Original Article

Turkish version of the patient-based Constant-Murley Score: Its cross-cultural adaptation, validity, reliability and comparison with the clinician-based version

Tuğçe Özekli Mısırlıoğlu[1] (ORCID), İlker Eren[2] (ORCID), Özden Özyemişçi Taşkıran[3] (ORCID), Caner Günerbüyük[2] (ORCID), Olgar Birsel[2] (ORCID), Nazan Canbulat[3] (ORCID), Mehmet Demirhan[2] (ORCID)

[1]Department of Physical Medicine and Rehabilitation, Istanbul University-Cerrahpaşa, Cerrahpaşa Faculty of Medicine, Istanbul, Türkiye
[2]Department of Orthopedics and Traumatology, Koç University Faculty of Medicine, Istanbul, Türkiye
[3]Department of Physical Medicine and Rehabilitation, Koç University Faculty of Medicine, Istanbul, Türkiye

ABSTRACT

Objectives: The aim of this study was to translate, cross-culturally adapt the patient-based Constant-Murley Score (p-CMS), assess its validity, reliability, and compare it with the clinician-based CMS (c-CMS).

Patients and methods: This cross-sectional study included a total of 51 shoulders of 46 patients (22 males, 24 females; mean age: 49±10 years; range, 29 to 70 years) with shoulder pain between December 2015 and July 2016. After translation of p-CMS, each participant was asked to complete the final Turkish version of the p-CMS. The c-CMS was assessed by a physiatrist who was blinded to the p-CMS. Retest of the p-CMS was performed in patients (n=15) who did not receive any treatment between two visits (Days 3 to 5).

Results: A total of 51 shoulders (n=5 bilateral shoulder pain) were tested. Strength, subjective, objective, and total scores were significantly different between the p-CMS and c-CMS (p<0.001). Pain scores of the c-CMS and p-CMS revealed similar results with 95% limits of agreement of -3.81 and 4.81. Weighted kappa statistics demonstrated that the levels of agreement ranged between 0.343 and 0.698 in subjective and between 0.379 and 0.515 in objective components. For test-retest reliability of the p-CMS, intraclass correlation coefficient values ranged between 0.838 and 0.995.

Conclusion: The Turkish version of the p-CMS has internal consistency and test-retest reliability to evaluate shoulder function in Turkish patients with shoulder pathologies. Considering the differences in test protocols and scoring methods of c-CMS and p-CMS, their interchangeable use is not supported.

Keywords: Constant-Murley Score, patient-reported outcome measures, reliability, shoulder pain, validity.

Shoulder pain is one of the most common musculoskeletal problems with a lifetime prevalence of 6.7 to 66.7%.[1] Both pain and reduced range of motion (ROM) of the shoulder can limit activities of daily living (ADLs), affect psychological and social well-being, and reduce quality of life.[2,3] As an important health problem, shoulder pathologies should be treated effectively. To determine the treatment effectiveness, valid and reliable tools that assess shoulder function is necessary. These tools provide important contribution to clinical decision-making and research.

The Constant-Murley score (CMS) is the most widely used scale for the evaluation of various shoulder disorders.[4] It was introduced in 1987 for evaluation of pain, ADL, shoulder ROM (movement) and strength[5] and was modified in 2008.[4] A standardized test

protocol for the modified CMS was published in 2013.[6] The modified CMS scale requires clinician input for the assessment of ROM and strength subscales, while pain and ADL subscales are self-reported by the patient. To overcome the challenges related to follow-up and resources on research teams, the patient-based CMS (p-CMS) with an objective self-scoring instruction for the ROM and strength subscales was developed by Levy et al.[7] in 2013. The p-CMS showed almost perfect or substantial agreement compared to the clinician-based CMS (c-CMS) and, therefore, it was suggested that p-CMS could be used interchangeably or in place of c-CMS.[7]

Considering the recommendation of the European Society for Surgery of the Shoulder and the Elbow (ESSSE) and the *Journal of Shoulder and Elbow Surgery* for the continued use of CMS on shoulder disorders,[4,6] and the stress of Levy et al.[7] on the advantages of p-CMS, in the present study, aimed to translate, cross-culturally adapt the p-CMS, assess its validity, and compare it with the c-CMS questionnaire.

PATIENTS AND METHODS

This cross-sectional study was conducted at Koç University Faculty of Medicine, musculoskeletal outpatient clinic between December 2015 and July 2016. Backward and forward translation was performed in both languages according to the established procedures.[8]

1. *Translation into Turkish:* First, p-CMS was translated from English into Turkish independently by two individuals who speak English fluently and Turkish as their mother tongue. To agree upon a common Turkish version, both translations were compared and discussed by two bilingual physicians, an orthopedic surgeon, and a Physical Medicine and Rehabilitation specialist.

