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Research article

Lower Limb Strength in Professional Soccer Players: Profile, Asymmetry, and Training Age

Konstantinos Fousekis[1,2], Elias Tsepis[2], George Vagenas[1]

ABSTRACT

Kicking and cutting skills in soccer are clearly unilateral, require asymmetrical motor patterns and lead to the development of asymmetrical adaptations in the musculoskeletal function of the lower limbs. Assuming that these adaptations constitute a chronicity-dependent process, this study examined the effects of professional training age (PTA) on the composite strength profile of the knee and ankle joint in soccer players. One hundred soccer players (n=100) with short (5-7 years), intermediate (8-10 years) and long (>11 years) PTA were tested bilaterally for isokinetic concentric and eccentric strength of the knee and ankle muscles. Knee flexion-extension was tested concentrically at 60°, 180° and 300 °/sec and eccentrically at 60° and 180 °/sec. Ankle dorsal and plantar flexions were tested at 60 °/sec for both the concentric and eccentric mode of action. Bilaterally averaged muscle strength [(R+L)/2] increased significantly from short training age to intermediate and stabilized afterwards. These strength adaptations were mainly observed at the concentric function of knee extensors at 60°/sec (p = 0. 023), knee flexors at 60°/sec (p = 0.042) and 180°/sec (p = 0.036), and ankle plantar flexors at 60o/sec (p = 0.044). A linear trend of increase in isokinetic strength with PTA level was observed for the eccentric strength of knee flexors at 60°/sec (p = 0.02) and 180°/sec (p = 0.03). Directional (R/L) asymmetries decreased with PTA, with this being mainly expressed in the concentric function of knee flexors at 180°/sec (p = 0.04) and at 300 °/sec (p = 0.03). These findings confirm the hypothesis of asymmetry in the strength

adaptations that take place at the knee and ankle joint of soccer players mainly along with short and intermediate PTA. Players with a longer PTA seem to adopt a more balanced use of their lower extremities to cope with previously developed musculoskeletal asymmetries and possibly reduce injury risk. This has certain implications regarding proper training and injury prevention in relation to professional experience in soccer.

Key words: Soccer, isokinetic strength, asymmetries, training-age

Key Points

- Muscle strength increased from the low (5-7 years) to the intermediate professional training age (8-10 years) and stabilized thereafter.
- Soccer practicing and competition at the professional level induces critical strength adaptations (asymmetries) regarding the function of the knee and ankle musculature.
- Soccer players with long professional training age showed a tendency for lower isokinetic strength asymmetries than players with intermediate and short professional training age.