



Introduction to Speech and Swallowing Problems Associated With Parkinson's Disease

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Introduction

WHO EXPERIENCES SPEECH PROBLEMS?

Researchers have reported that 60-90 percent of people with Parkinson's disease experience some difficulty with speaking. This difficulty may be very subtle, or in some cases, severe.

WHO EXPERIENCES SWALLOWING PROBLEMS?

Research indicates that at least 50 percent of people who have Parkinson's disease experience difficulty with swallowing. As with the changes that may occur in talking, difficulties in swallowing may range from mild in some cases to significant in others. No two swallowing problems are exactly alike.

WHAT IS THE REASON FOR SPEECH AND SWALLOWING PROBLEMS IN PARKINSON'S DISEASE?

Speaking and swallowing use many muscles and nerves in common, much as those of the lower face, lips, tongue, voice box, and throat. The nerves and muscles of these structures are often affected by the Parkinson's disease process. The speech and swallowing problems of Parkinson's mirror other movement problems associated with the disease. For example, just as the muscles involved in movements which we generally consider to be "automatic" such as walking can become stiff and slow to move in Parkinson's, so can the muscles of the "automatic" processes of speech and swallowing. Just as unwanted movements of the hands such as tremor can occur, so can unwanted movements of the jaw or tongue. Speech and swallowing problems often go together, although the problems may also exist in isolation.

WHAT IS THE PURPOSE OF THIS BOOKLET?

As a caregiver, whether you are a Parkinson's patient caring for yourself or someone caring for a person with the disease, it is important to identify the signs and symptoms of speech and swallowing problems as early as possible in the disease progression. This will maximize the effects of rehabilitation. The aim of this booklet is to help caregivers with timely identification of problems of speech and swallowing as well as assist in the proper treatment.



Changes in Speech Production Which May Be Associated With Parkinson's Disease

DEFINITIONS

The name for the type of speech problem associated with Parkinson's disease is *dysarthria*. *Dysarthria* is a general term that refers to an entire group of motor speech disorders which result from impaired muscular control of speech production. This impairment in muscle control can be due to a variety of underlying medical causes, all of which involve injury or illness affecting the brain. For example, *dysarthria* can result from a stroke which causes death of cells in the portion of the brain that exerts control over the muscles of one side of the face and mouth. In this case, the severity of the *dysarthria* will likely improve over time. Or, *dysarthria*, as in the case of parkinson *dysarthria*, can arise due to a disease process that affects cells in the portion of the brain that involves regulation of muscle tone and movement in the face, mouth region, and throughout the body. In this case, the *dysarthria* may become more severe over time. To the listener, *dysarthria* sounds like weak, slow, or uncoordinated talking.

The specific type of *dysarthria* characteristic of Parkinson's disease is called *hypokinetic dysarthria*. Hypokinetic simply means diminished movement.

From these definitions, it is clear that the speech disorder characteristic of Parkinson's disease pertains to a muscle problem. It does not typically reflect a decline in intelligence, memory, or personality. In as much as we as human beings express such traits as intelligence and personality through verbal communication, individuals with *dysarthria*, or impaired speech, are often forced to deal with changes in the way they are perceived by others.

Signs and Symptoms of Parkinson's Dysarthria

People with Parkinson's who experience *hypokinetic dysarthria* have some common complaints, although focused on the description of Parkinson speech patterns reveals variability among and even within individuals with Parkinson's. One of the characteristics of speech production for which you should listen in your own speech or in the speech of someone with Parkinson's is decreased overall loudness of speech. Overall loss of voice volume can be one of the first symptoms of *hypokinetic dysarthria*. The physiologic basis for decreased ability to speak at an acceptable level of loudness is rigidity and/or stiffness of muscles of breathing, since exhaled air is the power behind our voice. That is, rigidity in the chest wall muscles can result in shallow and/or irregular breath support. Stiffness in the breathing muscles also impairs voice volume, as these muscles normally are elastic and therefore can move with variable force and speed.

