


Food characteristics and oropharyngeal dysphagia: What speech therapists say

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Abstract

This study aims to investigate the knowledge of speech therapists about characteristics of food used in the management of dysphagia. This was a quantitative descriptive study, performed using an online questionnaire (SurveyMonkey®) about the desirable food and beverages attributes to facilitate deglutition in dysphagia rehabilitation: texture, viscosity, temperature, taste, and moisture. Participants were separated into two groups, experts in dysphagia and no experts in dysphagia. Differences between the two groups were compared using the Freeman–Halton extension of the Fisher exact probability test and chi-square test. From 1,072 respondents, 752 were included and 572 were experts in dysphagia. The speech therapist expert in dysphagia answered correctly about the texture and viscosity, while no experts answered correctly only about viscosity. The other attributes, temperature, taste, and moisture, were incorrectly answered by both groups. The speech therapists demonstrated reduced knowledge regarding the characteristics of foods most indicated for patients with dysphagia.

Practical applications

The rehabilitation program for patients with dysphagia, established to promote safe and efficient food intake, includes changes in diet offered, since swallowing mechanism is dependent upon bolus characteristics. Speech therapist must select specific characteristics, such as texture, viscosity, temperature, taste, and moisture. The speech therapists participants demonstrated reduced knowledge regarding the characteristics of foods, presenting better results in texture and consistency than in temperature, taste, and moisture. There is a need to deepen the knowledge of speech therapists about the characteristics of foods so that choices in modified diets are more assertive and achieve the goal of ensure a safe and efficient swallowing for these patients.

1 | INTRODUCTION

Food intake is one of the greatest human pleasures and it may be interrupted in oropharyngeal dysphagia (OD), when the normal progression of food through the digestive tract is affected (Abdulmassih, Teive, & Santos, 2014). Quality of life can be decreased in patients with OD by the risk of choking, suffocation, aspiration, pulmonary alterations, nutritional deficiencies, weight loss, and dehydration

(Marques, Medrado, Martins, Lima, & Correa, 2017). Speech therapy improve swallowing patterns (Logemann, 2007) in order to guarantee functional oral diet and increase quality of life by establishing safe, efficient, and pleasurable oral intake.

According to the swallowing pathophysiology, the rehabilitation program is established and promote changes in diet offered (Bridget, 2014; Garcia, Chambers, & Molander, 2005; Logemann, 2007). Texture, consistency, taste, and temperature of foods, swallowing volume,

utensil used and supply rate are modified when necessary (Cola et al., 2010; Silva, Luchesi, & Furkim, 2017), once swallowing mechanism is dependent upon bolus characteristics (Logemann, 2007).

Thick and homogeneous diets are considered to promote safe and efficient swallowing (Choi, Ryu, Kim, Kang, & Yoo, 2011; Hind et al., 2012; Leonard, White, McKenzie, & Belafsky, 2014; Newman, Vilardell, & Speyer, 2016; Silva et al., 2017) compensating deficits and reducing aspiration risk (Hind et al., 2012; Leonard et al., 2014). However, literature describes various modifications related to the increase in viscosity: longer oral and pharynx transit (Newman et al., 2016; Silva et al., 2017), food residues retained in mouth and pharynx (Hind et al., 2012; Newman et al., 2016; Silva et al., 2017), need of greater tongue pressure on the palate when swallowing (Newman et al., 2016; Steele, Molfenter, Péladeau-Pigeon, Polacco, & Yee, 2014).

Temperature is another attribute that can be used in modification diets for dysphagia management, since cold stimuli are beneficial for swallowing patterns (Chee, Arshad, Singh, Mistry, & Hamdy, 2005; Cola et al., 2010; Cola, Gatto, Schelp, & Henry, 2008; Hamdy et al., 2003; Lazzara, Lazarus, & Logemann, 1986; Pelletier & Lawless, 2003; Silva et al., 2017). Cold thermal sensation in the region of the pillar of the fauces intensifies the responses of the area and when the food is presented the individual triggers deglutition faster (Lazzara et al., 1986). Benefits of cold temperature for the management of OD are intensified if associated with citric flavor (Cola et al., 2010; Hamdy et al., 2003).

