

The Validation and Verification of the Nottingham Clavicle Score in the Turkish Population

Nottingham Klavikula Skorunun Türk Populasyonunda Geçerliliği ve Doğrulanması

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ABSTRACT

Aim: The aim of this study was to evaluate the validation and verification of the Nottingham Clavicle Score (NCS) in the Turkish population.

Methods: Sixty-eight patients (12 females, 56 males; mean age: 37.1±13.3 years) who underwent surgery due to clavicle fracture or acromioclavicular separation were included in the study. The Turkish version of the NCS (NCS-Tr) was designed in accordance with the stages recommended by Beaton et al. Each patient completed the NCS-Tr twice at 7 to 10-day intervals to evaluate the test-retest reliability based on the interrater correlation coefficient, and Cronbach's alpha was evaluated for internal consistency. Additionally, the Oxford Shoulder Score (OSS), Disabilities of the Arm, Shoulder, and Hand (DASH), Constant-Murley Score (CMS), and Short Form-36 (SF-36) Health Survey tests were completed by each participant to assess the correlation with the NCS-Tr.

Results: The main score of the NCS-Tr was 79.71 ± 20.37. The other mean scores of CMS, OSS, and DASH were 84.14 ± 21.47, 38.34 ± 12.43, and 17.84 ± 22.47 respectively. The translation and adaptation of the NCS-Tr for a Turkish context required no major cultural adaptation. Internal consistency was high (Cronbach's alpha: 0.933). Test-retest reproducibility was excellent (q=0.941, p<0.001).

Conclusion: The NCS-Tr is a valid, reliable, shoulder-specific scale in the assessment of patient-reported outcome measures for the functional assessment of Turkish patients undergoing surgery due to clavicle fractures or acromioclavicular joint separation.

ÖZET

Amaç: Bu çalışmanın amacı Nottingham Klavikula Skorunun (NCS) geçerliliğini ve doğrulanmasını Türk populasyonunda değerlendirmektir.

Yöntemler: Çalışmaya klavikula kırığı veya akromioklaviküler ayrışma nedeniyle ameliyat edilen 68 hasta (12 kadın, 56 erkek; ort. yaş: 37.1±13.3) dahil edildi. NCS'nin Türkçe versiyonu (NCS-Tr), Beaton ve arkadaşları tarafından önerilen aşamalara uygun olarak tasarlanmıştır. Her hasta, ölçekler arası korelasyon katsayısına dayalı test-tekrar test güvenilirliğini değerlendirmek için NCS-Tr'yi 7 ila 10 günlük aralıklarla iki kez tamamladı ve iç tutarlılık için Cronbach alfa değerlendirildi. Ayrıca NCS-Tr ile korelasyonu değerlendirmek için Oxford Omuz Skoru (OSS), Kol, Omuz ve El Disabilities (DASH), Constant-Murley Skoru (CMS) ve Short Form-36 (SF-36) Sağlık Anketi testleri her katılımcı tarafından dolduruldu. NCS-Tr ile korelasyonu değerlendirin.

Bulgular: NCS-Tr ana puanı 79.71 ± 20.37 idi. Diğer ortalama CMS, OSS ve DASH puanları sırasıyla 84,14 ± 21,47, 38,34 ± 12,43 ve 17,84 ± 22,47 idi. NCS-Tr'nin Türkçe bağlamına çevrilmesi ve uyarlanması büyük bir kültürel uyarlama gerektirmedi. İç tutarlılık yüksekti (Cronbach alfa: 0.933). Test-tekrar test tekrarlanabilirliği mükemmeldi (q=0.941, p<0.001).

Sonuç: NCS-Tr, klavikula kırığı veya akromioklaviküler eklem ayrışması nedeniyle ameliyat olan Türk hastaların fonksiyonel değerlendirilmesi için hasta tarafından bildirilen sonuç ölçütlerinin değerlendirilmesinde geçerli, güvenilir, omuza özgü bir ölçektir.

