


EFFECTIVENESS OF TENS THERAPY FOR PAIN MANAGEMENT BY PHYSICAL THERAPISTS WORKING IN TERTIARY CARE HOSPITALS OF KARACHI

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ABSTRACT

Background and Aim: Human illness treated electrically in old concepts back in 2500 BC, electric fish used by ancient Egyptian to manage pain through “Shock”. Electro medical devices gained popularity in 19th century. TENS was developed by Melzack & Wall for pain management which in turn found to be a big invention to the field of medicine. For pain relieve TENS is considered as low budget, easy to used and non-invasive electrotherapeutical equipment around the world. Study was aimed to evaluate the approach of TENS for pain management by physical therapist.

Methodology: This cross-sectional study conducted through survey among physiotherapist of Karachi. A total No of 101 physiotherapists recruited in this study. A Self-administrated

Questionnaire given to each participant for the evaluation of effectiveness of TENS for pain control. SPSS version 23.0 used for analysis.

Results: Almost 90% physiotherapist recommends TENS with other modalities. This indicates high prevalence of TENS as main modality for the management of pain by majority of the participants either solely or in combination with other modalities.

Conclusion: TENS found to have a significant effect in managing pain. Type and electrode placement also found important role in reducing pain.

Keywords: TENS, analgesic effect, neurogenic pain, gynecological condition, musculoskeletal pain, labor.

Introduction

Transcutaneous Electrical Nerve Stimulation (TENS) is a device that conveys beat electrical flow across surface of skin to stimulate nerve. A standard TENS device is comprised of a battery controlled compact machine that produces electrical flow, which conveyed through skin by the means of electrodes¹.

Transcutaneous electrical nerve incitement (TENS) is an economical, self-controlled procedure with no known potential for overdose. TENS is utilized as an independent treatment for gentle to direct pain and as a subordinate to pharmacotherapy for moderate to serious pain. TENS specifically stimulates low-threshold peripheral afferents (A-β) which represses progressing nociceptive transmission in the focal sensory system².

TENS is a protected helpful device with few or no related side effects. Numerous clinical

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papers had published the beneficial outcomes of TENS in the management of pain¹.

Diverse frequencies can be applied in TENS, varying from low (< 10 Hz) to high (> 50 Hz). Different frequencies can be applied in TENS, ranging from low (< 10 Hz) to high (> 50 Hz). Alone superficial sensation can be achieved by applying TENS at low intensity, to initiates muscular contraction (motor response) high intensity can be applied. Both motor and sensory response can be gained combined by using high intensity TENS².

To strengthen physical performance, management of pain and post-operatively respiratory endurance TENS has been used^{3,4}.

Clinical application recommended that muscles stimulation drives straight forwardly to absence of pain and diminished muscle soreness which in result restores muscular capacity⁵.

For the treatment of pain TENS considered as non-opioid equipment^{6,7}.

Patients having knee osteoarthritis had treated with TENS which potentially reduced pain and increased functional capability⁸.

Pain has been perceived to be the most widely recognized side effect for which medical services is looked for. Persistent nonmalignant pain is normal among more aged people, with proof supporting an age-related expansion in the prevalence of pain. For over 20 years, the expert writing has proposed or suggested the utilization of transcutaneous electrical nerve stimulation (TENS) as an intervention for constant pain in elderly Clinical practice rules for the administration of chronic (ie, persistent) pain in more aged people, distributed by the American Geriatrics Society, note that non-pharmacological mediations including TENS might work alone or in blend with suitable pharmacological methodologies⁹.

TENS was considered as an alternative therapy in varicose vein patients¹⁰.

Not only in musculoskeletal or neurogenic pain. TENS can be used during labor¹¹.

The study was aimed to discover the awareness, awareness, and attitude towards the treatment of pain through TENS by physical therapists. This study will be helpful to find out the cause behind the increasing preference of TENS for the pain management in different pathological conditions despite of the different manual techniques in physical therapy profession. Transcutaneous electrical nerve stimulation (TENS) can be considered as non-pharmacological option to manage pain. For different painful conditions TENS has been used. Clinical and basic knowledge related to TENS can be updated through this study.

