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LOW BACK PAIN;

EFFECTIVENESS OF TENS WITH OR WITHOUT STANDARD PHYSIOTHERAPY TREATMENT

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ABSTRACT… Background: TENS is widely used for the relief from pain this procedure was first observed by Luigi Galvani in 1970. Low back pain is the commonest problem for the majority of the population; most of the people have non-specific and mechanical lower back pain so the physiotherapist can easily treat the low back pain by applying the Transcutaneous electrical nerve stimulation because it works through pain gate theory and opioids mediated theory. **Objectives:** The aims and objectives of this study are to show the effectiveness and the efficacy of TENS among the physiotherapist for the management of pain along with manual therapy techniques. **Design of study:** A retrospective study was conducted. **Study Design:** Retrospective study. **Setting:** OPD of IPRS LUMHS, Jamshoro. **Period:** Six (06) months from July to December 2015. **Methods and Materials:** The sample was randomly selected with 75 patients of nonspecific chronic low back pain. **Database**: APTA, Pub Med, Google scholar. **Results:** The Results present the effectiveness of TENS by showing the significance p-value i-e 0.00 of pain intensities before and after treatment intervention. **Conclusion:** This study was done to look for the effectiveness of TENS with or without standard physiotherapy treatment the results of this study show the effectiveness of TENS for the alleviating of pain but still there is room for research on this topic to find out the efficacy of the treatment in much more depth and details.

Key words: TENS, Low back pain, Pain gate theory, and opioid mediated theory.

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INTRODUCTION

The Transcutaneous electrical nerve stimulation (TENS) is an electrical modality that is widely used as a physical therapy treatment for reduction of pain.[1] TENS is a commonly used as a non-pharmacologic and a non-invasive treatment for pain. Studies have shown that TENS can reduce both the acute and chronic pain from a number of different causes.[2]

Electrical stimulation is not a novel procedure and in 1970 Luigi Galvani first observed motion after applying electrical wires to leg muscles served from the body of frogs. In 1831, Michael Faraday showed that electrical currents can be used to stimulate nerves to create active movements and one of the earliest experiments for the stimulation of peroneal nerve in the leg was used to correct foot drop in patients with stroke.[3] Further deep into the history use of the electrical stimulation heal dates back to as far as 4000 years to ancient Egyptians (2500 B.C) and Romans back (46 A.D) used to administer shocks to treat different types of pain.[4] TENS is one of the most frequent causes for medical visits to physicians and emergency department with estimation of about 61 million visits alone in 2007, ranging highly increased in number from 15 million in 1990.[5]

In TENS the two procedures commonly used are prolonged stimulation at low intensities through an active electrode over the painful area and stimulation at higher but not painful intensities over the painful area for short time.[6] TENS has been used to alleviate the post-operative pain and numerous forms of chronic pain with reportedly good results.[7] The mechanism on which the TENS works is to induce analgesia in correlation with the pain gate theory and the release of endogenous opioids.[8] As discussed

by Gourav, Banerjee and Mark in 2013 that TENS technique causes the release of a variety of neurotransmitters in the central nervous system including opioids (endorphins), serotonin (5-HT), acetylcholine (Ach),nor-epinephrine, and gamma-amino butyric-acid (GABA).[4]

Further, it is thought that TENS induced pain relief may be augmented by dilation of local blood vessels. In the study Barbara, Amy and Lisa (2012) discussed the parameters of Electrical Stimulation (TENS) that are Frequency, Ramping of stimulation frequency, Pulse width/duration, Amplitude/ intensity.[3]

As discussed by Banarjee and Johsnon, (2015), that TENS is used for symptomatic relief of mild to moderate pain of any origin including nociceptive, neuropathic and musculoskeletal. TENS can be used to produce non-analgesic physiological effects and has been found to benefit in the management of post-operative treatment. TENS and the accessories are inexpensive, with ease of use and can be purchased by individual over the counter. Individuals can use TENS for self-management according to the severity of the treatment of the painful condition.[4]

Lower back pain (LBP) being the most common reasons for the medical visits to physician and emergency with an increase amount of money spent by the patients to find out a cheap treatment for the cause.[5] TENS which is widely used by physiotherapists worldwide as treatment for the mechanical low back pain with fruitful outcomes and patients satisfaction. This article discusses the effectiveness of TENS for the management of lower back pain with the outcomes to manage pain and patient satisfaction. The Bandolier evidence-based health care web site relies on one of these review conclusions as the best available evidence and states: ''Clinical bottom line: TENS is an effective method of pain relief''.[6]

MATERIALS AND METHODS

A retrospective study was conducted in the OPD of Institute of Physiotherapy and Rehabilitation Sciences (IPRS), in Liaquat University of Medical & Health Sciences (LUMHS), Jamshoro, Pakistan. And as being a retrospective study ethical committee approval was not required as patients were not accessed directly. The duration of the study was 6 months form July till December 2015, with the sample population of 75 patients in total. The sample selected was entirely on the inclusion and exclusion criteria defined. According to the research question regarding the effectiveness of the TENS in patients with low back pain the inclusion and exclusion criteria was clearly defined.

