



Online Publication Date: 20 September, 2010

ORIGINAL RESEARCH

EFFECTS OF AN ISOSTRETCHING TRAINING PROTOCOL TO INCREASE THE
MUSCULOARTICULAR FLEXIBILITY AND OTHER PHYSIOLOGICAL ASPECTS ON THE
QUALITY OF LIFE

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Abstract

Purpose: To apply the technique of Isostretching in a group of people over age 50 years and compare the flexibility of the posterior muscular chain before and after treatment, observing whether there was improvement in quality of life after the end of the sessions.

Method: Eleven healthy and sedentary people from 51 to 74 years old participated in the study, which was conducted in Brazil. To evaluate the flexibility we applied the SF-36 questionnaire and test flexion of the spine before and after the study. Eight domains were accessed with the scores ranging from zero to one hundred.

Results And Discussion: The technique was effective to gain flexibility of the posterior muscle group, which results in better quality of life for the participants. The results show that the domains related to physical health obtained the highest scores (“functional capacity”, “limitation in physical aspects” and “pain”). These aspects are strongly emphasised in a physical therapy treatment.

Key words: Isostretching, Flexibility, SF-36 Questionnaire, Posterior Muscle Group

Rezumat

Obiectivul principal al acestui studiu a fost să se aplice tehnica Isostretching într-un grup de persoane cu vârsta peste 50 de ani și compara flexibilitatea lanțului muscular posterior înainte și după tratament, cu respectarea dacă a existat în îmbunătățirea calității vieții după încheierea sesiunilor. Unsprezece persoane sănătoase și sedentari 51 la 74 de ani au participat la studiu, vrajitoare a fost făcut în Brazilia. Pentru a evalua flexibilitate am aplicat chestionarul SF-36 și flexie a coloanei vertebrale de testare înainte și după studiu. Opt domenii au fost accesate cu scoruri variind formularul de zero la sută.

Tehnica a fost eficient pentru a obține flexibilitatea grupa musculara posteriora, rezultate în vrajitoare bună calitate a vieții pentru participanți. Rezultatele arată că domeniile legate de sănătatea fizică a obținut cele

mai mari note ("capacitatea funcțională," limitarea în aspectele fizice "și" durere "). Acest aspecte sunt puternic subliniat într-un tratament terapie fizică.

Cuvinte cheie: Isostretching, Flexibilitate, chestionarul SF-36, grupa de muschi posterioră.

Background

The elderly population has grown at a faster pace than any other age group (Costa Júnior, 2003). This increasing number of individuals in old age makes us reflect on the quality of their lives.

For the World Health Organization (WHO) quality of life is: "the individual's perception of their position in life, in the context of culture, value systems in which they live in relation to their goals, expectations, standards and concerns". However, the concept of quality of life is more widespread and involves various forms of conditions that may affect the individual's perception, feelings and behaviors related to their daily operations, including but not limited to their health condition and medical interventions (Fleck, 1999; Sales, 2001).

Quantitative measures of quality of life could serve as indicators to guide therapeutic intervention strategies and create parameters for decisions on actions to promote health, whether individual or collective. It is not sufficient to evaluate the health care, it is necessary to incorporate HRQL (Quality of Life Related to Health) to clinical decisions and health planning. Although a consensual relationship between quality of life and health and its importance in health promotion in clinical practice easy to infer (Cerqueira, 2000).

Aiming to compare the quality of life before and after a therapeutic intervention in a given group, you must use a tool like, for example, a specific questionnaire. The examination of these instruments has been important in the area of scientific and practical knowledge in the health field.

This is because the concept of quality of life and health are interposed, - deemed satisfaction and physical well-being, psychological, cultural and socioeconomic - and priority in the treatment of any disease has been increasing, the quest for health, and especially the improvement quality of life. In this sense, the use of questionnaires of quality of life allows a more objective evaluation of this combination of subjective factors. In clinical practice, they can evaluate the effectiveness of a therapeutic intervention (Santos, 2006).

