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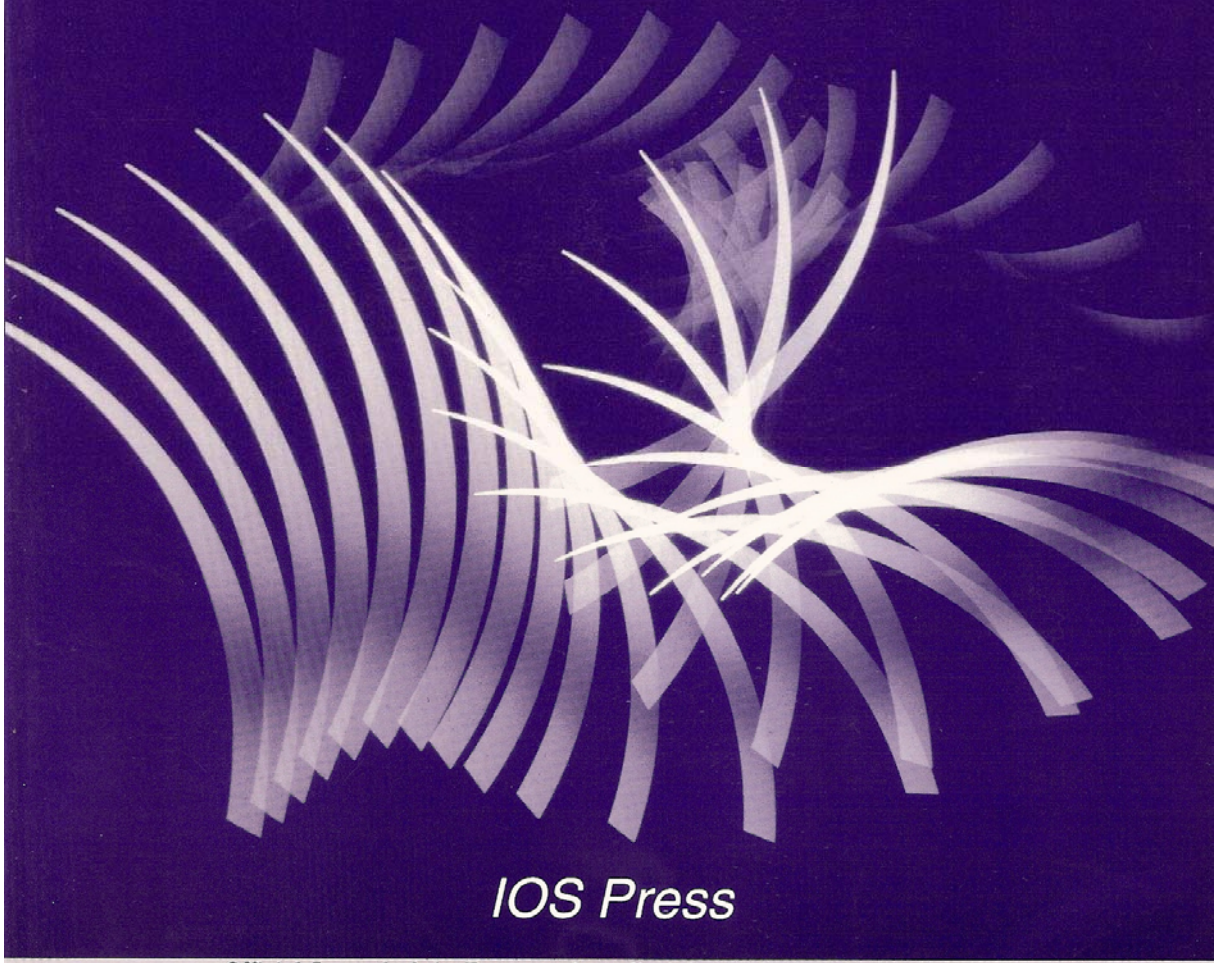

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Anaerobic power and isokinetic strength of basketball players

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Introduction: Basketball involves intermittent physical activity in which sequences of actions requiring a variety of skills of varying intensities are strung together. Explosive type efforts such as sprints, jumps and duels are important factors for successful basketball performance. These efforts depend on maximal strength and anaerobic power of the neuromuscular system, more particularly of the lower limbs. Therefore we assessed anaerobic power and muscular strength of basketball player to clarify which parameters are relevant in basketball practise.

Methods: Elite junior basketball players ($n = 10$, age 19 ± 1.1 years) and sedentary subjects ($n = 20$, age 23 ± 3.2 years) were examined. The isokinetic strength of knee extensor and flexor muscles was measured in the eccentric mode ($30°.\text{sec}^{-1}$ and $120°.\text{sec}^{-1}$) and through concentric exertions ($60°.\text{sec}^{-1}$ and $240°.\text{sec}^{-1}$). Anaerobic power based on vertical jump (one leg and two legs) and 10 m sprint time, was assessed using Optojump system. Possible relationships between sprint, jumps and isokinetic data were estimated through correlation analysis.

Results: The elite junior basketball players showed higher knee flexor torques than the sedentary group for all modes of contraction and angular velocities ($p < 0.05$), except for concentric $240°.\text{sec}^{-1}$. A mixed eccentric flexor/concentric quadriceps ratio(1) was significantly ($p < 0.05$) reduced in the sedentary group compared to elite group. Counter movement jump, counter movement jump free arms, drop jump dominant leg and power dominant leg were significantly higher ($p < 0.05$) in basketball players. For bodyweight normalized parameters, jumps were correlated only with the extensors concentric peak torque at the concentric speed of $240°.\text{sec}^{-1}$ in basketball group (drop jump dominant leg, $r = 0.96$; 10 s dominant leg, $r = 0.89$; counter movement jump, $r = 0.81$; counter movement jump free arms, $r = 0.78$).

Discussion: In our study, knee flexor muscle strength and jumping ability differ between elite junior basketball players and sedentaries. These results would tend to support the use of such tests for aiming to determine the relative importance of strength and anaerobic power to sporting performances and also for muscle strength disorders identification in sports dominated by the physical qualities of strength and power. In basketball group and sedentary group, we demonstrated few correlations between isokinetic muscle strength and anaerobic power performances. This could imply that isokinetic tests do not reflect the movement of lower limbs involved during jumping or sprinting.

Conclusion: The results demonstrated that isokinetic and vertical jump tests may be used to effectively discriminate between individuals with different performance levels. Further researches are requested to determine the most effective assessment protocols to differentiate basketball player performance levels.

Reference

[1] J-L. Croisier, *Am J Sports Med* **30**(2) (2002), S199–S203.

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