

# Danger Signs of Dysphagia in Dementia

삼킴 장애의 위험 신호  
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# Introduction

Why dysphagia in dementia patients

# Prevalence

Aspiration pneumonia has further been reported to be a cause of death in patients with dementia

Prevalence of swallowing difficulties in dementia: 13 to 57%

Institutionalized dementia patients who have dysphagia : 45 %

Extra pyramidal signs (EPS), autonomic dysfunction and fluctuations in cognition can lead to swallowing problems in patients with Dementia with Lewy body and Parkinson's disease dementia.

Understanding the contribution of dysphagia to altered eating in AD is especially important because the risk of AD increases with age, and dysphagia in elderly adults is associated with **morbidity**, including **pneumonia and malnutrition**, and **mortality**.

# Dementia exclusive

Eating can be defined as consisting of two components.

Self-feeding

Swallowing

# **Sign 1. Feeding problems**

# Specific in Dementia

Progressive loss of learned behaviors leads to feeding problems

Ability to feed oneself (utensil use)

What is food

What is meal

The need to eat

# Consequences

Eating dysfunction in Alzheimer dementia (AD) may involve impaired ability in transferring food from the table to the mouth (self-feeding), impaired transfer of food from the mouth into the stomach (swallowing), or both.

When self-feeding becomes impaired, the individual is at risk for malnutrition and its sequelae; when self-feeding ceases altogether, the individual becomes dependent on the motivation, commitment, and skill of another person or persons for adequate nutrition and hydration.



# Eating problems

**Eating Problems in Hospitalized Alzheimer Patients**

Status	n	Problem	Incidence, %
Feeds self	17	Requires assistance in opening milk cartons, unwrapping utensils, etc.	88
		Needs coaxing to eat	53
		Has to be served one course at a time	47
		Walks away from food on the table	18
Fed, no problem	13	Unable to chew regular diet	92
		Swallows on command	77
		Takes food in his mouth but does not swallow it spontaneously	23
		Unable to open mouth spontaneously	8
Refuses feeding	36*	Turns head away when fed	89
		Keeps mouth shut	78
		Pushes the spoon or hand away	72
		Eats by her/himself after refusing to be fed during mealtime	44
Chokes	23	Spits food	39
		Chokes on liquids	100
		Chokes on solids	96
		Chokes more on liquids than on solids	96

\*Includes patients who refused feeding *and* choked on food.

1. Volicer L, Seltzer B, Rheaume Y, Karner J, Glennon M, Riley ME, et al. Eating Difficulties in Patients With Probable Dementia of the Alzheimer Type. Topics in geriatrics. 3rd ed. 2016 Sep 2;2(4):188-95.

# Sequence and prevalence

50% patients lose the ability to feed 8 years after onset of dementia

Sequence of disability in feeding oneself

Severe speech difficulties

Loss of ability to dress oneself

Disruption of normal sleep wakefulness

Development of limb contractors

**Table 3**  
**Advanced stages of dementia**

<b>Stage</b>	<b>Manifestations</b>	<b>Mean Duration (y)</b>
6a	Ability to perform ADLs becomes compromised (eg, putting clothing on correctly)	2.5
6b	Loss of ability to bathe independently	2.5
6c	Loss of ability to manage the mechanics of toileting correctly	2.5
6d	Urinary incontinence	2.5
6e	Fecal incontinence Speech overtly breaks down in the ability to articulate. Stuttering neologisms, and/or an increased paucity of speech are noted. Still able to respond to nonverbal stimuli and communicate pleasure and pain via behavior	2.5
7a	Evident rigidity on examination of the passive range of motion of major joints, such as the elbow, in most patients with AD Require continuous assistance with basic ADLs for survival Speech is limited to 6 or fewer intelligible words	1
7b	Approximately 40% of patients with AD manifest contractures of the elbow, wrists, and fingers to the extent that they cannot move a major joint more than halfway Speech limited to a single intelligible word	1.5
7c	Loss of ability to ambulate independently Speech is lost	1
7d	Loss of ability to sit up independently	1
7e	Loss of ability to smile; only grimacing facial movements are observed	1.5
7f	Loss of ability to hold up the head independently	—

Reisberg B. The encyclopedia of visual medicine series. An atlas of Alzheimer's disease. Pearl River (NY): Parthenon; 1999.

Behavioral eating difficulties occur in all stages of AD.

