



## Efficacy of immediate physical therapy in bell's palsy-Case report

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### Abstract

Facial palsy is condition in which there is lesion of the facial nerve and the resultant paralysis in the muscles that it supplies. So there will be following features on the side of lesion: Loss of facial expression. Drooping of the face- Low eyelid, eyebrow and corner of mouth sag. Closing the eye is difficult. Eating is difficult because food collects in the side of the cheek and fluid seeps out of the corner of mouth. Speaking, whistling and drinking are impaired. Non-verbal communication is lost as the patient cannot register the pleasure, laughter, surprise, interest and worry. The patient tends to sit with the hand over the side of face. Facial nerve (cranial nerve VII) paralysis can be disfiguring disorder with profound physical and social impact upon the patient a common diagnosis related to facial nerve paralysis in Bell's palsy. Symptom may include paresis, hyperacusis, and decrease production of tear, altered taste, otalgia, aural pressure and facial pain. The etiology of Bell's palsy is unknown it may be congenital, infection, trauma or any toxic exposure. Although recovery is expected without intervention in most cases, incomplete recovery is not infrequent. The patient with facial paralysis cannot convey the normal social signals of interpersonal communication This case report describes a physiotherapy treatment based on interrupted direct current, taping & exercises for right facial nerve paralysis. The patient was a 23-year-old female with complete right-facial paralysis with a diagnosis of Bell's palsy. Signs and symptoms were assessed using a standardized measure of facial disability (Facial Disability Index-FDI). Physiotherapy rehabilitation involved interrupted direct current, taping & muscle-re-education exercises aimed at restoring normal movement within the affected right facial musculature. In 26 physiotherapy sessions over 2 months, the patient had improved self-reported facial disability (initial FDI score; Physical subscale = 33/100 and Social/Well-being subscale = 53/100. The final FDI score; Physical subscale = 72/100 and Social/Well-being subscale = 83/100) and significantly reduced functional impairments. These case report describe a physiotherapy treatment based in the form of electrical current and taping used on facial muscle In some cases, physiotherapy may provide extreme benefit in reducing the physical and social impairments commonly observed in patients suffering from Bell's palsy. Self-reported outcome measures, such as the FDI, provide an easy method to assess whether patients suffering from various diagnoses are responding to physiotherapy. There are many unresolved view on efficacy wide range of therapeutic modality approach in treatment of Bell's palsy. The purpose of this case study was to review systematically randomized controlled trials, study relating to the efficacy of electrotherapeutic modalities & taping in management of acute Bell's palsy. Facial nerve is responsible for voluntary facial movements & can be tested by asking a patient to perform movements such as wrinkling the brow, showing teeth, frowning, closing the eyes tightly, pursing the lips and puffing out the cheeks & noticing asymmetry patients with complete right-facial paralysis with a diagnosis of Bell's palsy.

**Keywords:** interrupted direct current, Bell's palsy, taping, facial disability index

### Introduction

In order to diagnose and treat the many causes of facial nerve paralysis, it is important that the clinician have a good understanding of the anatomy and function of the facial nerve. The facial nerve contains approximately 10,000 fibers. Of these, 7000 myelinated fibers innervate the muscles of facial expression, the stapedius muscle, the posterior belly of the digastric muscle, and the platysma. The remaining 3000 fibers form the nervous intermedius (Nerve of Wrisberg) which contains sensory fibers (taste) from the anterior 2/3 of the tongue, and parasympathetic secret motor fibers to the parotid, submandibular, sublingual, and lacrimal gland. The facial nerve also contains a few general somatic afferent fibers which join the auricular branch of the vagus to supply

sensation to the external auditory meatus, and visceral afferents which innervate the mucous membranes of the nose, palate, and pharynx via the greater palatine nerve. The first step in evaluating any patient who presents with facial nerve paralysis involves taking a careful and thorough history. It is important to determine the onset of the paralysis (sudden vs. delayed), the duration, and the rate of progression. It is especially important to determine whether the paralysis is complete versus incomplete. Patients should be questioned regarding previous episodes, family history, associated symptoms (hearing loss, otorrhea, otalgia, vertigo, headaches, blurred vision, parasthesias), associated medical illnesses (diabetes, pregnancy, autoimmune disorders, cancer), history of trauma (recent or remote), and previous surgery (otologic, rhytidectomy, parotidectomy). A

