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Validity of the Turkish version of the Kujala patellofemoral score in patellofemoral pain syndrome

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Objectives: Patellofemoral pain syndrome is one of the most common knee problems, with major effects on quality of life and function. The Kujala patellofemoral score is a functional evaluation instrument to evaluate knee problems related to the patellofemoral system. The aim of this study was to evaluate the validity of the Turkish version of the Kujala patellofemoral score in patients with patellofemoral pain syndrome.

Methods: After obtaining permission from Kujala et al., the Kujala patellofemoral score was translated into Turkish. The translated version was administered to 40 patients (32 women, 8 men; mean age 33±12 years; range 17 to 54 years) twice at a two-week interval to test internal consistency and test-retest reliability of the scale. All the patients had patellofemoral pain syndrome and did not receive any treatment before administration of the scale. Cronbach's alpha coefficient was used to assess internal consistency and Spearman's correlation analysis was used to assess test-retest reliability.

Results: Cronbach's alpha calculated for internal consistency of the Kujala patellofemoral score was 0.84. Correlation coefficients of the items to estimate test-retest reliability ranged from 0.613 (p=0.004) to 1.000 (p=0.000), with the mean correlation coefficient of 0.944 (p=0.000).

Conclusion: There has been no functional assessment scale validated for Turkish patients with patellofemoral pain syndrome. Internal consistency of the Turkish version of the Kujala patellofemoral score showed good reliability and test-retest results showed high reliability, suggesting that it is an appropriate functional instrument for Turkish patients with patellofemoral pain syndrome.

Key words: Patella/injuries; patellofemoral pain syndrome; questionnaires.

Patellofemoral pain (PFP) is one of the most common knee problems and its treatment is difficult.^[1,2] It describes the pain involving the patella and its neighborhood. Patellofemoral pain syndrome (PFPS) was first defined by Aleman in 1928.^[3,4] It occurs more commonly in active females, athletes, and soldiers,^[5] and accounts for approximately 10-40% of all musculoskeletal complaints and 20-40% of all knee problems.^[6] Considering that there are underdiagnosed cases, its incidence might be higher than estimated.^[7]

The etiology and pathogenesis of PFPS are not clear, but several predisposing factors have been proposed.^[1] Acute trauma, ligament injury or surgery, instability, overuse, immobilization, excessive weight bearing on the joint, excessive weight, genetic predisposition, dysfunction or malalignment of the knee or hip extensor mechanism, deficiency in strength or flexibility, congenital patellar anomalies, prolonged synovitis, recurrent bleeding into the joint, joint infections, recurrent intra-articular cor-

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ticosteroid injections are among factors responsible for PFP.^[1,8,9]

Symptoms most commonly appear during prolonged sitting with the flexed knee (movie-goers or cinema sign), especially during traveling, walking up and down stairs, or squatting, and localized around or below the kneecap.^[4,10,11] Pain can be in the forms of aching, blunt, or throbbing. Albeit not a typical finding, crepitation may also be seen among the symptoms of PFP. Patients feel giving way of the knee especially while walking down the stairs or slopes, because of insufficient strength and control of the quadriceps muscle during knee flexion and extension. In some cases, the knee can be locked in extension during weight bearing. In serious patellofemoral tracking disorders, synovial diseases, bleeding, and trauma in the knee, swelling around the knee can accompany pain. These problems have adverse effects on both quality of life of patients and their functions in daily living activities.^[3,12]

Various scoring systems for specific symptoms of the knee have been developed, but among all, only a few have focused on PFP. Kujala et al.^[13] have developed the Kujala patellofemoral score in order to determine which patellofemoral complaints are associated with PFP and this scoring system has become popular worldwide.^[13-15] Unfortunately, a scoring system specific to PFP does not exist in the Turkish language for patients complaining of PFP symptoms.

With the aim of making the Kujala patellofemoral score available for Turkish patients, we planned to translate this scoring system into Turkish and test its reliability in patients with PFPS.

Patients and methods

The study included 40 patients (32 women, 8 men; mean age 33±12 years; range 17 to 54 years) who were diagnosed as having PFPS in the Department of Physical Medicine and Rehabilitation, Medical Faculty of İstanbul University, between January 2006 and 2007.

The Kujala patellofemoral score developed by Kujala et al.^[13] is comprised of 13 questions. These questions inquire whether there is pain during walking up and down stairs, squatting, running, jumping, or prolonged sitting with the knee in flexion; whether there is limping, swelling, or subluxation of the patella; the amount of atrophy in the quadriceps muscle, flexion

deficiency, and pain, and whether there is a need for a walking aid. The total score ranges from 0 to 100, the highest indicating the best score (Table 1).

After obtaining permission from Kujala et al.^[13] the Kujala patellofemoral score was translated into Turkish. In the process of translation, we utilized validation and reliability studies in the literature and recommendations of the Mapi Research Institute for linguistic validation.

First, the English version of the scale was translated into Turkish independently by a physiotherapist who had received undergraduate education in the USA and a professor (academic member of the university) with good level of English. The two translations were reviewed by the same persons and a joint text was obtained, which was then translated back to English by a research assistant with advanced level of English. The original and translated English versions were compared, necessary corrections were made, and the final Turkish version was obtained. The sample text was administered to 20 healthy individuals to test its understandability. Then, the scale was administered to 40 patients for reliability. To estimate test-retest reliability, the same questionnaire was re-administered to the same patients after a two-week interval.^[16] As we did not want the scores to be influenced by changes in symptoms, test-retest assessments of the questionnaire were made before treatment.

