My Background

- A formerly severe stutterer who became a successful trial lawyer, thru the use of Valsalva Control;
- Published the Valsalva Hypothesis in *J. Fluency Dis.* (1985);
- Founded the Philadelphia Area Chapter of the NSA in 1985;
- Led local NSA support group meetings for 15 years;
- Member of the NSA's Board of Directors for 6 years;
- Presented national and international workshops on Valsalva Control for stuttering;
- Wrote *Understanding & Controlling Stuttering: A Comprehensive New Approach based on the Valsalva Hypothesis*;
- Received M.A. in Speech, Language & Hearing Science from Temple University.
- Now doing Clinical Fellowship in Speech-Language Pathology.
The Kind of Stuttering This Workshop Is About

- The most common variety of stuttering, in which the flow of speech is involuntarily disrupted by:
  - Forceful closures of the mouth or larynx,
  - Repetitions or prolongations of sounds and syllables, and/or
  - Hesitations or delays in making voiced sounds.

- Generally involves an excessive amount of effort, force, and struggle in the attempt to speak.

- May be accompanied by a variety of behaviors intended to avoid, postpone, or hide the blocks.
  - Starters, fillers, circumlocutions, movements, etc.
The Kind of Stuttering This Workshop Is About (continued)

- The person who stutters (PWS) is able to talk fluently some of the time, or in certain situations.
  - *E.g.*, when singing, speaking alone, reading in unison with someone else, etc.

- The severity of stuttering varies depending on the speaking situation or the words being said.
  - *E.g.*, speaking to authority figures, time pressure, most important words, etc.

- Onset usually occurs in childhood.

- *Not* associated with brain damage or other identifiable neurological or physical deficits.
  - Sometimes called “developmental stuttering.”
My Story

- Began stuttering at age 4.
- Treatment history:
  - Child psychologist, school counselors.
  - Attitude therapies at various university clinics.
  - Elocution lessons – taught me to speak eloquently when performing roles, but didn’t help ordinary speech.
  - Psychiatry, psychoanalysis, and cognitive therapy.
  - Participation in drug study.
  - Miniature metronome.
  - Air-flow technique.

- Therapies didn’t provide adequate explanation of stuttering or lasting relief.
Around 1983, I gave up on therapy altogether and began doing my own research into stuttering. My speech mechanism seemed basically all right, because I had learned to act out roles in front of an audience with perfect fluency. However, in other situations, it seemed as if a powerful force clamped down on my speech like a vise, causing me to block. My problem wasn’t any lack of ability to speak, but rather an interference with that ability. I suspected that the interference was physiological in nature, but that it might be activated by psychological factors.
To understand stuttering...

- The first thing I studied was normal speech.
The Speech Mechanism

- Nasal Cavity
- Lips
- Tongue
- Soft palate
- Epiglottis
- False vocal cords
- Vocal cords
- Trachea
- Epiglottis
- Larynx
- Thoracic (Chest) Cavity
- Abdominal Cavity
- Rib Cage
- Lung
- Diaphragm
Three Components of Speech

- **Airflow** - breath from the lungs.
- **Phonation** - voicing by the vocal folds in the larynx.
- **Articulation** - shaping of speech sounds by the oral cavities, tongue, lips, teeth, and parts of the larynx.
Breathing

Inspiration

Expiration
Airflow and Relaxation

- Most of the physical effort in breathing involves contraction of the diaphragm and chest muscles while *inhaling*.
- Exhaling mainly involves *relaxing* the diaphragm and chest muscles and letting the air flow out as the lungs contract of their own elasticity.
- Speech is powered by the airflow from this *outward breath*.
**Phonation**

- *Phonation* (voicing) occurs when the vocal folds in the larynx are brought gently together across the airway, as the air flows outward from the lungs.

- The vocal folds vibrate, making a buzz that becomes the sound of our voice.
The Larynx
(Frontal Section)
Top View of Vocal Folds
Phonation and Effort

- Although many little muscles adjust the vocal folds to the desired pitch and tension, phonation usually doesn’t require much muscular effort.

- What powers phonation is *not* muscular effort in the larynx, but rather the *air flow* that’s coming from the lungs.
Articulation and Effort

- The buzz of phonation is shaped into speech sounds by the pharyngeal, oral, and nasal cavities and by our tongue, lips, teeth, and parts of the larynx.
- Although articulation involves complex, coordinated movements, it does not require much physical effort.
- Fluent speech uses brief, light contacts.
Speech is phonation and a sequence of movements.

All the elements of speech require relatively little physical effort.

