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*Parkinson  
Disease:  
Speech and  
Swallowing  
2<sup>nd</sup> Edition*

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# *INTRODUCTION*

## **Speech and Swallowing Changes in Parkinson Disease**

Most people with Parkinson disease (PD) will experience changes in speech, voice and swallowing at some point during the course of the disease. The same PD symptoms that occur in muscles of the body--tremor, stiffness, and slow movement--can occur in the muscles used in speaking and swallowing. This can cause:

- A soft voice
- Mumbled or fast speech
- Loss of facial expression
- Problems communicating
- Trouble swallowing

While PD medications help improve most symptoms, they are not as helpful with improving speech and swallowing problems. Many people report little change in speech and voice related to changes in medication. Others report that their voices are stronger when PD medicines are at peak effectiveness.

Most people get the best improvement with speech and swallowing when medications are paired with a speech therapy program. Physicians and other health care professionals can refer people with PD to a qualified speech-language pathologist who can develop a personalized speech therapy program. Furthermore, speech-language pathologists are trained to evaluate and treat language, memory and swallowing problems.

Like other symptoms of PD, difficulties with speech and swallowing will vary from one person to another. This booklet will provide you with information, tools and exercises to help you better understand and manage speech and swallowing problems. Chapter 1 will guide you through speech self-tests and exercises. In Chapter 2, you can take self-tests to learn if you have trouble with swallowing. In Chapter 3, you will learn how to find a speech-language pathologist, and learn more about speech therapy and treatments. Speech-language pathologists can also help with memory problems. Chapter 4 will provide you with tips to enhance memory. If you'd like to know the details about resources, and anatomy of speech and swallowing, see the appendices at the end of this booklet.

Every person who has speech or swallowing changes associated with PD, whether mild or severe, is encouraged to consult with a qualified speech-language pathologist.

# CHAPTER 1:

## Speech and Communication Challenges

Communication is a vital part of daily life. Problems communicating can lead to feelings of frustration, depression, and withdrawal. Learning about how PD affects communication and what you can do about it can help you better cope with problems that you might experience.

About seventy-five percent of people with PD experience changes in speech and voice at some time during the course of the disease. These changes usually come on gradually, and can vary from moderate to severe.

### *How do I know if I have problems with speech and communication?*

This self-test can help you determine if you have a communication problem. Think about the following statements, and place a check mark next to the ones that apply to you.

- I am often asked to repeat a statement.
- People look slightly confused or as if they are trying hard to listen when I speak.
- My carepartner says that I sometimes slur or mumble words.
- My carepartner asks that I speak louder.
- I feel that my carepartner is ignoring me or may need a hearing aid.
- I do not attend social gatherings as often as before.
- I notice that I often stop trying to communicate in a group where others seem to “talk over me.”
- I feel like people do not listen to me anymore.
- I feel like people think that I don’t have anything interesting to say.
- I try to avoid the telephone.
- I need to clear my throat often.
- I cannot complete a conversation without feeling frustrated about my inability to communicate what I have to say.

If you checked any of these statements, you are probably experiencing changes in communication related to PD.

### *Carepartner Speech and Communication Survey*

If you are a carepartner, family member or friend who has regular contact with the person with PD, complete this questionnaire. Check the statements that are true for your friend or family member.

- I have difficulty hearing when s/he speaks.
- I have difficulty understanding his or her speech.
- S/he does not talk as much as in the past.
- S/he does not attend social functions as frequently as in the past.
- S/he often asks me to make phone calls or order from a menu for him or her.
- S/he clears his or her throat often.
- S/he often sounds as if s/he is running out of breath when speaking.
- S/he suspects that I need a hearing aid.
- S/he thinks I ignore what s/he has to say.

If you checked more than one box, your friend or family member probably has problems with speech and communicating.

Many of the problem areas revealed by this survey can be improved with speech therapy. Talk to your doctor or health care professional about an evaluation by a qualified speech-language pathologist.

### *What can I do to improve my speech and communication?*

While you are encouraged to see a speech-language pathologist, there are some strategies that you, your friends and your family can use to improve communication.

### *Taking Care of Your Voice*

It is very important to take care of your voice. Here are some simple steps for good “voice hygiene.”

