

Improvement in the quality of life and pain intensity among workers with shoulder impingement syndrome after application of the Isostretching method

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ABSTRACT

Among Work-Related Musculoskeletal Disorders, the Shoulder Impingement Syndrome (SIS) is the leading cause of work disability. Aside being off work, many cases often require physiotherapy. The Isostretching method can be an alternative and can contribute to improving the quality of life of workers with SIS. **Objective:** To verify the effects of a treatment protocol based on the Isostretching method in individuals with SIS, in improving the quality of life and decreasing pain intensity. **Method:** By analyzing patient records in treatment at the occupational health clinic and other Unicamp clinics, 30 volunteers were selected and submitted to 12 physiotherapy sessions with the Isostretching method for 6 weeks. The volunteers were evaluated before and after the proposed protocol using the SF-36 quality of life questionnaire and a visual numeric pain scale. Data was analyzed using (ANOVA) variance analysis, which was performed using software R, version 2.12.0. **Results:** The results of the SF-36 quality of life questionnaire showed statistically significant differences ($p < 0.05$) in most areas. In the visual numeric scale from zero to ten, the average value was 6.63 points pre-treatment and 3.23 post-treatment, which was significant ($p < 0.05$). **Conclusion:** The proposed protocol was effective in improving the quality of life and in reducing pain in the group of volunteers studied.

Keywords: pain, quality of life, shoulder impingement syndrome, workers

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INTRODUCTION

In recent decades, the discussion on the relationship between work activities and the appearance of musculoskeletal pathologies known as work-related osteomuscular disorders (WROD) has intensified, since these pathologies are more prevalent and characterize a universal phenomenon of great proportions.¹⁻⁴

The WRODs are difficult to diagnose and treat, they have a high index of re-occurrence, and are reported as the second cause of morbidity in the adult population of various countries, including Brazil.⁵ Work-related osteomuscular disorders are the main cause of work disability among insured Social Security users, with almost 100 thousand new cases a year in Brazil, which corresponds to 26% of the total benefits provided this year by Social Security.⁶ These cases are the consequence of the inappropriate and chronic use of a delicate mechanism, which is the upper limb.⁵

Among the WRODs, the Impingement Syndrome (IS) is what most afflicts Brazilian workers, being responsible for a great number of pain complaints related to shoulder movements and work disability. According to statistics, shoulder injuries (classified as M-75 by the CID-10) are responsible for 21% of the benefits paid out by Social Security.⁶

In 1972, Charles Neer described the Impingement Syndrome pathology, and its relationship to the degeneration of the rotator cuff. According to the author, the elevation of the upper limb occurs generally in flexion, and not in abduction, that is, the impingement occurs against the anteroinferior portion of the acromion, the coracoacromial ligament and the acromioclavicular joint.⁷⁻¹⁰

The Impingement Syndrome is defined as a "painful syndrome of the shoulder, of a micro-traumatic and degenerative nature, possibly accompanied by loss of strength, and characterized by RC tendinitis, with possible partial or total rupture of one or more tendons, depending on the clinical phase of the disorder. The tendon of the supraspinal muscle is the initial location of the pathology in practically all cases".⁸

Due to the chronic nature of the disorder and to physical and psychosocial factors involved, WROD treatment is complex and requires a multiprofessional approach and focus. The treatment must promote the social reintegration and quality of life of those so afflicted. These professionals must work together, striving for the complete rehabilitation of the

worker. The physiotherapist is an integral part of the multidisciplinary team, either helping to reduce the pain or improve the quality of life by using kinesiotherapy and manual therapy techniques.¹¹

After confirmation of the diagnosis, the worker must go on sick-leave, start receiving treatment, and avoid activities that overload the upper limbs. There are many controversies about which type of treatment would be more suitable for IS cases, whether conservative or surgical. The tendency is towards a conservative treatment, except in cases of total rupture of the supraspinal tendon. It is known that many IS patients respond favorably to conventional treatment, and some studies show success in approximately 70% of the cases.¹² The conservative treatment is indicated in cases of inflammation in Neer phase 1, where there are edemas and hemorrhages, and in phase 2, characterized by fibrosis and tendinitis, while surgical intervention is restricted to phase 3, where there is complete rupture of the Rotator Cuff, biceps tendon, and bone alterations.^{10,13}

Isostretching is a physiotherapeutic method created in France by Bernard Redondo, based on the *Gymnastique d'Equilibre* technique. It is a technique where the proposed exercises allow general work, considering the positioning, the state of contraction or stretching of the various segments of the body.¹⁴

