

## ELECTROMYOGRAPHIC ANALYSIS OF HIP DURING SINGLE-LEG SQUAT EXERCISES IN SUBJECTS WITH GLUTEUS MEDIUS WEAKNESS

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**Question:** How do the three different single-leg squat exercises affect the gluteus medius (GMED), tensor fasciae latae (TFL), and adductor longus (AL) in subjects with gluteus medius weakness?

**Design:** Randomized, within-participants, experimental study

**Participants:** Fifteen adults with gluteus medius weakness

**Methods:** Participants performed three different single-leg squat exercises with the supporting leg's knee flexed to 60°. The three single-leg squat exercises were the unilateral wall squat, lateral step down, and frontal step down.

**Outcome Measures:** Surface electromyography (EMG) was used to measure GMED, TFL, and AL activity and to assess the GMED:TFL and GMED:AL ratios. One-way repeated analysis of variance was used to compare GMED, TFL, and AL muscle activity and the GMED/TFL and GMED/AL ratios. Bonferroni correction was used to determine differences among the exercises.

**Results:** TFL EMG activity significantly decreased during the unilateral wall squat compared to the lateral step down and frontal step down ( $p < 0.05$ ). The GMED:TFL ratio significantly increased during the unilateral wall squat compared to the lateral step down ( $p < 0.05$ ).

**Conclusion:** These data indicated that the unilateral wall squat exercise could be used clinically to enhance GMED muscle activity.

### Key Practice Points:

- Single-leg squat exercises represent one of the most commonly used hip-strengthening exercises.
- Single-leg squat activities require GMED activation of the weight-bearing side to control the pelvis.
- This study has implications for physical therapists supporting hip abductor strengthening exercises to treat patellofemoral pain syndrome.

## DOES RIGID TAPING ALTER LUMBAR RANGE OF MOVEMENT?

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**Question:** Does rigid taping alter lumbar movement in asymptomatic subjects?

**Design:** Within subject, repeated measures experimental study design.

**Participants:** Ten healthy adults 171(8)cm tall, weighing 71(11)kgs and aged 34(9) years old, with no recent (past six months) history of low back pain.

**Intervention:** Data were collected during functional movement under two randomized conditions; with and without lumbar taping. Lumbar taping consisted of a fixomull underlay and rigid (leukotape) overlay, applied as two vertical strips between the thoraco-lumbar junction and posterior superior iliac spine with one cross intersecting at L3.

**Outcome Measures:** Lumbo-pelvic motion was assessed using DorsaVi movement sensor technology during lumbar active movement (flexion, extension, lateral flexion), functional movement (inline lunge, hurdle step, overhead squat, step down, single leg balance) and during sitting posture (usual, slouched, upright).

**Results:** Paired t-tests demonstrated lumbar taping significantly reduced lumbar lateral flexion range of movement ( $p < 0.05$ ) and trended towards significance for decreasing lumbar flexion range ( $p = 0.05$ ). Taping was also found to significantly increase lumbar extension ( $p = 0.05$ ). During the step down task taping decreased lateral flexion ( $p < 0.05$ ) but had no effect on the other functional movements or sitting postures ( $p > 0.05$ ).

**Conclusion:** Rigid taping significantly altered lumbar range of movement in asymptomatic individuals.

### Key Practice Points:

- Rigid taping altered lumbar movement patterns in an asymptomatic population.
- These findings provide mechanistic support for the common clinical practice of taping painful lower backs.
- Further research should investigate the effect of lumbar taping on subjects with low back pain.

## ARE WE 'ABOVE PAR' WITH A VICTORIAN STATE-WIDE INITIATIVE OF INTRODUCING PHYSIOTHERAPY-LED POST ARTHROPLASTY REVIEW CLINICS?

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**Question:** What is the value add of introducing a physiotherapy-led post arthroplasty review clinic?

**Design:** Prospective, observational, multicentre evaluation of a new model of care

**Participants:** Post arthroplasty review clinics from eight Victorian public hospitals.

**Outcome Measures:** Cost efficiency (cost of occasions of service post implementation compared with baseline); cost effectiveness (increased surgeon capacity); safety and quality (adverse events, percentage of patients with outcome measures completed, communication with General Practitioners, and patient and staff satisfaction).

**Results:** The cost of an occasion of service averaged \$66 (\$34 - \$114) less per site compared to baseline. The average cost effectiveness of increasing surgeon capacity was \$7,185 (\$1,649-\$19,690). Safety and quality was demonstrated with the consistent use of outcome measures, increased communication with general practitioners, and no adverse events were recorded. Of significance, 96% of patients were satisfied with their experience, and 83% of the workforce expressed they were very satisfied/satisfied in understanding the scope of practice for the role.

**Conclusion:** Physiotherapy-led post arthroplasty review clinics are a safe, cost effective and efficient adjunct to the traditional surgeon-led clinics. These services can contribute to managing the increasing demand on orthopaedic outpatient clinics.

### Key Practice Points:

- New models of care provided by musculoskeletal physiotherapists can be cost effective and efficient compared to traditional medical models of care.
- Physiotherapy-led post arthroplasty review clinics increase capacity for surgeons to review patients with urgent and/or complex needs.
- The collection of patient outcome measure across multiple hospitals provides a unique opportunity to measure outcomes for future research.

## VISUAL PERCEPTION AND UPPER LIMB FUNCTION IN CHILDREN WITH DEVELOPMENTAL COORDINATION DISORDER

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**Question:** Do children with Developmental Coordination Disorder (DCD) have deficits in global visual perception? Does global visual perception predict upper limb function in children with DCD?

**Design:** Cross-sectional observational study

**Participants:** 32 children aged six to 12 years, 17 with DCD and 15 typical developing (TD) children.

**Outcome Measures:** Visual perception (Motor-Free Visual Perception Test-3 (MVPT)); object handling speed (Jebsen-Taylor Test of Hand Function (JTTHF-objects)); handwriting accuracy (Evaluation Tool of Children's Handwriting (ETCH-accuracy)) and speed (JTTHF-handwriting; ETCH-speed); and manual dexterity (Movement Assessment Battery for Children, 2<sup>nd</sup> edition (MABC2)).

**Results:** Children with DCD demonstrated significantly poorer scores on global visual perception than TD children ( $p = 0.03$ ). Visual perception was most predictive of performance on object handling speed for the dominant ( $p = 0.005$ ), and non-dominant hands ( $p = 0.008$ ) and manual dexterity tasks ( $p = 0.003$ ). Visual perception also predicted handwriting accuracy for legibility of letters ( $p = 0.009$ ) and words ( $p < 0.05$ ). Visual perception was only related to handwriting speed for one subtest of the ETCH; uppercase alphabet writing ( $p = 0.03$ ).

**Conclusion:** Visual perception makes a large contribution to upper limb function for children with DCD, especially for dexterity and speed-based upper limb tasks involving hand trajectories and grasp.

### Key Practice Points:

- Some children with DCD have visual perception deficits
- Visual perception should be formally assessed in children with DCD
- Visual perception is predictive of upper limb function tasks especially hand trajectories and grasp at speed.