Fluent speech is like a ballerina lightly tip-toeing to music.
Then why did I use so much effort trying to force the words out?

Why was my speech like football players crashing into each other?
Stuttering and Effort (cont’d)

- When I wanted my car to go forward, I would step on the accellerator.
- Then why, when I wanted to speak, did I feel compelled to stomp on the brake?
- Why did exerting effort feel like the right thing to do – even though this was the very thing that blocked my speech?
The Answer?

- After extensive review of medical literature, consultations with professional researchers, and personal experimentation, I found what I believe is the force behind the interference with speech and which explains core stuttering behaviors.

- It is a normal bodily mechanism that we instinctively use every day, without even thinking about it.
The Valsalva Mechanism

- It is called the Valsalva mechanism.
- A neurologically coordinated team of muscles throughout the body which act together in the performance of a Valsalva maneuver.
The Valsalva Mechanism
The Valsalva Maneuver

- The purpose of a Valsalva maneuver is to increase air pressure in the lungs, in order to help a person exert physical effort or force things out of the body.
  - Named for Anton Maria Valsalva, an Italian anatomist who lived from 1666 to 1723.
The Valsalva Maneuver (cont’d)

- We all perform Valsalva maneuvers every day.

- Demonstration
  - Stand up. Curl your fingers, and link both hands together in front of your chest. Take a deep breath.
  - Now try to pull your hands apart, as hard as you can, without letting go. Pull really hard.

- What do you feel, and where?
How the Maneuver Works

- Abdominal muscles tighten up, squeezing the intestines and organs in the abdominal cavity, so that they press upward against the diaphragm, causing it bulge upward, compressing the chest cavity.
- Some chest muscles also tighten to bring the rib cage down, compressing the chest cavity even more.
- The larynx is neurologically programmed to close tightly around the upper airway to keep the air in the lungs from escaping. This is called *effort closure.*
- Rectal muscles may also tighten up, except when bearing down for bowel movements.
A Valsalva Maneuver
Effort Closure

- When the larynx performs effort closure during a Valsalva maneuver, the entire inside of the larynx closes tightly, like a fist, to block the air completely.

- The closure automatically becomes tighter as the air pressure increases.
CROSS-SECTION OF THE LARYNX
(From Fink & Demarest, 1978)

False Vocal Cords

Vocal Cords

False Vocal Cords

Vocal Cords

PHONATION

EFFORT CLOSURE
Why does the body do this?

- The increased lung pressure created by a Valsalva maneuver helps us to *exert physical effort* more efficiently.
- The air pressure in the lungs keeps the chest and shoulders firm and rigid, giving greater support to the arms.
Why does the body do this? (cont’d)

- The Valsalva maneuver helps us to force things out of the body.
  - Examples: defecation, urination, and childbirth.
  - The air pressure helps to stabilize the diaphragm, so that the abdominal muscles can squeeze things out of the abdominal cavity more efficiently.
  - The rectal and anal muscles relax when defecation is intended, but tighten up when it is not intended, so as to prevent accidental evacuation of the bowels.
Neurological Coordination

- All the muscles comprising the Valsalva mechanism are linked together as a "team" by our nervous system.
- They are neurologically coordinated to contract at the same time, and with the same relative degree of force, during a Valsalva maneuver.
- The greater the air pressure, the more these muscles contract.
Tight Closure in the Mouth

- The lips or tongue can also be recruited by the Valsalva mechanism to block the air, especially if they originally began the closure.

- Do the Valsalva maneuver again, but this time while you’re ready to make the following sounds:
  - /p/ as in “potato”
  - /t/ as in “toast”
  - /k/ as in “ketchup”

- Does that feel familiar?
Similarities with Stuttering

- Upon learning about the Valsalva maneuver, I was struck by its similarity to the forceful closures that occurred during my stuttering blocks.
  - The effort closure of the larynx felt just like blocks on initial vowel sounds, as in "uh-uh-uh-uh-airplane."
- The similarity in laryngeal behavior was visually confirmed by a laryngologist using a fiber-optic tube.
- The forceful closures of my lips and tongue were also the same as when I blocked on consonants.
- I realized that, when I blocked, I had been doing a Valsalva maneuver.
The Valsalva Hypothesis

- Stuttering blocks may involve a *neurological confusion between speech and the Valsalva mechanism*.

- Such confusion would tend to occur when we anticipate the need to "try hard" to speak properly or to force the words out.
How the Valsalva mechanism may interfere with speech

- If the person anticipates difficulty in speaking, the brain may neurologically prepare the body to do a Valsalva maneuver, in an attempt to force the words out.

