

노인재활

게시일시 및 장소 : 10 월 18 일(금) 08:30-12:20 Room G(3F)

질의응답 일시 및 장소 : 10 월 18 일(금) 10:00-10:45 Room G(3F)

## **P 1-18**

### **Factors associated with postoperative walking speed and distance after unilateral TKA**

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#### **Objective**

This study was undertaken to determine the factors correlated with postoperative walking speed and distance at 3 month after unilateral total knee arthroplasty (TKA).

#### **Methods**

Cross-sectional data from 149 patients (23 males and 126 females; average age  $72.1 \pm 6.4$  years) who underwent unilateral primary TKA were analyzed. The instrumental gait analysis for spatio-temporal parameters, isometric knee extensor and flexor strength of both knees, 6 minute walk test (6MWT), timed up-and-go (TUG) test, timed stair climbing test (SCT), knee flexion and extension range of motion (ROM) of surgical knee, Western Ontario McMaster Universities Osteoarthritis Index (WOMAC) pain, stiffness, and functional levels, EuroQol five-dimensions (EQ-5D) questionnaire were assessed.

#### **Results**

In bivariate analyses, postoperative walking speed had significant positive correlations with cadence ( $r=0.35$ ,  $p<0.001$ ), stride length ( $r=0.66$ ,  $p<0.001$ ), propulsion index of surgical ( $r=0.48$ ,  $p<0.001$ ) and non-surgical knee ( $r=0.57$ ,  $p<0.001$ ), peak torque (PT) of the extensor of surgical ( $r=0.29$ ,  $p<0.001$ ) and non-surgical knee ( $r=0.24$ ,  $p=0.003$ ) and flexor of surgical ( $r=0.19$ ,  $p=0.019$ ) and non-surgical knee ( $r=0.19$ ,  $p=0.021$ ), 6MWT ( $r=0.41$ ,  $p<0.001$ ), EQ-5D ( $r=0.35$ ,  $p<0.001$ ), and significant negative correlation with gait cycle duration ( $r=-0.29$ ,  $p<0.001$ ), TUG ( $r=-0.51$ ,  $p<0.001$ ), SCT-ascent ( $r=-0.33$ ,  $p<0.001$ ) and decent ( $r=-0.42$ ,  $p<0.001$ ) and WOMAC pain levels ( $r=-0.16$ ,  $p=0.048$ ). The postoperative walking distance had significant positive correlation with walking speed ( $r=0.41$ ,  $p<0.001$ ), cadence ( $r=0.20$ ,  $p=0.015$ ), stride length ( $r=0.30$ ,  $p<0.001$ ), swing phase duration ( $r=0.17$ ,  $p=0.034$ ), propulsion index of surgical ( $r=0.43$ ,  $p<0.001$ ) and non-surgical knee ( $r=0.38$ ,  $p<0.001$ ), PT of the extensor of surgical ( $r=0.22$ ,  $p=0.009$ ) and non-surgical knee ( $r=0.17$ ,  $p=0.035$ ), EQ-5D ( $r=0.34$ ,  $p<0.001$ ), and significant negative correlation with gait cycle

duration ( $r=-0.22$ ,  $p=0.007$ ), double support duration ( $r=-0.19$ ,  $p=0.021$ ), TUG ( $r=-0.64$ ,  $p<0.001$ ), SCT-ascent ( $r=-0.62$ ,  $p<0.001$ ), decent ( $r=-0.42$ ,  $p<0.001$ ) and VAS of both knees ( $r=-0.30$ ,  $p<0.001$ ). In the multivariate linear regression analyses adjusted the age and sex variables, TUG ( $\beta=-0.023$ ,  $p=0.002$ ), cadence ( $\beta=0.003$ ,  $p=0.007$ ), stride length ( $\beta=0.006$ ,  $p<0.001$ ) and propulsion index of non-surgical knee ( $\beta=0.020$ ,  $p<0.001$ ) were factor correlated with postoperative walking speed. The SCT-ascent ( $\beta=-5.404$ ,  $p=0.031$ ) and descent ( $\beta=-5.881$ ,  $p=0.018$ ), TUG ( $\beta=-13.958$ ,  $p=0.002$ ) and propulsion index of surgical knee ( $\beta=7.767$ ,  $p=0.006$ ) were factor correlated with postoperative walking distance.

