

STRENGTH MOTOR QUALITY: TRENDS AND DIFFERENCES BY GENDER AND AGE AMONG URBAN PRIMARY SCHOOL STUDENTS

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Abstract: *This study aimed to assess whether gender and age influenced differences in some strength indices in female and male primary school students. A total of 105 primary school students were sampled, 46 girls and 59 boys. The muscle regions on which the tests were applied were: lumbar region, lower limbs, upper limbs and abdominal region. The tests performed on the subjects were in accordance with age-specific motor characteristics and the current school curriculum, they were as follows: torso raises from dorsal decubitus and torso raises from facial decubitus, squats and push-ups. A significant difference was identified in the Push Up and Squats samples.*

Key words: *primary school, physical education, gender, motor quality strength.*

1. Introduction

Comparing genders in terms of strength is a topic well known to the research field because human beings are in a continuous development, with each generation influencing the indices in a more or less significant way.

Women are known to be less strong than equally well-trained men, indeed women's muscle strength is usually reported in the range of 40 to 75% of that of men [1]. For example, an analysis of nine studies by Laubach (1976) showed that, compared to men, women's absolute lower body and upper body strength is

approximately 57 - 86% (with an average of 71.9%) and 35 - 79% (with an average of 55.8%) respectively [2].

Early childhood is the stage where children undergo many different changes, emotionally, socially and cognitively [3], [7]. Primary school pupils are aged between 6 and 11. This is the period when pupils undergo a complex, long-term process of learning and consolidating the basic skills and competences necessary for everyday life. The main factors explaining gender differences in maximum strength, indeed, have been identified as muscle mass [4, 10]. When we refer strictly to the subject of physical education, the content

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of the curriculum specific to the primary grades has important elements such as: the main characteristics of correct body posture, taught in a preventive manner, the rules of personal hygiene, the promotion of physical activities in accordance with the natural factors of healing [12], [25].

Develop a positive attitude towards physical activity and health.

- Learning safe practices. In particular, responding promptly to instructions and learning how to pick up, carry and place equipment safely [11], [14].

Physical education in primary school consists of six activity areas: games, gymnastics, dance, swimming, outdoor and adventure activities, and athletic activities [5]. Swimming is difficult to access because the logistics of building a pool in a school are expensive, while other areas of activity can easily be done on a field or in a classroom. Motor skills are also subject to a systematic development programme. Strength motor skills are developed by muscle groups, the main ones being: chest, back, arms, abdomen, legs, shoulders.

Muscular stiffness, muscular elasticity and explosive strength are the main components of athletes' performance and vary according to gender and ethnicity [6]. Muscular elasticity and flexibility capacity is a determining factor influencing the number of repetitions of all exercises performed, regardless of gender. In general, girls have higher elasticity than boys but lower strength indices.

These could be attributed to differences in neuromotor control involving conduction of action potential action along the T-tubular system, Ca²⁺ release by the sarcoplasmic reticulum, formation

of cross-bridges between actin and myosin filaments, subsequent formation of tension development in shortening elements [13].

A similar process takes place in muscle, so if elasticity is analysed, then it is the onset of movement that must identify the boundary to be considered [15], [24].

Specialty literature showed that men's muscular strength declined with age, beginning at age 25 and reaching a loss of 54-89% at age 75. Yet, a major decline in women has only been seen after the fifth decade. Muscle strength declines from 48-92% by the age of 75. According to Sunnerhagen, the risk of falling rose significantly when the strength of the knee joint extensors was 50% lower than in younger people. The relationship between the involutional decline in muscular strength and the perception of experiencing disorder in older adults is highlighted. Inability to perform motor skills is strongly correlated with muscle mass [23].

2. Objectives

Establishing the precise research perspective; Establishing the sample for conducting the research; Establishing the samples for the sample of girls and boys; Interpreting the results obtained from the samples.

This study aims to assess whether gender and age influenced differences in some strength indices in female and male primary school students.

