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Childhood Apraxia of Speech: A Parent’s Guide

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Dyspraxia

The root of dyspraxia, in all its forms, is the Greek work *praxis*, whose definition can range from the “neurological process by which cognition directs motor action…the ability to formulate or plan different actions that allow the individual to affect the relationship between self and the environment [which]…occurs before actual motor execution” (Ayers 1985, p. 23) to “the practical application of a theory” (Webster.com). When broken down, praxis means the ability to carry out what you plan to do, and the prefix ‘dys’ and ‘a’ means poor and lack of respectively. Thus dyspraxia or apraxia means the inability to carry out deliberate motor functions. There are multiple neurological steps that need to be carried out in order for good *praxis* to take place, and it is at any of these steps that the process could break down. Brookes (2005) describes the steps as follows:

*Ideation* – forming the idea of using a known movement to achieve a planned purpose.

*Motor planning* – planning the action needed to achieve this idea.

*Execution* – carrying out the planned movement.

Studies have shown that children with dyspraxia can display weakness in either the planning stages (referred to as ideational dyspraxia), in the execution stage (referred to as ideo-motor dyspraxia), or in both (Ripley, Daines & Barrett, 1997). Many researchers believe that poor sensory integration is also a factor in dyspraxia; that dyspraxic children may experience decreased ability in the vestibular apparatus, the proprioceptive system, and the tactile receptors. A deficit in these systems, which are responsible for a person’s balance, sense of self in space, and touch sensory input respectively, are partly to blame...
for a person’s lack of coordination (Ripley et al., 1997). It is important to note that there is nothing wrong with the muscles or articulators themselves, that the problem is strictly a neurological deficit.

There are essentially three types of dyspraxia a child can have. *Motor*, or limb, dyspraxia means an inability to properly coordinate muscles needed for fine and gross motor skills. These children may look clumsy and uncoordinated. *Oral* dyspraxia is apraxia of the oral mechanism not involving speech acts. That is, tasks like sticking out the tongue, whistling, blowing a kiss, etc. are difficult for these children. *Verbal* dyspraxia, our main concern, is the inability to properly and consistently produce and sequence sounds and words. This would be the child who can recognize an object, know what it is called, but be unable to properly produce its name. This type of dyspraxia has many implications on a child’s overall development. A diagnosis of verbal dyspraxia also carries a certain amount of uncertainty and controversy that is important in understanding the condition fully.

Dyspraxia can be acquired or developmental. When found in adults, it is usually due to stroke or another medical incident that causes damage to specific areas of the brain, and is often accompanied by other speech and language deficits. Developmental dyspraxia that is found in children is thought to be caused from immature neurological development and can be eventually outgrown in certain cases, but not all. The most significant difference between the two is that adults with dyspraxia usually have a large vocabulary of automatic speech and reflexive movements that are still at their disposal. An adult with dyspraxia will have no problem vocalizing their displeasure when a heavy object is dropped on their foot, even if they might have difficulty producing the same
word when asked to deliberately. A child with developmental dyspraxia, on the other hand, has no automatic speech or reflexive movements already ingrained into their brain. The idea that dyspraxia affects movements and speech that require thought as opposed to reflexive movements and speech will be valuable while considering treatment options for children.

**Verbal Dyspraxia**

Childhood Apraxia of Speech (CAS) is also referred to as Developmental Apraxia of Speech (DAS) as well Developmental Verbal Dyspraxia (DVD); there is no differentiation between the three diagnoses. The former has been coined to be a theory-neutral, insurance friendly diagnosis and is currently used in most settings (Velleman, 2003).

A review of the literature reveals that Childhood Apraxia of Speech is a much debated disorder. There is controversy associated not only with how the disorder can manifest itself, but over its very existence as a specific speech and language disorder. Unlike other disorders, there are no giveaway traits of a child with CAS – most accepted symptoms are generally very broad and could be symptomatic of a number of other disorders or deficits, ranging from other specific conditions to a general developmental delay. Because of this, it is important to look at the child’s language as a whole when considering this diagnosis, and not to rely on a checklist of symptoms. This will be addressed more in depth later, but it is important to keep in mind before delving any further into the topic.

Due to the controversy associated with the diagnosis, the incidence rate for CAS in the United States and abroad is largely unknown. It is, however, assumed that the rate is
relatively low, occurring in 1-10 children per 1000 (approximately 3-5% of speech impaired preschoolers) ("What is Childhood Apraxia of Speech?", 2005). It is possible, however, that this number would greatly increase if every speech-language pathologist considered this a viable diagnosis, as approximately 17% of an elementary school pathologist’s caseload is that of students resembling dyspraxia or dysarthria (a similar but unrelated diagnosis) (Velleman, 2003).

Children with CAS are said to be “among the most severely impaired of all children diagnosed with a speech disorder” (“What is Childhood Apraxia of Speech?”, 2005). CAS is characterized by Shames and Anderson (2002) by the following:

1. A significant problem in learning speech production skills
2. Speech articulators that have adequate range and rate of movement but that appear to perform inappropriate movements during speech attempts
3. Very slow progress in speech remediation programs.

