

Department of  
**SPEECH THERAPY**

# Swallowing & Communication in Motor Neuron Disease





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# Introduction

## What is Motor Neuron Disease (MND)

Motor Neuron Disease (MND) belongs to a group of neurological diseases resulted by the progressive deterioration of the nerves (motor neurons) in the brain and spinal cord that control the muscles of the body. As a result, the muscles weaken, stiffen and deteriorate. Symptoms of MND vary from person to person, but in general, it can affect our breathing, eating, drinking, speaking, and movement.

The Main Types of MND Include:

1. Amyotrophic Lateral Sclerosis (ALS)
2. Progressive Bulbar Palsy (PBP)
3. Progressive Muscular Atrophy (PMA)
4. Primary Lateral Sclerosis (PLS)

## Role of the Speech Therapist in the Care of Individuals with MND

Speech Therapists work as part of a multidisciplinary team consisting of Neurologists, Nurses, Physiotherapists, Occupational Therapists, Speech Therapists, Respiratory Therapists, Prosthetists and Orthotists, Medical Social Workers, Psychologists and Pharmacists.

As Speech Therapists, we assess and diagnose swallowing and communication disorders. We provide advice and intervention for individuals with MND with the aim of maximising their quality of life in everyday functions of eating, drinking and communication.

# Swallowing in MND

## What Happens When You Swallow

Swallowing involves the transport of food or fluids from the mouth into the stomach. This complex process requires precise control, coordination and contraction of the muscles in the mouth, throat and food pipe and can be divided into three phases:

### 1. Oral Phase – Mouth

- I. The mouth first opens to receive food or fluids. Next, the lips will seal to prevent spillage of food or fluids out of the mouth.
- II. Next, the tongue takes control and prevents early entry of food or fluids into the throat. It also moves food around the mouth for chewing and to mix it with saliva.
- III. Once ready to be swallowed, the food and/or fluids are collected together and pushed to the back of the throat for swallowing.

