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THE ROLE OF „HANDBALL AT SCHOOL” PROGRAM IN ABILITY DEVELOPMENT AND REPLENISHMENT TRAINING

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Abstract: *In Hungary the undisputable merit of TAO subsidy is realized in replenishment training, human resource development and development of sports infrastructure. The other important base of replenishment development is „Handball at School” programme managed by Hungarian Handball Federation. „Handball at School” programme was launched in relation to every-day physical education and we undertook the skills-building role of its impact assessment. A survey programme was organised by us in the autumn and spring semesters of 2015/ 2016 academic year aiming to prove that project has positive effect on aiming accuracy and performance stability results of pupils, as well as their precision of technical implementation. 183 pupils were examined who had two sponge-handball lessons a week out of their 5 physical education lessons. When choosing the pilot scenes it was considered important to get Budapest, Eastern- and Western Hungary also involved. To examine aiming accuracy two tests were applied. One is „throwing at a target from throwing straddle without previous swing” performed by the pupils. The children were expected to hit the small box five times with right technical implementation meaning that it was done with lifted elbow. After the first implementation they were given some time to relax and the shots were repeated five times again. The children were asked another task to perform, a similar one to the first, but it had to be performed from running up, that is they ran back from a line, took the sponge ball, ran back to the line and had to hit the small box again with lifted elbow. At this task several aspects were noted and measured again: the time needed for implementation, target accuracy and also whether the technical implementation of the throw was accurate.*

Keywords: : Handball, TAO, Every-Day Physical Education, Aiming Accuracy, Speed Coordination
(JEL Classification: I21, Z28)

Introduction

TAO subsidy system for visual team sports was introduced in Hungary in 2011. The objective of the modification of Act LXXXI of 1996 on Corporate Tax and Dividend Tax (abbrev. TAO) was legal regulation of the sports-friendly tax (András, 2014). The act was accepted by EU, which became unprecedented, thanks to its regulations concerning sports. On 1. July 2011. Act LXXXII. of 2011 on the Modification of Certain Acts on Sports Subsidy and its Implementing Regulations came into effect (Bardóczy 2014).

The objective of the Act is to ensure direct state subsidy for visual team sports (football, handball, basketball, ice hockey, and water polo).

The beneficiaries can spend the resources coming from TAO on tangible investment, renovation, personal expenses and educational costs. In 2011 tax year 2618 tax payers benefited 20,4 bn HUF tax advantage on sports purposes, until 2012. 21 December it was already 25 billion (Bardóczy 2014).

An undisputable merit of TAO is that it has outstanding role both in replenishment training and in professionals' training as well (Dajnoki et al. 2015). Although in Debrecen football is

outstanding from TAO aspect, in handball sport they applied in 2011-2014 for 660 108 000 HUF for replenishment training from which 509 129 000 HUF was won on this purpose, meaning 77% efficiency (Bács And Bácsné 2014B). When examining subsidized areas of five visual team sports in general in Debrecen in 2011-2013 it can be stated that the least is spent on personal expenses and then on infrastructural investments, the amount of which was even exceeded by the sum spent on replenishment training tasks. University students can take part in the competition (organised by TAO) as a result of which several universities have developed their sport infrastructure by means of tenders (Bács and Bácsné 2014A; Pfau 2015A,B).

The importance of replenishment training is crucial, seen from the Hungarian data of 2006 issued by National Sports Strategy Sport XXI. (2007-2020) showing that there were 200000 sports people having competition permit in our country, of which 138000 people were from the six popular visual team sport categories (football, handball, basketball, ice hockey, volleyball and waterpolo). The five visual team sports were completed by volleyball from this year (2017). Team sport (especially football, basketball, handball) play a very important role in the Universities

sport (Bács and Bácsné 2014a, Bácsné 2014, Bácsné 2015; Pfau 2014a,b; PFAU and Domokos 2016).

Thanks to TAO, in every visual team sport increased the number of sports people (Ráthonyi-Odor and Borbély 2017). In handball sport TAO had inspiring effect on the growth of sports people's number, since in 2011 there were 24 000 persons, in 2012. There were 25 000 persons, in 2013. There were 29788 persons and in 2014. There were 31 227 registered sportsmen (Bardóczy 2014; András 2014).

