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DIAGNOSTICS THE RESPONSE OF GRECO-ROMAN WRESTLERS' ORGANISMS TO TRAINING LOAD

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SUMMARY

The aim of our contribution was to find out the response of organisms to training load in the Greco-Roman wrestlers of the Army Sports Club Dukla Banská Bystrica. The research sample consisted of 4 top Greco-Roman wrestlers. Lactate levels were detected from capillary blood of the wrestlers after two training matches, which lasted 2x3 minutes of actual time, in the 1st, 4th, and 8th minute of rest. Time between two training matches was 10 minutes.

Blood samples were taken from finger tips. Lactate levels were measured by means of the apparatus Biosen C Line Sport. The maximum values of blood lactate, which were measured in first training match was 13,16 mmol/l and in the second match was 15,25 mmol/l.

The arithmetic mean of blood lactate values in the sportsmen at the first match was 10,77 mmol/l in the 1st minute of rest, 9,47 mmol/l in the 4th minute of rest, and 7,64 mmol/l in the 8th minute of rest.

The arithmetic mean of blood lactate values in the sportsmen at the second match was 12,33 mmol/l in the 1st minute of rest, 13,57 mmol/l in the 4th minute of rest, and 8,65 mmol/l in the 8th minute of rest.

KEY WORDS: wrestling, training load, lactate

INTRODUCTION

Training load is specifically created and intentionally controlled initiative, through which we induce required changes in fitness level at judokas, influencing the growth of athletic performance. We distinguish indicators of the external and internal training load. The external loads consist of: volume, intensity, coordination complexity, mental performance and the way of organizing the load. The internal load is mostly expressed by the physiological and

biochemical values such as: heart rate, blood lactate concentrations, creatine kinase levels, ureido, and so on. (Štefanovský, 2009).

The aim of each systematic training process is to gradually increase the resistance of the organism to adequate load with respect to a competition period. Respecting the adaptation patterns in the organism should aim at the change in biological and psychical discomfort to the internal comfort in higher physiological and biochemical model parameters such as competition conditions. This long-term adaptation mechanism creates optimal prerequisites for the development and long-term maintenance of physical form (Laczo, 2010).

Blood lactate measurement belongs to the indirect tests of the training proces intensity, the level of regeneration and the dominant type of energy metabolism (Bielik, 2006).

AIM

The aim of our work within the framework of grant *Vega 1/0927/12 “Diagnostics of the Response of Organism to Training and Competition Load in Combat Sports“* was, on the basis of detected values of blood lactate, to compare the intensity of load in wrestling training after a training matches.

METHODOLOGY

We measured lactate levels during the training process in the wrestlers of the Army Sports Club (AŠK) Dukla Banská Bystrica. Lactate levels were detected from capillary blood of the wrestlers after two training matches , which lasted 2x3 minutes of actual time, in the 1st, 4th, and 8th minute of rest. Time between two training matches was 10 minutes.

Blood samples were taken from finger tips. Lactate levels were measured by means of the apparatus Biosen C Line Sport. The apparatus employs an electrochemical principle of measuring, combined with chip technology, and makes it possible to analyze lactate levels within the range of 0.5 – 40 mmol/l with an accuracy of up to 1.5 % at 12 mmol/l. In order to minimize mistakes (the apparatus's deviation), we repeatedly evaluated the results three times, and in our paper we present average values of the three measurings. The analyzer contains a rotor with 15 positions, and enables almost 100 analyses in one hour.

Our research sample consisted of 4 top Greco-Roman wrestlers, members of the Army Sports Club (AŠK) Dukla Banská Bystrica.

RESULTS AND DISCUSSION

Fig. 1 – 4 present the values of blood lactate in 4 top Greco-Roman wrestlers in the 1st, 4th, and 8th minute of rest after a training matches which took 2x3 minutes of actual time. Time between two training matches was 10 minutes. Fig. 5 shows the arithmetic mean of blood lactate values that we detected.

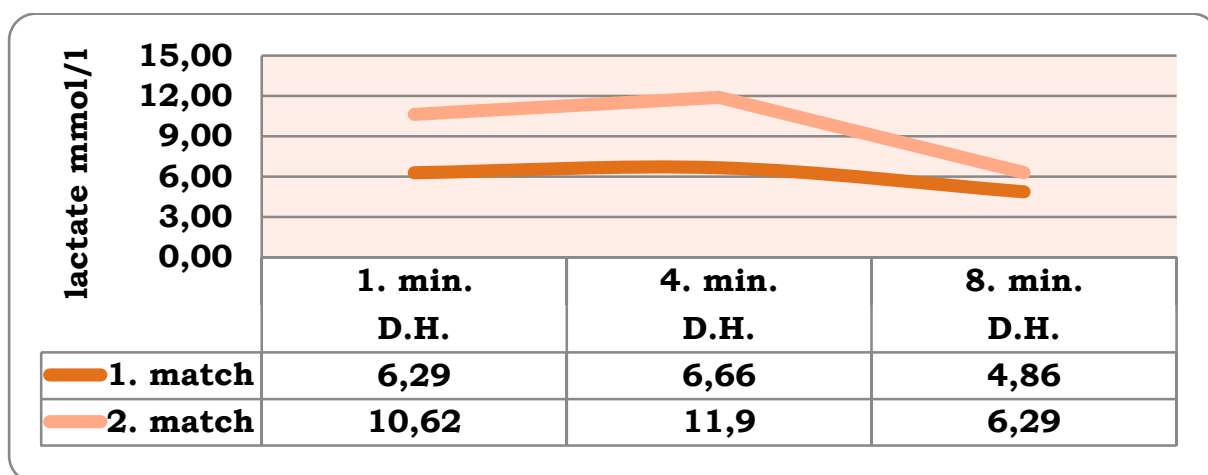


Fig. 1 The values of blood lactate of the wrestler D.H. in the 1st, 4th and 8th minute of rest

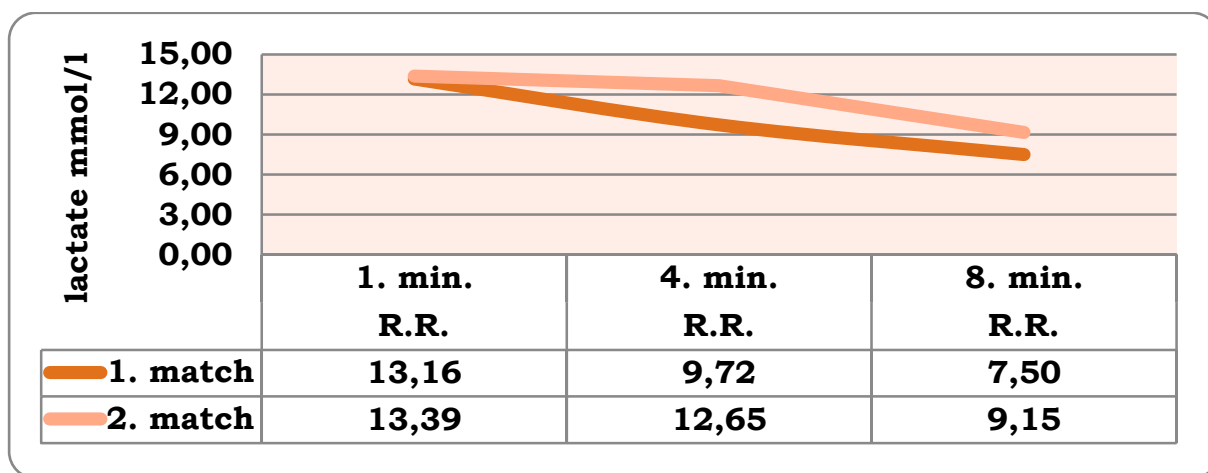


Fig 2 The values of blood lactate of the wrestler R.R. in the 1st, 4th and 8th minute of rest

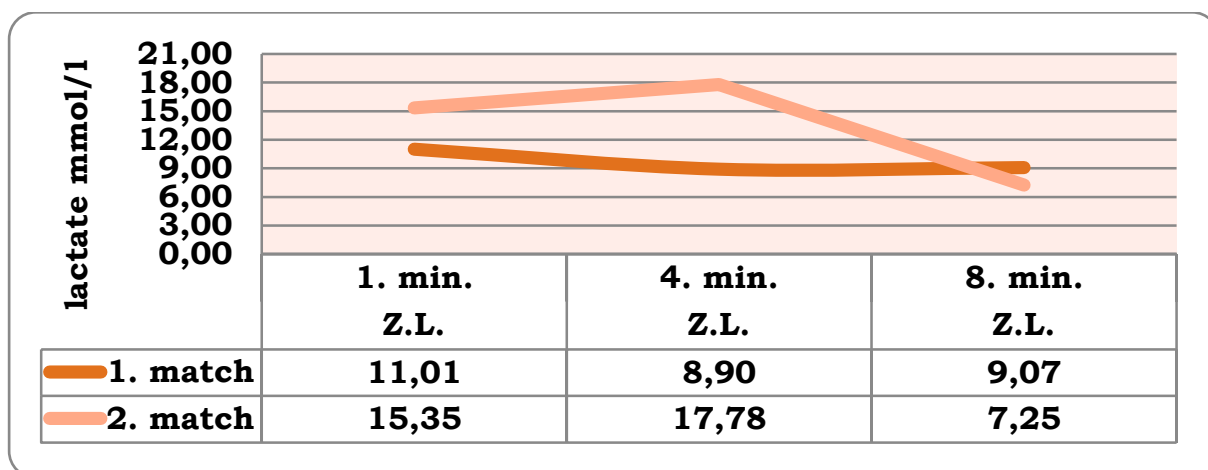


Fig 3 The values of blood lactate of the wrestler Z.L in the 1st, 4th and 8th minute of rest

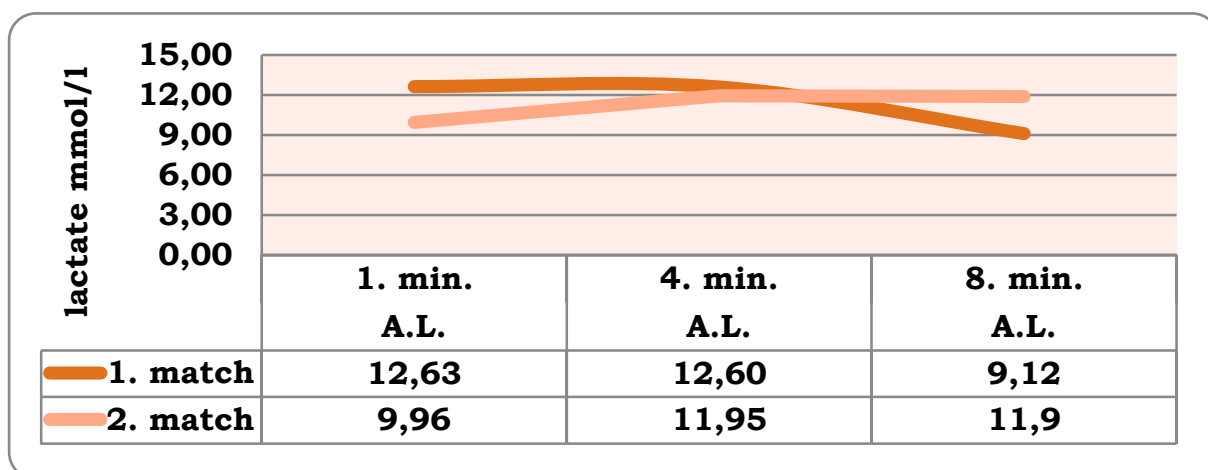


Fig. 4 The values of blood lactate of the wrestler A.L. in the 1st, 4th and 8th minute of rest

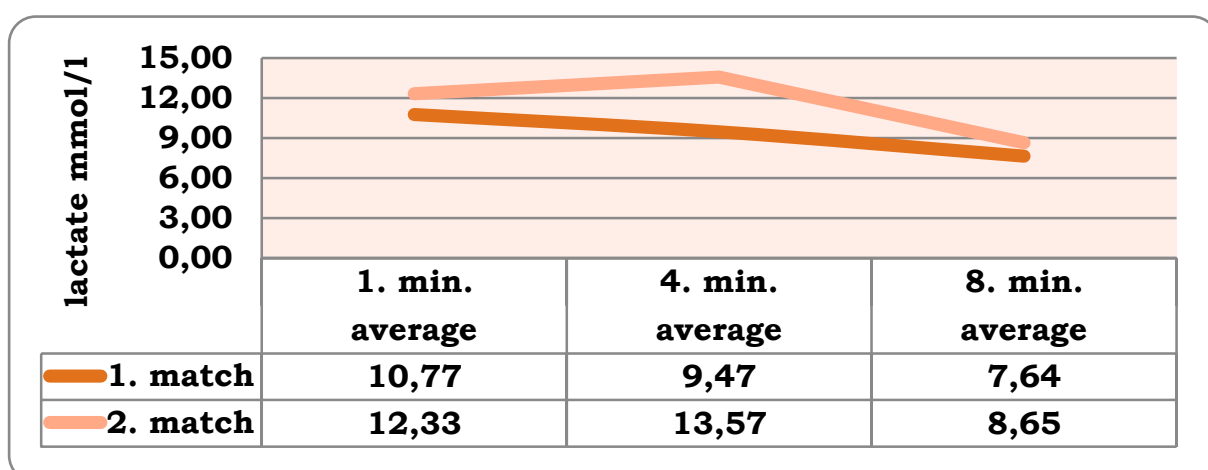


Fig. 5 Arithmetic mean of blood lactate values of four top Greco-Roman wrestlers in the 1st, 4th and 8th minute of rest

The results presented in Fig. 1 – 4 show that the highest values of blood lactate at the first match in the 1st minute of rest occurred in the sportsman R.R. – 13,16 mmol/l, and the lowest values in the sportsman D.H. – 6,29 mmol/l. In the 4th minute of rest the highest values of blood lactate were detected in the sportsman A.L. – 12,60 mmol/l, and the lowest values again in the sportsman D.H. – 6,66 mmol/l. The highest level of blood lactate in the 8th minute of rest was detected again in the sportsman A.L. – 9,12 mmol/l, and the lowest level in the sportsman D.H. – 4,86 mmol/l.

The results presented in Fig. 1 – 4 show that the highest values of blood lactate at the second match in the 1st minute of rest occurred in the sportsman Z.L. – 15,25 mmol/l, and the lowest values in the sportsman A.L. – 9,96 mmol/l. In the 4th minute of rest the highest values of blood lactate were detected again in the sportsman Z.L. – 17,78 mmol/l, and the lowest values again in the sportsman D.H. – 11,90 mmol/l. The highest level of blood lactate in the 8th minute of rest was detected in the sportsman A.L. – 11,90 mmol/l, and the lowest level again in the sportsman D.H. – 6,29 mmol/l.

As can be seen in Fig. 5, the arithmetic mean of blood lactate values in the sportsmen at the first match was 10,77 mmol/l in the 1st minute of rest, 9,47 mmol/l in the 4th minute of rest, and 7,64 mmol/l in the 8th minute of rest.

As can be seen in Fig. 5, the arithmetic mean of blood lactate values in the sportsmen at the second match was 12,33 mmol/l in the 1st minute of rest, 13,57 mmol/l in the 4th minute of rest, and 8,65 mmol/l in the 8th minute of rest.

Due to the average maximum blood lactate values, which were detected in a training matches – 13,57 mmol/l, it is obvious that the values do amount to the average values that were detected by e. g. Degoute et al. (2003) 12.3 mmol/l, Žára (1989) 12.36 mmol/l, Janata (2010) 7,7 mmol/l, Zbigniew et al. (2010) from 12 mmol/l to 13.4 mmol/l in dependence on the duration of a match in match randori in competitions. These authors found out these results in judo matches.

CONCLUSION

The highest values of blood lactate at the first match in the 1st minute of rest occurred in the sportsman R.R. – 13,16 mmol/l and the highest values of blood lactate at the second match in the 1st minute of rest occurred in the sportsman Z.L. – 15,25 mmol/l.

The arithmetic mean of blood lactate values in the sportsmen at the first match was 10,77 mmol/l in the 1st minute of rest, 9,47 mmol/l in the 4th minute of rest, and 7,64 mmol/l in the 8th minute of rest.

The arithmetic mean of blood lactate values in the sportsmen at the second match was 12,33 mmol/l in the 1st minute of rest, 13,57 mmol/l in the 4th minute of rest, and 8,65 mmol/l in the 8th minute of rest.

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DIAGNOSTIKA ODOZVY ORGANIZMU GRÉCKO-RÍMSKÝCH ZÁPASNÍKOV NA TRÉNINGOVÉ ZAŤAŽENIE

SÚHRN

Cieľom príspevku bolo diagnostikovať vybrané nepriame ukazovatele úrovne intenzity zaťaženia počas súťažného športového výkonu v tréningových podmienkach v grécko-rímskom zápase s využitím merania hladiny krvného laktátu pomocou prístroja Biosen C Line Sport. Výskumný súbor pozostával so zápasníkov grécko-rímskeho štýlu AŠC Dukla Banská Bystrica v počte 4.

Hladinu laktátu sme zisťovali z kapilárnej krvi v 1. 4. a 8. minúte zotavenia po tréningovom zápase v dĺžke trvania 2x3 minúty čistého času s 30 sekundovou prestávkou v 1. 4. a 8. minúte zotavenia. U zápasníkov sa realizovali celkove 2 tréningové zápasy v dĺžke trvania 2x3 minúty čistého času s 30 sekundovou prestávkou medzi 1. a 2.kolom. Prestávka medzi oboma tréningovými zápasmi bola 10 minút. Aritmetický priemer nameraných hodnôt krvného laktátu u sledovaných zápasníkov po prvom tréningovom zápase v dĺžke trvania 2x3 minúty čistého času s 30 sekundovou prestávkou medzi kolami bol v 1.minúte odpočinku – 10,77 mmol/l, v 4.minúte odpočinku – 9,47 mmol/l a vo 8.minúte odpočinku – 7,64 mmol/l.

Aritmetický priemer nameraných hodnôt krvného laktátu u sledovaných zápasníkov po druhom tréningovom zápase v dĺžke trvania 2x3 minúty čistého času s 30 sekundovou prestávkou medzi kolami bol v 1.minúte odpočinku – 12,33 mmol/l, v 4.minúte odpočinku – 13,57 mmol/l a vo 8.minúte odpočinku – 8,65 mmol/l.

KEY WORDS: zápasenie, tréningové zaťaženie, laktát

STATISTICAL PREDICTION METHODS IN PUBLIC HEALTH

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KEYWORDS: prediction, forecasting, time series, road event, road event equivalent coefficient

SUMMARY

Aim. Although the study was conducted in order to examine a structure of road events in the city of Bydgoszcz, the presented methods could be successfully used in public health surveys. The main observed character was a road event equivalent coefficient (REEC), which greatest ratio is related to numbers of killed and injured victims. Moreover, a trial of predicting unpredictable events was done by an example of forecasting values of REEC and numbers of participants of road events.

Material and methods. In order to improve road traffic safety (BRD) many statistical analysis are performed every year. They are based on data bases of insurance companies and the police reports. The material collected from the institutions is converted and processed with computer systems in order to prepare annual reports about the state of BRD (Bebyn G., Chmielewski J. et al., 2002).

All data related to road events which happened between 2002 and 2007 collected by the police and insurance agencies in Bydgoszcz were taken into account. Among analyzed variables there were: participants, reasons, sorts of events, locations and results. Besides basic analyses made for comparison with the reports mentioned above, more advanced interdependence and forecasts were carried out. The main results – a forecast of some road events characters, was obtained with using time series. All analyses were worked out with *Statistical Analysis System (SAS)* using *SAS Enterprise Guide 6* and SAS programming language.

