

A Comparison of Chosen Strength Abilities in Deaf and Blind Adolescents

by

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The presented paper is a comparative study of conditioning abilities of deaf and blind adolescents. It was assumed that the tested motor abilities were underdeveloped in blind adolescents. The given results are part of a research project entitled: "The influence of hearing and sight disabilities on chosen aspects of child and adolescent development". In this comparative study blind, deaf and normal adolescents aged 16-17 yrs were tested. The following types of strength abilities were evaluated: explosive strength, static strength, relative strength. All tests were conducted according to the Eurofit test instruction.

The results achieved by deaf boys may suggest better development of strength abilities in comparison with blind boys. This tendency does not occur with girls. In the majority of the tests their results were worse in comparison with blind girls. The hypothesis was confirmed with boys (apart from trunk strength). Among girls, worse results were achieved by deaf girls (apart from lower limb explosive strength).

Keywords: motor abilities, deaf, blind, youth

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Introduction

Human motor abilities have always been the subject of many research projects. Most authors list muscular strength and aerobic endurance as the most important motor abilities. Some authors also include speed and its components as significant motor abilities. Szopa [1993] claims that strength abilities show how the organism is able to work against external resistance or the resistance of one's own body, under static conditions or movements of low speed but great resistance. Strength abilities are primarily conditioned by anaerobic energy pathways. Among strength abilities several types of strength can be excluded: static strength, relative strength and explosive strength.

Despite the fact that different forms of strength have been evaluated in athletes and healthy subjects of both genders and wide age spectrum, little is known about its level in groups of handicapped people. This paper is an attempt in comparing strength abilities in groups of adolescents with dysfunctions of sight and hearing, and strength abilities in groups of fit adolescents. It was assumed that the tested motor abilities were underdeveloped in blind adolescents. The following research questions were formed:

What is the level of strength abilities in the tested groups of blind and deaf adolescents?

Are there significant differences in the level of chosen motor abilities of adolescents with disabilities and healthy control subjects?

The presented results are part of a research project entitled: "The influence of hearing and sight disabilities on chosen aspects of child and adolescent development".

Material and methods

The research material included blind adolescents (group B), deaf adolescents (group D) and healthy subjects which formed the control (C) group, all aged 16-17 yrs. The selection of both groups was purposeful: only adolescents completely blind since birth and adolescents with a hearing disability above 80dB qualified. All tested adolescents were within the intellectual average and without additional disabilities. The numbers of the tested groups are shown in table 1.

Table 1*The number of participants in particular tested groups.*

Group	Boys	Girls	Total
Deaf (D)	10	12	22
Blind (B)	11	10	21
Control (C)	18	16	34
Total	39	38	77

The following types of strength abilities we evaluated:

- standing broad jump – (explosive strength)
- hand grip – static strength (local force),
- relative strength:
- bent arm hang (functional strength)
- sit ups (trunk strength)

All tests were conducted according to the Eurofit test instruction. Basic descriptive statistics were calculated. To evaluate the significance of differences between particular groups the students “t” test was applied with the level of $p=0.05$.

Results

Sit ups (trunk strength)

In the sit up test the results of deaf adolescents (both boys and girls) were worse than the results of blind adolescents. The differences results of females are statistically significant. Among girls, the worst results were reached by deaf girls while the best by the group of blind girls. Blind girls achieved slightly better results than healthy girls, but deaf girls were much worse. Statistically significant differences occurred between deaf and healthy girls.

Both deaf and blind boys achieved much worse results than healthy boys, the differences are statistically significant. In the area of trunk strength the worse results were reached by deaf boys, the best ones by healthy boys (fig. 1, 2).

Bent arm hang (functional strength)

In the test measuring shoulder muscle strength blind boys achieved much worse results compared with deaf boys. Blind girls were slightly better than deaf girls. The results of healthy girls were much better than those of blind and deaf girls, the differences between the groups are statistically significant. Both

deaf and blind boys reached worse results in comparison with those of the control group yet only in case of the blind these differences were statistically significant (fig. 3, 4).