Key Words: Patient-reported outcome measures, Clavicle fracture, Acromioclavicular separation, Turkish validation

Anahtar Kelimeler: Hasta tarafından bildirilen sonuç ölçütleri, Klavikula kırığı, Akromioklaviküler ayrılma, Türkçe doğrulama

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Introduction

Identifying of patients and follow-up of outcomes are essential for the management of musculoskeletal disorders. In particular, the patient-reported outcome measures (PROMs) are designed to collect measurement data with standardization tools. Scoring systems (PROMs) have been established to standardize the treatment and outcomes of patients. The main goal is to obtain common results of different cases by giving the consensus of clinicians who are experts in scoring systems [1,2]. In this way, the results of different operations performed in different regions can be standardized and global results can be obtained. To illustrate, shoulder and clavicle is a complex region consisting of more than one muscle and tendon junction [3]. Therefore, more than one PROMs are defined for this area. These classifications have been defined separately for shoulder and accompanied functional or anatomical zones [3-5].

Clavicle fractures are frequent disorders that can affect quality of life and disrupt daily working performance of individuals. Different clinical presentations of this area are sourced by both-sided joint formation with the sternum and acromion. Therefore, varying clinical approaches have been described. Differences in localizations of both fractures may cause different treatment outcomes [3].

The main scoring systems for shoulder pathologies can be listed as the Oxford Shoulder Score (OSS), Constant-Murley Score (CMS), Disabilities of the Arm, Shoulder, and Hand (DASH) Questionnaire, and Nottingham Clavicle Score (NCS) [3-6]. Although all these scoring systems are defined for the shoulder joint, the NCS is specific for injuries to the clavicle, acromioclavicular joint (ACJ), and sternoclavicular injuries to the clavicle. The OSS is a patient-reported questionnaire consisting of 12 items [4]. The CMS is one of the best-known scores in the evaluation of results after rotator cuff surgery [5]. The DASH is the other scoring system to evaluate the results of shoulder and hand [6]. To standardize regional differences, these surveys should be validated according to ethnic and regional characteristics. Although the NCS is a frequently used scoring system in clavicle injuries, its validation studies have been carried out in European countries. However, there are fewer studies on its validation in Asia and non-European countries [3].

In the present study, we hypothesized that the NCS questionnaire was a valid and reliable tool for the assessment of outcomes in Turkish population. We, therefore, aimed to perform a cross-cultural adaptation of the NCS questionnaire and to investigate whether it was a valid and reliable instrument for assessing the outcomes of clavicular fractures, and ACJ disorders among Turkish population.

Patients and Method

Translation procedure

Before translation and adaptation of the NCS, permission was obtained from the main developer of the original version of the scoring system [3]. The translation and cross-cultural adaptation were made according to previously described guidance by Beaton et al. [7]. The original (English) form of the NCS was translated into Turkish by two native Turkish speakers (one translator was an expert working as an orthopedic surgeon, and the second translator was a professional English translator working at a university who was not a health specialist and was unaware of the study design and concept). Both translations were combined and a single Turkish questionnaire was produced. The final format of the questionnaire was approved by another independent specialist (Appendix 1). No cultural adaptation or designation changes were required during the translation process. The comprehensibility of the latest version of the scoring system was checked by testing 10 patients with a shoulder disorder and 10 healthy individuals, and the test committee, then, agreed on the compatibility of English and Turkish versions of the NCS.

Study design and study population

Patients who underwent surgery between April 2017 and December 2021 due to clavicle fractures or ACJ separation were screened. All patients were called back to the hospital for follow-up and asked to complete the NCS-Tr and other standard PROMs for the shoulder (DASH, CMS, OSS, Short Form-36 [SF 36]). Patients who did not attend the follow-up or did not give consent to participate in the study and who had mental or social problems that could prevent the completion of the questionnaire were excluded from the study. Inclusion criteria were as follows: age 18 years or older, patients undergoing surgery for clavicle fractures or ACJ separation, those giving consent to participate in both the test and re-test assessments, and being a native Turkish speaker. Finally, of 150 patients eligible for the study, a total of 68 who met the inclusion criteria were recruited. The indicated questionnaires (DASH, CMS, OSS, SF-36, NCS-Tr) were completed in full by all participants and clinical examinations were performed by the study investigators.

PROM data collections and outcome tools

NCS: The questionnaire consists of 10 items with five selection points in each. Each question has five categories of response, corresponding to a score ranging from 2 to 10.

The scoring ranges from 20 (greater difficulty) to 100 (the lowest difficulty) points, which evaluates the functional scales of the participants. The shoulder pain, pain in bed during sleep, pain during daily activities, and pain during sports activities and recreation are assessed in Items 1 to 4. The overhead strength and lifting capacity of heavy objects is assessed in Items 5 and 6. Cosmetic satisfaction is evaluated in Item 7, and movement of the shoulder and clicking in the shoulder are evaluated in Item 8. Tingling and numbness in the arm and neck were evaluated in Item 9 and heavy or dragging sensations were evaluated in Item 10. The scores are interpreted as excellent (80-100), good (60-79), fair (40-59), or poor (<40) (3).

