



EFFECTIVENESS OF NUEROMUSCULAR RE EDUCATION TECHNIQUE TO REDUCE FACIAL DISABILITY IN PATIENTS WITH BELL'S PALSY

Singam Siva Sankar

Mpt neurology.

Pasala Gopikrishna

Mpt orthopaedics.

ABSTRACT

BACKGROUND AND OBJECTIVES: Facial nerve paralysis, because of the dysfunctional problems that can occur at the level of a very special part of the patients body, who gives their personality needs special consideration. Peripheral facial palsy is the most frequent cranial neuropathy, and can originate from various kinds of damage to the seventh cranial nerve. Idiopathic facial palsy or Bell's palsy is the most frequent cause of facial paralysis occurs in 15 - 30 Persons per 100,000 per year.

METHODS: 30 subjects having facial disability who full filled with the inclusion criteria and randomly assigned. Group A and B with 15 subjects in each group. Group A subjects are treated with conventional therapy and Group B subjects are treated with Neuromuscular re-education techniques for 4 weeks. The outcome of this intervention was measured with Facial Disability Index (FDI). These recorded before and after the session of 4 weeks of intervention.

RESULTS: Statistical analysis of the data revealed that within group comparison both groups showed significant reduction of facial disability in conventional therapy and Neuromuscular re-education.

CONCLUSION: Finally the study concluded that 4 weeks of training program with Neuromuscular re-education showed significant improvement when compared to conventional therapy.

KEYWORDS : Neuromuscular re-education, Conventional therapy, Facial disability, Bell's palsy, Facial Disability Index.

INTRODUCTION

Facial nerve paralysis, because of the dysfunctional problems that can occur at the level of a very personal part of patients body, who gives their personality, needs special consideration. Because speech, mastication and expression of moods and emotions are based on the ability to move the facial musculature, successful treatment of facial nerve paralysis and especially functional re-education are vital concern for physical therapist¹. Peripheral facial palsy is the most frequent cranial neuropathy and can originate from various kinds of damage to seventh cranial nerve. Bell's palsy is unilateral weakness or paralysis of the face due to acute peripheral nerve dysfunction with no identification cause with some recovery of function within 6 months². Idiopathic peripheral facial paralysis or Bell's palsy is the most frequent cause of facial paralysis occurs in 15-30 persons per 100,000 per year³. Recurrence rate is about 10% that can present on the same or contralateral side. The illness occurs without specific causes in individuals regardless of age and in both sexes; however, it's incidence is higher around 40 years of age (or) over 65 years of age^{4,5}. Onset of Bell's palsy is sudden and usually during a period of 1-7 days, reaching maximum weakness up-to 1-3 weeks after onset. According to Peiterson⁶, 85% of patients recover with facial function within 3 weeks and 15% recover within 3-5 months.

Bell's palsy results in facial muscles paralysis on the affected side of the face with symptoms like resting asymmetry due to muscle weakness eyelid drooping, hyperacusis, painful auricle area, and taste changes⁷. Onset is sudden, often preceded by facial dysesthesia, epiphora, pain, dysgensia and decreased function of lacrimal gland⁸. Begin with symptoms of pain in the mastoid region and produce total (or) partial paralysis of movement of one side of the face. Symptoms differ in every individual and it ranges from mild to severe and voluntary loss of facial movements unilaterally and bilaterally in rare cases. Bell's palsy is commonly treated by various physical therapy strategies includes kinesiotherapy, massage therapy, cryotherapy and electrotherapy. Various neurofacilitatory approaches include PNF, Facial neuromuscular re-education (FNR)⁹.

Very often, the patients are told to do nothing and the muscle function and facial expression will return without any intervention. Patients that referred to physical therapy are typically treated with electrical stimulation of the facial muscles exercises with maximal effort. The results of such intervention are less then optimal resulting in the development of mass action (or) synkinesis¹⁰

Facial disability Index (FDI) : It measures physical disability and psychosocial factors related to facial neuromuscular function. It

consists of 2 sub scales as FDI physical function sub scale and FDI social/ well-being function sub scale. The total score is 200, 100 of each sub scale. FDI has high reliability and construct validity¹¹

Facial Neuromuscular Re-education:

Neuromuscular re-education is an energetic soft tissue technique which helps in restoring proper muscle function and movements that the body heels and performs at its optimal level. Facial neuromuscular re-education is a process of relearning facial movement using specific and accurate feed back to Enhance facial activity in functional patterns for facial movement and expression. Suppress abnormal muscle activity interfering with facial function.