In addition to these broad characteristics, CAS manifests itself in a number of distinct ways. Children with CAS may display anywhere from one or two of these symptoms to all of them (Ripley et al., 1997)

- The ability to produce a very restricted set of speech sounds
- Difficulties with length and complexity in sentences
- Difficulty in sequencing sounds for words and sentences
- Inconsistent speech production
- Difficulties with the prosodic features of speech
- Difficulty controlling breathing and phonation
- Vowel distortion

Children with CAS may also display some characteristics of oral apraxia, such as difficulty with feeding and other acts that require complete control of the speech apparatus (Ripley et al., 1997). Due to these difficulties, children with CAS are usually late talkers; it is often not until two years of age that the child will have any speech at all.
When speech does appear, it is likely that they will experience very slow progress with language as a whole. Specific speech tasks like producing repetitive syllables, also called diadochokinesis, are also found to be troublesome for these children. Additionally, children with CAS are likely to have poor spatio-temporal coordination, which dominates speech motor control development until age six (Velleman, 2003).

Despite the common appearance of the above listed symptoms, there is no set mold of what a child with CAS sounds like. Error patterns are said to be idiosyncratic, or unique, to the child, and are likely to change over time which makes it a difficult problem for both parents and speech language pathologists alike to identify and address (“What is Childhood Apraxia of Speech?”, 2005).

**Developmental Implications**

This difficulty with language has consequences reaching farther than their expressive language. In the years following the age of normal language acquisition, children can become aware of their deficit, and in turn can become embarrassed, withdrawn, or in extreme cases, selectively mute (Ripley et al., 1997). Frustration from their inability to communicate effectively may be cause for temper tantrums and other emotional outbursts, often in the presence of peers. The social repercussions of such behavior are obvious to anyone who has come under the judgment of a school-age child. Ripley et al. (1997) also report that disorder may cause children with CAS to more slowly develop social skills, especially skills that are related to verbal and non-verbal language use, e.g. facial expression.

Although children diagnosed with CAS are usually of normal intelligence, they are often threatened academically. Children with CAS are at greater risk for falling
behind their peers. Research suggests that these children are at a greater risk for experiencing language learning problems and other educational difficulties (Shames & Anderson, 2002). Difficulties in learning to read may arise from the lack of auditory reinforcement that comes from sounding out letters and words. It is important to note that dyspraxic children may learn to read very fluently in their heads, while sounding very disfluent when reading aloud. Some also suggest that there are subtle auditory processing difficulties which may not make themselves known until the later elementary grades when children are expected to follow multi-step instructions (Velleman, 2003). There is disagreement, however, about whether these symptoms are inherent to the disorder, are the result of decreased experience with language and phonology, or are unrelated effects of the presumed neurological differences (Velleman, 2003). It is important to remember, however, that despite these difficulties, children with CAS are usually of average to above average intelligence and that the academic difficulties attributed to the disorder have no bearing on their academic aptitude.

**Theoretical Approaches to CAS**

CAS is a rather unique and ambiguous disorder. The causes and manifestations of CAS are not indisputable by any means, and there are a wide range of opinions about what those might be. Since there is little agreement about what the causes and defining symptoms or characteristics of CAS actually are, researchers and professionals have established theoretical approaches that lay the foundation on which the symptoms are considered.
A disorder of motor planning and programming

The first approach to examine is a ‘lens’ which defines CAS as “an impairment of sensory processing and in particular of proprioceptive input, with an ensuing failure to programme, to organize and to carry out movements necessary for expressive speech” (Edwards 1984, p. 46). This approach considers CAS a true dyspraxia with underlying neurological dysfunction. It emphasizes the motoric deficits instead of possible linguistic deficits, which intrinsically makes it a more difficult disorder to treat. This approach uses the neurological basis to differentiate these children from those with other phonological impairments or delays. This would certainly be a logical differentiation, if it were possible to prove. There is currently no test to detect the neurological dysfunction, only theories on what goes wrong and what that looks like to an observer (Brookes, 2002). Despite the lack of hard evidence, definitive signs of neurological dysfunction are found more often in children diagnosed with CAS than in other speech-impaired children (Shames & Anderson, 2002). The science behind possible neurological function will be discussed later.

A linguistic/phonological impairment

Another approach to the disorder is defining CAS as “a breakdown in the spatial/temporal properties of movements, which cannot be explained by direct sensory-motor pathology” (Crary, 1984). This camp considers CAS to be a primarily language disorder that affects the development of the child’s sound system (Ripley et al., 1997). Taking this approach would make the distinction between children with CAS and other speech and language impairments less defined, relying mainly on the severity of the symptoms to differentiate them. Under this definition, CAS is more likely to be
successfully remediated through treatment approaches used with other phonological and articulation deficits. This approach does not deny the existence of a motoric deficit, but it strongly emphasizes the linguistic element of the disorder.

Despite their differences, certain aspects of CAS have been agreed upon, including the idea that the disorder has a much more profound effect on speech than it does on language (Ripley et al., 1997). There has been a consensus that the disorder stems from both views, and a working, albeit broad, definition of CAS is accepted by all professionals (Ripley et al., 1997). This definition does allow for neurological dysfunction, which is possibly a significant problem that is worth examining further.