All the patients that were included in the study were 18 years or above adults and all the patients below the level were excluded. The criteria for back pain was specified to nonspecific/ non pathological pain and only confined to the lumbar region and all other pathologies or pain due to secondary injury, trauma or presenting underlying diseases were all on the excluded. The mechanical pain with sub-acute and chronic conditions were included with all other pain due to acute conditions were excluded with articles limiting to only English language. The TENS along with standard physiotherapy treatment were included and all other therapies like massage, acupuncture and so on all were excluded. Patients overall pain relief and satisfaction were the possible outcomes.

Statistical Methods or Data analysis

This study was focused on the effectiveness of TENS along with standard physiotherapy treatment that shows how much this intervention gives the relief from mild, moderate or severe intensities of non specific lower back pain. Our research was conducted on a sample size of 75 patients that were randomly selected. So the data was entered and analyzed on SPSS version 16. The Percentage values of pain intensities before and after the treatment intervention and Chi square test were applied to the variables for finding the difference between pain intensities before and after the treatment intervention.

RESULTS

The Visual Analogue Scale (VAS) was used

to know the pain intensities before and after treatment intervention. The visual analogue scale has been squared range from 0 to 10. As 0 score indicates no pain, 1-3.4 scores indicates mild pain, 3.5-6.4 scores indicates moderate pain and 6.5-10 scores indicates severe pain.[9]

So the percentages of pain intensities before treatment intervention are 21.3% patients suffer from mild pain (1-3.4 VAS Score), 40.0% patients suffer from moderate pain (3.5-6.4 VAS Score) and 38.7% patients suffer from severe pain (6.5-10 VAS Score). There were patients with no pain (0 VAS Score) as per according to the inclusion criteria.

As shown in a Table-I attached at the end after the references. TENS as a treatment intervention was applied on patients, and the outcome shows a significant reduction or complete relief from pain. As the results show 65.3% patients have no pain (0 VAS Score), 29.3% patients have mild pain (1-3.4 VAS Score) and 5.4% patients have moderate pain (3.5-6.4) but there is no patient with the complaint of severe pain intensity (6.5-10) due to the effectiveness of the treatment intervention as also shown in a Table-I. On the other hand Chi square test applied to the variables that show significant value as shown in Table-II attached at the end of references.

	Score of VAS	Frequency	Percent
Before Treatment Intervention	0 Score of VAS	0	0
	1-3.4 Score of VAS	16	21.3
	3.5-6.4 Score of VAS	30	40.0
	6.5-10 Score of VAS	29	38.7
	Total	75	100.0
After Treatment Intervention	0 Score of VAS	49	65.3
	1-3.4 Score of VAS	22	29.3
	3.5-6.4 Score of VAS	4	5.3
	6.5-10 Score of VAS	0	0
	Total	75	100.0

Table-I. Showing Score of VAS before and after Treatment intervention.

Chi-Square Tests			
	Value	df	P-Value
Pearson Chi-Square	31.915	4	.000

Table-II. Showing significant value

These applied test and percentages to the variable indicating an effectiveness of intervention (TENS) for the treatment of nonspecific chronic lower back pain. Those patients who suffer from high intensities of pain, according to the visual analogue scale of pain (VAS) were getting the relief or reduce the pain after applying the treatment intervention.

DISCUSSION

The aims and objectives of this section are to discuss the effectiveness of TENS with or without standard physiotherapy treatment in the conditions of mechanical low back pain. TENS is used widely in a number of physiotherapy treatments with marked improvement in the symptoms of client.[1] TENS widely used as a pain relief procedure that is non-pharmacological and non-invasive and can reduce pain in acute, sub-acute or chronic conditions.[2]

TENS along with the standard physiotherapy treatment is widely used in the physiotherapy treatment and is a must tool that is required by a physical therapist. This study aimed at the general outcomes that are mostly the cause of disability in patients with low back pain. The outcomes on which this was defined, was to access the level of pain and the overall satisfaction of the patient. The Indian Journal provides a review on the TENS as the aid of pain management on the basis of their results Banarjee and Johansson's states that TENS is a non-invasive, safe and economical electrotherapeutic treatment used globally to relieve pain.[4] In another Randomized control trial by Ru-Lan Hsieh and Wen-Chung Lee (2002),

also stated about the benefits and effectiveness of TENS as the treatment of lower back pain.[10]

The research study that was conducted showed a marked difference in the reduction of pain levels and a great improvement in overall patient satisfaction was noted. The population before treatment that suffers from mild pain was 21.3%, from moderate were 38.7% and sever pain patients were 38.7%. The population were treated with TENS equally with and without standard physiotherapy treatment that resulted in marked reduction of overall pain levels in all the groups. The reduction level in pain impacted globally on the patients overall satisfaction. With TENS 65.3% of the patients were symptom free while 29.3% were having mild pain and 5.4% had moderate intensity of pain as well as significant p-value represents strong effectiveness of treatment intervention. The use of TENS globally affected the overall pain levels of the patients with most of the patients benefitting from the treatment and the intensity ratio of pain decreased in general.

