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ORIGINAL ARTICLE

TREATMENT OF BELL'S PALSY STRUCTURED FACIAL RE-EDUCATION PROGRAM VERSUS CONVENTIONAL TREATMENT - A COMPARATIVE STUDY	Search engine: **www.ijmaes.org**

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ABSTRACT

Background and Objectives: Bells palsy is an idiopathic facial paralysis of acute onset mostly attributed to a non-suppurative inflammation of facial nerve within the stylo-mastoid foramen. There are many unresolved views regarding the therapeutic approaches in the treatment of Bell's palsy. The purpose of the study was to determine the effectiveness of structured facial re-education program over the conventional treatment program in reducing the facial impairments in patients with Bell's palsy. **Methods**: Out of 20 subjects of Bells palsy, 10 were administered with electrical stimulation and 10 with Structured facial re-education program; once daily for 4 weeks. Analysis was based on the Facial Grading System scores before and after the treatment (On 1st and 30th day). **Results**: The patients who received electrical stimulation showed a significant mean improvement in FGS scores of 17.853 at P<0.05 when compared to the conventional therapy group. **Conclusion**: Both Structured facial Re-education and Conventional treatment programs were found to be effective in treating Bell's palsy; however patients the improvement seen in the structured facial re-education group was greater in terms of facial symmetry and facial impairments.

Keywords: Idiopathic Bells palsy; Facial Grading systems; Structured facial re-education; Conventional treatment.

INTRODUCTION

Bell's Paralysis is an intense facial loss of motion of obscure etiology that is most generally found in age of 15-45. This regularly happening facial loss of motion has been fundamentally viewed as a restorative bother with related practical problems[1]. Hence Bell's paralysis can result from any irritation/ contamination of the facial nerve inside the fallopian trench which prompts entanglement of the nerve in the hard channel, which prompts the pressure ischemia[2-4].

Consequently, on the off chance that choking of the facial nerve is proposed as a reason for facial loss of motion, the most probable region is at the intersection of the fundus of the interior hear-able trench and the hard waterway of the tangled portion[5,6]. Albeit stated no promptly recognizable reason for Bell's paralysis has been found, gathering clinical and exploratory proof recommends that herpes simplex sort I disease might play a role. Most of the patients become mindful of their sickness toward the beginning of the day. This recommends that facial paralysis seems to happen and advance at night[7-9].

Sounds might seem stronger on the impacted side (hyperacusis). This might be brought about by loss of motion of the stapedius muscle yet additionally happens freely. Retroauricular torment is normal at beginning, similar to an emotional vibe of "deadness" of the impacted side. Usually Bell's paralysis is first seen when an individual notices it in a mirror, or on eating since food will in general gather between the cheek and gums. Just minor contrast is found in rates between the genders and among people of various races. There is a marginally higher frequency in the winter[10-12].

Numerous patients give indications of progress as soon as 10 days after the beginning, even without treatment. Visualization is emphatically prescribed to side effects at the hour of beginning, length to the primary indication of abatement and age[7,9].

The utilization of a basic and viable nerve volatility test has it esteem in assessing the visualization and progress, the period somewhere in the range of 10 and 14 days after beginning has been viewed as generally significant for expectation of recovery10. There are numerous unsettled perspectives on proficiency of a great many remedial methodologies in the treatment of Bell's paralysis. The patients alluded for physiotherapy are frequently treated with electrical excitement of facial muscles and facial activities to be finished with maximal exertion [13-15].

Need of the Study: The patients referred for physiotherapy are frequently treated with electrical excitement of facial muscles and facial activities to be finished with maximal effort. The result of such mediations was less ideal, with patients frequently creating synkinesis[16].

Objectives of the study: Objectives of the study was to study the effect of Structured Facial Re-education program in reducing the facial impairments in idiopathic Bell's palsy. To study the effect of Conventional Treatment Program in reducing facial impairments in idiopathic Bell's palsy. To compare the outcome of patients treated with Structured Facial Re-education Program and Conventional Treatment in reducing the facial impairments in patients with Bell's palsy.

METHODOLOGY

Study Design: This was an experimental study involving the comparative analysis of the Structured Facial Re-education Group and Conventional treatment group.

Sample selection: A total of 30 patients were randomly split into two groups of fifteen each consisting of Structured Facial Re-education Program and Conventional regime. All the participants took part in the study with voluntary consent and a demographic data was collected from each subject and proposal of the study was explained to all subjects.

