ORIGINAL ARTICLE

Effect of isostretching training on flexibility and muscle strength

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ABSTRACT

Objective: To evaluate effects of the isostretching exercise training on flexibility and muscle strength. **Method:** Thirty-one healthy subjects (27 women), aged between 18 and 28 years, divided into two groups: Group A, isostretching, which has undergone a program of exercises based on the isostretching technique, and Group B, standard, which was subjected to the same exercises using the general technical principles of traditional stretching. The training went on for 12 weeks, twice per week, one hour per session. Flexibility was evaluated through photogrammetry in pre- and post-test, evaluating the wrist-floor distance and classifying posture according to the categories of muscle shortening described by Kendall, while muscle strength was assessed using a handgrip dynamometer. **Results:** There was no statistically significant difference between the results for each group in the flexibility test. Analysis of clinical significance and improvement by the Reliable Change Index (RCI) showed an improvement in flexibility affecting 14 subjects from both groups. Analysis of body contour in group A showed attenuation in the curvatures of the cervical, thoracic, and lumbar spine, as well as the hip flexion angle, and group B showed attenuation in the curvature of the cervical spine and hip flexion angle. Group A showed statistically significant differences in some specific muscle groups, but with no clinical significance. **Conclusion:** Both interventions affected flexibility in a statistically similar way, but had a different impact on the curvatures of the spine. Isostretching training clinically changed the flexibility of healthy individuals, with evidence that more intense or longer workouts can affect muscle strength.

Keywords: Muscle Strength, Muscle Stretching Exercises, Posture, Physical Therapy Specialty

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INTRODUCTION

Activities of daily living demand articular movements within the normal range of motion, and for this to happen without difficulty or injury flexibility is needed, defined as the degree to which a muscle length allows joint movement. In conjunction with flexibility, appropriate levels of strength are associated with less incidence of musculoskeletal injuries, gain in bone mass, better cardiometabolic risk profile, and less risk of mortality. Strengthening programs vary in frequency, duration, and intensity, and are determined for each specific population, as well as those developed to achieve the health of bones, muscles, and joints.[1]

Many techniques are used to develop flexibility and to normalize muscle strength such as global postural re-education, Pilates, and the isostretching method.[2]

Isostretching is a technique developed by Bernard Redondo in 1974, in France, that proposed to promote stretching and strengthening of muscles, especially those related to posture, in a general and aligned manner, by exercises coordinated with respiratory control and body posture, performed with control of all the movements involved in the physical exercise under the firm and detailed verbal command of the physical therapist. While the subject maintains the stretching posture, performing isometric contraction of the deep vertebral musculature,[3,4] he or she makes adjustments in posture and on the contractions requested and, at the same time, controls his breathing. For the creators of this technique, the main objective is strength and flexibility.[2]

OBJECTIVE

In view of the effects of the isostretching technique and of the scarcity of studies with experimental results, this work sought to study the effects promoted by the flexibility and muscle strength training using isostretching on healthy individuals.

METHOD

This was a randomized, controlled, and blind study with 31 healthy individuals: 27 females and four males, with ages between 17 and 28 years. Individuals free of clinical complaints and musculoskeletal, neurological, or cardiorespiratory diseases were included in the study. The participants signed the Free and Informed Consent form in compliance with Opinion Nº 747/02 approved by the Ethics in Research Committee of the institution.

The study was carried out at the Physiotherapy and Behavior Laboratory (LaFi.Com) of the Course of Physiotherapy at the School of Medicine of the University of São Paulo.

The participants were divided randomly into two groups, that is, group A with 15 participants (isostretching group) and group B with 16 individuals (control group). Before beginning, data on their age, weight, and height were collected, and before and after the training, both groups had their flexibility and muscle strength evaluated.

Evaluation of flexibility

Flexibility was evaluated by taking a right side photograph of the subject doing the test for anterior trunk flexion, with the subjects positioned on a 40 cm x 40 cm wooden bench 40 cm in height. The photogrammetry previously used the measurement between the right ulnar styloid process and the right lateral malleolus.[5] A photographic record of the right side view was made at the maximum trunk flexion, with extended knees and tibial-tarsal angle of 90°. The head and shoulders were relaxed and the fingers were above the feet, while the feet were supported by a wood rail fixed at 90° with the table.[6] The distance was measured directly in the photographs, from the two anatomical points of reference previously established.

