



Characteristic of Malocclusion among Saudi Special Need Group Children

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ABSTRACT

Introduction: The present study analyzed the characteristics of malocclusions, occlusal traits among Special Health care Needs (SHCN) children with Down syndrome (DS) and autism disorder (AD) in Riyadh City, Kingdom of Saudi Arabia.

Materials and methods: A total of 100 DS and 100 AD children from five rehabilitation centers in and around Riyadh, Kingdom of Saudi Arabia, were included in the study. Any children with history of ongoing medical treatment, extraction, or orthodontic treatment were excluded from the study. Out of the 200 patients examined, 131 were males and 69 were females and the age of the children ranged from 6 to 14 years. The children were examined for malocclusion characteristics using the Angle's classification of malocclusion, and also other occlusal traits, such as overjet, overbite, cross bite, and open bite were also determined. The data obtained were analyzed using Statistical Package for the Social Sciences, version 16 to generate descriptive statistics for each variable.

Results: The analyzed data of the right and left permanent molar relation showed higher incidence of class III malocclusion (66%) in DS children as compared with (3–4%) AD children. The AD children presented with higher percentage of class I malocclusion (40–41%) as compared with (10–14%) DS children. During examination of the primary molars, the analyzed data showed that left primary molar had more mesial shift in AD children as compared with DS children.

Conclusion: Down syndrome children had high incidence of class III malocclusion and autistic children had high incidence of class I malocclusion. Overall, the DS children were more prone to malocclusion.

Clinical significance: This study provides database for health professionals in Saudi Arabia in regard to malocclusion of autistics and DS patients.

Keywords: Autism disorder, Down syndrome, Malocclusion.

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INTRODUCTION

Malocclusion is defined as a deviation of the teeth or a malrelationship of the dental arches beyond the normal range.¹ Malocclusion is the third highest prevalent oral pathologic conditions, secondary to tooth decay and periodontal disease and hence, needs careful attention.² Malocclusions occur as a result of orofacial adaptability to various etiological factors, which result in several implications, such as psychosocial problems related to impaired dentofacial esthetics, disturbances of oral functions, such as mastication, swallowing and speech, and greater susceptibility to trauma and periodontal disease.¹ The studies on prevalence and incidence of malocclusion have been carried out occasionally since 1889.³ The classification of malocclusion by Angle based on the relative position of permanent maxillary first molar is one of the commonly used methods for assessing malocclusion.⁴

Special Health care Needs children face difficulty in accessing proper dental care services as compared with normal population and are identified as being in the category of high risk for oral diseases.^{5,6} The maintenance of good oral health among SHCN children is of utmost importance as poor oral health leads to difficulty in oral functions, such as eating, swallowing, and speech, resulting in malocclusion, compromised esthetics, and poor general health that can be discouraging.⁷ In these children, an improvement in the dentofacial apparatus can lead to better oral functions and better association in the society.

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Down syndrome, first described in 1866 by Dr John LH Down, is a genetic condition caused by the presence of an extra chromosome 21 or sometimes caused by the duplication of small regions of the chromosome. This condition affects 1 in 600 to 1,100 births. Down syndrome is a major cause of mental retardation and congenital heart disease.⁸ The dental anomalies include delayed eruption of primary and permanent teeth, microdontia, presence of spacing due to small-sized teeth, missing teeth, malpositioned teeth, hypoplasia, partial anodontia, supernumerary teeth, hypodontia, taurodontism, difference in the order of teeth eruption, and deficient growth in the upper arch and bruxism.⁹ The DS patients have many dental conditions suited to be considered for orthodontic treatment.¹⁰ Previous epidemiological studies have shown that SHCN children with DS are more prone to certain types of malocclusion, especially class III malocclusion, usually associated with mandibular overjet and open bite. These types of malocclusion are very unlikely in the general population.¹¹

Autism disorder, also referred to as early infantile autism, childhood autism, or Kanner's autism was first described in 1943 by the American child psychologist Leo Kanner of the Johns Hopkins Hospital (USA).¹² Autism disorder affects neural development characterized by impaired social interaction and communication by restricted and repetitive behavior. Autism affects many parts of the brain, the phenomenon which is not clearly understood. The symptoms gradually begin after the age of 6 months, become well established by the age of 2 or 3 years, and tend to continue through life.¹³

In understanding the problems, drafting prevention, and treatment strategies for the SHCN children, there is a need for collection of data that could help in improving the oral health of these children. The review of literature showed no study on malocclusion characteristics among the DS and AD children in Saudi Arabia. Therefore, the present study aims at determining the characteristic of malocclusion in SHCN children with DS and ADs in Riyadh, Saudi Arabia.

