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Effects of a regular motor activity on somatic and fitness variables in boys aged 17 – 18 years

Joanna Piotrowska

Warsaw Academy of Tourism, Food and Hospitality, Warsaw, Poland

Summary

Study aim: To assess the somatic and fitness changes in semisedentary boys persuaded to undertake Nordic Walking activities throughout a school year.
Material and methods: Two groups of schoolboys aged 17 – 18 years were studied: regularly attending physical education (PE) classes (Group A; n = 46) and those who avoided PE classes by submitting sick note ors excuses signed by parents (Group N; n = 29). The latter ones undertook Nordic Walking training (3 sessions a week throughout the school year). Group A undertook no motor activities except regular PE classes. At the beginning (Pre) and at the end of the study (Post) all boys were subjected to 7 fitness tests: 50-m run (50 m), shuttle run 4×10 m (SR4), 1000-m run (LDR), sit-ups (SUP), standing broad jump (SBJ), pull-ups (PUP) and stand-and-reach (STR).
Results: Mean Post-Pre changes in Group N evidenced significant improvements, compared with Group A, in most studied variables – body mass, body fat content, 50-m dash velocity, PUP, SUP, STR, SR4 velocity, no significant, unfavourable changes being noted.
Conclusions: Nordic Walking, being an attractive form of activity, may be an easy way to encourage people to undertake motor activities thus improving the health status.

Key words: Nordic Walking – Motor fitness – Physical activity

Introduction

Motor activity, directed at health-related fitness, needs not be intense but ought to shape sport habits from the earliest age as these carry over the effects to the adult age [9,10] and such activities are known to represent preventive measures against many a disorder [4]. Abstaining from motor activities restricts a normal functioning of young individuals and optimal functioning of adults [6,10]. Yet, children and youths lead nowadays increasingly more sedentary life and the sedentary activities reduce the motor activities beyond the required level [10]. According to the National Health Project (2007 – 2015) [3], only about 30% of children and youths meet the motor activity requirements; that problem was, however, reported also for other countries [6]. This is the result of upbringing children without prompting them to undertake motor activities which, in turn, leads to a high percentage of schoolchildren avoiding motor activities despite their being obligatory.

Among the recently fashionable motor activities is Nordic Walking that becomes increasingly popular as it may be practiced at practically every age [2,5], even by those with disabilities. That activity, when properly performed, engages up to 90% of muscles; an appropriate engagement of shoulders and arms protects from falling and reduces the load exerted on the spine and on the ankle, knee and hip joints [4,8].

Students of upper secondary schools select the lifelong sports or resign from motor activities for various reasons, including laziness. Since the activity schedule in Nordic Walking is so designed as to bring about improvements in body composition, motor coordination, strength and agility, and is attractive for both individual and group practicing, it seems extremely well suited to attract those who habitually abstain from physical activities. The aim of this study was thus to assess the somatic and fitness changes in sedentary or semisedentary young men, aged 17 – 18 years, persuaded to undertake Nordic Walking throughout a school year.

Author's address Dr Joanna Piotrowska, Chodakowska 50, 03-816 Warsaw, Poland
joanna_piotrowska@onet.eu

Material and Methods

Two groups of schoolboys aged 17 – 18 years volunteered to participate in the study: Group A (n = 46), consisting of boys regularly attending physical education (PE) classes, and Group N (n = 29), who avoided PE classes by submitting sick note ors excuses signed by parents. Boys from that latter group were suggested to receive a credit for PE classes by attending a Nordic Walking project financed by local municipality in 2009, aimed at popularising that form of motor activity among youths. The project lasted one school year and consisted of three 45-min sessions a week. The sessions included walking at a distance averaging 5.2 km at an average velocity of 5.6 km/h, as well as strength and coordination exercises. Sports Tracker software was used to measure the distance and velocity via mobile phone equipped with GPS module and GPS Garmin Forerunner 310 XT (Taiwan) device. The project included also competitive walking at 2-km distance.

Boys from Group A attended only the curricular PE classes consisting predominantly of training team sports (volleyball, basketball, football, unihockey). Total time spent on motor activities was in both groups alike, the only reason of absence being illness. None of the boys from both groups undertook any other motor activities.

