

# Abstract

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**THESIS:** The Influence of Incline Walking and Stair Ascent on Lower Extremity Mechanics in Older Adults

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**Background** Older adults are at an increased risk of developing knee osteoarthritis than younger adults due to displaying increased internal knee abduction moments during daily activities. Incline walking has been reported to decrease the internal knee abduction moment in younger adults. However, it is not known if this trend will occur in older adults.

**Aim** Therefore, the purpose of this study was to quantify frontal plane, lower extremity joint kinetics, to determine if incline walking will reduce the internal knee abduction moment in healthy older adults.

**Methods** Twelve healthy older adult males walked on a treadmill at five different gradients (0%, 5%, 10%, 15%, and 20%) at 1.34 m/s. Lower extremity joint kinetics in the frontal and sagittal plane were quantified.

**Results** Multiple, one-way ANOVA's revealed that incline walking altered walking kinematics and kinetics. The peak internal knee abduction moment significantly decreased from level walking at all incline gradients in 5% increments (0% to 5% ( $p \leq 0.001$ ), 5% to 10% ( $p \leq 0.001$ ), 10% to 15% ( $p = 0.017$ ), and 15% to 20% gradients ( $p = 0.001$ )).

**Discussion** A reduction in the knee abduction moment indicates that the knee joint is experiencing reduced knee joint loads on the medial compartment of the knee. This could potentially reduce knee joint pain, cartilage degeneration, and a decreased rate of developing medial knee osteoarthritis.

Therefore, incline walking could benefit older adults who are seeking suitable exercises for rehabilitation or personal use. These findings can also provide guidance to physical therapists and personal trainers when developing rehabilitation and exercise prescriptions incorporating incline walking for patients or clients.