- This neurological preparation may cause:
  - Forceful closures of the mouth or larynx, and/or
  - Difficulties and delays in phonation (voicing).
Neuromotor Tuning

- Before each movement, the brain neurologically “tunes” some muscle groups to respond to a triggering signal and others not to respond.
  - Example: “Get ready to make a fist.”
- Then comes the triggering signal. ("Now!")
- Demonstration
How the Valsalva mechanism may cause blocks

- If the body is neurologically prepared for a Valsalva maneuver, the restriction of airflow and increase in air pressure during articulation may involuntarily trigger a Valsalva maneuver.

- The original restriction by the larynx, lips, or tongue during articulation may turn into a forceful closure to build up air pressure as part of the Valsalva maneuver.
How the Valsalva mechanism may interfere with voice

- If the body is neurologically prepared for a Valsalva maneuver, the larynx will be prepared to do *effort closure* instead of phonation.

- This would interfere with the normal *prephonatory tuning* that must occur before the larynx can phonate.

- As a result, the person may have difficulty or delays in making a voiced sound.
Where the Valsalva Hypothesis fits into the stuttering picture

- Different factors may make people susceptible to stuttering or contribute to their original disfluencies.
- In their own ways, these factors each tend to make speech seem more difficult.
- The Valsalva Hypothesis describes a behavior that people may adopt in reaction to their anticipation of difficulty, in an attempt to force out the words.
The Valsalva-Stuttering Cycle

- The person’s psychological attitudes and physiological reactions reinforce one another in a pernicious Valsalva-Stuttering Cycle.
- Through continual reinforcement, these attitudes and behaviors become ingrained in nerve pathways that continue to perpetuate stuttering, even when the original reasons for difficulty have disappeared.
The Valsalva-Stuttering Cycle

1. Anticipation of Difficulty
   Expectation that speaking will be difficult, or that a particular word or sound will be hard to say. Concern over importance of good speech. Fear, emotional conflict, or ambivalence about talking. Fear of stuttering. Feeling of impaired speaking ability due to fatigue, illness, inexperience, neurological deficits, etc. Self-image as a stutterer.

2. Urge To "Try Hard"
   The feeling that physical effort will be needed to force the words out and to overcome the obstacles to speech. The person may unconsciously treat the words as if they were "things" that can be forced out with the same kind of physical effort that is normally assisted by the body's Valsalva mechanism.

3. Valsalva Tuning
   The brain responds by neurologically preparing the larynx and other parts of the body's Valsalva mechanism to perform a Valsalva maneuver (in which air pressure is built up by forcefully closing the larynx or mouth while the chest and abdominal muscles squeeze the chest cavity), in the mistaken belief that this may help to force the words out.

4. Vocal Delays and Forceful Closures
   Difficulty or delays in phonation, because the larynx is neurologically prepared to perform efforts closure rather than phonation. Valsalva tuning also leads to excessively forceful closures of the mouth or larynx during articulation, resulting in the blockage of speech.

5. Avoidance Behaviors
   Attempts to overcome, avoid, postpone, or hide the blockage of speech. May involve a wide variety of behaviors, such as hesitations, repetitions, use of starters, fillers, and other unnecessary words and sounds, word substitutions, grunting, breathing irregularities, facial contortions, teeth grinding, etc.

6. Mental Reaction
   Confirmation of belief that speaking is difficult, or that a particular word or sound is hard to say. False impression that force or other stuttering behavior helped to get the words out. Reinforcement of Valsalva tuning, the use of force, and stuttering behavior as ways of overcoming obstacles. Feelings of guilt, shame, and embarrassment. Loss of confidence and self-esteem.
The Valsalva-Stuttering Cycle (cont’d)

1. Anticipation of Difficulty

- Expectation that speaking will be difficult, or that a particular word or sound will be hard to say.
- Concern over importance of good speech.
- Fear, emotional conflict, or ambivalence about talking.
- Fear of stuttering.
- Feeling of impaired speaking ability due to fatigue, illness, inexperience, neurological deficits, etc.
- Self-image as a stutterer.
The Valsalva-Stuttering Cycle (cont’d)

2. Urge To "Try Hard"

- The feeling that physical effort will be needed to force the words out and to overcome the obstacles to speech.

