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Editorial

Dear Researcher,

We have the great pleasure to entry the eighth edition, volume one, of the ***Journal of Surgical and Clinical Dentistry - JSCD****.*

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Our ninth edition will be available in April, 2016!

Happy reading!

Mário dos Anjos Neto Filho
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Summary

ORIGINAL ARTICLE

CASE REPORT

IN VITRO EVALUATION OF THE ANTIMICROBIAL ACTIVITY OF DENTAL MATERIALS AGAINST *Streptococcus mutans*

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ABSTRACT

Secondary caries is related to the colonization of the tooth restoration interface by cariogenic microorganism. Believed that the use of materials with potential antimicrobial activity, either as protection of the dentin-pulp complex or as restoration, may have a role in preventing secondary caries. To verify this, we analyzed the following materials: acrylic resin; glass-ionomer, Maxxion-R; tooth sealant, Ultra Seal XT- Ultradent; fluid resin, Perma Flo – Ultradent; ionomer sealant, Clinpro XT Varnish – 3M; and adhesive system, PQ1 – Ultradent. The agar diffusion test performed to determine the bacterial growth inhibition of *Streptococcus mutans*. The materials were prepared according to the manufacture´s recommendations under aseptic conditions, and placed in Petri dishes containing solid BHI medium with 0.2 U/L bacitracin (selective medium for *S. mutans*), prepared in triplicate. The plates incubated at 37ºC with 5% CO_2 and observed daily for 7 days. The antimicrobial activity of these materials obtained by the ratio between the diameter of the specimen and the diameter of the halo of growth inhibition formed around it. As expected, the acrylic resin (negative control) showed no antimicrobial activity, while the glass-ionomer (positive control) showed inhibitory activity. Between the tested materials, only the ionomer sealant and adhesive system showed significant antimicrobial activity, compared to controls.

KEYWORDS: Products with Antimicrobial Action, Dental Materials, Dental Caries, *Streptococcus mutans*.

1. INTRODUCTION

Due to its high prevalence, dental caries is still considered a public health problem, especially in lower socioeconomic status communities, where the high consumption of sugar and other fermentable carbohydrates may interfere with the equilibrium of the host's oral microbiota[11,14-22].

Regarding the clinical longevity of the dental restorative procedures, secondary caries is a relevant factor in restoration replacement[s7,17-21], particularly due to the interface created between the tooth and the restoration after the cavity preparation, that can favor the marginal microinfiltration and its colonization by potentially cariogenic microorganisms. This event becomes more likely with the polymerization contraction of improper polymeric restorative materials[6].

In addition to this, in order to minimize the retention of oral plaque and, consequently, prevent the formation of carious lesions around restorations, one should also consider factors such as surface smoothness after finishing and polishing the restoration, and the antimicrobial action of the dental materials. In patients more susceptible to caries, the higher the surface roughness of restorations, the higher the colonization by potentially cariogenic microorganisms, increasing the likelihood of secondary caries[23]. However, the metabolism of the microorganisms that colonize restorations can be minimized with restorative materials bearing antimicrobial properties[9,26-33.]

The aim of this study is to evaluate the *in vitro* antimicrobial properties of different dental restoration materials against *Streptococcus mutans*, one of the major causative agent of dental caries.

2. MATERIAL AND METHODS

To test the antimicrobial activity of six dental materials we used a standard strain of *Streptococcus mutans* (UA159). The cariogenic strain UA159 we used in the

genome sequencing of *S. mutans* and kindly donated by Professor Rita de Cássia Café (Institute of Biological Sciences of the University of São Paulo).

The bacteria maintained in Petri plates with solid brain heart infusion (BHI - DFICO) and kept under refrigeration. For the experiments, we removed a small amount of culture from the plates with a platinum inoculation loop, diluted in 5 mL of liquid BHI and incubated for 16 hours at 37ºC and 5% CO_2 and no agitation.

The following materials were analyzed: acrylic resin, JET-Classic; conventional glass ionomer cement, Maxxion R – FGM; mono component adhesive system, Pq1 – Ultradent; fluid composite resin, Perma-Flo – Ultradent; resinous sealant for pits and fissures, Ultraseal – Ultradent; and ionomeric sealant Clinpro Varnish XT - 3M ESPE. Disc-shaped specimens were prepared with the mentioned materials measuring 6 mm of diameter and 2 mm thickness (Figure 1). All materials were handled in aseptic conditions, following the manufacturer's instructions.

