EFFECT OF MASAKO MANEUVER ON DYSPHAGIA IN POST OPERATIVE HEAD AND NECK CANCER PATIENTS

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***Abstract*—Background: Dysphagia is common in post-operative in HNC patients. Around 40% of patients with advanced HNC experience dysphasia post treatment. Dysphagia complications can be severe including aspiration pneumonia, malnutrition as well as feeding tube dependence, decreasing health-related quality of life thereby increasing the health economic burden. Management of dysphagia includes exercise rehabilitation in the form of swallowing and non-swallowing exercises including tongue hold exercises, jaw opening exercises, tongue movement and resistance exercises, supra-glottic swallowing man oeuvre, breath hold man oeuvre and the Shaker's Exercise or the head lifting man oeuvre. Masako Maneuver is an exercise for swallowing rehabilitation to improve the function of the pharynx rear wall. This Maneuver was performed by inducing dry swallowing. The Masako Maneuver, which is an exercise for swallowing rehabilitation to improve the function of pharynx constriction by strengthening muscles of the tongue base, has been reported to improve swallowing by helping the coordination of the larynx and the hyoid bone and improving the constriction of the pharynx and airway obstruction during pharyngeal swallowing. Tongue strengthening exercise (TSE) is a therapeutic exercise aimed at enhancing the swallowing function by improving tongue muscle strength. Several previous studies have demonstrated the efficacy of TSE. So, this study can be used in the rehabilitation for swallowing in Head and Neck cancer patients to regain the properties the maximum of the Tongue. Here, the Masako Maneuver is used to treat for the same, 20min per day, 5 days a week for 4 weeks.**

Aim: To study Effect of Masako on Dysphagia in post-operative Head and Neck cancer patients

Methodology: Materials used in this study are DHI Scale and QLA-H&N35 to classify the Patients severity and then later treatment protocol of 20min per day, 5 days a week for 4 weeks. And at the end of the 4th week the DHI and QLA-H&N35 is again taken to compare the progress from the 1st day of treatment to the last day. Hence the result will be obtained using the Paired 't' test.

Outcome measures: Dysphagia handicap index (DHI) AND QLA-H&N35

Results: Statistical analysis was done using paired t test. The statistical analysis of pre and post intervention data using both the outcome measures shows there is no significant effect on Dysphagia in post-operative Head and Neck cancer patients

Conclusion: The study was done on obese subjects to identify the effect Masako on Dysphagia in post-operative Head and Neck cancer patients. This state that Masako maneuver alone is not are effective on Dysphagia using Dysphagia handicap index (DHI) AND QLA-H&N35 was proven to significant p values. Hence,Masako maneuver is not very effective on Dysphagia in post-operative Head and Neck cancer patients. According to DHI and QLA-H&N35, result of the present study demonstrated that Masako maneuver is statistically no any significant change.

***Key words*: TSE, DHI, EORTC QLA H&N35**

I. INTRODUCTION (HEADING 1)

Head and neck cancer (HNC) are a complex disorder including squamous cell carcinomas developing in the upper respiratory tract[1, 2]. Around 40% of patients with advanced HNC experience dysphasia post treatment [1].

Swallowing is a complex process involving a large number of cranial nerves and muscles to safely and efficiently carry food from the mouth through the pharynx into the Esophagus and stomach[3]. It is a very automatic process until some damage occurs[4].

Swallowing involves controlling the food in the mouth, largely with the oral part of the tongue, to enable tasting and chewing to occur[4]. The oral tongue moves the food onto the teeth for the crushing of the food as the teeth come into occlusion[4]. The oral tongue also collects the food from around the mouth after chewing and brings it together, forming a ball or bolus, before swallowing[8].The swallowing of liquids involves the holding of the liquid together into single, cohesive amount[4]. As the food is propelled backward out of the mouth by the oral tongue, the pharyngeal stage of swallowing is triggered, and a number of necessary motor activities occur: (*1*) closure of the airway to prevent food from entering the lungs; (*2*) closure of the entrance to the nose, the Velopharyngeal port, to prevent food from entering the nose;(*3*)opening of the upper Oesophageal sphincter to enable the bolus of food to pass unobstructed into the oesophagus; and (*4*) application of pressure to push the food through the pharynx and esophagus[4]. Initially, the pressure is applied by the oral tongue and then by the base of the tongue and pharyngeal walls and, finally, by Oesophageal contraction to drive the food into the stomach [4] .

