

**Childhood Apraxia and Persistent
Speech Sound Disorders
Challenges and Strategies for the
School Therapist**

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**ASHA AdHoc Committee's
Definition of CAS**

- "Childhood apraxia of speech (CAS) is a neurological childhood (pediatric) speech sound disorder in which the precision and consistency of movements underlying speech are impaired in the absence of neuromuscular deficits (e.g. abnormal reflexes, abnormal tone)."

**Which children tend to be over-
diagnosed or misdiagnosed?**

- (1) the nonverbal child
- (2) the dysarthric child
- (3) the severely phonologically disordered child
- (4) the confounding diagnosis child.
 - Video Modeling for children on autism spectrum
 - Teresa Cardon at Utah Valley University
 - WordToob and Inner Voice apps for video modeling

What are challenges for school SLPs when treating CAS?

- (1) Not having much direct contact with parents
- (2) Caseloads that result in the need to see most children in group therapy.
- (3) Having extended summer breaks from therapy
- (4) Restrictions on videotaping

How should IEP goals look different for children with CAS?

- Sue Caspari in CASANA Webinar “Creating IEP Goals” talks about SMART goals – specific, measurable, action words, realistic, time limited.
- Isolated sound practice likely not included but replaced with movement gestures/syllable shapes.
- Vowel accuracy would likely be targeted.
- Prosody goals such as syllable and word stress would be included.

How do we incorporate early literacy skill building into tx?

- Build in phonological awareness skills.
- Use repetitive books with “fill-in-the blank”.
- Solomon/Pereira “Repetitive Books” article in Apraxia-kids.org
- Read SAME book for 6 weeks!
- Article in Selected References– “What Factors Place Children With Speech Sound Disorders at Risk for Reading Problems?”

What About Group Therapy?

- At some stage in the therapy process, may be the best option. [AdHoc committee report]
- Can target language/pragmatic goals more effectively [ASHA Leader 9/09]
- Can enhance pragmatic communication which often is weak (the “everybody drop what they’re doing -- Luke is talking” syndrome).

What is the evidence for therapy?

- Principles of Motor Learning should drive our therapy (11/6/07 ASHA LEADER & Maas, 2008 article on reference list/CASANA webinar)
 - Repetitive practice
 - Constant vs variable practice
 - Blocked vs random practice
 - Massed vs distributed practice

Principles of Motor Learning

Motor Performance vs Motor Learning

- In CASANA webinar, Edwin Maas uses creative pancake flip example.
- Constant – same size pan (better for performance)
Variable – S/M/L pan (better for motor learning)
- Blocked – 25 trials each with each pan size
Random – no set amount of trials per size
- Knowledge of Results / Knowledge of Performance

What is CAS treatment research telling us?

- Unfortunately not much, but it is getting better, thanks in part to treatment grants from CASANA.
- Sample sizes are small, however, so it's difficult to draw conclusions that guide therapy decisions.
- Only 4% of all pediatric communication disorder research includes pediatric motor speech disorder research - and that includes dysarthria.

What does a “multi-sensory” approach include?

- Touch cues and visual prompts (hand signals from “Easy Does It”; cues with cue cards from “The Speech Pathologist’s Handbook for Inclusive School Practices” by Julie Causton)
- PROMPT cues as determined by training
- PECS (Picture Exchange)
- AAC devices
- Sign language

Why sign language?

- Sign language can: (1) be held to the face (2) be paired with visual/touch cues (3) be used later to prompt functors.
- [Video – Jack, age 9-7, use of “am” sign]

Don't abandon sign language...

- because the child's fine motor planning and precision are impaired/weak.
- because the child does not like to sign.
- because it is hard to learn.
- because the child starts to talk.

What about AAC boards/devices?

- All levels from low tech to high tech can be used.
- Incorporate into a multi-sensory session.
- iPad as therapy tool and as device
- Web resources: AAC Institute; PrAACtical AAC: The Center for AAC and Autism

How does "multi-sensory" therapy reduce frustration?

- Distracts child from the challenge of sound precision/sequencing
- [Video - Sean, age 6-9]

What are important family considerations?

- Ensure parents “observe” therapy session flow in some way! [BIG challenge!]
- Teach parents speechese. (cognates)
- Get whole family involved if possible.
- Make sure home practice is successful.
- Talk about the struggle!! [take a vac]
- Don’t overwhelm parents! [Pledge]

How do we facilitate accurate articulatory starting postures?

- Use “starter positions” such as “mm”, “oo”, “ee” and even “rr”!
- [Video Clip – Dominique, age 5]

Should we teach compensatory placements?

- For tongue-tip sounds in particular (t,d,n,l), it may be **even better** to use a low, slightly forward tongue placement.
- Example: Doug who loved tools!

