

## INTERDEPENDENCE OF CERTAIN RESULTS IN ATHLETIC DISCIPLINE OF DEAF STUDENTS

*Original scientific paper*

**Radomir Arsić and Nevenka Zrnzević**

*Teachers Training Faculty Prizren-Leposavic*

### **Abstract**

*Since a large number of motor skills that are developed at the hearing population (such as with deaf children) in this paper we analyzed the results achieved in the 100m sprint, long jump and high jump. Testing was performed with over 99 subjects of both sexes (47 girls and 52 boys aged between 16 and 17) with hearing loss between 60 and 80 dB (severe hearing impairment). The study was aimed to determine the interconnectedness and mutual influence of the results achieved in these tests. The methods of theoretical analysis and descriptions that explain the causal link between the results. On the basis of tests and statistical analysis of data showed statistically significant interconnection with the results in 100 meters, long jump and high jump in boys, while in girls appeared only partially interconnected because statistically significant correlation appeared only in the results of running 100m to the results of the high jump. It is also significant that on the basis of the results of the high jump in both sexes can predict the results of running the 100m.*

**Keywords:** *running the 100m, long jump, high jump, motor abilities, motor strength, motor speed, motor repetitive strength, Kolmogor-Smirnov test; Correlation analysis, t – test, regression analysis*

### **INTRODUCTION**

Vestibular system is the first sense that is developed during the evolution of the animal world in order to maintain balance and body position, direction of movement and orientation in space. Later, for this purpose include more and vision and deep sensibility in the joints and muscles, but it still kept the vestibular apparatus function fastest mobilization of effector for the elimination of potential disruptions. The balance is considered to be one of the basic psychomotor skills.

Athletics has always been considered the queen of sports because it represented one of the most complex sports, whose base includes a large variety of activities of the entire human body. It is now generally acknowledged to be a success in most sports today achieves the proper running, jumping, walking, throwing, etc. (Winfried, 1997). Athletics in essence affects such forms of movement, develops them, perfected and allows each individual to achieve good base movement activity, which are essential for almost all sports (Željaskov, 2004; Nićin, 2000) states that the motor skills of a complex and very complex skills that are genetically determined, and with a high inherent coefficient (speed, coordination, balance, precision). Running speed ma short distance is almost the layout type, and is of great importance for achieving good results in individual and team sports for athletes. Most of the authors in their research papers for motor speed argue that the coefficient of the inherent 95%, which means that the variability of these abilities can possibly be improved only by about 5% (Wilmore and Costill 1994). So that for every success in one of the branches of athletics need a good motor skills development. As for the running, as well as athletic discipline prevails in it speed and power as the two dominant motor abilities. While jumping disciplines, in order to achieve success, in addition to explosive strength (which is the basis) is required and the speed, endurance

and coordination. So on the basis of the above, it can be concluded that the jumps, as disciplines in athletics, are very difficult and complex discipline, and that to achieve success and superior results required impact not only strength but also a lot of other factors (Tončev, 2001). For this reason Milanovic and Željaskov state that explosive strength is the ability to jump the maximum activity of the muscles that allow acceleration of one's own body in activities such as vertical and horizontal jumps (Milanović, 2005; Željaskov, 2004). At the same time, this represents the impact on human development, both in physical as well as physical development, in terms of mastering and upgrades of functional and motor skills in humans. In addition to motor skills, which play an important role, not far behind the morphological dimension of competitors on the basis of which a selection is made among athletes.

From the above we can see that basically each of the three disciplines to investigate, motor skills lie strength and speed. So it is directed, and the work that needs to analyze each of these motor skills, with a delay that is hearing impaired children, and to compare the results of running the 100 meters (here the required power and speed), long jump (where also need speed and power) and high jump, where in addition to the speed and power needed and coordination (Babic, Draganov, & Saratlija, 2003). In this paper we analyzed the interrelation of these disciplines, as well as predict the results in the competition in the high jump in relation to the results of running the 100 meters. The problem that is set in the research is the interconnection between the two disciplines, or the connection between their results. The question of whether the results obtained can be used in the planning of the work with the children in a further training process as well as gained through better results.