- The person may unconsciously treat the words as if they were "things" that can be forced out with the same kind of physical effort that is normally assisted by the body's Valsalva mechanism.
  - This tendency may be supported by Vanderbilt U. study on stuttering vs. non-stuttering children.
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The Valsalva-Stuttering Cycle (cont’d)

6. Mental Reaction

- Confirmation of belief that speaking is difficult, or that a particular word or sound is hard to say.
- False impression that force or other stuttering behavior helped to get the words out.
- Reinforcement of Valsalva tuning, the use of force, and stuttering behavior as ways of overcoming obstacles.
- Feelings of guilt, shame, and embarrassment. Loss of confidence and self-esteem.
The Valsalva Trap

- For the person who stutters, attempting to use effort to force words out may *feel* like the right thing, the safe thing, the *only* thing to do.
- But in reality, force and effort make fluent speech impossible.
- The harder one tries to be fluent, the more likely the Valsalva mechanism will be activated and interfere with speech.
Creation of Nerve Pathways

- Constant repetition of the Valsalva-Stuttering Cycle creates strong nerve pathways in the brain, linking speech to the Valsalva mechanism.
- Meanwhile, the nerve pathways for fluent speech – normally concentrated in the left hemisphere – are used less, and therefore aren’t as strong.
  - This may explain why a PWS’s areas of brain activity differs from that of normal speakers.
- Consequently, Valsalva-stuttering becomes a habitual, neurologically-based behavior that is very hard to eradicate.
Relevance to Stuttering Therapy

Virtually all fluency-enhancing conditions and stuttering therapies can be explained in terms of their incidental effect on some aspect of the Valsalva-Stuttering Cycle. For example:

- Light contacts, easy vocal onset, and passive air-flow may help to avoid the build up of air pressure.
- Emphasizing phonation (singing, stretching syllables, metronome) neurologically programs the larynx for phonation rather than effort closure.
- Devices that alter auditory feedback (masking, DAF, FAF) may force us to process words as sequences of movement rather than as “things” to be forced out.
- Psychological approaches may help reduce our anticipation of difficulty.
A Reason for Relapses?

- The Valsalva-Stuttering Cycle may explain why stuttering therapy is often followed by relapses.

- When a PWS “tries hard” to use a fluency technique, he or she may inadvertently activate the Valsalva mechanism, thereby interfering with speech.
Valsalva Control

- Valsalva Control is a new approach to stuttering therapy.

- Unlike other therapies, it is not aimed at controlling the PWS’s speech, but rather at controlling the *physiological force* (the Valsalva mechanism) that *interferes* with the person’s natural speaking ability.
Valsalva Relaxation

Here’s a simple demonstration of Valsalva relaxation:

- Make the hardest block you can on the /p/ sound.
- Feel where in your body you are tense.
- Now, while still blocking, relax your abdominal muscles.
- What happened to your block?

Did you ever learn this in speech therapy?
Three Starting Suggestions

- Breathe abdominally (from the diaphragm), and relax your abdomen as you exhale.

- Speak each phrase at the same time as you relax your abdomen.
  - Start off by practicing with very short phrases, then gradually increase their length.

- Concentrate on the relaxation of your abdomen as the act that controls your speech.
  - Forget about your mouth. Pretend that you’re talking from your navel.
Start with Short Phrases - \textit{e.g.:}

At each “/,” take an abdominal breath, relax your abdomen as you exhale, and start each phrase as you relax your abdomen. Start practicing with short phrases, and gradually lengthen them.

- We live in a world dominated by the spoken word.
- Almost everywhere - at home, school, work, social gatherings - speech is the way people get to know one another and share ideas, information, and feelings.
- By means of speech, we tell who we are, what we want, and why we are important.
- Through the give and take of spoken conversation, we develop friendships and become skilled in dealing with others.
- Speech is like a magic thread by which we weave ourselves into the fabric of society.
Other Suggestions for Valsalva Control

- Practice **Valsalva relaxation** every morning.
- Add the “**Adronian**” speech exercise every morning.
  - Valsalva relaxation plus continuous phonation to re-program your nerve pathways for speech, which is then modified into normal, resonant speech.
- **“Voluntary Valsalva” exercise.**
  - A less obvious kind of voluntary stuttering, in which blocks are silently created and then released through abdominal relaxation.
- Recognize and voluntarily refrain from doing Valsalva maneuvers during the day.
  - This is a way of increasing voluntary control over the Valsalva mechanism.
The Fluency Cycle

- **Valsalva Control** is holistic, in that it addresses and attempts to reverse *all* of the psychological and physiological aspects of the Valsalva-Stuttering Cycle.

- It employs both positive attitudes and physical strategies that reinforce one another through the Fluency Cycle.
The Fluency Cycle

1. Develop a positive attitude toward speech.
   Look forward to speaking as an easy and pleasant experience. Accept the fact that you stutter sometimes, and don't try to hide it.