Swallowing function is highly influenced by chemosensory input, providing insight into how oral sensation regulates pharyngeal swallowing (Chee et al., 2005). Tests with sour tastes demonstrated benefits on swallowing patterns such as reduced risk of laryngotracheal penetration (Pelletier & Lawless, 2003), positive influence on the pharyngeal transit time, increased perception of bolus, and afference through pairs of cranial nerves (Chee et al., 2005; Kajii et al., 2002; Pelletier & Lawless, 2003).

Moisture is a characteristic that is associated with the passage of the bolus from oral cavity to stomach and if the bolus is moist and lubricated this passage will be facilitated (Cichero, 2016). A moist diet contributes also with the oral fluid intake and the enjoyment of fluid dense foods, in contrast to thickened beverages, may be an interesting alternative to increase fluid intakes of those with dysphagia (Vivanti, Campbell, Suter, Hannan-Jones, & Hulcombe, 2009).

Considering that variables texture, viscosity, temperature, taste, and moisture influence swallowing patterns and that speech therapist is the professional responsible for evaluate and modify such aspects in order to facilitate the intake, this study aims to investigate the knowledge of speech therapists about characteristics of food used in the management of dysphagia.

2 | METHODOLOGY

This was a quantitative descriptive study approved by the Research Ethics Committee (56273316.0.000.5064). Data were collected using a questionnaire prepared by the researchers and made available in the SurveyMonkey® program (www.surveymonkey.com).

2.1 | The survey questionnaire

The questionnaire addressed the selection of food characteristics texture, viscosity, temperature, taste, and moisture.

The questions related to five food characteristics: texture, viscosity, temperature, taste, and moisture. Regarding the texture, the answers gave the terms “homogeneous,” “heterogeneous,” and “texture does not interfere.” As to viscosity, the alternatives were “pasty,” “liquid,” and “viscosity does not interfere.” For the temperature variable, the alternatives were “cold,” “room temperature,” “warm,” and “temperature does not interfere.” When questioning about the flavor the alternatives were “sweet,” “sour,” and “taste does not interfere”; and for the last variable, moisture, the responses would be “dry,” “moist,” and “moisture does not interfere.” For each category, the expected correct answers were homogeneous texture, pasty viscosity, cold temperature, sour taste, and moist.

2.2 | Recruitment

The target population was all registered Brazilian speech therapist. A message explaining the research and containing the questionnaire link was sent by e-mail and social networks (Facebook, WhatsApp, and Instagram) as an invitation to participate. At the beginning of the questionnaire, informational text corresponding to the informed consent term was presented, and the participants gave their consent to participate there.

The inclusion criteria were being a Brazilian speech therapist who agreed to respond to the electronic questionnaire and answered the questions about the five food characteristics. The questionnaire “Food Characteristics and Oropharyngeal Dysphagia: What Speech Therapists Say” was answered by 1,072 speech therapists, but 320 (33.50%) did not completed the questionnaire, leaving 752 (66.50%) participants.

2.3 | Analyses database

The collected data were arranged in tables, reviewed, and analyzed through the Survey Monkey program. The statistical analysis was performed using excel and <http://vassarstats.net/index.html>. Measures of central tendencies (mean and median) and dispersion (standard deviation and minimum–maximum) were reported for each of the numeric variables of interest. The data were normalized in percentage into the group. Differences between the two groups were compared using the Freeman–Halton extension of the Fisher exact probability test and chi-square test. The significance level was $p < .05$. The statistical analysis was performed using excel and <http://vassarstats.net/index.html>.

