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ORIGINAL ARTICLE

Occurrence of Dental Anomalies in Colombian Patients with Special Needs

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Abstract

Objective: To determine the occurrence of dental anomalies in patients with special needs from Barranquilla, Colombia. **Material and Methods:** An observational, cross-sectional descriptive study with a sample of 59 patients chosen at convenience for 6 months during the course of 2017. With prior approval by experts, an instrument that identified dental anomalies was applied, followed by an institutional clinical history, intraoral clinical examination and final evaluation of the study variables, with descriptive statistics. **Results:** With regards to age ranges, 25% of subjects were between 14 to 17 years, and 19% between 22 to 25 years. The average age was 14 (± 7.9). No cases were found in the age range of 26 to 29 years. In terms of gender, males predominated with 78%. The anomaly that predominated was fluorosis (50.8%), followed by agenesis (23.7%). The syndrome and / or disorder with the highest frequency of dental anomalies was mental retardation with 39%, followed by behavioral disorders (22%) **Conclusion:** The frequency of dental anomalies in patients with special needs was evidenced, showing higher prevalence of dental fluorosis in patients with mental retardation, and a higher incidence in males; in the patients with syndromes and / or disorders who were observed, there were a few oral findings unrelated to dental anomalies.

Keywords: Disabled Persons; Disabled Children; Tooth Abnormalities; Tooth, Supernumerary.

Introduction

An exceptional patient is defined as a person who has a disease, disorder or syndrome; It can be said that a person with Autism, Down syndrome, cerebral palsy are exceptional individuals. The disabled, special or exceptional patient is the person whose physical, mental or behavioral traits differ from those of other individuals of the same age. Samuel Kirk defines as exceptional that child (or person) that has mental, physical or social characteristics that deviate from the average of normal children of the same age and that due to this it is necessary to modify the dental practice and provide a special and different treatment so that they can develop and reach their maximum capacity [1,2].

A disease is an alteration of the organism of a living being either by internal or external causes. To be classified as a disease, it must include at least two of the following factors: identifiable signs and symptoms, anatomical alterations and / or an etiologic agent (causes) recognizable by the specialist [2].

The term syndrome refers to a set of symptoms that may occur together or vary over time. This term does not have to be linked to underlying pathologies [2]. Unlike the former, disorders are symptoms, actions or specific behaviors of a person and they are usually associated with pathologies. They may be related to either mental pathologies, or cognitive or developmental alterations [2]. Human teeth are formed from two of the primitive germ layers, called ectoderm and mesoderm, with an important contribution by the neural crest [3]. In the cephalic region, the cells of the neuronal crest (at approximately 4 weeks of development) migrate ventrally from their primitive position at the borders of the neural plate towards the branchial arches, where they interact with the surrounding tissues and constitute the ectomesenchyme, which will play an important role in facial development [3].

The most common oral and maxillofacial pathologies seen in patients are those mostly associated with dental cavities, with its pulpal complications in both primary and permanent dentition, the pathologies associated with deformities caused by bad habits and the serious consequences that occur from premature extractions [4].

Likewise, within systemic diseases and syndromes, there is a select group of patients who develop dental anomalies that are proper to a given disease or condition, such as mental retardation, Down syndrome, cerebral palsy, which usually encompass certain aspects and / or oral and physical characteristics which differentiate them from other diseases and syndromes (Table 1) [5].

Table 1. Conceptual characteristics of some syndromes or disorders.

Syndrome or Disorder	General Characteristics
Mental Retardation	It is a disorder that has an important impact on the life of an individual, his family and society. Mental retardation was defined by the American Mental Deficiency Association as a significant decrease in the intellectual function along with a deficit of re-adaptative behavior that manifests during development [6].
	As for the degree of severity, it is generally accepted that mental retardation is mild when the IQ is 50-55 to 70, moderate when the level is 35-40 to 50-55; serious from 20-25 to 35-40 and deep if it is less than 20-25 [7].