Difficulty with grocery shopping

Difficulty with meal preparation

Difficulty remembering when one has  
eaten a meal

Forget food  
What is food  
The need to eat

# Behavioral - early stages

Difficulty finding the dining room

Remembering when meals are served

Making food choices

Maintaining socially appropriate conversations and manners

To maintain proper sitting posture throughout the meal times

Resist distraction

Manipulate utensils

Decreased appetite

Reduced recognition of  
thirst and hunger

Malnutrition weight loss

Weigh loss , skin changes, skin  
breakdown, dry mouth,  
constipation

# Why fail to eat

Food agnosia (failure to recognize edible objects as food)

Loss of the sense of thirst and hunger

Depression



# Behavioral - later stages

Behavioral problem  
Refusal to eat food  
Turning the head away  
Refusal to open mouth

Spitting

Inability to swallow  
Being unable to swallow  
Allowing food to drop out of the mouth

# What do these behaviors mean

General decline in cognition and other functional activities.

The continuous involuntary failure to accept oral feeding is thought to be the cause of death in dementia when there is no additional comorbidity.

# Danger signs

# Feeding behavior

Memory dysfunction

Forget to eat a meal

Forget what food is

Increased agitation, distraction

Sitting for mealtime problematic

Unable to meet caloric demands

Mixing and playing with food without eating

Throwing food

Eating non-edible items

Holding the hand in front of the mouth

Hitting or biting the feeder

# Questionnaires

**Table 1** Questionnaire administered to nurses in present study

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Q1	Does the patient ever refuse to eat?
Q2	Does the patient turn his head away while being fed?
Q3	Does the patient refuse to open his mouth?
Q4	Does the patient spit out his food?
Q5	Does the patient leave his mouth open allowing food to drop out?
Q6	Does the patient refuse to swallow?

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The response to the questions was either: A, never; B, sometimes; C, often.

*References*

- Q1 (Miller 1971, Åkerlund & Norberg 1985, Alford 1986, Singh *et al.* 1988, Sanders 1990).
- Q2 (Norberg *et al.* 1980a, Athlin & Norberg 1987a, Michaelsson *et al.* 1987).
- Q3 (Athlin & Norberg 1987a, Michaelsson 1987).
- Q4 (Norberg *et al.* 1980b, Siebens *et al.* 1986, Athlin & Norberg 1987b).
- Q5 (Siebens *et al.* 1986, Michaelsson *et al.* 1987).
- Q6 (Norberg *et al.* 1980a, Siebens *et al.* 1986, Michaelsson *et al.* 1987, Athlin & Norberg 1987a, Sanders 1990).

# Instrumental Assessment Tools

The Feeding Assistance Observation Protocol - Dining room (Simmons and Schelle 2003)

Meal Assistance Screening Tool (MAST Steel 1996)

Feeding Behavior Inventory (FBIm Durnbaugh, Haley and Roberts)

Feeding Dependency Scale

Eating Behavior Scale (FBS, Tully Lambros et al. 1998 )

# **Sign 2. Swallowing problems**

# Swallowing impairment

AD subjects demonstrated significantly prolonged swallow durations for the oral transit duration (cookie), pharyngeal response duration (liquid), and total swallow duration (liquid)

Swallowing dysfunction, regardless of self-feeding status, places the demented individual at risk for malnutrition, aspiration pneumonia, nonoral feeding, and death.



# Dementia and instrumental assessment

Only 16% of patients had normal swallowing function

Common findings

delayed pharyngeal response or reflex and prolonged oral phase.

inefficient pharyngeal clearance.

prolongation or disorganization of bolus movement in the mouth resulting in an increased oral transit duration.

Inconsistent airway closure

The severity of the swallow abnormality noted on the videofluoroscopic swallow evaluation correlated with the severity of dementia.

Horner J, Albert MJ, Dawson DV, et al. Swallowing in Alzheimer's disease. Alzheimer Dis Assoc Disord 1994; 8:177-95.

# Pathomechanism

Brain forgets how to initiate a swallow, trigger a swallowing reflex

Degenerative changes of the corticobulbar tract and cranial nuclei in those with AD have been suggested.

Hypometabolism in the premotor cortex by PET scan in individuals with moderate and severe dementia

Leads to incoordination of the muscles

Old age associated dysphagia

# Early changes

Dysphagia may occur early in AD. VFSS can document swallowing alterations in small groups of individuals with mild AD.

Dysphagia occurring early in AD may be associated with functional changes in the cortical swallowing network (pre- and postcentral gyrus and frontal and Rolandic operculum) as measured using functional magnetic resonance imaging.

