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**When Speech Gets Stuck:
A Whole Body Approach for Apraxia of Speech
on the Autism Spectrum**

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**Wisconsin Speech-Language Pathology and Audiology Professional
Association
2010 Annual Convention
February 26, 2010**

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Course description

The percentage of children with Autism Spectrum Disorders (ASD) who are considered 'non-verbal' or 'low functioning' is estimated at 40-50%. While only some of these children present with classic symptoms of Childhood Apraxia of Speech (CAS) once they can speak, most are affected with a whole-body dyspraxia that limits the more basic skills of coordinated exhalation, phonation, and intonation. When 'speech gets stuck' at a core level, it can be hard to even determine that such children are trying to speak. For this reason, CAS diagnoses and treatment are often not applied to these children. This workshop will present the highly-successful 8-step protocol of support for dyspraxia in children with ASD.

Learning Outcomes

Workshop participants will be able to:

- * describe dyspraxia on the autism spectrum
- * describe how whole-body praxis is foundational to the development of and access to oral communication skills
- * assess the foundational levels of speech support in children with ASD, and determine the level on the 8-step protocol where children are 'stuck'

Introduction: Where in the body can speech get stuck?

What being 'stuck' means:

- * when our kids are silent, they can try as hard as they want, but speech will not occur
- * their voices will be only the ones they produce without trying: crying, screaming, laughing...and often much later than expected

Rethinking Childhood Apraxia of Speech on the Autism Spectrum:

Speech Praxis, and Body Praxis...where do they meet? Where do they overlap?

** Praxis involves the whole body, so dyspraxia can affect any part of the body.*

** Introducing Eddie, from the article, **When Speech Gets Stuck***

Understanding Levels 1-4 of the dyspraxia hierarchy

Where are our kids' speech stuck?

The hierarchy of support: from the foundation, up:

- (8) Purposeful communication/coordination
- (7) Running speech/coordination
- (6) Consonant sounds/coordination
- (5) Vowel sounds/coordination

- (4) Timing/stopping, starting, maintaining voice
- (3) Intonation/coordination
- (2) Voicing/coordination
- (1) Deep breathing/Exhalation/coordination

Level 1 - Deep breathing

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The first, or foundational, level is breathing, specifically deep ("diaphragmatic") breathing and exhalation. It occurs at a whole body level, and is what happens when a child is jumping on the bed, running hard, swimming, climbing through a pillow pit, or leaning over an inner tube and swinging. This level is all about fun exertion, which promotes lots of long breaths in and long breaths out. Your child may make some noise here, and

that is a plus...but it's not necessary for success at this level. At this stage, we are primarily thinking about the middle of your child's body (the "core"), where deep breathing takes place. Amazingly, this area also supports the trunk, shoulders, neck, and arms. The eventual support for gesture, and even the jaw, lives here, and the more the upper body can become coordinated with the lower body, and deep breathing, the better. OTs and/or PTs will be crucial at this stage of the support "game."

Knowing about this level will serve you well at all the successive levels, because as you move up the continuum, and all else fails (as it will sometimes), returning to level one is "grounding," and restores a sense of support to the voice and speech systems. Your OT, PT, or SLP will help you find equipment that can be added to your child's play area, and advise you about what activities can be taken on at home or at the playground. The best rule here is to "find the smile" in your child, and watch for good deep breathing from the belly area, as the muscle of deep breathing, the diaphragm, lowers to support it.

Level 2 - Voicing

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The second level of the support hierarchy is voicing, or vocal production. This is what happens at the level of the larynx when adequate air flows through the throat. When the muscles of the larynx (vocal folds) vibrate, voice is produced and the child is "vocalizing." Sometimes, a child's first pleasant experience with voice happens during laughter (crying and screaming in pain rarely work as productive vocal experiences, since there is so little awareness of voice under such strain). Laughter elicited through joyful physical experiences such as spinning or tickling (whatever a child truly delights in) is a wonderful first voice experience. I will never forget the wise child who silently lifted up his shirt for a tickle so that he could "find" his "lost" voice when he laughed. When a child has been essentially silent all his life, this stage of

supported development is magic. The child feels power and the world knows he is there! Loudness is enhanced with more air flow...more bouncing, etc., and with adequate playful experience making sound, kids have a second, solid place to return to when "all else fails" at the levels higher up.

