

Biomechanical Analysis of Gait During Unloaded Walking in Normals and Patients With Total Knee Arthroplasty. Uhlrich A, Rolf A, Foley A PT, DPT, Kohia M PT, Ph D. Rockhurst University. mohamed.kohia.rockhurst.edu

Purpose: Total knee arthroplasty (TKA) has become one of the most effective surgical treatments for severe osteoarthritis of the knee. One of the goals of physical therapy after a TKA is to return the patient to ambulation without gait disturbances. The purpose of this study is to determine if patients with TKA will have a similar gait pattern compared to normal subjects of the same age during loaded and unloaded walking. **Subjects:** Four subjects participated in this study and were enrolled into 2 groups. The first group (Normals) has three subjects whereas the second group (TKA) has one subject. The average age of the subjects was 63.5 ± 3.5 , average weigh of 198 lbs and average height of 70.5 in. Selection criteria for TKA patients included having a right TKA due to osteoarthritis less than 6 months prior to testing. Group 2 selection criteria included no history of TKA and matched to Group 1 by anthropometric measurements and age. **Methods:** Motion Analysis System was used to capture biomechanical gait parameters during ambulation. Knee angle data was collected in both groups during the 2 walking conditions: Loaded with no body weight support and unloaded with 30% of the body weight support. Subjects walked on a treadmill at 2.0 mph during both conditions. After a warm up period, data was collected for 2 minutes, and one full stride in the middle of testing was used for statistical analysis. The peak knee angle was used to compare between the 2 groups under the 2 loading conditions. **Results: Data Analysis:** Two-way ANOVA technique was used to analyze the data with the dependent variable being the right knee angle throughout the gait cycle. There were no significant differences between the 2 groups (TKA and Normals) throughout the gait cycle except during toe off ($P < .05$) with TKA patients having 5 more degrees of knee flexion. In addition, there were no significant differences between the 2 loading conditions (Loaded and Unloaded) for any component of the gait cycle. No significant interaction was found, indicating that the 2 groups behaved the same way during the conditions of loading. **Conclusions:** The results of this study showed that the 2 groups performed similarly during the loaded and unloaded conditions. The unloading system has benefits that can be utilized with TKA patients, which includes minimizing pain, decreasing pressure on knee joint, diminishing the risk of falls, and improving gait pattern through reducing the co-contraction of the hamstrings and quadriceps. Based on the results of this study, it is our recommendation that patients with TKA can benefit from the unloading system during early rehabilitation after surgery. **Funding Source:** Research not funded. Authors had no potential for material gain.

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This abstract has not been previously peer reviewed and accepted for presentation elsewhere.