

Comparative Study Between Facial PNF And Kinesio Taping Along With Facial Exercises In The Treatment Of Bell's Palsy

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Abstract: Background: Facial expressions of human convey strongest emotions of spirit.¹The facial nerve is responsible for voluntary facial movements. Bell's palsy is a partial paralysis of the facial muscles. There any many traditional approaches used for rehabilitation of Bell's palsy which includes electrical stimulation. Individually the proprioceptive neuromuscular facilitation (PNF) technique and kinesiology taping (k-taping) exercise has been proven effective yet no study has been done on comparison between two neuro-facilitatory approaches. Hence the effort to compare between facial PNF and k-taping with exercise for improving facial expressions, also to identifying which treatment protocol is superior. Methods:30 patients diagnosed with unilateral Bell's palsy by medicine department from both genders in the age group of 20 to 40 years were selected. Patients were assessed by using sunny brook facial grading system. They were divided randomly into two groups group A and B. Group A received facial PNF and group B received kinesio taping with facial exercises for 4 weeks. Results: The two techniques were compared using unpaired t test using sunny brook scale as outcome measure, the difference was significant with $p < 0.05$, Group B being more effective than group A. Conclusion: This study concludes that K- taping with facial exercises is more effective than facial PNF in improving the voluntary facial muscle contractions. [Paletkar T Natl J Integr Res Med, 2019; 10(2):25-28]

Key Words: Bell's palsy, Facial nerve palsy, Kinesio taping, facial proprioceptive facilitation, rehabilitation..

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Introduction Facial expressions of human convey strongest emotions of spirit.¹The facial nerve is responsible for voluntary facial movements. Bell's palsy is a partial paralysis of the face accompanied by pain or discomfort; it is also known as peripheral facial palsy². Studies says that annual incidence of Bell's palsy is 20-30 cases per 100, 000, also there is no gender, side or seasonal difference in occurrence of bell's palsy³. It is a very common disorder with numerous aetiologies. Complete recovery occurs in 71% of Bell's palsy cases without any medical intervention⁴.

A peripheral facial palsy can cause distressing disfigurement of the face and can also impair ability to communicate by facial expression and articulation. It may also need to inability to drink, eat and in agreeable manner, ultimately leading to embarrassment and social isolation. This seriously may impair an individual's functions in his social environment³. Most of the Bell's palsy patients recover well but persistent facial palsy may lead to facial asymmetry and weakness, disappearance of facial creases and nasolabial fold and corner of the mouth droops. The eyelid will not close and lower lid sags, an attempt to close the eyes eye ball rolls upward so called "The bell's phenomenon." There may secondary disabilities of Bell'spalsy, which includes excessive tearing of eyes, pooling of saliva and

spilling out of mouth from the affected side, taste disturbances, affection of stapedius leads to oversensitivity to loud noise, muscle spasm and facial pain. The most common and troublesome sequel is associated movements or synkinesis and contractures. These all impairments leads to social isolation, so rehabilitation of Bell's palsy is an important field of study³.

There any many traditional approaches used for rehabilitation of bell's palsy which includes electrical stimulation. Studies have states that patients treated with electrical stimulation produce "mass action" it is generalized contraction of all facial muscles with attempted facial expressions. The most common approach used is facial neuromuscular re-education using surface or mirror feedback, may randomized control trails have been done but there are no clear outcome measures for these approaches⁵.

Proprioceptive neuromuscular facilitation, it is an manual resistance technique that works by stimulating fundamental patterns of movement, it either facilitates or inhibits the movement. It has been reported that it improves function of facial muscles, flexibility, strength and co-ordination³. Most often voluntary facial contraction or expressions are combination of facial movements, for this reason facial movements are easily distorted in resting facial

posture or voluntary contraction in any region of face⁵. Unlike other skeletal muscles facial muscles lack fascial encasement and tendons. The intrinsic muscle receptors and joint receptors are few in the face.

The recent approach for management of bell's palsy is dynamic taping using kinesio tape with facial exercises. Kinesio taping is form of dynamic taping which may assist or resist the movement, so k-taping is always practiced with movement i.e exercises. The body has several types of receptors including proprioceptors that receive impulses from the areas where body movement has occurred. They are activated by quick changes in the angle of the joint and by pressure that compresses and distorts the capsule for brief period of time. Some researchers have proven that k-taping gives sensorimotor feedback leading to improvement in sense of awareness⁶.

