

VALIDITY AND RELIABILITY OF “STEP COUNT” FUNCTION OF THE ACTITRAINER ACTIVITY MONITOR UNDER CONTROLLED CONDITIONS

Filip Neuls

Faculty of Physical Culture, Palacký University, Olomouc, Czech Republic

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When assessing human physical activity, numerous objective measuring devices, such as accelerometers, pedometers, heart rate monitors, etc. are involved. The ActiTrainer is a new multifunctional monitoring tool putting all these functions together. The main purpose of this study was to realize standardizing measures of the pedometer (“step count”) function of the ActiTrainer under controlled conditions of walking and running and to contribute to the verification of the potentials of this device for physical activity assessment. Performance of the ActiTrainer as a step counter was evaluated against the actual number of steps taken during those two stages of locomotion. Reliability was estimated by: 1) comparison of two ActiTrainer units worn simultaneously on the right and left hip, and 2) comparison of the ActiTrainer with the previously verified Yamax Digiwalker SW-700 pedometer. The sample consisted of 20 volunteer subjects. All subjects covered a distance of 1 kilometer on the hard surface of a 400 meter long athletic oval in two stages (walking and running), while keeping a prescribed pace of locomotion. Each subject wore four devices (one ActiTrainer and Yamax unit on the right and on the left hip). When detecting steps under given controlled conditions, accuracy of the ActiTrainer was very high. Values of Pearson’s r expressing the relationship between actual and device measured steps ranged from 0.96 to 0.97. Marginal counts of steps measured by ActiTrainer did not exceed a difference of 0.3% from the actual steps taken. Also inter-instrumental (right vs. the left side) and equivalence (ActiTrainer vs. Yamax) correlations were favorably strong. As a step counter, the ActiTrainer seems to be a promisingly accurate monitoring tool.

Keywords: Physical activity monitoring, walking, running, pedometer, accuracy.

INTRODUCTION

An accurate assessment of physical activity is an important means for a variety of applications in public health research. The physical activity assessment in various subgroups of the population requires a choice of adequate and sufficiently valid methods of measurement. Contemporary methodology of the physical activity assessment offers tens of objective and subjective methods intended for laboratory and field monitoring, particularly direct and indirect calorimetry, doubly labeled water (DLW), motion sensors (e.g. accelerometers, pedometers), heart rate monitors, direct observation or a variety of questionnaire and log techniques (Montoye, Kemper, Saris, & Washburn, 1996). The selection of a concrete method depends on the objectives of a research project, the size and characteristics of the sample (age, sex, health status, employment, level of fitness), budget estimates of research, etc.

Continuously, in addition to standardized methods used on a long term basis, new technologies intended for both the research field and individual use are being developed. The ActiTrainer Activity Monitor is one of the newest multifunctional tools, which is presented

as being “revolutionary” (www.actitrainer.com). The term “revolutionary” is grounded in the fact that the ActiTrainer is the first and only 24 hour monitoring tool available that accurately measures (The ActiGraph, 2007): calories burned, heart rate (together with the Polar Wearlink® heart monitoring strap), intensity level, pace/distance traveled, step count, nighttime awakenings and sleep efficiency. Primarily, the ActiTrainer technology is based on the ActiGraph accelerometer with additional functions.

The ActiGraph accelerometer (formerly manufactured under the makes CSA and MTI) belongs among devices often involved in validation studies under laboratory and free living conditions in various groups of adults (Ainsworth, Bassett et al., 2000; Bassett et al., 2000; Brage, Wedderkopp, Franks, Andersen, & Froberg, 2003; Hendelman, Miller, Baggett, Debold, & Freedson, 2000; King, Torres, Potter, Brooks, & Coleman, 2004; Melanson & Freedson, 1995; Metcalf, Curnow, Evans, Voss, & Wilkin, 2002; Nichols, Morgan, Chabot, Sallis, & Calfas, 2000; Sirard, Melanson, Li, & Freedson, 2000; Strath, Bassett, & Swartz, 2003; Swartz et al., 2000; Welk, Blair, Wood, Jones, & Thompson, 2000; Welk, Schnaben, & Morrow, 2004) and children/adolescents

