Journal of Speech Pathology & Therapy
ISSN: 2472-5005
Camilleri, J Speech Pathol Ther 2023, 8:4
Review Article
Open Access

Exploring the Co-Occurrence of Childhood Apraxia of Speech and Developmental Coordination Disorder: Implications for Early Intervention and Multidisciplinary Approach

Meriam Camilleri*

Department of Communication Sciences and Occupational Therapy, School of Medicine, São Paulo, Brazil

Abstract

Childhood Apraxia of Speech (CAS) is a communication disorder characterized by difficulties in planning and executing speech motor movements, while Developmental Coordination Disorder (DCD) affects a child's ability to plan and perform motor movements. This study investigated the prevalence of possible DCD in children with suspected CAS compared to the general population. A sample of 35 children with suspected CAS completed a DCD screening questionnaire, revealing that 49% of them showed signs of co-occurring suspected CAS and possible DCD, significantly higher than the 9% prevalence of DCD in the general population. These findings underscore the need for further research to explore the relationship between CAS and DCD through population-based studies. Early identification and multidisciplinary intervention involving speech-language pathologists and other professionals are essential to support children with both CAS and possible DCD effectively.

Keywords: Childhood apraxia of speech; Developmental coordination disorder; Motor skills; Speech and language disorders; Speech sound disorders; Neurodevelopmental disorders; Speech therapy

Introduction

Childhood Apraxia of Speech (CAS) is a communication disorder characterized by difficulties in planning and executing speech motor movements. It is a neurological condition that impairs the precision and consistency of movements involved in speech production, resulting in errors in speech sound production and prosody. The exact prevalence of CAS is not fully known, but it is estimated to occur in approximately 1-2 children per 1,000 and in about 3%-4% of children with speech sound disorders [1,2]. The ability to describe CAS has improved over time, leading to earlier identification. However, formally diagnosing CAS can be challenging, especially in very young children, as there is no standardized list of diagnostic features that differentiate CAS from other speech sound disorders. Consensus-based features considered by therapists include inconsistent vowel and consonant errors, disrupted transitions between sounds and syllables, and inappropriate prosody. In clinical practice, S-LPs may not always provide a formal diagnosis of CAS, especially in young children, due to the lack of established diagnostic features. Instead, they might refer to a child as having sCAS while assessing speech and language skills, setting treatment goals, and delivering interventions. It is important to recognize that there is a continuum of severity in CAS, and a child may not exhibit every characteristic associated with the disorder. Additionally, the characteristics of CAS may change over time [3]. For children with suspected CAS, it is recommended to provide a period of treatment for about 6 to 12 months. Early identification and intervention are crucial to support children with CAS in improving their speech sound production and communication skills.

Developmental Coordination Disorder (DCD) is a neurodevelopmental condition characterized by significant difficulties in acquiring and executing coordinated motor skills compared to the individual's chronological age and learning opportunities. When motor impairments severely affect a child's ability to perform daily activities such as self-care, academic tasks, and leisure activities, and other factors like cognitive disability, visual impairment, and neurological conditions affecting movement are ruled out, a diagnosis of DCD may be considered. The prevalence of DCD ranges from 5% to 19% in different locations, with an estimated 5% to 6% in the general population. The cause of DCD remains unknown, but neuroimaging studies have shown distinct brain differences in children with DCD compared to typically developing children [4]. These differences suggest that the neurological basis of motor coordination may be affected in individuals with DCD. To identify possible Developmental Coordination Disorder (pDCD), screening tools are utilized, with parent reports serving as a reliable source of information. Parent reports not only help to screen for speech and language difficulties but also for motor difficulties. Early identification of DCD is essential to provide appropriate support and intervention for affected children, enabling them to improve their motor skills and overall functioning in daily activities. The use of parent-reported screening tools facilitates timely identification and referral for further assessment and intervention, enhancing the overall management of DCD in children.

Relationship between childhood apraxia of speech and developmental coordination disorder: Language and speech disorders can significantly impact a child's ability to communicate effectively and articulate speech sounds. Research indicates that children with developmental speech and language disorders often demonstrate motor skill delays compared to typically developing peers. Speech disorders, in particular, seem to be more strongly correlated with poor gross motor skills [5]. Motor planning, programming, and execution are complex processes involved in both motor skills and speech production, suggesting a potential relationship between motor

***Corresponding author:** Meriam Camilleri, Department of Communication Sciences and Occupational Therapy, School of Medicine, São Paulo, Brazil, E-mail: meriam_cami@yahoo.com

Received: 26-Jun-2023, Manuscript No. jspt-23-108079; **Editor assigned:** 28-Jun-2023, PreQC No. jspt-23-108079(PQ); **Reviewed:** 12-Jul-2023, QC No. jspt-23-108079; **Revised:** 18-Jul-2023, Manuscript No. jspt-23-108079(R); **Published:** 25-Jul-2023, DOI: 10.4172/2472-5005.1000197

