

Original articles

Alimentary difficulties in cerebral palsy: proposal of a protocol

Dificuldades alimentares na paralisia cerebral: proposta de um protocolo

Marcela de Oliveira Conde⁽¹⁾

Giuliana Tessicini⁽¹⁾

Daniela Pimenta Bittar⁽¹⁾

Ellen Cristina Siqueira Soares Ishigaki⁽¹⁾

⁽¹⁾ Associação de Assistência à Criança Deficiente, São Paulo, São Paulo, Brasil.

Conflict of interest: non-existent

ABSTRACT

Purpose: to propose a protocol able to analyze both the sensibility as oral motor function in feeding for patients with cerebral palsy.

Methods: a selection of sensibility and oral motor function evaluation protocols was done. Then four speech-language pathologists developed tasks of the protocol for the analysis of alimentary difficulties. After its elaboration, the protocol was critically analyzed by 9 speech-language pathologists with experience in orofacial motricity and care of patients with cerebral palsy, and one nutritionist. A consensual analysis was made among the authors of the protocol about the permanence or removal of the tasks following the 0.7 criterion of agreement among the judges. After this analysis the protocol was applied in three individuals with cerebral palsy, one with feeding difficulty complaint and two without complaint.

Results: after the judges' analysis, 100% of them agreed with the most of the tasks established in the protocol, the proposed suggestions were: changes in nomenclature and of some foods used in some tasks, for a detailed test, and the possibility of the observation in the chewing function.

Conclusion: it was proposed the "Protocolo de Rastreo de Dificuldades Alimentares", a screening tool of alimentary difficulties for individuals with cerebral palsy.

Keywords: Feeding Behavior; Protocols; Speech, Language and Hearing Sciences; Cerebral Palsy

RESUMO

Objetivo: propor um protocolo que permita analisar tanto a sensibilidade, quanto a função motora oral na alimentação para pacientes com paralisia cerebral.

Métodos: foi realizada uma seleção de protocolos de avaliação da sensibilidade e função motora oral. Em seguida, quatro fonoaudiólogas confeccionaram as tarefas do protocolo para análise das dificuldades alimentares. Após sua elaboração, o protocolo foi analisado criticamente por nove fonoaudiólogas com experiência na área de motricidade orofacial e no atendimento a pacientes com paralisia cerebral, e por uma nutricionista (juizes). Foi realizada análise consensual entre os autores do protocolo sobre a permanência ou retirada de tarefas, obedecendo ao critério de 0,7 de concordância entre os juizes. Após essa análise, o protocolo foi aplicado em três indivíduos com paralisia cerebral, sendo um com queixa de dificuldade alimentar e dois sem queixa.

Resultados: após a análise dos juizes, 100% deles concordaram com a maioria das tarefas estabelecidas no protocolo, as sugestões propostas foram: alteração de nomenclatura e de alguns alimentos utilizados para que fosse possível uma análise mais minuciosa, e a possibilidade de observação de algumas provas na função de mastigação.

Conclusão: foi proposto o Protocolo de Rastreo de Dificuldades Alimentares, um instrumento de rastreo de dificuldades alimentares para indivíduos com paralisia cerebral.

Descritores: Comportamento Alimentar; Protocolos; Fonoaudiologia; Paralisia Cerebral

Received on: May 25, 2015
Accepted on: December 20, 2015

Mailing address:

Marcela de Oliveira Conde
Avenida Miguel Yunes, 491 -
Campo Grande
São Paulo – SP – Brasil
CEP: 04444-000
E-mail: marcela.conde5@gmail.com

INTRODUCTION

Feeding difficulties occur when the individual is unable or refuses to eat or drink a quantity or variety of food¹. These difficulties can lead to complications such as loss development and even malnutrition, depending on the severity of the clinical picture¹.

It is estimated that there are some difficulties during feeding in 25% to 35% of children with typical development and 33% of children with developmental difficulties². These feeding difficulties often represent temporary manifestations in childhood, but when they persist it is necessary the intervention of a specialist³.

Disorganization of the sensory system is one of the factors that may cause these feeding difficulties. Among these difficulties are feeding selectivity, present when the individual ingests a restricted amount of food and tends to reject various forms of preparation, and food refusal when he shows little interest and pleasure in food and refuses to experiencing new foods³. Refusal and food selectivity may prevent the individual to accept and / or manipulating food, bringing unpleasant experiences such as nausea or discomfort; and consequently to improve the experience and learning new consistencies, textures and new flavors of food⁴.

Among the diseases that occur with feeding difficulties is Cerebral Palsy (CP), which runs with tone changes, movement and body posture, due to non-progressive lesion of the central nervous system (CNS), which may occur in the pre, peri and postnatal⁵. Individuals with CP can have global and oral sensorimotor system motor disorders. This system is affected in the individual CP due to neurological damage, thus interfering with the development of orofacial structures, and performance of speech functions, feeding, swallowing and breathing⁶.