(Brage, Wedderkopp, Andersen, & Froberg, 2003; de Vries, Bakker, Hopman-Rock, Hirasings, & van Mechelen, 2006; Eisenmann et al., 2004; Ekelund et al., 2001; Kelly et al., 2004; Kelly, Reilly, Grant, & Paton, 2004; Puyau, Adolph, Vohra, & Butte, 2002; Trost et al., 1998; van Coevering et al., 2005) or tested mechanically (Brage S., Brage N., Wedderkopp, & Froberg, 2003). A recent independent evaluation of accelerometry data has shown the ActiGraph to be the most accurate commercially available device to assess daily physical activity (Plasqui & Westerterp, 2007). The study compared data collected by eight commonly used accelerometers against the DLW technique, which is considered to be the most accurate measure of energy expenditure under free living conditions. The study concluded that the ActiGraph was the only commercially available monitor that showed positive correlation with the DLW derived results.

This study is oriented to how accurate the ActiTrainer, an ActiGraph derivative, would be as a step counter. The function of a pedometer was chosen because of 1) an increase in "research interest" in pedometers, 2) the fact that walking prevails in habitual physical activity and 3) the relatively easy availability of standardized means for evaluation.

OBJECTIVES AND RESEARCH QUESTIONS

The main purpose of this study was to realize standardizing measures of the pedometer ("step count") function of the multifunctional monitoring device ActiTrainer under controlled conditions of walking and running and to contribute to the verification of the potential of this device for physical activity assessment.

The secondary purposes were: 1) to determine the validity of the pedometer function of the ActiTrainer device under controlled conditions against a criterion of an actual number of steps; 2) to determine the inter-instrumental reliability of the ActiTrainer device under controlled conditions via comparison of two devices worn simultaneously on the right and left hips; 3) to compare the ActiTrainer device with the previously verified Yamax Digiwalker SW-700 pedometer under controlled conditions. Moreover, the following research questions were specified:

- 1) What are the differences between the actual number of steps and the number of steps measured by the ActiTrainer and Yamax devices?
- 2) When measuring the number of steps, is there any dependence of the accuracy of the measures on the placements of the ActiTrainer and Yamax devices on the right or left side of someone's body?
- 3) To what extent does the measured number of steps differ between the ActiTrainer and Yamax devices?

SAMPLE AND METHODS

The sample involved in these verification measures consisted of 20 volunteer subjects (10 men and 10 women), students of the Faculty of Physical Culture, Palacký University in Olomouc (TABLE 1). None of them would be classifiable as obese.

Performance of the ActiTrainer as a step counter was evaluated against an actual number of steps taken during a test containing two stages of locomotion (walking and running). Reliability was estimated by: 1) comparison of two ActiTrainer units worn simultaneously on the right and left hips (interinstrumental reliability), and 2) comparison of the ActiTrainer with the previously verified Yamax (new lifestyles) Digiwalker SW-700 pedometer (equivalence). The Yamax pedometer is acceptable as a criterion pedometer (Schneider, Crouter, & Bassett, 2004). This validity/reliability project was based on a validation scheme indicating acceptable criterion standards by Sirard and Pate (2001) indicating acceptable criterion standards.

Internal mechanisms of those involved devices differ considerably. The ActiTrainer utilizes a two axis solid state accelerometer to interpret movement of the body to which it is attached. Special algorithms are applied which accurately determine the amount of energy (calories) expended, steps taken, distance traveled and walking or running speed of the user. The data collected while the ActiTrainer is worn is logged in the internal memory of the device, which can store approximately 64 days of consecutive data before being cleared (The ActiGraph, 2007). The Yamax pedometer is a relatively simple electronic device used to estimate a distance walked or the number of steps taken over a period of time. Its technology uses a spring-suspended horizontal lever arm that moves up and down in response to the hip's vertical accelerations. This movement opens and closes an electrical circuit; the lever arm makes electrical contact (metal on metal contact) and a step is registered (Schneider, Crouter, Lukajic, & Bassett, 2003). Pedometers of this category do not have any capabilities for data storage.