Dysphagia complications can be severe including aspiration pneumonia, malnutrition as well as feeding tube dependence, decreasing health-related quality of life thereby increasing the health economic burden[5].

Masako Maneuver is an exercise for swallowing rehabilitation to improve the function of the pharynx rear wall. This Maneuver was performed by inducing dry swallowing[5].The Masako maneuver, which is an exercise for swallowing rehabilitation to improve the function of pharynx constriction by strengthening muscles of the tongue base, has been reported to improve swallowing by helping the coordination of the larynx and the hyoid bone and improving the constriction of the pharynx and airway obstruction during pharyngeal swallowing[5].

Here, the Masako Maneuver is used to treat for the same, 20 min per day,5 days a week for 4 week[5].

Tongue strengthening exercise (TSE) is a therapeutic exercise
aimed at enhancing the swallow wing function by improving tongue muscle strength[6]. Several previous studies have demonstrated the efficacy of TSE[6].

Several studies have observed the immediate effects, providing mixed results regarding its effect on pharyngeal and upper Oesophageous[7,8,9,10,11,12,13].

Quality-of-life indicators for dysphagia provide invaluable information to the treating clinician regarding the success or failure of swallowing therapy[14]. The purpose of this study was to develop a clinically efficient, statistically robust patient-reported outcomes tool that measures the handicapping effect of dysphagia on emotional, functional and physical aspects of individual's lives[14].It has been reported that dysphagia has a negative effect on all aspects of a person's life, including work, leisure, and social situations[14.]

1) MATERIALS AND METHODOLOGY

MATERIALS:

1] FOR MANUAL METHOD:

1) Consent form
2) Plinth or chair
3) Writing materials (Pen/writing pad,etc)

METHODOLOGY:

1. Type of study: Exprimental study
2. Type of sampling: Convenient sampling
3. Study design: Clinical trial
4. Sample size: 40
5. Study duration: 6 months
6. Study setting: Shiddhivinayak Cancer Hospital, Miraj, Sangli,Maharashtra.

OUTCOME MEASURES

1) Dysphagia Handicap Index (DHI)

Reliability-0.94 (Cronbach's alpha)

		Normal 1-2	Moderate 3-5	Severe 6-7
1F	**I avoid some foods because of my swallowing problem.**			
2F	**I have changed the way I swallow to make it easier to eat.**			
1E	**I'm embarrassed to eat in public.**			
3F	**It takes me longer to eat a meal than it used to.**			
4F	**I eat smaller meals more often due to my swallowing problem**			
6P	**I have to swallow again before food will go down**			
2E	**I cough up food after I swallow**			
3E	**I don't enjoy eating as much as I used to.**			

5F	**I don't socialize as much due to my swallowing problem.**			
6F	**I avoid eating because of my swallowing problem.**			
7F	**I eat less because of my swallowing problem.**			
4E	**I am nervous because of my swallowing problem.**			
5E	**I feel handicapped because of my swallowing problem.**			
6E	**I get angry at myself because of my swallowing problem.**			
7P	**I choke when I take my medication**			
7E	**I'm afraid that I'll choke and stop breathing because of my swallowing problem.**			
8F	**I must eat another way (e.g., feeding tube) because of my swallowing problem.**			
9F	**I must eat another way (e.g., feeding tube) because of my swallowing problem.**			
8P	**I feel a strangling sensation when I swallow.**			
9P	**I cough up food after I swallow.**			

