On-line supplementary for: **Hip muscle strength explains only 11% of the improvement in HAGOS with an intersegmental approach to successful rehabilitation of athletic groin pain: Case control intervention with 6-month follow-up**

**Appendix A1:**

**Intra-tester, inter-day reliability of peak isometric hip torque**

Isometric hip strength was assessed with hand-held dynamometry (Commander J-tech) as per published protocol by Thorborg et al (2010).

Isometric hip strength examined: hip adduction (side-lie), abduction (side-lie), flexion (supine), extension (prone), internal and external rotation (seated)

N = 15 healthy participants with no previous history of AGP (8M/7F, age 23.6 ± 4.5 years, height 1792 ± 53.4 cm, weight 76.1 ± 8.3 kg, Marx activity score 13.6 ± 2.5).

Intra-class correlation coefficient (ICC 2,1) ranged from 0.67 to 0.98, the standard error of measurement (SEM) ranged from 2.1 to 5.1% and the minimal detectable change from 8.6% to 17.8%.

**Peak isometric hip torque (Nm/kg): Assessor 1 intra-tester, inter-day reliability**

| Test | Abbreviation | Mean (SD) Test | Mean (SD) Retest | Mean (SD) Difference Test-| ICC (CI 95%) | SEM % SEM | MDC % MDC |
|------|--------------|---------------|-----------------|--------------------------|--------------|-----------|-----------|
| ABD  | DOM          | 1.93 (0.28)   | 2.02 (0.27)     | 0.09 (0.14)              | 0.93 (0.76-0.98)| 0.11      | 3.61      | 0.29 14.89|
|      | NDOM         | 1.90 (0.21)   | 1.92 (0.29)     | 0.03 (0.16)              | 0.88 (0.64-0.93)| 0.11      | 3.83      | 0.30 15.87|
| ADD  | DOM          | 2.14 (0.26)   | 2.21 (0.29)     | 0.07 (0.14)              | 0.86 (0.55-0.95)| 0.10      | 3.01      | 0.27 12.46|
|      | NDOM         | 2.04 (0.28)   | 2.21 (0.35)     | 0.17 (0.15)              | 0.87 (0.58-0.96)| 0.13      | 4.26      | 0.37 17.50|
| FLEX | DOM          | 1.21 (0.21)   | 1.26 (0.20)     | 0.05 (0.04)              | 0.98 (0.94-0.99)| 0.04      | 2.08      | 0.11 8.60 |
|      | NDOM         | 1.23 (0.24)   | 1.29 (0.24)     | 0.06 (0.06)              | 0.97 (0.91-0.99)| 0.05      | 2.80      | 0.15 11.53|
| EXT  | DOM          | 1.70 (0.47)   | 1.77 (0.47)     | 0.07 (0.09)              | 0.98 (0.96-0.99)| 0.07      | 2.65      | 0.19 10.93|
|      | NDOM         | 1.68 (0.46)   | 1.81 (0.48)     | 0.13 (0.08)              | 0.99 (0.98-1.0)| 0.09      | 3.60      | 0.26 14.79|
| IR   | DOM          | 0.81 (0.14)   | 0.84 (0.14)     | 0.03 (0.08)              | 0.79 (0.35-0.93)| 0.05      | 4.25      | 0.14 17.57|
|      | NDOM         | 0.75 (0.14)   | 0.79 (0.15)     | 0.03 (0.05)              | 0.92 (0.75-0.97)| 0.04      | 3.45      | 0.11 14.26|
| ER   | DOM          | 0.63 (0.11)   | 0.63 (0.17)     | 0.00 (0.06)              | 0.67 (0.035-0.89)| 0.04      | 4.27      | 0.11 17.75|
|      | NDOM         | 0.61 (0.07)   | 0.64 (0.10)     | 0.03 (0.07)              | 0.82 (0.45-0.94)| 0.05      | 5.13      | 0.13 21.16|

*ABD – abduction, ADD – adduction, FLEX – flexion, EXT – extension, IR – internal rotation, ER – external rotation, DOM – dominant limb, NDOM – non-dominant limb, ICC – interclass correlation coefficient, SEM – standard error of measure, MDC – minimal detectable change*
Appendix A2:

Double-leg and single-leg drop jump protocol

Athletes stepped off a 30cm (DLDJ) or 20cm (SLDJ) box and were instructed to keep hands on hips, spend minimal time on the ground and jump vertically as high as possible. Three practice and three maximum effort trials were performed. Jumps were separated by a 30-second rest period and two-minute rest between DLDJs and SLDJs. DLDJs were performed first followed by SLDJs on the non-symptomatic (AGP) or dominant (CON) side.
Appendix A3:

Intersegment control rehabilitation program

The rehabilitation program was designed to address trunk, pelvis and lower limb intersegmental control through strengthening, linear running and change-of-direction mechanics (King et al., 2018). Intersegmental control describes the relationship between the trunk, pelvis, hip, knee and ankle during dynamic movements and a loss of control has been suggested to play a role in the propagation of athletic groin pain. (Franklyn-Miller et al., 2017).

The intersegmental control rehabilitation program consists of three levels, with each level designed to address specific components of recovery. Level 1 focuses on intersegmental control through strengthening exercises, level 2 focuses on intersegmental control through linear running technique and progression of running load tolerance, and level 3 focuses on intersegmental control through change-of-direction technique and progression back to high speed running. Progression from level 1 to level 2 is achieved with a pain-free cross-over test (in the modified Thomas test position), progression from level 2 to 3 occurs with pain-free squeeze test (in 45° hip flexion), pain-free completion of linear ‘Run A’ program and symmetrical hip range-of-motion (flexion 90° internal rotation mobility). Finally, progression from level 3 to return-to-play is achieved with pain-free completion of ‘Run B’ program and multi-directional drills. Table 1 outlines the exercise streams for each level of the program and Table 2 outlines the exercise progressions for each of the exercise streams.

Once athletes are cleared to return-to-play, they are advised to complete one full strength session per week (i.e. level 1 control, strength and power exercises), three sessions of the level 1 intersegmental control exercises (e.g. as part of an athlete’s pre-pitch/gym preparation) and are to perform the linear and multi-directional technique drills prior to their sporting activity.
Table 1: Outline of exercise streams prescribed during each level of the intersegmental rehabilitation program

| LEVEL 1 | Stream                  | Segment                   | Target                           | set | reps |
|---------|-------------------------|---------------------------|----------------------------------|-----|------|
| Control | Hip flexor holds        | Pelvis on femur           | Isometric inner range hip flexion| 3   | 8    |
|         | Palloff press*          | Thorax on pelvis/pelvis on femur | Unilateral obliques             | 3   | 8    |
|         | Deadbugs                | Thorax on pelvis/pelvis on femur | Bilateral obliques             | 3   | 8    |
|         | Hip hitch               | Pelvis on femur           | Inner range hip abduction       | 3   | 8    |
|         | Banded turn outs        | Pelvis on femur           | Hip external rotation / abduction| 3   | 8    |
| Strength| Single leg hip thrust*  | Thorax on pelvis/pelvis on femur | Single leg hip extension        | 3   | 8    |
|         | Front squat             | Multi-segmental           | Front squat                      | 3   | 8    |
|         | Deadlift                | Multi-segmental           | Deadlift                         | 3   | 8    |
|         | Split squat             | Multi-segmental           | Split Squat                      | 3   | 8    |
| Power   | Ankling                 | Multi-segmental           | Reactive strength                | 4   | 10   |

Progression criteria - pain-free crossover test

| LEVEL 2 | Completed prior to Run A and B |
|---------|--------------------------------|
|         | Switch step        | Multi-segmental | Lateral hip RFD | 3 | 3 |
|         | Vertical skips     | Multi-segmental | Vertical plyometric | 4 | 20 |
|         | Resisted box lunge*| Multi-segmental | Horizontal RFD | 3 | 3 |

Progression criteria - symmetrical hip flexion (90°)/ IR range, pain-free squeeze (45° hip flexion) and completion Run A program

| LEVEL 3 | Completed prior to Run B |
|---------|--------------------------|
|         | Lateral jump/land*       | Multi-segmental | Lateral deceleration RFD | 3 | 3 |
|         | Side shuffle cut         | Multi-segmental | Lateral reactive strength | 3 | 3 |
|         | 180° cut                 | Multi-segmental | RFD + deceleration/reacceleration | 3 | 3 |