## Conclusion

This study confirmed the performance-based physical function were important factors with walking speed and distance 3 month after TKA.

Table 1. Demographic and Disease-related Characteristics of the Subjects (N=149)

Variables	Values
Age (years)	72.1 ± 6.4
Sex, males/females	23 (15.4) / 126 (84.6)
Height (cm)	152.9 ± 7.1
Weight (kg)	60.1 ± 10.4
BMI (kg/m <sup>2</sup> )	25.7 ± 3.4
K-L grades	
Grade 3	32 (21.5)
Grade 4	117 (78.5)
Lesion side	
Right	89 (59.7)
Left	60 (40.3)
Comorbidities	
Hypertension	93 (62.4)
Diabetes mellitus	27 (18.1)
Spine disease	24 (16.1)
Osteoporosis	77 (51.7)

Values represent mean ± standard deviation or number (%) of cases

The confidence interval of sex, K-L grades, lesion side, comorbidities are expressed in %.

Abbreviations: BMI, body mass index; K-L, Kellgren-Lawrence

Table 2. Correlation among Walking Speed and distance (6MWT), Gait parameter, Objective Performance-based Physical Function, Self-reported Physical Function at 3month after TKA

Variable	Correlation coefficients (r) Walking speed	Correlation coefficients (r) Walking distance (6MWT)
<b>Gait linear parameter</b>		
Walking Speed (m/sec)	-	0.41†
Cadence (steps/min)	0.35†	0.20*
Stride length (cm)	0.66†	0.30†
Gait cycle duration (sec)	-0.29†	-0.22†
Stance phase duration (% of gait cycle)	-0.02	-0.02
Swing phase duration (% of gait cycle)	0.07	0.17*
Double support duration (% of gait cycle)	-0.09	-0.19*
Single support duration (% of gait cycle)	0.09	0.13
Propulsion index of surgical knee	0.48†	0.43†
Propulsion index of non-surgical knee	0.57†	0.38†
<b>Isometric strength test</b>		
PT extensor of surgical knee (N·m·kg <sup>-1</sup> BW %)	0.29†	0.22†
PT flexor of surgical knee (N·m·kg <sup>-1</sup> BW %)	0.19*	0.01
PT extensor of non-surgical knee (N·m·kg <sup>-1</sup> BW %)	0.24†	0.17*
PT flexor of non-surgical knee (N·m·kg <sup>-1</sup> BW %)	0.19*	0.01
Deficit of extensor (%)	0.10	0.03
Deficit of flexor (%)	0.08	0.08
6MWT (m)	0.41†	-
TUG (sec)	-0.51†	-0.64†
<b>SCT (sec)</b>		
Ascent	-0.33†	-0.62†
Descent	-0.42†	-0.63†
<b>ROM (degrees)</b>		
Knee flexion	0.06	0.13
Knee extension	0.07	0.11
VAS	-0.15	-0.30†
<b>WOMAC</b>		
Pain	-0.16*	-0.01
Stiffness	-0.10	-0.13
Function	-0.31†	-0.07
EQ-5D	0.35†	0.34†

Values represent correlation coefficients (r)<sup>a</sup>

\* $p < 0.05$ , † $p < 0.01$ <sup>a</sup>

Abbreviations: PT, peak torque; BW, body weight; 6MWT, 6 minute walk test; TUG, timed up and go; SCT, timed stair climbing test; ROM, range of motion; VAS, visual analog scale; WOMAC, Western Ontario McMaster Universities Osteoarthritis Index; EQ-5D, EuroQol five dimensions

Table 3. Factors correlated with Walking Speed and Distance by Multivariate Linear Regression Analysis at 3month after TKA

Outcome/Independent Predictor	Standardized $\beta$	<i>p</i> -value	Adjusted R <sup>2</sup>
Walking speed			0.67
TUG (sec)	-0.023	0.002	
Cadence (steps/min)	0.003	0.007	
Stride length (cm)	0.006	<0.001	
Propulsion index of non-surgical knee	0.020	<0.001	
Walking distance			0.51
SCT-ascent (sec)	-5.404	0.031	
SCT-descent (sec)	-5.881	0.018	
TUG (sec)	-13.958	0.002	
Propulsion index of surgical knee	7.767	0.006	

Abbreviations: TUG, timed up and go; SCT, timed stair climbing test;