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A study of the dental treatment needs of special patients: cerebral paralysis and Down syndrome

ABSTRACT

Aim The aim of the present study was to compare the dental characteristics and the oral health care needs of patients with Cerebral Paralysis (CP) and Down Syndrome (DS).

Materials and Methods The selected sample consisted of 28 patients of both sexes between 10 and 20 years of age. Study Design: observational, descriptive and cross-sectional study. Statistics: The statistical analysis was carried out with the SPSS 19.0 program for Windows. The frequency distribution and contingency tables were analysed, as was interobserver concordance. *non mi è chiaro cosa intendono qui.*

Results Fifty percent of the patients with CP presented dental traumas, compared to 15% of the patients with DS. Dental prophylaxis was the most prevalent treatment in both groups (77% in CP compared to 86.7% in DS). The most frequent habit was oral breathing, which was found in 69.2% of the patients with CP and 80% of those with DS.

Conclusions Patients with CP and DS require early dental care in order to prevent and limit the severity of the pathologies observed.

Keywords Cerebral palsy; Dental treatment need; Down syndrome; Special need patients.

Introduction

Within the group of patients with special needs are two very common pathologies, cerebral paralysis (CP) and Down Syndrome (SD), which not only affect the patients' general health but also their craniofacial growth and development. These patients are more prone to develop oral diseases, have difficulties in removal of bacterial plaque, frequently consume sugar-sweetened foods and medicines, present xerostomia, delay in eruption, a compromised buffer capacity of saliva and abnormal tension in their facial muscles, as well as deficient control of the lips and tongue. They also have dysfunctional chewing and swallowing, in addition to a higher probability of being mouth breathers, presenting malocclusion and trauma, and they are also susceptible to demineralisation and caries, as well as bruxism and temporomandibular joint disorders [Al Habashneh et al., 2012; Carvalho et al., 2011; Chu and Lo, 2010; Du et al., 2010; Giménez et al., 2003; Grzic et al., 2011; Ihtijarevic-Trtak et al., 2014; Rodrigues et al., 2003; Rosenbaum and Stewart, 2004; Siqueira et al., 2007]. These patients may also present agenesis, hypodontia, supernumerary teeth, microdontia, taurodontism, or hypoplasia [Bradley and McAlister, 2004; Davidovich et al., 2010; Jara et al., 1995].

The principal objective is to recognise and compare the oral pathologies and the dental care needs of patients with DS and CP. Our hypothesis is: Do patients with SD and CP have the same needs of treatment at our dental practice? Therefore we consider a review of treatment needs and oral characteristics of these patients necessary to improve dental treatment, update existing knowledge and identify the right preventive approach to these problems, which can improve the quality of care.

Materials and methods

Sample

The records of patients treated under the Master's Programme "Specialist in Dental Care for Children with Special Needs," of the School of Dentistry of the Universidad Complutense de Madrid (Madrid, Spain) were evaluated. The sample selected comprised 91 patients. The following criteria for inclusion and exclusion were applied.

- Criteria for inclusion: Patients with Down Syndrome or Cerebral Paralysis with a medical diagnosis, who presented their medical records, aged between 10 and 20 year, of both sexes. They belong to the

Master's Programme "Specialist in Dental Care for Children with Special Needs," at the School of Dentistry of the Universidad Complutense de Madrid. All of them were required to have an informed consent form signed by their parents or legal guardians. The procedures, possible discomforts or risks, as well as possible benefits were explained fully to the parents or legal guardians to the subjects involved, and their informed consent was obtained prior to the investigation.

- Criteria for exclusion: Transplant patients, chronic degenerative diseases, motor deficiency or sensory or mental retardation, in the absence of CP or DS. Patients without quality x-ray records, or with incomplete medical records, those who refused to participate in the study or those for whom their parents or caregivers could not provide sufficient data.

In the end, 28 patients took part in the study; 13 patients had CP, and 15 DS. The distribution of the sample by gender was 61.5% females with CP, compared to 53% with DS. Among the males, 38.4% had CP, and 46.6% SD.

Materials

Medical records, periodontal probe, mouth mirror, bitewing x-rays and panoramic x-rays made with the same equipment and technical specifications.

Methods

This is an observational, descriptive and cross-sectional study, which was structured in three parts: medical interview, oral examination and x-ray examination.

