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Comparison of positional release technique and post isometric relaxation technique on patients with cervicogenic headache

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To Compare the effects of positional release technique (PRT) and post isometric relaxation (PIR) technique for pain, cervical flexion /extension range of motion (ROM) and functional disability in patients with cervicogenic headache (CGH).30 patients were randomly assigned to 2 groups. Group A underwent PRT and group B underwent PIR. Intervention given for 3 weeks. Pain, neck disability index (NDI) and cervical flexion / extension (ROM) were measured after treatment. Both groups showed significant improvement in VAS and NDI. There was non-significant difference between both groups on pain, NDI and flexion cervical ROM; while there was significant difference between both groups on cervical extension in favor to group A .Both treatments were effective in reducing pain and decreasing NDI. There is no significant difference between PRT and PIR on pain, NDI and C flexion ROM while there was significant difference on cervical extension ROM in favor to group (A) .

Keywords: Cervicogenic headache, Positional release technique, Post isometric technique.

INTRODUCTION

Cervicogenic headache (CGH) is a chronic hemicranial pain in which pain is referred from the cervical spine or soft tissues of the neck (Biondi, 2005). This category of headache is presented as unilateral cephalgia, and is believed to be caused by muscul oskeletal dysfunction of the neck (Rana, 2013). It is a syndrome characterized by chronic hemicranial pain that is referred to the head from either bony structures or soft tissues of the neck (Fryer et al., 2009).

Individuals with musculoskeletal symptoms have been found have headache higher than in those w without by 4 times. (Hagen et al., 2002)

Diminished cervical ROM in the sagittal plane has been reported in subjects with CGH(Hall et al.,2004). Flexion is the most affected ROM in patients with CGH (Huber et al., 2013).

Cervicogenic headache arises primarily from musculoskeletal dysfunction in the upper three cervical segments (Sharma et al., 2014). Patients with CGHs often have tightness of upper Trapezius, the sternocleidomastoid (SCM) and suboccipitals (Treleaven et al., 1994). The deep suboccipital muscles-rectus capitis posterior major and minor, inferior and superior oblique-are reported to be a common source of headache (Fernandez-de-las-Penas et al., 2006-a). Sternocleidomastoid Muscle also has been considered as a cause of atypical tension headache whereas the source of pain is the clavicular division that produces frontal headache or earache. (Simons al., 1999 and Fernandez-de-las-Penas et al., 2006-b). Etiology of headaches remains largely unknown (Jull, 1994 and Gopal et al., 2014). Various studies have

shown associated muscle tightness, impaired strength, endurance ratio in subjects with CGH (Zito et al., 2006). Approximately 47% of the global populations suffer from a headache (Stovner, 2007) and approximately 15-20 percent of those headaches are cervicogenic (Haldeman, 2001)**.** Adults with neck pain have a higher prevalence of headache as suggested by Epidemiological researchers (Sjaastad et al, .2008). Females seem more predisposed to CGHs affecting 4 times as many women as men and the mean age of patients with this condition is 42.9 years (Knackstedt et al., 2010). The diagnostic criteria for CGH include headache associated with stiff and painful neck. Cervicogenic headaches are unilateral, starting from one side of the posterior head and neck, migrating to the front, and sometimes are associated with ipsilateral arm discomfort (Antonaci et al., 2011).

It was proved that the positional release technique (PRT) is effective in patients with cervicobrachalgia because it reduced muscle tension in upper Trapezius and decreased the musculoskeletal pain, with subsequent improvement of posture and daily life activities (Kelencz et al.,2011).The post-isometric relaxation technique (PIR) is useful in reducing tightness and trigger point pain in patients with CGH (Fernandez et al., 2007). The aim of this clinical trial is to compare between the effects of two manual treatment regimens PRT and PIR technique for pain, functional disability and cervical flexion and extension ROM in patients with CGH. Up to our knowledge, there is a lack of high quality research regarding the efficacy and effectiveness of PIR and PRT (Fryer, 2011).

MATERIALS AND METHODS

This study was conducted in the Outpatients clinic of Kafer El Sheikh general hospital to compare between the efficacy of positional release technique (PRT) and post-isometric relaxation technique (PIR) on the intensity of pain, functional disability and cervical flexion and extension range of motion (ROM) and in the treatment of patients with cervicogenic headache (CGH).All patients participated in this study were referred by orthopedic surgeons who are responsible for diagnosis of cases based on clinical and radiological examinations.

