

The Influence of Total Knee Arthroplasty on Postural Control

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Abstract

Introduction: The aim of this study is to assess the changes induced by the unilateral total knee arthroplasty procedure in human postural control.

Materials and methods: The measurements were performed using the "AMTI AccuGait" force plate. Subjects completed three consecutive double-limb standing balance trials. The mediolateral and anteroposterior displacements were derived from the force and moment profiles measured by the force platform. The path length per unit time (average velocity) and Elipse 95 (collect 95% of data) were also assessed.

Results: Mediolateral displacement increase of 3.4% was observed postoperatively. Postoperative anterolateral displacement increase of 23.2% was recorded. The average velocity also rose by 16.8% postoperatively. The Elipse 95 grew by 33.7% postoperatively.

Discussion: Excepting mediolateral displacement, all the other studied parameters showed significantly ($p < 0.05$) higher values in the postoperative period compared with the preoperative one, in both open and closed eye trials.

Conclusions: The study results demonstrate that balance control is weaker shortly after unilateral knee arthroplasty, than in the preoperative period. Although proprioception is altered in osteoarthritic knees, the TKA procedure may additionally affect proprioceptors. The TKA causes additional instability in the days after the procedure, therefore the risk of falling injuries is higher in this period.

Key words: knee arthroplasty, balance control, proprioception

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