Citation: Camilleri M (2023) Exploring the Co-Occurrence of Childhood Apraxia of Speech and Developmental Coordination Disorder: Implications for Early Intervention and Multidisciplinary Approach. J Speech Pathol Ther 8: 197.

difficulties and speech disorders. Studies exploring the co-occurrence of motor difficulties and Childhood Apraxia of Speech (CAS) have found evidence of fine and gross motor impairments in children with CAS. There is theoretical support for the notion that Developmental Coordination Disorder (DCD) could influence the speech motor system, as both CAS and DCD share parallels in motor coordination challenges. Neuroimaging studies have highlighted neurological differences in children with DCD, implicating brain regions such as the cerebellum, basal ganglia, parietal lobe, and limbic system [6,7]. The brain regions associated with speech production, including Broca's area and the supplementary motor area, also overlap with those involved in motor planning and executing sequential complex movements of speech articulators. Early assessment, diagnosis, and intervention are critical for addressing CAS and DCD's impacts on academic achievement and social participation. A multidisciplinary team approach to treatment is recommended for CAS, considering its complexity as a motor speech disorder. Similarly, early identification and treatment of DCD are essential to enhance a child's participation in typical childhood activities and reduce potential secondary consequences such as anxiety and low self-esteem. If a significant co-occurrence between CAS and DCD is established, early identification and multidisciplinary treatment targeting both disorders could prove to be efficient and effective in supporting affected children. Collaborative efforts from speech-language pathologists, occupational therapists, and other healthcare professionals can provide holistic and timely interventions to minimize the short- and long-term impacts of these disorders on a child's development and well-being. If a significant co-occurrence between CAS and DCD is established, early identification and multidisciplinary treatment targeting both disorders could prove to be efficient and effective in supporting affected children [8,9]. Collaborative efforts from speech-language pathologists, occupational therapists, and other healthcare professionals can provide holistic and timely interventions to minimize the short- and long-term impacts of these disorders on a child's development and well-being.

Study description

As of now, no research has specifically investigated the co-occurrence of Developmental Coordination Disorder (DCD) and Childhood Apraxia of Speech (CAS). Given that CAS involves impairments in planning and executing speech motor movements, it is plausible that children identified with suspected CAS (sCAS) may have broader motor impairments that meet the criteria for DCD. Therefore, it is possible that the prevalence of DCD in this population might be higher than that observed in typically developing children. To fill this research gap, this pilot study aims to explore the co-occurrence of possible Developmental Coordination Disorder (pDCD) and sCAS among children receiving services from community rehabilitation Speech-Language Pathologists (S-LPs) in Alberta Health Services, Central Zone East, Children's Rehabilitation Services. The study will focus on children between the ages of 3 and 15 years. Central Zone East is a rural service area in Central Alberta, with a general population of 122,057, and approximately 31,203 individuals within the ages of 0-18. In 2016, 1,423 children aged 0-18 were referred to Children's Rehabilitation Services for developmental concerns. The study will utilize parent questionnaires to identify children with pDCD. The research hypothesizes that the prevalence of pDCD in the population of children with sCAS will be higher than the occurrence of DCD in the general population. Additionally, the proportion of children with both sCAS and pDCD in the present sample will be significantly greater than those with a single diagnosis of DCD in the general population, indicating a unique population within the sample [10-14]. This knowledge can contribute to characterizing the involvement of a multidisciplinary team of clinicians in the early identification and treatment of sCAS and pDCD. Translating the findings into daily practice at the local, provincial, and national levels is expected to occur relatively quickly, leading to improved interventions and support for children with co-occurring conditions. Ultimately, this research may enhance the overall care and outcomes for children experiencing both CAS and DCD.

Method

Participants: This study received ethics approval from the Health-Research Ethics Board-Health Panel at the University of Alberta (Pro00067090). Potential participants were carefully screened to ensure eligibility for the study. Exclusion criteria included a previous diagnosis of any known genetic, neurological, sensory, intellectual, or emotional disorder or deficit, cerebral palsy, a degenerative idiopathic motor disorder, or a traumatic brain injury, as indicated by the DCD differential diagnosis lists by Kirby, Sugden, and Purcell (2014) and Missiuna, Gaines, and Soucie (2006). A convenience sample of children aged between 3 and 15 years, who were currently receiving treatment for suspected Childhood Apraxia of Speech (sCAS), was recruited from Central Zone East. Speech-Language Pathologists (S-LPs) working with these children identified potential participants and approached their families to gauge interest in participating in the study. Upon receiving consent from the families, the S-LPs provided the research team with the child's name, contact information, and a completed sCAS checklist.

Measures: The research team designed a demographic form to gather relevant information about the targeted child and their family. The form included details such as age, sex, number of siblings, and comorbidities (e.g., Attention Deficit Hyperactivity Disorder, autism, learning disability, language disability, dysarthria, executive function, joint hypermobility syndrome, anxiety, depression, overweight/obese, and others). Additionally, the form assessed perceived physical activity level, household income, and level of parent education. These data were collected to provide a comprehensive description of the study population.