Does it help to use “catchy” names for sounds?

- Enhances fun with sounds, but try to incorporate placement/manner cues. [handouts - Verbal/Visual Cues and Parent Fill-in for home usage]
- “Friendly Sounds” Demo

Sound shift from an accurate inaccurate word position

- Use WORD PAIRS with picture cards or printed word.
- Best with continuants (s, sh, f)
- Bus-sock; push/mash-shoe; off-foot
- Fade volume cues (same volume-whisper - “think the word”).

Do we work on isolated sounds or sound sequences?

- Focus is on movement sequences.
- “sh” demonstration

What should I consider in selecting speech targets?

- Margaret “Dee” Fish in “Here’s How to Treat CAS” - not just nouns, but verbs and expressions like “send” (a text), “hang out” & “hit me up”.
- Teach CONTROL/POWER words beyond “no”.
- Target final **voiceless** consonants. (Use vowel prolongation as an alternative to voicing focus.)

What should I consider in selecting speech targets?

- Individualize “I” phrase word choice based on sound repertoire and co-articulation (e.g. “I pick, I need, I see, I choose” in place of “I want”)
- Use child and therapy goal-determined strategies like fun frustration phrases [“Oh milkshake!”]
- Develop a core vocabulary book in early stages.

What about vowel modification?

- Challenge not to move quickly through vowels – hold posture for extended proprioceptive feedback.
- In DTTC and “Time to Sing” prolonging vowels.

Vowel Resources

- “Turtle” vowels from “Easy Does It for Apraxia”
- Pam Marshalla “Place Cues” on YouTube.
- Vowel Viz App – has vowel chart
- Book “Vowel Disorders” and “Handbook of Vowel Disorders” by Ball and Gibbon.
- Computer visual feedback (TheraVox)

How do we incorporate the use of pictures into therapy?

- Use strategies to sequence pictures for building an airport runway, a road, or a path to obtain a snack!
- Advanced Webinar feedback

How do we address the suprasegmental features?

- First of all, address throughout therapy.
- Use music [“Time to Sing” and others]
- Hum tunes into kazoos

How do we address the suprasegmental features?

- Prolong vowels and exaggerate stress.
- [Comments on use of mirrors in therapy]
- Target increased inflectional range and variation through use of slides, mountain climbing, hand tracing, puppets, character figures, superheroes

How do we address the suprasegmental features?

- Use activities like “Build-A-Sentence” for word stress and adapt with frog “clicker”.
- Four different colored phrases – “Who, What, Where, and When”.
- If take out “When”, will allow for yellow to mean “pick any color you need”.
- Reinforce through selection of dinosaurs, figurines, etc for battles, dance contests, etc.

How do we address the suprasegmental features?

- [Kathy Jakielski and Megan Young’s “Songs, Toys and Games for Suprasegmentals” handout for loudness, pitch, stress and rate]
- Facilitate enhanced auditory feedback.
- Talk into tubes, echo microphones, boxes, underwater, etc.

How do we address multi-syllable word breakdowns?

- Use Backward Chaining/Build-Up (“anatomy”)
- [Video – Johnny, age 6-3]

How do we address multi-syllable word breakdowns?

- Use spondees (baseball, popcorn, meatball) to demonstrate word not as complex as think.
- As syllable complexity increases, use cues, pictures/print, and signs to mark syllables
- [Video - Zachary, age 9 2:25-end]

Multi-syllable word Therapy Techniques

- 2-11 Syllables “Utterances of Increasing Length” 2005, LinguSystems, Inc. in [The Source for Children’s Voice Disorders](#)
- “Early Apraxia of Speech Stories Backward Build-Up 8 Book Set”, 2011, Linguistics, Inc.

How do we incorporate new technology?

- Use apps (e.g. V-Lingo, Voice Changer, Dragon Dictation) [Handout-apps]
- Quote: “(The I-Pad) can literally replace every single flashcard that we have, and we have lots and lots of flashcards.”
- Quote: “The I-Pad is a really cool Swiss Army knife but you can’t build a house with it.
- [5 Steps to Getting an iPad Covered...]

How do we keep children motivated in therapy?

- Intrinsically not that much fun, so must make therapy exciting and varied.
- Find out what gives them “brain tingles!”
- “Start positive – End positive!”
- Allow for silences and time to process.
- “Acknowledge the feeling”.