DASH: The questionnaire is used to evaluate arm, shoulder, and hand disabilities through 30 items. In these items, disability is classified on a 1 to 5 scale. These scales are scored between 0 (no disability) and 100 (severe disability) for testing the degree of strength in performing a variety of daily physical activities. Additionally, the last five items include the severity of pain, aggravated pain with activity, tingling, weakness, and stiffness. Social, work, and sleep problems are also evaluated using this questionnaire. The cultural validity and reliability studies of the DASH were carried out in the Turkish population by Düger et al. [8].

SF-36 Health Survey: This 36-item questionnaire is used to evaluate self-reported quality of life of patients. Sub-scales include physical functions, social problems, emotional limitations, mental health, vitality, and bodily pain. The scores range between 0 (poor) and 100 (good health) for providing information about well-being. The cultural validity and reliability studies of the SF-36 in the Turkish population were conducted by Demiral et al. [9].

OSS: This questionnaire consists of 12 items which evaluate shoulder functions. All items have five subscales that are scored between 0 (worst) to 48 (best). Pain and quality of life can be evaluated using this questionnaire. The cultural validity and reliability studies of the OSS in the Turkish population were conducted by Tuğay et al. [10].

CMS: This is a 100-point scale which is used to evaluate the severity of pain, activities of daily living, and working in different positions. The scores range from 80-100: excellent, 65-79: good, 51-64: moderate, and to 0-50: poor. The cultural validity and reliability studies of the scale in the Turkish population were conducted by Çelik et al. [11].

Statistical Analysis

According to the G-Power t test, a sample size of 48 was calculated as 95% confidence, 95% power, 5% margin of error and large effect size. The research sample consisted of 68 patients who agreed to participate in the study.

Statistical analysis was performed using the SPSS 25.0 software (IBM Corp., Armonk, NY, USA). Continuous data were expressed in mean \pm standard deviation (SD), while categorical data were expressed in number and frequency. The internal consistency of the NCS-Tr was evaluated using Cronbach's alpha (α) coefficient. When the α level is greater or equal to 0.70, reliability is considered acceptable. The effect of each item on reliability, corrected item-total correlations and Cronbach's alpha levels, if any items were deleted, was examined. Intra-class correlation (ICC) coefficients and 95% confidence intervals (CIs) were calculated to investigate test-retest reliability for the NCS-Tr. If the ICC level was greater than 0.75, the test-retest reliability was considered excellent. The construct validity of the NCS-Tr was performed using the Pearson correlation analysis. The degrees of association between the NCS-Tr and other validated instruments (*i.e.*, OSS, DASH, CMS, and SF-36) were calculated using the Pearson moment-product coefficients of correlation. A *p* value of <0.05 was considered statistically significant.

Results

The cultural adaptation process and translation of the NCS-Tr were completed as described above, and no problems were encountered at this stage.

A total of 68 patients completed the PROM scales. Clavicle fractures were detected in 56 (82.4%) patients and ACJ separation was detected in 12 (17.6%) patients. The right shoulder was the most commonly affected side ($n=36/52.9\%$). There were 56 (82.4%) male patients and the mean age of all patients was 37.1 ± 13.3 years. Demographic and clinical data of the patients are summarized in Table 1.

The mean NCS-Tr score was 76.8 ± 19.8 . The mean scores of CMS, OSS, and DASH were 86.6 ± 16.2 , 39.4 ± 10.8 , and 18.3 ± 22.6 , respectively. The mean scores of the SF-36 subscales were as follows: physical functioning 84.5 ± 20.4 , role functioning/physical 73.5 ± 37.6 , role functioning/emotional 77.0 ± 37.4 , energy/fatigue 74.0 ± 26.5 , emotional well-being 76.5 ± 26.2 , social functioning 80.7 ± 23.4 , pain $75.8\pm$, and general health 80.5 ± 22.7 . In terms of discriminant validity, the NCS-Tr showed the least concordance with the role emotional/physical domain, although it was compatible with the mental subgroups, pain, and general health of the SF-36. The mean scores and range values of the PROMs are presented in Table 2.