Selection criteria
Inclusion Criteria:
- Patients clinically diagnosed with idiopathic Bells palsy.
- Patients with unilateral Bell's palsy.
- Patients affected with Bell's palsy of either side.
- Age group of 20-45 years.
- Both males and females.

Exclusion Criteria:
- Subjects with visual and perceptual disorders.
- Patients with Stroke.
- Patients with degenerative neural disorders like multiple sclerosis.
- Suppurative otitis media.
- Vestibular Schwannoma.
- Patients with other system illnesses.
- Patients with uncontrolled diabetes and hypertension.
- Bell's palsy secondary to surgical complications.

Source of data collection: All the patients included in this study were taken from

- Goutham Rehabilitation Center, Bangalore.

Materials used: The tools used for the study were Chair, Pillows & towels, EMG apparatus of Phenix USB 8 model, Self-adhesive and conductive electrodes of size 45×50mm, Computer, Marker, Inch tape, Surgical Spirit & Cotton, Treatment couch, Cables, Leads, Electrodes-plate and pen electrodes, Cotton, Lint pad, Electrical stimulator, Mackintosh, Sheet, Mirror.

Measurement tools: The Facial Grading System was used for measuring the facial impairments. The FGS comprises 3 sections: Resting symmetry (FGSR), voluntary movement (FGSM) and synkinesis (FGSS). These are scored individually and the scores are combined for a total or composite score. The possible scores of FGS range from 0 to 100 with 100 being associated with symmetry at rest, symmetry between sides during maximal voluntary movements and the absence of synkinesis. A higher FGSR and FGSS score indicates greater impairment. The FGS was used to monitor progress and to describe the patient at different stages of recovery.

Procedure: Patients who were clinically diagnosed as Bell's palsy were assessed by using the assessment form (Annexure-I) to know the side affected and the extent of paralysis using the facial grading system (Annexure II).

Pre-treatment instructions: The patient was given an orientation about the treatment procedure and the patient was told about current like feeling he would experience during electrical stimulation and the biofeedback procedures.

a) The patient was asked not to move the head or to touch the machine or leads during the treatment session

b) The patient was asked to report immediately if he felt any discomfort during the treatment session.

c) The dangers were explained to patient and written consent was taken for voluntary participation (Annexure-III).

Group I : Group I consisted of 15 patients who underwent a Structured Facial Re-Education Program used to guide the treatment and to monitor the recovery of an individual with facial paralysis. The physical therapy program consisted of a brief re-evaluation, training with sEMG and instruction for an exercise program to be followed by the patient at the home too.

The Structured Re-education program consisted of a structured treatment program given in two phases. The first Phase was given for duration of 15 days followed by Phase II for another 15 days.

Phase I: In this phase, the subjects were treated with biofeedback, active assisted range of motion exercises along with education of the recovery process.

Surface EMG biofeedback was also used, which helped in recording and displaying the small changes in muscle activity that wasn't possible with the mirror and thus gave a feedback for the patient to initiate the movement and also enabled to make patients aware of abnormal movements.

The recording electrodes for the biofeedback sessions were placed over the frontalis and the subject was asked to perform forehead wrinkle, then it was placed on levator labii muscle to perform snarling and finally on inferior occuli for eye closure. Each biofeedback session lasted for 30 min daily. There was an electrode placed on platysma also to detect the synkinesis movement for training the patients for initiation of movement and also for improving symmetry.

The active assisted exercises included targeting a specific muscle and asking the patient to keep the hand to position a part of the face to a range of motion for a specific movement and were asked to hold the position and slowly remove the passive assist. (Eg: Asking the patient to pull the corner of the affected side lip as if in smiling and trying to maintain the position even after removing the hand). To avoid fatigue in the initial phase the repetitions of the exercise were limited to 5-10.

Phase II: After a revaluation done after 15 days of treatment, Phase II required facilitation of correct movement and were treated with active and resisted facial movement exercises while maintaining facial symmetry[9]. The patients in this phase were asked to do small active facial movements without movement of the uninvolved side. These included forehead wrinkling, smiling, gentle eye closure, puckering, lowering of bottom lip. When some activities such as lowering the lip was difficult without movement of uninvolved side, for e.g. lowering bottom lip, the patients were asked to just pronounce vowels, or words starting with F, for example.[9]

The above were followed by resisted facial exercises in the form of self-applied manual resistance. Resistance was applied to only isolated facial movements without causing mass action or synkinesis. The patients were asked to do small movements against resistance, so as to prevent mass action, e.g. Resistance to forehead wrinkle or resistance upper lip with a finger while attempting to pucker.

