International Journal of Health Sciences and Research
Vol.13; Issue: 11; November 2023
Website: www.ijhsr.org
Original Research Article *ISSN: 2249-9571*

To Study the Effectiveness of Roods Approach Versus Oromotor Stimulation Exercise on Drooling Cerebral Palsy Children - A Randomized Control Trial

Dr. Ashwini Malokar[1], Dr. Chitra Mridha[2], Dr. Krutika Kale[3]

[1]MPTH, [2]Professor,[3]MPTH,
Department of Neuro Sciences, Dr. Ulhas Patil College of Physiotherapy, Jalgaon

Corresponding Author: Dr. Ashwini Malokar

DOI: https://doi.org/10.52403/ijhsr.20231142

ABSTRACT

Aim: To see the effectiveness of roods approach versus Oromotor stimulation exercise on drooling cerebral palsy children.
Background: In several forms of cerebral palsy (CP), head and neck involvement may be manifested with varying patterns of abnormal function. Drooling of saliva is one such condition seen in CP.
Procedure: This randomised control trial was done on 34 cerebral palsy children. Subjects selected according to the inclusion and exclusion criteria. The subjects divided into group A and group B. Procedure explained to the subject's parents and assessed by using drooling impact scale. Then group A treated with roods approach and group B treated with Oromotor stimulation exercises. The subjects were allocated by chit method and the allocator was blinded about the exercises. Also, the groups were blinded about each other's protocol. Then again, the subjects were reassessed by using drooling impact scale and were compared.
Results: The results of study showed significant overall decrease in symptoms of drooling in group A (roods approach) as well as in group B (OME) within group changes in term of severity, frequency and impact of drooling. There was significant change in drooling levels in group A throughout the therapy session with P value was <0.0001. Statically results showed that drooling levels decreased in group B after Oromotor exercises and roods approach and P value was <0.0001. But between these two groups, group B showed better results than group A with the p value of 0.0005.
Conclusion: Oro-motor exercises were more effective management option for drooling severity and impact on CP children life than rood's approach.

Keywords: Cerebral Palsy (CP), roods, Oromotor exercises

INTRODUCTION

Cerebral Palsy describes a group of permanent disorders of the development of movement and posture, causing activity limitation, that are attributed to non-progressive disturbances that occurred in the developing fatal or infant brain. The motor disorders of cerebral palsy often accompanied by disturbances of sensation, perception, cognition, communication, and behaviour, by epilepsy, and by secondary musculoskeletal problems.[1]

Drooling of saliva is one such condition seen in CP. The prevalence of drooling has been estimated at between 12% and 58%. Although drooling may, in rare cases, persist in a normal child, it is considered abnormal beyond the age of 4 years.[2]

The three pairs of major salivary glands (parotid, submandibular and sublingual) and

the hundreds of minor salivary glands create and emit saliva, which is watery liquid that is largely water but also includes electrolytes, mucus, antibacterial compounds, and other enzymes. Saliva production ranges from 0.75 to 1.5 litres per day in healthy individuals. The large salivary glands create at least 90% of the daily saliva whereas the minor salivary glands produce about 10%.[3]

Saliva, produced in the salivary glands, is a necessary and positive part. It keeps our mouths comfortably moist, cleans our oral cavity, lubricates food in preparation for swallowing, and facilitates digestion. Swallowing in an effective and efficient manner removes saliva periodically from the oral cavity for most people. The majority of children without disabilities have ceased unintentionally losing saliva from their mouth by age four. This difficulty may result in difficulties with socialization. Parents worry that children will have fewer social interactions or socially close encounters because of the unsightly, unpleasant swelling saliva that falls to their clothing, books paper, and electronic devices.

The stages of Saliva Swallow

The saliva collecting swallow is comprised of four distinct stages and a series of consecutive movements.

- In the oral preparation stage, saliva is made ready by the tongue, which gathers it into the tongue bowl.
- During the oral stage, saliva is sucked over the tongue and propelled by the tongue to the posterior pharyngeal wall.
- The pharyngeal stage begins as the saliva bolus contacts the posterior pharyngeal wall, activating an involuntary swallow reflex. The velum elevates, the pharynx has a peristaltic wave caused by the pharyngeal constrictors, the larynx closes both true and false vocal folds, the epiglottis moves to cover the trachea, the laryngeal elevates and draws forward, and the oropharyngeal sphincter opens.
- During the esophageal stage, the saliva bolus moves to the stomach.