Hearing loss is a complex problem that many researchers point out in their research (Myklebust, 1964; Schein

and Delk, 1974), and the very definition of deafness varies from researcher to researcher, or depending on whether it re-presents an educational or medical problem. There is also a *cultural definition* that includes, that defines the cultural identity of deaf persons to communicate using sign language as their primary means of interpersonal communication. The medical definition of deafness is defined as any hearing loss that is so serious that they are unable to fully learn the spoken language without the help of hearing aids or cochlear implants. Galaudet scale defines deafness according to whether a person is able to hear and develop speech. All these definitions recognize that deafness represents hearing loss greater than 80 dB, for the simple reason that in this case, even with a big gain through individual hearing aids can not be heard nor perceived speech sound from the environment.

Schmidt (1985) indicates that a delay in the language that is associated with hearing loss has a negative impact on student achievement and success in physical education. If damage occurs at an earlier age, the weight of the impact of delays in language development delays in the overall development of the child. Recent research (Dair, Ellis, & Liberman, 2006) point to the need for more effective physical education as part of the program for solving the problem of obesity (overweight) in deaf children. Unlike most other sports, athletics sport is very flexible, so that children who begin later to run lacking key skills that are built in accordance with their age, because in most disciplines appears what is natural behavior for children (running, jumping, throwing ...).

Deaf children are very ordinary children. They also love to run, jump, play, dance, and perform various pranks. Their problem is that very often do not know who to play, ing parents constantly encourage them to play and they because of their inability to communicate with the hearing to avoid. Mocking and stigma that leaves mark on the parents of deaf children and to themselves. In the end, they are moving away from the other children, closed in themselves and avoid all the everyday activities that require the use of speech.

Sport is one of the strong binding force in the world and the culture of the deaf. Love for the sport especially fostered in schools for deaf children who have boarding accommodation for their students, because it appears the rivalry, both among children themselves and among similar schools. For them sport is very quickly becoming a powerful tool for akultiracije deaf child, the exchange of experiences as well as a great source of pride for the appearance among them. Throughout the competition, the children learn about one another, socialize, exchange experiences, creating healthy habits and eventually develop their social skills. Stewart says that in *deaf Sport is a social institution in which deaf people exercise their right to self-determination through the organization, competition and socialization of other deaf who participate in sports activities* (Stewart, 1991, according to DePauw and Gavron, 1995).

Stujart (Stewart), 1991, according to DePauw and Gavron, 1995) in deaf sport, defined in three dimensions and spheres: social, psychological and educational. Socialization of deaf people and their involvement in the community constitutes the foremost goal that appears in every deaf person. Stujart further states that *the nature of sport in deaf is to promote the interaction of deaf individuals among themselves*. Sport in deaf people and promotes psychological health in a way that they are identified by group mem-

bership, thus enabling their access to social support and system integration. In addition, in deaf sport has an educational component and the value of that manifests itself in the fact that deaf people together through sport learn to work together and achieve the set goals. He further stated that sport, or else offers a common basis for almost all ethnic and social groups worldwide, including the zajednicu consisting of deaf people. Sports team class, school, neighborhood or city, is an important source of identification for each individual who belongs to the deaf community. Additionally sport in deaf to the process of socialization and between deaf people, because athletes in their desire to win, eclipsing all previous decisions prejudices and differences that exist in relation to the population of very prominent, and focuses only on the similarities that occur between Deaf and Hearing individuals or groups that are competing.

The Serbian nation has always appreciated the vitality faculties of work, combat readiness, and therefore physical exercise has always occupied an important place in the development of culture. Many legends, travel books, oral traditions and ethnographic records testify, and are of particular importance in our nation was competitive bidding, competing forms of physical exercise, such as combats, in which she came to the fore forces and all natural forms of movement and motion.

The first organized forms of physical education in Serbia, found in the regulations from the school (opened in Belgrade 1808.godine), where physical education enforced in the form of military training, to 1871, replaced by the term physical exercise and *gymnastics* became a compulsory subject in elementary School. In deaf students to gymnastics was first mentioned in 1896 and in an internal curriculum semi-state school for deaf society (Association) "King of Dečani" in Belgrade. This name, and the principle of *physical education* in deaf to retain almost 50 years to 1931. brought the official curriculum for deaf children, where does the name of the object in the *Physical exercises* at the Sokol system. Facilities subjects were focused primarily on breathing exercises and exercises of speech organs, and only in the higher grades were performed complex exercise when they practiced various sports.

