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COMPARISON OF MIME THERAPY AND MOTOR IMAGERY TECHNIQUE ON FACIAL DISABILITY IN BELL'S PALSY

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ABSTRACT

Background:
Bell's palsy affects facial motor functions, facial symmetry, and also results in facial disability as well as facial synkinesis. Mime therapy and motor imagery techniques play an important role in improvement of facial motor functions, symmetry, physical, social functions; reduction in facial disability and synkinesis.

Objective:
To compare the effects of mime therapy and motor imagery technique on facial motor functions, symmetry, disability, and synkinesis in Bell's palsy.

Methods:
This study was Randomized Control Trial (parallel two arm study design). Non probability convenient sampling technique was used. Toss and coin method was used for the random allocation of participants in mime therapy and motor imagery technique groups. Patients with age 20-40 years, both male and female, patients diagnosed with BP, and paralysis/paresis of all muscles of one side of face were included.

Results:
There were 44 participants in this this study; mime therapy group (n=22) and motor imagery technique group (n=22). Mean age of patients was 29.75±4.97 while in mime therapy group mean age was 30.32±5.17 and in motor imagery technique Group mean age was 29.18±4.81. For House-Brackmann Scale (At 3rd week p=0.68 & at 6th week p=0.63)), Sunny-brook Facial Grading System (At 3rd week

p=0.64 & at 6th week p=0.82), Facial Disability Index-Physical function(At 3rd week p=0.30 & at 6th week p=1.00), Facial Disability Index-Social function(At 3rd week p=0.53 & at 6th week p=0.81), and Synkinesis Assessment Questionnaire(At 3rd week p=0.56 & at 6th week p=0.32); no interaction was reported between time and group, there is no significant difference between mime therapy and motor imagery technique groups. Within group analysis revealed that both groups showed significant improvement individually based on facial motor function, symmetry, and disability. Both groups did not reveal significant improvement individually based on facial synkinesis.

Conclusion:

There is no significant difference between mime therapy and motor imagery technique groups based on facial motor functions, symmetry, synkinesis, and disability. Both groups showed significant improvement of facial symmetry, motor functions of facial muscles, and reduction in disability. Both groups did not reveal a significant improvement individually based on facial synkinesis.

INTRODUCTION

Bell's palsy, described by unilateral paralysis/paresis of facial muscles, is a condition with a significant effect on individuals' lives. It is lower motor neuron palsy, and has acute and sudden onset(1). It is idiopathic palsy which interrupts more than half of the facial muscles, and results in weakness of facial muscles or these muscles are totally paralyzed(2). If Bell's palsy is left untreated, it can have long-lasting impacts on a patient's quality of life, including loss of facial muscle control, emotional stress, and difficulties in communication(3). It was named after scientist Sir Charles Bell who was the first who presented the anatomical base of BP. It has been discovered in recent research that other European practitioners contributed earlier clinical descriptions of BP(4). Episodes of BP are higher in winter and spring seasons than in summer and autumn, but peak recurrence of BP is in autumn(5). The number of BP patients undertaking facial reanimation surgery is higher in the white population than in the black(6).

The epidemiology of Bell's palsy mostly differs according to the populations which are surveyed and methodological differences(7). In the United Kingdom, the annual incidence of BP is 37.7 per 100,000 people in a single year. While in the United State of America, the annual incidence of BP is 23 per 100,000 people in single year(8). Recurrence rate of BP is almost 10%, and it has lifetime risk of 1 in 60(9). BP has impacts on every class of population, people of all age groups, but the most commonly affected age group is 15 - 50 years(3). not only the males but also affects the females(4).

Bell's palsy is considered as the most prevalent defect in the lower motor of 7th cranial nerve. Bell's palsy, an Idiopathic disease, is a facial paralysis that is caused by a dysfunction of the Facial Nerve. Facial nerve disorders result from injury to the nerve which is responsible for regulating facial movements and expressions. Causes of Bell's palsy include viral infections, inflammation, trauma, surgery, and tumor(8). Viral infections e.g. herpes simplex virus,

varicella-zoster virus, and Epstein-Barr virus may result in BP. An association has been found between diabetes, hypertension, younger age and hypercholesterolemia with a possible incidence of BP. with recovery(4). The pathophysiology of BP includes facial nerve compression at the internal auditory meatus, and inflammatory edema which leads to sensory or motor functions temporary loss, but it can lead to permanent degeneration of facial nerve later(9).

