

EFFECTIVENESS OF SPEECH THERAPY IN EVOLUTION OF ORAL INGESTION IN PATIENTS WITH POST STROKE OROPHARYNGEAL DYSPHAGIA

Efetividade da intervenção fonoaudiológica na progressão da alimentação via oral em pacientes com disfagia orofaríngea pós AVE

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ABSTRACT

Purpose: to analyze the effectiveness of speech therapy in the evolution of oral ingestion of patients with dysphagia symptoms, who have suffered previous or current stroke, admitted to a federal hospital in Rio de Janeiro. **Methods:** a retrospective study was made from medical records of 20 patients, for which was requested speech therapy for dysphagia. A functional scale was used to compare the oral ingestion level of each patient, before and after the therapy. Possible interference factors in the progression on the scale were studied: age, duration and incidence of previous stroke, clinical complications. **Results:** over 20 patients, 15 showed improvement in the oral intake scale after speech therapy. Clinical complications were considered statistically significant for the lack of evolution in oral feeding. Other analyzed factors were not statistically significant, and they did not interfere in the improvement or worsening of the patient. **Conclusion:** speech therapy is effective in improving food intake by mouth in patients treated in hospitals with neurogenic dysphagia after stroke, except if clinical complications appear during the process.

KEYWORDS: Deglutition Disorders; Speech Therapy; Stroke

■ INTRODUCTION

It is understood as swallowing, the passage of stomach contents into the mouth, and it may refer to the flow of bolus or saliva. It is programmed in successive phases: preparatory, oral, pharyngeal and esophagic¹.

The disorder in the process of swallowing is called dysphagia and can be caused by a mechanical or neurological problem. Clinically it may manifest itself through symptoms like disorder in chewing, difficulty in initiating swallowing, nasal regurgitation, decreased saliva control, coughing and/or choking during meals. There may be further dehydration,

pneumonia and other pulmonary problems that can be linked to a dysphagia without symptoms².

Cerebrovascular diseases are considered the leading cause of death worldwide and the second in Brazil, accounting for numerous sequels that produce highly disability^{3,4}. Among them there is the oropharyngeal dysphagia, which has an incidence that varies from 40% to 90%, becoming, therefore, a common manifestation of stroke²⁻⁵.

Changes may vary depending on the site and extent of the lesion as well as on the age at which the stroke occurs. The elderly population is most commonly affected by stroke, and may have more difficulty in compensating changes in muscle tone that reduce chewing and decrease tongue pressure³.

There is no doubt that the high incidence of dysphagia represents co-factor for mortality and morbidity. Thus, the diagnosis of dysphagia should not be restricted to the acute phase of stroke⁴.

The patient with dysphagia, while in hospital, needs care of a multidisciplinary team of speech

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therapists, doctors of different specialties, physio-therapist, nutritionist, nurse, occupational therapist and psychologist. This team has a focus in minimizing the risks of early complications and preparing for the rehabilitation of sequels. The early speech-language intervention (twenty-four to forty-eight hours after the event and with the patient clinically stable) in a hospital environment aims an early identification of dysphagia and prevention of clinical complications⁶ and may shorten the use of alternative feeding means, time of hospitalization, and contribute to the improvement of pulmonary condition. The development of safe and functional oral intake of the patient, associated with the maintenance of lung health and nutritional status is a significant evidence of the therapeutical effectiveness⁷. Therefore, there is a necessity of checking which alternative feeding means and food consistencies the patient with oropharyngeal dysphagia will present before and after speech therapy.

Some factors can interfere in patient outcomes in relation to food intake by mouth, as the clinical worsening of the patient, the clinical complications and decreased level of consciousness. Other factors analyzed in studies, such as age and underlying disease, were not statistically significant, suggesting not interfere with improvement or worsening of patient⁸.

It is of utmost importance the realization of a speech-language service management by standard indicators, facilitating the analysis of performance over time, also the inclusion of new processes and technologies, and comparison with other services judged as references, called benchmark. This management contributes to highlight the efficiency and effectiveness of rehabilitation programs⁹.