2. *Back-translation from Turkish into English:* Two native Turkish speakers who were English teachers produced an English version of p-CMS independently. Upon analyzing and comparing the two translated versions, an agreed-upon back-translated version was created.

3. *Review of the back-translated version:* A committee comprising four clinicians who were experienced in shoulder rehabilitation and shoulder surgery compared and evaluated discrepancies of the back-translated version with the original version of the p-CMS. No

amendments were required. As a result, the final Turkish version of the p-CMS was approved (Appendix 1).

4. *Pre-testing:* Before commencing the study, Turkish version of the p-CMS was tested on five patients for checking the cross-cultural equivalence of source and final versions.

The patients who were admitted to physical medicine and rehabilitation or orthopedics outpatient clinics with the complaint of shoulder pain during the study period were consecutively included in the study. Diagnosis was made based on the findings of clinical examination and imaging studies. Patients who had inability to complete the form due to cognitive impairment or severe vision problem; acute onset complaints; history of previous shoulder surgery, and neurological disorders or rheumatological disorders were excluded. Each participant was asked to complete the p-CMS initially. The c-CMS was assessed by a physiatrist who was blinded to the p-CMS. Retest of the p-CMS was performed on patients who did not receive any treatment between two visits (Days 3 to 5).[9]

Clinician-based Constant-Murley score (modified Constant-Murley score)

The c-CMS (the modified CMS) is a 100-point scale, consisting of four different sections: pain, ADL, movement (ROM), and strength (Appendix 2). Pain and ADL are also referred as subjective subtotal, and movement and strength sections as objective subtotal. Total score is sum of subjective and objective subscores. Higher scores indicate a higher quality of function. The validity and reliability study of the Turkish version of the modified CMS and its standardized test protocol was conducted in Türkiye.[10] This adapted version of the modified CMS according to the standardized protocol defined by Ban et al.[6] was used in this study.

Pain is questioned by using a graduated line of Visual Analog Scale (VAS) from 0 to 15 (0-15 VAS). The highest level of pain is marked from 0 (no pain) to 15 (intolerable pain) by the patient. The ADLs are assessed with four questions about sleep, work, recreational activities, and level of painless arm movements during the ADL. In the movement section of the score, active and painless flexion and abduction are recorded by a long-armed goniometer in degrees; external and internal rotation are recorded as separate active maneuvers in a standing position. For the strength section of the test, either a well-established handheld dynamometer or a defined

spring balance technique is recommended for use. In our study, a digital dynamometer (Mecmesin Myometer, West Sussex, UK) was utilized. Strength was measured in a standing position with the arm in 90° of abduction in the scapular plane and the palm facing down. Maximum value of the three strength measurements separated by at least 1 min was recorded in Newtons (N). Verbal encouragement was given simultaneously throughout the test.

Patient-based Constant-Murley score

The p-CMS was adapted from modified CMS by Levy et al.[7] in 2013. This self-report questionnaire consists of six different sections: pain, function (ADL), occupation, postoperative questions, ROM, and strength. Occupation and postoperative questions are not scored. Pain and ADL are also referred as subjective subtotal, and ROM and strength sections as objective subtotal. Total score is sum of subjective (one item (A1+A2)/2 in pain and four items in function) and objective (four items in ROM and one item in strength) subscores (Appendix 2). Higher scores indicate a higher quality of function.

Pain is assessed with two questions by using a four-point categorical scale and a 0 to 15 continuous VAS. Function is assessed with five questions about night sleep, occupation or ADL, leisure and recreational activities, level of painless arm movements during ADL and a VAS question regarding the patient's satisfaction with his/her shoulder. In the ROM section, flexion, abduction, internal and external rotation are recorded according to a picture-based range of movement section showing a person with his/her arm in various positions. The patients are asked to assess their ROM by attempting to mimic the movements shown in the photographs while facing a mirror. In the strength section, the strength is assessed with household weights. The patients are instructed to hold the household weights with known weights in a carrier for 3 sec in the sitting position that is shown in the photograph and record the maximum weight for each arm.

Scoring of the tests

The pain score used in p-CMS analysis was the average of pain recorded by the four-point scale (severe or permanent (0), moderate (5), mild (10), no (15), and the 0 (no pain) to 15 (the maximum pain) points continuous VAS. For both of the continuous VAS scorings for c-CMS and p-CMS, after the highest level of pain was marked from 0 (no pain) to 15 (intolerable pain) by the patient, the measured distance (X) from 0 to the mark was subtracted from 15 for the scoring with the calculation 15-X. By this way, the points were given inverse to VAS scale.