The test-retest reliability of each item in NCS-Tr was evaluated and the maximum value was detected in Item 3 with an ICC of 0.823 (CI: 0.933-0.974) and the lowest value was detected in Item 10 with an ICC of 0.517 (CI: 0.647-0.864). The ICC values for each item are given in Table 3.

Table 1. Demographic and clinical characteristics of patients

		n=68
Age (years)		37.1±13.3
Age range (years)		18-61
Sex	Male	56 (82.4%)
	Female	12 (17.6%)
Side	Left	32 (47.1%)
	Right	36 (52.9%)
Diagnosis	Clavicula Fracture	56 (82.4%)
	Acromioclavicular Joint Speration	12 (17.6%)

Table 2. Descriptive statistics for all assessment tools

		Mean	SD	Min	Max
NCS		76.8	19.8	26.0	100.0
OSS		39.4	10.8	6.0	48.0
DASH		18.3	22.6	0.0	83.3
CMS		86.6	16.2	39.0	100.0
SF-36	Physical functioning	84.5	20.4	15.0	100.0
	Role functioning/physical	73.5	37.6	0.0	100.0
	Role functioning/emotional	77.0	37.4	0.0	100.0
	Energy/fatigue	74.0	26.5	0.0	100.0
	Emotional well-being	76.5	26.2	0.0	100.0
	Social functioning	80.7	23.4	12.5	100.0
	Pain	75.8	29.0	0.0	100.0
	General health	80.5	22.7	15.0	100.0

NCS: Nottingham Clavicle Score, OSS: Oxford Shoulder Score, DASH: Disabilities of the Arm, Shoulder and Hand Questionnaire, CMS: Constant-Murley Score, SF-36: Short Form-36 Health Survey, SD: Standard Deviation, Min: Minimum, Max: Maximum.

Table 3. Internal consistency of the Nottingham Clavicle Score

	Mean±SD	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Item 1	7.0±3.0	0.809	0.912
Item 2	7.2±2.9	0.765	0.915
Item 3	7.9±2.3	0.823	0.913
Item 4	7.2±2.8	0.734	0.917
Item 5	7.3±2.8	0.808	0.912
Item 6	7.2±2.7	0.871	0.908
Item 7	7.6±2.6	0.596	0.924
Item 8	8.4±2.4	0.509	0.928
Item 9	7.9±2.3	0.711	0.918
Item 10	9.0±1.6	0.517	0.927

Considering the relationship between the total scores obtained in the NCS-Tr examination and other scales, there was a statistically significant, negative, and strong correlation between the mean DASH score and the NCS-Tr score. The mean CMS and OSS physical function, energy, pain, and health scores had statistically significant, positive, and strong correlations with the NCS-Tr score. Also, bodily pain, physical functioning, physical role functioning and vitality in the SF-36 had statistically significant, positive, and moderate correlations with the NCS-Tr score. The correlation of the NCS-Tr score with the other PROMs is summarized in Table 4. The translation and adaptation of the NCS-Tr for a Turkish context required no major cultural adaptation. Internal consistency was high (Cronbach's $\alpha=0.933$). Test-retest reproducibility was excellent ($q=0.941$, $p<0.001$).

In Table 2, descriptive statistics of the scores given for each question item are shown. The NCS scale consists of 10 items and the mean score obtained by the participants from the NCS-Tr was 76.8 ± 19.8 , and the current scores of the participants ranged from 26 to 100.

The Cronbach's alpha (internal consistency) coefficient of the NCS-Tr was found to be 0.925. As a result of the reliability analysis, the corrected item-total scale correlation coefficients ranged from 0.509 to 0.871. According to the current results, the existing items performed at the desired level, as all of the adjusted item-total scale correlation coefficients were higher than 0.35. Similarly, even if any of the related question items were deleted, there was no significant change in the Cronbach's alpha internal consistency coefficients.

Test-retest reliability of NCS-Tr was evaluated by calculating the ICC. Accordingly, the ICC value was 0.921 (95% CI: 0.876 - 0.951), and test-retest reliability was found to be at very high levels statistically ($p<0.001$).