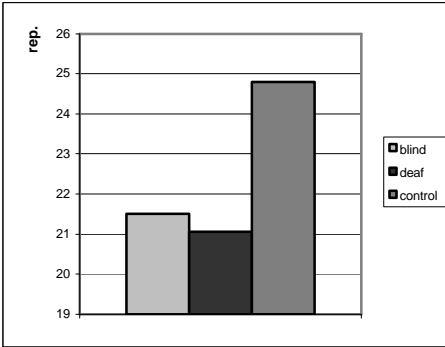


Fig. 1.
Sit ups (trunk strength) - boys

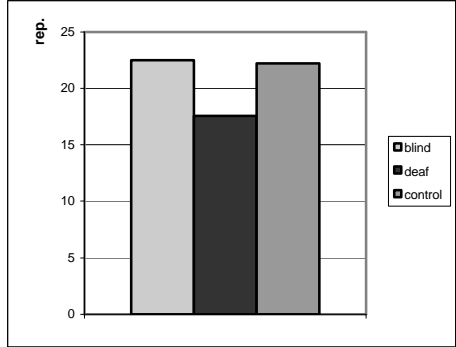


Fig. 2.
Sit ups (trunk strength) - girls

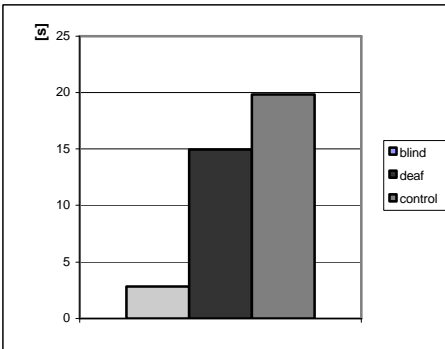


Fig 3.
Bent arm hang - boys

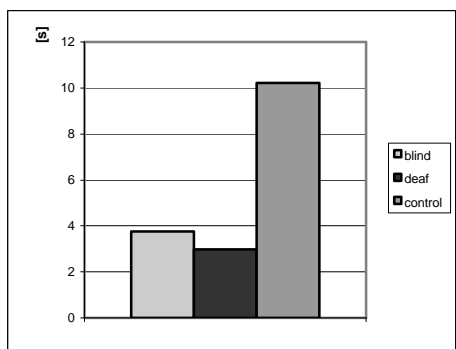


Fig 4.
Bent arm hang - girls

Explosive strength

In the standing long jump blind adolescents (both boys and girls) achieved statistically worse results than deaf adolescents of the same age. The results of deaf boys were close to those of healthy boys. The results of deaf females were very poor. Blind adolescents were significantly worse in the standing long jump in comparison to healthy subjects (fig. 5, 6).

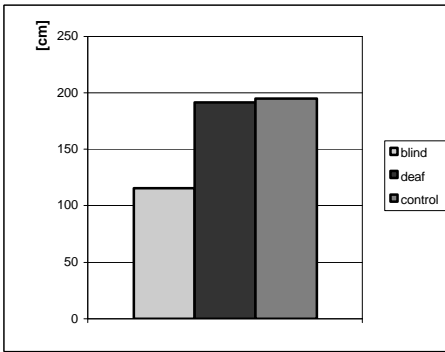


Fig 5.
Standing broad jump – boys

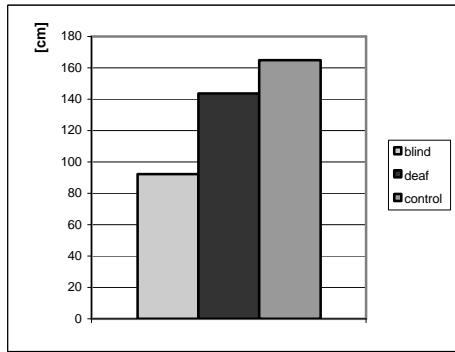


Fig 6.
Standing broad jump – girls

Hand Grip

In the test measuring hand grip strength blind boys achieved significantly worse results than deaf boys. The contrary was observed among girls. Blind girls reached better results than deaf girls. Comparing results reached by disabled adolescents and the control group, one observes that they are weaker in the area of muscular strength. Only in case of blind girls there are no statistically significant differences. In the test evaluating static strength of the hand the lowest results were reached by blind boys, while the highest ones by healthy boys from the control group. In case of girls, the lowest results were reached by deaf girls, while the highest results were achieved by those from the control group (fig. 7, 8, 9, 10).

