Original Article

Conventional physical therapy with low level laser therapy on pain and functional disability in patients of upper trapezius muscle trigger point

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Objective: To compare the effectiveness of conventional physical therapy with and without low level laser therapy on pain and functional disability in patients with trigger point of upper trapezius.

Methodology: This single blind randomized control trial was conducted at Health Care Physiotherapy, Sports, Spine & Rehabilitation Center, Faisalabad, Pakistan. Patients were placed into 2 groups using computer generated randomization sheet. Patients in group 1 were treated with low-level laser therapy with conventional physical therapy, while group 2 patients received only conventional physical therapy. Outcome measures were Numeric Pain Rating Scale and Neck Disability Index. SPSS version 21 was used for data analysis.

Results: Out of 62 patients, 12(19.35%) were male and 50(80.65%) female. There were 31 patients in each group. Mean age in the group was 27.81±7.72 years. There was statistically significant difference among two groups with respect to any parameter ($p<0.05$).

Conclusion: Conventional physical therapy with low level laser therapy was found more effective in reducing pain and functional disability in patients with trigger point of upper trapezius. (Rawal Med J 202;45:854-856).

Keywords: Intramuscular, trapezius, trigger points.

INTRODUCTION

Cervical pain is common in Pakistan, there is 54% prevalence of neck pain recorded over a period of six months amongst them 37% had persistent symptoms.[1] Trigger points (TRP) are considered as the main cause of pain in office employees and most commonly occurs due to prolonged contractions of muscles in static.[2] Trigger points are the subjective marker of the Myofascial Pain Syndrome. Trigger point has some distinguishing features like tender point within a tight band of muscle, the local twitch response (LTR) to physical stimuli, the referral of pain pattern and pain from TRP can lead to persistent pain disorders.[3]

Trigger points can be active or latent.[4,5]There is three points criteria for diagnosis of TRPs, one symptom based and two palpatory. Criteria are: 1) hypersensitive spot, 2) taut band and 3) referred pain.[6]Different techniques are being used in treating TRP e.g. correcting the causative factors and doing symptomatic management. These include contract relax passive stretch, contract relax active stretch, dry needling, spray and stretch and trigger point release therapy. They are also managed by osteopathic manual medicine, hot or cold therapy, and diathermy with strengthening exercises.[7]

Low level laser therapy (LLLT) occasionally referred to Photobiomodulation (PBM) is a low level intensity light treatment which results in photochemical effects, not thermal. This light produces biochemical variations inside the cells that are homologous to phenomenon of photosynthesis occurring in plants. The best penetrating wavelengths for TRP are between 760–850nm. These wavelengths gain light intensity of 5mW/cm2. Physiological effects of LLLT cause decrease in tenderness and relax contracted fibers of TRP.[8] The primary objective of this study was to evaluate effectiveness of conventional physical therapy with or without LLLT on pain and functional disability in patients with trigger point of upper trapezius.

METHODOLGY

An assessor blinded randomized controlled trial was conducted at Health Care Physiotherapy, Sports, Spine & Rehabilitation Center, Faisalabad, Pakistan. Sample comprised of patients of both

genders in the age range of 18-55 years diagnosed with active upper trapezius TRP.[9] After obtaining approval from the ethical committee of The University of Lahore, sample size was calculated by using previous published literature with the help of following formula:[10] $n= 2\alpha\ 2[Z1- \alpha/2 + Z\ 1- \beta]/ (\mu 1- \mu 2)2$. Sample size of 54 patients was taken (27 in each group). By adding 20%, dropout rate total sample size taken was 64 (32 in each group).

Patients were recruited using non-probability, purposive sampling technique and were divided into two groups using computer generated randomization sheet. Informed consent was taken from all subjects. Patients in group 1 were treated with LLLT and conventional physical therapy, while patients in group 2 were treated with conventional physical therapy only. LLLT was provided with pen probe by setting these parameters: wavelength of 820nm, power of 200mW, pulse rate of 2.5Hz, energy transfer of 24 Jcm^{-2} for 15 sec.[11] Conventional physical therapy group followed the recommendations for neck pain by the Standard Chartered Society of Physiotherapy.

Each patient was asked to perform active ROM exercises of cervical flexion, lateral flexion, extension and rotation for 5 times bilaterally with holding each position at end-range for 5 seconds.[12] Patients were given 12 sessions on alternative days for 1 month with 3 sessions given in each week. All participants received total twelve treatment sessions for four weeks. Protocol violation was dealt with intention to treat analysis. Assessment was made at baseline, 2 weeks after intervention and 4 weeks after intervention. There were 3 dropouts in group 1, whereas group 2 had dropouts. We used Numeric Pain Rating Scale (NPRS) and Neck Disability Index (NDI) to measure pain and functions.

Statistical Analysis: Data were analyzed with SPSS version 22. For each outcome measure Independent sample t-test was applied.

RESULTS

Out of 62 patients, 7 dropped. Mean age was 27.81+7.722 (range 18-52). Out of a total sample of 62 patients, 12(19.35%) were male and 50(80.65%) female. 25(40.32%) patients had no radiating pain while 37 (59.68%) had radiating pain. 53(85.48%) patients were experiencing intermittent pain while 9(14.52%) were having constant pain. Amongst the total sample of 62 patients, 21(33.87%) were working for 7-8 hours being the highest majority of the sample. 17(27.42%) patients amongst the sample were working for 9-10 hours another 17(27.42%) patients were working for 11-12 hours. 6(9.68%) patients were working for 5-6 hours. Only 1 patient was working from 3-4 hours. All patients female or male were working persons.