A research concerning basketball (Vácsi 2017), based on a questionnaire filled in by 53 clubs from the 125 basketball teams working in Hungary (playing in National 1/A, National 1/B, National 2), speaks about the usefulness of TAO. The clubs revealed how much they were helped in different areas by the TAO. The clubs had to evaluate the areas on a scale from 1- to 5. (1=not at all helped, 5= totally helped). The clubs were mostly helped by TAO in implementation of investments (average=4,38, deviation=1,14), then in replenishment training (average=4,42, dev.=0,79), and in HR development (average=4,11, dev=0,78).

It is not only TAO which plays crucial role in replenishment training in Hungary. A good example on it is „Handball at School” programme managed by Hungarian Handball Federation.

In the Hungarian society value preference changed after the changes of the regimes, this way new expectations were expressed by the society about education as well concerning skills (Hamar 2005). This way curricula were continuously altered in education, four National Curriculums were issued. The latest alteration was in 2012 when the government accepted and ordered in Act (110/2012. (VI. 4.) the introduction of everyday physical education (Hamar 2013). This way everyday physical education was introduced in phasing out system from 2012, that is in the first year it was compulsory for the 1st and 5th year children of the primary school and for 9th year students of secondary schools, then it became compulsory gradually for the other classes as well. For everyday physical education “Handball at School” programme was created, a methodological material for training handball in junior classes (1-4 classes). This way schools could opt for two handball lessons out of the five physical education lessons a week. Hungarian Handball Association ensured the necessary equipment and training of the teachers. A curriculum was made for this handball programme which was published in Magyar Közlöny 2016. year 126. issue 5. attachment 22/2016. (VIII.25) EMMI order.

“Handball at School” programme was introduced in 2013 and schools continuously joined it: in 2013 year 1430 students took part in the programme from 50 schools, then in 2014 already 3400 children took part in it from 91 schools, by 2015 the number of children rose to 4565 from 117 schools.

Within the programme the children got acquainted with the basics of sponge handball in two lessons a week where they acquired the basic sport skills besides the elements of dribbling, possession and passing. The teachers training the children were trained, prepared and continuously controlled by Hungarian Handball Association.

Several Hungarian and international researches have dealt with the testing and choice of adult handballers (Granados et al. 2007; Nikolaidis and Ingebrigtsen 2013; Serrien et al. 2016,

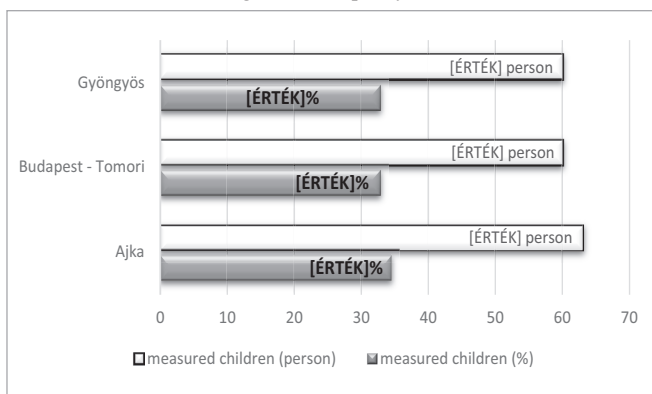
Schweising et al. 2016; Gürhan et al. 2016; Sabido et al. 2016, Schwesig et al. 2016; König and Ökrös 2016; König et al. 2017), and the importance of ICT in education (Czeplédi 2007, 2008; Nagy and Müller 2016 a,b; Nagy et al. 2017). Researches dealing with the measurement of children playing handball at school age also have literature background (Ingebrigtsen and Jefferys 2012; Diana et al. 2016; Karadenizli 2016; Muratovic et al. 2015; Kayapinar et al. 2015; Ingebrigtsen et al. 2013). Role of conditional abilities, mental stamina and performance indicators of adult elite sportsmen has also been examined by several professionals (Rivilla et al. 2011, Csukonyi et al. 2015; Gürhan et al. 2016; Ökrös, 2016). The handball research done with children has proven that the sport has beneficial influence on the development of motorous skills of children (Ion 2015).