The speech therapist is the professional capable of dealing with feeding problems from the intervention on changes of organs and the stomatognathic system functions and can also avoid language difficulties and emotional and social relationships of the patient⁴. So, for better therapeutic intervention in food difficulties in individuals with CP, it is necessary a detailed assessment. This can be accomplished by observing behavior, feeding tasks (Informal assessment) or a formal review. From the use of a protocol, the analysis of the individual order is possible to determine characteristics that define the clinical picture and the selection of therapeutic goals, in addition to making it possible to compare a particular behavior of this individual at different times, ie check results achieved during

the therapeutic process⁷. As the literature does not have an assessment protocol capable of characterizing the sensitivity and oral motor function focusing on individuals with eating difficulties, particularly in individuals with CP, it is necessary to create it.

The objective of this study is to propose a protocol capable of analyzing both the sensitivity like oral motor function in feeding for patients with cerebral palsy.

METHODS

This study was approved by the Research Ethics Committee of the Associação de Assistência à Criança Deficiente (AACD), under nº. 033636/2013, and was held at Ibirapuera unit Speech Therapy sector of this same institution.

From the idea of creating a capable protocol to analyze both the oral motor aspect as sensory oral for screening feeding difficulties, were selected in the national and international literature, more protocols currently used in speech therapy clinical practice to assess the sensitivity and / or oral motor function.

Four speech therapists with experience in the care of patients with PC selected the following protocols for analysis:

- Myofunctional Orofacial protocol – MBGR⁸: an extensive protocol that makes it possible for speech therapist conduct a comprehensive assessment of the entire stomatognathic system;
- Sensory Profile - item Oral Sensory sensitivity⁹: the item allows a specific analysis of oral sensory issues. Currently the Sensory Profile is the main sensory evaluation protocol, and is validated and recognized internationally. It is a multidisciplinary instrument. In this study, we performed a free translation of the item Oral Sensory sensitivity of this test;
- Orofacial Myofunctional Assessment Protocol with scores – AMIOFE¹⁰: It is also an instrument of comprehensive evaluation functions and the stomatognathic system structures and has the advantage of having been validated, which increases its accuracy.

After analyzing the protocols, each of them the main evidence considered relevant to the making of the final protocol selected. Also tasks were made that were part of the established protocol, based on clinical experience. The instrument was created called «Feeding Difficulties Screening Protocol», consisting of medical history and clinical examination.

The elaborate instrument was submitted to analysis of 10 judges, nine of them with extensive experience in

speech motor orofacial area and a nutritionist, all with experience in the care of individuals with CP. Given the importance of nutritionist and multidisciplinary intervention in cases of feeding difficulties¹¹, it was decided to request the opinion of this professional.

It was asked judges to analyze carefully in each task contained in the protocol, writing your opinion or criticism individually about each of them. From the responses of the judges it was prepared a table showing the analysis of the data of the same in order to facilitate consensus analysis conducted by the authors. This analysis followed the criterion 0.7 of the agreement between them, on the permanence or removal of a particular task.

After analyzing the protocol, it was applied in a male individual with complaints of feeding difficulty, CP diparesis spastic and 5 years old, and two individuals without complaints of feeding difficulties, also with CP, with a type spastic hemiparesis and female and another diparesis spastic and male, both with 5 years of age. These actions were carried out in order to verify the feasibility of application of the instrument and, if necessary, then make changes in order to optimize the application. The number of patients in this pre-test was determined by consensus among the authors.

The application was carried out simultaneously by two of the speech therapists trained and who participated in the drafting of the instrument, in a session lasting 40 minutes, always being responsible for the implementation of clinical history, with questions directed to caregivers of individuals, and the other by clinical examination, implementation of tasks in individuals. This method of application has been determined so that both evaluators could participate in the application in the same individual.

Parents or guardians of patients previously authorized the application by signing the Informed Consent.

The results will be described qualitatively.

RESULTS

The following describes the results of this study.

Semantic validation protocol was held, with the selection and preparation of tasks to compose the instrument. This occurred after the selection of evaluation protocols both sensitivity and oral motor function, published in national and international literature⁸⁻¹⁰.

The instrument was created called «Feeding Difficulties Screening Protocol» (Annex 1), and contains the medical history and clinical examination.

Clinical History: this part contains the individual identification data, brief history of family history and clinical complications at birth and throughout the development, including information relating to possible respiratory changes due to the influence that this function plays in feeding and orofacial development. In addition, questions were also selected based on Sensory Profile⁹.

Clinical examination: This part consists of the following tasks: muscle tone, Sensitivity, Mobility, Feeding and breathing.

The procedures for application of the instrument are described below. the use of finger cot instead of gloves was established due to the aversion that some children have in relation to the glove, which is determination made after analysis by the judges.

With regard to muscle tone, there is a tone of tongue, lips and cheeks by palpation. For tongue and lips, the evaluator should use finger cots. Should be given the maximum score (one point) if the individual presenting appropriate muscle tone. In case of increased or decreased muscle tone is not assigned a score item (zero point).

