A comparison of the effects of two different drop jump training method modalities on jumping performance and muscle strength

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Introduction
The efficiency of the drop jump (DJ) training method on jumping performance has been demonstrated in a number of studies (Bobbert 1990). Since improvement of jumping height associated with DJ training varies greatly among studies, it remains questionable which training method modality is the most efficient. Previous studies have shown that DJ training method modalities are influenced by DJ height. In some plyometric training studies (Wilson et al. 1996) DJ height has been progressively increased. In others (Matavulj et al. 2001), DJs were performed from the preselected height that was not changed. The effect of DJ on the leg extensor strength has also been examined (Young et al. 1999; Matavulj et al. 2001). The main aim of the study was to assess the effects of two different drop jump training method modalities on jumping performance and maximal strength and explosive force production.

Methods
Fifty-seven male physical education students with no previous experience in DJ training were tested prior to and after a six weeks of DJ training. The subjects were randomly allocated to three groups that included two DJ training modalities groups and a control group. The dependent variables included the height of countermovement jump (CMJ) and maximal isometric strength (Fmax) of hip and knee extensor and flexor muscles. In addition, the following explosive force production (EFP) indices were assessed from the recorded force-time curves: (a) the maximum rate of force development, (b) the same value normalized with respect to Fmax, and (c) the time interval elapsed between achieving 30% and 70% of Fmax. The optimal DJ training height was determined prior to training and after completed four weeks of training. Between 94 and 144 DJs were performed per week for six weeks from either optimal DJ height (experimental group 1) or from DJ height that was lower and higher than optimal, progressively (experimental group 2). The differences between the results obtained in three groups were tested by ANOVA with repeated measures and follow-up post hoc procedures were performed.

Results
The obtained results show significant increase in CMJ height in both experimental groups, as compared with the control group (p<0.05), while no differences were observed between two experimental groups (fig. 1). Although some moderate differences among the EFP indices obtained from three groups were recorded, the changes in jumping height were associated with significant changes in neither Fmax nor the indices of EFP.

Discussion/Conclusion
The obtained results support the concept that DJ training method is efficient in maximum jump performance improvement. A relatively short training period could be the main reason that none of the applied modalities provided a stronger effect than the other one. Since the DJ technique was not strictly controlled, while the subjects were without previous experience in DJ, the dominant technique could have been with long ground contact time and prolonged downward movement during the eccentric jump phase. The later phenomenon could explain for not obtaining the expected differences in the indices of explosive force production. This assumption is in line with findings of Young et al. 1999. In particular, the hip extensor muscles are usually less trained in athletes than the knee extensor muscles and, consequently, hip extensors are more sensitive on specific training. That might be the reason that some differences (although not significant) were found in EFP indices of hip extensor. Further research could reveal the possible effects of DJ technique on maximal strength and explosive force production testing.

References

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