



## P-03

# INTERVAL WALKING TRAINING OVER 10 YEARS PROTECTS AGAINST AGE-ASSOCIATED DECLINES IN PHYSICAL FITNESS

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Exercise training throughout a life is the most effective strategy to prevent an age-associated decline of physical fitness. We assessed the effects of 10-year continuation of interval walking training (IWT) in older people.

One hundred forty, 31, and 22 males (~68 years) and 321, 117, and 88 females (~63 years) started the IWT program in April of 2005, 2006, and 2007, respectively, and thereafter, 41, 13, and 7 males and 62, 21, and 16 females had continued the program without intermission until March in 2014, 2015, and 2016, respectively (the IWT group). During the periods, we instructed subjects to repeat  $\geq 5$  sets of 3-min fast walking at  $\geq 70\%$  of peak aerobic capacity for walking ( $VO_{2peak}$ ), followed by 3-min slow walking at  $\sim 40\%$   $VO_{2peak}$  per day, for  $\geq 4$  days/week. We measured  $VO_{2peak}$ , isometric knee extension and flexion forces before they started the program and every 6 months during the training. The target intensities for IWT were re-adjusted every 6 month according to the current  $VO_{2peak}$ . We confirmed that subjects having continued IWT over 10 years accomplished the above target throughout the period. For the control group, we adopted the measurements from 70 males and 221 females before starting the program every year regardless of their continuity of the training over the 10 years and averaged them crosssectionally every 2 years of the ages from 68 to 77 years for males and 62 to 71 years for females.

We found that in the control group, the thigh strength decreased linearly along with aging and the decreases were 30% in males and  $\sim 20\%$  in females from the baselines after 10 years. Similarly, the decreases in  $VO_{2peak}$  were  $\sim 20\%$  in males and females. In contrast, the thigh strength in the IWT group maintained the baselines during the following 10 years in males and females. Additionally, in the IWT group,  $VO_{2peak}$  increased by  $\sim 20\%$  for the first 6 month of the training and maintained the level during the following 9.5 years in males and females. As a result, the thigh muscle strength and  $VO_{2peak}$  in the IWT group were  $\geq 20\%$  and  $\geq 40\%$  higher than those of age-matched subjects in the control group after 10 years.

Thus, IWT over 10 years protected against age-associated declines in physical fitness in older people.

**Key words:** interval walking training; physical fitness; long-term effects; aging