RTP Criteria – pain-free completion Run B program and multi-directional drills

* Exercise additions to the rehabilitation program from King et al. (2018), RFD – rate of force development, IR – internal rotation, RTP – return to play
Table 2: Progressions for each exercise stream during each level of the intersegmental rehabilitation program: 1 – basic level, 2 – intermediate (entry) level, 3 – advanced level

| LEVEL 1 | Stream          | 1        | 2        | 3          |
|---------|----------------|----------|----------|------------|
| Control | Hip flexor holds | Supine   | Supported stand | Unsupported stand |
|         | Palloff press   | Half kneel | Stand    | Stand + rotation |
|         | Deadbugs        | Crook lie leg lifts | Crook lie alternate leg lowers | Crook lie bilateral leg lowers |
|         | Hip hitch       | Supported stand | Unsupported stand | Low box step-up |
|         | Banded turn outs| Light resistance | Moderate resistance | Heavy resistance |
| Strength| Single leg hip thrust | Supported | Unsupported | Loaded |
|         | Front squat     | High box (60cm) | Low box (45cm) (20% BW) | Low box loaded |
|         | Deadlift        | Hip hinge | Rack deadlift loaded (40% BW) | Rack deadlift loaded |
|         | Split squat     | Supported | Bodyweight | Loaded |
| Power   | Ankling         | Supported single taps | Unsupported single tap | Unsupported double taps |

| LEVEL 2 |
|---------|----------------|----------|----------|-------------|
| Switch step | March step | Switch step with 5kg plate | Overhead press 5kg plate |
| Vertical skips | Overhead march | Vertical skip 50% intensity | Build intensity +/- load |
| Resisted box lunge | Unresisted lunge | Resisted lunge single band | Resisted lunge double band |

| LEVEL 3 |
|---------|----------------|----------|----------|--------------|
| Lateral jump/land | 0.5-meter jump/land | 1-meter jump/land | 1-meter + 5kg medball |
| Side shuffle cut | 50% intensity | Build intensity | Shadow opponent |
| 180° cut | 50% intensity | Build intensity | 5kg medball |

† Exercise modifications to the rehabilitation program from King et al. (2018), BW – bodyweight
**Equipment**

The equipment required includes a squat rack, barbell, weights, box/chair (60cm, 45cm), resistance bands and 5kg medicine ball.

**Rehabilitation sessions**

Rehabilitation sessions were taken by one of three physiotherapists who were trained in the delivery of the intersegmental control rehabilitation program. All physiotherapists had five or more years clinical experience.

Athletes started their rehabilitation on the same day as their initial testing session. Each rehabilitation session was one-to-one and approximately 1 hour in length. Athletes are taken through the various exercises depending on which rehabilitation level they are in (Table 1) with the difficulty of the exercise selected, progressed or regressed depending on the participants ability to execute with appropriate technique (good form and no reproduction of symptoms) (Table 2). These sessions took place every 14-21 days depending on athlete availability.

In between supervised rehabilitation sessions, athletes were instructed to perform the rehabilitation program at their own training base. Each subject was given a printed handout of all the exercises with the main coaching cues for each), in addition to each exercise being captured on video using Dartfish™ software and the videos hosted online for the athlete to review between sessions. Athletes were instructed to complete a weekly exercise diary to help ensure compliance. Athletes were advised that should any exercise reproduce their symptoms, they should review their videos and amend their technique to resolve and if unable to do so these exercises should be discontinued and their physiotherapist will review during the next rehabilitation session.
Level 1

Level 1 exercises focus on both the control between two segments across one joint (e.g. hip flexor holds) and also multi-segmental movements (e.g. deadlift). For the loaded exercises, the deadlift weight started at approximately 40% bodyweight, front squat 20% bodyweight and split squat bodyweight only. The weight was gradually increased as athletes could reach the appropriate number of repetitions in each set with good control and no symptoms. The importance of correct technique was repeatedly emphasized. Level 1 exercises were included throughout the duration of the rehabilitation program.