Another important part of support at the second level is shared joy in movement, fun, and vocalizing. This is where adults get to be kids again, to let go and have fun...yelling, singing, laughing, and humming on a kazoo the entire time. This not only takes the pressure off the silent child, but "models" the kind of vocal output we are supporting at this stage. Remember that dyspraxia is a disorder of "planning," so the key here is to never have expectations for your child! The moment a child senses your expectation, he has to try, and when he has to try (or "plan"), he is rendered silent, or his sound becomes forced.

Level 3 - Intonation

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The third level of the hierarchy is that of intonational support. Parents and therapists should not even think about this level until kids achieve pretty reliable, automatic "vocal access" at level two. This does not mean vocalizing whenever a child "wants" to (since "trying" makes it harder, of course). It means that kids know that they can run and get on the trampoline whenever they want to get their voices going again, and they enjoy joining you in yelling, screaming, laughing, and generally playing with the immense variety of ways voices go up and down (intonation).

In our clinic, we spend lots and lots of time supporting kids at level three, because, truth be known, most of the meaning of oral communication is carried with intonation, and not with words at all! Listen to conversations at an airport, in the other room, on the bus, and hear how intonation sounds when you can't hear the particular words.

Once kids develop some intonation, we begin to understand what they know. If you are so fortunate as to have a child who is already at this stage of development, listen carefully in the next week, and see how many "intonational utterances" you can hear. Hypothesize what your child might be saying with his voice...and, over time, you will probably find out that you were right! When the clarity of "No way!" or "I know!" or "Come on!" emerges at later stages in this progression, you will be amazed at how long your child has been "talking."

Level 4 - Initiating, continuing, stopping

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The transition from level three to level four is a huge one, and one you want to make sure your child is ready for. You know that your child can enact some gross motor "plans," and you can see that his sense of his body in space is improving. He doesn't get "stuck" at the tops of slides or in his car seat nearly so often. He probably has plenty of automatic motor sequences that he can't get out of, however, and this is classic level three behavior. You'll see what I mean in the next paragraph...where we start to address stopping and starting (or "initiating").

The fourth level of support is the first where "control" starts to emerge. We do not want to rush into this stage, and you will want to have an

experienced SLP listen to your child before deciding he is ready. This level is one of starting, stopping, and maintaining sound. Your child will know how to keep his voice going already, and stopping is often just a matter of running out of air. First attempts at "starting" voice, however, are another story. They often come in brief "fits and restarts," like saying "ha ha ha," where the pause between syllables is short. This is because true "initiating" is the hardest part of the challenge of dyspraxia, and usually, kids just have to sneak up on it.

Supporting your child at this stage means knowing that momentary successes cannot, yet, be duplicated. That is fine. Let it go for the day. Return to it tomorrow. And, in between, drop back to the third level and have fun talking! A great trick here is to get your child giggling in whatever way you know will work. Then "model" (everything we say is an unintended "model") something fun like, "Gotcha!" or "Wow!" or "Hey!" When your child "initiates" vocalization in the midst of your vocal play, it won't be "from scratch," but, hey...giggling is vocalizing! It is a "backdoor" technique that will feel like initiating, and will, over time, become more commonplace.

How to look at our kids again - as speakers!!