Results. The obtained basic statistic parameters were similar to the ones described in the reports (e.g. classical and positional average measures, a structure of events location, daily and weekly distribution of road events number and gravity, etc.). Moreover, using analyses of interdependence of qualitative variables, we found the main reasons of road events, where unadjusted distance between vehicles was proved to be the first on the list ($\approx 32.62\%$). Against the popular myth, an undue speed is only the fifth main reason. Using analyses of variance it was proved that values of REEC were dependent, among the others, on the location and sort of events.

A short term forecasts were worked out for REEC and number of participants. Additive exponential smoothening models were obtained while analyzing the time series for both variables. The models were seasonal with no trends. The R square coefficients were 0.15 and 0.27 appropriately. Forecasted results were compared to empirical data. It turned out the forecasted data were overestimated however the values were much more regular than the empirical values. A short time period was found when the forecasted and empirical values were comparable. Thanks to the forecasted it was predicted how seriously injured would be participants of future events and how many participants would take part in.

Conclusions. Although it is easy to predict where the greatest number of accidents and collisions will happen in the nearest future (because of an immutable road infrastructure), it seemed to be impossible to guess how many participants would take place in the events and how seriously they would be injured. The forecast was proved to be weakly accurate (the greatest $R^2=0.27$). Nevertheless, it clearly showed an expected estimated danger in a case the road infrastructure would remain unchanged. Designation of other statistical parameters and coefficients showed which places of the road traffic net should be improved and which group of participants should be more protected.

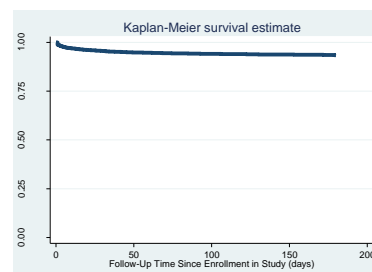
INTRODUCTION

After examining rich literature related to public health it was observed that the basic statistical analyses like estimating the mean and standard deviation (Ciesielska M., Lewandowski A. et al., 2013) correlation coefficient (Bykowski H., Łukowicz M., 2013), testing hypotheses with variety of tests (Szulc A., Niespodziński B., et al, 2014; Gorodyskay I., Grabovsky J. et al., 2013), etc., are the oftenest and the most popular methods. An interesting and useful methods of prediction seem to be more complicated to be used and interpreted. They refer to a great size of a sample and need survey methods spread in a longer time. Yet, they give much more useful results than typical comparison of means or ratios before and after an experiment

(testing differences). Although estimation of correlation may be a good beginning for establishing a regression model useful for further prediction, surveys usually end with examining linear models since other ones are much more difficult to be interpreted.

Another prediction method presented in the literature is examining time to event (survival) data (Katz J., West K. et al., 2000). The objective of the survey was to assess an effect of maternal vitamin A or β -carotene supplementation on fetal loss and survival. A random sample of 10295 pregnant women was chosen and so much data about live births was collected in order to investigate infant mortality rate in 6-months post birth. The total number of deaths in 6 month follow-up period was 644.

Figure 1. Kaplan-Meier curve



According to the number of enrolled women, the total follow-up time was 1 627 725 days. As a results it was obtained infant mortality rate in 6-months post birth equal to 0.0004 deaths per day (0.146 deaths per year), however the estimated child mortality rate in the group where vitamin A was supplemented, is 5% greater than the estimated child mortality in the placebo group. Next the Kaplan-Meier survival curve (figure 1) was drawn to display the tendency of children mortality.

In the paper other methods used both for describing analyzed data and for prediction are presented. However the analyses were done for road events, the methods can be successfully repeated in public health research.

AIM OF THE SURVEY

Road events are examined with details every year in order to improve the state of road safety by changing, for instance, a road infrastructure or organization of traffic. Because of a great cost of such changes, only a few places in a the city road net can be chosen for repair. Hence it is necessary to point the most dangerous road net elements. First objective of the survey was to examine a structure of road events in the observed city in order to find correlations between different variables describing the events. Next goal was to predict unpredictable with an example of forecasting the values of REEC and a number of participants of road events. Investigation of results of the used prediction method was a separate aim of the survey in order to apply it in the future in public health research.

Similar results of rich but basic statistical analysis are presented every year in the reports mentioned above. They were used for comparison with the results presented in the paper.

METHODS AND RESULTS

Gathering data for prediction is a time-consuming process. Hence the data collected formerly by University of Technology and Life Sciences in Bydgoszcz were taken into consideration. The data referred to all road events which had happened in Bydgoszcz from 2002 to 2007.

Basic notions

There are two sorts of road events considered. An event in which there was at least one victim is called an *accident*. If there were no victims, then an event is called a *collision*. Injured victims, seriously injured victims and killed victims are distinguished. In order to measure a gravity of an event, a *road event equivalent coefficient* (REEC) is estimated. The value of REEC is a combination of unit results of an event multiplied by their weights. The units results of an event are: killed victim, seriously injured victim, injured victim, a car damaged in an accident, a car damaged in a collision. The road event equivalent coefficient is defined with the following formula (Bebyn G., Chmielewski J. et al., 2006):

$$REEC = n_1 \cdot q_1 + n_2 \cdot q_2 + n_3 \cdot q_3 + n_4 \cdot q_4 + n_5 \cdot q_5$$

where:

No. i	Unit results of an road event	Weight q_i
1	killed victim	26,7
2	seriously injured victim	9,7
3	injured victim	0,5
4	a car damaged in an accident	1,0
5	a car damaged in a collision	0,5

Several road event characters were considered as variables. Six variables were distinguished to describe participants, three – to describe reasons, two – to describe a sort of an event, one – to describe an event location and seven – to describe results. For simplicity, only a selection of variables is presented in the paper, namely, the variables for which the results are presented in the paper. They are described in the table 1. In general, results of events were regarded depended variables.

Table 1. Variables taken into consideration in the survey

No.	Name	Values/description
Participants		
1.	Participant	driver passenger biker pedestrian
Reasons		
2.	HumanReason	unadjusted speed improper action (overtaking, turning, etc.) disrespect safe distance between vehicles
3.	RoadReason	improper state of the road bad weather
Sort of an event		
4.	Crash	head crash side crash back crash
Place		
5.	Location	junction inlet outlet crossing
Results Real numbers:		
6.	NumberKilled (NK) NumberSerInj (NSI) NumberInj (NI) ParticipantsNumber (PN) VehiclesNumber EquivalentCoefficient (REEC)	Number of participants killed in an event Number of participants seriously injured in an event Number of participants injured in an event Number of participants of an event Number of vehicles damaged in an event Road event equivalent coefficient (real number)

Analysis of road events structure

Before carrying out an advanced investigation, a structure of road events characters was investigated in order to describe distributions of main dependent quantitative variables and compare them to the normal distribution. Most of the examined variables were proved to be symmetric. Only REEC turned out to be right skewed, what was caused by a great value of a single outlier.

Table 2. Central tendency measures

Variable	N	NMiss	Total	Min	Mean	Median	Max	StdMean
NumberSerInj (NSI)	37372	1	727	0	0.02	0	4.0	0.000791
REEC	37372	1	48207	0	1.29	1	108.8	0.011726
NumberInj (NI)	37372	1	2862	0	0.08	0	11.0	0.001648
ParticipantsNumber (PN)	37372	1	70607	1	1.89	2	21.0	0.002805
NumberKilled (NK)	37372	1	83	0	0.00	0	4.0	0.000292

Several qualitative variables were described, as well. It was shown that unadjusted speed was only the fifth oftenest reason of road events (2339 events, 6.26%). Unadjusted distance between vehicles was the main reason (12190 events, 32.62%). The second oftenest reason was an improper driving backward and sudden stopping as it had caused 4076 (24.78%) events. Such actions as overtaking, turning, etc. caused 4076 events (24.78%). About 3.6% road events had resulted from bad weather conditions or a bad state of a road, hence they were independent on the events participants.

Analyses of time dependent changes showed the number of road events was seasonal and related to a particular hour of a day and particular day of a week (figure 2, figure 3).

Figure 2.

Daily road event distribution (total in 2002 – 2007)

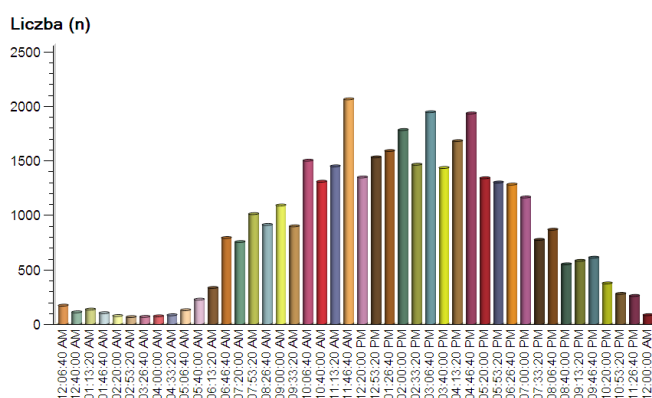
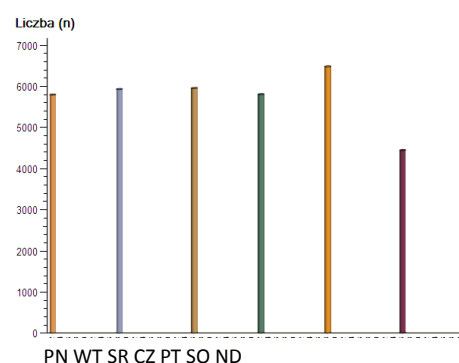


Figure 3.

Weekly road event distribution (total in 2002 – 2007)



It was easy to notice that the greatest number of events took place usually in January ($\approx 10\%$). However, an average equivalent coefficient was the lowest that month ($REEC \approx 1.20$). It shows that there were no victims (injured or killed) in most of the road events in January. The least number of events took place usually in July ($\approx 7\%$), again with a low equivalent coefficient ($REEC \approx 1.27$).

The most serious events took place usually in November (an average REEC \approx 1.4). Considering a low number of events that month it proves a great ratio of accidents with injured and killed victims. A graphic description of investigated variables shows they have no clear trends and are seasonal.

Analysis of interdependences

It was investigated how such variables as HumanReason, Location and EventSort influenced the road event equivalent coefficient (REEC). It should be mentioned the assumption that REEC distribution is normal was not fulfilled, however variance analyses are not too much sensitive about that.

Using One Way Anova method with SAS the following results were obtained (tables 3, 4, 5).

Table 3. Bartlett's test for REEC according to EventSort

Bartlett's Test for Homogeneity of REEC Variance			
Source	D.f.	Chi-sqr	Pr > chi sqr..
EventSort	24	33049.4	<.0001

Table 4. Bartlett's test for REEC according to HumanReason

Bartlett's Test for Homogeneity of REEC Variance			
Source	D.f.	Chi-sqr	Pr > chi sqr..
HumanReason	18	36567.9	<.0001

Table 5. Bartlett's test for REEC according to Location

Bartlett's Test for Homogeneity of REEC Variance			
Source	D.f.	Chi-sqr	Pr > chi sqr..
Location	13	13114.1	<.0001

In each case, it was proved that the road equivalent coefficient depends on reasons caused by a human as well as on events sorts and locations.

Additionally, it was examined how a number of participants and a sort of an event are correlated to REEC. Spearman coefficient was computed with Enterprise Guide 4.0. It was observed that the independent variables strongly influence the road event coefficient. The linear correlation coefficient for the a number of participants and REEC was $r = 0.658$ ($p < 0.001$). The correlation coefficient between REEC and number of participants turned out to be depended on the particular sort of an event:

head crash $r = 0.73$ ($p < 0.001$)

side crash $r = 0.06$ ($p > 0.15$)

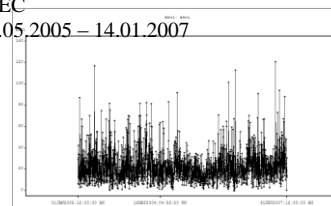
back crash $r = 0.94$ ($p < 0.001$)

Hence it was shown that the correlation between REEC and the number of participants were very strong in the case of back crashes, strong in the case of head crashes and not statistically essential as far as side crashes were considered.

Analysis of time series and forecasting

Data collected from the police and insurance agencies were credible, complete and comparable. One dimensional moments series were investigated for variables of REEC, number of injured participants (NI), number of seriously injured participants (NSI), number of killed participants (NK) and total participants number (PN). In the paper, the method and results for REEC, NI and NP are presented.

Figure 4. A part of time series for REEC
03.05.2005 – 14.01.2007



Before a further computation graphic analysis was carried out. An example of time series for the road event equivalent coefficient is presented at the figure 4. The graph showed that REEC had no clear trend and was seasonal. Similar observations were done for the number of participant and number of injured participants.

Using Enterprise Guide 4.0, seasonal exponential smoothing models were computed. It should be mentioned that order of autocorrelation was equal to 2 and the AR(2) process was stationary. Hence the forecasting based on it converged to the expected value and the variance of forecast errors converged to the variance of the process (table 6).

Table 6. Generated time series models for NP (LICZBA_UCZ), NK (ZABITYCH), NSI (CIEZKO_RANNYCH), NI (LEKKO_RANNYCH), REEC (EKWI)

Series Name	Model Label	Root Mean Square Error	Mean Square Error	Mean Absolute Percent Error	Mean Absolute Error
LICZBA_UCZ	Seasonal Exponential Smoothing	13.21181	174.55	52.35444	10.05151
ZABITYCH	Mean	0.23776	0.05653	96.61834	0.07348
CIEZKO_RANNYCH	Seasonal Exponential Smoothing	0.68707	0.47207	63.23366	0.45986
LEKKO_RANNYCH	Seasonal Exponential Smoothing	1.42624	2.03417	45.52638	1.06454
EKWI	Seasonal Exponential Smoothing	12.81484	164.22	68.97225	8.93096

Table 7. Estimated parameters of the

Statistics of Fit	
LICZBA_UCZ: liczba_ucz	
Seasonal Exponential Smoothing	
Statistic of Fit	Value
Mean Square Error	174.55194
Root Mean Square Error	13.21181
Mean Absolute Percent Error	52.35444
Mean Absolute Error	10.05151
R-Square	0.272

Essential R^2 coefficient were achieved for two variables:

$$R^2 = 0.148 \text{ for REEC, } R^2 = 0.272 \text{ for NP (table 7).}$$

Other ones were not statistically significant (e.g. the third greatest $R^2 = 0.091$ for IP).

MAIN RESULT

A prediction of unpredictable variables: number of participants (NP) of road events and a gravity of events described by the equivalent coefficient (REEC) was one of the main objective of the survey. The prediction period was 31 days, therefore that was a short term forecast. Its range included the city of Bydgoszcz. Prognosis data were generated with Enterprise Guide modul Time Series Forecasting, Produce Forecast. All computed forecast values are presented in the tables 8, 9.

Table 8. Forecasted road event equivalent coefficient for 1 – 12 January 2008

Predicted Upper 95% Lower 95% value for Confidence Confidence

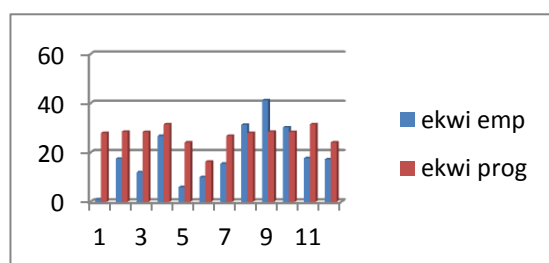
Obs data	REEC	Limit	Limit
2192 01JAN2008:12:00:00 AM .	27.9546	53.0827	2.8265
2193 02JAN2008:12:00:00 AM .	28.5037	53.6683	3.3390
2194 03JAN2008:12:00:00 AM .	28.4399	53.6411	3.2387
2195 04JAN2008:12:00:00 AM .	31.4655	56.7031	6.2278
2196 05JAN2008:12:00:00 AM .	24.1205	49.3945	-1.1536
2197 06JAN2008:12:00:00 AM .	16.2813	41.5918	-9.0291
2198 07JAN2008:12:00:00 AM .	26.7871	52.1338	1.4403
2199 08JAN2008:12:00:00 AM .	27.9546	53.3388	2.5703
2200 09JAN2008:12:00:00 AM .	28.5037	53.9243	3.0830

Table 9. Forecasted number of participants of road events for 1 – 12 January 2008

data	ZABITYCH	LICZBA_UCZ
01JAN2008:12:00:00 AM	.	37.8758
02JAN2008:12:00:00 AM	.	38.1950
03JAN2008:12:00:00 AM	.	37.2242
04JAN2008:12:00:00 AM	.	41.7652
05JAN2008:12:00:00 AM	.	28.8948
06JAN2008:12:00:00 AM	.	19.9061
07JAN2008:12:00:00 AM	.	37.1845
08JAN2008:12:00:00 AM	.	37.8758
09JAN2008:12:00:00 AM	.	38.1950
10JAN2008:12:00:00 AM	.	37.2242
11JAN2008:12:00:00 AM	.	41.7652
12JAN2008:12:00:00 AM	.	28.8948
13JAN2008:12:00:00 AM	.	19.9061
14JAN2008:12:00:00 AM	.	37.1845
15JAN2008:12:00:00 AM	.	37.8758
16JAN2008:12:00:00 AM	.	38.1950
17JAN2008:12:00:00 AM	.	37.2242
18JAN2008:12:00:00 AM	.	41.7652
19JAN2008:12:00:00 AM	.	28.8948
20JAN2008:12:00:00 AM	.	19.9061
21JAN2008:12:00:00 AM	.	37.1845
22JAN2008:12:00:00 AM	.	37.8758
23JAN2008:12:00:00 AM	.	38.1950
24JAN2008:12:00:00 AM	.	37.2242
25JAN2008:12:00:00 AM	.	41.7652
26JAN2008:12:00:00 AM	.	28.8948
27JAN2008:12:00:00 AM	.	19.9061
28JAN2008:12:00:00 AM	.	37.1845
29JAN2008:12:00:00 AM	.	37.8758
30JAN2008:12:00:00 AM	.	38.1950
31JAN2008:12:00:00 AM	.	37.2242

After the forecasted and real data had been compared, it turned out that prognosis values are overestimated. An average predicted road event equivalent coefficient was equal to 27 while the empirical mean was only 18.9. A predicted standard deviation was equal to 4.1 what proved that forecasted REEC values were much more homogenous than the empirical ones (empirical standard deviation was equal to 11.6). A comparison of values within 12 first days of the prognosis term are presented at the figure 5. Because of the low value of R2, the results met our expectations.

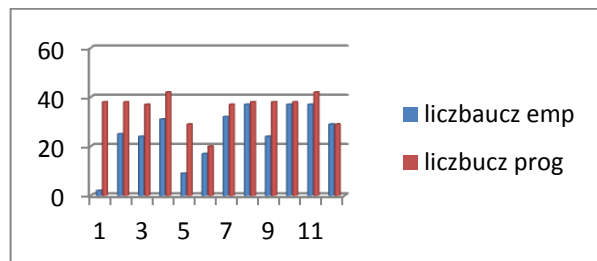
Figure 5. Empirical (ekwi emp) and predicted (ekwi prog) values of REEC



The forecast of number of participants turned out to be a bit more accurate. The empirical mean value of NP was equal to 25.3 with the standard deviation 11.1, the predicted mean value was equal to 35.5. and the forecasted standard deviation was 6.4. It could be observed that between 6th and 12th of January values of forecasted and empirical numbers of

participants are comparable. A comparison of values within 12 first days of the prognosis term are presented at the figure 6. It worthwhile to mention than even a bit greater R^2 coefficient proves better fitting of the model to empirical data.

