Title: Does the Powers^{TM} strap influence the lower limb biomechanics during running?

Authors: Henrike Greuel, Lee Herrington, Anmin Liu, Richard K. Jones

PII: S0966-6362(17)30224-2
DOI: http://dx.doi.org/doi:10.1016/j.gaitpost.2017.06.001
Reference: GAIPOS 5447

To appear in: *Gait & Posture*

Received date: 24-1-2017
Revised date: 30-5-2017
Accepted date: 2-6-2017

Please cite this article as: Greuel Henrike, Herrington Lee, Liu Anmin, Jones Richard K.Does the Powers^{TM} strap influence the lower limb biomechanics during running?.*Gait and Posture* http://dx.doi.org/10.1016/j.gaitpost.2017.06.001

TITLE PAGE

Title: Does the Powers™ strap influence the lower limb biomechanics during running?

Authors order:
Henrike Greuel[1]
Dr. Lee Herrington[1], l.c.herrington@salford.ac.uk, office: Allerton C715
Dr. Anmin Liu[1], a.liu@salford.ac.uk, office: Brian Blatchford PO17
Prof. Richard K. Jones[1], r.k.jones@salford.ac.uk, office: Brian Blatchford PO18
1 School of Health Science, University of Salford, UK
Frederick road campus, Brian Blatchford building, PO30, Salford M66PU, Greater Manchester
Corresponding author:
Henrike Greuel[1]
School of Health Science, University of Salford, UK
Frederick road campus,
Brian Blatchford PO30,
Salford M66PU, Greater Manchester,
H.Greuel@edu.salford.ac.uk, 44 (0) 161 2952017

Does the Powers™ strap influence the lower limb biomechanics during running?

Highlights:

- The Powers™ strap decreased hip internal rotation during the stance phase in running.
- The Powers™ strap did not modify hip or knee joint kinetics during the stance phase in running.
- The Powers™ strap might be a promising treatment approach to treat patients with an excessive hip internal rotation.

Abstract

Previous research has reported a prevalence of running related injuries in 25.9% to 72% of all runners. A greater hip internal rotation and adduction during the stance phase in running has been associated with many running related injuries, such as patellofemoral pain. Researchers in the USA designed a treatment device 'the Powers™ strap' to facilitate an external rotation of the femur and to thereby control abnormal hip and knee motion during leisure and sport activities. However, to date no literature exists to demonstrate whether the Powers™ strap is able to reduce hip internal rotation during running.

22 healthy participants, 11 males and 11 females (age: 27.45 ±4.43 years, height: 1.73 ± 0.06m, mass: 66.77 ±9.24kg) were asked to run on a 22m track under two conditions: without and with the Powers™ strap. Three-dimensional motion analysis was conducted using ten Qualisys OQUS 7 cameras (Qualisys AB, Sweden) and force data was captured with three AMTI force plates (BP600900, Advanced Mechanical Technology, Inc.USA). Paired sample t-tests were performed at the 95% confidence interval on all lower limb kinematic and kinetic data.

The Powers™ strap significantly reduced hip and knee internal rotation throughout the stance phase of running. These results showed that the Powers™ strap has the potential to influence hip motion during running related activities, in doing so this might be beneficial for patients with lower limb injuries.