In the ADL section, the question regarding to sleep was scored from 0 to 2 points for both scores. For the c-CMS, "undisturbed sleep" was given 2 points, "occasional disturbance" 1 point, and "disturbance every night" 0 points. For the p-CMS, "no" was given 2 points, "sometimes" 1 point, and "yes" 0 points. For the work and recreational activities of c-CMS, score was calculated by a point scale from 0 to 4 points, provided below the VAS. For the corresponding questions of p-CMS, "no" was given 4 points, "moderate limitation" 2 points, and "severe limitation" 0 points. The level of painless arm movements during the ADL was scored from 0 to 10 for c-CMS and 2 to 10 for p-CMS. The VAS question regarding the patient's satisfaction with his/her shoulder (part B5), occupational (part C) and postoperative (part D) questions of the p-CMS were not scored in the study.

In the movements section, the points for the flexion and abduction were given incrementally from 0 to 10 according to the degrees for both scores. External rotation was pointed out of 10 points allotting 2 points each for five separate active movements for c-CMS: 2 points each for five separate movements and 0 point for "cannot reach above head" for p-CMS. Internal rotation was pointed out of 10 points incrementally from 0 to 10 for both scores.

For the strength measurements of c-CMS, the maximum value of the three strength measurements recorded in N was first converted into kg and, then, multiplied by 2.2. For the p-CMS, the maximum weight that the patient reported was multiplied by 2. The differences between the subscales and their scores are given in Appendix 2.

Statistical analysis

Statistical analysis was performed using the IBM SPSS version 22.0 software (IBM Corp., Armonk, NY, USA). Descriptive data were presented in mean ± standard deviation (SD) or median (min-max) for continuous variables and in number and frequency for categorical variables. There are 10 items in this scale that is summed for the total score. Therefore, at least five shoulders per item were needed. The sample size was calculated as minimum 50 shoulders. The Kaiser-Meyer Olkin Measure of sampling adequacy was performed and found to be 0.825 and 0.875 for c-CMS and p-CMS, respectively, confirming the appropriateness of the data for factor analysis.

Regarding translation validity, face and content validity was confirmed by 10 physicians who are expert in this field (five physiatrists and five orthopedists) and all of the study participants. For construct validity, convergent validity was assessed by the level of agreements between c-CMS and p-CMS. Exploratory factor analysis with an extraction method of principal component analysis was performed. Varimax rotation was performed to enhance the interpretation of factor loadings. Internal consistency reliability analysis of c-CMS and p-CMS were performed through Cronbach's alpha, the corrected item-total correlations and the inter-item correlation matrix. Acceptance level for Cronbach's alpha ranged from 0.70 to 0.90.[11]

The Shapiro-Wilk test was used to check normal distribution of the continuous variables before administering one sample t-test. As a prerequisite of performing Bland-Altman analysis,[12] one sample t-test was performed to test the null hypothesis that there was no difference between the p-CMS and c-CMS regarding total scores and continuous subscores including pain and strength. Bland-Altman plots were used to evaluate the agreement among these two scores, if they were confirmed to be not statistically different by one sample test. Levels of agreement between p-CMS and c-CMS were assessed by Bland-Altman and weighted kappa statistics for continuous and categorical variables, respectively. Weighted kappa statistics were applied to assess the agreement of categorical variables between the p-CMS and c-CMS (pain, limitation in ADL, limitation in leisure activities, quality of sleep, level of painless movement, forward flexion, abduction, external rotation and internal rotation). Kappa values of <0.00, 0.00-0.20, 0.21-0.40, 0.41-0.60, 0.61-0.80, and 0.81-1.00 were considered poor, slight, fair, moderate, substantial, and almost perfect agreement, respectively.[13] To perform weighted kappa, grades of the items "limitation in ADL" and "limitation in leisure activities" in c-CMS were recorded as 0=0, 1=0, 2=2, 3=2, 4=4 to achieve same number of grades with p-CMS. "Level of painless movement" was graded as 6 levels in c-CMS and 5 levels in p-CMS. 0 score in c-CMS was collapsed to 2 score to provide similar levels as p-CMS. Intraclass correlation with one-way random model and the weighted kappa statistics were performed to assess the test - retest reliability of p-CMS for continuous and categorical variables, respectively. Intraclass correlation coefficient (ICC) values of <0.50, 0.50-0.75, 0-75-0.90 and >0.90 were considered poor, moderate, good, and excellent

reliability, respectively.[14] A *p* value of <0.05 was considered statistically significant.

