



## ELECTRICAL MUSCLE STIMULATION (EMS) IN THE MANAGEMENT OF A COMPLETELY EDENTULOUS PATIENT WITH A UNILATERAL CONDYLECTOMY-A CASE REPORT

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### ARTICLE INFO

#### Article History:

Received 19<sup>th</sup> June, 2017  
Received in revised form 3<sup>rd</sup>  
July, 2017  
Accepted 7<sup>th</sup> August, 2017  
Published online 28<sup>th</sup> September, 2017

#### Key words:

Condylectomy, deviation, electrical  
muscle stimulation, complete denture.

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### ABSTRACT

78-year-old male patient with history of unilateral condylectomy reported for complete denture treatment. The patient exhibited extreme jaw deviation due to disuse atrophy of masticatory muscles on the side of surgical resection. The patient was treated with electrical muscle stimulation therapy to stimulate and to restore muscle function and was successfully rehabilitated with complete dentures.

### INTRODUCTION

Temporomandibular joint plays a vital role in maintenance and function of the stomatognathic system and general health. The temporomandibular joint can be affected to varying degrees by autoimmune diseases, congenital, inflammatory and traumatic conditions.<sup>1</sup> Trauma involving the joint apparatus can range from mild to severe. Temporomandibular joint is very responsive to surgical treatment however, in case of contaminated injury leading to severe infection warrant condylectomy. A unilateral condyle can severely hamper oral function involving mastication, phonation and esthetics.<sup>2</sup> If a completely edentulous jaw is subjected to condylectomy the rehabilitation of the affected patient can be extremely challenging to the clinician.

#### History

A male patient aged 78years reported to the department of prosthodontics with a chief complaint of difficulty in mastication, phonation and extreme deviation of the lower jaw during function. History revealed patient was completely edentulous for a period of 6years and he met with a RTA 6 months before and underwent condylectomy of the right side due to severe fracture and subsequent infection. Extra oral examination revealed a marked facial atrophy on the right side and the patient had jaw deviation towards the left side on mouth opening. Examination of the muscles of mastication on the affected side exhibited decreased muscle tone and atrophic

changes. Patient had no habits and oral mucosa was normal. Radiographic examination revealed loss of the condylar head and neck on the right side and a healed bony architecture was observed.(Fig 1,2) The mental attitude of the patient was philosophical and nutritional counselling was done and various treatment options discussed. To rectify the decreased muscle tone EMS was advised to restore and rejuvenate the atrophic muscles on the right side followed by complete denture treatment.



Fig 1

#### Therapeutic Methodology

Various therapeutic options for strengthening the atrophic masticatory muscles were explained to the patient and finally electrical muscle stimulation(EMS) treatment was preferred after total consensus between the patient and the clinician.

Muscle function test was performed before placing the electrodes.

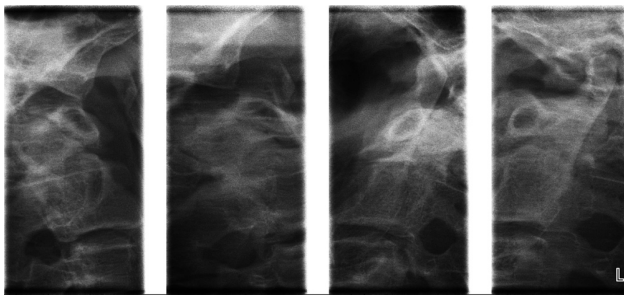


Fig 2

The centers of the temporalis and the master on right side were identified and the electrodes were placed parallel to the muscle fibers of these muscles equidistant from the origin and insertion of the respective muscles. A customized EMS device was modelled with a circular adhesive 3cm in diameter electrodes. The total time of treatment was 30 mins with variations of low and high frequency, starting with 4Hz for the first 5mins and gradually increasing the intensity to 100Hz. This cycle was repeated for a period of 15 days. Following this, the amount of jaw deviation reduced markedly by 12mm.