MATERIALS AND METHODS

Ethical Approval

The study design and procedures was approved by Ethical Committee at College of Dentistry Research Centre, King Saud University. Following ethical approval, the directors of all the five rehabilitation centers for special children in Riyadh, Kingdom of Saudi Arabia, were contacted to explain the purpose of the study, and the permission to conduct the study was obtained. Informed consent was also obtained from the parents of DS and AD children to participate in the study.

Table 1: Distribution of SHCN groups according to gender and type of dentition

SHCN condition type	n	Gender distribution		Dentition	
		Male	Female	Mixed	Permanent
DS (%)	100	66	34	74	30
AD (%)	100	65	35	68	32

Study Groups

A total of 100 DS and 100 AD children (131 males and 69 females) were included in the study. In DS (66 males and 34 females) and AD (65 males and 35 females), children were examined. The age of the children ranged from 6 to 14 years (Table 1). The participants were included only if they had a documented final diagnosis of a DS or AD. Any child with history of ongoing medical treatment, extraction, and orthodontic treatment was excluded from the study. The medical records of the children had earlier been reviewed with the help of the health care providers of the centers, and relevant information was extracted.

Examination

Each child was examined while seated on a portable chair under sufficient natural light using a disposable mouth mirror and tongue blade. No radiographs were taken. The Angle's classification was utilized for diagnosis of malocclusion. The malocclusion was recorded as flush, mesial, and distal occlusion for the primary molar teeth on the right and left. Angle's class I, II, and III were used in the permanent molar. In addition, other occlusal traits, such as overjet (horizontal overlap), overbite (vertical overlap), incisor open bite, and cross bite in the right and left side on both anterior and posterior aspects were recorded for both the DS and AD children.

Statistical Analysis

The data obtained were summarized and analyzed using Statistical Package for Social Sciences version 16.0 program for Windows (SPSS Inc., Chicago, Illinois, USA) to generate descriptive statistics for each variable.

RESULTS

The analyzed data of the right and left permanent molar relation showed higher incidence of class III malocclusion (66%) in DS children as compared (3–4%) with AD children. The children with AD presented with higher percentage of class I malocclusion (40–41%) as compared with (10–14%) DS children (Table 2). During examination of the primary molars, the analyzed data showed that left primary molar had more mesial shift in AD children as compared with DS children (Table 3).

The occurrence of overjet in DS children was 1 mm in 28%, 2 mm in 45%, 3 mm in 19%, and 4 mm in 8% of the

Table 2: The right and left permanent molars relation in DS and AD children

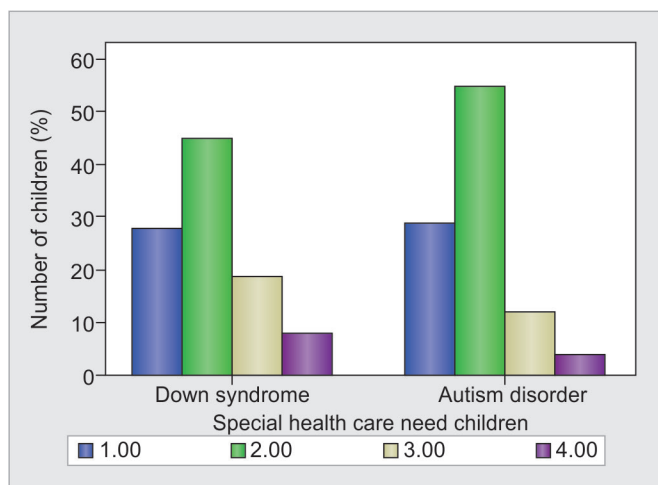
SHCN condition	Class I	Class II	Class III	NA	Total
DS (%)					
Right	14	1	66	19	100
Left	10	6	66	18	100
AD (%)					
Right	40	16	3	41	100
Left	41	15	5	39	100

