

THE EFFECTIVENESS OF ELECTRICAL STIMULATION FOR BELL'S PALSY PATIENTS: LITERATURE REVIEW

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Abstract

Many problems can occur in Bells Palsy, one of which is weakness in facial muscles. prevalence of Bell's palsy around 19.55% number of cases in Indonesia. This study aims to determine effectiveness of electrical stimulation in facial muscle strength in Bell's Palsy. This literature review research uses PICO as a database. Experimental group received sessions of transcutaneous electrical stimulation over period time, while control group received no additional stimulation. Have 4 journals that met criteria and showed results with p -value <0.05 . conclusion of journal that receiv. The conclusion this journal is electrical stimulation experienced a significant increase in the strength of their facial muscles compared to control group. Subjective measurements supported improvements in facial expression and speaking ability. We conclude that electrical stimulation can be an effective method for increasing facial muscle strength in people with Bell's Palsy. However, further research's needed to validate these findings and determine optimal stimulation parameters.

Keywords: Electrical stimulation, Bell's palsy, muscle face

INTRODUCTION

According to the World Health Organization (WHO), health is a state of physical, mental and social well-being that enables everyone to lead a socially and economically productive life. According to the WHO (Organization & Canada, 2015), physical therapy assesses, plans and implements rehabilitation programs that improve or restore a person's motor function, maximize mobility, reduce pain syndromes and treat or prevent physical challenges associated with injuries, diseases, and disorders. The facial nerve is a mixed nerve with motor and sensory functions. The function of sensory nerves is located in the front two-thirds of the tongue and the back wall of the outer auditory muscle, namely the auricle (Abdelatief, 2020). The facial nerve consists of two nerves, namely one efferent nerve and two afferent nerves, and has four functions. Facial nerve paralysis can cause significant psychological and neurological distress to patients.

Many of its effects on the patient, not only psychological, also affect the appearance of the face. Severe damage to the facial nerve can damage the cornea of the eye because the eye cannot close (Prajapati & Patel, 2019). The impact of facial paralysis is not only limited to the movement of facial muscles. Sometimes patients are concerned about the regulation of their mouth, such as talking, swallowing, smiling, and other facial expressions (Oliveira et al., 2022). Physiotherapy plays a very important role in increasing facial muscle strength to improve facial function in

patients with Bell's palsy. Bell's palsy is acute weakness or paralysis (acute onset) of the peripheral facial nerve on one side of the face (de Almeida et al., 2014). An anatomist and surgeon named Sir Charles Bell first described Bell's palsy in 1821 (Tuncay et al., 2015).

Abdominal injuries account for 19.55% of all neuropathy cases most commonly diagnosed in Indonesia. The disease is usually found between the ages of 20 and 50, and its incidence increases with age after the age of 60. (Fargher & Coulson, 2017), while the incidence of abdominal stroke in the United States is about 23 per 100,000 people. (Patil & Kanase, 2015)

Bell's palsy has no obvious signs. But many say that the cause of Bell's palsy is swelling of the seventh nerve, or fascial nerve, which causes the blood supply to that nerve to be cut off. This leads to cell death where the transmission of impulses or stimuli is disrupted. Therefore, the brain cannot command the facial muscles to move forward. However, there are several theories that are often put forward as the cause of Bell's palsy, namely the theory of vascular ischemia, the theory of viral infection, the theory of immunology, and the theory of heredity (Loyo et al., 2020). Electrical stimulation is a transcutaneous electrical stimulus that produces a low-amplitude pulsatile electric current that normally activates motor nerves that innervate weak muscles, produce contractions and prevent muscle atrophy. Electrical stimulation continues to be used as a therapeutic approach to improve facial function and reduce potential complications (Di Pietro et al., 2023). The purpose of using electrical stimulation is to promote nerve regeneration and maintain muscle mass. Many studies have shown that the use of electrical stimulation techniques is effective in increasing facial muscle strength in patients with abdominal paralysis. However, there has been no current research INCREASED EFFECTIVENESS OF ELECTRICAL STIMULATION IN INCREASING FACIAL MUSCLE STRENGTH IN BELL'S CAPE PATIENTS; LITERATURE REVIEW. Therefore, the author created this journal with the aim of updating research results based on literature reviews.