Information referring to muscle shortenings of the posterior chain was collected, considering the classification criteria of observable shortenings established by Kendall et al.[7] That author considered *normal shortening* (N) to be when the angle between the sacrum and the table was approximately 80°, showing an increase of posterior convexity, and a homogeneous and continuous curvature, with the subject capable of touching the tips of the fingers to the toes; *shortening 1* (Sho 1) = excessive length of back muscles, short ischiotibial muscles, normal length of gastrocnemius and soleus muscles; *shortening 2* (Sho 2) = excessive length of upper back muscles, slight shortening of middle and lower back muscles, gastrocnemius-soleus, and ischiotibial muscles, incapable of touching the toes; *shortening 3* (Sho 3) = normal length of upper and lower back muscles. Short ischiotibial and gastrocnemius-soleus muscles; *shortening 4* (Sho 4) = excessive length of ischiotibial muscles allows excessive pelvic flexion towards the thigh. Due to the excessive length of the posterior thigh muscles, the individual with this type of shortening is able to go beyond the ankles with the fingers, even with limited flexibility in the lower region of the trunk. Flexibility/shortening of level 5 is characteristic of people with non-progressive chronic encephalopathy and people with spinal cord injuries and, because of that, it was excluded from the evaluation in the present study. At the end of the experiment, through the Corel DRAW 10 software, body contours in flexion were superimposed to observe the alterations brought by the training.

Evaluation of muscle strength

Evaluation using the dynamometer and the muscle strength tests recommended by Kendall et al.[8] was proposed to study the effect of the muscle strength training program. The muscle groups evaluated were those responsible for wrist extension, elbow extension, shoulder abduction, shoulder protraction, knee flexion, knee extension, and hip flexion. The peak force was recorded when the maximum resistance was offered by the evaluator (make test), repeated three times, with an interval of one minute between measurements, and selecting the highest measurement. In this test, the measurements are given in kilograms.

Training program

The subjects were submitted to a program with 24 one-hour sessions for a period of 12 weeks. In each session, 14 exercises were performed three times each, starting with easy exercises and moving to higher degrees of difficulty, with half-minute intervals for rest between each exercise.

Group A was submitted to a training program based on the isostretching technique. The exercises were selected from the book *Isostretching - A ginástica da coluna*.[9]

Group B, the control group, was submitted to the same exercises, but without the application of the isostretching principles (detailed verbal command, respiratory control with supervision of the trainer, and postures with detailed and continuous feedback).

Statistical analysis

The data referring to flexibility and muscle strength were analyzed in two situations, pre-test and post-test, for group A and group B, and between the two groups. The variables for strength and flexibility between the pre- and post-test were analyzed by the Student t-test while, to compare between groups, a parametric test was used between two non-paired measurements with unknown standard deviation. The probabilities associated with the tests with values less than or equal to 0.05 were considered significant.

In order to analyze the variability of the response to the test for muscle strength and flexibility within the sample and to verify the efficacy of the interventions for the patient, the analysis of clinical significance was chosen. Two proposals were considered for defining the intervention as efficacious: 1- the percentage of patients that improved 20% or more in their flexibility and muscle strength measurements; 2- the Reliable Change Index, suggested by Jacobson & Truax, for muscle strength as well as for flexibility.[10]

Muscle strength variation considered the following:

Strength variation = (post-test muscle strength - pre-test muscle strength) X 100 pre-test muscle strength

And accepted:

Variation = 0, no alteration in relation to the baseline (the post-test strength is equal to the pre-test), therefore there is no change in strength.

Variation > 0, percentage of increase in relation to the baseline (the maximum strength in the post-test is greater than the strength in the pre-test).

Variation <, percentage of decrease in relation to the baseline (the maximum strength in the post-test is lower than the strength in the pre-test), therefore, there was a decrease in strength.

