Multidisciplinary approach to assessment and intervention of feeding problems in children with autism spectrum disorders: a clinical perspective

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Abstract

Purpose: The aim of this paper is to share the details of a multidisciplinary approach, which includes occupational therapy, and to review the factors that should be considered in the evaluation and treatment of children with ASD who are excessively selective in their food choices. Issues in this area are complex and often related to several complementary domains (medical, nutritional, psychosocial, sensorimotor, etc.). However, feeding disorders are frequently assessed and treated from a single discipline and important issues are missed or confounded.

Approach: A team of experienced clinicians in the field of paediatric feeding disorders gathered the knowledge and experience they acquired from working with individuals with ASD as well as with individuals with other neurodevelopmental diagnosis. A review of current literature in paediatric feeding disorders was used to document and explicate the multifactorial nature of feeding disorders in children with ASD and justify the need for a multidisciplinary approach to issues in this area.

Findings: Feeding disorders in children with ASD are linked to multiple sensory, motor, behavioural, nutritional, and gastrointestinal comorbidities. A multidisciplinary approach is needed and increasingly recommended. However, multidisciplinary teams specialized in the care of children with ASD and feeding issues, continue to be difficult to locate and access for families. We sought to highlight the signs of feeding problems in children with ASD from different domains and share a model of a multidisciplinary approach which can lead to more successful interventions.

Originality: The detailed description of the domains linked to feeding issues and the clinical descriptions provided throughout the paper create a roadmap for other clinicians aiming to set up similar teams.

Keywords: autism, feeding, multidisciplinary, occupational therapy

Paper type: Opinion Piece

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Background

Autism spectrum disorders (ASD) are neurodevelopmental disorders that are characterised by persistent challenges in social interaction, communication, and restricted/repetitive behaviours (APA, 2013). Feeding problems have been observed in children with ASD from the earliest diagnostic description (Kanner, 1943) and continue to be reported in many children with ASD (Sharp *et al.*, 2013). During the last two decades, feeding problems have been identified as a common co-existing set of problems in individuals with ASD (Sharp *et al.*, 2013). Atypical behaviours related to feeding tend to have an early onset in children with ASD, often being reported within the first year of life (Emond *et al.*, 2010).

Among the most reported reason for referral of children with ASD to feeding clinics are extreme food selectivity (Bandini *et al.*, 2010), defined as the intake of a limited variety of foods. Children with ASD can follow a restricted diet consisting of 5-6 or fewer food items or refuse all foods from one or more food groups (Sharp *et al.*, 2018). Selectivity can be based on the texture, colour, taste, or smell of food as well as on strong preferences for certain commercial brands (Marí-Bauset *et al.*, 2014). Although these aberrant eating behaviours are common in typically developing children, in children with ASD they appear to be more frequent, take more time to overcome or even persist into adulthood (Kuschner *et al.*, 2015). In some cases, children with ASD present with obsessive behaviours such as wanting to drink only from a certain cup or eat only from a certain plate (Nadon *et al.*, 2011).

Restricted diet in the ASD population can lead to health problems such as being underweight (Marí-Bauset *et al.*, 2015), overweight (Broder-Fingert *et al.*, 2014) or feeling too tired to effectively attend school (Florence *et al.*, 2008). Nadon *et al.* (2011) found that children with ASD were more likely than their siblings to skip eating at day-care, school, family outings to restaurants, or with extended family and friends, missing out on the multiple benefits of eating in the company of significant others.

The prevalence of eating problems in ASD is reported to be as high as 90% (Kodak and Piazza, 2008). Twachtman-Reilly *et al.* (2008) reported that 70 % of the ASD paediatric population could be described as selective eaters. Given the complex nature of eating problems in children with ASD, a heterogeneous patient population known to have multiple sensory, behavioural, nutritional,

and gastrointestinal comorbidities, a multidisciplinary approach is needed and increasingly recommended (Smile *et al*., 2020). However, multidisciplinary teams specialising in the care of children with ASD and in eating problems, are difficult to locate and access for families (Smile *et al*., 2020).