The effectiveness of rehabilitation in oropharyngeal dysphagia can be proven when the patients can eat by mouth adequately. In order to measure this effectiveness, current research sought to establish scales of functional control of swallowing, with features such as: rehabilitation time compared to their functional effects, type of alternative feeding means that the patient began rehabilitation and which changes occurred during the process, increased volume, change in consistency of oral intake and others¹⁰.

A measuring scale was developed by the American Association of Speech-Language Pathology (ASHA) in 1997, called the National System of Measurement Results (NOMS) – which consists of a collection of data to illustrate the value of speech therapy in adults and children referring to communication and swallowing. Those measures are used for communication function (MCF) and consist of a seven point scale applied to specific

disorders and designed to describe the change in functional communication of the individual and/or ability to swallow over time. The audiologist marks the level at which the patient is on admission and at discharge to describe the amount of change in communication and swallowing after intervention. By examining the admission and discharge of banknotes, one can evaluate the amount of change, and thus the benefits of treatment¹¹.

The objective of this study was to analyze the effectiveness of speech therapy on progression of oral feeding of patients with symptoms of dysphagia that underwent prior or current stroke, admitted to a federal hospital in Rio de Janeiro, using the scale-ASHA NOMS.

■ METHODS

A retrospective study of medical records of patients with stroke admitted to a federal hospital in the city of Rio de Janeiro, with symptoms of neurogenic oropharyngeal dysphagia, and for which language intervention was requested by attending physicians. Data from January to August 2011 were collected.

Of the 161 patients enrolled in the Speech Therapy in the analyzed period, 20 adults and elderly were included in the survey, as meeting the criteria for participation, namely: having suffered previous or current stroke, with symptoms of oropharyngeal dysphagia; breathing ambient air; present clinically stable and respond to simple verbal commands. Patients who showed abnormalities in phonatory structures, tracheostomy, ventilator dependency, lowered level of consciousness and clinically very committed were excluded.

The sample comprised 20 patients, 14 females (70.0 %). The average age was 71.85 (+/-14.41 years). The minimum age was 38 years and maximum 88 years. The median was 75 years.

According to the need of each patient, a program of rehabilitation of swallowing consists of evaluations, analysis of case severity and risk of dysphagia in a managerial⁹ perspective was performed. Speech therapy focused was also performed for the rehabilitation of swallowing during hospitalization, with techniques described in the literature as thermal stimulation, swallowing maneuvers and myofunctional exercises^{12,13}.

ASHA NOMS scale was used to check the development of oral intake in two stages, before and after speech therapy. To mark the first level at which the patient was in the range, it was considered the food of this status before the initial speech evaluation. And to mark the level after speech therapy, dietary

status was verified at speech therapy discharge. This discharge encompasses the following reasons: functional swallowing rehabilitation, hospital discharge, gastrostomy, putting sector in disposal due to no possibility of intervention at the time (eg, in the case of tracheal intubation).

ASHA NOMS scale describes whether there was a change in functional status after the speech therapy of patients with dysphagia (Figure 1) swallowing . The scale has not yet been validated in Portuguese translation therefore will be used in English.

ASHA-NOMS scale	
LEVEL 1:	Individual is not able to swallow anything safely by mouth. All nutrition and hydration is received through non-oral means (e.g., nasogastric tube, PEG).
LEVEL 2:	Individual is not able to swallow safely by mouth for nutrition and hydration, but may take some consistency with consistent maximal cues in therapy only. Alternative method of feeding is required.
LEVEL 3:	Alternative method of feeding required as individual takes less than 50% of nutrition and hydration by mouth, and/or swallowing is safe with consistent use of moderate cues to use compensatory strategies and/or requires maximum diet restriction.
LEVEL 4:	Swallowing is safe, but usually requires moderate cues to use compensatory strategies, and/or the individual has moderate diet restrictions and/or still requires tube feeding and/or oral supplements.
LEVEL 5:	Swallowing is safe with minimal diet restriction and/or occasionally requires minimal cueing to use compensatory strategies. The individual may occasionally self-cue. All nutrition and hydration needs are met by mouth at mealtime.
LEVEL 6:	Swallowing is safe, and the individual eats and drinks independently and may rarely require minimal cueing. The individual usually self-cues when difficulty occurs. May need to avoid specific food items (e.g., popcorn and nuts), or require additional time (due to dysphagia).
LEVEL 7:	The individual's ability to eat independently is not limited by swallow function. Swallowing would be safe and efficient for all consistencies. Compensatory strategies are effectively used when needed.