Table. Group comparison for mean change in NPRS and NDI at baseline.

Session	Group 1 (Mean± S.D)	Group 2(Mean± S.D)	p value
NPRS at Baseline	4.55±.938	4.72±1.222	.518
NPRS at week 2	1.93±1.387	3.00±1.209	.003
NPRS at week 4	.34±.769	1.93±1.072	.000
NDI at Day 1	20.04+3.958	18.93+4.341	.399
NDI at week 2	10.89+2.973	12.00+3.385	.203
NDI at week 4	1.93+1.804	7.15+2.445	.000

There was no significant difference observed in NPRS score at baseline and at 4 week follow up between both groups ($p>0.05$). But, significant difference was found in NPRS score at 2nd week follow up between 2 groups ($p<0.05$). There was no significant difference observed in NDI scores at baseline and at week 2 between both groups ($p>0.05$). But, significant difference was found in NDI scores at week 4 between both groups with p value being less than 0.05 (Table).

DISCUSSION

There was no significant difference of means observed in pain levels at day 1. But, significant difference of means was observed between the groups at week 2 and week 4. This indicated the effectiveness of LLLT with conventional physical therapy. A research compared the effectiveness of laser, placebo laser and dry needling in myofascial pain syndrome and found similar findings of decrease in pain after one month who were subjected to 632.8 nm He-Ne Laser.[13]

In current study, significant improvement in NDI scores was noted at week four between group 1 and 2 as measured by Independent Sample t-test.

Likewise, results were found in a study which evaluated the effects of LLLT and chiropractic manipulative therapy (CMT) in treatment of cervical facet dysfunction. Patients were placed in 3 groups: 1st group underwent CMT, 2nd group LLLT and 3rd group CMT and LLLT both. Improvements in all outcome measures (primary and secondary both) including NDI were observed in all 3 groups. CMT and LLLT group was found most effective in improving NDI and NPRS.[14]

CONCLUSION

Conventional physical therapy and LLLT used in combination were more effective in decreasing pain and functional disability than conventional physical therapy used alone in patients of trigger points of upper trapezius.

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REFERENCES

1. Côté P, Cassidy JD, Carroll L. The Saskatchewan health and back pain survey: the prevalence of neck pain and related disability in Saskatchewan adults. Spine. 1998;23:1689-8.
2. Lee JH, Han JT. The dose-dependent effect of an 830-nm, 450-mW low-level laser therapy on the myofacial trigger point of the upper trapezius muscle: a randomized, double-blinded, clinical trial. J Phys Ther Sci. 2011;23:933-5.
3. Dommerholt J, Mayoral del Moral O, Gröbli C. Trigger point dry needling. J Man ManipTher. 2006;14:70-8.
4. Hanten WP, Olson SL, Butts NL, Nowicki AL. Effectiveness of a home program of ischemic pressure followed by sustained stretch for treatment of myofascial trigger points. Phys Ther. 2000;80(10):997-1003.
5. Ibáñez-García J, Alburquerque-Sendín F, Rodríguez-Blanco C, Girao D, Atienza-Meseguer A, Planella-Abella S, et al. Changes in masseter muscle trigger points following strain-counterstain or neuro-muscular technique. J Bodyw Mov Ther. 2009;13:2-10.
6. Gerwin R. Trigger Point Diagnosis: At Last, the First Word on Consensus. Oxford University Press; 2017.
7. Alvarez DJ, Rockwell PG. Trigger points: diagnosis and management. Am Fam Physician. 2002;65:653-6.
8. Cotler HB, Chow RT, Hamblin MR, Carroll J. The use of low level laser therapy (LLLT) for musculoskeletal pain. MOJ Orthop Rheumatol. 2015;2:47-3.
9. Laakso El, Richardson C, Cramond T. Pain Scores and Side Effects in Response to Low Level Laser Therapy (Lllt) For Myofascial Trigger Points. Laser Therapy. 1997;9:67-2.
10. Bron C, Franssen J, Wensing M, Oostendorp RA. Interrater reliability of palpation of myofascial trigger points in three shoulder muscles. J Man Manip Ther. 2007;15:203-5.
11. Javaid HM, Ahmad A, Ajmad F, Liaqat S, Tahir S. Effects of Conventional Physical Therapy with or without Strain Counterstain in Patients with Trigger Points of Upper Trapezius; a Randomized Controlled Clinical Trial. Ann King Edward Med Univ. 2016;8:22-3.
12. Ilbuldu E, Cakmak A, Disci R, Aydin R. Comparison of laser, dry needling, and placebo laser treatments in myofascial pain syndrome. Photomed Laser Surg. 2004;22:306-1.
13. Ceccherelli F, Altafini L, Lo GC, Avila A, Ambrosio F, Giron GP. Diode laser in cervical myofascial pain: a double-blind study versus placebo. Clin J Pain. 1989;5:301-4.
14. Dundar U, Evcik D, Samli F, Pusak H, Kavuncu V. The effect of gallium arsenide aluminum laser therapy in the management of cervical myofascial pain syndrome: a double blind, placebo-controlled study. Clin. Rheumatol. 2007;26:930-4.