



Original Article

Comparison Between Proprioceptive Neuromuscular Facilitation and Neuromuscular Re-Education in Patients with Bell'S Palsy

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ABSTRACT

The condition known as Bell's palsy results in the weakness of fascial muscles causing it to sag and stiffen on that side. It results from damage to the 7 cranial nerve. **objective:** To identify the comparative effects between the PNF and neuromuscular re-education. **Methods:** It was randomized clinical trial with non-probability purposive sampling. Data were collected from Aziz Fatima, DHQ, Allied and MTH hospital of Faisalabad. The study consisted of 30 patients (males and females), 15 participants were randomly divided in each group by lottery method. Group A treated by proprioceptive neuromuscular facilitation with conventional physical therapy that include EMS and home plan exercises. Group B treated by neuromuscular re-education facilitation techniques with conventional physical therapy treatment. Total treatment was of 4 days per week for 4 weeks. Data were analyzed by SPSS version 21.0. **Results:** The findings indicated that Group A had a considerably greater value on the Facial Disability Index (FDI). Group A differed significantly from Group B in each single element (physical and social functioning), while Group B showed very moderate recovery on FDI. **Conclusions:** After completing four weeks of treatment, PNF demonstrated considerable reduction in facial dysfunction in conjunction with conventional PT treatment. In the case of facial paralysis, proprioceptive neuromuscular facilitation combined with conventional treatment is more efficient than neuromuscular re-education combined with conventional PT.

INTRODUCTION

The most severe form of cranial neuropathy, known as Bell's palsy, can result from various motor nucleus-related injuries to the VII cranial nerve [1,2]. One side of the face is weaker than the other because of the significant facial nerve dysfunction. It has an annual incidence of 11 to 40 cases / 100000 populations [3]. Most of the affected individuals' symptoms are reduced without treatment protocols; additionally, approximately thirty percent individuals receive mild treatment of their affected muscles of face and suffer from defacement, facial pain and psychological disturbance [3,4]. Half of all Bell's palsy

cases are unknown (facial palsy) and the remaining are caused by trauma, tumor, herpes zoster virus, injury during surgery, otitis media, and Ramsay Hunt syndrome [5]. Approximately 70 percent of cases of Bell's palsy have been completely recovered within three months [6,7]. Unfortunately, patients with incomplete recovery of facial nerve paralysis (FNP) suffer from weakness of facial muscle, hyperkinesis, contracture, synkinesis and atrophy. Among these sequelae, both facial asymmetry and synkinesis are the most common and serious problems, affecting the patient quality of life socially and

psychologically [8,9]. Physical examination should be performed for the diagnosis of Bell's palsy. Face grading scale (FGS) face Clinometric Evaluation (FaCE), House-Brackmann Scale (HBS) and facial disability index (FDI) are used to find out the progression, disability and impairment level of Bell's palsy [10,11]. There are different rehabilitation methods used to treat bell's palsy e.g. Kinesio Taping, neuromuscular retraining (NMR), message, proprioceptive neuromuscular facilitation (PNF) electrical muscular stimulation (EMS), cryotherapy, biofeedback, and facial exercise [12,13]. The treatment for facial paralysis known as neuromuscular retraining (NMR) integrates the fields of neurobiology, cognitive theories, psychiatry, and rehabilitative science. In order to improve facial muscle contraction in the functional rhythm of facial mobility and expression and to combat abnormal motor function halting face function, facial neuromuscular re-education uses precise and tailored reinforcement to teach the facial musculature how to perform again. Each patient's exercise program is customized depending on the symptoms and facial deterioration signals that were noted during the evaluation [14]. A manual resistance method known as PNF (proprioceptive neuromuscular facilitation) that simulates the basic sequence of motion. By stimulating the sensory receptors, it speeds up the neuromotor process reaction and may cause either acceleration or repression. According to research findings proprioceptive neuromuscular facilitation techniques improves in the function of muscles of the face. It improves coherence, mobility, and power [15]. Although proprioceptive neuromuscular facilitation as well as neuromuscular re-education, these two neurological facilitation treatments, have been shown to be beneficial as individual methods of treatment for Bell's palsy patients, there is a dearth of research comparing the two (BP). This research was carried out in order to add to the expanding body of evidence showing either these two treatments provide results that are equivalent to each other or that one treatment is better to the other, making it the best option for therapy [16].

METHODS

It was a randomized clinical trial study. Non probability purposive sampling was used. Data was collected after taking the permission from institutional Review board. The duration of the study was about 6 months from February 2019 to July 2019. Data was collected from neuro-physical therapy OPD of Aziz Fatima, DHQ, Allied and MTH hospital of Faisalabad. First of all, informed consent was signed from all participants. 30 participants were added in study. An inclusion criterion was the age between 35-55 years, patients with confirmed Bell's palsy, atraumatic occurrence, sudden onset of 1-3 weeks while the exclusion

criterion was the other psychological or metabolic diseases. A total of 30 individuals were divided into two groups randomly through lottery method. Group A Received Proprioceptive Neuromuscular Facilitation approach while the Group B received Neuromuscular Re-education approach. Conventional physical therapy treatment (EMS and facial exercises) was use as a baseline treatment in both groups. Both treatments were given for thirty minutes in each session for four days in a week for a month. FDI was used as outcome measure tool. Measurements were taken in the start or end of the treatment sessions. Pre and post values were analyzed by using paired sample t test. Data were analyzed by SPSS version 21.0.

RESULTS

Total sample size of this study was of 30 in which male were 18 and female were 12 Mean Age of patients was of 45.64±19.70. The table 1 shows the moderate correlation b/w pre and post physical function and social function by applying NMR. Paired t test reveal that there was no such significant difference in effect of neuromuscular reeducation in pre and post physical function (P=.116) and social function (P=.183) within subjects. Therefore, NMR was effective in improving physical function and social function Table 1.

