

Can Bell's Palsy Synkinesis Be Improved By PNF?

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ABSTRACT

When a person has facial paralysis, one of the most distressing consequences is face synkinesis. Face synkinesis develops from a pathophysiologic cause: aberrant regrowth of facial nerve fibres that supply specific facial muscle groups. Patients with this kind of aberrant regeneration often have hypertonic contractures and synkinetic motions, including closing their eyes while moving their lips or moving their midface while closing their eyes reflexively or voluntarily. Synkinesis in the platysma is a common symptom that patients report, since it may cause a stiffness in the neck. Isolation and impaired ability to do daily tasks like eating, drinking, and smiling are all possible outcomes of synkinesis. If you are looking for a therapeutic workout to enhance your neuromuscular control and function, PNF is a great choice. It combines neuromuscular facilitation techniques with movement patterns based on functional principles to stimulate motor responsiveness. Therefore, PNF may have an inhibitory or a facilitative effect. Furthermore, it has shown the greatest promise in treating a range of musculoskeletal and neuromuscular conditions. So, we're doing this research to see whether PNF helps with the synkinesis associated with Bell's palsy.

Method: Thirty people with Bell's palsy, as certified by a neurologist or otorhinolaryngologist, were randomly

assigned to one of two groups of fifteen, with each group receiving 15 patients with facial synkinesis.

GROUP A: PNF techniques and Conventional management of Bell's palsy.

GROUP B: Conventional management of Bell's palsy only.

Outcome Measure and Its Measurement:

We assessed facial synkinesis at baseline and again at the end of the fourth week from baseline.

After 28 days of follow-up, the results were compared to the initial measures.

Synkinesis Assessment Questionnaire was used to measure the Synkinesis.

Statistical Analysis:

- In order to determine the extent of synkinesis from the SAQ scores obtained in Bell's palsy patients, we compared the scores at baseline and the end of the fourth week independently. We used the student paired t test for within groups.
- Using the student's t-test for both groups, we compared the SAQ scores of patients with Bell's palsy at the beginning of the study and again at the conclusion of the fourth week to determine the extent of synkinesis.
- The threshold of significance was set at $p < 0.05$.

Results: Over the course of the four weeks, individuals in both groups showed improvement relative to their baseline measurements. However, Group A showed

a statistically significant higher change in SAQ scores than Group B.

Conclusion: Results demonstrate that both Group A, which received conventional care in addition to PNF exercises, and Group B, which received conventional management alone, successfully increased the amount of synkinesis in Bell's palsy patients. Group A, which consists of patients receiving both conventional treatment and PNF exercises, seems to have better results than Group B, which consists of patients receiving just conventional treatment, for Bell's palsy synkinesis.

Keywords: Bell's Palsy, Electrical Stimulation, Facial Synkinesis, and Proprioceptive Neuromuscular Facilitation.

INTRODUCTION

One of the most upsetting side effects of facial paralysis is face synkinesis.” When one set of face muscles is voluntarily moved while another set is not, a condition known as synkinesis develops. Face synkinesis develops from a pathophysiologic cause: aberrant regrowth of face nerve fibres that supply specific facial muscle groups. Patients with this kind of aberrant regeneration often have hypertonic contractures and synkinetic motions, including closing their eyes while moving their lips or moving their midface while closing their eyes reflexively or voluntarily. Synkinesis in the platysma is a common symptom that patients report, since it may cause a stiffness in the neck. Isolation and impaired ability to do daily tasks like eating, drinking, and smiling are all possible outcomes of synkinesis.¹

Nerve miswiring after trauma causes synkinesis. This outcome becomes apparent when voluntary motions are accompanied by involuntary muscle contractions. As an example, when a person voluntarily grins, their eye muscles contract involuntarily, leading them to squint.

Facial paralysis due to an unknown cause, often leads to facial synkinesis, also called Bell's Palsy or Facial Palsy.² Compression

of the seventh cranial nerve causes Bell's Palsy, a kind of hemifacial paralysis caused by the nerve's inability to function. Negative rewiring of the nerve occurs when it tries to heal. Patients with severe facial nerve paralysis will always acquire face synkinesis.³ Eye closure accompanied by voluntary contraction of the mouth muscles, midfacial motions accompanied by voluntary closure of the eyes, tightness in the neck, and hyperlacrimation, often known as crocodile tears, are the most typical signs of facial synkinesis.^{2,3,4,5}

Synkinesis: three possible processes:

Aberrant nerve regeneration: The theory proposes that in the aftermath of nerve damage, axons originate in the face nucleus but end up in the wrong peripheral muscle groups. Several facial nerve subdivisions may be innervated by these abnormal branches all at once.³

