



Available online freely at www.isisn.org

Bioscience Research

Print ISSN: 1811-9506 Online ISSN: 2218-3973

Journal by Innovative Scientific Information & Services Network



RESEARCH ARTICLE

BIOSCIENCE RESEARCH, 2019 16(2): 1468-1473.

OPEN ACCESS

The Efficacy Of Trigger Point Laser Puncture On Tension Headache

Hend S. Shokry¹, Lilian Albert Zaki¹, Ghada M. Koura^{1,2} and Ahmad M Kholeif³

¹Physical Therapy Department for Orthopaedic, Faculty of Physical Therapy, Cairo University, Egypt.

²Medical rehabilitation department, faculty of applied sciences, KKU

³Orthopaedic Surgery Department, Faculty of Medicine, Cairo University, Egypt.

*Correspondance: salma7sh@hotmail.com Accepted: 09 Mar. 2019 Published online: 18 May 2019

Abstract: Patients with Tension headache exhibit increased presence and tenderness of myofascial trigger point (MTrPs). Low level laser (LLL) Techniques considered effective therapy techniques in treatment of (MTrPs). Yet difference in efficacy of LLL and other modalities are not evaluated formally. The purpose of this study was to assess the effectiveness of trigger point laser puncture by comparing it with a standard technique such as myofascial release in treating the patients with (TTH). Methods: 40 females' patients had participated in this study and they were randomly assigned in two groups (group A, B). With age ranged from 25 to 39 years. Group (A) consisted of 20 patients with mean age 30.8± years, received Myofascial trigger point Release technique. Group (B) consisted of 20 patients with mean age 31.5 years, received low level laser puncture and the same Myofascial trigger point Release which applied to group (A) . Outcome measures: Headache disability index to assess the distress and disability that are experienced as a result of chronic headaches and Pressure pain algometer for PPT. Result: The results revealed that there was no significant difference between myofascial release (MFR) and low level laser Techniques on (TTH). Conclusion: Both modalities were shown to be effective in reducing pain level of headache and improving MTrPs in patients with (TTH)

Keywords: Tension headache, myofascial release, low level laser, MTrP

INTRODUCTION

Tension-type headache (TTH) is essentially defined as bilateral headache of a mild-to-moderate headache intensity, a pain that is described as 'pressing' and 'tightening' and can occur with differing frequencies and durations. The frequency threshold for having CTTH is defined as having headache on more than 15 days per month without a known medical cause .(Baldry, P,2005). in the pathology of TTH and located in the muscles of the head and neck, In recent years the myofascial trigger point (MTrP) has become a site of interest whose pattern of referred pain is propagated to certain regions of the head. Patients with TTH exhibit increased presence and tenderness of MTrPs in pericranial

muscles. There is evidence to suggest that the presence and pain sensitivity of MTrPs are sufficient to make distinctions between headache and non-headache populations. (Coupe, 2007; Fernandez-De-Las-Peñas C, 2007,).The presence of trigger points characterize the Myofascial Pain Syndrome (MPS), which is a neuromuscular disorder characterized by sensitive regions in tense muscle band, which takes the muscles to a state of shortening or contracture, with an increase of the tone and rigidity which could be the cause or be associated to the Tension-Type Headache (TTH). (Guyton AC, 2006; Yeng LT, 2003; Bigongiari A, 2008). Resent Researches relating to the tension type headaches has focused on the different treatment modalities

