

## MOTOR PERFORMANCE IN CHILDREN WITH CAS AND OTHER SSDs

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### Disclosures

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**Nonfinancial:**

Professional Advisory Committee for Apraxia Kids

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### About me



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## Learning Objectives

1. Learners will describe fine and gross motor deficits seen in children with CAS
2. Learners will identify which children with CAS are at greatest risk for motor deficits

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## Background

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## Comorbidity in Children with CAS

- **Speech** (ASHA, 2007; Iuzzini-Seigel et al., 2017)
- **Language** (Zuk et al., 2018; Lewis et al., 2004)
- **Fine/gross motor** (Iuzzini-Seigel, 2019; Teverovsky et al., 2009; Tukul et al., 2015)
- **Poor response to treatment** (Iuzzini & Forrest, 2010; Maas & Farinella, 2012; Murray & Iuzzini-Seigel, 2017)

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### Previous Research is Equivocal

- Motor deficits found in 21/32 of children with galactosemia and CAS (Potter et al., 2011)
- Fine motor deficits in timed tasks in children with CAS and inconsistent SSD (Bradford & Dodd, 1996)
- Fine motor deficits in children with oral apraxia but not speech deficits (Newmeyer et al., 2007)
- Normal motor performance within 1SD of mean on the BOT (Tukel et al., 2015)

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### Explanations for Mixed Findings

- Not controlling for language deficits
  - Important given interaction between motor and cognitive-linguistic systems
- Differences in sensitivity of different motor tests
- Different diagnostic criteria for CAS

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### Purpose of Current Study

- Investigate fine and gross motor deficits in children with idiopathic CAS and control groups of children with TD and non-CAS SSD
- Use a sensitive and specific motor test that is valid for children with even mild motor impairments and a range of cognitive-linguistic abilities

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### Methods

- 10 children with CAS, 30 age-matched peers w TD (n = 14) or SSD (n = 16)
- 43-105 months age (mean = 73 months)
- All participants completed
  - Speech, language, cognitive, motor, oral mech and procedural learning testing
- All passed hearing screening

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### Group Assignment

#### CAS

GFTA SS  $\leq$  85  
 $\geq$  5 CAS features,  $\geq$  3x, 3 contexts  
Inconsistency  
+/- language deficits on CELF

#### SSD

GFTA SS  $\leq$  85  
< 5 CAS features  
No inconsistency  
+/- language deficits on CELF

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### Group Assignment

#### TD

GFTA SS > 85  
< 5 CAS features  
No inconsistency  
No language deficits on CELF

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## Movement ABC-2 (Henderson et al., 2007)

- Fine Motor = Manual Dexterity
- Gross Motor = Balance and Aiming & Catching

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## Results

- ANOVAs and Kruskal-Wallis tests used to detect differences in demographic, speech, language, oral mech and cognitive variables

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## Demographic Summary

Table 2. Demographic and speech-language data by group.

Variable	Group		
	CAS (n = 10)	SSD (n = 16)	TD (n = 14)
Age in months	68 (10)	72 (19)	77 (13)
Sex	7M, 3F	10M, 6F	6M, 8F
Nonverbal IQ SS	94 (28)	108 (11)	114 (16)
Articulation SS	42 (7) <sub>a,b</sub>	69 (16) <sub>a,c</sub>	101 (7) <sub>b,c</sub>
CAS features	8 (0.6) <sub>a,b</sub>	3 (0.9) <sub>a,c</sub>	2 (0.8) <sub>b,c</sub>
Inconsistency severity %	28 (9) <sub>a,b</sub>	4 (4) <sub>a,c</sub>	0.34 (0.8) <sub>b,c</sub>
Expressive Language SS	65 (24) <sub>a,b</sub>	94 (16) <sub>a</sub>	111 (14) <sub>b</sub>
Receptive Language SS	73 (29) <sub>a,b</sub>	95 (19) <sub>a,c</sub>	114 (10) <sub>b,c</sub>
Oral Mechanism	23 (1)	23 (1)	24 (0.5)
Structure score	27 (5) <sub>a,b</sub>	31 (1) <sub>a</sub>	32 (1) <sub>b</sub>
Oral Function score	27 (5) <sub>a,b</sub>	31 (1) <sub>a</sub>	32 (1) <sub>b</sub>

Note. Group averages listed with standard deviations in parentheses. Groups sharing the same subscript letter were statistically different.

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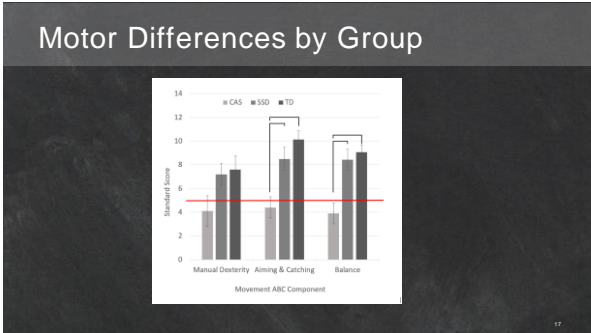
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### Parent Report

- 3/10 children in CAS group had history of PT/OT eval and/or treatment
- However, an additional 6 parents in CAS group reported concerns about fine/gross abilities
- Why the discrepancy?

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### Relation between Speech and Motor

- Significant moderate negative correlations between CAS features and all subtests
- GFTA-3 SS were moderately correlated with all subtests
- Significant moderate negative correlations between inconsistency and all subtests

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### Relation between Language and Motor

- Expressive and receptive language were mod-strong correlated with all motor subtests

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### Relation between Oral Motor Function and Motor

- Significant moderate-strong correlation between oral motor function and Aiming and Catching and Balance.

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### Motor Skills when Reclassified by Language Ability

- Participants in the CAS and SSD groups were reclassified by receptive language abilities
- CAS: n = 3
- CAS+LI: n = 7
- SSD: n = 10
- SSD+LI = 6

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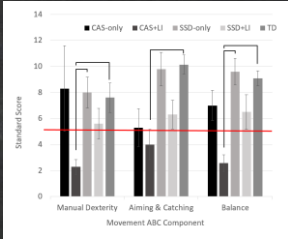
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### Motor Skills when Reclassified by Language Skills




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### Discussion

- Results are consistent with previous research showing poor motor abilities in children with CAS (Bradford & Dodd, 1996; Gretz, 2013; Potter et al., 2013)
- Correlations between speech, oral function and motor performance suggest a possible connection to mirror neuron system (Newmeyer et al., 2007)
  - This could impact performance across domains and treatment outcomes as well.
- Language matters!
- Procedural learning deficits?

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### Take Aways!

- Make referrals for PT/OT screenings as needed!
- Consider children's speech/language/motor and pattern learning abilities when planning treatment

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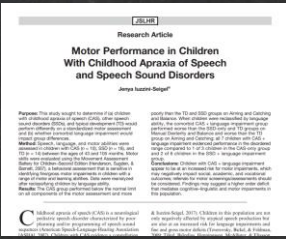
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## To learn more and for full reference list:



Iuzzini-Seigel, J. (2019). Motor performance in children with CAS and SSD. *JSLHR, 62*, 3220-3233.

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## Social Media to follow

Facebook/Instagram  
 \* Slpmommyofapraxia  
 \* Jordapraxia

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Thank you!

Questions? Email us at:

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Follow us on Instagram for the latest:  
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