Medical interview

The principal researcher held a medical interview with the parents or legal guardians that accompanied the patient to the Master's Programme. The interview consisted of the following parts:

- Medical history. The pathology of the patient is described through questions under different headings: cardiovascular system, central nervous system, haematopoietic and lymphatic system, respiratory system, endocrine system, growth and development, skin, bone and joint system and vaccinations.
- Current medical history. Includes current reports from the physician regarding any medical pathologies the patient presents, as well as any current pharmacological treatment and possible allergies to medicines.
- Dental history. Possible disorders as well as oral hygiene habits, among other things.
- Behavioural history. Refers to the anxiety of the parents and patients and their behaviour during previous visits to the dentist.

Oral examination

The principal researcher conducted an oral examination

of all the patients. The dental evaluations were conducted according to a uniform procedure, under good lighting conditions, with the patient lying in the dentist's chair. This study received support from a student from the Master's Programme, trained in the use of the clinical record card. The parents were not present in the office during the oral exploration.

X-ray examination

The orthopantomography was taken at the Radiology Department of the School of Dentistry of the University of Madrid. The bitewing x-rays were taken by the principal researcher with the help of a student from the Master's Programme.

Results

Statistical validation

The data collected were transferred to an Excel® database. The statistical analysis was made with the SPSS 19.0 for Windows programme, with the help of the University's Computer Support Service for Teaching and Research. The frequency distribution and contingency tables were analysed for the relationship among the qualitative variables. The interobserver concordance was also analysed; for this, all the patients in the sample, as well as their x-ray records, were evaluated by two different examiners at different times. After calibration, the results found in both cases were identical, with an interobserver concordance of 100%.

Bearing in mind the study variables, the following results were obtained.

- Dental pain and traumas: 53.8% of patients with CP had never experienced dental pain, 7.7% had in the last three months, and no patient had experienced it previously; 60% of the patients with DS had never in their life experienced dental pain, while 6.7% had during the previous three months and 13.3% before that period. As for traumas, 50% of the patients with CP had had some lesion of this type, compared to 15% of the patients with DS (Fig. 1).
- Dental treatments received (dental history). Seventy-seven percent (77%) of the patients with CP had been submitted to dental prophylaxis at least once, compared to 86.7% of the patients with DS. Sixty-nine point two percent (69.2%) of the patients with CP had received applications of fluoride in a dentist's office at least once, compared to 60% of the patients with DS. With respect to dental treatments with sealants, we made a distinction between primary teeth and permanent teeth. In primary teeth, 7.7% of patients with CP had received treatment with sealants in the first and fourth quadrant; however, in the second and third quadrants, no sealants had been used on any of the patients. The group with DS has similar results in the four quadrants, with a percentage of 6.7%. However, in the permanent

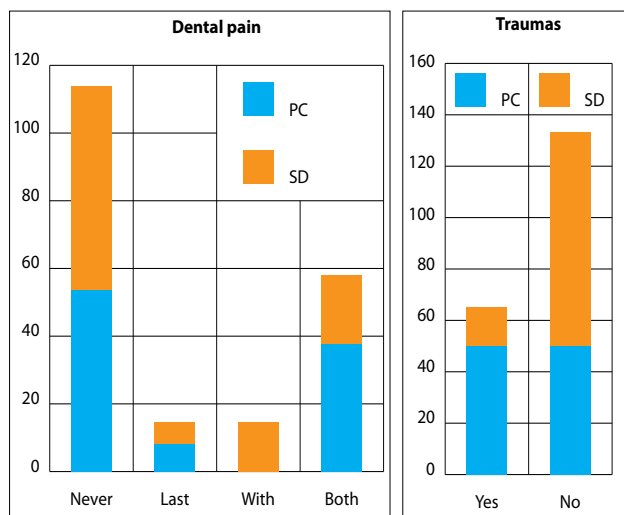


FIG. 1 Distribution of dental pain (A) and traumatism (B) in the entire sample with CP and DS.

teeth, the value is much higher. In patients with CP, the value obtained is 23.1% in the third quadrant and 38.5% in the second quadrant. In patients with DS, it ranges between 46.7% and 53.3%. Regarding treatment with preventive resins, some 7.7% of the patients with CP had received it on their primary teeth, and 15.4%, on their permanent teeth. However, no patient with DS had received treatment with preventive resins on both dentitions.

Study of dental treatments based on restorations or fillings in both dentitions, and bearing in mind the dental quadrant, showed in the group of patients with CP and primary teeth, values of 15% in the first, second and fourth quadrants, and 23.1% in the third quadrant. In the primary teeth, 0.7% of the patients with DS presented fillings in the second quadrant and 13.3% in the third, while in the first and fourth quadrants, no fillings were observed. Regarding restorations in permanent teeth, in the group with CP, the values ranged between 30.8% in the first and second quadrant and 38.5% in the third and fourth quadrant. However, in the group of patients with DS, the values were 26.7% in the first quadrant and 53.3% in the second quadrant.