The aim of this paper is to share the details of a multidisciplinary approach, which includes occupational therapy, and that has proven to be effective in the assessment and treatment of children with ASD and other neurodevelopmental diagnosis who refuse to eat or who are excessively selective in their food choices (Beaudry-Bellefeuille *et al*., 2015; Gándara-Gafo *et al*., 2021). The factors to be considered in the evaluation and intervention of selective eating are presented, the roles of the team members are discussed, and a model of multidisciplinary collaboration is proposed.

Our multidisciplinary approach is essentially a network approach in which each professional works from their own location (office, clinic, etc.) and all members possess basic knowledge of the areas of expertise of their colleagues. As experienced clinicians in the field of paediatric feeding difficulties (1 gastroenterologist, 2 occupational therapists (OT), 1 nutritionist, 1 speech therapist, 1 psychology researcher specialized in eating problems in children with ASD), we gathered the knowledge and experience acquired from working with individuals with ASD as well as with individuals with other neurodevelopmental disorders. Through discussions and a qualitative review of pertinent literature from each professional domain, the multifactorial nature of eating problems in children with ASD was documented and explicated to support the multidisciplinary approach used by our team.

Factors to consider when working with children with ASD with feeding issues

Discussions within our team and review of the literature led to a selection of factors collectively considered within our clinical practices. Factors were included when any member of the team considered them important to their area of practice and could provide supportive literature.

The motive for consultation

Identifying and analysing parental concerns is the first stage of the assessment process. Any concern related to feeding should be taken seriously and parents may need to be referred for professional advice (Kerzner *et al*., 2015). Issues may range anywhere from the family needing basic

information on the normal development of feeding to serious medical, nutritional, psychosocial, or feeding skills problems that need to be specifically addressed (Kerzner *et al*., 2015).

Regardless of the initial concern of the family or the first professional to assess the child, a fluid and non-hierarchal relationship and referral system between team members, with the child and the family at the forefront of the process, has been identified as key to successful interventions by our team (Figure 1). For example, a family may initially consult with the psychologist, concerned with their child's behaviour at mealtimes. However, once the psychologist has reviewed the presenting situation, her knowledge about sensory issues and their impact on arousal regulation and mealtime participation may lead her to refer to the OT. The opposite referral could also occur; for example, the OT may identify parental anxiety and inadequate family dynamics around mealtimes as one of the underlying issues to the child's eating problem and refer the family to a psychologist.

Gastrointestinal processes

Literature suggests a higher prevalence of gastrointestinal (GI) issues in children with ASD, with constipation and gastroesophageal reflux being among the most frequent (Ibrahim *et al*., 2009). Gastroesophageal reflux and constipation should be considered in the assessment as both are reported to coexist with eating problems (Ibrahim *et al*.,2009). In clinical practice, we often observe that children who experience discomfort related to the feeding process develop a negative relationship with food and show little motivation to eat (Kerzner *et al*., 2015). The intervention should include the treatment of the digestive disorder and consideration of the refusal to eat. The expectation that everything will be fine once the medical problem has been resolved is rarely met (Zangen *et al*., 2003) and the collaboration between the gastroenterologist and the rest of the team should begin early on.

Nutrition

Reports of the nutritional status of children with ASD indicate comparable intakes of energy, carbohydrates, and fats when compared to typically developing peers (Sharp *et al*., 2013). However, closer examination indicates deficits in calcium and protein intake and a higher number of nutritional deficits among children with ASD (Sharp *et al*., 2018). Relying exclusively on anthropometric parameters such as weight, height, and body-mass index to assess health status is not sufficient. The Three-Day Food Diary (Cornish, 2002) is a tool that allows professionals in the field of nutrition to measure the nutritional consumption of the child and compare it to a reference value. This type of tool

is used to measure the quantity and variety of foods consumed. However, the information gathered by means of a food diary gives a limited vision of the eating problem (Nadon *et al.*, 2008). If food variety and/or quantity is found to be limited, further interventions with nutritionists and therapists can be implemented to expand food variety and improve nutritional status.

