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### **Efficacy of Mime Therapy and Conventional Therapy Versus Conventional Therapy in Improving the Facial Functions of Bell's Palsy Patients**

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#### **ABSTRACT**

Bell's palsy is the peripheral paresis of the facial nerve. It is a lower motor neuron disease of the facial nerve characterized by acute unilateral peripheral facial muscle weakness. Physiotherapy can be beneficial with Bell's palsy and it is important to be implemented prior to recovery in order to help and prevent permanent contractures of the paralyzed facial muscles. Mime therapy is a performance art to improve the symmetry of facial features and increases the voluntary power of muscle to help patients regain expression and control of their facial muscles. Conventional therapy is a method of treatment which includes electrical stimulation, tapping techniques and heat modalities. Combination of mime and physiotherapy aims to promote symmetry of the face at rest and during movement to control Synkinesis. Hence accurate treatment of Bells palsies is important and this study intended to analyze the efficacy of Mime therapy along with conventional therapy versus conventional therapy on Bell's palsy. 30 subjects with Bell's palsy, age ranging from 20-40years, equally into two groups of namely Group A (15) and Group B (15), pre and post treatment score was checked using sunny brook facial grading scale. Group A received first with Mime therapy followed by Electrical stimulation .Group B received only conventional therapy. The study concluded that there is a statistically significant improvement in facial function within the groups and patient who received Mime therapy along with Conventional therapy in Bells palsy.

**KEY WORDS:** Bell's palsy, facial function, facial symmetry, Mime therapy, Conventional therapy, Sunny brook facial grading scale, home programmes.

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## **INTRODUCTION**

In our body face is considered as the image of soul. Face has a unique feature of attraction which is due to the symmetry and it implies the good health.<sup>1,2</sup> It has an influence on interpersonal relationship. Face has the function of expression which helps for communication. This is due to the coordinated functions of neuro-musculoskeletal system .If there is any disturbance in this coordination, can result in facial paralysis and cause facial asymmetry. The facial asymmetry can disturb individual's quality of life as well as there may be a psychological impact of skewed facial appearance.<sup>2</sup>

The two common forms of facial asymmetry or facial paralysis are Bells palsy and facial palsy which is due to the lesion of facial nerve. Bell's palsy is named after Sir Charles Bell, who has long been considered to be the first to describe idiopathic facial paralysis in the early 19<sup>th</sup> century. It is a lower motor nerve lesion of facial nerve results in unilateral facial muscle weakness. The causes can be compression of facial nerve along the nerve course, herpes infections, exposure to cold air, middle ear infections, traumatic injuries or post surgeries of dental and Ear, nose or throat.<sup>3</sup> The lesion in the facial nerve leads to decrease conduction of impulses to the muscles supplied having the function of facial expressions. It affects the muscles of forehead, face and neck. The bells palsy is common in both male and females; it is seen between the age group of 15-40 years. Symptoms of Bell's palsy usually begin suddenly and reach their peak within 48 hours.<sup>4</sup> Symptoms vary from person to person and can range in severity from mild weakness to total paralysis .The common features are loss of forehead wrinkles and inability to frown, Droopy eyebrow and inability to raise eyebrow, Inability to close the eye fully or blink ,Watery eye (crocodile tears),Inability to squint, Painful eye with symptoms of grittiness or irritation, Sensitivity to light, Drooling from the weak corner of your mouth, Excess or reduced salivation (dry mouth),Inability to flare nostril, Loss of taste in the anterior 2/3<sup>rd</sup> of the tongue, Hyperacusis. it is generally believed that spontaneous recovery is seen within nine months after bell's palsy. The complete recovery of facial functions seen 70% of people within three months, and sometimes around 30% continue to suffer with facial asymmetry at rest and during movements which is termed as synkinesis.<sup>5</sup> There is evidence that early treatment (within 3 days after the onset) is necessary for therapy to be effective.

