

Does occupational self-competence perception relate to functional outcomes after total knee arthroplasty?

Total diz artroplastisi sonrası aktivite öz yeterlik algısının fonksiyonel sonuçlarla ilişkisi var mı?

Abstract

Aim: The study investigates the effect of occupational self-perception level on the functional status in the early period after total knee arthroplasty (TKA).

Methods: Occupational Self Assessment (OSA), Canadian Occupational Performance Measure (COPM), Knee Injury and Osteoarthritis Outcome Score (KOOS), and Timed Up and Go Test (TUG) tests were administered before and at the 3rd and 6th week after surgery. Changes in COPM, KOOS, and TUG tests were analyzed using Friedman test. The relationship of OSA was examined using the Pearson correlation test.

Results: Self-perception score was statistically in relation to TUG ($r = -0.600$; $p = 0.001$). It was not significantly related with other assessment scores ($p > 0.05$).

Conclusion: Occupational self-competence perception of individuals affect their actual performance levels therefore; high occupational self-perception level may affect the recovery positively.

Keywords: Activities of daily living; recovery of function; total knee replacement

Öz

Amaç: Bu çalışma total diz artroplastisi (TDA) sonrası erken dönemde aktivite öz yeterlilik algısı düzeyinin fonksiyonel duruma etkisini araştırmaktadır.

Yöntemler: Aktivite Öz Değerlendirme ölçeği (AÖDÖ), Kanada Aktivite Performans Ölçeği (KAPÖ), Diz Yaralanması ve Osteoartrit Sonuç Skoru (KOOS), Zamanlı Kalk ve Yürü Testi (TUG) testleri ameliyat öncesi ve ameliyat sonrası 3. ve 6. haftalarda uygulandı. KAPÖ, KOOS, TUG testlerindeki değişimler Friedman testi kullanılarak analiz edildi. OSA ilişkisi Pearson korelasyon testi kullanılarak incelendi.

Bulgular: OSA puanı TUG ile istatistiksel olarak ilişkiliydi ($r = -0.600$; $p = 0.001$). Diğer değerlendirme puanları ile anlamlı bir ilişki yoktu ($p > 0.05$).

Sonuç: Bireylerin aktiviteler hakkında öz yeterlilik algıları, onların fonksiyonel performans düzeylerini etkilemektedir dolayısıyla; yüksek öz yeterlilik algısı iyileşmeyi olumlu yönde etkileyebilir.

Anahtar Sözcükler: Fonksiyonun geri kazanılması; günlük yaşam aktiviteleri; total diz replasmanı

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INTRODUCTION

Total knee arthroplasty (TKA) is a widely employed surgical procedure aimed at alleviating pain resulting from severe joint damage, particularly in cases of osteoarthritis, and enhancing both functionality and overall quality of life (1, 2). The demand for this surgery has been observed to be on the rise (3). Patients typically experience a reduction in pain-related symptoms within the initial four weeks, allowing for an accelerated return to daily activities six weeks post-surgery, contributing to functional recovery (4, 5). Studies indicate sustained, positive changes in terms of pain relief, functional recovery, and increased independence in daily life activities in the long-term following the surgery (6, 7).

The primary outcome following any treatment is functionality. Numerous factors that affect long-term functional post-surgery outcomes are discussed in the literature. These include significant systemic issues and obesity, cardiovascular diseases, and physical/surgical/biomechanical factors such as motor loss due to peroneal nerve damage, compromised knee joint biomechanics, and the occurrence of infection, all of which have been demonstrated to adversely impact the functional recovery process in TKA (8-11). Additionally, a few studies have noted that participants' beliefs about recovery may also influence functional outcomes (12, 13).

According to Geiger, individuals with high self-perception tend to recover more swiftly after surgery and resume routine activities more effortlessly. Conversely, there is a call for research to investigate the impact of participants' personal factors, such as self-efficacy, self-perception, and their health perspective, on the recovery process (13, 14). The influence of participants' self-perception regarding occupations, motivations for engaging in activities, and the values they ascribe to these activities on functional outcomes following TKA remains unclear. It is believed that individuals' personal beliefs and expectations about themselves before surgery may affect early recovery and functional status.

This study aimed to assess functional recovery and occupational participation levels during the early recovery period and establish a connection between occupational self-perception and early functional outcomes after TKA.

MATERIAL AND METHODS

Study protocol

Hacettepe University Non-Interventional Clinical Research Ethics Committee approved this study (date: 04.09.2018, decision no: GO 18/671-02). The purpose and procedures of the study were explained to the participants and written informed consent forms were obtained for participation in the study.

