

Isokinetic strength of foot plantar and dorsal flexors in young male orienteers

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Orienteers navigate point to point in unfamiliar and uneven grounds using map and compass to run their races. High levels of fitness and running speed are requested to cover successfully long distances and climbs. Strength in ankle and foot muscles is necessary to overcome natural obstacles in rough terrains (1). Eight male orienteers of junior Italian team (OR; age, 19±1.6yr), 8 cross country track and fields experienced runners (TF; 20±4.5yr), and 8 sedentary persons (control group CG; 23±2.7yr), all with right lower limb dominance volunteered. Ages, weights, heights, and body mass indices between groups did not differ (ANOVA, $p>0.05$). Each participant performed and an isokinetic dynamometer measured 4 repetitions of right and left foot dorsal and plantar flexions at the angular speeds of 60-120-180deg/sec respectively. Within side, group and angular speed, the ratios of peak torques between plantar and dorsal flexors were also computed. Descriptive statistics were calculated within subject, group, movement, angular speed, and side. For each movement, the effects of group and side, and group×side interactions on peak torques at different speeds were compared by ANOVA (statistical significance 5%). Within group, dorsal and plantar flexors of right foot were generally stronger than those of contralateral limb, but differences were not significant. Side-related differences were similar in all groups ($p>0.05$). On average, OR performed larger peak torques in both sides and movements. Differences were significant in foot plantar flexors at 60-120-180deg/sec, and in foot dorsal flexors at 60 and 120deg/sec ($p\leq 0.04$). In both limbs, the ratios between plantar and dorsal flexors were larger in OR at 120-180deg/sec, and in TF at 60deg/sec ($p<0.01$). Orienteers build their physical training mostly on overcoming natural obstacles and running on uneven grounds. This approach could stimulate a continuous proprioceptive activity, and favor the reinforcement of ankle and foot muscles. Data could be of interest for coaches to set efficient training plans preventing accidental injuries, and for physical therapists and physicians to quantify the effects of rehabilitation. Investigations should be extended to a larger group of participants and to other muscular districts.

References

[1] Fong et al. (2007). *Sports Medicine*37:73-94.

Keywords

Isokinetic dynamometer; foot plantar/dorsal flexors; muscular strength; orienteering.