The physiotherapy treatment for Bell's palsy includes Electrical stimulation of affected facial muscle, facial exercises and massage. <sup>6</sup> Around 1970s, Mime therapy was developed in the Netherlands by a mime actor named Jan Bronk and an otolaryngologist named Pieter Devriese specifically for people with facial nerve paresis through collaboration between medical clinicians and other mime-actors. Two decades of positive experiences in several Dutch university medical centres

have shaped mime therapy into its present form. Mime therapy is a type of physiotherapy. It was created to help patients who had limited or restricted facial movement or a lack of facial muscle control. Conventionally speaking, miming is a performance art that relies on expression and body movement to communicate without speaking. Miming demands a highly-refined sense of body and muscle control. During mime therapy, patients perform a series of mime-like Active facial exercises to increase the voluntary power of muscle. The most common facial expression exercises include brow raise, eye closure, snarl, smile, and pucker and pout in particular sequences. The goal of mime therapy is to improve the symmetry of facial features and to help patients regain expression and control of their facial muscles. Mime therapy consists of auto massage (stroking, effleurage, finger kneading), stretching with facilitation exercises, relaxation, inhibition of Synkinesis and coordination and emotional expression exercises.<sup>7, 8</sup> These exercise help by series of pattern of changes in facial movement for facial rehabilitation illustrates the plasticity of the facial neuromotor system. The brain learns to assign new roles to neurons, reducing abnormal patterns of movement and restoring appropriate patterns of facial muscle activity for intended facial actions.<sup>9</sup> Some of the studies indicates that mime therapy reduces facial asymmetry both at rest and during voluntary movements and thereby it reduces synkinesis.

Conventional therapy includes electrical stimulation is most commonly used treatment for Bell's palsy. The other additional treatments are tapping techniques, heat modalities and exercises. In electrical stimulation, the stimulation is given to the paralysed muscles which are dennervated and to the nerve trunks or branches until the voluntary movement returns. The nerve impulses to the muscles are blocked due to the lesion in facial nerve, by giving electrical stimulation the external stimulus can produce electric impulses which helps in restoring the muscle properties.<sup>10</sup> By this the recovery can complete within two to three months.<sup>6</sup> But, if continuous external electrical stimulation is given, at one point the muscles will become over stimulated. The result is short, tight, stiff muscles that cannot move. Tight muscles become painful and may spasm or twitch. It may also cause unwanted movement in the muscles on the affected side of your face, known as Synkinesis.<sup>11</sup>

There are several outcome measures to see the recovery in Bell's palsy. One of the measures is, Sunnybrook Facial Grading System (SFGS) which was developed in Toronto by Ross in 1992.<sup>12</sup> It is a regional scale that measures also Synkinesis. The regional scores are weighted for the composite score. It is based on the evaluation of resting symmetry, degree of voluntary excursion of facial muscles, and degree of Synkinesis associated with specified voluntary movement to form one single composite score from 0 to 100. Different regions of the face are examined separately using five standard expressions. All items of the grading system are evaluated on ordinal scales. Firstly, the physician assesses the symmetry of the eye, cheek (nasolabial fold) and mouth at rest. Choices under

each item are provided to be assigned a value of 0–2, and the sum is assigned a weighted factor of 5. Secondly, the physician is asked to rate facial movements during five standard facial expressions on a scale of 1–5 (1 = no movement, 2 = slight movement, 3 = mild excursion, 4 = near normal movement, and 5 = normal movement). The values are added together and multiplied by 4. In the third step, the physician is to grade the severity of synkinesis on a four–point scale (1 = none, 2 = mild, 3 = moderate, and 4 = severe) during the five expressions as in the second step. The sum of synkinesis score is given the weighted factor of 1. An overall score is totaled and the dimension combined to obtain one overall composite score. The scores are weighted to result in a composite score of 100 for normal facial function and a score of zero for complete facial paralysis.<sup>9, 13</sup>

There are various Physiotherapeutic managements are in practice for the treatment of Bells Palsy but lacks strong evidence for being a best treatment procedure. Hence this is an effort taken to know the effectiveness of Mime Therapy along with conventional therapy or the effectiveness of only conventional therapy in improving the facial functions of Bells palsy patients. There are a few research studies on mime therapy along with conventional therapy on improving unilateral muscle weakness of face, and very limited researches on effect of Mime therapy in Bell's palsy are available. So this study intended to analyze the efficacy of Mime therapy along with conventional therapy versus conventional therapy on Bell's palsy by using the tool Sunnybrook Facial Grading System (SFGS)