The analysis of the nutritional needs of the child, together with the assessment of oral sensorimotor skills, allows the team to set a diet that takes into account the skills of the child, the nutritional value, texture, taste and presentation of food (Beaudry-Bellefeuille *et al.*, 2015). For example, the nutritionist may prioritize fibre and could recommend foods such as broccoli and strawberries. However, the OT may consider the sensory properties of these foods to be too difficult for the child and discuss with the nutritionist the need to identify high fibre foods with a more homogenous texture. Children with ASD may also have to follow a specific diet that their family chooses due to ethical or religious reasons (e.g., dairy free or meat free diet). In these cases, the contribution of a nutritionist is equally important. Through collaboration we aim to provide consensual recommendations that are in accordance with the family's diet, the child's nutritional needs, sensorimotor abilities, and general preferences to avoid recommending foods which will likely be refused and cause more mealtime problems.

Oro-motor abilities

Oro-motor skills for eating are a complex set of fine motor skills which are mostly established in typical development by three years (Morris and Klein, 2000). Their progression is embedded in the context of both the child's gross motor and sensory development and difficulties in this area can lead to food refusal and selectivity (Morris and Klein, 2000). The literature outlines oro-motor difficulties in children with ASD (Nadon *et al.*, 2013) and in children demonstrating oral aversions, avoidance, or fear of eating (Goday et al., 2019). Difficulty progressing to challenging food textures, gagging, food loss, poor mouth clearance, swallowing issues, or drooling may all be manifestations of poor oro-motor control (Smile *et al.*, 2020; Sharp *et al.*, 2013). In case such difficulties are noticed, assessment of the child's oral motor skills is vital.

This area has been extensively researched and developed clinically within the fields of Speech Therapy and Occupational Therapy (Marcus and Breton, 2013; Morris and Klein, 2000). Our evaluation is based on extensive knowledge of oral motor development (Morris and Klein, 2000) and the observation of a meal which involves preferred and non-preferred foods. Therapists who are

knowledgeable in the area of oro-motor issues can build an intervention plan to improve the oral skills that may be at the root of poor control of food, ineffective bolus formation and inefficient chewing. Clinically we often observe that children with oro-motor issues will refuse foods which require refined oral skills and develop strong preferences for the foods which are less challenging motorically. Making a list of preferred and non-preferred foods is a way to identify a possible pattern linked to motor skill. For example, if all preferred foods are mashed, soft and/or dissolvable, and non-preferred foods require refined chewing skills, this may be an indication of oro-motor issues. In these cases, safety is always a concern and foods must be carefully chosen to avoid aspiration. Dissolvable solids such as crackers are often a good option. Feeders which hold the food in a gauze like pouch can also be used, allowing the child to practice chewing skills while safely securing the food inside the feeder.

Sensory functions

A meal is a complex sensory experience consisting of the foods with their appearance, odours, textures, and tastes, as well as the presence of others. When considering sensory functions several aspects must be assessed. Sensory reactivity, sensory perception, praxis, postural control, and bilateral integration have all been identified to be part of sensory functions (Ayres, 2004). Issues in sensory functions are common in children with ASD and may potentially impact feeding (Zobel-Lachiusa *et al*., 2015).

Sensory hyper-reactivity has been widely identified to be among one of the main factors related to food rejection and food selectivity in children with ASD (Zobel-Lachiusa *et al*., 2015). Sensory hyper-reactivity is also common in children with a history of gastroesophageal reflux (Davis *et al*., 2013), a common GI issue in children with ASD (Ibrahim *et al*., 2009). Making a list of preferred and non-preferred foods can also be extremely useful to identify sensory reactivity issues. For example, if preferred foods are homogenous, dry, and/or smooth in texture, whereas non-preferred foods are of mixed, viscous, or lumpy textures, this could be an indication of issues in sensory reactivity. The use of standardized questionnaire such as the Sensory Processing Measure (Parham *et al*. 2007) is a key component of the assessment of sensory reactivity issues.