For treatments involving large reconstructions, pulpotomies, preformed crowns and space maintainers, it was observed that 8% patients with CP had been treated with crowns and 23.10% with reconstructions. None had received pulpotomies or maintainers. Likewise, none of the patients with DS had received crowns, space maintainers or pulpotomies, although 6.7% of these patients presented large reconstructions.

When studying the treatment on the basis of dental extractions, a distinction was made between primary and permanent dentition. In primary dentition, no extractions had been performed in the fourth quadrant among the group of patients with CP. In the first and

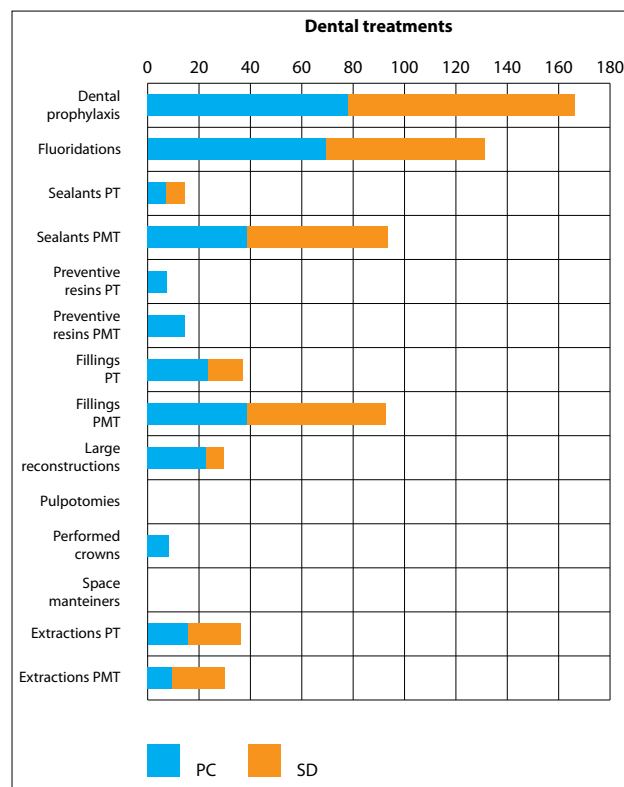


FIG. 2 Distribution of dental treatments conducted on the entire sample with CP and DS.

third quadrants, the percentage was 15.4%, and in the second quadrant, 7.7%. In the patients with DS, a percentage of 16.7% was observed in the third and fourth quadrants, 20% in the first quadrant and 13.3% in the second quadrant. For permanent teeth, the group of patients with CP had extractions only in the first quadrant, with a percentage of 7.7%. In the group of patients with DS, no extractions had been performed in the first and second quadrants, while in the third quadrant, the percentage was 20% and in the fourth, 6.7% (Fig. 2).

Habits, oral disorders and dental development

The most frequent habit in the CP group is mouth breathing, which is present in 69.2% of the patients, followed by drooling, 46.2%, and grinding and chewing objects, 30.80%. The least frequent habit is lip biting or sucking, which was found in 7.7%. In the group with DS, mouth breathing is the most frequent habit, found among 80%, followed by finger sucking and grinding, with a total of 13.3% in all the cases. For disorders, among the group with CP, the most frequent one is halitosis, found in 46.2% of the patients, followed by gingival bleeding in 38.5%. No patient suffered of burning mouth syndrome. In the group with DS, dry mouth was the most frequent disorder (40%), followed by halitosis in 33.3% and gingival bleeding, which was found in 26.7%

