

Effect of Global Postural Re-Education and Static Stretching on Pain and Disability in Women with Chronic Non-Specific Neck Pain- A Comparative Study

Sneha Somarajan 1 , Dr. Dharti Hingarajia 2

¹Assistant Professor, Masters of Musculoskeletal sciences, The Shrimad Rajchandra College of Physiotherapy, Uka Tarsadia University, Maliba Campus, Bardoli, Gujarat, India, ² Sr. Lecturer, Masters of Musculoskeletal and Sports, SPB Physiotherapy College, VNSGU, Surat, Gujarat, India

Abstract

Background: Women are more likely to develop and suffer from chronic non specific neck pain than men. Cervical muscle imbalance is considered an important factor to cause chronic non specific neck pain and disabilities during work, sport or daily activities. GPR is an option to manage postural deviations, treating aches and pains. The principal aim is to restore correct alignment of posture and re-establish body mechanics of the body movement to treat or prevent musculoskeletal problems.

Objective: To Compare the effect of GPR and Static stretching on pain and disability in women with chronic non-specific neck pain.

Methods: 64 female patients with chronic non-specific neck pain aged 18 to 35 years were randomly divided into two equal groups: GPR group and Static Stretching group. Both groups also received conventional therapy. Patients were evaluated before and after 4 week intervention for pain intensity (by means VAS), and for disability (by means of NDI). The treatment program consisted 3 sessions of 1-hour individual per week for 4 weeks. Data were statistically analyzed at a significance level of $p < 0.05$.

Conclusion: Statistically significant reduction in VAS and NDI were observed after 4 week intervention in both groups. However there were no significant differences observed between groups in this outcome measures. Global postural Re-education and Static stretching, in association to conventional therapy, were equally effective in reducing pain and disability in women with chronic non specific neck pain.

Keywords: GPR (Global postural Re-education); chronic Neck pain; Static stretching, Physical therapy.

Introduction

Pain is the most common symptom of which the human kind complaints. Pain from musculoskeletal system is very common internationally in modern sedentary society. Pain is defined as chronic when

persistent or regularly recurrent with duration of more than 3 months. In order of prevalence rate Overall, 58.8% (95% CI, 54.8-62.7) of women and 47.2 (95% CI, 42.4-51.5) of men had experienced neck pain in the previous 6 months.¹

Manual therapy (MT) may decrease pain and muscle spasm and provide some degree of short-term NP relief,² Manual therapy include stretching techniques for superficial cervical muscles.³ Static stretching is a commonly used method of stretching in which soft tissues are elongated just past the point of tissue resistance and then held in the lengthened position with a sustained stretch force over a period of time.⁴

Corresponding Author:

Sneha Somarajan

Assistant Professor, the Shrimad Rajchandra College of Physiotherapy, Uka Tarsadia University, Maliba Campus, Bardoli- Mahuva Road, Tarsadi- 394350, Dist: Surat, Gujarat, India

E-mail: Sneha.scorpio92@gmail.com,

Mobile no: +91- 8980360537

‘Global Postural Re-education’ (GPR) is a physical therapy method developed in France by Philippe Emmanuel Souchart. It is based on a central concept that postural muscles are organized to act in concert with each other as “muscle chains” located anterior and posterior to the spine.¹ It has been hypothesized that specific clinical pre sensations are caused by “muscle chain retractions” associated with Neck Pain.⁵

Global postural re-education aims to stretch and elongate these muscles, which are shortened state, by enhancing of antagonist muscles to promote improve muscle balance and postural symmetry.⁶ Based on the existence of muscle chain didactically divided into posterior and anterior chains,⁷ the method proposes global stretching of antigravity muscles.

