

## Chewing Function and Feeding Behaviors in Children with Autism: A Review Artical

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### Abstract

**Background:** Autism spectrum disorder (ASD) is a neurodevelopment disorder that emerges in early childhood, characterized by a range of deficits in two specific domains: The first one is social communication and social interaction; and the second one is repetitive patterns of behavior. Many features are representing Children with autism such as they have lack of social and emotional engagement, don't make eye contact, restricted routines, insistence on sameness and inflexibility. Feeding problems involved in children with autism are chewing problems, feeding behavior problems and selectivity that are obvious in them than their typically developing peers. This problems must be encountered, addressed and highlighted through appropriate assessment because this problems affect both the children with autism and their parents. So that powerful assessment must be accomplished to help physiotherapists and health care providers make the most appropriate intervention.

**Aim of Study:** To examine the relation between chewing function and feeding behaviors in children with autism and compare them with their typically peers.

**Conclusion:** Children with autism had chewing problems in the form of prolongation of chewing time. On other hand, feeding behaviors problems showed disruptive refusal behavior and selectivity problem. We concluded that this help the physiotherapist and health care providers to make appropriate intervention

**Key Words:** Autism – Chewing – Feeding behaviors – Selectivity Typically developing peers.

### Introduction

#### A- Definition:

Autism spectrum disorder (ASD) is considered not only a medical condition that gives rise to dis-

ability but also an example of human neurological variation ('neurodiversity') that defines a person's identity, with cognitive challenges [1].

#### B- Types:

Types: According to the Diagnostic and Manual Statistical of Mental Disorder, 5<sup>th</sup> edition (DSM-5) [2], ASD Children Classified into autism/autistic disorder, Asperger's Syndrome, Childhood Disintegrative Disorder and Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS). The most common type is autism/autistic disorder which is a neurodevelopmental disorder characterized by disturbances in social relationships and communication, and by the presence of restricted behaviors accompanied by narrow interests and activities.

#### C- Severity:

According to Serra et al., [3], ASD is characterized by three severity levels that indicate the type of support the person needs:

- Level 1 is the higher level of functioning, support is required, and includes individuals with problems of inflexibility, poor organization, switching between activities, poor social skills, and several deficits in social communication and interaction.
- Level 2 is the intermediate level of functioning that requires substantial support for the individual who shows marked difficulties in verbal and non-verbal social communication skills, restricted repetitive behaviours and noticeable difficulties in changing activities or focus.
- Finally, level 3 is the lower level of functioning and requires very substantial support because the individual shows severe difficulties in verbal and non-verbal communication, very limited speech and repetitive behaviors.

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#### D- Clinical manifestation:

Children with ASD are These patients exhibit different communication issues in a variety of ways. Nearly half of kids with ASD are verbally silent. Some of them use only gestures when speaking, while others use stereotypical or echolalia language [4].

Children with ASD may exhibit rigid or unusual behaviors, unusual eye contact, limited facial expressions directed at others, atypical social engagement and responsiveness, difficulty with peer relationships, lack of awareness or understanding of other people's thoughts and feelings, poor communication skills, and restricted interests [5].

Children with ASD often have areas of need that impact participation in meaningful activities at home, or in the community. The ASD is exacerbated by co-occurring symptoms, such as limited social reciprocity, externalizing behaviors, such as aggression and atypical sensory processing [6].

#### E- Diagnosis of autism spectrum disorder:

Children with ASD can be diagnosed as early as 2 years of age, but on average, the age of diagnosis is after 4 years. There is even evidence that parents may detect developmental concerns in children with ASD before 12 months of age [7].

*F- According to the Diagnostic and Manual Statistical of Mental Disorder, 5<sup>th</sup> edition (DSM-5) [2] Diagnostic Criteria for Autism Spectrum Disorder:*

- Persistent deficits in social communication and social interaction across multiple contexts, as manifested by the following, currently or by history:

- 1- Deficits in social-emotional reciprocity.
- 2- Deficits in nonverbal communicative behaviors used for social interaction.
- 3- Deficits in developing, maintaining, and understanding relationships.