Regarding the dedicated task to evaluate the sensitivity, the evaluator should make touches on extra oral region (skin of the cheeks) and intraoral regions (tongue, buccal mucosa and gingiva) using finger cot, the touches should be conducted bilaterally and, in the case of the gingiva, in all its quadrants. The maximum score (one point) should be given if the patient develops a typical reaction after the touch. If present hyper or hypo-response is no score to subsection (zero point).

Hyperresponsiveness are considered the following reactions: nausea and behavioral negative responses, such as turn away, walk away, pushing the hand evaluator preventing touch and / or make faces, suggesting discomfort. The absence of oral reactions like saliva, swallowing and tongue and lips movements are considered hyporesponsiveness.

As regards mobility, must be requested verbally and sign and / or tactile support, if necessary, carrying out specific orofacial feeding structures movements:

- Lips: protrude, retract, lateralized (left and right);
- Tongue: protrude, retract, lateralized (left and right), raise and lower;
- Cheeks: inflate, sucked, lateralized air;
- Mandible: lower and raise.

The maximum score for each item (one point) is assigned if the individual accomplish the movement requested, otherwise the item is not scored (zero point).

For realization of feeding screening, we selected two types of food for each consistency, namely: water and passion fruit juice for the liquid consistency and the sour taste; French bread and filled wafer for solid consistency and salty and sweet flavors; porridge industrialized salt, with or without crushed biscuit flour; and yoghurt type Petit Suisse, with and without corn flakes to the pasty consistency both heterogeneous and homogeneous and salty flavors and sweet.

Food should be offered the tools which the individual is used to use daily to prevent adverse reactions to intraoral touch unusual items. As for the amount of food, it is expected that the individual can consume a minimal amount of food: a sip of water and a passion fruit juice; a bite of French bread and the stuffed sweet wafer; a spoonful of salt in porridge homogeneous consistency, one in heterogeneous consistency, one for the homogeneous consistency of the yoghurt and the other for the same food in heterogeneous consistency, as proposed above.

From the supply of these foods, the observation of the intake and response of the individual to the different characteristics of food and given the corresponding score is performed. The maximum score (one point) the task occurs when the person eats the food in question and his response is considered typical. If the individual has ingested food, but presented a hyper or hiporresponsa, the item is not scored (zero point). The same is true for the individual who does not eat food.

Hyperresponsiveness are considered the following reactions: nausea, rejection of food (like spitting or not swallow) and behavioral negative responses, such as turn away, walk away, pushing the hand of the appraiser and / or grimacing, suggesting discomfort. As hyporresponsiveness are considered: the absence of any kind of orofacial reaction against a strong stimulus intensity.

Such responses (exacerbated, decreased or refusal) receive the same score as they are not expected and thus considered in this study, feeding difficulty characteristics, therefore has equal weight in the score.

With regard to chewing and sealing Lip item from the food offered, this screening protocol aims to analyze aspects related to the incision and the chewing pattern, and the presence or absence of the lip seal.

Regarding the incision analyzes the occurrence or absence. If it occurs, it is assigned a point in the absence of incision does not score (zero point).

The chewing pattern if the person has alternate bilateral chewing are given two points; the chewing unilateral type is assigned to only one point. In the absence of this process and the presence of kneading is not score (zero point). Furthermore, if joints presence of noise and / or the individual atypical muscle contractions should also not receive score (zero point).

As the sealing lip, there is the occurrence of labial during chewing. In this pattern the presence individual receives a point and in the absence, zero.

In the breath item, it should be considered the predominant breathing mode presented by the individual during the tasks previously performed. In case he present nasal breathing, the individual receives two points; if the breathing mode is oronasal the score should be a point; and the absence score (zero) should be given only for the case of oral breathing.

The score should be scheduled after analysis of each task individually in the protocol field for it. In the end, there is another field for the total score of the protocol, this should be added the individual score for each task. The maximum score that can be achieved in this instrument is 51 points.

So that the protocol was made the way it was presented, it had to go through the composition and adapt the instrument. For this, 100% of the judges agreed with the permanence of the proposed tasks and suggested some modifications. The changes suggested and accepted by the authors are described in Figure 1.

After the restructuring of the protocol was part of adapting a pre-test: two trained speech therapists applied the instrument in three individuals, one CP and feeding difficulty, and two individuals with CP without feeding difficulties. From the need among pre-test, there were minor modifications related to: restructuring of questions to ask the mother during the interview of the clinical history, and structural formatting protocol, including spaces for notes.

