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ORIGINAL ARTICLE

Effects of Mirror Therapy on Bell's Palsy

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A B S T R A C T

Background: Bell's palsy is a common nerve disorder. The annual incidence of Bell's palsy in the world is around 11-40 cases per 100,000 people. Both genders' prevalence rate seemed to be the same in their thirties. Conservative methods were used to treat Bell's palsy. Therefore, further research is required which provides more results in less time with less disability.

Objective: To evaluate the effects of mirror therapy in improving facial movements, symmetry, and the prevention of synkinesis.

Methodology: This study was a randomized clinical trial, conducted in Madina teaching hospital, Aziz Fatima hospital, and DHQ hospital Faisalabad, Pakistan from Feb 2019 to July 2019. A convenient sampling technique was used and 30 patients were randomly allocated into two groups by lottery method. Group A (n=15) received Conventional therapy (electrical muscle stimulation and facial exercise) while group B(n=15) received mirror therapy in which after application of EMS, exercises were performed in front of a mirror. Twelve treatment sessions were given in four weeks on alternative days. The duration of the study was 6 months. Pre-treatment and post-treatment measurements were taken. The Questionnaires, House-Brackmann scale, and Sunnybrook facial grading system were used as data collection tools.

Results: The patients' mean age was 35.27 ± 7.611 years with 14 (46.7%) males and 16 (53.3%) females. Mirror therapy shows improvement on Sunnybrook facial grading system score as a mean value 70.67 ± 11.127. The result shows both groups are significant as with a p-value <0.05.

Conclusion: Mirror therapy is an effective treatment for improving facial symmetry, facial movements, and decreasing synkinesis in patients with Bell's palsy.

Introduction

Nonsuppurative inflammation of VII cranial nerve (facial nerve) is called Bell's palsy, it affects the voluntary, associative, and emotional movements of the face. In Bell's palsy ipsilateral side of the face is paralyzed.[1] Bell's palsy annual incidence in the world is around 11-40 cases per 100,000 people a year.[2] It affects the social and emotional state of the patient, especially in the case of long-term symptoms and late improvement despite treatment which could lead to psychological problems and disability.[3] Bell's palsy developed by multiple factors which include pregnancy, vascular ischemia, autoimmune systems, and viral infections. It's essential to rule out facial paralysis other reasons and the point from where Bell's Palsy is thought to cause facial weakness or paralysis because of the idiopathic source.[4, 5]

The symptoms appear on the affected side after irritation of the facial nerve (VII cranial nerve) which supplies the facial muscles that raise the eyebrow, close the eye, crumple the nose, smile, and open and close the mouth. The sensation of the front of the tongue and the

lacrimal ducts of the eyes are also affected. Synkinesis can result from the facial nerve axons deviant redirection during reinnervation, which produces the adjacent muscle to contract simultaneously and involuntarily at the lesion side of the face.[6, 7]

Multiple treatment approaches were used for the treatment of Bell's palsy which includes acupuncture, botox, mime therapy, EMS, PNF, Kabat rehabilitation, and neuromuscular re-education techniques.[8] Mirror therapy is a method of facial neuromuscular rehabilitation in which functional movement, symmetry, and irregular muscle activity were improved by using visual feedback.[9] Visual feedback is coming from the contrary part of the body which produces movements in the affected side of the body.[10] EMS application maintained muscle bulk and improved the patient's functional outcome. There was evidence of EMS in improving axonal restoration.[11] Mirror therapy (MT) is the latest treatment approach used for treating neurological conditions and motor deficits. Mirror Therapy (MT) has the ability to activate the phenomenon of neuroplasticity but this concept of neuroplasticity improves the function of cranial nerves is yet not clear, which increased my concern about its use. The aim of this study was to evaluate the effectiveness of mirror therapy in the improvement of facial movement, symmetry, and reduction of synkinesis.

Methodology

This study was a randomized clinical trial conducted in the Madina Teaching Hospital, Aziz Fatima hospital, and DHQ hospital Faisalabad, Pakistan from February 2019 to July 2019. 36 subjects were selected through convenient sampling from which 6 didn't give follow up. Inclusion criteria included (age group between 25-50 years, a diagnosed case of Bell's palsy, acute onset of 1-3 weeks and House-Brackmann facial nerve grading III and IV) and Exclusion criteria included other neurological deficits, sensory deficits, and cognitive impairments. Total 30 (n=30) both male and female were randomly allocated by the lottery method into two groups (Conventional therapy group and mirror therapy group). 15 subjects received conventional therapy (EMS and Facial Exercises) while the other 15 subjects received mirror therapy in which after application of EMS, exercises were performed in front of the mirror.

Demographic data were recorded and the Screening questionnaire, House-Brackmann facial nerve grading scale, and Sunny Brook facial grading system were used as standardized assessment tools. Twelve treatment sessions were given in four weeks on alternative days. The duration of treatment for one session was about a half-hour (30 minutes). Pre-treatment and post-treatment measurements were done. SPSS version 20 was used for data analysis.

