



WHILE PURSUING EDUCATION, IMPROVING THE FLEXIBILITY OF THE STUDENTS' SHOULDER GIRDLE AND UPPER LIMBS ENGAGED IN SWIMMING

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ABSTRACT

Swimming is considered one of the preventive sports because it offers special conditions: the horizontal position of the body, through the supporting role of high pressure, is demanding over the respiratory actions. While swimming, the water exerts pressure on the body. It makes all muscle groups work, and the lung and heart make more attempts to maintain normal parameters, which improves the respiratory and cardiovascular systems. Physical exercises with increased amplitude are the primary methods for developing flexibility. Physical exercises are biological irritants for CNS. They can be active movements (simple, springy, swing) and passive movements (performed using a partner under the influence of their weight). The article examines the improvement of flexibility in the shoulder joints of students practising swimming. The aim is to prove the influence of swimming on the development of flexibility quality and, more specifically, that of the shoulder girdle.

Key words: swimming, flexibility, shoulder girdle, students

INTRODUCTION

Physical activity and sports are significant for maintaining good health, and they are powerful anti-inflammatory agents for the adverse effects of hypokinesia. (1). The measurement problem, preserving, developing and assessing physical efficiency, is fundamental in VU. Use of is required means and methods for improving the physical efficacy of students to improve its parameters and, respectively, of health (2). Monitoring and evaluation are an important component of the overall learning and training process. The assessment of motor skills, through testing, provides specific data on the reached level of training - the level of motor skills and habits, development of basic and special motor qualities, as well as the athlete's health status. They create an opportunity for feedback between the sports pedagogue and the athlete (3).

Good muscle elasticity is mandatory for the maximum expression of their strength capabilities. Therefore, developing physical qualities is an integral part of physical education activities. (4). The flexibility varieties relate to amplitude and movement coordination (5) Several authors (6-9), reviews flexibility as spatial and dynamic concerning the rapidity of movement on the body. Spatial flexibility is displayed as passive, active and anatomical. It characterizes the ability of the body or some parts of it to move or stretch as far and in different directions as possible. Dynamic flexibility defines continuous folding or unfolding movements, whose amplitude may differ.

Flexibility is the ability of a person to perform movements with a large amplitude in a certain direction, which is limited by the degree of joint mobility. Effective muscle action is determined by various factors such as:

- ✓ The activated motor units;
- ✓ The joints position;
- ✓ Muscle length;

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- ✓ The relative contraction and relaxation of the other muscles acting in the joint;
- ✓ We could qualify the types of flexibility as follows:
 - Active flexibility - active exercises performed by the person independently. Mobility is achieved through own muscular efforts. Here, the most used are exercises with different swings in the front-back or side direction with no support on a wall or device, dynamic sit-ups, twists in splits, etc.
 - Passive flexibility is passive movements in which increased joint mobility is achieved with a partner's help. Most exercises are the obstructed seat, inclines from the seat to the lower limbs, various splits, etc. Passive flexibility is determined by the magnitude of the amplitude reached under the influence of external forces (10). It is assumed that active and passive exercises are assumed to be performed until mild pain, with active flexibility being more important.
 - Dynamic and static flexibility - according to Hadjiev, flexibility can be defined as dynamic and static. The dynamic one occurs in dynamic conditions and depends on the elastic properties of the joint ligaments. A static mode of work refers to Static flexibility, and the strength of the respective muscle groups influences this flexibility (11). The first kind is the ability to achieve a certain amplitude of stretching the muscle and maintaining the occupied position for a certain time. Physical exercises with increased amplitude are accepted as the main method for developing flexibility.

The most commonly used method is the repeated method with a gradual increase in the amplitude of the movements. Stretching is a separate fitness discipline and the basis on which flexibility training is built. The different sports disciplines serve to restore and increase joint mobility by entering the tissue resistance at the end of possible mobility.

It is characterized by passive flexibility, which consists of slow stretching of the agonist's muscles until it reaches a "pain threshold". Causes a change in muscle length by exciting the nerve endings in the muscle spindles, which creates additional tension, which feels like a slight pain (12). Like any training practice, stretching has

indications and contraindications for use. A basic rule that must be observed is not to cause acute and severe pain. Stretching is just tension in working structures. Compliance with this rule is necessary to avoid undesirable injuries.