Before starting our research the following questions were asked we tried to find the answer for during our research. Which are the tests and procedures to examine the major conditional and coordinating skills, which are suitable to help the selection process of junior section pupils in handball sport? How will „Handball at School” programme affect in connection with general and sports-specific coordinational skills? How will target accuracy and speed coordination of pupils taking part in the survey change due to the project during the year? Which parameters will mostly have changed by the autumn and spring check? We consider that tests to check and examine conditional and coordinational skills, sports-specific tests must be approached in holistic way when finding talents for a sport in junior school age. We presume that there will be bigger development at children doing specific trainings in handball when doing ball coordination and speed coordination tests.

MATERIAL AND METHOD

The pupils were chosen, that in 2015-16 academic year at least 10% of all the students of the junior section take part in the programme. Out of 1430 pupils of the junior section 183 took part in the survey, that is 12,8% of it. The locations were chosen so that from Western- and Eastern Hungary and a school from the capital city be in the sample, so all the regions of Hungary were represented. It can be seen that there were about the same proportion of children from all the three locations (Figure 1.).

Figure 1. Sample by location

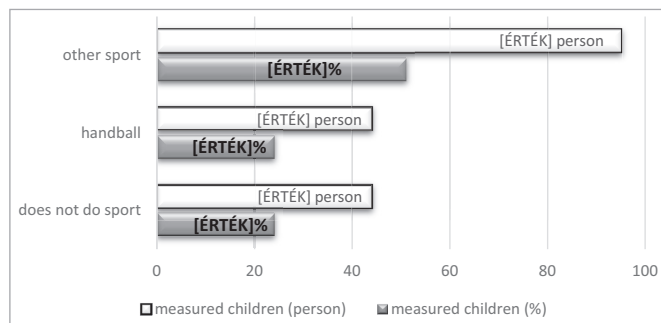


Source: Private edit 2017

94 persons (51.4%) of the measured junior section children were boys, while 89 persons (48.6 %) were girls. The surveyed

ones came from 2., 3. and 4. classes, with about the same proportion: 63 persons (34.4%) 2. class, 57 persons (31.1%) 3. class, and 63 persons (34.4%) 4. class children. The Figure 2. shows the sporting habits of the sample:

Figure 2. Sporting habits of the sample



Source: Private edit 2017

Our experience concerning sporting frequency was that 24%, that is 44 children of the sample do not do any sport besides physical education lessons, while 76% of the do some kind of sports activity. In the test group 24% of junior class children mentioned handball as sports activity, while 51% declared to do other sport.

The children were grouped by the age and the age groups were made by decimal age calculation. Our finding showed that 34,4% of the children in the sample were in the age group of 10 years old, representing the dominant part of the sample. 30,6% of the children were in the 9 year old category, while the 8 years old made 25,7% of the sample and the 11years old merely 4,4% of it and the 6-7 years old 5% of the sample.

To test the survey material pilot measurements were done in Ózd, Vasvári Street Primary School, to make sure the test material offered for the survey matched the abilities of the age group and to get information about the feasibility of the exercises and general and special technical level – related to the tasks – of the students of different age and pre-training. This school was chosen to have a location where underprivileged children could also be tested and the venue is suitable to play sponge handball.

During the pilot research alterations were made in the previously suggested material, since the 1. and 2. class pupils could not perform the 2. task (Alternate hand dribble with ball) even at basic level in alternative way. Therefore the above mentioned age group had to perform this task only with one hand (on the dominant side) during the survey. (Evaluation of this task will be published in a future article.)

Besides this – as the pilot test was done at the beginning of the school year –, the 1. year pupils could not be surveyed, since even understanding the task caused serious problems for them, as, lacking pre-training, they had never faced such kind of movement material.

The Surveyed Features and Positions

Movement accuracy is a very complex category in handball, therefore we tried to examine it through different factors in order to be able to give a complex summary on them later.

In our present article the results of our two surveys to test aiming accuracy are described. Therefore the description of these tests and their evaluation is also shown in details.

Shooting in transversal straddle position without running up (to survey sports specific coordination skills)

The aim of this trial was to measure sports specific coordination skills of the children, which means aiming accuracy and target accuracy in handball sport.

This trial is implemented by the children in the way that they stood behind the line drawn on the floor, then they had to hit the small box five times in standing position without previous swing. After the first implementation they were given some time to relax and the the shots were repeated five times again. The distance of the small box that is of the target surface was changed according to the age: the target surface for 1-2 classes was 5.5 meters, while for 3-4 classes it was 6 meters from the line. The size of the target surface, small box: 26 cm height, 62 cm length, 42 cm width. When hearing the whistle of the teacher the student had to throw a ball taken from the nearby small box and hit the target surface so that the ball hit it with direct contact. Precise technical implementation was required, that is with upper throw.