Some approaches have been used in an attempt to minimise the undesirable processes of aging, such as loss of balance, weakness and muscle shortening, respiratory alterations, osteomyoarticular pain and difficulty in social relationships. An important type of physiotherapy which acts directly on these processes, created in 1974 by Bernard Redondo in France as a natural evolution of the method *Gymnastique d'Equilibre* and implemented in Brazil in 1994, is Isostretching, a method based on kinesiotherapy balance that controls and keeps the body by correcting the postures of humans. The postures are performed during a deep and prolonged expiration in accordance with the limits for each individual. (Redondo, 2006).

The basic goal of this method is to strengthen the deep muscles of the spine, increase flexibility of muscles and improve joint mobility. The correct positioning of the pelvis and spine is the key point of Isostretching and the work is done by contracting and stretching and self-growth of the spine.

The main objective of this study was to apply the Isostretching technique in a group of people over age 50 years and compare the flexibility of the posterior muscular chain before and after treatment, observing whether there was improvement in quality of life after the end of the sessions.

Methods

Participants

Included in the program were all individuals who agreed to participate and were enrolled in the Family Center for the Elderly in city of Patos de Minas, Brasil. They signed a consent form and medical certificate that showed the Liberals for the implementation of activities. Those individuals who missed more than five sessions were excluded. To join the activities of this Family Center, the individual must have at least 50 years.

The group consisted of a total of 11 participants, and in the beginning, 17 people signed the consent form, but missed six more than five sessions and were excluded from the study. Data collection took place between November/2009 and January/2010. The study was approved by the Scientific Ethics Committee of the UNIPAN in february of 2010, with registration CEP-8/10.

Instruments

This study offers a quantitative approach (experimental and observational) and was conducted as an experiment applying a therapeutic method -Isostretching Training Protocol (ITP) to verify and explain its effectiveness in the quality of life of a particular group of the population.

The instrument used for the evaluation was the Brazilian Version of the Quality of Life Questionnaire - SF-36 (Medical Outcomes Study 36- Item Short-Form Healthy Survey), originally created in English by John E. Ware, 1988. Ciconelli (1997) performed a validation and cultural adaptation of the SF-36 applying it in patients with rheumatoid arthritis at UNIFESP in 1997. This tool considers the perceptions of individuals regarding their own health status and assesses both negative aspects of health (illness), as positive aspects (welfare). This is a

generic instrument for assessing quality of life and is classified as generic as it is used for any health condition. The SF-36 is a multidimensional questionnaire consisting of 36 items encompassing 8 domains: physical functioning, limitation of physical, pain, general health, vitality, social aspects, limitation by emotional and mental health.

At the end of all questions, the calculations were performed by the proposed SF-36 questionnaire, whose results had a score 0-100, where zero corresponds to the worst overall health status and 100 the best.

The calculation of the scores of quality of life questionnaire is divided into two phases:

- Stage 1: Weighting of the data. It is the phase correlation between the responses and score described by the SF-36, sometimes keeping the normal score of the question, now doing correspondence with the value given for each question in this first phase of the calculations (see Annex C).
- Stage 2: Calculation of Raw Scale. At this stage the value of the questions were transformed into notes of eight areas ranging from 0 (zero) to 100 (hundred), where 0 = worst and 100 = best for each area. It's called Raw Scale because the final value shows no unit of measurement. Therefore, the following formula should be applied to each domain:

$$\frac{\text{Domain: Value obtained in the corresponding issues} - \text{Lower Limit} \times 100}{\text{Score Range}}$$

Note: The question number 02 is not part of the calculation of any field, being used only to evaluate how the individual is better or worse compared to a year ago.

At the first ITP session the SF-36 was applied to all individuals, and other questions pertaining to your health. We then performed measures of flexibility of the posterior muscular chain, through the test of anterior trunk. This is a specific test for evaluating posterior muscular chain, where the individual is asked to make a maximum anterior flexion of the trunk, from the position of bipedalism, with the goal of touching the third finger on the floor. The finger-floor distance was measured by measuring tape. This test of anterior flexion of trunk, also called the Ground Fingers Test, was described by Magnusson et al (1997).

After applying the questionnaire to all participants, the sessions were initiated ITP. The sessions, lasting approximately fifty minutes, took place twice a week, totaling 20 sessions.