Although the method is often clinically practiced, very few studies were found on its efficacy in neck pain and its comparison with individual manual static stretching. In view of the incidence of neck pain and its consequences, especially in women, the purpose of the present study was to compare the effects of two kinds of stretching, GPR and static stretching in relieving pain and disability in female patients with non-specific chronic neck pain.⁸

Methodology

An approval for the study was obtained from the Institutional Ethical Committee. An Experimental study was conducted in subjects with Women with chronic non-specific neck pain SPB Physiotherapy College, Surat. Sample was achieved by Purposive sampling method. A total of n=64 subjects were selected. All the subjects were screened for inclusion Criteria i.e,Volunteers from S.P.B Physiotherapy College were considered for inclusion in the study if they met the following criteria:18-35 years of age of women, on specific neck pain diagnosis by orthopedician, Pain lasting for over 3 months, Patients with Neck Disability Index (NDI) score less than 24/50. Subjects excluded History of significant trauma to the cervical spine, fracture and dislocation of cervical spine, history of Vertigo, Disease of spinal cord, Inflammatory or infective arthropatheis of the vertebral column,Neurological signs and symptoms. Informed consent for participation of subjects in the study will be obtained. Demographic data, BMI, of all the patients was recorded. They were randomly allocated in to two

groups by sealed envelope method. **Group A:** This was consist of 32 patients and they had undergone GPR and conventional. **Group B:** This was consisting of 32 patients and they had undergone Static Stretching and conventional. Before the beginning and after the 4 week intervention period, all patients were evaluated in the following outcome measures. Pain measured in a 10 cm Visual Analog scale. VAS is a 10 cm line with pain descriptors marked “no pain” at 1 end and “the worst pain imaginable” at the other⁹. Disability measured by NDI scale. NDI scale is a questionnaire designed to help us better understand how your neck pain affects your ability to manage everyday life activities¹⁰.This same sequence was maintained throughout the study

Interventions:

All the patients attended 1 hour 3 physical therapy sessions per week for 4-week period.

GPR Group A: Patient in this group received muscle chains stretch as described by Marques keeping two stretching postures for 15 minutes each¹¹.

In order to stretch **the posterior muscle chain** (upper trapezius; levator scapule, suboccipitalis, erector spinae, gluteus maximus, ischiotibialis triceps surae & foot intrinsic muscles), the patient will lie in the supine position with the occipital, lumbar , and sacral spine stabilized, with lower limbs at 90° hip flexion and perform gradual knee extension. The posterior muscle chain stretch: (A) Supine posture with leg flexion progression: posterior muscle strain stretching Starting position. (B) Supine posture with leg flexion progression: posterior muscle chain stretching Final position¹¹

In order to stretch **the anterior muscle chain** (diaphragm, pectoralis minor, scalene, sternocleido mastoid, intercostalis, iliopsoas, arm, forearm and hand flexes), the patient lies in the supine position with upper limbs abducted at 30° and forearms supine. The anterior muscle chain stretch: (A) Supine posture with leg extension progression: anterior muscle chain stretching Starting position. (B)Supine posture with leg extension progression: anterior muscle chain stretching Final position¹¹

The pelvis will be kept in retroversion, while lumbar spine remains stabilized. Hips will be flexed abducted

and laterally rotated, with soles of feet touching each other.

Gradually, suspecting the patients limits, the lower limbs will be extended as much as possible while maintaining the tibiotarsal angle at 90°.

Static Stretching Group B:

Patients in this group received stretching of, forearm supinators and paravertebral muscles.¹² upper trapezius, and back of the neck, pectoralis, major and minor, rhomboids, finger and wrist flexors, and forearm pronators. Each stretch was passively repeated twice for 30 seconds and done slowly at normal breathing rhythm and with no compensation allowed. The total stretching time will be equivalent to that of the GPR group.

Conventional Protocol:

Conventional therapy was given for 30 minutes in each session. Repetitions and 10 sec hold and 2 minutes rest period administered between each exercise.

Exercises included were: Isometrics exercises of Cervical flexors, extensors, lateral rotators (right and left), side flexors (right and left). On neck region Hot

pack for (20minutes).

