

## Aspiration and Penetration Summary

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Disclaimer: This document is compiled based on a review of the published literature. No claim is made by VitalStim Therapy on the validity of the information in this summary.

### General Information

Aspiration, which is inhalation of food/liquid or gastric contents passing through the vocal cords, can be a serious complication of dysphagia. It can cause coughing, choking, airway obstruction, and if the aspirated material reaches the lungs can result in aspiration pneumonia.

A person's ability to tolerate aspiration is highly variable. It is normal to aspirate microscopic amounts of food or liquid. However, aspiration of large quantities is abnormal and can result in respiratory complications.<sup>1</sup>

There are several factors that can contribute to the effects of aspiration:

1. *Quantity.* Aspirating larger amounts is more detrimental.
2. *Depth.* The deeper the aspirated material reaches toward the lungs, the more dangerous it is.
3. *Properties of the aspirated substance.* Any aspirated material that introduces harmful bacteria from the oral cavity to the lungs is particularly detrimental. Also foods or liquids that are more acidic are thought to be more dangerous when aspirated. Aspiration of solids and puree foods have been associated with a higher incidence of developing pneumonia than aspiration of liquids.
4. *Ability to clear aspirated material.* Aspiration is more dangerous and more likely to result in pulmonary complications with patients who have a weak, unproductive cough or who do not cough in response to the aspiration – this is called “silent aspiration”.<sup>2</sup>

### Incidence of Aspiration:

The literature states that the true incidence of aspiration pneumonia, in contrast to other pulmonary conditions, is difficult to determine. Some researchers have stated that this is in part due the fact that the criterion for a definitive diagnosis of aspiration pneumonia is not standardized.<sup>3</sup> The research instead focuses on the documented instances of aspiration with patients of different diagnoses.

### Identification of Aspiration:

It is generally agreed upon in the medical literature that the best, most definitive way to detect aspiration during swallowing is with either a Modified Barium Swallow study (MBS) or Fiberoptic Endoscopic Evaluation of Swallowing (FEES). During one research study, a bedside swallowing evaluation alone was found to “underestimate aspiration risk in patients who aspirated and overestimate aspiration risk in patients who did not aspirate”.<sup>4</sup>

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However there are several risk factors which should alert the medical professional to the possibility of dysphagia/aspiration which may warrant a swallowing evaluation:

- Recurrent pneumonia or other respiratory infections
- Diagnosis of GERD
- Repeated unexplained low grade fevers
- Tube feeding
- Weight loss greater than 10% in last 6 months
- Rales or Rhonchi (rattling or bubbling sounds in the chest when breathing) <sup>5</sup>

In addition to the above medical conditions, the following symptoms should be watched for during a meal with an individual suspected of possibly having dysphagia/aspiration:

- Coughing, gagging, or excessive throat clearing during or after meals
- Gurgling sounds in throat while breathing
- Weak or absent cough
- Wet sounding speech
- Increased mucous, excessive drooling
- Wheezing without asthma
- Watery eyes during eating or drinking
- Nose running or sneezing during eating (when allergies or cold not present) <sup>5</sup>

If these symptoms are present, then the patient should be referred to speech pathology for a swallowing assessment.

### Aspiration Pneumonia

*Aspiration pneumonia* is an infection resulting from aspiration of pathogenic bacteria found in oropharyngeal secretions. Aspiration of these bacteria can occur during inhalation of food/liquids during swallowing. In contrast, *aspiration pneumonitis* is a chemical injury that results from the inhalation of sterile gastric contents which contain a high pH level. <sup>6</sup>

Patients with documented aspiration of solids or liquids do not necessarily develop pneumonia. Studies have demonstrated only 13-38% of documented aspirators went on to develop pneumonia.

While dysphagia has been found to be an important risk factor for aspiration pneumonia, it is generally not sufficient to cause pneumonia unless other risk factors are present as well. Other predictors of aspiration pneumonia in the nursing home population include the following:

- Dependent for feeding
- Dependent for oral care
- Number of decayed teeth
- Tube feeding
- More than one medical diagnosis
- Number of medications
- Smoking <sup>7</sup>

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While dysphagia alone is not statistically significant to result in aspiration pneumonia, another study reports that there is a significantly higher incidence of oral-pharyngeal dysphagia in patients with aspiration pneumonia.<sup>8</sup>

### *Elderly:*

Aspiration pneumonia and pneumonitis are common in the elderly population. However, while the existence of dysphagia and aspiration are important factors in the occurrence of pneumonia, there are other contributing factors.

- Elderly persons may have diminished production of saliva, often as a result of medications or oral/dental disease. This can lead to poor oral hygiene and colonization of pathogenic organisms in the oral cavity. Aspiration of these bacteria while swallowing food or liquids can lead to pulmonary complications.<sup>9</sup> Almost half of the elderly population in the US is prescribed medications that reduce salivary flow.<sup>3</sup>
- Elderly persons may also have impaired defenses against aspiration such as diminished cough strength or ability to clear aspirated materials.<sup>9</sup>

### Silent Aspiration:

Silent aspiration is when no outward signs or symptoms of aspiration, such as coughing or throat clearing, are present when food/liquids enter the airway.

Overall, studies suggest that 20-30% of patients with dysphagia silently aspirate.

The incidence of silent aspiration is higher with patients who have dysphagia following a stroke and is reported at 28-39%.

The incidence of silent aspiration was 78% in individuals with severe motor and intellectual disabilities.

In a study of 186 children with developmental dysphagia, 26% aspirated. Of these, 94% of the children who aspirated did so silently.

One study found that 50% of medically stable patients with tracheotomies aspirated with 77% of those having silent aspiration. Another study of patients with a tracheotomy within the last 2 months found that 33% of those patients aspirated 82% silently.<sup>10</sup>

These statistics further suggest the need for objective measures of swallowing, such as the MBS or FEES, to detect aspiration.

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