



## 2021 SMA e-Conference Podium Presentations

### S0(4)

#### Flat flexible compared to stable supportive footwear for self-managing knee osteoarthritis symptoms: a randomised clinical trial

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**Introduction:** International clinical guidelines advise stable supportive shoes for knee osteoarthritis (OA) however evidence suggests flat flexible shoes may reduce knee joint loading and symptoms. We hypothesised that flat flexible shoes would lead to greater improvements in pain and function, compared to stable supportive shoes.

**Methods:** This was a two-arm, participant- and assessor-blinded comparative effectiveness randomised controlled trial. We recruited 164 people aged 50 years or older with knee pain on most days of the past month and moderate to severe radiographic medial tibiofemoral OA. Participants were randomised to receive either flat flexible shoes (n=82) or stable supportive shoes (n=82), classified based on: i) differences in shoe heel height/thickness, ii) shoe pitch, iii) arch support/motion control features, iv) sole flexibility and v) weight. Shoes were worn >6 hours/day for 6 months. Primary outcomes were changes in walking knee pain (11-point numerical rating scale) and physical function (Western Ontario and McMaster Universities Osteoarthritis Index subscale, 0–68) at 6-months. Secondary outcomes included additional measures of pain, function, physical activity, quality of life and adverse events.

**Results:** 164 participants were recruited and 161 (98%) completed 6-month primary outcomes. There was evidence of a between-group difference in change in walking knee pain favoring stable supportive shoes (mean difference=1.1 units (95%CI 0.5 to 1.8; p=0.001) but no strong evidence of difference in function (2.3 (-0.9 to 5.5; p=0.17)). Furthermore, 46 (58%) participants in the stable supportive group achieved the minimal clinically important difference (MCID) in pain, compared to 32 (40%) in the flat flexible group (relative risk 1.56, 1.05 to 2.02). Improvements in knee-related quality of life and ipsilateral hip pain also favored stable supportive shoes (-5.3 (-10.0 to -0.5; p=0.03) and 0.7 (0.0 to 1.4; p=0.04), respectively), with no evidence of between-group differences in other secondary outcomes. Fewer participants reported adverse events with stable supportive shoes (n=12 (15%)) compared to flat flexible shoes (n=26 (32%); relative risk=0.46 (0.25 to 0.84; p=0.012)).

**Discussion:** Flat flexible shoes were not superior to stable supportive shoes. Contrary to our hypothesis, stable supportive shoes improved knee pain on walking more than flat flexible shoes. Furthermore, a greater proportion of participants allocated to stable supportive shoes achieved the MCID in walking pain compared to those allocated to flat flexible shoes. Findings from this trial are the first to show that stable supportive shoes may be an inexpensive, low burden self-management strategy to improve pain associated with knee OA.

**Conflict of interest statement:** My co-authors and I acknowledge that we have no conflict of interest of relevance to the submission of this abstract

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### S0 (5)

#### Should we rely on the limb symmetry index to evaluate functional performance after anterior cruciate ligament injury and reconstruction?

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**Introduction:** A limb symmetry index (LSI) >90% on hop tests is a widely advocated benchmark for functional recovery and return-to-sport clearance after ACL injury. Yet, the LSI assumes the contralateral limb is the “gold standard” and immune to decline. Due to the bilateral functional deficits evident after ACL injury and ACLR, other assessment methods such as comparing performance of both limbs to age, sex and activity-level matched uninjured peers may be required. Our primary aim was to describe the functional performance changes in the ACL-injured and contralateral limbs 1- to 5-years post-ACL reconstruction (ACLR) to determine the influence on LSI. Our secondary aim was to compare the ACLR group results to uninjured healthy controls.

**Methods:** 59 participants (38 men) aged 29±16 years completed three hop-tests and a one-leg rise 1- and 5-years post-ACLR. Mean(±SD) scores for the ACLR and contralateral limbs, and LSI at 1- and 5-years were reported. Linear mixed-effects models evaluated the difference in change between the ACLR and contralateral limbs. Participants were classified with stable, improving or worsening function relative to previously published minimal detectable change thresholds. Healthy controls completed the hop-tests (n=41) and one-leg rise (n=31) at a single time-point to provide reference data. Linear regression models (adjusted

for age and body mass index), assessed the differences in functional performance at 1- and 5-years between the ACLR group and the healthy control group.

**Results:** The contralateral limb had a significantly ( $p < 0.05$ ) greater decrease in functional performance between 1- and 5-years for the three hop-tests, compared to the ACLR limb. Worsening was more common in the contralateral limb than the ACLR limb; resulting in significant improvements in the LSI for the single-hop (mean 87% at 1-year to 95% at 5-years), side hop (77% to 86%) and one-leg rise (76% to 85%). The LSI on all four tests at 1-year post-ACLR was significantly lower than healthy controls, but did not generally differ between groups at 5-years.