The mobility of a joint is not equal to the elasticity of the surrounding muscles and tendons. To reach some joints' full range of motion, no particular stretching of the muscles is necessary. In others, the length of the muscle fibres can be recognised in some cases as a limiting factor. Stretching improves the physical condition of the body and the ability to learn and improve different motor skills: it accelerates recovery processes, reduces the risk of joint/ligament injuries, reduces muscle fatigue, reduces muscle tension, and improves tissue nutrition, but there are also disadvantages such as monotony, unusual and uncomfortable positions, excessive stress concentration. In most exercisers, the limited range of motion is primarily because the muscles are systematically trained uniformly, requiring them only to shorten, resulting in a functional reduction in fibre length. A limitation in the range of motion in the shoulder girdle is most often encountered in the movements of the shoulder joint associated with extension and abduction, and the muscles whose overstrain could prove to be a limiting factor are: Deltoides anterior; Pectoralis minor et Pectoralis major. Contributing to the reduced range of motion are virtually all pushing activities. Depending on the causes of muscle tension, the way to prevent it is determined. Contributing to the reduced range of motion are almost all testing activities. To improve training functionality of a different type, we should enhance flexibility with stabilizing exercises and individualize the relevant methodology according to differences in muscle tone (in their tension) (13).

The beauty of the human body is not only a gift of nature but the result of systematic, persistent and purposeful physical development. It is an indisputable fact that swimming sports develop the human body as complexly as possible - from building movement and breathing culture to forming healthy muscles. Physical exercises combined with mental work and intellectual pursuits are one of the surest means for the overall development and improvement of the human body (14).

METHODOLOGY:

In our research, we have included students practising swimming once a week throughout their studies (from 1st to 4th year). Sixty male students and forty females were divided into two groups - experimental (EG) and control (CG) were examined. Students from three higher schools in Sofia participated in both groups, divided into 30 men and 20 women per group decided to join of their own volition through a survey method. Students from both groups were tested according to the chosen indicator at the end of each year - a total of 4 stages, and between the 1st and 4th year, seven people dropped out, three from (EG) and four from (CG). Thus, the experiment was completed by 93 participants. The experiment participants' intermediate motor development results were reported at the end of each school year.

In addition to practising the swimming styles and the accompanying exercises, the experimental group participants were tested on the program of activities we developed aimed at developing the chest, improving the strength of the shoulder girdle and upper limbs, and flexibility in the shoulder joints. The program included breathing exercises on land and exercises with rubber bands to improve the shoulder girdle muscles, upper limbs, back and chest. In the water, the participants swam a different exercises with paddles to increase the load on the musculature of the shoulder girdle, upper limbs and trunk. The amount and intensity of the activities were tailored to the physical training and current state

of the participants' bodies. Participants in the control group worked according to the standard swimming training methodology. The indicator that was investigated in the present study was shoulder girdle flexibility. We measured the flexibility of the shoulder girdle with the following test:

Necessary facilities: a wall on which we drew a vertical line, a measuring centimetre line and an assistant.

Starting position: the experiment participants stand with their backs to the wall in front of the drawn line at arm's length from it. The legs are shoulder-width apart and placed in a marked place.

Implementation: With the right arm extended, parallel to the floor, the body is slowly and maximally rotated to the right until the fingertips touch the wall. The feet should stay in the same position. The arm should be held in the final place, extended and parallel to the floor for 2 seconds. The reached point is marked, and the distance from it to the drawn line is measured (the displayed result before the line is applied with a negative sign, after the bar with a positive one). The exact measurement is performed with the left hand. The results of both hands are added together.

RESULTS

In **Figures 1 and 2**, we trace the differences in the average values of the two groups, both in men and in women, of the developed shoulder girdle flexibility index in each year compared to the values taken at the beginning of the experiment.