Ephaptic transmission: The formation of an artificial synapse occurs when two nerves are able to establish such a connection. Because they are not sufficiently myelinated, regenerated nerves following a lesion might come into touch with each other, allowing an impulse to flow straight through the nerve membrane. This means that two nerves may “cross talk” and each can convey the other direction's action potential.⁶

Nuclear hyperexcitability: States that axonal degeneration (via Wallerian degeneration) happens after a lesion. As a result, the post-synaptic cell starts to respond more strongly to neurotransmitters (by, for example, developing more receptors) and less to inputs. Therefore, the depleted postsynaptic cell may get neurotransmitters from remaining healthy axons at the same lesion site. The hypersensitivity of the post synaptic cell allows neurotransmitters to be effectively stimulated when they travel to it from another nerve's axon. Synkinesis, or

unwanted peripheral motions, result from this.⁷

Hypertonic contractures and synkinetic motions, such the voluntary movement of the lips and the shutting of the eyelids, may be caused by face synkinesis, a kind of facial paralysis. When eating causes an excess of lacrimation, it is known as hyperlacrimation (crocodile tears). The brain circuits that control the secretion of saliva and tears are responsible for this. Additionally, patients may experience stiffness in the neck due to platysma muscle synkinesis, functional restrictions while eating, reading, or smiling, and even social isolation; hence, it is necessary to use the PNF approach in order to determine whether these characteristics improve.

Proprioceptive neuromuscular facilitation (PNF): characterised as a therapeutic workout that improves neuromuscular control and function via the integration of neuromuscular facilitation techniques with functionally orientated diagonal movement patterns. "Therefore, PNF may have an inhibitory or a facilitative effect."⁸

There have been reports that the PNF developed by Kabat, Knott, and Voss may enhance muscular function." The purpose of PNF, a standardised, assisted training approach for muscles, is to alleviate limits in joint mobility, muscle atrophy, imbalance, and decline via the use of traction, resistance movements, stretching, and approximation.⁹

More recently, PNF has shown promise in treating a variety of orthopaedic conditions, including those affecting the bones and joints, injuries sustained in athletic competition, and disorders affecting the central nervous system, including stroke.

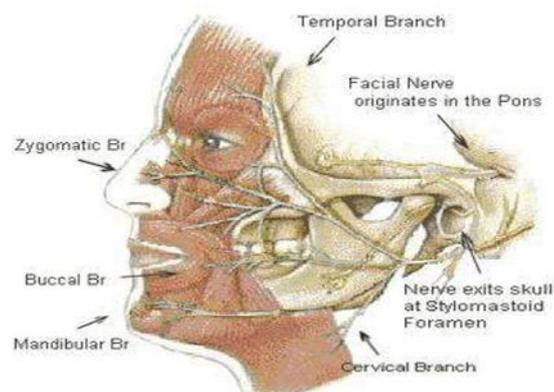
By incorporating PNF into orofacial and dental procedures, Nakajima et al. introduced the technique to Japanese practitioners, who have since used it to enhance the expressiveness of facial features. Because of this, the hypothesis was advanced that perioral muscle training with PNF may improve facial aesthetics by modifying the effects of orthodontic treatment on hard tissues.^{10, 11, 12}

The goal of proprioceptive neuromuscular facilitation (PNF) training is to improve the neuromuscular response of the proprioceptors. PNF patterns align with the topographical organisation of the muscles and have a spiraling, diagonal orientation.¹³

Bell's Palsy: This neurological illness begins with a gradual weakening or total paralysis of the ipsilateral side of the face and progresses due to a lesion of the seventh cranial nerve.¹⁴

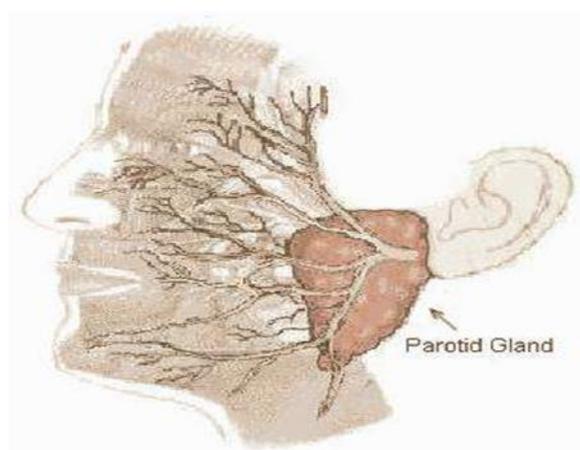
Facial palsy, also known as Bell's palsy, is characterized by drooping of the affected side of the face due to a malfunction of the facial nerve, also known as the VII cranial nerve, which controls facial muscles. In facial palsy, loss of control over the facial muscles is a characteristic. The form of paralysis is infranuclear, which affects lower motor neurons.

