



HIGHLIGHTS

From the

50TH

ANNUAL MEETING

of the **ACSM**

The latest research on preserving bone density, promoting weight loss, increasing muscular power, and using music to enhance workouts.

Walking Intensity and Bone Mineral Density

Fogleman, K.M., Borer, K.T., & Sowers, M.R. 2003. Walking intensity stimulates increases in BMD in post-menopausal women. *Medicine & Science in Sports & Exercise*, 35 (5, Supplement), Abstract 95.

Menopause is often associated with a loss in bone mineral density (BMD). Although exercise has been shown to increase BMD in postmenopausal women, the exact mechanism is presently unclear, as are the intensity and types of exercise that will elicit this response.

Purpose. To determine if walking can stimulate positive changes in BMD in postmenopausal women, and, if so, at what intensity these changes occur.

Methods. Eighteen postmenopausal women participated in a 15-week walking program. Subjects walked 2.84 kilometers (1.76 miles) a day 5 days a week at an intensity ranging from 90 to 134 percent of their ventilatory threshold (the “breakpoint” during exercise at which pulmonary ventilation and carbon dioxide production output begin to increase considerably). Dual-energy X-ray absorptiometry (DEXA) and blood draws were taken as biomarkers of bone formation activity at the beginning of the study and again 15 weeks into the study.

Results. BMD increased significantly in the subjects who exercised at intensities above 110 percent of their ventilatory threshold and decreased in subjects who walked at lower intensities.

Practical Application. This study adds to the growing body of research supporting the many health benefits of walking. The study conclusions suggest that walking less than 2 miles at least 5 days per week at a brisk pace and challenging intensity (14 to 15 or higher on the RPE scale) can lead to a significant improvement in BMD.

Exercise and Long-Term Weight Loss

Jakicic, J.M., et al. 2003. Dose of exercise to promote long-term weight loss in overweight adults. *Medicine & Science in Sports & Exercise*, 35 (5, Supplement), Abstract 578.

ACSM and the Centers for Disease Control (CDC) have established that approximately 150 minutes a week of moderate-intensity exercise is needed to attain health-related benefits. But the optimal dose response for long-term weight loss in overweight adults is yet to be determined.

Purpose. To examine whether the ACSM/CDC recommendations for exercise are sufficient for promoting long-term weight loss in overweight adults.

Methods. One hundred eighty-four sedentary women (age = 37 years, BMI = 32.6) completed 12 months of a behavior weight loss program that included 5 days a week of moderate- to vigorous-intensity aerobic exercise ranging from 30 to 60 minutes a day. A dietary intervention included behavior strategies to reduce calorie and fat intake.

Subjects were clustered into three groups according to their exercise time per week: (1) more than 200 minutes a week (min/wk); (2) between 150 and 200 min/wk; and (3) less than 150 min/wk.

Results. In the first 6 months, group 1 averaged 260 min/wk; group 2 averaged 176 min/wk; and group 3 averaged 125 min/wk. During months 7 to 12, group 1 averaged 269 min/wk; group 2 averaged 171 min/wk; and group 3 averaged 101 min/wk. No difference in intensity was seen between the groups. Percent weight loss was significantly greater in individuals performing more total work, as seen with the following weight loss percentages: group 1 = 15 percent, group 2 = 10 percent, and group 3 = 7 percent.

Practical Application. This study adds to recent investigations that suggest that for overweight clients to attain weight loss benefits, intervention strate-

gies should include a weekly total ranging from 150 to 269 minutes of aerobic exercise performed at moderate to vigorous intensity 5 days a week. In addition, dietary strategies to reduce total calorie and fat calorie intake need to be part of the intervention.

Improving Muscular Power in Older Adults

Henwood, T.R., & Taaffe, D.R. 2003. Beneficial effects of high-velocity resistance training in older adults. *Medicine & Science in Sports & Exercise*, 35 (5, Supplement), Abstract 1628.

With age and inactivity, the loss of muscular power is greater than the loss of muscle strength. Although much empirical evidence over the last few years has suggested that muscular power segments should be incorporated in resistance training programs for older adults, the research support for this type of protocol is lacking.

Purpose. To examine the effect of a high-velocity resistance training program on muscular power and functional performance in healthy men and women age 60 to 80 years.

Methods. For this 8-week study, 14 subjects were assigned to an exercise group, and 10 subjects were assigned to a control group. The exercise group trained 2 days a week on weight machines, performing three sets of eight reps for seven exercises at 35, 55 and 75 percent of each subject's one-repetition maximum (1 RM), using explosive concentric motions. The control group did not perform any resistance exercise.

Results. For the training group, muscle strength increased significantly—ranging from 21 to 81 percent on the knee extension and bench press. In addition, this group increased peak and average knee extension power at several isokinetic speeds from 16 to 33 percent of 1 RM; and increased peak and average bench press power at 55 and 75 percent of 1

RM. Significant improvements were also seen in this group (but not in the control group) in several functional performance tests, including floor rise to standing, chair rise, and lift and reach.

Practical Application. This study authenticates the value of protocols that many personal trainers around the country are already implementing with their older-adult clients. Explosive-style resistance exercise (in the concentric phase of a repetition), when introduced progressively and safely, results in significant improvements in muscular strength, muscle power and functional performance. The authors suggest that these improvements will help prolong functional independence and quality of life for an active older population.

The Effect of Music on Exercise Performance

Kirby, A.M., & Murphy, R.J.L. Does music alter performance and change perception of effort during exercise? *Medicine & Science in Sports & Exercise*, 35 (5, Supplement), Abstract 1592.

The use of music during exercise has commonly been associated with improved exercise adherence, enjoyment and psychological well-being. Research has suggested that the ergogenic effects of music are due in part to a “narrowed focus and decreased awareness of internal cues of fatigue . . . [which] could lead to lowered ratings of perceived exertion.”

Purpose. To investigate the effect of music on physiological and biomechanical variables and on the perception of effort during submaximal and maximal treadmill running.

Methods. Nine active females (age = 22 years) were assigned to each of two test conditions: a control group (no music) and a music group (in which exercise was accompanied by continuous music at 150 beats per minute). Oxygen consumption, heart rate, ventilation, respiratory exchange ratio (the ratio of carbon dioxide expired

to oxygen inspired), blood lactate, blood glucose, stride length, stride frequency and perceived exertion were measured during a 6-minute submaximal run and during a maximal run to exhaustion.

Results. During submaximal performance, the biomechanical, psychological and physiological variables measured were not significantly affected by music. However, when music was used during the maximal run, time to exhaustion was significantly longer, and the subjects' stride length increased while their stride frequency decreased. The authors note that this change in stride length and frequency positively affected the subjects' running economy, or efficiency of movement. Ratings of perceived exertion were also significantly lower at the end of the maximal run with the music accompaniment.

Practical Application. This is one of the most comprehensive physiological, psychological and biomechanical investigations to date examining the music-exercise connection. The authors suggest that music accompaniment has a significant effect on physiological, psychological and biomechanical variables during more vigorous exercise in young, active females. In addition, this study shows the importance of music at the end of a tiring workout; when it appears to have an ergogenic effect.

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