3 | RESULTS

The questionnaire response rate was 70.2% (752 speech therapists) of total of 1,072 respondents, being the main criteria of exclusion, the questionnaires with missing answers. Of the 752 respondent, 572 participants answered they were active working in the dysphagia area

TABLE 1 The questions related to five food characteristics: texture, viscosity, temperature, taste, and moisture

Characteristics	Participants			P
	G1 (n = 572)	G2 (n = 180)	Total (n = 752)	
Texture				
Heterogeneous	2 (0.34%)	3 (1.66)	5 (0.66%)	.0098
Homogeneous ^a	392 (68.53%)	91 (50.55%)	483 (64.22%)	
Does not interfere	178 (31.13%)	86 (47.79%)	264 (35.12%)	
Viscosity				
Pasty ^a	357 (64.41%)	111 (61.66%)	468 (62.23%)	.4971
Liquid	8 (1.39%)	8 (4.44%)	16 (2.12%)	
Does not interfere	207 (34.20%)	61 (33.90%)	268 (35.65%)	
Temperature				
Cold ^a	167 (29.19%)	23 (12.77%)	190 (25.25%)	.6070
Warm	133 (23.25%)	27 (15.00%)	160 (21.27%)	
Room temperature	208 (36.35%)	100 (55.55%)	308 (40.95%)	
Does not interfere	64 (11.20%)	30 (16.68%)	94 (12.53%)	
Taste				
Sour ^a	67 (11.71%)	4 (2.22%)	71 (9.44%)	.0213
Sweet	30 (5.22%)	11 (6.11%)	41 (5.45%)	
Does not interfere	475 (83.07%)	165 (91.67%)	640 (85.11%)	
Moisture				
Moist ^a	179 (31.29%)	52 (28.88%)	231 (30.71%)	.8774
Dry	1 (0.17%)	0 (0.00%)	1 (0.13%)	
Does not interfere	392 (68.54%)	128 (71.11%)	520 (69.16%)	

Note: G1: speech therapist experts in dysphagia. G2: speech therapist no expert in dysphagia. Significant differences were tested (p) using Fisher's exact test; the significance level $p < 0.05$.

^aThe expected answer for each characteristic.

(G1) and 180 stated they did not work with dysphagia nor had previously worked (G2).

Table 1 depicts the results of the five food characteristics: texture, viscosity, temperature, taste, and moisture. The speech therapist expert in dysphagia answered correctly about the texture ($p < .05$). Both groups answered correctly that the food should be pasty ($p > .05$). The temperature of the food was not a consensus among the answers and both groups pointed the incorrect answer ($p > .05$). Although there is a difference between the dysphagia expert and no expert ($p < .05$) concerning the taste, the majority in both groups answered incorrectly. There was no difference in the groups regarding the moisture characteristic ($p > .05$) and both groups answered incorrectly.

4 | DISCUSSION

The homogeneous characteristic is indicated to facilitate food intake (Choi et al., 2011; Hind et al., 2012; Leonard et al., 2014; Newman et al., 2016; Silva et al., 2017), so the answer was assertive by the experts ($p > .05$). However, it is worth mentioning the high number of

participants who considered the response "texture does not interfere," with values reaching 31.13% in G1 and 47.79% in G2.

For the characteristic viscosity, there was a predominance of pasty selection among all participants, with values above 60%. Pasty consistency is considered to be a facilitator for patients with dysphagia, promotes safe swallowing (Choi et al., 2011; Hind et al., 2012; Leonard et al., 2014; Newman et al., 2016; Silva et al., 2017) and reduces aspiration risks (Hind et al., 2012; Leonard et al., 2014). In this way, it can be considered that these responses were adequate. In the meantime, as for the texture variable, it is important to highlight the high number of responses "viscosity does not interfere," being 34.20% in G1 and 33.90% in G2. It is interesting to observe the similarity between these indices, since the practice with dysphagic patients did not guarantee more assertive answers.