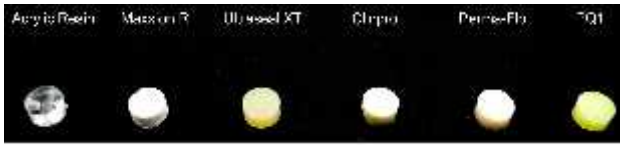

Figure 1. Specimens prepared for the agar diffusion test. Dimensions: 6 mm of diameter and 2 mm thickness. From left to right: acrylic resin, conventional glass ionomer cement, monocomponent adhesive system, fluid compound resin, resinous sealant of pits and fissures and ionomer sealant.

We inserted all specimens into a metallic matrix with same dimensions as mentioned above (Figure 2), to polymerization. For the acrylic resin and ionomer cement, we waited for the chemical cure; meanwhile, polymerized physically via photopolymerizer the other four materials.

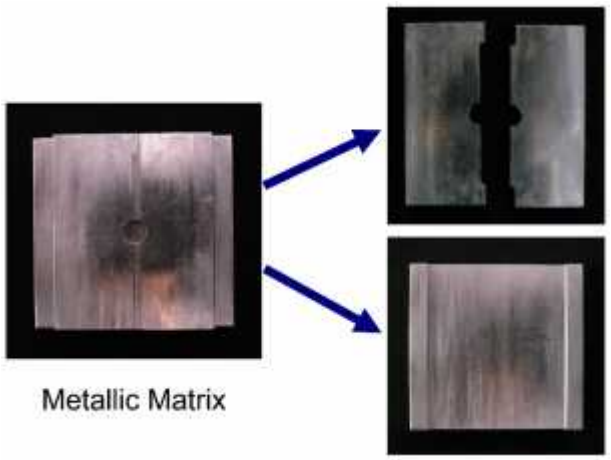

Figure 2. Matrix used for the specimens.

In order to evaluate the ability of the analyzed materials to release antimicrobial compounds into the medium, we conducted an agar diffusion method. The specimens were placed on the surface of solid BHI medium (10 mL) added with 0.2 U/mL Bacitracin (Sigma Aldrich), in Petri plates, with 100 µL of *S. mutans* (obtained from the cultures described above). Finally, the plates were incubated at 37ºC and 5% CO_2 and observed daily for up to 7 days. The antimicrobial activity was measured as the diameter of the halo of growth inhibition around the specimens. For a better visualization of the results, the plates were stained with crystal violet and photographed. The antimicrobial activity of the different materials was calculated as an inhibition zone (IZ), given as the ratio between the growth inhibition halo diameter and the specimen diameter. The acrylic resin and the glass ionomer were used as negative and positive controls, respectively. We conducted the experiment in triplicate, with two repetitions. We obtained the averages and standard deviations of the inhibition zones for each material and the statistical significance of the results were assessed with Student *t* test conducted on Excel (Microsoft).

3. RESULTS

As expected, the acrylic resin (negative control) did not show any antimicrobial activity, while the glass ionomer cement (positive control) showed an inhibition halo, proving the efficacy of the method.

According to Figure 3, both the ionomer sealant (Clinpro XT) and the dental adhesive (Pq1) showed antimicrobial activities against *S. mutans* similar to the positive control. On the other hand, the resinous sealant (Ultraseal XT) and the fluid resin (Perma-Flo) showed no statistically significant antimicrobial activity.

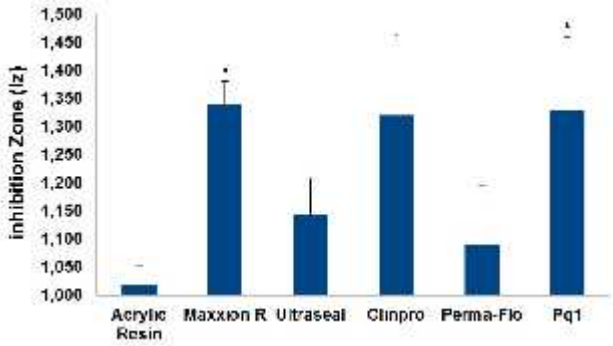

Figure 3. Graph with the averaged Iz for each material. The experiment was conducted in triplicate, with two repetitions. *Statistically different from the acrylic resin ($p<0,05$).