Inclusion criteria:

This study was delimited to patients of both genders, their age between 30 to 60 years old, with symptoms of CGH, Headache with neck limited ROM, and Patients had at least one tender point (TP) from these tender points of the cervical spine:

1- Anterior seventh cervical (AC7) for sternocleidomastoid muscle.
2- Posterior third cervical (PC3) for suboccipital muscle.
3- Mid upper Trapezius for upper fiber Trapezius muscle.

Exclusion criteria:

Patients having surgical procedures in the cervical spine, fractures of the spine or spinal tumors, dysfunctions in the temporomandibular joint were excluded. Headaches associated with high fever, stiff neck, or rash, problems with vision or profound dizziness also were excluded.

Treatment protocol:

Patients were randomly assigned into two groups. Written consent was taken from patients participated and falling into inclusion and exclusion criteria. Pretreatment evaluation form consisted of personal database, history, chief complaints, visual analogue scale (VAS), neck disability index (NDI) and cervical flexion and extension ROM, using Maryin OB goniometer were recorded. Patients of both groups received a hot pack for 15 min prior to PRT or MET at every Session .Every technique was repeated 3 times**.** FOR GROUP A: patients received PRT for upper trapezius. With the patient supine, we side bent the patient's head toward the TP the neck is rotated +to the opposite side, extended and side bent to the same side), then flexed the shoulder between 120^{o} and 180^{o} for 90 seconds, then the head and shoulder were returned slowly to the neutral position. For sternocleidomastoid (SGM) we sited at the head of the table, and the neck was taken into flexion with rotation to the opposite side and side bending to the same side for 90 seconds. For suboccipital (PRT): in supine lying position, the patient's head was grasped and extended moderately and laterally flexed and rotated away from the TP side. FOR GROUP (B): patients received PIR. In supine lying position Trapezius was taken to a length just short of pain, or to the point where resistance to movement is first noted (barrier), with proper stabilization of shoulder with the other hand. The patient gently contracted muscle with light resisted efforts for 15 seconds. After the effort, the patient was asked to relax and let go completely and then muscle was taken to the new barrier. Starting from that new

barrier, the procedure was repeated three times. For SGM, with the patient supine the head was moved into lateral flexion away from the side of involvement, rotation to the side of involvement, extension of the cervical spine to the thumb of the hand on the involved side is then placed onto the forehead. The patient was instructed to push upward against the thumb isometricaly for 15 seconds. After the release of the barrier gently muscle was guided to lengthen toward the floor until meeting a new barrier. The technique was repeated according the barriers found. For suboccipital muscle the patients in supine lying position and the occiput was supported with one hand and the ventral aspect of his or her shoulder was placed at the anterior aspect of the forehead. The barrier was reached by passively tuck the chain in. The patient was asked to pock the chin against the resistance (performing isometric contractions of the suboccipital muscle and held for about 6 seconds with one third of the muscular effort**.** Both protocols have continued for 3 weeks, 3 sessions per week, day every day. At the end of 9th session VAS, NDI and cervical flexion and extension ROM were recorded again.

RESULTS

Statistical analysis was conducted using SPSS for windows, version 18 (SPSS, Inc., Chicago, IL).). Prior to final analysis, data were screened for normality assumption, homogeneity of variance, and presence of extreme scores. . Group (A) consisted of 15 patients (12 females and 3 males) with mean age 45.86±8.825 years. Group (B) consisted of 15 patients (11females and 4 males) with mean age 43.66±8.39 years.Preliminary assumption checking revealed that data was normally distributed for all dependent variables, as assessed by Shapiro-Wilk test ($p > 0.05$); there were no univariate or multivariate outliers, as assessed by boxplot and Mahalanobis distance ($p > 0.05$), respectively; there were linear relationships, as assessed by scatterplot; no multi collinearity. There was homogeneity of variances ($p > 0.05$) and co-variances ($p > 0.05$), as assessed by Levene's test of homogeneity of variances and Box's M test, respectively.

