

USE OF ELASTIC BANDAGE ASSOCIATED WITH SPEECH THERAPY IN THE CONTROL OF SIALORRHEA (HYPERMOTIVATION)

Uso da bandagem elástica associada ao tratamento fonoaudiológico no controle da sialorréia

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ABSTRACT

Purpose: to verify the effectiveness of the use of elastic bandage associated with speech therapy to control sialorrhea. **Methods:** a longitudinal study was conducted with eleven children with a condition of chronic hypersalivation and neurological disorders. The perception of the speech therapists and of the responsible as of the graveness and the number of mouth towels utilized per day. Sialometry was also applied. Each participant received an application of the Kinesio Tape elastic bandage in the supra-hioid muscle for thirty days. The children were evaluated without the bandage (T0), immediately after removal of the bandage (T1) and three months after (T2). The speech therapy treatment was realized by the same professional in two weekly sessions. The data was analyzed statistically. **Results:** it was verified in the questionnaire there was a reduction of complaints of saliva choking in T1 ($p=0.024$). The average daily use of towels / cloths was of four (10.2%) in T0, two (5.1%) in T1 and four (10.2%) at T2. According to sialometry, there was a reduction of drooling from T0 to T1 ($p=0.018$) and no difference between T0 and T2 ($p=0.215$) and a raise from T1 to T2 ($p=0.05$). According to the speech therapist perception there was a reduction in drooling after thirty days after the use of the bandage, however no improvement was observed when comparing the results of thirty days without usage and three months without the bandage. **Conclusion:** the taping has shown to be effective in controlling sialorrhea during its use period, not being observed the permanence of the results after interruption of its application.

KEYWORDS: Bandages; Sialorrhea; Neurology; Child

■ INTRODUCTION

Saliva is made of water, which amounts to 99% of its structure, and by solid components represented by organic and inorganic molecules that are found dissolved in the aqueous member, that

change considerably from one individual to another and in the same individual many times a day. It also contains an array of specific proteins and enzymes such as peroxidase, lactoferrin, lysozyme and secretor immunoglobulin A (Ig A).

Its function is the lubrication of the oral cavity and to assist in the junction of food particles to help the transport of the food bolus; in addition, it protects the oral structures against bacterial activity and controls the intra oral pH. Its production volume varies according to stimulus, ergo, the saliva flux is bigger right after meals, and smaller during sleep state. In healthy individuals an average of 1000 to 1500ml of saliva is secreted each day. The submandibular, parotid and sublingual gland are responsible

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for 95% of saliva production. The remaining 5% are made in the lingual glands and other smaller glands.

The salivary variation is called excessive salivation, drooling and/or sialorrhea. It is characterized by the unintentional leak of saliva through the oral cavity. This is considered normal among the 18 to 24 months of life, when this occurs before the full development of the oral neuromuscular control. However, if the sialorrhea persists after 4 years of age, it's considered an alteration.

Sialorrhea may be considered acute or chronic. Acute causes might come from some inflammatory process of the oral cavity, infections such as epiglottitis and neoplasia. The chronic causes include neurological alterations, use of pharmaceuticals and indirect causes. Parkinson's Disease, cerebral paralysis and cerebral vascular accident are the main neurological diseases that generate chronic sialorrhea. In these diseases there isn't a rise in salivary production, there is however a difficulty or incapacity from the person in swallowing saliva, which generates a state of constant sialorrhea. The drugs associated as a casual factor of chronic sialorrhea include anticonvulsants, tranquilizers and anticholinesterase. The indirect causes are anatomical alterations such as macroglossia, occlusal alterations, nasal obstructions, head postures and emotional states.

Sialorrhea is a triggering factor of other alterations such as reddening around the mouth, chin and neck, therefore resulting in secondary bacterial infections. There are also references concerning halitosis. There may also occur alterations in the speech and feeding mechanisms, generating a reduction in life quality.

There are innumerable approaches for sialorrhea treatment, such as, anticholinesterase pharmaceuticals, antiparkinsons pharmaceuticals, radiotherapy and gland removal surgery. The most recent discovery is the application of the type A Botulinum Toxin in salivary glands. There are also the methods considered less invasive that encompass phonotherapy and biofeedback.