Onset of Bell's palsy is acute and sudden. Severity is reached at the peak within 48 to 72 hours and ranges from mild fatigue to paresis or severe paralysis of facial muscles on the ipsilateral side. Symptoms usually begin with facial muscles mild weakness of without any neurological abnormality and reach at the peak in the first week of onset and then gradually diminish in three weeks to three months(10). In the history of Bell's palsy patients, clinicians must ask about the duration and nature of symptoms(8). Common symptoms of BP include loss of wrinkles, inability to perform eye closure, saliva drooling, and paralysis of facial muscles, often on the same side of the face which is affected. Pain on same side of face, dry eye, and dry mouth are also prevalent symptoms(10). B

Prognosis of Bell's palsy is mostly good and more than 85% of the patients have a prominent improvement in 3-4 weeks, while 15 % of the cases may recover after three to six months of the onset(12). However, a few cases may have permanent weakness of facial muscles or some other problems on the ipsilateral side of the face(12). Patients show signs of mark able improvement within the first three weeks of the onset of symptoms. Chances of full and complete recovery are higher in them; therefore, as soon as the healing begins, chances of developing complications and residual paraesthesia are lessened. Four to fourteen percent of patients may experience reappearance; they may suffer from 36 percent palsy on the ipsilateral side(10). Younger patients suffering from Bell's palsy have good prognosis after onset(13). When treating the Bell's palsy, it is very essential to distinguish the reason of paralysis to be cured. The treatment of facial neuron affected by Bell's palsy depends upon different factors which include the patient himself, the grade of facial paralysis, and the effect of drug given to patient. Pharmacological, Therapeutic, Homeopathic, and Surgical management play a vital role in returning of functions and strength of nerve.

Physiotherapy is one of those methods which are used immediately after the onset of BP to increase patients' improvement and recovery rate. Physiotherapy treatment protocols include use of TENS (Transcutaneous Electrical Nerve Stimulation) and faradic current, infrared, and use of massage. Patient practices exercises on both sides of the face to maintain the facial functions and facial symmetry. The exercises are frequently performed for ten times to avoid exhaustion. Mostly performed exercises are raising eyebrows, wrinkle horizontally, wrinkle vertically, closing eyes together then relax, closing eyes together then tightly flaring the nostrils, Squeeze both nostrils when trying to sniff, compressing the cheeks and puckering lip, pulling lower lip down, exposing lower teeth and pulling lower lip down, and raising eyebrows while applying resistance to normal side. Massage is another treatment protocol which is used in BP; it is used for mobilization of the muscles and improvement of circulation. The massage might be applied for 20 minutes; it can be applied for 5 minutes for general massage and 15 minutes over the forehead, cheek, and lower area of face. Infrared is also used as a treatment protocol in BP; it is applied for 15 minutes on the same side of patient in sitting position for 15 minutes(13).

Rehabilitation protocols include various physical therapy techniques, among which Mime therapy and Motor imagery technique have shown significant improvement in Bell's palsy patients. In electrical

stimulation, we stimulate paralyzed muscles which are dennervated and to the nerve trunk or branches till the voluntary movement is returned. By giving electrical stimulation, the external stimulus can produce electrical impulses which help in restoring of muscle movement. Mime therapy focuses on the improvement of facial symmetry and muscle control by performing exercises in front of mirror. This treatment protocol produces immediate and complete recovery of facial functions at the rest and during movement. Mime therapy components involves providing information to the patient about treatment, application of self-massage on face and neck, Breathing exercises, relaxation exercises, facial expression exercises, special exercises for decreasing synkinesis, closure of lips and eyes exercises(1). Mime therapy is a treatment protocol to increase the voluntary strength of facial muscles to help the patients in regaining functions of their facial muscles(14). Mime therapy shows maximum advantages in improvement of facial functions and reduction in synkinesis. Aim of this treatment protocol has to improve facial symmetry and control synkinesis during voluntary movement. Studies show that mime therapy improves symmetry of face and facial functions more than conventional therapy and home exercise programs, in people with acute Bell's palsy(15). Mime therapy must be preferred in the rehabilitation of patients with peripheral idiopathic paresis of the 7th cranial nerve. It is the most effective treatment protocol in chronic facial paralysis(16). Mime therapy reduces facial asymmetry at rest, synkinesis, and enhances facial symmetry of voluntary movements.