Methodology

Study design

We conducted a cross-sectional, survey among Physiotherapist of Karachi involved in the management of patients with different sites pain.

Sample size

Using non-probability convenient sampling technique 101 Physiotherapist recruited in the study.

Sample Technique

Non- probability purposive sample

Data Collection

Data was collected by self-administered questionnaire containing questions regarding transcutaneous electrical nerve stimulation effects on pain. Professional physical therapist working in different clinical setups were requested to fill the questionnaire from different tertiary care hospitals including Liaquat National School of Physiotherapy, Baqai Institute of Physical Therapy & Rehabilitation Medicine, The Aga Khan University Hospital, Zia Uddin Hospital, Jinnah Post Graduate Medical Centre, SIUT and PNS Shifa.

Questionnaires were given by hand to each participant. Total time estimate for questionnaire was 10 minutes approximately.

Time duration

This study was conducted within four months (from November 2018 to February 2019)

Inclusion Criteria

Qualified physical therapy professionals
Both Males & Female

Serving in different physical therapy clinical setups

Exclusion Criteria

Undergraduate students.
Internees.
Only Academic physical therapy professionals
Not willing to participate

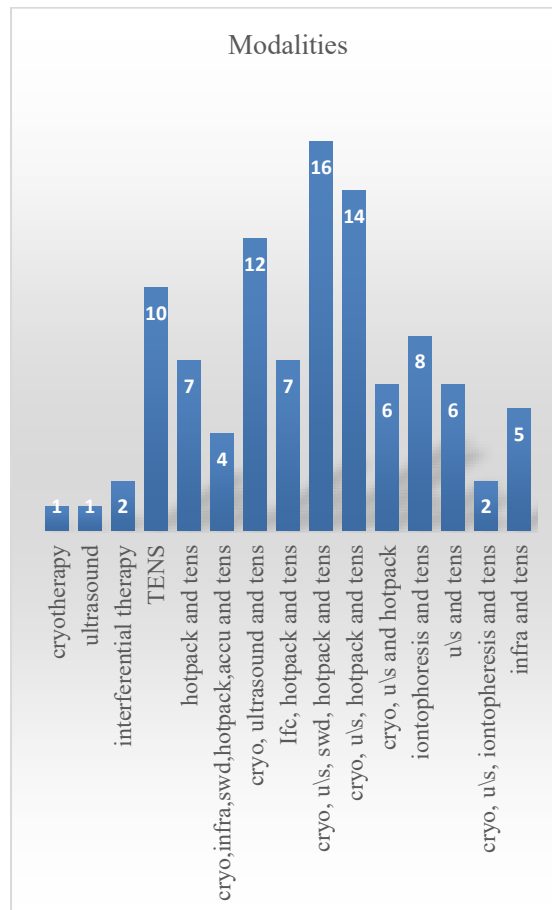
Data Analysis

SPSS version 23.0 was used for analysis of data. Frequencies and percentages were calculated for categorical variables. Mean age was also reported. To see the significance between TENS and other parameters Chi-Square test was applied.

