

IMPROVING THE ELASTICITY OF HIP MUSCLES AMONG THE POPULATION OF DEBRECEN UNIVERSITY STUDENTS

ÎMBUNĂȚIREA ELASTICITĂȚII MUȘCHILOR ȘOLDULUI LA STUDENȚII UNIVERSITĂȚII DIN DEBRECEN

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Key words: muscle disbalance, auto stretching, university students, physical education

Decreasing tendency of daily physical activity can be observed in the population of Debrecen University students. We started a physical education at the University of Debrecen which was called spine gymnastic. At the beginning of the semester we surveyed the health status and the health behaviour of the students focused on physical activity. The elasticity of hip muscles was also measured at the beginning and the end of the semester. After completing a 14-week spine gymnastic course, which included auto stretching and strengthening exercises, we found that all measured hip muscles improved.

Key words: dezechilibru muscular, autostretching, studenți, educație fizică

Printre studenții universității din Debrecen se observă o reducere a activităților fizice zilnice. În cadrul cursurilor de la Universitatea din Debrecen, studenții au început un curs de gimnastică pentru coloană. La începutul semestrului s-a realizat o evaluare a stării de sănătate a studenților, fiind vizată în special activitatea fizică. S-a evaluat elasticitatea mușchilor șoldului la începutul și la sfârșitul semestrului. LA terminarea a 14 săptămâni de gimnastică pentru coloană, ce cuprinde autostretching și exerciții de tonifiere, am constatat că toate măsurătorile efectuate asupra musculaturii șoldului s-au îmbunătățit.

Introduction

Decreasing tendency of daily physical activity can be observed in the population of university students. This tendency starts during primary school years and it becomes more serious in secondary school and at university. They spend too much time using computers or watching television¹. More and more young adults become ill because of the consequences of sedentary lifestyle. The locomotor diseases exceed among these health problems. This fact is clearly demonstrated by the increasing number of young adults visiting rheumatologists or neurologists. The sitting posture is demanding for the joint structures of spine and hip². These problems lead to muscle disbalances and pain around the hip and the waist, which can be prevented by doing regular physical exercises. It is compulsory for university students to participate physical

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education and it is a good opportunity for them to do quality physical activities. Therefore, we started a physical education, which was called spine gymnastic.

The correct posture is affected by the sedentary lifestyle and the static strain. Because of periods of long sustained sitting posture the back becomes more kyphotic and the lumbar lordosis straightens. Their hips are in flexion, abduction and external rotation during the sitting.

Few muscles around the hip have a tendency to be tense for example m. rectus femoris, m. iliopsoas, m. biceps femoris, m. semitendinosus, m. semimembranosus, m. piriformis, m. adductor brevis and m. erector spinae³. These muscles require a lot of stretching and relaxing.

Few muscles have tendency to be weak and to develop/have atrophy for example m. vastus medialis et -lateralis, m. gluteus maximus, m. adductor longus et -magnus, m. gluteus medius, m. rectus abdominis, m. obliquus internus et -externus abdominis. These muscles require a lot of strengthening³.

It is very important to attract the students' attention to these problems because it is possible to prevent and decrease this tendency.

Hypothesis:

1. The muscle disbalance of the hip can be decreased by improving the elasticity and using auto stretching exercises lead by a physiotherapist.
2. The compulsory physical education at the university can be effective means of decreasing the muscle disbalance around the hip.

Materials and methods

We had a self- controlled survey with comparing the result before and after the intervention. At the beginning of the semester, a self-constructed questionnaire was used to survey the health status and the health behaviour focused of the students on the physical activity. The questionnaire included questions about the quality and frequency of physical activity and about the place and type of the pain. The measurement of the elasticity of hip muscles was done before and after the training. The survey lasted for 14 weeks and we kept one class a week.

There were 12 students at the University of Debrecen, nine women and three men. They attended at the Faculty of Arts, at the Faculty of Engineering, at the Faculty of Informatics and at Faculty of Science. The age of the students ranged from 19 to 30 years.

Examination and measurement of the elasticity

The objective measurement consisted of inspection, palpation, examination of active movements and some special measurements. In the first step their standing posture was inspected anterior, laterally, posterior by searching asymmetry.

After inspection, we examined pressure-sensitive points: angulus superior, processus spinosus, tuber ischiadicum and we made notes about the painful points.

The elasticity of hip muscles was measured by the distance of well-palpable anatomical points.

- **Hip flexors:** Prone position, the distance of the trochanter major and the lateral malleolus was measured with maximal active knee flexion both sides.
- **Hip extensors:** Supine position, on the measured side, the leg is lifted until the knee stays in extension, the other leg lays on the ground with extended knee. Both ankles are in maximal dorsalflexion. The distance of the two medial malleoli was measured.