The oral stage and the pharyngeal stage take approximately one to two seconds (Stevenson and Allaire,1996).

The problem in children with CP as defined by Lesparget et al (1993) occurs during the oral stage of swallow when the initial suction stage is inefficient and the tongue lacks a bowl or cup-like shape. Difficulty also arises in the propulsion stage where timing between suction and propulsion is delayed beyond one second. These three problems – inefficient initial suction, lack of bowl in the tongue, and delayed propulsion are seen in most children who drool.[4]

Drooling is present in various other conditions like down's syndrome, autism but according to Amitha M. Hegde et al it is concluded that the incidence of drooling in children with CP was high, with almost half the study population suffering from some form of drooling. Drooling of saliva may regress spontaneously, but speech therapy/physiotherapy and the ability to control mouth closure are useful in the ability of individuals with CP to overcome drooling. The severity of drooling reduces with age, suggesting that drooling reduces with a maturation of the oral musculature.[2]

Roods facilitatory techniques normalize oral motor patterns. It uses different ways like fast brushing, tapping, stroking and vibration which are intended to improve jaw stability, mouth closure, increase in tongue mobility, strength, sensory awareness and decrease in hypersensitivity. The exercises are targeted to decrease drooling or loss of saliva out of oral cavity. (Becker, 2002).

This technique helps to improve oral motor control, sensory awareness and frequency of swallowing improvement in drooling patients with the both hyper and hypo tonic muscles using this technique. This technique improves muscle tone and saliva control.

There are three main categories of OME generally used in clinical practice: active exercises, passive exercises, and sensory applications.[5] Active exercises include, but are not limited to, active range of motion, stretching, and strength training. These exercises are used to increase strength,

endurance, and power through the recruitment of additional motor units as muscle fibres are enlarged.[6] Various forms of stretching affect muscle tone by manipulating the muscle spindles either to inhibit or elicit a stretch reflex. By inhibiting this reflex through slow stretching, muscle tone may be reduced. By inducing a stretch reflex through quick stretch, tone is increased.[7]

Passive exercises may include massage, stroking, stimulation, tapping, vibration, and passive range of motion exercises in which the movement is provided with the assistance of or entirely through the clinician or caregiver with little action from the individual receiving treatment. These procedures are applied to provide sensory input, improve circulation, and preserve or enhance joint flexibility. It has been theorized that some of these techniques normalize feeding patterns by reducing abnormal oral reflexes, facilitating normal muscle tone, or desensitizing the oral region. Some (e.g., cold) may be used to enhance sensory awareness to initiate a swallow response.[8]

Drooling can cause distress and affliction not only in children, but also in parents and caregivers, due to bad smelling, irritated or macerated facial skin, orofacial infections, dehydration, speech and masticatory problems. The probability of aspiration pneumonia and chest infections are higher. Unfortunately, all these problems can lead to social isolation.[9]

Complications of drooling range from mild embarrassment and discomfort for the intellectually intact patient with minimal drooling to gross emotional and physical impairment for the severely affected individual. Drooling produces an unhygienic condition that may be associated with a disagreeable Odor. Drooling patients may soil their clothes, toys and books, which may interfere with both play and school work. The frequent changes of clothing may be a burden for those involved in the care of these children. Drooling is cosmetically unappealing and may lead to social isolation and rejection. This may have a profound psychological impact on the child. Drooling facilitates the transmission of infection. Chronic drooling may lead to perioral maceration, and a loss of fluids and electrolytes. Rarely, it may be so severe as to cause dehydration [10]. Drooling can also impair articulation.[11]

The Drooling Impact Scale has been devised to evaluate longitudinal changes in the impact of drooling in children with neurological disorders. It was specifically designed to quantify the short- to medium-term treatment benefits of saliva-control interventions. It was scored on a 10-point scale to optimize their responsiveness. This has been useful for discriminating between children in terms of the severity and frequency of drooling. Effect sizes were interpreted according to criteria set by Cohen. Potential items for this scale were devised using information gained from parents and carers. This scale focused on questions about the frequency and severity of drooling and the number of bib or clothing changes needed each day.[12]

In few studies they have done only Oromotor stimulation and its impact on drooling and in some studies, they have done effect of exercises on drooling. Still there are paucity of research related to this so therefore in this study we are going to study the roods approach versus Oromotor exercises on drooling in children with cerebral palsy.

