

Effect of EMG Biofeedback in Patients with Synkinesis: A Case Report

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ABSTRACT

Synkinesis occurs after injury to the facial nerve. It is a usual sequelae of facial palsy synkinesis which is an involuntary movements accompanying a voluntary one the type of synkinesis is commonly described by combining the names of the two involved muscle group the first part referring to voluntary motor group followed by the involuntary muscle group, in this study we using E.M.G biofeedback. In many cases it is believed to be associated with other medical conditions but recurrence in facial palsy is common treating with conventional exercises and galvanic stimulation will increase the synkinesis. Hence E.M.G Biofeedback can be used as an alternative for reducing synkinesis.

Case presentation: A 20 year old male diagnosed to have a recurrent facial palsy in the year of 2017 and underwent galvanic stimulation with exercises therapy. Two episodes of facial palsy have occurred in 2018 then later he developed Synkinesis and asymmetric weakness of the facial muscles. E.M.G. Biofeedback is given along with mirror at Institute of Neurosciences, Neurorehabilitation Department was introduced to facial motor points and it result in significant reduction of synkinesis and complete recovery in weakness of the muscle.

Conclusion: E.M.G. Biofeedback along with mirror can be used to treat recurrent facial palsy with synkinesis.

Keywords: Synkinesis, Facial palsy, Electromyography (E.M.G.) Biofeedback.

INTRODUCTION

Facial expression is the chief means of non-verbal communication the way we present ourselves, relate our emotions, feelings but human's impairment of facial function may limit non-verbal communication which intends to psychologically disabling as well. Hence the retraining of the facial muscles and the nerves is needed as it is documented in studies.^{1,2,3} Improved technological support E.M.G. biofeedback is a perfect tool for retraining muscles and reducing synkinesis movement along with mirror

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two involved muscle group the first part referring to voluntary motor group followed by the involuntary muscle group in this study we using E.M.G biofeedback

Synkinesis starts 3-4 months after regeneration of facial nerve palsy and may prolong up to 2-3 years^{4,5,6}. there is very less chances for recovery facial nerve palsy there are different types of synkinesis oral -ocular synkinesis involuntary eye closure during ocular -oral synkinesis involuntary mouth movements during voluntary eye closure voluntary mouth movement during voluntary eye closure⁷ 50% of all facial palsy causes are idiopathic⁸ the rest of them are caused by otitis or Ramsay Hunt Syndrome, tumor, trauma, surgical injury^{9,10} most of the cases of facial palsy will get complete recovery within 3 months¹¹ the patients who are partial

recovered develop muscle weakness, contracture; hyperkinesis; atrophy and synkinesis^{12,13,14.}

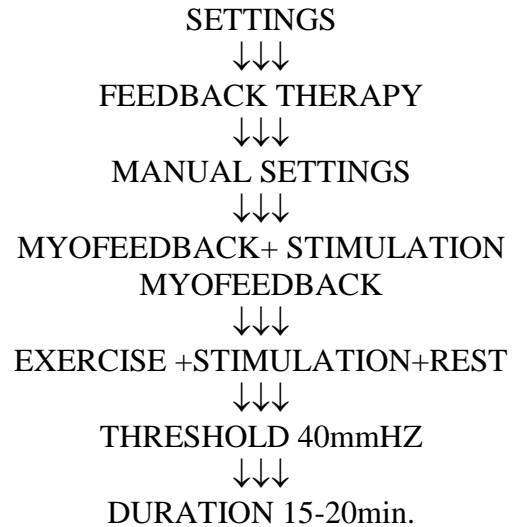
CASE PRESENTATION

A case of synkinesis 20-year-old patient had a recurrent facial palsy done galvanic stimulation and exercises for period of 4years with no other past medical history of Diabetes, hypertension or thyroid. Patient was apparently well after, the first episode of Facial palsy patient underwent a galvanic stimulation for a period of 4 weeks along with a conventional exercise got recovered completely. after which he had a second episode of facial palsy within a year again the same therapy was conducted the patient was partial recovered but after two years the third episode of facial palsy was occurred which have lead a massive impact on the recovery this when he came to I.N.K (Institute of Neurosciences Kolkata) there we have started treatment with E.M.G biofeedback with Mirror therapy this have reduced his synkinesis the therapy was conducted for a period of 4-6weeks , three sittings weekly. The synkinesis assessment questionnaire was used to evaluate the severity of the synkinesis and asymmetry of the facial muscles.