Physical therapy is the most used nonpharmacological treatment of TTH and includes the improvement of posture, relaxation, exercise programs, hot and cold packs, ultrasound and electrical stimulation, but the majority of these modalities have not been properly evaluated (Jensen and Roth, 2005) such as manual therapy. (Bodes-Pardo G¹, 2013), laser acupuncture, (Narges Sadat Ebneshahidi, 2012). It can be concluded that there is a huge contrast between the widespread use of physical therapies and the lack of robust scientific evidence for efficacy of these therapies, and that further studies of improved quality are necessary to either support or refute the effectiveness of physical modalities in TTH (Biondi, 2005; Lenssinck et al., 2004). Myofascial release therapy is a gentle blend of stretching and massage, which uses hands-on manipulation of the muscle to promote healing and relieve pain. Using this technique to ease pressure in the fibrous bands of connective tissue, or fascia, (Manheim et al., 2001). and restore the normality of neuromuscular function, and may provide relief of tension headache in the short and long term, reducing the frequency of episodes, increased range of motion of the cervical spine and lower use of drugs, as it has fundamental techniques for disabling TPs and their symptoms, whereas the TTH is secondary to thereof. (Yeng LT et al., 2003; Rayssilane Cardoso de Sousa,; Medeiros AA et al, 2012; Castien RF et al, 2009; Alonso-Blanco C et al, 2012). So Myofascial Release is being used to treat patients with TTH (Baldry, 2005; Stanborough, 2004; Richter and Hebgen, 2009). Uemoto et al, 2013 and other authors (Kannan P, 2012; Carrasco TG, 2009; Simunovic Z, 1996) have observed satisfactory results with low-level laser therapy in the deactivation of MTPs when applied correctly. The aim is to regulate physiological cell functions (Lizarelli RFZ, 2003), mediate inflammatory processes, enhance the tissue repair process, and promote analgesia in cases of acute or chronic pain (Venancio RA, 2002; Sanseverino NTM, 2001). When applied to the region of MTPs, laser therapy improves local microcirculation, favors the supply of oxygen to cells with hypoxia and helps remove the waste products of cell metabolism, thereby breaking the vicious cycle of pain, muscle spasm and further pain (Simunovic Z, 1996). According to Venancio et al., 2002 wavelengths in the range of 780–904 nm (infrared spectrum) are the most indicated for the deactivation of MTPs owing to the greater penetration into the tissue. However, Ilbuldu et al,

2004 obtained satisfactory results using a lower electromagnetic spectrum (632.8 and 730 nm, respectively), which leads one to believe that the dosage should also be considered. Indeed, according to Simunovic, 1996, the optimum dose applied directly to the target area is even more important than the wavelength, as under- or over-irradiation can inhibit the effect. The author recommends lower doses and an increased application frequency for the treatment of chronic pain. Therefore; the objective of our study was to predict the efficacy of LLL on tension type headache. So this study may help clinical practitioners as an easy, non harmful, non painful technique other than myofascial release on MTrPs in patient with tension type headache.

MATERIALS AND METHODS

Forty female patients were assigned randomly using the sealed envelope method of randomization into two groups (A, B). Group (A): Twenty patients who received myofascial trigger point Release therapy, Group (B): Twenty patients who received laser-puncture therapy and the same Myofascial trigger point Release which applied to group (A). Inclusion criteria: their age ranged from 25-39 years, Headache described as a continuing “dull ache” or “pressing/tightening” Patients suffer from frequent tension-type headaches, Bilateral headache pain that is usually located in the frontal, occipital, or sub occipital regions of the head and Two or more tension-type headaches episodes a week for the past three months. Exclusion criteria includes, Diagnosis of fibromyalgia syndrome according to the American College of Rheumatology (Wolfe et al., 1990), History of a whiplash injury, History of cervical spine surgery, Diagnosis of cervical radiculopathy or myelopathy determined by their primary care physician. All participants were given a full explanation of the treatment protocol and a written informed consent form giving agreement to participation and publication of results was signed by the patients. During 6 weeks of treatment, the patients in the two groups received 18 sessions, 3 session/week.

Low level laser therapy:

(AZA L.R, LASER 904nm) with wave length 904 nm, maximal power 27W, frequency ranged from 1 Hz up to 1000 Hz and 0.07 cm² spot area was used in this study.

Myofascial release therapy

Patients in both groups were received the same myofascial release protocol, Both groups were treated under the same conditions and the patients treated individually to avoid influencing one another.

Outcome measures:

Pressure pain algometer (Algometer dolorimeter Baseline) was used to detect and confirm the site and sensitivity of trigger points by determining the pressure pain threshold (PPT) using a pressure gauge probe.

Headache disability index to quantify the impact TTH has on daily living the HDI was administered as described by (Jacobson GP, Ramadan NM, 1994).