STRATEGIES FOR KEEPING SCORE

- OBJECT/PICTURE KNOCK DOWN with graduated scoring [handout]

STRATEGIES FOR KEEPING SCORE

- BASKETBALL SHOOT with 15 picture cards
- 3 semi-circle rows
- Child picks up picture – practices X times – shoots from where picked up picture (can stand on picture and practice “on...”)
- Have 2 “wild cards” for bonus points
- [Picture of favorite hoop]



3-in-1 Play Center
Discovery Toys/K-Mart/Walmart

STRATEGIES FOR KEEPING SCORE

- FROG LEAP [picture slide]

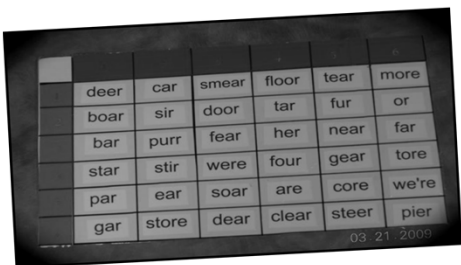


Lizard Leap with Graduated Scoring System

...designed for // and // blends

STRATEGIES FOR KEEPING SCORE

- RED ROLL/GREEN ROLL (or other colors)
- 10 checkers – goal to get rid of all 10 first
- Roll colored dice and practice X times
- “King side” down unless 2nd landing on space
- [Picture slide showing “Bingo” layout]

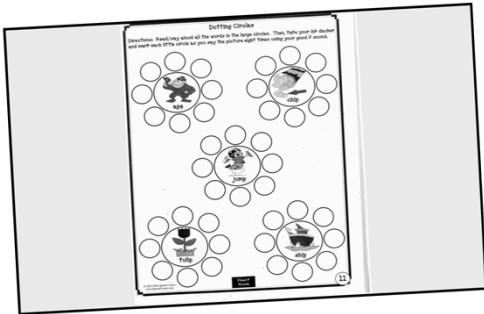


Red Roll/Green Roll with “Bingo” layout

...using 10 checkers for each player

DO-A-DOT MARKER ACTIVITIES

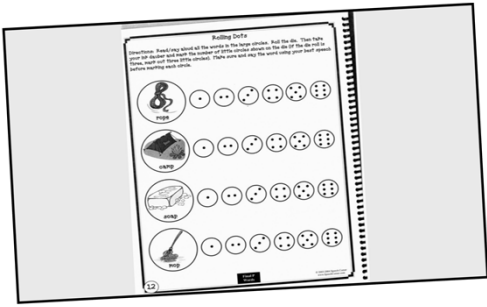
- Products by Rachele Ellsworth from Speech Corner
- Dot Markers from speechcorner.com or dotart.com
- [In Selected Resources handout]
- [Examples]



Do-A-Dot Dotting Circles
...with challenge modification

Use of dice in therapy

- Opportunity for "fun frustration phrases"
- Foam dice best to contain on table
- Can purchase self-contained dice "roller"
[picture slide]



Do-A-Dot Rolling Dots

...with increased repetitive practice



A Favorite Multi-Sensory Activity

Hop/Jump/Leap Over Activity for Blocked or Random Practice

Sound shift from an accurate inaccurate word position

- Use WORD PAIRS with picture cards or printed word.
- Best with continuants (s, sh, f)
- Bus-sock; push/mash-shoe; off-foot
- Fade volume cues (same volume-whisper - "think the word").

What about “th”??

- Challenging to figure out word targets
- [Audience participation – Magna Doodle]

PICTURE DROP

- Enhances verbal response on demand and facilitates focus.

Ideas I picked up from parents, therapists and students

- Squirt laminated pictures at bathtime.
- Paint a fingernail after so many reps.
- Use stretchy bugs for continuants.
- Pop bubble wrap under table (student idea)
- Use wipes container for mouth to feed cards.
- “Earn” cotton balls for snowball fight.

What are the most common parent suggestions I give?

- Adopt a "Rule of 3" especially for students with attentional weaknesses or low cognitive ability.
- Don't work so hard to understand unclear speech.
- Understand a hierarchy of response [handout]
- Watch your rate of speech in giving directions, asking questions and providing models.

What are the most common residual issues?

- Persistent sound production errors
- Multi-syllable word/utterance breakdowns
- Language errors, especially "functor" omissions and subtle grammatical errors
- Voicing errors
- Prosody abnormalities
- Rate of speech issues

Challenging Issues

- Challenge is that therapy fatigue may have set in for child and/or parents.
- Challenge is that games/activities for older children are often quite uninteresting.
- Challenge is that child/adolescent has gained confidence in speaking and may speak too quickly as a result.

PERSISTENT “R” ERRORS

- Look for overall tongue stability at rest, fasciculations, and muscle atrophy.
- Look at lateral tongue stability, lingual tension, & posterior movement changes.
- Look at over-usage of lips.