- Restricted, repetitive patterns of behavior, interests, or activities, as manifested by at least 2 of the following, currently or by history:

- 1- Stereotyped or repetitive motor movements, use of objects, or speech.
- 2- Insistence on sameness, inflexible adherence to routines. or ritualized patterns of verbal or non-verbal behavior.
- 3- Highly restricted, fixated interests that are abnormal in intensity or focus.
- 4- Hyper- or hypo reactivity to sensory input or unusual interest in sensory aspects of the environment.

- Symptoms must be present in the early developmental period (may not become fully manifest

until social demands exceed limited capacities, or may be masked by learned strategies in later life).

- Symptoms cause clinically significant impairment in social, occupational, or other important areas of current functioning.

Children with ASD have trouble using their oral motor skills, which are necessary for feeding and eating. They frequently struggle with managing texture and oral sensitivity, which affects the development of feeding [8].

#### I- Normal feeding and chewing function development:

##### A- Definitions:

- 1- Eating is a natural and essential human activity necessary to support growth, which also brings joy and pleasure. For infants [9].
- 2- Feeding is a highly complex developmental skill that matures over the first two years of life [10].

The healthy feeding relationship between a parent and child encompasses had both the physiological need of the child as well as an emotional aspect of the feeding responsibility of the parent [11].

Feeding and eating are vital components for family mealtimes and have role nourishing routines and family identity [12].

- 3- Chewing function: Is a complex and rhythmic process that begins with accepting food in the mouth, continues with placing the food between the molar teeth, crushing the food into smaller pieces and concludes with swallowing [13].

##### B- Development:

1- Development of liquid according to Borowitz & Borowitz, [14]:

- At birth, infants demonstrate suck, swallow, and gag reflexes that allow them to feed immediately. They are able to coordinate suck-swallow-breathe during breast or bottlefeeding.
- 4 months of age, suck-swallow becomes more voluntary. Liquid intake from a cup can start at that age.
- Between 12 and 18 months a child may still rely on biting the edge of the cup to stabilize the jaw,
- By 15 months of age most infants can drink from a cup without help.

Development of Solid foods according to Coulthard et al. [15]:

- Between 4 and 6 months of age usually in pureed form, are typically introduced at this age, infants can open their mouth for a spoon, use their tongue to move the food bolus to the back of their mouth to swallow it, and keep the food in their mouth.
- At 5 to 6 months of age. Oral function progresses to a bite-and-release pattern.

- At 7 to 8 months of age, most infants can grasp food with their hands and begin self-feeding.
- By 7 months of age, they can close their lip on the spoon and use their upper lip to clear the spoon,
- At 9 to 12 months of age sustained biting and the beginning of rotary chewing are typically seen.
- Between 8 and 12 months, children can bite crunchier foods as their teeth erupt.
- By 12 months of age most can remove food from the spoon with their lips.
- By 15 months of age most children have the ability to chew food.
- By 19 to 24 months of age most can feed themselves with a spoon without much spilling.
- Those offered more solid textures at 6 months of age have better chewing skills by 12 months of age.
- By 2 years of age. They are more accepting of, and are able to adequately chew, most table foods.
- Infants who were introduced to lumpy foods after 9 months of age have been observed to demonstrate a highly selective pattern and exhibited more feeding problems by 7 years of age.

The act of feeding a child is a crucial activity that fosters interaction between the child and the parent and directly affects the child's health. Due to behavioral factors as well as motor and sensory components, the parent's and kid's behavior may have an impact on how effectively the child feeds [16].

## II- Feeding and chewing problems in autism:

### A- Feeding problems in autism:

Feeding is a fundamental occupation, needed for optimal health and an area frequently addressed by pediatric occupational therapists. Feeding difficulties, such as selective eating, negative mealtime behaviors, food refusal and reduced acceptance of textured foods, are prevalent in to 89% of children with autism spectrum disorder (ASD), limiting successful participation in the essential daily occupation of eating and impacting quality of life for many children and families [17].

