

The Effects of Restricted Arm Swing on Gait Kinematics

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Background: Certain orthopedic or neurological conditions may affect the use of an upper extremity and its function as part of arm swing during gait. For example, an upper extremity may be restricted into a sling following a fracture or an individual's upper extremity may have decreased function following a stroke. The purpose of this study was to investigate potential effects of restricted arm swing during gait, with a focus on hip, knee and ankle kinematics and whether it may predispose an individual to further injury. Slings are a commonly used assistive device in clinical practice for a variety of clinical indications. Because of this, the question of their affects of gait kinematics and potential for lower extremity injury was considered. Given the normal properties of bipedal gait, it is known that arm swing is a critical component. Although there is literature looking at the effects of arm swing on pelvis and trunk rotation, there is limited evidence investigating the effects of decreased arm swing on the lower extremities.

Methods: The subjects in this study included two healthy 23-year-old Ithaca College females. Both subjects walked at a self-selected pace. Each subject's gait with both arms unrestricted was compared to gait with the subject's right upper extremity bound into a sling. The variables measured during gait were peak joint angles in the frontal and sagittal plane using a 3D motion analysis using a Plug-In Gait Model, as well as the vertical ground reaction force in the sagittal plane as measured by a force plate. These variables were compared individually for each subject during typical gait and unilateral restricted arm swing.

Results: The results of this study revealed variation among movement between typical gait and restricted arm swing trials. However, here were no significant differences in lower extremity peak joint angles in the sagittal and frontal planes. There were also no changes in vertical ground reaction forces shown between typical gait and gait with restricted arm string. In addition, there were no consistent differences in any measurements found between the two subjects during the study.

Discussion/Conclusion: Based on this research, restricted arm swing will not have negative effects on lower extremity gait kinematics. Using an arm sling is unlikely to predispose an individual to future lower extremity injuries. It is recommended that further research is performed due to the many limitations in this study including; a small sample size involving healthy individuals and the potential for bias.

Clinical implications: The use of arm slings in the clinic is supported and can be encouraged. It will not significantly impact the kinematics of the lower extremities and therefore, will not predispose an individual to further problems or injuries in the lower extremities.

References:

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