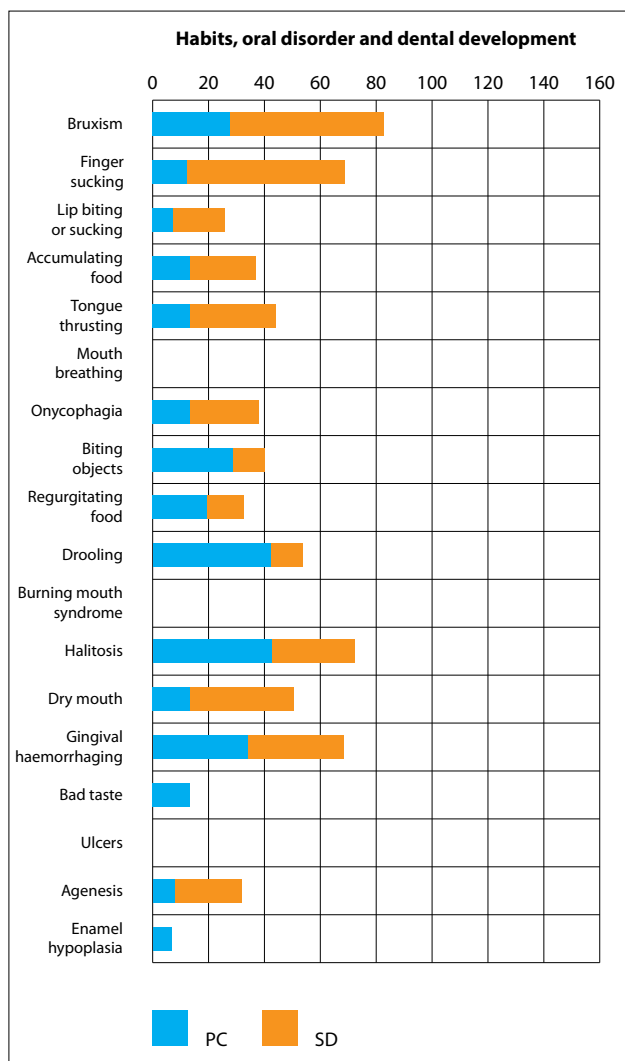


FIG. 3 Distribution of habits and oral and dental development disorders in the entire sample with CP and DS.

of the sample. The least frequent disorders were burning mouth syndrome and ulcers, with a percentage of 6.7%. Agensis and enamel hypoplasia were present in 8.3% of the CP group. However, in the group with DS, agensis was present in 26.7% of the cases and hypoplasia did not appear in any patient in this sample (Fig. 3).

Oral health and oral hygiene habits

Curiously, 100% of the patients with CP brushed their teeth by themselves, compared to 92.3% of the patients with DS; 80% of patients with CP received help with brushing, either from their parents or legal caregivers and 69% of the patients with DS received this help. The parents or legal caregivers supervised brushing in 78% of the patients with CP, compared to 83% of the patients with DS. Bearing in mind the daily number of brushings, 20% of the patients with CP brushed their teeth once a day, 30% twice a day and 50% three times

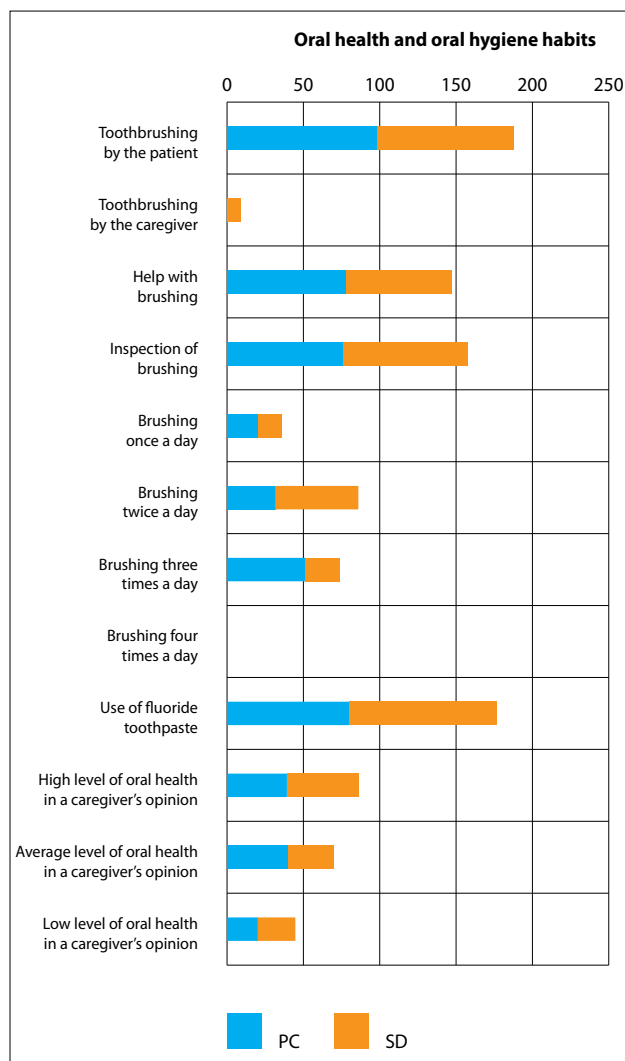


FIG. 4 Oral health and oral hygiene habits in the entire sample with CP and DS.