1. Drink plenty of water or other liquids each day (non-caffeine and non-alcoholic).
2. Do not try to shout over noise when you talk.
3. Rest your voice when it is tired.
4. Reduce throat clearing or coughing. Use a hard swallow or soft sound instead.
5. Reduce or eliminate heart burn.
6. If the air is dry in your home, use a humidifier.

### *Tips for Friends and Family*

Family and friends are often the best support system for people with PD. There are several things they can do to help their friend or loved one communicate more effectively.

The first and most important thing is to encourage your friend or family member to consider speech therapy when changes in voice and speech are noticed. A speech-language pathologist can develop a home exercise program tailored to his or her needs. The following tips and strategies are also helpful:

- Look at one another when talking. The element of lip reading can help you understand more of the conversation.
- Reduce background noise. Turn off the radio and TV, close car windows or shut doors to noisy areas.
- Be aware that people with PD may not show facial expressions because of rigid facial muscles. Don't assume that your friend or family member does not understand your message. Don't depend on facial expression to decide if the message was “transmitted.”
- Use shorter sentences and encourage your friend or family member to do the same. Ask questions that can be answered in a short sentence or with a “yes” or “no.”
- Be patient. Allow ample time for the person with PD to communicate. Don't rush or force responses.
- Make sure that everyone's hearing is as good as possible. While PD does not cause hearing loss, it is more common as people age. If you or a carepartner suspect hearing loss, a hearing aid may help. Ask your physician about an evaluation.



## Conversational Challenges

The best way to practice talking is to keep talking! Do not limit your speaking because you feel self-conscious or have difficulty. The saying, “use it or lose it” certainly applies in this instance.

Here is a list of possible conversation topics. If you don't have a companion with whom to converse, talk to yourself!

- Talk about your family - who's who, and where they're from.
- Describe a favorite hobby or pastime in detail.
- Give a report about a trip or vacation you've enjoyed.
- Discuss a period of time or particular event you recall from childhood.
- Talk about your favorite food or restaurant.
- Give your opinion and thoughts about a favorite topic.
- Talk about things you hope to accomplish in the next year.
- Acknowledge people by sharing what it is you most appreciate about them.



## Facial Exercises

Hoping to reduce the effects of rigidity of muscles in the face and reduced facial expression, many individuals with PD request face and mouth exercises. From the following list, determine which exercises are the most difficult to do. This will show the muscles that may need the most work.

Start with 10 repetitions of each of the facial movements explained below. Each exercise should be completed with purposeful movements and sustained effort. For instance, if smiling is the exercise, try to smile as wide as you can, and hold each smile for 5 - 10 seconds. Make sure you continue to breathe throughout the exercises. Try practicing in front of a mirror so that you can see your muscles work.

**1. Smile - hold - relax - repeat.**

**2. Pucker your lips - hold - relax - repeat.**

**3. Alternate puckering, then smiling.**

Pucker as tightly and smile as hard as you can. (To increase the benefit of this exercise, knit your eyebrows together when you pucker, and raise the brows when you smile.)

**4. Open your mouth and move the tip of your tongue all around the lips.**

The tongue should touch every part of the lips ... bottom, top, both corners. Movements should be deliberate, not "darting".

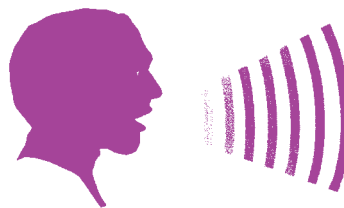
**5. Open your mouth and move the tongue around the gumline ...**

Move your tongue over the back of top and bottom teeth, front of top and bottom teeth and each side of top and bottom teeth.

**6. Open your mouth as wide as you can - hold - relax - repeat.**

**7. Say "KA" - a prolonged sound - as loud and hard as you can.**

**8. Say "PA"/"TA"/"KA" - as loud and fast as you can.**



## Singing and Voice

Singing is great exercise for the voice! Singing uses the same muscles that are used for speech. Try taking a nice deep breath and singing your favorite songs. Gently reach for the high and low notes and sing the lyrics as clear as you can. This is not only great exercise—it can help you feel good emotionally, too.



