

Perception Of Physiotherapist On Effects Of Transcutaneous Electrical Nerve Stimulation In Comparison To Therapeutic Ultrasound For The Treatment Of Grade V Bell's Palsy

ABSTRACT

BACKGROUND AND AIMS

Transcutaneous Electrical Nerve Stimulation (TENS) and Ultrasound (US) both are the most common therapeutic intervention modalities applied for Bell's palsy treatment. The study was conducted in a tertiary care hospital in order to evaluate the perception of physiotherapist regarding the effects of TENS and US in comparison for the treatment of grade V Bell's palsy.

METHODOLOGY

It is an observational study based on cross sectional survey based on questionnaire from the physical therapists of a tertiary care hospital with the clinical experience of one year or more. The sample size was 45 based on convenient sampling technique with the mean age of 27.4 ± 7.75 years.

RESULTS

The results of the study indicated that preference of therapist for the effective treatment of grade 5 Bell's palsy is TENS in comparison to US for early prognosis and patient's satisfaction. Further, the therapist prefers burst mode of TENS for effective results.

CONCLUSION

Though the study favors use of TENS However, due to small sample size, further studies are required to be conducted in domain to strengthen the role of Burst Mode of TENS as an effective intervention for Bell's palsy.

KEYWORDS

Bell's Palsy, Tens, Ultrasound, House brackmann Scale, Physiotherapist, Treatment

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INTRODUCTION

Among the other causes responsible for paralysis of face, Bell's palsy accounts for about 75%¹. Bell's palsy has been experienced by 11 to 40 persons from 100,000 worldwide every year². The mean age ranges between 15 to 40 years with both genders being equally influenced, however 45% cases per 10,000 reported are pregnant females³.

Bell's palsy is a unilateral paralysis of the facial nerve causing muscular weakness at one side of the face, resulting from traumatic, infectious, inflammatory, compressive or metabolic abnormalities, in most of the cases with the unknown cause⁴. It causes loss of sensation, muscular weakness, difficulty in functions like eating, talking etc.⁵ The major symptoms for Bell's palsy includes drooping of jaw, loss of nasolabial fold, loss of facial expression, deviation of mouth to opposite side, failure of eye-lid to close, or loss of wrinkles of forehead on looking up⁶. However, Viral infections caused by Herpes zoster,⁷ Mumps, E.B. virus results in inflamed VII cranial nerve during its course through the bony labyrinth part of the facial canal, where compression and demyelination of the axons and blood supply to the nerve occurs⁸.

House and brackmann in 2017 developed a grading scale to evaluate facial paralysis in relation to extent of nerve damage. This scale measures six grades. In this scale grade I allocates normal activity of face muscles, grade II represents slight weakness, dysfunction and slight dissymmetry of facial muscles, grade III meant to be moderate dysfunction is apparent but not obvious difference of symmetry between both sides, grade IV represents moderately intense dysfunction apparent and causes asymmetry on each sides, grade V means to be intense dysfunction hardly detectable movement and in grade VI there is complete loss of function of facial muscles⁹.

Multiple approaches are used in order to treat the Bell's palsy including both conservative and surgical approaches. In addition, Physical therapy approaches including electrotherapy, massage and exercises of face to stimulate the denervated muscles shows promising results when applied for rehabilitation of a patients with Bell's palsy. Further, electrical stimulation like TENS, Ultrasound, electro-acupuncture¹⁰, pulsed signal therapy (PST)¹¹ and Russian current have shown to be effective in axonal outgrowth and myelination, and partial activation of facial muscles in Bell's palsy¹². Significant effects were observed in the functional limitations of bell's palsy by the use of low level laser therapy¹³. In addition, kabat rehabilitation along with nerve stimulation has shown promising results in the improvement of physical and social functions¹⁴. Mustafa in 2017 found out the combination of kabat exercise, kinesiotherapy and electrotherapy reduces facial muscle asymmetry¹⁵. Similarly, K-taping and acupuncture with support of physiotherapy is safe and supportive therapy to manage early stage of ringer's paralays¹⁶. Another research concludes that the use of PNF technique is more effective than kinesio taping¹⁷. Similar results were reported by Pooja kumari et al in her study¹⁸.

