



Hard To Swallow: Understanding the Modified Barium Swallow Study (MBSS)

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Introduction

The Modified Barium Swallow Study (MBSS) is the most frequently used instrumental procedure for the assessment of dysphagia in patients of all ages. It may also be referred to as a Videofluoroscopic Swallow Study. In many acute care hospitals, as well as outpatient facilities, MBSS exams represent a significant use of fluoroscopic equipment. It is helpful for Radiology Residents, Radiologists, and Radiologic Technologists to have an understanding of these examinations, why they are performed, and the significant impact this exam may have on a patient's quality of life.

Dysphagia

Greek *dys-* meaning bad or disordered, and *phago-* meaning "eat"; difficulty swallowing.

Two major types:

1. Oropharyngeal Dysphagia: complications include dehydration/malnutrition, aspiration pneumonia, and death
2. Esophageal Dysphagia-not within the scope of practice for Speech Pathologist but cervical esophageal deficits (e.g. diverticulum, impaired UES functioning) may be appreciated by the Radiologist during the MBSS that impacts the pharyngeal phase of the swallow or be the cause of the patient's complaints (i.e. globus, reflux).

Etiologies

- | | |
|--------------------------------|------------------------------|
| -Cerebral Vascular Accident | -Neurodegenerative Disorders |
| -Amyotrophic Lateral Sclerosis | -Zenker Diverticulum |
| -Malignancy | -Cervical Spine Injury |
| -Movement Disorder | -Structural Abnormalities |
| -Myasthenia Gravis | -Multiple Sclerosis |
| -Muscular Dystrophies | -Medications |

Phases of Swallowing

Oral Preparatory Phase: Mastication and bolus formation into a cohesive mass/bolus.

Oral Phase: Anterior to posterior tongue movements to propel bolus into oropharynx.

Pharyngeal Phase: Velopharyngeal closure, elevation and anterior movement of hyoid bone and larynx, closure of the larynx, cricopharyngeal opening, tongue base and pharyngeal wall contraction, all occur when the pharyngeal phase is initiated.

Esophageal Phase: Begins once the bolus passes the upper esophageal sphincter (UES); Primary peristaltic wave pushes bolus through the lower esophageal sphincter. This phase is not specifically assessed during the MBSS.

Anatomy as viewed during MBSS

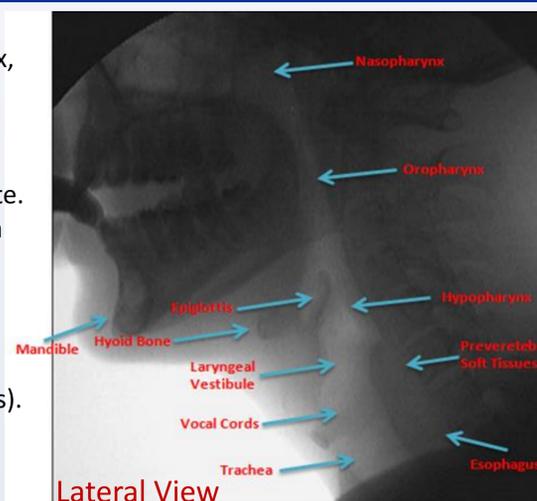
Pharyngeal Cavity: Is comprised Of the Nasopharynx, Oropharynx, & Hypopharynx.

Nasopharynx: uppermost portion of the pharynx, extends From nasal choanae to soft palate.

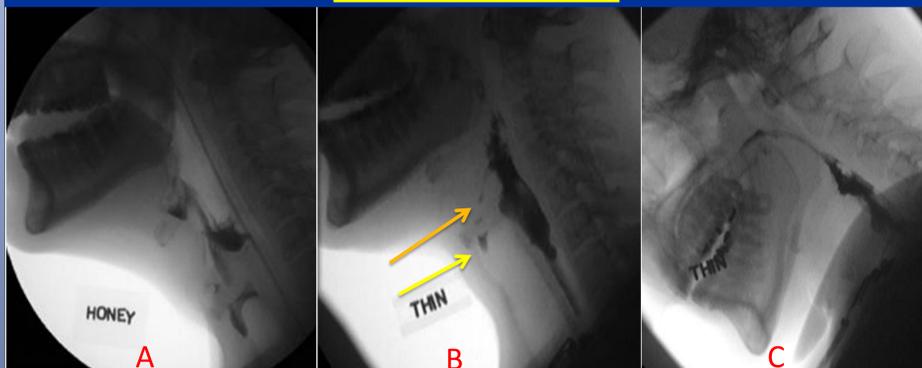
Oropharynx: extends from uvula to hyoid bone, formed by the superior and middle pharyngeal constrictor muscles; contains the valleculae (cavity between the base of tongue and epiglottis).

Hypopharynx: extends from epiglottis to cricopharyngeus muscle, formed by the middle and inferior pharyngeal constrictor muscles; contains the pyriform sinuses (cavity formed between the lateral insertion of inferior constrictor and lateral walls of the thyroid cartilage).

Larynx: comprised of the epiglottis (which inverts to protect the airway during the swallow) and vocal cords (which adduct to prevent material from being aspirated).



Case Examples



Pic. A Gross penetration and aspiration Pic. B Penetration (orange) and aspiration (yellow) during the swallow Pic. C The same pt using chin tuck during the swallow eliminating aspiration and penetration.



Pic. A Moderate amount of residue after the swallow in left pyriform sinus before head turn trial. Pic B. Image during the swallow with head turned to the left. Pic C. Resulting trace residue on left after swallow when head turn to left used. Penetration is when material enters the laryngeal vestibule. Aspiration occurs when material goes below the level of the vocal cords.

The Speech-Language Pathologist Role

- **Determination of Dysphagia:** A Speech-Language Pathologist conducts a clinical exam of the patient's swallow mechanism to determine if an MBSS is warranted.
- **Evaluate the physiology of the oropharyngeal phases by watching what is visualized during the MBSS with the physiological deficit:** (e.g., residue in valleculae due to reduced base of tongue retraction, aspiration during the swallow due to reduced laryngeal closure/epiglottic inversion, residue in the pyriform sinuses due to reduced anterior laryngeal movement, cricopharyngeal dysfunction).
- **Compensatory Strategies (i.e. Postural changes, maneuvers, consistency changes):** After determining the physiological deficits, various compensatory strategies (e.g., effortful swallow, head turn towards weak side, liquid wash, chin tuck) can be used during the study to determine effectiveness for use during oral intake. Consistency of the bolus (e.g., thin liquid, nectar or honey thick, puree, solid) may be altered to provide the safest oral diet.
- **Collaboration with Radiologist at the conclusion of the exam:** Discussion should occur throughout the exam to ensure reliability for most effective patient management and consistency in reports, as each department prepares a report to be provided to the referring physician.

Conclusion

The MBSS is a commonly performed, dynamic assessment of swallowing conducted in the Radiology Department, in conjunction with the Speech-Language Pathology Department. Results of the study are used to recommend the safest, least restrictive oral diet for patients with swallowing deficits. The exam can also be used to gauge interval improvement or worsening of swallow function. Radiology Residents/Fellows, Radiologists, and Radiologic Technologists, need to be familiar with the MBSS and their collaborative role with the Speech-Language Pathologist in making an accurate diagnosis and aiding in patient management.

References

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