3. Material and methods

The sample consisted of 105 students aged 6 to 12 years, (46 girls (M = 46, SD = 9.73; M = 8.52. SD = 1.50)) and 59

boys ((M = 37.64, SD = 23.03; M = 8.36, SD = 1.80)).

The muscle regions tested were lumbar region, lower limbs, upper limbs and abdominal region. The tests performed on the subjects were in accordance with age-specific motor characteristics and the current school curriculum, they were as follows: dorsal recumbent trunk raising, facial recumbent trunk raising, squats and push-ups. Interpretation of the data was carried out using the Independent - Samples T Test.

The school granted ethical approval to conduct the research on student groups. The data were taken during the physical education classes of grades I - IV. All students of the classes involved were selected except those who were exempted from sports by an official document signed by a medical specialist.

The ages of the children were verified through official documents, the ages of those included in the research ranged from 6 to 11 years.

4. Results and Discussions

Table 1 includes the results of the tests taken by the students in this study.

A significant difference was identified in the *Push Up* test, with the mean for boys (M = 5.93, SD = 3.01) being higher (t = -2.02, DF = 103, two-tailed p = 0.46) than for girls (M = 4.80, SD = 2.59).

A significant difference was also identified in the Genuflexions test, with boys' values (M= 27.07, SD= 5.50) being higher (t= -2.02, DF= 103, two-tailed p =0.46) than girls' (M= 24.93, SD= 5.16).

The values of the torso lift from dorsal recumbent and torso lift from facial

recumbent samples did not differ significantly.

This can be explained by physiological differences between genders, but the period of biological development in which they are in should not be omitted [17, 23].

Another common factor is muscle mass, with children being anatomically different, a fact supported by anthropometric measurements. Interpretation of the results was performed after the data were statistically processed. They show us the existence of significant differences within the sample ($p > 0.05$).

Descriptive epidemiological studies on the physical education of young people have consistently reported that male subjects are more active than female subjects and that physical activity decreases with age 18, respectively 24 [16], [21]. This can be explained by physiological differences between the sexes, but the period of biological development in which they are in should not be overlooked [17, 18, 19].

A common factor influencing both boys' and girls' results is the physical condition of each individual student. Another common factor is muscle mass, as children are anatomically different, which is supported by anthropometric measurements. The results showed a strong correlation between physical condition, motor competence and self-perception in children, which varied according to gender [9], [20].

For qualitative research, students performed five at a time in a test to check the quality of execution. The protocol was established in advance for each individual test. Execution quality was higher in children aged 10 to 11 years old, final grade of primary school.

Results obtained at the tests applied							Table 1
Test applied	Girls		Boys		t	DF	two-tailed p
	n	Mean (Std. Deviation)	n	Mean Std. Deviation			
Height	46	134.59 (5,02)	59	135.02 (6.58)	-	-	-
Weight	46	33.83 (9.73)	59	32.90 (3.03)	-	-	-
Push Ups (rep/30s)	46	4.80 (2.59)	59	5.93 (3,011)	2.02	103	0.046
Squats	46	24.93 (5.16)	59	27,07 (5,50)	2.02	99	0.043
Torso raises from dorsal decubitus (rep/30s)	46	39.43 (9,21)	59	33.98 (10.2)	0.50	130	0.615
Torso raises from facial decubitus (rep/30s)	46	15.98 (5,73)	59	14.59 (6.19)	1.17	103	0.243

5. Conclusions

Thus, from this study it can be said that boys are stronger, especially in the upper limbs. Both boys and girls in the study, aged 6 to 11 years, show similar indices of motor quality strength in the lower back and abdomen. Both genders show a correlation between repetition speed and segmental muscle strength. In terms of gender differences related to trainees' strength skill scores, there were statistically significant differences between boys and girls, where boys performed better in Push-ups and Squats.

Both genders are capable of performing all of these events requiring active use of skeletal muscles.

Various anatomical and physiological attributes of females were cited as factors contributing to the gender differences in strength, including more stooped shoulders and higher percentages of twitch fibers slow twitch fibres (which produce smaller amounts of force than fast twitch fibres [8], [22]).

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