

DEREK DEWIG, MA, ATC

“EFFECTS OF WHOLE BODY VIBRATION ON QUADRICEPS FUNCTION, LANDING BIOMECHANICS, AND PERFORMANCE IN INDIVIDUALS WITH ACL RECONSTRUCTION”

FUNDED BY: MALACREA RESEARCH ENDOWMENT

Project Summary:

Quadriceps dysfunction (i.e. inhibition and weakness) is a common, chronic complication following ACL reconstruction (ACLR) and contributes to aberrant landing biomechanics and deficits in functional performance. Whole body vibration improves quadriceps function and gait biomechanics in individuals ACLR. However, it is unknown vibration can similarly improve landing biomechanics associated with secondary ACL injury risk and functional performance, nor how improvements in quadriceps function influence these outcomes.

This study will assess quadriceps function (strength and neural excitability) and landing biomechanics in 40 individuals with ACLR immediately prior to and following a vibration intervention and a control (no vibration) intervention. We anticipate that treatment will improve landing biomechanics and performance, and quadriceps function more effectively than no vibration intervention. These hypothesized improvements will inform development of rehabilitation strategies to mitigate secondary ACL injury risk and elucidate the mechanism by which vibration influences functional outcomes.

Impact on the AT Profession

Athletic trainers spend substantial amounts of time and effort in attempts to mitigate quadriceps weakness and inhibition following ACLR. Unfortunately, quadriceps dysfunction often persists long-term and is difficult to adequately restore. Vibration therapy is an easily implemented clinical modality that has demonstrated promising results regarding the improvement of quadriceps function following ACLR. Additionally, whole body vibration has been shown to improve gait biomechanics associated with PTOA development, but it is unknown if it can similarly improve landing biomechanics associated with secondary injury risk or functional performance.



DEREK DEWIG, MA, ATC PRIMARY INVESTIGATOR

Derek Dewig is currently a PhD student at the University of North Carolina at Chapel Hill (UNC-CH), where he also completed his MA in Athletic Training ('16). He completed his BS in Athletic Training at Indiana University in Bloomington ('14), and was a staff athletic trainer for the track and field and cross country teams at Indiana University. Working under the direction of Dr. Troy Blackburn, PhD, ATC at UNC-CH, his research seeks to identify biomechanical and neuromuscular consequences following anterior cruciate ligament (ACL) injury and their association with both post-traumatic knee osteoarthritis and secondary injury risk. These findings will be leveraged to determine if vibration therapy can mitigate quadriceps dysfunction, and to improve corticomotor excitability, gait and landing biomechanics in efforts to improve long-term joint health and reduce the risk of secondary ACL injury. Derek enjoys spending time outside, watching sports, playing board games and spending time with his wife, Hayden.



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