TREATMENT:

The patient was scheduled for 3 times in a week for 4-6 weeks treatment session at, Neurorehabilitation department Kolkata.

Initial evaluation was completed on first day Including photographic demonstration of all the facial nerve muscle groups as well as clinical evaluation using Synkinesis Assessment Questionnaire the patient received knowledge about facial muscles and their movements on the other hand E.M.G biofeedback and mirror feedback were employed using ENRAF NONIUS V029



When the patient activates orbicularis oris a synkinesis movement orbicularis oculi Gets excited educate the patient to inhibit the involuntary movements several trails were Attempted threshold levels where maintained there was significant results in reduction of involuntary synkinesis movement

Patient Name: Himanshu Jaiswal
 DOB: 06-05-97
 MR #: _____
 Date: _____

UW Health
 University of Wisconsin Hospitals and Clinics Authority
SYNKINESIS ASSESSMENT QUESTIONNAIRE WORKSHEET

Please answer the following questions regarding facial function with regard to the affected side of the face with facial paralysis, on a scale from 1 to 5, according to the following rankings:

29/12/2010

1 = seldom or not at all
 2 = occasionally, or very mildly
 3 = sometimes, or mildly
 4 = most of the time, or moderately
 5 = all the time, or severely

Question	Score (1-5)
1 When I smile, my eye closes	<u>0.4</u>
2 When I speak, my eye closes	<u>0.1</u>
3 When I whistle or pucker my lips, my eye closes	<u>0.1</u>
4 When I smile, my neck tightens	<u>0.3</u>
5 When I close my eyes, my face gets tight	<u>0.3</u>
6 When I close my eyes, the corner of my mouth moves	<u>0.3</u>
7 When I close my eyes, my neck tightens	<u>0.3</u>
8 When I eat, my eye waters	<u>0.5</u>
9 When I move my face, my chin develops a dimpled area	<u>0.2</u>

Meta DP, Warwick Robinson M, Hedrick TA. Validation of the Synkinesis Assessment Questionnaire. Laryngoscope. 2007;117(5):653-656.
 RMB00212 (Rev. 08/29/18) Worksheet Only – Not a Medical Record Document. DO NOT SCAN

INITIAL TREATMENT



AFTER THE TREATMENT



DISCUSSION

In this case study exercise along with E.M.G biofeedback and mirror therapy have shown significant results, along with neuromuscular education causes a massive out come. Incomplete recovery in facial nerve palsy is because of the multiple episodes weakness is significant in the second stage.

The facial muscles have not many internal sensory receptors hence they are

very delicate with minimum contractions and highly vulnerable of contractures and change in movement patterns. Unbridled synkinesis causes tension and changes in facial expression in dynamic and static expression. The lack of particular timing in the contraction of the muscle is main pathological problem in synkinesis.

Also asymmetry in the face is not because of the weakness in the muscle but it's a co-ordination delay of both the sides.

Hence forth the E.M.G Biofeedback with the mirror will maintain the timing and symmetry of the face which has given a significant result reducing synkinesis and brings back the symmetry in the face.

This case study shows it is possible to re-educate the inhibition of the motor muscle conduct such as synkinesis.

CONCLUSION

E.M.G Biofeedback along with Mirror Therapy can be used to treat recurrent facial palsy with synkinesis

Limitations:

Assessment Scale for synkinesis should be done in a large sample size.

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