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RESEARCH ARTICLE

TO COMPARE THE EFFICACY OF KABAT REHABILITATION AND PROPRIOCEPTIVE NEUROMUSCULAR FACILITATION TECHNIQUE ON BELL'S PALSY: A COMPARATIVE STUDY

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Bell's Palsy, Neuropathy, Muscle Weakness, Kabat Rehabilitation, PNF Techniqueandfacial Nerve

Abstract

Introduction: Bell's palsyis the most common acute mono-neuropathy, or disorder affecting a single nerve, and is the most common diagnosis associated with facial nerve weakness/paralysis. Bell's palsy is an acute-onset peripheral facial neuropathyand is the most common cause of lower motor neuron facial palsy. It affects male and females equally, and has a slightly higher incidence in mid and later life, but certainly occurs across all age ranges. The incidence of Bell's palsy reaches a maximum between the ages 15 - 45 years, the disease is significantly less common below the age of 15 years and above the age of 60

Aims: To determine the efficacy of Kabat rehabilitation and proprioceptive neuromuscular facilitation technique on bell's palsy.

Methods And Materials: This experimental study was conducted at Garg Hospital, Hansi, five times a week for four weeks. The participants were divided in the study in three groups A, B& C having 20 participants each.Pre training assessments were taken using SBFGS(Sunnybrook facial grading system, HBGS(House-Brackmann grading system)and FDI(Facial disability index). Participants of Group A received Kabat rehabilitation and Group B received PNF exercises program and Group C received conventional treatment. Post training assessments were done using SBFGS, HBGS and FDI.The data analysis was carried out using SPSS version 18. Mean was compared with respect to Paired t-test (for three groups) and F-test (for pre and post compare each group). All statistical tests were seen at three-tailed levels of significance ($p<0.001$) and ($p<0.005$)

Results: The mean ±S.D. according to SBFGS (Sunnybrook facial grading system) pre-test reading was 59.20±5.16 for Group A, 62.35±3.78 for Group B and 61.95±4.01 for Group C. The post-test reading was 88.35±3.87 for Group A and 71.05±5.92 for Group B, and 67.65±4.28 for Group C. The mean ±S.D. according to HBGS (House-Brackmann grading system) pre-test reading was 3.80±0.69 for group A and 3.45±0.60 for Group B, and 3.40±0.503 for Group C. The post-test reading was 1.55±0.51 for Group A and 2.40±0.75 for Group B, and 2.65±0.58 for Group C. The mean ±S.D. of FDI (Facial disability index) pre-test reading was 2.55±0.51 for Group A and 2.70±0.47 for Group B, and 2.65±0.48 for Group C. The post-test reading was 4.45±0.51 for Group A and 3.65±0.58 for Group B, and 3.40±0.68 for

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Group C. There was also significant improvement in Group A with Kabat Rehabilitation program as compared to Group B & C.

Conclusion: This study concludes that exercise program with Kabat rehabilitation technique showed better results in improving voluntary movements and synkinesis in people with Bell's palsy in comparison of Group B with PNF (Proprioceptive Neuromuscular Facilitation) and Group C with conventional treatment.Measurements taken using tools like Sunnybrook facial grading system, House-Brackmann grading system, and Facial disability index indicated positive advancements in Bells Palsy patients in Group A than Group B and C.These results imply that Kabat rehabilitation presented a promising treatment approach for Bell's palsy than Proprioceptive Neuromuscular Facilitation andconventional treatment.

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Introduction:-

Bell's palsyis the most common acute mono-neuropathy disorder affecting a single nerve, and is the most common diagnosis associated with facial nerve weakness/paralysis [1]. Bell's palsy is an acute-onset peripheral facial neuropathy and is the most common cause of lower motor neuron facial palsy[2]. The clinical presentation of the disorder is a rapid onset, unilateral, lower motor neuron type facial weakness with accompanying symptoms of post auricular pain, dysgeusia, subjective change in facial sensation and hyperacusis. The clinical presentation can be explained by the anatomical construct of the human facial nerve, specifically its mixed nerve profile containing motor, sensory and parasympathetic Fibers. The propensity for the facial nerve to form numerous connections with adjacent cranial nerves[3]. Muscles of the affected side of the face become laxed, facial lines are distorted, effort by the patient to smile leads to drooling of saliva from the paralyzed side. The causes for the same can be attributed to the history of exposure to cold, water retention in pregnancy, infection of the middle ear, herpes zoster infection.The diagnosis of peripheral facial weakness is based on clinical presentation with weakness of all facial nerve branches, drooping of the brow, incomplete eyelid closure, impaired closure of the mouth, drooping of the corner of the mouth, dry eye, hyperacusis, and impaired taste or pain around the ear. If eye closure is incomplete, Bell's phenomenon occurs (upward diversion of the bulb on attempted closure of the eyelid) [4].Bell's palsy is a common cranial mononeuropathy. It affects male and females equally, and has a slightly higher incidence in mid and later life, but certainly occurs across all age ranges. The incidence of Bell's palsy reaches a maximum between the ages 15 - 45 years, the disease is significantly less common below the age of 15 years and above the age of 60[5]. The diagnosis of peripheral facial weakness is based on clinical presentation with weakness of all facial nerve branches, drooping of the brow, incomplete eyelid closure, impaired closure of the mouth, drooping of the corner of the mouth, dry eye, hyperacusis, and impaired taste or pain around the ear. If eye closure is incomplete, Bell's phenomenon occurs (upward diversion of the bulb on attempted closure of the eyelid) [6]