	Variable	Mean±SD	N	P value
Pair 1	NMR pretreatment physical function	51.76±31.70	15	.116
	NMR post treatment physical function	65.84±29.41	15	
Pair 2	NMR pre-treatment social function	64.57±20.94	15	.183
	NMR post treatment social function	57.66±23.61	15	

Table 1: Physical and social function within subjects of NMR group Moderate correlation b/w pre and post physical function and social function in term of PNF treatment was found. There was significant difference in pre and post physical function (P=.000) and social function (P=.037) in effects of PNF (P=.000) with in subjects. PNF give better results in term of improving physical function and social function as compare to the NMR Treatment Table 2.

	Variable	Mean±SD	N	P value
Pair 1	PNF Pre-treatment physical function	59.86±17.21	15	.000
	PNF Post-treatment physical function	89.58±18.02	15	
Pair 2	PNF pre-treatment social function	59.33±14.82	15	.037
	PNF post-treatment social function	46.13±17.53	15	

Table 2: Physical and social function within subjects of PNF group

DISCUSSION

This study stated that proprioceptive neuromuscular facilitation (PNF) is effective in improving physical function and social function in BELL'S palsy patients as compared to neuromuscular education. Several studies showed that both physical therapy treatment such as PNF and NMR is equally beneficial in the rehabilitation of Bell's palsy while

some studies suggest that there are no significant changes in gross facial movement [16]. A study on proprioceptive neuromuscular facilitation PNF in the rehabilitation of BELL'S palsy reported that after PNF treatment, patient was more socialize because of the regained conscience over their facial expression and facial mimics. Another study was conducted to access the validity of a physical therapy treatment approach to paralysis of facial palsy patient. PNF physical therapy treatment was providing a better and faster recovery in comparison of NMR and conventional physical therapy treatment which support to my results [17,18]. The above studies results were in accordance to current study in which the results showed that PNF technique is much better as compared to NMR with conventional treatment on Bell's palsy. The current study suggests that PNF, home plan facial exercises and electrical muscle stimulation EMS is highly beneficial to reducing the facial disability on FDI whereas neuromuscular re-education NMR, electrical muscle stimulation and home plan exercises has good results for decline the facial symmetry. Another experimental study carried out in Mayo Hospital Lahore. Patient in physiotherapy department were involved. This study evaluates the effectiveness of Kabat rehabilitation technique given to group 1 and Facial exercise given to group 2 in Bell's palsy patients. First outcome tool of this study was Sunnybrook facial grading scale. While second outcome measures were facial disability index scale. Treatment was applied for duration of 3 weeks. This study exhibited that Kabat rehabilitation had more influence on facial dysfunction as compared to fascial exercises. Kabat rehabilitation enhances the subject's social as well as physical function ($P > 0.05$) [17]. This study results support the present study result in which convention physical therapy that included fascial exercises along with PNF and NMR improve the social and physical function in bell's palsy patients. A study is conducted in the department of physical therapy and rehabilitation center. The goal of this study was to analyze the two different physical therapy treatment methods (PNF technique, kinesiotherapy and electrical muscle stimulation) VS (home exercise and muscle stimulation) on Bell's palsy. Patients divided in two groups. Result of both groups showed remarkable improvement according to the facial disability index (FDI). Group 1st showed the combination of PNF technique, kinesiotherapy, and electrical muscle stimulation decreases facial muscle asymmetry and improve facial muscle function and quality of movement more gross and precise [19]. This study results were support the present study results in which PNF along with conventional physical therapy that include fascial exercises and Ems reduced the facial dysfunction in bell's palsy patients. A retrospective

case study was conducted in Tertiary referral center. They were using neuromuscular re-education (NMR), massage, stretching and active exercise for the treatment of Bell's palsy. Variables affecting outcomes were analyzed by Facial Grading System (FGS) scale. This study showed that ages of all individuals from twenty to eighty-nine years indicate progression in facial grading scale after facial rehabilitation (FR) [20]. A research conducted on Bell's palsy individuals to determine the outcomes of NMR. This study exhibited that individual NMR has more beneficial effects that enhance the alignment of face in individuals suffering from Bell's palsy as compared to routine physical therapy [15,21]. These above studies results were in accordance to current study results in which NMR in conjunction with fascial exercises and Ems reduce the fascial symptom in bell's palsy patients. In order to promote harmonious motion and inhibit undesirable mobility, neuromuscular re-training (NMR) was adopted. Techniques like reflection exercises supplied sensual input to boost neurological response. Instead of considering the cause, the intervention is determined by the functional characteristic. This treatment method increases the movements and stops the irregular pattern of coordination, complexity of movement and refines motor control. Each patient has different facial problem. Proprioceptive neuromuscular facilitation works on the skin musculature spread over the wider region of the person's face, which may help to early restoration, as evidenced by the findings, which indicated a substantial positive influence on the facial dysfunction and speedy recovery within 4 weeks of intervention period. After intervention period, the patient was reported to have improved physically, including the increase capacity to swallow, chew, and clean their mouth, as well as socially and mentally [22]. Present study supports the above study because NMR and PNF both were effective in increase the physical and social function.

CONCLUSIONS

According to the findings of the current investigation, proprioceptive neuromuscular facilitations and neuromuscular re-education both show positive effects after four weeks of therapy. The purpose of this study was to demonstrate that PNF in combination with fascial exercises and ems therapy is superior to NMR in terms of improving social function or facial disability on FDI.

Conflicts of Interest

The authors declare no conflict of interest.

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