*See Appendix B for details about the anatomy of speech production.*

## ***CHAPTER 2:*** **Swallowing Changes**

People with PD may notice changes or difficulty with chewing, eating, or swallowing. These changes can happen at any time, but they tend to increase as PD progresses. Common changes include:

- Slowness in eating.
- A sensation that food is caught in the throat.
- Coughing or choking while eating or drinking
- Difficulty swallowing pills and drooling.

### ***How do I know if I have a swallowing problem?***

This self-assessment can help you determine if you have a swallowing problem. Carefully consider each statement below as it relates to you and your swallowing. Then, check those that apply to you.

- I have recently lost weight without trying.
- I tend to avoid drinking liquids.
- I get the sensation of food being stuck in my throat.
- I tend to drool.
- I notice food collecting around my gumline.
- I tend to cough or choke before, during, or after eating or drinking.
- I often have heartburn or a sore throat.
- I have trouble moving food to the back of my mouth.
- I have trouble keeping food or liquid in my mouth.
- It takes me a long time to eat a meal.

- I sometimes have trouble swallowing pills.
- My eating habits have changed recently or I have a loss of appetite.
- Sometimes, I have fever for unexplained reasons.
- I notice changes in my voice quality after eating or drinking.

If you checked any boxes above, you may need to see a speech-language pathologist for a swallowing assessment. Your physician or other health care provider can help you with a referral.

### *Carepartner Swallowing Survey*

This form is to be completed by the carepartner regarding the person with PD. Consider each statement thoughtfully and check “yes” or “no” following each statement:

- S/he seems uninterested in food.
- S/he coughs or gets “strangled” during meals.
- S/he often coughs following a meal when we are doing other activities such as watching TV or reading.
- It takes him/her longer to eat a meal than it used to.
- S/he sounds "wet" or “gurgly” when s/he speaks.
- I have had to use the Heimlich Maneuver on the person I am helping.

Checked boxes are symptoms of chewing, swallowing or eating difficulties. Encourage the person with PD to seek referral for a swallowing evaluation by a qualified speech-language pathologist. Your physician or health care provider can help with a referral.

### *How can I improve my swallowing?*

The following tips and techniques can help improve your eating, chewing and swallowing.

- Always sit upright when eating, drinking and taking pills.
- Chew small amounts of food well and swallow it all before adding more.
- Put your fork down between bites to slow yourself down.

- Make yourself swallow twice after every bite.
- Take small sips when drinking. Alternate bites of food and sips. This helps clear food from the mouth and throat.
- Take only one sip at a time. Do not drink gulp after gulp.
- Be wary of straws. Straws are useful when someone has severe tremors or dyskinesias, but can put too much liquid too far back too fast. Put the straw only in the front of the mouth.
- Keep your chin slightly down or at least parallel to the table. There is sometimes a tendency to lift the chin when drinking the last little bit of liquid in a cup or bottle. When the chin is raised, there is an increased risk of getting fluid in the lungs. Don't try to drink out of a can. Use a glass instead.
- Don't talk with food in your mouth.

The types of foods that you eat can affect chewing and swallowing. Some foods such as raw vegetables, nuts, and peanut butter may be more difficult to chew or swallow. In general, foods which are moist, slippery, don't crumble or fall apart and require less vigorous chewing are probably the best. A speech-language pathologist or registered dietitian can recommend foods and beverages that are easiest to swallow. An occupational therapist can recommend various types of helpful tools that can make eating a more pleasant experience.

### *What can I do about drooling?*

If you tend to drool, you probably don't have more saliva than you used to have; you are just not swallowing it as automatically as before. Frequent sips of water or sucking on ice chips during the day can help you swallow more often. Always keep your head up, with your chin parallel to the floor, and your lips closed when you are not talking or eating. Sugar tends to make more saliva in the mouth, so reducing sugar intake can be helpful.

Many people with PD complain that they have a thick phlegm or mucous in the throat. Drinking more water will help thin this phlegm. Drinking carbonated beverages or tea with lemon may also help. Eating or drinking dairy products can make phlegm worse.

*See Appendix C for details about the anatomy of swallowing.*

# **CHAPTER 3:**

## **Getting The Help You Need**

### ***What is a Speech-Language Pathologist?***

Speech-language pathologists are healthcare professionals trained to evaluate and treat people with speech, voice, language, memory and swallowing problems. Many are trained specifically in treating people with PD. A speech-language pathologist has a graduate degree and is certified by the American Speech-Language and Hearing Association (ASHA).