2) EORTC QLA-H&N35

Reliability-0.55 to 0.94(Cronbach's alpha)

	DURING THE PAST WEEK	Not at all	A little	Quite a bit	Very much
31.	Have you had pain in your mouth?	1	2	3	4
32.	Have you had pain in your jaw?	1	2	3	4
33.	Have you had soreness in your mouth?	1	2	3	4
34.	Have you had a painful throat?	1	2	3	4
35.	Have you had problems swallowing liquids?	1	2	3	4
36.	Have you had problems swallowing pureed food?	1	2	3	4
37.	Have you had problems swallowing solid food?	1	2	3	4
38.	Have you choked when swallowing?	1	2	3	4
39.	Have you had problems with your teeth?	1	2	3	4
40.	Have you had problems opening your mouth wide	1	2	3	4
41.	Have you had a dry mouth?	1	2	3	4
42.	Have you had sticky saliva?	1	2	3	4

43.	Have you had problems with your sense of smell?	1	2	3	4
44.	Have you had problems with your sense of taste?	1	2	3	4
45.	Have you coughed?	1	2	3	4
46.	Have you been hoarse?	1	2	3	4
47.	Have you felt ill?	1	2	3	4
48.	Has your appearance bothered you?	1	2	3	4

MASAKO MANEUVER PROTOCOL

1.Sit or stand comfortably
2.Stick out tongue out as far as possible
3.Hold your tongue gently between your teeth and then swallow
4.Let go of your tongue.
5. Repeat (20min per day,5 days a week for 4 week)

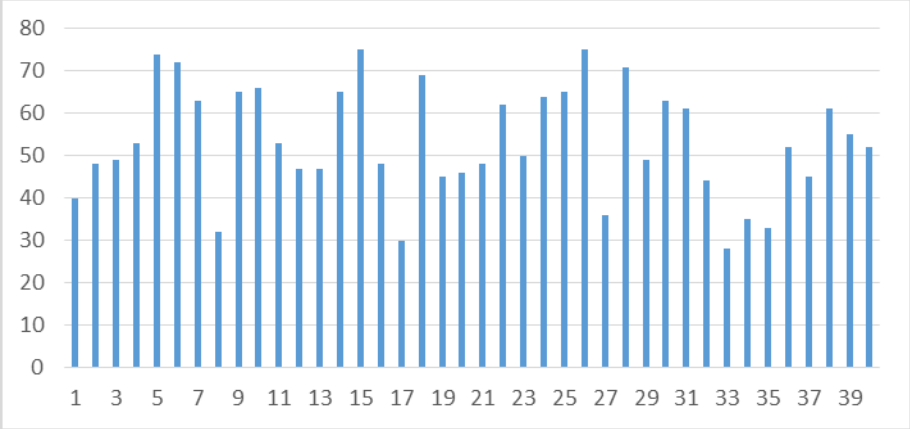
RESULTS

Statistical analysis was done using Paired t-test.

Analysis:

Observed Values

Graph 1: Age Graph for the Patients with Dysphagia irrespective of Gender.



