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Araştırma Makalesi

Indicators of Adapting Artificial Joint After Total Hip Arthroplasty

Total Kalça Artroplastisi Sonrası Yapay Ekleme Adapte Olabilmenin Belirleyicileri

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ABSTRACT

Purpose: The aim of this study was to investigate the indicators of adapting to an artificial joint in terms of age, period after surgery, fear of falling, quality of life and physical function following Total Hip Arthroplasty (THA). **Material and Methods:** This cross-sectional design included 52 patients with OA who underwent THA, aged between 46-74 years, and with a mean period of 1.96±0.76 years after surgery (1-3). Fear of falling, joint-specific functional outcome measurements and health-related quality of life questionnaires were assessed with the supervision of physiotherapists. Fear of falling was assessed with 0-10 cm Visual Analogue Scale (VAS). Health related quality of life and joint-specific function were assessed with EuroQol 5-Dimension 3-Level (EQ-5D-3L) VAS scale and Hip disability and Osteoarthritis Outcome Score (HOOS) – Physical Function Short form (HOOS-PS), respectively. The Forgotten Joint Score (FJS-12) was used to assess patient's adaptation in daily life to their artificial joint. **Results:** The FJS-12 scores were inversely related with fear of falling in patients with THA (r=-0.418; p=0.002). FJS-12 scores were strongly correlated with EQ-5D-3L VAS (r=0.536); and HOOS-PS scores (r=-0.519) (p<0.001). In linear regression analysis, strongest significant indicators of the dependent variable (FJS-12) were fear of falling, EQ-5D-3L VAS and HOOS-PS (R2=0.48; p<0.05). **Conclusion:** Detailed assessment about fear of falling, physical function and quality of life can explain adaptability to artificial joint in patients with THA. Therefore, rehabilitation programmes that are individualised according to patients' fear of falling, physical function and health-related quality of life should also be considered to decrease fear leading to activity limitation and participation in daily life following THA.

Key Words: Hip; Arthroplasty; Joint

ÖZ

Amaç: Çalışmanın amacı, Total Kalça Artroplastisi (TKA) sonrası yapay ekleme uyum sağlayabilmenin yaş, cerrahiden sonra geçen süre, düşme korkusu, yaşam kalitesi ve fiziksel fonksiyon açısından belirleyicilerini incelemekti. **Gereç ve Yöntem:** Bu kesitsel çalışma, 46-74 yaşları arasında TKA yapılan, cerrahiden ortalama süre 1,96±0,76 yıl (1-3) geçmiş, OA'li 52 hastayı içermektedir. Düşme korkusu, ekleme özel fonksiyonel sonuç ölçütleri ve sağlıkla ilişkili yaşam kalitesi anketleri fizyoterapist tarafından değerlendirildi. Düşme korkusu 0-10 cm Görsel Analog Skalası (GAS) ile değerlendirildi. Sağlıkla ilişkili yaşam kalitesi EuroQol 5 boyutlu 3 seviyeli GAS skalası (EQ-5D-3L VAS) ile ekleme özel fonksiyonel durumu ölçen Kalça Osteoartrit Sonuç Ölçeği Kısa Form (HOOS-PS) ile değerlendirildi. Hastaların yapay eklemlerine günlük yaşantılarından uyum sağlayabilmesini değerlendirmek için Unutulan Eklem Skoru (UES-12) kullanıldı. **Sonuçlar:** TKA'lı hastalarda UES-12 skorları ile düşme korkuları arasında zıt yönde ilişki vardı (r=-0.418; p=0.002). UES-12 skorları ile EQ-5D-3L VAS skorları (r=0.536) ve HOOS-PS skorları (r=-0.519) (p<0.001) arasında güçlü bir ilişki vardı. Doğrusal regresyon analizinde bağımlı değişkenin (UES-12) en güçlü belirleyicileri; düşme korkusu, EQ-5D-3L VAS ve HOOS-PS idi (R2=0.48; p<0.05). **Tartışma:** Düşme korkusu, fiziksel fonksiyon ve yaşam kalitesi ile ilgili sonuçlar, TKA'lı hastalarda yapay ekleme uyumun gelişmesinin belirleyicileri arasında sayılabilir. Bu sebeple, TKA sonrası bireylerde günlük yaşamdaki aktivite limitasyonuna sebep olan katılımı kısıtlayan korkuyu azaltmak için hastanın düşme korkusu, fiziksel fonksiyonu ve sağlıkla ilişkili yaşam kalitesine göre bireyselleştirilmiş rehabilitasyon programları dikkate alınmalıdır.