Figure 1 – National Measurement System Results – American Speech-Language-Hearing Association – National Outcomes Measurement System – ASHA NOMS

Improvement was considered when an increase in the level scale in the post speech therapy occurred, and worsening considered when lowering the level in the post speech therapy.

It was also verified if the following factors could interfere with the progression of oral feeding of patients with speech therapy, such as:

- Age: age was analyzed in the group that did not develop in ASHA NOMS scale and the group that evolved, the average was compared to verify whether age has an impact on the improvement in scale.
- Time of stroke and incidence of previous strokes: we verified whether these factors influence the level progression in the ASHA NOMS scale.
- Clinical deterioration and lowering the level of consciousness: these items were considered when the patient did not respond to simple

verbal commands for different reasons, namely infection, worsening of respiratory symptoms, worsening of neurological symptoms; comparison was made between patients who presented these factors during language intervention with patients who did not, checking which group most improved in the scale. There are reports in which these events may affect the mechanisms of airways protection^{8,14}.

The effectiveness of swallowing rehabilitation through outcome indicators was also analyzed:

- Time to pull the alternative feeding way.
- Time to return to oral feeding.

These indicators are expressed in relation to the number of days from the first speech evaluation⁹. Identify and relate information about the number

of patients who have the alternative feeding way removed and return to oral feeding safely within a time scale : 0 to 5 days, 6 to 10 days, 11 to 15 days and above 15 days¹⁵ .

Data were collected from medical records with specific form, based on a questionnaire created by Furkim and Sacco⁸ (Figure 2).

Data collection form						
Identification:						
Name: _____						
Medical records: _____	Age: _____	Birth: _____	Gender: M ()	F ()		
Patient data:						
Stroke's date: _____	Previous strokes: ()	Quantity and dates: _____				
Evaluation date	____/____/____	Discharge date	____/____/____			
Therapy time	_____	Number of sessions	_____			
Complications during therapy		Clinic worsening ()	Lowering of consciousness ()			
Current respiratory conditions:		AA ()	TQT ()			
ASHA-NOMS before therapy	() 1	() 2	() 3	() 4	() 5	() 7
ASHA-NOMS after therapy	() 1	() 2	() 3	() 4	() 5	() 7

Legend: AA: ambient air; TQT: tracheostomy

Figure 2 – Form for the data to be collected from medical records

First the acquired data from medical records using the form were addressed descriptively, as well as evolution or regression in ASHA NOMS scale. Subsequently, this variation was compared with the factors that could interfere with speech therapy.

This study was approved by the Ethics Committee in Research of the institution, no. 02-2011.

The findings of the study were statistically analyzed with the following tests: Fischer's exact test, which measures the degree of relationship between the two traits in independent samples. And the "Student t test", which is to use data from a sample to calculate the statistic and then compare it with the distribution of T student, to identify the probability of having obtained the observed result if the null hypothesis is true.

RESULTS

Table 1, based on a study done by Furkim and Sacco⁸, shows that 15 (75.0%) patients improved after intervention, 4 (20.0%) patients did not develop in ASHA NOMS scale, and 1 (5.0%) patient had worsening.

Table 2 shows the statistical analysis between the average ages of the patients divided into two groups, those who progressed and those who did not develop the ASHA NOMS scale. It was found that the group that did not evolved had higher average (77.20 years) compared to the group that evolved (70.06 years). However, the difference is not statistically significant .

Table 3 shows the relationship between the time of the stroke and changes in the ASHA NOMS scale. The patients were divided into two groups according to the time of stroke occurrence in the day of evaluation: acute (30 days) and not acute phase (after 31 days). Of the patients who developed the scale, the majority (66.7% – 10 individuals) had had stroke 1 month ago, and the group that did not evolved, 40.0% (2 subjects) also had had a recent stroke. There was no significant difference between the time of stroke and evolution in scale.

Table 4 shows the relationship between the incidence of previous strokes and progression of feed consistency. It was verified that in the group that progressed, 9 (60.0%) had already been affected by previous strokes, and in the group that did not evolved, 2 subjects (40.0 %). There was no significant statistical difference.