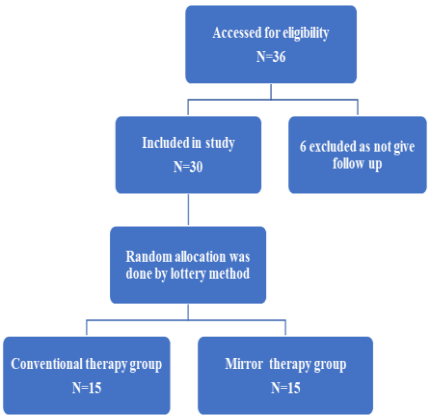

Fig. 1 Consort Flow Diagram

Results

Thirty patients between age groups 25-50 years were included with 14 (46.7%) males and 16 (53.3%) females. The patient's mean age was 35.27 ± 7.611. A statistical test (Paired t-test and independent t-test) was

Table I: Paired sample t-test (within-group analysis)

Variables	Conventional therapy group Mean ± SD	P-value	Mirror therapy group Mean ± SD	P-value
Pre RSS	16.00±4.309	0.00	13.33±5.563	0.00
Post RSS	12.33±3.716		7.13±3.441	
Pre SVM	56.53±12.817	0.00	55.87 ± 16.080	0.00
Post SVM	73.07±10.951		79.53 ± 13.282	
Pre SS	6.87 ± 3.021	0.00	6.80 ± 3.075	0.00
Post SS	4.93 ± 3.262		2.40 ± 1.957	
Pre SFGS	28 ± 15.203	0.00	36.40 ± 17.574	0.00
Post SFGS	50.33 ± 13.746		70.67 ± 11.127	

RSS: Resting symmetry score, SVM: Symmetry of voluntary movement, SS: Synkinesis score, SFGS: Sunny brook facial grading system.

used for data analysis.

This paired sample t-test shows a significant result in the post-treatment session as with p-value=0.00. This clearly depicts the fact that both treatments (conventional and mirror therapy) showed improvement within the groups while the mirror therapy in addition to conventional therapy showed to be an effective treatment as with mean value 70.67 ± 11.127. (Table I)

Mirror therapy group showed significant improvement in resting symmetry score (7.13±3.441), the symmetry of voluntary movement (79.53±13.282), and synkinesis score (2.40±1.957) at the end of treatment sessions which shows mirror therapy in addition with conventional therapy is a helpful and an effective treatment for Bell's palsy. (Table II)

Table II: Independent t-test (between group analyses)

Variables	Mean ± SD	P-value
RSS (CT)	12.33±3.716	0.00
RSS (MT)	7.13±3.441	
SVM (CT)	73.07±10.951	0.00
SVM (MT)	79.53 ± 13.282	
SS (CT)	4.93 ± 3.262	0.00
SS (MT)	2.40 ± 1.957	
SFGS (CT)	50.33 ± 13.746	0.00
SFGS (MT)	70.67 ± 11.127	

Discussion

Bell's palsy is one of the major conditions presents in patients which causes functional limitations and reduces the patient's level of activity. Due to the unknown etiology of Bell's palsy, the disease has no cure.[12] Optimal medical treatment for the disease is still under discussion, as several randomized studies show mixed results.[2] During the last 20 years, several studies have been conducted on the use of different drugs, as well as on alternative techniques, such as physical therapy in the treatment of the disease. The present study identified that is mirror therapy is an effective intervention for Bell's palsy patients in various selected hospitals. A study conducted on the rehabilitation of Bell's palsy. They reported that after treatment, the patients became more socialize.[13] The current study showed mirror therapy in addition to conventional therapy showed better results in improving facial movements, symmetry, and prevention of synkinesis. From the evidence of literature, the parameters of the study showed significant improvement at the end of treatment. Sunnybrook facial grading system score showed greater improvement with the mirror therapy group.[14] Another study also narrated more improvement in the mirror group as compared to the conventional group. A systematic review showed an improvement in mobility and facial symmetry for participants doing facial exercises with biofeedback. A decrease in synkinesis has also been reported.[15] Another study reported that mirror exercises are appropriate for the anatomical and physiological function of the face and also help in psychological disorders. In order to inhibit synkinesis, clients are instructed to determine synkinetic models and to slowly and progressively start primary movements while relaxing the synergistic movement area in order to dissociate the aberrant neural patterns.[16] A systematic review demonstrated that treatment with EMG-Biofeedback and Mirror biofeedback was effective for the recovery of peripheral nerve injuries which support the results of the current study as the reduction of synkinesis by the use of mirror therapy.[17, 18] Small sample size is the limitation, so more researches of this kind are required with a greater sample size in order to create more literature for guidelines. Another limitation was the absence of true control. Further new and advanced studies regarding different interventional models must be conducted so that proper measures could be taken to prevent and treat this common health and occupational problem.

Conclusion

It is concluded that mirror therapy is an effective treatment for improving facial symmetry, facial movements, and decreasing synkinesis in patients with Bell's palsy.

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