During the prior application of the Protocol, it found that this screening tool for feeding difficulties can be performed in a session of 40 to 60 minutes and requires little food for analyzing food issues. The final version was titled «Feeding Difficulties Screening Protocol» and is presented in Annex 1.

| Clinical History | Clinical examination |
|--|--|
| <ul style="list-style-type: none"> To include the observation of the type of occlusion; To include the specification of the tools used during feeding. | <p>FEEDING</p> <ul style="list-style-type: none"> Evaluation of: a neutral liquid (water), a solid sweet (filled wafer) and a heterogeneous pasty. <p>CHEWING AND SEALING LIP</p> <ul style="list-style-type: none"> Separation of the lip seal score, making it an item to be evaluated separately; Restructuring the instructions; The restriction in chewing classification in only two types: unilateral and bilateral alternating. <p>SENSITIVITY</p> <ul style="list-style-type: none"> Item naming changes before titled «Touch»; Specification of the use of the fingerstall and no longer sleeve. <p>MOBILITY</p> <ul style="list-style-type: none"> The elimination of sub-items that assess laterality Jaw; Restructuring the instruction to be given to the individual; The indication of the possibility to review this item during chewing function. <p>MUSCLE TONE</p> <ul style="list-style-type: none"> The Specified the best way to evaluate: palpation. |

Figure 1. Description of the changes suggested by the judges after protocol analysis

DISCUSSION

In clinical practice it has been observed incidence of individuals with CP who have feeding difficulties, whether only one selective or total denial of food. Thus, from the intention of improving the quality of therapeutic intervention in individuals with CP, it was necessary to draw up a protocol specifying the feeding difficulties.

This screening protocol of feeding difficulties followed the criteria of adaptation of instruments described in the literature^{8,12}. A formal instrument with careful semantic adaptation is important to ensure the error reduction interpretation by both the professional who is analyzing the performance of an individual, as a part of the individuals¹².

Although this instrument has been built with the aim of analyzing the possible presence of feeding difficulties in individuals with PC, it is also designed for children with other diseases or healthy without restriction in terms of age.

The proposed protocol in this study contains a Clinical History, composed of questions related to food and tasks related to the acceptance and reaction to foods with different flavors and textures, the chewing and lip seal. In addition to tests that examine the reaction to the extra touch and intraoral, mobility and muscle tone of speech organs and the breathing mode.

During the preparation of Clinical History questions were selected concerning feeding functions and their structures, such as breathing and dental occlusion.

Respiratory changes also common in children with CP due to the global motor changes¹³.

In relation to breath, lies in the literature that the smell and taste are closely related, nasal obstruction leads to reduction of smell, reducing appetite, for the occurrence of some nutritional disorders¹⁴.

Issues related to dental occlusion were included because studies refer to malocclusion as one of the responsible for the improper functioning of orofacial functions, causing interference in chewing¹⁵.

Questions related to chewing food and analyzed the individual, directed to the caregiver, are also part of the clinical history of the protocol proposed here. They show the consistency, texture and taste of food that the individual supports and preferring to eat, or otherwise, it is difficult in literature reports to feed the infant development¹⁶. These issues contain information that are also in the clinical examination in the form of tasks to be analyzed by the evaluator, the purpose of which are repeated to check the perception of the caregiver towards chewing and feeding of the child.

The literature reports that the sensory characteristics of a food is very important to determine their acceptability¹⁷, so the need to properly investigate both the intake, the reaction of children to foods with different flavors¹⁸, textures, consistencies¹⁷.

Studies show that sour or too strong flavor are determining factors for individuals reject certain foods. But the sweet taste is the main factor that determines the preference to certain foods¹⁹. Therefore, it is important to include a feeding assessment protocol these dietary

characteristics. In the proposed protocol in this study in addition to these characteristics, also part of the analysis of the salty taste, since it is the daily food predominance of this flavor.

Authors say that the texture of the food has great influence on the acceptance of food standards for children¹⁷. When a child presents feeding difficulties, it may show signs of hypersensitivity, or the central nervous system can not control the sensory properties⁴. For this reason, we chose to evaluate different textures of the same consistency, in this case the pasty consistency with homogeneous and heterogeneous texture.

Children aged around three to six years tend to eat fewer foods consistent with sound-soft texture and predominantly pasty²⁰. Thus, there was the need to include in the protocol proposed notice of acceptance and reaction to different textures of foods, such as solid, liquid and pasty.

The data relating to the preference of children by eating less consistent food are worrisome, because this kind of food does not demand great work of muscles related to chewing and may lead to loss of muscle strength²¹. Thus, food-type hard, dry and fibrous are important to stimulate chewing learning²². Also for this reason, they have been incorporated into the protocol foods with different characteristics: texture, flavor and consistency.

According to the literature, the alternating bilateral chewing allows a uniform distribution of masticatory forces²³, leading to a sync and functional muscular balance from the rotation of the working side and the muscle relaxing²⁴. Unilateral chewing causes muscular changes, affecting the performance of the entire masticatory system²⁵. Based on these data, and knowing the importance of chewing to the stomatognathic system was included in the protocol masticatory type checking the assessed individual. In view of the condition being assessed by the protocol and the alternating unilateral and bilateral types, research absence of chewing was included, ie only in the presence of food kneading.

It was decided to include the observation of the presence or absence of the initial phase of chewing, the incision, due to the great importance of this phase for chewing. It is during the incision arriving information consistency, temperature and size of the food, to process the subsequent phases²⁶.

The sealing lip during chewing may be absent due to respiratory changes that can be found commonly in subjects with CP. Mouth breathing tends to modify the functioning and the stomatognathic system structures,

so the individual can not properly chew food due to the need to breath²⁷. For this reason it was also emphasized in the study protocol to observe the lip seal related to chewing.