RESULTS

The current study was conducted on 40 participants. They were assigned into two equal groups. The current test involved two independent variables. The first one was the (tested group); between subjects factor which had two levels (group A receiving myofascial release only . and group B receiving 904 nm Ga-As I.R laser with 3J / point for 90 sec and myofascial release). The second one was the (measuring periods); within subject factor which had three levels (pre treatment, post one of treatment, and post two of treatment). In addition, this test involved eleven tested dependent variables (PPT for left and right Upper Trapezius, Splenius Capitis, Splenius Cervicis, suboccipital muscles,

sternocleidomastoid muscle, HDI scores). Measurements was taken at the beginning of study (pretreatment) and at the end of 6weeks and once more after 4 weeks as follow up.

Overall effects

Statistical analysis indicated that there were significant effects of the tested group on the PPT for left and right (Upper Trapezius, Splenius Capitis, Splenius Cervicis, suboccipital muscles, sternocleidomastoid muscle), and HDI scores.

The results of the current study demonstrated that regarding to the results of the study; it revealed that after treatment all patients had improvement in headache reduction, MTrP improvement. After two weeks follow up revealed that there was no significant difference of the values between both groups which had improvement in headache index score and of MTrP. And revealed that regarding to pain through assessment of PPT in left and right (Upper Trapezius, Splenius Capitis, Splenius Cervicis, suboccipital muscles, sternocleidomastoid muscle) there was significant difference of the median values of the "post 1" test between both groups with ($Z=-5.323$, $p=0.0001^*$) and this significant reduction in favor to group (B) in compared to group (A). Additionally, multiple pairwise comparison tests (Post hoc tests) revealed that there was no significant difference of the median values of the "post 2" test between both groups. So the total results that we had significant improvement within all groups.

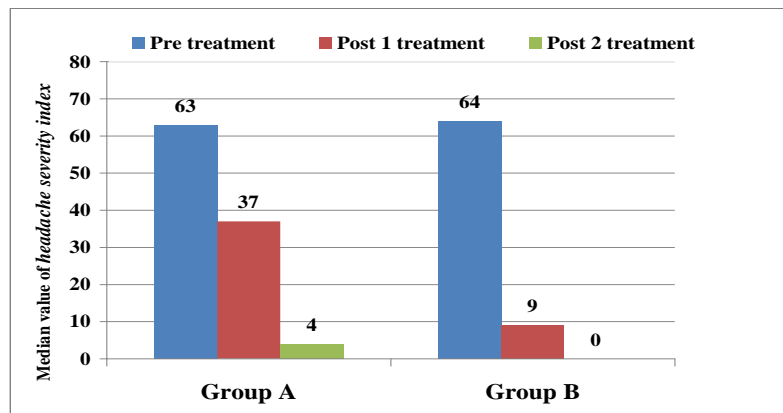


Figure.1 Median values for headache severity index among different measuring periods at both groups

DISCUSSION

Based on the literature reviews upon our knowledge this is the first study that compare laser with myofascial release techniques all previous studies that discussed tension headache used only manual therapy, trigger point injection, Transcranial magnetic stimulation, Acupuncture.

The results of the current study revealed that regarding to pain through assessment of PPT in left and right (Upper Trapezius, Splenius Capitis, Splenius Cervicis, suboccipital muscles, sternocleidomastoid muscle) there was significant increase in PPT ($p < 0.05$) in the (pre vs post1), pre vs post2, but no significant difference between post1 vs post2 within both groups, and this also ensured through HDI scores as there were significant decrease in HDI score in the pre vs post1, pre vs post2, but no significant difference between post1 vs post2 Within all groups. So the total results that we had significant improvement within all groups. So Symptoms of chronic tension-type headache abated significantly, and the effects were sustained through the follow up period of four weeks.

The finding of the current supported to those finding of laser therapy which has been shown to treat sinus headaches, cluster headaches, tension headaches, migraines, and cervicogenic headaches. It does this by increasing local microcirculation, increasing the levels of serotonin in the blood (the body's natural feel good chemical), releasing endogenous opioids (the body's innate pain relieving system), and altering cholinesterase levels (the enzymes needed for proper functioning of the nervous system). (Ebneshahidi NS, 2005). One study found that light therapy increases serotonin and blood flow in patients with TMJ syndrome. All patients reported pain relief, the average pain score decreasing from a 9.1 to a 3.3 (on a scale of 1-10, 10 being the most painful). The serotonin levels of the patients were found to be elevated even three days after each laser therapy treatment. (Tomaz de Magalhães M, 2016). Another study concluded significant improvements in headache intensity, duration of attack, and median number of days of headache per month in 50 people with chronic tension headaches treated with LLLT. (Ebneshahidi NS, 2005). Several concurrent pathophysiological mechanisms may be responsible for chronic tension headache.

