

LOWER EXTREMITY STRENGTH ASYMMETRY PROFILE IN ATHLETES: A NEW MODEL FOR MUSCLE STRAIN PREDICTION IN SOCCER?

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Introduction

Strength asymmetry to the lower limbs has been recognized as a key predisposing factor for strains to the involved muscles. (Fousekis et al, 2011; 2012) Given that the overall function of the lower extremities in sports is significantly affected by the symmetric synergy of all the lower limb muscles, the present study aims at quantitatively investigating the players' lower extremity strength asymmetry profile (LESAP) and its possible association with the incidence of muscle strains.

Methods

100 professional soccer players [mean(SD) age:23.6 (4.2), height 1.78 (.06), weight 73.34 (5.94)] were isokinetically assessed pre-seasonally and followed over the next competitive season to record prospectively muscle strains via a specific questionnaire. The registration of knee and ankle asymmetric strength profile (LESAP) comprised of isokinetic testing in slow (60°/sec) and fast (180°,300°/sec) velocities, both concentrically and eccentrically. Strength asymmetries were defined as bilateral differences in muscle strength of 15% or more per muscle group, speed and type of contraction.

Results

Soccer athletes exhibit a clear-cut LESAP, as only 11% presented with symmetric myodynamic function. At least 3 strength asymmetries in the knee and ankle joint were present in 27% of the players and 21% of them had at least 4 strength asymmetries. A proportion of 68% of the soccer players displayed concentric asymmetries and even more (73%) presented with eccentric asymmetries. Twenty-nine (29) non-contact muscle strains were recorded, 17 of which involved the hamstrings, 8 the quadriceps, 3 the hip adductors and 2 the gastrocnemius. A significant relative risk (RR=4.978; 95% CI:

1.371-18.076) for muscle strain was recorded in players with Eccentric LESAP. The risk of injury increased significantly as the quantity exceeded 2 eccentric strength asymmetries (>15%) at the lower extremity of soccer players (Fisher's Exact Test=8.569, p=0.024).

Conclusions

Professional soccer led to significant strength asymmetric adaptations to the lower limbs of the players, which in turn correlated with a high risk for muscle strain. The co-existence of strength asymmetries in various muscles of the lower limbs, could alter the overall kinesiological response in high loading conditions during soccer practice and playing, enhancing their vulnerability to injury. Detailed isokinetic evaluation, eccentric mode included and recording of the LESAP in soccer players can reveal an important risk factor for muscle strains and thus contribute to prevention of these injuries through specific strengthening programs.

References

1. Fousekis *et al*, BJSM, 45:709-714, 2011.
2. Fousekis *et al*, AJSM, 40(8):1842-1850, 2012.