

CHILDHOOD APRAXIA OF SPEECH (CAS): Do Minimally Verbal Children With Autism Have CAS?

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BACKGROUND

According to a study done by Boston University, 30% of children with autism spectrum disorders (ASD) “never learn to speak more than a few words”². Many Speech-Language Pathologist and researchers in the field reason that a child with ASD is unable to speak due to poor motor planning and programming. In other words, their inability to speak may stem from another underlying issue called Childhood Apraxia of Speech (CAS).

According to the American Speech-Language Hearing Association (ASHA)¹, CAS is “a neurological childhood 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).” Children with CAS exhibit certain characteristics, such as: inconsistent speech errors, inappropriate prosody, and difficulty moving their articulators (tongue, lips, jaw, etc.). However, when testing a child for CAS, the child must have some speech production.

PURPOSE

The purpose of this research assistant internship was to read previous literature about children with CAS and minimally verbal children with ASD. Another objective was to make a connection between the two, and understand the reasoning behind children with ASD being diagnosed with CAS. The result of this internship would be to create a research question for future research purposes. Specific objectives for this internship were:

- Review literature about motor speech disorders in children with autism.
- Review literature on CAS assessment in children.
- Review literature on CAS assessment in minimally verbal children with autism.
- Review literature in intervention of CAS
- Review literature of intervention of CAS in minimally verbal children with autism.

METHODS

The California State University, Fullerton library databases were used to search for peer reviewed journal articles related to each of the objectives. Two common databases used were PubMed and Academic Search Premier. In order to keep track of journal articles, they were arranged in 4 separate folders that matched each objective. An annotated bibliography was made for each objective as a deliverable.

RESULTS

After searching through the library database, 41 articles were found and pertinent to my objectives. Table 1 demonstrates a representative summary for each of my internship objectives. In a study conducted by Gernsbacher et al. (2008), researchers assessed oral and manual-motor skills in children with ASD. Their focus was to prove that their oral and manual-motor deficits attributes to a speech delay in a child with ASD. This study demonstrated that minimally verbal children with ASD had significant lower oral and manual-motor skills than the more fluent children with ASD, even though all children experienced an early speech delay. Although impaired performance of motor skills is consistently being reported in children with ASD, the neurological basis is not yet understood completely. According to Dziuk et al. (2007), 47 high-functioning (HF) children with ASD were assessed and compared to 47 typically developing children. Although they only focused on HF children with ASD, their article included a discussion of neural network in the brain, specifically involving the connections in the brain responsible for motor sequence learning. In children with ASD, there are abnormalities in this neural network that could be a basis of CAS in autism. This demonstrates that CAS could be a feature of ASD, or it could be a neurological marker that underlies the disorder.