PERSISTENT “R” ERRORS

- May need to investigate different approaches. [computer visual feedback, iPhone/iPad apps like V-Lingo/Voice Changer and Dragon Dictation, ultrasound biofeedback]

SUGGESTED “R” ACTIVITIES

- Conduct sports (or other) surveys for home practice [handout].
- Have students write r-rich poems and stories to add to age-level collection. [Examples]

SUGGESTED "R" ACTIVITIES

- Have students create index card tasks for selection in games [Car Race and Horse Race – "Pick A Card" Examples]
- Modify "War" card game (red hearts, dagger hearts, three-leaf clovers, girl's best friend).

PERSISTENT "SH" ERRORS

- "ee" reps – whispered "ee" reps – pant whispered "ee" reps – move lips to "sh"
- Play push/mash game to transfer to "weaker" word position.

PERSISTENT "S" ERRORS

- May be interdentalized, lateral distortion, or a combination of both!
- Consider that no particular tongue placement is best for all children.
- Use Pam Marshalla's articulation materials to build appropriate airstream placement. [Can search Pam's videos on YouTube]

LATERAL “S”

- Use /ts/ context for lateral /s/. Can use “its”.
- Prolong /t/ then turn into /tsssss/ while having child gently tap on front of his/her teeth.
- Use a program called “Straight Speech” with an “exploded /t/ sound” and /s/ at the end.
- Use Mia McDaniel’s “Magic Slide” visuals.
- Toward mastery, keep production short and not extended - longer held, better chance lateralized.

INTERDENTAL “S”

- Investigate airway patency and range of possible interdentalized sounds (e.g. t, d, n, l).
- Use “teeth bounce” technique to avoid clenching.
- Use “soda/coffee straw” for centralized airstream or contrastive picture drop for either type.
- Carry out negative and contrastive practice.
- [Cards/Video – Sean, age 6]

CONSONANTS	NAME OF SOUND	VERBAL CUE	OTHER CUES
“p” sound	Popping sound	“Where’s your pop?” “You forgot your pop.”	Fill cheeks up with air and blow out with the sound, feeling wind on hand
“b” sound	Popping sound	“Where’s your pop?” “You forgot your pop.”	Fill cheeks up with air and blow out with the sound
“m” sound	Humming sound	“Close you mouth and hummmm..”	Lips together and hum Touch to feel vibration
“n “ sound	Buzzing teeth or buzzing tongue sound	“Teeth together and buzz.”	Finger on clenched teeth to feel vibration
“t” sound	Tippy sound	“Use your tippy.”	Index finger to center of spot above upper lip
“d” sound	Tippy sound	“Use your tippy.”	Index finger to center of spot above upper lip
“h” sound	Open mouth windy sound	“Where’s your wind?” “I didn’t feel your wind.”	Open palm of hand up just in front of your mouth to feel wind
“k” sound	Throaty sound	“Where’s your throaty?”	Index finger pointed to throat
“g” sound	Throaty sound	“Where’s your throaty?”	Index finger pointed to throat
“f” sound	Biting lip windy sound	“You forgot to bite your lip.” “You forgot your wind.”	Bite lower lip with upper teeth and blow wind
“v” sound	Biting lip windy sound	“You forgot to bite your lip.” “You forgot your wind.”	Bite lower lip with upper teeth and blow wind
Initial “s” sound	Smiley windy sound	“Smile and make some wind.” “Keep those teeth together.”	Smile with teeth together and blow wind
Final sounds	Sticky sounds	“Where’s your sticky?”	Same as above for most but for “s” move forearm from left to right starting with an open hand and moving to a closed hand
“z” sound	Buzzing windy sound	“Use your buzz.”	Teeth together and blow wind
“sh” sound	Fat and fluffy sound	“Make it fat and fluffy.”	Lips out and puckered while blowing out

“ ch ” sound	Chomping sound	“I didn’t see those lips moving.” “Work your lips.”	Lips protruded while making chomp sound
“ j ” sound	Chomping sound	“I didn’t see those lips moving.” “Work your lips.”	Lips protruded while making chomp sound
“ l ” sound	Lifty sound or lizard sound if tongue low	“Open your mouth – tongue up.” “Touch the spot and drop.”	Mouth open, tongue up behind upper teeth, then lowered
“ r ” sound	Butterfly sound	“Push up on the sides and move back with your tongue.”	Demonstrate pushing up on sides of tongue in butterfly position
“ w ” sound	“oo” sliding sound	“ooo to eee sliding”	Start out in the ooo position with lips puckered then move to the eee sound
“ y ” sound	“ee” sliding sound	“eee to ooo sliding”	Start out in the eee position with lips spread then move to the ooo sound
“ sp, st, sk, sn, sl ” sounds and other consonant clusters	Friendly sounds	“You forgot your friend.”	With a straight index finger on table start moving finger from L to R while saying the /s/ sound then end by tapping finger on table when the “friendly” sound is added. Or move forearm with open hand from L to R while saying /s/ sound and point to other sound positions as indicated above