Another utilized method is the Kinesio Taping. It has been utilized with the purpose of improving oral control in children with neurological alterations, generating as a final result the reduction of sialorrhea and improvement of lip sealing.

Developed in Japan in 1996 by Kenzo Kase¹² the technique consists in the direct application of Kinesio Tape elastic bandaging in the muscle which need to be stimulated. This method acts in the functionality of the compromised muscle, rising blood and lymphatic flow⁷, improving coordination and control of the sensory motor system¹³. It may be used in corporal muscle and in facial¹².

Speech Language Pathology acts in the orofacial muscle with the objective of adequating sensibility, mobility and tonus of the structures of the oral cavity, improving posture, neuromuscular control, reducing risks of complications such as malnutrition, dehydration, respiratory complications, therefore improving life quality and social aspects. Hence the objective of the study was to check the advantages in the application of Kensing Tape elastic bandages associated to phonoaudiological therapy in the control of sialorrhea.

■ METHODS

The present study was approved by the Ethics Committee in research from CEFAC – Pós Graduação em Saúde e Educação, under the number 037/11.

It is a longitudinal study done with eleven children, being seven (64,4%) of the female gender and four (36,4%) of the male gender, with ages from five to ten years old who were undergoing phonoaudiological monitoring at the Associação de Pais e Amigos dos Excepcionais- APAE in the city of Caratinga - MG. All the participants were diagnosed with some type of neurological alteration, which were: three (27,27%) with delayed global development, three (27,27%) with delayed neuropsychomotor development, three (27,27%) with cerebral paralysis, one (9,09%) with hydroencephalitis and poor congenital formation and one (9,09%) with encephalopathy.

To include the patient into the research it was necessary to be older than four years old, a consistent state of sialorrhea, to go through phonoaudiological therapy with the same professional, as well as a signing of the term of free and clarified consent by all the responsible individuals. Any patient who had undergone or was undergoing any other type of procedure or method of sialorrhea control, for instance: use of pharmaceuticals, application of botulinum toxin, previous use of said elastic bandages, as well as those with cognitive impairment that would prevent the necessary evaluations to be done.

In the present study the periods of evaluation were called T0 (before the application of the elastic bandages), T1 (30 days after de use of the bandages) and T2 (three months after the removal of the bandages).

To reach the studies objectives it was verified the perception of the individual responsible for the child as of the social impact of sialorrhea and the number of mouth towels/tissues used per day⁷. A questionnaire elaborated to collect this information (Figure 1) was applied in T0 and T1. In T1 and T2 there was also included the speech language pathologists perception as of the level of sialorrhea (Figure 2).

It was also applied a quantitative evaluation through sialometry^{14,15} in T0, T1 e T2. In order to do so, four rolls of uni-sized SS Plus brand cotton, combined in two pairs for each patient. Each pair was deposited in a plastic cup (same size, weight and shape). The contents were weighed, using a Scale digital Lcd 2000gr mini scale. The weight was written down for further comparison. The rolls of cotton were deposited in the floor of the mouth, on the molar region, one on the left, one on the right, being put for 2 minutes. The cotton with saliva was removed and deposited in the plastic cup, being weighed again.

To ensure the reliability of the data, this technique was done twice a day in two distinct days (with a difference of three days between them), taking later the average of the values encountered. In T1 these days were the 27th and the 30th day of usage. To better the comprehension of the readings, this period was called "30 days after usage". The tests were done in the same time of the day and with a period of absolute fasting, two hours prior, along with an orientation to not brush their teeth or chew gum.

Finally, it was applied, for a period of 30 days, by the attending speech language pathologist, the Kensing Tape elastic bandages in strips of 5,0 x 2,5

cm with a maximum *stretch* on the supra-hioidéa muscle (anterior womb of the digastric muscle and milo-hióideo muscle). Each child remained two consecutive days with the bandage applied before switching the material done by the same attendant with an orientation of no intentional removal in this period.

