

Effectiveness of Manual Therapy with Home Exercises in the Management of Cervicogenic Headache: A Single Case Study

Dr. Prerna Mohan Saxena

Assistant Professor Amar Jyoti Institute of Physiotherapy, Karkardooma, Delhi, India

Abstract: *A single case study design was used to evaluate the effectiveness of manual therapy with home exercises in a 35-year-old woman with a two year history of cervicogenic headache. The study involved three six-week phases. The subject recorded details of all headaches and physical measures were taken every two weeks throughout the 18 weeks. During the six-week baseline phase the subject did not receive physiotherapy management and his headache pattern and signs of articular and muscle dysfunctions were stable. Following manual therapy there was a decrease in the frequency of cervicogenic headaches. Active range of movement, muscle lengths and endurance of stabilizing muscles all improved. These improvements were maintained over the final six-week phase, during which time the subject continued a home exercise programme only. The single case study design limits generalization but this work supports the appropriateness of a comprehensive manual therapy programme in the management of cervicogenic headache.*

Keywords: Cervicogenic headache, manual therapy, home exercise, single case study

1. Introduction

Cervicogenic headache is a common disabling problem accompanying neck pain that affects the quality of life. The term cervicogenic headache has been coined to describe headaches that arise from the cervical spine, although their incidence and mechanism are still debated (Bodguk, 1986; Edmeads, 1988; Sjaastad, 1992). Diagnostic Criteria and Clinical Presentation the International Headache Society (IHS) (1988) diagnostic criteria for cervicogenic headache include pain localized to the neck and occiput which can spread to other areas of the head. Sjaastad et al (1990) stated that cervicogenic headaches typically present uni-laterally and do not change sides although they acknowledge that bi-lateral cases can occur. The headaches can be of varied etiology with varying duration and of moderate intensity. Aggravating factors include prolong and wrong head postures and cervical movements. In about 50% of cases traumatic onset is also associated (braaf and Rosner, 1975) but in others there appears to be no known precipitant. A painful motion abnormality at a relevant segment in the cervical spine is also a feature (Pfaffenrath et al, 1988; Jull, 1994). Cervicogenic headache sufferers have been shown to demonstrate weakness and loss of endurance of upper cervical flexor muscles and often exhibit a forward head posture (Watson and Trott, 1993). This muscle dysfunction is thought to result from imbalance in activity levels between different muscles (Janda, 1988).

Few studies have been directed towards evaluating the efficacy of treatment methods for cervicogenic headaches. Jaeger (1989) investigated the effect of treatment of myofascial trigger points in a small group of cervicogenic headache sufferers and found that they all experienced significant improvement in the frequency and intensity of their symptoms. Jensen et al (1990) compared manual therapy with cold packs for the treatment of cervical joint signs in post-traumatic headache and determined that three sessions of manual therapy reduced the headache temporarily. The authors concluded that further work is

required to ascertain whether more sessions or a more comprehensive programme would have a longer-lasting effect.

Jull (1994) has described a comprehensive manipulative physiotherapy management programme which includes treatment directed at articular, muscular, postural and neural dysfunction. As an initial step, a single case study was undertaken to investigate the effectiveness of such a programme in relieving the signs and symptoms of chronic cervicogenic headache.

2. Objectives

- To determine whether headache symptoms change in response to a manual therapy with home exercise programme.
- To determine whether physical signs in the cervical spine were altered in response to a manual therapy and home exercise program.

3. Methodology

A single case study design with three six-week phases was employed. The main criterion for the study was a history of cervicogenic headaches of at least six months duration. Diagnosis had to follow the criteria of the IHS (1988). It was necessary to exclude any condition which would contraindicate manual therapy management (Grieve, 1988). A 35-year-old professional woman with a two-year history of headaches of insidious onset met the above criteria and consented to enter the study. The headaches increased in frequency from once a month to at least one each week in recent months, and were either uni-lateral or involved the whole head. The subject identified several provocative factors including sustained cervical flexion or extension, carrying loads, driving, stress or infections. Headaches did not interfere with normal activities, although she often took medication for relief and general health was good.

