

Effectiveness of Kinesiologic Taping Therapy in Drooling Management among Children with Cerebral Palsy

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ABSTRACT

Background: Drooling is a major issue among children suffering from cerebral palsy which can also affect the quality of life of the children and their parents.. There are different therapeutic interventions for drooling management. Kinesiologic taping therapy is one of them. The current study was conducted to make out the effectiveness of kinesiologic taping therapy among cerebral palsy children.

Objective: The objective of study was to determine the effectiveness of kinesio taping as therapeutic intervention in CP children with drooling, to provide evidence based facts of therapy to decrease drooling and to increase the awareness of taping technique in management of drooling.

Methodology: The experimental study was conducted at Armed Forces Institute of Rehabilitation Medicine (AFIRM) Rawalpindi. 30 CP children were selected with age between 2-6 years with moderate to severe drooling through convenient sampling technique. kinesiotape has been applied on each child for 45 minutes per session, 5 days per week for two months continuously. Data was collected through Thomas-Stonell and Greenberg drooling scale to measure frequency and severity of drooling and drooling impact scale on 1st day and finally on 8th week within the same group.

Results: Data analysis done on SPSS vs. 20. Paired sample t-test was used for pre and post testing. The results of current study show that the kinesiotaping has a significant impact on drooling management. Data was computed and statistically analysed and compared by paired sample t test with significant value of 0.00.

Conclusion: The study indicated on the basis of results, that the kinesiologic taping has an important role for reducing drooling in cerebral palsy children and proved one of the safest treatment option for management of drooling in cerebral palsy children.

Keywords: Cerebral palsy, Drooling, Drooling impact scale, Kinesiologic Taping

INTRODUCTION:

Cerebral palsy (CP) is a static, non progressive disorder of the brain caused by brain injury during the prenatal, perinatal, and postnatal stages of birth. It is one of the common disorder which .is predominated by the inability to normally control motor functions, and potentially effects the overall development of a child by debilitating the child's abilities to explore, speak, learn, and independent mobility, and diagnosed before the age of 2 years Effective management of CP can improve the quality of life for the child and family.⁽¹⁾

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Cerebral palsy describes a group of permanent disorders of the development of movement and posture which causing activity limitation that are attributed to non progressive disturbances that occurred in the developing fetal or infant brain. The motor disorders of CP are often accompanied by disturbance of sensation, perception, cognition, and communication, behavior, drooling, by epilepsy and by secondary musculoskeletal problems.⁽²⁾

Cerebral Palsy is a common disorder all over the world. The occurrence of CP is about 1.5 to 4 per 1000 living child births. This amounts to about 5,000 – 10,000 children born with CP every year in the US. Every year about 1,500 infants are diagnoses with this disorder. In about 70% of all cases of CP are found with other disorders, such as mental retardation. The overall prevalence of significant chronic drooling in childhood is put up to 0.6%. the commonist population group with severe and persisting difficulty is children with quadriplegic CP where the prevelence rate is as high as 30%-53%.⁽³⁾

Drooling is an unintentional loss of saliva from mouth which is normal in children from 18 year to 24 months of age. There are commonly two types of drooling i.e. anterior and posterior drooling. A large number of cerebral palsy children have drooling problem. Some other neuromuscular disorders or cognitive disorder also are known to cause drooling.⁽⁴⁾

Oral motor achievements are of as great importance as the mobility for social functioning, such as speech, the most appreciated capability. Adequate handling of saliva and food are important condition for oral integrity that supports social acceptance and integration. Impairment in basic functions such as sucking, swallowing, breathing, and coughing will frequently result in clinical problems of which drooling is an example. .^[5]

There are different treatments for mangement of drooling which include pharmacological treatment, speech language therapy (oral motor stimulation exercises) behavioral therapy , radiation therapy and surgery. Medicine are used to decrease symptoms, aticholinergic drugs are used to slow down saliva production. The anticholinergic drugs may cause side effects which include sedation, uniry retention, constipation, restlessness and blurred vission. Glycopyrrolate (anticholinergic drug) is mostly used drug for drooling.^[6]

The management of drooling in CP children are conservative/alternative, specific oral motor exercise which include certain stimulation exercises of oral motor musculature, use of intra oral devices, pharmacological , and surgical intervention. Specific oral motor exercise programs include measures to improve oral facial tone, increases sensory awareness and develop voluntary control of movement. Oral facial facilitation techniques such as brushing, vibration, and manipulation are reported to have short term effects on facial tone.^[7]

The kinesio taping (KT) technique was designed by Dr.Kenzo Kase. Dr. Kase has been probing for a sports taping technique to help out in the healing of the traumatized tissues. He establish that standard taping technique, such as athletic taping, and strapping provided muscle and joint support however they reduce ROM, did not support the fascia and inhibited the healing of the tissues. Dr. Kase developed kinesio taping method. Kinesio taping is key differetiator is its ability to aid in the lymphatic and muscle system. While supporting joints and muscle, since then Kinesio tape become one of the fastest growing sport treatment modalities in the world^[8]

