Medical Science

pISSN 2321–7359; eISSN 2321–7367

A case report on the perks of physiotherapy rehabilitation for restoring facial function following parotidectomy paralysis

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To Cite:
Lakkadsha TM, Patil S, Thorat R, Lalwani SS, Saifee SSH. A case report on the perks of physiotherapy rehabilitation for restoring facial function following parotidectomy paralysis. Medical Science, 2022, 26, ms170e2207.
doi: https://doi.org/10.54905/disssi/v26i123/ms170e2207

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Peer-Review History
Received: 03 April 2022
Reviewed & Revised: 05/April/2022 to 04/May/2022
Accepted: 05 May 2022
Published: 11 May 2022

Peer-review Method
External peer-review was done through double-blind method.

URL: https://www.discoveryjournals.org/medicalscience

ABSTRACT

Bell's palsy and temporomandibular joint (TMJ) pain are uncommon post-parotidectomy, but they should be handled as soon as feasible to avoid lasting deformities and disability. The following case is of a patient who has experienced this event. On postoperative day 3, he presented to the physiotherapy department with symptoms of loss of function on the left side of the face along with discomfort in the left TMJ while opening the mouth beyond a certain point. He was evaluated using a variety of outcome measures when he first started his physiotherapy regimen; after a month, a follow-up was conducted, and all of the outcome measures were analyzed again, showing favorable changes. For the treatment of Bell's palsy electrical stimulations is fairly common but, in this case, due to the financial situation of the patient it could not be given hence he was managed using conventional and traditional physiotherapy methods including strengthening, range of motion exercises with proprioceptive neuromuscular facilitation and roods which are not given much importance but have resulted extremely beneficial in this kind of situation. To conclude, a well-planned physiotherapy regimen can help a patient recover from Bell's palsy and TMJ pain caused postoperatively to a total parotidectomy through conventional and traditional physiotherapy methods and brings it back to normal functioning.

Keywords: Bell's palsy, Parotidectomy, Physiotherapy, Facial PNF

1. INTRODUCTION

When doing parotid gland surgery, it is important to remove the tumor completely while preserving the anatomical and functional integrity of the facial nerve, yet after the parotidectomy, the incidence of postoperative facial nerve dysfunction is 42.7 percent on the first postoperative day, 30.7 percent at one month, and zero percent at six months (Gaillard et al., 2005; Panchbhai

and Bhowate, 2020). The most frequent diagnosis associated with facial nerve palsy/paralysis, as well as the most common acute mononeuropathy, is Bell's palsy, which is named after Scottish anatomist Sir Charles Bell. Bell's palsy causes a partial or complete inability to move the affected side of the face muscles reflexively. Although Bell's palsy or facial paresis/paralysis normally heals within weeks or months, it can cause significant transient oral insufficiency and an inability to seal the eyelids in rare individuals, potentially resulting in irreversible eye injury. Moderate-to-severe facial asymmetry can remain in about 25% of people with Bell's palsy, affecting their quality of life significantly. These are some of the long-term side effects of Bell's Palsy, which can be devastating to victims (Hultcrantz, 2016; Javaherian et al., 2020; Zhang et al., 2020; Alshareef & Obeid, 2020).

The following case report depicts Bell's palsy and temporomandibular joint pain as a post-operative consequence of complete parotidectomy. Here, a physiotherapy regimen was designed keeping in mind each of the patient's complaints, be it pain or any functional disability.

2. PATIENT INFORMATION

A 53-year-old male came to the physiotherapy department with complaints of loss of function on the left side of his face for the past three days, which was sudden in onset and non-progressive in nature. His main complaints included inability to smile from the left side, close left eye, move left eyebrow and blow left cheek. The loss in these functions of the face began right after the surgical intervention which was performed for his parotid gland adenoma a few days ago. He also complained of left temporomandibular joint pain while opening his mouth after a certain limit after his surgery. A history of chronic tobacco chewing from the past 25 years was also associated. He lived in a remote village away from the hospital with low socioeconomic status, which contributed as a barrier to his ideal treatment program.