Many children with developmental delays had a variety of eating/feeding problems, making eating a challenge and a stressor for many parents. Eating/feeding problems occur more frequently among children with autism than typically developing children. Though few population studies have been conducted, close to 70% of children with autism are reported to be selective eaters. They have been found to display more of other eating/feeding problems, including food refusal, disruptive mealtime behavior, and acceptance of a limited variety and texture of food items, than typically developing

children. It was founded that children with autism have atypical feeding habits [18].

There is no surprise that eating/feeding problems are one of the most pressing concerns and reported by parents to be one of the most frustrating aspects of autism. Food selectivity is the most common feeding concern documented among children with autism. It was reported that significant feeding difficulties, primarily in the form of food selectivity by type and/or texture. Many children with autism who are food selective exhibit a preference for starches, snack foods, and display a lack of willingness to eat fruits, vegetables, and proteins. In addition, food refusal among infant [19].

Children with autism, eating can be particularly challenging because of their sensitivity to food textures and refusal to try new foods (food neophobia) [20].

Picky eating, a behavior seen in kids with autism, can be quite particular in what they consume. In fact, the first year of life, beginning with the introduction of the first complementary foods (i.e., vegetables and fruits), is when finicky eating is most prevalent [21].

Picky eating is the inability to eat new or familiar foods, which leads to a diet low in variety or little food consumption. Children with autism frequently reject foods with harsh textures, a bitter taste, or that are mushy, as well as dishes that have fragments or ingredients that are hidden. This rejection may be brought due to sensory difficulties. These include sensory sensitivity to bit into crunchy foods and the tactile or taste sensitivity to fibrous and wet foods, such as fruit and vegetables [22].

Food selectivity can have a negative impact on a child's growth and development because it directly affects nutritional intake. Resulting in an even more severely limited diet. Along with behavioral problems, such as completing rituals before meals, and/or cognitive problems, such as rigidity, picky eaters may also have sensory problems. Usually, these flaws, particularly rigidity, can cause issues in the interaction between parents and children [23].

There are a variety of behavioral elements that influence an individual's eating habits, including rituals and repetitive behaviors such as the need for consistency, inflexibility, and fear of novelty [24].

The feeding and mealtime behaviors founded in autism likely interact with the behavioral symptoms and features of the disorder by complex. It seems that the core social and communication deficits would impede a child's early learning of mealtime expectations. For example, children with autism may not be socially motivated to participate in mealtimes, able to model the habits of family members, be responsive to their parents' verbal praise

for appropriate feeding behaviors, or have the necessary communication abilities to effectively influence their feeding environment. Further, the repetitive behaviors of autism, as well as the behavioral inflexibility are likely form rigid mealtime routines. Hence, problematic feeding behaviors may be, at least due to the repetitive behaviors in ASD [25].

Other atypical eating behaviors have been identified in a child or with autism, such as eating too little or too much, mealtime long, requesting of food prepared in a specific way, gagging, closing the mouth tightly, aggressive or disruptive behaviors during mealtime, eating non-food items and pocketing food without swallowing [26].

There are some eating behaviors which found to be more common during early childhood in autism children, such as playing with food, eating very slowly, prefer certain food, stuffing mouth or cheeks, eating in some mealtime locations. Moreover, there are few behaviors that seem to remain stable across childhood. Such as “having some food preferences” or “repetitive eating of certain foods [27].

Disruptive behaviors also occur at high rates in children with autism. And may lead to problematic feeding and mealtime behaviors. Expulsion of food, complaining, eating without utensils, refusing to come to the table, and not staying seated have all been reported as disruptive mealtime behaviors in children with autism. On the other hand, these disruptive behaviors at mealtime have further been shown to be highly related to stressful meals and negatively influence family life [28].