complete head and neck examination must be performed, including microscopic examination of the ears, careful palpation of the parotid glands and neck, ophthalmologic examination (r/o papilledema), auscultation of the neck (r/o carotid bruits), and a thorough neurological examination. It is important to assess the degree of voluntary movement present. Bell's palsy is a complex neuromuscular facial disorder of unknown etiology commonly affecting the motor neurons of facial muscles receiving their neurological innervations from the seventh cranial nerve (the facial nerve) (Van Swearingen and Brach, 1998). Most patients' symptoms spontaneously resolve; however some patients continue to suffer in the long-term. Ultimately, the signs and symptoms related to long-term Bell's palsy may have a negative effect on many aspects of an individual's lifestyle. From a functional perspective, the ability to drink, eat and express oneself (verbally/non-verbally) can be greatly disturbed. In addition, the psychosocial impact of such a disorder can be life-altering in relation to social functioning. Treatment often consists of a dose trial of antibiotics, antiviral or anti-inflammatory agents and in some cases, surgical decompressive procedures at the facial nerve exit zone (stylomastoid foramen) may be considered (Holland and Weiner, 2006). Further to these medical options for the treatment of Bell's palsy, physiotherapy has been reported to improve the impairments associated with facial paralysis (Brudny *et al.*, 1988; Brudny *et al.*, 1991; Ross *et al.*, 1991; Brach *et al.*, 1997; VanSwearingen and Brach, 1998; Beurskens and Heymans, 2003) <sup>[1]</sup>.

The purpose of this case report is to describe efficacy of Interrupted direct current & taping in Bell's palsy

### Case description

23-year-old female was referred to our physiotherapy clinic with the diagnosis of Bell palsy, a unilateral facial palsy of unknown etiology. The patient reported that she first noticed the problem when she awoke 2 days ago and saw that her face "was distorted and deviated towards the right side." She stated that she was recovering from a recent respiratory tract infection and that the evening before the facial symptoms appeared, she experienced pain in the mastoid region. The patient saw her primary care physician who diagnosed her as having Bell palsy. She was initially examined by his family physician who prescribed a course of anti-viral (acyclovir) medication, oral steroids (prednisone) and suggested a consultation with a physical therapist for management of her facial muscle weakness. She continued to take prednisone at the time of the initial physiotherapy evaluation but the acyclovir medication was discontinued due to lack of response in relation to his facial symptoms. Upon arrival in our clinic, the patient expressed great concern that her facial weakness would interfere with her work as a student.

The neurological examination revealed facial asymmetry at rest with drooping of the corner of the mouth and some accumulation of saliva on the left side of the mouth and a decrease in the prominence of the nasal labial fold. Sensation over the left side of the face was intact; however, the patient reported a decreased sense of taste. When asked to perform volitional movement, the patient exhibited no motion of the left forehead and very slight movement of the left eyelid with maximal effort. The patient was able to produce a slight movement at the left corner of the mouth. When asked to close her eyes, there was an upward

movement of the left eye itself, but the lid remained opened (Bell phenomenon). The patient also was unable to show her teeth on the left side or hold air in her left cheek. No facial muscle synkinesis or contractures were present. The patient's presentation was consistent with a Facial disability index. To assess self-reported disability at baseline and to monitor treatment progress, the patient completed the Facial Disability Index (FDI), developed by Van Swearingen and Brach (1996). The FDI is a ten-item questionnaire used for assessing the disability of patients with facial nerve disorder. The FDI is designed to provide the clinician with information regarding the disability as well as related social and emotional well-being of the patient. The FDI consists of two subscales; Physical function (items 1-5) and social well-being (items 6-10). The scores range from 0 (complete paralysis) to 100 (normal facial function). The FDI has shown to be reliable and valid as a clinical instrument and has been shown to accurately demonstrate the relationship between impairments, disability, and psychosocial status (Van Swearingen and Brach, 1996).

Neelima Gopal initial FDI score on initial evaluation was; Physical function subscale = 33/100; Social/Well-being subscale = 53/100.