Although, swallowing impairment is usually noted in the late stages of AD, changes in cortical control of swallowing may begin long before dysphagia becomes apparent

# Signs for early identification

Instrumental assessment

Regular follow-up

By time of swallowing dysfunction

Can not communicate

Limitations in instrumental assessment

Refusal to open mouth

Reliance of clinical signs

**Table 4****Sentinel indicators of decline in deglutition with increased aspiration risk**

<b>Demographic</b>	<b>History</b>	<b>Physical Examination</b>	<b>Swallowing Evaluation</b>
Advanced age	Falls	Impaired cognition	Decreased oral bolus manipulation
Medical comorbidities	Wheelchair bound	Drooling	Delayed initiation of tongue thrust
Poor nutritional status	Recent hospitalization	Wet voice	Decreased laryngeal sensation
Depression/anxiety	Recent surgery	Weak voice	Pooled secretions in the pyriforms
Nursing home resident	Respiratory symptoms	Cough	Decreased or absent swallow reflex
	Fatigue and weakness	Dysarthria	Gross aspiration or microaspiration

# Part 3. Clinical cues

Exclusive to dementia patients

# Oral dysfunction

Important to confirm oral functions when examining for dysphagia.

When examining for the signs of dysphagia, the state of the teeth and tongue dysfunction need to be noted

Salivary leakage from the lips, decreased muscle strength, and decreased jaw and soft palate movements might be observed.

# Oral function

Logistic regression analysis revealed that lip closure, lingual movement and rinsing ability were significantly associated with suspected aspiration.

**Table 3.** Predicting suspected aspiration and silent aspiration

Factor	OR <sup>†</sup>	95% CI	P value
Age	1	0.9–1.0	0.804
Sex	1.3	0.6–2.7	0.486
Lip closure	5.6	2.3–13.8	<0.001
Lingual movement	4.2	1.7–10.1	0.001
Rinsing ability	2.8	1.3–6.1	0.012
Age	1	0.9–1.0	0.292
Sex	0.3	0.1–1.1	0.066
Dementia severity (CDR)	2.2	1.2–4.1	0.01

Upper section: Univariate and multivariate analyses with suspected aspiration as the dependent variable and each of the additional factors as independent variables.

Lower section: Univariate and multivariate analyses with silent aspiration as the dependent variable and each of the additional factors as independent variables.

<sup>†</sup>Odds ratio, adjusted by age and sex.



# Mouth rinsing

Among several factors that affect dysphagia in AD patients; rinsing ability was identified to be strongly associated with dysphagia.

Rinsing ability : rinse rhythmically sequentially without leaking water were defined as “better” function, whereas those who could not were defined as “worse”

Arai et al. mentioned the relationship between self feeding and rinsing, and noted that rinsing requires many difficult functions, including liquid and equipment management, pharyngeal functions, oral pressure control and spit control skills.

Table 2 Survey items

	Survey items
Swallowing function	Modified water swallowing test
Oral status	Residual teeth Occlusal contacts
Oral functions	Lips function Tongue function Rinsing ability Gargling ability
Basic information and Vital functions	Age and Sex Barthel index (BI) Vitality index (VI)
Cognitive function and neurological signs	Mini-Mental State Examination Clinical Dementia Rating
Nutritional status	Limb contractures Serum albumin Body mass index
Diet-related assessments	Storing food in the mouth Stuffing food into the mouth Appetite Caloric intake

Arai K, Sumi Y, Uematsu H, Miura H. Association between dental health behaviors, mental / physical function and self-feeding ability among the elderly?: a cross-sectional survey. *Gerodontology* 2003; **20**: 78-83

Sato E, Hirano H, Watanabe Y, Eda Hiro A, Sato K, Yamane G, et al. Detecting signs of dysphagia in patients with Alzheimer's disease with oral feeding in daily life. *Geriatrics & Gerontology International*. 2013 Aug 29;14(3):549-55.

# Simple verbal command task

Use of the orientation questions and simple verbal commands may help to identify individuals at risk for swallowing problem

In an acute hospital setting on patients with dementia and neurological injuries

Orientation to person place and time

One step commands (open your mouth, stick your tongue out, and smile)

The odds of liquid aspiration (by FEES) were 31% greater in individuals not oriented, and study subjects deemed unsafe for any oral intake were 69% of individuals who were not able to follow single step verbal commands ( $p < 0.001$ ).

# Early signs

Loss of appetite

Sense of smell

Feeding behaviors

Oral dysfunction

Rinsing of mouth

# Identification of early feeding behavioral changes

Swallowing task per se not only problem

Food refusal

Inability to chew

Inability to open mouth

**“SW allowing problems are clearly progressive.  
Start from “subclinical dysphagia”, evolving to  
“overt dysphagia” and finally “swallowing apraxia”  
as a continuum”**

*– Secil Y, Arıcı S, İncesu TK, Gürgör N, Beckmann Y, Ertekin C. Dysphagia in Alzheimer's disease. Neurophysiologie Clinique/Clinical Neurophysiology. 2016 Jun;46(3):171–8.*

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