Picture 6. Empirical (liczbaucz emp) and predicted (liczbaucz prog) values of NP



DISCUSSION

There exists a variety of characters and phenomena which seems to be unpredictable. Among them, we could list, for example, contracting a disease, improving health state, etc. However, thanks to modern statistical methods and computer application we can explore huge amount of data learning a lot about their structure and interdependences. One of the simplest advanced statistic reasoning – time series analysis – enable us to forecast future trends, behaviors, features in order to model them and change accordingly to our demands. This way it is possible both to prevent much better from diseases and other unrequired results, and to improve the features what can make a contemporary state better.

The method of modelling data described in the paper did not give accurate results. However, it was interesting to show how many people could take part in road events and how serious the event could be if nothing would be changed either in the road structure or in the traffic organization. Similar survey could be done based on medical data in order to show, for instance, how the phenomenon could spread or change.

ACKNOWLEDGMENT

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ELECTRONIC TRAINING MANUAL IN BASKETBALL: PURPOSE, CONTENTS, FUNCTIONS

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SUMMARY

Computer technologies in physical training are designed to improve the quality of the training process. The publication presents the description of the electronic training manual in basketball. The manual is designed for use in practical classes. The teaching material presented in the manual is used as a visual aid during physical exercises directly. Functional capabilities of the manual's software take into account the peculiarities of the basketball-related educational and training processes. Using this manual, training session sets can be generated. Didactic functions of the electronic manual are: presenting information about the technique of performing playing elements, preliminary and intermediate exercises, organizing a group of basketball trainees, basketball tactics, and basketball rules.

KEY WORDS: electronic training manual, basketball teaching, didactic interaction.

INTRODUCTION

Basketball as a sport plays a special role in the system of physical training of the rising generation. During basic education schoolchildren must acquire knowledge, skills and habits at such a level which would allow them to apply basketball means to solve problems of health-improving and applied orientation in their future adult life. The importance of basketball actualizes the problem of providing the quality of its teaching. One of the most promising ways to increase the effectiveness of educational activity lies in developing and implementing educational technologies based on the use of computer equipment and specialized software. The expediency of the educational activity computerization has been proved by studies of A.I. Bashmakov, V.P. Bespalko, L.H. Zainutdinova, E.I. Mashbits, P.I. Pidkasisty, I.V. Robert, A.V. Hutorskoi and others. At the same time the didactic potential of computer technologies of training at the physical culture classes is used in an extremely limited way now. Nowadays there is an apparent lack of specialized educational software and

there is no methodology of its implementation and use. This became the reason for developing the electronic training manual (ETM) “Uroki fizicheskoi kultury i zdorovya. Basketbol. 5-11 klassy”.

The research objective is to describe the ETM “Uroki fizicheskoi kultury i zdorovya. Basketbol. 5-11 klassy”.

Research methods: the analysis of methodological literature, theoretical methods (synthesis, abstraction, modeling).

Research results and their discussion. In its content and functional capabilities the developed ETM is the universal didactic system designed to support the educational process in the discipline "Physical culture" in educational institutions of general high education.

In its methodological purpose the ETM in basketball belongs to the group of training software which provide:

- visualization of educational information at practical and theoretical classes;
- managing pupils' educational activity during motive activities training;
- planning of the educational process;
- monitoring and evaluation of the level of mastering the technique of track-and-field exercises.

The teaching material presented in the ETM corresponds to Belarusian curricula on physical culture for schoolchildren of 5-11 classes [1]. The specific features of the ETM in basketball are as follows:

- all teaching material is presented in the form of videos, computer animations and illustrations;
- for trainees to gain a better understanding of the scheme of physical actions, the videos contain explanations and hints focusing on principal reference points;
- the teaching material is presented by: the technique of performing the basic exercise, the detailed description of the technique, exercises for learning and revising the technique of the exercise, the scheme of organizing the group of trainees, safety rules at classes;
- unlike a video film, the teacher can compose the individual study kit which he or she plans to use at his or her class.

The physical configuration of the ETM in basketball is presented in the figure below.



1 – table of contents (structure of information frames); 2 –video window; 3 – text explanation to the video; 4 –videoplayer control panel; 5 – switching over to full-screen mode; 6 – invoking filter control menu; 7 – overview of the list of external files attached to the ETM; 8 –full name of the information frame.

Figure 1 The user interface of the ETM in basketball

The ETM's functions from the position of a teacher of physical culture (fig.1):

- 1) preparation for teaching basketball in different classes taking into account the level of initial physical and technical readiness of schoolchildren;
- 2) formation of the lesson summary including visual teaching materials;
- 3) implementation of illustrativeness of the teaching material studied during the class;
- 4) demonstration of basketball technique with various levels of detailization;
- 5) formation of homework for pupils with visualized exercises;
- 6) evaluation of the level of trainees' mastering of basketball technique and tactics on the basis of comparison with the standard.

Depending on the form of class organization, educational tasks, as well as on the results of pedagogical control, the teacher can choose the level of the teaching material complexity.

Functional capabilities of the ETM in supporting the schoolchildren's studies are as follows:

- 1) obtaining educational information in the most realizable form;

- 2) full understanding of the content of the reviewed motor task;
- 3) supporting controlled self-study of schoolchildren;
- 4) presence of visual references for motional self-improvement.

The pilot implementation of the ETM in basketball took place within the framework of the national educational experiment in nine schools of Grodno region. The obtained data give evidence of the educational expediency of the suggested informatization form of physical culture classes.

CONCLUSIONS

The ETM in basketball provides trainees with helpful tools the use of which can lead to the following results:

- the way to solve a motor task is studied using specific visual references;
- the period of time spent on acquisition and learning of educational information becomes shorter;
- the effect of «deep feeling of the motion» is gained on the basis of connection of the muscular sensation image with the knowledge obtained during acquisition of specialized knowledge by trainees;
- the teacher chooses the teaching material and the pace of its presentation to the trainees according to the pre-set level of complexity.

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ELEKTRONICKÝ VÝCVIKOVÝ MANUAL V BASKETBALE: ÚČEL, OBSAH, FUNKCIE

SÚHRN

Počítačové technológie v telesnej výchove sú navrhnuté tak, aby zlepšiť kvalitu tréningového procesu. Publikácia obsahuje opis elektronického výcvikového manuálu v basketbale. Príručka je určená pre použitie v praktických cvičeniach. Učebné materiály uvedené v tejto

príručke sa používa ako vizuálna pomôcka počas telesných cvičení priamo. Funkčné schopnosti softvéru Tento manuál je brať do úvahy osobitosti vzdelávacích a školiacich procesov basketbal účely. Používanie tejto príručky, školenia súbory môžu byť generované. Didaktické funkcie elektronického manuálu sú: prezentácia informácií o technike prevedenie s hernými prvkami, predbežné a priebežné cvičenie, organizovanie skupina basketbalových učňov, taktiky basketbalové a pravidlá basketbalu.

KLÚČOVÉ SLOVÁ: elektronický výcvikový manuál, basketbal výučby, didaktické interakcie.

ACTIVITIES OF THE UNION OF SLAVIC SOKOL MOVEMENT IN THE LIGHT OF GYMNASTIC GUIDE „SOKOL” (1924 – 1939

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SUMMARY

The aim of the study is to present the activities of the Union of Slavic Sokol Movement in the light of Gymnastic Guide "Sokol" (1924 - 1939). The idea of "Sokol" developed rapidly in the Czech Republic. In the period of the outbreak of World War I, "Sokol" has developed in other Slavic countries, among others in Slovenia, Croatia, Bulgaria, Russia, and Poland. Even before the outbreak of World War attempts of joint cooperation of Slavic Sokol among others through participation in Sokol's rallies were expressed.

In the interwar period the development of Gymnastic Guide "Sokol" in the Slavic countries has begun. The largest numerically Sokol organizations were: Czechoslovak Sokol Association, Yugoslavian Sokol Association and the Society of Gymnastic Associations "Sokol" in Poland. Sokol Organisations from different Slavic countries were establishing cooperation. The result of these activities was the creation of the Slavic "Sokol" Union in 1925. Except "Sokol" Associations from aforementioned countries, to Slavic "Sokol" Union joined Sorbian (Bautzen) "Sokol", Gymnastic Union "Junak" from Bulgaria and the Russian 'Sokol' Union in exile.

On the initiative of Slavic "Sokol" Union joint rallies, "Sokol" courses and sport competitions were held. One of the biggest Slavic rallies was held in August in Prague on July 1-6, 1932. The activity of Slavic "Sokol" Union disappeared in 1939.

KEY WORDS: Gymnastic Society "Sokol" [*Falcon*], Slavic countries, physical education, sport

INTRODUCTION

The sokol idea developed in the Czech Republic. The creators of the Czech „Sokol” were Miroslav Tyrš and Jindřich Fügner. In the period until the outbreak of World War I „Sokol” developed in other Slavic countries, among others in Slovenia, Croatia, Bulgaria, Russia, and also in Poland. „Sokol” in Ljubljana was founded in 1863; in the years 1865 - 1866 the first Slavic sokol nests on the American continent were created; in 1867 the first nest of Polish „Sokol” was established in Lviv; in 1874 the Sokol movement developed among Croats; the genesis of the Sokol movement in Serbia falls on the year 1882, while in 1889 the idea of sokol penetrated to Russia (Gymnastic Guide „Sokol”, 1925 no. 12, p. 203).

„Sokol” in addition to the activities in the field of physical education and sport was engaged in cultural, educational, publishing, patriotic and pro-independence activities. Even before the outbreak of World War I there were attempts at joint activity of the Slavic Sokol Movement, among others expressed through participation in sokol rallies.

The aim of this article is to present the activities of the Union of Slavic Sokol Movement in the light of Gymnastic Guide „Sokol” in the years 1924– 1939. Gymnastic Guide „Sokol”, a magazine, was published in Warsaw in the years 1924– 1939. It came out mainly as a monthly. As far as the present state of research is concerned the most important are publications of the following authors (Blecking 1998; Małolepszy, Pawluczuk 2001; Drozdek-Małolepsza, Małolepszy 2013; Waic and col. 1996). It is worth mentioning that in some publications, addressing the issues of Sokol, the questions of the Union of Slavic Sokol Movement were touched upon in a fragmentary way (Mirkiewicz 1996; Pawluczuk 1996; Zaborniak, Obodyński 2008).

METHODS AND RESEARCH PROBLEMS

The paper uses the following research methods: analysis of historical sources, the method of synthesis, induction, deduction, and a comparative method. The following research areas have been put forward:

1. What part did the magazine Gymnastic Guide „Sokol” play in the process of dissemination of knowledge relating to the activities of the Union of Slavic Sokol Movement?
2. What were the activities of the Slavic Sokol Movement within the scope of organizational work, training staff for the purpose of „Sokol”, physical education and sport, development of ties between fraternal sokol organizations?

RESEARCH RESULTS

In the interwar years the Union of Slavic Sokol Movement was established. In August 1924, during the Rally of Yugoslavian Sokols, on the initiative of Adam Zamoyski the organizing committee was appointed. The organizing committee included representatives of „Sokol” from Czechoslovakia, Yugoslavia, Poland and Russia in exile (Ponczek, Drozdek-Małołepsza 2001). A year later (1925), at the Rally of Mazovia District of „Sokol” the statutes and declaration of the Union of Slavic Sokol Movement (USFM) were adopted. The declaration of USFM reads as follows: "Representatives of Sokol Associations, the ones of Czechoslovakia, Yugoslavia, Poland and Russia abroad, assembled on 14 August 1925 in the renowned capital of the Polish Nation, Warsaw (...) unanimously make the following declaration: Excited about the solemn mission of the Sokol idea and convinced that the idea, based on the principles, pointed out by M. Tyrs (...) is called to identify the ways of rebirth and rapprochement of Slavic nations; recognizing that Slavic nations obedient to the voice of eternal kinship and brotherly love, should unite their forces for the purpose of the development and defence throughout the Slavdom; henceforth we will line up to take care together of the moral and physical development of the Slavic peoples in the spirit of democratic brotherhood, rejecting all that divides us "(Gymnastic Guide „Sokol”, 1929 no. 13, p.145).

The Board of USFM was constituted in 1926 and was composed of: Józef Scheiner – President (Czechoslovakia), Adam Zamoyski – 1st Vice-President (Poland), Engelbert Gangl – Vice-President (Yugoslavia), Dymitr Wergun – Vice-President (Association of Russian Sokols In Exile), Wincenty Stepanek – Secretary (Czechoslovakia), Józef Truchlarz – Treasurer (Czechoslovakia), Henryk Vanicek – Head (Czechoslovakia) (Gymnastic Guide „Sokol”, 1929 no. 13, p.145). In 1929 the Association of Sorbian-Lusatian Sokol joined USFM; in April 1931 the Union of Slavic Sokol Movement in America; in 1934 the Gymnastic Association "Junak" in Bulgaria (Gymnastic Guide „Sokol”, 1935, no. 12, p.210).

On 11 January 1932 Józef Scheiner, the President of USFM and the President of the Association of Czechoslovakian Sokol Movement, died (Gymnastic Guide „Sokol”, 1932, no.1, p.1). As A. Zamoyski writes on the pages of Gymnastic Guide „Sokol”: "The man who passed away was of great stature, an ardent patriot who sacrificed his whole arduous life for the cause of his nation, who in broad terms of this cause related it closely to the Slavic idea. He felt and knew that the future of both the entire Slavdom as well as individual Slavic nations is in unity and harmony (Gymnastic Guide „Sokol”, 1932, no.1, p.1). After

J.Scheiner's death, Stanisław Bukovsky was appointed the new President of the Association of Czechoslovakian Sokol Movement. During the meeting of the Presidency of USFM in Ljubljana on 30 June 1933, S. Bukovsky (Czechoslovakia) became the new President, E.Gangl, A. Zamoyski (Vice-Presidents), W. Stepanek – Secretary, J. Truchlar – Treasurer (Gymnastic Guide „Sokol”, 1933, no. 6-7-8, pp. 113-114). On April 9, 1935 in Prague in Tyrs's House the meeting of USFM representatives was held. The new authorities were elected: S. Bukovsky – President, E. Gangl – Vice-President, F. Arciszewski – Vice-President, Eugeniusz Koppl – Secretary, J. Truchlar – Treasurer, dr M. Klinger – Head.

Sokol activists from Slavic countries participated in the meetings of the USFM Presidency. On January 11, 1931 a meeting of USFM was held in Prague, attended by representatives of „Sokol” from Czechoslovakia, Yugoslavia and Poland, among others J. Scheiner, E. Gangl and A. Zamoyski (Gymnastic Guide „Sokol”, 1931 no. 2, p.37). The meeting was chaired by the President of USFM – J. Scheiner. During the meeting, its participants honoured the memory of the deceased prominent Sokol from Czechoslovakia – Karol Heller. A representative of the Yugoslav „Sokol” – E. Gangl thanked the sokol associations from Czechoslovakia and Poland for their participation in a rally in Belgrade in 1930, Milada Mlada (Czechoslovakia) "for exemplary preparation of Czechoslovak female sokols" and Jadwiga Zamoyska for organising "a beautiful show of Polish dances". Members of the Presidency discussed the conditions of admission of the Gymnastic Association "Junak" from Bulgaria to USFM. The President of "Junak" was Watew.

The meeting of the Presidency of USFM under A. Zamoyski's direction was held on February 26, 1933 in Ljubljana (Gymnastic Guide „Sokol”, 1933, no. 2-3, pp. 28-30). During the meeting the amendments to the statutes of USFM were discussed and appeasement of internal conflict which existed within the Association of Russian Sokols in Exile. One of the causes of the dispute was the question of the seat of Russian Sokols In Exile – in Belgrade or in Prague.

On the initiative of USFM conferences dedicated to educational and cultural activities were organised. In the seat of USFM in Prague on 2 May 1931 the conference of USFM took place with the following participants: Vincent Stepanek (USFM Secretary), Antoni Krejcz (Czechoslovakia), Włodzimierz Belajcic (Yugoslavia), Marcin Nowak (Sorbian-Lusatian „Sokol”), Aleksander Winniczuk (Association of Russian Sokols in Exile), M. Maksyś – Poland (Gymnastic Guide „Sokol“, 1931 no. 5, pp. 97-98). The conference participants drew attention to making contacts between Slavic sokol associations closer, "opposing Slavic solidarity to the enemies of Slavdom"; organizing rallies of representatives of individual sokol

organisations; organizing joint training courses, lectures and talks; celebrating in all sokol associations "in one of the selected months the sokol festival of sokol brotherhood" (Gymnastic Guide „Sokol”, 1931, no. 5, p.98). On November 11, 1932 in Tyrs's house in Prague a meeting of USFM authorities was held chaired by Agaton Heller.

The largest organization making up USFM was „Sokol” in Czechoslovakia. Sokol structures were rebuilt fairly quickly after the end of World War I. Sokol structures in 1922 had 2,401 nests in 53 sokol districts with 360,192 members - over 18 years of age (Gymnastic Guide „Sokol”, 1925 no.12, p.203). In addition, 80,024 of sokol adolescents (from 14 to 18 years of age) and 131,372 girls and boys (under 14 years of age) belonged to „Sokol”. In Slovakia there were 85 nests organized in 7 districts (provinces). In 1932 it had 50 districts, 2,887 nests, 376,213 members, including 114,227 women and 321,648 children and adolescents. The Association of Czechoslovak Sokols was recognized as a state organization. It had a huge fortune, mainly in the field of sports infrastructure: 975 sokol exercise facilities, 1,579 pitches and 52 swimming pools. It maintained 837 divisions of football, 433 skiing divisions, 270 Czech handball, 107 tennis, 47 swimming, 42 basketball, 40 horse riding, 6 rowing, 6 fencing, 3 cycling, 2 athletics divisions, 1 shooting and 1 skating division.

The second largest organization was the Association of Yugoslavian Sokols. As of 1935, it had 25 districts, 914 societies and 1641 divisions, which totalled 2,555 nests (Gymnastic Guide „Sokol” 1936 no. 6-7, p.183). The largest sokol district was Nis with 263 nests, and the smallest one Nowe Miasto (Novo Mesto). The district of Nowe Miasto (Novo Mesto) consisted of 21 nests. „Sokol” had 177,225 members, including 25,576 women; 36,628 sokol youth (26,018 male youth and 10,610 female youth); 92,225 fledgling sokols (52,067 boys and 40,158 girls). In total „Sokol” consisted of 306,078 people. It is worth mentioning that, compared to 1934, the number of members decreased by 25,057 members and fledgling sokols. 41,951 members were engaged in physical activity, which represented 23.7% of all members. In terms of infrastructure it had 139 sokol exercising facilities and 296 pitches. The Association of Yugoslavian Sokols since 1930 was a state organization. The press organ of the Association of Yugoslavian Sokols was „Sokolska Prosveta”. The editors of the magazine had their seat in Novi Sad. On the pages of the magazine also materials devoted to Slavic sokol movement were published.

The Union of Gymnastic Societies (UGS) „Sokol” in Poland as of December 31, 1934 had 50,860 members (Drozdek-Małołepsza, 2001). It had 167 sokol exercising facilities, 144 pitches and 45 shooting ranges. Two years later - as of December 31, 1936 - UGS „Sokol” had 832 nests and 58 districts; 47,304 members (8,711 female sokols and 38,593 male

sokols), of whom 15,785 members (4,341 women and 11,444 men) actively participated in physical exercise; 13,847 fledgling sokols (4,342 girls and 9,505 boys, it had 179 sokol exercise facilities, 167 sports pitches and 39 shooting ranges (Gymnastic Guide „Sokol” 1938 no.3, p.93).

