

## **Neuromuscular Recruitment in Endurance Runners Should Be Improved with Explosive-Strength Training**

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### ABSTRACT

Research has indicated that anaerobic training combined with aerobic training may improve endurance performance greater than aerobic training alone, primarily by utilizing explosive-strength training. The purpose of this investigation was to find if there are any associations between  $VO_{2max}$  and rate of force development (RFD). METHODS: Eleven subjects ( $n=11$ , age  $34.1 \pm 13$  years, height  $175 \pm 9.7$  cm, weight  $76.1 \pm 15.5$  kg, hip range of motion  $33.5 \pm 6.9$  cm, ankle range of motion  $76.1 \pm 6.6^\circ$ ) volunteered for this study. Subjects were asked for endurance training experience ( $4.7 \pm 3.7$  years) and resistance training experience ( $4.1 \pm 4.6$  years). Participants signed an informed consent approved by Midwestern State University Internal Review Board. To meet training status, subjects were to have a  $VO_{2max}$  in the 80<sup>th</sup> percentile as per ACSM guidelines and were between the ages of 18 and 65. The treadmill test used to measure  $VO_{2max}$  was the standard Bruce treadmill testing protocol. In order to determine RFD subjects performed an isometric mid-thigh pull on a force platform. A Pearson Product  $r$  Correlation Coefficient was calculated to determine correlations between variables. RESULTS: A significant correlation was found between  $VO_{2max}$  and RFD ( $r=0.68$ ). DISCUSSION: These results indicate that explosive-strength training, as suggested in previous research, may in fact improve aerobic performance. Therefore, one can assume that utilizing explosive-strength training should improve aerobic performance through more efficient neuromuscular recruitment patterns, which in turn should improve time to fatigue. Olympic lifts, such as the clean and snatch exercises, are very effective exercises to utilize in order to improve RFD and should be a part of an endurance runners training program.