

## IMPROVING FLEXIBILITY THROUGH STATIC STRETCHING EXERCISES IN PHYSICAL EDUCATION LESSONS

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**Keywords:** *flexibility, spine, static stretching, students, physical education and sports lesson*

### **Abstract**

Stretching is a technique for recovering articular mobility which consists in stretching a muscle and maintaining the tension a few seconds. I started from the premise that stretching exercises bring many benefits on all the human body systems. Stretching exercises increases joint mobility, stimulates synovial fluid secretion, eliminate toxins, reduces stress and improves neuro-musculo-articular system. The aim of this study was to highlight the effects of static stretching exercises worked at the end of physical education lessons by following the literature data, in improving flexibility of the female students, with beneficial effects on the development of their general physical condition. The experiment was conducted on a group of 18 students from the second year of study (aged 19 to 21 years) at Faculty of Economic Sciences and Public Administration at "Ștefan cel Mare" University of Suceava. At the end of the experiment, the results highlighted the fact that there were significant differences between the initial and final results in all the tests performed.

### **Introductions**

The physical exercise phenomenon has taken a great deal today, engaging in varied and appealing forms, many more and more diverse people." Sport is the social phenomenon that has embraced cosmince dimensions." it was said in the 1964 at the UNESCO Manifesto (Ganciu, M., 2009, p. 142). One of the most used method in any sporting field is stretching. Stetching is a technique used for recovering articular mobility and involves stretching a muscle and maintaining the tension a few seconds. (Flora, D., 2002, p.115, Marcu, V., coord., 2006, p.81).

By Mârza, D., (2012, p.22), Leuciuc, F., V., (2014, pp.88-89), Sbenghe, T., (2002, pp.143-144), Cordun, M., (1999) Marcu V., Dan, M., (2006, p.82) Flora, D., (2002,p.115), Chera -Ferrario, B.,(2010,p.18) et al, the stretching types are: ballistic stretching; dynamic stretching; active

stretching; static (passive) stretching; isometric stretching. Another typology of stretching exercises found in the literature (Chera-Ferrario, B., 2010, p.18, Rață, G., Rață B., C., 2006) is: arcing and maintenance; stretching and holding (passive); stretching prolong; active proprioceptive neuromuscular training; proprioceptive neuromuscular training; relaxation technique. By Nelson, A.,G., and Kokkonen, J., (2018, p.XI), the stretching types are: active stretching, passive stretching, static stretching, ballistic stretching, proprioceptive neuromuscular facilitation stretching (PNF) and dynamically stretching.

General indications for stretching exercises (Marcu, V., Dan, M., 2006, p.84 quoted by Leuciuc, F., V., 2014, pp.90-91, Marza, D., 2012, pp. 22-23) are: using a stable position during the exercises; using a relaxing and comfortable positions; exercises should be made between 2 and 4 p.m because then the maximum mobility capacity is recorded; making a general warming of the body through aerobic exercise at least five minutes before stretching; it must be made active movements and breathing to be smooth and quiet; do not work stretching on two muscle groups simultaneously; the stretching of an agnostic muscle group has to be accomplished by doing a stretching for an antagonist muscles.

By Anderson, B., (1980, p.11) the parent of stretching, stretching exercises bring the following benefits: reduce muscle tension; induce a state of relaxation for the entire body; helps to improve coordination; movements are performed with greater efficiency; they increase the range of movements made by joints; prevent injuries and improve circulation; make aerobic activities more readily supported; give a general state of well-being at the mental level; develop proprioception and awareness of body parts (the stretching of all muscles leads to a better awareness of them through the sensation they transmit and the condition they give).

### ***Material and method***

*Hypotheses of the research:* we consider that the application of static stretching techniques (exercises) at the end of the physical education and sports lessons will increase the flexibility of the spine in a short time. The exercises will also bring benefits in terms of increasing the general physical condition of the female students.

*The purpose of the research:* the purpose was to highlight the role of the stretching exercises at the end of the physical education lessons in improving the flexibility of the spine of the students.

