High intensity electrical stimulation in acute Bell’s palsy on facial grading score: A case report

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Abstract
Background: Bell’s Palsy or idiopathic facial palsy is an acute onset disorder affecting Facial nerve. It affects the motor function of the face leading to inability to close the affected side eye, blowing out of cheek, puckering of lips. Literature shows low evidence data on the physical therapy management of the condition and further the effectiveness of a single intervention is not known.

Case Presentation: This is a report of 71 years old female with who reported to emergency department with chief complaint of distorted facial symmetry and inability to close eye on left side of her face. Patient was discharged from hospital with a seven day course of acyclovir. Patient was self-referred to physical therapist due to cosmetic concerns and eye irritation. Physical evaluation was conducted and patient was given high intensity stimulation for 2 weeks to see its effect as a unimodal modality.

Conclusion: High intensity electrical stimulation of facial muscles along with the facial trunk stimulation might be an effective treatment for early resolution of acute Bell’s Palsy in elderly patients.

Key Words: Bell’s Palsy, Electrical stimulation,

List of Abbreviations:
BP= Bell’s Palsy
ES= Electrical Stimulation

Background
Bell's palsy also known as Idiopathic facial palsy is a an acute peripheral nerve disorder affecting seventh cranial nerve (Facial nerve)[1]. With the annual incidence occurring from 15 to 30 per 100,000 persons, Bell's palsy affects men and women equally at all ages with peak incidence noted in 40s[2,3]. Various theories suggest that the nerve inflammation resulting in compression and further ischemia and demyelination is the possible cause of the Bell’s Palsy but the exact cause behind the pathophysiology of the condition is uncertain and unknown[4,5]. Subjects having hypertension, diabetes mellitus, upper respiratory tract infection following a viral attack and compromised immune system are at higher risk of developing BP[6]. There is low quality evidence existing in literature related to the effectiveness of physical therapy in subjects with acute Bell’s Palsy and large amount of treatment options are available which are used in combination with each other most of the times leading to unclear results as of which modality is more effective. Literature shows that the course of disease is almost self-limiting which further questions the applicability and effectiveness of physical therapy modalities in BP. [7]

Case Presentation
A seventy-one year old female reported to the emergency with chief complaint of sudden deviation of face to right side and inability to close eye since one day. There was no history of slurring of speech, ear discharge, fever, and loss of consciousness, vertigo, double vision and any limb weakness. There was no associated hearing or taste loss. Detailed history revealed patient is diabetic and hypertensive (usual BP – 140/80, Highest BP – 160/90) from past 10 years. Other system evaluation revealed patient has atrial septal defect with no clinical manifestations. Clinical
findings suggested idiopathic facial palsy. Laboratory investigations reported to be within normal limits with blood sugar levels at 110mg/dL. Patient was discharged from the hospital with a prescription of 7-day course of acyclovir and was referred to a physiotherapist for further management. Patient consulted physiotherapist due to cosmetic concerns and irritation in the eye due to incomplete closure. Standard examination included ENT examination, description of the palsy by the patient, grading using Facial grading scale and localization of the symptoms. Cranial nerve assessment revealed loss of volitional control (or voluntary movement) of all muscles of left side of the face. No changes in taste and hearing were reported by the patient. Also, there was no incidence of post auricular pain. Observation and subjective assessment revealing complete loss of facial movements on left side of the face with ptosis, inability to blow out the cheeks or contain air in the mouth. When patient was commanded to close her eyes, her left eyelid remained opened with an upward rolling of eye also known as bell’s phenomenon. The patient’s condition was graded using Sunnybrook Facial Nerve Grading Scale which evaluated patient on 3 parameters namely resting symmetry, symmetry on voluntary movement and synkinesis with a composite score of 55 for the affected side. The initial physical examination was conducted after 2 days of onset and later on every week until the full volitional control was achieved by the patient.

Treatment

Before the beginning of the treatment session, patient was explained about the purpose of the study. Patient was advised to report any discomfort or unpleasant feeling encountered during the treatment. Interrupted galvanic current was used to stimulate frontalis, orbicularis occuli, zygomaticus major and orbicularis oris to achieve raising of eyebrow, eye closure, smile and lip pucker respectively. Initially, a low-intensity current was applied using a pen electrode for stimulation starting from 0.5 mA and was further increased to elicit a visible muscle contraction with resultant action of the muscle. For e.g. orbicularis occuli, current intensity was increased until a complete eye closure was achieved and participant had reached her tolerability threshold. A total 15 sessions were provided over a time span of 15 days with no rest period in between. Total duration of treatment protocol lasted for approximately 30 minutes where each muscle received 2 sets of 60 contractions each with a rest period of 10 seconds between the sets. Surge faradic current was used to stimulate facial nerve trunk to speed up the recovery. Patient was taught normal movements of face to maintain the facial symmetry.

Outcome and Follow up

Patient follow up was taken after one month, where no residual paralysis or synkinesis was reported by the patient. Complete closure of eye was achieved post intervention which was the major concern for the patient. The observed clinical improvements lasted even after one month of intervention with no further deterioration of patient function.

Discussion

Existing literature shows conflicting evidence on the use of the combined corticosteroid and acyclovir for the treatment of acute Bell’s Palsy.[8]
According to a systematic review, studies involving the application of electrical stimulation have shown that the electrical stimulation caused more complications rather than resolving the symptoms. Previous studies have shown that electrical muscle stimulation can be effective, may cause no difference or may cause harm to the patient in case of synkinesis[7].

But the present study demonstrated that application of high intensity currents and teaching the patient some normal movements did not cause any harm to the patient in context to motor synkinesis and contractures.

None of the studies have been conducted to show that ES can be used as a single modality in treatment of bell’s palsy and could speed up the recovery in short duration of time.

Mirja Ilves, in his study on normal individuals demonstrated that higher amplitude currents can be used to elicit volitional contraction in patients but has shown concern regarding the efficacy of the same in the individuals with complete unilateral paralysis[9].

The report suggests that ES at higher amplitude and contractions can be helpful in speeding up the recovery of the patients with complete unilateral paralysis saving them from the concerns regarding physical appearance or cosmesis and without causing synkinesis or facial contractures.

Conclusion
Extensive Electrical stimulation of facial muscles combined with facial trunk stimulation might be an effective treatment for early resolution of symptoms in case of acute Bell’s Palsy.

References