Participants

Research data were collected in the orthopedics service of Düzce Atatürk State Hospital. Research invitations were distributed to individuals who were scheduled for surgery and came to visit the orthopedic clinic. The research procedure was explained in detail to individuals interested in participating in the study and their contact information was obtained.

Power analysis was performed to determine the number of participants. Individuals who met the inclusion criteria were included in the study. Inclusion criteria were to undergo total knee arthroplasty surgery, to be over 45 years old, and to be literate. Exclusion criteria were not having any communication problems ($n = 2$), not having obesity ($n = 4$), not developing post-surgical infection ($n = 2$), and not having a history of falling after surgery ($n = 1$). The study was completed with the participation of forty-three individuals.

Study design

Individuals who volunteered to participate in the study were interviewed and evaluated in the orthopedic service on the day before surgery. Evaluations took approximately one hour, and written consent was obtained from the participants. Individuals were called and invited to the hospital for evaluations in the third and sixth weeks after surgery, and the evaluations were repeated.

Outcome measures

Participants' demographic details were collected. This included inquiries about age, gender, height, weight, presence of chronic diseases, educational and occupational status, surgical history, experience of falls, and the duration of employment. Additionally, the Body Mass Index of participants was computed to identify the presence of obesity. Occupational Self-Assessment

(OSA), a Likert-type scale, was used to evaluate individuals' occupational self-competence perceptions. This scale consists of 21 items and is scored between 0-100 points (15, 16). Patient-reported Canadian Occupational Performance Measure (COPM), Knee Injury and Osteoarthritis Outcome Score (KOOS) and performance-reported Timed Up and Go Test (TUG) were used to evaluate functional expectations and changes. COPM determines occupational preferences and priorities; It evaluates perceived occupational performance and satisfaction while performing occupation. It is used as both goal setting and outcome measure in clinical education (17). Within the scope of this evaluation, a semi-structured interview identifies and lists the problems the participants encounter in the field of occupational performance (18). The Knee Injury and Osteoarthritis Outcome Score (KOOS) comprises five distinct subscales: pain, daily living, sports and recreational activities, symptoms, and quality of life related to the knee. Each subscale is evaluated independently, and the score for each ranges from 0 to 100. A score of 100 implies the absence of symptoms, while 0 points indicate the presence of severe symptoms (19, 20). In the TUG test, individuals are asked to stand up, walk 3 m with the assistive device, turn around, and return to the chair as quickly as possible. The time required to perform the action is timed using a stopwatch. Patients complete two trials and the average time it takes to complete the test in the hospital room is recorded in seconds (21).

Statistical analysis

The study's recorded data underwent statistical analysis using the Statistical Package for the Social Sciences package program version 24.0 (SPSS Inc., Chicago, IL, USA). Sociodemographic details of the participants were documented. The normal distribution of variables was assessed through visual methods (such as histograms and probability plots) and analytical methods (Kolmogorov-Smirnov/Shapiro-Wilk test). Mean and standard deviation values were used for numerical variables in participants' demographic information, while ratio values and frequency tables were employed for categorical variables. To assess the participants' level of improvement, scores for symptoms, pain, function, daily life, sports and leisure activities,

and knee-related quality of life in the KOOS test were examined. This included analyzing changes in COPM performance and satisfaction scores over time, as well as changes in TUG scores over time, using the Friedman test. Subsequently, Pearson correlation tests were utilized to evaluate the associations between OSA, COPM, KOOS, and TUG scores.

RESULTS

Forty-three participants with an average age of 62.4 ± 4.33 years were included in the study. Demographic data of the participants are summarized in Table 1.

In the COPM evaluation, problems were noted in functional mobility (12.5%), productivity activities (see Fig 1), and spiritual activities (32.5%) among daily living activities. More than 80% of the participants stated that they work for more than 12 hours a day in jobs that require physical strength. The average daily time that participants spent in income generating activities were 8.64 ± 3.81 hours. The basic productivity activities of participants were shown in Figure 1.

There was a significant difference between the functional skills of the participants in the six-week postoperative period ($p < 0.05$). The increase in performance and satisfaction levels of the activities in COPM was statistically significant ($p < 0.05$). An increase was found in both the activity performance and satisfaction levels of the participants. However, the change in performance and satisfaction levels between assessments was not clinically significant (less than 2 points change). According to the KOOS test, a reduction in symptoms, pain, ADL, sports, and recreational activities was detected in the six-week period ($p < 0.05$); there was no significant change in knee-related quality of life ($p > 0.05$). The change found in the TUG test was statistically significant ($p < 0.05$). The functional recovery findings of the participants are summarized in Table 2.