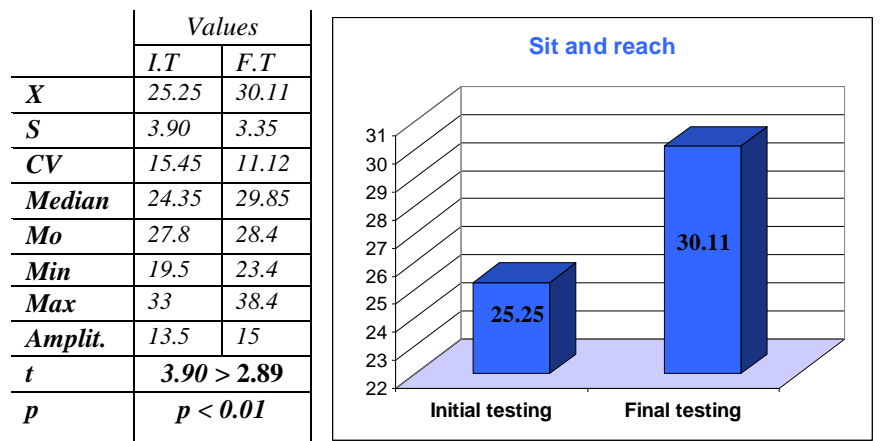
*Subjects of research:* the experiment was conducted on a group of 18 students from the second year of study (aged 19 to 21 years) at Faculty of Economic Sciences and Public Administration, at Ștefan cel Mare University of Suceava, specialization: Accounting and Management Information Systems.

*The research methods:* method of study of specialized literature, observation method, experiment method, methods of collecting, processing and interpretation of data.

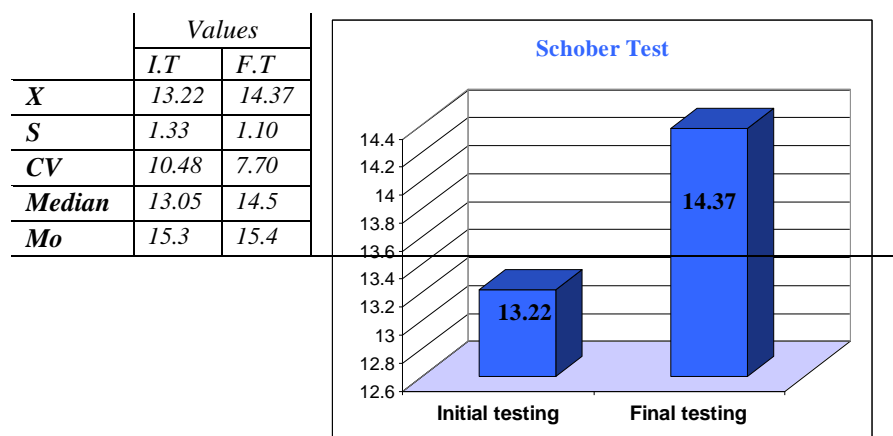
*Tests used in research:* Test Flexion of the trunk from the seated position (Eurofit battery test where the distance is measured with a special box), Schober Test, Trunk lateral flexion (finger – floor distance) and Trunk flexion from orthostatism (fingers – floor distance).

### Results

After some stretching exercises at the end of the physical education and sport lesson, the results were as follows in Tables 1, 2, 3 and 4, and in the graphic representation.



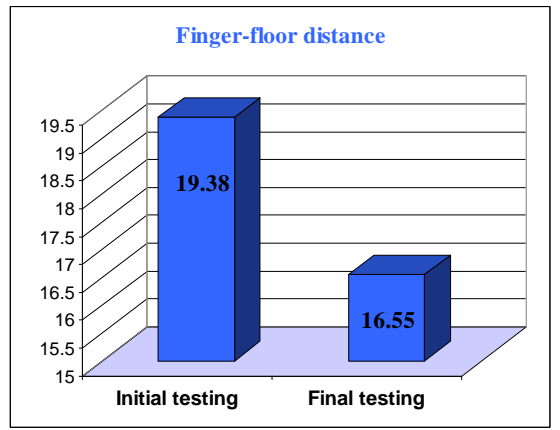
**Table 1. The initial and final values – Sit and reach**



<b>Min</b>	11.3	12.2
<b>Max</b>	15.3	15.8
<b>Amplit.</b>	4	3.6
<b>t</b>	<b>2.67 &gt; 2.56</b>	
<b>p</b>	<b>p &lt; 0.02</b>	