3. CLINICAL FINDINGS

He was examined thoroughly after taking informed consent from him. The clinical examination findings on inspection included sagging of the face, absence of forehead lines, angle of the mouth drooping, reduced nasolabial fold (Figure 1), eyebrow drooping, incomplete closure of the eyelid, and Bell's phenomenon on the left side of the face while compared with the right side. Furthermore, the mouth opening was only 2 centimetres (Figure 2), and while doing that he felt pain around the TMJ. A suture site was seen anteriorly and below the left earlobe and the incision was approximately 15 centimetres in length with grade 3 tenderness and without any discharge. The TMJ range of motion was severely reduced in five movements i.e., mouth opening, protraction, retraction, right and left lateral deviation. The manual muscle testing (MMT) of the facial muscles revealed grades 2 and 5 on the left and right sides respectively. All the sensations over the face and tongue were intact, and the cervical range of motion was reduced on the left side in all the movements compared with the right. Regarding the involvement of the facial nerve, a strength-duration curve was advised to the patient to analyze the extent of denervation of the facial muscles, but he denied it because lack of finances to perform the procedure. Summary of week-wise physiotherapy interventions is given in the Table 1 and patient is seen performing PNF exercise on his own (Figure 3).

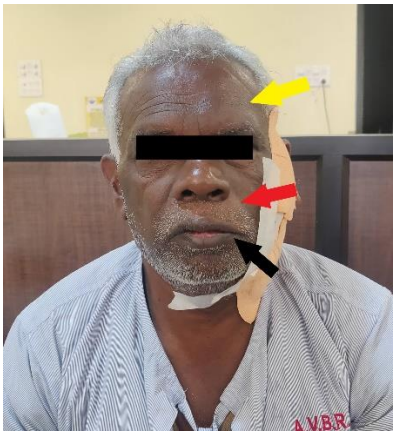

Figure 1 On the left side of the face, there is absence of forehead wrinkles, nasolabial fold reduced and drooping of the angle of the mouth. (The yellow arrow shows the absence of forehead wrinkles, red arrow shows reduced nasolabial fold, black arrow shows drooping of the angle of mouth)

Figure 2 Reduced mouth opening and stains of tobacco are evident over lips and teeth Physiotherapeutic Interventions

Table 1 Physiotherapeutic management and its administration

Sr. No.	Physiotherapy treatment goals	Therapeutic interventions	Therapeutic regimens
Summary of interventions given in weeks one-three			
1	To educate the patient	The patient was counselled about the importance of exercise regimen and the value of adherence to it	At the beginning of the session and whenever necessary
2	To reduce the pain	Ice massage surrounding the suture site but not over it	Five times a day for five minutes
3	To improve flexibility and mobility of TMJ and cervical spine	Active range of motion exercises of TMJ and cervical spine.	10 repetitions of each movement, thrice daily
4	To increase the mouth opening.	Mouth- opening by self-splinting suture site	10 repetitions, each time before eating and brushing teeth.
5	To increase tone in the facial muscles	Quick stretching to the facial muscles	A set of 3 stretches in 3 seconds each given for 3 minutes with 10-20 seconds break between each set.
		Quick icing to the facial muscles	A set of 3 strokes of ice in 3 seconds each given for 3 minutes with 10-20 seconds break between each set.
6	To improve the strength and function of facial muscles.	Exercises using mirror feedback for facial expression such as furrowing, eyebrow-raising, eye closing, nose flaring, smiling and grinning	10 repetitions of each expression exercise, five times a day
7	To provide appropriate support, assistance, and kinesthetic sensation to facial muscles	Taping using bandages	Once a day for two-three hours.
8	To provide proprioceptive sensations to the facial muscles. (Figure 3)	Facial proprioceptive neuromuscular facilitation techniques (Irradiation)	10 repetitions of each movement, thrice daily

