

# Endurance training nordic walking model for university students: tests and benefit analysis

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## Abstract

**Objective of the study** was to offer and test benefits of an endurance training Nordic walking model in application to university students.

**Methods and structure of the study.** We sampled for the new endurance training Nordic walking model testing study (run at Ural Federal University in 2018 to 2021) the Ural Federal University students (n=54, 27 boys and 27 girls) from the non-physical education departments, with the endurance training Nordic walking model tested as complementary to the regular physical education service. Practical Nordic walking trainings included combinations of different practices (standard Nordic walking in a few versions; dorsal muscle group training and physical conditioning practices with sticks; postural control practices etc.). Endurance was tested by the 3km Nordic walking tests (six tests for three years run on a pre- versus post-year basis).

**Results and conclusion.** The three-year endurance training Nordic walking model in application to university students was tested beneficial as verified by the significant gender group progress in the 3km Nordic walking tests. The gender gap in the progress tests demonstrates the need for the Nordic walking model to be prudently customized and individualized for the students' actual progress needs, health and challenges.

**Keywords:** *Nordic walking, endurance, physical activity, cyclic training.*

**Background.** Nordic walking is getting increasingly popular the world over since it offers, as compared to the standard walking practices, coordination-intensive physical activity [1] beneficial for many key physical qualities for many age groups including university students. Benefits of any sports practices are known to maximize when they are specific enough i.e. focused on the key physical qualities and skills need to be trained. Modern Nordic walking is commonly ranked with the cyclic sports that facilitate progress in general and special endurance, whilst endurance in its turn is critical for success in everyday living, professional service including sports as it improves working capacity on the whole [3, 4, 5].

Endurance is commonly trained by cyclic exercises taking fairly long time, with Nordic walking ranked high among them. However, actual benefits of the Nordic walking models for different age groups still need to be further explored. The accessible Russian and foreign

study reports on the subject are basically centered on the health and physical conditioning benefits of different Nordic walking practices for senior groups [2, 6, 7]; whilst modern Nordic walking models applicable in the endurance training service for university students still deserve special studies.

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**Methods and structure of the study.** We sampled for the new endurance training Nordic walking model testing study (run at Ural Federal University in 2018 to 2021) the Ural Federal University students (n=54, 27 boys and 27 girls) from the non-physical education departments, with the endurance training Nordic walking model tested as complementary to the regular physical education service. Practical Nordic walking trainings included combinations of different practices (standard Nordic walking in a few versions;

**Table 1.** Endurance rating 3km Nordic walking test data (min): boys group

Indices	Pre-year 1	Post-year 1	Pre-year 2	Post-year 2	Pre-year 3	Post-year 3
$\bar{x}$	24,4	23,8	23,2	22,7	21,9	21,1
$\sigma$	1,7	1,6	1,6	1,4	1,4	1,2
mx	0,3	0,3	0,3	0,3	0,3	0,2
V	6,9	6,8	6,7	6,3	6,3	5,6

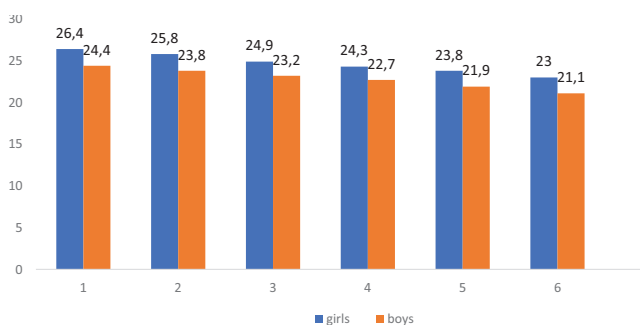
**Table 2.** Endurance rating 3km Nordic walking test data (min): girls group

Indices	Pre-year 1	Post-year 1	Pre-year 2	Post-year 2	Pre-year 3	Post-year 3
$\bar{x}$	26,4	25,8	24,9	24,3	23,8	23,0
$\sigma$	2,1	1,8	1,8	1,6	1,5	1,3
mx	0,4	0,3	0,3	0,3	0,3	0,2
V	7,8	6,9	7,2	6,6	6,1	5,7

dorsal muscle group training and physical conditioning practices with sticks; postural control practices etc.). Endurance was tested by the 3km Nordic walking tests (six tests for three years run on a pre- versus post-year basis).

**Results and discussion.** Tables 1 and 2 hereunder give accounts of the students' progress in the endurance rating 3km Nordic walking tests. Note that the Student t-test found the 1-year group progress insignificant ( $t=1.3$  and  $t=1.2$  for the boys and girls groups respectively). Later on till the end of the study the yearly progress was tested significant ( $p < 0.001$ ).

The significant progress demonstrated by both gender groups in the endurance training Nordic walking model testing study may be interpreted as indicative of the model benefits for the endurance training (Fig. 1). Note that the boys' group progresses were significantly higher than the girls' group ones (with  $t$  ranging from 3.9 to 5.8).

**Figure 1.** Gender group progress in the endurance rating 3km Nordic walking test, min

**Conclusion.** The three-year endurance training Nordic walking model in application to university students was tested beneficial as verified by the significant gender group progress in the 3km Nordic walking tests. The gender gap in the progress tests demon-

strates the need for the Nordic walking model to be prudently customized and individualized for the students' actual progress needs, health and challenges.

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