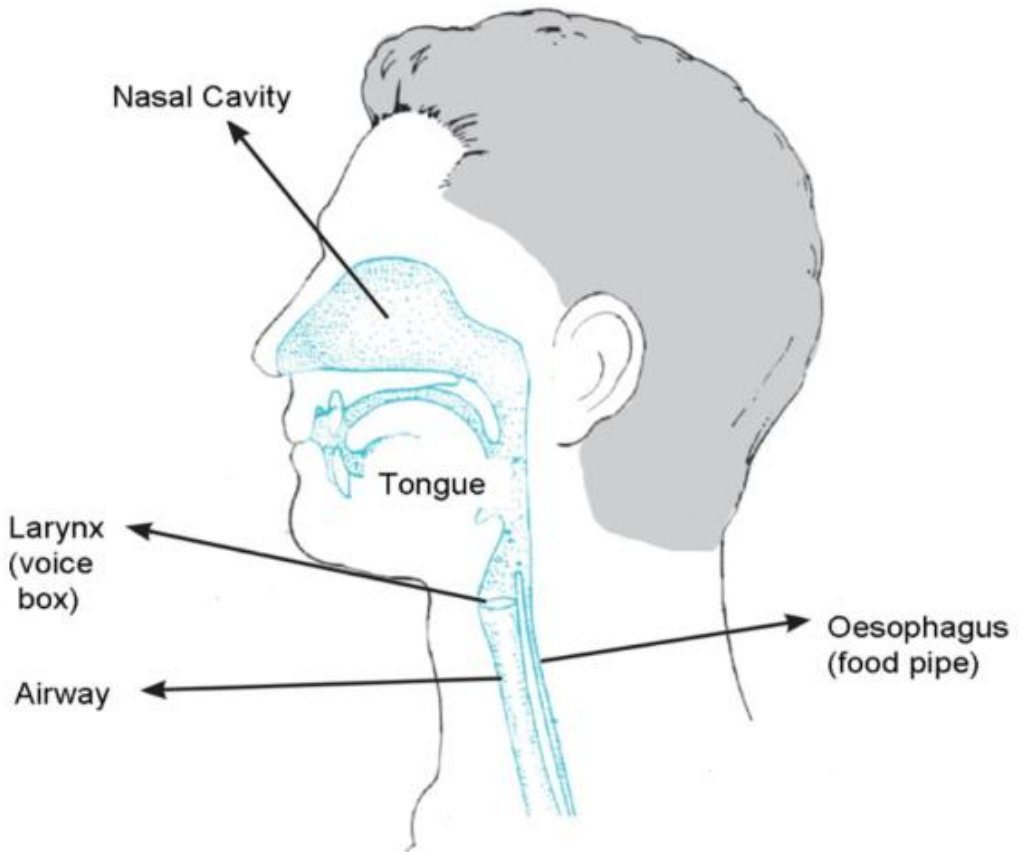
### 2. Pharyngeal Phase – Throat

- I. Muscles of the throat squeeze to push the food and/or fluids into the food pipe. At the same time, the larynx (also known as voice box) raises and seals off the windpipe (airway) to prevent food and fluids from entering.

### 3. Oesophageal Phase – Food Pipe

- I. A series of wave-like muscle contractions transport the food and fluids down the food pipe into the stomach.

# Head & Neck Structures



# Do You Have Dysphagia?

Dysphagia refers to swallowing difficulties experienced as a result of a disruption to the normal process of swallowing.

Individuals with MND may have swallowing difficulties caused by weakened muscles of the mouth, tongue and throat. The onset of these symptoms and the type of MND diagnosed vary with each person.

## What Should You Look Out for When You Eat and Drink ?

- Drooling of food or fluids from the mouth
- Difficulty biting food apart and/or chewing to mash the food
- Difficulty pushing food or fluids to the back of the mouth for swallowing
- Significant amount of food or fluid particles left in the mouth after swallowing
- Have to swallow multiple times per mouthful of food or fluids
- Food or fluid flows up into the nose when swallowing (nasal regurgitation)
- Sensation of food/fluids being stuck or causing irritation in the throat
- Coughing, choking or frequent throat clearing when eating or drinking
- Wet gurgly voice quality after eating or drinking
- Increased shortness of breath when eating or drinking

# How can Swallowing Difficulties Affect You?

Swallowing difficulties can greatly affect a person's health, wellbeing and quality of life.

## You May Experience Any of the Following:

- Taking a long time to finish a meal or a cup of drink
- Finding it tiring and effortful to eat or drink
- Becoming stressed and anxious due to fears of choking or being unable to eat or drink enough
- Eating and drinking become less enjoyable
- Avoidance of social activities which involve eating/drinking (i.e. meals with family and friends, eating out at the coffee shop)
- Chronic cough and recurrent chest infection due to aspiration (food or fluids going into the lungs)
- Face choking and breathing difficulties due to obstructed airway
- Dehydration and malnourishment with loss of weight

A referral to the Speech Therapist is important as they can assess your ability to swallow safely, advise you on potential swallowing strategies and determine if there is a need for modification of food textures and fluid thickness in your diet.



# What to Expect at Your Appointment

The Speech Therapist will ask you questions with regards to your:

## 1. Diet History

e.g. What type of food and drinks do you usually consume?

## 2. Feeding Dependency

e.g. Can you feed yourself independently?

Do you need the assistance of a caregiver to feed you?

## 3. Swallowing Difficulties

e.g. Do you cough or choke when you eat or drink?

When did your swallowing problems start?

Do you feel food stuck in your throat?

A clinical assessment will be carried out which involves:

1. Examination of your oral structures (lips, jaw, teeth, tongue)

2. Swallowing Assessment

You will be instructed to consume some food and fluids of various textures and thickness during the assessment



You will be required to return for regular follow up with the Speech Therapist, due to the progressive nature of MND.

After the clinical examination of your swallowing, you may be advised to go for more in-depth swallowing investigations which will be carried out in a separate visit.

## During the Investigation

This investigation can provide visual details on your swallowing function and check if food or fluids are entering your airway or remain in your mouth, throat or food pipe after you swallow. Specific swallowing strategies may also be tested during the assessment to help you swallow safely.

# Swallowing Investigations

## 1. Videofluoroscopy Study (VFS)

Videofluoroscopy (VFS) is a radiological exam to check if food or fluids are entering your airway and/or lungs when you eat or drink.