**Neuropathy**

In otherwise developmentally dyspraxic children, children with limb or oral dyspraxia, the neurological deficit is thought to originate from insufficient neuron production in the first six months of gestation. Since no new neurons are grown after six months, and damaged ones do not regenerate, this ultimately results in incomplete or impaired neural pathways. This translates into deficient connections between parts of the brain and the rest of the body, and thus there is inevitable disruption of messages being sent between the two (Brookes, 2005). Furthermore, there is also thought to be decreased myelin production in dyspraxic children. Without proper myelin sheathing covering the message carrying axons and dendrites, information is likely to be scattered and the pathways subject to decreased message carrying capacity (Brookes, 2005). The combination of these two deficits is said to account for the inability to properly control movement, and if CAS is a true dyspraxia, then would also be partially to blame for these children’s speech impairment.
More specific to CAS, there is thought to be possible neurological dysfunction near Broca’s area in the frontal lobe of the brain. Broca’s area, which is responsible for speech motor programming, is adjacent to the area of the brain where the prime motor system originates and where the innervation of the speech production musculatures begin (Shames & Anderson, 2002). Since the two areas are so close in proximity and so closely related functionally, subtle damage to this area of a developing brain could result in CAS, while restricting the effects of the damage to speech (Shames & Anderson, 2002). Whether this ‘damage’ is due to actual physical damage or from incomplete or insufficient development is unknown.

Also supporting a neurological as opposed to linguistic etiology is the strong genetic link that has been found in families that experience multiple accounts of CAS (Shames & Anderson, 2002). Ripley et al. (1997) features a study performed by Fletcher and Hall (1992) in which “a family where fifteen out of twenty-nine members, over three generations, had severe verbal dyspraxia, and two others, both young children, were of ‘questionable status’ (diagnosis not yet confirmed) (p.47).” Thus heredity, or at least genetic susceptibility, can be added to the list of possible causes of CAS.

**Diagnosis**

The bulk of controversy associated with CAS lies in the disorder’s diagnostic criteria, or lack thereof. Although there are commonalities between children diagnosed with CAS, there is an inability to identify a specific set of symptoms that allows clinicians to give an indisputable diagnosis (Shames & Anderson, 2002). Furthermore, Shames and Anderson report that “there has been no identifiable pattern of speech errors within groups of children who are believed to have the disorder” (2002). This has led
professionals in the field to accept the disorder as a syndrome, as opposed to a unitary disorder which presents a single list of symptoms. Researchers have proposed a variety of continua of symptoms, which allow for a wide range of dyspraxic traits. It is also accepted that an individual child’s symptoms can change over time, both from day to day and over the years (Velleman, 2003).

Although there are laundry lists of possible symptoms of CAS, they are not always as useful in the diagnostic process because many of the characteristic errors of CAS that may be considered ‘diagnostic’ can occur quite regularly in the general speech-impaired population (McCabe, Rosenthal, & McLeod, 1998). Indeed, many of the symptoms listed above could possibly characterize a number of speech disorders that would not qualify as apraxic. Many children experience a number of phonological and articulation impairments and delays that may be nothing more than just that – impairments and delays that can be addressed and remediated with speech and language therapy.

Despite the disagreement and uncertainty associated with the diagnosis, the diagnostic process for a child suspected of CAS is a rather consistent one. There are a number of standardized tests that a clinician can administer to take an inventory of a child’s verbal skills, including automatic and volitional speech, verbal sequencing, imitation, speech length and complexity, articulation skills, and many others. A clinician will choose the most appropriate standardized test and/or checklist to use with each particular child based on their demonstrated skills and deficits. In addition to these tests, clinicians will also use informal measures, such as observation, to assess a child in areas that are not as easily identified in a standardized testing situation, particularly vowel
production, prosody and the consistency of speech productions. These are very important factors in determining a possible CAS diagnosis and it is vital to the diagnostic process that they are properly analyzed, despite the lack of a specific test to identify them.

Despite the outcomes of standardized tests and checklists, it is important to be assured by the clinician that the symptoms and possible underlying causes will be treated, regardless of a diagnosis.

**Treatment**

The majority of special remediation programs for children with CAS are developed with a strong bias towards one of the aforementioned theoretical approaches in mind (Shames & Anderson, 2002). Treatment strategies conceived from the motor planning/programming approach usually feature motoric drill producing various syllable structures and processes (Velleman, 2003). Those stemming from the more linguistic approach emphasize more linguistic and phonological components, as well as flexible, functional communication (Velleman, 2003). Speech-language pathologists who have no particular bias between the two approaches tend to take a more pragmatic approach to treating children with CAS, basing their therapy on the child’s personal experiences (Ripley et al, 1997). In general, therapy for these children tends to consist of exercises to increase the child’s ability to transition smoothly from one articulatory posture to the next, as well as emphasizing the dynamic nature of speech (Velleman, 2003). Specific articulatory and phonological errors are not usually addressed, due to their inconsistency and the idea that they are generally accepted to be the manifestations of a more serious underlying problem. Regardless of the therapy approach taken, it is important to take into account the child’s compensatory skills that he or she has developed prior to therapy in
order to capitalize on the speech skills the child *does* have, and to shape their behaviors in a way that is conducive to such skills (Dixon & Addy, 2004).