The patients were instructed to do of repetitions 10-20 of active or resistive exercises twice daily[12]. The number of exercises was limited to 5 set of exercises to keep the patient focus in the area needing most work[11].

Fig 1: Subjects Group I undergoining EMG Biofeedback Training

Fig-2: Subject of Group II Undergoing Electrical Stimulation

Group II:

Group II consisted of 15 patients who received electrical stimulation using interrupted Galvanic current, with pulse duration of 10 ms, which was given to the muscles of face.[4] Each received 30 contractions per treatment session and whole treatment programmed was carried out for 30 minutes once a day for 4 weeks.

Orbicularis oculi, risorius, corrugator supercili, frontalis, orbicularis oris, mentalis and levator labii muscles were stimulated using electrical stimulation.

The electrotherapy session was followed with facial exercises using mirror biofeedback.

- The exercises included:
- Sneeze. Wrinkle nose. Flare nostrils.
- Twist upper lip up and raise and project upper lip.
- Pack lips together. Pucker lips and endeavor to whistle.
- Grin without going on the defensive toward; grin going on the defensive toward.
- Take a stab at moving your lips into a little grin gradually. Then, at that point, delicately pucker gradually utilizing equivalent strength from the two sides.
- Draw point of mouth up to extend wrinkle from side of nose to side of mouth.
- Solidify (wrinkle) the jaw; "stick out" the jaw (like a fighter).

For Patients who couldn't perform initially were asked to form a mental imagery of the movements. All the patients were asked to limit the exercise repetitions to 10 sets twice daily throughout the exercise program.

As part of the home exercise program, the exercises were followed by the patients in both the groups twice daily as demonstrated to them in the clinical setting.

A baseline assessment, post treatment (after 15 days) and final assessment post 4 weeks were taken using the Facial Grading Scale.

Data analysis:

In this review, the two gatherings were compaired for contrasts with surmise the viability of structured facial re-education over regular treatment for patients with Bell's Palsy.

The measurable device utilized in this examination was Independent't' test. The distinction of values among pretest and post test were found. It was finished for the qualities taken previously and toward the finish of about a month and a half individually. The mean distinctions of the FGS Score of Group I were compared and Group II and the real example of variety in every one of the classifications were noticed. With the obtained 't' value from the pretest and post test, the exact degree of importance was investigated

and interpreted. An alpha degree of P<0.05 was the degree of importance for the test. Likewise a reliant't' test was performed to break down the viability of treatment inside the gatherings.

RESULT AND INTERPRETATION

Thirty Bell's palsy subjects with a mean age of 33.79 years were selected for the study. The mean, variance and standard deviation values of the age groups according to the distribution of the sex are shown in Table-1.1 & 1.2.

SEX	N	MEAN	VARIANCE	SD
Males	8	33	33.71	5.8
Females	7	35	90.66	9.52
Total	15	33.93	56.78	7.53

Table 1: Mean, Variance & Standard Deviation Values Of Age Group In Group I

SEX	N	MEAN	VARIANCE	SD
Males	8	34.75	71.07	8.43
Females	7	32.42	36.95	6.07
Total	15	33.66	52.8	7.26