You will be seated and be given food and fluids of different consistencies that are mixed with Barium Sulphate (a non-poisonous substance). A video X-ray will be taken as you swallow. The entire procedure last 15 to 20 minutes, with the radiation kept to a minimum.



## 2. Fiberoptic Endoscopic Evaluation of Swallowing (FEES)

Fiberoptic Endoscopic Evaluation of Swallowing (FEES) is used to assess your swallowing ability. During the procedure, a flexible endoscope (a tube-like device with a camera attached at one end) is inserted through your nose down to the level of the throat. You will be given small amounts of fluids and food of different consistencies mixed with blue or green dyes to allow better visibility. The procedure normally takes about 20 to 30 minutes to complete.

\*Note:

There is no special preparation or fasting needed before VFS/FEES procedures. Wear or bring along your dentures for the procedure if applicable.

# Managing Dysphagia

After the assessment, the Speech Therapist will advise you on the following as required:

1. Modification of fluid thickness and food texture
2. Swallowing strategies
3. Alternative methods of feeding

## 1. Modification of Fluid Thickness & Food Texture

In order to swallow safely or eat and drink more efficiently, you will be taught on how to modify your diet texture and fluid thickness. This helps to maintain your nutrition and hydration

### 1A. Modification of Fluid Thickness

You may be advised to add a powdered form of fluid thickener into all your drinks (e.g. coffee, tea, milo, soup, juices, water)

#### How to Prepare Thickened Fluids?

1. Prepare a cup containing 100 ml of fluid
2. Add specified amount of Resource ThickenUp Clear thickener
3. Stir immediately to prevent clumping for at least 30 seconds
4. Ensure fluid is well thickened before serving



# Managing Dysphagia

## 1B. Modification of Food Texture

To achieve food texture modification, you or your caregiver may be advised to alter the way you prepare and cook meals. For example, cutting up larger pieces of meat into bite-size chunks, or blending food into a smooth puree. The various diet textures and fluid consistencies are presented below:

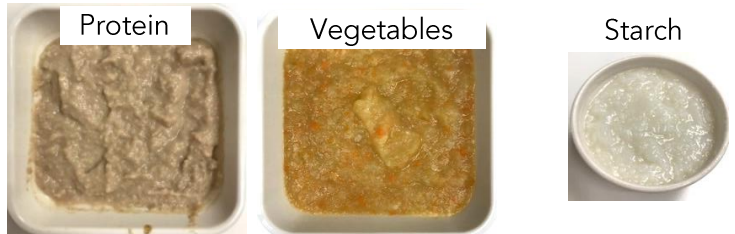
### Regular Texture



### Easy Chew Texture (Soft & Bite-Sized)



### Soft Moist Texture (Minced & Moist)



### Blended Texture (Pureed)



# Managing Dysphagia

## 1C. Taking Medications

You or your caregiver may also be advised to adjust the way you prepare your medications (tablets). This depends on the diet consistency you have been advised to consume by your Speech Therapist.

**Regular  
Texture**



**Easy Chew  
Texture  
(Soft &  
Bite-Sized)**



**Soft Moist  
Texture  
(Minced & Moist)**



**Blended  
Texture  
(Pureed)**



Mix crushed or powdered medications with fluids of appropriate thickness



For liquid medications, ensure it is served at the recommended fluid consistency level.

**Important:**

Always check with your doctor or pharmacist if your medications can be broken/crushed/pounded. Ask for alternatives if available.

# Managing Dysphagia

## 2. Swallowing Strategies

Depending on your condition, your Speech Therapist may advise you to:

- I. Adopt certain head and neck postures (i.e. chin tuck)
- II. Use specific feeding tools (i.e. teaspoon feeding, straw drinking)
- III. Swallow in a deliberate manner (i.e. swallowing multiple times to clear your mouth or throat; cough and swallow after each mouthful)
- IV. Drink fluids after every few mouthfuls of food to help clear any remaining food in your mouth, throat or food pipe

These strategies should only be performed as advised by your Speech Therapist

### General Tips when Swallowing:

- Sit as upright as possible
- Avoid tilting your head backwards
- Eat and drink at a slow pace. Do not rush through your meals
- Swallow first before taking the next mouthful of food or fluids
- Avoid talking with food or fluids in your mouth
- Take small frequent meals if you find it tiring to finish an entire portion at once

# Managing Dysphagia

## 3. Alternative Feeding Methods

Our Doctor, Speech Therapist and Dietitian may discuss alternative feeding methods with you and your caregiver if you have dysphagia.