In the first ten sessions the subjects performed simple postures, which gradually increased in the degree of difficulty. Also the rate of breathing was increased, increasing from two to three breaths in each posture. The postures were performed in standing positions, sitting and supine and lasted a single deep inspiration, followed by a forced expiration. Postures during isometric muscle contractions are required and participants are encouraged to undertake the enhancement of the spine, posture maintenance and forced expiration.

In the last ten sessions, subjects were able to perform more complex positions, which required a greater degree of balance, body awareness and muscle strength.

At the end of the twenty sessions participants completed SF-36, specific questions to participants about their health and flexibility test for front flexion comparing the individual with himself before and after training, making sure the ITP improved his body flexibility and especially their quality of life.

Statistical analyses

The normal distribution was confirmed using the Kolmogorov-Smirnov test. Thus, the differences between before and after 20 sessions of ITP were evaluated with a paired *t*-Student test. The statistical analysis was carried out with SPSS 15.0 software for Windows (SPSS Worldwide Headquarters, Chicago, IL) and the 0,05 level of significance ($p < 0,05$) was used for all statistical procedures.

Results

The results obtained by applying the SF-36 (the Table 1) show that the domain called "functional capacity" shown improvement in 11 participants (average increase of 25 points), the field called "limiting physical aspects" improved in 9 participants (average of 25 points), pain improved in 9 subjects (mean 30 points), the field called "general health" has improved in six participants (mean 1.41 points), the domain named "vitality" showed improvement in 9 subjects (average of 13.5 points), the domain 'social aspects', increased in 8 participants (average of 28 points), the field called "limitation by emotional" showed improvement in 6 subjects (mean 15 points) and finally the domain called "mental health" has improved in 7 subjects (average of 7 points). The overall average gain points in all areas after 20 sessions of ITP for study group was 22.7.

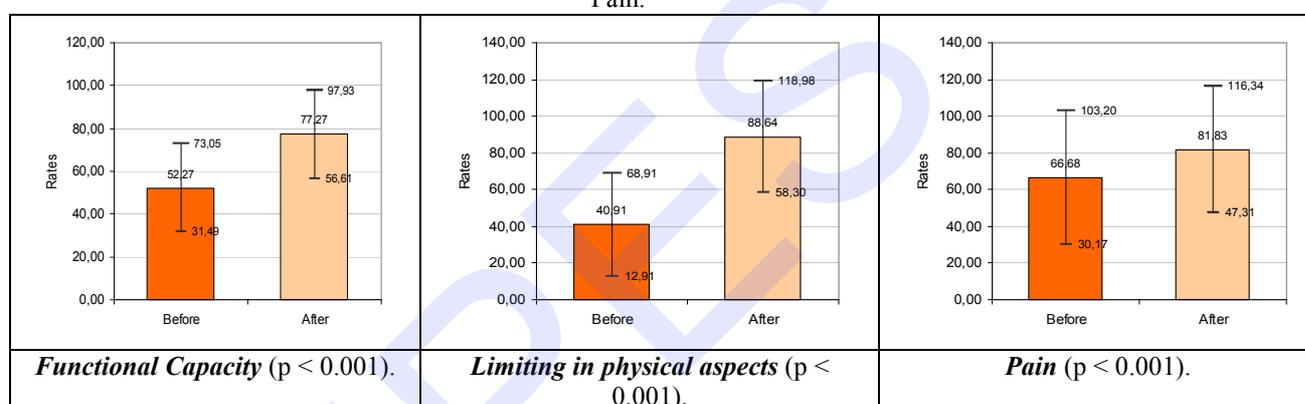
Table 1 – Results (points) obtained by applying the Brazilian Version of the Quality of Life Questionnaire - SF-36