RESULTS

A total of 51 shoulders of 46 patients (22 males, 24 females; mean age: 49±10 years; range, 29 to 70 years) were included in this study. Four women and one man had complaints in bilateral shoulders and, therefore, a total of 51 shoulders (five bilateral, 22 right, 19 left) were tested. The diagnoses were rotator cuff tendinopathy in 44, frozen shoulder in five, and acromioclavicular arthrosis in two shoulders. Retest of the p-CMS was performed on 15 patients (12 males, 3 females; mean age: 46.9±11.4 years; range, 29 to 70 years).

The mean values of pain, strength, subjective, objective and total scores of the c-CMS and p-CMS are summarized in Table 1. Strength ranges (min-max) for the c-CMS and p-CMS were 0-25 and 0-22, respectively.

Among study participants, all items were clearly understood by all participants except for external ROM, and strength items, which were clearly understood by 91.3% and 89.1% of the participants, respectively.

Factor loadings for each item in c-CMS and p-CMS are shown in Table 2. Factor loadings are used to determine the effect level of factor on each item. Loadings close to 0 indicate that the factor has a weak effect on the item. Higher loadings indicate that the factor has a strong effect on the item. The loadings above 0.5 can be interpreted as enough for factor membership. Factor loadings for each item in both questionnaires showed either enough or strong effect levels. For internal consistency reliability, Cronbach's alpha of c-CMS and p-CMS were 0.825 and

TABLE 1		
Pain, strength, subjective, objective and total scores for the clinician-based and patient-based Constant-Murley Scores		
	Clinician-based CMS (n=51)	Patient-based CMS (n=51)
	Mean±SD	Mean±SD
Pain	7.4±4.3	6.9±4.0
Subjective subscore	20.0±8.2	18.6±8.4
Strength	11.4±8.4	7.0±5.8
Objective subscore	38.6±18.0	32.6±16.6
Total score	58.5±23.5	51.2±22.5
CMS: Constant-Murley Score; SD: Standard deviation.		

0.875, respectively. Corrected item-total correlations for each item in c-CMS and p-CMS are provided in Table 3.

One sample t-test applied for the difference in pain scores between p-CMS and c-CMS was not statistically different and, therefore, the Bland-Altman plot was used (Figure 1). The points were randomly scattered in the Bland-Altman plot. The differences observed between two scales did not change with the variations in pain scores. The mean difference in pain score between p-CMS and c-CMS was 0.5 and 95% limits of agreement were -3.81 and 4.81. None of the pain scores showed consistent high or low results compared to the other scale. One sample t-test showed that there was statistically significant difference between p-CMS and c-CMS regarding strength, subjective, objective, and total scores (p<0.001). As a result, Bland-Altman plots were not created for these variables.

The weighted kappa statistics demonstrated that the levels of agreement in subjective components were as follows: fair for limitation in ADL, moderate for limitation in leisure time activities and substantial

TABLE 2		
Factor loadings for each item in clinician-based and patient-based Constant-Murley Scores		
	Clinician-based CMS	Patient-based CMS
Items	p	p
Pain	0.596	0.658
Sleep	0.556	0.602
Limitation in ADL	0.627	0.796
Limitation in leisure activities	NA	0.558
Level of painless movement	0.723	0.681
Flexion	0.888	0.845
Abduction	0.880	0.861
External rotation	0.731	0.795
Internal rotation	0.688	0.764
Strength	0.829	0.763
CMS: Constant-Murley Score; ADL: Activities of daily living; NA: Not applicable.		
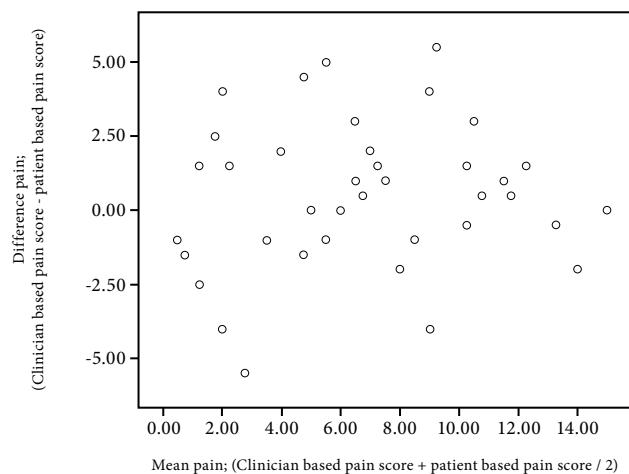
Figure 1. The Bland-Altman agreement plots for the pain score (n=51).

TABLE 3		
Corrected item-total correlations for each item in clinician-based and patient-based Constant-Murley Scores		
	Clinician-based CMS	Patient-based CMS
Items	p	p
Pain	0.478	0.523
Sleep	0.457	0.503
Limitation in ADL	0.583	0.729
Limitation in leisure activities	0.188	0.451
Level of painless movement	0.625	0.599
Flexion	0.844	0.785
Abduction	0.840	0.813
External rotation	0.657	0.754
Internal rotation	0.598	0.715
Strength	0.749	0.701
CMS: Constant-Murley Score; ADL: Activities of daily living; Cronbach's alpha of c-CMS and p-CMS were 0.825 and 0.875, respectively.		

