International Journal of Community Medicine and Public Health
Alyahya FA et al. Int J Community Med Public Health. 2023 Jan;10(1):326-330
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20223266

Review Article

Dental care and challenges for children with Down syndrome

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Received: 14 November 2022
Accepted: 29 November 2022

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ABSTRACT

Children who have Down syndrome, a common genetic defect, are among the special needs children who are more likely to have poor dental health. These oral health issues may be caused by a variety of causes, including variations in oral morphological characteristics, malocclusions, restricted salivary flow, caries-promoting foods and pharmaceuticals, bruxism, and immunologic elements. Noncooperative disposition during dental treatment combined with comorbidities, poor dental health, and predisposition to periodontopathies puts people with Down syndrome at an elevated risk for lasting poor dental outcomes including dental extraction and infectious diseases, and other costly restorative therapy under general anesthesia which may introduce more health risks due to comorbidities. Accessing dental care from a qualified practitioner is often challenging for children with Down syndrome. In addition to hampering the provision of professional dental care for this demographic, behavior problems also impede the incorporation of preventive dental care measures in the home. Acquiring a dentist who is capable and disposed to serving children with Down syndrome can be difficult. Administration of necessary medical services among medical professionals may be impacted by perceptions toward Down syndrome, a lack of awareness concerning disabilities, and a stereotypical view of children with Down syndrome. Dental professionals must make sure that patients with Down syndrome receive regular, cost-effective dental care and that they are ensured every opportunity to improve their oral health-related quality of life.

Keywords: Down syndrome, Special needs dentistry, Pediatric dentistry, Children

INTRODUCTION

When compared to their counterparts without special needs, children with special healthcare requirements are twice as probable to have unfulfilled dental health care requirements.[1,2] Children who have Down syndrome (DS), a common genetic anomaly, are among those who require special medical care and are more likely to have poor oral health. They also have a greater likelihood of having dental and oral conditions and an increased probability of developing medical issues which have an impact on their oral health, emphasizing their need for ongoing care from provided by trained specialists.[3] Along with visual and hearing difficulties, children with DS are frequently intellectual disabled, which affect their capability to interact during dental treatment.[4,5] There is a lot of variance in how intellectually and physically different children with DS function.[6] Additionally, there are distinctions in how pediatric patients with DS (and

children with other intellectual disabilities) are permitted to engage and be active in their own health care. Some people require more help than others.[6,7] Health care practitioners' attitudes toward the condition and lack of awareness about disabilities, as well as a stereotypical view of children with DS, can have an impact on the delivery of necessary medical and dental treatment.[8,9] It is advised to initiate contact with oral health care experts no later than one year of age, per the Swedish medical guidelines for children with DS. The recommendations emphasize the importance of collaboration between specialists and generalists.[10] Access to and use of dental health care may be impacted by the child's residence. While some families have regular access to dental providers, other families might only have inconsistent access.[11] Many parents and caregivers of children with DS underscore the potential for coordinated care amongst medical institutions and a comprehensive approach from healthcare workers.[12] Parents' discontent with to the healthcare systems around the globe regarding care delivery for the addressal of oral health needs of young people with disabilities has been identified in surveys of parents and other people who help young people with disabilities.[13] Additionally, they have emphasized the necessity of dental healthcare providers having knowledge and proficiency in treating children with intellectual disabilities.[14] There is substantial heterogeneity in expertise and involvement of practitioners delivering dentalcare to children with disabilities. Dental professionals and students have acknowledged that due to inadequate training and experience, they are often not confident when it comes to providing care to pediatric patients with intellectual disabilities.[15-17] The same level of dental care must be provided to children with DS as is provided to other patients.[18] Therefore, it's crucial to more thoroughly investigate how to meet the needs of children with DS in the context of oral healthcare.

LITERATURE SEARCH

This study is based on a comprehensive literature search conducted on September 29, 2022, in the Medline and Cochrane databases, utilizing the medical topic headings (MeSH) and a combination of all available related terms, according to the database. To prevent missing any possible research, a manual search for publications was conducted through Google Scholar, using the reference lists of the previously listed papers as a starting point. We looked for valuable information in papers that discussed the information about dental care and challenges for children with Down syndrome. There were no restrictions on date, language, participant age, or type of publication.