- **Hip adductors:** Supine position, both legs are in maximal hip adduction in a 0° and in a 90° hip flexion. The distance of the two medial malleoli was measured.
- **Lateral flexion:** Standing position, as the distance the hand moves down the thigh was measured both sides.
- **Schober- test** assesses the amount of lumbar flexion.
- **Improvement of posture:** Standing position, straight back. The distances of the two angulus inferior were measured.

We take down the data twice. The students could choose a login to identify themselves, so we could get the same kind of data from the same person. The students filled the questionnaire with these login. The person who made the data processing didn't know anything about the students, except the demographic data.

Our exercise program included a lot of exercises to strengthen abdominal, back and hip muscles, because these muscles must be strong to stabilize their spine and prevent the back problems. Strengthening the muscles was accomplished by using fitball, softball or simply by lifting the weight of their arms or legs in different positions (Figure 1-3.). These exercises were combined to strength these muscles in the same time.



Figure 1.



Figure 2.



Figure 3.

We also used a lot of spinal rotation exercises to improve spine mobility and relax muscles (Figure 4-6.).



Figure 4.



Figure 5.



Figure 6.

To achieve improvement of elasticity, the physical class included a lot of auto stretching exercises for the hip adductors, flexors and extensors in different positions^{4, 5}. The adductors were stretched in supine and prone position. The hip flexors were stretched in prone position, in "on all fours" position and in kneeling position. The hip extensors are targeted by a lot of stretching exercises in supine position and sitting on a fitball. The strengthening of abdominal muscles was often combined with the stretching of the hip extensors (Figure 7-9.).



Figure 7.



Figure 8.



Figure 9.

Results

The questionnaire was filled in by 15 students of the University of Debrecen. The age of the students ranged from 19 to 30 years. 60% of students did physical activities twice a week, most of them rode bicycles, swam or walked. Eight students did sports in secondary school however, at the university only one did. The examined university students preferred medial level physical activity as it was mentioned earlier. 50% of students spent 8- 12 hours sitting a day (Figure 10.). Six students had waist pain, three students suffered from pain between their scapulas and two students complained about shoulder and calf pains. They tried to decrease the pain with rest, relaxation and changing position (Figure 11.).

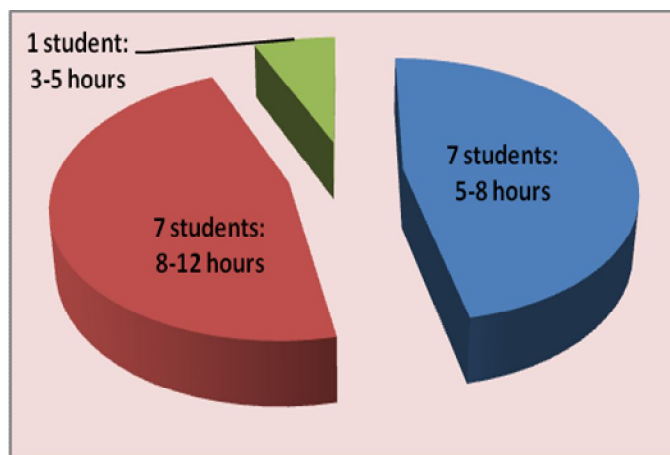


Figure 10: Spending time with sitting

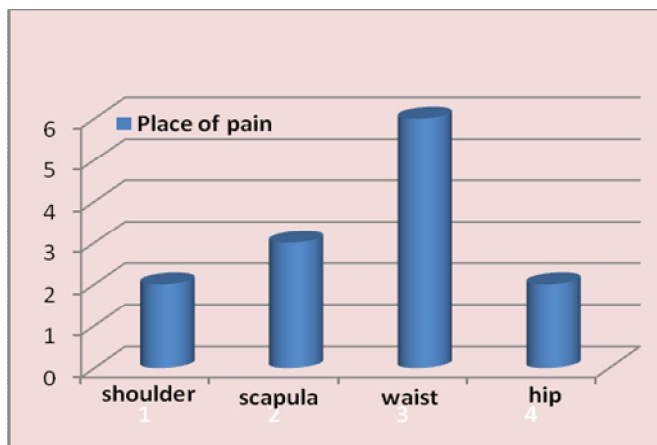


Figure 11: The place of pain

In the examination, which was done by 12 students, we experienced that five students have exaggerated lumbar lordosis but it could not improve in the end of semester. Three students complained about pressure-sensitive processus spinosus in lumbal spine, but after the spine gymnastic only two students had problems. It is interesting that nobody had pressure-sensitive tuber ischiadicum.

