# Nordic Walking: Introducing a New Low-Impact Exercise System for Cardiac Rehabilitation Patients

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Exercise training needs change with age, as the incidence of age-related degenerative conditions increases. High-impact aerobic exercise programs are not recommended for the elderly because of the risk of muscular skeletal injury.

Walking is one of the best forms of physical activity for the elderly and is low-impact, functional, safe and affordable.[1] However, walking as an aerobic exercise can have limitations and may not adequately challenge the circulatory system to achieve improvements in physical fitness and coronary artery risk factors. Many elderly patients are limited in their walking ability due to low fitness levels and age-related chronic diseases such as osteoarthritis. Nordic walking (NW) is a new way of walking with the help of specially designed walking poles. This alternative low-impact activity is easy to use and augments the benefits of walking.

## Nordic Walking History

Nordic walking was first discovered by cross-country skiers in Finland, who started using cross-country ski poles for off-season training. The cross-country ski poles, however, broke easily and were too long. Special walking poles that were more durable and flexible were developed in the 1970s and became a nationally approved training method in Finland. It is estimated that around 8 million people practice NW, mostly in Europe, and NW is quickly gaining popularity in Canada.

## Nordic Walking Benefits

Nordic walking simultaneously combines upper and lower body exercise training. With each stride, the walker applies force to the poles through the arms and thereby stimulates and improves muscle endurance in the arms, shoulders, upper back, chest and core muscles. The use of the poles increases the stride length, and this, in turn, leads to increased walking speed and oxygen consumption. It is estimated that oxygen uptake ($VO_2$) increases in the range of 20-49%, compared to walking without poles at same speeds.[2,3,4] The reason for such a wider range in $VO_2$ is that walking poles can be used at varying intensity levels. Heart rate (HR) has been shown to increase in the range of 7-14 bpm and blood pressure, 16/4 mmHg, while walking with the NW poles.[2,3,4,5] Nordic walking has been shown to improve functional capacity in the elderly population, as the use of the poles improves balance and stability, thus making it possible for the walker to increase walking duration. In addition, NW helps those with lower body joint pain and muscle weakness to walk more effectively. Nordic walking results in significant increases in metabolic demand without increasing perceived exertion.[4]

## Nordic Walking Training Program

Nordic walking can be easily incorporated into a cardiac rehabilitation (CR) exercise training program and tailored to meet individual patient needs. Poles can be used on indoor walking tracks, and after mastering the NW technique, patients can easily continue using poles outdoors, on covered walking tracks in the community, or even in shopping malls. The use of NW poles on treadmills is not recommended.

## Determining Pole Length

When deciding on pole length, several methods can be used: the height of the person in centimeters (cm) minus 50 cm; height in centimeters multiplied by 0.68; or having the person stand upright with elbows at a 90° angle and adjusting the poles so that the lower arms remain parallel to the floor. Other considerations when deciding on pole length include physical condition, mobility, and training goals. Elderly patients needing more support and stability may need a longer pole length. Patients wanting to work harder to increase upper body strength and increase HR response may want a slightly shorter pole.

## The Nordic Walking Technique

The ideal NW technique is to have the poles stay behind the body at approximately 40° angles. The upper body should maintain a slightly forward leaning posture. The arms and legs move in reciprocal fashion and swing forward and backward. The swing of the arms and the powerful placement of the poles on the ground have a strong effect on the length of the stride. When the movement of the poles is greater, the length of the stride, as well as the rotation of the pelvis and upper body, will increase. Better training results can be achieved by mastering the walking rhythm before using the NW poles.

## Modifications for Frail Elderly Patients

In the case of a frail elderly patient, the poles may be brought forward to improve balance and stability. The arms and legs still move in reciprocal fashion, but the placement of the poles should be less inclined, resulting in a lesser degree of trunk rotation.

## Warm-Up and Cool-Down

Warm-up and cool-down exercise periods should be included pre- and post-NW. Special attention should be paid on stretching lower-body musculature, including calf, hamstring, quadriceps, gluts and hip flexor. For the upper body, shoulder, arm, chest, and upper back stretches and side bends should be performed.

## Nordic Walking Case Study

**Patient:** A 78-year-old male with a past history of myocardial infarction and coronary bypass surgery (1983) enters CR following several recent percutaneous coronary interventions. Medical history also includes peripheral vascular disease, bilateral total hip replacements in 1996 and 1999, lumbar spine surgery in 1973 and right shoulder replacement in 1998. On entry to CR, the patient reported doing no physical activity and experiencing pain in the hips and lower back. The patient's walking and exercise tolerance were restricted by hip and lower back pain.

**Program and Results:** Nordic walking poles were introduced, and over the course of CR, the patient was walking 45 minutes with poles without discomfort. The patient reported liking NW poles immediately and experiencing dramatic improvements in hip pain. The patient commented that "walking was easier and I was able to walk faster easier with the poles." Exercise tolerance improved significantly when walking with the walking poles. Total walking distance on the 6-minute walking test improved by 36 meters, total metabolic equivalents improved by 0.2, percentage of predicted walk distance increased from 101% to 110%, and walking speed increased from 2.7 mph to 3 mph. Exercise HR increased by 8 bpm, systolic blood pressure by 22 mmHg and diastolic blood pressure by 4 mmHg. The patient-reported rating of perceived exertion level decreased from 3.5/10 to 3/10, and perceived breathlessness from 3/10 to 2/10. Right calf pain and left hip pain reported when walking were completely relieved while walking with poles.

## Research in Progress

A randomized, controlled research trial assessing the feasibility and effectiveness of NW protocol, compared to a conventional walking plus upper body strength training (WS) protocol in the lower-functioning congestive heart failure patient population, is underway in the Minto Prevention and Rehabilitation Centre of the University of Ottawa Heart Institute. As part of the study, a total of 50 patients will be randomly assigned to the NW and WS groups. Outcomes are assessed at the end of a 12-week intervention period and again in one year. Currently, a total of 22 patients have been enrolled in this study. Results of the study will be expected in the winter of 2009.

**References:**


1. American College of Sports Medicine. Exercise Testing and Prescription for Elderly People. In: ACSM's Guidelines for Exercise Testing and Prescription, 7th edition (2006). American College of Sports Medicine: Lippincott Williams & Wilkins.
2. Porcari JP, Hendrickson TL, Walter PR *et al*. The physiological responses to walking with and without power poles on treadmill exercise. *Res Q Exerc Sport* 1997;68:161-66.
3. Walter PR, Porcari JP, Brice G, Terry L. Acute responses to using walking poles in patients with coronary artery disease. *J Cardiopulm Rehabil* 1996;16:245-50.
4. Church TS, Earnest CP, Morss GM. Field testing of physiological responses associated with Nordic Walking. *Res Q Exerc Sport* 2002;73:296-300.
5. Rodgers CD, VanHeest JL, Schachter CL. Energy expenditure during submaximal walking with and without exerstriders. *Med Sci Sports Exerc* 1995;27:607-11.


# Psychosocial Issues and the Elderly – A Case Study


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"Psychosocial" is an umbrella term for the influence of social factors on an individual's mind or behaviour, and in this case presentation, within the context of health.[1] The following case is an example of what many multi-generational families face as they attempt to support their aging parents while navigating through the heathcare system.

## Case Presentation

Mr. H (age 88) and Mrs. H. (age 85) are an elderly couple who have been married for 15 years. This is their second marriage. Mr. H. has three children from a previous marriage and Mrs. H. has one; all of whom work, have adult children of their own, and reside within a 40 km radius of their