This study has limitations that could have affected the results: The current study tests only the short term effects, Small numbers of the patients, lack of objective method to detect the

ideal site of tender point for applying low level laser puncture as we depend only on so there may be some degree of measurement bias. Thus there is a need to investigate if there is an effect of low level laser as an easy, non harmful, non painful technique other than myofascial release on MTrPs in patient with tension type headache Our results suggest that low level laser puncture may be an effective treatment for chronic tension-type headache, but deserves further research.

CONCLUSION

From the finding of the current study it was concluded that after treatment both groups had significant improvement in HDI score and PPT for left and right (Upper Trapezius, Splenius Capitis, Splenius Cervicis, suboccipital muscles, sternocleidomastoid muscle). After four weeks follow up myofascial release group and low level laser group had improvement in HDI score and PPT. and the main outcome of this study is that LLLT decreases MTPs when applied correctly so we advise to use trigger point low level laser puncture as an effective approach in treating patients with tension type headache.

CONFLICT OF INTEREST

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

ACKNOWLEDGEMENT

The authors would like to thank the staff members of physical therapy for department of Musculoskeletal Disorders and its Surgery at faculty of physical therapy Cairo University for their effort and support in this study.

AUTHOR CONTRIBUTIONS

HSS designed and performed the experiments and also wrote the manuscript. LAZ, GMK and AMK performed continuous guidance and suggestions during the performance of experiments, data analysis and reviewed the manuscript. All authors read and approved the final version.

Copyrights: © 2019 @ author (s).

This is an open access article distributed under the terms of the [Creative Commons Attribution License \(CC BY 4.0\)](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author(s) and source are credited and that the original publication in this journal is cited, in accordance with accepted

academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.