The presence of atypical muscle contractions and noise during chewing can be a consequence of any deviation in the masticatory process, either by changes in the temporomandibular joint or related muscles²⁸. For this fact, it was also inserted into the protocol a topic for verification of these factors.

The Sensitivity related task, which suggests checking the individual's reaction to the touch intra and extra oral region, and analyze what the behavior. In clinical practice, it is known that a considerable number of individuals with sensorimotor disorders respond to this kind of stimulus with a reaction of discomfort, this is due to disorganization in the sensory system²⁹, ie the ability of the central nervous system to capture, process and use sensory information. These changes can lead a simple touch to generate a wealth of information to the nervous system, so the individual will be easily disturbed, reacting to stimulus unexpected way²⁹. It is believed that the observed hypersensitivity may interfere acceptance and handling of food on the oral cavity, bringing forward the food unpleasant experience, and provide increased episodes of nausea and / or food discomfort⁴.

Regarding mobility, tasks were selected that are able to verify the characteristics of the movements of the lips, tongue, cheeks and jaw. It is known that the masticatory function is very complex, and its smooth operation involves the interaction of said structures³⁰. The quality of the muscle tone of chewing was also evaluated, due to its importance for proper chewing function³¹.

According to the American Speech-Language-Hearing Association (ASHA), motor-oral alteration can compromise breathing and chewing functions, defining this change like oral myofunctional disorder that include abnormal anterior placement of the tongue, lip incompetence, which may include phonoarticulatory changes, influencing the chewing process and as a result, interfering with the feeding process³².

The analysis of expert judges (Figure 1) allowed an agreement on the stay, withdrawal or modification of protocol evidence. This analysis contributed to a more specific protocol to assist in feeding difficulty of screening, in addition to promoting best adaptations for the benefit and convenience of the valued.

The changes made to the protocol along the semantic validation (Figure 1) aimed at an easy and complete analysis with selected tasks and adapted for individuals with CP. As an example, there is the use of low cost food and easy acceptance by all patients, questions about the functions related to food and its structures like dental occlusion and breathing.

The elaborate instruments in accordance with the criterion that the better the individual's performance, the higher your score, which is a sliding scale, ranging from 0 to 2 points, depending on the task at hand and the expected result to normal. Despite scoring scale not be comprehensive as in other instruments widely used for oral myofunctional evaluation^{8,10}, there was a positive assessment of judges on the scale used in this instrument and also there were no difficulties or limitations applicable during the pre-test conducted. The literature has protocols whose score shows little variation. However, it was possible to perform validation and widespread use, such as the Nordic Orofacial Test - Screening³³.

This protocol, as a screening tool, is rapid, which allows the professional expert briefly to obtain a more accurate diagnosis.

Considering that a screening tool selects people most likely to present particular disease in question from a general population, and that when an individual show signs and symptoms of a particular disease, it must be subjected to a full and specific evaluation³⁴. It is suggested that future studies are undertaken in larger populations to be tested and psychometric characteristics of validity of this instrument.

CONCLUSION

In this study, the Food Difficulties Screening Protocol was proposed, a screening tool for individuals with CP. The methods used for their adaptation enabled the creation of an instrument with lower risk of interpretation errors and tasks that analyze the risk of feeding difficulties, trying to specify the change of the individual with CP.

REFERENCES

1. Polan HJ, Kaplan MD, Kessler DB, Shindledecker R, Newmark M, Stern DN et al. Psychopathology in mothers of children with failure to thrive. *Infant Ment. Health J.* 1991;12(1):55-64.
2. Palmer S, Horn S. Feeding problems in children. In: Palmer S, Ekvall S (eds.) *Pediatric nutrition in developmental disorders*. Springfield, Ill: Charles C. Thomas, 1978. p.107-29.
3. Fontes BV, Morgan CM, Moraes DEB. Transtornos alimentares na infância. In: Claudino AM, Zanella MT, organizadores. *Transtornos Alimentares e Obesidade*. Barueri: Manole, 2005. p.79-87.
4. Silvério CC, Sant'Anna TP, Oliveira MF. Ocorrência de dificuldade alimentar em crianças com mielomeningocele. *Rev CEFAC.* 2005;7(1):75-81.
5. Piovesana AMMSG. Paralisia Cerebral: Contribuições do Estudo por Imagem. In: Souza AMC, Ferraretto I (organizadores). *Paralisia Cerebral – Aspectos Práticos*. São Paulo: Frôntis Editorial, 1998. p.9- 37.
6. Cesa CC, Ecco CT, Bersch R, Chiappetta ALML. Desempenho das funções e reflexos orais em crianças com encefalopatia crônica infantil do tipo quadriparesia espástica. *Rev CEFAC.* 2004;6(2):158-63.
7. Felício CM. Desordem temporomandibular: avaliação e casos clínicos. In: Junqueira P, Dauden MTBC. *Aspectos atuais em terapia fonoaudiológica*. São Paulo: Pancast; 2002. p. 33-63.
8. Genaro KF, Berretin-Felix G, Rehder MIBC, Marchesan IQ. Protocolo Miofuncional Orofacial - Protocolo MBGR. *Rev CEFAC.* 2009;11(2):237-55.
9. Dunn W. *The Sensory Profile: User's manual*. San Antonio, TX: Psychological Corporation, 1999.
10. Felício CM, Ferreira CL. Protocol of orofacial myofunctional evaluation with scores. *Int J Pediatr Otorhinolaryngol.* 2008;72:367-75.
11. Junqueira P. Aspectos sensorio-orais e suas interferências no comportamento alimentar da criança. 2º Congresso Internacional Sabará de Especialidades Pediátricas; 2014 Set 12-14; São Paulo, SP. São Paulo: Blucher; 2014.
12. Radanovic M, Mansur LL. Performance of a Brazilian population sample in the Boston diagnostic aphasia examination: a pilot study. *Braz J Med Biol Res.* 2002;35:305-17.
13. Vivone GP, Tavares MMM, Bartolomeu RS, Nemr K, Chiappetta ALML. Análise da consistência alimentar e tempo de deglutição em crianças com paralisia cerebral tetraplégica espástica. *Rev CEFAC.* 2007;9(4):504-51.
14. Klein E. Obstrução nasal: um obstáculo à vida. *Rev Bras Otorrinolaringol.* 1987;53(4):106-10.
15. Freitas V, Matsumoto MAN. Incidência de más oclusões dentárias em pacientes respiradores bucais. In: Marchesan IQ, Zorzi JL. *Tópicos*

