



## 2022 Sports Medicine Australia Conference Oral Abstracts

(O14)

### A 2-year prospective randomized controlled trial investigating an accelerated rehabilitation pathway after double-bundle, remnant sparing anterior cruciate ligament reconstruction (ACLR)

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**Introduction:** Anterior cruciate ligament reconstruction (ACLR) is common. Insufficient quadriceps strength and functional hop asymmetry are associated with an increased re-injury risk after ACLR upon return to sport (RTS). This study sought to investigate whether an accelerated rehabilitation pathway after ACLR with a hamstring autograft could enhance strength and functional symmetry after ACLR, without affecting graft laxity and/or re-injury.

**Methods:** A total of 44 patients were allocated to an 'Accelerated' (n=22) or 'Control' (n=22) rehabilitation intervention. While still criterion-focused, the Accelerated pathway permitted an earlier initiation of single limb stance and proprioceptive exercises (2 versus 4 weeks), squat and lunge activities (3 versus 4 weeks), single limb squat variations (5 versus 7 weeks), integration of jump and land exercises (9 versus 12 weeks) and graduated return to running (10 versus 14 weeks). Patients were assessed pre- and post-operatively (6 weeks, 4, 6, 9, 12 and 24 months) with surveys, graft laxity, peak isokinetic knee extensor and flexor strength and a 4-hop performance battery. Limb Symmetry Indices (LSIs) were calculated. Sport participation, secondary operations, ACL re-tears and contralateral ACL tears were reported.

**Results:** No differences ( $p > 0.05$ ) existed in demographics or surveys, apart from the Anterior Cruciate Ligament Return to Sport after Injury (ACL-RSI) score which was significantly better ( $p = 0.001$ ) in the Accelerated group at 12 months. A significantly greater ( $p = 0.006$ ) percentage of Accelerated (77.3%) versus Control (59.1%) patients were participating in Level 1 or 2 pivoting sports at 12 months, though not different ( $p = 0.836$ ) at 24 months (Accelerated 86.4%, Control 85.7%). A significantly higher knee extensor strength LSI was observed in the Accelerated group at 6 ( $p < 0.0001$ ), 12 ( $p = 0.010$ ) and 24 ( $p = 0.005$ ) months, as was a significantly higher LSI for the triple hop for distance at 6 ( $p = 0.015$ ) and 9 ( $p = 0.008$ ) months, and the triple crossover hop for distance at 6 ( $p < 0.0001$ ) and 9 ( $p = 0.009$ ) months. No laxity differences or contralateral tears were observed, with one ipsilateral re-tear

(Control group, 17 months). Four re-operations were undertaken, including n=1 in the Accelerated (meniscectomy) and n=3 in the Control (three meniscectomies) group.

**Discussion:** The accelerated pathway produced earlier improvement in strength and hop LSIs which have been linked with re-injury in patients that RTS after ACLR. Importantly, the accelerated regimen and increased early participation in pivoting sports was not associated with an increase in graft laxity or graft re-injury.

**Impact and Application to the Field:** Current evidence has demonstrated a link between strength and hop asymmetry and an increased re-injury risk in patients who RTS after ACLR. The current study has shown that a structured, accelerated rehabilitation pathway with therapist progression and oversight, can enhance these physical outcomes, without an increase in graft laxity and/or an elevated re-injury risk.

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(O15)

### A randomised controlled trial of autologous tenocyte versus corticosteroid injection for interstitial rotator cuff tear and impingement syndrome

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**Introduction:** Interstitial supraspinatus tears can cause persistent subacromial impingement symptoms. This is the first comparative study to investigate safety and efficacy of Autologous Tenocyte Injection (ATI) compared to corticosteroid injection (CS) for interstitial rotator cuff tears.

**Methods:** Thirty participants were randomised to receive ATI (n=19) to the interstitial tear or CS (n=11) to the subacromial bursa under ultrasound guidance, in a 2:1 randomisation ratio. Inclusion criteria were duration of symptoms >6 months, magnetic resonance imaging (MRI) confirmed intrasubstance supraspinatus tear, and had previously undergone physiotherapy and at least one CS injection. Of the enrolled cohort, 20 (67%) were male, the mean age was 50.5 years (SD 8.5, range 30-63) and the mean DOS was 21.8 months (SD 12.1, range 7-

48). Assessments were undertaken pre-treatment and at 1, 3, 6 and 12 months post-treatment, including the Constant Score, Visual Analogue Pain Scale (VAS), American Shoulder and Elbow Surgeons Shoulder Assessment (ASES) and the Simple Shoulder Test (SST).

