Resistance-Training Interactions, Cycling Performance, and Much More

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Summary

This column summarizes several research studies, including ones regarding resistance training and volume and speed of movement, cross-limb transfer of training effect, leg vascular resistance, and creatine supplementation, and concerning the effect of warm-up and carbohydrate solutions on cycling performance.

Untrained men and women resistance-trained 3 d/wk for 6 weeks with unilateral elbow flexion using 6–8 repetitions maximum (RM), after being assigned to 1 of 4 groups: 1 fast set (-140°/second); 1 slow set (-50°/second); 3 fast sets; or 3 slow sets. A control group did not train. Upper arm girth had a small increase in all training groups. No changes were noted in biceps skinfold thickness. All training groups increased 1RM elbow-flexion strength, with the multiple-set and fast groups having a greater strength gain than the single-set or slow groups, respectively. There was no additional benefit of the multiple, fast-set combination.


Experienced road cyclists performed either no warm-up, an easy warm-up (15-minute stepwise cycling increases followed by a 2-minute rest), or a hard warm-up (15-minute stepwise cycling followed by 3 minutes of hard cycling followed by a 6-minute rest) prior to a 3-km time trial. The 2 warm-up groups had similarly better 3-km cycling times than the no-warm-up group.


Right-handed women performed right-handed (R), left-handed (L), or no resistance training for 6 weeks using identical protocols for 4 days per week. Muscle thickness and electromyographic activity did not change in the untrained limb of any group. The R training group had peak isometric torque gains in both limbs, whereas the L training group had peak torque gains in the trained limb only. It would appear that cross-education in ulnar deviation occurs to the nondominant side in right-handed women engaged in this type of training.


The effects of age and resistance training on the femoral artery and blood pressure...
(BP) were examined in normotensive men. Middle-aged men (35–65 years) had higher mean and diastolic BP than younger men (20–34 years) had. Resistance-trained men (vigorous whole body training >2 years, no aerobic training) had BP similar to that of sedentary men. Unlike their sedentary counterparts, resistance-trained men did not display the age-associated decline in basal whole leg blood-flow and vascular conductance, even if adjusted for the greater leg muscle mass. This study suggests that the prevention of an age-related increase in leg vascular resistance is yet another benefit of resistance training.


Endurance-trained men (mean ± SD; \( V_{O_2,\text{max}} = 60.5 \pm 6.7 \text{ mL-kg}\cdot\text{min}^{-1} \); age, 24 ± 4 years) exercised on a cycle ergometer at almost 60% \( V_{O_2,\text{max}} \) at 35°C and 30% relative humidity on 3 occasions, ingesting either a sweet 6.4% carbohydrate (CHO) drink, a nonsweet 6.4% CHO drink, or water. Participants drank 8 mL/kg body mass immediately before each trial and 3 mL/kg every 15 minutes while cycling. Time to exhaustion was similarly increased (~14%) with each CHO solution compared with the water trial (mean = 128 minutes). Considering that glucose delivery or hydration status previously has been shown not to be responsible mechanisms for increased exercise capacity in the heat, it may be that CHO itself, rather than its sweetness, stimulates receptors in the mouth or the rest of the gastrointestinal tract to signal suppression of the brain's perception of fatigue.


Men and women were assigned to a creatine (CR) or a placebo (PL) supplementation group. For 6 weeks, the CR group unilaterally resistance-trained each side of the body 2 days/week, with one side immediately followed by 0.2 grams CR per kg body mass and the other side by PL. The PL group trained similarly, but received only placebo supplementation. The CR group had a greater increase in biceps thickness of the CR side than of the PL side, an increase that was greater than that of either side in the PL group. Also in the CR group, men had a greater lean tissue mass gain than did women. Single-limb bench-press and leg-press 1RM and bone mass did not change. There appears to be some selective hypertrophy in the upper-limb muscles with creatine supplementation immediately postexercise.


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**November 2005:**

Well-trained road cyclists who replaced part of their usual in-season training with jump training and high-resistance cycling sprints improved their sprint performance. What was the effect on endurance performance?


The concepts of ventilatory and lactate thresholds commonly are used to establish the maximal steady state power level. What easily measured variable could be used to predict these in competitive cyclists?


**February 2006:**

A bout of heavy eccentric actions resulted in elbow-flexor muscle damage in a group of athletes. When the eccentric exercise was repeated 3 days later, did it result in further damage?


Male triathletes' 3-km running time trial was highly correlated with their \( V_{O_2,\text{max}} \), \( V_{\text{max}} \) (peak treadmill speed), and speed at the lactate threshold. Which variable could be used to predict 3-km performance?


A supervised golf-specific strength, power, and flexibility program performed by National Collegiate Athletic Association Division I golfers increased clubhead speed. How did it affect putting distance control?


Professional soccer players were faster in a flying 20-m sprint when preceded by static or dynamic stretching. Which type of stretching also improved agility and 10-m sprint time?


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