You can find speech-language pathologists at local hospitals and rehabilitation centers. They also provide services to patients in care centers, clinics, and even at home. In addition, many speech-language pathologists have private practices that accept new patients with referral from a physician. Evaluation and treatment costs are usually covered in part by Medicare or other medical insurance providers.

### ***How can I find a Speech-Language Pathologist?***

Your physician or other health care provider may be able to refer you to a speech language pathologist who is experienced with PD. See Appendix A for other resources which can help you find a speech-language pathologist in your area.

### ***What happens when I visit a Speech-Language Pathologist?***

At the appointment, the speech-language pathologist will evaluate your speech, voice, swallow and memory/thinking function. If indicated, he or she will recommend a specific course of treatment and together you will establish treatment goals. Treatment may focus on improving overall communication, and in some cases, swallow function and/or thinking skills.

### ***What is the Lee Silverman Voice Treatment?***

Ongoing research regarding a speech therapy program known as the Lee Silverman Voice Treatment (LSVT) method is funded by the National Institutes of Health (NIH) and the U.S. Office of Education. The LSVT method and its demonstrated effectiveness in improving voice and speech in persons with PD, is highly regarded within the medical community.

Dr. Lorraine Ramig of the University of Colorado and the Wilbur James Gould Voice Research Center in Denver pioneered LSVT. It is considered the first speech treatment for PD proven to significantly improve speech after one month of treatment.

Exercises taught in the LSVT method are easy to learn and typically have an immediate impact on communication. Improvements have been shown to last up to two years following treatment. LSVT methods have also been used with some success in treating speech and voice problems in individuals with atypical Parkinson syndromes such as Shy-Drager syndrome, Progressive Supranuclear Palsy (PSP), and Multiple-System Atrophy (MSA). Continuing research studies are evaluating the effects of LSVT on improving swallow function as well as speech production.

“LSVT Alive! Homework Helper” is a 25 minute interactive videotape which guides the user through a daily speech/voice strengthening session. It is available from Entropy Industries. Their website is listed in Appendix A. More information on the LSVT method is available at the LSVT web site listed in Appendix A.

### *When Should I See a Speech-Language Pathologist?*

Early intervention is key to maintaining and improving communication and swallow function. Self-assessments included in Chapter 1 and Chapter 2 of this booklet can help you decide if you should see a speech-language pathologist.

As soon as you or a carepartner notices changes in speech, swallowing or memory and cognition, it is the best time to seek a speech-language pathologist. It is easier to learn strategies and techniques than it is to rebuild what has already been lost. Nevertheless, it is never too late to get help to for speech and swallowing. Improvements following therapy at whatever stage of PD are often surprising and rewarding.

### *Alternative treatments for speech and voice*

#### *Collagen Injections*

Collagen injections have been used in the treatment of voice and/or speech impairment in PD. The purpose of collagen injections is to build up vocal folds that do not close completely while talking. The procedure involves injecting collagen directly into the vocal folds. Individuals who have undergone this procedure report some improvement in voice, specifically loudness and voice quality. However, the injection does not improve respiratory or articulatory function. The collagen effect typically lasts for about 6 months, and must be re-injected. While the collagen works, it is slowly being absorbed by the body. As this happens, there is

usually a gradual decline in voice function. Collagen injections do not work for everyone. More information can be obtained by consulting an ear, nose and throat specialist.

In addition to drug therapy for PD, several surgical options are available to treat the patient who no longer benefits from medication alone. The booklet “Parkinson Disease: What You and Your Family Should Know,” available through the National Parkinson Foundation, includes an excellent discussion of other medical and surgical options for managing the symptoms of PD.

### *Assistive Communication Devices*

In some cases, fatigue or other illness may make it difficult for you to use your normal voice. At times, it may seem difficult to talk at all. When this happens, using an augmentative or assistive communication device can make it easier to communicate.

Assistive devices come in all shapes, sizes and prices. A personal amplification system is the device most often used by persons with PD. It is most effective for people who have a soft voice. Using a microphone and speaker system, the device amplifies speech. The microphone can be hand-held, worn on the head like a pair of glasses or as a head set, or attached to a shirt pocket or collar. The amplifiers do not affect breath, articulation or rate of speech, and they are not particularly effective with whispered speech.