Sensory perception must also be considered. Bennetto *et al*. (2007) found that children with ASD may struggle to identify taste and olfactory sensations suggesting that issues in sensory perception contribute to eating problems among this population. Somatosensory perception difficulties

can also potentially impact eating. Multiple studies have reported a relationship between somatosensory discrimination and praxis (Ayres, 2004). Research has shown that many individuals with ASD have praxis and imitation difficulties, including orofacial imitation (Mostofsky *et al*., 2006). Furthermore, somatosensory perception deficits in combination with issues in praxis, are reported to be frequent in children with ASD (Roley *et al*., 2015). A common observation related to this type of issue is the lack of ability to localize food in the mouth and organise tongue movements to handle the food. Children may prefer food that is soft and homogeneous (e.g., mashed foods), not because of motor problems as such, but due to difficulty locating the food in the mouth and planning oral movements accordingly. Clinically we observe that children benefit from intense oral sensorimotor activities such as biting on vibrating or textured oral toys, becoming more aware of their oral cavity, and better equipped to handle a variety of textures. Choosing foods that can be safely handled with limited intraoral perception and praxis is of utmost importance.

Children, from an early age, are expected to adapt to the family's routine and learn the 'mealtime rules' by modelling the eating behaviours of parents and siblings (Birch *et al*., 1989). Research has shown that modelling healthy eating habits can have a positive effect on expanding children's dietary preferences (Birch *et al*., 1989). Therefore, difficulty imitating other people's behaviour could compromise the broadening of the eating repertoire (Nadon *et al*., 2011) and assessment of somatosensory perception and praxis is warranted in children who fail to imitate parents and peers when trying new foods. Assessment tools such as the Sensory Integration and Praxis Tests (Ayres, 2004) are useful to identify underlying sensory perception and praxis issues that may be impacting mealtime participation.

Efficient processing of vestibular and proprioceptive input is necessary for general motor skills such as trunk control for sitting upright, a key component of mealtime participation, and must therefore be considered as part of the eating assessment (Marcus and Breton, 2013). Deficits in postural stability and motor coordination in individuals with ASD are well documented (Flanagan *et al.*, 2012) and should be assessed when sitting at the table and hand use for self-feeding are problematic. In children with ASD, difficulties with vestibular-propioceptive processing often manifest as moving excessively and can easily be misinterpreted as a behavioural issue. OTs have developed expertise in sensorimotor deficits that impact participation in activities of daily living and children who show issues in this area may benefit from an in-depth assessment of their sensory functions. The OT

intervention to improve mealtime participation will often include adaptation of seating options and direct therapy for the underlying vestibular-propioceptive issues.

Respiratory processes

Issues with breathing are reported to be present in up to 25% of children with autism (Williams *et al*., 2004). The accumulation of secretions, breathing by the mouth and respiratory effort can impact the feeding process (Trabalon and Schaal, 2012). In these cases, the child is referred to a medical specialist (allergist, otorhinolaryngologist) for assessment and treatment.

Early feeding behaviour

Findings from the Avon Longitudinal Study of Parents and Children (Emond *et al*., 2010), indicate that children with a subsequent ASD diagnosis were more commonly described as “slow feeders” by parents at 6 months and had a slow transition to solid foods. Also, at 15 to 54 months, it was noted that toddlers with ASD were “difficult to feed” and “very choosy” eaters (Emond *et al*., 2010). In another study, Brisson and colleagues (2012) collected family videos of 48 children with ASD and 46 typically developing children and studied retrospectively how often the babies opened their mouth in anticipation of the feeding spoon. Researchers observed that typically developing infants who had initial anticipation difficulties quickly learned to successfully anticipate. However, this did not happen with infants who later received an ASD diagnosis.

From a clinical perspective there is literature suggesting that an early assessment followed by consistent monitoring of infant eating behaviour is crucial. Although exploring some of the early biological and behavioural markers of ASD can be invasive (e.g. brain imaging and eye-tracking techniques), assessing the eating behaviour of children from infancy is not only good practice that will promote the overall health and the development of children but if eating problems are accompanied by any other early symptoms related to ASD it can raise clinicians and carers attention and perhaps lead to seeking an earlier diagnosis or intervention (van't Hof, *et al*., 2020).