NA: Not applicable

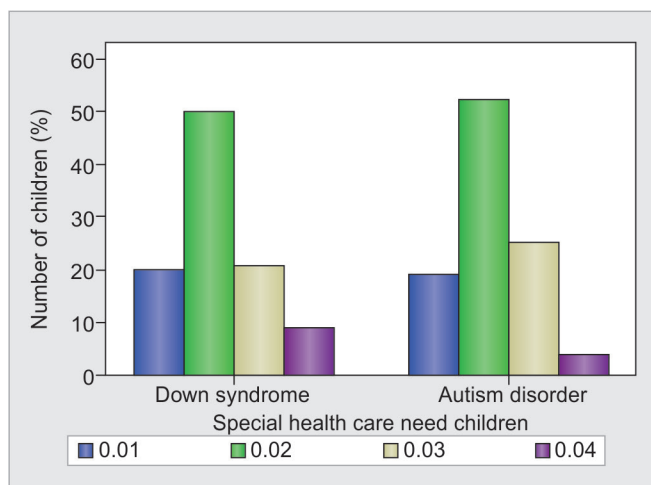
Table 3: Right and left primary molars relation in DS and AD children

SHCN condition	Flush	Mesial	Distal	NA	Total
DS (%)					
Right	6	11	3	80	80
Left	5	12	2	100	100
AD (%)					
Right	6	11	3	81	59
Left	6	32	3	100	100

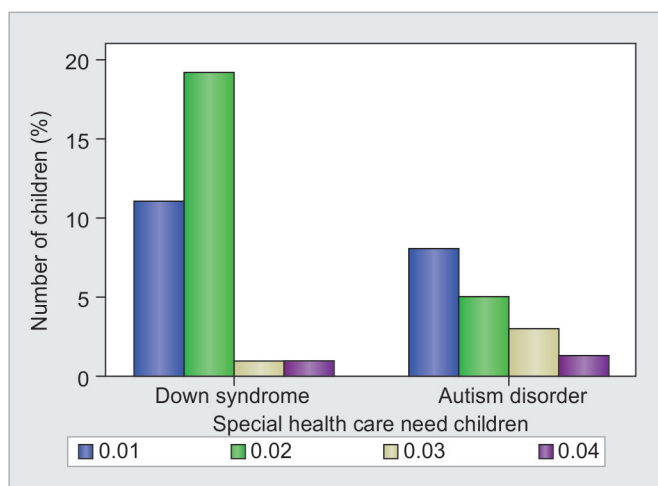
NA: Not applicable



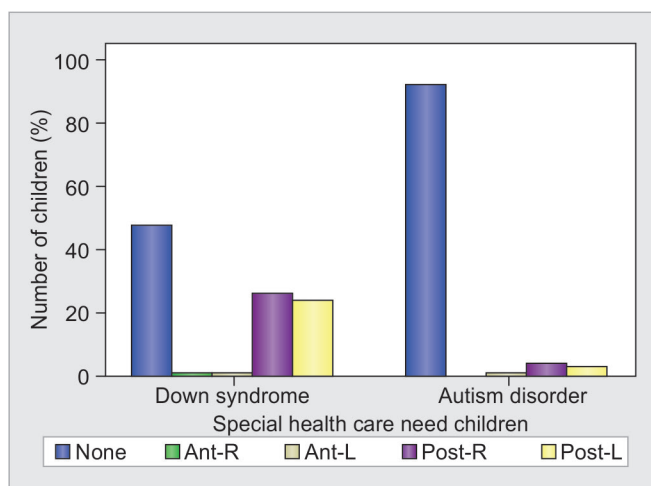
Graph 1: Prevalence of incisor overjet among DS and AD children



Graph 2: Prevalence of incisor overbite among DS and AD children



Graph 3: Prevalence of incisor open bite among DS and AD children



Graph 4: Prevalence of cross bite in anterior and posterior region among DS and AD children R: Right; L: Light; Ant: Anterior; Post: Posterior

children as compared with 1 mm in 29%, 2 mm in 55%, 3 mm in 12%, and 4 mm in 4% of the autism children (Graph 1). The children with overbite of 2 mm were 50% in DS children as compared with 55% in AD children. The increased overbite of 4 mm was observed in 10% of DS as compared with 4% of AD children (Graph 2).

