

Case Report

Effects of physiotherapy in 28-year-old male with Bell's palsy following vestibular schwannoma

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ABSTRACT

Schwannomas are benign, well-encapsulated, slow growing nerve sheath tumors. Vestibular schwannomas (VS) are one of the commonest intracranial tumors that arise from the Schwann cells at cerebropontine angle. Post-surgical complications are highly prevalent where Bell's palsy is one of the most reported problems. Bell's palsy is a lower motor neuron condition characterized by rapid and unilateral paresis of 7th cranial nerve. A 28-year-old male was diagnosed with vestibular schwannoma followed by Bell's palsy. Patient presented with facial muscle paresis along with the Bell's phenomenon. Neurological examination revealed 7th cranial nerve involvement (house Brackmann scale score-VI). Various physiotherapy interventions including facial PNF, facial exercise, electrical stimulation, biofeedback through mirror exercises, facial soft tissue manipulation and ultrasound therapy were used that reduced the house Brackmann scale score to I/VI.

Keywords: VS, Bell's palsy, Facial PNF, Ultrasound therapy, Facial exercise, Physiotherapy intervention

INTRODUCTION

Schwannomas are benign, well-encapsulated, slow growing nerve sheath tumors. The world health organization classifies it as a grade I benign tumor. These are generally located in the upper limb, followed by head and trunk.¹ VS are one of the commonest intracranial tumors that arise from the Schwann cells at cerebropontine angle. Vestibular schwannoma mostly presents with tinnitus, hearing loss, or disequilibrium. However, large tumors may also present with facial hypoesthesia, facial nerve weakness or hydrocephalus. After diagnosis schwannoma are treated through radiation therapy, stereotactic radiation surgery or combination and if not treated, excision is required. Post-surgical complications are most common. Frequently reported complication is Bell's palsy. Bell's palsy is a lower motor neuron condition characterized by rapid and unilateral paresis of 7th cranial nerve.² It has motor, sensory and

parasympathetic functions. Bell's palsy can be evaluated by House-Brackman (HB) scale.³ Along with medicines, physical therapy also helps in resolution of symptoms to extent.⁴

CASE REPORT

A 28-year-old male reported in outpatient department with two weeks old weakness of the left side of face along with inability to close eyes, wrinkle forehead, wrinkle nose and with drooping of angle of mouth on the left side. Patient was apparently alright until 1 year before when patient developed headache in occipital and temporal region along with tinnitus in left ear, gradually headache worsened and he consulted the neurosurgeon. After consultation, MRI and other lab investigations were done and he was diagnosed with VS and underwent tumor excision using left retromastoid sub-occipital approach. Post-surgery, over a period of 15 days patient

gradually experienced unilateral left sided facial weakness, for which patient came to physiotherapy OPD of Maharaja Agrasen medical college, Agroha. Here, the patient was diagnosed with Bell's palsy. Patient consent was taken before assessment and taking of pictures.

On clinical examination

Assessments performed before rehabilitation on day 1.

Patient was in no acute distress; his cognition and higher mental status was normal. Neurological examination revealed 7th cranial nerve involvement. The House-Brackman (HB) scale is used to grade the severity of facial paralysis by grading facial functions in six grades from normal (Grade 2) to total paralysis (Grade 6). This scale was found to have strong inter-rater reliability (Kappa=0.503-0.302).³ The score of HB scale was V motor involvement was present but patient did not experience any altered sensation of taste or any parasympathetic abnormalities. Along with this Bell's phenomenon was present as shown in Figure 2. Patient was apprehensive to ambulate independently, so he used wheelchair for mobility.

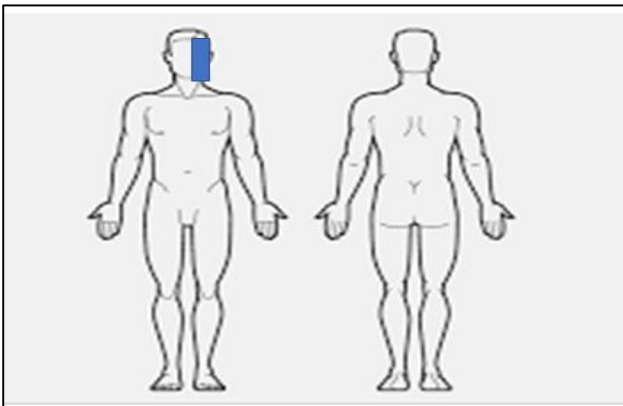


Figure 1: Body chart showing the side of palsy.



Figure 2: Case showing observational features of Bell's palsy.

Therapeutic intervention and protocol

Goal of the treatment was designed according to international classification of functioning disability and health (ICF). Outcome measures used was manual muscle testing (MMT), house Brackmann scale (HB scale), cranial nerve examination. Rehabilitation program of 21 days were given to the patient followed by follow up on 3rd week as presented in Table 1-3 and Figure 3.

Proprioceptive neuromuscular facilitation (Kabat rehabilitation)⁵

Patient was instructed to perform following exercises: Pursing the lips as whistling, smile with closed lips, lifting of angle of the mouth alternatively and with erect head, open mouth as wide as possible.