Table 2: Mean, Variance & Standard Deviation Values of Age Group In Group II
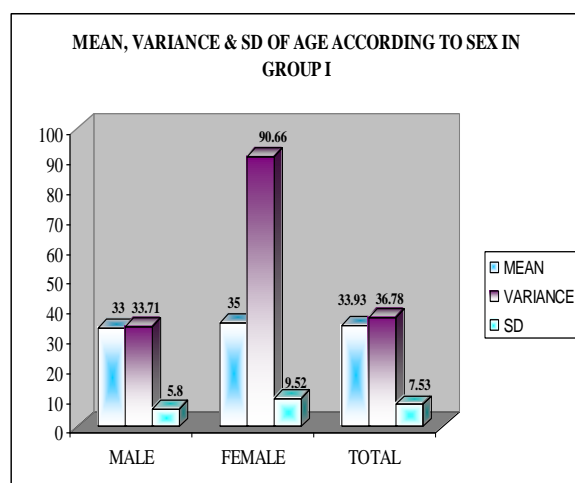
Graph 1
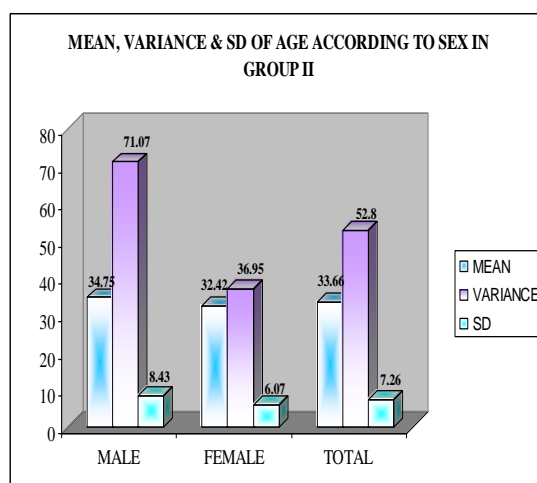
Graph 2

Subject No.	Pre Test values of Group I	Pre Test values of Group II
1	15	21
2	24	34
3	27	43
4	33	61
5	40	52
6	57	60
7	37	22
8	65	18
9	22	20
10	27	31
11	18	42
12	64	46
13	73	29
14	42	34
15	31	42
Mean	**38.33**	**37**
S.D.	**18.33**	**14**
n1	**15**	
n2	**15**	
Factor	**0.3651**	
Mean Diff	**1.3333**	
S	**16.0459**	**Table 't' value**
t	**0.2275**	**1.701**

Table 3: Independent 'T' Test Performed With Pre Test Values Of FGS Scores For Homogeneity Between Groups

Interpretation: The above Table-2.1 shows the value of 't' as 0.2275 for FGS Scores. When compared to the tabulated value (1.701) the above 't' value is smaller even at $p<0.05$, which is not significant, proving the homogeneity of both the groups for the above parameter.

Descriptive statistics: The following tables & graphs illustrates the mean, variance & SD values of the different parameters individually, thereby showing the improvement within the group by the respective training procedures.

Test	Mean	Variance	Standard Deviation
Pre Test	**38.33**	**336.23**	**18.33**
Post Test	**60.93**	**303.78**	**17.42**

Table 4: Mean, Variance & SD Values of Pre & Post Tests for FGS scores of Group I

Test	Mean	Variance	Standard Deviation
Pre Test	**37**	**196.14**	**14**
Post Test	**55.53**	**182.1**	**13.49**

Table 5: Mean, Variance & SD Values of Pre & Post Tests for FGS scores of Group II

Subject	Pre Test values of Group I	Post Test values of Group I	Diff D	D^2	Pre Test values of Group II	Post Test values of Group II	Diff d	d^2
1	15	35	20	400	21	45	24	576
2	24	50	26	676	34	50	16	256
3	27	55	28	784	43	65	22	484
4	33	63	30	900	61	75	14	196
5	40	70	30	900	52	65	13	169
6	57	72	15	225	60	66	6	36
7	37	58	21	441	22	39	17	289
8	65	85	20	400	18	35	17	289
9	22	40	18	324	20	38	18	324
10	27	41	14	196	31	48	17	289
11	18	40	22	484	42	60	18	324
12	64	82	18	324	46	71	25	625
13	73	90	17	289	29	43	14	196
14	42	68	26	676	34	63	29	841
15	31	65	34	1156	42	70	28	784
SUM	575	914	339	8175	555	833	278	5678
MEAN	38.3	60.93	22.6	545	37	55.53	18.53	378.5
VAR	336	303.8	36.69	82916	196.14	182.1	37.55	54430

S.D.	18.3	17.43	6.057	288	14.005	13.5	6.128	233.3
N	15				15			
Factor	339				278			
S	7704				7886			
T	14.46				11.71			
Table t	1.761							

Table 6: Dependent't' test performed with pre & post test values of fgs scores for significance within groups

Interpretation: The above Table-6 shows the value of 't' 14 & 11.71 as for Group I & Group II for the pre & post values of Facial Grading System using Dimension E. When compared to the tabulated value, the above 't' value is greater at $p<0.05$, which is significant & hence the Conventional Physiotherapy and Structured Facial Reeducation Program were effective for Group I & Group II respectively.