4. DISCUSSION

Given the high frequency of restoration replacements due to secondary carious lesions[5-25], some features are recommended for adhesive restorative materials such as low polymerization contraction, linear thermal expansion coefficient, physical mechanical properties similar to those of the dental substrate, and antimicrobial activi-

ty, capable of protecting the dental substrates from the adverse effects of a possible marginal microinfiltration. In this study, the activity of six dental restoration materials against a strain of *S. mutans* was evaluated in BHI agar medium. Among these, the acrylic resin (JET-Classic) was used as negative control due to the lack of antimicrobial compounds in its composition[20-27]. The lack of antimicrobial activity in a compound resin can be evaluated by a test proposed by Maara *et al.* (2012)[16]. In their study, the test was conducted with and without PTBAEMA against *Staphylococcus aureus*, *Streptococcus mutans*, and *Candida albicans* and showed no antimicrobial activity for the resin alone. On the other hand, the conventional glass ionomer cement (Maxxion, FGM) was used as positive control given its capacity to release fluoride and, therefore, to inhibit bacterial growth and to alter the process of demineralization and remineralization of the carious lesion[36].

Due to the range of clinical indications, these two materials were compared to a mono component adhesive system (Pq1, Ultradent); a fluid composite resin (Perma-Flo, Ultradent); a resinous sealant for pits and fissures (Ultraseal, Ultradent); and an ionomeric sealant (Clinpro Varnish XT, 3M ESPE). The microorganism was chosen considering its relation to the caries etiology and its availability in laboratorial research[1,15].

Our results showed that both the ionomer sealant and the mono component adhesive system showed antimicrobial activity similar to the conventional glass ionomer cement. Regarding the latter, the antimicrobial activity may not be attributed only to the fluoride release, which is influenced by the curation speed, but also to the presence of particles of Calcium, Aluminum, and Silicate[36]. The fluoride release process is directly affected by the composition of the material, its storage, the powder/liquid ratio, and the handling method, the pH of the medium, the material porosity after curation, and the type of material used on the surface protection[24]. Contrarily to what is recommended by the manufacturer, we did not use any surface protection material in order to avoid any changes in the concentration of fluoride released during the evaluation period.

When compared to the modified glass ionomer cement added with resinous monomer, the conventional cements are more soluble, more porous, present more irregular particles and higher powder/liquid ratio and, therefore, release larger concentrations of fluoride[12-29]. However, our results showed a similar antimicrobial behavior between the Maxxion R (FGM) cement and the ionomer sealant Clinpro XT Varnish (3M ESPE), a glass ionomer modified by resin indicated to the treatment of dentin hypersensitivity and sealing of pits and fissures. Since it releases fluoride, calcium and phosphate ions, it has antimicrobial properties and the capability to increase the dental surface resistance against the corrosive actions of acids. It is also indicated for application around the dental brackets to control the demineralization of the tooth enamel[2-10].

The antimicrobial property of the mono component adhesive system may be related to its low pH, a common feature for simplified adhesive systems[8]. In addition, this material presents the resinous monomer hydroxyethil methacrylate (HEMA) in its composition that, similarly to the triethylene glycol dimethacrylate (TEGMA), does confer antimicrobial activity to the resinous materials. This property arises in adhesive systems with molecules of glutaraldehyde, fluoride and/ or 12-methacryloyloxy dodecyl pyridinium (MDPB), and methyl methacrylate ammonium chloride (DMAE-CB) in its composition[30,34].

According to the results shown, the acrylic resin, the resinous sealant for pits and fissures and the fluid resin lacked antimicrobial activity. Therefore, pathogenic microorganisms such as Candida albicans and *S. mutans* can colonize the ridges and pores on their surface[20,27,31,32]. Aiming at reducing the microbial colonization on the surface of the acrylic resin, Regis *et al.* (2011)[28] incorporated MDPB to the material. However, this antimicrobial activity presented a defined lifespan and interfered with the mechanical properties of the resin28. Recent efforts to incorporate silver particles to these materials have shown promising results regarding antimicrobial activity.