The Association of Russian Sokols in Exile had nests in Poland, among others in Lviv, Poznań and Vilnius (Gymnastic Guide „Sokol” 1933 no. 1, pp.20-21). In September 1932 a nest of „Sokol” was established in Stanisławów. Activists of Russian „Sokol” in exile began to build nests in Volyn - in Kremenets and Lutsk.

The nests of Sorbian-Lusatian „Sokol” were first set up - in the interwar period at the turn of the 2nd and 3rd decade of the 20th century. (Gymnastic Guide „Sokol”, 1933 no. 5, pp.94-95, 1929 no. 13, pp.148-149). In Bautzen on November 9, 1920 the first nest of „Sokol” was created. An important date for the Sorbian-Lusatian Sokol was April 21, 1924. Then the 1st Rally of Sorbian-Lusatian Association of Sokols was held (Gymnastic Guide „Sokol”, 1924 no. 12, p.141). The rally was attended by Sokols from Czechoslovakia and Poland. During the rally celebrations, among other things, the Lusatian national anthem was sung, there were occasional speeches and gymnastic shows. At the end of the 1920s the Sorbian-Lusatian „Sokol” had 18 nests. On 8 March 1931 in Bautzen the Meeting of the Association of Sorbian-Lusatian Sokol took place, chaired by the President - Jakub Szajba (Gymnastic Guide „Sokol” 1931 no. 4, p.79). The meeting was attended by about 100 representatives from individual nests. The Sorbian-Lusatian „Sokol” had a press organ - "Sokol Letters", published 10 times a year. In addition, 2 gymnastic competitions were organized in Bautzen and Radibor, and preparations for the 3rd All-Association Rally, to be held on 17 May 1931 in Radibor near Bautzen, were completed. In the 2nd half of 1932 Germany began to persecute the Sorbian-Lusatian Association of Sokols. The German authorities "recognized the Association as a political organization, thus creating for themselves the opportunity to control sokol meetings and to prohibit wearing uniforms, and even the sokol badge" (Gymnastic Guide „Sokol” 1932 no. 9, p.202). At the Extraordinary General Meeting of the Association of Sorbian-Lusatian Sokol, on 9 March 1933 in Bautzen, delegates of societies and members of the Presidency of the association unanimously adopted the following resolution: "central organizations of the Sorbian sokol are disbanded. Societies, up until now united in the association, have been instructed to disband too" (Gymnastic Guide „Sokol”, 1933 no. 5, p.94). The Association of Sorbian-Lusatian Sokol disbanded because of the situation that prevailed in Germany in the first half of 1933 and in the following period, after nationalist and socialist forces came to power in Germany. The editors of Gymnastic

Guide „Sokol” referred to the further work of members of the Sorbian-Lusatian Sokol in the following words: "Let them continue to work in our Sorbian societies for our homeland dearest above all and so strongly connected with the German state (...). Sorbian-Lusatian cultural and national work cannot be an obstacle to participation in the activity for the common work of this state, according to our old slogan: <<Nothing for oneself, everything for a whole>>". At the meeting of the Presidency, on 30 June 1933, USFM, issued a statement "expressing solidarity with Sorbian-Lusatian sokol movement persecuted by the Germans" (Gymnastic Guide „Sokol” 1933 no. 6-7-8, p.114).

On the initiative of sokol associations operating in exile in the United States - Czechoslovakian, Yugoslavian and Polish ones - on 12 April 1931 an organizational meeting was held, at which it was decided to merge Slavic sokol organizations and to establish the Union of Slavic Sokol Movement in America (Gymnastic Guide „Sokol” 1931 no. 6, p.100). It was also decided that the system of physical education would be based on the "Tyrs's sokol system"; common speeches before the American society. One of the most immediate tasks was to prepare for the All-Slavic Sokol Rally to be held in 1932 in Prague. Starzyński (Poland) was elected the President, and Vice-Presidents: J. Zeman (Czechoslovakia) and B. Milasevic (Yugoslavia), Secretary F. Oslislo (Czechoslovakia), Head J. Jelinek.

On the initiative of USFM „Sokol” instructor courses were conducted, as well as conferences, sokol rallies and sports competitions. One of the first undertakings was to conduct a course in knowledge of sokol movement in Prague on 22 - 27 May, 1927. The course was attended by 25 participants. The speakers on the course were Sokols of Czechoslovakia, Yugoslavia, Poland and the Association of Russian Sokols in Exile; among others from Poland: Bronisław Korewa, M. Maksyś, Aleksander Małaczyński, Antoni Wolski, Jadwiga Zamoyska, Adam Zamoyski; from Czechoslovakia: Antoni Krejci, Józef Scheiner, Vincent Stepanek; from Yugoslavia: Engelbert Gangl; from the Association of Russian Sokols in Exile: Lew Magerowski, Mikołaj Manochin, Eugeniusz Salkow, Dymitr Wergun. In July 1937 in Novi Sad a referee course took place, prepared by the Association of Yugoslav Sokols in the name of USFM (Gymnastic Guide „Sokol” 1938 no. 3, p.92). The course was attended by among others: H. Zielińska and H. Chelmicki.

As part of USFM sokols from various Slavic countries participated in sokol rallies. On 26 – 27 June, 1927 Pokrajina Rally of the Association of Yugoslavian Sokol Movement took place in Ljubljana (Gymnastic Guide „Sokol”, 1927 no. 15-16, pp.181-182). The rally was attended by Sokols from Czechoslovakia, Yugoslavia, Poland and Russia in exile. Delegation of UGS „Sokol” in Poland, with the President of the Union Adam Zamoyski took part in the

Rally of Czechoslovak Sokol Movement in Pilsen on 6 - 7 July 1929 (Gymnastic Guide „Sokol” 1929 no. 14-15, p.177). Organizations making up USFM participated in the 7th Rally of Polish Sokol Movement in Poznań in 1929, among others from Czechoslovakia and Yugoslavia.

One of the biggest All-Slavic Rallies was held in Prague on 1 - 6 July 1932. The rally was attended by a group of 370 sokols from Poland. This was the only case of such a large participation of Polish sokols abroad. The Prague rally was attended by Yugoslav sokols - 5,700; about 700 people from the Russians in exile; from Bulgaria - 200 people; from the American continent - 2,000 (Gymnastic Guide „Sokol” 1932 no. 4, p.73; 1932 no. 12, pp.260-261). The participation of members of the „Sokol” from abroad was quite large at the Union Rally in July of 1929 in Poznań. It was attended by 1,150 foreign sokols. Delegation of the Polish Sokol Movement headed by Adam Zamoyski took part in 1935 in the Jubilee Rally of the Gymnastic Association "Junak" in Sofia.

The Rally of the Yugoslav Sokol Movement in Subotica, conducted on 27 - 29 June, 1936, was attended by a large delegation from Czechoslovakia and the Association of Russian Sokols in Exile (about 400 sokols) and major A. Bogusławski - representative of UGS „Sokol” in Poland. (Gymnastic Guide „Sokol”, 1936 no. 8, pp.228-229; 1938 no. 3, p.92). At the rally there were representatives of Yugoslavia authorities, among others the representative of the monarch - the king of Yugoslavia and the Yugoslav government. Such low participation of sokols from Poland was puzzling. As explained in the commentary to the rally, on the pages of the Gymnastic Guide „Sokol”: "It must be stated that (...) forced absence, reflects badly not only on the seriousness of the Polish sokol movement, among brotherly peoples, but also on the prestige of our country, and what is worse - causes a variety of adverse political commentaries" (Gymnastic Guide „Sokol”, 1936 no.8, p.229). Delegates of USFM were present at the 8th All-Poland Rally in Katowice in 1937.

As part of USFM sports competition was organized. In the programme of the 7th Rally of Polish Sokol Movement in Poznań in 1929 skiing competition of USFM was organized. The competition was held on 12 - 13 January, 1929 in Zakopane (Gymnastic Guide „Sokol” 1929 no. 3, pp.25-28). In the women's 6 km ski race B. Staszek-Polankówna (Poland) was the winner ahead of female sokols from Czechoslovakia - Bohumila Gottsteinova and Hanna Gregorová; in 18 km male sokol ski run the winner was Frantisek Fisera (Czechoslovakia) ahead of Władysław Czech (Poland); in the team competition (18 km run) the „Sokol” team of Zakopane won (Szostak, Motyka, Czech) ahead of the „Sokol” team from Czechoslovakia (Fisera, Martin, Zisius). In ski jumping the first three places were taken by sokols from

Poland: Stanisław Gąsienica-Sieczka, F. Cukier, Andrzej Krzeptowski, the 4th place was taken by Bohumil Kadavy (Czechoslovakia). During the Rally in Poznań (1929) gymnastic competition was held. In individual events - in international competition - there were the following winners: among men, in competitions of higher degree packs the first three places were taken by packs from the Association of Sokol Movement in Czechoslovakia; in individual competition of higher degree the 1st place was taken by Vilem Oburka (Czechoslovakia, Brno), ahead of Bohuslava Prihode (Czechoslovakia, Kralove Vinohrady) and Boris Gregorka (Yugoslavia, Ljubljana); in female sokol competitions, in competitions of higher degree packs the pack of female sokols from Czechoslovakia won before female gymnasts from Yugoslavia; in individual competition the first three places were taken by female sokols from Czechoslovakia. Maria Lorencova won ahead of Zdenka Hajna and Vlasta Dekanova; in competition of lower degree packs the pack of female sokols from Czechoslovakia won, the 2nd place went to the pack of the Greater Poland District from Leszno; in individual competition of lower degree Vera Boricka (Zižkov) was the winner (Gymnastic Guide „Sokol”, 1929 no. 16, pp.181-185). In addition to gymnastic competitions sokols of USFM took part in track and field events.

The Association of Sokol Movement of Czechoslovakia was in 1931 authorized to conduct skiing competitions of USFM. (Gymnastic Guide "Sokół", 1931, no. 11, p.235). Skiing competition was to be one of elements in the programme of All-Slavic Rally in Prague in 1932. It was expected to be held on 3 - 6 March 1932 in Štrbské Pleso. The programme of the competition consisted of the following events for women: 6 km ski run and 10 km ski run; for men - 3 km downhill ski race, 18 km ski run, and the ski jumping competition (Gymnastic Guide „Sokol”, 1931 no. 11, p.235; 1932 no. 2, pp.34-35).

Rally sports competitions of USFM in the High Tatras (Czechoslovakia) were held from 6 - 12 February 1938. (Gymnastic Guide „Sokol”, 1938 no. 5, pp.204-205). As for competitions of Slavic Sokol Movement skiing competition was held, because only sokols of Czechoslovakia took part in ice hockey and skating tournaments. In men's team classification sokols from Czechoslovakia were the winners (2,773.296 p.), the 2nd place was taken by the Yugoslavs (2,549.629 p.), the 3rd place - Bulgaria (827.826 p.), and the 4th one - Poland (437.925 p.); in the female sokols competition (downhill run and slalom) female sokols from Czechoslovakia (568.2 p.) were the winners ahead of the female Yugoslavs (377.2 p.). The Polish sokol press highly appraised the organization of the competitions. As the editors of the Gymnastic Guide „Sokol” write: "The organization of the competition was flawless. Guests were warmly welcomed, and the premises for the Yugoslavs, Bulgarians and Poles in the

hotel < <Praha> > in Tatranská Lomnica and the hotel "Hviezdoslav" in Štrbské Pleso, where the competition in classic events was held, pose a very difficult task for the Polish Sokol Movement at the moment when it is our turn to organize such competitions, as we have not had hotels decorated in such a way yet and it seems we will still not have them for a long time"(Gymnastic Guide „Sokol” 1938 no. 5, pp.204-205).

Another initiative of USFM was the organization of gymnastic competitions of Slavic associations in Novi Sad - Yugoslavia (Małolepszy, 2001). The competitions took place on 18 - 19 December, 1937 with the participation of national teams of „Sokol” from Bulgaria, Czechoslovakia, Yugoslavia, and Poland. The Polish team was composed of: Edmund Kosman, Wincenty Pietrzykowski (Warsaw), Bernard Radojewski (Poznań), Tadeusz Bettyna (Bydgoszcz), Wilhelm Breguła, Jan Gryszka, Maksymilian Pradela, Wilhelm Ślosarek and Teofil Rost (Katowice). In the team classification the team of Czechoslovakia won (343.1 p.), ahead of Yugoslavia (325.8 p.), Poland (303.5 p.) and Bulgaria (267.1 p). In 1939 the next gymnastic competition was scheduled to be held with the participation of sokols from Bulgaria, Czechoslovakia, Yugoslavia, and Poland. Due to political issues - Germany's invasion of Czechoslovakia - only a gymnastic match Poland – Yugoslavia took place on 18 May 1939 in Warsaw. The winners were the gymnasts from Yugoslavia (334 : 324.75).

At the meeting of the Presidency of USFM on 14 December 1937 in Cracow a motion of the Polish delegation was passed "prohibiting Sokols of all nations from taking part in demonstrations against such Slavic nations, whose sokol associations belong to the Union of Slavic Sokol Movement" (Gymnastic Guide „Sokol”, 1938 no. 3, p.92; Ponczek, Drozdek-Małolepsza, 2001). This resolution, according to the Polish delegation was aimed at "enhancing in a very strong way the fraternal relationship of Slavic Sokol Movement." It is worth pointing out that there were changes in the composition of the board of USFM, on the part of Poland. The place of one of the main proponents of USFM - Adam Zamoyski was taken in the 2nd half of 1930s by Franciszek Arciszewski. F. Arciszewski served as Vice-President and President of USFM and the President of UGS „Sokol” in Poland. The President of USFM was Bukovsky (Czechoslovakia). In spite of this resolution (of December 14, 1937), as M. Ponczek and T.Drozdek Małolepsza write: "In the face of German invasion of Czechoslovakia the authorities of the Polish „Sokol” did not even bring themselves to express their solidarity with the Association of Czechoslovak Sokols" (Ponczek, Drozdek-Małolepsza, 2001). In 1939 the activity of USFM came to an end. In the Protectorate of Bohemia and Moravia established in 1939 the operation of „Sokol” was banned (Lipoński, 2012). On

September 1, 1939 Germany without a declaration of war invaded Poland. The Union of Slavic Sokol Movement ceased to exist.

CONCLUSION

On the pages of the Gymnastic Guide „Sokol” materials, reports and articles were published on the activities of the Union of Slavic Sokol Movement. They served not only to develop the concept of the sokol idea among "Brothers Slavs", but also led to broaden the knowledge of Slavic Sokol Movement, as well as spread the sense of brotherhood among Sokols - Slavs.

The Union of Slavic Sokol Movement was established in 1925. The members of the Union were Sokol Organizations from Bulgaria, Czechoslovakia, Yugoslavia, Poland and the Association of Russian Sokols in Exile, the Union of Slavic Sokol Movement in America and Sorbian-Lusatian „Sokol”. The authorities of the Union of Slavic Sokol Movement included representatives from various Slavic national organizations. On the initiative of the Union of Slavic Sokol Movement joint rallies, sokol courses and sports competitions were organized. One of the biggest All-Slavic Rallies was held in Prague on 1 - 6 July 1932. Activity of the Union of Slavic Sokol Movement declined in 1939.

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ČINNOST' ZDRUŽENIA SLOVANSKÝ SOKOL VO SVETLE GYMNASTICKÉHO SPRIEVODCU "SOKOL" (1924 - 1939)

SÚHRN

Cieľom tejto štúdie je predstaviť činnosť združenia Slovanský Sokol v svetle Gymnastického sprievodcu "Sokol" (1924 - 1939). Idea Sokola vznikla v Českej republike.

V období pred prvou svetovou vojnou sa Sokol vyvíjal aj v ďalších slovanských krajinách, medzi inými v Slovinsku, Chorvátsku, Bulharsku, Rusku a v Poľsku. Ešte pred vypuknutím prvej svetovej vojny boli pokusy o spoločnú aktivitu slovanského sokolstva, vyjadrené aj prostredníctvom účasti v súťažiach, ktoré organizoval Sokol.

V medzivojnovom období došlo k rozvoju Gymnastickej spoločnosti Sokol v slovanských krajinách. Najväčšími organizáciami Sokola v blízkych krajinách boli: Československý zväz Sokol, Juhoslovanský zväz Sokol a Gymnastické združenie spoločnosti Sokol v Poľsku. Organizácie Sokol z rôznych slovanských krajín medzi sebou spolupracovali. Výsledkom týchto projektov bolo v roku 1925 vytvorenie Zväzu Slovanských Sokolov. Do Zväzu Slovanských Sokolov, okrem sokolstva v sponenutých krajinách, sa pridali Srbskolužický Sokol (Budziszyn), Gymnastické združenie Junák z Bulharska a Zväzy ruských Sokolov v emigrácii.

Na základe iniciatívy Zväzu Slovanských Sokolov boli usporiadané spoločné sokolské zlety, sokolské kurzy a športové súťaže. Jeden z najväčších slovanských zletov sa konal v Prahe 1. - 6. júla 1932. Činnosť združenia Slovanský Sokol zanikla v roku 1939.

KLÚČOVÉ SLOVÁ: Gymnastické združenie Sokol, slovanské krajiny, telesná výchova, šport.

KAREL WEIGNER – PROTAGONIST OF A HEALTHY LIFESTYLE

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SUMMARY

This paper is aimed to present Karel Weigner as a physician, educator, "Sokol" worker and protagonist of a healthy lifestyle. His ideas and suggestions: focus on antique harmony of body and soul, social value of health, harmony of an individual with the nature, hygienic importance of game, will be included into a broader social context.

KEY WORDS: Karel Weigner, healthy lifestyle, harmony of an individual with the nature, harmony

INTRODUCTION

Work of Karel Weigner depends primarily on two directions-link medical and physically education. The aim of this paper is to bring closer an educational activities and intentions of the man who enthusiastically and almost without right for pay engaged in field of physical education. Weigner criticized overwork of students. He emphasized importance of hygiene games and irreplaceability of exercising on the fresh air. In his works he followed Tyrš and ancient ideal kalokaghatie. As a physician and educator he realized very well how important it is, not only for the nation but especially for individuals themselves to harmoniously develop their spirit, strengthen their body and realizing moral values. Ideas and suggestions of Karel Weigner on healthy lifestyle are valid nowadays. In order to achieve harmony of body and soul it is necessary to listen to our body and keep a healthy lifestyle consisting in enough of physical activity, sleep and a balanced diet. Further in making a good interpersonal relationships and not to be caught up in today's hectic time.

AIM

The aim of this paper is to analyze Weigner physical education works for a healthy lifestyle.

METHODOLOGY

Because it is mainly a historical work we have chosen biographical method. The essential feature of this method is an approach to social reality. In our case we are focusing on a healthy lifestyle through the knowledge of Weigner's life. Life of Karel Weigner interests us in the versatile connections to the surrounding life as a probe by which we want to work towards deeper knowledge about some of the parts of social development. (HROCH, M., s. 246). We analyze "sokolsko-ideological" and sports publications of Karel Weigner. Available biographical material about Karel Weigner consist of monographs, letters, diaries, notebooks, travel reports, books, proposals, etc.

KAREL WEIGNER

We can talk about Karel Weigner like about a teacher, university professor, rector of Charles University in Prague in the interwar period, physician, the great theoretician of physical education, physical education adviser on issues at the Ministry of public health and physical education, able and tireless organizer of state physical education courses¹ and last but not at least about a man who wants to uplift the nation in terms of all-round development of personality. If the personality of Karel Weigner will be seen as a "sokol" worker and promoter of "sokol" gymnastic, then in connection with him we cannot omit Miroslav Tyrš and the idea of a patriotic mission of "sokol". Weigner continues in this ideas and suggestions in his considerations and works. Tyrš's (1971) influential article „our task, direction and goal“ considers Weigner as a „Sokol“ gospel because the fundamental pillars of a new national education system are discipline, freedom, equality, morality and brotherhood (Weigner, K., *Náš úkol, směr a cíl*, s. 13-14). In 1931 he wrote an essay „Our task, direction and goal after 75 years“ which is based on Tyrš's article.