The kinesio tape have been used with children who present with decreased oral motor control using the following technique for TMJ stabilization, jaw stability to decrease drooling, and jaw stabilization for better lip closure. The Orbicularis oris is the major muscle responsible for lip

closure. This is generally weakened muscle, due to over stretch from poor closure, head and neck position and poor alignment, and muscle imbalance. Children with varying diagnosis, including CP, developmental delay, and dysarthria have been taped using Orbicularis Oris taping technique.^[8]

KT was designed to mimic the qualities of human skin. It has roughly the same thickness as the epidermis and can be stretched between 30%-40% of its resting length longitudinally. Kase et al have proposed several benefits, depending on the amount of stretch applied to the tape during application. 1) provides a positional stimulus through the skin, 2) align the fascial tissues, 3) creates more space by lifting fascia and soft tissues above area of pain and inflammation, 4) it provides sensory stimulation to assist or limit motion and 5) to assist in removal of edema by directing exudates toward a lymph duct. It is latex free and the adhesive is 100% acrylic and heat activated. The 100% cotton fibers allow for evaporation and quicker drying. This allows KT to be worn in the shower or pool without having to be reapplied. Lastly prescribed wear time for 1 application is longer, usually 3 to 4 days.^[9] The objective of study was to determine the effectiveness of kinesio taping as therapeutic intervention in CP children with drooling, to provide evidence based facts of therapy to decrease drooling and to increase the awareness of taping technique in management of drooling.

MATERIALS AND METHODS:

The study was pretest posttest experimental study conducted in clinical setting (AFIRM). Sample size of the study was 30 cerebral palsy children including both male and female of 2 to 6 years of age, rating of ≥ 3 on Thomas-Stonells drooling scale (moderate to profuse drooling), child having head control and who can understand simple verbal commands included in the study. Data was collected through non probability convenient sampling technique. The study was carried out in 8 weeks. The tools used for data collection are general oral motor examination, Thomas-Stonell and Greenberg drooling scale and drooling impact scale.

Need and purpose of the study was explained to the parents of the children and an informed consent was taken from them to ensure confidentiality. A brief oral motor examination of the subjects was taken prior to the study. This process was carried out 5 days a week, in which CP children were attended by researcher and rest of 2 days parents were guided. They followed the same taping procedure. Thomas Stonells scale and Drooling impact scale was used as a pre and post assessment testing.

Paired Sample t-test was used to analyze the treatment effect. The test was applied through SPSS 20.

Each child was given 45 minutes. In the session orbicularis oris muscles was taped for 45 minutes... All CP children treated through taping the orbicularis oris muscles at least 45 minutes per day. Post interventional assessment was carried out after eight weeks

Taping technique was pursued through following procedures. Taping Technique was, used 2 inches cut tapes according to orbicularis oris structure. The length to fit around mouth when fully opened. The tape anchored at center of mouth above the upper lip. Tape was laid down on open mouth, with paper-off (10%) tension or pull. Tape ended at corners of upper lip. Tape not placed on lips, but just outside of lips, outlining mouth. A second piece of tape was anchored at center of the lower lip. Tape was surrounded around the mouth, following the orbicularis oris muscle. Ends of the tape overlapped slightly. Taping with this method has been shown to improve "pursing of

lips and mouth closure. Children tired with the initial taping as it is worn for a maximum of 45 minutes, with time gradually increased. ⁽³⁾

RESULTS:

The results of the statistical analysis, carried on the data set, are included here. The factors which are considered during the analysis are Age, Gender, Thomas-Stonell and Greenberg drooling scale ⁽¹⁰⁾ and drooling impact scale ⁽⁶⁾. Statistical analysis compares the day 1 (week-0) scores of the children with their follow-up scores in week 8. IBM SPSS statistics V 20, statistical analysis software, is used to prepare the dataset and run the analysis. The results obtained manifest the difference and effectiveness of the treatment. The paired *t*- test was used two times to measure the mean difference of the before-after statistics in week-0 & week-8. .The results are found significant with p-value of 0.00.

Table 1: Pre Test Mean & Standard Deviation

(DSS, DFS & DIF)

	N	Mean	S.D
DSS	30	4.6667	0.4794
DFS	30	3.8000	0.4068
DIS	30	52.133	4.1417

The above mentioned table 4.3 shows the mean and standard deviation of drooling severity scale, drooling frequency scale and drooling impact scale when pre assessment done .The results of pre assessment shows significant difference. The pre test mean difference of DSS is 4.6667 and S.D is .04794. The pre test mean difference of DFS is 3.8000 and standard deviation of 0.4068 whereas the pre test mean difference of DIS is 52.133 and standard deviation is 4.

Table 2: shows Post Test Mean & Standard Deviation
(DSS, DFS & DIF)

	N	Mean	S.D
DSS	30	2.2000	0.7611
DFS	30	2.5333	0.7760
DIS	30	29.533	7.4590

The above table 4.3 shows the mean and standard deviation of drooling severity scale, drooling frequency scale and drooling impact scale when post assessment done .The results of post assessment shows significant difference. The post test mean difference of DSS is 2.2000 and S.D is .07611. The post mean difference of DFS is 2.5333 and standard deviation of 0.7760 whereas the post mean difference of DIS is 29.533 and standard deviation is 7.4590.