On the other hand, Motor imagery technique involves mental practice of motor activities, activating similar brain regions which are activated during actual movements, which enhances neuroplasticity(1). It leads to significant improvement in motor functions of face(17).Motor imagery technique is implemented in a silent room. The components of MIT include ask the patient to lie on plinth and close his/her eyes, ask him/her for relaxing all body parts, ask the patient for taking deep breath then exhale, then ask the patient to imagine exercises(1). MIT has been labeled as the mental representation of movement without any body movement. Literature reports the positive impacts of MIT on motor learning and improvement of performance in individuals with neurological conditions. MIT allows the patient to attentively perceive a movement, without absolute rebuilding link between the perception and movement. Types of Imagery can be classified as external (visual) and internal (kinesthetic). In external imagery, a person looks himself from the viewpoint of an external observer. In internal imagery, the person really imagines being inside his/her body and experiencing those feelings that may be expected within the actual situation(18). Brain activity is higher when patients imagine the task, without giving any motor output to the patients; a dynamic mental state is perceived when the image of a given motor movement is rehearsed in working memory of the patients. This improves neuroplasticity and motor learning in the patients. MIT prevents the appearance of muscular spasm and facial synkinesis. MIT shows improvement in emotional and communicative aspects of the patient, and has positive impacts on improvement in the quality of life(19). MIT is an effective treatment protocol in improvement of facial physical functions, reduction of psycho-emotional distress and improvement of quality of life(20).

The aim of this study is to compare the effects of Mime therapy and Motor imagery technique in order to determine the most effective approach for enhancing facial motor functions, symmetry, reducing facial disability as well as synkinesis in individuals with Bell's palsy. Currently, there is limited empirical evidence to guide healthcare professionals in choosing the

most suitable rehabilitation approach for patients. The aim of this study is to address this gap in knowledge by comparing two specific rehabilitation techniques: Mime therapy and Motor imagery technique. Mime therapy is a structured approach focusing on facial muscle coordination and expression. Motor imagery technique is an intervention involving mental rehearsal of motor activities. Understanding which of these rehabilitation techniques can significantly influence clinical practice. By conducting a systematic comparison, the aim of this study is to provide evidence-based recommendations to healthcare professionals which allow them to make informed decisions regarding the selection of the most appropriate rehabilitation protocol for BP patients.

METHODOLOGY

The study was conducted in Muzaffar hospital Ahli Rawana (Kotmomin), Mohsin hospital and Alnoor hospital, Bhagtanwala from January 2024 to May 2024. This study included total 44 participants who were divided into two groups, 22 each Randomization. Sample size was calculated using G Power. Non probability sampling (convenient sampling technique) was used; patients included in research were convenient to access. Coin toss method was used for the random allocation of participants in mime therapy and motor imagery technique groups**.** This study was single blind. 60 participants have been screened out for eligibility criteria who visited study settings. 44 participants were randomized in both groups. 16 participants were excluded because they did not meet inclusion criteria, decline to participate or because of other reasons. Signed consent was taken from participants after randomization; the participants were divided into two Experimental Groups. The Mime therapy Group had 22 participants who received mime therapy treatment for 30 min. The Motor imagery technique group received motor imagery technique treatment for 30 min. The outcome tools used for both groups were House-Brackmann Scale, Sunnybrook Facial Grading System, Synkinesis Assessment Questionnaire, and Facial Disability Index. The assessment has been done at the baseline, 3rd week and 6th week. Total statistical analysis was done using SPSS 25. Shapiro-Wilk, Q-Q plot, and Histograms were used to evaluate normality. Both Parametric and Non-Parametric tests were used. Mixed ANOVA was used to report interaction between time and group. One way ANOVA was used to determine the effects between groups. Repeated measure ANOVA was used to report the effects within groups. Kruskal-Wallis test was non-parametric test to report effects between groups. Friedman and post hoc Wilcoxan signed-rank tests were used to evaluate effects within groups.

RESULTS

Age of participants

Mean age of total 44 patients was 29.75±4.97 while in mime therapy group mean age was 30.32±5.17 and in motor imagery technique Group mean age was 29.18±4.81.

Table 4: Mean age of participants

Variable	**Mean ±SD**
Age (years)	Group A(mime) n=22 30.32±5.17
	Group B(MIT) n=22 29.18±4.81
	Overall n=44 29.75±4.97

Frequency of Genders

Table 5: Frequency of Genders

Variable	**Frequency and Percentage**		
Gender	Group A (mime)	Group B (MIT)	Overall

Female	8(36.4)	9(40.9)	17(38.6)
Male	14(63.6)	13(59.1)	27(61.4)
Total	22(50%)	22(50%)	44(100%)

Paretic side of participants

In 44 of the participants, left side of face was affected in 21 (47.7%) participants while in 23(52.3%) participants right side of face was affected. In group A (mime) total 10 (45.5%) participants were with left affected side and 12(54.5%) participants were with right affected side, while in Group B (MIT) 11(50%) of participants left side of face was affected and 11 (50%) right side of face was affected.