Level 2

The focus of the level 2 exercise streams (Table 1) is to improve intersegmental control during linear running with exercise drills designed to address commonly observed technical faults (e.g. poor lumbopelvic control at toe-off, poor swing leg recovery) or reduced neuromuscular capacity (e.g. contralateral hip drop during the stance phase of the running gait). Once athletes complete the linear running drills, they carry out the Run A program (Table 3). This was developed for field-sport athletes to gradually build tolerance to running loads and intensity while assessing the athletes’ tolerance and suitability for progression. It starts with low volume and low intensity, both of which increase at different points through the program. Athletes are instructed to progress, or regress based on a traffic-light system. Green light means no pain during or the following day and athletes can progress to the next running session. Red light means increased pain during or the following day and athletes are instructed to repeat the same session or drop back a session when scheduled until they can tolerate it and then progress to the next session (by obtaining a green light).
Table 3: Run A and B programs included in Level 2 and 3 of the intersegmental control rehabilitation and comparison to King et al (2018).

### Baida et al (2020)

| Run A (Level 2)       | Distance (m) | Time (sec) | Speed (km/h) | sets | reps | Work:Rest ratio | Speed Distance (m) | Total Distance (m) |
|-----------------------|--------------|------------|--------------|------|------|-----------------|--------------------|--------------------|
| Warm-up               | 400          | 50%        | 1            | 2    | 1:1  | 1:1             | 360                | 720                |
| Linear exercise drills|              |            |              |      |      |                 |                    |                    |
| session 1 Intervals   | 20/80/20     | 24         | 12           | 2    | 8    | 1:2             | 1920               | 2720               |
| session 2 Intervals   | 20/80/20     | 24         | 12           | 2    | 10   | 1:2             | 2400               | 3200               |
| session 3 Intervals   | 20/80/20     | 21         | 14           | 2    | 10   | 1:2             | 2400               | 3200               |
| session 4 Intervals   | 20/80/20     | 21         | 14           | 3    | 8    | 1:2             | 2800               | 3400               |
| session 5 Intervals   | 20/80/20     | 19         | 16           | 3    | 8    | 1:2             | 2880               | 3480               |
| session 6 Intervals   | 20/80/20     | 17         | 18           | 3    | 8    | 1:2             | 2880               | 3480               |

### RUN B (Level 3)

| Run A (Level 2)       | Distance (m) | Time (sec) | Speed (km/h) | sets | reps | Work:Rest ratio | Speed Distance (m) | Total Distance (m) |
|-----------------------|--------------|------------|--------------|------|------|-----------------|--------------------|--------------------|
| Warm-up               | 400          | 50%        | 1            | 2    | 1:1  | 1:1             | 360                | 720                |
| Linear exercise drills|              |            |              |      |      |                 |                    |                    |
| session 1 Sprints (rolling start) | 30     | 7      | 18          | 3    | 2    | 1:10            | 180                | 360                |
|                      | 80           | 25-22     | 14-16        | 6    | 3    | 1:1             | 1440               | 2420               |
| session 2 Sprints (rolling start) | 30     | 6      | 20-22       | 3    | 2    | 1:10            | 180                | 360                |
|                      | 80           | 25-22     | 14-16        | 6    | 3    | 1:1             | 1440               | 2420               |
| session 3 Sprints (rolling start) | 30     | 6      | 20-22       | 5    | 2    | 1:10            | 300                | 600                |
|                      | 80           | 25-22     | 14-16        | 6    | 3    | 1:1             | 1440               | 2540               |
| session 4 Sprints (standing start) | 30     | 6      | 20-22       | 5    | 2    | 1:10            | 300                | 600                |
|                      | 80           | 25-22     | 14-16        | 6    | 4    | 1:1             | 1920               | 3020               |
| session 5 Sprints (rolling start) | 30     | 5      | 24-26       | 5    | 2    | 1:10            | 300                | 600                |
|                      | 80           | 25-22     | 14-16        | 6    | 4    | 1:1             | 1920               | 3020               |
| session 6 Sprints (standing start) | 30     | 5      | 24-26       | 5    | 2    | 1:10            | 300                | 600                |
|                      | 80           | 25-22     | 14-16        | 6    | 4    | 1:1             | 1920               | 3020               |