In working with children with impaired hearing in teaching physical education should be handled with caution, primarily when performing exercises in which dominates the element of balance. This above all, to the very nature of hearing loss, which causes dysfunction of organs for balance and hearing organs that are connected in the labyrinth of the cochlea (a snail). Organ of hearing is phylogenetically much younger than the body to balance, because it stems from, and is a function of the cochlea subjected to the principles of work of the organs of balance. The balance is over and above all infraction of deaf children in whom hearing loss at the level of the cochlea, because if the auditory nerve, because hearing damage is not receiving adequate auditory stimuli will then have an inadequate vestibular nerve stimulation, which may cause uncertainty in the movement as well as problems in maintaining the balance of the body.

## METHODS

Analyzed the results achieved in the 100m sprint, long jump and high jump. Testing was performed over 99 subjects of both sexes (47 girls and 52 boys aged between 16 and 17 years) whose hearing loss between 60 and 80 dB (severe hearing impairment). The study was aimed to dete-

rmine the interconnectedness and mutual influence of the results achieved in these tests. The methods of theoretical analysis and descriptions that *explain the causal link between the results*.

## RESULTS AND DISCUSSION

Table 1 shows the results of the descriptive parameters of respondents of both sexes who have reached the three test discipline in the Republican tournament for deaf children, held in 2015. The analysis of results is noted that respondents males have the highest variation width with the results that have been achieved in the long jump and the lowest in 100 meters.

When calculating the dispersion parameters based on the standard deviation (SD) of the respondents obtained results indicate that the respondents and male and female najhomegenije achieve results in 100 meters. The reason for this homogeneity can be justified by the fact that the respondents, in preparation for the Republican tournament for deaf students, the most practiced technique of sprinting, and this athletic discipline has much less require the high jump and long jump. Respondents of both sexes showed the highest inhomogeneity in the discipline long jump. The reason for this inhomogeneity multiply found in the fact that to achieve good results in this discipline needed and Bražina and power, a major role has a technique of performing a jump, a technique that deaf children had no place to rehearse. In fact it is known that within schools for hearing impaired children there are jumping on which the children rehearsed jump. Inhomogeneity of the results achieved, the addition can be justified, and by the fact that even

though subjects were trained to perform the long jump, this technique is not fully mastered.

Table 2 shows the results achieved mutual korelacija running the 100 meters, long jump and high jump, boys and girls. The results of correlation analysis between the results achieved in boys amounts -0.33 and -0.52, and in both cases the value of significance is 0.00, which proves that in both cases there is a statistically significant relationship. In girls the value of correlation between the results of the tested amount -0.37 and -0.52 in the first case to the value of significance of 0.00 in the first case demonstrating statistical significance between the results obtained in the second case the value of significance is 0.06, and does not show a statistically significant correlation. This lack of statistical significance between the results of running the 100 meters, long jump and high jump, is justified by the weight of mastering techniques long jump and high jump in girls, and the lack of playground for the respective discipline in schools for hearing impaired children in Serbia. Girls are its explosive power and speed of movement of the lower limbs showed the discipline of running the 100 meters, but did not use in the long jump and high jump, primarily due to poor techniques in these disciplines.

Correlation of results during the race at 100 meters (sprint) with jumps in the long jump and jumps in the air in both sexes deaf children can be justified motor skills you need to develop if they want better results. With low start and the rebound should be developed primarily explosive power of the lower extremities and in the run-up to jump ppotrebno to develop speed and technique of jumping (long jump in the air).

Table 1. Descriptive and dispersion parameters

Pupils	Variable	Rang	Max	Min	Mean	SD	S <sup>2</sup>	Skew	Kurt	KS
Boys	Sprint	3,93	11,28	15,21	12,83	0,63	0,39	0,5	0,89	0,71
	High jump	55	120	175	148,36	10,66	113,6	-0,9	0,54	0,07
	Long jump	244	345	589	484,91	40,12	1609,4	-0,27	0,46	0,35
Girls	Sprint	4,21	14,06	18,27	15,87	0,84	0,7	0,33	2,11	0,8
	High jump	25	115	140	124,62	6,77	45,85	0,36	-0,45	0,4
	Long jump	165	263	428	373	38,46	1478,9	-1,46	2,41	0,14

Legend: SPRINT - Running the 100m; SKOKDALJ - Long Jump; SKOKVIS - high jump

Table 2. Correlation analysis.