In Table 4, the results of the correlation analysis with other scales whose validity and reliability were conducted, are shown to examine the structural validity of the NCS-Tr. Accordingly, a statistically significant and very high correlation was found between the NCS-Tr and OSS ($r=0.867$ and $p<0.001$). There was a statistically significant and highly inverse correlation between the NCS-Tr and DASH ($r=-0.898$ and $p<0.001$). A statistically significant and same-directional very high correlation was also found between the NCS-Tr and CMS ($r=0.892$ and $p<0.001$). Finally, there were statistically significant, same-directional, and high correlations between all components of the SF-36 and NCS-Tr ($p<0.001$).

Discussion

In the present study, we performed a cross-cultural adaptation of the NCS questionnaire and investigated its validity and reliability in Turkish populations to assess the outcomes of clavicular fractures, and ACJ disorders. Our study results showed that the NCS-Tr was a valid and reliable tool for this patient population. The translation and adaptation of the NCS-Tr into Turkish were found to be applicable and did not require significant revision. The Item 10 of the English version is a pattern sentence, and it was translated into Turkish with the integrity of the meaning rather than a literal translation. Therefore, although a significant correlation was found, the lowest ICC was detected for the Item 10 compared to the other questions. The other question types were translated as close to the original as possible. Our study results support that Turkish-speaking individuals are easily able to understand and answer the NCS-Tr in clinical practice. Moreover, the completion of the NCS-Tr is satisfactory compared to previously validated PROMs.

Table 4. Degrees of associations between Nottingham Clavicle Scores and other assessment tools

	Coefficient of correlation	p-value †	
OSS	0.867	<0.001	
DASH	-0.898	<0.001	
CMS	0.892	<0.001	
SF-36	Physical functioning	0.685	<0.001
	Role functioning/physical	0.758	<0.001
	Role functioning/emotional	0.618	<0.001
	Energy/fatigue	0.754	<0.001
	Emotional well-being	0.664	<0.001
	Social functioning	0.595	<0.001
	Pain	0.843	<0.001
	General health	0.838	<0.001

OSS: Oxford Shoulder Score, DASH: Disabilities of the Arm, Shoulder and Hand Questionnaire, CMS: Constant-Murley Score, SF-36: Short Form-36 Health Survey. † Pearson correlation analysis.

In the literature, there are many shoulder PROMs for the identification of symptoms of patients. This is because various shoulder disorders present with different clinical outcomes. Although there are many different scoring systems, relatively more specific scoring, such as the Western Ontario Shoulder Instability Index (WOSI) and Oxford Shoulder Instability Score (OSIS) are used in shoulder instabilities [12,13]. The CMS, OSS, DASH, the Simple Shoulder Test (SST), and American Shoulder and Elbow Surgeons (ASES) scores are used in rotator cuff pathologies [6,14]. Although different scoring systems have been described for the same anatomic region, each scale system reflects different specific pathologies.

To date, the Turkish validation and verification studies of many shoulder scoring systems have been conducted [6,12-14]. The validation of PROMs is important in revealing ethnicity differences and the applicability of scores in different cultures [6]. The intercultural adaptation of the OSS in Turkish was conducted by Tuğay et al. [10]. Other shoulder scores that have been validated in Turkish are the modified CMS and DASH [8,11]. The Turkish versions of these scores have been shown to be utilized reliably in the Turkish population.

The NCS was designed more specifically for injuries to the clavicular and ACJ and sternoclavicular joint. However, there is no study on the validation of the NCS in the Turkish population. Charles et al. [3] described the NCS by comparing the OSS, CMS, and Imatani scoring systems. In this first described version, a high Cronbach's alpha value was found postoperatively (0.87). Cronbach's alpha values higher than 0.70 are considered significant [15]. The Italian version of the NCS was validated and verified by Vascellari et al. [16]. They indicated that the most difficult adaptation or translation for the Italian NCS was found in Item 10, which was attributed to the fact that "dragging sensation" was not a clearly described Italian phrase. The authors used the SF-36, DASH, and OSS scores for the validation of the Italian NCS. Finally, they found a strong correlation with the DASH and OSS scores, a high-to-moderate correlation with bodily pain, physical functioning, physical role functioning, and vitality in the SF-36, and a high ICC was obtained for the NCS (0.86). Similarly, in our study, Item 10 was interpreted with semantic integrity and it was translated into Turkish with the integrity of meaning rath-

er than a literal translation. We compared the NCS-Tr with DASH, CMS, SF-36, and OSS scores and observed highly significant correlations with all PROMs. A high Cronbach's alpha score (0.933) was determined for the NCS-Tr in our validation study.