- em fonoaudiologia. São Paulo: Revinter, 2003. p.279-87.
16. Kachani AT, Abreu CLM, Lisboa SBH, Fisberg M. Seletividade Alimentar da Criança. *Pediatria*. 2005;27(1):48-60.
 17. Cunha CS, Castro CF, Pires CV, Pires ISC, Halboth NV, Miranda LS. Influence of the texture on the acceptance of oat creams by people from different ages. *Alim.Nutr*. 2009;20(4):573-80.
 18. Battochio JR, Cardoso JMP, Kikuchi M, Macchione M, Modolo JS, Paixão AL et al. Perfil sensorial de pão de forma integral. *Ciênc Tecnol Alim*. 2006;26(2):428-33.
 19. Valle JMN, Euclides MP. A formação dos hábitos alimentares na infância: uma revisão de alguns aspectos abordados na literatura nos últimos dez anos. *Rev APS*. 2007;10(1):1-20.
 20. Medeiros JS, Maciel CRB, Motta AR. Levantamento dos hábitos alimentares de crianças de 4 a 6 anos: base para um trabalho preventivo-comunitário. *Rev CEFAC*. 2005;7(2):198-204.
 21. Oliveira AS, Silva VAP, Alves JJ, Fagundes D, Pires ISC, Miranda LC. Eating habits of preschoolers: the influence of mothers and breastfeeding. *Alim. Nutr*. 2012;23(3):377-86.
 22. Franco MLZ. Mastigação bilateral: mito ou realidade. *Rev Soc Bras Fonoaudiol*. 1998;2(3):35-42.
 23. Rahal A, Goffi-Gomes MVS. Avaliação eletromiográfica do músculo masseter em pessoas com paralisia facial periférica de longa duração. *Rev CEFAC*. 2007;9(2):207-12.
 24. Agostini TM, Santana CAM. Aspectos da mastigação em crianças com dentição mista. *Rev CEFAC*. 2003;5(3):259-63.
 25. Coelho Jr PGP. O estudo da importância da mastigação para a manutenção do equilíbrio do sistema estomatognático [tese]. Contagem (MG): Instituto de ciências da saúde - FUNORTE / SOEBRÁS; 2011.
 26. Tagliaro ML, Calvi CL, Chiappetta ALML. A fase de incisão no processo da mastigação: enfoque clínico. *Rev CEFAC*. 2004;6(1):24-8.
 27. Silva MAA, Natalini V, Ramires RR, Ferreira LP. Análise comparativa da mastigação de crianças respiradoras nasais e orais com dentição decídua. *Rev CEFAC*. 2007;9(2):190-8.
 28. Mancini MC, Alves ACM, Schaper C, Figueiredo EM, Sampaio RF, Coelho ZAC et al. Gravidade da paralisia cerebral e desempenho funcional. *Rev Bras Fisioter*. 2004;8(3):253-60.
 29. Weiss-Salinas D. Sensory defensiveness: a theory of its effect on breastfeeding. *J Hum Lact*. 2001;17:145-51.
 30. Whitaker ME, Trindade Júnior AS, Genaro KF. Proposta de Protocolo de avaliação clínica da função mastigatória. *Rev CEFAC*. 2009;11(3):311-23.
 31. Felício CM. Fonoaudiologia aplicada à casos odontológicos: motricidade oral e audiologia. 1ª Ed. São Paulo: Pandcast; 1999.
 32. American Speech-Language-Hearing Association. The role of the speech-language pathologist in assessment and management of oral myofunctional disorders. Ad Hoc Committee on Labial-Lingual Posturing Function. *ASHA Suppl*. 1991;33(5):7.
 33. Bakke M, Bergendal B, McAllister A, Sjogreen L, Asten P. Development and evaluation of a comprehensive screening for orofacial dysfunction. *Swed Dent J*. 2007;31(2):75-84.
 34. Goulart BNG, Chiari BM. Avaliação clínica fonoaudiológica, integralidade e humanização: perspectivas gerais e contribuições para reflexão. *Rev Soc Bras Fonoaudiol*. 2007;12(4):335-40.