The technique uses "straightening of the body", through static postures, focusing more on the spine, since that is the axis and starting point of imbalances in all the bodily structures. Starting with the choice of a posture, the Isostretching method demands the placement of the limbs in tension through isometric contraction (especially abdominals, gluteus, leg muscles, and the scapular belt), the mobilization of the pelvis in the vertical direction of growth, the stretching of the leg muscle chains, and spinal alignment—all exercises performed with maximum attention and intensity, but respecting individual limits and capacity.¹⁴

OBJECTIVE

The objective of this work was to verify the effects of a treatment protocol based on the Isostretching method, in patients with Impingement Syndrome, in relation to their improvement in quality of life and reduction of pain intensity.

METHOD

This is a longitudinal intervention study, submitted and approved by the Research Ethics Committee of the Medical Sciences College of the University of Campinas (CEP/FCM/UNICAMP).

In this study, 30 subjects participated, referred from the Work Medicine Clinic (HC/UNICAMP), Shoulder Clinic (HC/UNICAMP), and from the Physiotherapy department at the Community Medical Service (CECOM/UNICAMP), and who met the inclusion criteria: volunteer workers who signed the Free and Informed Consent Form, and who showed Neer phase 2 Impingement Syndrome of the shoulder.

All the subjects, regardless of their origins, received a physiotherapeutic evaluation before starting the treatment protocol. The evaluation consisted of general physical exam, and palpation of the shoulder or shoulders afflicted, and the performance of specific maneuvers and tests: Neer, Jobe, and Apley. Those who had at least two positive tests were considered suitable to participate in the treatment protocol.

The Neer test detects the Impingement Syndrome. The upper limb of the subject is raised passively, rotated medially, and abruptly flexed upwards (the examiner is positioned behind the patient). This test reduces the space while moving the greater tubercle against the acromion. The test will be positive if the subject reports pain. The Jobe test evaluates the supraspinal muscle tendon, in this maneuver the individual raises the arm in abduction of 90° (thumb down) and the examiner resists the abduction. It will be positive if there is pain or weakness.^{15,16} Finally, the Apley test evaluates the tendinitis of the rotator cuff. The subject is asked to reach behind his head to the superomedial angle of the counter-lateral scapula. This test is positive if there is pain or inability to make the movement.¹⁶

Excluded from the study were subjects with an IS diagnosis on Neer phases 1 or 3, type 3 acromion (or hooked), history of shoulder trauma (not related to work activity), cervical radiculopathy, previous treatment with Isostretching method, and those who did not sign the Free and Informed Consent Form.

The subjects were scheduled for data collection through their completion of an anamnesis (personal data of the volunteers, their situation in the work market, and physical exam), and their answers to the Quality of Life questionnaire (SF-36) and the Visual Numeric

Scale (VNS) for pain, whose score ranges from zero (no pain) to ten (intense pain). The questionnaires were reapplied at the end of the treatment protocol. The initial and final evaluations of the volunteers were made by different researcher, so that the researcher who performed the treatment protocol did not have access to that data during the study, thereby guaranteeing impartiality in the results.

During the initial interviews, the difficulty of the participants to commute from their cities of origin became evident. Because of that, the sample came together by convenience due to the difficulties in gathering subjects. The treatment protocol lasted 6 weeks, and the sessions were done twice a week, totaling 12 sessions. Those who completed at least 10 sessions were included in the study. Each session lasted from 40 to 50 minutes.

In the application of the Isostretching method, each session was divided into 3 moments: warm-up, postures, and relaxation. The postures were selected and adapted based on treatment protocols that showed good results in patients with IS;¹⁷⁻²¹ that is, those techniques were used that worked most movements in the glenohumeral articulation and that achieved improvement in the joint amplitude, strength, in the QV, and reduced pain. In addition, the postures chosen did not use a bat or a ball, so that when reproduced, the treatment protocol could be applied in any situation. The protocol consisted of 8 postures, 6 standing, one seated and one lying down, and whose choice was based on physical evaluation, and adapted so that all the subjects could do it (Figure 1).