2. Resist the urge to "try hard."
   Remember that fluent speech requires very little physical effort. Effort never helps to get the words out, and only serves to block them. Learn to treat words as phonation and a sequence of movements.

3. Relax the Valsalva mechanism — don't force!
   Relax your abdomen and rectal muscles, and feel the relaxation spread through your body, all the way to your larynx. Take a full breath, using your diaphragm, and relax your abdomen as you exhale. Keep an open larynx. Don't hold your breath. Speak each phrase at the same time as you relax your abdomen. Speak in short phrases. Use passive airflow, light contacts, and easy onset to avoid building up air pressure. Again: don't force!

4. Focus on phonation and vowels.
   Pay attention to the music and resonance of your voice. Keep a relaxed, open larynx, with vocal cords ready to phonate. Concentrate on phonation, using variations in pitch and inflection. Intentionally stretch or prolong syllables when necessary.

5. Speak slowly and deliberately, without avoidance.
   Don't try to rush the words out. Don't hide behind avoidance tactics. Go ahead and say what you want, without substitutions or backtracking. Keep eye contact with the listener, even if you are blocking.

6. View your speech objectively, without shame or blame.
   Learn from your speaking experiences, both fluent and disfluent. Don't be fooled into thinking that force or avoidance helped to get the words out. Speak as much as possible. Maintain your self-esteem.
The Fluency Cycle

1. Develop a positive attitude toward speech.

- Look forward to speaking as an easy and pleasant experience.
- Accept the fact that you stutter sometimes, and don't try to hide it.
2. Resist the urge to "try hard."

- Remember that fluent speech requires very little physical effort. Effort never helps to get the words out, and only serves to block them.

- Learn to treat words as *phonation and a sequence of movements*.

- Whenever you think you must “prove” your fluency, you’ve already lost the ball game.
The Fluency Cycle (cont’d)

3. Relax the Valsalva mechanism — don't force!

- Relax your abdomen and rectal muscles, and let the relaxation spread up your body to your larynx.
- Take a full breath, using your diaphragm, and relax your abdomen as you exhale.
- Keep an open larynx.  Don't hold your breath.
- Speak each phrase at the same time as you relax your abdomen.
- Speak in short phrases.
- Again: don't force!
The Fluency Cycle (cont’d)

4. Focus on phonation and vowels.

- Pay attention to the music and resonance of your voice.
- Keep a relaxed, open larynx, with vocal cords ready to phonate.
- Concentrate on phonation, using variations in pitch and inflection.
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- Speak as much as possible.
- Maintain your self-esteem.
Valsalva Control in Practice

- Valsalva Control has been pursued mainly on a self-help basis.
- Many anecdotal reports of success, but no scientific studies yet.
- Interest among some SLPs in other countries (e.g., the South Korean Speech & Hearing Ass’n published my book in Korean) and some SLPs in the U.S.
As an SLP, I hope to pursue research and conduct case studies in Valsalva Control therapy.

In my only clinical application of Valsalva Control thus far, dramatic results were achieved in less than seven (7) one-hour sessions.
Clinical Results

- Young adult male with severe blocks during oral reading.
  - No significant improvement from previous therapy.
- Baseline compared to results at 7th one-hour session:
- **Disfluency rate:** 41%/syllable, reduced to 0.8%.
- **Disfluency time/total time:** 62.0%, reduced to 0.47%.
Clinical Results (cont’d)

- **Longest block:** 53 seconds, reduced to 0.25 second.
- **Speech rate:** 0.38 syllables/second, increased to 2.4 syllables/second.
Always remember . . .

- Fluency is not the meaning of our existence and should never be the basis of our self-esteem.
- The quest for perfect speech is unrealistic, unnecessary, and ultimately self-defeating.
- We may never reach the point where we are absolutely fluent all the time. And that’s okay.
Always remember (cont’d) . . .

- There’s no purely mechanical formula for fluency.
  - You must understand the *reason* for each strategy, if you are to learn from it.
  - Learn from your experiences, both fluent and disfluent.

- Instead of chasing fluency for its own sake, more productive goals would be:
  - To have fun *communicating* with others, and
  - To make speech *easier and more enjoyable* for ourselves.
Understanding & Controlling Stuttering

by William D. Parry, CF-SLP

- Available from the NSA bookstore
- Proceeds benefit the National Stuttering Association

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  - Stuttering and the Law: [www.stutterlaw.com](http://www.stutterlaw.com)