9	To restore the functioning of muscles around the mouth.	Teeth clenching for masseter	10 repetitions thrice daily
		Balloon blowing for buccinator	Blowing a balloon completely thrice daily
		Sucking and blowing water through the straw for orbicularis oris	Blowing and sucking for 30 seconds each three repetitions thrice daily
Summary of interventions given in week 4-6 along with the previous regimen of 1-3 weeks			
1	To regain the strength of the facial muscles.	Facial muscle strengthening exercises	10 repetitions x three sets of each movement with minimal manual resistance for the fourth week and maximal manual resistance for the fifth and sixth weeks.
2	To regain the strength of the muscles acting on the TMJ.	TMJ strengthening exercises	10 repetitions x three sets with minimal manual resistance for the fourth week and maximal manual resistance for the fifth and sixth weeks.
TMJ: Temporo-Mandibular Joint			

Figure 3 Patient is seen performing Proprioceptive neuromuscular facilitation technique for zygomaticus major muscle whose action is smiling (The red arrow shows the position of the patient's finger to assist smiling from the affected side)

Follow-up and outcome of interventions

Summary of outcome measures used to assess the post treatment recovery is given in Table 2. Also a simple yet comprehensive graph to show the recovery in facial function has been depicted in Figure 4 using House-Brackmann facial nerve grading system.

Table 2 Outcome measures that were used to assess the recovery pre- and post-treatment.

Sr. No.	Outcome measures	Pre-treatment scoring	Post-treatment scoring
1.	House Brackman scale	Refer Figure 4	Refer Figure 4
2.	Facial muscles MMT	2	4+
4.	Functional opening "Knuckle test"	two knuckles	three knuckles
5.	LDF-TMD-Jaw Function Scale	Moderately difficult	No problem
LDF-TMD-Jaw Function Scale: Limitation of Daily Function Questionnaire for Patients with Temporomandibular Disorder; MMT: Manual Muscle Testing			

