

Study on motric capacity strength development in adulthood

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Abstract:

Purpose: The motric capacity strength is an important capacity (along with the other capacities) in the sense that any movement that an individual wants to achieve is based on this capacity, the various acts and/or actions being reduced to a lesser or a greater extent of its development. Material and methods: This study was conducted over one academic year, on a sample of 60 students divided into two groups (experiment and control). The preparation has been differentiated through the increase of the number of hours which aim to develop the motor capacity strength for the experiment group and the diversification of the means that focused on this capacity. The experiment in question was addressed only to boys. Conclusions: From the data we can say that the motric capacity strength can be successfully improved in adulthood, the methods and means specific to physical and sports education ensuring the successful development of this capacity. I believe that maintaining physical and sports education as a compulsory discipline in university curricula and not only is a necessity in order to maintain the individual's health, but also to improve the level of manifestation of the physical condition of one individual. Even though the age of the tested subjects is over 19-20 years, it can be observed that both groups had an evolution that has shown in the final testing. However the experimental group was superior at all five tested tasks compared to the control group.

Key words: strength, adult age, development.

Introduction

Strength, as a motor capacity, is an important capacity (along with other ones) in the sense that any activity or type of movement that an individual wants to achieve is based on this capacity, the various acts and / or motor actions being conditioned to a lesser or greater extent by its level of development. This subject is treated a lot in the specialty literature, therefore I wish to confirm the capacity of developing this quality at any the adult age through the different way of working with the students. The term strength itself should not be confused with the term of the physically-looking strength, namely as a mechanical feature of the movement ($F = m \times a$).

M. Epuran and M. Marolicaru (2003, p. 105) highlight the fact that within the pale of the strength we encounter a multitude of forms of this motric capacity, presenting "oscillations at different times, which determine the measurement and the recording with maximum values of one or more muscle groups, using a variety of devices, designed and adopted for the most varied forms of manifestation (traction, pushing, holding, striking, etc.)".

The definition of motric capacity strength is somewhat similar to the definition that the vast majority of specialists give. For example, A. Dragnea and S. Mate-Teodorescu (2002, p. 356) define the force as "the ability to make efforts to overcome, maintain or cede an external or internal resistance by contracting one or many more muscle groups". Gh. Carstea (1997, p. 98) defines the force as "the capacity of the human body to overcome an internal or external resistance through muscle contraction".

The main factors influencing the development of the motric capacity strength can be of biological, biomechanical and psychological nature, such as: age, gender, initial level at which training begins, joints and ligaments condition, methods and means used, continuity of the training process, psychic factors, the ability to concentrate the fundamental nerve processes (excitation and inhibition), the level of one's development of other motor skills, intermuscular coordination, lasting and intensity of the muscle contraction, thickness, number and length of muscle fibers engaged in contraction, diurnal rhythms, etc.

Regarding the maximum values for strength, specialized studies have shown that under normal conditions they are recorded around the age of 16-17 years for girls and 18-20 years for boys. During the physical and sports education class, the motric capacity strength can develop throughout the academic year, and it can be done both in the open air and the gym. Most of the times the development of the motric capacity strength is planned for the times when it is not possible to work outdoors.

T. Virgil (1999, pp. 62-78) and Gh. Carstea (2000, p. 74-80) synthesized the main methodical methods used for the development of motric capacity strength, namely the weight lifting process: the process of the segmented efforts repeated until refusal, the power-training process, the middle effort process, the "isometric" process and the circuit process.

Materials and methods

This study was conducted over an academic year, on a sample of 60 students divided into two groups (experiment and control), the preparation being differentiated through the increase of the number of hours which aim to develop the motric capacity strength in the experimental group and the diversification of the means that focused on this capacity. The experiment in question was addressed only to boys.

The proposed experiment aims for the testing of the explosive strength on the lower limbs on vertical direction (detent), the strength of the scapulo-humeral flexors (from hanging, pull-ups/ beam traction test), the strength of the abdominal muscles (lifting the trunk to a vertical direction from the dorsal decubitus) and the explosive strength of the upper limbs (throwing the 2kg medical ball back and forth with two hands above the head).

The main methods used in the experiment are: the bibliographic study method, the experimental method, the measurement and record method, the statistical-mathematical method and the graphic method. The statistical indicators used are: arithmetic mean, median, upper limit, lower limit, quartile, amplitude and standard deviation.

