

NORDIC WALKING OR TRADITIONAL WALKING IN PATIENTS WITH INTERMITTENT CLAUDICATION: A CRITICAL REVIEW

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Abstract. *Regular exercises can improve walking distance and reduce physical impairment in patients with intermittent claudication. The objective of the research is to summarise and analyse the existing proof about the comparative effectiveness of Nordic walking and traditional walking in the improvement of health indicators in patients with intermittent claudication. Methods: The following online databases were used as sources for data collection: Ebsco, Science Direct, Clinical Key, ProQuest, Scopus. The selection of works of research was performed on the basis of key words “Nordic walking”, “intermittent claudication”, “walking with poles”, “Nordic walking and walking and intermittent claudication” and the year of publishing (that is, from 2005 till 2015). Inclusion criteria met four works of research that were included in the critical analysis. Results and conclusions: There is no proof about the superiority of the Nordic walking programme over traditional walking (and there exist indications about the superiority of the traditional walking programme) in the improvement of health indicators, but patients with intermittent claudication feel less discomfort during Nordic walking and they can cover a longer distance by using poles.*

Keywords: *intermittent claudication, Nordic walking, traditional walking.*

Introduction

The narrowing of peripheral blood vessels in legs, caused by atherosclerotic changes, significantly limits blood circulation in muscles during walking and leads to cramping pain in muscles of calf during walking (intermittent claudication). It is proven that regular home-based exercising can improve walking distance and reduce physical impairment in these patients (Li et al., 2014). Unfortunately, the compliance of this group of patients in training programmes is very low due to fear of provoking pain, as well as due to the age and other lifestyle factors. Therefore, it is essential to identify such physical activities that would be popular in society and that would cause less painful symptoms, thus motivating the enrolment of patients. One of such activities is Nordic walking that has gained popularity in many countries (including Latvia) among various age groups.

The objective of the research is to summarise and analyse the existing proof about the comparative effectiveness of Nordic walking and traditional

walking in the improvement of health indicators in patients with intermittent claudication.

Material and Methods

The following online databases were used as sources for data collection: Ebsco, Science Direct, Clinical Key, ProQuest, Scopus. The selection of works of research was performed on the basis of key words “Nordic walking”, “intermittent claudication”, “walking with poles”, “Nordic walking and walking and intermittent claudication” and the year of publishing (that is, from 2005 till 2015). The next step was the review of research titles with an aim to select the ones that corresponded to the theme, and duplicates, systematic or critical reviews and incomplete texts were excluded; researches that were not in English, were not chosen, too. The next step was a review of research summaries with an aim to select the ones that correspond to the set inclusion criteria: the analysis of patients with intermittent claudication (peripheral arterial disease was confirmed using the ankle-brachial index (ABI) (≤ 0.90) or vascular laboratory doppler evaluation), objective tests were carried out with an aim to assess and perform a comparative analysis about the effectiveness of Nordic walking and traditional walking.

Data about the training methods applied in Nordic walking and traditional walking have been summarised and analysed (the length of training sessions, their frequency and intensity, the total length of the training programme, as well as supervision and the compliance of patients), as well as the methodology of traditional walking used in the comparative analysis. The measurements (tests) of objective and subjective results, used in the works of research, were also summed up, as well as the described results about exercise testing (absolute walking time, initial claudication time), indices of cardiopulmonary work (as peak oxygen consumption), ABI, gastrocnemius muscle tissue oxygenation (StO₂), pain and perceived physical impairment.

The assessment available in PEDro database was used for the quality assessment of the analysed works of research. This assessment relates to two aspects of quality: reliability and the interpretation possibilities of the research. Credibility is evaluated according to random and hidden selection, the initial comparability, unknown participants, therapists and evaluators, adequate examination and the analysis of “intention to treat”. The question whether the research can be interpreted is assessed according to the comparativeness of groups, the report on points and the changeability of calculations. The assessment is performed by independent experts. One point is given for the correspondence with each criterion, but the correspondence of the research itself is not assessed according to the points; therefore the maximum number is 10 on the 11-points scale.