MATERIALS & METHODS

MATERIALS

Pen, Paper, Informed consent form, drooling impact scale, ice, brush

METHODOLOGY

- Sample size- 28
- Study Design – randomised control trial
- Study Type – comparative study
- Sampling Method – Simple random sampling using chit method
- Study population – cerebral palsy children
- Study setting – physiotherapy outpatient department and multispeciality hospitals

Inclusion criteria

1. Diagnosed case of cerebral palsy
2. Both male and female
3. Score of more than 0.2 on drooling impact scale
4. Age between 3 and 8 years.

Exclusion criteria

1. Previous surgical interventions for saliva control
2. Use of drugs that could interfere with saliva secretion (including botulinum toxin).
3. Children with visual, auditory, vestibular or perceptual deficit
4. Other neurological and cardio respiratory conditions like: epilepsy, mental disorder, tetralogy of Fallot.
5. Other conditions like: gum bleeding, tooth abscess
6. Other Oromotor pathological conditions

Outcome measures

- **Drooling impact scale (ICC = 0.85)[12]**

The scale consists of 10 questions. Effect sizes were interpreted according to criteria set by Cohen. 16 An effect size of 0.2 to 0.49 was interpreted as small, 0.50 to 0.79 as moderate, and 0.80 or greater as large. A standardized response mean was calculated.

PROCEDURE

To conduct the study Ethical clearance was taken from the institutional ethics committee. Inform Consent was Obtained from subject's parents. Screening of participants was done using inclusion and exclusion criteria. The subjects were assessed by drooling impact scale and the score was noted. Randomised control trial study was done on 34 cerebral palsy children. The subjects were divided into group A (n=14) and group B (n=14) by simple random sampling method using chit method. Procedure was explained to the subject's parents and were assessed by using drooling impact scale. Then group A were treated with Roods approach (Brushing, Stroking, Tapping, Icing) and group B were treated with Oromotor stimulation exercises (Tongue mobility exercise, Jaw mobility exercises, Bubble blowing, Candle blowing, Whistle blowing) for 6 days for 4 weeks. In this study the allocator was blinded about the exercises and also, the groups were blinded about each other's protocol. Post assessment by drooling impact scale was taken. The data collected compared and analysed statistically.

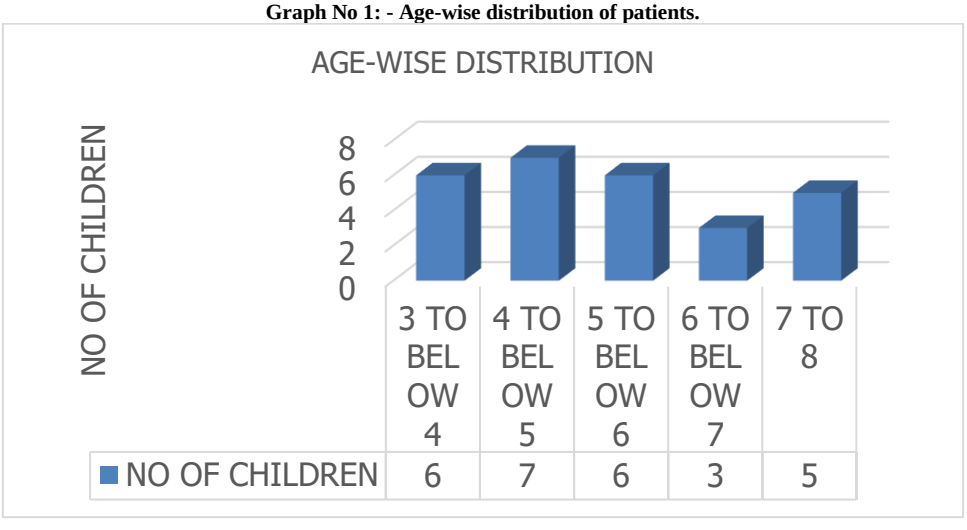
DATA ANALYSIS

Data was entered in excel spreadsheet, tabulated and subjected to statistical analysis. Data was analysed by using Graph pad Instat,

Table No 1: - Age-wise distribution of patients.