Table 6: Paretic side of participants

Paretic Side	Group A (mime)	Group B (MIT)	Overall
Right	12(54.5%)	11(50%)	23(52.3%)
Left	10(45.5%)	11(50%)	21(47.7%)
Total	**22(50%)**	**22(50%)**	**44(100%)**

Test of Normality

Four outcome variables (Sunnybrook facial grading system, Synkinesis assessment questionnaire, Facial Disability Index-physical function, and Facial Disability Index-social function) were assessed for normality at baseline, 3rd week, and 6th week. The Shapiro-Wilk test has shown that all data analyzed was not normally distributed as its $p<0.05$ except Facial Disability Index-social function which $p>0.05$.

House-Brackmann scale

Kruskal-Wallis

There is no statistically significant difference between mime therapy and motor imagery technique groups based on facial motor functions on 3 time lines; At base line Median (IQR) is 4.00(3.0) and p value is 0.66, At 3rd week Median (IQR) is 2.0(2.0) and p value is 0.68, At 6th week Median (IQR) is 1.0(0.0) and p value is 0.63.

HBS	Baseline		3rd week		6th Week	
	Median (IQR)	**P value**	**Median (IQR)**	**P value**	**Median (IQR)**	**P value**
Between groups	4.00(3.0)	0.66	2.0(2.0)	0.68	1.0(0.0)	0.63

Table 7: Kruskal-Wallis between group differences in HBS

Friedman

There has been a statistically significant improvement within mime therapy group based on facial motor functions on 3 timelines, $x^2(2) = 41.20$, $p<0.001$. A significant improvement has been reported within motor imagery technique therapy group for House-Brackmann based on facial motor functions on 3 timelines, $x^2(2) = 40.92$, $p<0.001$.

Table 8: Friedman within group differences in HBS
Post hoc test

Group	Time Point	Mean Rank	Chi- Square	Df	P value
Mime Therapy	Baseline	3.00	41.20	2.00	<0.001
	3rd week	1.82			
	6th week	1.18			
Motor Imagery Technique	Baseline	3.00	40.92	2.00	<0.001
	3rd week	1.77			
	6th week	1.23			

(Wilcoxan signed-rank test)
There has been statistically significant difference within mime therapy group based on facial motor functions on 3 timelines. From baseline-3rd week p<0.001, Z= -4.16c, 3rd week-6th week p=0.001, Z= -3.38c, and baseline-6th week p<0.001, Z=-4.13c. There has been statistically significant difference within motor imagery technique group based on facial motor functions on 3 timelines. From baseline-3rd week p<0.001, Z=-4.17c, 3rd week-6th week p=0.001, Z=-3.17c, and baseline-6th week p<0.001, Z=-4.14c.

Table 9: post hoc Wilcoxan signed-rank within group differences in HBS

HBS	Mime		MIT	
	Z	P value	Z	P value
Baseline-3rd week	-4.16c	<0.001	-4.17c	<0.001
3rd week-6th week	-3.38c	0.001	-3.17c	0.001
Baseline-6th week	-4.13c	<0.001	-4.14c	<0.001

Sunnybrook Facial Grading System
Mixed ANOVA
One dependent variable was measured at continuous variable. This study consists of 1 continuous variable (SFGS) on baseline, 3rd week and 6th week, and between subject factor consists of two categorical, independent groups (Group A mime and Group B MIT). Box's test has been used to examine the assumption of equality of

covariance matrices across groups. In this case, the p-value is 0.12, which is greater than 0.05. So, there is no evidence to suggest a violation of the assumption of equality of covariance matrices. Mauchly's Test of Sphericity results indicate that the assumption of sphericity has been violated, p value is 0.00. Therefore, the degrees of freedom for the tests of within-subjects effects have been adjusted using the Greenhouse-Geisser. The p-values using Greenhouse-Geissere suggests that this assumption is not significantly violated. There is no significance interaction between time and group, as p-value is 0.62 on Greenhouse-Geisser.

One-way ANOVA

One way anova analysis of SFGS has shown that for mime therapy group the Mean±SD of SFGS at baseline was 24.59±27.68, 3rd week 74.59±22.92, and 6th week was 97.50±8.12. While for the motor imagery technique group the Mean±SD of SFGS at baseline was 30.86±26.81, 3rd week was 77.81±22.77, and 6th week was 97.95±4.92. p value at baseline was 0.45 at baseline, 0.64 at 3rd week, and 0.82 at 6th week , which is not significant.

