

## Strength imbalances and prevention of hamstring injury in professional soccer players: a prospective study

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**Introduction:** Hamstring strains are very common and prone to recurrence in soccer players. Strength imbalances are suggested to play a key-role in muscle injury, yet relationship between hamstring strain and strength disorders remains matter of controversy in the literature. The aim of our study was to determine whether (a) strength variables could be predictors of subsequent hamstring strain and (b) normalization of strength imbalances could reduce the incidence of hamstring injury.

**Methods:** 687 professional soccer players performed a standardized preseason isokinetic testing. The concentric and eccentric measurements permitted to identify soccer players with strength imbalances. Subjects were classified among four subsets according to the imbalance management content. Recording subsequent hamstring injuries allowed defining injury frequencies and relative risks (RR) between groups.

**Results:** Of 687 players isokinetically tested in preseason, a complete follow-up was obtained in 462 players, for whom 35 hamstring injuries were recorded. The rate of muscle injury was significantly increased in cases with untreated strength imbalances in comparison with players showing no imbalance in preseason (RR 4.66 with 95% CI 2.01 – 10.8). The risk of injury remained significantly higher in players with strength imbalances and subsequent compensating training but no final isokinetic control test than in players without imbalances (RR 2.89 with 95 % CI 1.00 – 8.32). Conversely, normalizing the isokinetic parameters reduced the risk factor for injury to that observed in players without imbalances (RR 1.43 with 95% CI 0.44 – 4.71).

**Discussion-Conclusion:** The outcomes in this prospective study allow to conclude that (1) the isokinetic intervention, as a preseason screening tool in professional soccer players, gives rise to the early detection of strength imbalances; (2) untreated strength imbalances increases the rate of subsequent hamstring injury; (3) restoring normal strength performances and agonist/antagonist ratios in players with preseason imbalances significantly reduces the risk of hamstring injury.

**Reference:** Croisier et al.: Am J Sports Med (in press).