

Effectiveness of Non-Invasive Interventions in Controlling Drooling

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ABSTRACT

Background: Excessive loss of saliva from mouth is commonly encountered in pediatric and adult population both by physical and speech therapists and other medical practitioners. Drooling is considered abnormal after 3 years of age. Salivation is caused by neurological, developmental and glandular dysfunction. Drooling greatly affects personal life, social interaction, hygiene of the person and makes them prone to different infections. It is managed using multiple approaches such as invasive and non-invasive. Currently there is insufficient evidence to support which non-invasive treatment approach is effective to deal patients with drooling.

Objective: To identify the most effective non-invasive intervention for drooling control in cerebral palsied children.

Methodology: Interventional study design. Data was collected from Pakistan Society for the Rehabilitation of Disabled (PSRD) in 2 months before and after intervention on the cerebral palsied children. Purposive sampling technique was used to collect data from cerebral palsied children age 4-10 years using Thomas-Stonell & Greenberg scale for measuring frequency and severity of drooling. The data was analyzed using SPSS 17. In 5 children, oral motor therapy alone was intervened and in 5 children behavioral therapy and in 5 children combination of both therapies was applied. Therapy was given 4 days /week, each session of 30 minutes duration for 2 months.

Results: The results of present study illustrate that oral motor therapy was more efficient than behavioral therapy to decrease the frequency of drooling in cerebral palsied (CP) children. Drooling caused skin irritation in 33.3% of children and slight embarrassment in 53.3% children.

Conclusion: Oro motor therapy takes the lead in the management of sialorrhea then other non-invasive therapies. Drooling is major problem encountered by cerebral palsied children causing problems of skin and psychological issues side by side. In the initial stages, trial of non-invasive techniques should be given to manage sialorrhea as evident from the results that these therapeutic techniques are effective in decreasing the incidence of drooling.

Key words: Drooling, Cerebral palsy, Oral-Motor Therapy, Behavior Therapy

INTRODUCTION

Cerebral palsy is disorder of posture and movement due to non-progressive damage to immature brain. Affected movement can be of any part of the body depending on the part of brain suffering from the damage. Muscles and other structures related to the oral region are not properly

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functional due to the neurological damage, causing saliva loss along with, accompanying sensory disturbances, cognitive issues, behavioral problems, communication lapse(1).

Loss of saliva is clinical manifestation of neurological or motor issues specifically relating to muscles of lip, cheek, improper function of jaws. Ten percent of children with cerebral palsy have significant drooling problem, to interfere with social and practical functions on daily basis(2). It is considered abnormal when it is unintentional and frequent related to the child. It is normal till age of 3 years as during this time period, the oral structures are developing. In some cases loss of saliva continues beyond this age limit but the peer demands are enough to control this condition(3). When it extends beyond 3 years of age, it is labeled as abnormality(4),(5). Drooling causes personal, social issues and/or psychological problems(6). The cerebral palsied children feel uncomfortable due to this issue as they encounter other children of the same age group and even in special education institutes.

Many options are available for the management of drooling that is broadly divided into two categories i.e., invasive and non-invasive(7). Invasive therapies include taking medicines orally or injecting medicines through dermal route or taking the surgical option. Different medicines are in current practice such as Botulinum toxin (BoNT therapy)(7), (8). Surgical treatment includes removal of salivary glands or re-routing the ducts(8).

Non-invasive treatment domains include oromotor therapy, behavioral cues usage and sometimes combination of both of these domains. Oromotor therapy encompasses use of neuro-developmental techniques (NDT) to augment the function of sensory and motor system(9). Behavioral therapy is the application of positive and negative reinforcements for the development of erect head posture and lip closure (10). The present study is designed to find out the most effective therapeutic technique out of these non-invasive management domains. As recently, evidence is not enough to support or reject the theme of current study.

MATERIALS & METHODS:

Purposive sampling technique was used to collect data from 15 cerebral palsied children age 4-10 years a well structured questionnaire including Thomas-Stonell & Greenberg scale for measuring frequency and severity of drooling, along with questions related to skin irritation, embarrassment level and some bio data details. The data was analyzed using SPSS 17. In 5 children, oral motor therapy alone was intervened through NDT and stroking techniques and in 5 children behavioral therapy through reinforcements and feedback procedures and in 5 children combination of both therapies was applied. Therapy was given 4 days /week, each session of 30 minutes duration for 2 months.