Electrical stimulation is applied to re-establish or get outward appearance (for example, rumination, blowing, flickering eyes, grinning, sucking, and others) and accessory muscles including those of neck and eyes are also stimulated to achieve better result¹⁹. Among other electrical stimulations, Transcutaneous electrical nerve stimulation (TENS) is most commonly used to enhance the quality of facial muscle's proprioception and neuromuscular coordination in the chronic stage of bell's palsy¹³. It is known for providing pulsed currents for depolarizing peripheral nerve fibers from skin. TENS have five modes of delivery that are conventional, acupuncture like, brief intense, burst, and modulation²⁰. Most common sites used for innervation of facial nerve via TENS includes the orbicularis oculi for blinking of eye, the frontalis muscle used for raising eyebrow, the zygomaticus major muscle for grinning, and the

orbicularis oris muscle for lip pucker⁴. Further, therapeutic Ultrasound in its conventional mode, is known to treat soft tissue pathologies, wounds, and bone fractures²⁰.

In patients with bell's palsy ; generally features settle down completely except for some patients who experience hardship for prolonged periods of time as symptoms do not settle by 3 weeks¹⁴. Usually prognosis is appreciative when symptoms seem to be recovered within 21 days of onset of disease²¹. However, in cases of absolute facial paralysis, worst pain, people older than 60 years of age, herpes zoster virus, in contagious disease conditions like pregnant women, hypertensive patient and diabetic patient or in case of severe degeneration of facial nerve poor prognosis has been recorded¹⁴. The main aim of this study is to evaluate the effective of TENS in comparison to Therapeutic ultrasound in the perspective of physical therapist for the treatment of Bell's palsy.

METHODOLOGY

Study Setting

Data was collected from tertiary care hospital in Karachi.

Target Population:

Physical therapist with the experience of = or ≥ 1 years.

Study Design

Cross sectional study

Duration of Study

This research took 6 - 8 months after the approval of synopsis.

Sample Size

N=45

Sampling Technique

Simple convenience sampling.

Sample selection

Physical therapist with clinical experience of one or more than one year and have treated patients with Grade V house brackmann score Bell's palsy without any secondary complications. However, professional with experience of less than one year or lack experience of less than two week in the treatment of bell's palsy.

Data Collection Tool

Data was collected by a Questionnaire designed by researchers which included 10 questions. Question were based on the therapist opinion regarding grades of House Brackmann's scale, effects of TENS and ultrasound and its modes on prognosis of Bell's palsy and safest modality for Bell's palsy.

Data Collection Procedure

Research questionnaire was provided to the physical therapist at a tertiary care hospital who gave their consent to participate in the study.

Data Analysis

Data analysis was done with the help of METCALC SPSC.

Ethical Considerations:

Written consent was taken from the participants of the study *and* autonomy to participate in the study was given to the participants. Participants were given the right to with draw from the study anytime. Confidentiality of the participants was not breached nor was any harm caused to them during the course of research.

RESULTS

The total numbers of 45 participants, 14 male and 31 females, were recruited for the identification of their perception in the effectiveness of TENS for the early treatment of Bell's palsy. The mean age of the participants was 27.4 ± 7.75 years with the clinical experience of 3.51 ± 4.97 years.

95.55% of our subjects considered TENS as best modality while remaining 4.45% were in favor of ultrasound as safest modality for the Bell's palsy treatment. In this cross sectional study when subjects were asked about the best mode of TENS for Bell's palsy treatment according to their clinical experience, 88.88% responded in favor of Burst mode while other 11.12% were comfortable to use conventional mode on their Patient's with grade V Bell's palsy. Meanwhile 71.11% subjects consider that Electrotherapy may cause complications on patients with Bell's palsy.