Tube feeding may be recommended in the following instances:

- Your swallowing is significantly impaired with high aspiration risks if you continue to eat and drink by mouth
- You have difficulty maintaining nutrition and hydration through oral feeding due to dysphagia
- As an early elective intervention so that when your disease progresses, it can be used as a nutritional supplementation or as an alternative mode of feeding to maintain nutrition and hydration

### Types of Feeding Tubes

#### I. Through a Stoma

A feeding tube is inserted through a stoma (hole) into the stomach under local anaesthesia. A short hospital stay of a few days is required for post-procedure monitoring.

##### a) Percutaenous Endoscopic Gastrostomy (PEG)

To undergo PEG insertion, patient must have good respiratory function to undergo this procedure

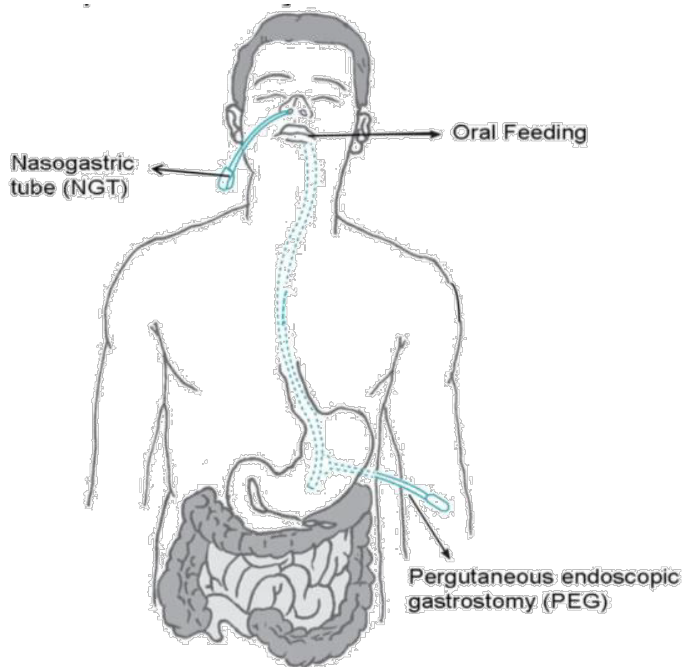
##### b) Radiologically Inserted Gastrotomy (RIG)

Tube is inserted under X-ray guidance. This procedure can be done even if respiratory function is reduced

Gastrostomy may be an elective procedure, but should be considered early for persons with MND and dysphagia. With early insertion, procedural related risks and complications may be reduced.

# Managing Dysphagia

- II. Feeding tube inserted through the nose into the stomach  
Nasogastric Tube (NGT)



## Commonly Asked Question:

Does it mean I am unable to eat or drink anymore after a feeding tube is inserted?

Even with a feeding tube, you can still continue to eat, drink or taste by mouth as tolerated and if deemed safe to do so by your doctor and speech therapist.

Having a feeding tube allows you and your caregiver to feel more confident that you are getting enough nutrition and hydration.



# Risks & Complications of Dysphagia

## 1. Aspiration Pneumonia & Choking

- Aspiration refers to the entry of food or fluids (including saliva) into the airway or lungs, instead of being swallowed into the food pipe and stomach.
- Aspiration may lead to choking due to obstruction of the airway, resulting in breathing difficulties or even pneumonia, which is a lung infection.
- Both condition may lead to death.

## 2. Dehydration & Malnutrition

- You may develop a fear of eating and drinking as a result of multiple choking episodes or swallowing difficulties that may occur when you eat or drink.
- You may lose your appetite while getting used to the modified diet textures or fluids
- You may feel tired from eating or drinking due to your swallowing difficulties.
- All of the above reduced intake of food and fluids. In severe cases, reduced nutritional and fluid intake may cause malnutrition and dehydration.

