

# Effect Of Strength Training On Resting Metabolic Rate And Physical Activity: Age And Gender Comparisons.

---

Lemmer JT, Ivey FM, Ryan AS, Martel GF, Hurlbut DE, Metter JE, Fozard JL, Fleg JL, Hurley BF. Department of Kinesiology, College of Health and Human Performance, University of Maryland, College Park, MD 20742, USA.

## **OBJECTIVES:**

The purpose of this study was to compare age and gender effects of strength training on resting metabolic rate (RMR), energy expenditure of physical activity (EEPA) and body composition. Forty healthy sedentary subjects 10 young men (20-30 yr), 9 young women (20-30yr), 11 older men (65-75yr) and 10 older women (65-75yr) completed a 24 week whole body strength training program. To assess changes in RMR, EEPA and body composition 1 RM, DEXA, Vmax 229, physical activity monitoring and the Stanford Seven Day Physical Activity Recall questionnaire were employed before and after the 24 week ST program.

## **RESULTS:**

All groups exhibited a significant increase in 1 RM strength for all exercises. When all of the subjects were pooled together there was a 7% increase in absolute RMR in response to strength training. Additionally, ST increased absolute RMR by 7% in both the young ( $6,302 \pm 1,458$  vs.  $6,719 \pm 1,617$   $\text{kJ} \cdot \text{day}^{-1}$ ) and older ( $5,614 \pm 916$  vs.  $5,999 \pm 973$   $\text{kJ} \cdot \text{day}^{-1}$ ) groups, with no significant interaction between groups. In contrast, gender affected absolute RMR with men showing a 9% increase in absolute RMR while the women did not show any significant increases. When RMR was adjusted for fat-free mass, all subjects pooled together revealed a significant increase in RMR with ST. Again, however, men showed a significant increase in RMR while the women did not. EEPA and total energy expended did not change in response to ST for any group.

## **SUMMARY:**

The data revealed that changes in absolute and relative RMR in response to ST are not significantly influenced by age, but they are influenced by gender. In fact, the 7% increase in RMR of all groups when pooled is due largely to the 9% increase in RMR attributed to men only. In addition, the changes in FFM appear similar in both genders. Finally, this study showed that young and older men and women do not show an increase in EEPA outside of the ST sessions. The authors suggest that the difference in RMR between genders may be due to sympathetic nervous system adaptations.

## **KEISER PIECES USED:**

Leg Press, Leg Extension, Chest Press, Lat Pulldown, Shoulder Press, Tricep Pushdown, Leg Curl, Upper Back and Abdominal