ActiTrainer (10) and 20 Yamax (20) units were used in this study, interchanged systematically among subjects. Each subject wore four motion sensors (two of either brands) placed bilaterally on the right and left hips.

All subjects covered a distance of 1 kilometer on the hard surface of a 400 meter long athletic oval in each of the two stages (walking/running), while keeping a prescribed pace of locomotion. The recommended duration ranges were 10:00–12:30 min. for walking (corresponding to a speed of 4.8–6.0 kilometers per hour; with an approximate intensity of ca. 3.5 METs) and 5:25–6:40 min. for running (at a speed of 9.0–11.0 kilometers per hour;

with ca. 10 METs). Those intensity levels were estimated according to the “Compendium of Physical Activities” (Ainsworth, Haskell et al., 2000). The actual number of steps taken was registered by a digital counter. The study took place in May, 2008. All measures were realized under mild climactic conditions.

All analyses were performed using Statistica 6.0 software. For all analyses, an alpha (p) of 0.05 was used to denote statistical significance. A percentage difference score was computed and compared with zero. Difference scores of zero would indicate that there was no difference between the actual number of steps and the device – measured number of steps. Positive difference scores represent overestimations and negative scores represent underestimations. Repeated ANOVA measures were used to determine whether there was a significant difference between the mean difference scores of all performed measures (i. e. the actual number of steps, two ActiTrainer units and two Yamax units). A Tukey post hoc test was used to determine eventual differences between single measures. Pearson’s product moment correlations were used to estimate validity and reliability scores. Although there is no firm standard by which to evaluate a reliability estimate, it is generally recognized that a reliability estimate needs to be above 0.70 and a validity estimate needs to be above 0.60 to be at an acceptable level (Odom & Morrow, 2006).

RESULTS

TABLE 2 displays the means and standard deviations of actual and device measured steps during the walking stage. There were no significant differences between actual steps taken by male and female subjects [$F(1, 18) = 3.61$ ($p = 0.074$)], although men

realized a lower number of steps than women owing to greater stride length. The actual number of steps was slightly overestimated by both types of monitors. However, mean difference scores of all the performed measures in the whole sample showed no significance [$F_{\text{repeated measures}} = 0.17$; $p = 0.951$].

TABLE 3 shows accordant data for the running stage. While the ActiTrainer monitors tended to underestimate the actual number of steps, the Yamax pedometers continued to overestimate them as during the walking stage. However, the under/overestimations are presumed to be inconsiderable. Again, the actual number of steps did not differ statistically between genders [$F(1, 18) = 1.23$ ($p = 0.282$)]. Similarly, no statistical significance was found between all the performed measures [$F_{\text{repeated measures}} = 0.01$; $p = 0.999$].

TABLE 4 and 5 present correlation coefficients indicating a very strong degree of agreement between the device measured and the actual number of steps. All the whole sample coefficients exceeded .90 levels, independently of the type of locomotion (walking or running) in cases of both ActiTrainer and Yamax devices.

Inter-instrumental reliability is estimated as a degree of agreement between two devices worn on the right and left hip of the body (TABLE 6). Evidently, those correlations are close to absolute values ($r = 1.00$) in both types of the verified motion sensors. The highest difference scores between the right and left side as performed by the ActiTrainer units in one subject were two steps (walking) or seven steps (running), respectively. Similarly, not even the accuracy of the Yamax pedometers is dependent on the side on which the device is worn.

TABLE 7 and 8 display a very strong consistency of the ActiTrainer and Yamax step counting data. These two types of monitoring tools were almost absolutely correlated, particularly in the running stage.

