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#### HANDBALL: NATURE OF INJURIES AND ITS RELATIONSHIP WITH VOLUME

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**Introduction and Aims:** Professional players usually spend far more time in training than competing, and nowadays handball trainings do not differ greatly from games with reference to physical, mental, and technical preparedness. Volume as type, frequency and intensity of training play a major role in the etiology of overuse injuries<sup>1</sup>, however these are not commonly registered in epidemiological studies<sup>2,3</sup>. So the aim of this study was to document the nature of injuries (acute vs overuse) in a professional female handball team and to determine its relationship with training/game volume.

**Methods:** Injuries in a professional female handball team were analyzed during four competitive seasons. Two physiotherapists present at all times reported all injuries and treatments after each training and game on a standardized injury report form. Injury incidence was calculated as the number of injuries per 1000 hours of exposure. Training and game volume was calculated as the time players were training and playing handball.

**Results:** The average training/game volume was 206,2 hours per player during the season. 551 injuries were registered with an overall injury incidence of 31,3. There was a statistical relationship between training/game volume and injury incidence ( $p=0,004$ ). Pearson's chi-squared test showed that the number of overuse injuries ( $p=0,14$ ) and acute injuries ( $p=0,30$ ) per month was constant along the four seasons. There were 213 (39%) acute injuries with an incidence of 16,4/1000 hours of exposure and 338 (61%) were overuse injuries with an incidence of 26 injuries/1000 hours of exposure. Overuse injuries showed a statistical relationship with training/game volume during the months of the season (Kruskal Wallis test,  $p=0,01$ ). The highest number of overuse injuries occurred in the pre-season conditioning period and late period of competition.

**Conclusions:** This study shows a relationship between training/game volume and injuries in a professional female handball team; furthermore, this relationship is due to the high number of overuse injuries reported. Daily data collection is important since the information provided is more sensitive to provide specific information regarding overload conditions. References

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#### A STEP TOWARDS A FIELD BASED AGILITY TEST IN TEAM SPORTS. A PERSPECTIVE ON RETURN TO PLAY CRITERIA

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**Introduction:** Agility performance tests can be limited by the requirement for force plates, timing gates and expensive camera systems (Correia et al., 2012; Green, Blake, & Caulfield, 2011) making application into rehabilitation programs practically challenging. The aims of this study were to assess the reliability of a field based 1v1 agility test encompassing perceptual-action performance that could be replicated in applied settings. A secondary aim was to assess the relationship between the 1v1 agility test with a range of physical performance tests including the commonly used Y step test (Paul, Gabbett, & Nassis, 2016).

**Methods:** Twenty-eight male rugby union players volunteered (Mean  $\pm$  SD age 19.3  $\pm$  2.2 years, age range 18 – 24, weight 96.5  $\pm$  13.3 kg). Participants

were randomly assigned to attack or defensive roles (1v1 agility test) within a simulated rugby evasion task (Brault et al., 2012). A previously utilized agility performance score (Young & Murray, 2016) was modified to assess agility performance. Two independent investigators reviewed video recordings (side and behind attacking player) to score attack and defensive performance. Each participant completed 10 agility trials.

**Results:** Cohens Kappa statistic showed inter-rater reliability of agility scoring was almost perfect .861 (CI .816 to .917). Attacking agility had a large significant relationship with Y step performance ( $r = -.577, p = .001$ ), single leg repeat hop ( $r = .570, p = .002$ ) and body mass ( $r = -.537, p = .003$ ). Defensive agility had a large significant relationship with CMJ flight time:contraction time ratio ( $r = .580, p = .001$ ) and CMJ concentric duration ( $r = -.656, p = .000$ ).

**Conclusion:** Findings show the Y step test shared 33% of common variance with 1v1 attack and 5% with defensive agility performance. Low commonality is likely due to significantly greater frontal and transverse plane movement during agility compared to change of direction tests (Green et al., 2011). It is recommended that the 1v1 agility test be considered as part of return to play criteria in team sports players to assess attacking and defensive agility performance.

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#### ONLY 19% OF PIVOTING ATHLETES AFTER ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION MEETS RETURN-TO-PLAY (RTP) CRITERIA WHEN THEIR PHYSICAL THERAPIST RELEASES THEM TO RTP

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**Introduction and Aims:** Anterior cruciate ligament (ACL) ruptures are common in the first two years after return to play after ACL reconstruction (ACLR). Previous research showed that athletes that did not meet return-to-play (RTP) criteria had a fourfold increased risk for re-ruptures.<sup>1,2</sup> The aim of this study was to describe the results of RTP tests for pivoting athletes that were released to RTP by their own physical therapist. Besides, the effect of six predefined variables on the chance of RTP was determined.

**Methods:** 102 Pivoting athletes (67 males, 35 females, age 24  $\pm$  7 years) were treated with primary ACLR were included. The athletes rehabilitated at a physical therapist of their own choice according to a previously described practice guideline.<sup>3</sup> At the end of rehabilitation they made an outpatient appointment for return to play testing. This appointment included measurements of quantity of movement (four strength tests and three single-leg hop tests) and measurements of quality of movement (single-leg hop-and-hold and double-leg countermovement jump with video analysis).

**Results:** 19 athletes passed all nine RTP tests and were allowed to RTP. There were three independent variables that predicted RTP: athletes treated by a sports physical therapist had a 3.09 times higher chance of meeting the RTP criteria than those treated by a general or manual