METHODS

This study used a literature review approach or literature review. Literature review is a systematic method that summarizes and evaluates knowledge or practice on a particular subject. (Knopf, 2006)

This study followed the PICO format: (P = population) patients with belly palsy, (I = intervention) electrical stimulation, (C = comparison) no comparison, (O = Outcome) electrical stimulation can effectively increase facial muscle strength in patients with belly palsy. Research journal articles reviewed with a span of the last 10 years, namely 2013 – 2023.

Articles are reviewed if they meet the following criteria (i) research subjects with belly palsy, (ii) the articles are research not reviews, research intervention is electrical stimulation, whether or not there is a comparison in journal articles still investigate.

This research article will be rejected if it has the following criteria: (i) research with review literature, (ii) research journals under 2013, (iii) the subject refuses to participate.

The author obtains information including data bases such as: PUBMED, GOOGLE SCHOLAR, and if the journal article is locked make the author download it. To overcome our bias, the authors accept every intervention influence from every literature. For data synthesis we summarize including research subjects age type of intervention given (frequency, duration and measuring instruments) research instruments using:

Softwer Kinovea :

A tool to observe the movements made by the patient so that it can be slowed down.

SFGS(Sunnybrook Facial Grading System):

Face symmetry was measured using SFGS 13 items. The system includes three components:

- (1) break symmetry,
- (2) symmetry of voluntary movements, and
- (3) synckinesis.

SFGS has high reliability and good to excellent repeatability. That The variability of SFGS composite scores was greatest and was mostly seen during voluntary movements of raising eyebrows and pursing lips. (Siddharth S Mishra¹ & Mahvish Sayed, 2021)

FDI (Facial Disability Index) :

FDI helps measure difficulties encountered in activities of daily living, such as eating, drinking, and communicating. It represented the relationship between disability, disability, and psychosocial status and also focused on the disability of individuals with disorders of the facial motor system.

HBS (House Brackmann Grading Scale):

A rating scale used to assess the functional recovery of facial muscles by detecting symmetry at rest and measuring eyebrow movement (upward or upward movement) and mouth movement (outward or sideways movement) (Burelo-Peregrino et al., 2020). The face is divided into two lines: a vertical line that symbolizes the movement of the mouth and a horizontal line that symbolizes the movement of the eyebrows. Each line contains four points with a movement of 0.25 cm at each point until completing 1 cm. If the movement of the eyebrows and mouth is completed by 1 cm, it means that the functional movement of the face is normal with a total score of 8, while below that score (8/8) facial muscle dysfunction is assessed from mild dysfunction to complete paralysis. All patients were assessed at baseline treatment (after 2 weeks after onset), after one month of treatment, and at the end of the study (after 2 months).

MMT(Manual muscle testing) :

Assessment tools used by rehabilitation doctors or physiotherapists, physiotherapists, neurologists, and other physicians who deal with an individual's functional status. The most frequently used approach is the use of MMT to assess the degree of muscle weakness in various pathologies. (Roman et al., 2022)

Electrical Stimulation of faradic current:

Definition The electrical stimulation used in this case uses a pharadic current. Faradic current is an unsymmetrical alternating electric current that has a duration of 0.01-1 ms with a frequency of 50-100 cy/second. Pharadic currents are generally modified into the form of urged or interrupted physiological effects (Prajapati & Patel, 2019).

RESULTS AND DISCUSSION

Based on 5 journals that we looked through the stages Screening, Eliligibility and Inclusion found effective results of using TENS on cure in patients with Bell's Palsy. According to the results of the article obtained and analyzed by the author, we got the results that electrical stimulation provides significant results in increasing facial muscle strength in patients with Bell's palsy.