Professor Weigner, thinking about health and well-being of our nation in the whole complexity, determines, in a problematic period when one world war changes another, principles of healthy lifestyle that are valid even today. In his works from the medical, but

¹ Karel Weigner is considered as an architect of the Czech topographic anatomy. From 1926 until his death in 1937 he led an anatomical institute of Charles University. He was also in the board of Czechoslovak "sokol" community. He led training course for teachers on high schools, Charles University and organized a national holiday postgraduate courses for physical education teachers and instructors of gymnastics clubs

also psychological and pedagogical perspective deals with ancient harmony of body and soul. Further in his works he is thinking about health as a social value. He does not omit emphasizing of the relationship between the individual and nature, hygienic significance of games and finally he mentions the negative factors of modern time which affect an individual's life: haste, stress, single aimed workload, bad working conditions and addictive substances.

THE TERM KALOKAGHATIE

Almost in every Weigner's works we can find term kalokaghatie. From a historical point of view we know that there are multiple interpretations of this term, depending on the selected period of ancient Greece. Platón deals with this issue in his dialogues, Aristoteles in politics, and others. Weigner understands this term as an ideal which aims to promote harmonious upbringing of humans. The importance of this ideal is the overall human cultivation, harmony of body and soul which product should be not only a beautiful and good person but also strong and free person (Weigner, K. Tělesná výchova, s. 9). This topic is especially important for school physical education which was not during the interwar period obligatory for all students. Weigner wanted to change this fact and that is the reason why he refers to the ancient ideal, to justify the necessity of physical education in the education of humans.

In connection with the aesthetic evaluation of physical culture we will stay by the Greeks. Weigner admires their sense of beauty. Muscular, healthy body of Greeks Weigner conceived as an Art. As an esthetician and doctor he express sadness over the fact that this art, art of creating beautiful bodies, unfortunately vanish in the context of the current loss soundness of body and soul. Beautiful body is a body which is healthy, developed, full of strength and flexibility (Weigner, K., Skauting v rámci tělesné výchovy, s. 8). Weigner was enraptured by ancient culture, he admires performing Greeks exercises, their versatile developed bodies where movements cannot “be other than beautiful, gracefully curved spine, upright posture, head and torso, arched chest which contrasts with hang head, bend back, flat chest and heavy-footed lazy walk, consequences of daily employment and inadequate care of body”. (Weigner, K., Skauting v rámci tělesné výchovy, s. 8)

Karel Weigner did not end by an admiration. In 1919 he drew up a proposal for the Czechoslovak government. During compiling a draft (1919) his findings were based not only on ancient culture but also on the principles of Komenský who accentuate the positive effect of physical activity on the spirit of a man and Tyrš's gymnastic system. (Bureš, P., Plichta, J. S. 11). The Proposal (1919) sets up the objectives of physical education, the means and methods used in physical education. Special attention had been focused on a didactics of a

physical education in which he elaborates, the ways of teaching young people of different age groups including time grants of physical education. Weigner's work was based on this proposal, which was the author, also in his activities of a chairman of the advisory board for physical education of the ministry of public health and physical education (Bureš, P., Plichta, J., S. 19)

Personality of a man is developed thanks to physical education. Qualities such as self-reliance, courage, balance, confidence, eagerness, truth, friendship, loyalty, reliability, discipline, sense of a general interest, willingness to help are also developed. Current education as Karel Wigner claims that physical education of youth is necessary part of an education and highlights some of its aspects such as: physical exercise (sports, games, swimming, winter sports) experiencing knowledge of physiology, diet, experiential exercises, recreation and picnics. (Československá vlastivěda, s. 607)

REFORM OF THE SCHOOL PHYSICAL EDUCATION

According to Karel Weigner it was necessary that physical education of children and adolescents was built on a solid scientific basis, based on medico-education and not rely only on experience, even though it was consecrated by tradition for decades (Weigner, K., *Náš úkol, směr a cíl po 75 letech*, 1937, s. 27). Weigner subsequently defined the requirements for physical education which should be versatile, general (binding as well as intellectual and moral education) and mandatory (on all schools for younger and older adolescents). Equally important requirement was the mentoring of students and continuous monitoring tools, methods and results of physical education experts including teachers and doctors. In the work of pre-school's doctors (Weigner, K., *O školních lékařích*, s. 2) author indicates an important task of the school doctor. The task is to monitor physical education of youth and also contributes along with a physical education teacher to decide on freeing pupils from teaching gymnastics and oversees the overall development of youth.

Karel Weigner criticized the education system of his time. Unfortunately teachers did not kept what J. A. Komenský advised and proceeded quite opposite. In the classroom prevailed complexity over simplicity, superficiality instead of knowledge and vain ambition for achieving the best results (records) instead of harmonious development of personality or whole nation. Weigner's criticism also touched disunity of school gymnastics, federal gymnastics and compulsory military service. What was missing was a uniform procedure in physical education in human development (from childhood through adolescence to adulthood) and thus development of our society was delayed. At last but not least point of criticism Weigner reserved himself against overloading of students. Weigner saw the cause in the fact

that students had a lack of rest which was reflected in fatigue of students resulted in poor results of students, health problems, decreased immunity, lack of interest in education, etc. School life was not the only one cause why the students were overloaded but also the way of life of students in the family, environment and stress were the causes. Workload of parents of students observes the life of the whole family as well. The constant rush, lack of time for themselves, for other family members creates stressful situations that can cause a family breakdown.

The school should help to healthy growth and development of students and understand their individual peculiarities. Weigner therefore defined proposals for changes of our education system: "in the lowest classes should not be more than 40 students, in the higher classes more than 30. Beginning of teaching day should be moved, in winter time, to nine o'clock in the morning. Length of teaching hour should be between 40 to 50 minutes. Between teaching hours should be break in length of 10 to 15 minutes. In education correct posture should be supervised, esp. in writing and drawing. Physical education should be taught in the afternoon. Especially physical education of children and adolescents should be guided by hygienic principles." (Weigner, K., *Zdravím k síle národa*, s. 111-114) Karel Weigner tried to introduce compulsory physical education for the general population of children and youth up to 24 years. The physical education was not mandatory in a whole vocational and high schools and therefore Karel Weigner as a chairman of the Advisory board of physical education submitted to the MVZTV a draft law of a mandatory physical education. According to this law pupils and students of these schools should have a mandatory physical education in gymnastics clubs. It remained only in draft. Weigner also contributed to a change of the content of physical education. School physical education in interwar Czechoslovakia inherited an Austrian outline of Adolf Spiess whose content was primarily tools and order exercises. Karel Weigner participated in the drafting of the new outlines in 1924 and 1933 which introduced natural movements, games and picnics into the physical education.

MOVEMENT IN THE NATURE

One of the main principles of Karl Weigner is irreplaceability of exercises in the nature. He demands changes in school system. He demands construction of a new gyms, summer playground and playgrounds with necessary tools and equipment. But the most important is movement in the fresh air. The exercises in the nature contribute to the hardening of students. In the summer students learned to swim, in winter to skate, ski and sledge. Weigner stresses the need of games that are for children and adolescents the most natural form of exercise

because they meet the following requirements. The game is important because it minimizes negative occurrence bore and fear. The diagnostic function of the game allows students to realize their deficiency and find their mistakes, knowledge and skills. The course of the game and the behavior of their individuals actors gives teachers an excellent opportunity to observe the social relation between children and their moral qualities and principles and what is more these qualities can be influenced in a positive way. Cultivation of games and sports such as swimming, rowing according to Weigner reinforce the natural abilities of the human body – walking, running, jumping and strengthens internal organs esp. heart function, lungs. (Weigner, K., Skauting v rámci tělesné výchovy s. 9)

Physical education is therefore an essential component of all humans. Scouting as an educational system educates the whole person with regard to the principle that the pillar of all character qualities is self-control. Scouting according Weigner makes youth fearless, imaginative, proactive, prescience, resolution and quick. Individuals learn qualities such as moderation, simplicity in lifestyle and rejecting addictive substances. Scouting gives children space for their imagination, it gives them the opportunity to imitate adults which leads them to independence. Among youth the love of life is awakened as well as creation and opportunity to make not only their life prettier. Because the fact that this physical education takes place in the nature we do not need to motivate them. The beauty of nature arouses in students lust to expolore, observe and investigate phenomena in nature. Young scouts thus emerge secrets that will not appear in the gym. “Scouting sees its goal in a healthy body, harmonious education of body and soul, in creation of permanent characteristics, in education of men and women, in the Socratic truth”. (Weigner, K., Skauting v rámci tělesné výchovy s. 9)

CONCLUSION

Karel Weigner became a significant figure in both the medical and sports science. In my contribution I mainly focused on his effect and creating healthy lifestyle which he asserted and propagated especially among children and youth. He did so in the context of comprehensive physical, mental and moral education in the spirit of kalokagathie in which he believed. Weigner as a doctor and educator was also aware of how important it is no only for nation but especially for individuals to harmoniously develop their spirit, strengthen their bodies and realizing their moral values. At the first sight work of Karel Weigner may look little bit archaic and too moralizing. It matches the historical period, in which Weigner worked, replete state-building which is in physical culture reflected in searching a new national form and also in building a new content of school and federal physical education.

Physical education has taken an important place in the education of citizens who have responsibility for their health and take care of their bodies by regular exercising. In this way Weigner's legacy seems to be very actual. The effort of comprehensive development of personality through which an individual will contribute to the development of whole society is timeless and that is the reason why is the work of Karel Weigner still inspiring.

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KAREL WEIGNER – ZASTÁNCE ZDRAVÉHO ŽIVOTNÍHO STYLU

SÚHRN

Príspevek si klade za cieľ predstaviť Karla Weignera ako lekára, vychovateľa, sokolského pracovníka a zastánce zdravého životného štýlu. Myšlienky a návrhy Karla Weignera zamerané na antickú harmóniu tela a duše, spoločenskú hodnotu zdravia, súlad jedince s prírodou, hygienický význam her, budú začlenené do širšieho spoločenského rámca.

KLÍČOVÁ SLOVA: Karel Weigner, zdravý životní styl, soulad jedince s přírodou, harmonie

PHYSICAL ACTIVITY AND LEISURE TIME STUDENTS

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SUMMARY

The aim of research is to identify pupils' attitudes to physical education and sport education and physical activities during their study on secondary school pupils of secondary schools in Slovakia, as well as determine the impact of the family on attitudes of students to physical sports activities and impact of the main factors of the teaching process to pupils' attitudes to physical education and sports. In Slovakia, we realized our research in 35 secondary schools. Correctly completed the questionnaire 1215 students of which 602 were boys and 613 girls. For statistical processing, we found statistically significant intersexual differences in popularity physical and sport education.

Implementation of physical sporting activities outside of physical education classes is more often in boys. Statistical analysis of the results showed statistically significant differences between boys and girls. Based on the calculated p-values we see, boys perform physical sports activities more often than girls.

KEY WORDS: attitudes, secondary school students, sport activities, physical and sport education.

INTRODUCTION

To do so, we exclude activities like working with the concept of physical sporting activities. Sports can perform as individuals and collectively, in different seasons but of course there are also extreme sports, air sports, and the like. Every sport has its complete name, precisely defined rules, regular competition and the managing authority. In fact, this is the main difference between sport and physical activity. In preparation for the sport, however, we use physical activities such as physical exercises and games to improve gaming activities and individuals alike. Between physical activities we also include a variety of children's games, such as the Red and White, Black Peter, various kinds of chases with various tools and so on.

Teachers should understand the importance of their mission, it is they who help in shaping the attitudes of students towards physical education and also to physical activities. In terms of creating the foundations to perform physical activity throughout the life of an individual is crucial age children and youth. During this period the foundations for lifelong physical activity, creates a positive relationship to the activities of a recreational nature their integration into strong lifestyle, attitudes and motives of adequate procedures (Pistlová, Sedlacek, 2008).

Physical education is historically the oldest branches of education. In past was associated with a military education. An example follows oriented physical education is the educational system in ancient Sparta. Physical education as an integral part of the content of education has undergone historical development and today occupies an important place in the educational process (Bartik, 2005).

Improvement of the teaching process in physical education is not possible without knowledge of objective empirical knowledge acquired from subjects directly involved - that the teacher and student (Střesková, 2001).

By Bebčáková and al. (2002) Physical education is a compulsory specific subject, as it focuses on the physical, functional, physical, psychological and intellectual improvement of pupils. Students do not receive it only theoretical and practical education, physical education from selected branches of physical education and sport but one of its goals is to stimulate bio-psychosocial effective lifetime exercise regimen and prevention of civilization diseases and the development and shaping positive attitudes of students towards sports activities and physical education.

In this complex system, creating attitudes in which are put many impulses on students. It should just be a teacher in major positive position who showed his students the right way to physical activities, not only in physical education classes but also in everyday life of pupils even that he offers to students the quality, interesting and varied of physical education lessons. Creating a positive attitude toward physical education, to physical activities is also important because so as pupils are actively involved in physical education, not only for physical education classes and beyond.

Precisely for this reason, many authors have paid attention to the pupils during PE classes. Survey of attitudes and the physical education classes, the teacher of physical education, with specific activities during PE classes.

Knowledge of the structure of interests of students in the sports industry is important in terms of curriculum in physical education in primary and secondary schools and professional training of student teachers of physical education (Bebčáková, 1998).

This is why the authors deal with the issue of attitudes from primary school to high school. Monitoring of physical education at school dedicated Beťák (2012) research sample consisted of 586 students who expressed their attitude to the assessment of teaching physical education units.

Bebčáková, Fromel, Ludva, Bartoszewicz and Skalik (2004) paid attention to the opinion survey of students to trainees on teaching practice in physical education classes and their research was realized in five European regions.

The issue of pupils attitudes in primary school to physical education and sport is dedicated by Michal (2006, 2007), Novotna - Vladovičová (2006), Bartik (2005, 2009).

Results of research Gorner-Starší (2001) in selected primary schools in the Central Region indicate pupils in sixth and eighth grade primarily positive attitudes toward school physical education and sport. An important factor positively influencing students they consider a good job of teachers and popularity of sport created by the media.

Among the researches in the field of survey of students attitudes of secondary school to physical education and physical activity are mainly work Sigmund-Frömela-Sigmund (2003), Bartik - Mesiarik (2009), Bendíková (2012), Antalá (2009), Michal (2009) and other authors.

Kollar-Michal-Kružliak (2010) surveyed students in the first and fourth years at selected secondary schools of their interests and attitudes toward physical activity in secondary schools. The final results have found that students enjoy practicing. They expected that in class pupils improved their mood and taste in learning.

Sigmund, Fromel, Sigmund (2003) are dealing with issue, school physical education, James, F. Sallis (2003) addresses the issue of quality physical education, together specifically they were dealing with the role of school physical education and organized physical activity in adolescent.

Michal (2002) in the interests and attitudes found that majority of students have a positive attitude towards physical education and showing interest in various forms of physical education and sports activities. Majority of students correctly understand the importance of physical education and sport from a personal and professional point of view but adds that the practical realization a number of subjective and objective reasons are behind.

Michal (2009), based on knowledge of the current global social problem of continuous deteriorating health of youth investigated the relationship of secondary school students to

physical activities and sports. Research has focused on the relationship of respondents to sport, the athletes and to activities which promote before sport and they prefer in their spare time.

The issue of attitudes towards physical education to sport and physical activities of university students pay attention Michal (2002), Fleming (2005), Adamčák - Nemec (2010, 2011), Pistlová - Sedlacek (2008), Šimonek (2008).

And what place is in the broad context of school education interest now? This question could help answer the issue of pupils' attitudes. Just survey of attitudes we can figure out ways that could be taken into account pupils' interests, different conditions for teaching physical education and sports or regional traditions. How to bring students to an active and healthy lifestyle?

According to Slezak (2009) Health statistics show an alarmingly rising status of overweight and obesity of young people. Currently, pupils take over at primary and secondary education on average 13 000 teaching hours. Only about 7% pay attention to physical activity and 93% theoretical training. If we want to stop this dangerous trend, we need to consider about changes in the design of programs for several years to come.

For this reason the diagnosis has interest of students in physical education, sport and physical activity of increasing importance especially for teaching practice. The term motion-sports activity means all kinds of sports but also physical activity.

Since the physical activities include work around the house, in the garden home chores like ironing, vacuuming, and the like.

AIM

The aim of our research is to identify pupils' attitudes to physical education and sport education and physical activities during their study on secondary school pupils of secondary schools in Slovakia, as well as determine the impact of the family on attitudes of students to physical sports activities and impact of the main factors of the teaching process to pupils' attitudes to physical education and sports.

METHODOLOGY

In Slovakia, we realized our research in 35 secondary schools. Correctly completed the questionnaire 1215 students of which 602 were boys and 613 girls. Research group: Humenné, Svidník, Nitra, Poprad, Brezno, Spišská Nová Ves, Trenčín, Galanta, Senica, Nové Zámky, Kežmarok. Most schools are adequately equipped for lessons of physical

education and sport multifunctional gymnasium and school areal which are suitable for teaching, even though in many cases outdated conditions. If the school does not have its own gym, use gym and surrounding area schools otherwise replaced its shortcomings in this area. Some schools are equipped with modern and attractive climbing wall for students.

The final questionnaire contained 25 questions, 15 of which were closed and one was an open question. Some questions were created using Likert scale, which allows us to identify well the whole range of possible attitudes and ideas. Similar responses to the open questions were grouped into several categories so that they can be subsequently processed statistically.

RESULTS AND DISCUSSION

It is in their free time, students have space to rest, physical, but also mental recovery. It's time to escape from everyday pupils especially schoolwork. It was at this time may pursue their own interests, needs, can meet with friends, relax, have fun. Therefore, we wonder whether just physical sports activities include pupils to fill their free time (Fig. 1). Students frequently spend their free time with friends (22,37%), located just in adolescence, for this period is characterized by the creation of peer groups, adolescent needs to feel that somewhere someone is and that it matters. Therefore, the answer is this leisure time with friends by drawing logical needs of adolescents.

Very often they listen to music (13,65%) and playing on the computer (10,25%). A very positive finding is that the fourth place in the ranking of leisure activities are physical sports activities (9,25%), because of physical sporting activities promote healthy mental and physical development and health are of great importance. Students in their leisure time, doesn't forget about physical sporting activities. TV monitors in their free time up to 7,98%, but almost the same number (9,13%), reading books and magazines. Nearly 5% of students go in their free time in nature and the same number of students spending time with animals such as dogs, cats, horses and the like that. Family is on the first place in their leisure time, children from parents assume particular patterns of behavior and mimic their lifestyle. Nevertheless, only 4,03% of our surveyed students spend their free time with his family. Many children are brought up "street" without any oversight or concern parents. According to the latest trends are "in" spent time in shopping malls (5,01%). Different types of rings, as well as play an instrument, or work occupies too much free time (3,56%). Since cinema is costly, only 2,36% of students go on a regular basis in their free time to the movies. 1,99% of the students said other activities carried out in their free time, which included mainly files, training, learning, relaxation or girlfriend.

