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Effectiveness of integrated neuromuscular inhibition technique on headache in college students

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Abstract
Aim: The study is to find out the immediate effect of integrated neuromuscular inhibition technique on tension type headache in young collegiate students.
Subjects: A total of 20 participants were included in this study between the ages of 18 and 25. Subjects who are having headache along with nausea, vomiting were excluded.
Methodology: Subjects were given neuromuscular inhibition technique on the trigger points present over the upper trapezius and sub occipital muscles. The intervention was given for 3 sessions in a week. Numeric pain rating scale (NPRS) and headache disability index (HDI) rating scale was used to compare the score before and after each intervention.
Result: This study shows that there is significant reduction in the sensitivity of the trigger points developed in the subocciput and upper trapezius muscles which leads to Tension Type Headache. The pain intensity score on NPRS for each trigger point effectively reduced and their headache frequency also reduced significantly.
Conclusion: The integrated neuromuscular inhibition technique can be a treatment of choice for the patients suffering from tension type headache.

Keywords: tension type headache, Trigger points, INIT, NPRS

Introduction

Headache is one of the most common problems seen among all the ages. Out of the various types of headaches, tension-type headache (TTH) is one of the most prevalent in adults. Nearly all headache experienced by the college students are tension type headache [1]. Various researches that have been done on the tension type headache suggest that it is usually due to the referred pain through the trigger points present in the head and neck muscles [2].

Frequent and severe headaches are common among college students and have a major impact on their academic performance and quality of life, and may bring about limitation in their daily activities and work. A tension type headache causes non-throbbing, frequently bilateral pain [3]. It has been demonstrated that the most prominent clinical finding in both adult and children suffering from TTH is an increased tenderness on palpation of pericranial tissue [4-7]. Referred pain is an important characteristic of a trigger point. Therefore the development of trigger points in the neck and subocciput muscles in the college students is responsible for their tension type headache because of their awkward posture and their lifestyle. Headache can be indirectly treated by treating the motor trigger points (MTrPs) that can reduce the intensity and frequency of headache [8]. In this study, a non-invasive technique, Integrated Neuromuscular Inhibition Technique (INIT), is applied on the college students over their neck and subocciput muscles and their headache frequency and intensity is evaluated. INIT intervention was given to the students who fulfilled the inclusion and exclusion criteria for 3 days in a week and NPRS and headache disability index were used as measures. The sensitivity of trigger points is reduced significantly after treating with INIT.

Methodology

In this clinical trial, subjects were college students between age 18 to 25, headaches meeting International Classification of Headache Disorders, 2nd edition (ICHD-2) criteria for TTH defined as head pain of bilateral location, pressing or tightening quality, mild to moderate intensity, and not aggravated by routine physical activity (e.g. walking or stair climbing). Both of the following criteria also had to be met: no nausea or vomiting in association with the headache; and no more than one of the following two symptoms, photophobia or phonophobia.

Protocol

Students were selected according to the inclusion and exclusion criteria.
↓
Informed consents were taken
↓
Students were assessed for the presence of MTrPs in their subocciput and upper trapezius muscles
↓
INIT intervention applied to them for 3 days in a week and NPRS and headache disability index were used as measures.
↓
Master Chart will be prepared and data will be analysed and interpreted in the form of graphs and tables.

Procedure

Subjects were chosen according to the inclusion as well as exclusion criteria. Informed consent was taken from the subjects. Then they were examined for the presence of MTrPs in subocciput muscles and upper trapezius. Subjects

were asked to complete the headache disability index before starting the programme.

Init for Upper Trapezius [9]

1st step: First trigger points (TrPs) were identified in the upper trapezius. The subjects were placed in supine to reduce tension in the upper trapezius muscle. Their arm was positioned in slight shoulder abduction with the elbow bent and their hand resting on their stomach. Using a pincer grasp, the therapist moved throughout the fibers of the upper trapezius and made note of any active TrPs

2nd step: The first technique applied was ischemic compression. The therapist again utilized a pincer grasp, placing the thumb and index finger over the active TrP. A Slow, increasing levels of pressure were applied and maintained for 10 seconds.

3rd step: Ischemic compression was then followed by the application of strain-counterstrain (SCS). Moderate digital pressure was applied to the identified TrP as subjects rated their level of pain on a scale from 1 to 10. If pain was unable to be identified, pressure was increased. If pain was reproduced, the pressure was maintained over the active TrP as the position of ease was identified. The position of ease was often produced through positioning the muscle in a shortened/relaxed position. Ease was defined as the point where a reduction in pain of at least 70% was produced. An example of this was supine lying with the head side bent towards the involved side while the therapist positioned the ipsilateral arm in flexion, abduction and external rotation to reduce the reported TrP pain. Once the position of ease was identified, it was held for 20–30 seconds.