Materials and Methods: The study was conducted on 30 patients diagnosed with non-traumatic unilateral bell's palsy, in the age group of 20 to 40 years of age. All were on oral anti-inflammatory medications, and having an acute onset of 1 to 3 weeks. Patients diagnosed with 5th cranial nerve involvement having defective sensation on face, Presence of any tumours or any growth around the treatment area, UMN lesion and Skin Allergy to kinesiology tape were excluded. Institutional ethical clearance was obtained. A written informed consent for patients active participation in the study was taken.

30 patients were equally divided into two groups, group A receiving facial PNF, rhythmic initiation technique was used and group B receiving kinesio taping along with facial exercises They were assessed for facial muscle voluntary contraction using Sunnybrook grading system pre and post intervention . Duration of intervention for both the groups was 30 minutes,5 times in a week for 4 weeks, a total of 20 sessions.

Procedure: General procedure: 30 patients diagnosed with unilateral bell's palsy by a physician were divided into two groups (A and B) by lottery method .A pre-participation screening was done by using sunny brook facial grading system. Duration of the study was 4 weeks.

Procedure in Group A: Group A received facial proprioceptive neuromuscular facilitation. 15 repetitions for 2 sets, with duration of 30 mins.

The technique used was maximal resistance and repeated contractions.The facial muscles being small muscles,they are easily fatiguable so 15 repetitions for 2 sets were given.

Materials used in group A: Treatment couch. Postural mirror.

PNF for facial muscles

1.Elevation and depression of eyebrows, diagonal direction.

(A)"Ready" (stretch downward and medially)

(B) "Look up,raise your eyebrows".

(C) "Hold it, now look up some more, now look downward and in.(Maximal resistance, repeated contractions.)

2.Opening and closing of the eyelids,diagonal direction.

(A) "Open your eyes wide (stretch)."Hold them open.

(B)"Now , close your eyes, Don't let me open them (maximal resistance) and relax."

3. Retraction of angle of mouth downwards; protrusion of the lips upwards.

(A) "Frown up, Hold it"(stretch, maximal resistance).

(B) "Pucker up and hold it, now pucker up some more."(maximal resistance, repeated contractions)

4.Retraction of angle of mouth upwards; protrusion of lips.

(A)"Smile wide, hold it there."

(B) "Pull your lips together forward and then down, hold it (maximal resistance, slow reversal hold) , smile again and hold.

5. Lips open with inversion , lips close with protrusion as check compress.

(A)" Close your lips."(stretch ,maximal resistance)

(B)" Hold it, and now relax"(repeated contractions)

6 .Mouth opening to the right, reinforced by head and neck flexion.

"Open your mouth and look down at your right hip"(stretch, maximal resistance)

"Hold it, now open(repeated contractions)

7.Mouth opening to left, reinforced by head and neck extension.

(A) "Close your mouth and look up to your left."(stretch ,maximal resistance)

(B)"Head up, and now hold."(maximal resistance)

PNF for facial muscles: Facial PNF was given for frontalis, assisted resisted technique. Assistance was given for weak muscles and resistance for intact muscle.

Procedure in group B: Patients in group B received K-taping with facial exercise. A patch test was done prior the application of k-tape.

Materials used in group B : Skin colored K-tape. Treatment couch. Scissor. Postural mirror. K-Tape along with facial exercises were given to the patients 15 repetitions, 2 sets for 30 min. K-tape was checked after every 3 days of its application.

Application: 1.Taping for buccinator- Base is on lateral mandible, a muscle technique will be applied.

2.Taping for frontalis-Base is on area above the eyebrows .

The k-tape used was cotton based so , k-tape was kept for 3 days, it was applied for 2 times in a week .So in the whole study duration the k-tape was 8 times for 4 weeks.

Results : The data was collected and analysed by paired t test for intra group analysis and unpaired t test for inter group analysis as the data was normally distributed. Level of significance was $p < 0.05$ with 95% confidence interval.

Table 1: Comparison of scores obtained on Sunnybrook scale in groups A and B.

Group	Mean		Mean Difference + SD	P value
	Pre	Post		
A	24.3	78.0	53.07 + 6.67	P<0.05
B	20.3	80.3	61 + 6.87	

Table 1 shows that though individually both groups were effective, the improvement seen in Group B was better than that seen in Group A on the Sunnybrook scale. ($P < 0.05$).