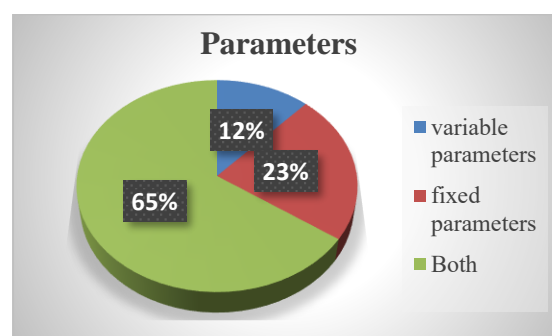
Results

Normality of data was checked before analysis. The Cronbach's alpha found to be 0.982. Nine-point nine percent (n=10) used solely TENS as treatment option for pain management after TENS, 2.0% (n=2) participants used interferential therapy merely as option for pain management, 1.0% (n=1) used ultrasound as a treatment choice for pain control, 1.0% (n=1) contributors chooses cryotherapy as pain control parameter. Majority 15.8% (n=16) were selected combination of different modalities as a pain control parameter including cryotherapy, ultrasound, Short wave diathermy(SWD), hot pack and TENS, 13.9% (n=14) second most commonly used combined options for pain management including cryotherapy, ultrasound, hot pack and TENS, 6.9% (n=7) used hot pack and TENS for pain control, 4.0% (n=4) contributors prefer cryotherapy, infrared, short wave diathermy(SWD),hot pack, acupuncture and TENS for the management of pain, 11.9% (n=12) participants used cryotherapy, ultrasound and TENS for pain control, 6.9% (n=7) used

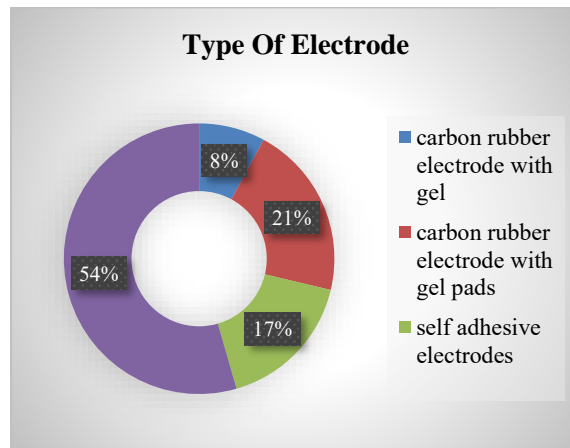
interferential therapy, hot pack and TENS for pain management, 5.9% (n=6) contributors used cryotherapy, ultrasound and hot pack for pain management, 7.9% (n=8) used iontophoresis and TENS in combination for pain control, 5.9% (n=6) participants prefer combine therapy for control of pain including ultrasound and TENS, 2.0% (n=2) focused on cryotherapy, ultrasound and iontophoresis for pain management and 5.0% (n=5) participants rely on infrared and TENS for the pain control.



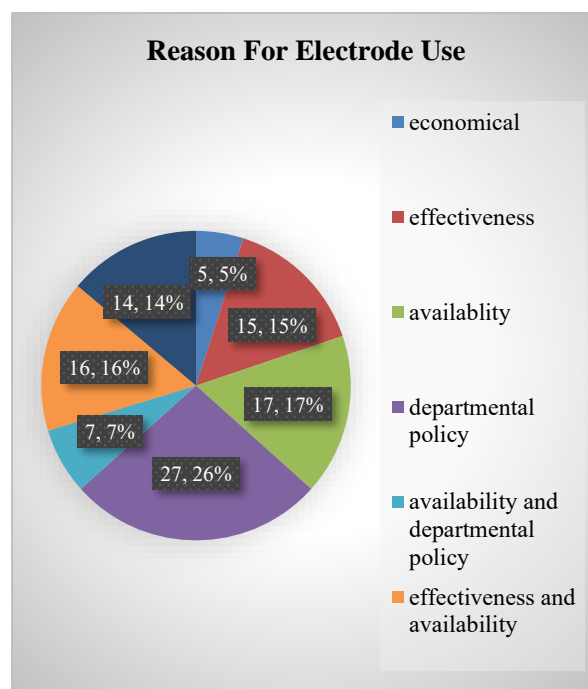
On the basis of TENS parameters 11.9% (n=12) contributors used only variable parameters, 22.8% (n=23) contributors used fixed parameters and majority of the contributors 65.3% (n=66) prefer variable and fixed both parameters in TENS for pain management.