DIFFICULTY CHANGING VOCAL VOLUME

We use change in overall vocal volume to modify our voices for speaking quietly, such as when someone is sleeping, versus loudly, such as when speaking over background noise or to someone who is hearing impaired. We also count on the ability to alter the volume of our voice to put stress and importance on key words or phrases we say. Many individuals with *dysarthria* due to Parkinson's lose the ability to do this. To the listener, the Parkinson patient may sound detached from what he or she is saying.

HOARSE OR BREATHY VOICE

A change in the quality of the voice, usually described by listeners as "hoarse," "breathy," or "gravely" can be the first symptom of Parkinson's disease. The physiologic basis for a hoarse, gravely, or breathy sounding voice is stiffness, slowness of movement, or reduced movement of the vocal cords within the voice box.

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DIFFICULTY CHANGING THE PITCH OF THE VOICE

We utilize variation in pitch, that is fluctuations in the melody of our voice, to signal meaning beyond the actual words we say. The melody of our voice is intimately related to people's perceptions of our personality. Individuals with dysarthria due to Parkinson's disease can lose the ability to raise and lower the pitch of their voice for these and other parameters of speech, as well as for singing. Listeners may describe the Parkinson voice as monotone. The physiologic basis for inability to vary pitch is stiffness of the vocal cords within the voice box.

DIFFICULTY CONTROLLING SPEAKING RATE

Another symptom of hypokinetic dysarthria is lack of control of speaking rate. Speaking rate often becomes too fast, and listeners often describe this symptom as "rushes" or "bursts" of speech, or as speech that "runs away" from the person with Parkinson's. Rapid, "run away" rate of talking along with overall loss of voice volume make people with hypokinetic dysarthria difficult to understand. Conversely, difficulty in controlling the rate of speech can result in excessive slowness of speech, often with inappropriate pauses. The physiologic basis for lack of control of speaking rate is based in the brain and is called *bradykinesia*. Bradykinesia describes difficulty initiating movement with excessively rapid performance of the movement when it finally is initiated.

IMPRECISE PRONUNCIATION

Imprecise or indiscreet pronunciation is a symptom of most dysarthrias, or motor speech disorders. In the case of hypokinetic dysarthria of Parkinson's disease, speech sounds can seem to run together, sound sloppy, or be omitted altogether, especially sounds at the ends of words. Listeners often say the person with Parkinson's "mumbles." The physiologic basis for poor pronunciation is reduced range, strength, and speed of tongue and lip movements.

Treatment of Speech Problems in Parkinson's Disease

WHAT CAN BE DONE ABOUT SPEECH PROBLEMS?

You, the Parkinson patient or caregiver, can help assure a favorable response to treatment by seeking the help of a Speech Language Pathologist as soon as any of the aforementioned signs or symptoms of dysarthria are noticed, no matter how subtle they may be. Early intervention is key in the treatment of motor speech disorders.

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HOW CAN A SPEECH PATHOLOGIST BE FOUND?

Referral to a speech language Pathologist in your area may be obtained from your physician, a nurse, or another therapist such as a Physical Therapist. If these professionals cannot help, contact the American Speech Language and Hearing Association (ASHA) in Rockville, Maryland for a referral.

A Speech Language Pathologist is nationally certified and licensed by the State Board of Medical Quality Assurance. A Speech Language Pathologist with expertise in the diagnosis and treatment of speech and swallowing disorders characteristic of Parkinson's disease will be able to help.

WHAT CAN SPEECH THERAPY DO?

Initially, a Speech Pathologist will evaluate the dysarthric individual's speech pattern, identifying the speaker's own unique pattern of errors. Treatment is available for the gamut of symptoms of Parkinson's dysarthria. For example, there are exercises

1. that improve breath support for speech, which improves voice loudness,
2. to improve the quality of voice, which improves problems of hoarse or breathy voice,
3. to improve articulation, which improves the problem of "mumbling,"
4. to improve rate of speech, which improves the problem of talking too slowly or too quickly, and
5. to improve the prosody, or melodic component of speech, which improves monotone speaking.

