

MODIFIED BARIUM SWALLOW AND BARIUM SWALLOW: WHAT IS THE DIFFERENCE?

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Evaluation of oropharyngeal swallowing is a multifaceted process that involves assessment of swallowing behaviors during the task of eating and drinking. During the clinical evaluation, the speech-language pathologist examines the movements of the lips, tongue, palate and larynx while the patient eats or drinks a small amount of regular food or liquid. Sometimes the nature of the problem is not clearly evident during this evaluation and an instrumental examination is required. For example, some patients may display aspiration (food or liquid entering the trachea) on radiographic examination without coughing and choking while eating or drinking.

Instrumental examinations allow for direct visualization of the swallowing structures during swallowing behavior, a process that cannot always be accurately determined during bedside examination. The most frequently used method of visualizing the process of mastication and swallowing is a radiographic procedure, the modified barium swallow, alternately named the videofluoroscopic oropharyngeal swallowing study.

During the modified barium swallow study patients are positioned in an upright posture in the radiology suite and drink and eat controlled amounts of liquids, semi-solids and solid materials that contain barium. Barium is a radio-opaque compound that shows up during x-ray and outlines the structures it encounters and allows for imaging of the process of swallowing. The purpose of the modified barium swallow is to understand the individual's swallowing function as well as the problems the patient is experiencing. An equally important goal is to evaluate the efficacy and effectiveness of therapeutic strategies, which are aimed at increasing swallowing safety and efficiency. These strategies include altering the posture of the head and neck in order to alter the flow of the contrast, teaching voluntary swallowing maneuvers which improve pressure on the bolus or protect the airway or changing the bolus characteristics, which affects the speed with which they are swallowed. Some strategies are more effective than others depending on the unique characteristics of the patient's swallowing behavior. The patient's response to these therapeutic strategies provides crucial information to the speech pathologist for management of the patient's swallowing function.

Sometimes *modified barium swallow examination* and *barium swallow examination* are confused and used interchangeably, albeit erroneously. These two examinations are in fact distinct and have different purposes. The table below summarizes the critical differences. The goal of the barium swallow is to examine esophageal function; oropharyngeal swallowing is only screened during this examination. During the barium swallow the radiologist examines the passage of barium contrast from the cricopharyngeal segment at the entrance to

the esophagus through the gastroesophageal junction as the contrast enters the stomach. Specifically, the barium swallow seeks to examine esophageal mucosa for signs of functional and structural abnormalities such as diverticula or pouches, strictures, webs, varices, tumors, polyps, other mucosal irregularities. In addition the barium swallow evaluates esophageal motility while the patient is positioned upright and supine and problems such as impaired esophageal peristalsis, gastroesophageal reflux and hiatal hernia may be observed.

<i>Modified Barium Swallow</i>	<i>Barium Swallow</i>
Performed by a speech pathologist and a radiologist	Performed by a radiologist and radiology technologist
Evaluates oropharyngeal swallowing including oral cavity, pharynx, larynx and cervical esophagus	Evaluates esophageal swallowing from cricopharyngeus (entrance to the esophagus) to gastroesophageal junction (entrance to the stomach)
Detects presence of and causes of aspiration	Detects esophageal mucosal abnormalities and signs of dysmotility
No specific patient preparation is necessary prior to the test	The patient must refrain from eating or drinking 12 hours prior to the study
Contrast: controlled volumes of a variety consistencies containing barium including thin and thick liquid, semi-solid (pudding), solid (cookie) and barium tablet	Contrast: single contrast – 1 or 2 cups of thin and thick barium Double contrast – effervescent granules and thick barium and barium tablet
Patient is positioned upright seated or standing	Patient is positioned upright and in supine posture
The entire study is videorecorded for later play back and analysis	Single selected spot images are taken while the patient is swallowing
Efficiency of mastication, propulsion and airway protection are evaluated	Mucosal abnormalities and esophageal motility are evaluated
Testing duration is under 5 minutes of fluoroscopic imaging with the total duration of the study about 10 minutes	Testing duration can be 10-15 minutes but sometimes further images are required several minutes after the barium is ingested
If the patient is seen to aspirate, therapeutic strategies are introduced in an attempt to reduce the aspiration	If the patient is seen to aspirate the procedure is terminated
The speech pathologist and radiologist report the findings of the procedure together and the speech pathologist uses this information to manage the patient's swallowing dysfunction further	The radiologist reports the findings to the referring physician who manages the patient further