The resinous sealant and the fluid resin did not show significant activity in comparison to the negative control, even with the addition of sodium monofluorphosphate to their composition. Regarding the amount of fluoride in the resinous monomer, although a smaller quantity of the ion reduces the antimicrobial activity of the resin, it also renders the material more translucent, a desirable feature for restorative compounds[18,35].

If correctly applied, ensuring the prevention of microinfiltration, the lack of antimicrobial activity of the sealant of pits and fissures will not affect its clinical indication and its preventive action against the colonization by cariogenic microorganisms in areas of fissures and pits, of difficult hygienization[3]. Another point worth observing during the sealant application is the relation between its longevity and efficacy. In a systematic review, Kühnisch *et al.* (2012)[13] observed that the sealants retention time is five years and, regardless of its lack of antimicrobial activity, it should be indicated for the mechanical control of the bacterial plaque on the retentive surfaces.

5. CONCLUSION

According to the methodology used in this study, we can conclude that the sealant for pits and fissures and the fluid compound resin did not present antimicrobial activity. On the other hand, the ionomer sealant modified by photopolymerizable resin and the adhesive system

present activity against *Streptococcus mutans.* Thus, this study suggests that the ionomer sealant and the dental adhesive can be used to prevent secondary carious lesions due to their antimicrobial activity.

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PREVALENCE OF DENTAL ANOMALIES THROUGH THE ANALYSIS OF RADIOGRAPHIES

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ABSTRACT

Dental anomalies have been studied in various countries by different people. There are many controversial results in the literature. The aim of this study was to evaluate the prevalence of 8 kinds of anomalies (supernumerary, agenesis, microdontia, macrodontia, transposition, fusion, concrescence and taurodontism), on a sample from Campo Grande, Mato Grosso do Sul Brazil, in a population group between 6 and 15 years old, through 1543 panoramic radiographies; characterize the prevalence observed and its respective hemisections and check if there had been any association of a kind of anomaly diagnosed in a patient (dental agenesis) with the emergence of other kinds on the same individual. For the sample, panoramic radiographies were not used either from patients wearing orthodontic braces or orthodontic retainer. The images were carefully analyzed by a calibrated observer. The results showed that 27.6% of the total sample presented some kind of anomaly. Agenesis was observed in 20.1% of the patients, microdontia in 5.8% of them, taurodontism in 3.1%, supernumerary teeth in 2,1%, macrodontia in 0,3% of the patients, dental transposition in 0,3% and fusion in 2 patients (0.1%). None of the patients presented dental concrescence. From the anomalies observed in this study, 32% involved the upper right hemiarch, 29.1% the upper left, 19.9% the lower right and 19% involved the lower left hemiarch. The presence of a second or third variation of normality was verified in patients who presented agenesis of incisors and premolar.

KEYWORDS: Radiography. Dental malformation. Congenital absence.

1. INTRODUCTION

Dental anomalies have been studied for years due to the problems they might cause if not diagnosed at the right moment. Thus, current figures and more accurate studies are not only a matter of interest for orthodontists but also for Public Health in general.

The main causes of congenital and acquired anomalies are nutritional problems, infections, traumas, temperature variation, as well as intoxication from chemical substances[1]. The existence of an anomaly is clinically relevant to the early diagnosis of a possible association and might indicate an increased risk of other anomalies[2].

Studies about dental anomalies are important as it is possible to prevent the installation of occlusal problems in decidual, mixed and permanent dentitions. The aim of this study was to, through the analysis of panoramic radiographies, look into the appearance of some kinds of dental abnormalities in individuals seen at private practices of Odontological Radiology and observe if, when agenesis was present in an individual, the same person presented other kinds of associated anomalies.

2. MATERIAL AND METHODS

The present study was submitted to the Research Ethic Committee (CEP) from UFMS, with approval under the protocol n° 545.578, from 27/02/2014. Only digital images were used, obtained at two Radiology Clinics from the city of Campo Grande (Brazil) through their database. The radiographies were analyzed in a dark room using a 27” computer (27” iMac – 8G memory).