Anahtar Kelimeler: Kalça; Artroplasti; Eklem

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Osteoarthritis (OA) of the hip is one of the primary cause of pain and functional disability in older adults (Blagojevic, Jinks, Jeffery, & Jordan, 2010). THA is the best option to regain the joint function; since the end stage OA of the hip adversely affect the physical functions as well as the quality of life (Dimitriou, Antoniadis, Flury et al 2018). The surgical techniques have been improved, but a subgroup of patients has still poorer postoperative outcomes with respect to pain and physical functioning (Singleton and Poutawera, 2017)

Several studies, investigated the postoperative outcomes following THA in terms of pain, range of motion and physical function and it is specified that patients have further expectations (Mancuso, Jout, Salvati &Sculco, 2009). Most of the patients concerns were about improving walking ability and daily life activities outside at home, pain relief during daytime and night time and also, psychological well-being. Recently, the ability to "forget" the joint implant in everyday life is considered to be the ultimate objective after THA (Mancuso, Jout, Salvati &Sculco, 2009).

On the other hand, the other important factor that affect the posterior outcomes after THA is fear of falling. Previous studies reported that patients with THA have high level of falling rate even at one year after surgery and the fear of falling is related to poorer postoperative functional outcomes (Nagai, Ikutomo, Tagomori, Miura et al, 2018). Detailed information regarding the relationship between fear of falling, quality of life, physical function and ability to forget the artificial joint after THA would enable designing more complementary rehabilitation programs. Therefore, the aim of this study was to investigate the indicators of adapting to an artificial joint in terms of fear of falling, quality of life, physical function and adapting to the artificial joint following THA. It was hypothesized that fear of falling, would result with poor ability to forget the artificial joint and poorer quality of life outcomes.

MATERIAL AND METHODS

This cross-sectional correlational design included 52 patients aged between 46-74 years with a mean period 1.96±0.76 years after surgery (1-3). Patients with primary OA who underwent cemented THA (titanium) with postero-lateral technique (mean hospitalization period 2-4 days) participated in the study. Exclusion criteria were lower extremity discrepancy, history of any neurologic disease as hemiplegia, having cooperative impairment and inability to understand and cooperate. Demographic characteristics such as age, height, weight, sex were recorded when the patients who came to routine controls at the outpatient clinic. Pain level and fear of falling, joint-specific functional outcome measurements and health-related quality of life questionnaires were assessed with the supervision of physiotherapists. Ethical approval for this study was obtained from the Non-interventional Clinical Research Ethics Committee (GO 18/632) and all patients signed a written informed consent form.

Number of participants in this cross-sectional study was determined (n=52) as five times more than independent variables (age, period after surgery, fear of falling, quality of life and physical function) (Hayran M. & Hayran M. 2011).

Fear of Falling

Fear of falling was assessed with 0-10 cm Visual Analog Scale (VAS). The distance (cm) of the patient's mark on the line indicated his or her intensity of fear of falling (Wolf et al., 2001).

The EuroQol 5-Dimension 3-Level (EQ-5D-3L)

(EQ-5D-3L) format was introduced in 1990 (EuroQoL G., 1990). It consists of the EQ-5D descriptive system and the EQ visual analogue scale (EQ VAS). The EQ-5D-3L descriptive system comprises the following 5 dimensions: mobility, self-care, usual activities, pain/discomfort and anxiety/depression. Each dimension has 3 levels: no problem, some problems, and extreme problems. Since the EQ-5D-3L VAS scale is not a choice-based method and the values were not anchored between 0 (dead) and 1 (full health), we preferred to use mean variable of EQ-5D-3L VAS. The descriptive system can be represented as a health state. Turkish version of EQ-5D-3L was used in this study (Kahyaoğlu Süt H, 2009).