**Clinical steps**

- Primary impressions were made with irreversible hydrocolloid and primary casts were poured. (Fig 3)
- Secondary impressions were made with addition silicone over a special tray and subsequent border moulding.(Fig 4)
- TENS significantly helped on the jaw relation procedure with the patient having little difficulty in providing a myocentric occlusion at established vertical dimension after face bow transfer.
- The size, shape and color of the teeth were selected and were arranged in bilateral balanced occlusion and wax try-in was done.(Fig 5)
- The dentures were fabricated using injection moulding technique, trimmed polished and inserted in the patient.(Fig 6)

The patient was followed up for a period of 3 months and no deviation was observed. The patient had good masticatory efficiency, phonation and experienced high satisfaction with no discomfort.



Fig 3



Fig 4



Fig 5

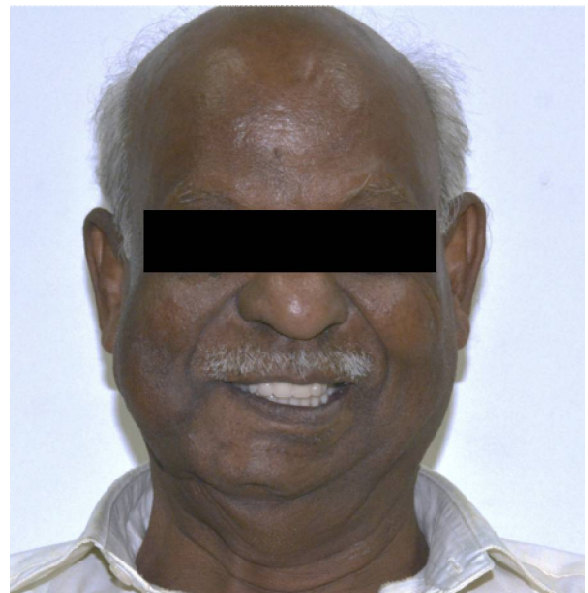


Fig 6

**DISCUSSION**

Various neuromuscular and muscle disorders are common in geriatric population undergoing prosthodontic treatment. Neuromuscular disorders like Parkinsonism,<sup>3</sup> Myasthenia Gravis,<sup>4</sup> stroke, Bell's palsy can significantly influence esthetics, function and the outcome of prosthodontic treatment. Another condition posing a significant challenge in prosthodontic practice is prosthetic rehabilitation in patients who have underwent respective surgeries in the orofacial region due to trauma, fibro-osseous lesions or other forms of surgical management for oncogenic conditions.<sup>5</sup> When the underlying bone is resected the muscle fibers originating and inserting into them are compromised on their anatomy and function.<sup>6</sup> The compromise in function can vary from mild to severe depending on the site and extent of the osseous resection, inadvertent iatrogenic nerve damage associated with resection can also deteriorate the integrity of the muscle function.

The various modalities of management include physiotherapy, Low Intensity Pulse Ultrasonography(LIPUS)<sup>10</sup>, Transcutaneous electrical nerve stimulation(TENS), EMS<sup>9</sup>, acupuncture<sup>11</sup>, surgical reconstruction.<sup>7,8</sup> All the above mentioned techniques may help the patient to restore the muscle function however the results may vary depending on the various clinical parameters.

EMS is a very effective treatment for the management of atrophic muscles. The advantage includes the safety of the procedure, faster results, short term of treatment, no adverse reaction and avoidance of extensive surgical intervention and significant improvement in muscle function.<sup>12</sup> The difficulties

encountered in prosthetically rehabilitating patients with osseous resection include restricted mouth opening, difficulty in impression making, jaw relation, compromised retention. Restoration of muscle balance will aid the clinician in establishing proper jaw relation which will be a crucial determinant in achieving prosthodontic success and hence EMS can be a very potential therapeutic option in the management of atrophic muscles and can be significantly improve the quality of prosthodontic care.

## CONCLUSION

EMS is a viable treatment option to stimulate and restore muscle integrity and function. EMS treatment can markedly improve the success of prosthodontic care in patients with respective osseous defects.

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