1543 panoramic radiographies were selected, 818 from female patients and 725 from male patients, aged between 6 and 15 years old. The aim of this study was to obtain the prevalence of the following dental anomalies: supernumerary, agenesis, macrodontia, microdontia, transposition, fusion, concrescence and taurodontism. It was also evaluated in which hemisection there were more cases of anomalies and in which gender there were more cases. In the sample, panoramic radiographies were not used either from patients wearing orthodontic braces or orthodontic retainer, due to the fact that the orthodontic treatment requires, in most cases, that the patient has the third molars or the first pre-molars extracted. Patients carrying syndromes were not included in the sample either.

In order to evaluate dental agenesis in patients with mixed dentition, a table was used. The beginning of the appearance of the third molar crypt around 8 until 10 years old was considered. Thus, it was considered as a

third molar agenesis carrier, patients older than 10 years old, due to the fact that, according to what was expected, up to this age the crypt of these teeth must have appeared.

The analyzed radiographies were separated by filling in a form: by age, gender, and absence or presence of anomaly, tooth in question, and attempted hemi arcade. The images were carefully analyzed by a calibrated observer (through Kappa method) and the radiographic exams with absence of visualization standards and diagnosis were excluded from the research, as well as those which caused doubts on the interpretation of the images.

The evaluation of the association between the gender of the patients and the presence or non-presence of dental anomalies, as well as between the gender of the patients and the agenesis of pre-molar teeth or lateral incisors, with or without association to other anomalies, was made through chi-square test. On the other hand, the comparison between genders, in relation to the percentage of each one of the anomalies observed, was made through test z. The remaining results of the variables assessed in this study were presented either by descriptive statistics or by tables and graphics. The statistical analysis was carried out using the software SPSS, version 20.0 or SigmaPlot, version 12.5, considering a 5% level of significance.

3. RESULTS

Among the patients who were assessed, 72.4% did not present any dental anomaly, while 27.6% presented at least one kind of dental anomaly. In relation to gender, dental anomalies were observed in 27.1% of female patients and 28.1% of male patients.

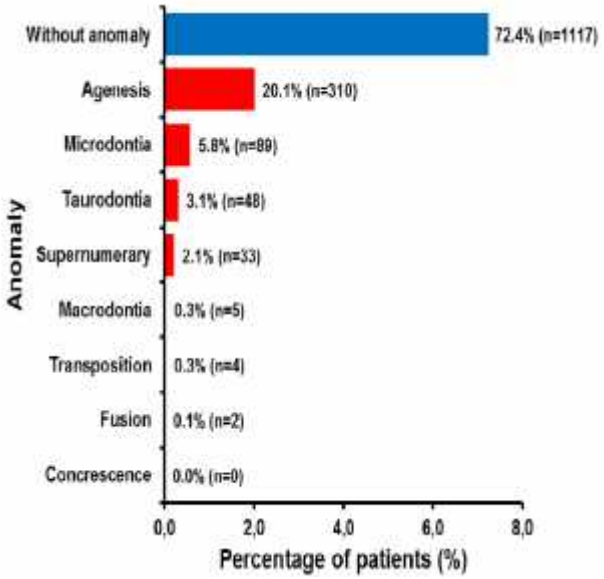

Figure 1. Graphic presenting the percentage of patients without anomalies and the percentage of patients with each one of the anomalies evaluated in this study. Each bar represents the percentage value.

There was no association between the gender of the patients and the presence or non-presence of dental anomalies (chi-square test, p=0.703). In general, the percentage of each anomaly found is displayed on the graphic below (Figure 1).