The responses involving temperature demonstrated less standardization between the two groups than in the previous categories. The most notable response was "room temperature," for both G1 (36.35%) and G2 (55.55%). The literature confirms the benefits of cold stimuli for swallowing dynamics (Chee et al., 2005; Cola et al., 2008, 2010; Hamdy et al., 2003; Lazzara et al., 1986; Pelletier & Lawless, 2003; Silva et al., 2017), but this alternative obtained the second best

result in G1 (29.19%) and the worst result in G2 (12.77%). For the results of temperature variable, it was possible to observe a better result for G1 when compared to G2, but still presenting a high error rate (70.81%) when the inadequate responses (“warm,” “room temperature,” and “temperature does not interfere”) are added. The low index “cold” responses could indicate the lack of knowledge of the professionals regarding the advantages offered by the use in clinical practice and in the prescription of cold food for patients with dysphagia.

As for temperature, the taste characteristic did not obtain assertive results in this research. The literature confirms the benefits of the sour taste for the swallowing process (Chee et al., 2005; Kajii et al., 2002; Pelletier & Lawless, 2003) such as reduced risk of laryngotracheal penetration (Pelletier & Lawless, 2003), positive influence on the pharyngeal transit time and increased perception of the bolus, but the alternative “sour” obtained extremely low responses, being 11.71% for G1 and 2.22% for G2. The great majority of participants opted for the answer “taste does not interfere,” demonstrating that they do not know the influence of taste on the dynamics of swallowing. The results indicate that the professionals who work with dysphagia are not using this characteristic in their clinical practice or in the prescription of food.

The last analyzed characteristic, moisture, presented similar results between the two groups, both of which selected the answer “moisture does not interfere” in its majority, G1 68.54% and G2 71.11%. According to the researched literature, moist foods are beneficial for oral and pharyngeal transit and contribute with the oral fluid intake (Cichero, 2016; Vivanti et al., 2009). Only 31.29% of G1 and 28.88% of G2 indicated moist trait.

Since swallowing mechanism is dependent upon bolus characteristics (Logemann, 2007), knowledge about the influence of texture, viscosity, temperature, taste, and moisture is of extreme relevance for the speech therapist to plan a successful rehabilitation process. The results found in the present research indicated a restricted knowledge on such aspects, mainly in terms of temperature, taste, and moisture.

5 | CONCLUSION

The speech therapists participants of the research demonstrated reduced knowledge regarding the characteristics of foods most indicated for patients with dysphagia, presenting better results in the variables texture and consistency than in the variables temperature, taste, and moisture. It is not possible to say that speech therapists working with dysphagic patients have more accurate knowledge about the influence of eating characteristics on the swallowing process than those who do not work with patients with dysphagia.

There is a need to deepen the knowledge of speech therapists about the characteristics of foods so that choices in modified diets are more assertive and achieve the goal of ensure a safe and efficient swallowing for these patients.

CONFLICT OF INTEREST

The authors declare that they do not have any conflict of interest.

