

## COMPARATIVE ANALYSIS OF MOTOR COORDINATION INDICATORS IN SPORTS SCHOOL AND SECONDARY SCHOOL STUDENTS

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**Abstract.** *Assessment of coordination abilities is an important component of physical development evaluation in school-aged children. This study aimed to compare coordination indicators of 5–6 grade students from a specialized sports training center and a general secondary school using tennis ball catching tests. Boys and girls were assessed through two motor tasks: catching a tennis ball after a vertical toss and after rebound from a table surface.*

*Results were expressed as mean  $\pm$  standard error ( $M \pm m$ ).*

**Key words:** *motor coordination; physical development; school-aged children; sports training; tennis ball test; comparative analysis; motor performance; physical education.*

The development of motor coordination in school-aged children constitutes a fundamental component of physical growth, neuromuscular maturation, and overall functional preparedness. During the period of 11–13 years, significant age-related transformations occur in the central nervous system, sensorimotor integration, and movement regulation mechanisms.

These changes directly influence the efficiency of complex motor actions, reaction accuracy, spatial orientation, and hand–eye coordination. Therefore, objective assessment of coordination abilities at this stage is of considerable scientific and practical importance.

### **Materials and Methods**

The study was conducted among 5–6 grade students from two different educational institutions: the Olympic and Paralympic Sports Training Center in Andijan and Secondary School No. 2 in Baliqchi district. The participants included both girls and boys enrolled in Grades 5 and 6. Students from the sports training center were regularly engaged in systematic sports practice, while students from the general secondary school participated only in standard physical education classes.

A comparative research design was employed to evaluate coordination abilities. Motor coordination was assessed using two standardized tennis ball catching tests:

- 1. catching a tennis ball after a vertical upward toss, and**
- 2. catching a tennis ball after rebound from a table surface.**

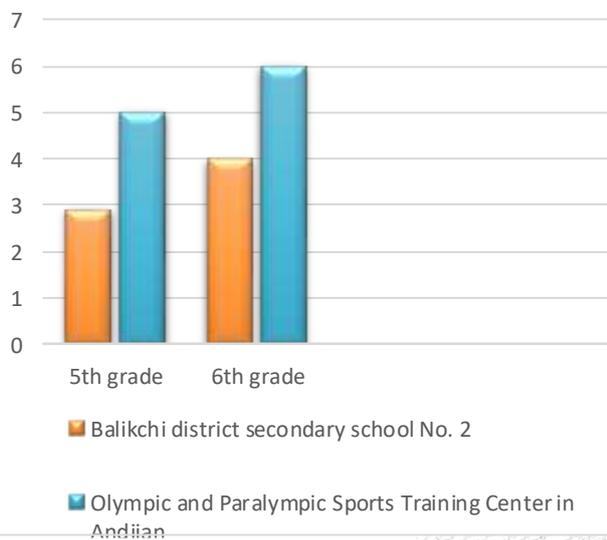
Each participant performed the tests under identical conditions. The number of successfully caught balls was recorded as the primary performance indicator. These tests were selected due to their validity in assessing hand–eye coordination, reaction accuracy, and dynamic motor control.

The obtained data were processed using descriptive statistical methods. Results were expressed as mean  $\pm$  standard error ( $M \pm m$ ). Comparative analysis was carried out to determine differences between groups according to school type, grade level, and gender.

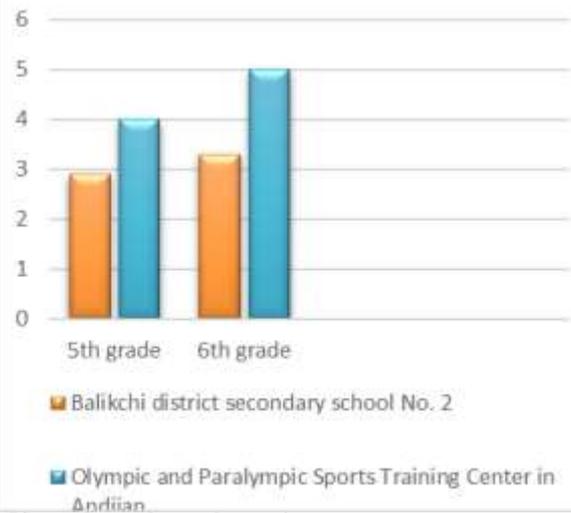
### **Results of the Comparative Analysis of Coordination Abilities**