PARENT FILL-IN FOR SOUND NAMES

CONSONANTS	NAME OF SOUND	VERBAL CUES	OTHER CUES
The “ p ” sound	popping sound	“Where’s your pop?”	Fill cheeks up
The “ b ” sound			
The “ m ” sound			
The “ n ” sound			
The “ t ” sound			
The “ d ” sound			
The “ h ” sound			
The “ w ” sound			
The “ y ” sound			
The “ k ” sound			
The “ g ” sound			
The “ f ” sound			
The “ v ” sound			
The “ s ” sound			
The “ z ” sound			
The “ sh ” sound			
The “ ch ” sound			
The “ j ” sound			
The “ l ” sound			
The “ r ” sound			

SONGS, TOYS AND GAMES FOR SUPRASEGMENTALS

(Pitch, Stress, Rate and Loudness)

(With thanks to Dr. Kathy Jakielski and Megan Young, Augustana College)

Songs (ages 3-6):

- Ten Little Indians [Pitch]
 - Time To Sing www.apraxia-kids.org
- Monkey Song [Pitch]
 - <https://www.youtube.com/watch?v=Iliy7-rSVN8>
 - Also great for vowel facilitation!
- I'm a Little Teapot [Pitch]
 - Time to Sing www.apraxia-kids.org
- Skidamarink [Pitch]
 - <https://www.youtube.com/watch?v=GEzzldOLqMM&list=PL9FDA79DC8AB4A032>
- Alice the Camel has Five Humps [Stress]
 - <https://www.youtube.com/watch?v=GpoqrvTLc8M&list=PL53361B2D31F6929E>
 - Put stress on number of Alice's humps.
- Head, Shoulder, Knees and Toes [Rate]
 - Time To Sing www.apraxia-kids.org (Head and Tummy)
- John Jacob Jingleheimer Schmidt [Rate and Loudness]
 - https://www.youtube.com/watch?v=H_imuS5oh84
 - Increase rate each time singing the verse.
 - Increase loudness after "whenever we go out, the people always shout".
- Itsy Bitsy Spider [Rate]
 - <https://www.youtube.com/watch?v=pm-vLG36x6k>
 - Increase rate each time singing the verse (slow to fast version plus gestures/signs).
 - Time To Sing www.apraxia-kids.org (Eentsy Weentsy Spider)
- Frere Jacques [Rate]
 - http://www.youtube.com/watch?v=_S5PvD9rP2g&list=PLD4337AEC7A0F0FE9
 - Increase the rate at the start of each verse.
- B-I-N-G-O [Loudness]
 - https://www.youtube.com/watch?v=9mmF8zOlh_g
 - Increase or decrease loudness when spelling out B-I-N-G-O.
 - Time to Sing www.apraxia-kids.org

- Teddy Bear [Loudness]
 - <https://www.youtube.com/watch?v=LjxxHlfVT1g&list=PL9FDA79DC8AB4A032>
 - Increase or decrease loudness when giving Teddy Bear directions.
- Five Little Monkeys [Loudness]
 - <https://www.youtube.com/watch?v=ZhODBFQ2-bQ&list=PLB5D53B883FF2C5C8>
 - Increase loudness on “No more monkeys jumping on the bed!”
- Pop Goes the Weasel [Loudness]
 - Time to Sing www.apraxia-kids.org

Songs (ages 6-10)

- High, Low Children’s Song [Pitch]
 - <https://www.youtube.com/watch?v=LCDVU0yuhDA>
 - Also can be used for younger children.
- Let It Go –Frozen Soundtrack [Pitch]
 - <https://www.youtube.com/watch?v=L0MK7qz13bU>
- Hey Baby, Let’s Rock and Roll [Stress and Loudness]
 - <https://www.youtube.com/watch?v=j0ljoXH4brl&list=PL53361B2D31F6929E>
 - Put stress on “hey” and the action repeated.
 - Increase or decrease loudness on “Hey baby”.
- The More We Get Together [Stress]
 - <http://www.youtube.com/watch?v=lldmkrJXQ-E>
 - Put stress on “together”.
- Form Bananas [Stress, Rate, Loudness]
 - <http://www.youtube.com/watch?v=IVK88X9gJZI>
 - Put stress on “banana” and “potato” (etc.).
 - Increase the rate on the final verse (Go Bananas!, etc.).
 - Increase the loudness on the final verse of each food (Go Bananas!, etc.).
- Skip To My Lou [Rate]
 - <https://www.youtube.com/watch?v=LgQXhs9BWt8>
 - Exaggerate fast and slow verses.