All of the muscles in your face, including those that move your eyes, mouth, and jaw, are controlled by the facial nerve. The muscles involved in chewing or mastication are not controlled by it. Damage to the facial nerve may paralyze the face, making it impossible to shut the eyelids and leading to drooling as a result of the orbicularis oris muscles, which are responsible for closing the lips. In a similar way, when the eyelids stop protecting the eye from debris and water, it may lead to drying out of the eye.



The Pons is a region of the brain stem where the seventh cranial nerve begins. It enters the parotid gland via the stylomastoid foramen. The parotid gland is where it divides into its primary branches. Seven thousand fine nerve fibres extend the nerves from this point to the outer ear, salivary glands, the face, and the neck. This nerve regulates not just the volume that we perceive in sounds, but also the muscles in our necks, foreheads, and faces. Additionally, it increases the production of saliva, tears, and fluids from the front of the mouth's glands as well as the lower jaw. In addition to sending signals to the outer ear and the front two-thirds of the tongue, the seventh nerve also carries perceptions of taste.

Inflammation inside the facial canal or fallopian canal, a small bony tube, is the root cause of bell's palsy. There is a very little space in the canal. Compressing the nerve is a possible outcome of inflammation inside it. Also, the nerve can encounter pressure if it becomes inflamed within this small canal. The 7th nerve is unable to perform any of its various tasks since it has not yet emerged from the skull and divided into its many branches. Some types of trauma, such as those caused by tumors or surgeries, may happen to a nerve just after it has split into its major branches. One or more branches may be spared and certain muscles may be able to keep working after this kind of injury.



As seen in the image above, the facial nerve emerges from the skull via the stylomastoid foramen and branches out at the parotid gland area. Subsequently, the main branches further split into many smaller

nerve fibres. Doctors need to find out whether the muscles in the forehead are not affected. Because of a quirk in anatomy, the muscles of the forehead get innervation from both hemispheres of the brain. So,

even in patients with facial palsy that originates in one hemisphere of the brain, wrinkles may still appear on the forehead (central facial palsy). When the issue is in the facial nerve (peripheral palsy), all nerve impulses, including those to the forehead, are disrupted.

MATERIALS & METHODS

MATERIALS USED FOR THE STUDY:

- Electrical stimulator
- Talcum powder or oil for massage
- Taping tape- for taping technique
- Synkinesis Assessment Questionnaire for measuring amount of facial synkinesis.

STUDY DESIGN: Randomized Control Trial.

SOURCES OF DATA: From several physiotherapy outpatient departments and hospitals in Mangalore, 30 patients met the inclusion criteria; the participants included both males and females. The research comprised all patients who were diagnosed with persistent Bell's palsy with synkinesis and referred by otolaryngologists and neurologists. All participants were told of the study's goal and given the opportunity to provide their permission. A standardized instrument, the Synkinesis Assessment Questionnaire, was used to evaluate each participant.

METHOD OF COLLECTION OF DATA

Sampling Technique: Simple sampling technique.

INCLUSION CRITERIA:

- Patients in the age group of 15-65 years were included in the study.
- Patients having obvious signs of synkinesis which were confirmed by SAQ, i.e. chronic cases.
- Patients diagnosed with chronic Bell's palsy
- Those who can follow instructions without any difficulty in understanding.

EXCLUSION CRITERIA:

- Subjects with age group below 15 & above 65 years
- UMN lesion
- Neurotmesis
- Any previous facial trauma
- Psychiatric illness
- Skin infection & open wounds
- Hypersensitive skin
- Skin Allergy to micropore
- Skin disease affecting the face.

TECHNIQUE OF APPLICATION:

Method: Subjects were divided into 2 groups, 15 in each group.

Pre-intervention SAQ scoring was done and recorded.

GROUP A: Received PNF techniques and Conventional management of Bell's palsy.

GROUP B: Received Conventional management of Bell's palsy only."

PNF training procedure A: (performed by the therapist)

- To help injured muscles contract on their own will, we offer global stretching and resistance to the affected area, then use verbal cues and physical touch to encourage movement.
- In order to enhance its contractile power, the muscle is first stimulated with ice by applying two or three brief strokes to the skin around it.
- This treatment (A) was administered once a day for half an hour. After that, the patient was instructed to undertake the following exercises at home.

PNF training procedure B: (performed by the patient) Home program

1. Smile without opening the mouth, then use your fingers to resist the movement for 5 seconds.
2. Purse the lips as in whistling, and then apply resistance using the fingers for 5 sec.
3. Lift the angle of the mouth, and then apply then resistance using the fingers for 5 sec.