Results

During the selection 7 works of research were chosen on the basis of the titles (the first step), after the analysis of their summaries, 3 works of research were excluded (two of them did not include a comparative analysis between Nordic walking and traditional walking, and one research was an overview of bibliographical sources). As a result, four works of research were included in the critical analysis: two of them was performed by a group of researchers in the USA (Collins et al. (2012)¹ and Collins et al. (2012)²) and two of them were works of two groups of researchers in the United Kingdom (Oakley et al. (2008) and Sparfford et al. (2014)).

For three works of research included in the analysis quality was assessed in the PEDro database; this proves that both researches of Collins et al quality can be assessed as medium and high (that is, Collins et al. (2012)¹ 5 (10) points), but Collins et al. (2012)² 6 (10)), whereas research of Sparfford et al. (2014) is valued as medium (4 (10) points). It should be noted that the lack of unknown participants, therapists and evaluators lowered the quality for all three works of research.

The number of participants and general characteristics

In total 85 patients were included in the research of Collins et al. (2012)¹ (n=45 in the Nordic walking group, n=40 in the traditional walking group; 93% were men and the average age of patients was 69.4±9.1 years (in the Nordic walking group the average age was higher 71.7±9.2, p=0.012)). Whereas, in the second research of this group of researchers 103 patients were included at the beginning, but in the final analysis data was summarised about n=34 patients of the Nordic walking group and n=43 patients of the traditional walking group (94% were men and the average age of patients was 69.7±8.9 years (the average age was higher in the Nordic walking group, p<0.05)).

The number of participants in both works of research carried out in the United Kingdom was comparatively lower: initially 52 patients were included in the research of Spafford et al. (2014), but only 38 patients were involved in the final analysis (n=19 in each group; the average age 65±2 years; there is no data about the gender proportion for the analysed group). 21 patients were analysed in the research of Oakley et al. (2008) (men, the average age 70 years (from 57 to 79)).

On average about 30-35 % of patients (in 3 works of research and 17% of patients(in 1 research) were smokers (active) and the average weight index of patients in various works of research ranged from 27.8 to 29.0, ABI in a peaceful position indicated on average from 0.61 to 0.63 (±0,11).

Training methodology for Nordic walking and traditional walking

In the research of Collins et al. (2012)¹ Nordic walking was organised 3 times a week for 12 weeks. At the beginning patients were trained how to apply the techniques of Nordic walking, during the training process the techniques

were supervised and corrected. The interval method was applied in the training programme, by using low to medium intensity load at the beginning of the programme and by progressing to medium and high intensity load at the end of the programme. The training intensity was dosed according to the heartbeat frequency that was measured during the treadmill test by determining the maximum usage of oxygen. The training length and intensity were adjusted every three weeks: at the beginning 30 minutes (20% low, 60% medium, and 20% high intensity), and in the 10th-12th weeks: 55 minutes (10% low, 45% medium, and 45% high intensity). The training programmes were organised as follows: 2 times a week on the treadmill and once a week outdoors or in the corridor.

In the research of Collins et al. (2012)² Nordic walking was organised 3 times a week for 24 weeks. The interval method was applied in the training programme: at the beginning 30 minutes (20% low, 60% medium, and 20% high intensity) and gradually till the 24th week the timing reached 60 minutes (10% low, 35% medium, 50% high, and 5% very high intensity). The training programmes were organised on the treadmill or outdoors in case of favourable weather conditions.

In both researches of Collins et al. the supervised training regime was applied. In the research of Spafford et al (2014) patients were trained and instructions were provided to perform individual training at home at least 30 minutes 3 times per week for 12 weeks (the execution was controlled with a pedometer and a diary), the patients were motivated and supported by telephone calls of the physiotherapist once a week, as well as the patients were controlled every 4 weeks.

In the research of Oakley et al. (2008) the immediate effect of Nordic walking was examined in comparison with traditional walking, so patients were trained how to apply the Nordic walking techniques, did some exercising and performed Nordic walking on the treadmill with the speed of 3.2 km h⁻¹ and inclination of 4%.

In all works of research the traditional walking was dosed and applied identically to Nordic walking, but without the use of the Nordic walking equipment and techniques. In the research of Oakley et al. (2008) that examined the immediate effects, 15 minutes of rest was given between the both tasks (Nordic walking and traditional walking).