Other communication devices range from hand-made communication boards to sophisticated computerized equipment. People comment that such devices are sometimes distracting, cumbersome and expensive. However, for some, this is an acceptable solution for an increased ability to communicate. Again, a speech-language pathologist can recommend a device appropriate for the various conditions.

## **CHAPTER 4:**

# **Memory and Thinking Changes in PD**

Speech-language pathologists can be helpful when dealing with changes in memory and thinking that sometimes occur as PD progresses. Slowness in responding, day to day forgetfulness, trouble concentrating, especially when other things are going on, and feelings of sadness or depression can be signs of changes in thinking. Sometimes PD medications, which are so important in helping the physical symptoms of PD, can make a person less alert, more likely to be confused and even have hallucinations.

Most of us probably have experienced short term memory lapses. Trying to remember all of the items needed at the grocery store, what you went into the basement to get, or what you did three days ago can be difficult at times. Some changes in memory seem to be a part of the normal aging process. People with PD experience these same challenges, but report that their problems seem more severe or happen more often than would be expected due to normal aging.

*Thinking changes can be a challenge. They may include any or all of the following:*

- Reduced ability to concentrate or “think through” an activity.
- Reduced ability to solve problems.
- Slowness in responding, or needing increased time to think through information.
- Requiring additional time to think of what you want to say.
- Difficulty thinking of a specific word you want to use.
- Loss of your train of thought while speaking.
- Being easily distracted.

If you are concerned about changes in your memory, thinking or concentration, ask your physician for an evaluation. Adjusting the dose or discontinuing a particular medication can often correct the problem. The physician can also assess the cause of cognitive problems, such as undetected depression or underlying infection.

Your physician may refer you to a speech-language pathologist, who can further evaluate memory and thinking skills. He or she may work on a team with other health care professionals, such as occupational therapy, nursing and social services. A comprehensive evaluation can pinpoint the exact nature of the memory and thinking changes. It can lead to therapy or other strategies to make living with PD easier and safer, giving the person with PD more independence and self-confidence.

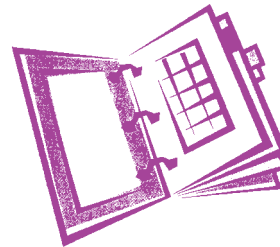
### *Brain Power Boosters*

- Read and discuss articles in the newspaper or in a magazine. “News for You” is a weekly newspaper which can be enjoyed even if vision reading and memory skills are somewhat diminished. (See Appendix A for ordering information.)
- Read for pleasure. Use a red pen to underline or circle important information as you read.
- Work crossword puzzles or word search puzzles.
- Go through old photos and make memory books for your children and grandchildren.
- Play board or card games.
- Develop or continue a favorite hobby, such as bird watching, gardening or crafts
- Exercise daily with some outside activity such as short walks in the neighborhood, sweeping sidewalks, or gardening.
- Plan a household job to do everyday.



### *Memory Joggers*

- Keep a detailed diary of events and review it every day.
- Keep a calendar of appointments and engagements and review it daily.
- Have paper and pencil by each phone in your home.
- Organize lists in categories to stimulate memory.
- Focus on remembering main points, not trying to recall every detail.



### *Tips for Family and Friends*

- Always be “eye to eye” when talking with each other. Don’t try to talk when you cannot see each other.
- Reduce distracting background noises or other commotion when having a conversation.
- Socializing in small groups or one to one will probably be more satisfying than trying to socialize in large groups. Talk before hand about who will be in the group and what possible topics may come up. A little preparation ahead of time may be helpful.
- Allow individuals with PD ample time to process what has been said and to respond.
- Don’t jump from topic to topic during conversations.
- Be concise when speaking of specific people and events. Use proper names rather than pronouns (“Sally” instead of “she”).
- When asking someone with PD to make a choice, offer options. For example, when choosing food for dinner, say “Would you like chicken or beef?” instead of “What would you like for dinner?” Ask questions which can be answered by “yes” or “no”.
- Review upcoming activities for the day every morning. Write down important information, such as where you have gone and when you will return, on a dry erase board in a highly visible area of the home.
- Keep routines the same and perform activities of daily living in the same order every day. People who have memory problems function better during the day if they know what is going to happen and when.