## **EXPERIMENTAL SECTION**

The study design used is pre-post experimental design by using convenience sample method. The sample size is of 30 and divided into two groups, Group A and Group Beach group consists of 15 individuals suffering from bell's palsy. The ethical clearance and informed consent was taken prior to the study. The intervention was given for four week, 6 sessions per week .The inclusion criteria for the selection of study subjects were Patients clinically diagnosed with Bells Palsy (unilateral peripheral facial nerve palsy) and duration of more than 3 days from onset, Age group between 20 to 40 years, both male and female gender, both right and left side. And the exclusion criteria includes Subjects with the history of surgical intervention for facial nerve palsy, Subjects with other form of neurological impairments or sensory loss over face, Subjects with pain of any other origin, Subjects with any deformity or disability requiring medical attention, Subjects with age less than 20 or greater than 40 years, Patient with history of immunodeficiency syndromes, Patient with metal implants. The outcome measure used was Sunny Brook Facial Grading Scale. the materials used for treatment procedure were Treatment Couch, Electrical stimulator, Mirror, Tapping

tape, Powder, Pen and Paper, Kidney tray, Lint pad or plate electrodes and pen electrodes, two leads, Straps, Cotton, Gel, Water bowl.

Subjects willing to participate in the study were briefed about the study and the intervention. The assessment was performed and the initial facial symmetry was measured using the Sunny Brook Facial Grading Scale. The subjects were randomly allocated and assigned to either Group A, Group B with 15 subjects in each group respectively, Group A received Conventional therapy (electrical stimulation) along with Mime therapy and Group B received conventional therapy (electrical stimulator) .Subjects were blinded on either type of intervention and to which group they were belonged. Throughout the treatment sessions, subjects from both the groups were not allowed to have any interaction to each other and the subjects were not aware of what kind of treatment they received and its effects.

Assessment was taken on the day of admission and at the end of intervention; follow up was done after 2 weeks to check for recurrence. Patient were given treatment until recovery and were excluded from the study if more than 4 weeks of treatment.

### ***Procedure of intervention for Group A: Mime therapy and Conventional therapy***

In this group, 15 patients were screened and did baseline evaluation. The intervention was given Mime therapy followed by Electrical stimulation. Mime therapy which included stretching exercise, massage, specific facial expression exercises like vowels and consonants, relaxation techniques and active assisted range of motion exercises. 6 days a week for four weeks and exercise were made to do under supervision as follows:

Mime Therapy Exercise includes

1. Stretching exercises-to relieve muscles involved in synkinesis.
2. Massage for face and neck daily for 10-15 minutes
3. Facial expression exercises-5 repetitions three times daily.
4. Relaxation technique was taught to patient which is a combination of marked asymmetry of facial posture at rest (as for movement control category) with spontaneous twitching and facial muscle spasms

Electrical Stimulation exercises are:

1. Faradic stimulation using 0.1 – 1 ms duration pulse delivered at a frequency of 1 – 2 pulses/s or more.

2. This was given for 50 – 200 contractions, 3 sessions week until recovery.
3. For stimulating muscles which is completely de-innervated, interrupted galvanic stimulation of (IGS) of 100 ms triangular pulses was given at a rate of 1 pulse/s for 30 – 100 contractions/sessions.
4. During each session electrical stimulation may be stopped once muscle fatigue occurs

### ***Procedure of intervention for Group B: Electrical stimulation (conventional therapy)***

In this group, 15 patients were screened and these patients received only electrical stimulation followed by home programme for 6 days a week up to 4 weeks duration. The Parameters followed for the treatment was: Interrupted direct current (I.D.C.) or Galvanic current was used to stimulate the facial muscles with pulse duration of 100ms, given to the muscles of the face and faradic current was used for each facial nerve trunks. 90 contractions were given to each muscle in three sessions and ten contractions were given to each facial nerve trunk. The intensity was increased until minimal visible contractions of the muscle were obtained. Electrical stimulation was given to patients once daily for six days a week for a period of four weeks. Treatment was given for the duration of 30 to 40 min per session<sup>14, 15</sup>. The patients were provided with a list of Home programme and safety tips.<sup>16</sup>

### ***Outcome measurement***

Subjects of both groups participated in the study were evaluated for outcome measurement such as facial Synkinesis, facial function prior to the treatment and after 4 weeks of intervention and again asked to review for reoccurrence. The patients were treated till maximal recovery but were not considered for statistical analysis.