Silent kids (1)

Vocal kids (2)

Happily-vocal kids we occasionally think are verbal (3)

Happily-vocal kids we find communicatively rewarding and even verbal (4)

Kids we sometimes understand, so we suspect they are more verbal than we thought (5)

Verbal kids we understand more often (6)

Kids that everyone knows are 'verbal' but mostly hard to understand (7)

Verbal kids who have frequent communication breakdowns; kids who finally seem to have 'apraxia of speech' (8)

Treatment goals and strategies - Levels 1-4: *Why do our kids talk at OT or at McDonald's playland, but not with us?*

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Initial assessment of the child:

- ** Gathering information before-hand:
- ** Asking parents to make a movie of their child under a variety of natural, spontaneous conditions ('the good, the bad, and the meltdowns')
- ** Asking parents to describe their child (paying special attention to when the child vocalizes beyond screaming/crying, if at all)
- ** Finding out the child's favorite things, people, places, etc; finding out when a child tends to vocalize with other people, etc.
- ** Making a home visit, keeping it as casual as possible...preparing parents ahead of time that you just want to blend into the situation that is already occurring
- ** Making the first therapy session a 'seamless' transition from that casual time at home: with some of the same, fun sensory-motor activities, some of the same referents, and some of the same demeanor as home
- ** Assessing the child's level(s!!) of speech development as seen under various conditions (and as supported under various conditions!!)

Levels of Support Demonstrated

Child:

Date(s):

Situations(s):

exhalation	
phonation	
intonation	
start/cont/stop	
vowels	
consonants	
sequencing	
volitional use	

Warm-up, mini-assessment, and establishing treatment goals at the beginning of each session:

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Over-arching principles:

(1) As SLP's, we know that dyspraxia is a disorder of 'volition,' of trying... So, we are obliged to help parents and others know that whenever child is 'trying' too hard, at a level that is more than the 'just right challenge, it's just too hard!!

(2) We want to support speech rather than 'work' at it, at least at the basic levels 1-4, and, depending on a child's age, even at levels 5.

(3) We will find that the level of performance changes with all the conditions that affect well-being: sleep, health, nutrition, emotional state, fun, excitement. This is even before we support with the environmental tricks of the trade you will learn today!

Treatment goals will match the level a child demonstrates with support for that level.

Principles of treatment:

(1) Warm-up with the basic environmental supports appropriate for the particular child:

(a) physical environment (lighting, spatial safety and comfort, sound parameters, heat, food, water, accessible bathroom)

(b) physical supports (people a child can count on, joint references a child can count on, possibilities for fun, freedom for movement and choice,

accessible but challenging play/work surfaces, accessible but challenging 'tasks' (the 'just right challenge')

(c) support for the 'best' level of speech the child has demonstrated to date

(2) Assess the level at which the child is supported: is it the same as his 'best' level? If not, can his 'best' level be attained by modifying something in the environment (a and b)? If not, can his 'best' level be attained by supporting something at the next lower level (c)? If not, what other communication skill, physical skill, language skill, interaction skill, or life skill can be supported instead?

** Sample goals:*

(1) breathing: maintain sustained exhalation for the maximum time observed during warm-up ___ times during the next 10 minutes. (Goal is 2 seconds of sustained exhalation at least 10 times during each half hour)

** think about passive and active techniques that will help (suck/swallow/breathe; assisted breathing; playful activities at the core; running that engages the core; crawling that engages the core)*

(2) voicing: produce exhalation + voicing at the loudness and duration observed during warm-up at least ___ times during 20 minutes. (Goal is 2 seconds of sustained full voicing at least 10 times during each half hour)

(3) intonation: produce exhalation + voice + intonation of the contours observed during warm-up (or the previous session) at least 3 times each during a half hour. (Goal is use of rising, falling, rising and falling contours produced variably 3 times each during a half hour)

(4) starting, sustaining, and stopping voice: produce exhalation + voice + intonation + 'sss' at least 3 times during a half hour. (Goal is coordinating all 4 levels for each intonational contour 3 times each during a half hour)

Understanding Levels 5-8 of the dyspraxia hierarchy: the ones we, as SLP's are much more used to working with!

Level 5 - Vowel Sounds

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The fifth level of support has often been going on for one or more levels already, but it is not until now that we give it our attention. This is the level of vowel sounds. Vowels are a result of changes in the size and shape of the oral cavity (mouth) when air flows through it and voice is produced. It's nothing more than that, but the effect is powerful!