Neelima Gopal was a student studying in college. She has to communicate with teacher & friends in college. She lived with her grandparents and reported significant difficulty with drinking, eating, speaking and closing her left eye. These functional impairments were consistent with examination findings of synkinesis (abnormal movement of the face during a desired motion) for her right-sided muscles of facial expression e.g. smiling, 'puckering' and frowning. Neelima Gopal also remarked on the need to continually use eye drops as well as performing manual closure of his left eye-lid in order to relieve the symptoms of a dry, irritated left eye. These symptoms were consistent with the clinical presence of a positive Bell reflex on the left side (eye rolling backward during active eye closure) which prevented complete eye closure (Jelks *et al.*, 1979). She appeared motivated to improve his facial function with physiotherapy intervention.

It was initially decided that the patient would be seen four time per week for up to 8 weeks, with each session scheduled for 45 minutes. Each session began with a brief re-evaluation of facial motor functioning e.g. active smiling, frowning, 'puckering' and eye closure.

### Treatment

It was evident that the patient's goals were to improve her facial functioning as well as decrease her concern for an impaired aesthetic appearance. In order to assist NG achieve her goals, the treating physiotherapist performed a literature review on interrupted direct current & taping best evidence for recovery from Bell's palsy. The literature review yielded recommended guidelines described by Brach and Van Swearingen (1999).

### Instrument/Material

Diagnostic Electrical Stimulator (electro care system-interrupted direct current), Micro pore Tape, Surgical Blade & Scale, Functional assessment checklist and Facial Function Deficits & Facial grading score sheet.

Taping protocol is based on the principles of Neuro Muscular Retraining (NMR), Neurophysiology & Biomechanics. It states that weak or paralyzed muscle can

be reinforced or facilitated through irradiation and temporal & spatial summation. The principle of Biomechanics explains the vectors responsible to perform a movement in facial region, which needs to be balanced to optimize the muscle function in desired direction thereby preventing asymmetry. Taping protocol utilizes all of the above principles & serve the main purpose that are

- Preventing asymmetry
- Preventing over activity/ over pull of paralyzed muscle
- Enhance facilitation
- Reinforce movement in graded fashion
- Maximize functional use of affected muscles by incorporating functional activities

**Electrical stimulation**

Initially the interrupted direct current stimulation was given. An impulse with duration of 100 ms is considered satisfactory for the treatment of denervated muscles. Muscles were showing contractions on 100 ms. Ninety contractions were given for treatment to be effective. After 25 days of treatment, improvement was noted. Muscles were showing contractions on 30 ms. electrical stimulation was provided daily until active contractions returned and then 3 times per week until recovery or a plateau in function. Treatment for patients with denervation lasted from 2 to 6 months. The outcome measure used for recovery was a visual estimate of recovery of function of the affected side expressed as a percentage of effected side.

**Home exercise programme**

1. Patient was instructed to passively raise her left eyebrow with his fingers and activate the appropriate musculature.
2. Asked the patient to raise eyebrows and then frown.
3. Close eyes and then open wide.
4. Smile
5. Say a,e,i, o,u
6. Hold the straw in mouth – Suck and Blow.
7. Whistle

A mirror is useful while performing these exercises to enable the patient to observe the muscle activity. Generally the patient should practice these facial exercises twice a day with about five repetitions at a time. So as not to fatigue the muscle. The improvement was noted in eye closure, speaking, drinking and chewing.

**Facial disability index for a patient with facial neuromuscular dysfunction**

**Overview**

The Facial Disability Index can be used to evaluate the impairment a patient has because of a facial neuromuscular disorder. This can be used over time to monitor the course the condition and any response to interventions. The authors are from the University of Pittsburgh.

**Sub scores**

1. Physical function
2. Social functioning and well-being Responses are based on the level of functioning experienced during te past month.

**Physical functioning**

1. How much difficulty did you have keeping food in your mouth moving food around in your mouth or getting food stuck in your cheek while eating?

2. How much did you have drinking from a cup?
3. How much difficulty did you have saying specific sounds while speaking?
4. How much difficulty did you have with your eye tearing excessively or becoming dry?
5. How much difficulty did you have with brushing your teeth or rinsing your mouth?

**Table 1**

Responses	Points
usually did with no difficulty	5
usually did with a little difficulty	4
usually did with some difficulty	3
usually did with much difficulty	2
usually did not do because of health	1
usually did not do for other	0
reason	
not applicable	NA

Sub score for physical function = SUM (points for questions 1 to 5)

**Social Functioning and Well-Being Questions**

6. How much of the time have you felt calm and peaceful?
7. How much of the time did you isolate yourself from people around you?
8. How much of the time did you get irritable towards those around you?
9. How often did you wake up early or wake up several times during your nighttime sleep?
10. How often has your facial function kept you from going out to eat shop or participate in family or social activities?