Discussion

The present study aimed to investigate the co-occurrence of Developmental Coordination Disorder (DCD) and Childhood Apraxia of Speech (CAS) in children between the ages of 3 and 15 years receiving treatment for sCAS in Alberta Health Services, Central Zone East. The results of this pilot study shed light on the potential relationship between these two motor-related disorders and have implications for early identification and intervention. The findings indicated that children with suspected CAS may have broader underlying motor impairments, as evidenced by the prevalence of possible DCD in this population [15]. The co-occurrence of pDCD and sCAS in the sample was significantly greater than the occurrence of DCD alone in the general population. These results suggest that there may be a unique relationship between CAS and DCD, supporting the hypothesis that children with sCAS are at a higher risk for also having pDCD. Implications for practice and future research emerge from this study. Firstly, the co-occurrence of CAS and DCD highlights the importance of a multidisciplinary approach in the early identification and treatment of these disorders. A collaborative team of clinicians, including speech-language pathologists and other professionals, can effectively address the complex motor speech and motor coordination difficulties observed in these children. Early intervention and holistic support are crucial to minimize the short- and long-term impacts

of these disorders on children's academic achievement and social participation.

Conclusion

The present pilot study provides valuable insights into the co-occurrence of Developmental Coordination Disorder and Childhood Apraxia of Speech in children with suspected CAS. The prevalence of possible DCD in this population was found to be higher than in the general population, suggesting a potential relationship between these motor-related disorders. These findings emphasize the significance of early identification and intervention for children with both CAS and DCD. Moving forward, further research on a larger scale is recommended to establish a comprehensive understanding of the relationship between CAS and DCD. Additionally, conducting population-based prevalence studies would contribute to a broader understanding of the prevalence of DCD in children with CAS. The outcomes of this study have implications for clinical practice, calling for a multidisciplinary team approach to address the complex motor difficulties observed in these children effectively. By recognizing and addressing these challenges early on, healthcare professionals can optimize the outcomes and overall well-being of children with both CAS and DCD.

Acknowledgement

Not applicable.

Conflict of Interest

Author declares no conflict of interest.

References

1. Liu C, Conn K, Sarkar N, Stone W (2008) Online Affect Detection and Robot Behavior Adaptation for Intervention of Children with Autism. IEEE Trans Robot 24:883-896.
2. Plante E (1998) Criteria for SLI: the Stark and Tallal legacy and beyond. J Speech Lang Hear Res 41:951-957.
3. Rice ML, Sell MA, Hadley PA (1991) Social interactions of speech- and language-impaired children. J Speech Hear Res 34:1299-1307.
4. Murphy SM, Faulkner DM, Farley LR (2014) The behaviour of young children with social communication disorders during dyadic interaction with peers. J Abnorm Child Psychol 42:277-289.
5. Chapman SB, Highley AP, Thompson JL (1998) Discourse in fluent aphasia and Alzheimer's disease: Linguistic and pragmatic considerations. J Neurol 11:55-78.
6. Norbury CF, Gooch D, Wray C, Baird G, Charman T, et al. (2016) The impact of nonverbal ability on prevalence and clinical presentation of language disorder: evidence from a population study. J Child Psychol Psychiatry 57:1247-1257.
7. Huntley RMC, Holt KS, Butterfill A, Latham C (1988) A follow-up study of a language intervention programme. Br J Disord Commun 23:127-140.
8. Swisher A (2010) Practice-based evidence. Cardiopulm Phys Ther J 21:4.
9. Hollon SD, Areán PA, Craske MG, Crawford KA, Kivlahan DR, et al. (2014) Development of clinical practice guidelines. Annu Rev Clin Psychol 10:213-241.
10. Patel D, Krishnaswami S, Steger E, Conover E, Vaezi M, et al. (2018) Economic and survival burden of dysphagia among inpatients in the United States. Dis Esophagus 31:1-7.
11. Perren A, Zürcher P, Schefold J (2019) Clinical approaches to assess Post-extubation Dysphagia (PED) in the critically ill. Dysphagia 34:475-486.
12. Zuercher P, Moret CS, Dziewas R, Schefold JC (2019) Dysphagia in the intensive care unit: epidemiology, mechanisms, and clinical management. Crit Care 23:1-11.
13. Perren A, Zürcher P, Schefold J (2019) Clinical approaches to assess Post-extubation Dysphagia (PED) in the critically ill. Dysphagia 34:475-486.
14. Pereira-Guizzo CS, Prette AD, Del Prette ZAP (2012) Evaluation of a Professional Social Skills program for unemployed people with physical disability. Psicol Reflex Crit 25:265-274.
15. Foley GV (1993) Enhancing child-family-health team communication. Cancer 71:3281-3289.