Table.1 comparison of experimental groups and control groups

Reviewen	Participant		Intervention		Measure ment	Results	Design Study
	Intervention group	Control group	Experimental group	Control group			
Marotta Nicola, et al (2020)	N : 20 unknown	N:10 N:10 unknown	Electrical Stimulation (ES), & Short Wive Dhiathermy (SWD)	NMES bipolar (Stimulation Listrik neuromoskular) & SWD gelombang monofastik.	<i>Softwer Kinovea</i>	p < 0.05	Single-blind, controlle d study
Siddharth S Mishra1& Mahvish Sayed (2021)	N : 30 18 – 59 years	N : 30 18 – 59 years	Sensory Exercises & eletrical stimulation	facial exercises, mime therapy, sensory exercises	SFGS & FDI	P<0.05	comparat ive experime ntal study.
Gitanjali R. Patil & Suraj B. Kanase (2015)	N: 30 <15 years	N : 20 < 15 years	Electrical Stimulation and Active Muscle Contractions	Heat therapy, massage and exercis	(HBS)& MMT	p= 0.7240	INSTST
Abdelatief,E,E, M (2020)	N : 49 15-60 years	N : 49 15 – 60 years	Electrical Nerve Stimulation and Faradic Current Stimulation	electrotherapy, massage, heating, ultrasound, laser, exercises and acupuncture	HBS	p > 0.05	different physical methods

According to the literature we read, we found samples consisting of different types of ages. Their age ranges from 15 years – 68 years. Then the research designs used also vary. Such as ABA, single-blind & Cotrol study, experimental study, INSTS and different physical methods with an average of p-veleu (0.05). The experimental intervention group used is Electrical Stimulation. However, each intervention is accompanied by several other interventions such as SWD & Exercise.

Table 2. Dosage Intervention Therapy Electrical Stimulation

Reviewer	Type of Intervention	Therapeutik Desage				Duration therapy
		F	I	T	T	
(Marotta et al., 2020)	Electrical Stimulation (ES), & Short Wive Dhiathermy (SWD)	5x per week	(ES) 80Hz 0,5 Ma 700mikrodeti k & (SWD) 2,2Hz	Electical Stimulation (bipolar), SWD & pantomime therapy (therapeutic massage, breathing and relaxation exercises, opening and closing eyes and lips, facial expression and	30 minutes /sessio n	5 sessions /week for 4 weeks.

					letter pronunciation exercises)		
(Mishra & Sayed, 2021)	Sensory Exercises (facial exercises, mime therapy, sensory exercises & electrical stimulation (ES)	6x a week	0,01-1 ms with frequency 50-100cy/sec	Sensory Exercises (facial exercise, mime therapy, sensory exercis) & electrical stimulation (ES)	60 minutes	18 sessions	Each session lasts 60 minutes per day, six haari per week, for three sessions
(Patil & Kanase, 2015)	Electrical Stimulation (ES),Heat therapy, massage, exercise, &Active Muscle Contractions	3x per week	100Hz	Electrical Stimulation (faradic current), heat therapy, massage , exercise & active Muscle Contractions	30 minutes	3 sessions	during the week and ending in 5 weeks
(Abdelatief, 2020)	Electrical Nerve Stimulation, massage, heating, ultrasound, laser, exercises and acupuncture Faradic Current Stimulation	1x week	100 ms of pulses duration	Electrical Nerve Stimulation, massage, heating, ultrasound, laser exercises and acupuncture Faradic Current Stimulation	60 minutes	1x a week	after one month

Based on the research that has been done, researchers found that electrical stimulation in its use has a wide range of intensity. And various kinds of exercise therapy namely mirror therapy, exercise, pantomime therapy, mime therapy, & active muscle contractions.