**Table 2**

Responses	Positive Points	Negative Points
none of the time (no night in #9)	6	1
a little bit of the time (a few nights in #9)	5	2
some of the time (some nights in #9)	4	3
a good bit of the time (a good number of nights in #9)	3	4
most of the time (most nights in #9)	2	5
all of the time (every night in #9)	1	6
not applicable	NA	NA

Positive direction: 7 8 9 10

Negative direction: 6

Sub score for social functioning and well-being= SUM (points for questions 6 to 10)

**Interpretation**

- minimum score for physical functioning: 0
- maximum score for physical functioning: 25
- minimum score for social and well-being: 5
- maximum score for social and well-being: 30

Physical functioning score as percent functional ability = ((total sub score)–(number of questions answered))/ (number of questions answered) \* (100 / 4)

Where: The minimum percent physical functioning is (- 25%) if the patient did not do any of the activities for "other reasons". This is if the instructions given are followed. However if it is assumed that these items are not applicable then everything works fine. Social functioning and well-being score as percent functional ability = ((total sub score) – (number of questions answered)) / (number of questions answered) \* (100 / 5)

## References

1. Brach Jennifer S, Van Swearingen Jessie, Delitto Anthony, *et al.* Impairment and Disability in Patients with Facial Neuromuscular Dysfunction; Otolaryngology–Head and Neck Surgery,1997;315:321-117:4.
2. Burelo-Peregrino E, Salas-Magaña M, Arias-Vázquez P, *et al.* Efficacy of electrotherapy in Bell's palsy treatment: A systematic review; Journal of back and musculoskeletal rehabilitation,2020;865:874-33:5.
3. Buttress S. Electrical stimulation and Bell's palsy; Emergency Medicine Journal,2002;428:a-428-19:5.
4. Cederwall Elisabet, Fagevik Olsén Monika, Hanner Per, *et al.* Evaluation of a physiotherapeutic treatment intervention in “Bell's” facial palsy; Physiotherapy Theory and Practice,2006;43:52-22:1.
5. Centre for Reviews and Dissemination. The efficacy of electro therapy for Bell's palsy: a systematic review.
6. Clinical decision on the use of ES for Bell palsy-Mosforth J, Taverner D. Physiotherapy for Bell's palsy. BMJ,1958;2:675-677.
7. Farragher Diana, Kidd Geoffrey L. Tallis, Raymond; Eutrophic electrical stimulation for Bell's Palsy; Clinical Rehabilitation,1987;265:271-1:4.
8. Frach JP, Osterbauer PJ, Fuhr AW. Treatment of Bell's palsy by mechanical force, manually assisted chiropractic adjusting and high-voltage electrotherapy; Journal of manipulative and physiological therapeutics,1992;596:598-15:9.
9. Modlin M, Forstner C, Hofer C, Mayr W, Richter W, Carraro U, *et al.* Electrical Stimulation of Denervated Muscles: First Results of a Clinical Study Artificial Organs,2005;203:206-29:3.
10. Quinn Rosie, Cramp Fiona. The Efficacy of Electrotherapy for Bell's Palsy: A Systematic Review; Physical Therapy Reviews,2003;151:164-8:3.
11. Shrode LW. Treatment of facial muscles affected by Bell's palsy with high-voltage electrical muscle stimulation; Journal of manipulative and physiological therapeutics,1993;347:52-16:5.
12. Spielholz NI. Electrical stimulation of denervated muscle. In: Nelson RM, Hayes KW, Currier DP, eds. Clinical Electrotherapy. 3rd ed. Stamford, Conn: Appleton & Lange, 1999, 9.
13. Targan Robert S, Alon GAD, Kay Scott L. Effect of long-term electrical stimulation on motor recovery and improvement of clinical residuals in patients with unresolved facial nerve palsy; Otolaryngology–Head and Neck Surgery,2000;246:252-122:2.
14. Taverner D, Kemble F, *et al.* 16 1966 Excluded Clinical trial of ACTH gel.Mosforth and Taverner,17 1958 Included Clinical trial of ES for patients with acute Bell palsy, BMJ,1967;581:582-4:5579.