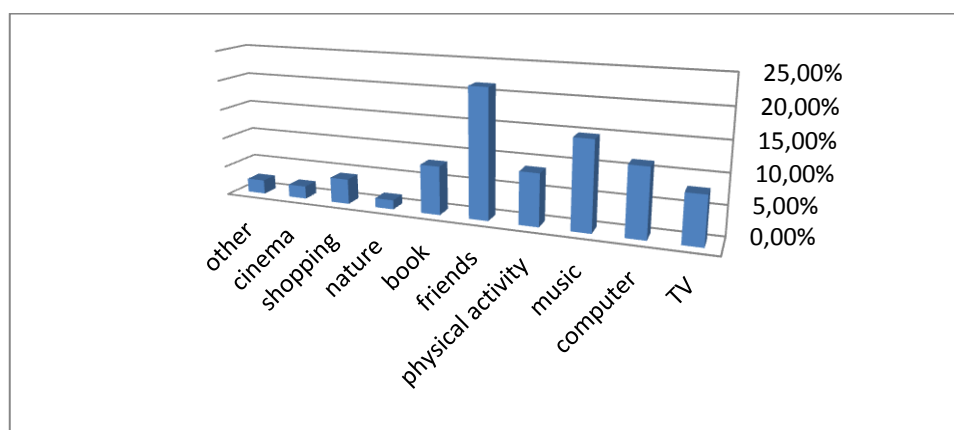


Figure 1 Leisure time

Among the most popular sports physical activity in leisure time activities were mainly that students can perform individually (Fig. 2). The students considered the most popular swimming (13,78%), ranking second in popularity captured dance, aerobics (10,33%) which are especially popular among girls. Generally bike lacks in few households. The great popularity currently have treadmills, most people, I go to the gym for one reason alone. They are not satisfied with your figure, want to gain weight, lose weight or improve fitness. The ideal of the human body that flooded television screens, magazine pages, billboards but also various kinds of websites created by students represents an ideal body that they want to achieve. Because of this trend it is 7,56% for pupils popular leisure activity. Sports like hockey 5,98%), basketball (4,32%). Sports games are in school sports and education amongst the most popular, but in their free time students probably prefer a more individual to physical sports activities.

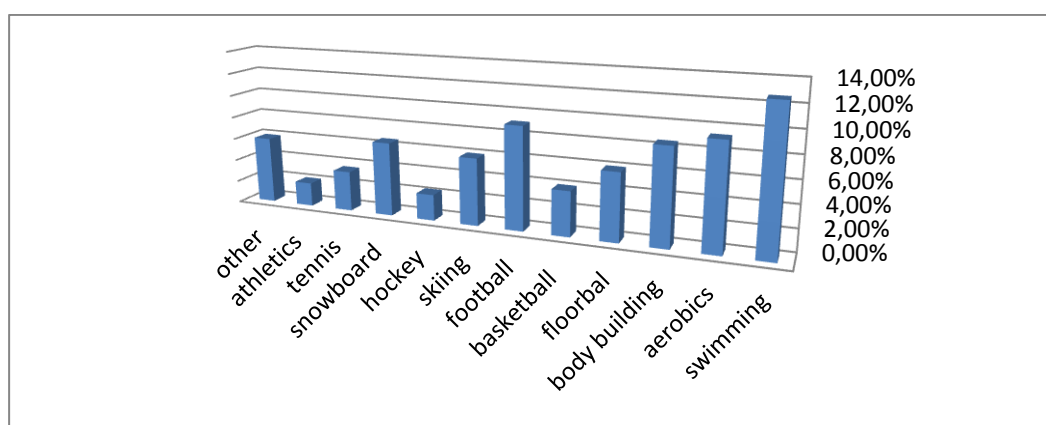


Figure 2 Favorite sports physical activity in leisure time

One exception in this case creates a football (8,45%), which is also a leisure very popular sport activity. Other places occupied by popularity costly sports such as skiing

(6,23%), hockey (1,95%), snowboard (7,20%) and tennis (4,02%). Among other physical sports activities (5,88%) crew mainly badminton, table tennis, airsoft, motocross, skateboarding, horseback riding, squash.

Since we found how the popularity depends on physical and sport education for pupils in secondary schools by gender and type of school, also we are interested in how students are doing with the implementation of physical sporting activities outside of physical education and sports.

Similar to the previous findings in boys were physical education and sport more popular than girls, as well as statistical methods we managed to confirm, well we tried to figure out how it is with the implementation of physical sports activity for students in terms of gender and also in terms of the type school. Whether gender and type of school affecting the implementation of physical sporting activities outside of physical education and sports.

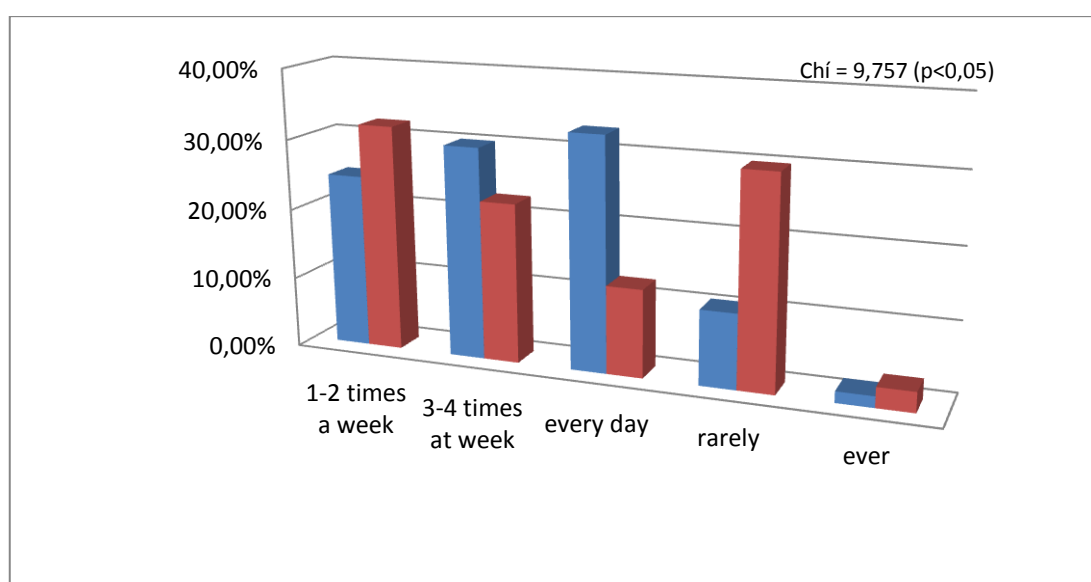


Figure 3 Implementation of physical sporting activities by gender

Implementation of physical sporting activities outside of physical education classes is more often in boys (Fig. 3). Statistical analysis of the results showed statistically significant differences between boys and girls.

We did double-selective Wilcoxon test. Based on the calculated p-values we see, that the significance level of 5%, we can also to reject the null hypothesis in favor of the alternative hypothesis. Thus, boys perform physical sports activities more often than girls.

From results we wonder how it relates implement physical sporting activities with those that are actively involved in the competition. Of 356 secondary school students who are certain physical sports activity devoted to competitive, to 46,21% each day and 40,13% for

three to four times a week. Our questions were also control question, if students answer questions truthfully. Logically, therefore, from that established that if students pay attention competitive physical sports activity and the frequency of implementation of physical activity is higher.

Similar results have reached the Bartík (2005) who investigated the extent to which respondents devote active sports. Evaluation questionnaires found that active sports are increasingly paying attention more boys than girls.

CONCLUSION

Since the function families in socializing children into sport and physical activities is indispensable, therefore pupils from families where the parents pay attention to motion sports activities, children will themselves carry out physical sports activities more frequently than children from families in which the parents have given motion sports activities or do not pay attention . Given the hypothesis that active parents will model for their children, we confirmed. Implementation of physical sports activities in children depends on the implementation of physical sporting activities with their parents. In families where a parent or both parents dedicated physical sports activity and pupils from these families pay attention to motion sports activities regularly and more often than students from families in which parents are an example for the kids in the implementation of physical sporting activities.

For students from families where the parents paid or pay attention to motion sports activities, children suffer physical significance of sports activities more than children from families in which the parents physical and sports activities are not carried out or not carried out. Our assumption was verified using Chi-square test of independence. We found that there is a relationship between physical exercise sports activities for parents and perceived physical significance of sports activities in the life of their children.

Statistical test calculated p-value are very small, so our null hypothesis of independence of the variables can be rejected in both cases the significance level of 5%. Our variables are dependent, so the children of parents who are devoted or dedicated physical sports activity suffer more physical significance of sports activities in a person's life than children from families in which the parents have not paid attention by the activities and are not engaged in either countries surveyed. These results confirm our hypothesis.

LITERATURE

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POHYBOVÁ AKTIVITA A VOĽNÝ ČAS ŠTUDENTOV

SÚHRN

Cieľom výskumu bolo zistiť postoje žiakov k telesnej a športovej výchove v priebehu ich štúdia na stredných školách. Na Slovensku sme realizovali náš výskum na 35 stredných školách. Správne vyplnilo dotazník 1215 študentov, z ktorých 602 boli chlapci a dievčatá 613. Vykonávanie pohybových a športových aktivít mimo hodín telesnej výchovy je častejšie u chlapcov. Štatistická analýza ukázala štatisticky významné rozdiely medzi chlapcami a dievčatami. Z vypočítaných p-hodnôt je zrejmé, že chlapci vykonávajú pohybové športové aktivity častejšie ako dievčatá.

KEĽÚČOVÉ SLOVÁ: postoje, študenti stredných škôl, športové aktivity, telesná výchova a šport.

EVALUATION OF BODY POSTURE OF PUPILS AND PRIMARY EDUCATION TEACHER

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SUMMARY

This article deals with the need of pedagogical diagnostics focused on body posture of primary education pupils. According to the results of the survey, no pupil of 2^d-class from two elementary schools in Banská Bystrica had perfect body posture, 53.4 % of pupils had good body posture, 46.6 % had poor body posture and 28.8 % of pupils were diagnosed a musculoskeletal disorder. The authors point out the need to pay higher attention to the problems of body posture in elementary school. Teachers of primary education can adapt the education to current needs of pupils according to the diagnostics of pupils and thanks to appropriate preventive and compensation measures they can develop harmonically the personality of a pupil.

KEY WORDS: evaluation of body posture, primary education pupils, primary education teacher, diagnostics.

INTRODUCTION

In present-day humanistic era the education is based on harmonic development of a child. Worsen state of health impinges the whole person; it influences not only his/her physical but also psychological and mental state and it impends the harmonic development of personality. According to B. Kasáčová (2009), the biological factors, that she considers to be internal conditions of education, influence significantly the quality of life. In education, the course and the results of intentional processes are influenced mainly by following factors: long-term and current state of health, chronic diseases, somatic condition and somatic predisposition, age-related specifics and individual characteristics. Some of them are evident (explicit), other are hidden (implicit) and they are manifested by extraordinary or reduced

performance or by abnormal behaviour. Most often they are functional, teachers and pupils have relatively reduced possibilities to influence them. Their influence is so restricted, eliminated, balanced or supported by using tangible or non-tangible educational tools (Kasáčová, 2009). In terms of holistic education it is necessary to pay attention to state of health of the pupils, to know it and diagnose it.

According to Trunečková et al. (2001), a detailed universal knowledge of each pupil is one of the preconditions to meet the objectives of physical education. When planning the annual or individual lessons objectives, teacher must also base them on the knowledge about pupils (state of health, physical competence, motor skill performance, hobbies, previous motor skill experience etc.). The term diagnostics is according to Kasáčová and Cabanová (2011) generally understood as a theory and practise of recognising the causes of undesired effect or state, or the measurement of the deviations from the norm. The sense of pedagogical diagnostics is according to them to know the current state, real possibilities for child's development and the individualisation of the educational objectives for his/her further development. The purpose of the pedagogical diagnostics is to enable the child the further development according to diagnostic findings in order to gain the most from the educational process for his/her future.

PROBLEM

„Body posture is a motion habit developed during our childhood“ (Jurašková – Bartík, 2010, p. 16). Bartošík et al. (1994) and Bartík (2005) say that each individual must master the erect body posture from the childhood because it strengthens the body posture stereotype (postural stereotype) that is to be stabilised in the age of 6 or 7 but its development is not accomplished till maturity when he/she finishes growing. According to Liba (2005) it is necessary to pay particular attention to the cultivation of proper postural habits since the postural stereotype is a necessary precondition to balanced development of physical and psychological skills of growing child.

Binovský (2003) says that the body posture is a specific way how to face the gravitation and keep the balance of the body. From the viewpoint of management of support motor function it is a realisation of the postural stereotype that is strongly an individual feature. The organism can compensate small deviations; that is the reason why body posture, walking and running are unique for every person and characteristic like a signature.

We agree with the opinion of Bendíková (2014, p. 28) that *„present-day trend of innovations in learning process leads to greater liberty of teachers when deciding about*

curriculum and application of certain didactic methods, devices and forms while being more responsible for pupils' health and performance in accordance with their real possibilities and interests". In today's hypokinetic times, in times when we spend most of our day sitting, it is necessary to pay higher attention to our body posture not only from the aesthetical but primarily from the medical point of view and to choose appropriate prevention or compensation measures according to the current situation.

AIM

The aim of the research was to monitor the body posture of 2^d-class pupils in two elementary schools in Banská Bystrica and to reveal the occurrence of diagnosed disorders of musculoskeletal systems via a questionnaire.

METHODOLOGY

Research sample consisted of 2^d-class pupils from two elementary schools in Banská Bystrica who participated in evaluation of body posture and delivered a completed questionnaire. From the total number 73 pupils, there were 32 girls and 41 boys. The age of the pupils varied from 7.04 to 8.93 years, the average age was 7.72 years (girls 7.60 years; boys 7.80 years). The body height of pupils varied from 116.5 to 146.8 cm, the average body height was 129.3 cm (girls 128.6 cm; boys 129.8 cm). The body weight of the pupils extends from 19.4 to 53.2 kg and the average body weight was 27.6 kg (girls 27.5 kg; boys 27.6 kg). The average BMI was 16.39 (girls 16.39; boys 16.39) and it ranges from 12.97 to 25.30 (Tab.1).

Table 1 Characteristic of research sample

	Girls (n=32)			Boys (n=41)			Together (n=73)		
	min.	average	max.	min.	average	max.	min.	average	max.
Age [years]	7,04	7,60	8,51	7,10	7,80	8,93	7,04	7,72	8,93
Height [cm]	116,5	128,6	145,0	118,0	129,8	146,8	116,5	129,3	146,8
Weight [kg]	19,4	27,5	53,2	19,4	27,6	38,5	19,4	27,6	53,2
BMI	13,40	16,39	25,30	12,97	16,39	22,75	12,97	16,39	25,30

From the viewpoint of complexity the most appropriate way of body posture evaluation is the evaluation of Jaroš and Lomíček (Bartík 2005). Since it requires a special

item for measuring angles (a goniometer) that is not accessible to the teachers we chose a method of Klein and Thomas modified by Mayer, which is according to Jurašková and Bartík (2010, p. 69) „*appropriate because of its simplicity, elementariness and a very good classification system for respective types of body postures*“.

The evaluation of body posture according to Klein and Thomas modified by Mayer (Hošková – Matoušková, 1998 In Jurašková – Bartík, 2010; Hošková – Matoušková, 2005 In Bendíková, 2011; Hrčka, 2008) consists of five evaluation features: head and neck posture, chest shape, abdomen shape and pelvis tilt, curved back, and height of shoulders and position of shoulder blade. Each of these features is evaluated by marks from 1 to 4. Body posture is evaluated by the sum of the points in respective areas. The above mentioned evaluation allows a more precise description of body posture thanks to the points range from 5 to 20 where 5 points means perfect body posture, 6-10 points good body posture, 11-15 points poor body posture and 16-20 points very poor body posture (Hošková – Matoušková, 1998 In Jurašková – Bartík, 2010). The evaluation of body posture was realized in September and October 2013.

In June 2014 a questionnaire was distributed to the pupils. For this research only one questionnaire entry was processed: „*Have your children been diagnosed any musculoskeletal system disorder (ex: flat foot, scoliosis etc.)?*“

Note: Evaluation of body posture and the questionnaire are the parts of a wider research. We choose only a part of the research because of the limited extend of this article.

RESULTS

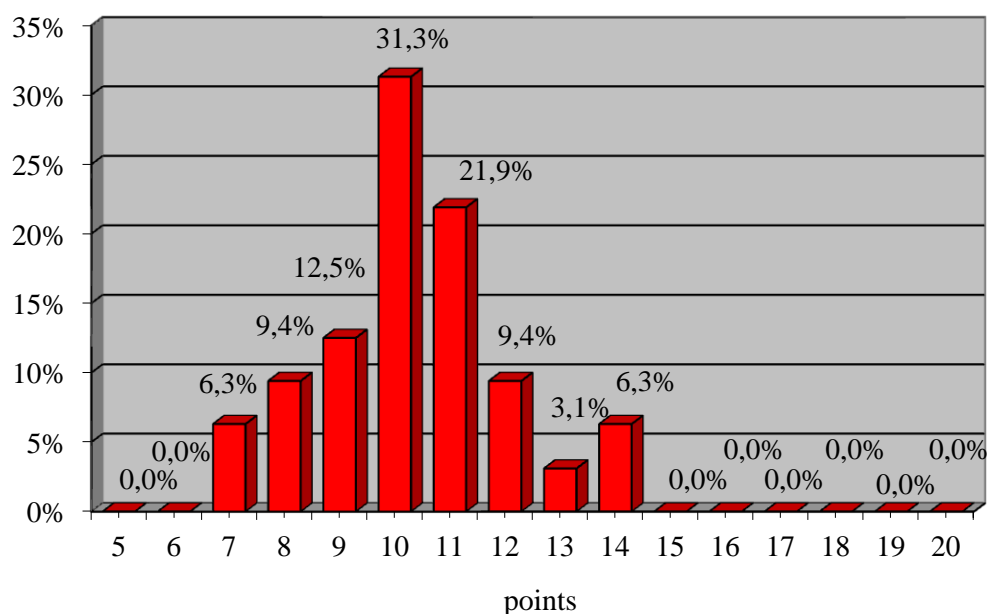
According to division of body posture into 4 groups (perfect, good, poor, very poor) we can state that nobody had either excellent or very poor body posture. Good body posture predominated amongst the girls (59.4 % of girls), on the contrary wrong body posture predominated amongst the boys (51.2 % of boys). Together, 53.4 % of pupils had good body posture and 46.6 % of pupils had wrong body posture (Tab.2). Thus the poor body posture is observable as early as in the first grade of primary education that is confirmed also by the research of Jurašková and Bartík (2010) and Bendíková (2013).

Table 2 Body posture of pupils

	Girls (n=32)	Boys (n=41)	Together (n=73)
Perfect body posture	0 %	0 %	0 %
Good body posture	59,4 %	48,8 %	53,4 %
Poor body posture	40,6 %	51,2 %	46,6 %
Very poor body posture	0 %	0 %	0 %

By classifying the pupils into 4 groups we do not have clear evidence about their body posture because of the differences between minimal and maximal number of points in respective categories. Pictures 1 – 3 offer us better and more detailed overview because of the fact that the pupils are divided there into groups according to the number of points obtained.