Cronbach's alpha coefficient was used to assess internal reliability of the scoring system. Cronbach's alpha was calculated for each item of the questionnaire. After the second administration of the scale, Spearman correlation coefficients for each item was calculated and test-retest reliability was assessed using the Spearman's correlation analysis (2-tailed).

Results

The mean body mass index of the patients was 23.7±4.6 kg/m². None of the patients received treatment for PFP previously and the mean pain score determined by a 10-cm visual analog scale was 6.0±1.6 (range 3 to 9). The mean Kujala patellofemoral scores were 76.8 (range 54 to 92) and 75.2 (range 54 to 89) in test and retest evaluations, respectively.

All the patients participated in test-retest applications of the Kujala patellofemoral score, responded to all items, and were included in the evaluation.

Table 1
The Kujala patellofemoral scoring system*

	Score		Score
1. Limp		8. Prolonged sitting with the knees flexed	
a) None	5	a) No difficulty	10
b) Slight or periodical	3	b) Pain after exercise	8
c) Constant	0	c) Constant pain	6
2. Support		d) Pain forces to extend knees temporarily	4
a) Full support without pain	5	e) Unable	0
b) Painful	3	9. Pain	
c) Weight bearing impossible	0	a) None	10
3. Walking		b) Slight and occasional	8
a) Unlimited	5	c) Interferes with sleep	6
b) More than 2 km	3	d) Occasionally severe	3
c) 1-2 km	2	e) Constant and severe	0
d) Unable	0	10. Swelling	
4. Stairs		a) None	10
a) No difficulty	10	b) After severe exertion	8
b) Slight pain when descending	8	c) After daily activities	6
c) Pain both when descending and ascending	5	d) Every evening	4
d) Unable	0	e) Constant	0
5. Squatting		11. Abnormal painful kneecap (patellar) movements (subluxations)	
a) No difficulty	5	a) None	10
b) Repeated squatting painful	4	b) Occasionally in sports activities	6
c) Painful each time	3	c) Occasionally in daily activities	4
d) Possible with partial weight bearing	2	d) At least one documented dislocation	2
e) Unable	0	e) More than two dislocations	0
6. Running		12. Atrophy of thigh	
a) No difficulty	10	a) None	5
b) Pain after more than 2 km	8	b) Slight	3
c) Slight pain from start	6	c) Severe	0
d) Severe pain	3	13. Flexion deficiency	
e) Unable	0	a) None	5
7. Jumping		b) Slight	3
a) No difficulty	10	c) Severe	0
b) Slight difficulty	7		
c) Constant pain	2	Total score:	
d) Unable	0		

*Maximum score= 100.

Correlation coefficients of the items to estimate test-retest reliability of the Kujala patellofemoral score ranged from 0.613 ($p=0.004$) to 1.000 ($p=0.000$), with the mean correlation coefficient of 0.944 ($p=0.000$). Cronbach's alpha calculated for internal reliability was 0.84. Internal reliability and test-retest reliability values showed that the Kujala patellofemoral scoring instrument was understood by the patients and re-

sponses to the items given at two different times were same or similar.

Discussion

Patellofemoral pain syndrome, which is also known as anterior knee pain, is one of the most common symptoms encountered in the fields of physical therapy and sports medicine. It is estimated to account for 10 to

40 percent of all musculoskeletal problems. Pain localized around or below the kneecap, that most commonly occurs during prolonged sitting with the knees flexed, or during extension activities such as walking up and down stairs or squatting significantly affects quality of life of patients and their functions in daily living activities. Both clinical tests and functional assessment scales are used for functional assessment of the patients.

The Kujala patellofemoral score is one of the commonly used assessment scales for patients with PFP. It was developed by Kujala et al.^[13] in 1993 and provides a functional assessment instrument for knee complaints related to the patellofemoral structure. The scale was designed especially for patients with PFP, patellar dislocation or subluxation.^[13,17,18] Crossley et al.^[19] showed that the scale had considerable validity, reliability, and sensitivity in the assessment of patients with PFPS.

To determine the reliability of a survey instrument, Cronbach's alpha and item-total correlation are calculated to find out if the questions are correlated with each other. We used Cronbach's alpha, a more common method, to determine the internal consistency of the items. It is known that 0.70 or higher values of Cronbach's alpha show a good correlation between the items.^[20] In our study, Cronbach's alpha was calculated as 0.84. We could not have the chance to compare test-retest correlation coefficients and Cronbach's alpha coefficients of the scale as there was no other study investigating the validity of the Kujala patellofemoral score in a different language.

Considering the lack of a validated functional assessment scale for Turkish patients with PFPS, we investigated the validity and reliability of the Turkish version of the Kujala patellofemoral score, which is a short, easy, and understandable scale. Internal consistency of the Turkish version of the scale showed good reliability and test-retest results showed high reliability, which suggests that the Kujala patellofemoral score is an applicable instrument for Turkish patients with PFPS.

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