Pain level:

In the group (A). Multiple pairwise comparison tests (Post hoc tests) revealed that there was significant reduction of Pain level at post treatment in comparison to pretreatment (P-value =0.0001) In the group (B) there was significant reduction of Pain level at post treatment in compare to pretreatment (P-value =0.0001).as presented in table (1).

There was no significant difference of the mean values of the "post" test between both groups with (p=0.35) while there was clinical difference and high percent of improvement in favor to group B.as presented in table (2).

Neck disability:

In group (A) there was significant reduction of NDI at post treatment in compare to pretreatment (P-value =0.0001).In group (B) there was significant reduction of NDI at post treatment in compare to pretreatment (P-value =0.0001).as presented in table (1). Between both groups, there was no significant difference of the mean values of the "post" test with (p=0.291). Additionally there was no statistical.

Significant difference of NDI between both groups while there was clinical difference and high percent of improvement in favor to group (B).as presented in table (2).

Range of motion of neck flexion:

In group (A) there was no significant difference of ROM of neck flexion at post treatment in compare to pretreatment (P-value =0.12).

Table (1): Within Group analysis of VAS, NDI, CROM.

	GROUP A				GROUP B			
	Pre-treatment	Post-Treatment	P	%Of change	Pre-treatment	Post - treatment	P	%Of change
VAS	6.73±1.33	4.33 ±1.54	0.0001*	35.66	6.3 ±1.54	3.76±1.58	0.0001*	40.31
NDI	49.33±8.83	28.16±10.32	0.0001*	42.91	43.65 ±7.54	24.06±9.73	0.0001*	44.87
Flexion	44±8.81	47.46 ±7.79	0.12	7.86	50 ±9.41	52.92±9.81	0.219	5.84
Extension	49.6 ±8	55.73±9.73	0.001	12.35	43.69 ±9.01	48.76 ±6.95	0.0005	11.6

*Significant level is set at alpha level <0.05 SD: standard deviation
MD: Mean difference p-value: probability value

TABLE (2): Between Group Analysis of VAS, NDI and C Flexion / Extension ROM.

	Mean Difference Group A	Mean difference Group B	P
VAS	2.4	2.54	0. 35
NDI	21.17	19.59	0.291
FLEXION	-3.46	-2.92	0.113
EXTENSION	-6.13	-5.07	0.041

In group (B) there was also no significant difference of ROM of neck flexion at post treatment in compare to pretreatment (P-value =0.219). As presented in table (1)**.** Between both groups: there was no statistical significant difference between both groups while there was clinical difference and high percent of improvement in favor to group A as presented in table (2)**.**

Range of motion of neck extension:

In group (A) there was significant difference of ROM of neck extension at post treatment in compare to pretreatment (P-value =0.0001). In group (B) there was also significant difference of ROM of neck extension at post treatment in compare to pretreatment (P-value =0.005). Between both groups; there was statistical significant difference between both groups (P-value =0.041) and this significant increase in favor to group A.

DISCUSSION

The purpose of this study was to compare the effects of positional release technique (PRT) and post isometric relaxation technique (PIR) on pain, neck disability and cervical ROM of flexion and extension in patients with cervicogenic headache (CGH).According to the results, both PRT and PIR improved VAS score, NDI and cervical extension ROM. Group A receiving PRT showed significant decrease in the VAS score (P =0.0001). This is in a accordance with the study done by Perreault et al., 2009 on subjects with self-reported upper trapezius stiffness and pain. They were randomly assigned to receive sham positioning treatment or PRT in a blinded study. Both PRT (d = 0.71) and sham (d = 0.40) immediately reduced palpation pain, but 24 hours after treatment they demonstrated no differences existed between groups.

The current study results are also coinciding with the study results of Albert et al., (2006) on immediate effects of PRT in the treatment of tender points (TPs) in the upper trapezius muscle and found that PRT was effective in reducing tenderness of TPs in upper trapezius muscle.

We also agree with Rameshor et al., 2014 who compared the efficacy of positional release and myofascial release therapy in tension type headache on 28 subjects for 4 week, and they found that PRT was significantly effective in treatment of tension type headache. Although they found that myofascial release is more effective than PRT in VAS and neck disability.