The clinical presentation of the disorder is a rapid onset, unilateral, lower motor neuron type facial weakness with accompanying symptoms of post auricular pain, dysgeusia, subjective change in facial sensation and hyperacusis. The clinical presentation can be explained by the anatomical construct of the human facial nerve, specifically its mixed nerve profile containing motor, sensory and parasympathetic fibres. The propensity for the facial nerve to form numerous connections with adjacent cranial nerves. [7]

Bell's palsy is an acute idiopathic facial nerve paralysis of sudden onset. It is the most common cause of lower motor neuron facial nerve paralysis with an annual incidence of 15 - 30 per 1,00,000 population. It represents a sudden onset of unilateral peripheral facial weakness and can be diagnosed without difficulty in patients with isolated facial weakness of unknown origin. Multiple studies have been done on face exercises to 4 treat this condition. Further research related to bell's palsy along with Kabat rehabilitation and PNF technique may provide better result to treat the bell's palsy. The aim of the study is to determine the efficacy of Kabat rehabilitation and proprioceptive neuromuscular facilitation technique on bell's palsy.

Materials And Methods:-

This was an Experimental study conducted from October 2022 to November 2022.The study included three different groups.An explanation of details of study & procedure was provided to the subjects and signed consent was obtained. Participants took part in 1hr training session, five times a week for four weeks.

60 subjects were recruited for the study in three different groups. Subjects were selected between 30 - 65 years of age.Participation of the subjects was on the basis of loss of facial voluntary movements due to Bell's palsy. Subjects were assessed using Sunnybrook facial grading system, House-Brackmann grading system and Facial disability index. Subjects were excluded if had anyPsychological or metabolic diseases, Patients that underwent postoperative radiotherapy and Ramsay-Hunt syndrome.

A total of 60 subjects were included in the study.Using a convenience sampling technique, subjects who met the inclusion and exclusion criteria were selected. Participation in the study was voluntary.

Statistical Analysis

The data analysis was carried out using SPSS version 18.The ANOVA test was used to determine whether there was a significant difference between the three programs, and a Tukey's post hoc test was conducted to determine which programs were significantly different from each other.Mean was compared with respect to Paired t-test (for three groups) and F-test (for pre and post compare each group). All statistical tests were seen at three-tailed levels of significance ($p<0.001$) and ($p<0.005$)

Study Procedure

60 subjects were recruited for the study in three different groups as per inclusion and exclusion criteria. Subjects were selected between age 30 to 65. Subjects took part in 1 hr training session, five times a week for four weeks.

Subject's personal information including name, age, address was taken. Subjects were informed about the study and informed consent was taken. Subjects were divided into 3 groups. Pre training assessment was taken usingSunnybrook facial grading system, House-Brackmann grading system and Facial disability index.Group A received exercise training that included Kabat technique and Group B received exercise training with facial proprioceptive neuromuscular facilitation, and Group C receivedconventional treatment which includes facial exercises.

Group A - The group received exercises program that included Kabat technique. IN this technique three fulcra are taken into consideration: the upper, intermediate and lower. The manipulation of these three fulcra is carried out by utilizing both contralateral contraction and the basic proprioceptive stimulation comprising stretching, maximal resistance, manual contact and verbal input.

Group B - This group received facial proprioceptive neuromuscular facilitation. The PNF techniques that manage facial paralysis conditions are: Pressure, stretch, resistance, reinforcement, repeated contractions, reversal of antagonist and relaxation. PNF technique helps in reducing facial disability and helps to improve facial expressions.

Group C - This group received conventional treatment which includes facial exercises, Elevation and depression of eyebrows, opening and closing of eyelids, retraction of angle of mouth upward, protrusion of lips, forehead wrinkling, flaring of nose, blowing paper.

Post training assessments were done using Sunnybrookfacial grading system, House-Brackmann grading system and Facial disability index.Data was collected. Data was analyzed. Result was obtained.

Discussion:-

Bell's palsy is a neurological disorder that causes paralysis or weakness on one side of the face. This study compares the efficacy of Kabat rehabilitation and PNF technique in bell's palsy.