Depending on the initial posture chosen, the application of the Isostretching method demands that the limbs be placed in tension, the mobilization of the pelvis in the vertical direction of growth, the stretching of the muscular chains of the lower limbs, and an alignment of the spine. The duration for maintaining the posture is a deep and long exhalation of about 6 seconds. After each exhalation, the tension is just relaxed; that is, the isometric contraction, which is either static or sustaining, without the macroscopic change of articulation angle, and without modifying the base position.¹⁴

The statistical analyses were made in the software R (version 2.12.0). The SF-36 raw scale for each one of the eight domains was calculated according to orientation of the instrument. The original value of the analog scale pain was studied. The descriptive analysis ob-

served the averages and standard deviations of the measurements collected before and after the physiotherapeutic treatment. The efficiency of the treatment was verified through the comparison of variables in the measurements collected beforehand and afterwards, which were studied through a variable analysis (ANOVA), with all the instruments cited above, considering as statistically significant, the measurements that obtained a *p*-value lower than 0.05 in the F test, to verify the real ratio between the variables of the values obtained before and after the treatment, that is different from one.

RESULTS

The sample was formed of 30 participants: 16 males and 14 females, with average age of 45.56 (± 8.35) years.

As for their careers, half of them were from the service industry. Even with IS, most (70%) were still working in the same function; that is, they performed the same activity as before the onset of IS. Despite the evidence of work activities triggering and aggravating injuries to the upper limbs, the workers who remained active were not changed to another function or activity, a fact that perpetuates and worsens the disorder, their working capacity, and their quality of life. As for the afflicted shoulder, 56% had a lateral affliction; 40% only in the right shoulder, and one worker in the left shoulder. This corroborates the data found referring to the dominant limb, since 87% of the volunteers were right-handed, indicating the relationship between the afflicted and the dominant limb.

Throughout the six weeks of treatment, there was a commitment from the physiotherapist, who fulfilled his dates and appointments, and from the volunteers, who did not miss the sessions. This contributed to the reduced number of dropouts and to the adherence to the treatment: 30% participated in all sessions, 30% participated in 11 sessions, and 40% participated in 10 sessions.

For the quality of life evaluation, a summary of the data analysis obtained in the eight SF-36 domains is described in Table 1. In the Functional Capacity domain, the average value obtained in the score before treatment was 51.7 (± 21.5), while after treatment it was 68.2 (± 19.4), and such difference was statistically significant (*p* = 0.003).

In the Physical Aspects domain, the average score obtained before and after treatment

was 25 (± 31.4) and 47.5 (± 34.9), respectively. This difference was statistically significant (*p* = 0.011).

As for the Pain domain, which evaluates the presence of severe and limiting pain, or its absence, in addition to the limitations stemming from pain; before treatment the average value obtained was 37.4 (± 18.3), and after treatment, the average value was 59.2 (± 18.7). This difference was also statistically significant (*p* = 0.00), which corroborates the results obtained in the pain VNS, described below.

For the General State of Health domain, related to personal health and the perspective of the individuals on their own health, the results obtained were not statistically significant (*p* = 0.66).

The Vitality domain, which measures the level of energy and fatigue, the values of 49.8 (± 25.1), obtained before treatment, and 67.5 (± 20.2), after treatment, show a statistically significant difference (*p* = 0.004).

The Social Aspects domain measures the interference of physical and emotional problems in social activities. The values obtained pre and post-treatment were 57.5 (± 31.2) and 76.3 (± 22.5), respectively, and they were also statistically significant (*p* = 0.010).

The Emotional Aspects domain evaluates the interference of emotional factors related to work and daily activities, the difference, 46.7 (± 48.4) before treatment and 71.1 (± 41.7) after treatment, was statistically significant (*p* = 0.041).

The Mental Health domain measures the presence, permanence, or even the absence of depression, nervousness, peace, and happiness most of the time, and also showed statistically significant differences (*p* = 0.004), considering the values obtained pre 55.9 (± 24.5) and post-treatment 55.9 (± 24.5).

In relation to the pain intensity perception, the subjects of the study should consider the pain they were feeling that week, on a numeric scale (from 0 to 10) for pain intensity. The average value found, described in Table 2, varied from 6.6 points (± 1.8) before the treatment to 3.2 (± 1.9), which confirms the subjective improvement of the workers in relation to pain.