The phonoaudiological treatment was done by the same attendant, in two weekly sessions, with the use of the same techniques in all the children, to reduce sialorrhea: cryotherapy, inductive massages, oral motor sensitive stimulus and isometric exercises and isotonic. These therapeutic techniques assist the oral motor sensitive development, modifying the postural patterns and pathological motors, easing the postures and normal movements¹⁶.

A statistical analysis was done in the MINITAB 14 software through hypothesis test to differentiate the proportions, looking to verify if there was any difference in the occurrence of alterations caused by sialorrhea, in the most visited places and the reasons not to go out. For the results of the sialometry an average of the two measurements done each day was done and the Mann-Whitney non-parametric test was used. A level of relevancy of 5% ($p < 0,05$) was adopted chosen in both cases.

Questionnaire	
Name:	_____
DN :	_____ Age : _____ Sex : () F () M
<ul style="list-style-type: none"> • Changes that observed due to intense sialorrhea : (1) itch (2) redness / allergy (3) Bad Breath (4) gagging with saliva (5) difficulty breathing (feeling of suffocation) (6) feeding difficulties (7) replacement feeding diet for liquid and pasty (8) changes in the voice (9) difficulties in speech therapy (10) other : _____ . • often leave much besides going to medical and therapeutic ? () Yes () no • If you do not quit , why? (1) uncomfortable with people who ask and look much; (2) shame of drooling ; (3) choking constant ; (4) very tiring ; (5) difficulties exchanges Bibs / swaddling mouth ; (6) other? _____ • Number of towels / cloths mouth that uses on average in a day : 	

Figure1 - Questionnaire applied to parents

Assessing the severity of drooling	
<p>- Perception of the speech therapist:</p> <ol style="list-style-type: none"> 1. There was a reduction of drooling? (1) yes (2) no 2. Degree reduction: (0) absent (1) Light weight (2) moderate <p>Clinical classification of severity of drooling^{14,15}:</p> <ul style="list-style-type: none"> • Absent: without saliva leak, without externalization of saliva. • Take: escape of saliva in small quantity. • Moderate: escape of saliva in moderate amounts (up to three exchange bibs/day). 	

Figure2 - Evaluation of the severity of drooling

■ RESULTS

Regarding the questionnaire applied to the responsible individuals, it was verified that the complaints of choking with saliva was reduced after the use of elastic bandages, although the complaint present by all the interviewed participants, difficulties in speech therapy, hasn't been modified after the intervention. With the objective of analyzing the

impact of sialorrhoea in the life quality of the patients, it was verified if they had or not the habit of going out a lot, and also the reasons which leads the patients to stay at home. It was verified the most of the interviewed participants stated that they have the habit of going out with the kids. It is interesting to note that those who did not go out before the intervention lost that habit after 30 days.

Table 1 - Comparison of the findings of the questionnaire before and 30 days after removal of the elastic bandage

Questions	T0		T1		p-value ¹
	n	%	n	%	
Changes resulting from drooling					
Itching	0	0,0	0	0,0	1,000
Redness / Allergy	3	27,3	1	9,0	0,586
Bad Breath	7	63,6	4	36,4	0,395
Choking with saliva	7	63,6	1	9,0	0,024*
Difficulty breathing	3	27,3	1	9,0	0,586
Difficulty in feeding	5	45,4	7	63,6	0,670
Substitution diet	3	27,3	3	27,3	1,000
Voice disorder	3	27,3	3	27,3	1,000
Difficulty in speech therapy	11	100,0	11	100,0	1,000
Leave home often					
Yes	7	63,6	7	63,6	1,00
No - Tiring	4	36,3	4	36,3	1,00
No - Excess return Bibs	1	9,1	1	9,1	1,00
No - Gagging constant	0	0,0	0	0,00	1,00
No - Shame ptyalism	0	0,0	0	0,00	1,00
No - Inconvenience	0	0,0	0	0,00	1,00

Legend: 1 - Testing of hypothesis for differences between proportions ($p < 0.05$)

T0 - Period before applying elastic bandage

T1-Period 30 days after the use of banding

The results concerning the perceptive clinical evaluation indicated that in T0 the average of mouth towels/tissues used per day was four (10,2%), and in T1, two (5,1%) and in T2, four (10,2%).