The OSA- Competence score was significantly correlated with TUG results ($r = -0.600$; $p = 0.001$). On the other hand, it was not in relation with other assessment scores significantly ($p > 0.05$). The COPM satisfaction variable was found to be significant in terms of occupational self-perception level ($p < 0.05$). Individuals with high perception levels also had high levels of satisfaction Table 3.

Table 1. Demographic characteristics of the participants.

	Descriptive	n (%)
Gender	Female	37 (86%)
	Male	6 (14%)
Total knee prosthesis	Right	20 (46.5%)
	Left	14 (32.5%)
	Bilateral	9 (21%)
Education level	Illiterate	18 (41.8%)
	Primary school	23 (53.4%)
Different surgical history	Collage	2 (4.6%)
	Yes	36(83.7%)
	No	7(16.3%)

n: number, %: percentage

Table 2. The functional recovery findings of the participants.

Outcome	Time	Mean±SD	p	p'	
COPM Performance	1	2.75±0.13	0.0001	1-2	0.013*
	2	3.37±0.13		1-3	0.001**
	3	4.02±0.15		2-3	0.013*
KOOS Symptoms	1	38.97±18.36	0.001	1-2	0.22
	2	47.31±15.60		1-3	0.10
	3	53.84±14.36		2-3	0.001**
KOOS Pain	1	22.97±20.50	0.0001	1-2	0.03*
	2	33.54±18.48		1-3	0.0001**
	3	42.81±15.90		2-3	0.0001**
KOOS ADL	1	30.61±19.73	0.0001	1-2	0.02*
	2	38.06±18.49		1-3	0.002**
	3	44.86±16.72		2-3	0.001**
KOOS Sport and Rec	1	4.50±10.60	0.0001	1-2	0.86
	2	8.50±10.20		1-3	0.48
	3	11.61±10.73		2-3	0.04
TUG Test	1	43.91±18.62	0.002	1-2	0.001
	2	37.35±9.80		1-3	0.001
	3	30.11±7.69		2-3	0.001

1: Preoperative evaluation. 2: Postoperative 3rd week. 3: Postoperative week 6; * p <0.05 ** p <0.001; p': corrected p value for Bonferonni correction

ADL: Activities of daily living; COPM: Canadian Occupational Performance Measure; KOOS: Knee Injury and Osteoarthritis Outcome Score; TUG: Timed Up and Go Test; OOL: Quality of Life; Rec: Recovery; SD: Standard deviation, n: Number, %: Percentage

DISCUSSION AND CONCLUSION

This study revealed that occupational self-perception is related to functional performance in the early period after TKA. However, individual's statements about functional recovery (patient-reported evaluations) were not related to the level of self-perception. In addition, while knee-related results progressed posi-

tively in the early postoperative period, the changes in the level of quality of life were not significant. This study also stated an activity profile of the patients as a secondary result, which may give valuable information for planning measures. Most patients treated for knee osteoarthritis with total knee replacement have shown high rates of perfection and good early functional results(22). When evaluating functional results

Table 3. The Relationships between occupational self perception and functional outcomes

Pearson correlation test	OSA occupational competence		OSA occupational value	
	r	p	r	p
COPM performance	0.233	0.062	0.049	0.766
COPM satisfaction	0.782	0.001	0.653	0.002
TUG test	-0.600	0.001	-0.770	0.001
KOOS symptoms	-0.036	0.826	-0.095	0.526
KOOS pain	-0.179	0.695	-0.041	0.801
KOOS ADL	-0.021	0.896	-0.017	0.915
KOOS sport and recreation	-0.160	0.924	-0.228	0.158

ADL: Activities of Daily Living, COPM: Canadian Occupational Performance Measure, KOOS: Knee Injury and Osteoarthritis Outcome Score, OSA: Occupational Self Assessment, TUG: Timed Up and Go Test; QOL: Quality of Life, $p < 0.05$; r: Correlation coefficient

in individuals with TKA, objective outcome measurements and patient-reported outcome measurements (PROMs) are encountered (23, 24). Physical assessments such as TUG generally provide good results. The Timed Up and Go test is a recommended assessment of functionality, balance, and walking ability for people with knee osteoarthritis and is one of the most commonly used performance-based outcome measures for TKA (21, 25), performance-based measures such as TUG provide a more objective response than patient-reported outcome measures in the acute phase after TKA (23). Therefore, it is thought that measures such as TUG may help to identify patients early who may need additional rehabilitation to reduce the potential for poor outcomes after surgery. In this study, positive changes were also found in both perceived and performance-based functional results of individuals in the early period after TKA. However, surprisingly it was determined that there was no improvement in the quality of life levels of the participants in the early period. Quality of life is not only bound with physical measures, it is a biophysicosocial measure that reflects motive, social status, psychology, etc (26).