DISCUSSION

Impingement Syndrome is responsible for functional and social losses in adult individuals. A physiotherapeutic intervention is

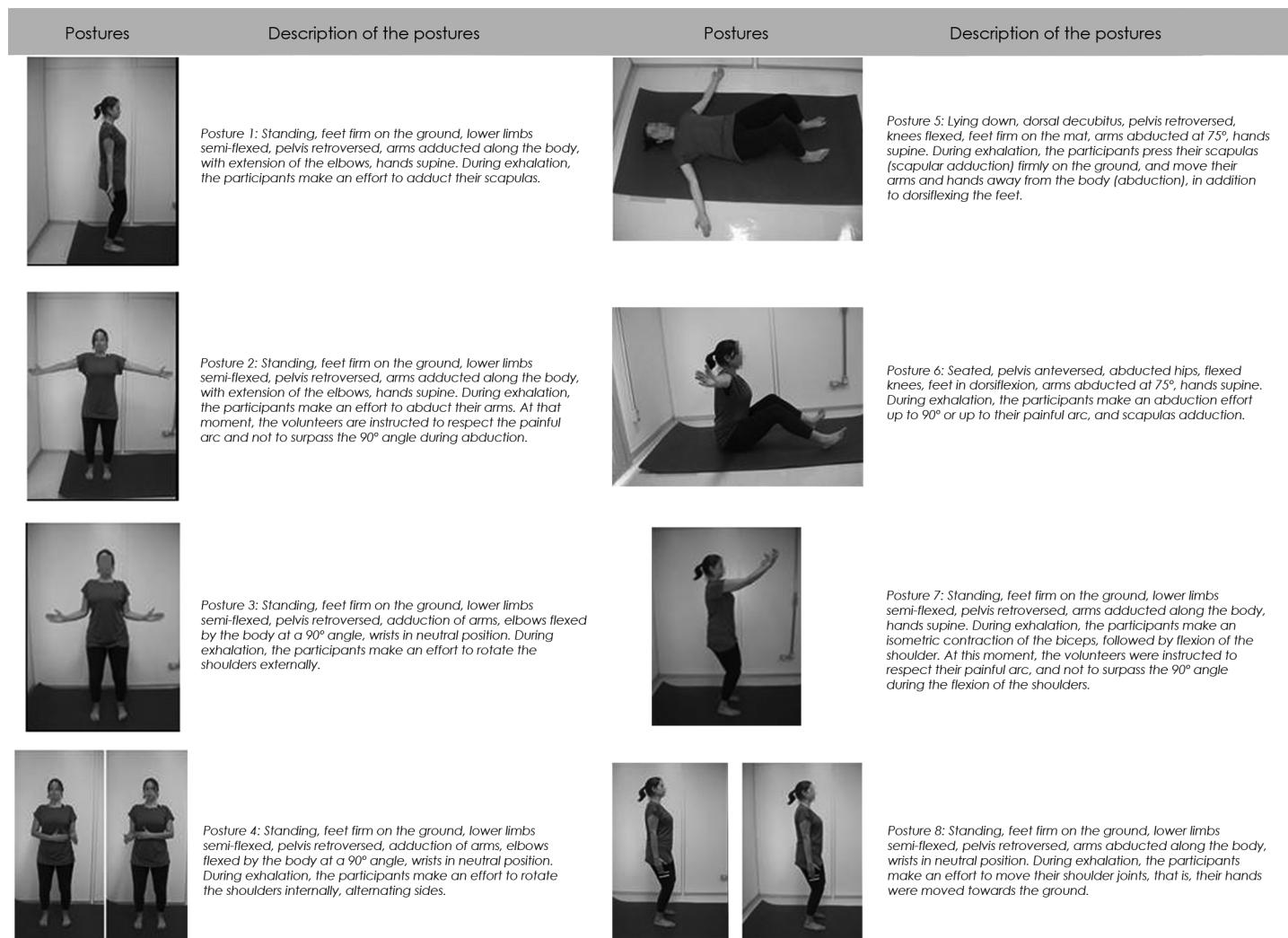


Figure 1. Postures adopted in the treatment protocol

fundamental to the treatment, for it improves the muscular balance of the region, increases the functionality of the afflicted limb, and makes it possible to return sooner to one's daily life activities, also reducing pain.²²

In addition, the physiotherapeutic intervention seeks new methods that will enrich and improve the efficacy and efficiency of the treatment, and which may contribute to a better Quality of Life for IS sufferers.

Analyzing their anamneses, it was confirmed that most workers (70%) kept working in the same function, even after being diagnosed with IS. Due to this excessive number, it was necessary to include them in a rehabilitation program with stretching and strengthening exercises for the scapular belt, so that they could continue their necessary daily and work activities.