As with all the levels, support comes from the bottom up, with play partners using the open sounds "ah" or "uh" in their play, and all the others too, such as "oh," "uh oh," wow, and hey. Ask your SLP to note how flexible your child's mouth is, and include any exercises recommended to "stretch" IT. Food variety and mouthing toys are helpful in your child becoming more aware of his mouth and how to move it. By this time, you have learned a trick or two from your OT and/PT also, and know that how your child supports his head (especially his jaw) is critical to his success with vowels. Trunk control is as important as it ever was, so go back to some of the OT/PT "basics" as well.

Level 6 - Consonant Sounds

The sixth level of support is that of consonant sound development, even though the child may have developed a few consonants along the way (the "m" sound is nothing more than voicing with the mouth closed). But at this stage in the hierarchy, kids are really ready to take off in their consonant sound production, usually following a developmental progression from lip sounds (m, b, p) to back-of-the-tongue sounds (g, k, ng), to front-of-the-tongue sounds (n, d, t), and then the more controlled sounds (l, r, s, sh, f, etc.). This level is the one most people think of as "speech," and it is helpful to realize how much must happen before it can be really successful. We know that a "splinter skill" like, "Say 'b'," for example, fails to generalize into conversation and play. If this level is targeted when the child is ready, however, generalization happens readily, because all the lower levels support it.

The sixth level involves the production of all the consonants of the language, in all their variations, as they precede or follow other sounds. These movement patterns involve accurate timing, pressure, and grading of all the muscles of articulation, while maintaining vowel production, intonation, and voice. Support at this level involves play with rhythm and timing, singing and chanting, coordination with motor movements such as gesturing, signing, clapping, and finger tapping, specialized oral motor "tricks" like resistance (horns, straws, etc.), and facial touch-cuing like PROMPT (Hayden, 1984). Work closely with your SLP to learn how to use supports your child likes and finds helpful, and remember that this is still play, not imitation work...yet.

Level 7 - Sequencing Sounds

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The seventh level is putting it all together in running speech, sequencing sounds in all the possible orders of the language, coordinating the transitions from sound to sound, and using a rate that eventually approaches "normal." The practice work your SLP will provide at this level involves saying target utterances, while varying the emphasis and intonation, thus changing meaning. The level of practice material changes at this point, because spontaneous imitation will be pretty easy now. That's what "fluency" is all about...imitation only when it is not "trying" any more!

A word to the wise is in order here. Your child's expressive language will start to explode now, as his consonant sounds start coming. Sounds won't be reliable for some time to come, however, and you may not be able to understand him as well as you did! As ironic as this seems, this is classic "apraxia of speech," where sounds get mixed up, and the sound your child intends for the end of the word, for instance, occurs at the beginning. Resist asking him to repeat himself just yet...even if he can, it requires more "planning" than it is worth at this point, and it will probably come out differently anyway! Better to teach yourself to replay his speech in your own brain...and with your own lips...and to listen closely! Remember that intonation is still your best clue, and that your child's timing will become better! As it does, you will see the "referents" (e.g. the cookie) more often, and have more tangible clues for understanding!

Level 8 - Purposeful Speaking

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The eighth level involves accessing all the levels of support, under more and more purposeful conditions, within the real challenges of daily life. Remember that apraxia is a disorder of "trying." So when trying becomes harder, so does the possibility that an individual must rely on a more foundational level of support to approach a particular situation. Specific strategies at this level will include role-play and practicing under simulated conditions (you'll find that all those apraxia "programs" will begin to fit here), and then under a variety of supported real-life conditions.

Treatment goals and strategies - Levels 5-8

Treatment Principles:

- (1) treatment is at more than one level during a therapy session. For example, during warm-up, treatment might be levels 1-3, until there is sufficient intonation to begin to work at a higher level, if the child has shown readiness
- (2) treatment includes assessment at the same time; because we need to continuously monitor success, we will drop back a level or two when needed.