The boys were examined twice: in September, after having returned from vacation (Pre), and in June, at the end of the school year (Post). All boys were subjected to 7 tests from the International Fitness Test battery: 50-m run (50 m), shuttle run 4×10 m (SR4), 1000-m run (LDR), sit-ups (SUP), standing broad jump (SBJ), pull-ups (PUP) and stand-and-reach (STR). The results of running tests were converted to velocities (m/s). Body composition was assessed by BIA technique using the Tanita TBF-300A (Japan) device.

Student's *t*-test for dependent data was used to assess the Post-Pre differences. The data were also standardised against Polish population data by employing age functions of the respective means and standard deviations [7]. The level of $p \leq 0.05$ was considered significant.

Results

The results of the study are presented in Table 1 and in Figs. 1 and 2. Figure 1 shows multivariate profiles of both groups, i.e. standardised against Polish population data, at the beginning of the study (Pre). As compared with the Polish population of male youths, those from this study were markedly inferior in SBJ, LDR, PUP and STR but superior in 50-m dash, SR4 and SUP. With respect to BMI, over 60% of boys from both groups were within normal limits and only two boys were obese.

Table 1. Mean values (±SD) of somatic and fitness variables and of the Post-Pre changes (Δ) in boys aged 17 – 18 years

Group	N (n = 29)		A (n = 46)	
Variable	Pre	Δ	Pre	Δ
Body mass (kg)	74.1 ± 13.3	-0.1 ± 2.5	68.5 ± 12.5	4.0 ± 2.6 ^{ooo}
BMI	22.4 ± 3.5	0.0 ± 1.1	21.6 ± 3.2	1.3 ± 4.0 ^{o}
Body fat content (%)	11.8 ± 5.6	-0.8 ± 1.0 ^{ooo}	9.3 ± 3.2*	1.4 ± 2.3 ^{ooo}
Body water (%)	62.6 ± 6.2	1.9 ± 2.2 ^{ooo}	64.8 ± 10.0	-0.2 ± 3.2
50-m run (m/s)	6.83 ± 0.43	0.08 ± 0.15 ^{oo}	6.92 ± 0.41	-0.14 ± 0.24 ^{ooo}
SBJ (cm)	197 ± 26	-1.0 ± 7.6	202 ± 22	-2.5 ± 4.7 ^{oo}
LDR (m/s)	3.77 ± 0.50	0.03 ± 0.17	3.82 ± 0.45	-0.07 ± 0.27
PUP (s)	6.72 ± 5.05	0.62 ± 1.93	8.52 ± 5.76	-1.41 ± 1.41 ^{ooo}
SR4 (m/s)	3.85 ± 0.25	0.02 ± 0.06	3.90 ± 0.23	-0.05 ± 0.06 ^{ooo}
SUP (n)	28.9 ± 5.4	0.0 ± 1.9	29.9 ± 4.4	-1.8 ± 1.4 ^{ooo}
STR (cm)	-2.0 ± 8.7	1.1 ± 1.7 ^{oo}	3.6 ± 6.9**	-1.0 ± 1.2 ^{ooo}

Legend: SBJ – Standing broad jump; LDR – Long-distance run (1000 m); PUP – Pull-ups; SR4 – Shuttle run (4×10 m); SUP – Sit-ups; STR – Stand-and-reach; Significantly (p<0.01) different from Group N: * $p<0.05$; ** $p<0.01$; Significant Post-Pre changes: ^{o} $p<0.05$; ^{oo} $p<0.01$; ^{ooo} $p<0.001$

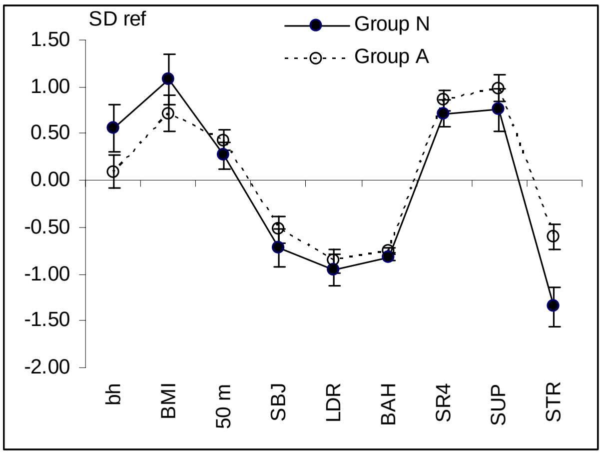

Fig. 1. Mean values (±SE) of somatic and fitness variables standardised against Polish population of male youths (X-axis)