Table 10: One-way ANOVA between group differences in SFGS

Group	Baseline		3rdweek			6th week		
	Mean± SD	P value	Mean± SD	P value	Effect Size	Mean± SD	P value	Effect
Mime Therapy	24.59± 27.68	0.45	74.59± 22.92	0.64	0.00	97.50± 8.12	0.82	0.00
MIT	30.86± 26.81		77.81± 22.77			97.95± 4.92		

Repeated Measures ANOVA

Within group analysis of both groups has been done by repeated measure ANOVA. Assessment has been done at Baseline, 3rd week and 6th week. Results of mime therapy group were significant with p value of 0.00 with Mean±SD at baseline was 24.59±27.68, at 3rd week was 74.59±22.92 and 6th week was 97.50±8.12. Results of motor imagery technique group showed significant results with value of 0.00 and a Mean±SD at Baseline of 30.86±26.81, 3rd week was 77.81±22.77 and 6th week was 97.95±4.92.

Table 11: TEST OF WITHIN SUBJECT PAIRWISE COMPARISON(SFGS)

SFGS	MIME			Motor Imagery		
	Mean±SD	Mean difference	P value	Mean±SD	Mean difference	P value
Baseline– 3rd week	24.59±27.68 74.59±22.92	50.00	0.00	30.86±26.81 77.81±22.77	46.95	0.00

3rd - 6th week	74.59±22.92 97.50±8.12	22.90	0.00	77.81±22.77 97.95±4.92	20.13	0.00
Baseline - 6th week	24.59±27.68 97.50±8.12	72.90	0.00	30.86±26.81 97.95±4.92	67.09	0.00

Synkinesis Assessment Questionnaire

Mixed ANOVA

There is no statistically significant interaction between time and group.

One-way ANOVA

One way anova analysis of SAQ has shown that for mime therapy group the Mean±SD of SAQ at baseline was 22.92±7.58, at 3rd week 20.90±4.26, and at 6th week was 20.00±0.00. While for the motor imagery technique group the Mean±SD of SAQ at baseline was 22.72±9.35, at 3rd week was 21.81±5.88, and at 6th week was 20.90±4.26. p value at baseline was 0.93, at 3rd week was 0. 56, and at 6th week was 0.32, which is not significant.

Table 12:One-way ANOVA between group differences in SAQ

Groups	**Baseline**		**3rdweek**			**6th week**		
	Mean± SD	**P value**	**Mean± SD**	**P value**	**Effect Size**	**Mean± SD**	**P value**	**Effect Size**
Mime therapy	22.92 ±7.58	0.93	20.90 ±4.26	0.56	0.00	20.00 ±0.00	0.32	0.02
MIT	22.72 ±9.35		21.81 ±5.88			20.90 ±4.26		

Repeated Measures Anova

We did within group analysis of both groups by Repeated measures ANOVA. Assessment had been done at Baseline, 3rd week and 6th week. Results of mime therapy group were not significant because p value was more than 0.05 with Mean±SD at baseline was 22.92±7.58, 20.90±4.26 at 3rd week, and 20.00±0.00 at 6th week. Results of motor imagery technique group were not significant because p value was more than 0.05 and a Mean±SD at Baseline was 22.72±9.35, at 3rd week was 21.81±5.88 and at 6th week was 20.90±4.26.

Table 13: TEST OF WITHIN SUBJECT PAIRWISE COMPARISON(SAQ)

SAQ	**MIME**			**Motor Imagery**		
	Mean ±SD	**Mean difference**	**P value**	**Mean±SD**	**Mean difference**	**P value**
Baseline –	22.92±7.58	2.02	0.49	22.72±9.35	0.90	

3rd week	20.90± 4.26			21.81±5.88		0.98
3rd week - 6th week	20.90±4.26 20.00±0.00	0.90	0.98	21.81±5.88 20.90±4.26	0.90	0.98
Baseline - 6th week	22.92±7.58 20.00 ±0.00	2.92	0.25	22.72±9.35 20.90±4.26	1.81	0.98

Facial Disability Index-Physical Function Mixed ANOVA

One dependent variable has been measured at continuous variable. This study consists of 1 continuous variable (FDI-P) on baseline, 3rd week and 6th week, and between subject factor consists of two categorical, independent groups (Group A mime and Group B MIT). Box's test was used to examine the assumption of equality of covariance matrices across groups. In this case, the p-value is 0.99, which is greater than 0.05. So, there is no evidence to suggest a violation of the assumption of equality of covariance matrices. Mauchly's Test of Sphericity results indicate that the assumption of sphericity has been violated, p value is 0.00. Therefore, the degrees of freedom for the tests of within-subjects effects have been adjusted using the Greenhouse-Geisser. The p-values using Greenhouse-Geissere suggests that this assumption is not significantly violated. There is no significant interaction between time and group, as p-value is 0.55 on Greenhouse-Geisser.