Table 1 – Evolution of the patients according to levels of functional evaluation of oral intake

		After							Total
		1	2	3	4	5	6	7	
Before	1	4	0	0	0	3	7	1	15
	2	0	0	0	0	0	0	0	0
	3	0	0	0	0	1	1	0	2
	4	1	0	0	0	0	2	0	3
Total		5	0	0	0	4	10	1	20

Legend: Dark gray: Number of patients who remained on the same level after speech therapy.

Black: Number of patients who worsened after speech therapy.

Light gray: Number of patients who improved after voice therapy.

Table 2 – Average age-related developments in ASHA NOMS scale

N	Group	Average age
15	Evolved	70,06
5	Not evolved	77,20

Student's t test: $p = 0.074$ (not significant, $p < 0.05$)

Table 3 – Relationship between time of occurrence of stroke and evolution in ASHA NOMS scale

		Progress in ASHA-NOMS scale				Total	
		Evolved		Not evolved			
		N	%	N	%	N	%
Stroke phases	Acute phase	10	66,7%	2	40,0%	12	60,0%
	Not acute phase	5	33,3%	3	60,0%	8	40,0%
Total		15	100,0%	5	100,0%	20	100,0%

Fischer's exact test: $p = 0.347$ (not significant, $p < 0.05$)

Table 4 – Relationship between previous incidence of stroke and evolution in ASHA NOMS scale

		Progress in ASHA-NOMS scale				Total	
		Evolved		Not evolved			
		N	%	N	%	N	%
Incidence	Previous stroke	9	60,0%	2	40,0%	11	55,0%
	Current stroke	6	40,0%	3	60,0%	9	45,0%
Total		15	100,0%	5	100,0%	20	100,0%

Fischer's exact test: $p = 0.616$ (not significant, $p < 0.05$)

Table 5 presents the clinical complications during speech therapy, namely: onset of infection, worsening of respiratory symptoms and/or neurological symptoms. All 5 (100 %) patients in the group that did not develop showed clinical worsening or decreased level of consciousness. In the group that

evolved, only 3 (21.4 %) patients demonstrated some problems during the process of swallowing rehabilitation. This shows that the onset of these complications contribute to the lack of progress in the ASHA NOMS scale, statistically proven.

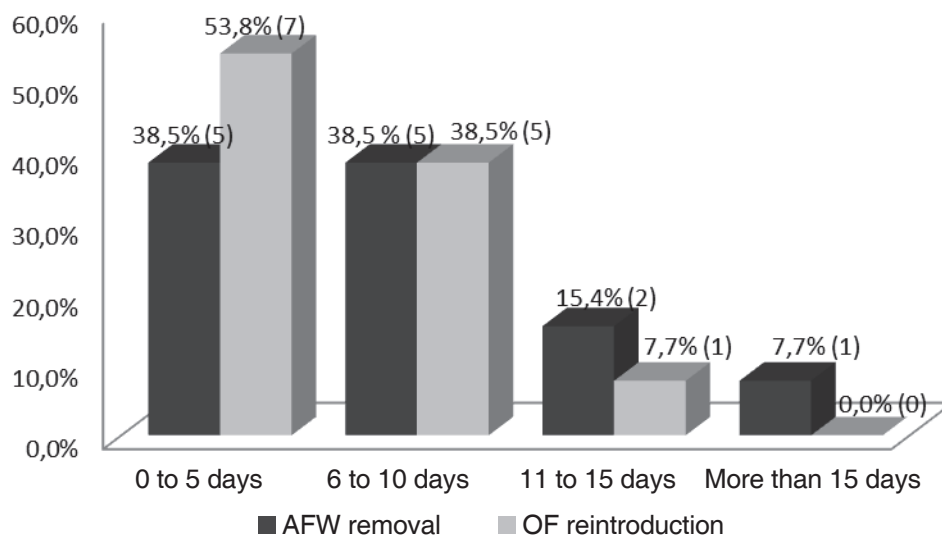
Table 5 – Clinical complications during therapy and its relation to progression in ASHA NOMS scale

