



EFFECTIVENESS OF PHYSIOTHERAPY IN TENSION-TYPE HEADACHE

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ABSTRACT

Background: Tension-type headache is primary headache disorder, with lifetime prevalence in the general population ranging between 30% and 78% in different studies. It is characterized by a bilateral, pressing tightening pain of mild to moderate intensity, occurring either in short episodes of variable duration or continuously. The aim of this study was to evaluate the effect of massage and stretching in Tension-type headache.

Method: The study was ethically approved by Institutional Review Board. 30 subjects meeting inclusion criteria were divided into experimental and control group. Study duration was 6 weeks. All subjects kept record of headache parameters throughout study duration. Experimental group received physiotherapy in the form of massage and stretching during 3rd and 4th week of study. Control group continued usual care by self or medical practitioner. Outcome measures were headache parameters i.e. frequency and intensity of headache; number of trigger points and HDI. Data was analyzed using non parametric tests at 5% level of significance.

Result: Within group analysis showed significant improvement in all headache parameters in both groups except headache frequency in experimental group. Between group analysis showed statistically significant difference for number of trigger points and functional component of HDI in experimental group.

Conclusion: Physiotherapy should be incorporated as an adjunct to pharmacological treatment for subjects with Tension-type headache.

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INTRODUCTION

Headache disorders are generally classified as either primary or secondary and these classifications are further divided into specific headache types.^[1] Primary headache disorders are not associated with an underlying pathology and include migraine, tension-type and cluster headache. Secondary headache disorders are attributed to an underlying pathological condition and include any head pain of infectious, neoplastic, vascular, or drug-induced origin.^[1]

Tension-type headache (TTH) is common, with lifetime prevalence in the general population ranging between 30% and 78% in different studies; it has a very high socio-economic impact.^[2]

Tension-type headaches (TTH) are recurrent episodes of headache lasting minutes to weeks.

Tension-type headaches have been divided into Episodic tension-type headache (ETTH), Chronic tension-type headache (CTTH) and Probable tension-type headache.^[3]

The symptoms of TTH are typically pressing or tightening in quality of pain, mild to moderate pain intensity, and bilateral in location. Nausea and vomiting is usually absent, but photophobia or phonophobia may be present.^[3,4]

Despite numerous clinical and neurophysiological studies, the exact cause of tension headache remains elusive. A peripheral pain mechanism (muscular factors) is the most likely explanation for episodic infrequent and frequent tension-type headache, whereas central pain mechanisms (altered central nociception) play a more important role in chronic tension-type headache.^[3] There is evidence which suggest that TTH originate from sustained isometric contraction of muscles associated with the head and neck or cranial and pericranial muscles. This type of extended muscle contraction may result in local nutrient deficiencies due to ischemia, which can generate trigger points within muscles. Collectively, these effects and activation of myofascial trigger points has also been implicated as a cause of headache.^[5]

The diagnosis of TTH is based on the diagnostic criteria of International headache society, history of patient, physical examination such as manual palpation of pericranial muscles. Neurological examinations are normal.^[6]

Pharmacological interventions as well as physiotherapy interventions like articular manual therapy, cervical muscle

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stretching, electrotherapy and massage are effective for this disease in different aspects related with TTH.^[4]

Massage therapy techniques which act in part to increase blood flow to tissue may also reduce the activity of trigger point. For patients with CTTH the benefit of massage as part of soft tissue manipulation is conclusive.^[5]

Ischemic compression therapy to the trigger points in people with TTH has a positive influence in decreasing pain intensity and frequency of headache. Ischemic compression followed by stretching is effective in pain relief and significantly effective to reduce myofascial trigger points.^[7, 8]

Stretching generally focuses on increasing the length of a musculotendinous unit, reduces chronic pain, muscle soreness and prescribed to align collagen fibers during healing muscle. Static stretching has been shown to be more effective than other kind of stretching.^[9, 10]

There is lack of data on role of physiotherapy in TTH in India so the purpose of the present study is to see the efficacy of physiotherapy for tension-type headache. In this study massage and stretching exercises were used because no previous study has investigated the combined effect of massage and stretching in subjects with TTH.

METHODOLOGY

This experimental study was ethically approved by Institutional Review Board. Thirty out of eighty subjects with headache meeting inclusion criteria were recruited in this study. Convenient sampling technique was used. Inclusion criteria were male or female with age between 15 to 25 years, meeting diagnostic criteria of frequent episodic tension-type headache and chronic tension- type headache according to ICHD-III-beta, presence of trigger points in any one or more pericranial/cranial muscles and education up to High-School. Exclusion criteria were presence of Infrequent TTH, Probable TTH and any other headaches type, history of any trauma to neck or head, general hypermobility of cervical joints, hyper laxity of soft tissue of neck, cervical joint stiffness and osteoporosis of cervical spine. Study was conducted for one year.