Cerebral Palsy	Fundamentally, they have a characteristic motor impairment caused by brain malformations or injuries during a stage of maturation prior to three years of age; if occurred in later stages, it is referred to as brain trauma or damage [8].
	According to the International Classification of Functioning, Disability and Health of the World Health Organization (WHO), in 2009, CP constitutes: "A group of disorders in movement and posture development, which cause limitation in activity and they are attributed to non-progressive alterations that occur in the developing brain of the fetus or young child [9].
	Common causes include Hypoxia, advanced age of the mother, recurrent history of abortions, intrauterine infections, fertility and multiple pregnancy problems, abnormal fetal presentation [8,10,11].
	Degree of motor impairment: Mild: total autonomy; Moderate: patient has autonomy or needs some assistance at the most; Severe: almost zero autonomy; Very severe / Profound: zero autonomy [8,9,12].
Down Syndrome	It is a genetic disorder in which a person has three copies of chromosome 21. The presence of an extra chromosome causes a genetic imbalance and is responsible for the phenotypic manifestation proper to Down syndrome, and in turn causes alterations in organs and systems development and function. The nervous system is the most affected, especially the brain, which is why people with Down syndrome have a variable degree in intellectual disability [13].
	There are three types of trisomies that cause Down syndrome: regular trisomy, which is approximately 95% of cases, translocation trisomy (3-4%) and mosaic trisomy [14].
	Regular Trisomy: This is the result of a genetic error that occurs in the process of cell reproduction. During the formation of the male or female gamete there is no disjunction of pair 21 and then one of the two gametes contains 24 chromosomes instead of 23. When the gamete bearing the extra chromosome joins that of the opposite sex, the result is a zygote with 47 chromosomes [15].
	Down syndrome is the most frequent genetic disease. Its incidence rate is estimated in one case per every 660 live births.
	The Down syndrome has been related to risk factors as varied as genetic, physical, chemical, immunological, infectious and social agents, but only there are currently considered as probable etiologic agents of trisomy 21: They are chromosome abnormalities of parents capable of inducing secondary meiotic disjunction, maternal, zygotic exposure to ionizing radiations, and advanced maternal age. The first two, while important, are responsible, in practice, for a minority of cases of Down syndrome, while it has been shown that there is a close relationship between this codition and the maternal age [16-18].

The purpose of this study was to determine dental anomalies in patients with special needs from Barranquilla, Colombia.

Material and Methods

Study Design and Sample

The study was of an observational, descriptive cross-sectional type. The population consisted of the exceptional patients who attended the Foundation in 2017. There was a population of exceptional patients of 276 participants; 82 patients were excluded as they did not have the signature on the written consent agreement; We excluded 135 patients who did not have dental anomalies. Sampling was non-probabilistic at convenience, because only exceptional patients with dental anomalies were selected. We worked with the available population, consisting of 59 exceptional patients from the Foundation who had dental anomalies.

Data Collection

For the data collection process, an instrument was designed with the study variables. Once designed and approved by 5 experts in Pediatric Dentistry of a University, the clinical histories of the patients of a Foundation for Exceptional Patients of Barranquilla, Colombia, were selected.

The standardization was completed in 10 days, as follows: each day a group of 15 patients were attended to; this was carried out at different times in the same light conditions, in the same dental unit, with the same instruments and the same number of materials; in this process the patients were assessed in order to observe present dental anomalies, examining tooth by tooth (erupted). Cotton swabs were placed, and visual and tactile clinical examinations were conducted with an oral mirror and a periodontal probe. During this process, the data collection instrument was used. The information was collected directly by observing the patients and taking field notes; also, through the clinical records of the Foundation for exceptional patients, and information obtained from parents and / or guardians.

Data Analysis

Data were analyzed using Microsoft Excel 2013 (Microsoft Corp., Redmond, WA, USA). Descriptive statistics were used to calculate the absolute and relative frequencies, mean and standard deviation.

Ethical Aspects

Informed written consent was obtained from each parent, and a certification of the research was conform to the Helsinki Declaration of 1975 and granted by the Ethics Committee of the Metropolitan University of Barranquilla.

Results

It was found that 78% of the exceptional patients were male and 22% were female. With regards to age ranges, 25% were between 14 and 17 years, and 19% were between 22 and 25 years. The average age was 14.0 (± 7.9) (Figure 1).