TABLE 1

Summary characteristics of the sample ($M \pm SD$)

Variable	All subjects ($n = 20$)	Men ($n = 10$)	Women ($n = 10$)
Calendar age [years]	24.00 $\pm$ 3.91	24.30 $\pm$ 4.47	23.70 $\pm$ 3.47
Body weight [kg]	72.85 $\pm$ 10.44	80.80 $\pm$ 8.09	64.90 $\pm$ 4.93
Body height [cm]	177.60 $\pm$ 6.50	182.40 $\pm$ 4.74	172.80 $\pm$ 3.94
BMI [$\text{kg}\cdot\text{m}^{-2}$]	23.00 $\pm$ 2.15	24.29 $\pm$ 2.06	21.71 $\pm$ 1.34

Legend: M – mean, SD – standard deviation.

TABLE 2

Device measured number of steps ($M \pm SD$) with indication of mean differences (percentage and direction) from actual steps (walking)

Measurement	All subjects (n = 20)	Men (n = 10)	Women (n = 10)
Actual steps	1244.55 $\pm$ 70.68	1216.40 $\pm$ 75.96	1272.70 $\pm$ 54.92
ActiTrainer (right)	1246.75 $\pm$ 73.74 +0.18%	1217.80 $\pm$ 69.68 +0.12%	1275.70 $\pm$ 69.00 +0.24%
ActiTrainer (left)	1247.00 $\pm$ 73.55 +0.20%	1218.40 $\pm$ 69.62 +0.16%	1275.60 $\pm$ 68.97 +0.23%
Yamax (right)	1253.45 $\pm$ 75.76 +0.72%	1223.30 $\pm$ 73.73 +0.57%	1283.60 $\pm$ 68.26 +0.86%
Yamax (left)	1261.25 $\pm$ 72.16 +1.34%	1226.70 $\pm$ 65.31 +0.85%	1295.80 $\pm$ 63.83 +1.82%

Legend: M – mean, SD – standard deviation.

TABLE 3

Device measured number of steps ($M \pm SD$) with indication of mean differences (percentage and direction) from actual steps (running)

Measurement	All subjects (n = 20)	Men (n = 10)	Women (n = 10)
Actual steps	907.00 $\pm$ 73.84	892.70 $\pm$ 93.44	922.89 $\pm$ 43.64
ActiTrainer (right)	905.42 $\pm$ 73.78 -0.17%	892.40 $\pm$ 95.27 -0.03%	919.89 $\pm$ 39.97 -0.33%
ActiTrainer (left)	905.68 $\pm$ 74.16 -0.15%	892.20 $\pm$ 95.26 -0.06%	920.67 $\pm$ 41.05 -0.24%
Yamax (right)	908.00 $\pm$ 73.94 +0.11%	894.40 $\pm$ 95.04 +0.19%	923.11 $\pm$ 40.62 +0.02%
Yamax (left)	908.37 $\pm$ 73.96 +0.15%	894.50 $\pm$ 95.10 +0.20%	923.78 $\pm$ 40.33 +0.10%

Legend: M – mean, SD – standard deviation.

TABLE 4

Values of correlation coefficients with p values for comparison of the device measured and actual number of steps (walking)

Comparison	All subjects (n = 20)	Men (n = 10)	Women (n = 10)
Actual steps vs. ActiTrainer R	$r_p = .979$; $p = 0.000$	$r_p = .992$; $p = 0.000$	$r_p = .979$; $p = 0.000$
Actual steps vs. ActiTrainer L	$r_p = .979$; $p = 0.000$	$r_p = .992$; $p = 0.000$	$r_p = .981$; $p = 0.000$
Actual steps vs. Yamax R	$r_p = .975$; $p = 0.000$	$r_p = .984$; $p = 0.000$	$r_p = .967$; $p = 0.000$
Actual steps vs. Yamax L	$r_p = .904$; $p = 0.000$	$r_p = .967$; $p = 0.000$	$r_p = .790$; $p = 0.007$

Legend: r_p – Pearson's correlation coefficient, p – level of statistical significance, R – right side, L – left side.