Annex 1 - Feeding Difficulties Screening Protocol

| Feeding Difficulties Screening Protocol <i>Conde, M.O.; Tessicini, G.; Bittar, D.P.; Soares-Ishigaki, E.C.S.</i> | | | |
|---|-----|----|-----------|
| CLINICAL HISTORY | | | |
| Name: _____ ID: _____ DB: ___ / ___ / ___ Age: _____ Exam date: ___ / ___ / ___ Informer: _____ Diagnosis: _____ Motor Level (GMFCS): _____ Complaint: _____ Brief History (Family history, Complications during pregnancy and childbirth): _____ | | | |
| Medicines: _____ RGE () | | | |
| Breathing problems: Frequent colds () Tonsillitis () Nasal obstruction () Other: _____ Posture of the lips: Parted () Closed () Breast-feeding Breast: yes () no () From _____ months to _____ Bottle: yes () no () From _____ months to _____ Increased nipples: yes () no () Tools for feeding: () glass. Type: _____ () straw () spoon. Type: _____ () fork Occlusion: Normal () Altered: Open: () anterior () lateral () Butt () Cross | | | |
| CHEWING | | | |
| Instruction – The evaluator will ask the responsible for the patient: “You realize that your son ...” | | | |
| | YES | NO | SOMETIMES |
| Need liquid to facilitate the chewing | | | |
| Feel any pain or discomfort in chewing | | | |
| Make a lot of effort to chew | | | |
| Exhaust food during chewing | | | |
| Observations: _____ | | | |
| FEEDING | | | |
| Instruction - The evaluator will ask the responsible for the patient: “You see his son ...” | | | |
| | YES | NO | SOMETIMES |
| Difficulty drinking liquid in the cup | | | |
| Difficulty in accepting different consistencies | | | |
| Difficulty eating fruit | | | |
| Difficulty eating vegetables | | | |
| Difficulty eating greens | | | |
| Difficulty eating cereals (rice, pasta, wheat, ...) | | | |
| Difficulty eating grains (beans, lentils, corn, ...) | | | |

| | | | |
|--|--|--|--|
| Difficulty eating meat | | | |
| Difficulty eating or drinking milk derivatives | | | |
| Difficulty eating foods with sugar | | | |
| Difficulty in accepting different flavors | | | |
| Difficulty in perceiving differences in the texture of the food | | | |
| Difficult to accept most foods | | | |
| Difficulty in brushing teeth | | | |
| Difficulty in trying new foods | | | |
| Difficulty notice of food remains on the lips | | | |
| Difficulty notice when the lips are wet | | | |
| Usually smell objects | | | |
| Usually smell food | | | |
| Difficulty accepting food with strong flavor (lemon, black pepper) | | | |

CLINICAL EXAM**TONE**

Instruction – The evaluator should touch lips, tongue and cheeks of the patient and check the tone of the structures.

Score – It is assigned a score of 1 if it is found suitable tone structure (normotonic); and a score of 0 if it is found increased or decreased tone.

| | Normotonic | Decreased tone | Increased tone |
|--------|-------------------|-----------------------|-----------------------|
| Lips | (1) | (0) | (0) |
| Tongue | (1) | (0) | (0) |
| Cheeks | (1) | (0) | (0) |

TONE SCORE**SENSITIVITY**

Instruction – Using finger cot, the evaluator will be expected to touch the locations described below.

Score – It is assigned a score of 1 if there is no overreaction (hyperresponsiveness) or very low reaction (hyporresponsiveness) to the touch. A score of 0 is assigned if the patient presents overreaction (hyperresponsiveness), greatly reduced or absent touch.

| Local | Reaction to the touch | | |
|--|------------------------------|----------------------------|----------------------------|
| | Typical | Hyperresponsiveness | Hyporresponsiveness |
| Right Extra Oral (cheek) | (1) | (0) | (0) |
| Left Extra Oral (cheek) | (1) | (0) | (0) |
| Right Tongue – lateral (the forward movement from the middle of the tongue) | (1) | (0) | (0) |
| Left Tongue – lateral (the forward movement from the middle of the tongue) | (1) | (0) | (0) |
| Right Intra Oral (inner cheeks) | (1) | (0) | (0) |
| Left Intra Oral (inner cheeks) | (1) | (0) | (0) |
| Gingiva: top right (from the upper labial frenulum) | (1) | (0) | (0) |
| Gingiva: top left (from the upper labial frenulum) | (1) | (0) | (0) |
| Lower right gingiva (from the upper labial frenulum) | (1) | (0) | (0) |
| Lower left gingiva (from the upper labial frenulum) | (1) | (0) | (0) |