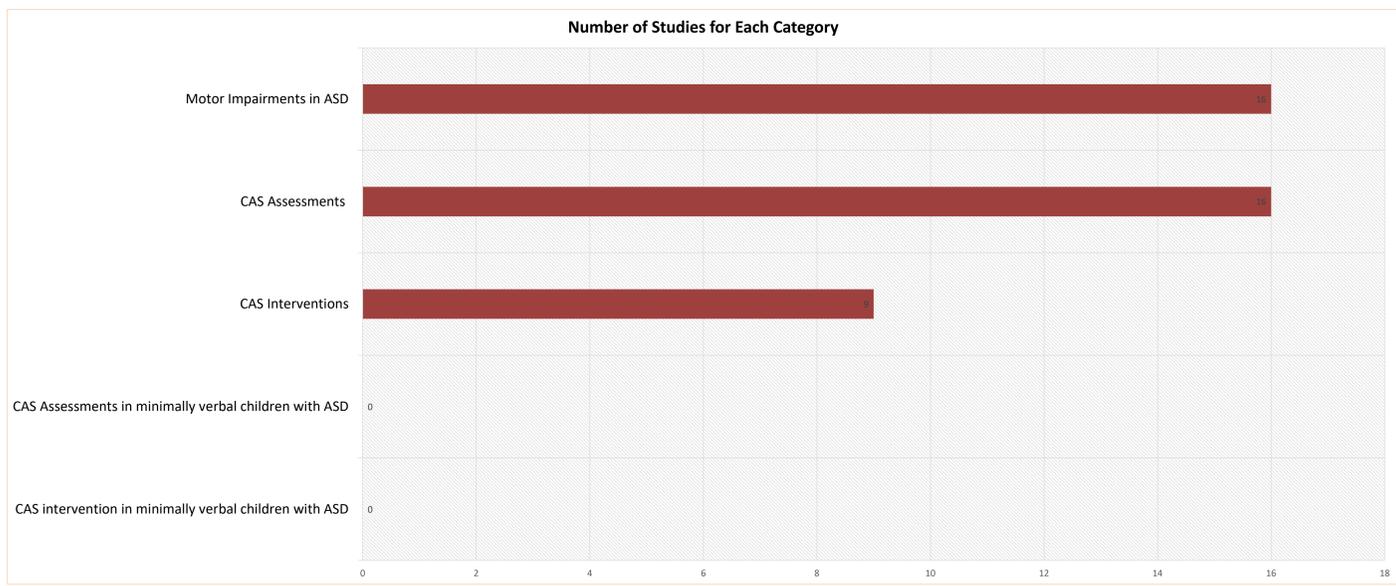


Table 1. Summary of Articles

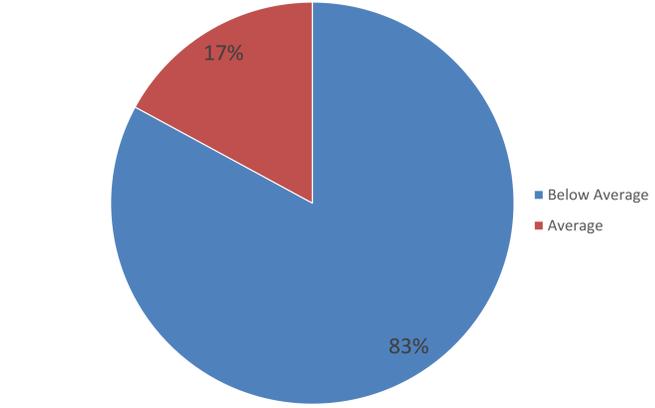
Study	Participants	Purpose/Research Hypothesis	Results
CAS Diagnosis ³	23 Articles selected for review	A systematic review of literature on the main tools used to evaluate CAS.	There are a few instruments available for CAS assessment. However, few studies on this topic have not been conducted at the national level. Protocols are needed to assess and assist in an accurate diagnosis.
CAS Treatment ⁴	1 girl; 4 years and 7 months	Assess the effectiveness of the combination of two motor intervention methods, Melodic Intonation Therapy (MIT) and the Touch-Cue Method (TCM).	The combination of MIT and TCM was effective for this child.
Autism – Speech Delay & Motor Impairment Diagnosis ⁵	31 children (6 females, 25 males)	“To ascertain quantitatively the existence, nature, and proportion of a subgroup of children whose speech deficits may be secondary to oral motor deficits.”	Researchers classified a motor-impaired group who also had difficulty with expressive language. The learning rates for expressive and receptive language were highly correlated with the learning rate for oral motor skills.
Autism – Speech Delay & Motor Impairment Treatment ⁶	N/A; Authors discussed evidence related to gross motor, fine motor, postural control, and praxis impairments in children and adults with ASD.	Early motor delays within the first 2 years of life may contribute to the social impairment of children with ASD. Children with ASD may also have basic fine and gross motor impairments or complex planning impairments.	Researchers proposed that motor learning principles should be applied to ASD interventions.

CONCLUSIONS

Based on my review of literature, I conclude that there is minimal research and evidence that justifies the diagnosis of CAS in minimally verbal children with ASD. Many of the research studies focused on high-functioning children with autism who had speech production, and did not focus on low-functioning children with autism who had minimal speech. Children with ASD who are minimally verbal do not have enough speech production to be tested with a CAS assessment, therefore, future research studies should focus on this population.

There is a strong need for a development of a clear diagnostic guidelines for CAS in a child with ASD. Further research studies should identify the most effective treatment for this population and include the treatment in an overall comprehensive approach for autism.

Figure 2. Motor Skills of Children with ASD⁷



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REFERENCES

1. Childhood Apraxia of Speech. (n.d.). Retrieved April 14, 2018, from <https://www.asha.org/public/speech/disorders/ChildhoodApraxia/>
2. Berdick, Chris. Cracking the code of silence in children with autism who barely speak. Boston University website. July 2015.
3. Gubiani, M., Pagliarini, K., & Keske-Soares, M. (2015). Tools for the assessment of childhood apraxia of speech. *CoDAS*, 27(6), 610-5.
4. Martikainen, Anna-Leena, & Korpiolahti, Pirjo. (2011). Intervention for Childhood Apraxia of Speech: A Single-Case Study. *Child Language Teaching and Therapy*, 27(1), 9-20.
5. Belmonte MK, Saxena-Chandhok T, Cherian R, Muneer R, George L and Karanth P (2013) Oral motor deficits in speech-impaired children with autism. *Front.Integr. Neurosci.* (7)47. Bhat, A., Landa, R., & Galloway, J. (2011). Current perspectives on motor functioning in infants, children, and adults with autism spectrum disorders. *Physical Therapy*, 91(7), 1116-29.
6. Bhat, A., Landa, R., & Galloway, J. (2011). Current perspectives on motor functioning in infants, children, and adults with autism spectrum disorders. *Physical Therapy*, 91(7), 1116-29.