The researches done in the past few years addressed the effectiveness of TENS in adjunct to other physiotherapy interventions. Studies showed a marked difference in the use of TENS with other form of therapies and resulted in the improvement of the overall patient condition. The studies done in the past were also in adjunct to the treatment of TENS for example manual mobilization, massage, stretching, and exercise intervention and so on. TENS works through Pain gate theory as Melzak and Wall proposed the Gate theory in 1965, Gate control theory based on the nervous system (including CNS and PNS) involves two sets of Afferent (incoming) nerve fibers that enter the spinal cord. One is A-beta fibers – large diameter, faster, carries touch sensation, and other is C and A-delta fibers – smaller diameter, slower, carry pain sensation. When the TENS is applied to the painful area so the transmitting of the pain signals that is carried by the C and A- Delta small diameter and slower fibers inhibited by the stimulation of A-beta large diameter, faster and proprioceptive nerve fibers that overridden of nerve impulses causing closure the gate of pain perception to the brain.[4]

Another theory Opioid mediated control theory are present it states that the brain can secrete its own analgesic (body's pain killer) substance named as endorphins.[11] Electrical stimulation increases the secretion of endorphins and circulating it in the CSF of patients and causing relieve from pain.[11] As we know low back pain is one of the most common illness patient's reports with to the physician or primary clinician. As an estimate report of low back pain to the physician or emergency departments are estimated 61 million visits in 2007 that is hugely increased up from 15 million in 1990.[5] This figures shows that there is a huge number of back pain from 90's till the present. The one of the reason of this could be adapting a more mechanical dependant or sedentary life style and reduction in physical activity that was being carried out in the era of 90's.[12] Adapting a more sedentary life style is leading us towards morbidity and it is said that sedentary life style has worse impact on health status. Lack of physical activity is responsible for slow down the metabolic rate.[13]

Anabolic and catabolic activity plays a major role to repair the body's cell damage naturally and due to no or less physical activity with faulty mechanical alteration or adopting bad posture for longer time period can lead first towards the non specific pain and then develops the co morbidities.[14] Physical activity has a long been regarded as an important component of healthy lifestyle.[15] Engaging in a regular/systematic physical activity has many beneficial effects, such as decreasing the risk of cardiovascular disease, through reducing cholesterol levels and having stable lipid management.[7] Regular exercise increases the muscle mass thereby strengthening the bones and in consequence affecting those muscles responsible for maintaining body balance and coordinating movement.[14]

Physiotherapy treatment must include the intervention of TENS before any manual therapy or exercises to reduce or eliminate pain and spasm. Muscle spasm is a protective mechanism of muscle

that tries to stop or reduce the muscle activity to prevent the muscles from further damage by generating the pain.[6] So if physiotherapist treats the pain with the intervention of TENS then spasm itself reduce and allow the patients to move joints, contract or relax the affected muscles as well as physiotherapists easily initiate their manual treatment or exercises without aggravating the pain on the affected region of the body.

This article addresses the effectiveness of TENS with or without standard physiotherapy treatment for the treatment of mechanical chronic low back pain management by physical therapist. TENS has been proved to be effective in the treatment of sub-acute and chronic pain of the lower back. The efficacy of the usage in adjunct with other physiotherapy standard treatment has proven to be effective in order to alleviate symptoms of pain and improve all over patient satisfaction.

CONCLUSION

In short, this study was done in order to observe the effectiveness of the TENS with or without standard physiotherapy treatment. Literature and study reported a marked difference in the pain threshold level in patients with the use of TENS. The TENS was beneficial in alleviating pain with or without standard physiotherapy treatment. There is still a room for research on this topic with being more specific and targeted so to find out the efficacy of the treatment much more depth and details.

As TENS is the main stray of treatment so much more research with other physiotherapy intervention would aid its benefits and present us to explore the usage of TENS in much better way. We need to disseminate the study and is finding so to impart knowledge to different medical fields, in order to widen the spectrum of physiotherapy field among different health professionals. In a way that will help to promote the field and let other professionals know about the benefits that could be gathered by the physiotherapy treatment, and save patients from any other disabling or any other major conditions.

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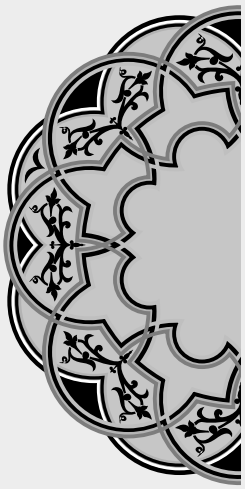

"Don't let small minds convince you that your dreams are too big."

Unknown

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