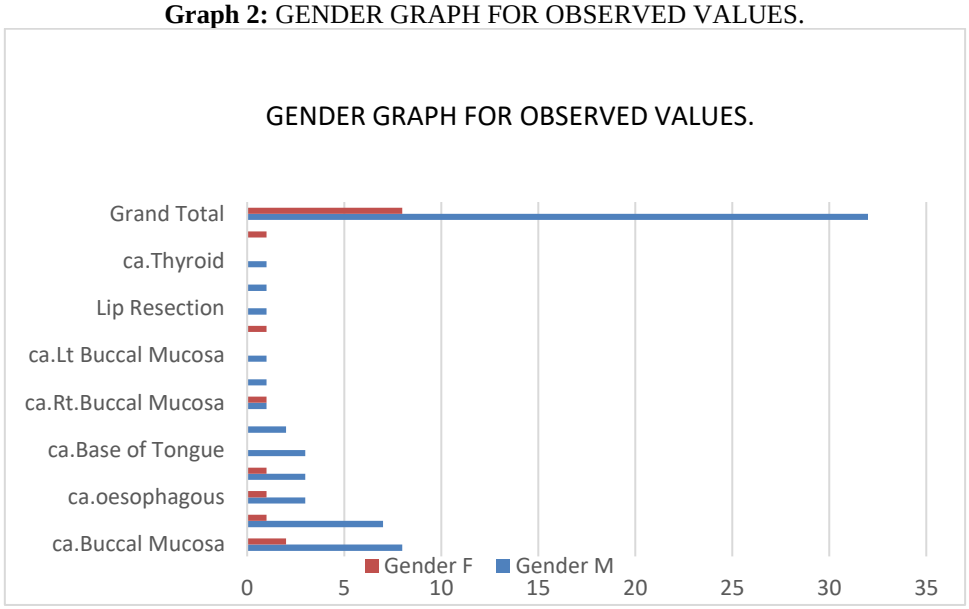
x-axis-no.of patients,y-axis-age of aptients

Age graph for the patients with dysphagia signifies that the patients of age 30-65 are the maxium in count(irrespective of the gender.)

TABLE:1

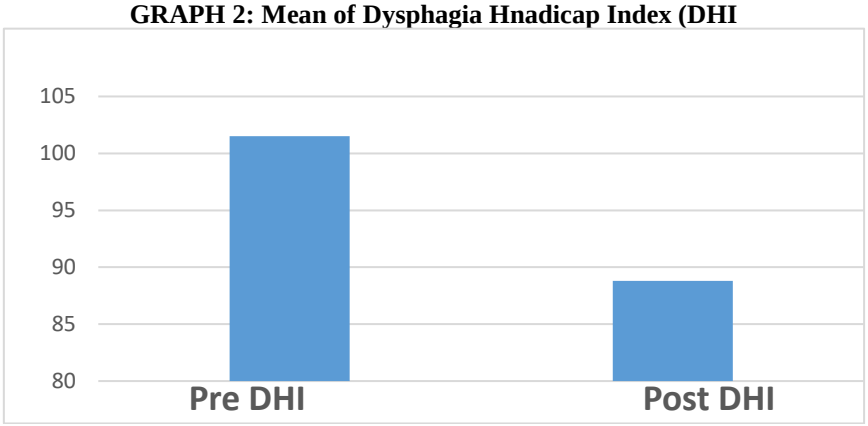
Observed Values			
Diagnosis	**Gender**		**Grand Total**
	M	**F**	
ca. Buccal Mucosa	8	2	**10**
ca. Tongue	7	1	**8**
ca. Oesophagus	3	1	**4**
ca. Lower Lip	3	1	**4**
ca. Base of Tongue	3		**3**
Neck Dissection	2		**2**
ca. Rt. Buccal Mucosa	1	1	**2**
ca. Upper Lip	1		**1**
ca. Lt Buccal Mucosa	1		**1**
ca. vocal cord		1	**1**
Lip Resection	1		**1**
ca. Hypopharynx	1		**1**
ca. Thyroid	1		**1**
ca. Post Cricoid		1	**1**
Grand Total	**32**	**8**	**40**

Graph 2: GENDER GRAPH FOR OBSERVED VALUES.



p-value -0.814415242 Significance level-0.05 As p-value is greater than significance level we do not reject the null hypothesis i.e. Diagnosis and Gender are independent

