RELATIONSHIPS BETWEEN ISOKINETIC KNEE STRENGTH, SPRINT AND JUMP PERFORMANCE IN YOUNG ELITE SOCCER PLAYERS

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Introduction
Muscular strength is one of the most important components of physical performance in sport, in terms of both high-level performance and injury occurrence [1]. According to Stølen [2] during a game, a sprint bout occurs approximately every 90s, each lasting an average of 2-4s. The aim of the study was to examine relationships between knee extensors (KE) and flexors (KF) strength, linear sprint performance and jump performance in youth soccer players.

Methods
Fourteen Czech youth male soccer players (age = 15.6 ± 0.4 years, height = 177.7 ± 6.9 cm, weight = 67.9 ± 8.7 kg) from U16 national team were examined. Strength of KE and KF on dominant limb during concentric contraction in different angular velocities $(60,180,300° \cdot s^{-1})$ were assessed by Cybex dynamometer. Acceleration sprint performance (5m, 10m) and maximal sprint performance (flying 20m) were assessed by photo cells (Brower Timing System). Vertical jump (Counter Movement Jump – free arms, Squat Jumps) was assessed by Kistler's force plate. Spearmen's correlation was used for evaluation of relationships between parameters.

Results & Discussion
Players achieved following strength results (mean±SEE): KE_{60} = 3.11 ±0.09; KE_{180} = 2.24 ± 0.05; KE_{300} = 1.71 ± 0.05; KF_{60} = 1.88 ± 0.09; KF_{180} = 1.47 ± 0.04; KF_{300} = 1.13 ± 0.05 $N \cdot m \cdot kg^{-1}$; S_{5m} = 1.11 ± 0.03 s, S_{10m} = 1.86 ± 0.02 s, S_{20m} = 2.40 ± 0.03 s, CMJ_{FA} = 40.65 ± 0.61 cm and SJ = 32.53 ± 0.96cm. The highest correlations were found between KF_{300} and each others parameters. Lehance [1] reported significant correlation between KF_{240} vs. 10 m (-0.46; p<.01) in elite players.

Table 1. Correlation analysis of observed parameters

Test	5m	10m	20m	CMJ$_{FA}$	SJ
KE_{60}	-.24	-.12	-.40	.19	-.12
KE_{180}	-.09	-.36	-.35	.39	.06
KE_{300}	-.18	-.34	-.27	.38	.26
KF_{60}	-.29	-.47	-.74**	.25	.28
KF_{180}	-.33	-.49	-.57*	.35	-.01
KF_{300}	-.61*	-.75*	-.78**	.46	.31

Conclusion
The best indicator for linear speed performance is relative peak torque of knee flexors in highest angular velocity. Project was supported by GACR P407/11/P784.

References
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