4. Lower the lower lip, and then apply resistance using the fingers for 5 sec.
5. Strains the chin with the mouth closed and then applies resistance for 5 sec.
6. With the head upright, open the mouth wide, and then apply resistance for 5 sec.
7. After exercise 6, release the resisted movement and then stick out the tongue and hold for 5 sec.
8. Stick the tongue upward to try to touch the tip of the nose and hold for 5 sec.
9. Stick the tongue downward to try to touch the tip of the chin and hold for 5 sec.
10. Stick the tongue to the right and then to the left. When sticking the tongue to the right (left), lower the left (right) shoulder, and hold for 5 sec.”

Each participant was required to do the 10 training activities three times daily (in the morning, evening, and night) for a duration of four weeks, with each item being repeated five times.

The ten steps were clearly shown and explained to each patient. As a biofeedback mode, we had everything perform as we saw it in the mirror.³

This strategy (B) required a total of thirty minutes each day, broken down into three 10-minute sessions.

So, each day, you'll need an hour to complete both PNF methods A and B.

Conventional Management Includes:

- Facial Massage (15 to 20 min.)
- Electrical stimulation in the form of interrupted direct current (I.D.C.) and not faradic current to the affected side of face. (15 to 20 min.)
- Taping technique to the affected side of face”

With three sessions per day—morning, evening, and night—the therapist would massage the patient's face for fifteen to

twenty minutes. After that, the patient would self-massage in the evening and at night while watching in the mirror, for a total of forty-five to sixty minutes.

All of the muscles were electrically stimulated; at least thirty I.D.C. stimulations were administered to each muscle. It lasted for fifteen to twenty minutes and was done only once during the morning session. As there were three sessions each day (morning, evening, and night), this amounted to 45 to 60 minutes daily.

The patient was instructed to wear the tape for 24 hours following each day's face massage and ES treatment. (The nightly and evening massages were performed over the already placed tape.) Consequently, the total time spent on conventional care was 1 hour and twenty minutes.

Combined daily time commitment for conventional management and PNF workouts was two hours and twenty minutes.

At the end of the fourth week, participants were given and reported the post-intervention SAQ.

Method of administering Synkinesis

Assessment Questionnaire: A straightforward, patient-graded tool for accurately gauging face synkinesis, the SAQ is very easy to give. In a hectic clinical environment, it is simple and inexpensive to administer, and it provides a great way to monitor the recurrence of synkinesis symptoms.¹ The SAQ consists of nine components in total. A scale from 1 to 5 is used to score each item. Higher scores indicate greater synkinesis when the total score is transformed to a scale from 0 to 100. We had each patient fill out the SAQ and record their results accordingly.

Outcome Measures

Facial synkinesis was measured using the Synkinesis Assessment Questionnaire.

Fig.1: ADMINISTERING SYNKINESIS ASSESSMENT QUESTIONNAIRE IN PATIENT WITH BELL'S PALSY SYNKINESIS.



Fig.2: MIRROR BIOFEEDBACK FOR PERFORMING PNF EXERCISES



Fig.3: SUBJECT PRESENTING FEATURES OF LMN FACIAL PALSY, RIGHT SIDE



Fig: DEMONSTRATING FACIAL MASSAGE AND PNF EXERCISES



STATISTICAL ANALYSIS

- In order to determine the level of synkinesis from the SAQ scores obtained at baseline and at the end of the fourth week in patients with Bell's palsy, statistical analysis was performed using the student t-test for across groups and the paired t-test for within groups.
- P value < 0.05 was taken as the level of significance.

Statistical software: Microsoft Word and Excel were used to create tables and graphs, while SPSS (Software Package for Social Science) was employed for data analysis.

Within Group Analysis:

- Group A and Group B were compared using a student paired t-test to determine the mean and standard deviation of the SAQ scores at the beginning and conclusion of the fourth week.

A p-value at the 0.05 threshold of significance was used for statistical testing.

Between Group Analysis:

- Group A and Group B were compared using a student's t-test to determine the mean and standard deviation of the SAQ scores at the beginning and end of the fourth week.

A p-value at the 0.05 threshold of significance was used for statistical testing.

RESULT

The synkinesis of thirty patients, ranging in age from fifteen to sixty-five years old, were evaluated in two groups, one for each sex.”