TABLE 5

Values of correlation coefficients with p values for comparison of the device measured and actual number of steps (running)

Comparison	All subjects (n = 20)	Men (n = 10)	Women (n = 10)
Actual steps vs. ActiTrainer R	$r_p = .961; p = 0.000$	$r_p = .959; p = 0.000$	$r_p = .966; p = 0.000$
Actual steps vs. ActiTrainer L	$r_p = .963; p = 0.000$	$r_p = .961; p = 0.000$	$r_p = .968; p = 0.000$
Actual steps vs. Yamax R	$r_p = .960; p = 0.000$	$r_p = .958; p = 0.000$	$r_p = .964; p = 0.000$
Actual steps vs. Yamax L	$r_p = .962; p = 0.000$	$r_p = .960; p = 0.000$	$r_p = .967; p = 0.000$

Legend: r_p – Pearson's correlation coefficient, p – level of statistical significance, R – right side, L – left side.

TABLE 6

Values of correlation coefficients with p values for inter-instrumental comparison of the number of steps measured by devices worn on right and left hip

Comparison	All subjects (n = 20)	Men (n = 10)	Women (n = 10)
R vs. L ActiTrainer (walking)	$r_p = .999; p = 0.000$	$r_p = .999; p = 0.000$	$r_p = .999; p = 0.000$
R vs. L ActiTrainer (running)	$r_p = .999; p = 0.000$	$r_p = .999; p = 0.000$	$r_p = .998; p = 0.000$
R vs. L Yamax (walking)	$r_p = .926; p = 0.000$	$r_p = .970; p = 0.000$	$r_p = .849; p = 0.002$
R vs. L Yamax (running)	$r_p = .999; p = 0.000$	$r_p = .999; p = 0.000$	$r_p = .999; p = 0.000$

Legend: r_p – Pearson's correlation coefficient, p – level of statistical significance, R – right side, L – left side.

TABLE 7

Values of correlation coefficients with p values for comparison of the ActiTrainer and Yamax devices (walking)

Comparison	All subjects (n = 20)	Men (n = 10)	Women (n = 10)
ActiTrainer R vs. Yamax R	$r_p = .991; p = 0.000$	$r_p = .996; p = 0.000$	$r_p = .982; p = 0.000$
ActiTrainer R vs. Yamax L	$r_p = .925; p = 0.000$	$r_p = .972; p = 0.000$	$r_p = .851; p = 0.002$
ActiTrainer L vs. Yamax R	$r_p = .990; p = 0.000$	$r_p = .996; p = 0.000$	$r_p = .981; p = 0.000$
ActiTrainer L vs. Yamax L	$r_p = .924; p = 0.000$	$r_p = .971; p = 0.000$	$r_p = .851; p = 0.002$

Legend: r_p – Pearson's correlation coefficient, p – level of statistical significance, R – right side, L – left side.

TABLE 8

Values of correlation coefficients with p values for comparison of the ActiTrainer and Yamax devices (running)

Comparison	All subjects (n = 20)	Men (n = 10)	Women (n = 10)
ActiTrainer R vs. Yamax R	$r_p = .997; p = 0.000$	$r_p = .999; p = 0.000$	$r_p = .999; p = 0.000$
ActiTrainer R vs. Yamax L	$r_p = .998; p = 0.000$	$r_p = .999; p = 0.000$	$r_p = .998; p = 0.000$
ActiTrainer L vs. Yamax R	$r_p = .999; p = 0.000$	$r_p = .999; p = 0.000$	$r_p = .999; p = 0.000$
ActiTrainer L vs. Yamax L	$r_p = .998; p = 0.000$	$r_p = .999; p = 0.000$	$r_p = .998; p = 0.000$

Legend: r_p – Pearson's correlation coefficient, p – level of statistical significance, R – right side, L – left side.