The mean±S.D. according to SBFGS pre-test reading was 59.20±5.16 for Group A, 62.35±3.78 for Group B and 61.95±4.01 for Group C. The post-test reading was 88.35±3.87 for Group A and 71.05±5.92 for Group B, and 67.65±4.28 for Group C. The mean±S.D. according to HBGS pre-test reading was 3.80±0.69 for group A and

3.45±0.60 for Group B, and 3.40±0.503 for Group C. The post-test reading was 1.55±0.51 for Group A and 2.40±0.75 for Group B, and 2.65±0.58 for Group C. The mean±S.D. of FDI pre-test reading was 2.55±0.51 for Group A and 2.70±0.47 for Group B, and 2.65±0.48 for Group C. The post-test reading was 4.45±0.51 for Group A and 3.65±0.58 for Group B, and 3.40±0.68 for Group C. There was also significant improvement in Group A with Kabat rehabilitation program as compared to Group B & Group C.

Kabat rehabilitation is a practical method to enable physicians to analyse the motor activities of a patient and simultaneously identify the most effective strategies for functional movements[8].

The ten sessions of Kabat rehabilitation resulted in faster and better recovery. The patient had a good outcome of their treatment suggested by the qualitative score from grade VII to grade III and the quantitative score from 1/8 -2/8 to 5/8- 6/8. On the first day of session, the patient's physicaland social function on FDI score was 49,5/53. Then the patient was treated with Kabat rehabilitation and her physicaland social function score on FDI was improved to 77/48[9].

PNF is a therapeutic exercise technique that combines functionally based diagonal pattern of movements with neuromuscular facilitation techniques to elicit motor responses and improve neuromuscular control and performance.

KUMAR etal.had reported that comparison between Proprioceptive Neuromuscular Facilitation and Neuromuscular re-education for reducing facial disability and synkinesis in patient with bell's palsy, a randomised clinical trial and concluded PNF with conventional PT is more effective in improving facial function and reducing the facial disability.

The main finding of the study demonstrated that in people with Bell's Palsy with Facial asymmetry and synkinesis and Kabat rehabilitation shows fabulous results.

Table/figure 1:- Performing PNF technique.

Table/Figure 2:- Blowing air while whistling.

Table/figure 3:- Try to hold air.

Table/Figure 4:- Blowing candle.

Table/Figure 5:- Age (mean and S.D.) in Group A , Group B and Group C.

Group		**Mean±S.D.**	**p-value**	
AGE	Group-A	40.30±9.274	.269	
	Group-B	44.15±8.67		
	Group-C	45.05±11.10		

*****Significance of p-value<0.01

Table/Figure 6:- Mean and S.D. of Pre and Post score of SBFGS.

Group		Mean±S.D.	p-value
SBFGS-PRE TEST SCORE	Group-A	59.20±5.167	<0.001
	Group-B	62.35±3.787	
	Group-C	61.95±4.019	
SBFGS-POST TEST SCORE	Group-A	88.35±3.870	<0.001
	Group-B	71.05±5.925	
	Group-C	67.95±4.283	

Table/Figure 7:- Mean and S.D. of Pre and Post HBGS.

Group		Mean±S.D.	p-value
HBGS-PRE TEST SCORE	Group-A	3.80±0.696	<0.001
	Group-B	3.45±0.605	
	Group-C	3.40±0.503	
HBGS-POST TEST SCORE	Group-A	1.55±0.510	<0.001
	Group-B	2.40±0.754	
	Group-C	2.65±o.587	

Table/Figure 8:- Mean and S.D. of Pre and Post FDI.

Group		Mean±S.D.	p-value
FDI-PRE TEST SCORE	Group-A	2.55±0.510	<0.001
	Group-B	2.70±0.470	
	Group-C	2.65±0.489	
FDI-POST TEST SCORE	Group-A	4.45±0.510	<0.001
	Group-B	3.65±0.587	
	Group-C	3.40±0.681	

Limitation Of Study

Sample size was small. Follow up of patients was not done for longer period of time and Sample size was collected at a specific place.

Conclusion:-

The result of present study concludes that there was a significant improvement in voluntary movements of the face of people participated in exercise program with Kabat rehabilitation in comparison of PNF (Proprioceptive Neuromuscular Facilitation) and conventional treatment. The readings of SBFGS(Sunnybrook facial grading system), HBGS(House-Brackmann grading system) and FDI(Facial disability index) showed positive improvements in symmetry of voluntary movements and synkinesis. Therefore, we can say that exercise training with Kabat rehabilitation provide good results in people with Bell's palsy in comparison of Group B & Group C with PNF (Proprioceptive Neuromuscular Facilitation) and conventional treatment.

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