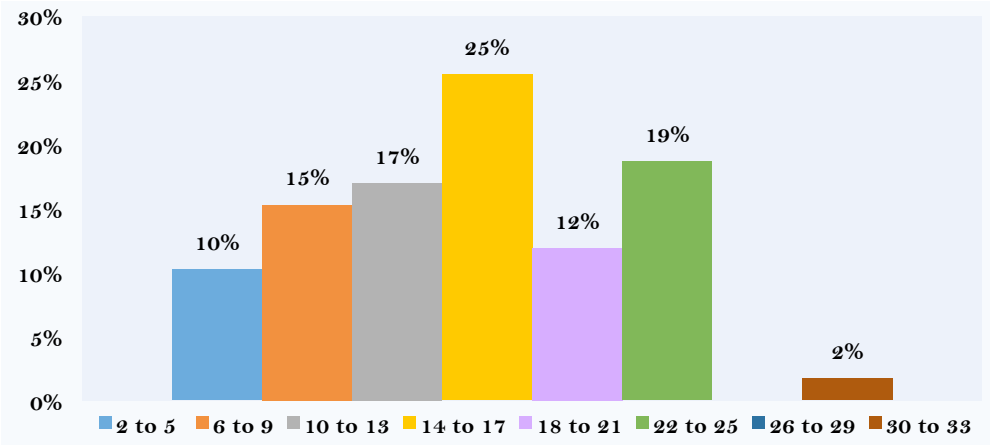

Figure 1. Distribution of the frequency of dental anomalies according to age range.

The predominating dental anomaly was fluorosis with 50.8%, followed by agenesis with 23.7%, macrodontia (10.2%), and hypoplasia (10.2%) (Table 2). In reference to the syndrome or disorder with the highest incidence of dental anomalies, 39% of patients had mental retardation, 22% had behavioral disorders, and 10.2% were Down syndrome patients.

Table 2. Distribution of patients, according to the type of anomaly and syndrome or disorder.

Variables	Frequency	
	N	%
Type of Dental Anomaly		
Fluorosis	30	50.8
Agenesis	14	23.7
Macrodontia	6	10.2
Hypoplasia	6	10.2
Fusion	2	3.4
Supernumerary	1	1.7
Syndrome and/or Disorder		
Mental Retardation	23	39.0
Behavioral Disorders	13	22.0
Down Syndrome	6	10.2
Cerebral Palsy	5	8.5
Autism	5	8.5
Hydrocephalus	3	5.1
Turner Syndrome	1	1.7
Cornelia De Lange Syndrome	1	1.7
Muscular Dystrophia	1	1.7
Arteriovenous Malformation	1	1.7

In patients with mental retardation, 60.9% were found to have fluorosis, and 17.4% had agenesis (Table 3). In patients with behavioral disorders, fluorosis was found to be the predominating anomaly (38.5%), followed by agenesis with 30% and hypoplasia with 23.1%. As for Down syndrome, the most prevalent dental anomaly was agenesis with 83.3%, followed by fluorosis (16.7%). Regarding patients with cerebral palsy, 60% were cases of macrodontia and agenesis and hypoplasia occurred in an equal rate of 20% each. As for Hydrocephalus, fluorosis had a prevalence of 66.7%, and fusion 33.3% (Table 3).

Table 3. Distribution of patients according to the type syndrome or disorder.

Type of Syndrome and/or Disorder	Frequency	
	N	%
Mental Retardation		
Fluorosis	14	60.9
Agenesis	4	17.4
Hypoplasia	2	8.7
Macrodontia	1	4.3
Fusion	1	4.3
Supernumerary	1	4.3
Behavioral Disorders		
Fluorosis	5	38.5
Agenesis	4	30.8

Hypoplasia	3	23.1
Macrodontia	1	7.7
Down Syndrome		
Agenesis	5	83.3
Fluorosis	1	16.7
Cerebral Palsy		
Macrodontia	3	60.0
Agenesis	1	20.0
Hypoplasia	1	20.0
Hydrocephalus		
Fluorosis	2	66.7
Fusion	1	33.3

As for the pathologies, the most common dental anomaly in Autism was fluorosis (100%). The dental piece with the highest incidence of anomalies was 11 with 44.1% and 45 with 42.4%. With regards to permanent dentition, quadrants in which dental anomalies occurred most frequently were Quadrant #4 with 36.5%, Quadrant #2 with 26.9%, Quadrant #1 with 26.7%, and Quadrant #3 with 26.5%. Only 1.9% of the patients observed had dental anomalies in deciduous dentition.

Discussion

When comparing the results of this research with those obtained in Colombia [19], it has been found that: 115 patients with anomalies were between 5 and 27 years of age, 63% were male and 37% were female, coinciding with the present study, in which 22% occurred in females and 78% in males. Because the presence of dental anomalies in humans is rare, its prevalence and distribution have been reported in the literature in recent years.