**Prognosis**

Progress in most children diagnosed with CAS has historically been slow and tedious; so much so that it has become one of the characteristic indicators of the disorder, albeit a controversial indicator (Velleman, 2003). However, it is unclear whether this is due to the stubborn persistence of the disorder, or if it is because of poorly designed therapy that does not account for the true nature of CAS. There has been evidence that milder cases of CAS can be treated successfully with therapy to the point of making its symptoms undetectable; this is, however, not the norm, and some cases of CAS persist into adulthood.
Works Cited


Resource Guide

For more information about Childhood Apraxia of Speech, its symptoms, and possible treatment options, explore the following professional websites and books.

Websites

Apraxia-Kids
www.apraxia-kids.org
This comprehensive website is a wonderful tool that is complete with an online library, message board and a learning center for parents. Run by the Childhood Apraxia of Speech Association, it serves as an up to date resource for both parents and speech language pathologists.

NINDS Apraxia Information Page
www.ninds.nih.gov/disorders/apraxia/apraxia.htm
This website is run by the National Institute of Neurological Disorders and Stroke. It gives a very brief description of CAS as well as short blurbs and the disorders prognosis and treatment options.

Apraxia of Speech
www.nidcd.nih.gov/health/voice/apraxia.htm
This website run by the National Institute on Deafness and Other Communication Disorders provides a clear but thorough explanation of CAS and its related factors.

Cherab
www.cherab.org
This website provides information on CAS and other related communication disorders often found in children. Run by the Cherab Foundation, it boasts an extensive list of links to related material and other resources, including information on insurance issues and online support groups.

Childhood Apraxia of Speech
www.asha.org/public/speech/disorders/childhood-apraxia.htm
This page is part of the American Speech Hearing Association (ASHA) website. It lists early warning signs as well as later symptoms of the disorder. It also explains the assessment process and possible treatment options.

Can We Talk?
www.tayloredmktg.com/dyspraxia/
This website features an article by Ann S. Guild, MA CCC/SLP explaining CAS and its related factors, as well as a parent FAQ section.

Signs and Symptoms: Apraxia of Speech
This website published by the Kaufman Children’s Center gives an explanation of CAS, as well as a list of early signs and symptoms of the disorder.

Expressive Communication Help Organization (ECHO)
www.apraxia.ca/
This Canada based website provides information on CAS as well as information on support groups, a checklist for parents, and a list of related links on the web.

Children’s Speech Sound Disorders: Questions and Answers
www.members.tripod.com/Caroline_Bowen/phonol-and-artic.htm
This website published by Caroline Bowen features information on CAS, as well as dysarthria and general articulation and phonological impairments.

Childhood Apraxia of Speech and Severe Phonological Disorders
www.speech-language-therapy.com/2006cas_dpd.htm
This website features links to documents by Caroline Bowen and other SLPs about CAS and its related factors.

Afasic
www.afasic.org.uk
A UK based website dedicated to speech and language difficulties. Includes information about speech and language elements and development, as well as message boards and printable publications.

The Hanen Centre
www.hanen.org
This website provides an informational section for parents about general language impairments and delays. Provides tips, activities, and games for parents to do with their children at home to increase language skills.

Yahoo Group – Phonological Disorders and Delays
http://groups.yahoo.com/group/phonod/
An online group for parents who have children with developmental speech delays and disorders. Includes an active message board to share experiences, questions, and advice. Membership is free, but required.

Yahoo Group – Late Talkers
http://groups.yahoo.com/group/Latetalkers/
An online group for parents who have children that have apraxia, autism spectrum disorders, learning disabilities, and phonological disorders. Includes and active message board to share experiences, questions, and advice. Membership is free, but required.

Books

Childhood Apraxia of Speech Resource Guide
By Shelley Lynne Velleman
Published 2003
Thomson Delmar Learning
192 pages
ISBN 0769301657

This comprehensive resource guide was created in response to the requests from practicing speech language pathologists and parents of children with apraxia of speech
for information on the nature of this complicated disorder and advice on assessment and treatment methods. Fundamental aspects of the disorder are discussed in depth and different viewpoints regarding apraxia are compared, eliminating the need to track down multiple sources. Detailed practical assessment and treatment guidelines provide speech language pathologists with a framework of how to help children with apraxia and the motivation behind each treatment. Case studies bring material into a real world context.

—Description taken from Google Books

The Late Talker
By Dr Marilyn C Agin, Lisa F. Geng, Malcolm J. Nicholl
Published 2004
St. Martin's Press
228 pages
ISBN 0312287542
The mother of a boy with a speech disorder and the developmental pediatrician and former speech-language pathologist who diagnosed it as apraxia team up with scribe Nicholl to pen this expert guide to understanding speech delays and problems. An overview of speech disorders focuses particularly on those in which language acquisition and speech sound production is affected—e.g., apraxia. The authors walk parents through finding the right doctor, therapist and method of therapy; ensuring that their publicly schooled child gets an Individualized Educational Program; dealing with insurance companies; engaging in activities that encourage speech practice; understanding nutritional supplements; and dealing with fears, both their child's and their own. A careful, thorough and realistic book, this will be a great resource for any parent dealing with these issues. —Description taken from Amazon.com

Dyspraxia: A Guide for Teachers and Parents
By Katie Ripley, Bob Daines, and Jan Barrett
Published 1997
David Fulton Publishers
102 pages
ISBN 1853464449
The authors, Kate Ripley, a senior educational psychologist, Bob Daines, an educational psychologist for Brighton and Hove council, and Jenny Barrett, chief speech and language therapist at South Downs Health Trust, have written a well organized guide, clearly signposted throughout so that information is easily found and presented in manageable sections. This book presents a cognitive processing model of dyspraxia from a developmental perspective. It provides instant access to ideas for use in the classroom and at home, ad well as making helpful suggestions on how to address issues of social interaction. Description taken from Textic.com