Toys (ages 3-6)

- First Act Mic and Amp - \$19.99 [Pitch and Rate]
 - Different colors are available for girls and boys.
 - An mp3 hookup is available.
 - Can choose songs with varied pitch and rate for children to sing along.
- Winfun Step to Play Giant Piano Mat - \$22.99 [Pitch]
 - While stepping on ascending or descending notes, child can work on ascending and descending pitch.
- Space Hopper Ball (ages 3-6 size) - \$15.00 [Pitch]
 - When bouncing up and down, fluctuate pitch.
- Plan Toy Solid Wood Drum - \$15.00 [Stress]
 - Tap the drum on the stressed word.
- KidiBeats drumset - \$24.99 [Stress]
 - Children may tap out the stress in words using this toy.
 - This toy also comes with educational songs containing numbers and letters.
- First Act Junior Bongos - \$19.99 [Stress and Loudness]
 - The bongos may be used to experiment with loudness or to demonstrate stress.
- Wood Xylophone - \$12.99 [Stress]
 - Use the drumsticks to mark stress in a word.
- Meowsic Keyboard - \$27.99 [Rate]
 - Keyboard comes with a microphone and set of songs that can be adjusted by tempo so that child can sing at different rates.
- FAO Schwarz Bear in the Box – \$19.99 [Rate and Loudness]
 - The song speeds up and slows down depending on rate at which child turns the knob.
 - The child can practice singing at a fast or slow rate
 - Instruct the child to yell "Pop!" to the accompanying song.
- Strum & Jam Kidiband - \$19.99 [Loudness]
 - Comes with a piano, guitar, and drums.
 - Loudness may be adjusted in freestyle mode and for the twelve children songs included.
- Pop Goes Froggio - \$11.40 [Loudness]
 - Stomp on the pump that sends froggio flying when producing a word loudly
 - Lightly step on the pump when producing quiet speech.

Toys (Ages 6-10)

- First Act Mic and Amp - \$19.99 [Pitch, Rate and Loudness]
 - An mp3 hookup is available.
 - The child can practice singing at high and low pitches to songs of their choosing.
 - SLP may choose songs with varying rate for the child for the child to sing along.
 - Encourage the child to sing loudly or softly to songs of his or her choosing
- Action Figures or Dolls [Pitch]
 - SLP and child play while voicing characters with high or low pitched voices.
- Wood Xylophone - \$12.99 [Pitch]
 - Can be used to model high or low pitches.
- Space Hopper Ball (ages 7-9 size) - \$15.00 [Pitch and Stress]
 - When bouncing up and down fluctuate pitch, or bounce on the stressed word or syllable.
- First Act Percussion Pack - \$34.99 [Stress]
 - The percussion instruments included may also be used to demonstrate concepts of loudness, stress, and rate.
- First Act Junior Bongos - \$19.99 [Stress]
 - Can be used to demonstrate stress on a particular word or syllable.
- Play-Doh! [Stress]
 - Smash or squeeze the Play-Doh on the stressed word.
- First Act Discovery Monsta Jam Digital Drum Pad - \$29.99 [Rate]
 - Adjustable tempo and rhythm controls
- First Act Percussion Pack - \$34.99 [Rate]
 - The percussion instruments included may also be used to demonstrate concepts of loudness, stress, and rate
- Melissa and Doug Band in a Box - \$19.99 [Loudness]
 - Comes with 10 different percussive instruments used to model appropriate loudness.
- Director's Megaphone - \$14.00 [Loudness]
 - Can be used as a cue to encourage loudness.

Games (ages 3-6)

- Candyland - \$14.00 [Pitch]
 - When passing by different characters on the board game, the child must imitate what their voice would sound like (high or low pitched).
- Chutes and Ladders - \$11.99 [Pitch]
 - When traveling up a ladder, pitch ascends.
 - When traveling down a chute, pitch descends.
- Simon Says [Pitch]
 - Ask the client to imitate animals or persons with high and low pitched voices etc.
- Hoot Owl Hoot - \$15.99 [Pitch, Rate and Loudness]
 - Each time an owl moves, practice saying “Hoot!” in a high or low pitch.
 - Each time an owl moves, practice saying “Hoot! Hoot! Hoot!” slowly or more rapidly.
 - Each time an owl moves practice saying “Hoot!” softly or loudly.
- Ants in the Pants - \$9.99 [Stress]
 - Flip ant towards the dog’s pants when saying stressed word (“The **dog** (flip) likes ants”).
- Gamewright Hiss Card game - \$14.99 [Stress and Rate]
 - Instruct child to put stress on one “hiss” in a sequence of hisses (“hiss **hiss** hiss”).
 - Upon drawing a matching card, child will say “hiss hiss hiss” slowly or rapidly.
- Count Your Chickens Board Game - \$16.00 [Stress]
 - When counting chickens, instruct the child to put stress on a particular numbers (1, **2**, 3).
- Hi Ho Cherry-O - \$9.99 [Rate]
 - Practice counting the cherries into the basket slowly or rapidly.
- Crocodile Dentist - \$9.00 [Loudness]
 - The SLP and child can take turns pressing down the teeth in the crocodile’s mouth until it snaps down.
 - Choose a target word and increase the loudness each time the SLP or child presses down on a tooth.
- Tomy Pop-up Pirate Game - \$20.00 [Loudness]
 - Stick the swords into the barrel until the pirate pops out of the top.
 - With each sword, increase or decrease the loudness of the target word.