GRAPH 2: Mean of Dysphagia Hnadicap Index (DHI

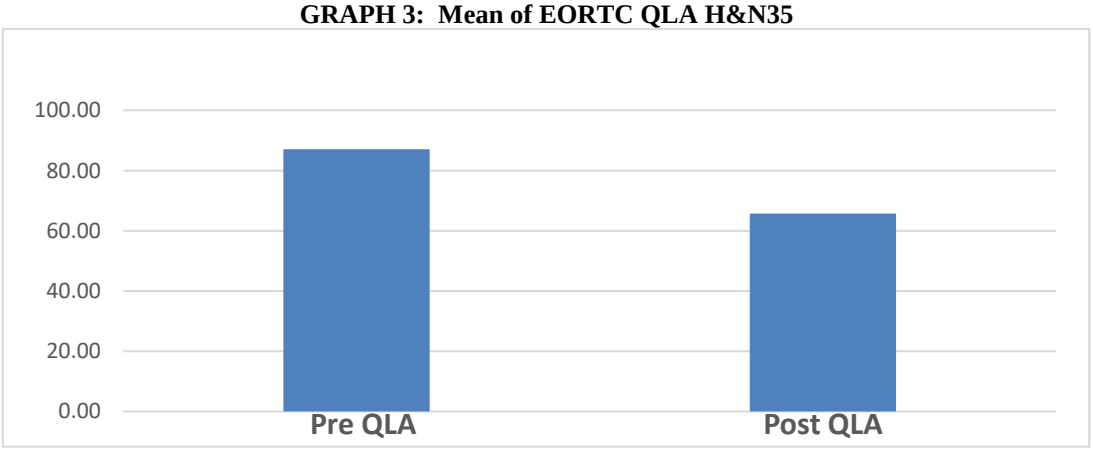


There were total three subscales under the DHI Scale (Physical,Functional and Emotional)Where in physical subscale mean score is Pre-test 34.45 and Post-test 30.45, Functional subscale mean score is Pre-test 35.0 and Post-test 28.90 and Emotional subscale mean score is Pre-test 32.50 and Post-test 29.43.

Here the sum of all the subscales mean are Pre-test 101.5 & Post-test 88.8

Significance Level 0.05 , p-value <0.05 Since the p – value is less than our alpha 0.05, we reject the null hypothesis that there is no significant difference in the means of each sample.

GRAPH 3: Mean of EORTC QLA H&N35



Significance Level 0.05 ,p-value <0.05

Since the p – value is less than our alpha 0.05, we reject the null hypothesis that there is no significant difference in the means of each sample.

TABLE 2:

variable	Tests	Mean	Sample size	z-value	p-value
DHI	**Pre- test** **Post-test**	**101.5** **88.8**	**40**	**5.95**	**<0.05**
QLA H&N 35	**Pre-test** **Post-test**	**87.05** **65.75**	**40**	**10.3**	**<0.05**

RESULTS FROM ANALYSIS:

Here, the sample size i.e no. of patients is 40 (irrespective of gender), where the DHI scale mean score of Pre-test is 101.5 and Post-test is 88.8,the z-value is 5.95 and the p-value<0.05.

And the EORTC QLA H&N 35 scale mean score of Pre-test is 87.05 and Post-test 65.75, the z-value is 10.3 and the p-value<0.05

Hence, there is no significant difference in the means of each sample.

DISCUSSION:

Cancer begins when healthy cells change and grow out of control, forming a mass called a tumor. A tumor can be cancerous or benign. A cancerous tumor is malignant, meaning it can grow and spread to other parts of the body. A benign tumor means the tumor can grow but will not spread.

"Head and neck cancer" is a medical term used to describe a number of different malignant tumors that develop in or around the throat, larynx, nose, sinuses, and mouth.

Most head and neck cancers are squamous cell carcinomas. This type of cancer begins in flat squamous cells. These cells make up the thin layer of tissue on the surface of the structures in the head and neck. Beneath this layer, which is called the epithelium, some parts of the head and neck have a layer of moist tissue called the mucosa.