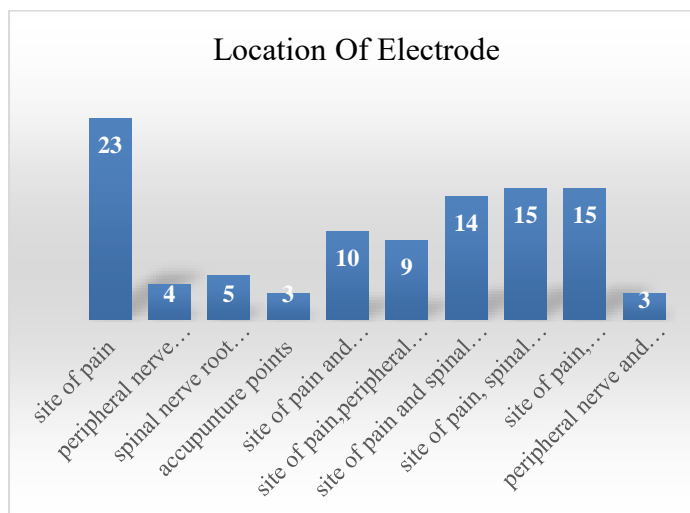
Different electrodes of TENS were used by all individuals for pain management. Majority 54.5% (n=55) used more than one type of electrode including carbon rubber electrodes with gel, carbon rubber electrodes with gel pads and self-adhesive electrodes for pain control, 20.8% (n=21) participants prefer carbon rubber electrodes with gel pads for management of pain, 16.8% (n=17) participants prefer self-adhesive electrodes for the management of pain and 7.9% (n=8) participants prefer carbon rubber electrodes for the management of pain.



The selection of electrode was based upon different factors. Majority 26.7% (n=27) of the participants used electrode type suggested by departmental policy, 16.8% (n=17) participants select electrode type on availability, 15.8% (n=16) participants chose electrode on two factors including effectiveness and availability, 14.9% (n=15) participants prefer electrode type on effectiveness for pain management, 13.9% (n=14) participants prefer electrodes type on availability and economical basis for pain management. 6.9% (n=7) participants select electrodes type on availability and departmental policy and 5.0% (n=5) participants select electrodes type economically.



Out of 101 participants, 22.8% (n=23) applied electrodes on single location for pain management that is site of pain, 14.9% (n=15) applied electrodes on different locations for pain control including site of pain, peripheral nerve, spinal nerve root and acupuncture points, 13.9% (n=14) individuals applied electrodes at two different points including site of pain and spinal nerve root for pain management, 9.9% (n=10) participants applied electrodes at two different locations that is site of pain and peripheral nerve point, 8.9% (n=9) contributors applied electrodes at three different locations including site of pain, peripheral nerve and spinal nerve root, 5.0% (n=5) applied electrodes at only spinal nerve root representing area of pain location for pain management, 4.0% (n=4) contributors applied electrodes at peripheral nerve supply area for pain management and 3.0% (n=3) contributors applied electrodes at three different locations for pain management including accupunture point, peripheral nerve and spinal nerve root.



On the basis of Likert Scale 60.4% (n=61) physiotherapist were satisfied with the application of TENS for pain management, while 22.8% (n=23) physiotherapist were strongly satisfied with use of TENS for pain control and 16.8% (n=17) physiotherapist reported neutral gesture (no benefit, no harm) for the use of TENS for pain management.

Along with TENS other modalities also used by participants for pain management. Majority contributors 73.3% (n=74)were satisfied with the use of hot pack for pain control, 46.5% (n=47) participants were strongly satisfied with the use of Cryotherapy for pain control, 46.5% (n=47) were strongly satisfied with the use of ultrasound for pain management, 42.6% (n=43) were satisfied with the application of infra-red rays for eradication of pain, 51.5% (n=52) individuals satisfied with the use of interferential therapy for pain control,44.6% (n=45) were also satisfied with the application of short wave diathermy for the management of pain, 11.9% (n=12) satisfied with the use of laser for pain control, 19.8% (n=120) participants were satisfied with the use of iontophoresis for pain management and 44.6% (45) contributors were had neutral point of view about the use of acupuncture point for the management of pain.