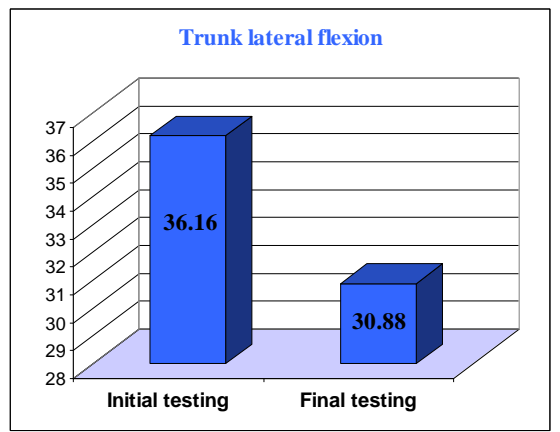
**Table 2. The initial and final values – Schober Test**

	Values	
	I.T	F.T
<b>X</b>	19.38	16.55
<b>S</b>	4.05	3.37
<b>CV</b>	20.92	20.35
<b>Median</b>	18.5	16.5
<b>Mo</b>	17	19
<b>Min</b>	13	12
<b>Max</b>	27	23
<b>Amplit.</b>	14	11
<b>t</b>	<b>2.21 &gt; 2.56</b>	
<b>p</b>	<b>p &lt; 0.02</b>	



**Table 3. The initial and final values – Finger-floor distance**

	Values	
	I.T	F.T
<b>X</b>	36.16	30.88
<b>S</b>	4.51	3.66
<b>CV</b>	12.47	11.86
<b>Median</b>	35	30
<b>Mo</b>	35	30
<b>Min</b>	29	26
<b>Max</b>	46	40
<b>Amplit.</b>	17	14
<b>t</b>	<b>3.74 &gt; 2.89</b>	
<b>p</b>	<b>p &lt; 0.01</b>	



**Figure 4. The initial and final values – Trunk lateral flexion**

**Conclusions**

Stretching is a western technique created by Bob Anderson that uses stretching exercises who increase the elasticity and the mobility of the joint and muscle, stimulate synovial fluid secretion, eliminate toxins, reduce stress and ameliorate the state of the neuromuscular system.

The  $t$  calculated were higher than the values in the table of Fisher's  $t$  critical at the significance thresholds of 0.01 and 0.02, at the degree of freedom  $n-1$  ( $18-1=17$ ),  $p < 0.01$  and  $p < 0.02$ .

The null hypothesis was rejected, and with a 98% confidence we can say that the results are due to our stretching techniques. Alternative hypotheses are acceptable and in 2% of cases we may risk that the results are not due to our programs.

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### **ÎMBUNĂTĂȚIREA FLEXIBILITĂȚII PRIN EXERCIȚII DE STRETCHING STATIC ÎN LECȚIA DE EDUCAȚIE FIZICĂ**

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**Cuvinte cheie:** *flexibilitate, coloana vertebrală, stretching static, studente, lecția de educație fizică și sport*

### **Rezumat**

Stretchingul este o tehnică de recuperare a mobilității articulare ce constă în întinderea unui mușchi și menținerea întinderii câteva secunde. Am plecat de la premisa că exercițiile de întindere aduc foarte multe beneficii asupra tuturor aparatelor organismului uman. Exercițiile de stretching determină creșterea mobilității articulare, stimulează secreția de lichid sinovial, contribuie la eliminarea toxinelor, diminuează stresul și ameliorează starea sistemului neuro – musculo – articular. Scopul acestui studiu a fost de a evidenția rolul exercițiilor de stretching static practicate la sfârșitul lecțiilor de educație fizică și respectând indicațiile date de literatura de specialitate, în îmbunătățirea flexibilității studenților, cu efecte benefice și asupra dezvoltării condiției fizice a acestora. Experimentul s-a realizat pe un grup de 18 studente din anul al II-lea de studiu, la Facultatea de Științe Economice și Administrație Publică, din cadrul Universității „Ștefan cel Mare” Suceava. La sfârșitul experimentului rezultatele au scos în evidență faptul că există diferențe semnificative între mediile inițiale și finale la toate măsurătorile realizate.