The Sunnybrook Facial Grading Scale (FGS) was used which measures different regions like:

- Resting symmetry
- Symmetry of voluntary movement
- Synkinesis

FGS domain scores are combined to form a weighted composite score from 0 (complete flaccid paralysis) to 100 (normal function).

### ***Procedure for measuring Resting Symmetry (RS)***

Patient is explained about the procedure and then assessment of symmetry of the eye, cheek (nasolabial fold) and mouth at rest is checked and scored respectively based on SFGS i.e. Choices

under each item are provided to be assigned a value of 0-2, and then the sum of all the three is multiplied by 5, the score known as Resting symmetry score

### ***Procedure for measuring Symmetry of Voluntary Movement (SMV)***

In this step the rating of facial movements is done by using five standard facial expressions such as (forehead wrinkle {FRO}, gentle eye closure {OCS}, open mouth smile{ZYG/RIS}, snarl {LLA/LLS}, and lip pucker {OOS/OOI}) on a scale of 1-5 (1 = no movement, 2 = slight movement, 3 = mild excursion, 4 = near normal movement, and 5 = normal movement) . The values are added together and multiplied by 4, the score obtained is known as Voluntary movement score.

### ***Procedure for measuring Synkinesis (S)***

This step includes grading the severity of Synkinesis on a four-point scale (1 = none, 2 = mild, 3 = moderate, and 4 = severe) during the five expressions as in the second step. The sum of Synkinesis score is multiplied by 1 and the score is known as Synkinesis score.

### ***Procedure for total SFGS score***

An overall score is calculated by subtracting all three parts as voluntary movement score – resting symmetry score -Synkinesis score.

The data (facial function measures) recorded prior to the intervention (pre test) and at the end of fourth week (post test) is analyzed statistically.

## **RESULTS**

The results was analysed by using the soft ware SPSS 16.0.comparative analysis was done for the outcome measure Sunnybrook Facial Grading Scale by keeping the significance level at  $p<0.005$ .Pearson Chi-Square test and has been used to analyze the significant of basic characteristic of gender, age and side distribution of the subjects studied. Wilcoxon test has been used to analyze the comparison between Pre and Post treatment of the subjects with Bell's palsy. Mann Whitney 'Q' test has been used to analysis the comparison between the two group, Group A and Group B variables pre-intervention to post-intervention with calculation of percentage of change.

**Table 1: Mean and standard deviation of age in Group A and Group B**

Groups	Mean & standard deviation of age
Group A(n=15)	29.5± 4.95
Group B(n=15)	31±5.81

The **Table 1** results shows that mean age of group A was 29.5±4.95 and group B was 31±5.81

**Table 2: the side of facial paralysis in Group A and Group B**

	Left	Right
Group A(n=15)	6(40%)	9 (60%)
Group B(n=15)	9 (60%)	6(40%)

The **Table 2** results shows that the number of subjects affected with left side was 6 in group A and 9 in group B, right side was 9 in group A and 6 in group B.

**Table 3. Gender difference between Group A and Group B**

	Male	Female
Group A(n=15)	7(46.6%)	8(53.4%)
Group B(n=15)	5(33.33%)	10(66.67%)

The **Table 3** results shows that male participant were 7 in group A and 5 in group B, whereas female participants are 8 in group A and 10 in group B.

**Table-4: Mean and SD of Resting Symmetry (RS) in Group A and Group B**

		N	Mean and Std. Deviation
Group-A	Pre RS	15	15.33±1.29
	Post RS	15	15.00±.00
Group-B	Pre RS	15	15.33±1.29
	Post RS	15	15.00±.00

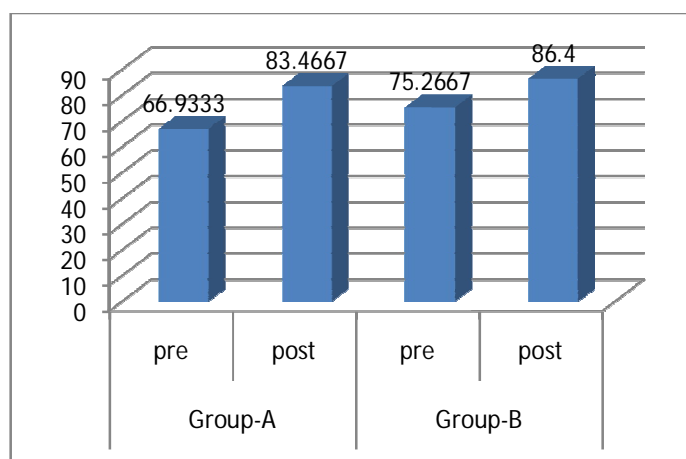
The **Table 4** results shows that mean and standard deviation of resting symmetry in group A and group B for pre - intervention was 15.33±1.29 and post intervention was 15.00±.00.