Results

The results obtained in the study can be seen in the tables and graphs below:

Table 1. Results for the experiment group

	Detent		Pull-ups		Strength of abdominal muscles		Throwing ball in front		Throwing the ball in the back	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final
Arithmetic mean	32,00	35,13	6,63	8,38	36,50	39,75	6,01	6,27	9,21	9,59
Minimum	18	20	1	3	20	24	3	3,2	5,1	5,35
Maximum	49	50	17	18	58	60	10,5	10,6	13,05	13,1
Amplitude	31	30	16	15	38	36	7,5	7,4	7,95	7,75
Median	30	34	6	8,5	35	38	6	6,35	9	9,25
Lower quartile	26,75	30,75	3,75	5,75	30,5	32,75	5	5,1875	8,1	8,475
Upper quartile	39	42,5	7,5	9	40,5	44,5	6,2	6,575	10,125	10,525
Standard deviation	10,58	10,06	4,87	4,47	11,56	11,59	2,12	2,10	2,47	2,44

The above table shows that the final values are superior to all the investigated parameters compared to the initial ones, so all items studied have made progress.

Table 2. Results for the control group

	Detent		Pull-ups		Strength of abdominal muscles		Throwing ball in front		Throwing the ball in the back	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final
Arithmetic mean	34,38	35,63	6,38	7,25	33,25	34,63	5,44	5,56	8,89	9,14
Minimum	16	17	2	3	19	21	3,15	3,3	5	5,1
Maximum	47	48	15	16	61	62	9,8	9,9	13,2	13,25
Amplitude	31	31	13	13	42	41	6,65	6,6	8,4	8,35
Median	34,5	35,5	5,5	6	30,5	31,5	5,325	5,425	8,7	8,88
Lower quartile	31,25	32,75	4,5	4,75	24	26	4,1125	4,2	7,125	7,375
Upper quartile	40	41	6,75	8	35,75	37,25	5,85	6,025	10,35	10,425
Standard deviation	9,47	9,33	4,07	4,27	14,15	13,66	2,02	2,01	2,84	2,76

As with the experimental group, the control group showed higher values in the final assessment compared to the baseline at all five items proposed to be studied, but still there was less progress compared to the first group.

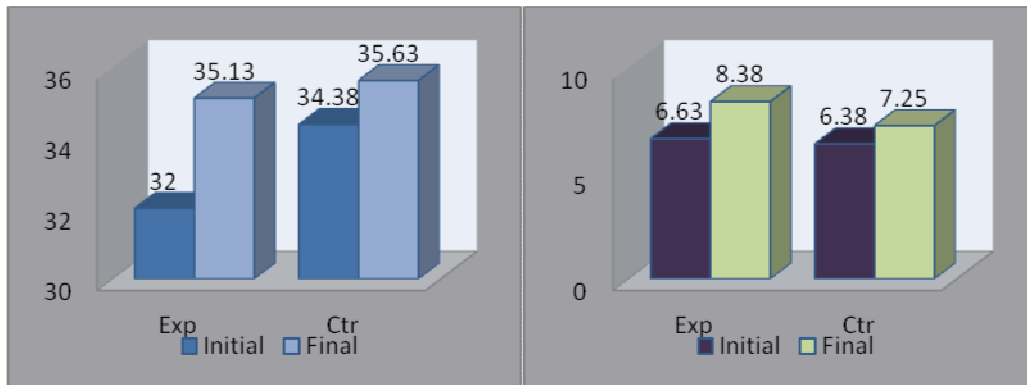


Fig. 1. Average values of detent

Fig. 2. Average values of pull-ups

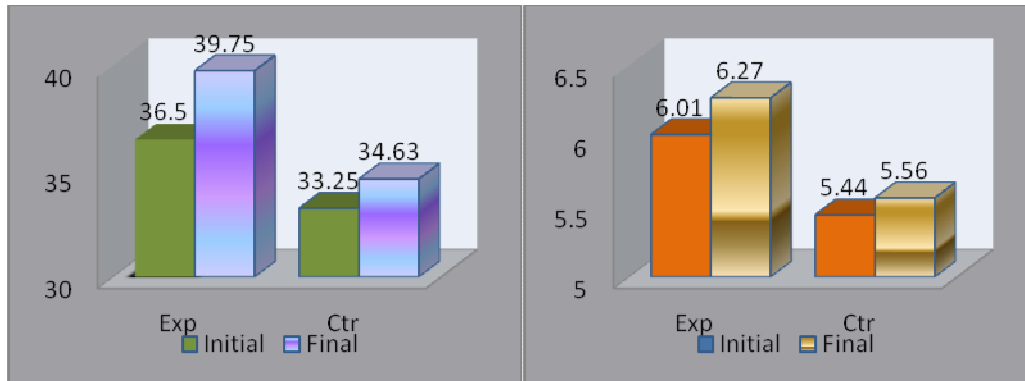


Fig. 3. Average values of strength of abdominal muscles Figure 4. Average values of throwing ball in front