Age distribution	No of subjects
3 to below 4	6
4 to below 5	7
5 to below 6	6
6 to below 7	3
7 to 8	5

Graph No 1: - Age-wise distribution of patients.

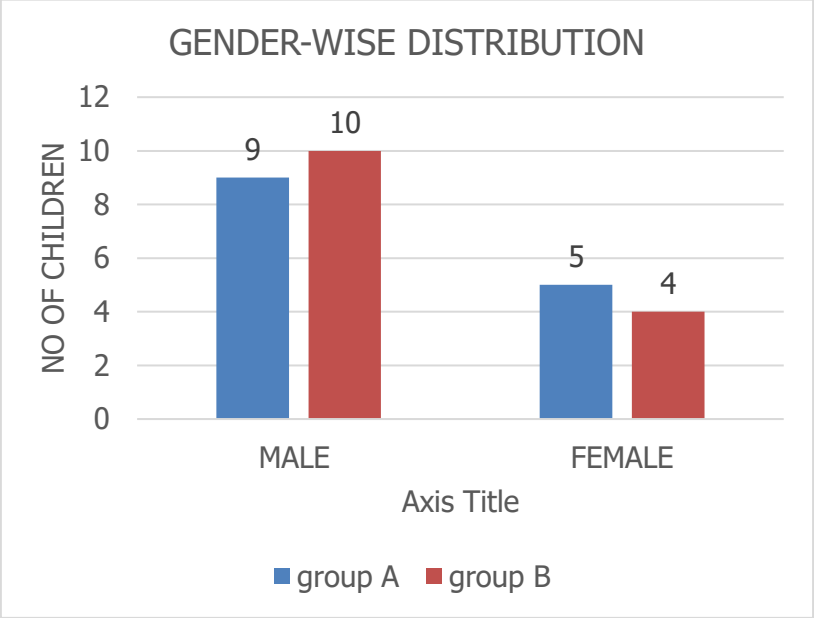


Comment: - The table and graph no 1 show age-wise distribution of male and female of which 28 children were included in this study from age 3 to age 8. Out of which 6 of them were between 3 to < 4 years of age, 7 of them were between 4 to < 5 years of age, 8 of them were between 5 to < 6 years of age, 3 of them were between 6 to < 7 years of age and 5 of them were between 7 to < 8 years of age.

Table no 2: - Gender wise distribution of subjects

Gender distribution	Group A	Group B
Male	9	10
Female	5	4

Graph No 2: - Gender wise distribution of subjects

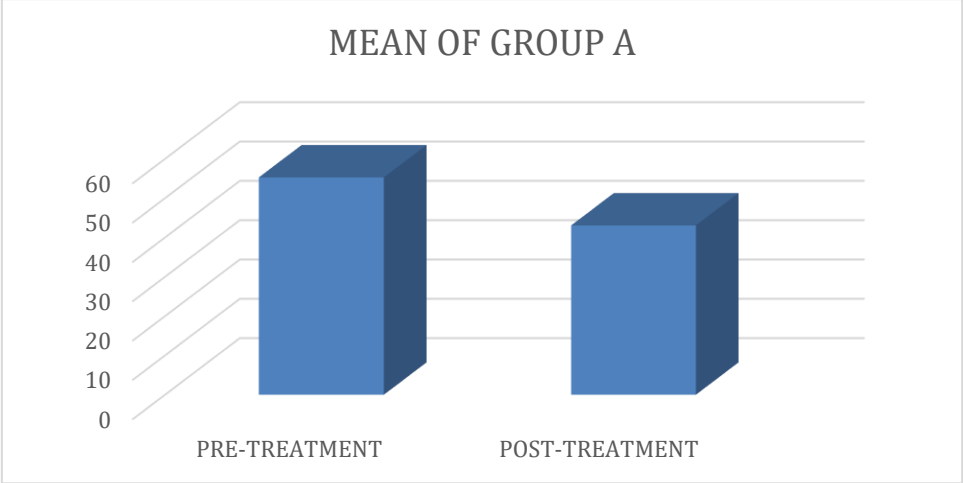


Comment: - In this study, in group A there were 9 male 5 female and in group B there were 10 male and 4 female.