# ***Appendix A:*** **Resources**

## **National Parkinson Foundation, Inc. (NPF)**

Bob Hope Parkinson Research Center  
1505 N.W. 9th Avenue  
Bob Hope Road  
Miami, FL 33136-1494

Telephone: (800) 327-4545  
Internet: [www.parkinson.org](http://www.parkinson.org)

## **American Speech-Language and Hearing Association (ASHA)**

10801 Rockville Pike  
Rockville, Maryland 20852

Telephone: (800) 638-8255  
Internet: [www.asha.org](http://www.asha.org)

## **Lee Silverman Voice Treatment Foundation**

Telephone: 1-888-606-5788  
Internet: [www.lsvt.org](http://www.lsvt.org)

For the videotape "LSVT Alive! Homework Helper":  
Entropy Industries  
PO Box 3131  
Eldorado Springs, CO 80025

Telephone: 1-888-554-1003  
Fax: 1-303-554-1003  
Internet: [www.entropyindustries.com](http://www.entropyindustries.com)

## **Your state Speech-Language and Hearing Association**

### **Your state Department of Health**

For the weekly newspaper "News for You":  
New Readers Press  
PO Box 3588  
Syracuse, New York 13235-5888

Telephone: 1-800-448-8878  
Fax: 1-315-422-5561  
Internet: [www.newreaderspress.com](http://www.newreaderspress.com)

# Appendix B:

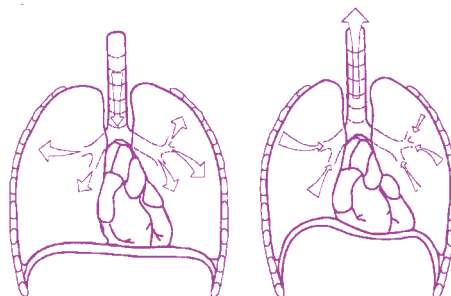
## Anatomy of Speech and Communication

### *How Do We Produce Speech and Voice?*

To help you improve communication, it is helpful to understand the five parts of speech and voice production. Each part builds upon the next and all work together as a system.

### *Respiration*

Respiration, or breathing, is the fuel for speaking. The respiratory system is composed of the lungs, the ribs and the diaphragm. The diaphragm is a dome shaped muscle which sits just under the lungs and on top of the stomach area. As we fill our lungs with air, the diaphragm flattens and the rib cage expands outward and rises slightly. This part of the respiratory cycle is called “inhalation.” Once the lungs have filled, the “exhalation” part of the respiratory cycle begins. As the air leaves the lungs, the diaphragm rises and the rib cage moves inward and downward. It is this cycle of inhalation and exhalation that supports our voice and gives us the power for a strong voice. Voice starts at the top of the breath, at the moment when the cycle changes from inhalation to exhalation. Muscle stiffness and reduced muscle movement make it more of a challenge for people with PD to fill the lungs completely and to forcefully exhale.



Control of inhalation/exhalation enables a person to maintain adequate loudness of speech throughout a conversation. If the breathing muscles are not well controlled, the voice tends to fade away at the end of a sentence. If too few breaths are taken, there is not enough respiratory support for a strong voice. A person with PD may speak at the “bottom” of his or her breath, or inhale, exhale, then speak, rather than on the “top” of the breath, inhale, speak, exhale remaining air.

### *Phonation*

The second system of speech and voice production focuses on the vocal folds, two very small bands of muscle that sit horizontally across the top of the airway. Also called vocal cords, they lie within the larynx, or voice box. During the exhalation portion of the breathing cycle, as air is rushed up through the windpipe, the vocal folds meet and begin to vibrate very rapidly. This vibration is the “buzz” of our voice. If the vocal folds do not meet well or don’t maintain a consistent vibration, the voice may sound hoarse or breathy and quite soft. If the vocal folds do not stretch well, the voice may sound monotone or flat.

### *Resonance*

The third system is resonance, which determines the richness of the voice. As the buzz of the voice moves up from the vocal folds, the amount of opening of the throat, mouth and passage to the nose subtly change the tone. People with PD have a tendency to not open the mouth widely enough, and the voice sounds thin or flat. If the soft palate, located at the back of the roof of the mouth, doesn’t close off the passage to the nose, the voice may have a nasal quality.