Shooting in transversal straddle position with running up

At this task sports specific coordination of children was measured, with target shooting from movement typical of handball.

This trial, similarly to the previous one, had to be performed by standing behind the line drawn on the floor, they ran back from a line to the small box place 2 meters from the line, took a sponge ball from it, ran back to the line and had to hit the small box five time with the better hand, with proper technical implementation, the after some rest they did five new trials again. The distance of the small box that is of the target surface was changed according to the age, placed at the distances mentioned above.

The data gained during the survey were processed with the help of SPSS statistical software, basic statistical measures were calculated, like: average, deviation, median, modus. To measure correlations two-sample trial was applied. The results were drawn in graphic and table system.

RESULTS AND DISCUSSION

Implementation of shooting in transversal straddle position without running up, from stabil position is a task which can be expected from and can be performed by school children of junior age, since it is practised not only when being taught with sponge handball, but small-ball throw and throw are part of the natural exercises of athletics in the curriculum,

it appears in school physical education games (dodgeball) or even in competitive- and relay races. The size of sponge handball used at the survey was the one used by the age groups, since the size of the palm is also different at the different age groups. This way grip stability implemented with a suitable sponge handball was adequate to the certain age groups.

However, it is well-known that there is a significant difference between the throwing technics, coordination abilities, muscular power of arms, etc. of the first- and fourth-year pupils. Therefore the tasks had to be differentiated, so different shooting distances were chosen, that is the distance between the target and the shooting place was different accordingly to the different age groups, which had been resultful in our previous surveys (pilot research). Since if the different age groups have to throw from the same distance, the younger ones find it too difficult, while the older ones complete it almost without mistakes. The task accordingly with the age was determined in the way that the distance of the vertical surface of the small box for 2nd year pupils was 5.5 meters, while for 3-4th year pupils it was 6 meters. Differentiation of the shooting distance was necessary because not only throwing technics get better with age, but throwing performance as well, while aiming accuracy shows improving tendency, presumably thanks to taking part in the handball programme, and also the above mentioned distances are signed just like goal line for the different age groups. The students had two attempts. At each attempt they performed five shots so after some rest they had another five shots as second attempt.

In case of students the average score from the first 5 throws was 1,35 (deviation=1,17) in the autumn survey.

Table 1. The results of shooting in transversal straddle position without running up related to aiming accuracy, target accuracy, time results and technical implementation

	Autumn result		Spring result		paired t test (p)
	average	deviation	average	deviation	
First attempt Score (pieces)	1,35	1,17	1,94	1,28	p<0,05
Second attempt Score (pieces)	1,42	1,15	1,95	1,22	p<0,05
First attempt Lifted elbow (pieces)	3,29	1,92	3,8	1,56	p<0,05
Second attempt Lifted elbow (pieces)	3,29	1,84	3,84	1,53	p<0,05
First attempt Time(sec)	11,57	2,23	10,78	1,97	p<0,05
Second attempt Time(sec)	11,13	2,13	10,29	1,98	p<0,05

Source: Private edit 2017

After the first five shots they had some rest and then threw five times again, where the average value was 1,42 (deviation=1,15). The results of the second attempt, second aiming steadily showed better values. Müller (2004) had 10 relay kicks done by primary- and secondary school students to test aiming accuracy. It is proven that the fourth kick attempt was the best, because of the above mentioned ones. The tenth attempt proved the weakest result, as tiredness caused unfavourable tendencies in soft coordination (Table 1.)

In our research more precise aiming is shown by the fact that the deviation value measured at the second time is smaller, that is variation range of the output decreased showing more balanced aiming performance.

At the spring survey even efficiency of sponge-handball practices can be seen. During the spring survey the students performed this shooting task at 1,94 (deviation=1,28) value on average at the first attempt showing better shooting accuracy after the first semester than in autumn. The shooting results of the two measurements show significant differences. During the second row of throwing attempts students produced better values again, since the average of scores improved from 1,42 to 1,95 on average and deviation increased from 1,15 to 1,22 from autumn to spring. The cause of it may be that progression to output may increase variation range of scoring performance. When checking the second series significant improvement was experienced at students (p<0,05), that is spring results are better than the autumn ones (Table 1.).