### King et al (2018)

| Run A (Level 2)       | Distance | Speed | set | rep | Rest (rep) | Distance | Total Distance |
|-----------------------|----------|-------|-----|-----|------------|----------|---------------|
| Linear exercise drills|          |       |     |     |            |          |               |
| session 1 Intervals   | 400      | 50%   | 1   | 6   | 60sec      | 2400     | 2400          |
| session 2 Intervals   | 400      | 50%   | 1   | 8   | 60sec      | 3200     | 3200          |
| session 3 Intervals   | 400      | 50%   | 1   | 10  | 60sec      | 4000     | 4000          |
| session 4 Intervals   | 400      | 70%   | 1   | 10  | 60sec      | 4000     | 4000          |
| session 5 Intervals   | 400      | 85%   | 1   | 10  | 60sec      | 4000     | 4000          |
| session 6 Intervals   | 400      | 100%  | 1   | 10  | 60sec      | 4000     | 4000          |

### RUN B (Level 3)

| Run A (Level 2)       | Distance | Speed | set | rep | Rest (rep) | Distance | Total Distance |
|-----------------------|----------|-------|-----|-----|------------|----------|---------------|
| Linear exercise drills|          |       |     |     |            |          |               |
| session 1 Sprints (rolling start) | 400  | 70%  | 1   | 4   | 60sec      | 1600     | 1600          |

| Multi-directional exercise drills |       |       |     |     |            |          |               |
|-----------------------------------|-------|-------|-----|-----|------------|----------|---------------|
| session 1 Sprints (rolling start) | 30    | 70%   | 1   | 10  | 60sec      | 1000     | 2600          |
| session 2 Sprints (rolling start) | 400   | 50%   | 1   | 8   | 60sec      | 3200     | 3200          |
| session 3 Sprints (rolling start) | 400   | 50%   | 1   | 10  | 60sec      | 4000     | 4000          |
| session 4 Sprints (rolling start) | 400   | 70%   | 1   | 10  | 60sec      | 4000     | 4000          |
| session 5 Sprints (rolling start) | 400   | 85%   | 1   | 10  | 60sec      | 4000     | 4000          |
| session 6 Sprints (rolling start) | 400   | 100%  | 1   | 10  | 60sec      | 4000     | 4000          |

| Sprints (standing start) | |       |     |     |            |          |               |
|-------------------------|------|-------|-----|-----|------------|----------|---------------|
| session 1 Sprints (standing start) | 30 | 70% | 1 | 5 | 30sec | 250 | 2500 |
Level 3

The focus of the level 3 exercise streams is to improve intersegmental control during multidirectional movements, lateral rate of force development and agility prior to returning to sports (Table 1). Athletes also progress from Run A to Run B program which increases exposure to high speed running. Once athletes complete the multidirectional drills (and linear run drills) they carry out the Run B program. The drills are executed at as high an intensity as possible without reproduction of symptoms.

Weekly frequency

Level 1 of the rehabilitation program is prescribed on a 3-day cycle: day 1 all exercises (control, strength and power), day 2 control exercises only and day 3 rest. Level 2 and 3 is prescribed on a 4-day cycle: day 1 all exercises (control, strength and power), day 2 Run A or B (depending on which level an athlete is at), day 3 control exercises only, day 4 rest.
### Appendix A4:

#### Outcome measures: Peak isometric hip torque, hip torque ratios, double-leg and single-leg reactive strength and bilateral