The purpose of study was explained to the subjects. Informed written consent was taken prior to the study. Subjects were randomly divided into two groups: Experimental Group and Control Group. Subjects in Experimental Group received physiotherapy treatment and in Control Group subjects continued self-usual care. Total duration of study was 6 weeks. Pretreatment Period (1st and 2nd week):

Detailed assessment was carried out for all subjects before starting study. All subjects were explained about how to record headache parameters in a diary. All participants were requested to visit the department to record headache parameters as baseline measures at the end of 2nd week.

Outcome measures were Headache Parameters, Headache Disability Inventory (HDI) and Number of trigger points in cranial and pericranial muscles.

1. **Headache Parameters:** According to national health survey guidelines headache diary is very helpful assessment tool for headache. The headache diary reveal following parameters:

- The Frequency of headache recorded by number of day (register dates of headache) in a week.
 - Headache pain intensity: It was scored by the participant on Visual-analogue-scale.
2. **Headache Disability Inventory:** It was administered to quantify the impact of TTH on daily life. It consists of 25 items. Emotionally based questions are 13 and remaining 12 questions are Physical and Functions based question with three possible response options: Yes = 4 points, Sometimes = 2 point, No = 0 points.

A total score is computed by summing all scores. A total score change of at least 16 points is necessary for effects to be considered clinically significant. The HDI has good internal consistency (0.89), robust long-term test re-test reliability (0.83) and good construct validity.⁽¹¹⁾

HDI and number of trigger points were evaluated at the beginning and at the end of sixth week.

Analysis of Headache parameters was done by using mean of recorded data during baseline period (1st and 2nd week) and follow up period (5th and 6th week).

Intervention Period (3rd and 4th week)

Experimental group received physiotherapy treatment in the form of massage and stretching. Effleurage, petrissage and finger kneading massage techniques were applied to posterior and lateral aspect of neck for 10 to 15 minutes. Pericranial and cranial muscles like Upper fibers of Trapezius, Sternocleidomastoid, Suboccipital, Spleniuscapitis, Occipitalis, Frontalis and Temporalis were assessed to identify trigger points. The assessment for all the trigger points was performed by the same therapist following the diagnostic criteria described by Simons et al., 1999 and positive “jump sign”. Ischemic compression therapy was applied to treat trigger points. In this technique, patient was placed in a comfortable position like sitting on back supported chair. Gentle and sustained pressure was applied by thumb or index finger until trigger points soften (approximately 90 sec). Static stretching was applied to above mentioned cranial and pericranial muscles. It was applied two times with 30 seconds hold.

Treatment was given for 5 days/ week for 2 weeks. Total duration of intervention was approximately 45-50 minutes. During these two weeks subjects in control group were asked to continue usual care by self or medical practitioner and maintain headache diary.

Follow Up Period (5th and 6th week)

Fifth and sixth weeks were considered as follow up periods for both the groups. Subjects were asked to maintain record of headaches in diary. Headache parameters, number of trigger points and HDI were assessed at the end of sixth week for all subjects.

Data analysis

Data was analysed by using statistical software SPSS for Windows (Version 16) and Microsoft Excel 2007. Non parametric tests such as Wilcoxon Signed Ranked for within group analysis and Mann-Whitney U for between group analysis were used. Data was analyzed at 5% level of significance with confidence interval (CI) at 95%.

RESULTS

In this study effectiveness of physiotherapy was evaluated in subjects with TTH. Table 1 shows baseline characteristics like age and number of headache years in both groups.

Within group analysis showed significantly reduced headache intensity in both groups. Even headache frequency was reduced significantly in control group as shown in table 2. Between group analysis showed no significant difference in headache frequency (U = 88, p = 0.66) and headache intensity (U = 90, p = 0.72) (Table 4).

Table 1 Baseline characteristics of subjects in both groups

Variables	Experimental Group	Control Group
	(n=14) Mean (SD)	(n=14) Mean (SD)
Age	19(0.5)	19 (0.3)
No. of Headache Years	2.4 (0.51)	2 (0.54)

Table 2 Comparison of Headache Parameters at 0-6 weeks within Experimental group and Control group

Group	Variables	Pre treatment		Follow Up		W	p
		Mean	SD	Mean	SD		
EXP	Headache Frequency	3.17	0.70	3.21	0.73	-1.9	0.52
	Headache Intensity	4.7	0.72	4.05	0.54	-2.8	0.005
CT	Headache Frequency	3.6	0.70	3.07	0.73	-2.1	0.03
	Headache Intensity	5	0.72	4.14	0.65	-2.5	0.01

Within group analysis also showed significant improvement in functional component (W = -3.31, p < 0.05) and total score of HDI (W = -2.26, p < 0.05) in experimental group as shown in table 3. Between group analysis showed significant difference in functional component (U = 49, p < 0.05) of HDI (Table 4). Table 5 showed significantly reduced number of trigger points (u = 18.50, p < 0.05) in experimental group.

