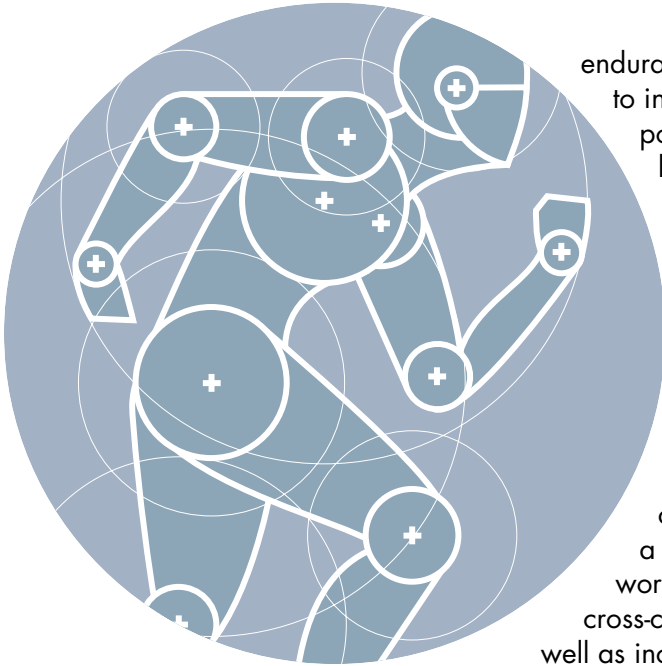


## A RESEARCH OVERVIEW:

# STRENGTH TRAINING AND THE ENDURANCE ATHLETE

by Patrick A. Ward, CSCS



endurance capabilities due to increases in anaerobic power, increases lactate threshold as well as enhanced exercise economy. [1,2,3,5,8,9,16]. Hoff, et al., concluded that even maximal strength training increased work economy in the control group of a study focused on work capacity of female cross-country skiers [8], as well as increased endurance through greater work economy and rate of force development in male skiers [15]. Marcinik, et al., found that while there was no change in VO<sub>2</sub>max, endurance performance was improved through increases in lactate threshold and leg strength in 18 untrained males, during a cycling test [5].

Another type of training that appears to show some benefit to the endurance athlete is explosive training [4,6,7,13,14]. The improvement in endurance from explosive training appears to be due to increased exercise economy, increased motor unit recruitment, and an increase in lactate threshold

[4,6,7,13,14]. Paavolainen L, et. al, concluded that training consisting of both endurance and explosive exercise, enhanced running performance through improvements in neuromuscular characteristics, leading to greater maximal velocity [4]. Stone, et al, discovered that olympic style weightlifting alone can produce changes in some cardiovascular parameters; such as, increased VO<sub>2</sub> max and decreased resting heart rate [7].

In order to take advantage of the potential benefits that strength training has to offer, athletes that compete in endurance based sports need to divide their training up to include a variety of energy systems and have a more well rounded approach. This type of training has been referred to as concurrent training or "simultaneous training"[9,11,12,14,16,17]. Concurrent training has been shown to be effective for increasing maximal strength, endurance and exercise economy [9,16]. As the competition nears, it might be advised that endurance athletes focus more of their attention on the actual event, while backing off of the strength training, but still maintaining strength levels by training one to two times a week [10].

**E**ndurance based athletes (marathon runners, distance bikers, ultra-distance runners, Ironman athletes, etc.) are notorious for avoiding resistance training as part of their training program. The common excuse is that "their legs get enough training during their running/cycling". In reality, these athletes may be holding themselves back from hitting their full potential in their desired sport because they are avoiding resistance training!

Endurance athletes who perform strength training as part of their exercise program have the potential to increase their

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Patrick Ward is a certified strength and conditioning specialist through the National Strength and Conditioning Association (NSCA), a certified personal trainer through National Academy of Sports Medicine (NASM), a USA Weightlifting-Certified Club Coach, and a competitive Olympic weightlifter. He grew up in Lyndhurst, just outside of Cleveland, OH, where he played High School Baseball for Notre Dame Cathedral Latin. He is currently pursuing a Masters degree in Exercise Science and Health Promotion.

Patrick's professional experience working with a diverse clientele ranges from training for general health, rehabilitation, to athletes who want to take their abilities to the next level. Prior to founding Optimum Sports Performance, Patrick was a top-level personal trainer in New York City, where he also taught and held seminars for other trainers, covering topics such as program design, periodization and fitness assessments. He served as a strength and conditioning consultant for various athletes of all ages and status.

## THE OSP PHILOSOPHY

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We expect our athletes to give us everything they've got, and in return, we demand the same from ourselves.