SENSITIVITY SCORE

| MOBILITY | | | | | |
|---|------------|-----------|---------------|---------------------|---------------------|
| Instruction – The evaluator must ask the patient verbally, by gesture or if necessary with tactile track, which perform the movements below, whenever possible: «You should ...». The required movements can also be observed in the chewing function. | | | | | |
| Score – The score 0 is given when the patient does not perform the movement in question and score 1 is assigned whenever the patient perform the movement. | | | | | |
| LIPS | | | | | |
| “...Make a beak “(protrusion) | | | (1) | (0) | |
| “...Give a smile “(retraction) | | | (1) | (0) | |
| “...Make a beak on this side “(Right Sides) | | | (1) | (0) | |
| “...Make a beak of this other side “(Left Sides) | | | (1) | (0) | |
| LIPS MOBILITY SCORE | | | | | |
| TONGUE | | | | | |
| “...put out his tongue with mouth open “(protrusion) | | | (1) | (0) | |
| “...put the tongue in the back of the mouth with open mouth “(retraction) | | | (1) | (0) | |
| “...put the tongue on this side with an open mouth “(Right Sides) | | | (1) | (0) | |
| “...put the tongue of this other side with an open mouth “(Left Sides) | | | (1) | (0) | |
| “...touch the tip of the tongue on the upper lip with an open mouth “(Raise) | | | (1) | (0) | |
| “...touch the tip of the tongue on the lower lip with an open mouth “(Lower) | | | (1) | (0) | |
| TONGUE MOBILITY SCORE | | | | | |
| CHEEKS | | | | | |
| “...fill the cheeks of the air “(inflate) | | | (1) | (0) | |
| “...put the cheeks inside “(suction) | | | (1) | (0) | |
| “...fill the air cheek and take it from one cheek to the other “(lateralized) | | | (1) | (0) | |
| CHEEKS MOBILITY SCORE | | | | | |
| JAW | | | | | |
| “...open your mouth “(Lower) | | | (1) | (0) | |
| “...close your mouth now “(Raise) | | | (1) | (0) | |
| JAW MOBILITY SCORE | | | | | |
| MOBILITY TOTAL SCORE | | | | | |
| FEEDING | | | | | |
| Instruction – The evaluator must offer the patient the following foods: water, passion fruit juice, stuffed sweet biscuits, French toast, yoghurt type Petit Suisse or fruit baby food with and without corn flakes, salt porridge with and without cookie salted flour and observe the patient’s reaction. | | | | | |
| Score – It is assigned a score of 1 if the patient ingest the food in question and there is no overreaction (hyperresponsiveness) or very low (hyporresponsiveness) to food. A score of 0 is assigned if the patient does not accept the food in question, and if there is overreaction (hyperresponsiveness) or very low (hyporresponsiveness) to food. | | | | | |
| Acceptance Feed forms | Ingest | | Food reaction | | |
| | Yes (1) | No (0) | Typical | Hyperresponsiveness | Hyporresponsiveness |
| Liquid | (1) | (0) | (1) | (0) | (0) |
| Pasty Homogeneous | (1) | (0) | (1) | (0) | (0) |
| Pasty Heterogeneous | (1) | (0) | (1) | (0) | (0) |
| Solid | (1) | (0) | (1) | (0) | (0) |
| Salty | (1) | (0) | (1) | (0) | (0) |
| Sweet | (1) | (0) | (1) | (0) | (0) |
| Sour | (1) | (0) | (1) | (0) | (0) |
| FOOD SCORE | | | | | |
| Observations: | | | | | |

CHEWING AND SEALING LIP

Instruction – The evaluator must offer French bread to the patient, and observe the pattern shown chewing, as well as the presence or absence of noise and muscle contractions.

Score – The score 2 will be assigned only to patients presenting bilateral chewing pattern; A score of 1 should be given to the patient who develops food incision, unilateral chewing pattern, and when it is observed the presence of lip seal and absence of noise, atypical muscle contractions and kneading. In the absence of lip sealing and presence of noise, atypical muscle contractions and kneading, the score should be 0.

| CHEWING | | SEALING LIP | |
|------------------------------|---------|-------------------|--|
| Incision | (1) (0) | (1) (0) | |
| Bilateral alternate | (2) | | |
| Unilateral | (1) | | |
| Noise | (1) (0) | | |
| Atypical muscle contractions | (1) (0) | | |
| Kneading | (1) (0) | | |
| CHEWING SCORE | | SEALING LIP SCORE | |

BREATHING

Instruction – The evaluator should observe during the tasks requested that the respiratory pattern presented by the individual.

Score – It is assigned a score of 2 when checked nasal breathing, one in the case of mixed breathing mode and 0 to oral breathing mode.

| Nasal | Mixed Breathing | Oral |
|-----------------|-----------------|------|
| (2) | (1) | (0) |
| BREATHING SCORE | | |
| TOTAL SCORE | | |