Subject	Functional Capacity		Limiting in physical aspects		Pain		States General Health		Vitality		Social Aspects		Limitation by Emotional		Mental Health	
	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A
1	5	35	25	100	10	100	72	52	40	80	0	37,5	66,7	100	48	40
2	40	60	0	0	0	41	10	42	0	50	0	87,5	0	0	52	72
3	75	85	50	100	61	61	27	42	45	70	25	62,5	0	66,7	44	60
4	70	90	25	100	21	72	57	72,5	50	60	87,5	100	66,7	100	68	76
5	35	80	100	100	72	62	82	57	80	55	50	75	100	33,4	88	84
6	50	65	25	75	31	41	57	52	55	75	100	100	100	100	80	88
7	65	100	25	100	61	72	42	52	55	50	50	100	66,7	100	56	64
8	75	95	75	100	41	84	62	60	65	70	87,5	70	66,7	100	64	92
9	60	90	50	100	51	62	77	47	70	75	100	87,5	100	100	68	68
10	45	55	25	100	31	100	62	82	60	80	62,5	100	100	100	64	52
11	55	95	50	100	61	84	72	77	75	80	50	100	66,7	100	76	92

Range from 0 to 100 points; Legend: B – Before ITP; A – After ITP

The statistical differences found after the treatment are showed in Figures 2 and 3

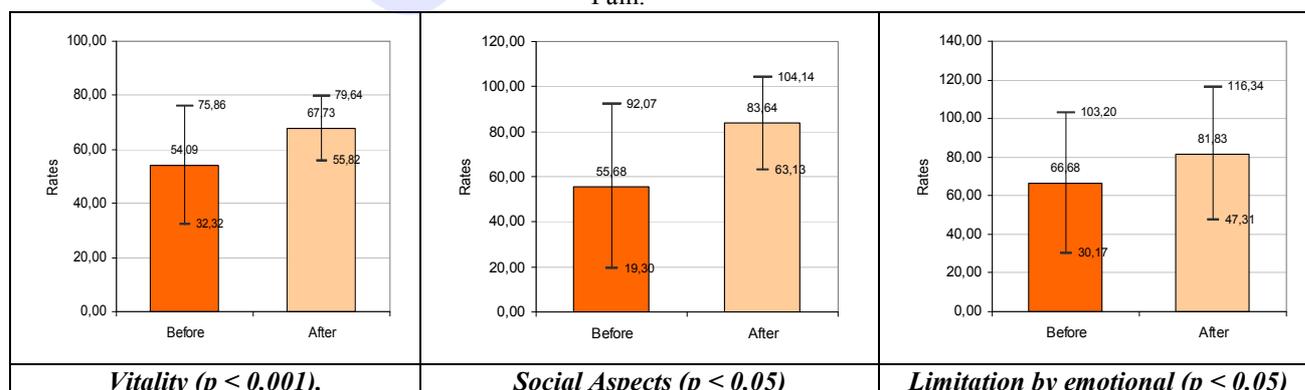
Figure 2 – Table of averages points of three domains – Functional Capacity, Limitation in Physical Aspects and Pain.



*Difference between *After* and *Before* ITP (*t test*)

It was observed that the ITP contributed to the patients had an average increase of about 25 points ($p < 0.001$) in their “functional capacity”, 48 points ($p < 0.001$) in “limiting in physical aspects”, about 30,82 points ($p < 0.001$) in their “pain”, 13,64 points ($p < 0.001$) in their vitality; 27,96 points ($p < 0.05$) in their “social aspects” and about 15,15 points ($p < 0.05$) in their “limitation by emotional”, after twenty sessions of ITP.

Figure 3 – Table of averages points of three domains – Functional Capacity, Limitation in Physical Aspects and Pain.



*Difference between *After* and *Before* ITP (*t test*)

The domains "general health" and "mental health" presented no significant statistical difference. The results of testing the flexibility of spinal muscular chain were satisfactory, where the participants had an average gain of 6.5 cm (Table 2).



Table 2. Results of testing the flexibility of spinal muscular chain (the finger-floor distance in cm).

	Before	*After	P
Average Values	14,8	8,23	<0,01
Difference in relation to <i>Before ITP</i>			

Discussion

The functional and postural re-education for the elderly through the method of Isostretching is a physical therapy rehabilitation method, that proves to be effective in preventing deleterious effects of aging bringing many benefits to health and quality of life of these individuals.

The Isostretching acts primarily in the spine, favoring its stretching and strengthening, as the exercises proposed by the technique strengthens the various muscles, especially those that support the spine, increasing flexibility and functional capacity (Redondo, 2001).