Table no 3: - Comparison of mean between pre - treatment & post treatment for drooling impact scale in group A

Drooling impact (Group A)	mean ± SD	MEAN DIFFERENCE	t-value	P – Value	Significance
PRE-TREATMENT	55.28 ± 9.39	12.21	14.54	<0.0001	Extremely significant
POST-TREATMENT	43.07 ± 8.940				

Graph no 3: - Comparison of mean between pre - treatment & post treatment for drooling impact scale in group A

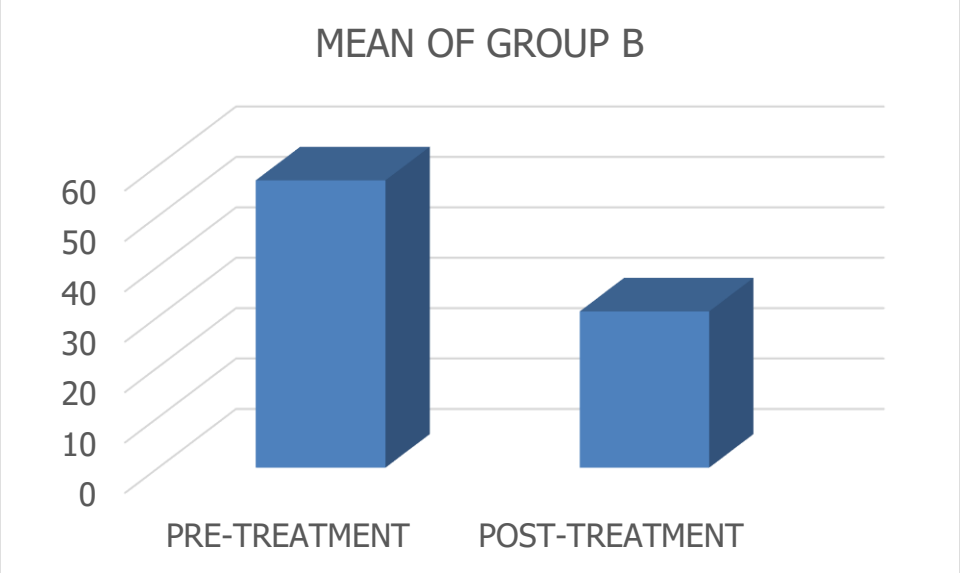


Comment: Values are Mean ± Standard deviation. P-values are obtained using paired t- test, after confirming the underlying normality assumption. P-value <0.0001 which is less than 0.05 which is considered as extremely significant.

Table no 4: - Comparison of mean between pre - treatment & post treatment for drooling impact scale in group B

Drooling Impact (Group A)	Mean ± SD	Mean Difference	t-value	p-value	Significance
PRE-TREATMENT	57.00 ± 6.49	25.92	20.57	<0.0001	Extremely Significant
POST-TREATMENT	31.07 ± 5.75				

Graph no 4: - Comparison of mean between pre - treatment & post treatment for drooling impact scale in group B