Table 1: Gender Distribution Table

Gender	Group-I	Group-II
Female	5	6
Male	10	9
Total	15	15

Graph 1:

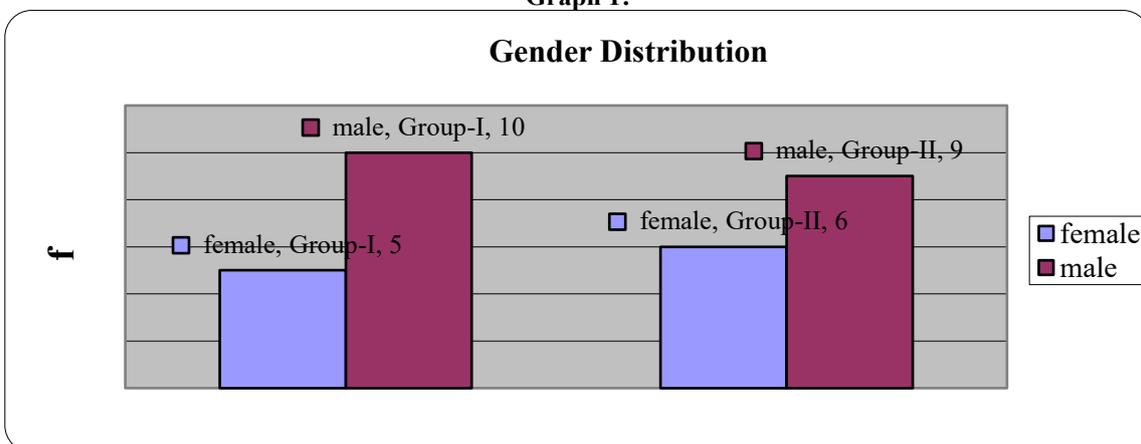


Table 1 & Graph 1: Show the frequency distribution of patients with respect to gender as 5 females and 10 males in Group I and 6 females and 9 males in Group II in a study of 30 patients.

Table 2: Age Distribution Table

Age	Group-I	Group-II
10-20	0	1
20-30	3	3
30-40	1	0
40-50	4	4
50-60	6	5
60-70	1	2
Total	15	15

Graph 2:

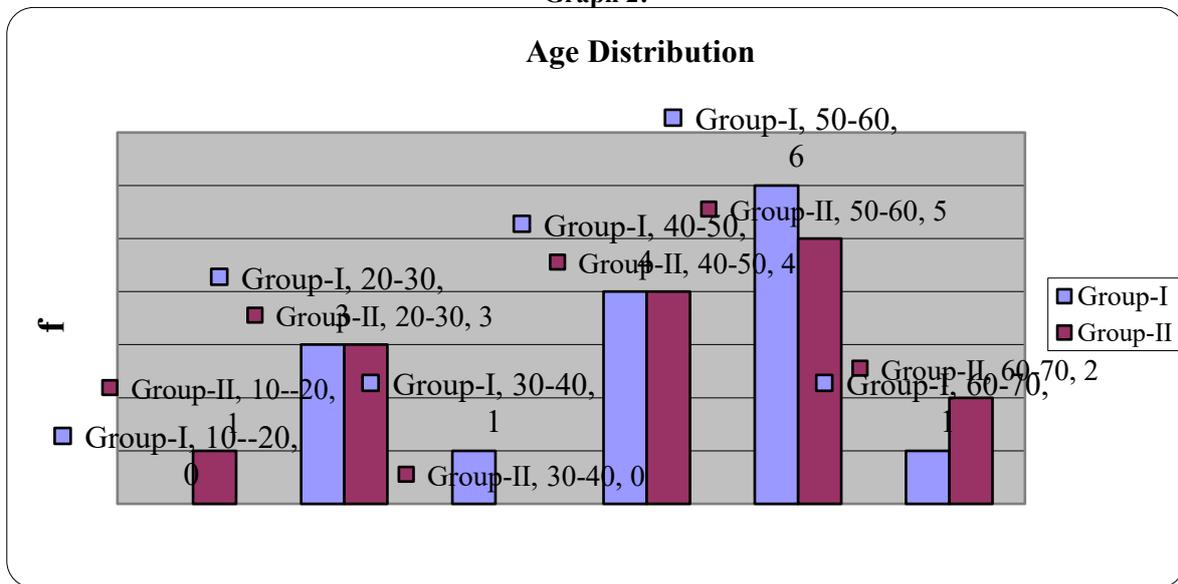


Table 2 & Graph 2: Show the frequency distribution of patients across the age group of 10-20 yrs as 0 & 1, across 20-30 yrs as 3 & 3, across 30-40 as 1 & 0, across 40-50 as 4 & 4, across 50-60 as 6 & 5 and across age gr. of 60-70 as 1 & 2 in Group I and Group II respectively.