According to the values found in the sialometry (Table 2), it has been verified a low variation coefficient, indicating that the data is homogeneous. According to the data, (Table 3) there has been a

reduction from T1 to T0, but this condition was not maintained in T2.

Regarding the initial stage, the speech language pathologist considered that there was a reduction of sialorrhoea 30 after the use of the bandages, especially those of a mild level. However, no improvement is seen when comparing the results of 30 days after usage and three months without the bandages.

Table 2 – Results sialometry

Sialometry	T0	T1	T2	CV
T0	-	0,018*	0,215	0,08
T1	0,018*	-	0,050*	0,16
T2	0,215	0,050*	-	0,08

Legend: cv - coefficient of variation

T0 - Period before applying elastic bandage

T1-Period 30 days after the use of banding

T2 - Period of three months after the removal of the bandage

Table3 - Comparison of results sialometry

Sialometry	T0	T1	T2
T0	-	0,018*	0,215
T1	0,018*	-	0,050*
T2	0,215	0,050*	-

Legend: T0-Period before applying elastic bandage

T1-Period 30 days after the use of banding

T2-Period of three months after the removal of the bandage

Mann-Whitney

Table4 - Perceptual severity of drooling

Perception of professional	T0 x T1		T1 x T2	
	n	%	n	%
Reduction of drooling				
Yes	8	72,7	0	0,0
No	3	27,3	11	100
Degree of reduction				
Absent	3	27,3	11	100
Take	5	45,4	0	0,0
Moderate	3	27,3	0	0,0

Legend: T0 - Period before applying elastic bandage

T1-Period 30 days after the use of banding

T2 - Period of three months after the removal of the bandage

■ DISCUSSION

The elastic bandage is a recent technique that has been being utilized more commonly in the athletic and clinical therapy fields. Primarily the purpose of the bandage is to give effective strength through minimal contact with the skin to normalize body movement or extremities movement. Kinesio Tape is a differentiated bandage than of those found in the market, once it is manufactured with a special fabric and a viscosity that allows a water and ventilation resistance, with bigger elastic expansion and minimal skin discomfort¹⁷.

The possible benefits and mechanisms of the elastic bandage include physical corrections, fascia

relaxation, rectification of movement and circulation of lymphatic fluid¹⁷. Although these hypothesis haven't been proven so far, the bandage is being used more and more in rehabilitation departments and consequently by Speech Language Pathology because of its capacity of raising neuromuscular perception.

This study refers to sialorrhea in children with some neurological alteration. All the children have presented difficulties during therapy, which can be resulting of alterations such as hypo-sensibility, bad posture, bad phonoarticulatory organ function and/or occlusal problems. It is necessary to check the characteristics of each child and integrate the discovered facts in order to facilitate more adequate

therapeutical procedures and, above all, evaluate if there is or not the possibility of modification.

According to the perceptive clinical evaluation of the attendant and the individual responsible for the child as of the level of saliva leak, it is shown that most of the children achieved an important reduction during the use of the bandage. This study is consistent with the literature, which points out that most children would achieve this benefit with the use of the bandage⁷. However, this reduction was not sustained after three months of use of said bandage. Follow-up studies were not found in the literature.

Regarding the use of mouth cloths used during the day it was verified that there was a reduction in the use of said cloths right after the removal of the bandages. In the literature, there are data that confirm this reduction of mouth cloth usage after the use of the bandage⁷. As in the perceptual evaluation, the results were not sustained after the removal of the elastic bandage.

In the objective evaluation, sialometry was used, which is a more precise method, that measures the total dosage of saliva produced¹⁴. A significant reduction was obtained in all the children while using the bandage, regardless of the neurological state. After the removal of the bandage, these readings were not maintained, with another rise in saliva accumulation in the oral cavity, and a subsequent leak.

The questionnaire applied to the individuals responsible for the kids had questions that cover child health and social life. Regarding the alterations caused by constant sialorrhea, the obtained data point out that all the children in this study, show difficulties in speech therapy, which is the most common alteration, followed by halitosis and choking.