Statistics Analyses

Statistical analysis was done using SPSS version 15 software. Baseline characteristics were compared to check homogeneity between intervention groups. Paired t-test was used to analyze the pre and post intervention differences within each group and independent t-test was used for between groups comparison. Confidence interval was kept 95% and the level of significance for all statistical data was set $\alpha=0.05$. Total 64 patients were recruited

Results

Total 82 patients were assessed for eligibility. Sixty four patients were enrolled in the study and randomized to one of the treatment group (32 in GPR group and 32 in SS group). Mean age of participants in GPR was 21.65 ± 3.38 , and of SS group was 26.43 ± 6.07 . For GPR group Minimum Age was 19 and Maximum Age was 30 and for SS Minimum Age was 20 and Maximum Age was 35. One patient from GPR and two from SS group discontinued intervention in between. Outcome measurements were completed on 61 participants (31 in the GPR group and 30 in the SS group) after 6 week of intervention.

Table:1 Baseline characteristics of subjects

VARIABLE	GROUP A	GROUP B	P value
	Mean \pm SD	Mean \pm SD	
AGE (Years)	21.65 \pm 3.38	26.43 \pm 6.07	0.62
BMI (kg/m ²)	21.74 \pm 3.39	25.64 \pm 4.35	0.38
DURATION (Week)	13.10 \pm 1.59	15.30 \pm 8.93	0.18
PRE VAS (Cm)	4.53 \pm 1.15	4.81 \pm 1.21	0.36
PRE NDI	15.43 \pm 3.43	16.73 \pm 3.27	0.13

The GROUP A receiving GPR Intervention with mean age of (21.65±3.38) and mean pre VAS and pre NDI score of (4.53±1.15,15.43±3.43), GROUP B receiving GPR intervention with mean age of (26.43±6.07) and mean pre VAS and pre NDI score of (4.81±1.21,16.73±3.27). All two groups were matched in term of age, BMI, duration in week, VAS, NDI. The baseline characteristics were equivalent across the intervention groups ($p>0.05$).

Age Distribution

Table:2 MEAN AGE DISTRIBUTION OF CHRONIC NON SPECIFIC NECK PAIN

GROUP	N	MEAN AGE (IN YEARS)	SD
GROUP A	32	21.65	10.82
GROUP B	32	26.43	13.21
TOTAL	64	24.04	12.02

The table displays the statistics of age distribution among 61 chronic non specific neck pain patients

INTRA GROUP COMPARISON OF TWO OUTCOME MEASURES

Paired t-test was used to compare the Pre-intervention values of outcome measure i.e. VAS and NDI with and post intervention values with the groups.

Table:3 Intra-Group comparison of mean of VAS, and NDI score before and after 4 weeks intervention using paired t test.

VARIABLE	GROUP A (GPR)		P-Value	GROUP B (NDI)		P-Value
	Pre - Intervention Mean ± SD	Post - Intervention Mean ± SD		Pre - Intervention Mean ± SD	Post - Intervention Mean ± SD	
VAS	4.53±1.15	0.65±0.63	0.000	4.81±1.21	1.29±0.50	0.000
NDI	15.41±3.43	1.54±2.06	0.000	16.7±3.27	3.66±2.24	0.000

Table shows GROUP A Mean of Pre VAS (4.53±1.15) and Post VAS (0.65±0.63) $p<0.05$ and Mean of Pre NDI (15.41±3.43) and Post NDI (1.54±2.06) $p<0.05$. In GROUP B Pre VAS (4.81±1.21) and Post VAS (1.29±0.50) $p<0.05$ and Mean of Pre NDI (16.7±3.27) and Post NDI (3.66±2.24) $p<0.05$. There is significant difference between pre and post VAS and NDI in GPR and SS group.

INTER GROUP COMPARISON OF OUTCOME MEASURE

Table:4 Inter group comparison of mean difference value of VAS and NDI of two groups using independent t test.

VARIABLE	GROUP A (GPR)	GROUP B (SS)	P VALUE
	Post-Pre Diff (Mean ± SD)	Post-Pre Diff (Mean ±SD)	
VAS	-3.96 ±1.0	-3.52±1.0	0.93
NDI	-13.87±3.10	-13.06±2.49	0.27

A comparison of the mean difference of VAS and NDI between two groups was done using independent t-test. It was carried out to analyze is there any significance between two groups and to find out the effective to improve the pain and disability in chronic non-specific neck pain patients. For VAS Mean difference of GPR is (-3.96±1.0), (-3.52±3.1) and $p>0.05$. For NDI Mean difference of SS is (-13.87±3.10), (-13.06±2.49 and $p>0.05$. No significant differences were observed between the groups for both outcome measures.

