Strength training periodization for young soccer players

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Introduction
Determining the most effective and efficient method of strength development has been a primary focus of strength coaches and strength researchers for decades. One main concern has been the choice of the best manipulation of volume and intensity over the training cycle, in other words, periodization. The classic form of linear periodization did not match with the characteristics of sports with long competitive periods. Recently, the literature has reported some evidence that a so-called non linear periodization strategy could produce good results with sports with long competitive periods (Kraemer et al. 2003). The purpose of this study was to investigate physiological and performance adaptations, induced by a combination of a linear and non linear periodization strength training programs for young soccer players.

Methods
Thirty young soccer players (age = 16 ± 0.5 years old; body mass = 66 ± 3 kg) were involved during ten months in a longitudinal study and they were assigned to a periodized strength training group (TG) and a control group (CG). Periodized strength training involved a linear periodization (LP), with two hypertrophy training blocks, followed by a daily undulating periodization (NLP), with a hypertrophy, rate of force development, and reactive strength training sessions. The LP period lasted four months, with two training sessions per week. The subjects have performed 2-3 sets of 15 RM, with a rest interval of 2 minutes, during the first eight weeks. In the next eight weeks the load increased for 3 sets of 12 RM. In the NLP the subjects performed the same two training sessions per week, during a period of six months. The first session was dedicated to hypertrophy (3 sets of 10 RM), the second session to the rate of force development (3 sets of 6 RM) and the next session was oriented do the reactive strength (4 x 3 sets of 8-12 jumps). This sequence was repeated in a row during the entire period of six months. The TG performed this strength training program and the soccer routines four times per week. The CG only performed the soccer training sessions. Measurements for maximal strength (Fmax), rate of force development (RFD), reactive strength (RS) and speed, were performed, before, in the middle and at the end of the training process. Anova for repeated measures and T-tests for paired samples and descriptive statistics were used for analyzing the results.

Results

In the training group Fmax, RFD and RS increased 22%, 32% and 11%, respectively, during the LP period, whereas the CG only showed gains of 6%, 7% and 3%, for the same parameters. During the NLP it could be observed a moderate increase of Fmax (14%), RFD (12%) and RS (7%) for the TG, whereas the CG showed only small increases (Fmax-6%; RFD-3%;RS-2%).

Discussion/Conclusion
At this age group strength gains in all strength components could be observed as a result of the growth and maturation process. The differences between the gains of the CG and the TG could be seen as an adaptation due to the training stimulus. In this study we were interested in looking at the possible advantages of combining a linear and a non linear periodization model, for strength training in young soccer players. The results suggest that the LP model produce the best results for the initial gains in maximal strength and in the rate of force development. Like some other ball games, soccer has a large competitive period, where is important to maintain as high as possible the performance of all strength qualities. The results of the NLP model, allow us to conclude that this procedure could be a good solution for the sports with large competitive periods. The basic strength components (Fmax, RFD and RS) showed a moderate increase during six months of NLP, without significant differences from the gains obtained in the LP period.

References