

# Manual Therapy Research Review



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Manual therapy and cervical artery dysfunction: identification of potential risk factors in clinical encounters - P3

## Welcome

Welcome to the first Research Review of 2016. In this edition there are a range of papers from one that demonstrates post graduate education in manual therapy provides better clinical outcomes for managing musculoskeletal conditions compared to other disciplines, to a very relevant clinical paper that demonstrates Mulligan taping is effective in the management of patella femoral pain. Enjoy and see you all in Glasgow! Duncan



## Paper One

**Childs, J., Whitman, J., Sizer, P., Pugia M., Flynn, T and Delitto, A. A description of physical therapists' knowledge in managing musculoskeletal conditions BMC Musculoskeletal Disorders 2005, 6:32 doi:10.1186/1471-2474-6-32**

### Abstract

**Background:** Physical therapists increasingly provide direct access services to patients with musculoskeletal conditions, and growing evidence supports the cost-effectiveness of this mode of healthcare delivery. However, further evidence is needed to determine if physical therapists have the requisite knowledge necessary to manage musculoskeletal conditions. Therefore, the purpose of this study was to describe physical therapists' knowledge in managing musculoskeletal conditions.

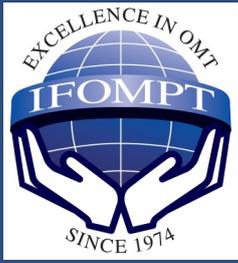
**Methods:** This study utilised a cross-sectional design in which 174 physical therapist students from randomly selected educational programs and 182 experienced physical therapists completed a standardised examination assessing knowledge in managing musculoskeletal conditions. This same examination has been previously been used to assess knowledge in musculoskeletal medicine among medical students, physician interns and residents, and across a variety of physician specialties.

**Results:** Experienced physical therapists had higher levels of knowledge in managing musculoskeletal conditions than medical students, physician interns and residents, and all physician specialists except for orthopaedists. Physical therapist students enrolled in doctoral degree educational programmes achieved significantly higher scores than their peers enrolled in master's degree programmes. Furthermore, experienced physical therapists who were board-certified in orthopaedic or sports physical therapy achieved significantly higher scores and passing rates than their non-board-certified colleagues.

**Conclusion:** The results of this study may have implications for health and public policy decisions regarding the suitability of utilising physical therapists to provide direct access care for patients with musculoskeletal conditions.

### Commentary

Many of us have committed large amounts of time and money to extend our post graduate skills in musculoskeletal physiotherapy. This paper now provides evidence that these advanced skills support the fact that we manage patients with musculoskeletal conditions better than other disciplines who work with these types of patients. This also supports the growth of specialisation in many countries and also gives support to the IFOMPT Standards Document and the courses Member Organisations run to achieve and maintain membership of IFOMPT. Funders of musculoskeletal services also need to recognise these facts as the authors have suggested.



## Paper Two

**Khayambashi K, Ghoddosi N, Straub RK, Powers CM. Hip Muscle Strength Predicts Noncontact Anterior Cruciate Ligament Injury in Male and Female Athletes: A Prospective Study. Am J Sports Med. 2016 Feb;44(2):355-61. doi: 10.1177/0363546515616237. Epub 2015 Dec 8**

### Abstract

**Background:** Prospective studies have reported that abnormal movement patterns at the trunk, hip, and knee are associated with noncontact anterior cruciate ligament (ACL) injuries. Impaired hip strength may underlie these abnormal movement patterns, suggesting that diminished hip strength may increase the risk of noncontact ACL injury.

**Purpose:** To determine whether baseline hip strength predicts future noncontact ACL injury in athletes.

**Study design:** Case-control study; Level of evidence, 3.

**Methods:** Before the start of the competitive season, isometric hip strength (external rotation and abduction) was measured bilaterally by use of a handheld dynamometer in 501 competitive athletes (138 female and 363 male athletes) participating in various sports. During the sport season, ACL injury status was recorded, and injured athletes were further classified based on the mechanism of injury (noncontact vs contact). After the season, logistic regression was used to determine whether baseline hip strength predicted future noncontact ACL injury. Receiver operating characteristic (ROC) curves were constructed independently for each strength measure to determine the clinical cutoff value between a high-risk and low-risk outcome.

**Results:** A total of 15 noncontact ACL injuries were confirmed (6 females, 9 males), for an overall annual incidence of 3.0% (2.5% for males, 4.3% for females). Baseline hip strength measures (external rotation and abduction) were significantly lower in injured athletes compared with non-injured athletes ( $P = .003$  and  $P < .001$ , respectively). Separate logistic regression models indicated that impaired hip strength increased future injury risk (external rotation: odds ratio [OR] = 1.23 [95% CI, 1.08-1.39],  $P = .001$ ; abduction: OR = 1.12 [95% CI, 1.05-1.20],  $P = .001$ ). Clinical cut-offs to define high risk were established as external rotation strength  $\leq 20.3\%$  BW (percentage of body weight) or abduction strength  $\leq 35.4\%$  BW.

**Conclusion:** Measures of preseason isometric hip abduction and external rotation strength independently predicted future noncontact ACL injury status in competitive athletes. The study data suggest that screening procedures to assess ACL injury risk should include an assessment of isometric hip abduction and/or external rotation strength.