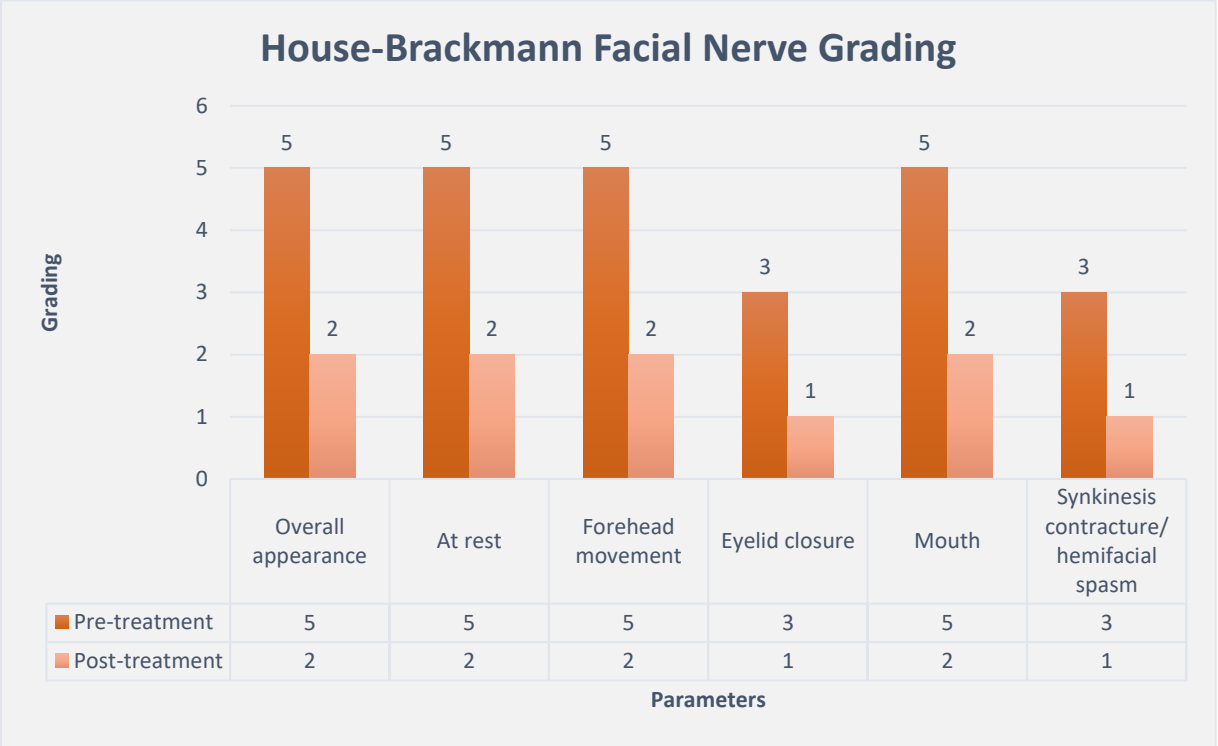

Figure 4 House Brackmann facial nerve grading on the pre and post treatment

4. DISCUSSION

This is a case report of post parotidectomy Bell's palsy and TMJ pain. The patient's symptoms have been managed by a thorough and precise plan that had been made and applied with definitive successful results. The patient was treated for Bell's palsy using various techniques such as facial proprioceptive neuromuscular facilitation (PNF), which was proven to be effective if given for two weeks or more (Deshpande et al., 2021; Hindle et al., 2012); Rood's approach, was given in the form of quick stretches and quick icing because one of the fundamental concepts of this Approach is tone normalisation through the use of suitable sensory cues to elicit the desired response from the muscle (Bordoloi and Deka, 2018); taping the facial muscles for assistance and maintenance of kinaesthetic sensations of those muscles (Alptekin, 2017), sucking and blowing exercises (Adhikari et al., 2019) along with the conventional physiotherapy management including facial expression exercises and facial muscle strengthening exercises while using the mirror as a feedback method.

Galvanic current has also been shown to be useful in these patients (Shrode, 1993) however, due to lack of his finances, this could not be done for this patient. The patient was managed for temporomandibular joint pain by increasing the mobility and stability of the joint and strength of the surrounding muscles by teaching active range of motion exercises and strengthening of overall all the muscles acting upon this joint (De Meurechy et al., 2019). He was also counselled to quit tobacco chewing since it might aggravate the TMJ pain and is also hazardous for his health. Due to the presence suture site at the left side of his face and neck, the patient was apprehensive about opening his mouth completely and moving his neck in a full range of motion, he was given appropriate physiotherapy in the form of cervical range of motion exercises and mouth opening exercises by self-splinting the suture site to reduce his apprehension of unwinding the sutures.

His progress regarding the symptoms of Bell's palsy was evaluated using the House Brackmann facial nerve grading system and MMT of facial muscles. For success with mouth opening, knuckle test was utilized and for TMJ pain, the LDF-TMD-Jaw Function Scale (Limitation of Daily Function Questionnaire for Patients with Temporomandibular Disorder-Jaw Function Scale) was used. The only limitation with the treatment was the unaffordability of the patient for electrical muscle stimulator.

5. CONCLUSION

Galvanic current stimulation though plays an important role in Bell's palsy; nevertheless, one can treat such patients without it. Such as, in this case since the patient could not afford the stimulator expenses, he was left with only manual and self-rehabilitation techniques. He was a case of post parotidectomy Bell's palsy where he was given physiotherapy rehabilitation in the form of facial

PNF (irradiation), Rood's (quick stretch and quick icing) associated with conventional physiotherapy like facial expressive exercises, strengthening of facial muscle using manual resistance and functional exercises, all these treatment techniques turned out to be extremely effective for a patient recovering from Bell's palsy and TMJ pain to bring the muscles back to normal function.

Acknowledgement

We thank the patient who co-operated with us during his treatment and consented to publish his case report and our teachers for motivating us to do so.

Authors' Contributions

TML has made the original manuscript, SP, RT, SSL, and SSS have read and approved the manuscript.

Informed Consent

Written & oral informed consent was obtained from the patient.

Funding

This study has not received any external funding.

Conflicts of interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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