DISCUSSION

When detecting steps under given controlled conditions, the accuracy of the ActiTrainer was very favorable. The values of Pearson's r , expressing the relationship between actual- and device-measured steps, ranged from 0.96 to 0.97. As a criterion for pedometer usability, the Japanese industrial standard is often applied (Hatano, 1993). This recommendation has set the maximum permissible error of miscounting steps at 3%, or 3 steps out of 100. Marginal counts of ActiTrainer measured steps did not exceed a difference of 0.3% from the actual steps taken, i.e. a tenth of the recommended standard.

Differences between step counts measured by the ActiTrainer and Yamax (as the criterion pedometer) were only minor. Correlations between these two technically unequal devices tended to be very strong (0.92–0.99). Consistently with these findings, Bennett and Campagna (2002) indicate a strong relationship between the CSA/ActiGraph accelerometer (the above mentioned ActiTrainer fore runner) and the Yamax pedometer ($r = 0.97$) when assessing daily step count activity. Eighty one participants completed selected moderate intensity tasks in a study of Bassett et al. (2000). In these analyses, the ActiGraph and Yamax devices were correlated by $r = 0.803$. Both motion sensors were compared under free living conditions for seven consecutive days in a sample of 52 subjects by Tudor-Locke, Ainsworth, Thompson, and Matthews (2002). There was a strong relationship between all ActiGraph output and pedometer output ($r = 0.74$ – 0.86). Invariably, Yamax pedometers are the most accurate step counters in both controlled and free living settings (Bassett, 2000; Crouter, Schneider, Karabulut, & Bassett, 2003; Le Masurier, Lee, & Tudor-Locke, 2004; Schneider, Crouter, & Bassett, 2004; Schneider, Crouter, Lukajic, & Bassett, 2003; Vincent & Sidman, 2003; Welk et al., 2000). Thus, a similar accuracy of detecting steps under various conditions can be expected also with the ActiTrainer. However, further analyses in this field are needed.

In this study, the validity and reliability of the ActiTrainer for counting steps was verified using two ways of locomotion (i.e. walking and running) with no evident differences in accuracy between them found. Nevertheless, many studies (Bassett, 2000; Beets, Patton, & Edwards, 2005; Brisson & Tudor-Locke, 2004; Karabulut, Crouter, & Bassett, 2005; Melanson et al., 2004; Rowlands, Stone, & Eston, 2007) suggest that motion sensors are less accurate at very slow and very high speeds (according to lower sensitivity of devices at both slow and fast frequencies of movements). On the other hand, the too high sensitivity of a device can lead to erroneous detections of nonsteps (Le Masurier & Tudor-Locke, 2003).

Expectedly, the inter-instrumental correlations of ActiTrainer devices worn simultaneously on the right and

left hips were very close to absolute values (0.99–1.00). Yngve, Nilsson, Sjöström, and Ekelund (2003) confirm, that the placement of the monitor does not influence the interpretation of the data.

Pedometers belong among the most popular motion sensors for researchers and for individual use because of their relative accuracy, low cost and acceptable (“user friendly”) interpretation of data (i.e. steps), easily comparable with public health recommendations for ambulatory activity (e.g. Tudor-Locke & Bassett, 2004). Nevertheless, the electronic pedometers have limitations as research tools, including their inability to provide information related to nonambulatory activity (i.e., cycling, weight training, and swimming) or underestimating the cost of most other types of “lifestyle” activities, especially those involving arm activity, pushing or carrying objects, walking uphill, or stair climbing (Schneider, Crouter, & Bassett, 2004; Schneider, Crouter, Lukajic, & Bassett, 2003). Epidemiological pedometer data should thus be interpreted with these limitations in mind. On the other hand, although the ActiTrainer does not belong in the low cost category of monitoring tools, its advantages arise from the fact that it engages also a heart rate monitoring feature for precision in obtaining data (www.actitrainer.com).

In follow up analyses, verification of the other features of the multifunctional ActiTrainer device, including the determination of its validity in field settings when assessing physical activity variables in various groups of population, is assumed.