a day, while no patient brushed their teeth four times. In the group with DS, 17% brushed their teeth once a day, 58% twice daily, 25% three times and, as in the group with CP, no patient did it four times a day. Parents or caregivers considered the oral health of the patients in the CP group, as good in 40% of cases, insufficient in 20% and in 40% of cases considered it average or poor. In the DS group, 46.2% of parents or legal caregivers thought that their child enjoyed good oral health, while for 23% it was insufficient and for 30.8% average or poor (Fig. 4).

Variables that influence dental treatment

Fifty percent of the patients with CP presented some difficulty in opening their mouths and 11.10% had problems during dental treatment. Among the patients with SD, 30.8% had some difficulty in opening their mouths; however, none had a problem during dental treatment. Respectively, 45.5% and 61.5% of the patients

with CP and DS had difficulties in both communicating and learning; 9% of the patients with CP and 7.7% of those with DS only had learning difficulties, and 27.3% of the patients with CP and 30.8% of those with SD only had difficulties with communication; 9% of the patients with CP did not present any of the two difficulties and no patients with SD. Considering the anxiety of the patients regarding dental treatment, in the opinion of the parents or caregivers, 50% of the patients with CP had anxiety, 10% of it mild and 40% moderate, but none had a severe degree of anxiety. Among the patients with SD, 38.5% had no anxiety about dental treatment, while 30.8% showed a mild degree of anxiety, 15.40% a moderate degree and 7.7%, a high degree of anxiety about the treatment. Considering the anxiety of the parents or caregivers about dental treatment, in 60% it was mild, in 10% very mild, in 10% average, and in the remaining 20%, high. However, 63.6% of the parents or caregivers of the patients with DS had a mild degree of anxiety about dental treatment, 18.2% a very mild degree, none showed severe anxiety and 18.2% showed a high degree (Fig. 5).

In the end, none of the patients in the study required general anaesthesia for their dental treatment.

Discussion

A review of the literature shows a lack of comparative studies on oral pathology in patients with special needs.

Costa et al. [2014] affirm that 10.6% of all the patients with CP have suffered a dental trauma. For Holan et al. [2005] 57% of these patients reported a history of trauma, but in this case, the control group was the general population. However, Chandna et al. [2011] found a minor prevalence, which could be due to the fact that individuals with CP cannot take part in many of the activities which people without disabilities do, thereby mitigating the risk of dental trauma. Du et al. [2010] did not find statistically significant differences in the prevalence of dental traumas between those with and without CP. Dos Santos and Souza [2009] maintain that the prevalence in the group with CP is similar to that of the general population, regardless of the type of malocclusion they present.

As for the incidence of caries in CP patients, some authors [Grzic et al., 2011; Guade and Ciamponi, 2003; Holan et al., 2005; Rodríguez et al., 2003] maintain that it is similar to the rest of the population, but the caries lesions in this case are more extensive. However, other authors [Carvalho et al., 2011; Chu and Lo, 2010; Du et al., 2010; Giménez et al., 2003; Pope and Curzon, 1991] contend that the incidence is greater than in the general population, due above all to the type of diet, medication, poor hygiene and motor skill disorders. For patients with DS, some authors maintain that the incidence of caries is similar to that of the general population, and even