Childhood feeding problems can present as an inability to manipulate a bolus of food, vomiting, avoidance, oral hypersensitivity. Feeding problems in early childhood are common, 80% of children with developmental disabilities, and 85% of children with complex medical diagnoses. Children with feeding problems also have a higher risk of comorbid developmental impairments, indicating that the problem related to feeding often do not occur in isolation [29].

Feeding problems can turned into a feeding disorder (FD) if not resolved [30].

While mealtimes can be a source of great satisfaction for both infant and parent as children when feeding skills are intact, problems with feeding can be a potential source of significant stress for both children and parents. Furthermore, as children grow older, preoccupations with food may become compounded by psychological factors such as poor emotional development, low self-esteem and social pressures, increasing the risk of eating disorders [31].

Feeding issues are prevalent in children with autism. Food refusal, a small range of food options, and a high frequency of eating just one food are some characteristics. Although the causes of these issues are not fully understood, they probably have some connection to the insistence and sensory differences. Micronutrient deficiencies can develop from a restricted diet, which is caused by food refusal, a small variety of foods to choose from, and frequent consumption of a single item [32].

#### B- Chewing problems in autism:

Chewing difficulties may result in insufficient bolus formation because decreasing fragmentation of food, which may cause swallowing difficulties, asphyxiation and feeling of food sticking in the throat. Insufficient bolus formation and prolonged feeding may also have a psychological effect and have adversely affect the quality of life of both children and their families and also child-parent relationship [33].

Children with neurological disorders may also struggle with chewing impairments. Chewing disorders result in multiple conditions including food leakage, gagging or choking during swallowing, and residue after swallowing. So, early evaluation and detecting the reason for chewing difficulties is important [34].

Most of the children with autism don't chew the food properly and swallow instead and this may lead to digestion problems. Some children don't eat fruits, vegetables or some food which should be a part of their daily diet [35].

Children with autism who have difficulty chewing have several behavioral options when foods that need chewing are offered. They may refuse the food, swallow the food without chewing and spit the food out [36].

#### III- Parents and autism:

In a meta-analysis published in 2013, it was concluded that parent who have a child with autism have more parenting stress, depression, and anxiety compared to parent who have typically developing child or another disability [37].

Parents often may use force-feeding and coaxing to get their child to eat, which can negatively impact the child's mealtime and result in aversion. Pediatric feeding disorder affect children and their families and may make parents feeling isolated, having long meals, child engaging in disruptive behavior [38].

#### Conclusion:

Our study focus on feeding problems that apparent mainly in Children with autism than their typically developing peers which summarized as Chewing problems, feeding behavioral problems

and food selectivity that encountered and enumerated in This review by powerful assessment to fill the gap in knowledge that will open the door for future research to done the most appropriate intervention.

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## وظيفة المضغ وسلوكيات التغذية لدى الأطفال المصابين بالتوحد: دراسة مرجعية

اضطراب طيف التوحد (ASD) هو اضطراب في النمو العصبي يظهر في مرحلة الطفولة المبكرة، ويتميز بمجموعة من العجز في مجالين محددتين: الأول هو التواصل الاجتماعي والتفاعل الاجتماعي؛ والثاني هو أنماط السلوك المتكررة. هناك العديد من السمات التي تمثل الأطفال المصابين بالتوحد، مثل افتقارهم إلى المشاركة الاجتماعية والعاطفية، وعدم التواصل البصري، والروتين المحدود، والإصرار على التشابه وعدم المرونة. مشاكل التغذية التي يعاني منها الأطفال المصابون بالتوحد هي مشاكل المضغ، ومشاكل سلوك التغذية والانتقائية التي تكون واضحة لديهم أكثر من أقرانهم الذين ينمون بشكل طبيعي. ويجب مواجهة هذه المشاكل ومعالجتها وتسهيل الضوء عليها من خلال التقييم المناسب لأن هذه المشاكل تؤثر على كل من الأطفال المصابين بالتوحد وأولياء أمورهم. لذلك يجب إجراء هذا التقييم القوي لمساعدة أخصائي العلاج الطبيعي ومقدمي الرعاية الصحية على القيام بالتدخل الأنسب.