4th step: Lastly, the subjects received muscle energy technique (MET) directed towards the involved upper trapezius. Each isometric contraction was held for 7–10 seconds and was followed by further contralateral side bending, flexion, and ipsilateral rotation to maintain the soft tissue stretch. Each stretch was held for 30 seconds and was repeated two times per treatment session.

Init for subocciput muscles [10]

1st step: in supine lying position, these points lie at the base of the skull in a hollow just to the side of the centre of the back of the neck.

2nd step: There was application of ischemic compression and maintain this for 10 seconds. By palpating the tender point on the side with the hand on that same side, and pressed hard enough to register the pain and score this from 0 -10.

3rd step: This phase was followed by SCS phase in which position of ease was found and maintained this position from 30-90 seconds.

4th step: Then isometric compression of the same muscles for 7 to 10 seconds was given followed by stretching of the subocciput muscles and then again the procedure was repeated.

After each intervention, pain was rated again on NPRS for the same tender points and the intervention was given for 3 days in a week. And subjects were asked to again fill the headache disability index (HDI) form.

Statistical analysis

The data was analyzed using SPSS 17 by repeated measure ANOVA for NPRS in pre and post intervention after 1st reading, 2nd reading and 3rd reading for subocciput, right trapezius and left trapezius respectively and paired t test for pre and post intervention scoring for Headache disability index.

Result

This study shows that there is significant reduction in the sensitivity of the trigger points developed in the subocciput and upper trapezius muscles which leads to Tension Type Headche. The pain intensity score on NPRS for each trigger point effectively reduced and their headache frequency also reduced significantly.

Repeated measure ANOVA for NPRS

- The mean for the NPRS for subocciput muscles (preintervention) was 5.9500 and it reduced to 2.9500 after 1st intervention, 2.0500 after 2nd intervention and 0.6500 after 3rd intervention and standard deviation was 1.39454 (pre-intervention) which reduced to 1.50350, 1.35627 and 1.13671 after 1st, 2nd and 3rd interventions respectively. It showed that the intensity for the subocciput muscles reduced significantly with significance accepted at $p < 0.05$.
- The mean for the NPRS for right trapezius muscle (pre-intervention) was 6.2000 and it reduced to 3.1000 after 1st intervention, 2.8000 after 2nd intervention and 1.4000 after 3rd intervention and standard deviation was 1.90843 (pre-intervention) which reduced to 1.58612, 1.82382 and 1.50088 after 1st, 2nd and 3rd interventions respectively. It showed that the intensity for the right trapezius muscles reduced significantly with significance accepted at $p < 0.05$.
- The mean for the NPRS for left trapezius muscle (pre-intervention) was 5.3000 and it reduced to 2.6000 after 1st intervention, 1.5500 after 2nd intervention and 0.5500 after 3rd intervention and standard deviation was 2.07998 (pre-intervention) which reduced to 2.11262, 1.90498 and 1.19097 after 1st, 2nd and 3rd interventions respectively. It showed that the intensity for the left trapezius muscle reduced significantly with significance accepted at $p < 0.05$.

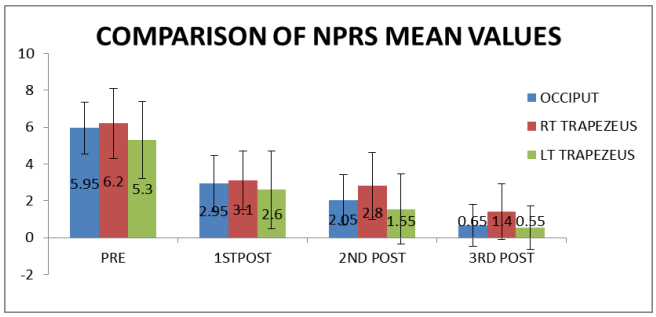

Fig 1

- The mean for the HDI pre-intervention was 35.500 and it reduced to 15.300 post intervention and standard deviation was 13.48488 pre-intervention which reduced to 9.27419 post intervention. It showed that the HDI scoring was significant with significance accepted at $p < 0.05$ and t value 9.045.

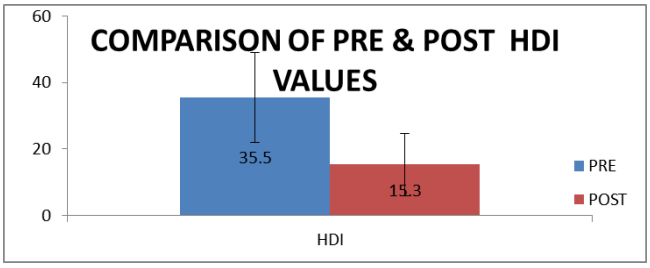

Fig 2

Discussion

In this study, 20 college students participated who were suffering from tension type headache were participated on which INIT intervention was given to each one of them for 3 days in a week. NPRS and headache disability index (HDI) were used as outcome measures. After the analysis, results showed that the sensitivity of trigger points is reduced significantly after treating with INIT.