Legend: bh – Body height; 50 m – 50-m run (velocity); SBJ – Standing broad jump; LDR – Long-distance run (1000 m; velocity); PUP – Pull-ups; SR4 – Shuttle run (4×10 m; velocity); SUP – Sit-ups; STR – Stand-and-reach

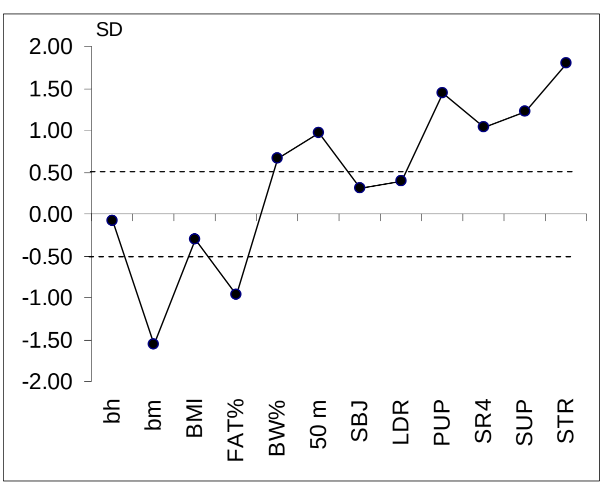

Fig. 2. Multivariate profile of Group N standardised against Group A ("control")

Legend: bh – Body height; bm – Body mass; BW – Body water content; 50 m – 50-m run; SBJ – Standing broad jump; LDR – Long-distance run (1000 m); PUP – Pull-ups; SR4 – Shuttle run (4×10 m); SUP – Sit-ups; STR – Stand-and-reach; Dotted lines correspond to $p<0.05$

It is worth noticing that boys from Group A ("control") had lower body fat content at the beginning of the study than their sedentary mates. Yet, at the end of the school year, the control boys significantly gained in body mass, BMI and body fat content while boys from Group N significantly lost body fat. In effect, no significant between-group differences were noted post-study in any variable, except flexibility (STR), boys from Group N remaining significantly ($p<0.05$) inferior to Group A boys (by 3.5 cm on the average).

On the other hand, when considering the effects of regularly practicing Nordic Walking throughout a school year, significant improvements (body fat content, by nearly 7%; 50-m dash velocity, by 1%) or a lack of significant changes (body mass, BMI, SBJ,PUP, SR4, SUP) were noted in contrast to the A-group, in which no significant improvement was observed in any variable studied. Moreover, in that latter group significant, unfavourable changes were noted in all fitness variables except LDR and in the somatic ones (body mass, BMI, body fat content) as shown in Table 1.

In Fig. 1 are shown changes recorded in Group N standardised against those in Group A. Thus, the changes are expressed in SD units of the respective individual Post-Pre changes in Group A. Mean changes in both groups did not differ significantly only in case of body height, BMI, SBJ and LDR. All other changes evidenced a significant improvement in Group N.

Discussion

The nearly adult students who led a semisedentary life and avoided regular PE classes but consented, upon persuasion, to undertake Nordic Walking activities throughout a whole school year, exhibited marked improvement not only in their fitness but in their body composition as well. That improvement could be attributed to the specificity of Nordic Walking, i.e. engagement of almost all muscles that enabled a more intense workout at a lower perceived fatigue [1,5]. It should be emphasised that although a significant improvement in that group (N) was noted only for the 50-m dash (speed) and for the stand-and-reach test (flexibility), the training-induced changes in Group N showed significant improvements in all variables except BMI and SBJ when compared with Group A that could be regarded as a reference, control group.

The deviations in several fitness variables in relation to the respective population means could be due to local specificity, like daily habits at school and at home, since representative cohorts studied every decade showed no such deviations [6]. The observed deviations may also point to the need of modifying the curricular PE classes and of promoting non-sedentary life styles. The results presented for Group N and the experience in running Nordic Walking sessions with those youths, seem highly promising. It would be interesting to assess the motivation of those boys who seemed truly committed to those activities. It is also necessary to conduct repeated studies in order to assess the long-term engagement and persistence. Nordic Walking, with its motor novelty is very well suited to attract people of any age.

Summing up, Nordic Walking, being an attractive form of activity, may be an easy way to encourage people to undertake motor activities thus improving their motor fitness and a general health status.

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