Hip disability and Osteoarthritis Outcome Score – Physical Function Short form (HOOS-PS)

HOOS-PS is developed as an instrument to assess the patients' opinion about their hip and associated problems. HOOS-PS is used for hip disability with or without osteoarthritis (OA) (Davis A et al., 2008). Turkish version of the HOOS- PS is a 5-item measure of physical functional derived from the items of the function, daily living and function, sports and recreational activity subscales of the HOOS (Yilmaz O et al., 2012). It scored between 0–100 with zero scores representing no difficulty and 100 scores representing extreme difficulty.

The Forgotten Joint Score (FJS-12)

The FJS-12 was developed by Behrend et al. is

based on the patient's ability to forget about a joint as a result of successful treatment during activities of daily living. It uses a 5-point Likert response format (0, never; 1, almost; 2, seldom; 3, sometimes; 4, mostly) consisting of 12 items. The raw scores are transformed from 0 to 100 and higher scores indicate better outcome (Behrend et al., 2012). The Turkish FJS-12 exhibits satisfactory properties with excellent reliability and validity with total hip arthroplasty (Kinikli GI et al., 2017).

Statistical Analysis

SPSS version 23 (IBM Corp., Armonk, NY, USA) was used for statistical analysis. For the demographic characteristics, continuous variables were shown as mean ± standard deviation (SD). Furthermore, frequencies and percentages were presented for nominal variables. The Kolmogorov-Smirnov Normality test showed non-normal distribution. Thus, Spearman's rank correlation coefficients were used for non-parametric variables. Correlation coefficients between 0.10 and 0.29 represent a weak association; coefficients between 0.30 and 0.49 represent a moderate association, and coefficients of 0.50 and above represent a strong association. Observed power (0.94) of the dependent variable (FJS-12) was analysed according to the highest correlation coefficient of the independent variable (EQ-5D-3L VAS) (p=0.012; effect size=0.514). Linear logistic regression analysis was used to explore the association between FJS-12 (dependent variable) scores and the independent variables: fear of falling (VAS), physical function (HOOS-PS) and quality of life (EQ-5D-3L VAS). A p-value of <0.05 was considered statistically significant.

RESULTS

There were 52 patients (Female, n=34; 65.4%) in the present study. Physical characteristics of the patients were presented in Table 1. Spearman correlation analysis revealed that FJS-12 scores were inversely related with fear of falling in patients with THA (r=-0.418; p=0.002) (Table 2). Furthermore, FJS-12 scores were strongly correlated with EQ-5D-3L VAS (r=0.536); and HOOS-PS scores (r=-0.519) (p<0.001) (Table 2).

In linear regression analysis, strongest significant indicators of the dependent variable (FJS-12) were fear of falling, EQ-5D-3L VAS and HOOS-PS (R2=0.48; p<0.05) (Table 3).

Table 1. Physical characteristics of the patients

n=52	Min.	Max.	Mean	SD
Age (years)	46	74	58.96	6.58
BMI (kg/m^2)	21.55	40.89	28.28	4.24
Disease duration (years)	1	3	1.96	0.76
Fear of falling (0-10 cm)	0	10	3.96	3.38
EQ-5D-3L VAS (0-1)	0.22	1	0.68	0.20
HOOS – PS (0-100)	0	100	39.59	24.42
FJS-12 (%)	0	100	52.33	34.67

n: Sample size; **Min.:** Minimum; **Max.:** Maximum; **SD:** Standard Deviation; **BMI:** Body Mass Index; **HOOS-PS:** The Hip Disability and Osteoarthritis Outcome Score-Physical Function Short-form; **FJS-12:** The Forgotten Joint Score; **EQ-5D-3L VAS:** EuroQol 5-Dimension 3-Level Visual Analogue Scale

Table 2. Correlations between FJS-12 and fear of falling, EQ-5D-3L VAS, HOOS-PS

n=52		Fear of falling	EQ-5D-3L VAS	HOOS-PS
FJS-12	**r**	-0.418*	0.536**	-0.519**
	p	0.002	<0.001	<0.001

p<0.05**; n:** Sample size; **r:** Correlation coefficient; **FJS-12:** The Forgotten Joint Score; **EQ-5D-3L VAS:** EuroQol 5-Dimension 3-Level Visual Analogue Scale; **HOOS-PS:** The Hip Disability and Osteoarthritis Outcome Score-Physical Function Short-form