Complications		Progress in ASHA-NOMS scale				Total	
		Evolved		Not evolved		N	%
		N	%	N	%		
	No complications	12	80,0%	0	0,0%	12	60,0%
	Clinical worsening or lowering of consciousness	3	20,0%	5	100,0%	8	40,0%
Total		15	100,0%	5	100,0%	20	100,0%

Fischer's exact test: p = 0.003 (significant, p <0.05)

In the group of patients who developed the ASHA NOMS scale, two indicators of outcome, time to remove the alternative feeding way (AFW) and time to reintroduction of oral feeding (OF) were analyzed . Of the 15 patients who had improvement in the scale, 2 were already without AFW and released OF, and were presenting symptoms of dysphagia for some food consistencies. Therefore, 13 patients were evaluated in these indicators. In Figure 3 it can

be seen that the vast majority of patients (76.9% – 10 subjects) could have the AFW removed before 10 days, and almost all patients (92.3 % – 12 individuals) obtained reintroduction of oral feeding before 10 days. The average for the two indicators was 3.25 days with a standard deviation of 2.06 for the AFW removal and 3.30 for the reintroduction of oral feeding.



Legend: AFW: alternative feeding means; OF: oral feeding.

Figure 3 – Proportion of patients who returned to oral feeding and had the alternative feeding way removed in a scale of time (in days)

Regarding the 5 patients who did not develop the ASHA NOMS scale, 3 of them were submitted to gastrostomy. The other 2 patients had worsening of respiratory symptoms and underwent endotracheal intubation and remained in this condition until the end of the period analyzed in this study (September 2011).

■ DISCUSSION

In this study the effects of speech therapy in the progression of food consistency in patients with stroke were analyzed. Most patients presented developments at ASHA scale during the period studied, which demonstrates the effectiveness of voice therapy in the progression of oral feeding safely in hospital.

Despite the delineation of pathology studied, this presents a wide range of occurrence, linked to the type of stroke (ischemic or hemorrhagic), site and extent of lesion^{15,17,18}. The present study included a heterogeneous sample about these factors. Regarding the type of stroke, only one patient had hemorrhagic stroke, which prevented larger comparisons. It is suggested that further research on specific populations on the size and location of the lesion is needed, checking for relationship with the efficacy of speech therapy.

Another factor to be considered is the time of the stroke, which can influence the rehabilitation of swallowing. The clinical impression is a spontaneous recovery of swallowing. This improvement is relatively common and occurs over days or weeks^{15,19-21}. In the study of Smithard et al, using videofluoroscopic examination of swallowing, an incidence of aspiration of 22% by an average of two days after the stroke and 15% was found in a month²². This can be explained by the distribution of bilateral control of the swallowing muscles in the motor cortex. After hemispheric stroke, neuroplasticity promotes an adaptation and allows the control of the muscles of swallowing, it is reorganized in the hemisphere not affected¹⁴. Other studies also reported the recovery of dysphagia months or years after a stroke, but the recovery rate remained low^{23,24}.

In this research, the majority of participants were in the acute phase of stroke, in both groups: that developed and did not develop in ASHA scale. Therefore, it was not possible to verify statistically significant difference between patients with recent and not recent stroke. Researches with larger samples are needed.

Logemann (1983) reported a delay in time after the action of swallowing recovery post stroke dysphagia, with a slight increase in the

pharyngeal residue. It suggested that it is possible that swallowing recovers functionally but remains impaired at a more intricate level. This may also explain the increased incidence of dysphagia after stroke for the second or third time²⁵. In the present study it was not possible to check this, since most of the patients who had progressed on ASHA scale repeat strokes, and in the group that did not evolved half had a previous stroke history. This may be due to compensatory mechanisms that patients develop after some involvement. This compensation may cause the patient who had recurrent stroke, to adapt better to the different pattern of swallowing than a stroke patient who presents for the first time. A more specific comparative research would be important to verify the relationship between the incidence of stroke and dysphagia, particularly in establishing a relationship between the extent of injury and swallowing disorders.

Aging can cause change in swallowing, called *presbifagia*. It can still be considered a risk factor for dysphagia²⁶. In this study the average age of the patients in the group that developed in the ASHA scale (70.06 years) showed no statistically significant difference in average age of the group who did not progress (77.20 years). This fact is due to the age given by the participants, mostly elderly, which prevented a comparison with younger patients.