Discussion

The present results indicate that both GPR and static stretching, in association with conventional therapy were effective in reducing pain and improving disability in patients with chronic non specific neck pain, with no significant differences between groups.¹⁰

In the present study, the choice of associating stretching to *pompage* was due to the latter being a safer form of manual therapy compared to joint manipulation, wherein adverse effects are rarely seen. According to Bronfort et al,¹² frequent adverse effects include pain worsening, discomfort, dizziness, visual disturbance, and ear symptoms.

According to Wang et al,¹³ Bronfort et al,¹² and Evans et al,¹⁴ patients who performed exercises and had manual therapy exhibited higher levels of satisfaction and performance when compared to patients who only received manual therapy.

Our results did not show differences between groups, that is, between the two kinds of stretching.

Each stretching modality has specific features. Global or muscle chain stretching is active and requires the patient's perception and concentration under a trained therapist's supervision, whereas conventional stretching is simpler and may be passive or auto-passive and easily learned. Nonetheless, the two stretching programs produced equivalent results.¹⁰

It might be argued that the stretching time is different in both programs; however, the total stretching time was equal in both groups, and there are no studies that suggest that a longer duration (15 minutes) of stretching is more effective than a shorter one (30 seconds).¹⁰

The balance between groups may also be explained by the fact that, while in GPR, the stretch force is slowly and gradually distributed along the muscles that make up the muscle chain, while in static stretching, the force is more intense but focused and for a shorter period of time. In both cases, the same process, that is, visco-elastic stress relaxation¹⁷ takes place, and muscles are maintained in a static elongated position, regardless of the type of stretching.

Furthermore, the similarity of observed results may be due to the fact that both stretching regimes were performed under the supervision of the same therapist, with the same care and according to the same principles: keeping a regular breathing rhythm with no inspiratory block, never provoking pain, and avoiding compensations; that is, while a muscle segment is being stretched, the compensating shortening of other distant muscles is not allowed.¹⁰

This explanation might also account for the similar results obtained by Rosário et al¹⁵, Cabral et al⁷² and Maluf¹⁸ who also compared the two kinds of stretching and found them to be equally effective.

Our results are similar to those by Cunha et al, who found no significant differences on pain, range of motion and quality of life comparing conventional static stretching and GPR in patients with chronic neck pain.

However, these results are different from those by, Francesca Bonetti who found significant difference in outcomes comparing GPR and stabilization exercise in chronic low back pain. The reasons for these differences may be related both to the areas affected by spinal pain, and to the fact that GPR might be more effective when compared to analytical stabilization, although not superior to other stretching techniques.

A literature review⁴ concluded that the GPR method has been shown to be an effective treatment technique for musculoskeletal diseases. One more study comparing muscle chain and conventional stretching¹⁶ with results that favor GPR was found in literature. Unfortunately, those findings cannot be compared to the results obtained in this study since patients in that study had ankylosing spondylitis.

Global postural re-education may be a gentle option to propose movement without pain, enhance relaxation via respiratory rhythm, and offer a positive experience of body posture modification. This approach to a clinical encounter can influence not only the “posture” but also the negative feelings and beliefs that are frequently associated with chronic pain.¹¹

This study has limitations, such as we included only female patients, an absence of a control group, and the short follow-up period. Patients were also told not to change their usual medications, which may have helped in reducing pain. At the end of treatment, 90% of subjects reported a reduction in medication usage.¹⁰

The results of this study are easily generalizable in common clinical practice due to the inexpensive interventions, equipment, and setting involved. Moreover, the characteristics of the participants are similar to those of individuals who are normally seen for physical therapy management of NP.¹¹

Conclusion

Global postural Re-education and Static stretching, in association to conventional therapy, were equally effective in reducing pain and disability in women with chronic non specific neck pain.

Conflict of Interest: None.

Source of Funding: Self.