| Peak torque (Nm/kg) | AGP pre | AGP post | CON | AGP pre vs. CON | AGP post vs. CON | AGP post vs. CON |
|--------------------|---------|---------|-----|-----------------|-----------------|-----------------|
|                    | Mean ± SD | Mean ± SD | Mean ± SD | p | d | % Diff | Cons (%) | Mean ± SD | Mean ± SD | Mean ± SD | p | d | % Diff | Cons (%) | Mean ± SD | Mean ± SD | Mean ± SD | p | d | % Diff | Cons (%) |
| ABD                | 1.84 ± 0.31 | 2.11 ± 0.38 | 2.28 ± 0.27 | 0.000* | -1.20 | 24% | 100 | 0.000* | -0.83 | 15% | 100 | 0.066 | -0.58 | 8% | 60 |
| ADD                | 2.18 ± 0.43 | 2.73 ± 0.35 | 2.81 ± 0.39 | 0.000* | -1.20 | 29% | 100 | 0.000* | -1.15 | 25% | 100 | 0.505 | -0.20 | 3% | 3 |
| FLEX               | 1.18 ± 0.21 | 1.36 ± 0.17 | 1.43 ± 0.19 | 0.000* | -1.07 | 22% | 100 | 0.000* | -0.86 | 15% | 100 | 0.212 | -0.40 | 6% | 19 |
| EXT                | 1.83 ± 0.43 | 2.33 ± 0.37 | 2.20 ± 0.39 | 0.005* | -0.83 | 21% | 100 | 0.000* | -1.05 | 27% | 100 | 0.303 | 0.32 | -5% | 4 |
| ER                 | 0.65 ± 0.14 | 0.78 ± 0.11 | 0.75 ± 0.14 | 0.030* | -0.67 | 15% | 85 | 0.000* | -0.92 | 20% | 100 | 0.394 | 0.26 | -4% | 4 |
| IR                 | 0.91 ± 0.18 | 1.06 ± 0.16 | 0.95 ± 0.18 | 0.439 | -0.23 | 5% | 1 | 0.000* | -0.84 | 17% | 100 | 0.035 | 0.64 | -11% | 73 |
| **Torque ratio**   |         |         |       |     |     |     |     |     |     |     |     |     |     |     |     |
| ADD/ABD            | 1.21 ± 0.26 | 1.31 ± 0.21 | 1.25 ± 0.21 | 0.556 | -0.16 | 3% | 0 | 0.041 | -0.43 | 9% | 75 | 0.328 | 0.31 | -5% | 10 |
| EXT/FLEX           | 1.57 ± 0.30 | 1.73 ± 0.24 | 1.55 ± 0.22 | 0.638 | 0.07 | -1% | 0 | 0.009* | -0.55 | 10% | 99 | 0.018* | 0.71 | -10% | 90 |
| ER/IR              | 0.72 ± 0.14 | 0.76 ± 0.13 | 0.80 ± 0.13 | 0.061 | -0.58 | 11% | 60 | 0.222 | -0.25 | 5% | 8 | 0.254 | -0.37 | 6% | 14 |
| **Reactive strength** |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| DL/DJ GCT (sec)    | 0.30 ± 0.08 | 0.26 ± 0.06 | 0.26 ± 0.09 | 0.158 | 0.42 | -12% | 15 | 0.010* | 0.54 | -13% | 100 | 0.726 | -0.03 | 1% | 0 |
| DL/DJ JH (cm)      | 30.49 ± 5.30 | 29.70 ± 5.12 | 30.59 ± 3.93 | 0.672 | -0.03 | 0% | 0 | 0.373 | 0.15 | -2% | 2 | 0.507 | -0.20 | 2% | 0 |
| DL/DJ RSI          | 1.09 ± 0.33 | 1.19 ± 0.30 | 1.29 ± 0.40 | 0.082 | -0.53 | 18% | 49 | 0.086 | -0.32 | 9% | 41 | 0.366 | -0.27 | 8% | 2 |
| SL/DJ GCT (sec)    | 0.37 ± 0.07 | 0.32 ± 0.04 | 0.33 ± 0.06 | 0.050 | 0.58 | -11% | 64 | 0.001* | 0.76 | -14% | 100 | 0.555 | -0.17 | 3% | 0 |
| SL/DJ JH (cm)      | 13.42 ± 3.08 | 13.15 ± 3.18 | 15.21 ± 2.45 | 0.050 | -0.61 | 13% | 68 | 0.542 | 0.09 | -2% | 0 | 0.029 | -0.68 | 16% | 83 |
| SL/DJ RSI          | 0.38 ± 0.13 | 0.42 ± 0.12 | 0.48 ± 0.12 | 0.014* | -0.73 | 26% | 97 | 0.093 | -0.30 | 9% | 45 | 0.099 | -0.51 | 15% | 43 |

| Squeeze test (mm Hg) |         |         |       |     |     |     |     |     |     |     |     |     |     |     |     |
| SQ0 Max             | 151 ± 24 | 170 ± 28 | 171 ± 32 | 0.024* | -0.66 | 13% | 86 | 0.008* | -0.66 | 12% | 100 | 0.662 | -0.05 | 1% | 0 |
| SQ0 P1              | 126 ± 17 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| SQ45 Max            | 257 ± 38 | 276 ± 27 | 273 ± 39 | 0.177 | -0.41 | 6% | 19 | 0.006* | -0.57 | 8% | 100 | 0.627 | 0.09 | -1% | 0 |
| SQ45 P1             | 128 ± 36 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