DISCUSSION

Greater severity and earlier start of periodontopathy are characteristics of DS.[19-21] These dental health issues may be caused by a variety of causes, including variations in oral morphological features, malocclusive relationships, restricted salivary flow, caries-promoting diet and drugs, bruxism, and immunologic elements.[22,23] Furthermore, it has been noted that people with DS have poor dental hygiene and often struggle to comply when receiving dental treatment, which makes it challenging to provide quality care services.[9,24-27] People with DS are more likely to experience life-long poor dental health, like dental extractions and infectious diseases, and other costly restorative treatment under general anesthesia because of uncooperative behavior during treatment, poor dental health, and higher predisposition for periodontal damage which may pose additional health hazards due to coexisting comorbidities.[28,29]

In DS patients, dental anomalies such anodontia, conical teeth, microdontia, and late eruption are frequent; in fact, they are ten-fold more likely to occur than in the general population.[19] Microdontia frequently results in spaces between teeth, however this condition is manageable with orthodontic or restorative treatment.[30]

Lip incompetence, sialorrhea, and occlusal changes can be caused by insufficient skeletal development linked to the orbicularis oris and associated apparatus constituting the lips and facial musculature. The intricate interplay of numerous factors that affect growth and maturation frequently leads to malocclusions in individuals with DS. The development of occlusal problems in these people is influenced by a variety of DS-related variables, such as nasal obstruction (compromised airway, hypertrophic adenoids, sinus or nasal mucosa related mucositis), functional issues (dystonia, metabolic syndrome, dehydration of the mucosal surfaces), and pharyngeal obstruction (because of macroglossia, narrow, arched palate, micrognathia, and hypertrophic tonsils).[31] An epidemiologic analysis done by the oral health Brazil program revealed a 53% occurrence of occlusal problems in adolescents among the ages of 15 and 19 and a 38.5% occurrence of the same in children aged five to twelve.[32] Due to hypotonic musculature, subjects with DS frequently thrust their tongues against their dentition or out of the oral cavity. In addition to mouth breathing and improperly positioned teeth, a hypotonic and protruding tongue causes several issues with suction, speech, and mastication.[33-35] In such cases, speech-language pathologists and orthodontist should be consulted for their expertise.[19] In one survey, 38% of the mothers said their child had a tongue-thrusting habit. The functioning and aberrant posturing of the tongue have been implicated in the development of malocclusive dental relationships. Anterior open bite can result from tongue thrusting and improper tongue posturing, due to its effect on the position of the teeth and the form of the dental arch.[36] Many times, a small oral cavity, along with hypotonia and tongue protrusion, can resemble macroglossia. Oftentimes, the entire dorsal surface of the tongue has the impression of the teeth. According to some scholars, real macroglossia is uncommon.[33] Others, however, claim that people with DS have tongues that are abnormally long and broad.[34,35]

Despite the fact that parafunctional behaviors might cause malocclusion, researchers only discovered a statistically significant correlation between open mouth and digit-biting. This shows that factors other than breastfeeding, sucking patterns, teeth grinding, etc. could be responsible for malocclusion caused by vertically or transversally occurring abnormalities in DS patients. Malocclusion is significantly correlated with clinical traits, but psychological factors also play a significant role. These people require aid in accessing orthodontic care. The degree to which occlusion problems impact the lives of these patients should be known to caregivers and health practitioners.[30,37] In one study, parents revealed incidences of colds (87%), throat irritation (39%), and ear pain (12.5%) in their children.[38] Moreover, patients with DS have a significant frequency of upper airway infections. There is a clear correlation between the frequency of occlusal abnormalities and sore throat occurrences. Due to the recurring nasal obstruction, research has shown that a number of children undergo tonsil or adenoid surgery. However, mouth breathing practices frequently persist even once the airways are clean, supporting the idea that this is indeed a habit.[9]

