females; mean ± SD age 30 ± 5.6 years; BMI 22.7 ± 2) and 11 'poor' performers (6 females; age 31 ± 5.7 years; BMI 22.5 ± 1.7) underwent subsequent biomechanical analysis. Participants performed five consecutive SLSq repetitions on an embedded force plate, with lower limb kinematic data simultaneously collected using a nine-camera VICON motion analysis system. Peak knee valgus torque and peak angles (trunk, pelvis, hip, knee, ankle, foot) corresponding to visual rating criteria were calculated for each squat, and the average of the middle three squats used for subsequent analyses. One-way analysis of variance evaluated between-group differences ($p < 0.05$).

Results: Participants rated as 'poor' performers on video analysis had significantly higher peak knee valgus torque (mean difference 0.110 Nm/kg, 95% CI 0.024 to 0.196 Nm/kg) and peak hip adduction angle ($-3.87°$, $-7.2°$ to $-0.53°$) than 'good' performers. 'Poor' performers had significantly greater peak trunk rotation towards their standing limb (3.85°, 0.45° to 7.24°). Non-significant trends were observed at the hip and ankle, whereby 'poor' performers had greater peak hip internal rotation ($-3.77°$, $-8.21°$ to 0.66°), and less peak ankle dorsiflexion (4.08°, $-0.08°$ to 8.25°) compared to 'good' performers. There were no other significant between-group differences for kinematic variables ($p > 0.05$).

Discussion: Observed differences in peak knee valgus torque and hip/trunk kinematics validate the ability of the visual rating criteria to differentiate runners with 'good' and 'poor' single leg squat control. This supports the use of visual classification of SLSq performance in clinical settings, as a screening tool for lower limb injury and to identify impairments that may contribute to presenting injuries. Future research should evaluate the visual rating criteria in symptomatic populations.

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11

Reliability of Askling H-test using ViMove sensor technology

S. Cowan [1,2,3], J. Heerey [2,*]

[1] *The University of Melbourne, Australia*
[2] *Clifton Hill Physiotherapy, Australia*
[3] *St Vincents Hospital Melbourne, Australia*

Background: The Askling H-test is a commonly used clinical test to indicate the readiness to return to sport following hamstring injury. Sporting organisations and in particular physiotherapists are now using the test with ViMove sensor technology to assess whether an athlete is ready to return to sport. Despite its increasing use there is currently no published data indicating the reliability of ViMove sensors for use in the Asklings H-test. Thus the aim of this study was to identify the reliability of ViMove sensor evaluation of the Asklings H-Test in community AFL players.

Methods: 11 healthy males were recruited from a local Victorian amateur football association team and were tested on two occasion 7–10 days apart. ViMove sensor technology was used to assess active straight leg range, passive straight leg range and peak velocity of movement using a standardised protocol

Results: Participants were 23(2) yrs old, 178(6) cm high and weighed 84(10) kg's. Paired *t*-tests revealed no significant differences between the two testing sessions ($p > 0.5$). Intra-class correlation co-efficients ranged from .88 to .98. Active flexibility for the H-test averaged (SD) 100(11) degrees and was greater than passive flexibility 82(11). There were no significant differences between the right and left legs, with the percentage difference being less than 3%.

Discussion: ViMove sensor technology can be used to provide simple and reliable objective measure of the Asklings H-test. Whilst the results concur with previous published data, the clear advantage of the Vimove system is its ease of use coupled with immediate reliable results. Whilst further research is required it is possible that the use of the Vi move system to assess the Asklings H-test may assist physiotherapists and other medical staff in making more informed decisions about an athletes readiness to return to sport.

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12

Correlation between neck motor control impairment and shoulder pain in elite male handball players

M. Asker [1,2,*], J. Ravnanger [1], T. Bjørnstad [1], E. Skillgate [1,2]

[1] *Scandinavian College Of Naprapathic Manual Medicine, Sweden*
[2] *Karolinska Institutet, Institute of Environmental Medicine, Sweden*

Background: Handball is a body contact team sport including a lot of throwing which consist of a great portion of overhead movement patterns in the shoulder girdle. The scapula and the cervical spine with its surrounding muscles play a fundamental role in making these movement patterns optimal. It is suggested that the neck function and neck pain affects the motor control of the shoulder, which in the next step may cause injuries. There is to our knowledge no study that has investigated the relationship between neck function and shoulder pain in overhead athletes. The aim of this study was to investigate whether there is a correlation between motor control impairment in the neck and shoulder pain among elite handball players.

Methods: 64 male elite level handball players mean ages 25.4 (± 4.1) were recruited from four different teams. Each player answered a baseline questionnaire regarding age, amount of games/practice per week, how longed they had played handball and if they suffered from any shoulder and/or neck pain (≥ 2 on a NRS scale 0–10) for the past 6 month or longer. Each player then conducted the cranio-cervical flexion test (CCFT), measured with feedback from a pressure sensor placed behind the neck.

Results: 38% of the players had shoulder pain with duration more then six month. 15% of the players had neck pain more then six month and 13% had have both neck and shoulder pain more then six month. Players with shoulder pain had significant lower test score on CCFT than those without pain, 24.5 (± 1.22) compared to 28.4 mmHg (± 1.55), mean difference between the groups of 3.9 mmHg (95% CI 3.1–4.6). There was also a strong correlation between the CCFT and shoulder pain ($r = -0.70$, $p = 0.02$). Regarding the parameters from the questionnaire, there was no difference between the ones with shoulder and/or neck pain and the players without pain.

Discussion: This study shows that the prevalence of long time shoulder pain is high in elite handball and that those with long time shoulder pain has a significant lower score on CCFT compared players with no shoulder pain. Furthermore this study shows that there is a strong correlation between motor control impairment of the neck and shoulder pain. Whether there is a casual relationship between the control impairment of the neck and the shoulder pain is unclear, and to investigate that further prospective studies are needed.

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