**Discussion:** Although the LSI significantly improved between 1- and 5-years post-ACLR, this was mostly due to worsening function in the contralateral limb. The LSI should not be used in isolation to evaluate functional performance changes after ACLR, as it may overestimate functional improvement. Exercise-based interventions may need to continue beyond the typical rehabilitation period of 6-12 months to improve or maintain function in both limbs, considering the deficits at 1-year post-ACLR compared to healthy controls, and minimal improvement over the preceding 4-years.

**Conflict of Interest:** My co-authors and I acknowledge that we have no conflict of interest of relevance to the submission of this abstract

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## S0 (6)

### Does cam morphology size and location affect self-reported burden in football players with femoroacetabular impingement syndrome?

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**Introduction:** Diagnosis of femoroacetabular impingement (FAI) syndrome requires hip and/or groin (hip/groin) pain, positive clinical signs, and cam and/or pincer morphology. Cam morphology most often occurs in the anterosuperior region and is better visualised using a Dunn 45° radiograph than an anteroposterior pelvis (AP) radiograph. The relationship between anterosuperior (Dunn 45°) or superior (AP) cam morphology size and reported burden is unknown in people with FAI syndrome who do not seek surgery. Therefore, we aimed to investigate the relationships between cam morphology size and scores for the Copenhagen Hip and Groin Outcome Score (HAGOS) and International Hip Outcome Tool-33 (IHOT-33) in football players with FAI syndrome.

**Methods:** One hundred and eighteen sub-elite football players (12 women) with FAI syndrome (>6months of hip/groin pain, positive flexion-adduction-internal rotation test, and cam morphology) completed HAGOS and IHOT-33 questionnaires. All participants were aged 18 to 50-years-old and free from hip osteoarthritis and acetabular dysplasia. Participants underwent an anteroposterior (AP) pelvis and Dunn 45° radiograph. An alpha angle  $\geq 60^\circ$  determined anterosuperior (Dunn 45°) and superior (AP pelvis) cam morphology to be present. Linear regression models were used to investigate the relationships between alpha angle (independent variable – assessed separately using AP and Dunn 45° radiographs) and IHOT-33 and HAGOS scores (dependent variables – score of 0 to 100).

**Results:** In total, 110 (93%, 9 women) and 77 (65%, 8 women) participants had cam morphology when assessed using the Dunn 45° and AP radiographs, respectively. Larger anterosuperior alpha angles were associated with worse scores for the IHOT-Total, IHOT-Symptoms, IHOT-Job, and IHOT-Social subscales (unadjusted estimate range -0.555

to -0.321 (95% confidence interval -0.899 to -0.044),  $P=0.002$  to 0.024,  $R^2=0.049$  to 0.089). Superior alpha angles were not related to any scores.

**Discussion:** Football players with larger anterosuperior, but not superior, cam morphology reported worse burden on all IHOT-33 scores, except the IHOT-Sport. Larger cam morphology identified using the Dunn 45° radiograph might have greater clinical relevance in football players with FAI syndrome, than the AP radiograph; however, further prospective studies are needed to discern importance of these findings over time.  $R^2$  values suggest that other physical and non-physical factors also contribute to reported burden in football players with FAI syndrome.

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## S8

### Glenoid Labral Tears are associated with Increased Neurofilament Innervation

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**Background:** Pain is a common presentation following glenohumeral labral injuries. However, the source of that pain is undetermined. We aimed to determine if there is a differential expression of nerve fibres around the glenoid labrum and if torn labra have increased neuronal expression compared to unorn labra.

**Methods:** Labral tissue was collected at 3, 5, 9 and 12 o'clock during total shoulder arthroplasty. Samples were also collected at 3, 5 and 12 o'clock during rotator cuff repair, anterior labral repair, type II superior labral anterior to posterior (SLAP) repair and capsular release for idiopathic capsulitis. Sections were immunostained with antibodies to neurofilament, a specific neuronal marker which is used to identify central and peripheral nerve fibres, and the concentration and intensity of immunostained-positive cells assessed.

**Results:** The concentration of neurofilament staining was similar in the superior, anterior, posterior and inferior glenoid labrum in unorn labra (8 neurofilament expressing cells/mm<sup>2</sup>,  $p > 0.05$ ). Torn labra exhibited a 3-4-fold increase in neuronal expression which was isolated to the location of the tear in SLAP ( $p = 0.09$ ) and anterior labral tears ( $p = 0.02$ ). The concentration of neurofilament expressing cells in torn glenoid labrum samples were comparable to the glenoid labrum of adhesive capsulitis samples ( $p > 0.05$ ).

**Conclusions:** This study supports the hypothesis that following a traumatic tear of the anterior or superior labrum, the labrum in that region becomes populated with new nerves fibres and that these fibres are likely to be responsible for many of the symptoms noted by patients with superior (SLAP) and/or anterior labral (Bankart) tears.

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## S11

### Long-Term Durability of Restorative Neurostimulation for Chronic Mechanical Low Back Pain – Two-Year Pivotal Trial Results

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