Table 3: Paired Sample t-test (Pre & Post Test)

		N	Mean	Mean dif.	S.D	p-value
DSS	Pre Test	30	4.6667	2.466	0.4794	0.00
	Post Test	30	2.2000		0.7611	
DFS	Pre Test	30	3.8000	1.266	0.4068	0.00
	Post Test	30	2.5333		0.7760	
DIS	Pre Test	30	52.133	22.60	4.1417	0.00
	Post Test	30	29.533		7.4590	

The results of the above table indicate paired sample t-tests. The results are found to be significant on p value 0.00. The mean difference in the DIS Score is 22.60 indicating the decrease in complaints. In case of DFS the mean difference is 1.266 reflects that the magnitude of severity has been decreased. Similarly, the mean difference in DSS which was 2.466 reflects the improvement. On above mentioned results we reject the null hypothesis and accept alternative hypothesis. So this showed that kinesio tapping is effective treatment option for the management of drooling children with cerebral palsy.

DISCUSSION:

The aim of the present study was to determine the effectiveness of kinesio taping in cerebral palsy children to reduce drooling using Thomas-Stonell and Greenberg drooling scale⁽¹²⁾ and drooling impact scale⁽⁶⁾ on day 1 and 8th wk. The control of drooling is difficult as the problem is caused by complex interacting elements, especially for children with severe and multiple disabilities.

The most important findings of Sajjan Kumar in his study was that there was a significant difference in drooling frequency ,severity scores, jaw control and lip control scores after oro motor stimulation therapy in reduction of drooling. MOT conducted a study on 25 spastic CP children and focused on use of slow rhythmic tapping, firm pressure, stroking, tongue stretching and mobility and the combined effect in reducing drooling through facilitation jaw and lip control. He also used activities to strengthen the oral musculature which results in improvement in functional oral motor skills. The similar results were obtained in the present study where the participants were treated with kinesio taping therapy around the orbicularis oris muscles for 8 weeks. The significant results showed in both studies.^[11]

The effectiveness of oro motor rehabilitation program in reducing drooling, the study was conducted on 12 children with varying of drooling problems and the results showed improvement in drooling, indicating that treatment oromotor therapy and behavioral therapy may be worth trying even in more severe cases with saliva control problem

The Orbicularis oris taping technique is mentioned by Trish Martin which founded that the orbicularis oris muscle is responsible for lip closure which is generally weakened due to over stretch from poor closure, poor alignment of head and neck. This technique was found compatible with present study where the same technique was incorporated and reported to be beneficial in reduction of drooling which showed statistical significant result in DIS and TSGD scale with a 'p' value of 0.00 with a possible reason that the kinesio tape provides cutaneous feedback and facilitates the muscle hence thereby improving the lip closure and showing reduction in drooling.^[8]

According to Dr. Kenzo Kase, the tape and taping method corrects muscle function by strengthening weakened muscles, improves circulation of blood and lymph by eliminating tissue fluid or bleeding beneath the skin by moving the muscle, decreases pain through neurological suppression, repositions subluxated joints by relieving abnormal muscle tension, helping to return function of fascia and muscle and increases proprioception through increased stimulation to skin mechanoreceptors.^[27] The results of the present study showed improvement in reduction of drooling with application of kinesio tape supporting the finding of Dr. Kenzo Kase, stating that increased stimulation of skin mechanoreceptors might be the possible reason for improvement.^[13]

The result of the present study is in support with another study in which use of kinesio tape has shown statistical significant decrease in the parameters assessing the drooling in 42 CP children age ranging from 4 to 15 years and giving conclusion in the favour of the present study. The tape under the chin enhances swallowing and thereby help reduce drooling. The possible reason for this may be the sensori motor feedback provided under the chin the whole day.^[13]

Kinesio taping therapy is recommended for clinical practice of drooling management in cerebral palsy children. An experimental study done by Shukra Abhyaraj M, in his study he assessed the effectiveness of kinesio taping therapy in drooling management among spastic cerebral palsy children. In his study he included 40 cerebral palsy children, and divided them into two groups. He gave oro motor stimulation exercises to control group and taping therapy to experimental group. He founded that kinesio taping therapy gives significant results in drooling management. He concluded that kinesio taping is safe and effective method to control drooling and he recommended kinesio taping therapy for clinical practice. Hence this study justifies the present study's effectiveness.^[14]

CONCLUSION:

The study indicated on the basis of results, that the kinesiologic taping has an important role for reducing drooling in cerebral palsy children. It was also concluded that it is safe and effective method for controlling drooling in the cerebral palsy children. It can also reduce the use of drooling control medicine. So it is suggested that kinesiologic tapping must be included for the management of drooling along with other drooling reducing protocols.

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