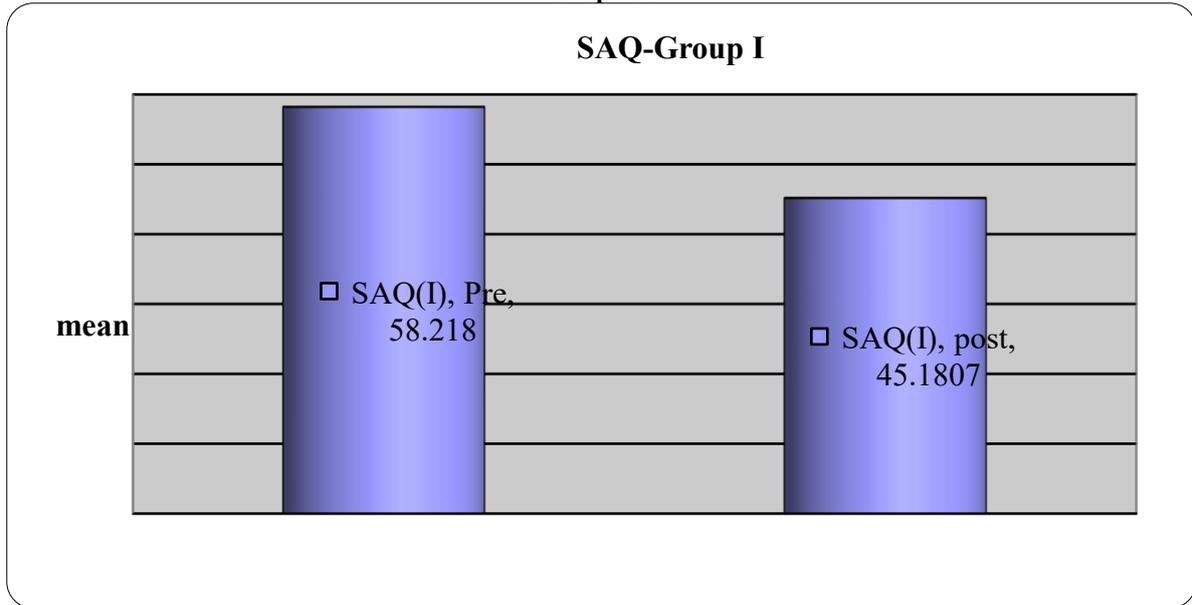
Table 3: Displays the Mean, SD, t-values, p-values & Mean Improvement of SAQ scores in Group I.

Group I—SAQ	Mean	SD
Pre-intervention	58.2180	18.1742
Post-intervention	45.1807	16.7474

	Mean Improvement	t-value	p-value	Result
(Pre)-(Post)	13.037	17.440	0.000	P<0.05 sig

The Pre & Post-intervention Mean values are as 58.2180 & 45.1807 respectively, the Pre & Post-intervention SD values are 18.1742 & 16.7474 respectively, t-value is 17.440 with the result being highly significant with p<0.05 level of significance.

Graph 3:



Graph 3: Shows Mean values of the SAQ taken at baseline and end of 4th week as 58.218 & 45.1807 respectively in Group I.

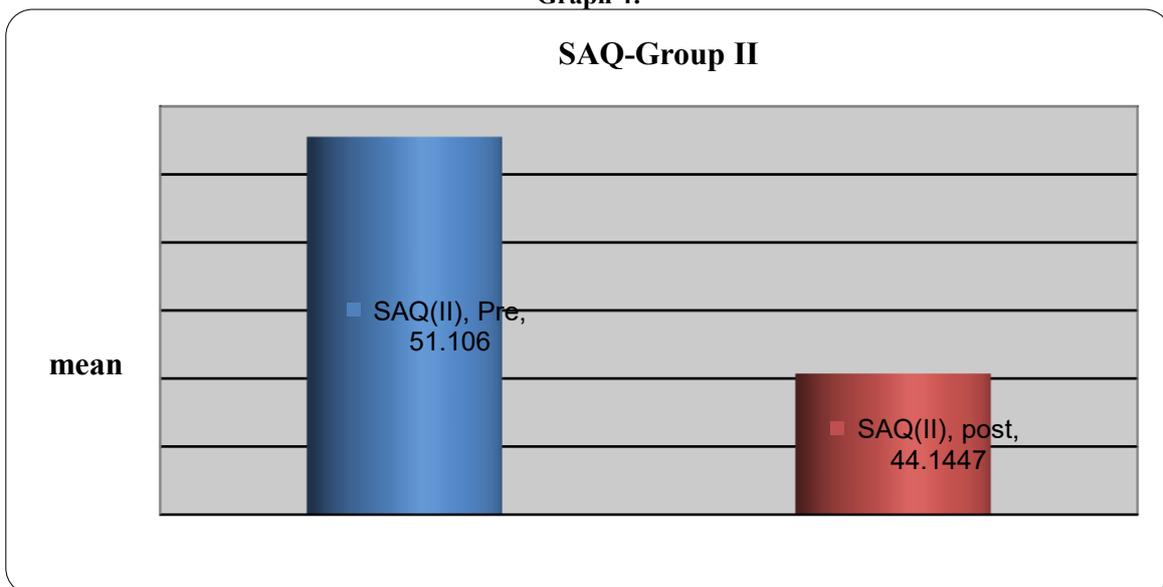
Table 4: Displays the Mean, SD, t-value, p-value & Mean Improvement of SAQ scores in Group I.