Sprint	Boys					Girls				
	High jump			Long jump		High jump			Long jump	
	r	p	n	r	p	r	p	n	r	p
	-0,33	0	63	-0,52	0	-0,37	0,6	26	-0,52	0

Table 3. The impact of the results of running 100 meters on the results of the long jump and high jump.

Pupils		Unistand. Coeff.		$\beta$	Standard Coeff.		Dependes variables
		B	SE		t	p	
Boys	Constant	219,66	17,61	-0,33	12,47	0,00	High jump
	Sprint	-0,56	1,37		-4,05	0,00	
Boys	Contants	912,45	59,93	-0,52	15,23	0,00	Long jump
	Sprint	-33,34	4,67		-7,14	0,00	
Girls	Contants	752,4	127,8	-0,52	5,92	0,00	Long jump
	Sprint	-23,9	8		-2,99	0,00	

Was performed regression analysis examined the results and predict the results of the long jump and the jump based on the results achieved in the 100m with male participants. The value of significance is 0.00 and based on it can be concluded that there is a statistically significant prediction to be based on the results achieved in the 100m to achieve better results in in the high jump and long jump. Achieving better results to justify that the technique of sprinting that runs the so-called *hump step* the same as the last step in the rebound with the high jump and long jump. Also these two athletic disciplines (running, ie sprint and high jump, long jump) are connected to the motor skills to be developed, because with low start and rebound poptrebna the explosive power of the lower limbs when performing a running distance and the energy to jump needed is speed. This means that the development of explosive strength, which is characteristic of running enhancing explosive power needed for a better kick-back in the high jump, and the development of sprint running speeds and affects the required speed on a roll in the high jump. If we take into account the  $\beta$  (beta) coefficient, then finds a negative relationship between these two disciplines because it reduced the lead in running for a second result among the respondents in the high jump increases by 5.5 cm.

After the regression analysis in predicting the results in speed (running at 100 meters) and the long jump, and forecasting results based on the results, the results of running the 100 meters in subjects signifiknosti value is 0.00, so on the basis it can be concluded that there is a statistically significant prediction better results if they achieve better results in the running. This prediction results in the long jump based on the results in 100 meters is justified by the fact that the techniques used in sprint running performed in the same manner as in the initial start of the long jump. These two discipline link and motor abilities and the same is the case with the explosion (explosive power) of the lower extremities with i running at start-up for the jump. Based on B coefficient leads to the conclusion that the results of these two disciplines are among the respondents in a negative relationship, because a reduction results in running for one second the result of increases in long jump of 33.34 sm.

## CONCLUSION

Our study was carried out on a sample of 99 deaf children from all over Serbia, aged between 16 and 17 years with the aim to establish connections and influence of motor abilities with the results of running short sprint to 100 meters. The application of canonical correlation and regression analysis of the obtained results confirmed that there is a strong link between the sets of tests of motor skills and speed of running on short tracks. It turned out that the results in 100 meters statistically significantly associated with motor abilities manifested by repetitive speed and strength.

Deaf and hard of hearing children (and adults) have a problem in maintaining balance, especially when they are required bed rest with your eyes closed, or standing on one leg with your eyes closed and his arms. Therefore, physical education and sports is very important and should be started as early as possible, because it not only encourages physical development of deaf child is already developing the overall personality of the child. Hearing impaired children with the use of rhythmic stimulation may develop speech

as a basic prerequisite of communication that of deaf children have great influence on their socialization. Many authors speak about the integration of intelligence, motor skills and social maturity in children (Ismail, 1976, according to Martinovic, 2003). That is why we say that the success of the school in addition to cognitive factors need to develop skills and physical and emotional development.

People who have a *sports school* or those actively involved in sports are convinced that they are the sport helped to raise their self-esteem. Sport teaches us to make sacrifices to achieve the goal, the end of the lessons learned from social sport help us in future life. Sport today applies the principles of modern life - rely on yourself and people around you, and that means that success depends both on the personal as well as from social quality.

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Correspondence:

Radomir Arsić

Teachers Training Faculty in Prizren-Leposavić

University of Priština - Kosovska Mitrovica

Nemanja bb, 38218 Leposavić, Serbia

E-mail: radomir.arsic@pr.ac.rs