**Results:** No pre-treatment group differences ( $p > 0.05$ ) existed. The ATI group performed significantly better in the Constant Score at 1 ( $p = 0.020$ , ATI = 81.8, CS = 67.6), 6 ( $p = 0.026$ , ATI = 84.9, CS = 71.1) and 12 ( $p = 0.024$ , ATI = 86.5, CS = 65.4) months, and reported better ASES scores at all post-treatment timepoints including 6 ( $p = 0.012$ , ATI = 88.6, CS = 74.0) and 12 ( $p < 0.01$ , ATI = 93.3, CS = 62.9) months. The mean ASES scores in the ATI group improved from baseline to 6 and 12 months (14.4 and 19.1 points, respectively), with improvements greater than the MCID (12.0 points). At 12 months, 95% of the ATI cohort reported a PASS (patient acceptable symptom state) in their ASES score. The ATI group reported significant better VAS scores at all post-treatment timepoints, including 6 ( $p = 0.010$ , ATI = 2.3, CS = 4.2) and 12 ( $p < 0.01$ , ATI = 1.6, CS = 4.3) months, and reported significantly better SST scores at 3 ( $p = 0.041$ , ATI = 84.3, CS = 69.7) and 12 ( $p = 0.046$ , ATI = 90.8, CS = 77.1) months. No injection side effects were observed, though 7 of 11 CS participants withdrew from the trial between 6 and 12 months due to worsening pain and function.

**Discussion:** This is the first Level 1 study using ATI to treat interstitial supraspinatus tear with chronic impingement syndrome. The preliminary data demonstrate that ATI results in a significant and sustained reduction in pain, and improvement in shoulder function.

**Impact and Application to the Field:** Non-surgical treatments for interstitial supraspinatus tears can result in persistent and/or recurrent symptoms. This is the first comparative study to demonstrate safety efficacy of ATI compared to CS, as a treatment for these symptomatic interstitial rotator cuff tears.

**Conflict of Interest Statement:** a funding grant was provided by Orthocell to assist this research.

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(O100002)

### Healing of a ruptured anterior cruciate ligament and patient-reported outcomes following non-surgical management with a novel bracing protocol

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**Introduction:** A common belief amongst clinicians, researchers and the public is that a ruptured anterior cruciate ligament (ACL) has no healing capacity. This belief has contributed to the high rate of ACL reconstruction, with substantial health costs. We hypothesised that immobilisation in a knee brace at 90-degrees flexion (reducing the distance between the torn ends of the ACL) after acute ACL rupture would facilitate healing. The objective was to investigate MRI evidence of ACL healing, patient-reported outcomes and knee laxity

in the first 80 individuals with ACL rupture managed with a novel non-surgical bracing protocol.

**Methods:** We report outcomes from all patients ( $n = 80$ ) who presented to a sports medicine clinic with MRI-confirmed ACL rupture and were managed with the Cross Bracing Protocol (CBP) within 4 weeks of injury. The CBP involved knee immobilisation at 90-degrees flexion in a brace for 4 weeks. The brace was then adjusted at regular increments to allow progressive increases in range-of-motion (unrestricted flexion/extension at week 10, brace removal at week 12). All patients underwent standardised physiotherapist-supervised goal-oriented rehabilitation. MRIs (baseline, 3 months, 6 months) were graded using the ACL OsteoArthritis Score (ACLOAS) by 3 radiologists. Patients completed the Lysholm Scale and ACL-QOL at a mean  $14 \pm 9$  months post-injury, and scores were compared between patients with ACLOAS Grade 0-1 (continuous +/- thickened ligament and/or high intraligamentous signal) versus 2-3 (continuous but thinned/elongated or complete discontinuity) using Mann-Whitney U Test. Lachman's Test assessed knee laxity at 3-months. Return-to-sport, ACL re-rupture and subsequent surgery data were collected.

**Results:** Participants were aged a mean  $26 \pm 10$  years at injury, 31% were female, 48% had concomitant meniscal injury, and all were participating in pre-injury sport (recreational (35%), competitive (60%), professional (5%) level). At 3 months,  $n = 72$  (90%) had evidence of ACL healing (ACL continuity, ACLOAS Grade-0 ( $n = 1$ ); Grade-1 ( $n = 40$ ); Grade-2 ( $n = 32$ )). Six-month ACLOAS grades were the same as 3-months for all but 4 patients (3 improved). Patients with ACLOAS Grade 0-1 at 3 months reported better Lysholm Scale (median (IQR) 98 (94-100) vs. 94 (85-100),  $p = 0.01$ ) and ACL-QOL (89 (76-96) vs. 70 (64-82),  $p \leq 0.001$ ) scores, compared to patients with ACLOAS Grade 2-3. All patients with ACLOAS grade 0-1 had a normal 3-month Lachman's test and 91% returned to pre-injury sport. Twenty-four patients with an ACLOAS grade 2-3 had a normal Lachman's test (40%) and 57% returned to pre-injury sport. Thirteen patients (16%) re-injured their ACL (mean  $10 \pm 4$  months following ACL rupture, 12 had ACL reconstruction). Two patients (2.5%) had arthroscopic knee surgery (cyclops lesion removal, partial meniscectomy).

**Conclusion:** After management of ACL rupture with a novel bracing protocol, 90% of patients had evidence of healing on 3-month MRI (continuity of the ACL). Higher grades of healing were associated with better knee function and quality of life outcomes.

#### Impact/Application to the field:

- A novel bracing protocol that immobilises the knee at 90-degrees flexion, may facilitate healing of ACL rupture and result in favourable outcomes.
- Longer-term follow-up and clinical trials are needed to determine whether this intervention should be used in clinical practice.

The authors have no conflicts of interest to declare.

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(O100004)

### Comparison of hip strength in football players with hip and/or groin-related pain and healthy controls

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**Introduction:** Muscle weakness and atrophy have been associated with longstanding joint pathology, and strength testing