Dyspraxia
By Geoff Brookes
Published 2005
Continuum International Publishing Group Ltd.
112 pages
Accessible and engaging, this book provides teachers with tips and techniques for teaching those with dyspraxia. As Geoff Brookes writes, 'There are symptoms, there are
problems, there are frustrations, there are tears. But there are strategies that can lead to positive outcomes. And whilst it is important to understand where it comes from, providing support and guidance is what this book is all about.'  – Description taken from Amazon.com

The Source for Childhood Apraxia of Speech
By Robin Strode and Catherine Chamberlain
Published 2006
Linguisystems
180 pages
ASIN: B000HYL7BU
Get tips on how to handle a child with Childhood Apraxia of Speech (CAS) who is resistive to therapy, has developmental delays or autism/PDD. Contains comprehensive information about children who have this neurologically-based disorder. Defines apraxia and describes its causes and characteristics. Explains how to evaluate a student to determine if he has apraxia. Includes detailed descriptions of therapy programs for the child with CAS Integrates communication goals to facilitate both speech and language skills simultaneously. Learn how to expand utterance length and provides oral-motor facilitation techniques of isolated sound productions. Promotes practice at home with activities for parents. – Description taken from Amazon.com

Becoming Verbal with Childhood Apraxia
By Pam Marshalla
Published 2001
Marshalla Speech and Language
ISBN: 0970706065
In this book, Pam Marshalla describes her thinking, experience and methods at helping children with apraxia of speech learn valuable speech imitation skills. Appropriate for parents and clinicians.
Activities

The following are a variety of activities that you can do with your child at home to facilitate speech and language development outside of the clinic. Since children spend such little time in therapy relative to that at home, it is important that skills are practiced and reinforced throughout the week. It is important to keep in mind the idiosyncratic nature of CAS when working with your child through these activities. They may not all be appropriate for your child, depending on their skill and abilities, and it is very important to carefully consider your child’s individual speech and language abilities when selecting activities to pursue. It is not imperative that these activities and drills be mastered to achieve progress. These are drills and activities that may be used in a therapy setting by a speech language pathologist, but that can easily be implemented at home by parents or other caregivers.

Basic Principles and Tips

- Don’t start out too hard
If your child cannot produce an intelligible “cat”, don’t begin drilling him or her on words like “refrigerator”. Any progress made will be fleeting because there is not a solid foundation for pronunciation.

Give opportunities for success
- Make sure that you set your child up to experience success once in a while in order to keep them motivated and confident.

Encourage slowed rate
- This does not mean to have your child speak painfully slow, but to remind them that you are there to listen and that they should take their time to speak carefully and to annunciate, instead of rushing through their words.

Imitation
- Have your child imitate your (slow rate) productions of both sounds and words. If they are unsuccessful, say it with them simultaneously until they are able to produce it.

Use Multiple Modalities
- Don’t just use verbal prompts to elicit your child’s productions. During both practice and throughout the day use visual, rhythmic, prosodic, and motor cues to prompt your child’s speech.

Encourage Self-Monitoring
- Depending on their age, most children can be taught to regulate the quality of their communication. This can include monitoring their rate, intelligibility, and prosody.

Teach carrier phrases
- Teaching applicable phrases that your child can utilize on a daily basis will greatly increase their communication with others, even if the phrases are not perfectly articulated. See Social Interactions.

Stabilize existing productions
- Work to have your child consistently and accurately produce the sounds that are already in his or her vocabulary or sound repertoire before moving on to more troublesome sounds or words.

Vary the context of practice
- As often as possible, vary where you work with your child. Practice can take place almost anywhere: outside, in a play area, at the kitchen table, anywhere your child is comfortable.
- Keep the pace
  o Keep as rapid as a pace as possible without sacrificing proper and careful articulation in order to keep a natural feel to the speech and to develop momentum.

- Don’t get stuck
  o Don’t dwell on difficult words or utterances. If your child is struggling, move on.

- Emphasize precision
  o Make sure your child knows that all the sounds in a word are important, not just the first and last, and that they all should be said carefully.

- Use reinforcement if necessary
  o It might help to develop a quick, simple, positive reinforcement system to keep your child on track and focused.

- Keep it fun!
  o Working on speech and language at home should not be made to feel like a chore to the child. Chances are, they experience enough frustration exert enough effort during the day that they will only stay interested and motivated to practice if it is in a no pressure, relaxed, fun setting.

Oral-Motor Exercises

Children with CAS often have trouble making deliberate motions with their articulators even if there is not an oral apraxia duel diagnosis. To help them become more aware of the structures in their mouth, do these exercises with them before moving on to sounds and words. This is a good warm up for later exercises because it gets the child to explore their mouth and play with their control of it.