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REFERENCES

- Abdulmassih, E., Teive, H., & Santos, R. (2014). The evaluation of swallowing in patients with spinocerebellar ataxia and oropharyngeal dysphagia: A comparison study of videofluoroscopic and sonar doppler. *International Archives of Otorhinolaryngology*, 17(1), 066–073. <https://doi.org/10.7162/S1809-97772013000100012>
- Bridget, P. (2014). Use of fluid thickener to reduce dysphagia risk. *Nursing Times*, 110(12), 16–18.
- Chee, C., Arshad, S., Singh, S., Mistry, S., & Hamdy, S. (2005). The influence of chemical gustatory stimuli and oral anaesthesia on healthy human pharyngeal swallowing. *Chemical Senses*, 30(6), 393–400.
- Choi, K., Ryu, J., Kim, M., Kang, J., & Yoo, S. (2011). Kinematic analysis of dysphagia: Significant parameters of aspiration related to bolus viscosity. *Dysphagia*, 26, 392–398.
- Cichero, J. A. Y. (2016). Adjustment of food textural properties for elderly patients. *Journal of Texture Studies*, 47(4), 277–283. <https://doi.org/10.1111/jtxs.12200>
- Cola, P., Gatto, A., Silva, R., Spadotto, A., Schelp, A. O., & Henry, M. (2010). The influence of sour taste and cold temperature in pharyngeal transit duration in patients with stroke. *Arquivos de Gastroenterologia*, 47(1), 18–21.
- Cola, P., Gatto, A. R., Schelp, A. O., & Henry, M. (2008). Reabilitação em disfagia orofaríngea neurogênica: sabor azedo e temperatura fria. *Revista CEFAC*, 10(2), 200–205.
- Garcia, J., Chambers, E., & Molander, M. (2005). Thickened liquids: Practice patterns of speech language pathologists. *American Journal of Speech-Language Pathology*, 14(1), 4–13.
- Hamdy, S., Jilani, S., Price, V., Parker, C., Hall, N., & M, P. (2003). Modulation of human swallowing behavior by thermal and chemical stimulation in health and after brain injury. *Neurogastroenterology and Motility*, 15, 69–77.
- Hind, J., Divyak, E., Zielinski, J., Taylor, A., Hartman, M., Gangnon, R., & Robbins, J. (2012). Comparison of standardized bariums with varying rheological parameters on swallowing kinematics in males. *Rehabilitation Research & Development*, 49(9), 1399–1404.
- Kajii, Y., Shingai, T., Kitagawa, J., Takahashi, Y., Taguchi, Y., Noda, T., & Yamada, Y. (2002). Sour taste stimulation facilitates reflex swallowing from the pharynx and larynx in the rat. *Physiology & Behavior*, 77, 321–325.
- Lazzara, G., Lazarus, C., & Logemann, J. (1986). Impact of thermal stimulation on the triggering of the swallowing reflex. *Dysphagia*, 1, 73–77.
- Leonard, R., White, C., Mckenzie, S., & Belafsky, P. (2014). Effects of bolus rheology on aspiration in patients with dysphagia. *Journal of the Academy of Nutrition and Dietetics*, 114(4), 590–594.
- Logemann, J. A. (2007). Swallowing disorders. *Best Practice & Research Clinical Gastroenterology*, 21(4), 563–573. <https://doi.org/10.1016/j.bpg.2007.03.006>
- Marques, R., Medrado, A., Martins, G., Lima, H., & Correa, M. (2017). Qualidade de vida em deglutição e câncer de cabeça e pescoço: revisão de literatura. *Revista Brasileira de Odontologia*, 8(1), 26–33. <https://doi.org/10.17267/2238-2720v8i1.1260>
- Newman, R., Vildardell, N., & Speyer, R. (2016). Effect of bolus viscosity on the safety and efficacy of swallowing and the kinematics of the swallow response in patients with oropharyngeal dysphagia: White paper by the European Society for Swallowing Disorders (ESSD). *Dysphagia*, 31, 232–249.
- Pelletier, C., & Lawless, H. (2003). Effect of citric acid and citric acid-sucrose mixtures on swallowing in neurogenic Oropharyngeal dysphagia. *Dysphagia*, 18, 231–241.
- Silva, R., Luchesi, K., & Furkim, A. (2017). Programas de intervenção fonoaudiológica para disfagia orofaríngea neurogênica em adultos. In R. A. Deditivis, P. P. Santoro, & L. Arakawa-Sugueno (Eds.), *Manual prático de disfagia diagnóstico e tratamento* (1st ed., pp. 279–293). Rio de Janeiro: Revinter.

- Steele, C. M., Molfenter, S. M., Péladeau-Pigeon, M., Polacco, R. C., & Yee, C. (2014). Variations in tongue-palate swallowing pressures when swallowing xanthan gum-thickened liquids. *Dysphagia*, 29(6), 678–684. <https://doi.org/10.1007/s00455-014-9561-6>
- Vivanti, A. P., Campbell, K. L., Suter, M. S., Hannan-Jones, M. T., & Hulcombe, J. A. (2009). Contribution of thickened drinks, food and enteral and parenteral fluids to fluid intake in hospitalised patients with dysphagia. *Journal of Human Nutrition and Dietetics*, 22(2), 148–155. <https://doi.org/10.1111/j.1365-277X.2009.00944.x>

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