**ABD** – abduction, **ADD** – adduction, **FLEX** – flexion, **EXT** – extension, **ER** – external rotation, **IR** – internal rotation, **% Diff** – percent mean difference, **% Δ** - percent change in mean score, **cons** – consistency of p<0.05, **DL** – double leg, **GCT** – ground contact time, **JH** – jump height, **RSI** – reactive strength index, **SL** – single leg, *significant difference (p < 0.05, freq > 85%), SQ45/0 – bilateral squeeze test in 45°/0° hip flexion, **MAX** – maximum value, **P1** – value recorded at onset of pain occurred, **N/A** – not applicable (no squeeze pain reported in AGP post or CON g)
## Appendix A5:

**Asymmetry index of peak isometric hip torque and single-leg reactive strength**

| Peak torque (Nm/kg) | AGP pre | AGP post | CON | AGP pre V CON | AGP pre V AGP post | AGP post V CON |
|---------------------|---------|----------|-----|----------------|-------------------|----------------|
|                     | Absolute | Directional | Absolute | Directional | Absolute | p | d | Cons (%) | p | d | Cons (%) | p | d | Cons (%) |
| ABD | 8.62 ± 7.69 | -0.15 ± 11.50 | 7.05 ± 5.67 | 1.48 ± 8.89 | 8.56 ± 5.13 | 0.239 | 0.01 | 6 | 0.400 | -0.16 | 1 | 0.133 | -0.27 | 20 |
| ADD | 9.94 ± 8.86 | -4.21 ± 12.58 | 6.23 ± 4.78 | 0.77 ± 7.80 | 7.91 ± 5.39 | 0.328 | 0.27 | 0 | 0.115 | -0.46 | 30 | 0.148 | -0.33 | 16 |
| ER | 12.42 ± 9.07 | -3.22 ± 15.01 | 10.52 ± 6.10 | -1.03 ± 12.06 | 7.90 ± 5.67 | 0.049 | 0.57 | 64 | 0.450 | -0.16 | 0 | 0.076 | 0.43 | 42 |
| EXT | 12.31 ± 8.96 | -0.31 ± 15.17 | 8.54 ± 5.65 | 3.64 ± 9.54 | 11.29 ± 8.04 | 0.338 | 0.12 | 0 | 0.171 | -0.31 | 22 | 0.180 | -0.39 | 10 |
| FLEX | 9.32 ± 6.65 | -3.02 ± 11.01 | 5.61 ± 4.86 | -1.77 ± 7.18 | 6.18 ± 4.22 | 0.059 | 0.54 | 55 | 0.565 | -0.13 | 1 | 0.269 | -0.13 | 2 |
| IR | 13.00 ± 8.89 | -3.3 ± 15.33 | 11.02 ± 9.46 | -3.52 ± 14.05 | 9.85 ± 6.74 | 0.142 | 0.39 | 14 | 0.727 | -0.01 | 0 | 0.330 | 0.14 | 1 |
| Reactive strength | | | | | | | | | | | | | | |
| SLDJ CT (sec) | 9.47 ±7.50 | 2.50 ±11.77 | 6.79 ±5.88 | 2.59 ±8.58 | 5.98 ±5.13 | 0.057 | 0.52 | 61 | 0.698 | -0.01 | 0 | 0.297 | 0.15 | 0 |
| SLDJ JH (cm) | 10.77 ±9.61 | -3.55 ±13.93 | 14.85 ±16.28 | -3.05 ±21.69 | 10.57 ±7.89 | 0.273 | 0.02 | 5 | 0.687 | -0.02 | 0 | 0.278 | 0.32 | 3 |
| SLDJ RSI | 15.18 ±14.38 | -5.49 ±20.11 | 15.42 ±14.96 | -5.39 ±20.66 | 11.64 ±10.00 | 0.257 | 0.28 | 4 | 0.695 | -0.01 | 0 | 0.212 | 0.29 | 4 |

*ABD – abduction, ADD – adduction, FLEX – flexion, EXT – extension, ER – external rotation, IR – internal rotation, SL – single leg, GCT – ground contact time, JH – jump height, RSI – reactive strength index, cons – consistency of p<0.05.*

*Nb: a negative sign in the directional asymmetry value indicates a greater value on the non-symptomatic limb*