Group II—SAQ	Mean	SD
Pre-intervention	51.1060	17.5375
Post-intervention	44.1447	17.7541

	Mean Improvement	t-value	p-value	Result
(Pre)-(Post)	6.961	9.317	0.000	P<0.05 sig

The Pre & Post-intervention Mean values are as 51.1060 & 44.1447 respectively, the Pre & Post-intervention SD values are 17.5375 & 17.7541 respectively, t-value is 9.317 with the result being highly significant with $p < 0.05$ level of significance.

Graph 4:



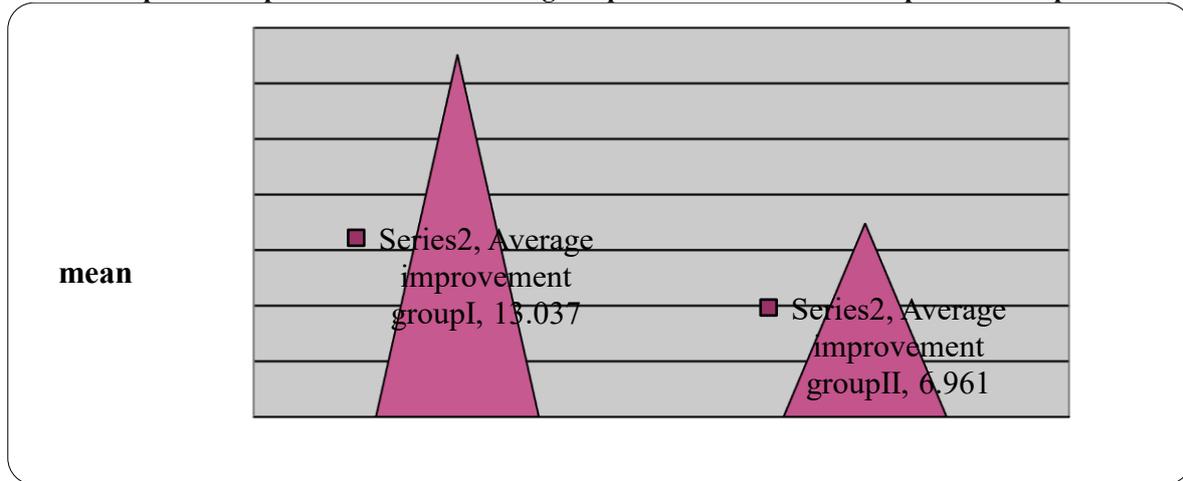
Graph 4: Shows Mean values of the SAQ taken at baseline and end of 4th week as 51.106 & 44.1447 respectively in Group II.

Table 5: Shows Mean Improvement Values in Group I and Group II and their corresponding t-value and p-value with the result being highly significant with p<0.05 level of significance.

	Mean Improvement Group I	Mean Improvement Group II	t-value	p-value	Result
(Pre)-(Post)	13.037	6.961	5.74	0.000	P<0.05 sig

The Mean Improvement values in Group I and Group II are 13.037 & 6.961 respectively with their corresponding t-value as 5.74 with the result being highly significant with p<0.05 level of significance.

Graph 5: Comparison of Mean / Average Improvement values in Group I and Group II.



Graph 5: Represents the Mean Improvement values in Group I and Group II as 13.037 & 6.961 respectively”

DISCUSSION

One of the most upsetting side effects of facial paralysis is face synkinesis. The abnormal regeneration of facial nerve fibres that feed the different facial muscle groups is the pathophysiologic basis of face synkinesis. This outcome becomes apparent when voluntary motions are accompanied by involuntary muscle contractions. The most prevalent consequences of this aberrant regeneration after facial nerve injury are hypertonic contractures and synkinetic motions.

With such a crippling pathophysiologic base, it is difficult to provide a precise course of therapy. Recently, neuromuscular training and botulinum toxin therapy have become the cornerstones of treatment for this disorder. Patients get evident clinical advantages from these therapies, but no one-size-fits-all therapy approach exists. Treatment for synkinesis is cyclical since botulinum toxin effects typically last three

to four months; between treatments, the symptoms of synkinesis become worse.¹ PNF exercises have a long history of successful usage in the treatment of a wide range of musculoskeletal and neuromuscular problems in humans. The goal of proprioceptor neuromuscular function (PNF) training is to improve the neuromuscular response. PNF patterns align with the topographical organisation of the muscles and have a spiraling, diagonal orientation.¹³ To improve muscular decline, discord, and atrophy, it is a standardized, assisted training approach that uses stretching, resisted motions, traction, and approximation.⁹ In this study, researchers looked at the effects of conventional treatment alone on synkinesis in Bell's palsy patients, as well as the benefits of a combination intervention plan including PNF and conventional care. Electrical stimulation, massage, and applying tape to the face's affected area were the traditional methods of treatment.