Only a few studies describe the frequency and distribution of dental anomalies in exceptional children; reporting in different populations, which may reflect not only differences in study methodologies, but also variations in demographic and environmental susceptibilities [5].

Previous authors found in the city of Mérida, Venezuela that agenesis, excluding third molars, had a prevalence of 6.18% with a diagnosis of hypodontia [20], which differs from the present work, in which agenesis was found to have a prevalence of 23.7%. There is a coincidence with our study, because all subjects with agenesis were diagnosed with hypodontia. It should be noted that the present study was performed in patients with systemic pathologies, due to the lack of studies in exceptional patients. One of the first studies was conducted in 1974 with 161 patients who had supernumerary teeth and, in 5 of them, he evidenced agenesis of one or more pieces, so the frequency of "concomitant hypo-hyperdontia" (CHH) in patients with supernumerary teeth was 3.1% [21].

The literature classifies the syndrome of "concomitant hypo-hyperdontia" (CHH) in four subtypes, without taking into account the third molars when assessing the agenesis, unlike Gran, who does include them when studying the concomitant hypo-hyperdontia. To classify the subtypes, he refers to the location of the anomaly. Premaxillary, if said anomaly occurs from canine to canine; maxillary, mandibular, and bimaxillary if it occurs in both maxilla and mandible [22].

Among the Spanish population where it was found that the population with Down syndrome had 100% incidence of dental anomalies [23], differing from the present research, in which the percentage of children with Down syndrome affected was 10%, as only 6 patients with this pathology had dental anomalies. In another study, shape anomalies were determined, with fusion being found to have a percentage of 10% [19], taking distance from the current research, where the percentage was 3.4%. As for structure anomalies, 12% of patients were found to be affected, with fluorosis being present in 50.8% and hypoplasia in 10.2% of patients.

With regards to number anomalies, the authors found 16%, whilst this research evidenced 23.7% agenesis and 1.7% supernumerary teeth; these are part of the classification of number anomalies [19]. In a descriptive, cross-sectional study conducted in a sample of 455 schoolchildren from 6 to 13 years of age suffering from Down syndrome, dental fluorosis was found to have a prevalence of 73.4%, coinciding with this investigation, with a smaller group of patients studied, resulting in 50.8% of affected patients [23].

The severity of fluorosis is mainly related to the amount of fluoride ingested, and in this sense, we consider that the patients who participated were exposed to Fluoride above the optimal doses during the odontogenesis stage, or they may present higher susceptibility. In this study, important results were obtained for the Barranquilla Exceptional Patients Foundation, as well as for the professionals and people who are in charge of the participants' care, since because of this study, these patients may have the opportunity to receive comprehensive treatment, considering their diagnosis. This integral treatment will consist in delving more deeply into the dental problems such as dental anomalies, so as to provide proper treatment for each.

Likewise, it will be of great relevance for the community of the city, as it will encourage dentists to commit themselves professionally, when dealing with the population of exceptional patients, to performing a meticulous examination, not only providing preventive treatment for caries or common diseases, but also recognizing dental anomalies that are relevant and that should be treated timely as required. It should be noted that the studies associated with this research were conducted in non-exceptional patients.

This study has some limitations. First, it was not possible to expanded the sample because the university only has an agreement with that institution of patients with special needs. Second, there was no possibility of using dental X-rays because of the difficulty of transferring patients to radiological centers. Third, some patients did not participate in the study because of the lack of interest of their caregivers in signing Informed consent.

Conclusion

Males were found to have the highest prevalence of dental anomalies. The anomaly with the highest prevalence in each participant was fluorosis, may be due to excessive consumption of fluoride before the eruption of the tooth, or due to water consumption in many areas where it can contain

high levels of Fluoride, which was the predominant case in patients with mental retardation, disorders that affect behavior, autism, hydrocephalus and fusion.

The syndrome and / or disorder with the highest presence of dental anomalies was mental retardation. In Down syndrome patients, the dental anomaly that had the highest prevalence was agenesis; in patients with cerebral palsy, macrodontia was predominant. As for the most affected dental organ, in all the patients examined, it was maxillary central incisor.

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Conflict of Interest: The authors declare no conflicts of interest.

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