

HIGH-INTENSITY RESISTANCE CIRCUIT-BASED TRAINING (HRC) APPLICATIONS FOR PERFORMANCE & HEALTH

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Improvements in sports performance in most team sports are determined by a high demand of aerobic/anaerobic metabolism, maximal strength, mechanical power, speed and agility, etc. Thus, success or failure in these sports is largely dependent on the optimal training plan used for developing these abilities, which are often trained simultaneously (i.e., concurrent training). Furthermore, different physical activity guidelines published by internationally-renowned associations, and from different review articles, have shown that increases in maximal strength, along with cardiovascular fitness, provide overall health benefits for the general public, the elderly, as well as for the treatment and quality of life improvements in people with different pathologies. Since the 1970s, there has been a search for a single type of concurrent training that improves both maximal strength and aerobic endurance while using a reduced session duration for its application in competitive sports, as well as in the area of health. To this day, the most traditionally used concurrent training method is resistance circuit-based training (RCT). In its early employment, RCT was comprised of single sets of several different exercises completed in succession, with little rest between exercises. The exercises were generally performed at low intensity (40-60% of 1-RM), with a high number of repetitions, and more often, using a set length of time (e.g., 30 seconds) with a very short rest period between exercises (1:1). The purported benefit of this

form of training was that it produced improvements in strength, muscular endurance, and aerobic conditioning in one workout. Presently, and together with the new training trends (e.g., CrossFit™ and others), there have been some slight modifications of the earliest method of RCT, such as using high loads (85% 1-RM) and corresponding lower number of repetitions (6-RM), to additionally promote neuromuscular adaptations. This type of circuit with high loads is known as HRC (High-Intensity Resistance Circuit-based training). One of the main features in HRC training is that the heart rate is typically higher when compared to traditional strength training, mainly due to short recovery time, and lactate levels are very high. In addition, circuit training, when used with high loads (HRC), usually produces a higher post-exercise oxygen consumption (EPOC) during the first 30 minutes of recovery compared to traditional strength training. Another important benefit of using this type of circuit is that it significantly reduces fat mass and improves muscle mass in healthy, trained, or elderly people. Finally, note that this type of training reduces training time by 66% or more when compared to traditional strength training with recoveries between 2-3 min/sets.

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