The current study showed significant decrease in VAS score (p =0.0001) in Group B receiving PIR. This is in accordance with a study done by Noelle, 2009 who showed the effects of MET on pain in patients with non- specific lumbo-pelvic pain and they demonstrated a decrease in VAS score. They explained that this technique may be better than others in decreasing pain for several reasons as the time it takes to administer. MET is very short (less than 1 minute). It also helps the patient to trust the clinician through physical contact with the patient, MET is isometric contraction with a low-force in a pain-free position.

In another study by Hamilton et al., (2007) MET non significantly changed the pressure pain threshold PPT of the suboccipital muscles in a symptomatic participants 90 patients (P<0.01). Compared to the control group, MET demonstrated greater mean increases in PPT and investigation of the effect of these techniques in a symptomatic population is recommended.

We also agree with Burns et al., (2006) that found an immediate increase in overall cervical ROM (approximately 4°) following the application of MET as compared with a control sham procedure in a symptomatic group with multi planar motion restrictions. These studies support the use of PIR to increase spinal ROM and improve clinical indicators of pain and disability.

According to the results, lack of improvement of flexion as the most affected ROM in patients with CGH (Jull et al., 2007) may be due to spasm of the posterior cervical muscles, including the cervical multifidus, semispinalis capitis, longissimus capitis, and the more superficial splenius capitis and cervicis that did not included by PRT nor PIR.

In a randomized double-blinded study by Hariharasudhan et al., (2014) on 90 subjects were recruited using simple random sampling from 180 community dwelling mechanical low back pain subjects. Forty-five subjects randomized into two groups. Mean age were 37 and 40 years, respectively. Moist hot pack for both groups, the first group received PRT and the second group received MET.

Outcome measures were VAS, Modified Oswestry Disability Index, and lumbar flexion (ROM) using modified Schober's test. They demonstrated that (MET) showed significant changes with all outcomes (P <0.0001) at 3 months. But PRT group showed significant changes only with Schober's test and no trends favoring treatment were found with VAS and Modified Oswestry Disability Index that were different of the current results.

CONCLUSION

Both positional release technique and post isometric relaxation technique were effective in reducing pain and decreasing NDI and increasing cervical extension ROM while both techniques were not effective in improving cervical flexion ROM .The difference in VAS, NDI score and cervical flexion between the groups were not significant. While PRT is significantly effective than post PRT in improving cervical extension in patients with cervicogenic headache. There is clinical difference and high percent of improvement in cervical flexion ROM favor to positional release group.

CONFLICT OF INTEREST

The authors declared that present study was performed in the absence of any conflict of interest.

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AUTHOR CONTRIBUTIONS

All authors contributed equally in all parts of this study. All authors read and approved the final version.

REFERENCES

Albert A, Jose L.2006. Immediate effects of the strain counterstrain in local pain evoked by tender points in upper trapezius muscle.Clin chiropractic. 9 (3):112-118.

Antonaci F, and Sjaastad O, 2011. Cervicogenic headache: a real headache. Curr Neurol Neurosci Rep. 11(2): 149-55.

Biondi D. 2005. Cervicogenic headache: A review of diagnostic and treatment strategies. The Journal of the American Osteopathic Association. 105(4):16-22.

Burns D, Wells M, 2006. Gross Range of Motion in the Cervical Spine: The Effects of Osteopathic Muscle Energy Technique in Asymptomatic Subjects. J Am Osteopath Assoc. 106 (3):137-142.

Fernandez C, Calos J, 2007. Performance of the craniocervicalflexion test, forward head posture, and headache Short-term effects of strain counterstrain in reducing pain in upper trapezius tender points.Athletic Training and Sports Health clinical parameters in patients with chronic tension-type headache, A pilot study. JOSPT, 37(2): 33-39 .

Fernandez-de-las-Penas C, Alonso-Blanco C, Cuadrado M, Gerwin R, Pareja J, 2006a. Trigger points in the suboccipital muscles and forward head posture in tension type headache. Headache .46:454-460.

Fernandez-de-las-Penas C, Alonso-Blanco C, Cuadrado M,Gerwin R, Pareja J, 2006b. Myofascial trigger points and their relationship to headache clinical parameters in chronic tension type headache. Headache 46: 1 2 64- 1 2 7 2.

Fryer G, 2011. Muscle energy technique: An

evidence-informed approach. Int J Osteopath Med. 14(1):3-9.

Fryer G, Fossum C, 2009. Therapeutic Mechanisms underlying Muscle energy Approaches. In Physical therapy for tension type and cervicogenic headache: 221-229.