TABLE 4			
Level of agreement between categorical variables of the clinician-based and patient-based Constant-Murley Scores			
		Weighted kappa	Approximate significance
Analysis	CMS component	p	p
Subjective	Sleep	0.672	<0.001*
	Limitation in ADL	0.343	0.001*
	Limitation in leisure activities	0.410	<0.001*
	Level of painless movement	0.698	<0.001*
Objective	Flexion	0.429	<0.001*
	Abduction	0.379	<0.001*
	External rotation	0.515	<0.001*
	Internal rotation	0.423	<0.001*
CMS: Constant-Murley Score; ADL: Activities of daily living; * p<0.05.			

TABLE 5
Pain and strength, subjective, objective and total test and retest results and ICC, 95% CI for test-retest reliability of patient-based Constant Murley Score

	1st p-CMS (n=15)	2nd p-CMS (n=15)			
	Mean±SD	Mean±SD	ICC	95% CI	p
Pain	8.6±2.7	8.4±2.5	0.838	0.514-0.946	<0.001*
Subjective subscore	23.7±5.9	24.3±5.2	0.883	0.654-0.961	<0.001*
Strength	10.8±5.6	11.0±6.1	0.995	0.986-0.998	<0.001*
Objective subscore	41.7±14.0	43.0±14.7	0.952	0.861-0.984	<0.001*
Total score	65.4±18.4	67.2±19.2	0.953	0.863-0.984	<0.001*

p-CMS: Patient-based Constant Murley Score; SD: Standard deviation; ICC: Intra-class correlation; CI: Confidence interval; * p<0.05.

for sleep, and level of painless movement. The levels of agreement in objective components were fair for abduction and moderate for flexion, internal and external rotation (Table 4).

The mean values of pain, strength, subjective, objective and total scores of the first and second p-CMS are given in Table 5.

In test-retest reliability for p-CMS, ICC values range between 0.838 and 0.995. Pain and subjective scores showed good reliability and strength, objective and total scores demonstrated excellent reliability (Table 5).

All subjective categorical variables demonstrated substantial reliability, except for level of painless movement. All objective categorical variables demonstrated moderate reliability, except for range of external rotation and abduction (Table 6).

TABLE 6
Level of agreement of categorical variables for test-retest reliability for patient-based Constant Murley Score

Analysis	CMS component	Weighted kappa	Approximate significance
		p	p
Subjective	Sleep	0.637	0.004*
	Limitation in ADL	0.727	0.003*
	Limitation in leisure activities	0.737	0.003*
	Level of painless movement	0.271	0.055
Objective	Flexion	0.483	0.005*
	Abduction	0.362	0.017*
	External rotation	0.178	0.072
	Internal rotation	0.448	0.002*

CMS: Constant-Murley Score; ADL: Activities of daily living; * p<0.05.

DISCUSSION

The results of this study support the validity and reliability of the Turkish version of the p-CMS. However, as the agreement between the p-CMS and c-CMS was found to be substantial to fair, the use of both scores interchangeably remains questionable.

Among the subjective components, pain scores of c-CMS and p-CMS revealed similar results with 95% limits of agreement of -3.81 and 4.81, respectively. These limits might be considered below the range of clinically meaningful difference for the measurement of pain with a 0-15 VAS. The Bland-Altman figure showed that only five scores exceeded the limits of confidence interval, and four of them were very near to the limits. Although assessment of pain is subjective in both p-CMS and c-CMS, these scores demonstrate that there may be some variability in the self-assessment of the same individual. There was a substantial agreement for sleep and level of painless movement, and fair agreement for limitation in ADL and leisure activities. The reason for this fair agreement may be owing to differences in scoring methods of the questions regarding to limitation in ADL and leisure activities. While 0-15 VAS with a corresponding point scale from 0 to 4 points was used for the c-CMS, 3 answer choices with 0, 2, and 4 points were given for p-CMS.