Besides scoring accuracy technical implementation, movement accuracy was also checked, the surveyor also watched at the certain throws how many times the attempt was performed with lifted elbow. The students performed the throw with lifted elbow 3.29 times, with 1.92 deviation value, out of 5 attempts at the first autumn series. At the spring measurement the task was performed with right technics 3.8 times on average, and with lower deviation value (1,56). The more precise technical performance also improved efficiency, target accuracy. Compared to autumn results the improvement in technical implementation was proven by not only the smaller deviation, but also significant differences were experienced after doing the two sample-T probe. "Handball at School" programme had good effects also on improving technics. In the second series of the autumn survey students performed the exercise with lifted elbow 3.29 times, with 1,84 deviation value. The spring results were improved to 3.84 on average (deviation=1.53), which can be considered a significant difference (Table 1.).

Time spent on implementation was also measured, since motion pressed by time is also a peculiarity of ball games, determining in open-skill sports. However, understanding sports-specific connection between fastness and accuracy is also important.

The students performed the first series in 11.57 sec (deviation=2,23) in autumn, which value decreased to 10.78 sec (deviation=1,97) by spring. The average value of the second series in autumn was 11.13 (deviation=2,13), which

got improved to 10.29 sec (deviation= 1,98) by spring (Table 1.).

The next task was similar to the previous one, but the students had to implement the shooting task performed with running up characteristic in handball through a series of throws, with similarly different ball and shooting distance corresponding their age, as mentioned in the previous trial. The results are shown in the following table (Table 2.).

Similar results and tendencies can be seen to the previous

Table 2. The results of shooting in transversal straddle position with running up related to aiming accuracy, target accuracy, time results and technical implementation

	Autumn result		Spring result		paired t test (p)
	average	deviation	average	deviation	
First attempt Score (pieces)	1,26	1,07	1,92	1,34	p<0,05
Second attempt Score (pieces)	1,36	1,07	1,88	1,29	p<0,05
First attempt Lifted elbow (pieces)	3,12	2	3,76	1,66	p<0,05
Second attempt Lifted elbow (pieces)	3,28	1,95	3,77	1,61	p<0,05
First attempt Time(sec)	18,3	2,98	17,57	2,86	p<0,05
Second attempt Time(sec)	17,99	2,71	17,5	2,94	p<0,05

Source: Private edit 2017

trials when examining the results, shooting accuracy, technical implementation and time results of the pupils. It can be stated that pupils shooting accuracy of the second series of throws is more favourable, and with smaller variation range. It is true for pupils that target accuracy by scores in the autumn measurement is worse and the spring results are significantly better. When checking technical implementation and compared to autumn results the improvement in technical implementation was proven by not only the smaller deviation, but also significant differences were experienced after doing the two sample-T probe. Significantly better results were proven for pupils in both score results, technical implementation and implementation time as well.

Running trial with direction change: (to measure speed coordination - without using ball) The pupil stands behind the line in standing start position. Three cones are placed every five meters on the 15-meter-long track. The pupil sets off on the whistle by by-passing the cones starting at the first one from the left hand. Having rounded the third cone he performs the by-passing task without ball. There are five attempts. After two attempts there is a long break (he has a rest while the other members of the class also perform the task) after which he has two more attempts. Evaluation: By a digital watch, the hundredth of a second punctuality.

In the Table 3 time results of running trials with direction

Table 3. Time results of running trial with direction change (without using ball) in the autumn- and spring measurements

	Autumn result		Spring result		paired t test (p)
	average	deviation	average	deviation	
First attempt	8.67	0.90	8.40	0.89	p<0.05
Second attempt	8.94	1.01	8.64	0.99	p<0.05
Third attempt	8.72	1.05	8.41	0.97	p<0.05
Fourth attempt	8.98	1.00	8.69	0.96	p<0.05

Source: Private edit 2017

change, by-passing cones can be seen. Running without ball, running by changing direction is also an important element of handball, when in an attack one has to get forward fast without ball, possibly by by-passing defender players. This task was performed four times both in autumn and in spring, so average and deviation values of the time results of the four attempts can be seen here.

