Joint Mechanics After Total Knee Arthroplasty While Descending Stairs

Verena U Fenner, Henrik Behrend & Markus S Kuster

BACKGROUND
Modern knee designs do not fully restore the anatomy and kinematics of the natural knee. This study evaluates the kinematic and kinetic changes of well-functioning patients with total knee arthroplasty (TKA) in comparison to a healthy age-matched control group while descending stairs and level walking. The aim was to have a baseline for further investigations of TKA patients with problems.

METHODS
Fifteen patients satisfied with TKA (8/7; 66.8 ± 7.4 years; body mass index (BMI) 25.9 ± 2.8 kg/m²; 2.1 ± 1.3 years postop, LCS Complete) and 17 healthy control subjects (7/10; 66.6 ± 6.8 years; BMI 25.0 ± 2.2 kg/m²) participated in the study. Kinematic (upper and lower body) and kinetic (lower body) data were collected during stair descending (step height 17 cm) and level walking, using an 8-camera Vicon system and 2 force plates. Parameters were compared using a Student t test.

RESULTS
Patients after TKA showed significantly lower frontal knee moments and a more externally rotated hip during stance for both level walking and stair descent. There were 31% more significantly different parameters during level walking than during stair descent.

CONCLUSION
The analysis of stair descending in addition to level walking for satisfied patients does not add additional information for the understanding of the kinematic and kinetic changes after TKA. It seems more important to include the kinematics and kinetics of the hip and ankle joint in all 3-dimensional planes.

type journal paper/review (English)
date of publishing 13-8-2016
journal title J Arthroplasty
ISSN electronic 1532-8406