Although many studies have stated that the quality of life of individuals increased after TKA (27-29). Canovas and Dagneaux that there was no change in the quality of life of approximately 30 percent of patients (30). As our study revealed similar results with Canovas and Dagneaux we offer individual factors, and unrealistic occupational goals desired to be achieved in the early period may have caused the individuals' quality of life to not increase at the expected level. Studies

may focus on the factors related to quality of life.

Factors such as personal and cultural influences that affect results after TKA are still not sufficiently clear (31). In joint replacement, depressed mood was consistently associated with less improvement in osteoarthritis symptoms following surgery, while greater self-efficacy was variably associated with better (32). Self-perception holds many cultural, personal factors. However, the effects of personal characteristics such as pre-surgical self-perception and self-efficacy are not yet clear in the literature(33, 34). A significant result of this study is that occupational self-competence perception of individuals affects actual performance levels, but not perceived performance levels. This study revealed a relationship between occupational self-perception level and objective evaluation of walking performances. In other words, the changes in the functional performance of the individuals during the surgical process are affected by the individuals' activity identities and the sense of self-efficacy about the activities. High occupational self-perception levels affected the recovery positively.

Rossi stated that individuals' functional improvement expectations, i.e. perceived activity performance and actual performance levels, differ after TKA (24). Therefore, while examining the recovery, expectations of the individuals and their functionality should be examined separately. Studies have shown that surgical expectations are multidimensional and affected by patient characteristics and clinical features. Also, preoperative patient expectations may affect functional outcomes. Therefore, a more comprehensive understanding of pa-

tients' surgical outcome expectations is required (35). In this study, it can be stated that the functional expectations of the patients before the surgery were not fully met after the surgery. It can be said that this situation stems from the unrealistic expectations of the patients or their low self-efficacy perceptions.

This study showed that KOOS and COPM performance scores were not correlated with the OSA score but in the meantime, the COPM satisfaction variable was found to be significant in terms of occupational self-perception. And the change in participants' performance levels in COPM was not clinically significant. Individuals with high perception levels also had high levels of satisfaction. Participants' low perception levels about surgical processes and activities led individuals to set unrealistic recovery goals and eventually reached a level of professional engagement below expectations. Living in rural areas, a low education level and sociocultural level may cause individuals to have a lower perception of occupations. This may also affect the expected relation of OSA with COPM results. The universe in which a person lives, person's social and cultural environment, life roles, opportunities and resources has in accessing occupations can change his view of the occupation (36). Patient expectations are sometimes unrealistic. Individuals may have expectations such as having a new knee joint with surgery and thinking of returning to their old functions. These expectations vary mostly in relation to the cultural dimension of the activity.

In a study conducted with individuals with TKA in Scotland, when the activities individuals want to do after surgery were questioned; expectations rose, such as playing golf or gardening (37). In this study, individuals had expectations of gaining independence in religious activities such as praying. This results shows us that people have a pain-free life expectancy for different activities, and analysis of the activities performed and expected can also be a factor in deciding which surgeries will be performed. Cultural influence should not be forgotten either.

This study examined the recovery process in the early period after TKA from the occupational perspective and the perception of people. In this study, occupational self-perception levels of the participants in the early period after TKA surgery were shown to

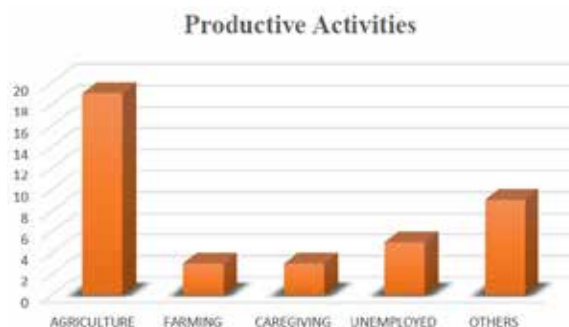


Figure 1. Productivity activities of participants

affect their walking performance. However, occupational self-perception level had no effect on patient-reported functional improvement outcomes. Also, it was seen that the individuals could not reach the level of functional independence and quality of life they wanted to achieve in the early period. Therefore; determining realistic occupational goals and holding occupational therapy interviews with individuals before the TKA surgery can positively contribute to the recovery process of the individuals.

The study had some limitations. Individuals had difficulty in understanding OSA. Another limitation of our study was the coexistence of individuals who underwent unilateral and bilateral arthroplasty, which heterogenized the group structure.

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Conflict-of-interest and financial disclosure

The authors declare that they have no conflict of interest to disclose. The authors also declare that they did not receive any financial support for the study.

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