Changes in health indicators as a result of the comparison of Nordic walking and traditional walking

When analysing the changes of health indicators by comparing the influence of Nordic walking and traditional walking, the research of Oakley et al. (2008) was reviewed in particular, as it explored the immediate effects of both activities, whereas other three works of research analysed the long-term training programmes.

The research of Oakley et al. (2008) demonstrates that during Nordic walking, in comparison with traditional walking, the distance walked before the onset of claudication pain ($p < 0.001$) and the maximum walking distance ($p < 0.001$) increased, as well as the pain intensity is comparatively lower at the maximum walking distance. Significant differences can be identified in several indices of cardiopulmonary work, that is, during Nordic walking oxygen consumption and the minute volume of expired air was comparatively higher, however the assessment of effort at the maximum load did not differ. No credible difference was noted in the ABI decrease after both types of activities.

The main results of the effectiveness of the long-term Nordic walking and traditional walking programmes in patients with intermittent claudication are summarised in Table 1.

Table 1. The comparative effectiveness of the long-term Nordic walking (NW) and traditional walking (TW) programmes

	Collins et al. (2012)¹	Collins et al. (2012)²	Spafford et al. (2014)
Training programmes	12 weeks Supervised	24 weeks Supervised	12 weeks Home-based
Absolute walking time	Greater ↑ in TW ($p=0,002$)	Greater ↑ in TW ($p=0,037$)	-
Initial claudication time	No difference	No difference	-
Maximal walking distance	-	-	No difference
Claudication distance	-	-	No difference
ABI	No difference	-	No difference
Peak oxygen consumption	No difference	-	-
Time walked to nadir StO ₂ *	Greater ↑ in TW ($p=0,002$)	No difference	-
Physical impairment**	-	No difference	-

**the percentage of hemoglobine oxygen saturation in gastrocnemius muscle tissue measured by near-infrared spectroscopy*

***perceived physical function measured by SF-36 scale and Walking Impairment Questionnaire*

In the research of Collins et al. (2012)² the characteristic measurements (such as step length, forward velocity, cadence, and ground reaction force) were analysed for part of patients, but no differences among the groups were identified after six weeks.

All three works of research confirmed high compliance of patients in both types of groups (in Nordic walking and traditional walking).

Discussion

All examined works of research confirm the positive influence of regular, long-term physical activities in patients with intermittent claudication, as the results demonstrate and validate that both programmes (Nordic walking and traditional walking) significantly increase the covered distance until the moment of occurrence of pain, as well as the total walked distance. These improved results are explained by the increase in the number of capillaries in calf muscle (Wang et al., 2009) and, as the results of Collins et al. (2012)¹ research suggest, the walking exercise improves muscle tissue oxygenation, as well as a notable role is played by the increase of general cardiovascular endurance.

Both works of research carried out in the USA (medium and high quality, randomised works of research), in which 12 and 24 weeks supervised training programmed were applied, confirmed that better results in respect of the absolute walking time on the treadmill test (and one research also showed longer time till reaching nadir oxygenation values) were obtained by applying traditional walking. The authors note that it should be taken into account that the training load was dosed according to the heartbeat frequency, however it is possible that the upper extremities were used in the Nordic walking group and leg muscles were involved less actively, thus reaching the load intensity. Also, during the training on the treadmill, using the walking poles, patients could not hold on to arm supports; this increased fear of falling down thus augmenting the heartbeat frequency and providing false information about the load intensity. The authors also noted that the results could be influenced by comparatively older age of patients in the Nordic walking group, although this factor was taken into account during the statistical processing of data.

In the research of Spafford et al. (2014) (medium quality, randomised works of research) that examined independent training sessions, no significant differences between the groups were identified. However, both in this research and the work of Oakley et al. (2008), when analysing the immediate effects of Nordic walking and traditional walking, it is confirmed that by walking with the poles patients with intermittent claudication can cover a longer distance and pain in legs appear comparatively later.

Conclusions

Although there is no proof about the superiority of the Nordic walking programme over traditional walking (and there exist indications about the superiority of the traditional walking programme), it should be taken into account that Nordic walking is becoming more and more popular, thus patients can be motivated to join this activity, as well as patients with intermittent claudication feel less discomfort during Nordic walking and they can cover a longer distance: these factors could promote compliance and the experience of positive activities.

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