One-way ANOVA

One way anova analysis of FDI-P has shown that for mime therapy group the Mean±SD of FDI-P was 48.00±21.48 at baseline, 92.00±16.11at 3rd week, and 109.00±3.23 at 6th week. While for the motor imagery technique group the Mean±SD of FDI-P was 52.29±22.29 at baseline, 97.00±15.51 at 3rd week, and 109.00±3.65 at 6th week. p value was 0.51 at baseline, 0.30 at 3rd week, and 1.00 at 6th week, which is not significant.

Groups	**Baseline**		**3rdweek**			**6th week**		
	Mean± SD	**P value**	**Mean± SD**	**P value**	**Effect Size**	**Mean± SD**	**P value**	**Effect Size**
Mime therapy	48.00± 21.48	0.51	92.00± 16.11	0.30	0.02	109.00± 3.23	1.00	0.00
Motor imagery	52.29±		97.00±			109.00±		

Table 14: One-way ANOVA between group differences in FDI-P

technique	22.29		15.51			3.65		

Repeated Measure ANOVA

Within group analysis of both groups has been performed by repeated measure ANOVA. Assessment has been performed at Baseline, 3rd week and 6th week. Results of mime therapy group were significant with p value of 0.00 with Mean±SD at baseline was 48.00±21.48, 92.00±16.11 at 3rd week and 109.00±3.23 at 6th week. Results of motor imagery technique group showed significant results with p value of 0.00 and a Mean±SD at Baseline of 52.29±22.29, 97.00±15.51at 3rd week, and 109.00±3.65 at 6th week.

Table 15: TEST OF WITHIN SUBJECT PAIRWISE COMPARISON(FDI-P)

FDI-P	MIME			Motor Imagery		
	Mean±SD	Mean difference	P value	Mean± SD	Mean difference	P value
Baseline – 3rd week	48.00± 21.48 92.00± 16.11	44.00	0.00	52.29± 22.29 97.00± 15.51	44.70	0.00
3rd - 6th week	92.00± 16.11 109.00± 3.23	17.00	0.00	97.00± 15.51 109.00± 3.65	12.00	0.00
Baseline - 6th week	48.00± 21.48 109.00± 3.23	61.00	0.00	52.29± 22.29 109.00± 3.65	56.70	0.00

FACIAL DISABILITY INDEX-Social Function

Mixed ANOVA

One dependent variable was measured at continuous variable. This study consists of 1 continuous variable (FDI-S) on baseline, 3rd week and 6th week, and between subject factor consists of two categorical, independent groups (Group A mime and Group B MIT). Box's test has been used to examine the assumption of equality of covariance matrices across groups. In this case, the p-value is 0.70, which is greater than 0.05. So, there is no evidence to suggest a violation of the assumption of equality of covariance matrices. Mauchly's Test of Sphericity results indicate that the assumption of sphericity has been violated, p value is 0.00. Therefore, the degrees of freedom for the tests of within-subjects effects have been adjusted using the Greenhouse-Geisser. The p-values using Greenhouse-Geissere suggests that this assumption is not significantly violated. There is no significance interaction between time and group, as p-value is 0.78 on Greenhouse-Geisser.

One-Way ANOVA

One way anova analysis of FDI-S has shown that for mime therapy group the Mean±SD of FDI-S was 74.90±19.32 at baseline, was 54.72±13.37 at 3rd week, and was 41.45±5.98 at 6th week. While for the motor imagery technique group the Mean±SD of FDI-s was 79.81±18.45 at baseline, was 57.27±13.25 at 3rd week, and was 41.09±4.30 at 6th week. p value was 0.39 at baseline, was 0.53 at 3rd week, and was 0.81 at 6th week, which is not significant.