Games (ages 6-10)

- Chutes and Ladders - \$11.99 [Pitch]
 - When traveling up a ladder, pitch ascends.
 - When traveling down a chute, pitch descends.
- Jenga - \$9.99 [Pitch]
 - Instruct child to make a sound that fluctuates his/her pitch from high to low each time he/she draws a block from the tower.
- Don't Break the Ice - \$9.99 [Pitch, Rate and Loudness]
 - Fluctuate pitch when tapping the ice block until it falls out or until it all collapses.
 - The child will say words like "tap" at a fast or slow rate depending on how fast they are tapping the ice block.
 - Instruct the child to say "tap" softly while tapping the ice block lightly and loudly when tapping the ice block harder.
- Uno! - \$6.00 [Pitch and Loudness]
 - Each time the color changes or a player has an "Uno!" he or she must call it out in a high- or low-pitched voice.
 - Instruct child to yell "Uno!" each time he/she has one remaining card in his/her hand.
- Sorry! - \$9.99 [Stress, Rate and Loudness]
 - When counting spaces, instruct child to put stress on one particular number (1, **2**, 3, etc.).
 - Instruct child to count the number of spaces he/she moves slowly or more rapidly.
 - Instruct child to increase or decrease the loudness when counting spaces
- Black Jack [Stress]
 - Put the stress on the "hit" in "**hit** me".
- Guess Who? Board Game - \$30.00 [Stress]
 - Instruct child to put the stress on the specific attribute in question ("Does she have **glasses**?").
- Go Fish Card Game - \$5.00 [Stress]
 - Put stress on the fish being asked for ("Do you have a **blue** fish?").
- Hot Potato Electronic Musical Passing Game - \$9.99 [Rate]
 - Increase the rate at which "hot potato" is said each time it is passed around.
- Ker Plunk - \$22.00 [Loudness]
 - Players begin by inserting sticks through the tube and then pour marbles on top of them.
 - Players can increase or decrease the loudness of the target word with each time they pull out a stick until the marbles fall to the bottom.

Suggested Apps (special thanks to Pooja Aggarwal, Progressive Speech Tx)

Apraxia Ville – sound windows – cartoon avatar making sounds and window for children to make their own video of sounds

Speechprompts – targets prosody, rate, rhythm, stress, and loudness

Smarty Ears - r intensive – has an r diagnostic

Pocket SLP Articulation

VAST – video modelling of syllables, words, phrases, and sentences

NACD: National Association for Child Development Apraxia – moves from mass to distributed practice and blocked to random – nonspeech words and no phrases or sentence

Vowel Viz – biofeedback for tongue position on vowel quadrilateral – can use for vocalic /r/ - helpful to train child's and parents' ears

Ipractice verbs – pictures of verbs can choose verbs and tense but has verb written on corner

TalkingTom – imitates what he hears said

Icommunicate – record voice like on old language masters

Wheels on the Bus – gets child to figure out he/she has control over device

Fireworks – low level – when child touches screen, creates fireworks – can target expressions or words like “wow” and “pop”

Signing Time – has activities for kids and video of each sign more appealing to kids, smart hands – has video of each sign

Splashtop - download software onto your laptop and makes it a touchscreen – have to be online – desktop sharing, can use your software on the ipad

Iprompts – has ready-made social stories e.g. communicating without words, shows the gestures for yes/IDK, schedules – customizable

Reading Rockets for literacy

Pictello – create visual stories

VASTAutism 1 – free – can see zoom in of oral movements, you go through the list of words, can't select words, can scroll through words, phrases

Parent Response Hierarchy

(when a child makes an error on a targeted word, phrase, etc.)

Just look at child with non-understanding.

Provide a touch cue, visual prompt, or sign without any accompanying verbal hint.

Respond with a verbal hint such as: (1) "You forgot your... sticky." (2) "Where's the...friend?" (3) "I didn't hear any...wind."

Provide minimum to maximum cueing depending upon child's response to the above strategies.

Cueing Hierarchy

1. (Sign) + full verbal prompt ("ball").
2. (Sign) + first sound cue ("ba").
3. (Sign) + first sound position (pursed lips).
4. (Sign) only

Goal is to fade the cues as soon as possible to allow the child's speech-motor system to "do the work." - enables faster master of the motor plan. This avoids depending upon "I say it...you say it."