All measured parameters were improved in the group on average (Figure 12.).The result of Schober-test improved 0.25cm on average in group (in the first measurement was 5.2cm and in the second measurement was 5.45cm) so our result got closer to the physiological one.

The lateral flexion was increased in both sides, by 1.33cm in right side and by 1.75cm in the left side on average.

The elasticity of hip flexors was improved by 2.41cm in the right side and by 2.5cm in left side on average. One student had 11 cm-improvement.

The elasticity of hip extensors was increased by 10.41cm in right side and by 10cm in the left side. Three students' results were outstanding. Their averages in the two sides were 35cm, 20cm and 15cm.

The elasticity of hip adductors in a 0° hip flexors was improved by 5.58cm, in a 90° hip flexion was increased by 8cm on average.

Five students' distance of the right and left angulus inferior was decreased. The other students' results did not improve.

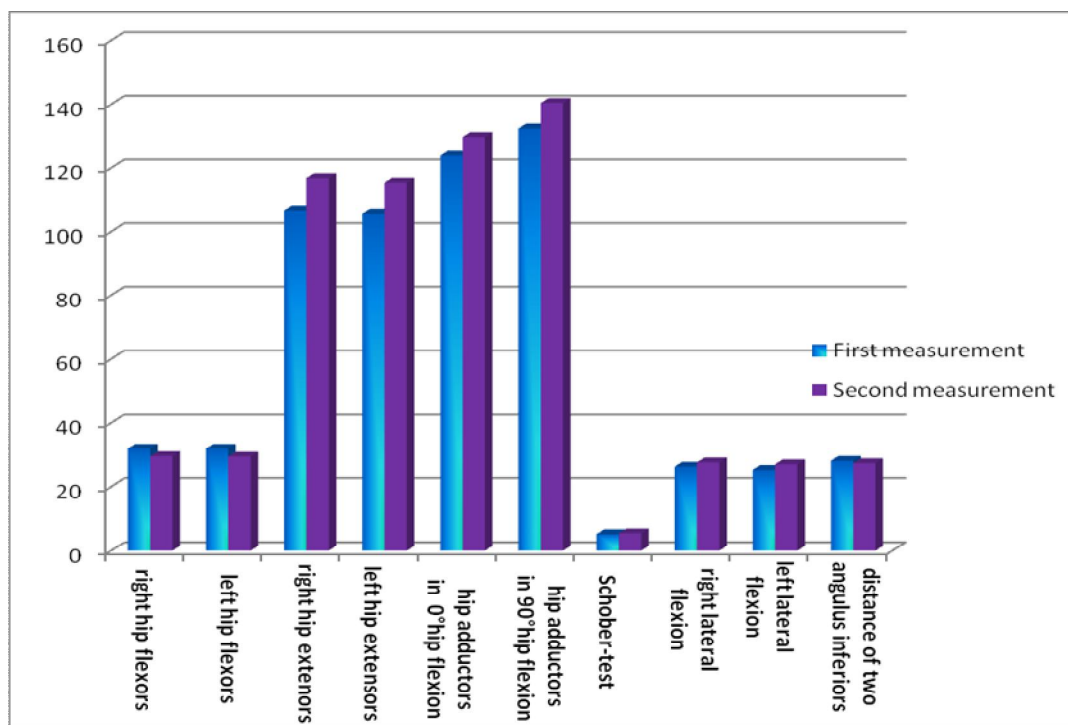


Figure 12: The results of measurements on average in the group

Conclusion

Examining the literature, we did not find researches among healthy university students in which the elasticity of hip muscles are measured with these methods. Analysing our data, we can say that all measured parameters improved in our group. The most outstanding results were measured among those students who did not do sports. We have found the main improvement in the elasticity of hip extensors and adductors which were obviously caused by the targeted auto stretching exercises. The elasticity of hip adductors in a 90° hip flexion improved in proportion to the elasticity of hip extensors. The stretching of hip flexors would have required more time than the stretching of hip extensors and adductors. The stretching exercises of hip flexors were done with a lot of compensations so these exercises required more corrections. The improvement of spine flexion was great as the students spent 8-12 hours sitting and they did not do sports. Results suggest that strengthening and stretching exercises were effective means of decreasing muscle disbalances.

At the end of the semester we also observed a decreasing tendency of pain. The students liked spine gymnastic as a compulsory physical education and they had a good experience. We would like to achieve that the student choose spine gymnastic as a compulsory physical education, if they have the opportunity.

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