RESULTS

Characteristics of the groups

The mean age of group A was 19.9 with SD of 2.43 years, and that of group B, 21.3 with SD of 2.67 years. The mean weight of group A was 54.7 with SD of 7.75 Kg, and that of group B, 60.9 with SD of 10.01 Kg. The mean height of group A was 163.8 with SD of 5.93 cm, and that of group B, 166.4 with SD of 5.96 cm.

The comparative statistical study between groups A and B for age, weight, and height showed that there was no statistically significant difference between those variables.

Flexibility

A decrease in the distance between wrist-ankle was found, with group A showing a mean between the pre- and post-tests of 10.1 with SD of 3.23 cm, and group B showing 7.6 with SD of 2.21 cm. The training promoted improvement in the flexibility of both groups, however with no statistical significance ($p < 0.05$).

The study of flexibility through a clinical significance analysis and of improvement through the Reliable Change Index (RCI) demonstrated an improvement of 93.3%, reaching a total of 14 subjects from both groups.

The study of posture classification during the flexibility test, according to the proposal by Kendall et al.[8] confirmed that in group A, only four subjects reached normality, and that in group B, two individuals changed their classification from Shor 2 to Shor 3, getting closer to the appropriate posture, and only one individual went from Shor 3 to Shor 2 (Chart 1).

In group A, a smoothing of the cervical spine curvature became evident associated with the hip flexion in six subjects and the smoothing of the cervical spine with thoracic-lumbar was seen in six subjects, with 15 subjects showing alteration in their cervical spine. In group B, the effect of training was the attenuation of cervical spine curvature associated with the attenuation of the hip flexion angle in 12 subjects. The main alteration came to be in the cervical spine (15 subjects).

Muscle strength

In group A, there was a significant variation for both sides (dominant and non-dominant) of the following muscle groups: elbow flexors, upward scapular rotators, hip flexors, and knee extensors. A significant variation of strength in the wrist extensors, elbow extensors, shoulder abductors, and knee flexors was also found in the non-dominant side.

In group B, a significant variation was found on both sides for the following muscle groups: elbow flexors, shoulder abductors, and knee flexors and extensors. Also, a significant variation was found on the dominant side for the elbow extensors and for the muscles that protract the scapula.

When comparing the evolution of muscle strength of group A and group B, group A differed from group B in the variation of muscle strength in the wrist extensors and in the knee flexors of the non-dominant side. However, in group B there was increased muscle strength in the knee extensors for both the dominant and the non-dominant sides[11] (Table 1).

For the clinical evaluation of muscle strength variation, two studies were made, one on the improvement in the Maximum Reliability Index and the other on improvements greater than 20% (Table 2).

The analysis by the Reliable Change Index (RCI) showed that, although the statistical analysis of the groups had indicated an improvement in group A, the most subjects who presented improvement in muscle strength from a single group was seven out of 15, which was for the left knee flexor muscle group. It was also possible to observe that, by the RCI most subjects presented no clinical changes.

In group B, there was a centralized improvement of the knee extensors on the dominant side for 13 of the 16 subjects, and for the left knee extensors, there was improvement for eight subjects. Similarly, in group A, it was possible to verify that most subjects did not

Chart 1. Study of trunk contour of participants in groups A and B

Subjects	Group A	Group B
1	↓ lumbar, ↓ cervical; ↑ hip flexion	↓ cervical; ↓ hip flexion
2	↓ lumbar, ↓ cervical; ↑ hip flexion	↓ cervical; ↓ hip flexion
3	↓ thoracic- lumbar, ↓ cervical	↓ cervical; ↓ hip flexion
4	↓ cervical	↓ cervical; ↓ hip flexion
5	↓ thoracic - lumbar, ↓ cervical	↓ hip flexion
6	↓ thoracic - lumbar	↓ cervical; ↓ hip flexion
7	↓ lumbar, ↓ thoracic, ↓ cervical; ↓ hip flexion	↓ upper thoracic, ↓ cervical; ↓ hip flexion
8	↓ thoracic - lumbar, ↓ cervical	↓ cervical
9	↓ cervical; ↓ hip flexion	↓ cervical; ↓ hip flexion
10	↓ thoracic - lumbar, ↓ cervical	↓ cervical; ↓ hip flexion
11	↓ lumbar, ↓ thoracic, ↓ cervical	↓ cervical; ↓ hip flexion
12	↓ lumbar, ↓ cervical	↓ cervical
13	↓ lumbar, ↓ cervical; ↓ hip flexion	↓ cervical
14	↓ thoracic - lumbar, ↓ cervical; ↓ hip flexion	↓ cervical; ↓ hip flexion
15	↓ thoracic - lumbar, ↓ cervical; ↓ hip flexion	↓ cervical, ↓ lumbar; ↓ hip flexion
16		↓ cervical; ↓ hip flexion