Gopal D, Pancholi P, Parth S, Trivedi M, Shirin M, Momin C, 2014. Comparative Effect Between C1-C2 Self-Sustained Natural Apophyseal Glide (SNAG) And Deep Cervical Flexors Strength Traininge In The Management Of Cervicogenic Headache 4.issue2, 96-73.

Hagen K, Einarsen C, Zwart J, Svebak S, Bovim G,2002. The co-occurrence of headache and musculoskeletal symptoms amon 51050 adults in Norway. Eur J Neurol; 9: 527–53.

Haldeman S, 2001. Dagenais, Cervicogenic headaches: a critical review. Spine J. 1(1): 31-46.

Hall T, Robinson K, 2004. The flexion-rotation test and active cervical mobility: A comparative measurement study in cervicogenic headache. ManualTher.9:197–202.

Hamilton L, Boswell C, Fryer G, 2007.The effects of high-velocity, low-amplitude manipulation and muscle energy technique on suboccipital tenderness. International Journal of Osteopathic Medicine 10. 42-49.

Hariharasudhan R, Balamurugan J, 2014. A randomized double-blinded study of effectiveness of strain counter-strain technique and muscle energy technique in reducing pain and disability in subjects with mechanical low back pain. Saudi Journal of Sports Medicine.12, |14 (2). 83-88.

Huber J, Lisinski P, Polowczyk A, 2013. Reinvestigation of the dysfunction in neck and shoulder girdle muscles as the reason of cervicogenic headache among office workers. Disable Rehabil. 35:793–802.

Jull G, Amiri M, Bullock-Saxton J, Darnell R., Lander C.2007. Cervical musculoskeletal impairment in frequent intermittent headache.Part 1: Subjects with single headaches*. Cephalalgia*;27:793–802.

Jull, GA, 1994. Cervical headache. A review. In: Boyling J., Palastanga N. (Eds.) Grieve's Modern Manual Therapy. 2nd ed. Churchill Livingstone, Edinburgh: 333–347.

Kelencz C,Ferreirac C, Tairini V, Amorim C, 2011.Trapezius upper portion trigger points treatment purpose in positional release therapy with electromyographic analysis North American Journal of medical science 3(10):451-5 .

Knackstedt H, Bansevicius D, Aaseth K, Grande R, Lundqvist C, 2010. akershus study of chronic headache. Cephalalgia. 30(12):1468-76.

Noelle M. 2009. Short term of Muscle Energy Technique on pain in individuals with non specific lumbopelvic pain. Journal of Manual & Manipulative Therapy 17(1) 2012.

Perreault A, Kelln B, Hertel J, Pugh K, Saliba S.2009. Short-term effects of strain counterstrain in reducing pain in upper trapezius tender points**.**Athletic Training and Sports Health Care. 1(5):214–221.

Rameshor L,Chauhan V, 2014. Comparison of Efficacy of Myofascial Release and Positional Release Therapy in Tension Type Headache. JMSCR.2 (9):2372-2379.

Rana M, 2013. Managing and treating headache of cervicogenic origin. Med Clin North Am. 97:267–80.

Sharma S, Sen S, Dahawan A, 2014. Effects of cervical stabilization exercises on neck proprioception in patients with cervicogenic headache Bio Sci . Jan; 5(1): (B) 405 – 420.

Simons D. Travell JG, Simons LS.1999 MyoJascial Pain and Dysfunction: The Trigger Point Manual. Vol . I . The upper body. Philadelphia: Lippincott Williams & Wilkins. 2nd. ed.

Sjaastad O. Bakketeig L., 2008.Prevalence of cervicogenic headache: Vaga study of headache epidemiology. Acta Neural Scand 117: I 73-180.

Stovner L, 2007 .The global burden of headache: a documentation of headache prevalence and disability worldwide. Cephalalgia. 27(3): 193-210.

Treleaven J, Jull G, Atkinson L, 1994. Cervical musculoskeletal dysfunction in post-concussional headache. Cephalalgia. 14(4): 273-9; 257 discussion.

Zito G, Jull G, Story I, 2006. Clinical tests of musculoskeletal Dysfunction in the diagnosis of cervicogenic headache. Manual Ther. 11:118–29.