Tabel 3. Mean of Study Characteristics

Reviewer	Measurment	Group experiment		Control group		Significant
		Pre	Post	Pre	Post	
(Marotta et al., 2020)	<i>Softwer Kinovea</i>	30,3 ± 7,8	29,9 ± 6,45	55,4 ± 9	46,4 ± 3,7	p < 0.05
(Mishra & Sayed, 2021)	SFGS & FDI	26.5±3.59	47.60±17.32	27.9±3.24	38.80±4.23	P<0.05
(Patil & Kanase, 2015)	(HBS)&MMT	4.5333 ± 0.7432	3.4666± 0.6399	4.8666 ± 0.6399	2 ± 0.7559	p= 0.7240
(Abdelatief, 2020)	HBS	39.81 ± 10.61	82.12 ± 2.07	40.59 ± 10.6	82.12 ± 2.07	p > 0.05

From the literature we get significant or good results.

Discussion

The main purpose of this journal is to update the literature on the effectiveness of electrical stimulation to increase facial muscle strength in people with Bell's palsy. This study used an effective literature review of the five journals found. Exercise therapy is combined with literature.

The face is very important for everyone, because it can cause a psychological burden. Physical therapy for Bell's palsy aims to increase facial muscle strength and improve the patient's functional performance. Bell's palsy is the result of inflammation and dysfunction of the facial nerve (seventh cranial nerve). Although the exact cause of Bell's palsy is unknown, there is evidence that the condition may be related to a viral infection. Some viruses associated with Bell's palsy are herpes simplex virus, varicella virus/shingles (varicella zoster virus), mononucleosis (Epstein-Barr virus and cytomegalovirus) and respiratory infections (cold and flu viruses) . Physiotherapy procedures that can be done at home:

Nerve recovery occurs faster when warm compresses are applied to the face experiencing severe weakness leading to facial dysfunction. Physiotherapy plays a very important role in overcoming facial function disorders in facial paralysis. Exercise therapy that can produce biofeedback effects obtained with the help of mirrors. Through In this exercise program, patients are asked to perform facial movements such as: raising eyebrows and forehead, closing eyes, smiling, pulling the corners of the mouth to the right or left, whistling and barking, closing the eyes, showing front teeth and lifting lips, widening and emptying nostrils, saying the words lips: I, M N. Exercises performed for 10-20 minutes 4-5 times in each exercise independently are mirrortherapy exercises. In the case of Bell's Palsy affecting patients diagnosed with Bell's Palsy caused by damage to the facial nerve that controls the muscles. facial muscles that mostly result in the inability to produce facial expressions experience severe weakness resulting in severe facial dysfunction. Physiotherapy plays a very important role in overcoming facial function disorders in facial paralysis. However, to reduce the risk and increase facial muscle strength, ES treatment is carried out which can reduce the effect by preventing muscle atrophy and increasing the selectivity of motor nerve regeneration. i.e. muscle strengthening, muscle education, efficacy of electrotherapy to treat Bell's Palsy mirror therapy exercise The purpose of this study was to determine the effect of mime treatment with sensory exercises on facial symmetry and functional ability in Bell's palsy patients, potentially reducing these symptoms by preventing Exercise Mirror Therapy. From comprehensive treatment: After the administration of Vaginal Current electrical stimulation, massage therapy and exercise, there was an increase in facial muscle strength as shown by examination and assessment of facial muscle MMT, Facial Current electrical stimulation, massage and UFS examination and assessment. Patient complaint at the first examination: the right face feels thick when gasping

CONCLUSION

Electrical stimulation is a transcutaneous electrical stimulus that produces a low-amplitude pulsatile electric current that normally activates motor nerves that innervate weak muscles, causing contractions and preventing muscle atrophy. Electrical stimulation continues to be used as a therapeutic approach to improve facial function and reduce potential complications. The purpose of using electrical stimulation is to promote nerve regeneration and maintain muscle mass. The results of data synthesis showed that electrical stimulation was significantly effective in

increasing facial muscle strength in ventral palsy patients. Electrical stimulation is also supplemented by some exercises (sensory gymnastics, facial gymnastics, mime therapy).

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