The aim of treatment for progressive dysarthria due to Parkinson's disease is threefold:

- First, goals are set for direct improvement of muscle function for the specific muscles identified by a Speech Pathologist.
- Second, exercises can be provided that will guard against further deterioration of speech muscle function, given the degenerative nature of Parkinson's disease.
- Finally, compensatory strategies are learned, which can be utilized by both the individual with Parkinson's as well as family members. Compensatory strategies maximize communicative effectiveness by compensating for reduced understandability or other abnormal parameters of speech.

WHO CAN BENEFIT FROM SPEECH THERAPY?

Most individuals with a change from their normal speech, and the motivation to improve skills through practice, would be a candidate for speech therapy.

Mild changes in speech

The individual who seeks therapy early, when deficits are subtle, can often hope to normalize his or her speech. He/She also can learn exercises aimed at preventing or retarding the progressive nature of speech decline.

Moderate impairment of speech

Moderately involved speakers can directly improve some aspects of speech in addition to learning to compensate for the remaining deficits and thereby improve understandability.

Severe speech problems

For the most significantly impaired speaker who cannot make needs known through talking, the goal of treatment is to establish an alternative method of functional communication. An alternative communication system may consist of a machine or computer with voice output.

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DOES MEDICATION AFFECT SPEECH?

Some individuals taking medication for Parkinson's disease experience fluctuations in muscle performance, including muscle function for speech and swallowing, within or across medication cycles.

WHAT IS THE PROGNOSIS FOR IMPROVEMENT?

Good prognosis for improvement in both speech and swallowing problems is based on such factors as timeliness of intervention, high level of motivation, excellent family support, age, and overall health.

Changes in Swallowing Which May Be Associated With Parkinson's Disease

DEFINITIONS

The primary purpose of swallowing is to move nutrition, hydration, and saliva from the mouth to the stomach in a rapid, safe, and efficient manner. Swallowing is considered safe if no food, liquid, or saliva enters the airway because its entrance is tightly closed and protected. Swallowing is considered efficient if the food reaches its destination, namely the stomach, without any being left behind in the mouth or throat. Swallowing is considered timely if the act is completed within a few seconds. Any disruption in the numerous and complicated neuromuscular events that take place simultaneously during a swallow can result in a swallowing disorder, or *dysphagia*.

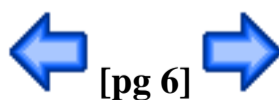
Dysphagia can arise from a wide variety of underlying medical causes. Many cases of *dysphagia* are due to injury or illness affecting the brain, such as Parkinson's disease. In these dysphagic cases, the brain regions affected are devoted to detecting the presence of something in the mouth or throat to be swallowed, or are devoted to control of the muscles which complete the act of swallowing.

Individuals with *dysphagia* due to Parkinson's disease are relatively unique in that they may or may not be aware of the swallowing problem. Because the disease may disrupt the normal sensations in the throat, some Parkinson patients may not be aware if food or liquid "goes down the wrong way" or gets "stuck" in the throat.

In addition to meeting basic nutritional needs, we typically derive a great deal of pleasure from the act of eating. Difficulty with the act of quick and efficient swallowing can make eating an undesirable and unsafe experience, and can have a particularly negative impact on self image. This is due to the tremendous social importance and ceremony we attach to the act of eating. When someone no longer feels comfortable participating in social dining situations due to eating problems such as *dysphagia*, ramifications in the areas of lifestyle and personal relationships can be felt.

Untreated *dysphagia* also can negatively impact health. One possible consequence of a swallowing disorder is unsafe swallowing. In this case, food or liquid may enter the air pipe instead of the passageway to the stomach. If this food or liquid reaches the lungs - the organ to which the air pipe leads - it can cause infection. In some cases, pneumonia can develop. Or, if a chunk of food becomes lodged instead of moving normally into the stomach, a Heimlich Maneuver may become necessary.