Mime therapy⁶

Patient was instructed to perform following exercises: Raising both eyebrows (like a surprised face), to make an anger expression, raising bridge of nose like disgusted expression, closing of both the eyes forcefully, smiling with and without showing teeth, bilaterally blowing of air in mouth and to make pout (like whistling).



Figure 3: Showing muscle stimulation and facial exercise.

Clinical diagnosis and rehabilitation programs

Table 3 shows the findings of facial muscle testing values before and after the whole rehabilitation program.

Table 1: The rehabilitation protocol during the first week.

1 st week	Protocol	Repetition
For muscle contraction	Electrical stimulation (galvanic)	80-Hz pulse, pulse duration of 700 MS, intensity was gradually increased from 0.5 mA. 30 minutes/ session 5 sessions /week. ⁷
	Facial soft tissue manipulation	7 steps for 45 seconds each. ⁸ Stroking, tapping, hacking, kneading (finger/ thumb) along with effleurage)
	Active facial exercises (brow lift, gentle eye closure, forced eye closure, snarling, smiling and lip picking)	10 repetitions for 10 sec holds.

Table 2: The rehabilitation protocol during the 2nd week.

2 nd week	Protocol	Repetition
For muscle contraction	Electrical stimulation (galvanic)	80-Hz pulse, pulse duration of 700 MS, intensity was gradually increased from 0.5 mA. 30 min/ session 5 sessions/ week.
To improve lung functional capacity	Deep breathing exercise, segmental exercise and the spirometry (insp.-600 cc, expi-900 cc)	10 repetitions with 5 se hold.
To prevent Wallerian degeneration	Ultrasound was applied to the paralyzed facial muscles at mastoid process.	(Frequency: 1000 kHz, intensity: 0.5 w/cm ² , on-off ratio: 1:2) 5-min daily session, 5 days per weeks, 5 cm ² head. ⁹

Table 3: Rehabilitation protocol during 3rd week.

3 rd week	Protocol	Repetition
For irradiation and strengthening	Facial PNF (repeated stretch from the beginning of range)	10 times with 5 seconds hold of each
For facial motor re-education	Mime therapy ¹⁰	10-15 repetitions

Table 4: Pre and post-rehab MMT of facial muscle.

Facial MMT	Pre-rehab MMT	Post-rehab MMT
Orbicularis oculi	0	WF
Corrugator	0	WF
Frontalis	0	WF
Procerus	0	F
Orbicularis oris	0	F

DISCUSSION

The present study presented a case of acute facial weakness occurring 15 days following vestibular schwannoma surgery. The patient developed HB 5/6 facial weakness which improved within 3 weeks to 2/6. The mechanism of facial nerve weakness in cases of VS is usually due to direct compression or other possible mechanisms such as inflammation or in our case it can probably be because of retromastoid sub-occipital approach. After this surgery, patient usually present with facial weakness either in the form of sudden paralysis or with gradual paralysis. Reviewing the literature, it was found that in case where facial weakness of moderate to severe intensity of HB scale III-V are observed, significant improvement of facial function occurs after 3 months of post excision surgery.

Nayak et al reported that facial nerve paralysis may develop within a few hours to a week or more after acoustic neuroma removal and if facial nerve involvement is more than 3 HB grades, chance of poor long-term outcome exists. There is an agreement that with any of the available approaches, such as the retromastoid suboccipital, retrosigmoid, the middle fossa and the trans-labyrinthine approaches facial nerve weakness is seen and requires physical therapy interventions.¹¹ Physiotherapy with biofeedback helps to improve facial function in patients with vestibular schwannoma. However important factors that influence the management of facial weakness include the duration and severity of weakness as well as the size of the tumor.¹²

Rinaldi et al reported 62 patients with preoperative normal function with HB I reported post-operative facial

nerve deficit with HB grade II-VI with onset usually at 8 days after surgery. They also advocated on prevalence of facial nerve deficit with the type of surgical approach.¹³ In this study, Mime therapy, facial proprioceptive neuromuscular facilitation, soft tissue manipulation, ultrasound therapy given for three weeks showed clinical improvement in the outcome measure and thereby the symptoms of the patient.

Existing literatures showed that the effectiveness of proprioceptive neuromuscular facilitation, soft tissue manipulation, ultrasound therapy among Bell's palsy patients is similar to findings of current case. It was evident that PNF helps the perioral muscles adapt to alterations after treatment. PNF along with the conventional treatment helps in treating the Bell's palsy.¹⁴

CONCLUSION

The findings of the current case suggested that facial PNF, mime therapy, ultrasonic therapy along with muscle stimulation and conventional facial exercise provide wholesome rehabilitation among Bell's palsy patients. Therefore, this protocol can further be used for an experimental study. The patient of this study was briefly instructed about the given treatment and its effects on his presenting symptoms. He was quite satisfied with the treatment he received which was relatively evident with the adherence rate to the intervention. Patient was voluntarily agreed to participate in the treatment plan and gave consent to share his information and photos for research purpose if needed.

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