# Managing Saliva Problems

Persons with MND may experience excessive thin, watery saliva that drools out of the mouth or thick, sticky saliva/phlegm that gets stuck in the mouth or throat.

## How to Manage Saliva Problems?

- Consciously swallow or spit out excessive saliva regularly
- Improve posture to prevent saliva from flowing out of the mouth before it can be swallowed or flow back into the throat which may cause choking
- Apply moistening oral gel or spray to relieve dry mouth
- Consume regular sips of water and plenty of fluids to avoid dehydration that can contribute to thick secretions
- Improve breathing techniques through adding extra force to your cough to expel secretions (best advised by your Physiotherapist)

## Medication Prescription by Your Doctor

For thin watery saliva:

- Apply Atropine drops under the tongue for short term relief
- Amitriptyline (antidepressant)

For thick sticky secretions:

- Mucolytics (e.g. Flumucil) will break down secretions to make it less thick and sticky and easier to cough out

## Oral Suctioning Unit

This involves inserting a suctioning tube into the mouth to remove saliva or phlegm

(best advised by your doctor, nurse or physiotherapist)

## Other Options for Excessive Thin Watery Saliva

- Injection of Botox (Botulinum toxin) into the salivary glands (effect lasts for 3 months)
- Radiation of the salivary glands

Both have side effects that include swallowing problems and dry mouth.

# Importance of Oral Hygiene

Research has shown that oral hygiene is poorer in individuals with dysphagia. Individuals with MND sometimes avoid oral hygiene for fear of choking or having toothpaste/mouthwash enter their breathing tube.

However, it is important to maintain good oral hygiene to avoid increased risk of caries (tooth decay), halitosis (bad breath) and periodontal disease (infection of the gums and other structures around the teeth).

## Tips for Basic Oral Hygiene:

- Use a toothbrush, oral swab or clean damp cloth to clean teeth, the inside of cheeks and surface of tongue
- Keep a forward bent posture when brushing your teeth or rinsing your mouth to reduce accidental backflow of fluids into the throat
- Clean your dentures (if any)



Toothbrush for cleaning teeth



Oral swab

You may wish to speak with your dentist for more details or strategies on maintaining good oral hygiene.

# Communication in MND

## How is Speech Produced?

Air enters through our nose or mouth into the airway and then into the lungs. When air is squeezed out of our lungs, it passes the vocal cords (voice box), making it vibrate to create sound. Sound travels into our mouth, where our articulators of speech (lips, teeth, tongue, palate) form different shapes to create speech.

## How can MND Affect My Communication?

With progression of MND, the muscles of your lips, jaw, tongue and throat, which are involved in speech production, may gradually become weaker. As a result, you may start to notice the following changes to the way you speak:

- Speaking at a slower pace than usual
- Speech volume is softer
- Speech is often unclear or slurred
- Changes in voice quality (rough, strained, breathy)
- Running out of breath easily when speaking  
(e.g. only able to speak one to two words in a single breath)

Because of these speech changes, your family and friends may face increased difficulty in understanding your speech which may cause feelings of frustration, anxiety and social isolation.

# Managing Changes in Communication

The Speech Therapist can offer advice and support to help you meet your communication needs. This may come in the form of:

## 1. Speech Strategies

Useful strategies to consider:

- Speak slowly
- Emphasize the sounds of each word
- Keep your sentences short and use key words
- Take a deep breath before you speak
- If you are running out of air, pause to take a deep breath before you continue to speak
- Use gestures and/or facial expressions to complement your speech

### Tips for Your Communication Partner

- Speak face-to-face
- Be patient, give your loved one time to speak or communicate
- Ask close-ended questions (e.g. yes/no questions, offering choices)
- Avoid speaking in areas with excessive background noises

# Managing Changes in Communication

## 2. Alternative & Augmentative Communication (AAC)

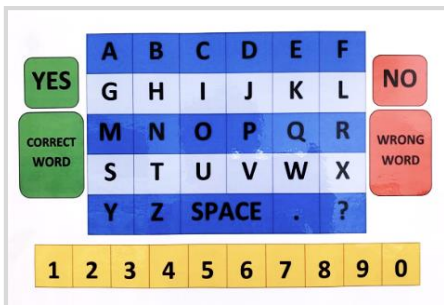
As MND progresses, speech becomes gradually more tiring and difficult. It may also become harder for others to understand you.