Table 1. Mean (M) and standard deviation (SD) of muscle strength variation between pre- and post-test in groups A and B (%)

Variable		Group A M (SD)	Group B M (SD)	P
Upper Limb				
Wrist extension	D	8.3 (11.54)	2.9 (23.3)	0.105
	ND	11.1 (18.92)	5.8 (13.27)	0.007
Elbow flexion	D	19.9 (25.12)	19.2 (28.5)	0.939
	ND	19.6 (25.96)	17 (16.4)	0.744
Elbow extension	D	6.2 (21.75)	16.4 (22.52)	0.213
	ND	11.8 (20.89)	8.1 (25.02)	0.556
Shoulder abduction	D	13 (21.55)	12.5 (23.68)	0.95
	ND	15.6 (29.87)	15.5 (32.31)	0.992
Scapular protraction	D	20.1 (25.41)	12.1 (17.23)	0.307
	ND	20.6 (32.8)	4.3 (19.45)	0.1
Lower Limb				
Hip flexion	D	10.3 (14.54)	0 (10.81)	0.033
	ND	10.9 (16.85)	2.1 (16.05)	0.146
Knee flexion	D	14.6 (19.51)	11.6 (24.14)	0.709
	ND	24.4 (21.1)	7.9 (15.18)	0.018
Knee extension	D	11.2 (21.55)	25.2 (14.73)	0.031
	ND	11.5 (13.82)	30.7 (24.27)	0.012

D: dominant limb; ND: non-dominant limb

Table 2. Clinical Significance – improvements greater than 20% and improvement in the Reliable Change Index (RCI) – Comparison between groups A and B

Variável		Melhora - variação maior que 20% (%)		Melhora pelo IMC (%)	
		Grupo A	Grupo B	Grupo A	Grupo B
Membro Superior					
Extensão punho	D	20 (3)	12,5 (2)	13,3 (2)	6,3 (1)
	ND	33,3 (5)	6,3 (1)	20 (3)	6,3 (1)
Flexão cotovelo	D	46,7 (7)	18,8 (3)	46,7 (7)	25 (4)
	ND	40 (6)	26 (4)	53,3 (8)	18,8 (3)
Extensão cotovelo	D	13,3 (2)	6,3 (1)	20 (3)	18,8 (3)
	ND	40 (5)	25 (4)	46,7 (7)	6,3 (1)
Extensão cotovelo	D	6,7 (1)	31,3 (5)	40 (6)	18,8 (3)
	ND	20 (3)	37,5 (6)	33,3 (5)	0 (0)
Protação de escápula	D	40 (6)	31,3 (5)	25,7 (4)	12,5 (2)
	ND	40 (6)	25 (4)	20 (3)	6,3 (1)
Membro inferior					
Flexão quadril	D	20 (3)	0 (0)	20 (3)	6,3 (1)
	ND	13,3 (2)	12,5 (2)	13,3 (2)	0 (0)
Flexão joelho	D	26,7 (4)	25 (4)	13,3 (2)	12,5 (2)
	ND	33,3 (5)	25 (4)	46,7 (7)	18,8 (3)
Extensão joelho	D	13,3 (2)	68,5 (11)	13,3 (2)	81,3 (13)
	ND	20 (3)	50 (8)	33,3 (5)	50 (8)

present any increase or decrease in muscle strength; that is, there were no changes between the pre- and post-test.

The improvement analysis by variation greater than 20% reinforces the RCI findings when comparing group A with group B. There was no correlation between the wrist-ankle distance variation (flexibility) and the muscle strength variation through linear association measurement.