CONCLUSIONS

When detecting steps under given controlled conditions, the accuracy of the ActiTrainer was very high. Values of correlations expressing relationships between actual and device measured steps ranged from .96 to .97. Marginal counts of the steps measured by the ActiTrainer did not exceed a difference of 0.3% from the actual steps taken. Also, the inter-instrumental (right vs. left side) and equivalence (ActiTrainer vs. Yamax) correlations were favorably strong. As a step counter, the ActiTrainer seems to be a promisingly accurate monitoring tool. Verification of the other features of the multifunctional ActiTrainer device, including determination of its validity in field settings when assessing physical activity variables in various groups of population, is assumed.

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**VALIDITA A RELIABILITA FUNKCE
„MĚŘENÍ POČTU KROKŮ“
U PŘÍSTROJE ACTITRAINER
V KONTROLOVANÝCH PODMÍNKÁCH**
(Souhrn anglického textu)

Při výzkumu v oblasti pohybové aktivity je využíváno množství objektivních monitorovacích přístrojů, jako jsou akcelerometry, pedometry, monitory srdeční frekvence apod. ActiTrainer je novým multifunkčním monitorovacím přístrojem, který tyto funkce spojuje. Hlavním cílem této studie bylo realizovat standardizační analýzu funkce „měření počtu kroků“ u přístroje ActiTrainer v kontrolovaných podmínkách chůze a běhu a přispět tak k ověření možností tohoto přístroje pro výzkum pohybové aktivity. Validita detekce kroků u přístroje ActiTrainer byla stanovena proti kritériu skutečného počtu kroků vykonaného během kontrolovaného testu. Reliabilitu určilo 1) porovnání dat ze dvou přístrojů ActiTrainer nošených simultánně na pravém a levém boku a 2) porovnání přístroje ActiTrainer s již dříve ověřeným pedometrem Yamax Digiwalker SW-700. Výzkumný soubor tvořilo 20 osob, jejichž úkolem bylo překonat předepsaným tempem dvakrát (chůzí a během) vzdálenost jednoho kilometru na 400 m atletickém oválu s umělým povrchem. Každé z osob byly nasazeny celkem čtyři přístroje (po jednom přístroji ActiGraph a Yamax na každé straně). Při detekci kroků v daných kontrolovaných podmínkách byla přesnost přístroje ActiTrainer velmi vysoká. Hodnoty korelačních koeficientů vyjadřujících vztah mezi skutečným a naměřeným počtem kroků se pohybovaly mezi 0,96 a 0,97, přičemž odpovídající odchylka od skutečného počtu kroků nečinila více než 0,3 %. Velmi vysoké byly korelační koeficienty i při porovnání hodnot počtu kroků naměřených dvěma přístroji ActiTrainer nošenými jednou osobou na pravém a levém boku, podobně jako při vzájemném srovnání přístrojů ActiTrainer a Yamax. V oblasti monitoringu chodecké aktivity se přístroj ActiTrainer jeví jako velice slibný.

Klíčová slova: monitoring pohybové aktivity, chůze, běh, krokoměr, přesnost.

Mgr. Filip Neuls, Ph.D.



Palacký University, Olomouc
Faculty of Physical Culture
tř. Míru 115
771 11 Olomouc
Czech Republic

Education and previous work experience

1999 – Palacký University, Olomouc, Faculty of Physical Culture – Master's degree (Physical Education and Biology).

2007 – Palacký University, Olomouc, Faculty of Physical Culture – doctoral degree (Kinanthropology – Didactics of Physical Education and Sport).

Since 2003 – Department of Sports, Faculty of Physical Culture, Palacký University, Olomouc – Assistant Professor (Swimming).

Since 2005 – Center for Kinanthropology Research, Faculty of Physical Culture, Palacký University, Olomouc.

Study internships – Arizona State University, Valdosta State University, San Diego State University.

First-line publications

Botek, M., Stejskal, P., & Neuls, F. (2008). Monitoring of the autonomic nervous system's activity during post marathon recovery by spectral analysis of heart rate variability: A case study. *Medicina Sportiva*, 12(2), 31–35.

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