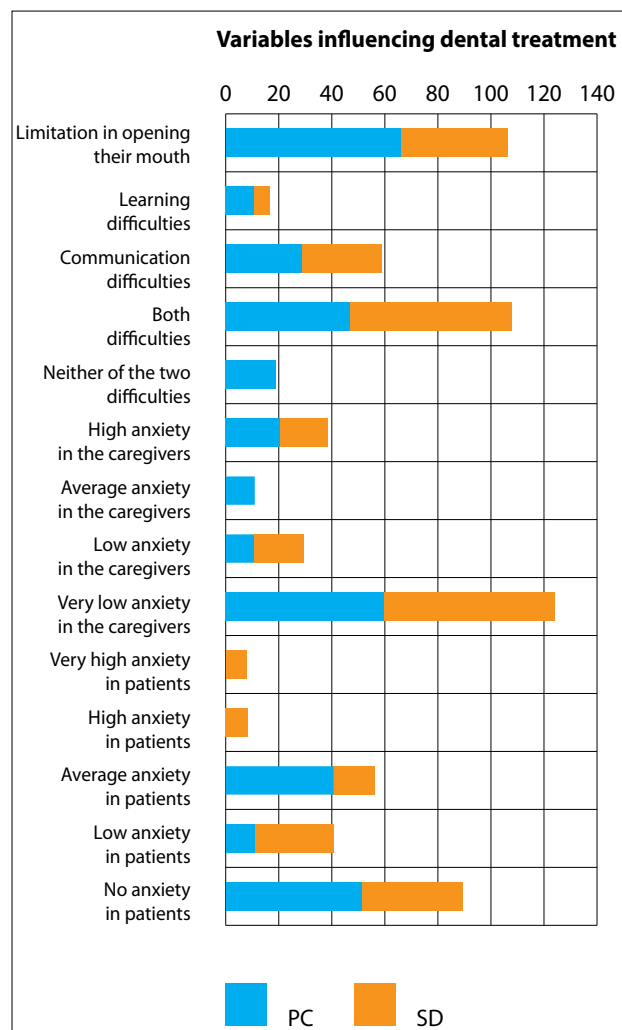


FIG. 5 Variables influencing dental treatment in the entire sample with Cerebral Paralysis and Down Syndrome.

lower [Bradley and McAlister, 2004; Davidovich et al., 2010]. In our research, we did not study the incidence of dental caries; however, the average index of patients with DS that required fillings in primary teeth was 5% and in permanent teeth, 36.6%, values similar to the group with CP, where in primary teeth it reaches 17.3% and in permanent teeth, 34.6%. The patients with CP needed a greater number of large reconstructions and preformed crowns, with 23.1% and 8% compared to 6.7% and 0%, respectively, in patients with DS. The average index of extractions is similar in both groups in primary teeth, while in permanent teeth, it is greater in DS compared to CP.

In a study of Giménez et al. [2003] 38.5% of the patients with CP had been subject to dental extractions of permanent teeth, while 42.1% presented fillings in permanent teeth and 5.8% had fillings in primary teeth. In our study, the average percentage of patients with CP who underwent extractions of permanent teeth is much lower (1.92%); 34.6% presented fillings in permanent

teeth and 17.3%, fillings in primary teeth. As a result, in general terms, in our study, the percentage of patients with dental treatment in both groups is similar, as our sample benefited from the same plans for prevention, treatment and follow-up.

With respect to bruxism, 30,8% with CP presented this habit, while Bhat et al. [1992], found that 15% in children with CP had this habit.

The incidence of drooling is much higher in the CP than in the DS group (46.2% compared to 13.3%). Morales et al. [2008] found that 58% of the patients with CP had this habit. Tahmassebi and Curzón [2003] found it to be 58%.

Hedge et al. [2008] saw no significant differences regarding the presence of carious, malocclusions or oral hygiene indices in CP with and without the drooling habit.

The values for enamel hypoplasia obtained in our study are 8.3% in CP and none in DS patients. Carvalho et al. [2011], in their study of patients with CP, observed defects in dental enamel in 38.5%, while Bhat et al. [1992] found it in 32% of their samples. Dos Santos and Souza [2009] found defects in the enamel on the labial surface of 13 teeth in nine patients with CP. However, Du et al. [2010] did not find statistically significant differences regarding developmental defects involving enamel between patients with and without CP.

As for the presence of agenesis, in our study 8.3% in the CP group and 26.7% among patients with DS. In the study by Carvalho et al. [2011] on patients with CP, 13.5% had anodontia.

Regarding oral hygiene care, the majority of the patients in both groups brushed their teeth by themselves: 100% of the CP group and 92.3% of the DS patients. However, 80% and 69.7% of the CP and DS groups, respectively, received help when brushing; 77.8% of the patients with CP and 83.3% of those with DS were supervised during brushing; 20% of the CP patients and 17% of those with DS brush their teeth once a day; 30% and 58% of patients with CP and DS, respectively, do so twice a day and 50% of those with CP and 25% of those with DS, three times a day; 80% of the patients with CP use fluoride toothpaste, compared to all of the patients with DS.

Conclusions

Our conclusions are the following.

1. Half of the sample in both groups had had no dental pain before being treated. The patients with CP had suffered more traumas and had required more complex restorative treatment than the patients with DS.

2. The most frequent oral habit in both groups was mouth breathing, while the most common oral disorder was dry mouth in patients with DS and halitosis in those with CP. Agenesis is more frequent in patients with DS while hypoplasia is more common in those with CP.
3. Both groups presented problems in learning and communication during the dental treatment.

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