Among the objective components, all ROM parameters showed a moderate agreement, except for abduction which showed a fair agreement. Also, strength measurement of the p-CMS was significantly lower than the c-CMS measurements. This significant difference in strength measurement scores was an expected finding, due to the differences in scoring methods and measurement techniques. For the strength measurement of the c-CMS, maximum strength value recorded in kg was multiplied by 2.2,

whereas for the p-CMS, the maximum value was multiplied by 2. In c-CMS, strength was measured with a digital dynamometer in the presence of physician's verbal encouragement. In p-CMS, the patient had to decide the maximum weight that he/she could carry on his/her own. Also, strength testing was performed in standing position for c-CMS while the patient was instructed to carry the weight in sitting position in p-CMS. For all the objective components, including ROM, significantly lower scores were recorded by the patients. This can be attributed to the fact that patients might have pushed their limits when they were with a clinician, but they might have not attempted their best when they did the scorings by themselves.

Substantial retest reliability was demonstrated for all subjective categorical components of p-CMS, except for the level of painless movement which was fair. The reason for this relatively low reliability for level of painless movement question may be due to the fact that the patients had time to observe themselves in their daily lives in a two- to five-day period between the measurements and realize their true level of painless movement. Moderate retest reliability was demonstrated for all objective categorical components, except for range of external rotation and abduction which were slight and fair, respectively. These differences of ROM in retest of p-CMS and between c-CMS and p-CMS could be the result of the differences in instructions of the corresponding questions. To illustrate, during the ROM assessment of the c-CMS, the patients are instructed to lift their arm pain free. If the arm can be lifted to 140 degrees with pain and 110 degrees without pain, 110 degrees is recorded. However, in p-CMS, patients are only instructed to tick the boxes below the photographs, if they are able to perform the action. It is not specified, if the patients should perform the action pain-free. This difference in instructions of the ROM questions also elucidates the difference in test-retest reliability. Since the c-CMS test was performed before the second p-CMS test, at the second p-CMS test the patients might have recorded their pain-free ranges and given less scores according to how they were instructed to do in c-CMS. On the other hand, all the continuous variables, pain and strength, showed good test-retest reliability.

Another apparent difference between c-CMS and p-CMS was in external rotation component of the ROM subscale. In c-CMS, external rotation starts with "hands behind head, elbows forward" position, while the external rotation photograph of p-CMS starts with "hands behind head, elbows back" position. Since each completed external rotation movement is pointed separately in both tests, 2 points for each movement, an overt difference in total external rotation scores was not an expected finding.

Furthermore, our results were different from the original study done by Levy et al.[7] The aforementioned authors found almost perfect or substantial agreement between the composite questionnaire and its subgroups. The difference between the present study and their study can be attributed to differences in test protocols of c-CMS. The c-CMS that was used in their study was the modified CMS that was published Constant et al.[4] in 2008. In our study, we followed the standardized test protocol of the modified CMS published by Ban et al. [6] in 2013. The p-CMS was, indeed, the modified form of CMS that was published by the Constant et al.[4] Therefore, it is reasonable to expect higher agreement level between p-CMS and c-CMS in the study done by Levy et al.[7] Since there is no information about the protocol that they followed during performing c-CMS in their study, we cannot discuss the differences between these two test methods further. Considering the differences in test protocols and scoring methods of c-CMS and p-CMS, p-CMS should not be regarded as the exact patient-derived version of the modified CMS. These are two different measures with different scorings. Therefore, we cannot expect them to be used interchangeably. As a result, the Turkish version of the p-CMS is a reliable test to assess shoulder function. Although our study does not support the use of p-CMS with c-CMS interchangeably, p-CMS, as a self-reported questionnaire evaluating shoulder function, is a simple, practical measure that requires short period of time. Therefore, we believe that further studies evaluating the use of p-CMS during clinical follow-up are needed.

The main limitation of this study is the inherent characteristics of p-CMS. The modification of p-CMS due to standardized test protocol of CMS proposed by Ban et al.[6] is needed to clarify some of the instructions and increase comprehensibility.

In conclusion, the Turkish version of the p-CMS is a reliable measurement tool for the evaluation of shoulder function in Turkish patients with shoulder pathologies. However, further studies are needed to improve this outcome measure and to investigate its clinical utility.

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Appendix 1. Turkish Version of the Patient-Based Constant-Murley Score

CONSTANT-MURLEY OMUZ DEĞERLENDİRME ANKETİ		
Hasta Bilgileri:	Tarih:	Taraf:

Elinizdeki bu formu doldurmak için birkaç dakikanızı ayırabilirseniz memnun oluruz. Bu anket, uyguladığımız tedavinin ve cerrahinin sonuçlarını değerlendirmek için son derece önemlidir. Bu sayede sizin için verdiğimiz hizmetin kalitesi artacaktır.

A.   AĞRI

A1. Günlük etkinlikleriniz sırasında omzunuzda ağrı var mı?