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Signs and Symptoms of Parkinson's Dysphagia

Caregivers and people with Parkinson's disease themselves should be aware of some of the more common complaints associated with dysphagia due to Parkinson's. These symptoms can occur in isolation or in combination. The severity of symptoms can range from mild, which may cause an infrequent inconvenience, to severe, in which case weight loss or health compromise may occur.

DIFFICULTY CONTROLLING THE BITE OR SIP WITHIN THE MOUTH

Inability to form a cohesive "ball" of food or liquid within the mouth is not uncommon in Parkinson's. This can result in some food or liquid spilling out of the mouth, spilling into the cheek area, or falling back into the throat before the individual has a chance to swallow. The physiologic basis for impaired control or manipulation of a bite or sip is impaired function of the muscles inside the tongue to hold the food in a cohesive "ball" until the individual is ready to swallow it. Individuals who have this problem may complain of choking or coughing when swallowing thin liquids, inasmuch as thin liquids are the most difficult consistency to hold in a cohesive "ball."

DIFFICULTY MOVING THE BITE OR SIP FROM THE FRONT TO THE BACK OF THE MOUTH

Once a bite has been chewed and made into a cohesive "ball," it is ready to be swallowed. A dysphagic individual may experience difficulty propelling the bite from the front to the back of the mouth using a single forceful movement of the tongue against the roof of the mouth. Instead, the individual may use disorganized, incomplete, or ineffective tongue motions. This movement is often seen on X-ray as a repetitive, rocking motion. The individual may complain that it takes longer to eat and may need to swallow multiple times per single bite or sip. The physiologic basis for inability to efficiently move the food through the mouth is impaired range of movement and force of the muscles which pull on the tongue.

DIFFICULTY INITIATING A SWALLOW

This problem is one that people are typically not aware of themselves but can be picked up by a trained observer. With Parkinson's, a delay can develop between the message to swallow (which originates in the brain) and the action of the muscles to initiate the swallow. Individuals with this problem also may cough or choke when drinking liquids, or even when swallowing saliva. In some individuals, the physiologic basis for the delay is impaired sensation of the food, liquid, or saliva to be swallowed. In other cases, the etiology is slowness of movement of the muscles of the throat.

POOR AIRWAY PROTECTION DURING THE SWALLOW

Normally, the windpipe is tightly closed during a swallow, to keep food or liquid from entering. In some dysphagic people, the airway does not close completely, allowing some food to fall or liquid to splash into the airway during the swallow. These individuals often will cough immediately. The physiologic basis for reduced protection of the airway is diminished closure of the vocal folds within the voice box.

WEAKENED MOVEMENT OF THE THROAT MUSCLES

The muscles of the throat contract behind the bite of food, to ensure that no food gets left behind in the throat. In Parkinson's disease, these muscles can lose their function and residue can remain in the throat after the swallow. Individuals with this difficulty may complain of something "stuck in the throat," or may cough sometime after eating when the residue spills into the airway. The physiologic basis for this disorder is stiffness and lack of function of the throat muscles.

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WHAT TO WATCH FOR...

As a person with the disease, or as a caregiver or family member, be alert to the following:

1. Coughing while eating or drinking, or after a meal.
2. Awakening at night coughing on saliva.
3. Any change in voice quality after swallowing, especially a "wet" or "gurgly" sound to the voice.
4. Throat clearing during or after eating.
5. Increased congestion after eating.
6. Increase in length of time required to eat a meal.
7. Increased effort required for the act of eating.
8. Weight loss or dehydration.
9. Complaint of food "stuck in the throat."
10. Complaint of food or liquid "going down the wrong way."
11. Liquid required to "wash down" solids.
12. Fever spikes, or low grade fever.
13. Pneumonia.

