the scale. Also, points are given by movements successfully performed, whereas others are given as the movement progresses for different items of the ROM. We did not change these inconsistencies in the original guidelines for allocation of these points, but we tried to make clear recommendations in our test protocol and the accompanying methodology guideline.

The translation of the modified guideline for the CS [2] into Danish, which followed international recommendations [9], was successfully conducted. The process revealed only minor discrepancies concerning the wording and understanding of the CS, and pretesting revealed that both patients and health professionals found the translation acceptable and relevant and the test easy to complete. Still, the patients used for cognitive debriefing represent a small and specific group of all shoulder disorders and therefore do not fully match the target population, as the CS targets shoulder disorders in general.

Some potential limitations of the CS were acknowledged in the conclusion of the paper on the modified guideline [2], but at the same time it was pointed out that the CS is widely accepted and should therefore continue to be used until a more valid and reliable alternative has been developed. Thus, the CS is still recommended for assessment of shoulder disorders in general despite the obvious fact that the wide range of shoulder disorders represents slightly different problems. Whether the CS is valid for all shoulder disorders is therefore questionable as some items might be irrelevant and there might be ceiling effect for some subgroups. We therefore recommend that our standardised test protocol be validated on all subgroups of shoulder disorders before being used clinically.

CONCLUSION

A simple standardised English test protocol of the modified Constant Score was developed. With precise terminology and definitions, this test protocol is the first of its kind; and we suggest it be used internationally for standardised assessment of the CS. A translation of the CS

into Danish was successfully conducted. We suggest this Danish version of the modified CS for use in Danish patients with shoulder diseases, as it is – to our knowledge – the first translation into Danish that follows international guidelines. However, testing of validity, reliability and responsiveness of these new English and Danish versions needs to be done before there use may be recommended for daily clinical use.

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LITTERATUR

1. Constant CR, Murley AHG. A clinical method of functional assessment of the shoulder. *Clin Orthop* 1987;214:160-4.
2. Constant CR, Gerber C, Emery RJH et al. A review of the Constant score: modifications and guidelines for its use. *J Shoulder Elbow Surg* 2008;17:355-61.
3. Conboy VB, Morris RW, Kiss J et al. An evaluation of the Constant-Murley shoulder assessment. *J Bone Joint Surg Br* 1996;78:229-32.
4. Iannotti JP, Bernot MP, Kuhlman JR et al. Postoperative assessment of shoulder function: a prospective study of full-thickness rotator cuff tears. *J Shoulder Elbow Surg* 1996;5:449-57.
5. Wright RW, Baumgarten KM. Shoulder outcomes measures. *J Am Acad Orthop Surg* 2010;18:436-44.
6. Hirschmann MT, Wind B, Amsler F et al. Reliability of shoulder abduction strength measure for the Constant-Murley score. *Clin Orthop Relat Res* 2010;468:1565-71.
7. Rocourt MH, Radlinger L, Kalberer F et al. Evaluation of intratester and intertester reliability of the Constant-Murley shoulder assessment. *J Shoulder Elbow Surg* 2008;17:364-9.
8. Roy JS, MacDermid JC, Woodhouse LJ. A systematic review of the psychometric properties of the Constant-Murley score. *J Shoulder Elbow Surg* 2010;19:157-64.
9. Wild D, Grove A, Martin M et al, ISPOR Task Force for Translation and Cultural Adaptation. Principles of good practice for the translation and cultural adaptation process for patient-reported outcomes (PRO) measures: report of the ISPOR Task Force for Translation and Cultural Adaptation. *Value Health* 2005;8:94-104.
10. Blonna D, Scelsi M, Marini E et al. Can we improve the reliability of the Constant-Murly score? *J Shoulder Elbow Surg* 2012;21:4-12.