The incisor open bite of 1 and 2 mm was more for DS children, whereas the open bite of 3 and 4 mm was seen more in AD children (Graph 3). Among the AD children, 90% of the children showed no incidence of cross bite as

compared with 48% in DS children. There was a higher incidence of posterior cross bite among the DS children (Graph 4).

DISCUSSION

The need for baseline information regarding malocclusion and occlusal traits of DS and autistic children in Saudi Arabia is essential as there is no available information regarding the same. This information is also to help the

policymakers in designing effective oral health education programs for this category of special needs children. The prevalence of definite and severe malocclusions is usually higher for special needs groups and it also has a noticeable effect that could affect their daily routine, such as facing discrimination due to their appearance, issues with functions, such as mastication, swallowing, and speech.^{14,15} Orthodontic services have normally been neglected for this group of children with special needs.

This study compared the occurrence of dental occlusal anomalies and found an increased prevalence of class III malocclusion in the DS children compared with the autism subject who had a higher prevalence of class I. This is in agreement with a study that reported an increase incidence of Angle class III malocclusion in children with DS.¹⁶ On the contrary, the study did not conform to previous study where it was reported that AD children had higher incidence of class II and III malocclusion.¹⁶ The majority of the DS and AD children had 2 mm overjet and also 20% overbite. The prevalence of posterior right and left cross bite was highly prevalent in the DS group compared with the AD group. In fact, among the total number of children, 48% of the DS children, and 92% of the autism children had no cross bite. This is in contradiction to the study by Luppanapornlarp et al¹⁷ where they found that cross bite was the most frequent occlusal anomaly in handicapped children. The difference in the findings could be due to the severity of the morphological abnormalities and ethnicity.¹⁸

The most frequent malocclusions among the patients with DS are mandibular protrusion, anterior open bite, and posterior cross bite. These findings are a result of vertical and transversal occlusal changes. Such changes are related with insufficient bone development, orofacial muscle hypotonia, and the positioning of the tongue. Patients with DS generally have a short facial appearance and a decreased development of the middle third of the face, resulting in a class III malocclusion.¹⁹ Jensen et al evaluated the width, length, and perimeter of dental arches of DS patients. They found that width of both maxillary and mandibular arches is equal, or the mandibular arch is even wider as compared with the normal population where the maxillary arch width exceeds the mandibular arch width, which results in high incidences of class III malocclusion and cross bite.²⁰

Suwanee et al²¹ in their study on AD children found that this group of special need children had higher percentages of spacing, reverse overjet, open bite, and class II molar relationship, which was also in disagreement with the findings of the study. The orthodontic problems in AD children may occur as a result of patient's abnormal behaviors, such as thumb or finger sucking habits, nail biting or self-extraction of teeth,

communication problems, self-negligence, self-injurious behaviors, limited dental care accessibility, hyposensitivity to pain, and less social contact.²²

The compromised dental status in combination with other oral habits the child may possess, such as bruxism, tongue thrusting, and lip biting, may result in certain type of malocclusions in SHCN children.^{18,23,24} In addition, SHCN children are in need of more dental care and frequent access to orthodontic treatment. Children with special needs present with uncooperative behavior during dental treatment because they usually do not tolerate exposure to dental lights, which can potentially limit their access to dental health care leading to compromised dental status. Most of the patients report to dental clinics at an older age.

The health care professional should have an integral and multidisciplinary role in motivating parents or guardians to seek oral care at young age.¹⁵ A proper approach by health care professionals and policymakers should aim at reducing the prevalence of malocclusion in these special group children, thereby developing and improving their quality of life. Furthermore, the public or national health care services should draft suitable policies, such as education, motivating the parents that could significantly benefit in preventing or treating malocclusions. More prevalent studies should be conducted over a long term to evaluate the effect of such policies in reducing malocclusion.

The limitations of the study were that our samples were mainly male children, and the differences between the male and female children were not categorized. Secondly, the outcome of the present study was compared with few studies as the literature regarding the same is scarce.

In conclusion, the majority of children with DS exhibited class III malocclusion as compared with AD children who exhibited more of class I malocclusion.

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