Try the following exercises with your child:

- Press lips together and make the ‘mmm’ sound
- Click your tongue
- Stick out your tongue and move it from one corner of your mouth to the other
- Make “fish faces”
- Kiss your hand and then blow the kiss
- Make “ambulance noises” by pushing your lips in and out (“ooo-eoo-ooo-eee”), both ‘with’ your voice and ‘without’ it.
- Make the “motor sound”
- Lick your top lip, then the bottom (have them lick off peanut butter!)
- Poke each cheek hard with your tongue
- Hide your lower lip with your top lip, then vice verse
- Stick out your tongue and point it to your nose, then your chin
- Draw a circle on the roof of your mouth with your tongue
- Puff out your cheeks with air, holding it in tightly
- Touch right between your two front top teeth with your finger, then touch directly behind it (this is called the alveolar ridge, and is very important for articulation)
- Tap the alveolar ridge with your tongue
- Touch right between your two front bottom teeth, then touch directly behind it
- Tap this spot with your tongue
- Starting at one end, run your tongue along the outside of the bottom teeth, then the top
- Starting at one end, run your tongue along the inside of the top teeth, then the bottom
- Make and sustain a “hissing” sound

If you find that your child has difficulties placing their tongue at specific locations (behind their teeth, on the roof of their mouth, etc) try gently placing a bit of peanut butter using a tongue depressor or pressing a lollipop to the spot for a few seconds so that when the child has the correct placement they will be able to tell by tasting it.

**Songs**

Having your child sing songs that have lots of repetition is a very good exercise to do with them. The melodic nature of songs helps children with apraxia to develop intonation and fluidity in speech.

**Old MacDonald**

Old MacDonald had a farm.
E-I-E-I-O
And on his farm he had a horse (cow, pig, cat, dog, duck).

E-I-E-I-O
With a neigh neigh here and a neigh neigh there
Here a neigh, there a neigh, everywhere a neigh neigh
Old MacDonald had a farm
E-I-E-I-O
**Bingo**

There was a farmer had a dog and Bingo was his name-O.  
B-I-N-G-O, B-I-N-G-O, B-I-N-G-O and Bingo was his name-O.  
(Repeat)

**Teddy Bear**

Teddy bear, teddy bear, turn around  
Teddy bear, teddy bear, touch the ground.  
Teddy bear, teddy bear, shine my shoe  
Teddy bear, teddy bear, that will do.

**This Old Man**

This old man, he played one  
He played knick-knack on my thumb

Chorus:  
With a knick-knack paddy whack,  
Give a dog a bone  
This old man came rolling home.  
This old man, he played two  
He played knick-knack on my shoe.  
(Chorus)  
This old man, he played three  
He played knick-knack on my knee.  
(Chorus)  
This old man, he played four  
He played knick-knack on my door.  
(Chorus)  
This old man, he played five  
He played knick-knack on my hive.  
(Chorus)  
This old man, he played six  
He played knick-knack on my sticks.  
(Chorus)  
This old man, he played seven  
He played knick-knack up in heaven.  
(Chorus)  
This old man, he played eight  
He played knick-knack on my gate.  
(Chorus)  
This old man, he played nine  
He played knick-knack on my line.  
(Chorus)  
This old man, he played ten  
He played knick-knack on my hen.  
(Chorus)

**The Mulberry Bush**

Here we go ‘round the mulberry bush,  
The mulberry bush, the mulberry bush.  
Here we go ‘round the mulberry bush,  
so early in the morning.  
This is the way we mend our clothes,  
mend our clothes, mend our clothes.  
This is the way we mend our clothes,  
so early in the morning.  
This is the way we sweep the house,  
sweep the house, sweep the house.  
This is the way we sweep the house, so early in the morning.  
This is the way we bake our bread,  
bake our bread, bake our bread.  
This is the way we bake our bread, so early in the morning.  
This is the way we read a book, read a book.  
This is the way we read a book, so early in the morning.  
This is the way we iron our clothes,  
iron our clothes, iron our clothes.  
This is the way we iron our clothes, so early in the morning.  
This is the way we scrub the floor,  
scrub the floor, scrub the floor.  
This is the way we scrub the floor, so early in the morning.
This is the way we wash our clothes, wash our clothes, wash our clothes. This is the way we wash our clothes, so early in the morning.

**Pop Goes the Weasel**

All around the cobbler’s bench the monkey chased the weasel. The monkey thought ‘twas all in fun. Pop! Goes the weasel.

A penny for a spool of thread, a penny for a needle. And that’s the way the money goes Pop! Goes the weasel.

(Chorus)
Rufus has a whooping cough, and Sally has the measles. And that’s the way the doctor goes. Pop! Goes the weasel.

(Chorus)

**A-Tisket A-Tasket**

A-tisket a-tasket A green and yellow basket I wrote a letter to my love And on the way I dropped it

I dropped it, I dropped it Yes, on the way I dropped it A little girlie picked it up And took it to the market

(Was it red?) No, no, no, no (Was it brown?) No, no, no, no (Was it blue?) No, no, no, no Just a little yellow basket

**Ba Ba Black Sheep**

Baa, baa, black sheep, Have you any wool? Yes sir, yes sir, Three bags full.

One for the master, One for the dame, And one for the little boy Who lives down the lane.

Baa, baa, black sheep, Have you any wool? Yes sir, yes sir, Three bags full.

One to mend the jerseys one to mend the socks and one to mend the holes in the little girls' frocks.

Baa, baa, black sheep, Have you any wool? Yes sir, yes sir, Three bags full.