According to research, there is a significant predominance of anterior crossbite (33%) attributable to the tongue protrusion habit and subsequent proclination of the mandibular anterior teeth frequently observed in these patients. When Quintanilla et al examined the lateral cephalometric radiographs of 39 patients with DS between the ages of seven and eighteen, they came to identical conclusions.[39] The prevalence of anterior crossbite in the authors' group was 38.5%. The mandibular front teeth, which are frequently in crossbite, are subjected to excessive pressure from the anterior protruding tongue. Researchers observed a prevalence of anterior open bite of 21%, deep overbite of 4.5%, and edge-to-edge bite of 14% in one study. Children with DS, of average of six years old, had a 20% prevalence of anterior open bite, as per a study by Carlstedt et al.[40] In children without DS, Santos et al discovered a prevalence of edge-to-edge bite of 2.5%, deep overbite of 6%, and anterior open bite of 56%.[41] This variation most likely happened as a consequence of different diagnostic standards used. The prevalence of posterior crossbite was determined to be 31%. Thirty-nine percent of the children in a study by Santos et al had posterior crossbite, according to the findings. Children with DS typically have an arched, narrow hard palate, which reduces the capacity of the mouth and makes chewing and speaking difficult.[31] Age has been shown to be important, showing that, regardless of other exposure factors, a child's odds of being afflicted by malocclusion rise as they get older. This most likely happens as a result of DS traits including craniofacial deformities and hypotonia of the orofacial muscles, which includes the tongue, that contribute to the occurrence of malocclusions. Age-related increases in occlusal aberrations in children with DS are caused by delayed craniofacial development and are linked to oral motor dysfunctionality, which impairs mastication and deglutition.[42] Even though frequent tooth brushing is highly recommended, studies have shown that up to 50% of kids do not brush their teeth every day in a given week. In other studies that evaluated parents and caregivers, parent subjects stated that their children with Down syndrome (DS) used the toothbrush less frequently (mean=11 times per week) than typically developing children (mean=12.6 times per week), but more frequently than children with autism spectrum disorder (mean equals 10.5 times per week).[33] Strangely, neither of these clinical nor nonclinical groups met the twice-daily brushing requirement. Children with DS have decreased toothbrushing frequency in addition to hypotonic motor activity, which might result in insufficient hygiene and raise the risk of poor dental health.[43] The provision of professional oral care and oral care in the home to this demographic may both be hampered by behavioral issues.[5,27] Although some data shows that managing dental-related behavior in adults with DS is not a problem, other studies have documented uncooperative behaviors and stress experienced by children with DS while receiving oral treatment at the dentist.[5,22,25-27,35] Uncooperative behavior has the potential to have a number of dental care-related effects, such as unfulfilled dental needs, tooth loss, and the requirement for sophisticated behavioral training methods.[44] Finally, despite the higher potential for oral health issues, children with DS frequently have many other health-related concerns, thus dental care may not be prioritized. Children with DS were revealed to have the highest percentage of underserved dental care needs (17.4%), and they face substantially greater number of obstacles in accessing required dental treatment than other children with special medical needs, according to the 2006 national survey of children with special health care needs.[45] Some dental practitioners' hesitancy to treat children with special medical requirements has been partly associated with low levels of confidence in their ability to care for this population as a result of insufficient training and information. It is not surprising that nearly 50% of parents indicated that caregivers refused to serve their child with DS due to lack of training to manage children with special medical needs. Health professionals' education is frequently reported constraint to dentalcare access for children with special medical needs.[46,47] This issue impacts both developed and developing countries. For example, over 70% of dentists in Belgium indicated that they rarely treat children with Down syndrome and that they would find more training valuable,[15] while more than 50% of dentists in Brazil who responded to survey say they only "partially" comprehend the needs and considerations of patients with DS.[26] Contrary to this a survey of dental schools in the United States and Canada found that over 90% said they have educational materials on DS, autistic spectrum disorder, mental impairments, and age-related limitations.[48]

Based on research findings, it's critical for oral healthcare providers to approach these children in a friendly and

compassionate manner. The ability of the oral healthcare provider to meet and engage the child is crucial to the success of this acclimation. Dentalcare providers who demonstrate patience, are capable of engaging the child and are compassionate, good communicators, and knowledgeable about DS are desired by parents of children with DS.[27] They claimed that parents are happier when they can work well with the specialists since it improves their child's quality of life.[49] A stereotyped view of children with DS may adversely affect the care they receive, and attitude of professionals can have an impact on way care is delivered. Uncooperative behavior in the child might result from a bad experience, which can also raise the risk of frustration in the child and the parents.

CONCLUSION

Because oral health and wellbeing in general, and malocclusions in particular, constitute a public health issue, public health programs must include intervention techniques to prevent and manage these problems at a younger age. Patients with down syndrome should not be excluded from the general population with regard to dental care. Patients with down syndrome pose many unique challenges and opportunity for advancement of the domain of special needs dentistry. From an ethical standpoint, dental professionals should take on the responsibility and commit to contributing their skills and expertise for the enhancement of the oral-health related quality of life of children with down syndrome.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Alyahya FA, Alfareh AM, Albadr RM, Al Jowher AA, Aljuaid FK, Almutairi YS et al. Dental care and challenges for children with Down syndrome. Int J Community Med Public Health 2023;10:326-30.