Table 3 Comparison of HDI at 0-6 weeks within Control group and Experimental group

GROUP	HDI Variables	PRE Treatment		Follow Up		W	p
		MEAN	SD	Mean	SD		
EXP	Emotional	41.85	3.37	41.35	4.10	-0.8	0.04
	Functional	31.8	3.8	28.35	2.87	-3.31	0.001
	Total Score	0.73	0.043	0.69	0.039	-2.6	0.00
CT	Emotional	40.5	4.32	38.5	3.03	-1.8	0.07
	Functional	30.57	1.86	30.35	1.90	0.00	1.0
	Total score	0.70	0.037	0.69	0.037	0.00	1.0

Table 4 Comparison of HDI Components and Headache Parameters at 0-6 weeks between Experiment group and Control group

Variables	Groups	Post treatment difference		U Value	P Value
		Mean	SD		
HDI Items :					
Emotional	EXP	0.8	2.3	56	0.056
	CT	0.8	2.3		
Functional	EXP	1.5	1.7	49	0.024
	CT	0.28	0.46		
Total score	EXP	0.02	0.05	96.5	0.94
	CT	0.05	1.11		
Headache frequency	EXP	0.35	0.4	88	0.66
	CT	0.5	0.85		
Headache duration	EXP	0.32	0.46	89	0.7
	CT	0.3	0.4		
Headache intensity	EXP	0.32	0.46	90	0.72
	CT	0.3	0.4		

Table 5 Comparison of No. of Trigger Points at 0-6 weeks between Experiment group and Control group

Variables	Groups	Difference post treatment		U Value	P Value
		Mean	SD		
Total no. of Trigger Points	EXP	2	0.18	18.50	0.00
	CT	0.28	0.26		

DISCUSSION

The present study was conducted to evaluate effectiveness of physiotherapy in tension-type headache. Subjects were matched for age and number of years of headache in both groups in order to minimize the difference in the population. In the present study, results for within group analysis at 6 weeks showed significant improvement in headache intensity and HDI components except emotional component in experimental group.

Jan D, Jaeger B and Reeves JL (2010), found a reduction in headache pain by stretching. Quinn, Chandler *et.al* in (2002), found a significant decrease in headache parameters like frequency, duration and intensity of headache with massage and stretching in CTTH.^[5] Hernandez-Reif and Eisenberg (1998), reported significant decrease in headache intensity as well as frequency with use of massage.^[12]

The hypothesis behind the improvement in variables can be due to reduction of the peripheral mechanism and decreasing the local concentration of pain mediators i.e. Bradikinin, Serotonin and Substance P leads to reduction in the tension of the muscles.^[5, 13]

Albert Moraska *et al* ^[14] studied massage therapy in TTH and found significant changes in headache frequency but no stastical significant difference was found in the emotional component of HDI. There are multiple factors for TTH^[1] but present study dealt with the muscular cause of TTH whereas remaining factors were untreated. That's why few variables like headache frequency and emotional component of HDI showed no significant change in present study. Even the period of intervention was limited.

Results for within group analysis at 6 weeks for control group showed significant improvement in all headache parameters but no significant improvement for HDI components. Similar results were found in study conducted by Holroyd *et al* (2001), who compared Spinal Manipulation Therapies like massage and exercises to the commonly used drugs for TTH and found significant difference in both the groups.^[15] Bendtsen L *et al* (2000), studied effect of pharmacological intervention in TTH and concluded that a commonly used drug can reduce headache.^[12] The hypothesis behind improvement in control group variables can be use of medicines which leads to reduce nociceptive stimuli to the CNS.^[16,17,18]

Between groups analysis at 6 weeks showed significant difference in functional component of HDI and number of trigger points in experimental group. Menkam *et al.*, (2015), suggested that stretching of the muscle after ischemic compression is necessary to provide longer pain relief and reduce number of trigger points.^[18] Fernandez *et al* (2007), proposed that the trigger point is deactivated by myofascial trigger point release (ischemic compression) because the afferent input from the myofascial trigger point is stopped and the headache symptoms are relieved.^[7,18] Christopher Quinn,

DC,BS and Albert Moraska (2002), found that massage and stretching reduces trigger point sensitivity by improving local nutrient deficiencies.^[5]Hence in present study ischemic compression therapy was used as part of massage and followed by static stretching. Similar results were found in study conducted by Prem C and Anshul (2010). Who investigated the effect of ischemic compression therapy in TTH and concluded that this therapy has positive influence to reduce trigger point and headache.^[7]

Limitations of this study are small sample size, limited study duration and long term follow up was not taken. Future studies can be conducted on different age groups and with different physiotherapy techniques.

CONCLUSION

Present study concludes that physiotherapy reduces headache intensity, its impact on daily life and number of trigger points. Hence, physiotherapy should be incorporated as an adjunct to pharmacological treatment for subjects with TTH.

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