ORIGINAL RESEARCH
PREDICTING FOOT PROGRESSION ANGLE DURING GAIT USING TWO CLINICAL MEASURES IN HEALTHY ADULTS, A PRELIMINARY STUDY

Michael T. Cibulka, PT, DPT, MHS, OCS, FAPTA
Kyle Winters, DPT
Teri Kampwerth, DPT
Blake McAfee, DPT
Lisa Payne, DPT
Tara Roeckenhaus, DPT
Sandy A. Ross, PT, DPT, MHS, PCS

ABSTRACT

Background: The foot progression angle (FPA) is related to the transverse plane rotation of the lower extremities and associated with many lower extremity conditions.

Purpose: The purpose of this study was to examine how two commonly used clinical measures, tibio-fibular torsion (TF) and hip rotation, can be used to predict FPA during gait in healthy adults.

Study Design: Cross-sectional study design

Methods: Passive hip internal and external rotation ranges of motion and TF torsion were measured with a 12-inch goniometer while the FPA (degree of toe-in/out) was measured with the GAITRite during midstance in sixty participants. The data was analyzed using a multiple regression model.

Results: Hip ER was not significant and was therefore excluded from the final model. The final model included passive hip IR and TF torsion ($F = 19.64; p < .001$; multiple $R^2 = .41$; adjusted $R^2 = .39$). Simple binary correlations showed that hip IR had a moderate negative correlation ($r = -.40$) with FPA (the greater the hip IR, the greater the in-toeing) while TF torsion had a positive correlation ($r = .39$) with FPA (the greater the external TF torsion. the greater the out-toeing).

Conclusions: Greater amount of passive hip IR predicts in-toeing while greater TF torsion predicts out-toeing of the foot during midstance phase of gait.

Level of Evidence: Level 2

Keywords: hip rotation, TF torsion, and foot progression angle

CORRESPONDING AUTHOR
Michael T. Cibulka, PT, DPT, MHS, OCS, FAPTA
Associate Professor
Maryville University
650 Maryville University Drive
Physical Therapy Program
St. Louis, MO 63141
E-mail: mcibulka@maryvile.edu

1 Maryville University, St. Louis, MO, USA