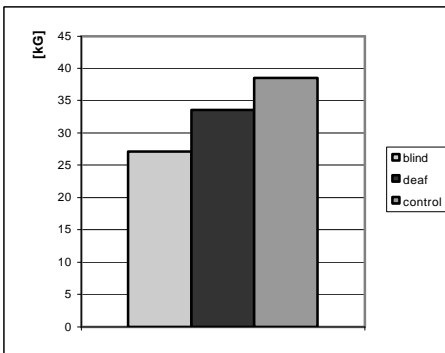


Fig 7.
Static strength – hand grip of right hand – boys

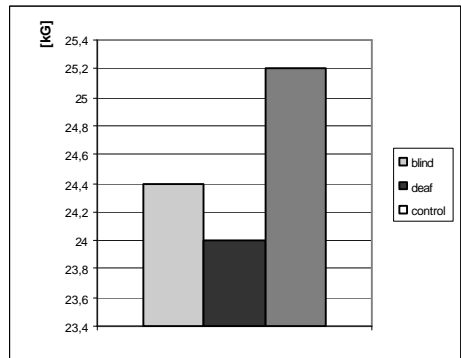
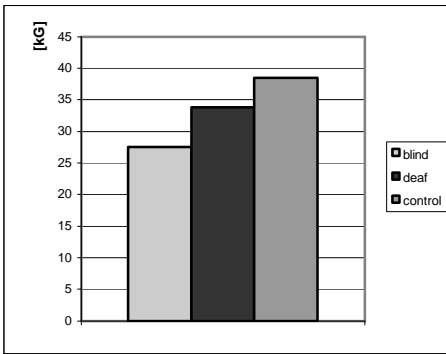
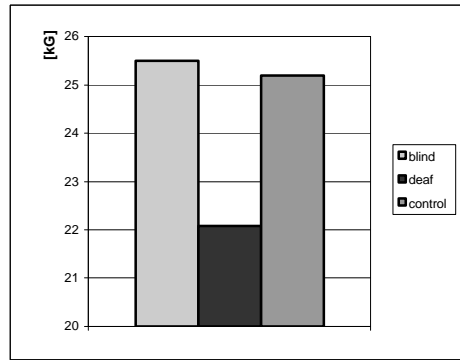


Fig 8.
Static strength – hand grip of right hand – girls

**Fig 9.**

Static strength – hand grip of left hand - boys

**Fig 10.**

Static strength – hand grip of left hand - girls

Discussion

Literature is scarce in analysis of physical abilities of deaf and blind people. Authors more often point to a lower level of physical fitness in those with dysfunctions of senses, in comparison with healthy subjects [Gawlik 2005, Zwierzchowska 2004, Cabak 2003, Bolach 1997, Hopkins 1987]. Scarcer still are comparative analyses of those with hearing and sight dysfunctions, and the results of different authors vary significantly. Cuming (1971) stated that deaf children have a much higher level of physical fitness in comparison with blind children. Contrary results were published by Hattin et al (1987). They conducted tests on a ergocycle and stated that the endurance of deaf people was 9,5 % worse and maximum oxygen uptake was 17,5% worse than that of blind people. A comparative analysis of strength abilities of blind and deaf people has not yet been found in literature. The results achieved by deaf boys may suggest better development of the tested strength abilities in comparison with blind boys. This tendency does not occur in girls. In the majority of the tests their results were poorer in comparison with blind girls. This fact escapes a single interpretation. It seems that this tendency may have a connection with the origin of deafness. Deafness was hereditary in the majority of tested boys. Research has shown [Korzon 1996, Zwierzchowska 2004] that people with hereditary deafness are physically better developed and agile compared to those whose deafness has other origins. Better physical development of boys may be due to the origin of this disability. Results of conditioning tests of deaf and blind children may indicate a poor level of physical fitness. Deafness and blindness is primarily a disability of communication rather than a disability of motor skill performance. Results indicate that blind girls participate in youth

sports at rates comparable to those of boys, yet the reasons for participation in sport activities are different.

The presented results are part of a research project which is currently being conducted. It seems that further research is needed in this area and the results may allow to make precise suggestions as to the development of motor abilities of people with dysfunctions of particular senses.

Conclusions

The obtained results do not confirm the tested hypothesis that the level of motor abilities is lowest in blind adolescents. The hypothesis proved correct with boys (apart from trunk strength). In girls, the worst results were achieved by deaf girls (apart from explosive strength).

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