To further avoid synkinesis and other issues such as contracture forms and lasting effects of unilateral facial paralysis, conventional physiotherapy was administered. The nine-item Synkinesis Assessment Questionnaire (SAQ) was used to quantify synkinesis, which is a condition specific to the face.¹

The results demonstrated the positive impacts of PNF workouts. This was confirmed by comparing the SAQ scores before and after the intervention. Because PNF exercises were also administered, synkinesis was improved via the use of neuromuscular facilitation and biofeedback. The underlying concepts of PNF may provide the justification for this enhancement. Functional anatomy and neurophysiology provide the basis of PNF. You may enhance your strength, flexibility, and range of motion with the use of proprioceptive, cutaneous, and auditory signals. Additionally, it imitates typical motion patterns. The patient should maintain eye contact with the treated area or moving limb. Visual stimulation by glancing into the mirror, reasons that may have contributed to the improvement in face synkinesis include verbal signals for coordinating reflex and voluntary movements and physical touch with suitable pressure for resisting and directing. In addition to this, the ideas like In autogenic inhibition, inhibitory signals provide a slow release of tension by blocking excitatory impulses. In a process known as "reciprocal inhibition," when one muscle contracts, the other relaxes, and vice versa. The patient's learnt patterns of movement, the Stretch Reflex (in which one muscle contracts when the other relaxes), and the use of Quick Stretch (which permits more muscular contraction) may have all played a role in PNF's beneficial effects on improving facial synkinesis.

It was crucial to include mirror-based biofeedback and neuromuscular facilitation into the rehabilitation process in order to make up for the lack of facial muscle spindles, either completely or partially.^{15,16,17}

Group A, consisting of 15 subjects, had statistically significant results with a t-value of 17.440 and a p-value of less than 0.05. The mean values before and after the intervention were 58.2180 and 45.1807, respectively. The standard deviation values before and after the intervention were 18.1742 and 16.7474, respectively. The statistical results for Group B show that the mean values before and after the intervention were 51.1060 and 44.1447, respectively. "Prior to the intervention, the standard deviation was 17.5375, and after it, it was 17.7541. With a p-value lower than 0.05 and a t-value of 9.317, the outcome was highly significant. At a $p < 0.05$ threshold of significance, the findings are extremely significant, with t-values of 5.74 for Group I and 13.037 and 6.961 for Group II, respectively. The impact of PNF exercise on the profile of the face was studied by Mari Namura and Mitsuru Motoyoshi. They found that PNF training makes a huge difference in how the mouth and submandibular region look, but that continuing the training is key to avoiding recurrence.¹⁸ The Japanese medical community was first exposed to PNF by Nakajima E, Yanagisawa K, et al., who used it in orofacial and dental treatment to improve the aesthetics of facial expression. They postulated that perioral muscular strengthening (PNF) would enhance face aesthetics by helping patients adjust to the shifting of hard tissues brought about by orthodontic therapy.¹⁹

Now, since PNF significantly affects the sharpness of the mouth and submandibular region, and because it trains the perioral muscles to adapt to alterations in the hard tissues after orthodontic treatment, it may improve facial attractiveness.¹⁸ Here, we focused on Bell's palsy as a model to examine how PNF influences facial synkinesis after LMN lesion. Results from the two treatment methods were quite different, as we found out.

When compared to traditional management techniques alone, statistical studies clearly show that PNF exercises when combined

with conventional management provide better results. In addition to showing that Group A improved compared to Group B, the data also demonstrate a significant improvement in Group A. As a result, PNF is an effective treatment for Bell's palsy synkinesis.

CONCLUSION

- When compared to their baseline values evaluated by the SAQ, individuals with Bell's palsy who exhibited synkinesis (Group A) had a significant improvement in their face synkinesis values at the end of the fourth week, all because of the combination of PNF exercises and conventional care of the condition.
- Group B, which consisted of patients with Bell's palsy and synkinesis, had remarkable improvement in their face synkinesis values at the end of the fourth week as compared to their baseline values assessed by the SAQ, all because of the traditional treatment for the condition.
- Combining conventional therapy with PNF exercises resulted in a significantly more substantial improvement in face synkinesis values at the end of the fourth week for individuals with Bell's palsy synkinesis compared to conventional care alone.

Declaration by Authors

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Conflict of Interest: The authors declare no conflict of interest.

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