### *Articulation*

The articulatory system is comprised of the muscles of the face, lips, tongue, and jaw. While speaking, these muscles move at rapid speeds in a coordinated manner, turning the buzz of the voice into understandable sounds and words. If these movements are slowed because of muscle stiffness, or if they don’t move to all of the right targets within the mouth, the speech will sound slurred or mumbled. Sometimes people with PD have a rate of speech that is simply too fast to allow the tongue or lips to reach all of the targets. Tremor or dyskinesias in the oral structures can make this coordination even more difficult.

### *Facial Expression*

Much of what we say is communicated by our facial expression. Unfortunately, due to muscle rigidity, many people with PD have difficulty moving the facial muscles. Think about a time when your face was very cold. You might have noticed that it was difficult to move your facial muscles and your speech became slightly slurred or unclear. This sensation is similar to the one experienced by individuals with reduced movement in the facial muscles. When there is reduced facial expression, the listener may think that the person with PD is uninterested in conversation, not understanding what is said, or even angry.

## *Putting It All Together*

Clear and understandable speech starts with sitting up as straight as possible, taking a deep abdominal breath, exhaling with good energy, closing and vibrating the vocal folds, opening the mouth widely and using precise tongue and lip movement for articulation.

*Try the following steps for practice:*

1. Sit up straight.
2. Take a deep breath and feel your stomach area expand as you fill your lungs.
3. As you begin to exhale, start your voice on a loud and clear “ah.” Think of your “ah” as coming from your breathing and being thrown across to the other side of the room in an arc.
4. Continue taking deep breaths and starting your voice as you exhale. Say any of the following. Give each new word a new breath.

**\*Days of the Week**

**\*Months of the year**

**\*Counting 1-20**

**\*Alphabet**

Remember to use plenty of breathing energy to power your voice and to exaggerate your tongue and lip movements. But do not strain to push your voice from your throat area.

More voice and speech practice materials are included in Chapter 1 of this booklet.

# *Appendix C:*

## **Anatomy of Swallowing**

There are three stages of a swallow: oral, pharyngeal or transition, and esophageal. All three work together as a system and all may be affected by PD.

### *Oral Stage*

The oral stage begins when food is placed into the mouth, chewed, formed into a ball on top of the tongue, and moved to the back of the mouth.

Because the tongue, lips, jaw, and face are all composed of muscles, the oral stage of swallowing can be affected by muscle rigidity, reduced movement, tremors, or dyskinesias in the same way mobility in an arm or leg can be affected.

Changes due to PD in this stage of swallowing can include a feeling of excess saliva in the mouth, food or liquid slipping out from the lips, dry mouth, food trapped around the gumline and teeth, difficulty moving food to the back of the mouth, and difficulty actually starting he swallow itself.

### *Transition Phase*

The second stage of a swallow starts the moment the food is propelled from the tongue into the throat. It ends when the food enters the esophagus or food tube. This is the part of the swallow in which the food is moving down the throat into the esophagus, by-passing the trachea, or windpipe. Correct movement of food and liquid during this stage of swallowing is important because of the proximity of the trachea to the esophagus. Difficulty can occur at this stage due to a reduced or delayed swallow trigger, reduced contraction and downward pushing by the throat muscles, reduced elevation of the voice box and vocal folds that do not close completely or fast enough to protect the airway.

Symptoms that can occur during this stage are coughing or choking before, during or after the swallow, and aspiration, or foreign material entering the lungs by way of the trachea. There also can be a delay in the swallow and a buildup of food in the throat after the swallow, giving a feeling that food is stuck in the throat. Food may also sit at the top of the esophagus because that muscle doesn't open as well as it once did.

### *Esophageal Phase*

The third stage of a swallow starts once food enters the esophagus. One symptom that may be noticed is the sensation of food stuck in the esophagus or going down very slowly. The person with PD may feel full even though not very much food has been eaten. Heartburn or acid reflux may occur during or after eating. A physician, such as a gastroenterologist, should be consulted when difficulty with this stage of a swallow is suspected.

## **Author, 2nd Edition**

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