RESULTS:

15 cerebral palsied children were included in the study with mean age 6.53 years and standard deviation 1.506. There were 67% males and 33% females in our selected sample. According to the caretakers of the children, 20% of them were taking medicines for managing drooling, 53% were not relying on medical treatment and 28 % didn't know whether the child was on medication for this issue or not. Status of drooling frequency before therapeutic intervention was such that 40% of the children had continuous drooling complaint, 47% had frequent drooling and

14% had occasional drooling. After therapy, there were 7% children with constant drooling, 27% with frequent drooling, 47% with occasional drooling and 20% had no drooling.

Severity of sialorrhea before therapy was such that 7% had profuse drooling, 40% had severe, 40% had moderate and 13% had mild issue. After the intervention, there was no child with profuse drooling, 40% had mild complaint and 53% children were dry.

10 children had complaints of mild choking incidences, 1 had moderate incidence and 4 children had no such issue according to the current research findings.

Table # 1: frequencies of drooling before and after therapies in 3 treatment groups

Group 1: oral motor therapy, Group 2: behavior therapy, Group 3: combination therapy

Group	N	Mean	Std. Deviation	Std. Error Mean
Frequency of drooling before therapy in group 1	5	3.4000	.54772	.24495
Frequency of drooling after therapy in group 1	5	2.0000	.70711	.31623
Frequency of drooling before therapy in group 2	5	2.8000	.83666	.37417
Frequency of drooling after therapy in group 2	5	2.0000	1.00000	.44721
Frequency of drooling before therapy in group 3	5	3.6000	.54772	.24495
Frequency of drooling after therapy in group 3	5	3.6000	.54772	.24495

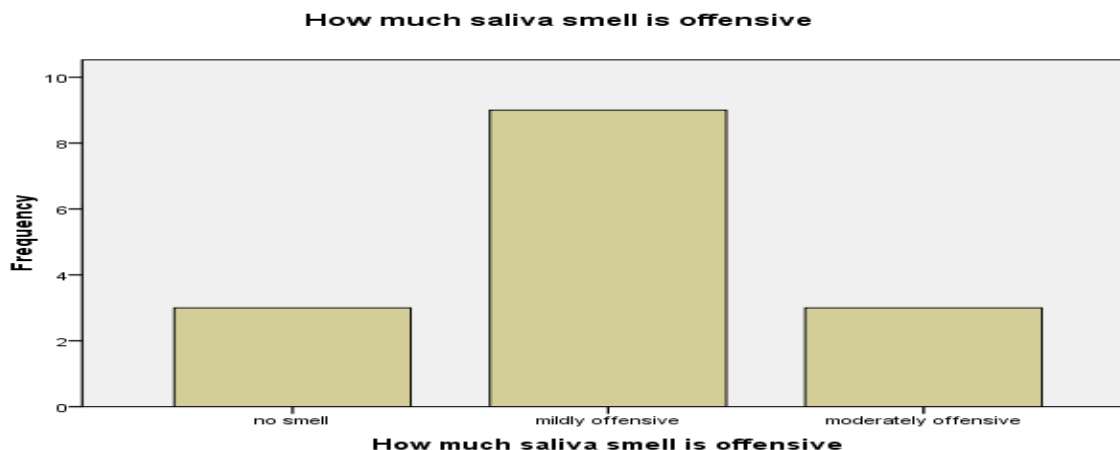
Table#2: severity of drooling before and after therapy in 3 treatment groups

Group 1: oral motor therapy, Group 2: behavior therapy, Group 3: combination therapy