1. Ağrı Yok   **2. Hafif Ağrı**   **3. Orta Derecede Ağrı**   **4. Ciddi Ağrı**

A2. Ağrı Düzeyi: Lütfen **günlük etkinlikleriniz** sırasında omuz ağrınızı tanımlayan en uygun **sayıyı işaretleyiniz**. (0 hiç ağrı yok, 15 yaşayabileceğiniz en şiddetli ağrıyı ifade etmektedir)

YOK   HAFİF   ORTA   CİDDİ   DAYANILMAZ

☺ 0   1   2   3   4   5   6   7   8   9   10   11   12   13   14   15 ☹

B.   FONKSİYON

B1. Omzunuz işinizi ya da günlük yaşantınızı kısıtlıyor mu?

1. Hiç Ya Da Çok Az   **2. Orta Derecede Kısıtlılık**   **3. Ciddi Derecede Kısıtlılık**

B2. Boş vakitlerinizde yaptığınız eğlence aktiviteleriniz omzunuz yüzünden kısıtlanıyor mu?

1. Hiç Ya Da Çok Az   **2. Orta Derecede Kısıtlılık**   **3. Ciddi Derecede Kısıtlılık**

B3. Omzunuz gece uykunuzu bölüyor mu?

1. Hayır   **2. Bazen**   **3. Evet**

B4. Hangi seviyeye kadar kolunuzu **makul ölçüde ağrısız** olarak hareket ettirebiliyorsunuz?

1. Bel   **2. Göğüs**   **3. Boyun**   **4. Kulak**   **5. Baş Üstü**

B5. 0 ile 10 arası derecelendirmede, **0 memnun olmama** ve **10 çok memnun olma** anlamına gelirse, siz omzunuzdan ne kadar memnunsunuz?

Memnun Değil   **Çok Memnun**

☹ 0   1   2   3   4   5   6   7   8   9   10 ☺

C.   MESLEĞİNİZ NEDİR?

C1. Mesleğinizi ne kadar iyi yapabiliyorsunuz?

1. Kolaylıkla   **2. Az Bir Zorlukla**   **3. Orta Derecede Zorlukla**   **4. Aşırı Zorlukla**   **5. Hiç Yapamıyorum**

C2. Yaptığınız iki ana spor veya eğlence aktivitesi nedir?

C3. Bu aktiviteleri ne kadar iyi yapabiliyorsunuz?

1. Kolaylıkla   **2. Az Bir Zorlukla**   **3. Orta Derecede Zorlukla**   **4. Aşırı Zorlukla**   **5. Hiç Yapamıyorum**

D.   CERRAHİ SONRASI SORULAR: (Lütfen, bu bölümü ameliyat olduysanız doldurun)

Operasyon:	Operasyon tarihi:

D1. Ameliyatınızdan sonra, şu anda nasıl hissediyorsunuz?

1. Çok Daha İyi   **2. Daha İyi**   **3. Aynı**   **4. Daha Kötü**

D2. Şu anda: **(Lütfen en uygun seçeneği işaretleyiniz)**
    1. Aynı işe geri döndünüz mü?
    2. Aynı işe omzunuz yüzünden daha az bir aktivite düzeyi ile mi geri döndünüz?
    3. Omzunuz yüzünden işinizi değiştirdiniz mi?
    4. Omzunuz yüzünden çalışmayı tamamen bıraktınız mı?

D3. Eğer mesleğinizi değiştirdiyseniz, şu anda ne iş yapıyorsunuz?

D4. Şu anda: **(Lütfen en uygun seçeneği işaretleyiniz)**
    1. Aynı spora, aynı aktivite düzeyi ile mi geri göndünüz?
    2. Aynı spora, omzunuz yüzünden daha düşük bir aktivite düzeyi ile mi geri döndünüz?
    3. Omzunuz yüzünden yaptığınız sporu değiştirdiniz mi?
    4. Omzunuz yüzünden spor yapmayı tamamen bıraktınız mı?

D5. Eğer yaptığınız sporu değiştirdiyseniz, hangi spora geçtiniz?

Appendix 1. Continued

E. HAREKET AÇIKLIĞI:	
Resimdeki modelin yaptığı hareketleri taklit edin. Bu hareketleri ayna karşısında yapmak yararlı olabilir.	Her sırada **soldan** başlayarak **sağa** doğru ilerleyin: • **Hareketi yapabiliyorsanız** her bir fotoğrafın altındaki kutucuğu **işaretleyin** • **Hareketi yapamıyorsanız** kutucuğu **boş bırakın**

E1.

☐ 0-30° ☐ 30-60° ☐ 60-90° ☐ 90-120° ☐ 120-150° ☐ 150-180°

E2.

☐ 0-30° ☐ 30-60° ☐ 60-90° ☐ 90-120° ☐ 120-150° ☐ 150-180°

E3.   Başa erişemiyor

☐ ☐ ☐ ☐ ☐ ☐

E4.