TENS widely used in musculoskeletal conditions 96% (n=97) by majority of participants for pain control, along with musculoskeletal conditions 77.2% (n=78) participants used TENS for pain caused by neurogenic origins and 34.7% (n=35) contributors applied TENS in gynecological conditions.

Efficacy of the TENS was compared with the other physical therapy modalities. Cross tab shows that there is significant difference of efficacy of TENS in comparison with Ultrasound with P-

value 0.04. Cross tabs show there is no significant difference of TENS in comparison with Cryotherapy for pain management with P-Value 0.155. Comparison of TENS with Hot pack gives P-value of 0.246 on crosstab, which shows there is no significant difference. TENS is not significantly different with laser for pain management as a result shows in cross tab with P-value of 0.566. No significant difference was noted between TENS and Interferential therapy as their P-value was 0.84. There is no impact of TENS in comparison with Iontopheresis as the P.value 0.07 was insignificant.

Outcome Measures

There was no significance difference found between TENS and other modalities for pain management.

Discussion

The aim of the study is to explore the effectiveness, awareness, knowledge and attitude towards the use of TENS for pain management in professional physical therapists¹⁰. Result shows that 83% of participants are aware with the significance use of TENS for pain management, while Licia Santos Sanata et al reported the significance of TENS used in their study which shows that the health professionals are strongly satisfied with the use of TENS (0.05) with confidence interval of 95%¹¹. 34.7% of therapist applied TENS for the gynaecological conditions including primary dysmenorrhea, like wise Arik MI et al concluded in her meta-analysis that TENS can be used for the treatment of primary dysmenorrhea. Yilmaz M. et al stated in his study that there is no superiority between TENS & ultrasound for the selection of pain management³, unlike result was concluded in our study that there is significant difference of efficacy of TENS in comparison with Ultrasound with P.value 0.04 for the pain management selection^{12,13,14}.

In this study we concluded that TENS is not significantly different with laser for pain management as a result shows in cross tab with P-value of 0.566¹⁵, however M Venosa et.al concluded in their study that high intensity laser had significant difference in comparison with TENS and ultrasound¹⁵. In present study a TENS and Interferential Current had no significant difference in management of pain, similar results were reported by Camilia Cadena de Almedia and Dias V et al with no significant difference¹⁶. Fahimeh kemali, et al reported in their study that application of TENS electrode at acupuncture points gives significant relief in painⁱ, although in this study health professionals did not report the effectiveness of TENS on acupuncture point for pain relief^{f7,18}.

Sevtap Gunay Ucurum et al, reported in study that there is no significance difference between the application of TENS and Ultrasound for pain managementⁱⁱ, however in this study the result was found significant for the application of TENS for pain management in comparison with Ultrasound. A Y M Jones et al, stated that there is no significance difference in pain relief when comparing the positions of electrode at different levelⁱⁱⁱ, same results were found in this study that there is no significance difference when placing the TENS electrode at different points for pain management^{19,20,21,22}.

No significant difference was noted in this study regarding comparison of TENS with iontophoresis for pain management however, Y cai et.al stated in his study that application of drugs through iontophoresis gives better pain relieve in comparison with oral drugs^{iv}.

CONCLUSION

TENS found to had a significant effect in managing pain. Type and electrode placement also found important role in reducing pain. Application of TENS for the management of pain by qualified

physiotherapist has been found enormous. In addition, other modalities also play important role in management of pain.

AUTHORS' CONTRIBUTION:

The following authors have made substantial contributions to the manuscript as under:

Conception or Design: Rabia Khan

Acquisition, Analysis or Interpretation of Data: Rabia Khan

Manuscript Writing & Approval: Rabia Khan

All authors acknowledge their accountability for all facets of the research, ensuring that any concerns regarding the accuracy or integrity of the work are duly investigated and resolved.

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