

**KNEE GAIT KINEMATIC RESPONSES TO VIBRATION OF THE HAMSTRING TENDONS:
AN EXPLORATORY STUDY OF PERSONS WITH ANTERIOR CRUCIATE LIGAMENT
INJURY**

*Catherine Gauthier¹, Magalie Boulay¹, Isabelle Fraser-Beaulieu¹, Julie-Pier Laurent¹, Nicolas Poliquin¹,
Daniel Audet², Cyril Duclos³ and Nathaly Gaudreault¹*

¹École de Réadaptation and ²Département d'orthopédie, Université de Sherbrooke, Sherbrooke, Canada,

³École de réadaptation, Université de Montréal, Montréal, Canada

INTRODUCTION: Science shows that vibration applied to a tendon is accompanied by an illusion of stretching and contraction of the vibrated muscle (Tonic Vibration Reflex or TVR) or of its antagonist (Antagonist Vibratory Response or AVR). Vibration can potentially be used as a proprioceptive rehabilitation modality to correct the internal tibial rotation offset commonly observed during the gait of patients with anterior cruciate ligament (ACL) injuries. The aim of this study was to explore the effect of vibration to the lateral and medial hamstrings tendons on transverse plane knee gait kinematics of healthy participants and participants with an ACL tear. **METHODS:** Six healthy subjects and 7 individuals with complete ACL tear participated in this descriptive comparative exploratory study. Transverse plane knee kinematics data were first recorded while participants walked at a comfortable speed on a treadmill. These data were used as reference. Two walking tests were then carried out while a low amplitude vibration was applied to the tendons of 1) the medial hamstring and 2) the lateral hamstring. The angle at initial foot contact and the minimum internal rotation angle during terminal stance were used as parameters to compare the effect of medial and lateral hamstring vibration with the reference values. A descriptive analysis was performed to determine the nature of the response elicited (TVR or AVR) under each vibration condition on knee rotation. **RESULTS:** The results demonstrated a trend in AVR for healthy participants, especially for the vibration applied to the medial hamstring. Five of the 6 healthy participants showed a decrease in internal knee rotation for at least one parameter. An AVR also seemed to be observed with lateral vibration, though less frequently (3 of 6 healthy participants) and only at initial contact of the foot. Among the ACL participants, medial tendon vibration seemed to have no effect. We noted that lateral tendon vibration also tended to produce AVR by increasing internal rotation for at least one parameter in 3 of 7 ACL participants. **DISCUSSION AND CONCLUSION:** The results suggested that the AVR was elicited in healthy individuals. It was therefore presumed that vibration of the medial hamstring may correct internal rotation in patients with an ACL injury. However, vibration does not seem to elicit AVR in these individuals. The different responses observed in the injured knees could be explained by the fact that vibration acts on proprioception, which might be altered following ACL injury.

KEYS WORDS: knee, kinematics, gait, vibration, anterior cruciate ligament