If a cancer is only found in the squamous layer of cells (epithelium), it is called carcinoma in situ. If the cancer has grown beyond this cell layer and moved into the deeper tissue, then it is called invasive squamous cell carcinoma. If doctors cannot identify where the cancer began, it is called a cancer of unknown primary. If a head and neck cancer start in the salivary glands, the tumor will usually be classified as an adenocarcinoma, adenoid cystic carcinoma, or muco-epidermoid carcinoma.

There are 5 major types of head and neck cancer, each named according to the part of the body where they develop. For more information about a specific type, visit the guide dedicated to that type of head and neck cancer on this same website.

Laryngeal and hypopharyngeal cancer. The larynx is commonly called the voice box. This tube-shaped organ in the neck is important for breathing, talking, and swallowing. It is located at the top of the windpipe, or trachea. The hypopharynx is also called the gullet. It is the lower part of the throat that surrounds the larynx.

Nasal cavity and paranasal sinus cancer. The nasal cavity is the space just behind the nose where air passes on its way to the throat. The paranasal sinuses are the air-filled areas that surround the nasal cavity.

Nasopharyngeal cancer. The nasopharynx is the air passageway at the upper part of the throat behind the nose.

Oral and oropharyngeal cancer. The oral cavity includes the mouth and tongue. The oropharynx includes the middle of the throat, from the tonsils to the tip of the voice box.

Salivary gland cancer. The salivary gland produces saliva. Saliva is the fluid that is released into the mouth to keep it moist and that contains enzymes that begin breaking down food

Other types of cancer can also be located in the head and neck region, but the diagnosis and treatment are much different and some of them are brain tumors, esophageal cancer, eye cancer, parathyroid cancer, sarcoma, and thyroid cancer.

The tongue-hold or Maasako maneuver is a widely used clinical technique designed to increase posterior pharyngeal wall movement in individuals with dysphagia. It is hypothesized that the tongue-hold maneuver results in increased contraction of the superior pharyngeal constrictor.

Haewon Byeon, Dr Sc(2016) has mentioned in his study that the Masako maneuver and NMES each showed significant effects on the improvement of swallowing function in patients with dysphagia caused by stroke, but no significant difference was observed between the two treatment methods.

Here , masako maneuver alone was used to reduce the dysphagia in patients during the study. Whereas, masako maneuver is a effortful tongue hold exercise where dry swallowing is instructed to the patient.

As Haewon Byeon,Dr sc(2016) implemented the used of Masako maneuver on the stroke patients and significant effects were observed on the respective group of stroke patients (sub-acute) with dysphagia.

Here in this study we have used DHI(Dysphagia handicap index) and EORTC QLA H&N35 sacles to determine the dysphagia in head and neck cancer patients prior the initiation of the Masako Maneuver in patients.

Later, the selected patients are observed for 20min per day, 5 days a week for 4 weeks of times doing the masako maneuver.

And at the end of the 4th week the DHI and QLA-H&N35 is again taken to compare the progress from the 1st day of treatment to the last day. Hence the result was obtained using the Paired 't' test.

This clinical presentation could not show any specific significant change in the head and neck cancer in DHI scale and in EORTC H&N35 scale.So this study is concluded as a null hypothesis.

CONCLUSION:

The study was done on obese subjects to identify the effect Masako on Dysphagia in post-operative Head and Neck cancer patients. This state that Masako maneuver alone is not are effective on Dysphagia using Dysphagia handicap index (DHI) AND QLA-H&N35 was proven to significant p values. Hence,Masako maneuver is not very effective on Dysphagia in post-operative Head and Neck cancer patients**.** According to DHI and QLA-H&N35, result of the present study demonstrated that Masako maneuver is statistically no any significant change.