REFERENCES

- Alonso-Blanco C, De-La-Liave-Rincón AI, Fernández-De-Las-Peñas C (2012): Muscle triggers point therapy in tension-type headache. *Expert Rev Neurother.*; 12(3): 315-22.
- Baldry, P (2005): Pain in the Head and Face, Tension Type Head Ache, Acupuncture, Trigger Points and Musculoskeletal Pain, third ed.. Elsevier Ltd, .,; pp. 251e270.
- Bigongiari A, Franciulli PM, Souza FA, Mochizuki L, Araujo RC.(2008): Análise da Atividade Eletromiográfica de Superfície de Pontos Gatilhos Miofasciais. *Rev Bras Reumatol.*;48(6):319-324
- Biondi D.M. (2005) Physical treatments for headache: a structured review. *Headache* 45: 738–746
- Bodes-Pardo G¹, Pecos-Martín D, Gallego-Izquierdo T, Salom-Moreno J, Fernández-de-Las-Peñas C, Ortega-Santiago R. 2013, Manual treatment for cervicogenic headache and active trigger point in the sternocleidomastoid muscle: a pilot randomized clinical trial. *J Manipulative Physiol Ther.* Sep;36(7):403-11.
- Carrasco TG, Guerisoli LD, Guerisoli DM, et al. Evaluation of low intensity laser therapy in myofascial pain syndrome. *Cranio.* 2009;27:243–7.
- Castien RF, Windt DAWM, Grooten A, Dekker J (2009): Effectiveness of manual therapy compared to usual care by the general practitioner for chronic tension-type headache: design of a randomized clinical trial. *Cephalalgia.*;31(2):133–143.
- Coupe´, C., Torelli, P., Fuglsang-Frederiksen, A., Andersen, K.V. 2007, January tension-type headache: a double-blinded controlled study. *The Clinical Journal of Pain* 472, 23e27.
- Ebneshahidi NS, Heshmatipour M, Moghaddami A, et al. (2005) The effects of laser acupuncture on chronic tension headache – a randomised controlled trial *Acupuncture in Medicine*;23:13-18.
- Fernandez-De-Las-Peñas C, Cuadrado ML, Pareja JA (2007): Myofascial trigger points, neck mobility and forward head posture in episodic tension-type headache. *Headache.*; 47(5): 662-72
- Guyton AC, Hall JE (2006): *Tratado de fisiologia médica*. 11. ed. Rio de Janeiro: Elsevier.
- Ilbuldu E, Cakmak A, Disci R, Aydin R. (2004) Comparison of laser, dry needling, and placebo laser treatments in myofascial pain syndrome. *Photomed Laser Surg.*;22:306–11.
- Jacobson GP¹, Ramadan NM, Aggarwal SK, Newman CW.(1994): The Henry Ford Hospital Headache Disability Inventory (HDI). *Neurology.* ;44(5):837-42.
- Jensen R., Roth J.M. (2005) Physiotherapy of tension-type headaches. In Olesen J., Goadsby P. J., Ramadan N., Tfelt-Hansen P., Welch K. M., editors. (eds), *The Headaches*. Philadelphia: Lippincott Williams Wilkins, 721–726
- Kannan P. (2012) Management of myofascial pain of upper trapezius: a three group comparison study. *Glob J Health Sci.*;4:46–52.
- Lenssinck M.L., Damen L., Verhagen A.P., Berger M.Y., Passchier J., Koes B.W. (2004) The effectiveness of physiotherapy and manipulation in patients with tension-type headache: a systematic review. *Pain*112: 381–388
- Lizarelli RFZ. In: Lizarelli RFZ, editor. *Protocolos clínicos odontológicos – Uso do laser de baixa intensidade*. São Paulo: Bons Negócios Ed; 2003. p. 10–64
- Manheim, C.((2001)) *Cervical Region, the Myofascial Release Manual*, third ed.. SLACK, Incorporated, pp. 98e113
- Medeiros AA, Lima BRDA, Siqueira DF (2012): A eficácia da fisioterapia manual na cefaléia tensional: uma revisão sistemática. *Rev Ter Man.*; 10(47): 100-104.
- Narges Sadat Ebneshahidi, Mojtaba Heshmatipour, Alireza Moghaddami, Payam Eghtesadi-Araghi, 2005; The effects of laser acupuncture on chronic tension headache – a randomised controlled trial; *Acupunct Med* 23: 13-18
- Rayssilane Cardoso de Sousa, Ludmilla Karen Brandão Lima de Matos.(2014) The myofascial release and the treatment of tension headache induced by trigger points. *MTP&RehabJournal* 12
- Richter, P., Hebgen, E (2009): *Muscles of Head and Neck Pain, Trigger Points and Muscle Chains in Osteopathy*. Thieme, pp.,. 125e144.
- Sanseverino NTM.(2001) Clinical evaluation of

- the antalgic action of the low level intensity of gallium arsenide and aluminium laser in the treatment of the temporomandibular disorders. Master Thesis. São Paulo University; p. 122.
- Simunovic Z. (1996) Low level laser therapy with trigger points technique: a clinical study on 243 patients. *J Clin Laser Med Surg.* 14:163–7.
- Stanborough, M (2004): *Towards the More Effective Treatment of Headaches, Direct Release Myofascial Technique*, first ed..Elsevier Limited.
- Tomaz de Magalhães M1, Núñez SC2, Kato IT3, Ribeiro MS4. (2016) Light therapy modulates serotonin levels and blood flow in women with headache. A preliminary study. *Exp Biol Med (Maywood)*. Jan;241(1):40-5.
- Uemoto L, Garcia MAC, Alfaya TA, et al. (2013) Laser therapy and needling in myofascial trigger point deactivation. *J Oral Sci.*;55(2):175–81.
- Venancio RA, Camparis CM, Lizarelli RFZ. Laser no tratamento de desordens temporomandibulares. *JBA.* 2002;2:229–34
- Wolfe F, Smythe HA, Yunus MB, Bennett RM, Bombardier C, Goldenberg DL, et al.(1990) The American College of Rheumatology 1990 criteria for the classification of fibromyalgia: report of the Multicenter Criteria Committee. *Arthritis Rheum*;33: 160 –72
- Yeng LT, Kaziyama HH, Teixeira MJ (2003): Síndrome dolorosa miofascial. *JBA.*;3(9):27-43.