Question	Response 1	Response 2
Knowledge of participants about house brackmanns scale	86.66% were affirmative	13.34% were negative
Effective treatment for Bell's palsy	95.55% responded with tens	4.45% responded with ultrasound
Safest modality for Bell's palsy treatment	95.55% responded with tens	4.45% responded with ultrasound
Modality aiding for early recovery	95.55% responded with tens	4.45% responded with ultrasound
Effective mode of TENS for the treatment of Bell's palsy	88.88% responded with burst mode of TENS	11.12% responded with conventional mode of TENS
Effective mode of ultrasound for the treatment of Bell's palsy	84.44% participants responded with pulsed mode of ultrasound	15.56% participants responded with continuous mode of ultrasound
Duration the treatment of Bell's palsy	39 participants responded that it takes 6-7 sessions	6 responded that it take 4-5 sessions

Patient's satisfaction for the treatment modality	41 responded for TENS	4 participants responded for Ultrasound
Complications of using electrotherapy for treating Bell's palsy grade V.	71.11% were affirmative	28.89% were negative

Table 1: Responses of participants to the close ended questions provided

Moreover, 39.7% subjects that a patient with grade V Bell's palsy can recover completely on the other hand 31.7% subjects responded negatively. The results of the study indicates the preference of therapist for the effective treatment of grade 5 Bell's palsy is tense in comparison to ultrasound in reference to early prognosis and patient's satisfaction.

DISCUSSION

The findings of our study highlight the perspective of physical therapist that favors TENS for the treatment of Bell's palsy. Similar findings were observed in a study conducted by Alice (2020) where she reported the beneficial results of electrical stimulation in patients of acute case of Bell's palsy⁵. Further, study also stated majority of the therapists favored the use of electrical therapy in clinical practice to treat Bell's palsy⁵.

Multiple studies have stated the effects of neuromuscular electrical stimulation are significant in term to enhance of strength of facial muscles post paralysis or paresis^{22,23}. Further, evidence has proved that paralyzed muscle can be evoked by electrical stimulation along with massage for facial muscles relaxation and facial exercises for muscular strengthening⁴. It has also been observed that NMES (neuromuscular electrical stimulation) when combined with SWD (shortwave diathermy) and exercises for the treatment of Bell's palsy reduces complexity and recover functional activities²⁴.

Moreover, according to the subjects of our study, TENS is most effective, safe, and less complicated electrotherapy to treat bell's palsy grade V whereas Ultrasound has very low or negligible usage in treating bell's palsy. Efficacy of TENS on bell's palsy patients is also proved by J.Lylykangas et al²⁵ in their article, stating the effectiveness of TENS on eye blinking and surrounding muscles. Makel el al also researched on re animation of facial muscles by TENS. Simon goldie with his co member's conduct this case study in which they observe after applying electrical stimulation on bell's palsy patients result was quite favorable with this treatment²⁶. Electrical stimulation has shown non observable effects initially and showed positive results after a month²⁷. Contradictory, Anoop Kurian (2019) in his case study on acute case of Bell's palsy reported TENS treatment to have considerably low healing rate²⁸. On the adequacy of electrical incitement as a source of facial nerve stimulator in loss of motion, no significant results were observed²⁹.

However, Study finding also revealed the significant side effects and complication of electrotherapy were observed by therapist during the treatment course. Such results were also reported by Allison in a study where therapist was asked about the effects of TENS on facial paralysis⁵. In opposition, Wiebke (2020) suggested that Surface electrical stimulation for facial paralysis is not harmful nor does it delays or prevents reinnervation or increase synkinesis in

facial paralysis³⁰. Since a perception based study is not enough to support the role of electrical stimulation on grade V Bell's palsy, further evidence is required to support it.

CONCLUSION

To conclude, this perception based study favors the use of TENS as the efficient modality to use for the innervation of facial nerve in Grade V Bell's palsy patients. However, being conducted on a very small sample, further studies are required to be conducted in domain to strengthen the role of electrical stimulation as an effective intervention for Bell's palsy.

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