**Table-5: Mean and SD of Symmetry of Voluntary Movement (SVM)**

SVM		N	Mean and Std. Deviation	Std. Error Mean
Group-A	Pre SVM	15	66.93±12.33	3.18
	Post SVM	15	83.47±10.24	2.64
Group-B	pre SVM	15	75.27±10.44	2.69
	Post SVM	15	86.40±7.38	1.90

The **table 5** shows the symmetry of voluntary movement prior to the intervention was 66.93±12.33 in group A and after intervention the results shows as 83.47±10, where as in group B it was 75.27±10.44 prior to the intervention and post intervention the results shows as 86.4±7.37.

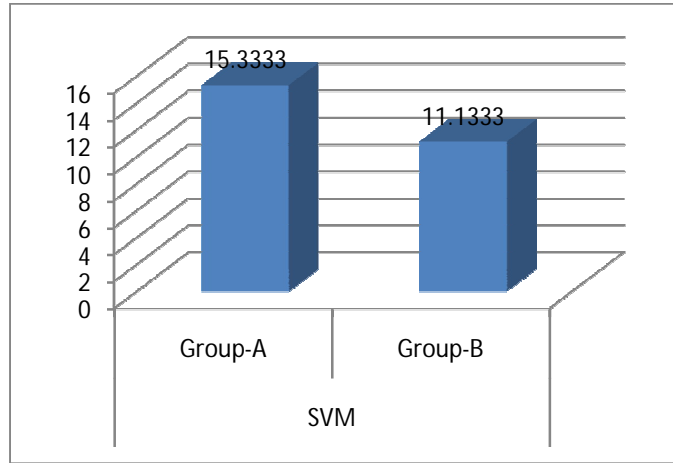


**Graph-1 Mean and SD of symmetry of voluntary movement**

**Table-6: Pre- post comparison in SVM**

		Average improvement	z-value	p-value	Result
Group-A	Pre SVM – post SVM	16.53333	3.464	0.001	P<0.05 sig
Group-B	Pre SVM – post SVM	11.13333	3.413	0.001	P<0.05 sig

The **Table 6** shows that symmetry of voluntary movement in Group A and B shows significance difference before and after intervention, p value is 0.001.

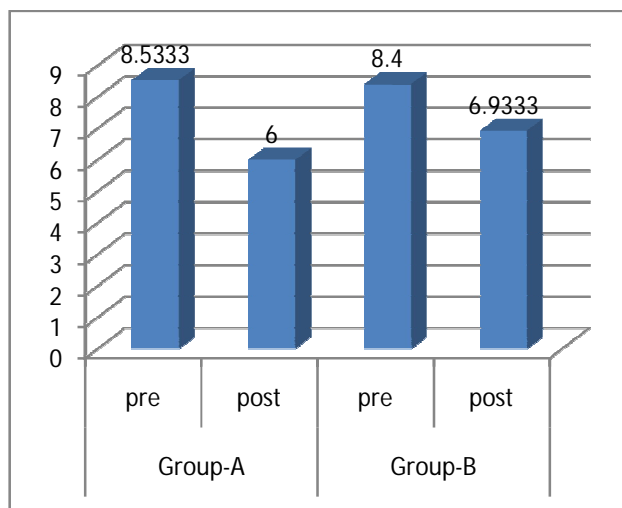


Graph-2 Pre- post comparison in SVM

Table-7 - Mean and SD of Synkinesis

		N	Mean &Std. Deviation
Group-A	Pre SINK	15	8.53± 2.07
	Post SINK	15	6.00± 1.60
Group-B	pre SINK	15	8.40± 2.028
	post SINK	15	6.93± 1.87