Subject No.	Pre Test Group I	Post Test Group I	Difference X_1	Pre Test Group II	Post Test Group II	Difference X_2
1	15	35	-20	21	45	-24
2	24	50	-26	34	50	-16
3	27	55	-28	43	65	-22
4	33	63	-30	61	75	-14
5	40	70	-30	52	65	-13
6	57	72	-15	60	66	-6
7	37	58	-21	22	39	-17
8	65	85	-20	18	35	-17
9	22	40	-18	20	38	-18
10	27	41	-14	31	48	-17
11	18	40	-22	42	60	-18
12	64	82	-18	46	71	-25
13	73	90	-17	29	43	-14
14	42	68	-26	34	63	-29
15	31	65	-34	42	70	-28
Mean			-22.6			-18.53
S.D.			6.056			6.128
n1	15					
n2	15					
Factor	0.3651					
Mean Diff	4.0666					
S	6.3337					
't'	1.7583	Table 't'	1.701			

Table 7: Independent 'T' Test Performed With Pre & Post Test Values of FGS Scores for Significance between Groups

Interpretation: The above table shows the value of T = 1.7583 for mean improvement in the values of FGS Score at p<0.05. As the t value was significant being greater than the table value, it was concluded that Structured Facial Re-education Program Group had a superior effect over the Conventional Physiotherapy Group.

PARAMETERS	Group I	Group Ii
Facial Grading System Score	22.6	18.53

Table 8: Mean improvement in all the parameter between Group I & group II

Interpretation of statistical results:

This study was done with 30 subjects allotted into two groups namely Group I and Group II consisting of 15 each, to know the effectiveness of Structured Facial Reeducation Program in improving the walking ability of patients with Bell's palsy.

The parameter used was Facial Grading System assessed using Dimension E. It was taken before training and at the end of sixth week.

The data were analysed using dependent 't' test to find the significance of the interventions used within the groups and then an independent 't' test was used for the above mentioned parameter to find the significance between the groups.

The dependent 't' test showed significance for both the groups stating Conventional physiotherapy and Structured Facial Reeducation Program, in reducing facial impairments in patients with Bell's palsy.

The results were found to be significant with independent 't' test at p<0.05 with the calculated 't' values as 1.7583 being more than the table value (1.701) for Facial Grading System, stating that there is a significant effect when using Structured Facial Reeducation Program with conventional physiotherapy than Conventional physiotherapy alone in reducing facial impairments in patients with Bell's palsy.

DISCUSSION

In this study, two groups were analysed for reducing in facial improvements as measured with Facial Grading System, which is a validated grading system to measure facial impairments and outcome of patients with facial paralysis as demonstrated by Brenda Ross[17].

The mean was calculated and the statistical analysis of the values showed considerable mean improvement for both groups indicating both Conventional and Structured Facial Re-Education Program were effective treatment means of patients with Bell's palsy. However, a statistical analysis between the two groups using an independent t-test proved Structured Facial Re-Education Program to be more effective.

The results of the study support the experimental hypothesis that Structured Facial Re-Education Program has better outcome in terms of reducing facial impairments and improving overall facial function[18-20].

The study did provide insight into distinctions about treatment outcome between groups. The improvement in functional parameter provides further evidence that facial impairments can be improved with facial re-education and thereby producing measurable clinical outcomes[21-23].

The Structured Facial Re-Education Program which uses biofeedback and phase appropriate facial exercises emphasizes on isolated muscle control and accuracy of movement thus aiding to improve facial symmetry and reduce functional limitation while providing proprioceptive feedback to the affected side and decreasing silkiness[24,25].

Limitations of the Study

1. The treatment regime has been restricted for a period of 4 weeks, which could be enhanced until near total recovery of facial function.
2. Long-term follow-ups could not be done to determine if improvements were maintained.
3. Only selected muscles were treated and analyzed for improvement.

CONCLUSION

Physiotherapy offers various treatment options to patients with Bell's palsy which complement pharmacological and surgical treatments. Insight into factors affecting recovery process can lead to better therapeutic interventions.

This study had shown that patients with Bell's palsy receiving Structured Facial Re-education Program showed better outcome than conventional therapy as measured by FGS scores.

The findings of the study support the evidence for the effective use of Structured Facial Re-education Program in patients with idiopathic Bell's palsy. This short-term study demonstrates positive outcome for Bell's palsy patients and thus extending the treatment period may further increase the success rate of the intervention.

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