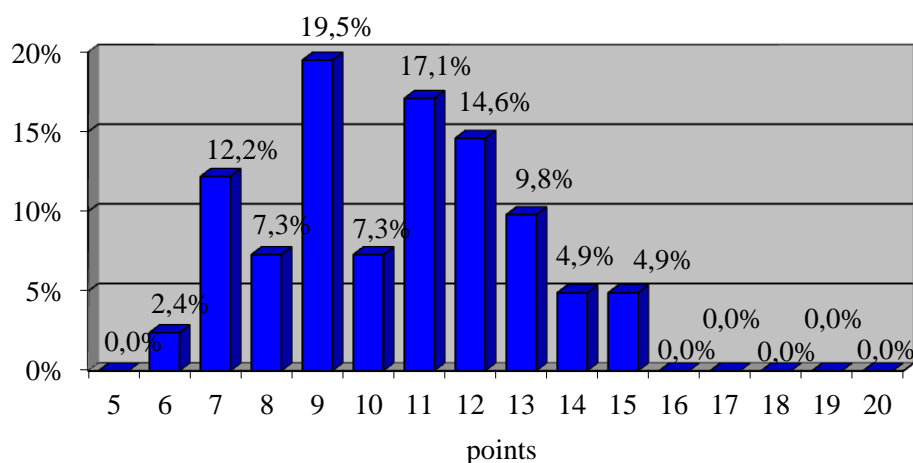
Girls scored in the evaluation of body posture from 7 to 14 (Fig.1); most often they obtained ten (31.3 % of girls, good body posture) or eleven points (21.9 % of girls, poor body posture).



Note: 5 points – perfect body posture, 6-10 – good body posture, 11-15 – poor body posture, 16-20 – very poor body posture.

Figure 1 Percentage frequency of points of body posture evaluation of girls

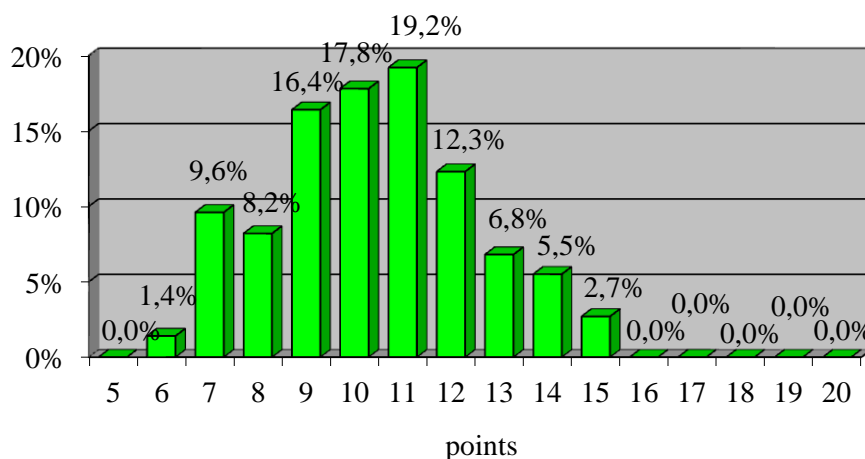
In evaluation of body posture of boys the score was from 6 to 15 points (Fig. 2); most often they obtained nine (19.5 % of boys, good body posture) or eleven points (17.1 % of boys, poor body posture).



Note: 5 points – perfect body posture, 6-10 – good body posture, 11-15 – poor body posture, 16-20 – very poor body posture.

Figure 2 Percentage frequency of points of body posture evaluation of boys

Together, the pupils obtained from 6 to 15 points in the evaluation of body posture (Fig. 3). Most often they obtained eleven (19.2 % of pupils, poor body posture) or ten points (17.8 % of pupils, good body posture).



Note: 5 points – perfect body posture, 6-10 – good body posture, 11-15 – poor body posture, 16-20 – very poor body posture.

Figure 3 Percentage frequency of points of body posture evaluation of all pupils

The best average results (Tab. 3) were obtained in the element „head and neck posture“ (1.59; girls, 1.56; boys 1.61) the worst average results were observed in the element „height

of shoulders and position of shoulder blade“ (2.38; girls 2.31; boys 2.44) and almost all the results were worsen by protruding shoulder blades. In elements „head and neck posture“, „chest shape“ and „height of shoulders and position of shoulder blade“ as well as in total average score, girls performed better. Boys obtained lower score in elements „abdomen shape and pelvis tilt“ and „back curved“.

Table 3 Average results for respective elements of body posture

	Girls (n=32)	Boys (n=41)	Together (n=73)
I. Head and neck posture	1,56	1,61	1,59
II. Chest shape	1,81	1,95	1,89
III. Abdomen shape and pelvis tilt	2,28	2,17	2,22
IV. Back curved	2,28	2,22	2,25
V. Height of shoulders and position of shoulder blade	2,31	2,44	2,38
Total average score	10,25	10,39	10,33

According to the questionnaire entry „Have your children been diagnosed any musculoskeletal system disorder (ex: flat foot, scoliosis etc.)?“ with possible answers: „a) no, b) if yes, what kind of disorder?“ we found out that 21 (28.8 %) pupils (15.6 % of girls and 39.0 % of boys) were diagnosed a musculoskeletal system disorder. 13 out of 21 pupils were diagnosed one disorder, 8 were diagnosed two disorders. The most common disorder among boys as well as among girls was a flat foot (9.4 % of girls, 31.7 % of boys) diagnosed among 21.9 % of pupils. Second most common diagnosis among boys was scoliosis (14.6 % of boys), third was poor body posture (4.9 % of boys). Other disorders – start of flat feet, lordosis, knock-knees and Ehlers-Danlos syndrome – were diagnosed only to one pupil (percentage is represented in Table 4).

Table 4 Musculoskeletal disorders of pupils

Diagnosis	Girls	Boys	Together
Flat feet	9,4 %	31,7 %	21,9 %
Start of flat feet	3,1 %	–	1,4 %
Scoliosis	3,1 %	14,6 %	9,6 %
Lordosis	–	2,4 %	1,4 %
Knock-knees	3,1 %	–	1,4 %
Wrong body posture	–	4,9 %	2,7 %
Ehlers-Danlos syndrome	–	2,4 %	1,4 %

CONCLUSION

In 2012, on the sample of 27 teachers from elementary schools in Ružomberok with the approbation physical education and/or elementary school education, Hubinák (2014) found out via questionnaires that teachers are optimistic about good body posture of their pupils. According to this author, it could be a result of wrong assessment or ignorance of what a good body posture means. He also found out that only 22.22 % of teachers provide an annual diagnostics of body posture of their pupils and he states that within the evaluation of state of health and weaknesses, every teacher of physical education should diagnose the body posture at least annually. We agree with his opinion because by diagnosing the body posture of pupils a teacher is able to adapt better the educational process to his pupils' needs and so contribute to their harmonic development. Therefore, it is necessary not to underestimate the evaluation of body posture and pay attention to prevention.

Bendíková (2013, p. 35) supposes that „*during the stage of forming and stabilization of a good postural stereotype a teacher of physical education plays a key role. His obligation is not only to reveal the causes of poor and wrong body posture but also to remove and repair them by appropriate movements*”.

It is a teacher of primary education who usually teaches the pupils all the subjects and so he/she spends all the time with them. Such a teacher has the best preconditions to fulfil the preventive and correctional function in terms of body posture. Within a framework of pedagogical diagnostics the teacher is able to evaluate the body posture of pupils during the course of physical education and according to these observations he/she can implement appropriate movements not only during the lessons of physical education but also during the other lessons in the classroom, by paying attention to a proper body posture during different

activities, changing several positions and inserting also a bit of physical education according to the needs of pupils. During the educational process he/she can observe pupils and correct their poor body posture.

According to the results of the presented research we are convinced that teachers of primary education should pay more attention to the issue of body posture because in the first grade of elementary schools there is already a high occurrence of musculoskeletal system disorders. Underestimation of this fact can lead to growing problems of pupils and make their further education more difficult.

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HODNOTENIE DRŽANIA TELA ŽIAKOV A UČITEĽ PRIMÁRNEHO VZDELÁVANIA

SÚHRN

Príspevok sa zaoberá potrebou pedagogickej diagnostiky zameranej na držanie tela žiakov primárneho vzdelávania. Na základe výsledkov prieskumu, v ktorom ani jeden žiak 2. ročníka dvoch vybraných základných škôl v Banskej Bystrici nemal výborné držanie tela, 53,4 % žiakov malo dobré, 46,6 % žiakov chybné držanie tela a 28,8 % žiakov malo lekárom diagnostikovanú oporno-pohybovú poruchu, autorky poukazujú na potrebu venovať zvýšenú pozornosť problematike držania tela už na prvom stupni základnej školy. Učiteľia primárneho vzdelávania môžu na základe diagnostiky žiakov prispôbiť edukáciu aktuálnym potrebám žiakov, a tak prostredníctvom vhodných preventívnych a kompenzačných prostriedkov harmonicky rozvíjať celú osobnosť žiaka.

KEĽÚČOVÉ SLOVÁ: hodnotenie držania tela, žiak primárneho vzdelávania, učiteľ primárneho vzdelávania, diagnostikovanie.

PHYSICAL EDUCATION IN PRIMARY SCHOOL AND DEVELOPMENT OF THE MOTORIC PERFORMANCE OF CURRENT YOUNG LEARNERS AND THE MOTORIC PERFORMANCE OF PUPILS IN THE PAST

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SUMMARY

This article describes the issue of monitoring of motoric performance of 3rd grade students who participate in physical education of selected primary schools in Banská Bystrica also by analyzing their leisure physical activities. We also compare the obtained results with each class and the same with the results obtained by the test battery Eurofit Slovakia (Moravec et al., 1996). The authors highlight the importance of increasing physical performance, which is associated with the increase of health-oriented fitness and human health. We also present the importance of physical and spatial equipping of schools that just as physical activity; affect the performance level of students.

KEY WORDS: Physical education in primary school, motoric performance, young learners, teacher in primary education, leisure physical activities.

INTRODUCTION

Physical education occupies in the lives of students in primary education an important place. In the last two decades, around the turn of the 20th and 21st century, the training of physical education has undergone many changes and intensive development in our country. As in the past, today, there is still a focus of physical education on physical, functional and motoric improvement of man. This contributes to improving the health, health-oriented fitness and motor performance of pupils.

In our research, we focus the most on general motoric performance that is defined by Junger and Kasa (1996, p. 9), as "a person's ability to administer repeated performances in some physical activity for some time". According to those authors, the outcome depends on the level of motoric skills and the level of skills, habits and mental preparedness. During younger school age period, it is essential to pay attention to the development of general physical performance of students, and health-oriented fitness, mutually respecting the sensitive period, when the dynamic natural biological development of the organism of young students is significant and defines the global effect of physical education.

While health related fitness is a qualitative indicator of the state of the body and health, physical performance, by contrast, remains a quantitative indicator of the state of the organism. The result depends on the level of motor skills and it is important to develop them proportionally in each age period. We agree with Šimonek (2012, p.11), which presents the motor physical abilities as "relatively independent sets of internal assumptions of the human body for motoric activity, which is also reflected in itself." Labudová (2002, p. 96) says that the motor physical abilities are a relatively independent set of internal assumptions intended to implement physical activities that require the fulfillment of specific motion tasks. They create the necessary conditions on the acquisition and implementation of physical activities.

Motoric performance and its development has become the object of several studies in Slovakia, but also abroad. One of the largest research, completed in 1996, evaluating physical development and motoric performance of the school population is Eurofit. The test methodology was formulated by "Committee for the Development of Sport" at the Council of Europe, as a fundamental basis for monitoring the state of physical development and motoric performance of children and youth already in 1977 (Moravec et al., 1996). From this year, the methodology developed basic evaluation system of physical performance. Then research evaluated by the test battery Eurofit Slovakia has been led from 1993 to 1996 by A. Moravec, in collaboration with M. Bela, I Čilík, and others. Contemporary researchers often rely on the results of said research and take them as a standard for monitoring the state of physical performance of students and youth. During the following years, the movement has monitored the performance of only small samples of subjects. And, for example, Bela (1992), or through test battery Unifit (Horvat-Liba-Lipková, 1997), then again Eurofit test battery in the East region Turek (1999), later research on sports interests and functional characteristics of students in the central region have been monitored by Bartik et al. (2003) and others.

OBJECTIV

This article aims to identify and analyze the level of motoric performance and leisure physical activities of current 3rd grade students of selected primary schools in Banska Bystrica and to compare the results obtained with each other between classes, and also with the results of Moravec, et al., (1996).

METHODOLOGY

Testing the physical performance took place at selected primary schools in Banska Bystrica in the school year 2013/14. Primary school is equipped with two equally large gyms, site-oriented side by side in the basement. The outdoor school complex has also a large sports complex with sports ground.

The research group were pupils of grade 3.A, 3 B, 3 C and 3.D of selected primary school, altogether 92 students, 38 boys and 54 girls. The average age of the studied sample was 9.39 years for boys and 9.23 years for girls. Time allowance, physical education, was in each class two hours a week. During physical education, due to lack of space conditions, two classes have to participate in the same time. 3. A class worked with 3.B class, profiting from 1 large gym twice a week. 3.C class worked with class 3.D also 2x a week. Those conditions required space for educator's natural authority and discipline. The course of such a lesson with up to 50 students in one confined space is almost unmanageable. Given the lack of discipline pupils disturb each other, high noise occurs in the area and the conditions are more difficult for teaching what have been confirmed by the educators. Teachers discribed physical education as one of the most challenging subjects; first, in terms of organization, security, discipline, but also in terms of preparation for teaching and especially practical design curriculum.

A basic overview of selected sample of students was formed on anthropometric variables, obtained by selective somatic measuring for both sexes of survey sample. The average value of the weight (BW) of a sample of boys was 35.51 kg and body height (BH) 140.84 cm. For girls, the average value of the weight was 30.63 kg and values of height 137.64 cm. Selective average values of height, weight and age of each class are presented in Table 1 and 2.

The level of physical performance has been evaluated in 7 physical performance tests, chosen from the test battery Eurofit (Moravec et al., 1996). The obtained data were processed by using descriptive statistics, which gave us a basic characteristic of the reference file. For the evaluation of physical performance, we used the following tests: 1. Flamingo balance test

(FLAM); 2. Sit and reach test (REACH); 3. Standing broad jump (SBJ); 4. Sit-ups per 30 s (L-U); 5. Bent arm hang (BAH); 6. Shuttle run 10x5 m (ShR 10x5); 7. Endurance shuttle run (EShR). The results of motor tests are given in Table 3 and 4. When processing the obtained data, we first used the descriptive statistics, and then we can analyze the resulting values and compares.

Organization

Physical performance testing was carried out in agreement with the teachers and after the approval of the director of a primary school in 2014, only during physical education classes. Measurements have been conducted by researchers and 5 trained examiners. Material and spatial conditions for carrying out the test disciplines were standard. The implementation was carried out in the gym exactly according to the methodology of Eurofit. Particular stands, equipped by measuring devices, have been served by trained examiners. The test persons understood objective of the research, become acquainted with the organization of measurements and received starting numbers.

RESULTS AND DISCUSSION

In the research, we wanted to find out what is the level of motor performance of 3rd grade students of all classes of the selected primary schools in Banska Bystrica. The results of each class was analyzed and compared between them; to complete the comparison, we used also the Eurofit results (Moravec, et al., 1996). This article includes only partial results of the research.

First, we created a basic overview of a selected sample of students which formed anthropometric indicators of boys (Table 1) and girls (Table 2). Then, we compared the results of somatic indicators.

Table 1 - Anthropometric indicators of boys

FILE (designation)	NUMBER (n)	Average/ Dir. dev.	Dec. AGE (n)	BH (cm)	BW (kg)	BMI
3. A	10	x	9,01	140,90	35,43	17,89
		s	0,30	4,66	7,89	3,58
3. B	10	x	9,28	141,60	34,49	16,90
		s	0,29	6,40	7,03	2,57
3. C	11	x	9,64	141,16	37,35	18,43
		s	0,25	3,97	8,15	3,58
3. D	7	x	9,13	139,04	33,26	16,96
		s	0,27	3,74	4,84	2,15
TOTAL	TOTAL	x	9,265	140,675	35,1325	17,545
3rd grades	38	s	0,24	0,98	1,49	0,64

From our research findings we can see in Table 1 following. The body height of boys ranges from 139.04 cm to 141.60 cm. The average difference between the highest and lowest height of boys is **2.56 cm**, what is not globally considered as a visible difference. The heaviest group are boys from 3.C class, their average weight is 37.35 kg and lowest reached weight is 33.26 kg of boys in 3.D class. The difference between the figures represents **4.09 kg**, what we consider a larger difference in the weight of students. As finally BMI values range from 16.90 to 18.43, pupils of all classes, are still in the range of normal weight. The data are processed in accordance with the current Bulletin of the Ministry of Health (2012, p. 40). We believe that the measured somatic values of boys could affect the final values of physical performance.

The girls (Table 2) reached the highest height of schoolgirls in class 3.B with a value of 138.00 cm. The lowest body height has been demonstrated of girls from 3.A class representing 137.10 cm. The difference between these values is **0.90 cm**, what we consider as significant.

Table 2 - Anthropometric indicators of girls

FILE (designation)	NUMBER (n)	Average/ Dir. dev.	Dec. AGE (n)	BH (cm)	BW (kg)	BMI
3. A	12	x	8,83	137,10	30,90	16,17
		s	0,31	5,46	3,46	1,91
3. B	15	x	9,13	138,00	31,13	16,27
		s	0,26	5,86	8,45	3,43
3. C	13	x	9,20	137,90	31,68	16,38
		s	0,32	5,23	4,14	1,73
3. D	14	x	9,40	137,41	28,51	14,91
		s	0,30	4,59	4,89	1,93
TOTAL	TOTAL	x	9,14	137,603	30,555	15,933
3rd grades	54	s	0,20	0,37	1,21	0,60

The lowest body weight has been reached in 3.D class - 28.51 kg and the highest weight has been reached in 3.C class - 31.68 kg. The difference between the average weights is **3.17 kg**, what may indicate certain risk of error. According to the current Bulletin of the Ministry of Health (2012, p. 40) the average values of BMI are represented in the overall evaluation of all girls. From this we conclude that there are not such differences between girls of different classes, especially concerning body height, which could result in significant differences in motor performance of female pupils of each class; while the body weight of girls between

classes has higher differentials. The lowest BMI has been reached in 3.D class; we will evaluate the physical performance of this class in detail.

In the next part, we analyze *leisure physical activities*, which are closely related to the level of *motoric performance of pupils*, obtained from the results of motor tests. Tests were carried out equally in all classes of 3rd grade of one primary school.

We believe that the selection and especially with the volume and intensity of leisure physical activities is closely related to the personality of the teacher of physical education. Selection and possibilities of leisure physical activities of children particularly depends from parents' decision. It is known from global statistics, that most of the parents are forcing their children to practice the leisure (physical) activities, which they could not realize themselves in childhood. On the other hand, the direction is set also by the teacher directing each student to choose such activities that would be the best suited to his personality. For this reason, we put to contribution brief description of the personality of each teacher of all 3rd grade classes selected in primary schools in Banska Bystrica. Except English language, all subjects are managed in every classroom by one teacher.

In **class A**, the teacher has 15 years of experience, and is sufficiently erudite in sport and physical education, actively carries out physical activities. She oriented activities mainly to the field of gymnastics, but also motoric games. She tried to lead her students in that direction as much as possible. Teacher in **class B** engaged the leisure physical activities infrequently. She focused the physical education on the current curriculum and did not require anything beyond the content of the curriculum. Discipline in the classroom was weak. It is a teacher with 13 years of experience. In **class C**, the teacher, with 5 years of experience, required maximum discipline and order and led the students to independence, what was also evident in the physical education classes. She required from students to master discussed curriculum rather well. She was more focused on content than on performance. Teacher in **class D** with 15 years of experience could be characterized as paidotrop, teacher focussing mainly on students and their individuality with natural authority. In sports, we consider her to be reasonably educated, interested in a variety of physical activities. The occurrence of organized physical activities of pupils shows Fig. 1. As organized we consider interest groups of the physical education / sports, which are often associated with the training process.