Study Limitations: The main limitation to this study is its relatively small sample size. Therefore, the results of this study should be cautiously interpreted. Another limitation is the lack of evaluation of responsiveness, which can be identified as the ability of PROMs to assess time-dependent changes in the measurement process. Further well-designed large-scale studies are warranted to draw more reliable conclusions on these issues.

Conclusion: In conclusion, our study results show that the Turkish version of the NCS is valid, reliable, consistent, and comparable to the English version, and can be used as an instrument to assess the functional limitations of patients with injuries of the clavicle and ACJ.

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Ethics Committee Approval: Institutional review board approval was received from Hacettepe University Non-Invasive Clinical Research Ethics Committee (control no. 2019/27-19).

ORCID and Author contribution: **A.G. (0000-0002-9012-8053):** *Concept and/or Design, Analysis and/or Interpretation, Literature Search, Writing, Critical Review, Final approval.* **G.N.D. (0000-0003-0738-6455):** *Literature Search, Editing, Critical Review, Final approval* **D.Ç. (0000-0002-2060-8510):** *Analysis and/or Interpretation, Literature Search, Writing, Final approval.* **E.E.K. (0000-0003-1237-8580):** *Literature Search, Critical Review, Final approval*

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Appendix 1. Turkish Translation of NCS (NCS-Tr)

“Bir CC BY lisansı altında [3]’den değiştirilmiştir, [Prof W Angus Wallace] izniyle basılmıştır, orijinal telif hakkı [2017].”

Nottingham Klavikula Skoru (Köprücük kemiği, Akromioklavikular veya Sternoklavikular eklem (A/K & S/K eklem) yaralanmaları içindir.)

Aşağıdaki sorular son iki ay boyunca köprücük kemiğiniz/omuzunuzun çevresinde hissettiğiniz ağrı düzeyi ve zorluklar ile ilişkilidir.

- Genelde Omuzunuz/Köprücük kemiğinizdeki ağrıyı nasıl tarif edersiniz?
 - Hiç
 - Çok hafif
 - Hafif
 - Orta
 - Ciddi
- Geceleri yatakta Omuzunuz/Köprücük kemiğinizdeki ağrı nedeniyle ne sıklıkla sorun yaşıyorsunuz?
 - Hiçbir gece
 - Sadece bir veya iki gece
 - Bazı geceler
 - Çoğu geceler
 - Her gece
- Omuzunuz/Köprücük kemiğinizdeki ağrı günlük işlerinizi ne kadar etkiledi? (ev işleri ve araba sürmek dahil)
 - Hiç
 - Çok az
 - Orta
 - Büyük oranda
 - Tamamen
- Spor aktiviteler veya hobiler sırasında Omuzunuz/Köprücük kemiğinizde ne sıklıkla ağrınız oluyor?
 - Hiçbir zaman
 - Ara sıra
 - Bazı zaman
 - Çoğunlukla
 - Her zaman
- Ağır objeleri kaldırabilme açısından Omuzunuz/Köprücük kemiğinizde ne kadar problem yaşıyorsunuz?
 - Hiçbir zaman
 - Ara sıra
 - Bazı günler
 - Çoğu günler
 - Her gün
- Baş üstü aktiviteler sırasında Omuzunuz/Köprücük kemiğinizde yorgunluk veya güçsüzlük hissi oluyor mu?
 - Hiçbir zaman
 - Ara sıra
 - Bazı zaman
 - Çoğunlukla
 - Her zaman

7. Köprücük kemiğinin dış görünüşünden memnun musunuz?
- Tamamen mutlu
 - Çok mutlu
 - Orta derecede mutlu
 - Çok az mutlu
 - Hiç mutlu değil
8. Köprücük kemiğiniz bölgesinde size sorun yaşatan veya sizi endişelendiren herhangi bir hareket veya tıkkırtı hisseder misiniz?
- Hiçbir zaman
 - Ara sıra
 - Bazı zaman
 - Çoğunlukla
 - Her zaman
9. Boynunuza veya kolunuza doğru yayılan herhangi bir karıncalanma veya uyuşukluk yaşıyor musunuz?
- Hiçbir zaman
 - Ara sıra
 - Bazı zaman
 - Çoğunlukla
 - Her zaman
10. Daha önce hiç kolunuzda ağırlık veya çekilme hissi yaşadınız mı?
- Hiçbir zaman
 - Ara sıra
 - Bazı zaman
 - Çoğunlukla
 - Her zaman

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