

## Effect of Neuromuscular Facilitation Training in Pediatric Facial Palsy

Vijay Kumar Gupta<sup>1</sup>, Jagroop Singh<sup>1\*</sup>, Dr. Sukhraj Kaur<sup>2</sup> Manjinder Kaur<sup>3</sup>

<sup>1</sup> Ph.D Research Scholar, Desh Bhagat University, Mandi Gobindgarh, Punjab, India

<sup>2</sup> Professor and Head, Department of Biochemistry, Government Medical College Amritsar, Punjab, India

<sup>3</sup> Nursing Officer, Guru Nanak Dev Hospital Amritsar, Punjab, India

Corresponding author : Jagroop Singh\*

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### ABSTRACT

**Background:** Facial palsy in paediatrics is very rare, and it doesn't have any identifiable cause. Usually, exercises, massage, and taping are suggested. Since it is one of the rarest conditions and there is no optimal treatment recommended. The purpose of the study is to identify the effect of neuromuscular facilitation training in paediatric facial palsy.

**Methodology:** This is a Case series done with five children with facial palsy, and all underwent neuromuscular facilitation training and video-guided exercises. All patients were managed with conventional physiotherapy which includes, massage and facial movements. The conventional treatment was given for five days. Since the lockdown was proposed due to Covid 19, the parents and the children were called and taught neuromuscular facilitation training to the parents; along with that, and a handout was also given to them. The video call was made to the parent by the therapist and did exercises video-assisted. The initial two weeks it was video-guided, and later, the parents were doing the exercises, and the therapist monitored them through video. The improvement was measured using the House-Brackmann scale. **Result;** Three males and two female children were involved with an average of 6.2 years, and the duration of the symptoms is five days on average. On application of the neuromuscular facilitation training, a significant difference was obtained, and all the children become normal at 7th week. **Conclusion:** Neuromuscular facilitation training plays an essential role in stimulating the weakened facial muscles by the principle of irradiation. It shows better than traditional therapy in paediatric facial palsy.

**Keywords :** Facial Palsy, Pediatrics, Neuromuscular Training, House-Brackmann Scale, Exercises.

## I. INTRODUCTION

Facial palsy is the seventh nerve palsy acknowledged since olden times by Romans, Greeks, Egyptians, and various other native cultures (1). Usually, facial nerve paralysis is idiopathic, and its annual incidence is about 15—30 cases per 1 00 000 population around the globe. (2) Facial palsy raises significant aesthetic and psychological issues because it expresses emotions by controlling the eyebrows, mouth, nostrils, and speech. (3) Apart from that, facial palsy causes difficulty in eating, speaking, corneal drying, altered taste, facial muscle spasm, and synkinesis.

Facial paralysis in children is very uncommon compared to adults, and the improvements are much better in children than in adults. (4) Diagnosing pediatric facial palsy requires a detailed history collection. It is mandatory to investigate the onset of the paralysis and the improvements (5). The prognosis of pediatric facial palsy is similar to that of adults with facial paralysis. However, the assessment of the forecast is challenging. Every child got full functional recovery in the previous literatures cited. Evaluation of facial paralysis is by the house brackman's index in adults, which is one of the best outcome measures. Still, it does not possess high validity in pediatric facial palsy (6).

Standard management recommended for this is usually oral corticosteroids, preferably within three days from onset. There is no harmony in managing paediatric facial palsy, and it was typically managed with physiotherapy and multivitamins. (7) Physiotherapy management for an adult includes exercises, electrical stimulation, taping, massage, mime therapy, and PNF (8). Studies have identified that neuromuscular facilitation training (NMFT) has more effective than no exercises. (9) Since there are no clinical guidelines available to manage paediatric facial paralysis, and it can't be managed like adults. Electrical stimulation is not strongly advised in paediatric facial palsy. The main line of the management focuses only on exercises and massage.

Since the exercises are recommended in the management this study tries to identify the effect of neuromuscular facilitation training. So, this study was aimed to investigate the effect of neuromuscular facilitation training (NMFT) on pediatric facial palsy.