The **Table 7** shows that synkinesis in group A prior to the intervention was  $8.53 \pm 2.07$  and post intervention the synkinesis is reduced to  $6.00 \pm 1.60$ , where as in group A prior to the intervention was  $8.40 \pm 2.028$  and post intervention the synkinesis is reduced to  $6.93 \pm 1.87$



Graph 3-Mean of Synkinesis

**Table-8 - Pre post comparison of Synkinesis**

		Average improvement	z- value	p-value
Group A	Pre SINK-post SINK	2.5333	3.214	0.001
Group B	Pre SINK-post SINK	1.46667	3.326	0.001

The **table 8** shows the results of synkinesis in group A and group B, where the P value is 0.001 which indicates the significant reduction in synkinesis.

The **Table 9** shows the mean and standard deviation of SFGS prior to intervention in group A was 44.60±14.74 and post

**Table 9-Mean and standard deviation of SFGS**

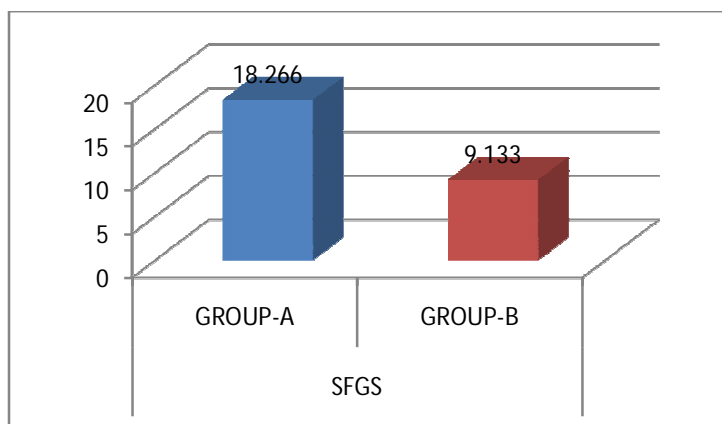
		N	Mean and Std. Deviation	Std. Error Mean
Group-A	Pre SFGS	15	44.60±14.74	3.81
	Post SFGS	15	62.87±11.34	2.93
Group-B	Pre SFGS	15	57.40±7.41	1.91
	Post SFGS	15	66.53±8.37	2.16

intervention was 62.87±11.34, whereas in group B prior to intervention was 57.40±7.41 and post intervention was 66.53±8.37.

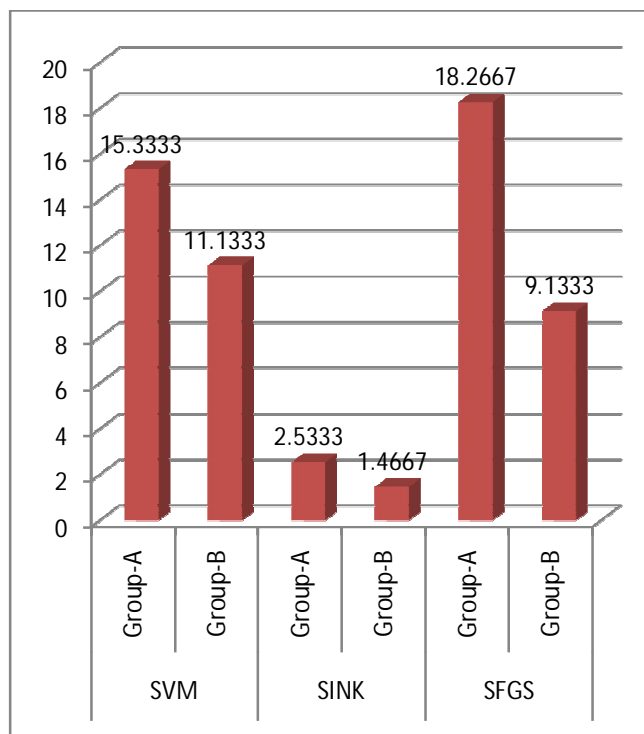
**Table-10 - pre post comparison of SFGS**

		Average improvement	z-value	p-value	result
Group-	A Pre SFGS – post SFGS	-18.26667	3.416	0.001	P<0.05 sig
Group-B	Pre SFGS – post SFGS	-9.13333	3.299	0.001	P<0.05 sig