The Bear Went Over the Mountain
The bear went over the mountain, the bear went over the mountain, to see what he could see.
And all that he could see, and all that he could see
Was the other side of the mountain, the other side of the mountain
The other side of the mountain, was all that he could see.

For he's a jolly good fellow, for he's a jolly good fellow
For he's a jolly good fellow, which nobody can deny.
Which nobody can deny, which nobody can deny
For he's a jolly good fellow, for he's a jolly good fellow
For he's a jolly good fellow, which nobody can deny.

The bear went over the river, the bear went over the river, to see what he could see.
And all that he could see, and all that he could see
Was the other side of the river, the other side of the river
The other side of the river, was all that he could see.

For he's a jolly good fellow, for he's a jolly good fellow
For he's a jolly good fellow, which nobody can deny.
Which nobody can deny, which nobody can deny
For he's a jolly good fellow, for he's a jolly good fellow
For he's a jolly good fellow, which nobody can deny.

The Farmer in the Dell

The farmer in the dell
The farmer in the dell
Hi-ho,The derry-o
The farmer in the dell

The farmer takes a wife
The farmer takes a wife
Hi-ho,The derry-o
The farmer takes a wife

The wife takes a child
The wife takes a child
Hi-ho,The derry-o
The wife takes a child

The child takes a nurse
The child takes a nurse
Hi-ho,The derry-o
The child takes a nurse

The nurse takes a cow
The nurse takes a cow
Hi-ho,The derry-o
The nurse takes a cow

The cow takes a dog
The cow takes a dog
Hi-ho,The derry-o
The cow takes a dog

The dog takes a cat
The dog takes a cat
Hi-ho,The derry-o
The dog takes a cat

The cat takes a rat
The cat takes a rat
Hi-ho,The derry-o
The cat takes a rat
The rat takes the cheese
The rat takes the cheese
Hi-ho, The derry-o
The rat takes the cheese

The cheese stands alone
The cheese stands alone
Hi-ho, The derry-o
The cheese stands alone

*If You're Happy and You Know it*

If you're happy and you know it, clap your hands (clap clap)
If you're happy and you know it, clap your hands (clap clap)
If you're happy and you know it, then your face will surely show it
If you're happy and you know it, clap your hands. (clap clap)

If you're happy and you know it, stomp your feet (stomp stomp)
If you're happy and you know it, stomp your feet (stomp stomp)
If you're happy and you know it, then your face will surely show it
If you're happy and you know it, stomp your feet. (stomp stomp)

If you're happy and you know it, shout "Hurray!" (hoo-ray!)
If you're happy and you know it, shout "Hurray!" (hoo-ray!)
If you're happy and you know it, then your face will surely show it
If you're happy and you know it, shout "Hurray!" (hoo-ray!)

If you're happy and you know it, do all three (clap-clap, stomp-stomp, hoo-ray!)
If you're happy and you know it, do all three (clap-clap, stomp-stomp, hoo-ray!)
If you're happy and you know it, then your face will surely show it
If you're happy and you know it, do all three. (clap-clap, stomp-stomp, hoo-ray!)
Words of Increasing Length and Syllables

To help your child train their speech structures to more fluidly produce longer or multisyllabic words and utterances, start with words or phrases that can be easily broken down. This approach helps to prime the musculature and the articulators before attempting a potentially difficult word or phrase. Have the child repeat segments of the word in order until the whole word or phrase has been intelligibly produced.

Example:
  Have the child say
  “Hip”...then
  “Hip hip”... then
  “Hip hip hur”... then
  “Hip hip hurray!”

Words and Phrases
- bum: bumble: bumblebee
- jump: jumping: jumping jack
- pill: pillow: pillow case
- can: candy: candy cane
- sub: subtract: subtraction
- ice: ice cream: ice cream cone
- cook: cookie: cookie cut: cookie cutter
- laun: laundry: laundry bask: laundry basket
- tel: tele: televish: television
- pea: peanut: peanut but: peanut butter
- teet: teeter: teeter tot: teeter totter
- birth: birthday: birthday part: birthday party
- fe: fe fi: fe fi fo: Fe fi fo fum!
- Oop: Oopsy: Oopsy dai: Oopsy daisy!
- ya: yaba: yabada: yabadaba: yabadabadoo!

It might be useful to take words or phrases that are used frequently or that are particularly troublesome for the child and routinely break it down like the examples above. It important to make sure that intelligibility is not sacrificed for speed at the end of each of these drills. If able, try to also stress intonation in the final utterances of each word or phrase.

**Social Interaction**

Since effective communication is often difficult for them, children with CAS tend to be frustrated more often in social situations than their peers. It is more often than not easier for these children to use short, nondescript phrases to indicate their wants and needs, such as “no!” or “more”. The effort it takes to verbally detail their thoughts or feelings is usually more than what they are willing to put forth, and this often results in withdrawal, temper tantrums, or other behavior management issues. If children are taught to approximate certain phrases or ideas, then they will be much more likely to effectively express them than if they are left to their own devices. Therefore, it would be very worthwhile to work with your child on specific phrases that will serve him or her well in social situations. Depending on the child’s age, these will be very applicable to their daily life both in school and at home and will help them to socialize more effectively.