Ethical Clearance: The ethical clearance was obtained from the Institutional ethical committee South Gujarat medical education and research center SPB physiotherapy college under VNSGU.

References

1. Cote Pierre, J. David Cassidy and Linda Carroll. The Saskatchewan Health and Back Pain Survey: The Prevalence of Neck Pain and Related Disability in Saskatchewan Adults. *Spine* 1998; 23(15): 1689-1698.
2. Guzman J, Haldeman S, Carroll LJ, et al; Bone and Joint Decade 2000–2010 Task Force on Neck Pain and Its Associated Disorders. Clinical practice implications of the Bone and Joint Decade 2000–2010
3. Task Force on Neck Pain and Its Associated Disorders: from concepts and findings to recommendations. *Spine (Phila Pa 1976)*. 2008; 33 (4 suppl):S199–S213.
4. Häkkinen A, Salo P, Tarvainen U, et al. Effect of manual therapy and stretching on neck muscle strength and mobility in chronic neck pain. *J Rehabil Med*. 2007; 39: 575–579
5. Teasell RW, Shapiro AP & Mailis A (1993) Medical management of whiplash injuries. *Spine: State of the Art Reviews* 7: 481–499
6. Vanti C, Generali A, Ferrari S, et al. General postural rehabilitation in musculoskeletal diseases: scientific evidence and clinical indications [in Italian]. *Reumatismo*. 2007; 59: 192–201.
7. Bonetti F, Curti S, Mattioli S, et al. Effectiveness of a “Global Postural Reeducation” program for persistent low back pain: a non-randomized controlled trial. *BMC musculoskelet Disord*. 2010; 11: 285.
8. Kisner C, Colby LA. Exercícios terapêuticos - fundamentos e técnicas. São Paulo: Manole; 1992

9. Marques AP. Cadeias musculares; um programa para ensinar avaliação fisioterapêutica global. São Paulo: Manole; 2005
10. Ana Claudia Violin Cunha¹, Thomaz Nogueira Burke¹¹, Fabio Jorge Renovato Franca¹¹, Amelia Pasqual Marques¹¹. Effect Of Global Posture Reeducation And Of Static Stretching On Pain ,Range Of Motion, And Quality Of Life In Women With Chronic Neck Pain: A Randomized Clinical Trial. Clinics 2008;68(6):763-70
11. P. Pillastrini, F. de Lima e Sa' Resende, PT, PhD, Effectiveness of Global Postural Re-education in Patients With Chronic Nonspecific Neck Pain: Randomized Controlled Trial
12. Bronfort G, Evans R, Nelson B, Aker PD, Goldsmith CH, Vernon H. A randomized clinical trial of exercise and spinal manipulation for patients with chronic neck pain. Spine. 2001; 26:788-99.
13. Wang WTJ, Olson SL, Campbell AH, Hanten WP, Gleeson PB. Effectiveness of physical therapy for patients with neck pain: an individual approach using a clinical decision-making algorithm. Am J Phys Med Rehabil. 2003; 82: 203-18.
14. Evans R, Bronfort G, Nelson B, Goldsmith CH. Two-year follow-up of a randomized clinical trial of spinal manipulation and two types of exercise for patients with chronic neck pain. Spine. 2002; 27: 2383-9.
15. Rosário JLP, Sousa A, Cabral CMN, João SMA, Marques AP. Reeducação postural global e alongamento estático segmentar na melhora da flexibilidade, força muscular e
16. Fernández-de-las-Peñas C, Alonso-Blanco C, Morales-Cabezas M, Miangolarra-Page JC. Two exercise interventions for the management of patients with ankylosing spondylitis. Am J Phys Med Rehabil. 2005;84:407-19
17. McHugh MP, Magnusson SP, Gleim GW, Nicholas JA. Viscoelastic stress relaxation in human skeletal muscle. Med Sci Sports Exerc. 1992;24:1375-82.
18. Maluf SA. Efeito da reeducação postural global e do alongamento estático analítico em portadores de disfunção temporomandibular: um estudo comparativo [Tese]. São Paulo: Faculdade de Medicina, Universidade de São Paulo; 2007