☐ ☐ ☐ ☐ ☐ ☐

F. KUVVET:	
Aşağıdaki iki fotoğrafa bakın. Her defasında plastik çantadaki ağırlıkları taşıyarak kolunuzu bu pozisyonda 3 saniye boyunca tutmaya çalışın.	Lütfen plastik çantanın içerisinde ağırlık olarak şunlardan birini kullanın: • **Şeker poşeti** • **Dolu plastik süt şişeleri** (su ile de doldurulabilir) • **Ağırlığını bildiğiniz ve kullanabileceğiniz ne varsa**

Lütfen aşağıdaki boşluklara her bir kol için **3 sn boyunca kaldırabildiğiniz maksimum ağırlıkları** kilogram veya litre cinsinden kayıt edin.

Önden görünüm	Üstten görünüm

Bu pozisyonda 3 saniye boyunca kaldırabildiğim en fazla ağırlık:

Sağ kol: ……………. Kilogram/ Litre   Sol kol: ……………. Kilogram/ Litre

G.   YORUMLAR

Appendix 1. Continued

PUANLAMA

A. AĞRI (Maksimum 15): (A1+A2) /2
    A1. 1=15 puan, 2=10 puan, 3=5 puan, 4=0 puan
    A2. 15 puan – işaretlenen rakam

B. FONKSİYON (Maksimum 20)
    B1: 1=4 puan, 2=2 puan, 3=0 puan
    B2: 1=4 puan, 2=2 puan, 3=0 puan
    B3: 1=2 puan, 2=1 puan, 3=0 puan
    B4: 1=2 puan, 2=4 puan, 3=6 puan, 4=8 puan, 5=10 puan
    B5: Puanlanmaz

C. Puanlanmaz
D. Puanlanmaz

E. HAREKET AÇIKLIĞI (Maksimum 40)
    E1. Abduksiyon: Ulaşabildiği en üst seviye puanlanır.
        $0 - 30°$= 0 puan, $30 - 60°$= 2 puan, $60 - 90°$= 4 puan, $90 - 120°$= 6 puan, $120 - 150°$= 8 puan, $150 - 180°$= 10 puan
    E2. Öne fleksiyon: Ulaşabildiği en üst seviye puanlanır.
        $0 - 30°$= 0 puan, $30 - 60°$= 2 puan, $60 - 90°$= 4 puan, $90 - 120°$= 6 puan, $120 - 150°$= 8 puan, $150 - 180°$= 10 puan
    E3. Eksternal rotasyon: Aşağıdaki pozisyonlar toplanarak puanlanır.
        Başa erişemiyor = 0 puan
        El baş arkasında, dirsek yanda = 2 puan
        El baş arkasında, dirsek önde = 2 puan
        El baş üzerinde, dirsek yanda = 2 puan
        El baş üzerinde, dirsek önde = 2 puan
        Tam elevasyon = 2 puan
    E4. İnternal rotasyon: Ulaşabildiği en üst seviye puanlanır.
        Kalça = 2 puan
        Sakroiliak eklem = 4 puan
        Bel = 6 puan
        T12 = 8 puan
        Skapula arası = 10 puan

F. KUVVET (Maksimum 25): Kilogram/Litre x 2

Toplam Skor = A + B + E + F (Maksimum 100)

Appendix 2. Comparison of the subscale, subtotal and total scores of the clinician-based and patient-based Constant-Murley Scores

		Clinician-based CMS scores	Patient-based CMS scores
A.	Pain		
	Level of pain by the 4-point scale	-	0,5,10,15
	Level of pain by the continuous VAS	0-15	0-15
B.	ADL or function		
	Sleep	0,1,2	0,1,2
	Daily living	0,1,2,3,4	0,2,4
	Recreational activities	0,1,2,3,4	0,2,4
	Level of painless motion	0,2,4,6,8,10	2,4,6,8,10
	Satisfaction with shoulder*	-	0-10
Subjective subtotal (A+B)		0-35	2-35
C.	Range of motion		
	Flexion	0,2,4,6,8,10 (0-10)	0,2,4,6,8,10 (0-10)
	Abduction	0,2,4,6,8,10 (0-10)	0,2,4,6,8,10 (0-10)
	External rotation	2,2,2,2,2 (2-10)	0,2,2,2,2,2 (0-10)
	Internal rotation	0,2,4,6,8,10 (0-10)	0,2,4,6,8,10 (0-10)
D.	Strength	0-25	0-25
Objective subtotal (C+D)		2-65	0-65
Total score (A+B+C+D)		2-100	2-100

CMS: Constant-Murley Score; ADL: Activities of daily living; VAS: Visual Analog Scale; *: Not included in the score.