WHAT'S WRONG? Football and Tennis Sentences

1	2	3	Sentences
			The tennis player hit the ball under the net, and scored a point.
			The safety tackled the linebacker in the fourth quarter.
			I served the ball in the back square, and got an ace.
			The quarterback threw a punt to the wide receiver.
			He used his racket to make a birdie putt on the fourth hole.
			The Steelers beat the Chargers with a score of 50-love.
			Tennis racket strings are made out of yarn and are very durable.
			The score at the end of the third quarter was Browns-5, Broncos-1.
			Andy Roddick won the Super Bowl after a tough match.
			The Baltimore Coach caught the quarterback's great pass and ran 40 yards.
			After the football game, the coach said to put away our rackets.
			The football trainer ran onto the field to put air in the football.
			The player in the chair called the serve out of bounds.
			At training camp, football players try to learn how to dribble the football.
			There are 6 players on a tennis doubles' team.
			In flag football, hard tackles are permitted as long as you say, "I'm sorry."
			Tennis players are allowed four bad serves before they lose a point.
			The quarterback jumped over the net at the end of the tiring match.
			Tennis players are not in very good shape since they don't need to run much.
			The Heisman Trophy is awarded to the best professional football player.
			Total

WHAT'S WRONG? Baseball and Soccer Sentences

1	2	3	Sentences
			The forward kicked the ball out of bounds and the defender scored.
			In the top of the third inning, we scored a run after the other team scored four.
			The midfielder really hit the soccer ball hard with his right hand for a great pass.
			Robbie hit a home run but only got to third base.
			The other goalie scored four goals while playing on the front line.
			Either the first baseman or the left fielder will catch the fly ball.
			The soccer referee said we scored a touchdown on Saturday.
			The catcher threw a curve ball, but the pitcher dropped it and the runner was out.
			The crowd cheered when the soccer ball hit the other team's basket.
			Our right fielder ran all the way to fourth base during a game on Thursday.
			Soccer is a slow sport, where running is not permitted.
			Shortstops play between right field and first base.
			There are four goal keepers in each goal for every game in soccer.
			If the other team scores a run, our team will kick a field goal.
			All soccer players wear helmets to protect their heads.
			There are four outs allowed in extra inning games until the fourteenth inning.
			If you score a goal in soccer it is worth 3 points unless it is scored by a defender.
			The first baseman threw the umpire out of the game for arguing.
			Soccer balls are made out of rubber so they can bounce high to reach the basket.
			Baseball managers are allowed to play right field if the right fielder needs a rest.
			Total

Selected Therapy Resources
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“Time to Sing” Children’s CD

- ❖ Apraxia-kids.org

“Moving Across Syllables-Training Articulatory Sound Sequences” by Kirkpatrick, et al.

- ❖ The Psychological Corporation at www.psycorp.com

“Captain Hammer & Super Sean – The Case of the Missing G” by Freiburger and Clark

- ❖ Apraxia-kids.org

“Do-A-Dot Markers”

- ❖ Do-A-Dot Art at www.dotart.com

“Build-A-Sentence”

- ❖ Amazon.com

“DOT Articulation” by Rachele Ellsworth

- ❖ www.speechcorner.com

“Easy Does It For Apraxia of Speech-Preschool” by Robin Strode and Catherine Chamberlain

- ❖ www.linguissystems.com

“Sign Language Resources”

- ❖ www.signingtime.com , www.signingsavvy.com , www.lifeprint.com

Heathfield Adjustable Chair with Tray

- ❖ www.disabilitysupplies.com

Marvel Magnet Alphabet Set – Marvel Education Company, New York, NY

- ❖ www.cptoy.com (go to Constructive Playthings not US Toys)

Deluxe Therapy Mirror and Kit or Speech-Teach Portable Mirror

- ❖ www.schoolhealth.com/earlychildhood
- ❖ www.dysphagiaplus.com

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- 12) “What Factors Place Children With Speech Sound Disorders at Risk for Reading Problems?” Jason L. Anthony, et al, American Journal of Speech-Language Pathology, Vol. 20, May 2011, pp. 146-160
- 13) “Nobody Ever Told Me (or My Mother) That! – Everything from Bottles and Breathing to Healthy Speech Development”, Diane Bahr, 2010, available on-line through Amazon.com, Sensory World, or [Future Horizons, Inc.](http://Future Horizons, Inc)
- 14) “Lessons by Abigail: Educating a Seasoned Speech-Language Pathologist named Mom”, in the Jan/Feb 2003 edition of Disability Solutions, pp. 1-15 or through Apraxia-kids.org.