DISCUSSION

Isostretching promoted changes in the flexibility and muscle strength of healthy individuals after 12 weeks of training. Other studies corroborate the positive findings obtained, like Macedo et al.,[12] who reported an increase in muscle strength for the abdominals, gluteus maximus, and trunk extensors of patients with low back pain; Monte-Raso et al.[13] described that the technique was efficacious in the alignment of the thoracic spine and improvement of flexibility in only one group; Wilhelms et al.[14] and Hespanhol et al.[3] also obtained increases in flexibility.

In the present study, there were gains in both groups in the wrist-floor distance test adapted for seated, although with no statistical significance; a greater number of individuals would be necessary to confirm such a finding. However, the clinical significance and improvement by RCI analyses showed improvements for most of the population studied. The clinical significance is a measurement that indicates the extent to which the treatment conditions produce clinically significant improvements for the population served.

Only in group A, whose exercises were based on the Isostretching technique, did a few subjects reach the normality of spinal curvatures, according to the classification by Kendall. The results obtained may be justified by the isostretching technique being based on maintaining stretching postures during a prolonged exhalation and, thereby promoting alterations in the viscoelastic properties of the muscle. Studies by Redondo[9] and Toscano & Egypto[15] state that directed static work promotes greater stretching of the deep connective tissue, improving the capacity of the muscle to contract and relax.

The study of the body contour presented in both groups showed a reduction of at least one curvature or associated attenuation. This difference may be explained by the fact that the individuals were submitted to a situation that demanded or recruited more muscular involvement with a greater number of muscle groups being stretched more efficiently and contributing to the gain in joint mobility. Monte-Raso et al.[13] justified that the gain in flexibility of the posterior chain may have occurred because the postures of the technique emphasized the symmetrical stretching of the posterior muscle chain and did not stretch the segments asymmetrically.

However, the individuals who were submitted to the training with the Isostretching principles presented greater differences in the spinal and thoracic-lumbar segments, as well as in hip flexion. Borghi et al.[16] reported that the benefits of Isostretching are broader, affecting such things as an increase in thoracic expansibility and a reduction of the scoliosis angulation and of lumbar lordosis.

The flexibility test, considering only the distance between the fingers and the floor during trunk flexion, is a quick test and easy to apply in clinical practice, being a routine instrument for most physiotherapists,[16] although it misses clarifying elements of the flexibility modification process, which are obtained from postural analysis during the performing of the test. Monte-Raso et al.[13] and Borghi et al.[16] used photographic analysis and evaluation of curvatures to observe post-intervention postures, however, the analysis of posture during the test, as proposed in the present study, enriches the finger-floor test with specific information referring to the flexibility modification process.

The clinical significance analysis for the muscle strength test demonstrated low efficacy of isostretching in gaining muscle strength. In group A, strength increase only occurred for the left knee flexors. In group B, the control group, muscle strength increase occurred for the dominant knee extensors and for the left knee extensors.

The muscle strength gain did not occur in a situation of stretching without resistance training,[17] however Macedo et al.[12] reported an increase of muscle resistance for the abdominals, gluteus maximus, and trunk extensors of patients with low back pain. The tests used by Macedo et al.[12] to evaluate muscle strength were the One Repetition Maximum (1RP), where specific movements were evaluated through repetitions and were only considered when performed completely. In the present study, the strength evaluation test was carried out using a dynamometer, which is a gold standard instrument to evaluate muscle strength and no significant results were found. Another possibility would be that isostretching is only efficacious for the treatment of patients with musculoskeletal alterations, such as individuals with low back pain. Thus, more studies are needed to confirm that isostretching is not efficacious to develop muscle strength in healthy individuals.

CONCLUSION

The study of posture during the flexibility test through the body contour demonstrated that different techniques affect one's flexibility in a statistically similar way, although affecting different regions of the body. The need for systematized evaluations during the flexibility and muscle strength evaluation may generate information that will base the clinical decision of the physiotherapist concerning the most appropriate technique to be used for each therapeutic session.