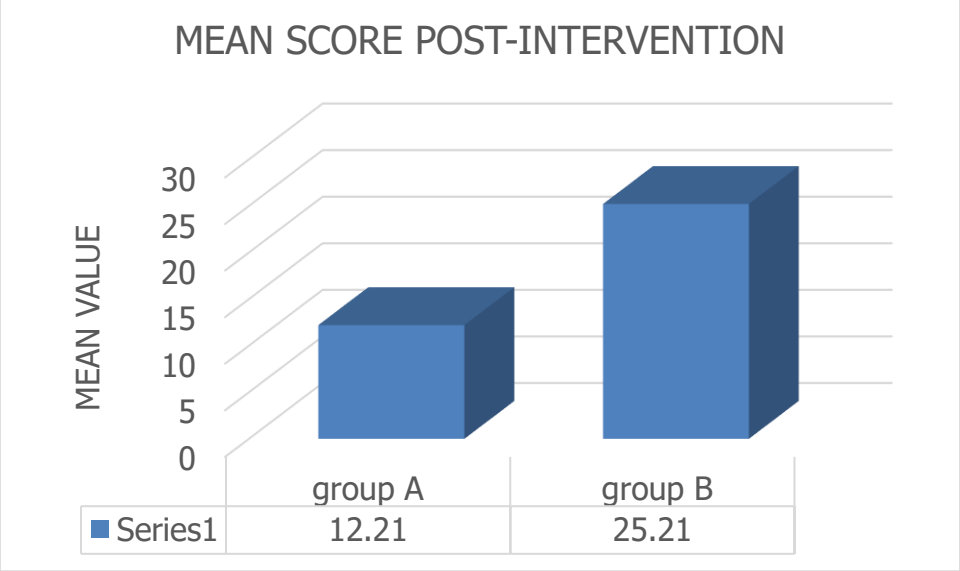


Comment: Values are Mean ± Standard deviation. P-values are obtained using paired t- test, after confirming the underlying normality assumption. P-value <0.0001 which is less than 0.05 which is considered as extremely significant.

Table no 5: Comparison of mean between post - treatment of group A & post treatment for drooling impact scale in group B

Drooling impact	Post intervention group A (mean ± SD)	Post intervention group B(mean ± SD)	P – Value	Significance
	12.21 ± 3.1	25.21 ± 4.70	<0.0001	Very significant

Graph no 5: - Comparison of mean between pre - treatment & post treatment for drooling impact scale in group B



Comment: Values are Mean ± Standard deviation. P-values are obtained using unpaired t- test, after confirming the underlying normality assumption. P-value <0.0005 which is less than 0.05 which is considered as extremely significant

RESULT

Total 28 cerebral palsy children were included in this study. Out of which 14 children were included in group A and 14 children were included in group B. In group A there was significant decrease in drooling with a p value of 0.0001. In group B there was significant decrease in drooling in the cerebral palsy children with P value of 0.001. After comparing the results of group, A and B it was found that group B showed more significant results than group A with a p value of 0.0005.

DISCUSSION

Cerebral Palsy describes a group of permanent disorders of the development of movement and posture, causing activity limitation, that are attributed to non-progressive disturbances that occurred in the developing fatal or infant brain. The motor disorders of cerebral palsy often accompanied by disturbances of sensation, perception, cognition, communication, and behaviour, by epilepsy, and by secondary musculoskeletal problems.[1]

In several forms of cerebral palsy (CP), head and neck involvement may be manifested with varying patterns of abnormal function. Drooling of saliva is one such condition seen in CP. The prevalence of drooling has been estimated at between 12% and 58%.2 Although drooling may, in rare cases, persist in a normal child, it is considered abnormal beyond the age of 4 years.[13]

This study aims to compare the effect of roods approach and Oromotor exercises to reduce drooling in cerebral palsy kids.

In this study group A had given roods approach to reduce drooling in cerebral palsy kids and group B had given Oromotor exercises along with roods approach to reduce drooling in cerebral palsy kids. In group A there is decrease in drooling with a p value of 0.0001. In group B there is significant decrease in drooling in the cerebral palsy children with P value of 0.0001. The results were found that group B shows more significant results than group A. So Oromotor exercises are more effective than roods approach to reduce drooling.

According to the roods' principle

1. Functional divisions of the nervous system
2. Combined effects of the primitive reflexes
3. Developmental sequence patterns

Functional divisions of the nervous system, the nervous system consists of the autonomic and the voluntary systems. The autonomic system is further divided into the sympathetic system, which functions to protect the individual, and the parasympathetic system which functions to maintain metabolism. When activated, the sympathetic system prepares the body for a "fight or flight" reaction. A general state of arousal incurs, with increased tone in the voluntary musculature, increased breathing and heart rate, and inhibition of the parasympathetic system. Conversely, the activated parasympathetic system produces relaxation of the voluntary musculature and stimulation of metabolic functions including increased sucking and swallowing. Schwindt (1976) 8, suggested that the parasympathetic system is the one which should be aroused in the treatment of pre-feeding problems, since it activates sucking and swallowing.[14]

The study by Harris and Dignam[15] who applied Oromotor exercises for 9 months, including sucking games, games of blowing out candles, blowing up balloons, and blowing trumpets showed improvement was 28%. This study shows the significance of Oromotor exercises.