Volume 8 Issue 2, February 2019

www.ijsr.net

Licensed Under Creative Commons Attribution CC BY

4. Measurements

- **Headache Patterns:** The subject maintained a daily diary to record his headache pattern over the study period. Information documented included the frequency, duration and area of each headache. Intensity was rated on a 10 cm visual analogue scale (Huskisson, 1974). The subject recorded any known provoking factor for the headache and listed the type and dosage of any medication taken.
- **Physical Measurements:** The physical assessment included a measure of range of active cervical movement, manual examination of the cervical and upper thoracic joints, selected muscle lengths and activation and endurance capacity of the neck flexors.
- **Active range of Movement:** The ranges of cervical spine flexion, extension, lateral flexion and rotation were measured using a Myrin goniometer. This method has moderate to good reliability (Balogun et al, 1989).
- The subject rated the presence of pain on segmental testing on a scale of 0 (no pain) to 10 (worst pain). The sensitivity and specificity of manual examination to detect the symptomatic joint in the cervical spine has been determined previously (Jull et al, 1988).

Two tests were used to assess the endurance capacity of the neck flexor muscle group in recognition of the imbalance which may develop between the deep and superficial cervical flexors (Janda, 1988). The muscle groups were tested using techniques described by Richardson et al (1992). **Deep neck flexors:** The endurance of the deep neck flexors was measured as the number of times the subject could hold a chin tuck position for 10 seconds in the supine position. An endurance limit of a maximum of ten 10-second holds was regarded as a normal endurance level for the purposes of this study.

5. Procedure

The first phases of the study (A) comprised baseline data collection during which time the subject did not receive any physiotherapy. In phase (B), manual therapy with home exercises. In the final phase (C), active intervention was withdrawn but a home exercise programme was continued. Throughout the three phases the subject recorded details of all headaches in the diary. The physical measurements were undertaken at the end of each two-week period.

Physiotherapy Management

The manual therapy management programme began during phase B. It was carried out twice a week for four weeks and once a week for two weeks. On days that treatment coincided with the independent assessment, the assessment always preceded treatment. Articular and muscular systems were evaluated (Evjenth and Hamberg, 1984; Maitland, 1986; Rutler, 1991). Treatment was directed towards dysfunction found in the articular and muscular systems. The subject received mobilization with distraction at each treatment session. This was initially directed towards the articular signs, the upper cervical zygoapophyseal joints and the cervical spine intervertebral joint. At the third session muscle re-education was begun to improve endurance and holding capacity of deep neck flexors. Muscle lengthening

techniques were also performed on those muscles found on examination to be tight, namely left upper trapezius and scalene. These techniques were introduced in stages because headaches are often irritable (Jull, 1994). The subject received advice regarding posture at work and home.

Subject performed a home programme of muscle lengthening exercises for the left upper trapezius and scalene. This home programme was repeated twice a day during phase B and once a day throughout phase C, after the manual therapy had been discontinued.

6. Results

Headache Pattern- In diary the subject described two distinct patterns of headaches. One was a left uni-lateral headache in the suboccipital, occipital and frontal region provoked by a sustained cervical flexion or extension, carrying loads or driving. The second pattern of headache involved the whole head and was associated with viral infections or stress. During the study the subject recorded 13 uni-lateral and 17 whole-head headaches. The uni-lateral headaches decreased in frequency over the latter half of the treatment phase (B) and the subject reported only no such headache in the six-week follow-up period (phase C). The whole-head headaches showed a much more consistent pattern throughout the study period with a slight decrease in the latter half of the treatment.

Active Range of Movement: The ranges of movement of flexion and extension, right and left rotation and right and left lateral flexion were summated to reduce any errors in establishing the neutral starting position. The most noticeable increase occurred in lateral flexion, particularly during the latter part of the study.

The lengths of the pectoralis major on both left and right sides were difficult to evaluate with the classical clinical test. It appeared that the subject's natural gleno-humeral articular flexibility was the limiting factor rather than the length of muscle. This finding remained constant throughout the study period.

Deep Neck Flexors The subject was unable to complete more than three 10-second holds at any of the assessments in phase A. Following the introduction of the muscle activation programme in phase B, she could maintain ten 10-second holds for the remainder of the study was added.

