

Nordic Pole Walking: Scientific Studies

The first research results on responses to pole walking training were published in 1992 by Stoughton, Larkin and Karavan from the University of Oregon. They studied psychological profiles (mood states) as well as muscular and aerobic fitness responses before and after 12 weeks of pole walking or walking training in sedentary women.

The study group consisted of eighty-six 20-50 year old women whose fitness was at moderate level. Maximal aerobic power (Vo2Max) varied between 34-37 ml/kg/min. The study group was divided into three sub-groups. The control group did not change their exercise habits.

Walking with poles groups walked 30-45 minutes four times a week at an intensity corresponding to 70-85% maximum heart rate for 12 weeks. In the poles group both the walking speed and the distance walked were slightly less than in the walking group.

In both intervention groups the maximal aerobic power and maximal treadmill time increased significantly. These increases were eight and 19% on an average. A slight increase in maximal ventilation occurred in the poles group. Muscular strength assessed using triceps pushdown and a modified lateral pull-down did not improve in either group.

Pole walkers showed significant improvements in depression, anger, vigor, fatigue, total mood disturbances and total body cathexis scores. It was speculated that the pole walking group may have felt more unique and special because of their opportunity to do a new and more enjoyable method of walking.

Nordic walking poles were also compared to the weighted vests, ankle weights, hand and wrist weights, weighted gloves and Powerbelts(TM) by Porcari (1999) with similar results as above.

Nordic walking increases energy expenditure when compared to regular walking

The physiological responses to walking with and without poles were studied by Hendrickson (1993) and by Porcari et al. (1997). Hendrickson's study group consisted of 16 fit women (VO2Max 50 ml/kg/min) and men (59 ml/min/kg). They walked with and without poles on a treadmill at speeds of 6-7.5 km/hr. There were no differences in the responses between males and females.

It was found that the use of poles significantly increased oxygen uptake, heart rate and energy expenditure by approximately 20% compared to walking without poles in fit subjects. In Porcari's study of 32 healthy men and women walking with poles, results were an average 23% higher oxygen uptake, 22% higher caloric expenditure and 16% higher heart rate responses compared to walking without poles on a treadmill. Rate of Perceived Exertion (RPE) values averaged 1.5 units higher with the use of poles and the pattern of responses were similar for men and women.

Rogers et al. (1995) compared energy expenditure during sub maximal walking with poles in ten 24 year old fit women. Mean maximal aerobic power (21 vs. 18 ml/kg/min) and heart rate (133 vs. 122 bpm) were significantly greater during walking with poles compared to walking without. Also the total caloric expenditure in a 30 minute session was significantly greater during pole walking (74 vs. 141 kcal). In contrast, RPE did not differ significantly between the two conditions.

Laukkanen (1998, unpublished) compared heart rate during normal and fast walking speeds with and without Exel Walker poles. Ten middle-aged men and women were studied on an indoor hall track. The heart rate increase, measured with telemetric Polar heart rate (HR) monitors was between 5-12 bpm and 5-17 bpm higher in men and women.

A dual-motion treadmill Cross Walk has been studied by Knox (1993), Foley (1994) and by Butts et al. (1995). The Cross Walk Dual Motion Cross Trainer is a motorized treadmill designed to increase the energy cost of walking by incorporating arm activity during walking, thus increasing the muscle mass used during exercise.

Knox studied thirty-seven 17-35 year old women and they all performed six 5 minute steady-state exercises with and without arm activity. Walking with arm activity significantly increased heart rate, ventilation, oxygen uptake and energy expenditure compared to walking without arm activity. For example, heart rate increased 17-31 bpm. Rating of perceived exertion as well as energy expenditure increased by an average of 14%. In Butt's study both the 24-year-old women and men were studied with a similar design. In this study arm work increased energy expenditure by 55% on an average compared to the regular walking, but only increased RPE slightly. This was consistent with the results from Foley, who did Cross Walking in 24-year-old men.

Nordic walking helps strengthen and tone upper body muscles

A Finnish study (Anettila et al. 1999) compared pole walking with regular walking training for 12 weeks in 55 female office workers. The EMG measurement showed that electrical activities of the muscles of the upper body, neck, shoulder and upper back were significantly higher when walking with poles. Pole walking training diminished neck and shoulder symptoms and subjective feelings of pain. Mobility of the upper body increased as well.

The most recent study published on Nordic walking compared metabolic cost of Nordic walking to normal walking in twenty-two 31-year-old men and women (Morss et al. 2001). Participants of this study walked on an outdoor 200 meter track with Cosmed K4b for oxygen analysis and Polar Vantage heart rate monitor for HR measurements. The study indicated significant increases in oxygen consumption (20% on average), caloric expenditure and HR in Nordic walking compared to normal walking. The range of increase was large, ie. oxygen consumption 5-63% indicating differences in poling intensity and technique. Perceived exertion did not differ between the walks. The same group also compared separately the metabolic cost of high intensity poling (Jordan et al. 2001). In high intensity poling Nordic walking increased HR 35 bpm on average compared to regular walking.

Summary

Based on research, walking with poles adds physiological strain to regular walking in both women and men and in fit and less fit individuals. Walking with poles seems to elicit improvements with slightly less speed. Because perceived exertion in pole walking is often less than true physiological strain, controlling heart rate may be beneficial for those who tend to overreach. Walking with poles improves mainly aerobic fitness, muscular endurance, decreases neck-shoulder area disabilities and pain, and can have positive effects on mood state. In order to improve muscle power, uphill walking is required. Pole walking affecting body coordination and motor fitness has not been published. Walking with poles is a safe and fun exercise mode and fits everybody.

This research summary was written by:

Raija Laukkanen
Ph.D., Docent
Director, Exercise Science
Polar Electro Oy
Finland

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The Cooper Institute

The Cooper Institute in Texas compared physiological responses of Nordic Walking to regular walking. The caloric expenditure and the oxygen consumption increase on an average with 20% and the heart rate increase with about 10 beats per minute when using Nordic Walker poles. The interesting thing is that even through the body works harder using the poles, the RPE (rated perceived exertion) was the same walking with or without poles!

Dr. Tim Church said, "Some individuals increased as much as 46% in oxygen consumption and just about the same in caloric expenditure."

Quotes from the study:

"Individuals who poled more intensely had higher oxygen consumption."

"There is potential for considerably more or less benefit depending on the selection of poling-off intensity. This may have particular significance for individuals who need to increase caloric expenditure but have walking speed limitations."

"Increased caloric expenditure with no corresponding increase in perceived exertion during Nordic Walking, may have important public health applications."

"The use of Nordic Walker poles is particularly promising, as the poles provide stability that may promote physical activity among older individuals and those with orthopedic and balance concerns."

T. Church, C. Earnest, G. Morss at The Cooper Institute,
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