Communication and social skills

Children with ASD are more likely to present with developmental delays in the areas of speech and social interaction (APA, 2013). Mealtime is one of the key social interaction moments both for the family and the child. Consequently, the existence of social and communication difficulties may make mealtime a stressful time and may compromise the ability to effectively communicate needs around food (Williams *et al*., 2000). In these cases, therapists or any other teaching staff working with the child should prioritise the expansion of the child's mealtime vocabulary so that they can better communicate their food preferences, or any sensory or intestinal discomfort certain foods may cause them.

Psychological factors affecting eating in children with ASD

Children with ASD commonly engage in repetitive and ritualistic behaviour (Boyd *et al*., 2010). Consequently, they are more likely than typically developing children to insist on a ritualistic mealtime, such as eating the same food every day (Schreck *et al*., 2004). Children with ASD may also demonstrate insistence for sameness, which can result in a preference to use certain utensils or follow certain routines during mealtime. Another factor that can compromise eating is anxiety, a frequent co-occurring diagnosis in this population (MacNeil *et al*., 2009), which can decrease appetite (Bryant-Waugh *et al*., 2010). Lack of appetite may mistakenly be perceived as extreme food selectivity or 'fussiness' in children with ASD.

Psychologists should be aware that repetitive and ritualistic behaviour may also be demonstrated in the eating behaviour of children with ASD. In these cases, the psychologist needs to work with the child with ASD to specifically decrease their anxiety around mealtime and/or develop trust towards foods that they are less willing to try and assisting them in the introduction of these foods into their diet (Dial *et al*., 2020).

Summary and conclusions

Children with ASD and eating problems have complex combinations of medical, nutritional, feeding skills and/or psychosocial issues (Smile *et al*., 2020). Commonly used terms such as "picky eater", "food refusal " and "food selectivity" seem to imply that these are voluntary behaviours when, they are very likely to appear due to unidentified medical, psychological and/or sensorimotor problems that make the process of eating challenging or painful (Williams *et al*., 2010).

Reports of interventions which include comprehensive assessment, analysis of objective data and clinical reasoning to identify underlying issues that compromise participation in daily activities are showing promising results in children with ASD (Schaaf *et al*., 2014). Similarly, this approach to assessment and intervention has also shown positive outcomes in children with eating problems (Beaudry-Bellefeuille *et al*., 2015; Gándara-Gafo *et al*., 2021). Focusing on the multiple underlying mechanisms that may impact eating can help us better understand the eating problems of this population. Once the underlying factors are identified, the professionals of the multidisciplinary team who are best equipped to tackle the challenges can design the intervention in collaboration with the family (Goday *et al*., 2019). Pleasurable participation in mealtimes for the child and family, as well as the development of healthy eating habits that support growth and development, are the goals of the intervention. Occupational Therapists, Speech Therapists, Nutritionists, Psychologists, and several medical specialties may all be necessary to carry out a personalized assessment and intervention when dealing with children with ASD who face eating problems.

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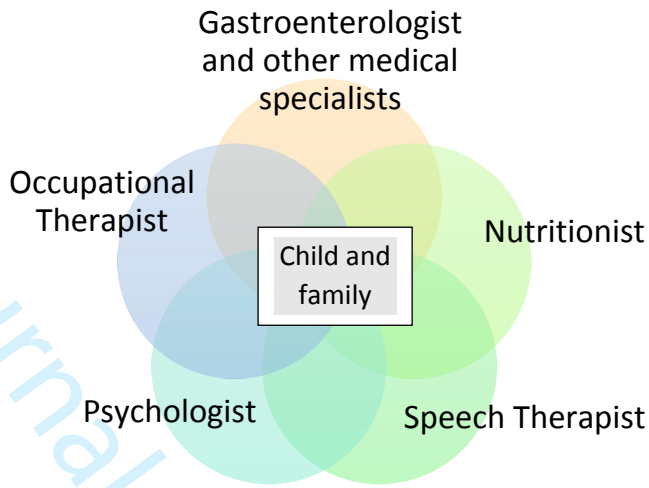

Figure 1

A fluid and non-hierarchal relationship between the members of the team has been identified as key to successful interventions.