**Suggested phrases:**

<table>
<thead>
<tr>
<th>They say</th>
<th>Teach</th>
</tr>
</thead>
<tbody>
<tr>
<td>No!</td>
<td>I don’t like that</td>
</tr>
<tr>
<td></td>
<td>No, thank you</td>
</tr>
<tr>
<td></td>
<td>That hurts me</td>
</tr>
<tr>
<td>Gimme!</td>
<td>Can I have?</td>
</tr>
<tr>
<td></td>
<td>That’s mine</td>
</tr>
<tr>
<td>More!</td>
<td>More please</td>
</tr>
<tr>
<td></td>
<td>Can I have more?</td>
</tr>
<tr>
<td>Stop!</td>
<td>Please stop</td>
</tr>
<tr>
<td></td>
<td>That bugs me</td>
</tr>
<tr>
<td></td>
<td>I don’t like that</td>
</tr>
</tbody>
</table>

**Other Useful Phrases**
I’m mad!    I like
I’m sick    I don’t like
I want      She/He is
I don’t want Can I

It is important to note that even if these approximations are not as intelligible as “No!” or “Stop!”, they will still benefit the child by becoming automatic phrases that are in their vocabulary that they feel comfortable using to express themselves. Again, please consider your child’s abilities and producible sounds when choosing appropriate target phrases.

Flash Cards 1

Using flash cards with your child is a good way to drill certain sounds and syllable structures. It is also a good way to practice carrier phrases. When using the flash cards, don’t just have your child say what is on the card, but have them try using these phrases or similar ones before each turn:

- He/She/They/You/I found a...
- He/She/They/You/I see/sees/saw a...
- He/She/They/You/I lost a ...
- There is a ...
- He/She/They/You/I want a ...
- He/She/They/You/I have a ...
- He/She/They/You/I got a ....
<table>
<thead>
<tr>
<th>Airplane</th>
<th>Bananas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calendar</td>
<td>Dinosaur</td>
</tr>
<tr>
<td>Elephant</td>
<td>Footprints</td>
</tr>
<tr>
<td>Garden</td>
<td>Helicopter</td>
</tr>
<tr>
<td>-----------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Icicles</td>
<td>Jellyfish</td>
</tr>
<tr>
<td>Kangaroo</td>
<td>Lawn Mower</td>
</tr>
<tr>
<td>Measuring Tape</td>
<td>Newspaper</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>Pajamas</td>
</tr>
<tr>
<td>Quarter</td>
<td>Radio</td>
</tr>
<tr>
<td>Soccer Ball</td>
<td>Tornado</td>
</tr>
<tr>
<td>-------------</td>
<td>---------</td>
</tr>
<tr>
<td>Unicorn</td>
<td>Watermelon</td>
</tr>
<tr>
<td>Exit Sign</td>
<td>Yo-Yo</td>
</tr>
</tbody>
</table>
Zebra
Thunderstorm
Brothers
Cheese
Shark
Violin
Flashcards 2

This round of flashcards is appropriate for children who have successfully practiced their sounds in isolation (round one of flashcards) and who seem ready to take on sentences. These cards can be used in a number of ways:

1) If your child is older and can read, let them read each card.

2) If your child is younger and cannot read, read the flashcard first, then ask them an appropriate question such as “what did he eat?” “what happened?”, or “ what did she do?”. Insist that they answer using a whole sentence, opposed to simply a one word answer.

   Example: “Alex ate an apple” – What did he eat?
   “Alex ate an apple” instead of “ apple”

   If your child does not say the name or the entire sentence, keep going, but continue to prompt him or her to say the whole thing.

3) If your child is talkative and has no problem coming up with spontaneous speech, you can use the flashcards (both rounds) simply by saying “tell me about this picture”. Encourage the same degree of accuracy in their creative sentences as in scripted ones.
Alex ate his asparagus

I borrowed the bike

Kate caught the cat

He dug a ditch

Eddie likes eating eggs

He felt the flower petal
<table>
<thead>
<tr>
<th>Sally glued on googley eyes</th>
<th>Hank hopped over the hurdle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Icicles hung on the igloo</td>
<td>Jake played on the jungle gym</td>
</tr>
<tr>
<td>Kyle cleaned the kitchen</td>
<td>Lilly lost the lipstick</td>
</tr>
</tbody>
</table>
Mike is a milkman

Nancy needs a napkin

Oscar plays the oboe

She picked a pumpkin

The queen made a quilt

Rick raced around the track
<table>
<thead>
<tr>
<th>Sally salted her steak</th>
<th>Tim took his temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>He upset his uncle</td>
<td>Vince got a new van</td>
</tr>
<tr>
<td>Wendy went on a walk</td>
<td>I have a box of socks</td>
</tr>
<tr>
<td>Image 1</td>
<td>Image 2</td>
</tr>
<tr>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td><img src="image1.png" alt="Bus" /></td>
<td><img src="image2.png" alt="Cherries" /></td>
</tr>
<tr>
<td><strong>She yelled at the yellow bus</strong></td>
<td><strong>Charlie ate some cherries</strong></td>
</tr>
<tr>
<td><img src="image3.png" alt="Thunder" /></td>
<td><img src="image4.png" alt="Letters" /></td>
</tr>
<tr>
<td><strong>I think I heard thunder</strong></td>
<td><strong>He gave them their letters</strong></td>
</tr>
</tbody>
</table>