The improvement of body posture obtained in this experiment after 20 sessions of ITP alleviated pain in the spine, a common complaint among the elderly study participants. Our findings corroborate the findings of Moraes and Matthew (2005), which demonstrated the efficacy of that protocol in the treatment of thoracic hyperkyphosis (a several change in the column) in a patient 9 years old carrying the disease, which was submitted to 10 sessions of this technique, which shows that the method Isostretching acts primarily in the spine, as proposed by Redondo (2001).

We believe that such responses are due to the fact that the abdominal muscles are stabilizers of the spine and within that context, during the performance of postures Isostretching, the isometric contraction of abdominal muscles is always requested together with the correct positioning of the pelvis, to encourage stabilization of the spine. In this condition the activation of the abdominal muscles held by the protocol tested in this study resulted in the strengthening abdominal, a fact reported by study participants. Our results agree with those of Carvalho (2008) also showed greater activation and abdominal neuromuscular control, improving the performance of motion in consequence to stabilize the trunk in adult patients undergoing a ITP.

It is noted that with the combination of re-education spinal posture and strengthening the abdominal muscles, stabilizing the spine, we obtained significant improvement of muscle flexibility of the participants of this study, which also agrees with the results and Sá Lima (2003) in a case study, which applied the ITP treatment in an individual adolescents with mile idiopathic scoliosis, getting similar results of an increase in flexibility.

Our results also agree with the work described by Lopes et al (2006), who obtained significant results using the ITP in the treatment of chronic low back pain. In this case the authors show the results obtained with 12 sessions of therapy and showed improved quality of life, pain, flexibility, muscular strength and even the height, because in 35% of the participants they found a growth of at least one inch due to the stimulus of self-awareness and correction of curvatures using this technique.

Regarding the changes of aging in the respiratory system, they are well detailed in the literature which demonstrates a significant role in increasing difficulty with mechanical ventilation with sedentary aging. According to Brandt et al (2004), it is known that Isostretching exercise method are capable of improving the function of respiratory muscles and therefore increase the functional capacity of individuals, by increasing the actuation diaphragm. In addition, we also observed an improvement in respiratory function of elderly volunteers in our study, which occurred because of breathing exercises which have been intensively implemented during all postures when we ask for a forced and prolonged expiration.

We believe that one of the justifications for this purpose was the adaptation of respiratory muscles developed during the prolonged expiration each posture, which promotes, among other implications, intense active recruitment of abdominal muscles during expiration. However, further studies are needed to confirm this hypothesis.

The domains "general health" and "mental health" presented no significant statistical difference. We believe that these two items have not been properly interpreted by the population because they are difficult to understand. We suggest that they are adapted to facilitate the understanding of any group of people who will participate in several studies that use the SF-36.

In the present study it was possible to evaluate the functional capacity and other physical aspects, after the application of SF-36 to the end of treatment, where we observed an improvement in score (scale 0-100 points). The results of this study led to an improved functional capacity of older individuals, which were of major parts of their body functions compromised due to the aging process. By ITP, we observed an improvement in functional capacity, which gave the best performance in elderly perform daily activities, results also reported by Carvalho (2008) to verify an increase in functional capacity of elderly patients after 10 sessions of this application postural method.

Among the many benefits of the Isostretching for elderly subjects in our study, we can highlight the increase in muscle strength in most body segments and improved body awareness provided by the method used.

These data support the findings made by Whipple (2001), that it is necessary to carry out a program of muscle strengthening exercises targeted to lower limbs to improve balance, since the weakness is in the process of senescence is natural and it may lead the individual to fall with greater frequency

Conclusion

This study allows us to conclude that, after applying the ITP in a group of elderly people, most of the areas tested showed improvement in their scores. Moreover, the technique was effective in gaining muscle posterior chain flexibility, resulting in improved quality of life of participants reported improvements in the items: "functional capacity", "limited by the physical", "pain", "vitality", "social" and "limitation by emotional. Further studies using the technique in different age groups will be necessary to demonstrate the effectiveness of the same in the whole population. It would also be interesting to apply the ITP at a time greater than 20 sessions, to maintain the benefits obtained.

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