The individuals that have some sort of neurological alteration normally show oral problems not only because of characteristics of their clinical state, but mainly due to a short access to dental treatment and prevention. Therefore, the oral health of these individuals need more intensified daily care and also followed by specialized professionals.

The susceptibility of these children to oral diseases in itself favors halitosis. But since these individuals possess constant sialorrhea, the mouth stays half open favoring contact of the external environment with the internal environment with a higher frequency. Saliva when stagnated in the oral cavity for longer periods favors a higher spread of

bacteria¹⁷. Also, this is a population which doesn't have the autonomy to perform oral hygiene on their own.

Problems in feeding and swallowing may happen when lips, tongue and oropharynxes are altered by anatomic problems, congenital or acquired. The alterations found in neurological patients are normally related to swallowing control. They are characterized mainly by alterations in the preparatory oral, oral and pharyngeal phases. In the oral preparatory phase, it can be observed an incapacity in food control in the oral cavity, resulting in extra oral leak and sealing difficulties due also to the reduction of motor sensory perception. In the oral phase, we verify a reduction of oral reflexes and tongue movement, premature loss of saliva and food. In the pharyngeal phase, there is a reduction of pharyngeal sensibility, difficulties in motor programming and reduced esophageal peristalsis. Due to all these alterations found in the swallowing phase there is a higher probability of choking with food and saliva¹⁸.

The use of the elastic bandage has been more and more common in rehabilitation areas, in which this study has shown it help, during the use, in sialorrhea reduction. However, it was also possible to state that the benefits did not remain after three months. According to the literature, skin stimulation techniques do not possess effect after suspension of treatment. So far, none of the many types of bandages applied externally had their treatment effects lasted longer¹⁷. Therefore, the technique does not exclude phonological intervention in these cases.

Studies regarding the use of elastic bandages are limited. This work is an exploratory study in the area of Speech Language Pathology, and the first one to use objective methods of saliva leak measurement and follow-ups before, after and during the use of the bandage. However, it is extremely important the need for new studies in this area, especially with different methods of saliva leak measurement.

■ CONCLUSION

The elastic bandage has shown itself effective in the control of sialorrhea 30 days after the use, not being observed the maintenance of said results three months after its removal.

RESUMO

Objetivo: verificar a efetividade do uso da bandagem elástica associada ao tratamento fonoaudiológico no controle da sialorréia. **Métodos:** estudo longitudinal realizado com onze crianças com quadro de sialorréia crônica e alteração neurológica. Foi verificada a percepção do fonoaudiólogo e do responsável acerca da gravidade e o número de toalhas/paninhos de boca utilizados ao dia. Empregou-se também a sialometria. Cada participante recebeu a aplicação da bandagem elástica Kinesio Tape na região da musculatura supra-hióidea por 30 dias. As crianças foram avaliadas sem a bandagem (T0), imediatamente após a retirada da bandagem (T1) e três meses após (T2). O tratamento fonoaudiológico foi realizado pelo o mesmo profissional em duas sessões semanais. Os dados foram analisados estatisticamente. **Resultados:** no questionário verificou-se redução da queixa de engasgos com saliva em T1 ($p=0,024$). A média de uso diário de toalhas/paninhos era de quatro (10,2%) em T0, duas (5,1%) em T1 e quatro (10,2%) em T2. De acordo com a sialometria, verificou-se redução da sialorréia de T0 para T1 ($p=0,018$) e ausência de diferença entre T0 e T2 ($p=0,215$) e aumento de T1 para T2 ($p=0,05$). De acordo com a percepção do fonoaudiólogo houve redução da sialorréia 30 dias após o uso da bandagem, entretanto não se observou melhora ao se comparar os resultados 30 dias após o uso e três meses sem a bandagem. **Conclusão:** a bandagem elástica se mostrou eficaz no controle da sialorréia durante seu período de uso, não sendo observada permanência dos resultados após interrupção da aplicação.

DESCRIPTORIOS: Bandagens; Sialorréia; Neurologia; Criança

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