Table 16: One-way ANOVA between group differences in FDI-S

Groups	Baseline		3rd week			6th week		
	Mean± SD	P value	Mean ± SD	P value	Effect Size	Mean ± SD	P value	Effect Size
Mime Therapy	74.90±19.32	0.39	54.7±13.37	0.53	0.00	41.45±5.98	0.81	0.00
MIT	79.81±18.45		57.27±13.25			41.09±4.30		

Repeated Measures ANOVA

Within group analysis of both groups had been performed by repeated measure ANOVA. Assessment has been done at Baseline, 3rd week and 6th week. Results of mime therapy group were significant with p value of 0.00 with Mean±SD at baseline was 74.90±19.32, at 3rd week was 54.72±13.37, and at 6th week was 41.45±5.98. Results of motor imagery technique group have shown significant results with p value of 0.00 and a Mean±SD at Baseline was 79.81±18.45, at 3rd week was 57.27±13.25, and at 6th week was 41.09±4.30.

Table 17: TEST OF WITHIN SUBJECT PAIRWISE COMPARISON(FDI-S)

FDI-S	MIME			Motor Imagery		
	Mean± SD	Mean difference	P value	Mean±SD	Mean difference	P value
Baseline – 3rd week	74.90 ± 19.32 54.72 ± 13.37	20.18	0.00	79.81±18.45 57.27±13.25	22.54	0.00
3rd - 6th week	54.72 ± 13.37 41.45 ± 5.98	13.27	0.00	57.27±13.25 41.09±4.30	16.18	0.000
Baseline - 6th week	74.90 ± 19.32 41.45 ± 5.98	33.45	0.00	79.81±18.45 41.09±4.30	38.72	0.00

DISCUSSION

The purpose of current study was to compare the effects of mime therapy and motor imagery technique on Bell's palsy. Overall, the protocol with a total of 15 hours of treatment session was thought to be adequate in terms of frequency and length. Based on earlier research after Bell's palsy, in the current study the total amount of treatment sessions in current rehabilitation program were calculated. It showed that five treatment sessions each week for six weeks were sufficient(1). Mime therapy and motor imagery technique had positive impacts on the recovery and improvement of facial functions. There is no significant difference between mime therapy and motor imagery technique based on facial motor functions, symmetry, disability, and synkinesis. Both groups showed significant effect in improvement of facial symmetry (Sunnybrook facial grading system), disability (Facial Disability Index), and motor functions of facial muscles (House-Brackmann scale). Both groups did not reveal significant improvement based on facial synkinesis (Synkinesis Assessment Questionnaire).

Prajapati conducted a study in 2019, which concluded that group receiving electrical stimulation with Mime therapy had shown a significantly greater improvement in Strength and Motor function of facial muscles as compared to group receiving electrical stimulation with motor imagery technique. This study conflicts with current study as current study reported no significant difference between mime therapy and motor imagery technique based on facial motor functions because patients of both groups were regular in receiving treatment session. This study measured improvement in Strength and Motor function of facial muscles, while current study measured improvement in facial symmetry, facial motor functions, physical, motor functions; reduction in disability and synkinesis. This study was conducted on small number of participants which was 30 (1). While current study was conducted on large sample size which is 44.

Patel conducted a study, which concluded that a significant improvement had been shown after intervention in group receiving motor imagery and mirror book therapy based on social functions (Facial Disability Index-social function) than in group receiving mime therapy and a group receiving conventional electrotherapy. This study results conflicted with current study results based on social functions (Facial Disability Index-social function), as current study reported that mime therapy and motor imagery technique were equally effective based on social functions because in current study both groups were receiving mime therapy and motor imagery technique solely, with electrical stimulation as a control treatment. This study reported that the group receiving motor imagery and mirror book therapy and the group receiving mime therapy treatment had shown equal improvement based on facial symmetry, which favors current study as current study has also reported similar results based on facial symmetry. This study showed that motor Imagery technique and mirror Book Therapy reported significantly better results than mirror therapy with regards to physical and social functions(20), which conflicted with current study as current study has reported that physical and social functions were equally improved in both mime therapy and motor imagery technique groups. This study was conducted on small sample size (30), while current study was conducted on large sample size (44). This study measured improvement in facial symmetry, physical, and social functions. Current study has measured improvement in facial motor functions, facial symmetry, physical, social functions, and reduction in synkinesis.

Kakkad conducted a study in 2021, which concluded that Bell's palsy patients receiving conventional physiotherapy with an EMG biofeedback and mime therapy showed significant improvement on electrophysiological parameters.. The

patients with Bell's palsy showed significant improvement based on facial symmetry (Sunny-brook facial grading system)(14). This study supports current study as current study also reported positive effects of mime therapy in improvement of facial muscle functions in patients with Bell's palsy, and it has significant improving facts based on improvement in facial symmetry. This study measured improvement in facial muscle functions, facial symmetry, and amplitude of facial muscles. Current study measured improvement in facial motor functions, facial symmetry, physical, social functions, and reduction in synkinesis.