### Commentary

Chris Powers and his team of researchers have provided previous evidence that hip abduction strength is a key component of the diagnosis and management of patello femoral pain (Souza and Powers, 2009). Also, the work of Hewett et al has demonstrated the inability to control the knee valgus position on landing is a predictor of ACL injuries (Hewett et al 2005). This paper now shows that a lack for proximal control around the hip is also predictive of ACL injuries. The ability to screen athletes for potential injuries and reduce them is also a key part of our work. This study supports screening for hip strength in ACL patients.

### References:

Souza, R and Powers C. Differences in Hip Kinematics, Muscle Strength, and Muscle Activation Between Subjects With and Without Patellofemoral Pain. *Journal of Orthopaedic & Sports Physical Therapy*, 2009 Volume:39 Issue:1 Pages:12-19 DOI: 10.2519/jospt.2009.2885

Hewett et al Biomechanical Measures of Neuromuscular Control and Valgus Loading of the Knee Predict Anterior Cruciate Ligament Injury Risk in Female Athletes A Prospective Study *Am J Sports Med* April 2005 vol. 33 no. 4 492-501

## Paper Three

**Hickey A, Hopper D, Hall T, Wild CY. The Effect of the Mulligan Knee Taping Technique on Patellofemoral Pain and Lower Limb Biomechanics. Am J Sports Med.**

### Abstract

**Background:** Patellofemoral pain (PFP) affects 25% of the general population, occurring 2 times more often in females compared with males. Taping is a valuable component of the management plan for altering lower limb biomechanics and providing pain relief; however, the effects of alternative taping techniques, such as Mulligan knee taping, appear yet to be researched.

**Purpose:** To determine whether the Mulligan knee taping technique altered levels of perceived knee pain and lower limb biomechanics during a single-legged squat (SLSq) in adult females with PFP.

**Study design:** Controlled laboratory study.

**Methods:** A total of 20 female patients with PFP, aged 18 to 35 years, participated in this study. Participants performed 3 to 5 SLSq on their most symptomatic limb during a taped (Mulligan knee taping technique) and nontaped (control) condition. During the eccentric phase of the SLSq, the 3-dimensional kinematics (250 Hz) of the knee and hip and the ground-reaction forces (1000 Hz) and muscle activation patterns (1000 Hz) of the gluteus medius, vastus lateralis, and vastus medialis oblique were measured. Participants' perceived maximum knee pain was also recorded after the completion of each squat.



**Results:** Between-condition differences were found for hip kinematics and gluteus medius activation but not for kinetics or vastus medialis oblique and vastus lateralis muscle activity (timing and activation). Compared with the nontaped condition, the Mulligan knee taping technique significantly ( $P = .001$ ) reduced perceived pain during the SLSq (mean  $\pm$  SD:  $2.29 \pm 1.79$  and  $1.29 \pm 1.28$ , respectively). In the taped condition compared with the control, the onset timing of the gluteus medius occurred significantly earlier ( $120.6 \pm 113.0$  and  $156.6 \pm 91.6$  ms, respectively;  $P = .023$ ) and peak hip internal rotation was significantly reduced ( $6.38^\circ \pm 7.31^\circ$  and  $8.34^\circ \pm 7.92^\circ$ , respectively;  $P = .002$ ).

**Conclusion:** The Mulligan knee taping technique successfully reduced knee pain in participants with PFP. This is the first study to establish a link between Mulligan knee taping and the reduction of PFP in conjunction with decreased hip internal rotation and earlier activation of gluteus medius.

### Commentary

This is another great paper from Toby Hall, one of the leading Mulligan teachers. Many of us use the Mulligan taping in various areas of the body and this is an example of the effectiveness of this approach in the patella femoral pain group. Whilst the McConnell taping approach has been around and well tested for many years (Crossley et al 2012), the Mulligan taping looks to alter the tibio femoral alignment rather than the patella per se. This is in keeping with other work from the Powers group (2009) that looks to manage hip movement in the treatment of patella femoral pain.

#### References:

Crossley et al Physical Therapy for Patellofemoral Pain A Randomized, Double-Blinded, Placebo-Controlled Trial Am J Sports Med November 2002 vol. 30 no. 6 857-865.  
Souza, R and Powers C. Differences in Hip Kinematics, Muscle Strength, and Muscle Activation Between Subjects With and Without Patellofemoral Pain. Journal of Orthopaedic & Sports Physical Therapy, 2009 Volume:39 Issue:1 Pages:12-19 DOI: 10.2519/jospt.2009.2885

### Paper Four

**Vaughan B, Moran R, Tehan P, Fryer G, Holmes M, Vogel S, Taylor A. Manual therapy and cervical artery dysfunction: identification of potential risk factors in clinical encounters, International Journal of Osteopathic Medicine (2016), doi: 10.1016/j.ijosm.2016.01.007**

Cervical artery dysfunction is a reported potential risk associated with manual therapy applied to the cervical and cervicothoracic spine. While a variety of physical examination tests have been advocated to screen patients who may be at risk of adverse events during or after manipulation, their clinical utility is limited. This paper provides an overview of the literature and current thinking with regard to risk assessment and clinical action related to the application of manual and exercise therapy for the cervical and upper thoracic spine.

### Commentary

This is a really good summary paper of the key issues that clinicians need to address when managing the potential cervical artery dysfunction patient. It covers the risk factors, clinical reasoning process, and the screening processes. It refers to the IFOMPT cervical screening framework and blends other relevant evidence very nicely, well worth the read.

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