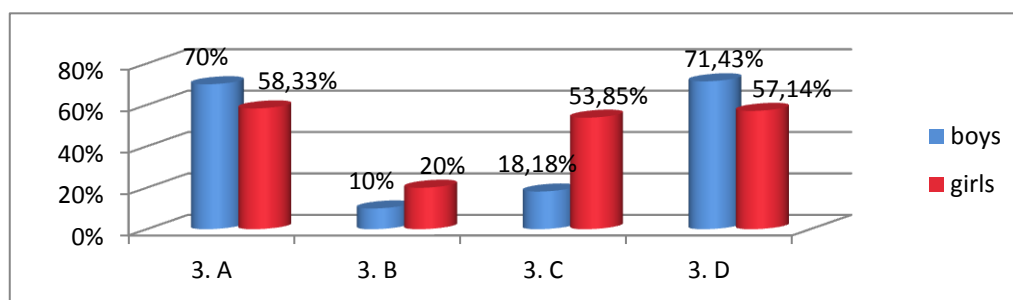


Fig. 1- Organized leisure physical activities of students

Figure 1 shows that the students of classes 3.A and 3.D are most interested in leisure physical activities, realised by the departments of physical education and sports, which is representing the interests of boys and girls in about equal numbers of both classes. A higher percentage of interest can be seen also for girls of class 3.C.

Unorganized leisure physical activities of students are expressed in average number of hours per week per class. Given the different number of students in each group, Fig. 2 provides only informative characteristic of the sample.

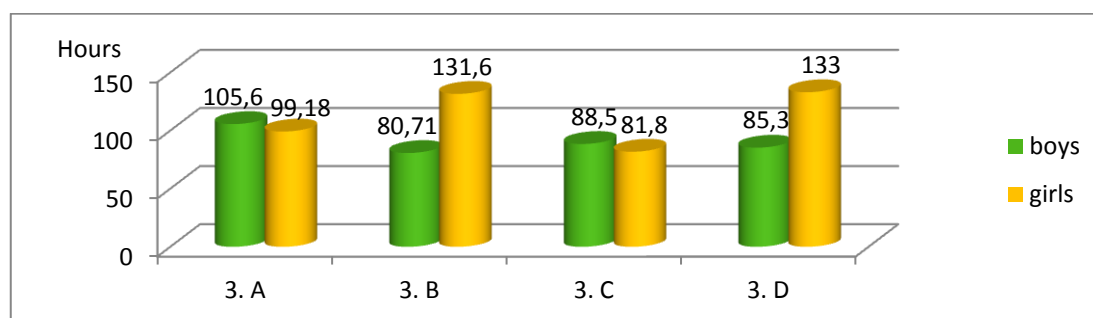


Fig. 2 - Unorganized leisure physical activities of students

Leisure physical activities largely affect the level of motor performance of pupils, which may be reflected in below analytical findings.

Table 3 - Physical performance of boys

FILE (designation)	NUMBER (n)	Average/ Dir. dev.	FLAM (n)	REACH (cm)	SBJ (cm)	S-U (n)	BAH (s)	ShR 10x5 (s)	EShR (n)
3. A	10	x	9,5	3,6	134,2	22,6	14,38	25,034	23,3
		s	6,98	3,77	17,36	3,77	13,36	1,48	12,49
3. B	10	x	11,3	1,7	127,6	23,1	23,16	24,874	29,3
		s	7,98	7,96	19,49	3,39	20,96	2,05	13,4
3. C	11	x	14,18	1,1	118	20,4	12,1	25,67	22,8
		s	7,88	4,74	22,3	4,05	9,45	2,36	13,58
3. D	7	x	7,57	7	141,1	23	22,3	23,63	33,7
		s	2,56	4,87	24,84	2,2	18,3	1,98	19
TOTAL	38	differences best.>worst	6,61	5,9	23,1	2,7	11,06	2,04	10,4

From the measurement of static balance of boys (Table 3) during the first Flamingo balance test, the best average performance was reached in class 3.D, where students achieved 7.57 trials needed to balance the small balance beam within one minute. For this group of students, the value of the standard deviation s is less than half of the value of the arithmetic mean, underlying reliability of pupils' performance. The worst results of the balance test have been reached by 3.C class with 14.18 attempts. The results of the balance test prove that the differences are significant. Worst average output (3.C) versus the best one (3.D) is almost twice as high (**6.61 attempts**). Higher values of this test indicate a lack of level of Balance Abilities. From the results it can be concluded that the deterioration of the status of Balance ability is due to higher levels of physical development, where 3.C has the maximum body weight and contained an average of almost the highest pupil. Worse results of balance tests have been reached by 3.B class, where the body weight of students is not high, but the average height of students is one of the highest heights of all students. Another possible factor influencing the results of Balance Abilities for some students may still be incomplete physiological processes of the vestibular apparatus.

In the second test, sit and reach, focused on joint locomotion and flexibility in the lumbar section, the results of measurements in 3.A, 3.B and 3.C classes are not very different. Among the achieved results above classes were only small differences. However, in 3.D class, we had a higher difference of the distance achieved in this test, up to 7 cm. We believe that such an outcome could affect the lowest average value of somatometry of the class. It concerns mostly the weight, where the boys were 2-4 kg lighter compared to pupils of other classes. Large differences were observed mainly in the explosive power of the lower limbs and static muscle endurance strength of upper limbs. *In the third test, standing broad jump*, students of class 3.C showed the lowest length, ie, 118 cm; the difference is 23.1 cm, compared to 3.D class with the highest length 141.1 cm. *In the fifth test, bent arm hang* the best performance has been achieved by 3.B class (23.16 seconds) and worst again by 3.C class C (12.1 s), which is weakest almost by one-half (11.06 s). It is quite likely that such differences in explosive strength of the lower limbs and the static strength of the upper extremities can be caused by particular differences in weight. Better performance in these tests was reached by lighter pupils.

In the fourth test, sit-ups per 30 s, where the factor is dynamic and endurance strength of abdominal and hip-thigh muscles, we have not seen considerable differences of the performance of each class. Even the value of the standard deviation s is 25% below the

average. Deviation of the measured values occurs about the average values, while the variance of the test results is less.

Running speed with changes of direction was present in *the sixth test, shuttle run 10x5 m*, the best again in 3.D class - 23.63 s. The worst running speed was reflected again in 3.C class with an output of 25.67 s. The difference between classes is a **2.04 s**, which we consider in this test as important. The interesting finding is that in all classes, the sample standard deviation values have not reached above 10% of the average.

In *the last test of endurance abilities, endurance shuttle run*, we noted again major differences in performance of each class. Again, the best results have been achieved by 3.D class with 33.7 racing sections of 20 m. Also in this test, students of 3.C class have achieved the worst-average results. The difference above the present interval exercise represents **10.4** racing sections of 20 m.

In the girls category (Table 4) positions of the performance of each class turns more than boys.

Table 4 - Physical performance of **girls**

FILE (designation)	NUMBER (n)	Average/ dev.	Dir.	FLAM (n)	REACH (cm)	SBJ (cm)	S-U (n)	BAH (s)	ShR 10x5 (s)	EShR (n)
3. A	12	x		6,83	11,8	132,3	24,73	14,76	25,53	21,64
		s		6,53	3,81	15,91	4,27	10,91	1,06	9,22
3. B	15	x		10	5,93	127,4	22,27	19,55	26,07	24,9
		s		8,17	4,72	20,63	3,26	16,61	2,28	14,3
3. C	13	x		8,62	5,77	120	22,5	20,5	25,19	25,38
		s		6,39	5,31	22,4	4,81	13,6	2,46	10,82
3. D	14	x		6,93	7,29	126,6	21,6	13,5	24,9	23,2
		s		5,61	4,03	13,96	2,41	8,89	1,47	9,65
TOTAL	54	differences best.>worst		3,17	6,03	12,3	3,13	7,0	1,17	3,74

Girls of 3.A class achieved the best results in the four tests; in the balance test with the result of 6.83 attempts / 1 min. while maintaining balance on a small balance beam. Compared to 3.B class who reached the worst result in that test - 10 attempts. The difference between classes is **3.17 attempts / 1 min.**, it is not considered as significant as boys' difference. Girls of 3.A class are on the top ranking in the test sit and reach, which factor is joint locomotion and flexibility in the lumbar section. Their excellent performance 11.8 cm is representing a larger difference compared to the worst group of girls of 3.C class with a mean average 5.77 cm. The difference is even **6.03** cm. The significant differences have been seen also in the *standing broad jump test* ranging up to **12.3 cm**. Again 3.A class took the best position (132.3 cm) and the worst 3.C class C (120 cm). Girls' somatometry showed us that the difference in weight and height of girls is not so high that it could cause significant

changes in performance. From the previous, we can consider that these changes affect other factors, probably outside.

The dynamic strength and endurance of abdominal and hip-thigh muscles (sit-ups per 30 s) has not been affected by significant differences between classes. We are more interested in the analysis of bent arm hang endurance test in bends, where the static muscle endurance strength of the upper extremities of each class is quite different, the difference was 7 s. The best performance is achieved by students of 3.C class C (20.5 seconds) and worst 3.D class (13.5 s). In this test we refute the assumption that body weight can significantly affect the results of a static force of the upper limbs. 3. C class achieved the best performance in the test, but the girls' average weight is greatest. While conversely, 3.D class achieved the worst performance and body weight of the girls is just lightest.

In the shuttle run test by female students, we have experienced only a small **1.17-second** difference. Similarly, we do not consider significant the difference between the best and worst class in the last test, endurance shuttle run, which represents only **3.74 racing sections** of 20m.

Relationship between the leisure physical activities and physical performance

To analyze in detail the relationship between the leisure physical activities and physical performance, we find that 3.D class, which had the highest proportion of pupils attending interest groups with physical education and sports focus, achieve the best results in almost all physical performance tests. Yet boys of 3.A class also attended organized physical education departments in almost equal representation, but their physical performance stood out in only three tests. After further analysis, we found that the presence of physical activities that are carried out by boys of 3.A class, most develop the skills in which the physical performance of these students better. What makes us extremely surprised was that the boys with higher representation of physical activities on arm strength development, though did not reached such an excellent performance in the test against this ability. In 3.B class only one boy attended organized physical education departments, representing 10% of the class, nevertheless the performances of pupils of 3. B class were good in 4 tests.

The relationship between the leisure physical activities for girls and their physical performance shows us the following. 3. A class had the highest proportion of representation of female students in organized sports and sporting departments, and this class has reached the highest performance in only four tests. Endurance, speed and strength of upper limbs with these girls were almost the worst. Nevertheless, the most prevailing physical activities were tennis, swimming, dancing. About 1% lower share of representation of female students in

organized sports and sporting bodies compared to 3. A class had just 3.D class, in which the average performance of tests for girls varied. The best results have been obtained in the running speed, the worst in the static strength of upper limbs and the strength of the abdominal and hip-thigh muscles. Dance, karate and swimming dominated of leisure physical activities. The relatively high proportion of female students attending leisure physical education and sports departments attain the girls in the 3.C class. In this class, physical performance was similar to those in the 3.D class, even in some cases better. The organized physical activities of schoolgirls have been represented by tennis and dancing.

Comparison of motoric performance of our research group with a set of test from the past

As we mentioned in the introduction, many researchers are often based on the results of Eurofit that is taken as standard for monitoring the state of physical performance of students and youth. In the same way, we also want to look at differences in anthropometry and physical performance of students between the two researches sets apart 20 years. Therefore, below we present Table 5 and 6, which form a basis for comparison of these findings.

Table 5 – Comparison of anthropometry and physical performance of boys

File	number	Age (n)	BH (cm)	BW (kg)	FLAM (n)	REACH (cm)	SBJ (cm)	S-U (n)	BAH (s)	ShR 10x5 (s)	EShR (n)
PS BB	38	9,27	140,7	35,1	10,6	3,4	130,2	22,3	18	24,8	27,3
Eurofit	74	9,47	137,8	31,52	12,68	20,19	149,3	21,28	19,17	22,73	43,88
Difference	36	-0,2	+2,9	+3,58	+2,08	-16,79	-19,1	+1,02	-1,17	-2,07	-16,58

In the category of boys (Table 5), we chose to compare the Eurofit third age group given the smallest differences in decimal ages of tracking students. While our set students is younger of few months than boys evaluated by Eurofit in 1993/94, apart 20 years we can observe slight differences in height and weight. On this basis, we see constantly ongoing secular trend in anthropometry of population of younger students. Focusing on the values of the motoric performance, and in Table 5, we can observe that in 20 years motor performance declines, but not in all tests. In the Balance Abilities, our reference set is better by 2.08 attempts necessary to balance the small balance beam as file pursued in the past. We observed a positive result also in the strength of the abdominal and hip-thigh muscles when our boys made 1.02 more cycles for 30 s, than the boys from the past. We have find positive that value in the test endurance in bends, where our boys were weakest with only about 1.17 s

comparing to the boys of the past. In other tests, the decreasing of physical performance was recorded particularly in the achievement test, bending forward and sitting and in the endurance shuttle run.

In the category of girls (Table 6), we used the comparison of the results of the second age bracket, considering that not all the girls of our group have already exceeded the nine years.

Table 6 – Comparison of anthropometry and physical performance of **girls**

File	number	Age (n)	BH (cm)	BW (kg)	FLAM (n)	REACH (cm)	SBJ (cm)	S-U (n)	BAH (s)	ShR 10x5 (s)	EShR (n)
PS BB	54	9,14	137,6	30,6	8,1	7,7	126,6	22,8	17,1	25,4	23,8
Eurofit	60	8,57	132,0	28,2	14,8	21,1	133,1	19,1	10,29	23,7	31,3
Difference	6	+0,57	+5,59	+2,37	+6,7	-13,4	-6,5	+3,7	+6,81	-1,7	-7,5

From the anthropological measurements, we can see that the girls of our survey sample are about 2.37 kg heavier and 5.59 cm above comparison of pupils from the past. Based on the results of motor performance, we found that girls of the investigated group are superior to those of pupil in the past in the three tests. Excellent results were achieved by our schoolgirls in the test of balance, which were more powerful of 6.7 attempts. A similar result was recorded in the endurance test in bends, where they were better by 6.81 seconds compared to girls from Eurofit ratings in 1993/94. Increase of physical performance also seen in the sit-ups per 30 s test where our schoolgirls made 3.7 cycles more than girls in the past. In other tests we have seen only decrease of performance. A significant decrease occurred in the Sit and reach test, where the difference still represents 1.7 seconds. The slight difference of 7.5 racing sections of 20 m has been observed in endurance shuttle run, which for us is more optimistic information concerning boys. In the Standing broad jump test there is a difference of only 6.5 cm, which does not represent such a significant difference in performance.

Overall, we assess that after 20 years, while the secular trend continues, but only in anthropology of students, we didn't notice any decrease of the level of their physical performance in any tested discipline. We even noticed for us a positive increase of physical performance in two of boys and three of girls testing.

CONCLUSION

The analysis of our research findings can be summarized in the following conclusions. In all completed general motoric physical performance tests of the boys reached the worst results just the heaviest and the second highest students of 3.C class. Organized physical

activities of this class are represented only by 18.18% (ie 2 students). It is possible that the outcome of the measurement of motoric physical performance was also influenced by this factor. It was shown that the **best performance** in almost all tests was achieved by the lightest and smallest **boys** of 3.D class. We believe that the level of physical performance values reached in tests have been affected by the somatic indicators and high percentage (71.43%) of students attending physical education departments organized outside the classroom; specially football, tennis, karate and swimming. This fact has been refuted in case of girls testing. Especially in endurance test in bends, where the best performance has been achieved just by the heaviest girls (3.C class); on the other hand, the worst performance has been achieved by the lightest girls (3.D class). Another interesting fact occurring in this case is that the two classes had relatively equally well represented female students attending regularly organized physical activity. In C class prevailed tennis and dance; and in D class in addition to those listed we could find karate. In both classes, there is a prerequisite for greater power arm, and though the results of the exercise endurance in pull-ups diametrically different. A greater difference also occurred in joint locomotion and flexibility in the lumbar section, where girls are at a different level. The most interesting for us is finding that girls of 3.A, 3.C and 3.D classes are in about similar number attending organized physical education departments, with the predominant activities such as tennis, dance, karate and swimming. Nevertheless schoolgirls reached in this test significant differences in performance. The same differences also occurred in the test of the explosive power of the lower limbs. As seen test results for boys varies in significant differences. The differences of today`s girls are not such significant.

In many research works we are facing an expression of how significantly decreased level of physical performance of existing young learners. Likewise we meet also the statement that in one area, the performance of students improved. Our research findings are showing us positive information. For our girls, compared with girls in the past, performance increased in even three physical performance tests; in balance test, the strength of the abdominal and hip-thigh muscles and static strength of the muscles of the upper limb. We can see improvement in boys` performance only in two tests also focused on static balance and the strength of abdominal and hip-thigh muscles. You can watch as the performance of young learners is changing during last 20 years. However, it is questionable what has affected motoric performance in the past and what is affecting it today. Was it due to the influence of mass physical education? Or was it due to stricter understanding of the essence of physical education? Is it the impact of diet and lifestyle and or due to present hectic, consumer society,

which has no time for anything, not even the healthy development of young generation of students?

Ultimately, when analyzing the findings, we are facing other issues and questions. What most affects motor performance? How and in what conditions the physical performance of young learners is developed in the best way? What is the personality of teacher of physical education and how he can effectively use time and the whole process of teaching of this subject? What is at the top students motivating force to move? In this process, each of the enumerated factors clearly play an important role. In particular, we believe that it is most important for children to grow and continually develop a positive attitude towards physical activity, exercise and sport. Most natural is such a relationship developed mainly using motion games that children face from an early age. In the development of physical performance and lifestyle of young learners we also consider the importance to use an interdisciplinary collaboration of experts, especially in the school environment. It is necessary to involve parents to physical education and collaborate with them on this subject. It is important also to lead students to recognize the importance of physical performance, why is increasing of the physical performance important and how it is related to their health.

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ŠKOLSKÁ TELESNÁ VÝCHOVA A ROZVOJ POHYBOVEJ VÝKONNOSTI SÚČASNÝCH ŽIAKOV PRIMÁRNEJ EDUKÁCIE A POHYBOVÁ VÝKONNOSŤ ŽIAKOV V MINULOSTI

SÚHRN

Príspevok sa venuje problematike monitorovania pohybovej výkonnosti žiakov 3. ročníkov, ktorí sa zúčastňujú na vyučovaní telesnej výchovy vybranej základnej školy v Banskej Bystrici, pričom analyzujeme aj ich mimoškolské pohybové aktivity. Zároveň získané výsledky komparujeme navzájom medzi triedami a rovnako s výsledkami získané testovou batériou Eurofit na Slovensku (Moravec, et al., 1996). Autorky poukazujú na dôležitosť zvyšovania pohybovej výkonnosti, s ktorou sa spája aj zvyšovanie zdravotne orientovanej zdatnosti človeka a jeho zdravia. Tiež prezentujú význam materiálneho a priestorového vybavenia škôl, ktoré rovnako, ako pohybová aktivita, ovplyvňujú výkonnostnú úroveň žiakov.

KEÚČOVÉ SLOVÁ: Školská telesná výchova, pohybová výkonnosť, žiaci primárnej edukácie, učiteľ primárnej edukácie, mimoškolské pohybové aktivity.

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Deadline for submissions for each issue of the journal is

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The text of the contribution is in English. The contribution is not to exceed a maximum limit of 15 pages (including tables, pictures, summaries and appendices). A summary will be in the Slovak language, and by rule 1 page at the most. The text is to be presented in MS Word editor.

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We look forward to our further cooperation.

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