7. Discussion

The subject who was chosen for this study fulfilled the symptomatic criteria for cervicogenic headache and was found to have articular signs and changes in muscle function that were commensurate with upper cervical dysfunction and headache (IHS, 1988; Jull et al, 1988; Jaeger, 1989; Sjaastad et al, 1990; Watson and Trott, 1993). The diary reports described two distinct headache forms, clearly related to different provocative factors. The uni-lateral headache was associated with mechanical precipitants such as neck postures or carrying loads. The subject associated his whole-head headaches with viral infections or stress. The results of this study indicated that the uni-lateral headaches decreased

in frequency and intensity following the SNAGs with forearm distraction physiotherapy management programme but the whole-head headache pattern remained unchanged. The overall reduction of the unilateral headache pattern followed the improvement gained with treatment of the cervical articular and muscular dysfunction suggests that this subject's uni-lateral headaches were of cervical origin. The consistent frequency of the whole-head headaches throughout the study suggested that these were not cervicogenic. Furthermore, the chronic nature of this subject's condition and the relatively stable baseline measures of phase A suggest that the improvements in cervical signs and headache symptoms were not due to a spontaneous remission.

A review of the uni-lateral headaches indicates that they increased in frequency during the initial treatment phases (B1 and B2). This was despite a measured improvement in articular and muscle signs. Analysis of the subject's diaries indicated that three of the six phase B headaches appeared to be a reaction to treatment. This increase in frequency could therefore reflect the irritability of the upper cervical region which is commonly found in cervicogenic headache patients (Jull, 1994).

Active gross ranges of cervical movement were measured as within normal limits (Balogun et al, 1989; Lind et al, 1989) but visual estimation of C1/C2 rotation revealed a restriction in motion which was consistent with manual segmental findings. The symptomatic hypo mobility in the left C1/C2 zygoapophyseal joint lessened with local joint treatment and this was associated with an increase in active C1/C2 rotation and a decrease in frequency of headache. Not unexpectedly, there was little change in gross active ranges of movement over the study period with the exception of cervical lateral flexion.

The improved flexibility, however, seemed to be related more to the introduction of muscle lengthening procedures. The articular signs did not resolve completely following the treatment and slight hypomobility at the left C1/C2 zygoapophyseal joint persisted. This may account for the occurrence of the one uni-lateral headache in the final phase. In the normal clinical situation, treatment would have continued until all the articular signs had been resolved. A longer follow-up phase would have helped to identify whether the improvement in the cervicogenic headaches persisted. The length of each phase of the study was, however, predetermined.

Poor activation and endurance capacity were found in the deep neck flexors. This muscle dysfunction was addressed in treatment and the subject was provided with a specific home programme of muscle lengthening and precise exercises to improve the endurance capacity of the stabilizing muscles. An improvement in muscle function began to be recorded in the treatment phase and further improvement occurred in the follow-up phase as the subject continued his home programme.

The results of this study suggest, therefore, that cervicogenic headache can be benefited by a comprehensive manipulative physiotherapy management programme. There was no

attempt to determine the effect of particular components of the programme. This could be an area for future research. A single case study was chosen because this design is particularly suitable for an in-depth investigation of the management of an individual subject, although it is not intended that the results of such a study are generalised to the population as a whole. Such studies are more powerful than straightforward case histories for establishing a link between intervention and outcome. At the same time, they allow treatment to be tailored specifically to the needs of the subject, rather than following a highly standardised regime. This study has been described as an ABC design, rather than the more usual ABA design (Ottenbacher, 1986). This was because the subject continued with the home maintenance programme in the final phase, once the active treatment was discontinued, and therefore did not revert to the baseline condition. It is normal practice following manipulative physiotherapy treatment for a home programme to be continued. It may, in fact, be essential in order to prevent recurrence of symptoms.

8. Conclusion

This study demonstrated that a comprehensive physiotherapy management programme directed at the cervical spine was followed by improvement in signs and symptoms of uni-lateral cervicogenic headache. The continuation of a home programme may have contributed to the further improvement or maintenance of improvement in the short term following the cessation of treatment. The chronic nature of this subject's condition and the stable baseline measurements suggest that this improvement was not a spontaneous remission. The persistence of whole-head headaches suggests that the improvement was not a placebo response as the subject was unaware that the treatment might have influenced only one type of headache.

The single case study design limits generalization, but this work supports the concept of cervicogenic headache and the appropriateness of a comprehensive mobilization with distraction physiotherapy management programme.