The analysis of coordination indicators revealed consistent differences between students of the sports training center and those of the general secondary school. In the vertical toss test, sports school girls demonstrated higher performance compared to secondary school girls. In Grade 5, the mean number of successfully caught balls was  $4.2 \pm 0.1$  in the sports school and  $3.1 \pm 0.07$  in the secondary school, while in Grade 6 the values increased to  $5.1 \pm 0.07$  and  $3.5 \pm 0.07$ , respectively. A similar pattern was observed among boys: sports school students achieved  $5.1 \pm 0.1$  (Grade 5) and  $6.1 \pm 0.1$  (Grade 6), exceeding the results of secondary school boys ( $3.0 \pm 0.1$  and  $4.1 \pm 0.09$ ).

**Dynamics of changes in the number of balls caught (ta) by male students in grades 5-6 when throwing a tennis ball into the air.**



**Dynamics of changes in the number of balls caught (ta) by female students in grades 5-6 when throwing a tennis ball into the air.**

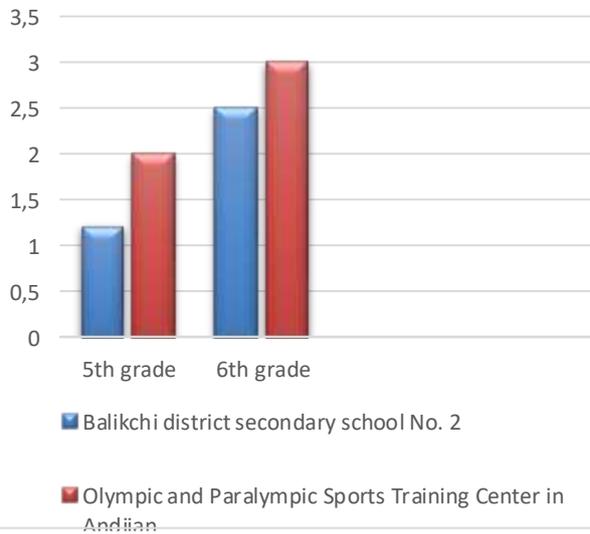


In the rebound test, coordination performance also remained higher in the sports school group. Among girls, the mean results were  $2.5 \pm 0.06$  and  $3.1 \pm 0.09$  in Grades 5 and 6, respectively, compared to  $1.3 \pm 0.06$  and  $2.1 \pm 0.07$  in the secondary school. Boys from the sports school obtained  $3.0 \pm 0.1$  and  $3.8 \pm 0.09$ , while their peers from the secondary school demonstrated  $1.6 \pm 0.06$  and  $2.6 \pm 0.1$ .

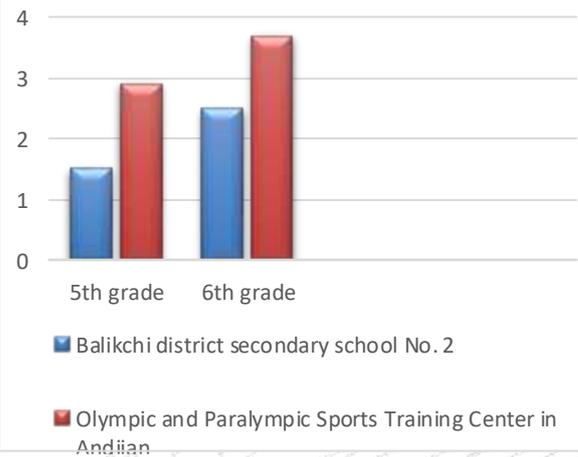
Across all groups, an age-related improvement was observed from Grade 5 to Grade 6.

Overall, students engaged in systematic sports training consistently demonstrated superior coordination performance in both motor tests compared to students participating only in general physical education. The results demonstrate that students engaged in systematic sports training show higher coordination performance compared to their peers from general secondary education. In both the vertical toss and rebound tests, sports school students consistently achieved superior results, indicating the positive impact of regular training on hand-eye coordination and motor control.

**Dynamics of changes in the number of balls caught (ta) by female students in grades 5-6 when a tennis ball falls on the table.**



**Dynamics of changes in the number of balls caught (ta) by male students in grades 5-6 when a tennis ball falls on the table.**



An age-related improvement was observed from Grade 5 to Grade 6 across all groups, reflecting natural neuromuscular development. However, the greater performance levels in sports school students suggest that structured training enhances coordination beyond normal age-related progression.

These findings confirm the effectiveness of tennis ball catching tests as practical tools for assessing motor coordination in school-aged children.

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