Regarding this need to strengthen the muscles of the region, it is known that with conventional treatment, pain occurs and postpones rehabilitation. Although it is the most indicated and efficacious way to improve the function of the upper limb in individuals with IS, kinesiotherapy based on isotonic exercises, is controversial in the treatment of subacromial impingement, because the exercises promote conflicts in the inflamed area against the stenosis points, and consequently, the program needs to be interrupted or followed more slowly for those individuals who feel pain during therapy.^{23,24}

By the results obtained in this study, it was observed that Isostretching can be an option to the conventional therapy, providing rehabilitation for individuals with IS. The

isometric exercises for the scapular belt with Isostretching show satisfactory effects, without using the isotonic abduction and flexion movements of the musculature involved, which would cause a greater impingement on the subacromial region and increase the local pain, hindering the therapy process itself.

Melchior confirmed in a study using the Isostretching method in females who had deficient amplitude of movement while flexing and abducting the shoulder joint. Due to the limitations of conventional therapy for the treatment of shoulder IS, the author chose to use Isostretching as a way to add a new treatment instrument.²⁵

Therefore, therapy with Isostretching, besides promoting the isometry of the supraspinal, infraspinal, subscapularis, and teres minor

Table 1. SF-36 questionnaire results, pre and post-treatment

Domain	Phase Treatment	Minimum	Average	Maximum	p-value
Functional capacity	Pre	20	51.7	100	0.003*
	Post	15	68.2	100	
Physical aspects	Pre	0	25.0	100	0.011*
	Post	0	47.5	100	
Pain	Pre	20	37.4	100	0.000*
	Post	30	59.2	100	
General state of health	Pre	20	54.2	95	0.066
	Post	10	65.0	100	
Vitality	Pre	5	49.8	90	0.004*
	Post	25	67.5	90	
Social aspects	Pre	0	57.5	100	0.010*
	Post	25	76.3	100	
Emotional aspects	Pre	0	46.7	100	0.041*
	Post	0	71.1	100	
Mental health	Pre	20	55.9	88	0.004*
	Post	28	73.1	100	

* $p < 0.05$ - statistically significant difference**Table 2.** VNS result for Pain, pre and post-treatment

	Treatment phase	Minimum	Average	Maximum	p-value
VNS for Pain	Pre	2.00	6.63	10.00	0.000*
	Post	0.00	3.23	8.00	

* $p < 0.05$ - statistically significant difference

muscles, favoring the external and internal rotations, flexion and abduction movements, makes it possible to work with the rhomboid muscle that will help in the adduction of the scapula to optimize the scapulohumeral rhythm, facilitating shoulder mobility.²⁶

According to the SF-36 questionnaire results, it is possible to confirm that there was improvement in the subjects' perception as to quality of life, after the application of the Isostretching method. Meanwhile, the high values for standard deviation in the comparison between pre and post-treatment is justified by the non-homogeneity of the sample. An improvement in referred pain was also observed according to the VNS, results that corroborate other studies based on exercises for the treatment of IS and that also used the VAS for pain to evaluate the efficacy of the treatment.^{12,18,27-29}

This study showed that using the Isostretching method, a global postural gymnastic, improved Quality of Life, according to the SF-36 questionnaire criteria, and reduced the pain perceived by the subjects with shoulder Impingement Syndrome who participated in the study. The method is seen as an alternative

to the traditional methods of physiotherapy where a segmented focus predominates, only concerned with the region of the body affected, to the detriment of holistic care in the treatment and view of the body as a whole.

Studies show that the rehabilitation program based on motor control and strengthening exercises is efficacious, but did not report any difference in pain after a supervised exercise program with stretching and isometric strengthening. Individuals who felt pain during the strengthening exercises had their exercises interrupted or progressed more slowly than expected. Thus, kinesiotherapy showed little value, for the exercises can trigger conflicts in the inflamed area. Patients treated with kinesiotherapy were not able to perform abduction with internal rotation without increasing pain, and also had their treatment suspended. They must, nevertheless, be introduced into an appropriate phase to avoid the reoccurrence of pain.^{23,24,30}

This is how the Isostretching method can be a viable alternative that promotes autonomy and empowerment for individuals with shoulder Impingement Syndrome. It is important to note that the high adherence to the

treatment can indicate the satisfaction of the subjects with the exercises and their results. With the reduced number of participants, the non-homogeneity of the group studied, and the absence of a control group may have influenced the statistical interpretation of the data, for these factors were limitations to this study.

CONCLUSION

Through the application of the Isostretching Method, an improvement in quality has been observed, as well as in the level of referred pain of the volunteers in this study. Thus, this method can be an alternative to traditional physiotherapy methods.

Due to the limitations presented, we recommend broadening this study as to the number of participants, so that the Isostretching Method may be validated as a therapeutic alternative in the treatment of shoulder Impingement Syndrome.

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