Mishra conducted a study in 2021, which concluded that the group receiving combination of mime therapy and electrical stimulation along with sensory exercises showed significant effects for improving facial functions and reducing facial synkinesis in Bell palsy patients as compared to the group receiving conventional therapy alongwith electrical stimulation, and the group receiving mime therapy alongwith electrical stimulation. All three treatment protocols showed positive effects on improving facial muscle functions and recovery of patients with Bell's palsy. The improvement in the participants receiving mime therapy along with electrical stimulation could be because that mime therapy involves facial massage, stretching, and specific exercises, based on happy, sad, angry, surprise expressions which are a part of an individual's daily routine regarding to facial activities(14). This study favors current study as current study also reported significant impacts of mime therapy in improving facial functions. This study conflicts with current study as in current study mime therapy did not show significant impact on reducing facial synkinesis in patients with Bell's palsy because synkinesis was reported in small number of patients (3 in mime therapy group).

Prem Kumar BN conducted a study in 2022 to compare the effects of PNF with mime therapy on Bell's palsy. PNF showed significant improvement in patient with Bell's palsy as compared to motor imagery technique. The significant improvements were noted in both groups (19). This study results supports current study because current study also reported significant improvement of facial motor performance and social functions while using motor imagery technique. This study conflicts with current study as in current study motor imagery technique did not show significant impact on reducing facial synkinesis in patients with Bell's palsy because synkinesis was reported in small number of patients (2 in MIT group)..

Paolucci conducted a study in 2019, which interpreted that motor imagery technique showed significant effects in improvement of facial physical function and limiting psycho-emotional distress and improving quality of life which is also associated with emotional and communicative aspects of mimic expressions(20). This study favors current study results, because in current study motor imagery technique showed significant impacts in improving facial physical functions.

Agostini conducted a research in 2020, which interpreted that mime therapy was found to be the most effective rehabilitation protocol in the treatment of chronic facial paralysis. Mime therapy showed better and effective results in improving mimic facial function and reducing the recovery time after facial paralysis. Self-massage, relaxation exercises, special facial function exercises, breathing techniques, and pronunciation of words letters were included in mime therapy rehabilitation protocol (16). This study supports current research, as current study also showed significant improvement in chronic facial paralysis, and mimic facial function.

Beurskens conducted a study which main purpose was to determine whether improvement in symmetry of face would be attained by mime therapy. This study concluded that facial symmetry in people with long-term facial nerve paresis was significantly improved. Greater improvements were seen in the Sunnybrook

Facial Grading System for all three components (resting symmetry, symmetry of voluntary movement, and synkinesis) of facial symmetry in the group that received mime therapy as compared to the group that was on the waiting list. In the House-Brackmann scale similar improvements were noticed. After receiving mime therapy, facial asymmetry at rest and synkinesis was reduced, while facial symmetry of voluntary movement increased in the group receiving mime therapy. Eye asymmetry at rest was not improved as a result of mime therapy(21). This study supports current research, as current study also reported significant improvement in facial symmetry. Facial asymmetry at rest and synkinesis was significantly reduced, while facial symmetry of voluntary movement was significantly increased in the group receiving mime therapy. Anyhow, current study conflicts with this study as in current study eye symmetry at rest has also been significantly improved by mime therapy. This study did not cover physical and social aspects aspect in Bell's palsy, while current study has also covered that aspect and noticed significant improvement within group.

Felício conducted a study in 2023, which reported that functional recovery of Bell's palsy patients was significantly improved in patients receiving mime therapy while the improvement of the facial performance was assessed by the House-Brackmann Scale. Mime therapy contained facial mimicry exercises, self-massage, inhibition of synkinesis, expressive emotional exercise, and relaxation exercises(22). This study favors current research, as current study also reported significant improvement in functional recovery in Bell's palsy patients receiving mime therapy.

CONCLUSION

There is no significant difference between mime therapy and motor imagery technique based on facial motor functions, symmetry, synkinesis, physical, social functions, and disability. Both groups showed significant impact on improvement of facial symmetry (Sunnybrook Facial Grading System), motor functions of facial muscles (House-Brackmann Scale), physical, social functions, and reduction in disability (Facial Disability Index). Both groups did not show significant impact on reduction in synkinesis (Synkinesis Assessment Questionnaire).

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