The **Table 10** shows the average of pre and post SFGS



**Graph – 4-Average improvement in SFGS**



**Graph-5: Shows pre post comparison between group A and group B of SVM, Synkinesis and SFGS**

Since both the groups are showing significant improvement, we need to find which is better. Therefore between groups comparison is done, result as follows

- Comparison between A and B in SVM shows  $P < 0.005$ , average improvement is more in group A. Hence Group A is better than Group B.
- Comparison between A and B in Synkinesis shows  $P < 0.05$ , means there is significant difference between group A and B. Average improvement is more in group A.
- Same as SFGS shows average improvement is more in group A

## DISCUSSION

The present clinical trial was conducted to study the Efficacy of Mime therapy along with conventional therapy in improving facial function on patients with acute Bell's palsy. The SBFGS used to evaluate severity of facial nerve paresis, included three components resting symmetry, voluntary movements and Synkinesis. In the present study asymmetry has reduced in both the groups but more in a Mime therapy along with conventional therapy group than others. This improvement may be because massage improves circulation and maintains muscle properties. Visual feedback has shown to control muscle activities in facial muscle. Also miming demands highly refined sense of body and muscle control. Earlier studies proved that mime therapy has shown to create new growth

and increase production of collagen and connective tissue in facial muscles and restore facial muscle action.

In group A, improvement in facial function could be because of Mime therapy and conventional therapy which is a combination of an active movement with simultaneous passive stimulation which helps in rapid restoration of facial function. Mime therapy found to be effective by neuro physiological mechanism of production of highly refined sense of muscle control. This treatment technique produces a total and immediate recovery of facial function. Another Study say that mime therapy has an effect on patients with long term facial nerve paresis and it shows that it improves facial symmetry.

In accordance with a study of Cronin and Steenerson (2003) biofeedback by surface electromyography results revealed improvement in facial symmetry. Ahmad SJ and Rather AH (2012) did a prospective Study of physical therapy in facial nerve paralysis and found that physiotherapy in the form of electrotherapy and facial exercises has an effective role in the early management of peripheral facial paralysis. Because the effectiveness of therapeutic changes differs greatly among patients, it is essential that effectiveness of trials directly measure patient related improvement and satisfaction with treatment.

In group B the improvement in facial function could be because of electrical stimulation which is aimed to increase the passive activation of muscle by firing the motor point and nerve root. Its passive rhythmic movement re-establishes the function of muscle and gain control thereby improving facial function.

When the improvement in facial function of group A was compared with group B subjects there was no significant difference, however group A subjects showed greater percentage of improvement in facial function. This could be due to added effect of active movement along with simultaneous passive stimulation in Group A which is lacking in Group B. Mime therapy along with Conventional therapy was better in improving facial function as it has the additional benefit which may engage additional muscle control. The difference in improvement can be variable as pre intervention comparison of means between Group A and Group B found that there is no statistically significant difference in RS, SVM, and SYN between the groups. Therefore this may also interfere with the post intervention means. SFGS average improvement showed in Group A.

The findings in this study are based on the subjects with age of 20 to 40 years having bells palsy. Therefore effects cannot be generalised with other age groups.

Hence based on the analysis and findings, the present study found that with 4 week of Mime therapy along with conventional therapy showed better result with P value <0.05. So mime therapy along with conventional therapy is a good choice of treatment for people with Bell's palsy. Thus Mime

therapy can be used in the treatment of people with acute Bell's palsy to get improvement in Facial asymmetry within a shorter period of time.

## **CONCLUSION**

The present study concluded that, Mime therapy and conventional therapy together are shown to have effect on improving facial function and reduction of facial Synkinesis in Bell's palsy patients. Conventional therapy alone also has effect on improving facial function and reduction of facial Synkinesis in Bell's palsy patients. The combination of Mime therapy and Conventional therapy showed more effect on improving facial function and reduction of facial Synkinesis in Bell's palsy patients. Hence it is recommended that combination of both Mime therapies along with Conventional therapy is clinically beneficial on improving facial function and reduction of facial Synkinesis for Bell's palsy patient. The limitations was the subjects with small range group between 20 to 40 years of age were considered for the study, thus results cannot be generalized to individual age. It is a short duration study in which follow up was not done, therefore long term effects were not known. Further recommendations for the future research is considering large sample, to find the added effect of conventional therapy along with other techniques and follow up for long term effects.

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