There are reports in the literature regarding the level of consciousness, which can influence the supply of safe diet by mouth^{8,14,27}. It can be considered insufficient for protecting airways²⁸.

The results of this research were similar to these reports. All patients in the group that did not progress in ASHA scale had clinical worsening or decreased level of consciousness, verified by not responding to simple verbal commands. In these situations, the oral feeding is suspended, which prevents food progression and compromises speech therapy, since there are no reports on the effectiveness of passive speech therapy for swallowing rehabilitation literature. In the group that evolved on the scale, only 18.2 % had some medical complications.

In the group that evolved on scale, it was possible to withdraw the alternative feeding way in 77% of patients within 10 days. It was still possible to reintroduce oral feeding safely in most of these patients (92.3 %), also in less than 10 days. This shows the importance of speech therapy services to minimize prolonged hospitalization of patients with swallowing disorders.

Most patients (75.0%) at the end of the speech rehabilitation, was located above the level in 5 ASHA scale, which is not needed alternative feeding way because safe oral intake is viable, without risk of complications. It is assumed that with the reduction

of hospital costs. However, this was not the purpose of this study, and it is suggested the realization of specific research on the effects of speech rehabilitation of swallowing in reducing hospital costs.

The American Speech-Language-Hearing Association (ASHA) in their assignments and responsibilities includes the speech language pathologist (SLP) in dysphagia management: identifying and using appropriately measures of functional outcomes; knowing the quality improvement policies established by accrediting bodies; knowing the methods used to measure and monitor the quality of important processes and results¹¹.

It was observed that the ASHA scale is a practical and easy to apply label to verify the oral intake of hospitalized patients. Patients can be monitored objectively the evolution of levels on the scale before and after speech therapy. It also showed the effects of the onset of clinical events in this progression. It can be considered an instrument for measuring effectiveness of speech therapy on progression of oral feeding safely. It is important that this scale

obtained a validated translation into Portuguese, to facilitate and disseminate its use in Brazil.

Studies with larger and more specific populations in these affections are needed, yet the effectiveness of speech therapy on progression of oral intake of hospitalized patients with dysphagia after stroke was observed.

■ CONCLUSION

This work has been possible to verify the effectiveness of speech therapy in the evolution of food consistencies of patients with dysphagia who underwent previous or current stroke, using the ASHA NOMS scale as a marker.

It was also found that the onset of clinical deterioration or loss of consciousness level directly affects the speech swallowing rehabilitation, hindering the progression of oral feeding, described by no evolution in the ASHA NOMS scale.

RESUMO

Objetivo: analisar a efetividade na progressão da alimentação via oral de pacientes com sintomas de disfagia, que sofreram acidente vascular encefálico prévio ou atual, internados em um hospital federal do Rio de Janeiro. **Métodos:** foi feito estudo retrospectivo do prontuário de 20 pacientes com acidente vascular encefálico, para os quais foi solicitada fonoterapia para disfagia. Para comparação do nível de ingestão oral de cada paciente, antes e depois da terapia, foi utilizada uma escala funcional. Foram estudados os possíveis fatores de interferência na progressão na escala como: idade, intercorrências clínicas, tempo e incidência prévia do AVE. Os seguintes indicadores de resultado foram analisados: tempo para retirada de via alternativa de alimentação e tempo para reintrodução de alimentação via oral. **Resultados:** dos 20 pacientes, 15 apresentaram melhora na escala de ingestão oral após a fonoterapia. As intercorrências clínicas foram consideradas estatisticamente significantes para a não evolução da alimentação via oral. Os outros fatores analisados não demonstraram significância estatística, sugerindo não interferir na melhora ou piora do paciente. Foi possível reintroduzir alimentação via oral e retirar via alternativa de alimentação antes de 10 dias. **Conclusão:** a fonoterapia é efetiva para melhorar a ingestão de alimentos por via oral nos pacientes com AVE e disfagia neurogênica, atendidos em ambiente hospitalar, salvo se apresentarem intercorrências clínicas e rebaixamento do nível de consciência durante o processo.

DESCRIPTORIOS: Transtornos da Deglutição; Fonoterapia; Acidente Vascular Cerebral

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