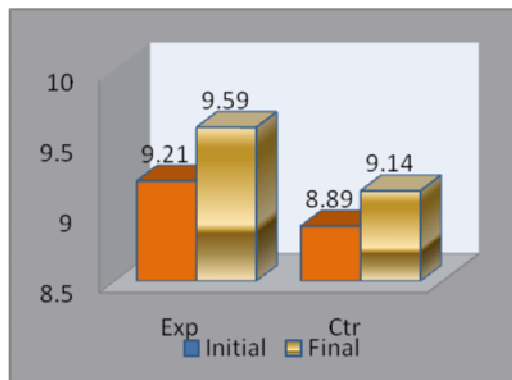


Fig. 5. Average values of throwing ball in back

Discussions

The results obtained and presented above reveal that in the experimental group, in terms of detent, the calculated arithmetic mean shows an improvement of the performance at the second test of 3,13 cm, compared to the control group where the evolution of was only 1,25 cm. As regards the scattering of values, this is great for both the experimental group and the control group.

The beam traction test at the fixed bar reflects the strength of the scapulo-humeral flexors and is characterized by superior values in the experimental group compared to the control group, the progress achieved by the first group being of 1,75 repetitions compared to the value of 0,87 repetitions obtained by the second group. The degree of scattering is small for both the experimental and the control group.

Abdominal muscular strength (lifting of the trunk in a vertical direction from the dorsal decubitus) is also characterized by the greater evolution of the experimental group, the improvement of the performance being of 3,25 repetitions compared to 1,38 repetitions in the second group . The degree of scatter is high in both targeted groups.

From the point of view of the explosive force of the upper limbs (throwing the 2kg medical ball from the front, with two hands above the head) the tendency remains as in the previous samples, the evolution of the first group being 26 cm compared to the second one, the second group having only a 12 cm evolution. It should also be mentioned that the degree of scattering of the values is small.

At the fifth test, namely the explosive force of the upper limbs (throwing the 2kg medical ball backwards with two hands above the head) one can be observed that the greater evolution is for the experimental group, the difference between the two tests being 38 cm compared to the control where the evolution was 25 cm.

Conclusions

From the data it can be said that the driving force can be successfully improved during adult age, the methods and means specific to physical and sports education ensuring the successful development of this capacity.

I believe that maintaining physical and sports education as a compulsory discipline in the university curricula and not only is a necessity in order to maintain the individual's health, but also to improve the level of manifestation of the physical condition of one individual.

Knowing the underlying factors of motric capacity strength, development is one of the main requirements that must be obtained in order to achieve the proposed objectives. Even though the age of the tested subjects is over 19-20 years, it can be observed that both groups had a great evolution at the final testing, however the experimental group was superior to all five tested tasks compared to the control group.

The grading of the effort during the physical education class, ensuring its continuity, is another important requirement that the didactic framework should take into account in the development of the motric capacity strength. Also, an important role is played by creating an adequate mentality in terms of physical activity regularly performed by students, developing their motor skills being one of the objectives of physical education that has the goal of maintaining health.

References

- Bompa, T. (2001). *Development of biomotorical qualities - Periodization*, edition and translation in Romanian. Bucharest: CNFPA, Edit. Ex Ponto.
- Cârstea, Gh. (1997). *Physical Education - Theory and basics of methodology*. Bucharest: A.N.E.F.S.
- Cârstea, Gh. (2000). *Theory and methodology of physical education and sport*. Bucharest: AN-DA Publishing House.
- Dragomir, St, Barta, A. (1998). *Physical Education, Manual for the 9th grade, normal schools*, re-editing. Bucharest: Didactic and Pedagogical Publishing House.
- Dragnea, A., Mate - Teodorescu, S. (2002). *The theory of sport*. Bucharest: Fest Publishing House.
- Dragnea, A. et al. (2006). *Physical Education and Sports - Theory and Didactics*. Bucharest: Fest Publishing House.
- Epuran, M., Marolicaru, M. (2003). *Methodology of Body Activity Research*. Cluj-Napoca: Risoprint Publishing House.
- Manno, R. (1996). *Theoretical basics of sports training*. Ed. Revue E.P.S., 1992, Rome, translated by C.C.P.S., Bucharest: S.D.P. 371-374.
- Rață, G., Rață, B.C. (2006). *Skills in motor activity*. Bacau: EduSoft Publishing House.
- Săvescu I. et al. (2002). *"1001" physical exercises to develop motor skills in physical education and school sports lessons*. Policrom Publishing House.
- Tudor, V. (1999). *Conditional, coordinating and intermediate capacities - components of motor capacity*. Bucharest: RAI Publishing House.
- Tudor, V., Crisan, I. (2007). *Strength - Driving skills*. Bucharest: Bren.