Table 3. Linear regression analysis

Predictors	**Standard Error**	**Beta**	**t**	**p***
Fear of falling	1.114	-0,277	-2.551	0.014
EQ-5D-3L-VAS	18.293	0.433	3.964	<0.001
HOOS -PS	0.151	-0.288	-2.707	0.009

***p**<0.05; **Dependent Variable:** FJS-12; **Independent variables:** Fear of falling; EQ-5D-3L VAS, HOOS-PS; **FJS-12:** The Forgotten Joint Score; **EQ-5D-3L VAS:** EuroQol 5-Dimension 3-Level Visual Analogue Scale; **HOOS-PS:** The Hip Disability and Osteoarthritis Outcome Score-Physical Function Short-form

DISCUSSION

In the present study, we investigated the indicators of adapting to the artificial joint following THA. The major findings of our study demonstrated that fear of falling; quality of life and physical function were associated with the ability to forget the artificial joint in daily life in patients with THA. Furthermore, fear of falling, quality of life and physical function are represented as indicators of adapting to the artificial joint in daily life after THA.

Since the patients' expectations on the post-operative function have changed over the past years; validated methods asking for self-reported outcomes of the patients had a great importance. FJS-12 is a questionnaire that focuses on the awareness, instead of the pain of the affected joint. The main characteristic of the FJS- 12 that is not observed in other tools is that discrimination among ''good,'' ''very good,'' and ''excellent'' is possible using relatively abstract questions to ask whether patients are aware of their artificial joint during activities of daily living (Matsumoto et al., 2015). Our sample has a moderate score for FJS-12 compared to the literature. Although the disease duration of our sample is enough (Mean: 1.96 years) to recover following THA; the possible reason for this low adaptation to daily life might be fear of falling associated with low physical function as a result of lower health related quality of life. Similarly, our results demonstrated moderate to strong correlations between fear of falling, quality of life, physical function and adapting the artificial joint following THA. Fear of falling causes fear of movement and thus functional disorders in the patients with THA. In a study Nagai K et al. (2014) revealed that functional outcome is most strongly associated with general

fear of falling and suggests that lower functional outcome has a strong effect on fear of falling after THA (Nagai K et al., 2014). Our results were in line with the Nagai K et al. (2014) who studied fear of falling during activities of daily living after THA (Nagai K et al., 2014). They found associations with poorer functional outcome, history of falling, lower walking capacity, higher anxiety level and older age following THA.

In another study of Scheffer et al, the VAS was determined to be useful for measuring fear of falling in elderly people (Scheffer et al., 2010). Despite the fact that in the present study, mean age was younger (Mean: 58.96 years), fear of falling was still an indicator of adapting to the artificial joint following surgery. Another study from Fujita et al. (2009), also reported that patients who have undergone total hip replacement have some difficulties during activities of daily living compared to normal subjects (Fujita et al., 2009). Similarly, our patients had reported difficulties in daily activities in FJS-12 questions. In addition, residual decreased physical function according to HOOS-PS scores following THA may have led to these results. THA was designed primarily to improve physical function related to the hip and to decrease pain. These benefits also appear to translate into appropriate improvement in Health-related-Quality of life (Towheed et. al., 1996). Physical function results accompanying fear of falling may be the reason of the decreased quality of life scores according to EQ-5D-3L VAS in our cohort. In a review of Towheed et. al., beneficial and often dramatic improvement were demonstrated in health-related-quality of life after THA (Towheed et. al., 1996).

One possible limitation on this study is that a limited sample population is included. In addition, the psychological and Mini Mental State Examination test have not been evaluated in the present study. In fact, it can induce a debilitating downward spiral, marked by loss of confidence and reduced activity in patients following THA. Future studies would preferably be performed on a larger study population. Moreover, patients who have undergone THA may require a long-term complementary rehabilitation programme to adapt to their artificial joint in daily life.

In conclusion, detailed assessment about fear of falling, physical function and quality of life can explain the half of adaptability to artificial joint in patients with THA. This cross-sectional study results have presented a need for an effective rehabilitation programme to prevent excessive fear related activity limitation accompanying with lower physical function and quality of life following THA. Therefore, rehabilitation programmes that are individualised according to patients' fear of falling, physical function and self-reported quality of life should also be considered to decrease fear leading to activity limitation and participation in daily life following THA.