Facial neuromuscular re-education is an evidence based therapeutic practice utilizing specific movement training techniques to optimize facial muscular control¹². Facial neuromuscular re-education is a conservative approach to facial rehabilitation. It offers outpatients rehabilitation services designed to regain symmetrical facial movements and to decrease or eliminate associated speech and swallowing problems. Facial neuromuscular re-education consists of evaluation of facial impairments and functional limitations, guided training sessions of correct movement patterns and instruction in a specific facial exercise program^{13,14}.

The exercises for NMR is massage, stretching for facial retraction, thermotherapy (heat/cold application). The exercise program is individualized for each patient and is based on the signs of facial impairment identified and the key symptom of the patient reported at evaluation.

Neuromuscular reeducation is gaining recognition as an effective element for optimal recover from facial nerve paresis¹⁵. FNR is a process utilizing both sensory feedback and focused coordinated movement activities, to facilitate the return of desired facial movement patterns and inhibit unwanted or abnormal facial expressions¹⁶. Facial neuromuscular re-education with tailored exercises for patients had been demonstrated to be effective in impairments related to facial paralysis¹⁷.

We conduct this study to compare the effect of facial neuromuscular re-education and conservation therapy to improve facial disability in patients with Bell's palsy.

METHODOLOGY

This study was proposed to determine the effectiveness of neuromuscular reeducation for reducing facial disability in patients with Bell's palsy.

Subjects: A total number of 30 subjects , both men and women.

Study Design: Randomized Control study

Sample Size : 30

Population : both men & women fulfilling inclusion criteria.

Study Sample: A total of 30 subjects were taken, who were willing to participate in the study, taken the consent form, from the subjects who met the inclusion criteria with Group A and Group B.

Sample Design: Simple randomized control trail.

Treatment Duration: 4 weeks, six days per week.

Materials Used:

Couch, pillow, Chair, Powder, Graph paper

Inclusion Criteria

Subjects were selected for the study, if they fulfilled the following inclusion criteria:

- Diagnosed with Bell's palsy
- Non traumatic onset
- Subject with age 20-70 years
- Acute onset 1-3 weeks
- Both males and females

Exclusion Criteria

Subjects were excluded by using the following exclusion criteria:

- Psychiatric illness / non-co operative patient
- Upper motor neuron disease
- Post – surgical cases
- Subjects who having other neurological disorders.

Outcome Measures:

Facial disability Index (FDI) : It measures physical disability and psychosocial factors related to facial neuromuscular function .It consists of 2 sub scales as FDI physical function 29 sub scale and FDI social/ well-being function sub scale. The total score is 200, 100 of each sub scale. FDI has high reliability and construct validity 11.

Procedure

30 subjects met the inclusion criteria and allocated into 2 groups. 15 in Group A and 15 in Group B. Initially they are screen with FDI. After that they were given conventional treatment and tailored exercises in a 4 – week protocol according to the group they were allocated. During the study period, the study was carried out for approximately 30 minutes, 6 days per week up-to 4 weeks. The rest time between the exercise is 30 seconds. Patients in control group received conventional treatment while patients in the facial neuromuscular re-education group received techniques that were tailored to each patient and conventional therapy.

Group –A

We treated patients in the control group with, gross facial expression exercises, thermo therapy and massage according to our conventional protocol. The exercise program usually consists of 5 to 10 repetitions of 3 to 5 exercises to be done twice daily.Effleurage finger to thumb kneading, wringing, hacking, tapping & stroking. Facial exercises for bell's palsy are personalized to the patient.

We also taught facial expression exercises, which included eye closure, eyebrow raise, frown, smile, Jaw and mouth movement, snarl, pucker and pout. We also advised the patients to do exercises such as balloon blowing, chewing gum on the paralyzed side, using a straw and pronouncing vowels to strengthen the cheek muscles.

Group –B

We treated patients in the facial neuromuscular re-education group with techniques that were tailored to each patient. To avoid fatigue, we instructed patients to do only 5-10 repetitions of facial exercises three times a day in the initial stages.

We also instructed the patients to do symmetrical facial movements on the affected side without allowing the voluntary movement of the uninvolved side to distort the movement. We applied resistance only to the isolated movements, without causing mass action or synkinesis.

Facial massage techniques focus on several area's of face including Lower facial muscles – Mouth exercises, Forehead- massaging the upper portion of the face, Cheek-Using the finger tips to perform the circular motion around the cheek.

We warned the patients to concentrate on the quality of the exercises and not on the quantity. We advised patients in both the groups to use a hand-held mirror during the exercise programme for the visual feedback. Facial massage was given and strapping was applied to the face to maintain the symmetry of the face. We encouraged the patients to follow-up these exercises at home for a period of three months by providing a daily log.

Statistical Analysis

Statistical analysis was performed using MS Excel .The demographic data like standard deviation and mean difference percentage were calculated and presented.