Discussion: Idiopathic peripheral facial paralysis or Bell's palsy is a lower motor neuron lesion of the seventh cranial nerve, affecting all ages and both sexes and is the most frequent cause of facial paralysis¹. It is characterised by the Bell's phenomenon which is upward diversion of the eye on attempted closure of the lip seen when eye closure is incomplete. It results in an inability to control the facial muscles on the affected side. The most alarming symptom of Bell's palsy is paresis. The palsy is often sudden in onset and evolves rapidly, with maximal facial weakness developing within two days. On the affected side, there is dysfunction with activities such as laughing, whistling, opening wing of nose, closing eye, scowling, elevating eyebrow, drooling, excessive tearing, pain around the jaw, dizziness,

hypersensitivity to sound on the affected side and dryness of eye and/or mouth⁶

Typically symptoms come on over 48 hours. The cause of Bell's palsy is unknown. Surgery is generally not recommended. Often signs of improvement begin within 14 days, with complete recovery within six months. A few may not recover completely or have a recurrence of symptoms. It most commonly occurs in people between ages 15 and 60. Males and females are affected equally.

Bell's palsy is divided into six categories (normal, mild dysfunction, moderate dysfunction, moderately severe dysfunction, severe dysfunction and total paralysis) and is a 0–6 point scale with 6 representing total paralysis. Sunnybrook scale measures three components of facial asymmetry: Resting asymmetry (scored from 0–4 with 4 being the most asymmetrical), symmetry of voluntary movement (scored from 0–5 with 5 being the most symmetrical) and synkinesis (scored from 0–3 with 3 being the worst). A perfect score of 100 points represents normal facial symmetry. The other tests which are used to assess the voluntary facial muscle contraction and status of denervation are strength duration curve, blink reflex, Nerve conduction velocity and electromyography of facial muscles.

The physiotherapeutic management which are in practice for treatment for Bell's palsy lacks strong evidence for being best treatment protocol. Individually, the facial PNF and K-taping with facial exercises has been proven effective in treating Bell's palsy, yet there is no comparison done between two neurofacilitatory approaches. The other treatment approaches available for Bell's palsy management includes electrical stimulation. Surface EMG guided biofeedback, Mirror biofeedback, Facial exercises and mime therapy for facial expressions.

Group A received facial PNF, 15 repetitions for 2 sets with 30 minutes of treatment duration. PNF generates appropriate forceful muscle contractions by diagonal patterns of stretching. It improves facial symmetry and reduces facial disability. As the facial muscles are small so they are easily fatigable. There are many treatment procedures used to treat facial muscle weakness like electrical stimulation, mirror therapy, acupuncture, facial exercise, massage, taping, but

there is less researcher available on effect of facial PNF. So this study was done to identify the effectiveness of PNF on facial muscle weakness. Statistical analysis using Paired t test was done using primer software. Mean difference on Sunnybrook scale of pre-treatment values was 24.33 and post-treatment mean was 78 with p value $p < 0.005$. Hence facial PNF was effective in improving facial muscle strength.

A study done by Ramos-Jimenez et al⁶ concluded in their study that studied the effectiveness of electro-stimulation as a treatment for Bell's Palsy and concluded that there is insufficient evidence to support electro-stimulation as an effective method to treat Bell's palsy. Assist resist technique used in this study is approach used in PNF technique, this mechanism of improvement in voluntary muscle contraction and reducing the synkinesis is postulated as ,when resistance is provided to intact muscle the irradiation from the intact muscle are generated to weaker or paralysed muscles which in turn induces the muscle contraction.

Group B received K-taping with facial exercises. A patch test was performed to check the sensitivity for k-tape on dorsum of the hand-tape with facial exercises were given for 15 repetitions for 2 sets with 30 minutes of duration-tape was checked after every 3 days of its application. The tape being cotton based, it was re-applied after 3 days so it was applied for 8 times in 24 days. The taping protocol is based on principles of muscular re-training, neurophysiology and biomechanics. K-tape being a dynamic tape it is always applied along with facial exercises. It prevents facial asymmetry, prevents over pull of paralyzed muscle and reinforces muscle action in graded fashion. Paired t test was applied to pre and post values using sunny brook scale as outcome measure. The mean of pre value was 29.33 and that of post were 81. Hence facial exercises with K taping was effective in improving the muscle function. The improvement seen in k-taping with facial exercises s due the fact the k-tape is a dynamic tape which means this tape should be applied at the time of exercises .It maintains the muscles angle of pull hence by correcting the pathomechanics in the muscle.

Conclusion: This study concludes that K taping with facial exercises is more effective than facial PNF in treating patients with unilateral Bell's palsy.

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