References

- [1] Balogun, J, Abereje, O, Olagun, M and Obajuluwa, V (1989). 'Inter- and intratester reliability of measuring neck motions with tape measure and Myrin gravity-reference goniometer', *Journal of Orthopaedic and Sports Physical Therapy*, 10, 7, 248-253.
- [2] Bodguk, N (1986). 'Cervical causes of headache and dizziness' in: Grieve, G (ed) *Modern Manual Therapy*, Churchill Livingstone, Edinburgh, pages 289-302. Braaf, M and Rosner, S (1975).
- [3] 'Trauma of cervical spine as a cause of chronic headache', *Journal of Trauma*, 15, 5, 441-446. Butler, D (1991).
- [4] *Mobilisation of the Nervous System*, Churchill Livingstone, Edinburgh. Dalton, M (1989). 'The effect of age on cervical posture in a normal female population', *Proceedings of the Sixth Biennial Conference, Manipulative Physiotherapists Association of Australia, Adelaide*, pages 34-44.

- [5] Dalton, M and Coutts, A (1994). 'The effect of age on cervical posture in a normal population' in: Boyling, J and Palastanga, N (eds) *Grieve's Modern Manual Therapy of the Vertebral Column*, Churchill Livingstone, Edinburgh. In press. Dvorak, J and Dvorak, V (1984).
- [6] *Manual Medicine, Diagnostics*, Georg Thieme-Verlag, Stuttgart. Edmeads, J (1988). 'The cervical spine and headache', *Neurology*, Evjenth, O and Hamberg, J (1984).
- [7] *Muscle Stretching in Manual Therapy, A clinical manual. The spinal column and the TM joint, vol 2*, Alfa Rehabilitation, Sweden.
- [8] Gonella, C, Paris, S and Kufner, M (1982). 'Reliability in evaluating passive intervertebral motion', *Physical Therapy*, 62, 436-444. Grieve, G (1988). *Common Vertebral Joint Problems*, Churchill Livingstone, Edinburgh (2nd edn).
- [9] Huskisson, E (1974). 'Measurement of pain', *Lancet*, 2, 1127-31. International Headache Society (1988). 'Headache classification', *Cephalalgia*, 8, suppl 7, 1-96. Jaeger, B (1989). 'Are "cervicogenic" headaches due to myofascial pain and cervical dysfunction?' *Cephalalgia*, 9, 157-164.
- [10] Janda, V (1988). 'Muscles and cervical pain syndromes' in: Grant, R (ed) *Physical Therapy of Cervical and Thoracic Spine*, Churchill Livingstone, New York, pages 153-166. Jensen, O, Nielsen, F and Vosmar, L (1990).
- [11] 'An open study comparing manual therapy with the use of cold packs in the treatment of post-traumatic headache', *Cephalalgia*, 10, 241 -250.
- [12] Jull, G (1994). 'Headaches of cervical origin' in: Grant, R (ed) *Physical Therapy of Cervical and Thoracic Spine*, Churchill Livingstone, New York (2nd edn).
- [13] Lind, B, Sihlbom, H, Nordwall, A and Malchau, H (1989). 'Normal range of movement of the cervical spine', *Archives of Physical Medicine and Rehabilitation*, 70, 692-695. Maitland, G (1986).
- [14] Pfaffenrath, V, Dandekar, R, Mayer, E, Hermann, G and Pollmann, W (1988). 'Cervicogenic headache: Results of computerbased measurements of cervical spine mobility in 15 patients', *Cephalalgia*, 8, 45-48.
- [15] Sjaastad, O (1992). 'Cervicogenic headache: The controversial headache', *Clinical Neurology and Neurosurgery*, 94 (suppl), Sjaastad, O, Fredriksen, T and Pfaffenrath, V (1990).
- [16] 'Cervicogenic headache: Diagnostic criteria', *Headache*, 30, 725-726. Richardson, C, Jull, G and Comerford, M (1992).
- [17] A W Heinemann, J M Linacre, E D Wright, B B Hamilton, C Granger. 133- 143. Determining normative standards for functional independence measure transitions in rehabilitation.
- [18] W B Long, W J Sacco, S Scoombes, W S Copes, A Bullock, J K Melville. 144 - 148. Prognosis of rehabilitation outcome in head injury using a disability rating scale.
- [19] J M Fleming, F Mass. 156- 163. Patient-oriented rehabilitation planning in a single visit: First-year review of the quick program.