The study by Fatima et al. who applied oral motor exercises over a period of 6 months, including techniques for sensory stimulation; face massage, tapping, stroking, brushing, and ice stimulation showed a significant reduction in drooling $p < 0.05$.[16]

The study by Iammatteo et al. who applied oral facilitation techniques for 12 days, including gentle stroking and firm pressure around lips and inside the mouth in the context of play showed decreasing drooling and study by Domaracki and Sisson who applied hourly treatment of oral motor stimulation, then vibration for 10 s, oral motor stimulation, including an NUK device which was used to stimulate the child's hard palate, brush the upper and lower gums, massage the centre and both sides of the tongue, and make strokes to the inside of each cheek, showed decreasing drooling by oral motor stimulation, but when vibration was applied, it did not provide any additional therapeutic effects. This variation did not allow us to make a consistent conclusion about the best type and duration of OME to improve feeding.[17]

CONCLUSION

It is concluded that Oromotor exercises are more effective than roods approach to drooling in cerebral palsy children.

Declaration by Authors

Ethical Approval: Study was approved by Institutional Ethical Committee of DUPCOP, Jalgaon

Acknowledgement: None

Source of Funding: None

Conflict of Interest: None

REFERENCES

1. Peter April Rosenbaum et al 2006 A report: the definition and classification of Cerebral Palsy, UCP Research and Washington, Educational Foundation; Suite DC, USA 20036
2. Amitha M. Hegde et al. 2009 Drooling of saliva in children with cerebral palsy—etiology, prevalence, and relationship to salivary flow rate in an Indian population Spec Care Dentist Volume 29 Issued 4 Page -163-8
3. Ganesh Bavikatte et al 2012 Management of Drooling of saliva, British journal of Medical Practitioners Volume 5, Page 1.
4. Janet H. Allaire et al 2001 Young Children and Drooling the Neuro Developmental Treatment Association Volume 8 Page5
5. Clark HM. Et al 2003 Neuromuscular treatments for speech and swallowing: a tutorial. Am J Speech Lang Pathol Vol 12 Page 400–15.
6. Burkhead LM et al 2007 Strength-training exercise in dysphagia rehabilitation: principles, procedures, and directions for future research. Dysphagia Vol 2 Page 251–65.
7. Raj Kumar et al 2015 Role of Oromotor Therapy in Drooling Child Attending E.N.T Department IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) Volume 14, Issue 8 Ver. VI Page 09-13.
8. Ottenbacher K et al 1981 The effectiveness of a program of oral sensory-motor therapy with the severely and profoundly developmentally disabled. Occup Ther J Res Vol 1 Page 147–60.
9. Van der Burg et al 2006 Social interaction and self-esteem of children with cerebral palsy after treatment for severe drooling. Eur J Pediatr. Vol 165 Issued 1 Page 37-41.
10. Bailey CM et al 1985 Treatment of the drooling child by submandibular duct transposition. J Laryngol Otol Vol 99 Page 1111-7.
11. Harris SR et al 1987 Drooling and its management in cerebral palsy. Dev Med Child Neurol Vol 29 Page 807-11.
12. Susan M Reid et al 2009 The Drooling Impact Scale: a measure of the impact of drooling in children with developmental disabilities Developmental Medicine and Child Neurology Volume 52 Issue 2 Pages 23-28.
13. Rosenbaum P et al.2007 A report: the definition and classification of cerebral palsy April 2006. Dev Med Child Neurol Suppl. Vol 109 Page 8-14.
14. Cecile Loiselle et al 2016 Rood -based Program for Decreasing Pre-feeding Behaviours PENNSYLVANIS STATE UNIV.
15. Susan Harris et al 1987 Drooling and its management in Cerebral Palsy Developmental Medicine and Child Neurology Vol 29 Issue 6.
16. Fatima A et al 2019 Drooling reduction with oral motor exercises among cerebral palsied children at the National Institute of Rehabilitation Medicine: a quasi-experimental study. Annals of King Edward Medical University Vol 25 Issue 1.

17. Iammatteo PA et al 1990 Trombly C, Luecke L. The effect of mouth closure on drooling and speech. Am J Occup Ther Vol 44 Issue 8.

How to cite this article: Ashwini Malokar, Chitra Mridha, Krutika Kale. To study the effectiveness of roods approach versus Oromotor stimulation exercise on drooling cerebral palsy children - a randomized control trial. *Int J Health Sci Res.* 2023; 13(11):342-350.
DOI: *https://doi.org/10.52403/ijhsr.20231142*

******