## II. METHODOLOGY

The case series includes paediatric patients from March 2020 to June 2021. Five paediatrics were referred from the department of paediatrics to the outpatient department of physiotherapy with facial paralysis and recommended for exercises. Initially, a 7-year-old child has been referred to physiotherapy with complaints of facial weakness, and a comprehensive assessment and treatment protocol was developed. Treatment planned were Exercises, Massage, and Taping. Home programme was advised, which includes balloon blowing, straw sucking, and facial massage. The child was treated at the department for five days, and the lockdown was enforced in March 2020. We invited the child and the parent and taught NMFT to the face muscles, and also supervised how they are doing it. After two days telephonic call was made by the therapist to assist in the NMFT exercises. The parents have requested to do the exercises while the therapist do video guided. Following two weeks of the video guided therapy on alternate days the parent was comfortable in applying the NMFT and the therapist did a video supervision. Subsequently, alternate days of video-guided exercises were conducted and identified his progress. Within ten days, another child with the age of 6 years, came with idiopathic facial paralysis, and the same protocol was followed along with video-guided exercises.

Neuromuscular facilitation training includes relaxation techniques, was used to relax the facial muscles. NMFT starts with asking the child to lift eyebrows, look up and wrinkle the forehead against the resistance of the parent using their fingertips to

stimulate frontalis, Ask the child to frown, the resistance applied just above the lateral direction to facilitate corrugator Supercilli, ask the child to close the eyelid against resistance to stimulate orbicularis oculi, Ask the child to wrinkle the nose against resistance diagonally down to stimulate procerus, ask the patient to purse the lips and say prunes against resistance to encourage orbicularis oris and ask the child to wrinkle the chin to stimulate mentalis. All the exercises were done in front of a mirror, exercises were done only for 5—10 repetitions to avoid muscle fatigue, and the whole session is for 40 mins twice daily (10).

Every month one new paediatric facial palsy visited the department, and the same protocol was followed. Four cases were treated from March 2020 to July 2020, and in May 2021. We follow the same video-guided exercises. Following the activities, all the child's parents were requested to take a video of the child. This video was used to assess the child's progress, and the progression is calculated using The House-Brackmann Scale.

**III. RESULT**

In this case series, three male children and two female children were scanned with a mean age of 6.2, and the duration of the symptoms is five days. The questionnaire developed using a Likert scale on the treatment progression, treatment satisfaction, and treatment methods. All the children and their parents were delighted with all the components. House-Brackmann scale was used to investigate the improvement, and still, as the participants are significantly fewer, the values are not quantifiable. Table I shows the clinical analysis of the onset of recovery and the duration of rehab. It has demonstrated that an average of 6 weeks required for complete healing.

Table I. Clinical analysis of Facial paralysis

Age in years	Sex	Grade of presentation (House Brackmann) & Side of presentation	Recovery onset in days	Duration of complete recovery in weeks
7	Male	IV (Right side)	Day 8	7 <sup>th</sup> week
6	Female	III (Left side)	Day 6	6 <sup>th</sup> week
5	Male	III (Right side)	Day 7	5 <sup>th</sup> week
6	Male	IV (Left side)	Day 5	7 <sup>th</sup> week
7	Female	III (Left side)	Day 8	5 <sup>th</sup> week

**IV. DISCUSSION**

The purpose of the case series is to evaluate the effect of neuromuscular facilitation training on paediatric facial paralysis. Similar studies on facial palsy show that around 89.3 % of children with facial palsy were recovered completely (11), and the recovery happened with 90% (3). Exercise is the most commonly used method for the rehabilitation of facial palsy (12). Physiotherapy with neuromuscular retraining is much helpful in managing facial nerve palsy (13). NMFT benefits in correct movement patterns and improves facial movements and exercise programs (14). NMFT helps in stimulating the weakened facial muscles by the principle of irradiation, and it shows better than traditional therapy in paediatric facial palsy (13). NMFT affects the cutaneous muscle distributed over the face, contributing to early improvements (15).

NMFT emphasis the accuracy of the facial movement patterns and improves the isolated muscle control. It prevents the exercises which promote mass contraction of the muscles related to more than one facial expressions (17). Similar studies showed that participants who perform self exercises at home show more significant improvement (16,17), and analysis was done by Beursken et al. also showed a considerable improvement even in chronic cases. He concluded that structural home exercises produce many benefits (18).

The major limitation of this study is a case series design, and this study has done with five children. More participants are needed to explore more on this treatment perspectives. The effectiveness of the neuromuscular exercises was not quantifiable since the smaller sample.

## V. CONCLUSION

The prognosis of all the children has been good, and all have a higher recovery rate. This study concludes that the application of neuromuscular exercises and frequent video-guided exercises aids in the recovery of paediatric facial paralysis.

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**CONFLICT OF INTEREST:** None declared.

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