Because dyspraxia is a 'disorder of volition,' the amount of support needs to trump the amount of 'trying'!!

(3) It's important to spend plenty of time getting kids unstuck with level 1-4 techniques, even when they have some level 5-8 splinter skills.

- (a) Revisit and refine deep breathing and exhalation
- (b) Revisit and refine voicing
- (c) Revisit and refine intonation
- (d) Revisit and refine "conversational turn-taking"

When a child is ready for level 5-8 goals, take inventory and consider how many successes he has already had at level 5 (vowels) and level 6 (consonants): how regularly does the child use each vowel besides the schwa? Are there particular phrases that elicit particular vowels?

Level 5 - Vowels

Along with prosody (intonation, stress, timing), vowels carry the bulk of the meaning of what we say. Along with gesture (including facial expression), 70% of what we say is communicated without consonants at all!

Level 6 - Consonants

Pam Marshalla would remind us that we spend much too much time on consonant sounds, much too early...and much to the detriment of kids' intelligibility

Our program looks at clusters of constriction of air flow.

Consonants are grouped by:

- (1) degree of constriction of air flow
- (2) manner of articulation (continuing sound vs exploding)
- (3) place of articulation

h, r (little constriction, continuing, back of the mouth)
w (little constriction, continuing, front of the mouth)
l (some constriction: "el" not "luh", continuing, back)
s, z, sh (some constriction, continuing, front of the tongue)
f, v (some constriction, continuing, front of the mouth)
ng (constriction = nasal, continuing, back)

glottal stop, k, g (exploding, back of the tongue)
m (continuing, constriction, lips)
p, b (plosives, lips)
n, th (continuing, tongue tip)
l, t, d, ch (l=luh; plosives, tongue tip)

Level 7 - Sound sequencing

Vocal and verbal fluency depend on the continuation of exhalation, and on the reliable use of intonational contours.

If we can help kids maintain the fluency established in Level 3 (intonation), and enhanced by Level 5 (vowels); make sure the new consonants are superimposed on a well-developing and coordinated body (gesture, timing of the arms, actions, and "stories"!), kids can have 'resources' left to hit their target consonant(s) as long as all the other levels are coordinated.

Level 8 - Volitional, conversational speech

Some principles of treatment:

- (1) The two sides of the coin of self-awareness and metacognition
- (2) Role-play taking the place of play...and preparing for life
- (3) Life, with all its emotional and physical demands
- (4) Where alertness fits in
- (5) The supportive position of an understanding communication partner

Remember that the ASD kids we are talking about are the same 40% who, historically, never developed speech!! So, yes, it may take a child's entire childhood to get through the progression...and even as he trucks off to college, he is still working at level 8 (as the "plans" change daily!)...but, like all of us learning any motor skill or set of skills, we have our entire lives to perfect them! And if we believe in our kids all along the way, they will too!

Sample goal statements:

(5) Vowels: The child will produce all the vowels in his baseline repertoire during a total of 60 minutes of treatment. [This goal statement allows a

variety of set-ups to be used, and assumes that one situation might not elicit the same vowels as another]

(6) Consonants: The child will produce the consonant ___, ___, or ___ while maintaining air flow, vocalization, and intonation, at least 3 times during a half hour conversation.

(7) Sound sequences: The child will produce ___ utterances that include more than one of his target consonants, while maintaining air flow, vocalization, intonation, and vowel sounds.

(8) Purposeful speaking; The child will maintain the criteria above during three two-turn conversations that he cares about.

Putting it all together: supporting ASD children's speech in the clinic, at school...and at home!

Questions to ask yourself as you return to your work-place:

What are the active supports of speech?

Which levels do they support?

How are the activities supportive of speech?

How is the environment supportive of the activity?

How could this be done better?

What are the passive supports of speech:

Which level(s) are supported?

How is the environment supportive?

How could this be done better?

Equipment/activity	What it promotes

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