Kaynaklar

Behrend H, Giesinger K, Giesinger JM, & Kuster MS. (2012). The "forgotten joint" as the ultimate goal in joint arthroplasty: validation of a new patient-reported outcome measure. *J Arthroplasty,* 27(3), 430–6.

Blagojevic M, Jinks C, Jeffery A, & Jordan KP. (2010). Risk factors for onset of osteoarthritis of the knee in older adults: a systematic review and meta-analysis. *Osteoarthritis Cartilage*, 18(1), 24-33.

Davis A, Perruccio A, Canizares M, Tennant A, Hawker G, Conaghan P, & et al. (2008). The development of a short measure of physical function for hip OA HOOS-Physical Function Shortform (HOOS-PS): an OARSI/OMERACT initiative. *Osteoarthritis Cartilage*, 16(5), 551-9.

Dimitriou D, Antoniadis A, Flury A, Liebhauser M, & Helmy N. (2018). Total hip arthroplasty improves the quality-adjusted life years in patients who exceeded the estimated life expectancy. *J Arthroplasty,* 33(11), 3484-3489.

The EuroQol. "EuroQol-a new facility for the measurement of health-related quality of life." *Health policy* 16.3 (1990): 199-208.

Fujita K, Makimoto K, Higo T, Shigematsu M, & Hotokebuchi T. (2009). Changes in the WOMAC, EuroQol and Japanese lifestyle measurements among patients undergoing total hip arthroplasty. *Osteoarthritis Cartilage*.17(7), 848–55.

Hayran M, & Hayran M. (2011). *Sağlık araştırmaları için temel istatistik.* Ankara: Omega Araştırma.

Kahyaoğlu Süt H. (2009). *Akut koroner sendromlu hastalarda yaşam kalitesi: EQ-5D ölçeğinin geçerlilik ve güvenirlik çalışması.* Yayınlanmamış Yüksek Lisans tezi, Trakya Üniversitesi, Türkiye.

Kinikli GI, Guney-Deniz H, Karahan S, Yuksel E, Kalkan S, Kara-Donder D, & et al. (2017). Validity and reliability of Turkish version of the Forgotten Joint Score-12. *JETR*, 4(1), 18-25.

Mancuso CA, Jout J, Salvati EA, & Sculco TP. (2009). Fulfillment of patients' expectations for total hip arthroplasty. *J Bone Joint Surg Am,* 91(9): 2073–8.

Matsumoto M, Baba T, Homma Y, Koboyashi H, Ochi H, Yuasa T, & et al. (2015). "Validation study of the Forgotten Joint Score-12 as a universal patient-reported outcome measure." *EJOST,* 25(7), 1141-1145.

Nagai K, Ikutomo H, Tagomori K, Miura N, Tsuboyama T, & Masuhara K. (2018). Fear of Falling Restricts Activities of Daily Living after Total Hip Arthroplasty: A One-Year Longitudinal Study. *Clin Gerontol.* 41(4), 308-314.

Scheffer AC, Schuurmans MJ, Vandijk N, Van Der Hooft T, & De Rooij SE. (2010). Reliability and validity of the visual analogue scale for fear of falling in older persons. *J Am Geriatr Soc*, 58(11), 2228-30.

Singleton N, & Poutawera V. (2017). Does preoperative mental health affect length of
hospital stay and functional outcomes following arthroplasty surgery? A
registry-based cohort study. *J Orthop Surg (Hong Kong)*. 25(2), 2309499017718902.

Towheed, TE, & Hochberg MC. (1996). "Health-related quality of life after total hip replacement." *Seminars in arthritis and rheumatism*, 26(1), 483-491.

Yilmaz O, Gul ED, & Bodur H. (2014). Cross-cultural adaptation and validation of the Turkish version of the hip disability and osteoarthritis outcome score-physical function short-form (HOOS-PS). *Rheumatol Int,* 34(1), 43-9.

Wolf B, Feys H, De Weerdt W, van der Meer J, Noom M, & Aufdemkampe G. (2001). Effect of a physical therapeutic intervention for balance problems in the elderly: a single-blind, randomized, controlled multicentre trial. *Clin rehabil*, 15(6), 624-36.