As with early detection of changes in speech, early intervention for swallowing problems can maximize potential treatment effects. Beyond this, early intervention for swallowing problems may avoid development of additional health problems.

WHAT CAN BE DONE ABOUT SWALLOWING PROBLEMS?

Experts used to consider swallowing to be a reflex. However, we now know that it is not. Indeed, there is a great deal of control we can exert over the swallow. Therefore, therapy for swallowing disorders can be highly effective. Initially, a Speech Pathologist can evaluate the swallow during an office visit. Often, this assessment involves watching the individual with dysphagia swallow foods and liquids of various consistencies.

Sometimes, the Speech Pathologist follows this office visit with an X-ray study, called a "modified barium swallow." This is a simple and painless test in which the patient sits comfortably in his or her usual eating position and is given a variety of foods and liquids to swallow. During the study, it is possible to determine which muscles are performing abnormally, to observe which structures may be moving abnormally, and to analyze the flow of the food through the mouth and throat.

Most importantly, during this X-ray study, the Speech Pathologist can evaluate the effectiveness of treatment techniques to improve the patient's swallow. In this way, the best type of individualized treatment program can be identified, since no two dysphagic people have exactly the same pattern of swallowing.

Swallowing therapy can treat a variety of problems characteristic of Parkinson's. There are for example:

- exercises to improve ability to control, manipulate and move a bite or sip through the mouth or throat.
- exercises to improve saliva swallowing.
- exercises to improve ability to close the airway during swallowing, to keep food and liquid out.

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WHAT TREATMENTS ARE AVAILABLE?

Each person with dysphagia due to Parkinson's disease must have an individualized treatment plan developed for him or her after careful examination of the swallowing mechanism. The aim of treatment is threefold:

- First, to improve function of the affected muscles through exercise.
- Second, to prevent or retard the rate and degree of decline in swallowing function through exercise, given the progressive nature of the disease. This may involve learning new ways of swallowing.
- Third, to teach compensatory strategies. These strategies are designed to make the deviant swallow safer or more efficient by changing such things as eating position or food consistency.

The information in this booklet is designed to help you better identify the speech and swallowing changes that may be associated with Parkinson's disease. Additionally, it is hoped that this booklet will provide you with information regarding available treatments. Many Parkinson's patients who seek treatment for speech and swallowing problems say that education helps to demystify the disease and motivates them to meet the challenge of improving their quality of life.

Exercises for Improving Speech and Swallowing in Individuals with Parkinson's Disease

These exercises are general, in that development of an ideal exercise program individualized to your particular symptoms is only possible through evaluation by a Speech Pathologist. The following exercises improve some symptoms common to many persons with Parkinson's, but are not meant to address each person's particular needs. Maximum benefit from these exercises will be gained if practice occurs many times (three to five) throughout the day in practice sessions of short duration (five to ten minutes each).

1. Say "puh puh puh" ten times. Repeat each syllable slowly and evenly. Use a metronome if you have access to one. Now say the sequence as quickly as you can, **without sacrificing evenness**. Again, use a metronome if possible. You may need to sacrifice some speed in order to maintain even rate until you improve through practice.
2. Repeat the instructions above, saying the syllable "tuh tuh tuh" ten times.
3. Repeat the instructions above, saying the syllable "kuh kuh kuh" ten times.
4. Repeat the instructions above, saying the sequence "puh tuh kuh" ten times.
5. Place one end of a licorice whip on the mid-portion of your tongue. Do not close your mouth or bite it. Hold the other end of the licorice whip in your hand. Attempt to move the licorice whip from the middle of your tongue to the front of your tongue and then all the way to the back. Move the licorice by strong upward movements of your tongue along the roof of your mouth, **not** by moving your jaw. Move the licorice from front to back ten times.
6. Repeat the instructions above, this time moving the licorice whip from the mid-portion of the tongue over to the right, deposit the licorice in your cheek on the right, pick it up with your tongue and move it to the cheek on the left. Repeat this left to right movement ten times.

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