In such situations, **Alternative and Augmentative Communication (AAC)** is often considered to supplement your communication or replace speech. There are low technology options, such as personalised word or picture boards, and high technology options, such as text-to-speech and computer-based systems.

Your choice of AAC may depend on your familiarity with technology, cost, and several other factors.

### Low Tech AAC Options

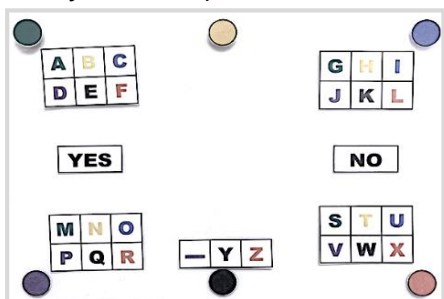
(i) Alphabet Chart



(ii) Picture/Word Chart



(iii) Eye Gaze Alphabet Chart



(iv) Eye Gaze Phrase Chart



# Managing Changes in Communication

## High Tech AAC Options

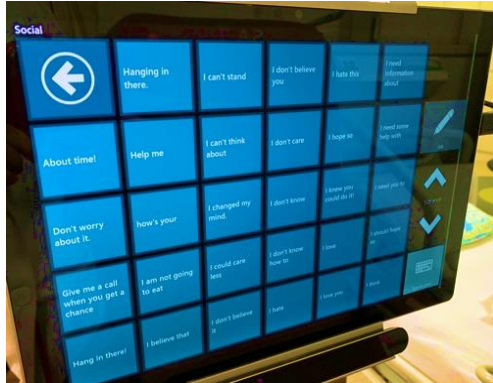
(i) Text-to-Speech Function



(ii) Windows Control with Eye Gaze



(iii) Customisable Phrase Charts



(iv) Picture boards



Bluetooth Switch



Gyroscopic Computer Mouse



# Early Planning for Communication Needs

Individuals with MND may wish to bank their voice for use in high-tech speech generating communication systems.

## A. Voice Banking

You will be instructed to record a number of set phrases or sentences, which will eventually be combined and used to create a personal synthetic voice. With progression of speech difficulties, individuals can download their synthetic voice into text-to-speech systems to generate an infinite combination of words and sentences.

\*Do note that the synthetic voice may not sound exactly like your natural voice but it will be a close match.

To complete the voice banking process, you will need to record between 600 to 3,500 sentences over the course of weeks or months. It may take longer if you require more breaks during the recording. You will require a high quality microphone headset, a computer and a quiet environment with no background noise for your recording.

## B. Message Banking

You will be asked to record words, phrases or sentences messages you may say on a regular basis. Recorded messages can be downloaded into a speech generating communication device and played back in your own voice. There is no limit to the number of messages you can record and it may be done in any language.

Messages can be meaningful to you or your loved ones.

Examples include:

"Have you eaten?", "Scratch my back", "I love you", "What time are you coming home?"

Given the progressive nature of MND, individuals who wish to bank their voices and messages are encouraged to do so as early as possible while their speech is still clear.



# Early Planning for Communication Needs

## C. Leaving a Digital Legacy

### Record Me Now

A digital legacy is made up of audio or video interview recordings of yourself speaking on topics close to your heart. You are encouraged to leave this long lasting legacy for your loved ones.

#### Examples of Interview Questions:

“What has been your proudest moment?”

“What activities do you enjoy doing most together?”

“What would you want to do if you had more time?”

“What hopes and dreams do you have for those closest to you?”

You can find web links to download the “Record Me Now” Application for Mac/Windows Desktop or iPhone by scanning the below the QR code or using this link : <http://recordmenow.org/>







## **Clinic B1C**

TTSH Medical Centre, Level B1

### **Contact:**

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