Between The Groups:

Independent t-test was performed to assess the statistically significant difference in mean value between the groups.

Within The Groups:

Paired t-test was performed to assess the statistical difference within the groups.

To observe the treatment impact before and after the treatment in the group. The analysis was carried out using statistical tests, for the outcome measures facial disability index.

The statistical significance was set at $p < 0.05$ with 94% confidence intervals

Table 1 :- Analysis Of Mean Score Of Pre And Post Test In Facial Disability Index With Group A Graph

TEST	MEAN	STANDARD DEVIATION	T VALUE	P VALUE
PRE TEST	11.600	0.918	1.039	<0.0001
POST TEST	14.200	0.516		

Table-2: Analysis Of Mean Scores Of Pre And Post-tests In Facial Disability Index With Group B

TEST	MEAN	STANDARD DEVIATION	T VALUE	P VALUE
PRE TEST	14.700	1.316	1.372	<0.0001
POST TEST	21.200	0.823		

Table-3 : Analysis Of Mean Scores Of Post-tests In Facial Disability Index Between The Groups.

TEST	MEAN	P VALUE
POST TEST GROUP A	14.200	< 0.0001
POST TEST GROUP B	21.200	

Results: The above table shows mean values changes between the groups from post-test and between the groups were found to be statistically significance ($p < 0.0001$).

DISCUSSION

This study details the findings of a prospective randomized study for assessing the effect of facial neuromuscular re-education over conventional therapeutic measures in patients with Bell's palsy and finds that targeted re-education leads to greater improvement. There was a statistically significant change between pre- and post-treatment scores of Facial Disability Index in both groups, but spontaneous recovery in the acute stages of Bell's palsy may well account for this. In between group analysis there is statistically significant difference between Neuromuscular re-education techniques and conventional therapeutic measures there is a significant difference in improving facial disability after 4 weeks of intervention for subjects with Bell's palsy.

Neuromuscular reeducation used in group B is a problem solving approach to treatment using selective motor training to facilitate symmetrical movement and control undesired gross motor activity. Tools such as specific mirror exercises provide augmented sensory information to enhance neural adaptation and learning. The application of learning theory maximizes motivation through individualized instruction and active patient participation. Because each patient presents a different functional profile, there are no generic

lists of exercises. Treatment is based on individual function, and as a result each treatment program is different.

In subjects with Bells palsy there is reduction in facial disability from pre mean 11.600 to post mean 14.200 in conventional therapy and Neuromuscular re-education group with pre mean 14.700 to post mean 21.200.

Patient was also given exercises with specific neuromuscular retraining for Bell's palsy. Neuromuscular re education is proven effective method for rehabilitating facial musculature in patients with facial paralysis.

Several authors have shown that DAVID MC Cormicks's landmark study published in lancet in 1972, reactivation of latent herpes simplex virus in the seventh nerve ganglion. IN one of the more extensive case series analyses, Wilbrand and Blumhagen describe a population of 230 individuals with idiopathic peripheral seventh nerve palsy, 6% of which had family history.

Patients with some preserved motor function have good recovery, but those with complete paralysis may have long term residual deficits.

Both the groups shown improvement in facial muscle physical function and facial symmetry was assessed using facial disability index.

The result of this study shows more effectiveness of NMR and more beneficial to patients with bell's palsy than conventional therapy.

Brach and Swearingen conducted a study on "Physical therapy for facial paralysis: a tailored treatment approach" and in his case report he describes a classification system used to guide treatment and to monitor recovery of an individual with facial paralysis and revealed that recovery from Bell palsy can be a complicated and lengthy process. The use of a classification system may help simplify the rehabilitation process¹⁹.

Manikandan conducted a study on effect of facial neuromuscular re-education on facial symmetry in patients with Bell's palsy: a randomized controlled trial and concluded that individualized facial neuromuscular re-education is more effective in improving facial symmetry in patients with Bell's palsy than conventional therapeutic measures²⁰.

The facial neuromuscular re-education exercise program emphasizes accuracy of facial movement patterns and isolated muscle control, and it excludes exercises that promote mass contraction of muscles related to more than one facial expression.

Treatment is based on functional profile rather than etiology. Techniques to facilitate movement and inhibit abnormal patterns refine motor, coordination and complexity of movement.

The result of the study suggest that Neuromuscular re-education techniques are more effective in reduction facial disability in subjects with Bell's palsy.

CONCLUSION

Both the groups Neuromuscular re-education and Conventional therapy have shown significant improvement in reducing facial disability in subjects with Bell's palsy. However, Neuromuscular reeducation showed statistically significant when compared to Conventional therapy in reducing facial disability.

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