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REFERENCES:

1) Pattanshetty, Renu. (2017). Shaker's Exercise Rehabilitation in Head and Neck Cancer Patients – A Clinical Trial. journal of medical science and clinical research. 5. 10.18535/jmscr/v5i8.189.
2) Logemann J, Pauloski B, Rademaker A, Lazarus C, Gaziano J, Stachowiak L et al. Swallowing disorders in the first year after radiation and chemoradiation. Head Neck. 2008; 30(2):148-158.
3) Burkhead LM, Sapienza CM, Rosenbek JC: Strength-training exercise in dysphagia rehabilitation: principles, procedures, and directions for future research. Dysphagia,2007,22: 251-265.[Medline] [CrossRef]
4) Mittal BB, Pauloski BR, Haraf DJ, Pelzer HJ, Argiris A, Vokes EE, Rademaker A, Logemann JA. Swallowing dysfunction--preventative and rehabilitation strategies in patients with head-and-neck cancers treated with surgery, radiotherapy, and chemotherapy: a critical review. Int J RadiatOncolBiol Phys. 2003 Dec 1;57(5):1219-30. doi: 10.1016/s0360-3016(03)01454-8. PMID: 14630255.
5) Byeon H. Effect of the Masako maneuver and neuromuscular electrical stimulation on the improvement of swallowing function in patients with dysphagia caused by stroke. J PhysTher Sci. 2016 Jul;28(7):2069-71. doi: 10.1589/jpts.28.2069. Epub 2016 Jul 29. PMID: 27512266; PMCID: PMC4968508.
6) Yano J, Nagami S, Yokoyama T, Nakamura K, Kobayashi M, Odan Y, Hikasa M, Hanayama K, Fukunaga S. Effects of Tongue-Strengthening Self-Exercises in Healthy Older Adults: A Non-Randomized Controlled Trial. Dysphagia. 2021 Oct;36(5):925-935. doi: 10.1007/s00455-020-10216-w. Epub 2020 Nov 19. PMID: 33215265; PMCID: PMC8464581.
7) Silbergleit AK, Schultz L, Jacobson BH, Beardsley T, Johnson AF. The Dysphagia handicap index: development and validation. Dysphagia. 2012 Mar;27(1):46-52. doi: 10.1007/s00455-011-9336-2. Epub 2011 Mar 20. PMID: 21424584.
8) Fujiu, M., &Logemann, J.A. (1996). Effect of a tongue-holding maneuver on posterior pharyngeal wall movement during deglutition. American Journal of Speech-Language Pathology, 45(1), 23–30.
9) Hammer, M., Jones, C., Mielens, J., Kim, C., & McCulloch, T. (2013, March). Evaluating the tongue-hold maneuver using high-resolution manometry and electromyography. Paper presented at the annual convention of the Dysphagia Research Society, Seattle, Washington.
10) Doeltgen, S.H., Witte, U., Gumbley, F., & Huckabee, M. (2009). Evaluation of manometric measures during tongue-hold swallows. American Journal of Speech-Language Pathology, 18, 65–73.
11) Doeltgen, S.H., Macrae, P., & Huckabee, M. (2011). Pharyngeal pressure generation during tongue-hold swallows across age groups. American Journal of Speech-Language Pathology, 20, 124–130.
12) Umeki, H., Takasaki, K., Enatsu, K., Tanaka, F., Kumagami, H., & Takahashi, H. (2009). Effects of a tongue-holding maneuver during swallowing evaluated by high-resolution manometry. Otolaryngology – Head and Neck Surgery, 141, 119–122.
13) Lazarus, C., Logemann, J.A., Song, C.W., Rademaker, A.W., &Kahrilas, P.J. (2002). Effects of voluntary maneuvers on tongue base function for swallowing.Folia PhoniatricaetLogopaedica, 54(4), 171–176.
14) Fujiu, M., Logemann, J. A., &Pauloski, B.R. (1995). Increased postoperative pharyngeal wall movement In subjects with anterior oral cancer: Preliminary findings and possible implications for treatment. American Journal of Speech-Language Pathology, 4(2), 24–30.
15) Pisegna, Jessica &Langmore, Susan. (2014). The Efficacy of the Masako (Tongue-Hold) Maneuver: A Pilot Study.