During the autumn attempts the time result of the first performance was 8.67 sec. having a smaller deviation value (dev=0.90). The time result of the second attempt decreased since it was performed below the average =8.94 sec, which had higher deviation value =1.01. As there was a rest time after the second attempt, the result of the third attempt got better compared to the second one. The time of the fourth attempt got worse since tiredness decreases the results of speed coordination (Table 3.).

In the case of the spring time results similar was experienced; while the distance was managed to be completed in 8.4 sec, (dev=0.89), the time result of the second attempt decreased, as it was 8.64 seconds (dev=0.99). After the break the result of the third attempt was experienced to be better again, the value of which was 8.41 seconds (dev=0.97), which was close to the results of the first attempt. The time of the fourth attempt was the worst, which also may be related to tiredness. When the spring- and autumn results are compared by paired test, it can be seen that speed coordination of the children improved, since the spring results were usually better compared to the autumn ones proven also by the significant differences (Table 3.).

Dribble with direction change: (to measure speed coordination (with using ball). The pupil stands behind the line in standing start position with a ball in his hand. Three cones are placed every five meters on the 15-meter-long track. The pupil sets off on the whistle by by-passing the cones starting at the first one from the left hand. Having rounded the third cone he performs the by-passing task backward as well dribbling the ball. The dribbling must be done with changed hands in the way that after the start he starts dribbling with right hand and changes for left hand after having by-passed the first cone as long as he has by-passed the second cone.

Having by-passed the second cone he goes on with right hand again until the third cone has been by-passed. The way back is the same as above, keeping the opposite side dribbling rule concerning the cone. (In 1st and 2nd classes the teacher may conduct it – if necessary – which hand to use when dribbling in the given position.) There are four attempts. After two attempts there is a long break (he has a rest while the other members of the class also perform the task) after which he has two more attempts. Evaluation: By a digital watch, the hundredth of a second punctuality.

Dribbling trial with direction change is a sports specific

Table 4. Time results of running trial with direction change (with using ball) in the autumn- and spring measurements

	Autumn result		Spring result		paired t test (p)
	average	deviation	average	deviation	
First attempt	13.36	3.58	12.41	3.40	p<0.05
Second attempt	13.11	3.26	12.37	3.02	p<0.05
Third attempt	12.45	2.89	11.80	2.65	p<0.05
Fourth attempt	12.65	2.97	11.95	3.19	p<0.05

Source: Private edit 2017

test where the students accomplish the track with a sponge ball. This trial also measures speed coordination, however, possession of the ball, measuring ball skills is also done in dynamic conditions.

In the autumn test we experienced that the first attempt was accomplished in 13.36 seconds in general (dev.=3.58), while the second attempt in 13.11 seconds (dev.=3.26), the third attempt in 12.45 seconds (dev.=2.89), while the fourth attempt was accomplished in 12.65 seconds (dev.=2.97). It was experienced that the time results of the third and fourth trials were better compared to the first two ones. The experience of the first two accomplishments may have helped the better that is faster implementation, of the third and fourth trials, "they got to the task" (Table 4.).

When looking at the spring time results in the dribbling task, similarities can be experienced to the autumn measurements, (first attempt average=12.41 sec (dev.=3.40), second attempt average =12.37 (dev.=3.02), third attempt average =11.80 (dev.=2.65), fourth attempt average =11.95 (dev.=3.19), that is the time results of the 3rd and 4th attempts were better compared to the first two ones. Proper warm-up is indispensable for speed tasks, which also may have resulted in the better results (Table 4.).

In case the autumn- and spring results are compared, improvement can be stated in all the four attempts, since the tasks were implemented faster, which not only show a tendency, but it could be proves statistically as well, as results of paired test showed significant differences.

In our pilot research and survey we experienced that in junior school age tests measuring and checking conditional a coordinational abilities, sports specific tests of handball must be applied in holistic approach when wording talent and choosing a sport. Our research has proven that in case of certain parametres (technical implementation, accuracy, shooting accuracy) „Handball at School” programme has positive effect on pupils performance.

„Handball at School” programme – meaning two sports specific lessons a week - has improved shooting accuracy results, technical implementation and speed coordination of all pupils alike. The programme improved speed coordination as well manifested in improving time results of trials with- and without ball proven statistically as well.

In our former measurements (Juhász et al. 2016; Juhász et al. 2017) we could also prove favourable impact of the programme on students of different age, gender and pre-education. The handball can play a very important role as a tools in the every-day physical education, because the program developed the motor skills for the pupils.

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