Thematic Area: Sports Performance

THE EFFECT OF STRENGTH TRAINING ON BODY COMPOSITION IN DISTANCE RUNNERS

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Introduction

Strength training can improve neuromuscular function in athletes (Zatsiorky, 1995). Previous literature has demonstrated that strength training can improve key performance indicators (i.e. economy, velocity at $\dot{V}O_2 \text{max}$, & anaerobic power/capacity) in competitive distance runners (Beattie et al., 2014). However, the practice of strength training in distance runners is still a novel training modality. Traditionally, for unknown reasons, distance runners have been cautious to strength train. One potential reason is that athletes and coaches are unaware of the neural adaptations of strength training (musculotendinous stiffness, motor unit recruitment and synchronisation, rate coding, intra- and inter-muscular coordination, and neural inhibition), and deliberate that strength training results solely in increased muscle mass, negatively effecting relative aerobic power and performance. The purpose of this study was to examine the effect of a 40 week strength intervention on body composition variables (mass, % body fat, overall-lean & leg-lean muscle) in competitive distance runners.

Methodology

Twenty competitive club-standard distance runners ($n = 20$; $28.2 \pm 8.6$ years; $71.6 \pm 6.6$ kg; $180.1 \pm 6.8$ cm) participated in the 40 week study. Participants were divided into two groups based on their personal preference. The two groups consisted of a ‘strength’ intervention group (ST; $n = 11$; $29.5 \pm 10.0$ years; $72.8 \pm 6.6$ kg; $182.8 \pm 8$ cm), and a control group (CON; $n = 9$; $27.4 \pm 7.2$ years; $70.2 \pm 6.4$ kg; $177.4 \pm 3.7$ cm). Both the intervention and control groups were informed to train as normal throughout the 40 week study. The intervention group strength trained twice a week during the twenty week pre-season period, and once a week during the twenty week in-season ‘racing’ period. All strength sessions were coached by the author who is an experienced Strength & Conditioning coach. Each runner was assessed for maximal-strength (1 RM back squat), reactive-strength (drop-jump 30 cm) and body composition (dual energy X-ray absorptiometry) at week 0, week 20 and week 40.

Results

There was a significant ‘time x group’ interaction for maximal-strength and reactive-strength measures ($p < 0.05$) between both groups during the 40 weeks. However, there was not a significant difference for body composition variables (body mass, % body fat, overall-lean & leg-lean muscle) between both groups.

Conclusion

The results from this study show that 40 weeks of strength training can significantly improve maximal- and reactive-strength qualities, without significant changes to body composition.
(specifically overall-lean and leg-lean muscle). Interestingly, even though there were significant improvements in maximal- and reactive-strength qualities in the strength group, leg-lean muscle decreased over the 40 weeks. It is suggested that the strength improvements in the intervention group resulted from improved neural function of the leg musculature. This study demonstrates that runners can strength train to improve maximal and reactive force capabilities, and potentially distance running performance, without adding ‘unwanted’ lean muscle tissue.