Isostretching has shown to be efficacious in improving the flexibility of healthy individuals, but muscle strength has not shown any clinical significance. New studies with a greater number of healthy subjects are necessary to confirm the efficacy of this technique.

REFERENCES

1. Micheo W, Baerga L, Miranda G. Basic principles regarding strength, flexibility, and stability exercises. PMR. 2012;4(11):805-11. DOI: http://dx.doi.org/10.1016/j.pmrj.2012.09.583
2. Hespanhol Junior LC, Girotto N, Lopes AD, Oliveira KTF, Oliveira TGV, Carvalho ACA.Efeito do método Isostretching na flexibilidade e nível de atividade física em indivíduos sedentários saudáveis. Rev. Bras Ciênc Mov. 2011;19(1):26-31.
3. Moraes SMS, Mateus ECL. O método isostretching no tratamento da hipercifose torácica. Fisioter Bras. 2005;6(4):311-3.
4. Durante H, Vasconcelos ECLM. Comparação do método Isostretching e cinesioterapia convencional no tratamento da lombalgia. Semina Cienc Biol Saude.2009;30(1):83-90. DOI: http://dx.doi.org/10.5433/1679-0367.2009v30n1p83
5. Caromano FA, Ostermayer E, Taniguchi C, Nonaka L, Farias MR. Flexibility and posture in elders using analyse photographic method. In: I Congresso Pan-Americano de Gerontologia; 1995; São Paulo. Abstract. São Paulo: Sociedade Brasileira de Geriatria e Gerontologia; 1995. p. 22.
6. Watson AW. Procedure for the production of high quality photographs suitable for the recording and evaluation of posture. Rev Fisioter Univ São Paulo. 1998;5(1):20-6.
7. Kendall FP, McCreary EK, Provance PG. Músculos: provas e funções. 4 ed. São Paulo: Manole; 1995.
8. Kendall FP, McCreary KE, Provance PG, Rodgers MM, Romani WA. Músculos: provas e funções com postura e dor. 5 ed. Barueri: Manole; 2007.
9. Redondo B. Isostretching: a ginástica da coluna. Piracicaba: Skin Direct Store; 2001.
10. Jacobson NS, Truax P. Clinical significance: a statistical approach to defining meaningful change in psychotherapy research. J Consult Clin Psychol. 1991;59(1):12-9. DOI: http://dx.doi.org/10.1037/0022-006X.59.1.12
11. Aaron DH, Jansen CW. Development of the Functional Dexterity Test (FDT): construction, validity, reliability, and normative data. J Hand Ther. 2003;16(1):12-21. DOI: http://dx.doi.org/10.1016/S0894-1130(03)80019-4
12. Macedo CSG, Debiagi PC, Andrade FM. Efeito do isostretching na resistência muscular de abdominais, glúteo máximo e extensores de tronco, incapacidade e dor em pacientes com lombalgia. Fisioter Mov. 2010;23(1):113-20. DOI: http://dx.doi.org/10.1590/S0103-51502010000100011
13. Monte-Raso VV, Ferreira PA, Carvalho MS, Rodrigues JG, Martins CC, Iunes DH. Efeito da técnica isostretching no equilíbrio postural. Fisioter Pesq. 2009;16(2):137-42. DOI: http://dx.doi.org/10.1590/S1809-29502009000200008
14. Wilhelms F, Moreira NB, Barbosa PM, Vasconcellos PRO, Nakayama GK, Bertolini GR. Análise da flexibilidade dos músculos da cadeia posterior mediante a aplicação de um protocolo específico de Isostretching. Arq Ciênc Saúde UNIPAR. 2010;14(1):63-71.
15. Toscano JJO, Egypto EP. A influência do sedentarismo na prevalência de lombalgia. Rev Bras Med Esporte. 2001;(7)4:132-7. DOI: http://dx.doi.org/10.1590/S1517-86922001000400004
16. Borghi AS, Antonini GM, Facci LM. Isostretching no tratamento da escoliose: série de casos. Rev Saúde Pesq. 2008;1(2):167-71.
17. Durigon OFS. Alongamento muscular parte II: a interação mecânica. Rev Fisioter Univ São Paulo. 1995;2(2):72-8.