According to the research done by Lucas KR, Polus BI and Weissmann RD, Myofascial trigger points can cause motor, sensory, and autonomic changes. Frequently, trigger points develop in cervical muscles can refer pain to the head, so they are important in pathogenesis of TTH. Therefore, it would be expected that symptoms of patients with TTH eliminate after treatment of trigger points. Several studies have reported the reduction of symptoms in headache patients after different treatment procedures for trigger points. A complex central mechanism cause pain TTH. Central sensitization of second order neuron in the dorsal horn and in the trigeminal nucleus is an important factor in increased Myofascial sensitivity in patients with TTH.

Positional release technique (PRT) is an effective approach in treating trigger points. There are various researches that support PRT: Wong & Schauer-Alverez (2004) (as cited in Deig 2006) found that strain counter strain on hip tender points and hip joint muscles decreased pain and dysfunction and increased the strength of weak hip muscles, Lewis & Flynn (2001) (as cited in Deig 2006) improvements were found in four case studies of pain and disability. A significant reduction in symptoms was reported through the use of PRT.

PRT can affect the nociceptive system through the relaxation of tissues by the improvement in the vascular circulation, and removal of the chemical mediators of inflammation [11]. PRT may also resolve the decreased pain threshold in spinal cord segments which may reduce the central sensitization as Giamberardino and Fernandez-de-las-penas showed that the trigger points can cause central sensitization.

PRT include INIT which is an effective technique for treating trigger points. In a clinical trial done by Nagrale *et al*. (2010), who compared MET (used alone) with the INIT protocol, on 60 patients with non specific neck pain, aged between 19 to 38 found that there was significant improvements in pain and neck disability and lateral cervical flexion ROM in INIT group. The finding of this study indicates the potential benefit of an integrated approach in deactivating upper trapezius trigger points.

This study is also supported by the study of Ali Ghanbari, Abbas Rahimijaberi on the effect of trigger point management by positional release therapy on tension type headache. Their study was a randomized controlled clinical trial, in which subjects were patents of tension type headache diagnosed by the neurologists but in our study subjects are students with TTH as classified by the international classification of headache disorder. In their study there were 2 groups, PRT group and medication group. The subjects in PRT group were assessed for sensitivity of trigger points at the end of the baseline phase. They received 5 sessions of PRT during 2 weeks (treatment phase each trigger point was treated in a specially defined position of comfort. The position of comfort produced optimal relaxation of the involved tissues. At the end of the treatment phase, the subjects were assessed again for sensitivity of trigger points. After the treatment phase, in follow up they were told to complete daily headache diary for 2 weeks. The result of that study showed that the positional release technique is a good treatment in treating patients with the tension type headache.

But in this study only one group was selected in which INIT, a type of positional release technique was given for only 1 week as the muscles that were chosen was a small group. And the intervention was given over trigger points for 3 days in a week and before and after the treatment sensitivity for trigger points was checked and after the 3rd intervention they were asked to fill the HDI again.

Various researches showed that not only suboccipt and upper trapezius muscles are responsible for the tension type headache but also scalene, sternocleidomastoid, leavator scapulae etc., are also responsible. However, it is not necessary that all of the students should have trigger points in these muscles therefore in this study two major muscles group were taken because trigger points in these muscles were common among all 20 subjects.

This study shows the significant reduction in the sensitivity of the trigger points developed in the suboccipt and upper trapezius muscles responsible for the TTH in the college students. After the treatment protocol, their pain intensity on NPRS for each trigger point effectively reduced and their headache frequency also reduced significantly.

Therefore it is seen that the trigger points can be successfully treated with the INIT. This study suggests that the INIT is effective on the pathogenesis of TTH in college students.

Clinical Relevance

The findings of this study suggest that the integrated neuromuscular inhibition technique can be a treatment of choice for the patients suffering from tension type headache

Limitation of the study

Various researches showed that not only suboccipt and upper trapezius muscles are responsible for the tension type headache but also scalene, sternocleidomastoid, leavator scapulae etc., are also responsible. However, it is not necessary that all of the students should have trigger points in these muscles therefore in this study these two major muscles group were taken because trigger points in these muscles were common among all 20 subjects.

Study was performed on a relatively small sample size (n=20).

Data collected was from a specific geographical region hence the result could not be generalized.

Future Research

- Future research with larger sample size can be undertaken.

- More muscle groups can be considered.

Conclusion

This study shows the significant reduction in the sensitivity of the trigger points developed in the suboccipu and upper trapezius muscles responsible for the TTH in the college going students. After the treatment protocol, their pain intensity on NPRS for each trigger point effectively reduced and their headache frequency also reduced significantly. The integrated neuromuscular inhibition technique can be a treatment of choice for the patients suffering from tension type headache.

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