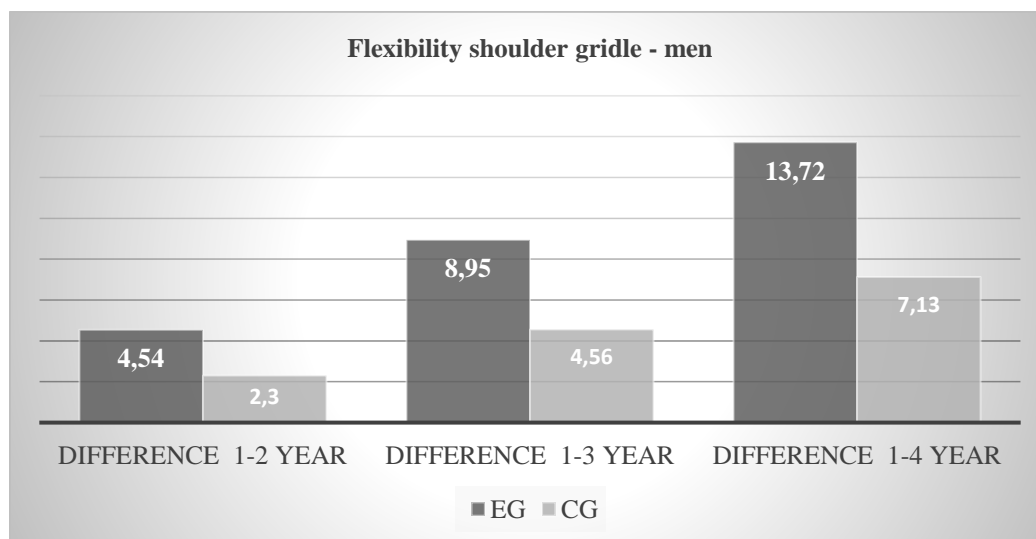


Figure 1. Average flexibility value - men

Figure 1 shows that in one year of working with our proposed methodology, the men from EG achieved a difference of 4.54 cm, and their colleagues from CG registered 2.3 cm. In the next reporting period, 1-3 years, the difference in EG

increases to 8.95 cm and that of CG - 4.56 cm. During the last reporting period, students from EG registered 13.72cm, and those from CG - 7.13cm.

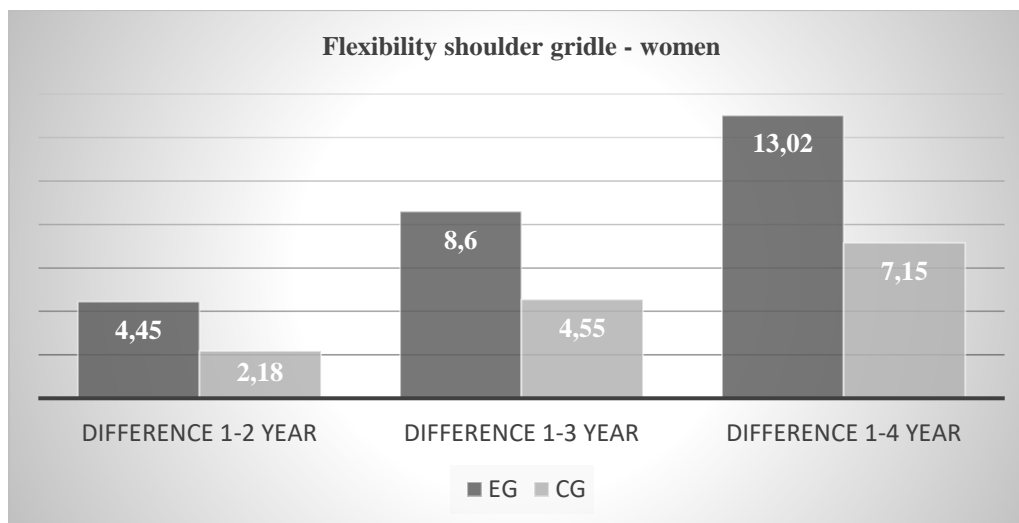


Chart 2. The average value of flexibility - women

In the ladies (**Figure 2**), we again observe much more significant differences in the mean values for EG compared to CG's. In the first reporting period, 1-2 years, the girls from EG registered a difference of 4.45 cm and those from CG 2.18 cm. In 1-3 years, the examined persons from EG reached a difference of 8.6 cm and those from CG 4.55 cm. In the last testing, 1-4 years, the difference of 13.02 cm for EG is almost twice as big as that of CG - 7.15 cm. Tracking the averages and reporting the differences in each year from the first shows us how our proven methodology for developing quality shoulder girdle flexibility has impacted compared to the standard methods. In both groups, we note the development of the studied indicator. Still, both men and women from the experimental group have improved their flexibility in the shoulder joints many times more than their colleagues from the control group.

CONCLUSIONS AND RECOMMENDATIONS

From the analyzed results for both sexes, it is clear that the quality of flexibility also develops in this age group, albeit at a slower pace, and they give us reason to claim that through appropriate swimming activities at all ages, the health status of the individual. This study's results indicate an increase in the difference between the two groups.

Therefore, we can assume that activities in a water environment positively affect the development of the considered motor quality, the exercises developed by us, presented in a particular program, contribute to a more effective use of the favourable environment.

The conducted research, although partially, gives reason to claim that the need for innovative qualification forms, models and programs that increase and expand the knowledge of pedagogical specialists in the given field is a means that would optimize the educational process in physical education and sports, as well as would increase the qualification of sports specialists.

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