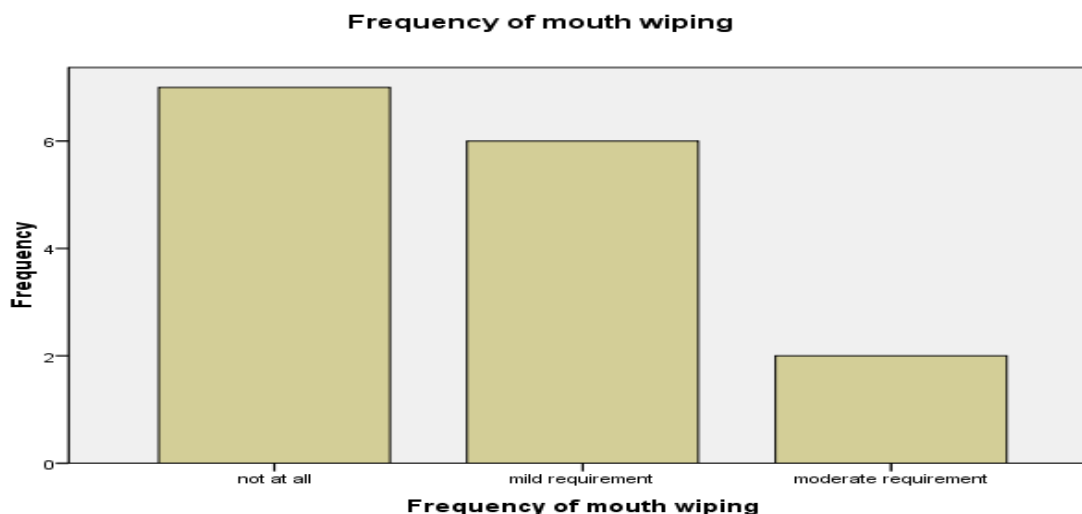
Group	N	Mean	Std. Deviation	Std. Error Mean
Severity of drooling before therapy in group 1	5	3.2000	.83666	.37417
Severity of drooling after therapy in group 1	5	1.6000	.54772	.24495
Severity of drooling before therapy in group 2	5	3.2000	.83666	.37417
Severity of drooling after therapy in group 2	5	1.2000	.44721	.20000
Severity of drooling before therapy in group 3	5	3.8000	.83666	.37417

Severity of drooling after therapy in group 3	5	1.8000	.83666	.37417
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Figure #1 shows offensiveness from loss of saliva



Figure# 2 shows the frequency of mouth wiping needs before therapy in drooling children



DISCUSSION:

The current study was designed to find out the most efficient treatment technique for the management of drooling in cerebral palsied children. In this study sample, excessive salivation from the mouth was caused by underdevelopment of oral structural control. For this purpose, first technique applied to 33.3 % children was oro-motor therapy, to improve the muscle function, motor control of the oral structures and the flexibility of the muscles of the cheek and the lips. Also this therapy improves jaw control as evident by the results of a similar study was conducted by Bailey. The researcher also applied this technique and states that it is beneficial for the children with problematic oral structures. The research also states that therapy trial must be

given earlier in the life so as to get better results(11). Similar study conducted by McCracken in mentally retarded children, reports that sensorimotor techniques (part of oromotor therapy) given to these children resulted in reduced drooling but she didn't make objective measurement of the drooling(12). But the current researcher made record of change in drooling through Thomas Stonnell and Greenberg scale, so the findings are more reliable. Similarly another study was done in 1983, facilitation techniques and tactile stimulation procedures for the purpose of jaw closure(9).

Second approach that was used by the researcher to minimize the incidence of sialorrhea is behavioral therapy. Behavioral therapy includes the use of tactile cues for the development of behavior in cerebral palsied children. This technique is effective in children with better understanding powers and better IQ level, so that they can follow the cues given by the therapist. In the recent study this was applied in 33.4% of subjects, as was applied Garber(13). In that study only 16 therapy sessions were given (3 times /week), but the researcher gave therapy for total of 32 sessions (4 sessions /week for 2 months duration), each of 30 minutes duration. In another study Drabman along with his colleagues, monitored the effects of reinforcement technique(14).

Methods including overcorrection, presentation of rewards or the threat of punishment are effective techniques that come under the domain of behavioral therapy. The only requirement for the application of this technique is that the child understands the concept of cues and shows affiliation for certain things as mentioned in the study by Thomas Stonnell(15).

Though, oromotor therapy and behavioral therapy is a lengthy procedure but still its importance can't be negated and it is recommended that at least trial of non-invasive therapy should be given for 6- months before going for medication or surgery. Another positive point to use oromotor therapy is that cognitive and motivative part on behalf of patients is minimally required(15). Behavioral therapy is bit demanding in term of IQ level of the patient but still its importance is superior enough to be used before invasive procedures(16).

CONCLUSION:

Oromotor therapy takes the lead in the management of sialorrhea then other non-invasive therapies. Drooling is major problem encountered by cerebral palsied children causing problems of skin and psychological issues side by side. In the initial stages, trial of non-invasive techniques should be given to manage sialorrhea as evident from the results that these therapeutic techniques are effective in decreasing the incidence of drooling. Large sample size study is required to generalize the results. Additional studies must be conducted to see whether these techniques are effective for long duration or the effect diminishes after few months or continuous treatment is required.

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