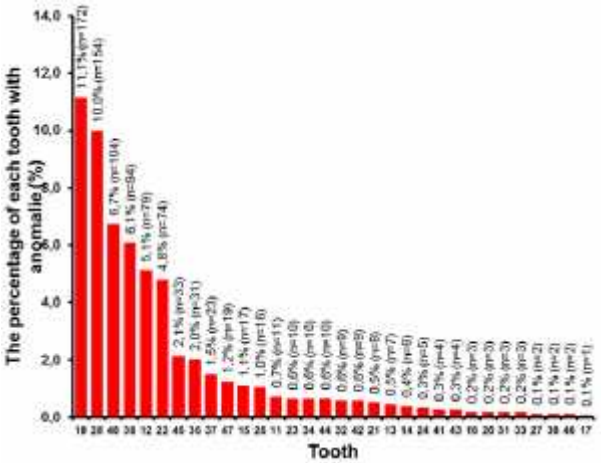

Figure 2. Graphic presenting the percentage of each tooth with anomalies evaluated in this study. Each column represents the percentage value.

Table 1. Distribution of teeth and malfunction of teeth with greater prevalence in each of the anomalies.

Teeth abnormality (n=921)			
Anomaly/tooth	% (n)	Anomaly/tooth	% (n)
Agenesis (71,1% - n=655)		**Microdontia (14,0% - n=129)**	
18	24,9 (163)	12	44,2 (57)
28	21,4 (140)	22	38,0 (49)
48	15,9 (104)	28	9,3 (12)
Taurodontia (9,1% - n=84)		**Supernumerary (4,2% - n=39)**	
37	23,8 (20)	11	15,4 (6)
47	22,6 (19)	23	15,4 (6)
35	15,5 (13)	21	12,8 (5)
Macrodontia (0,8% - n=7)		**Transposition (0,5% - n=5)**	
11	42,9 (3)	13/14	60,0 (3)
21	42,9 (3)	23/24	40,0 (2)
Fusion (0,2% - n=2)		**Concrescence (0,0% - n=0)**	
32/33	50,0 (1)	-	-
41/42	50,0 (1)	-	-

The percentage of male patients with supernumerary teeth (3.2%) was significantly higher than the female patients (1.2%). There was no significant difference be-

tween genders for the other anomalies and among patients who did not present any dental anomaly. The percentage of each tooth involved with anomalies in this study is presented in the Figure 2.

On table 1, the distribution of teeth by anomaly is presented, as well as the teeth with higher prevalence of anomaly in each one of them. Among the 921 anomalies observed in this study, 71.1% of them were dental agenesis, 14.0% were microdontias, 9.1% were taurodontism, 4.2% were supernumerary teeth, 0.8% were macrodontias, 0.5% were tooth transposition and 0.2% were dental fusions. Dental agenesis was most observed on tooth 18 (24.9%), microdontia on tooth 12 (44.2%), taurodontism on tooth 37 (23.8%), supernumerary teeth on tooth 11 (15.4% - n=6), macrodontia also on tooth 11 (42.9%), dental transposition on teeth 13/14 (60.0%) and dental fusion on teeth 32/33 and 41/42 (50% - 1 in each pair).

Table 2. distribution of patients according to gender and agenesis of pre-molar or lateral incisor teeth, with or without association to other anomalies.

Agenesis	Gender		p Value	Total % (n)
	Female % (n)	Male % (n)		
Premolars	**(n=23)**	**(n=28)**		**(n=51)**
Agenesis of 1 premolar tooth	34.8 (8)	39.3 (11)	0.968	37.3 (19)
Other abnormalities, including agenesis of the other premolars	65.2 (15)	60.7 (17)		62.7 (32)
Other types of defects as well as agenesis (among other defects)	20.0 (3)	29.4 (5)	0.838	25.0 (8)
Lateral incisors	**(n=22)**	**(n=20)**		**(n=42)**
Agenesis of 1 lateral incisor tooth	22.7 (5)	10.0 (2)	0.490	16.7 (7)
Other abnormalities, including agenesis of other lateral incisors	77.3 (17)	90.0 (18)		83.3 (35)
Other types of defects as well as agenesis (among other defects)	47.1 (8)	66.7 (12)	0.407	57.1 (20)

From the 33 patients who presented supernumerary teeth, 33.3% of them were mesiodens. From the 310 patients who presented agenesis, 16.5% of them were from pre-molar teeth and 13.5% from lateral incisors. Among those who presented pre-molar agenesis, 37.3% of them presented agenesis only in one of the pre-molar teeth, without any other anomaly, while the others (62.7%) presented other anomalies, including agenesis in other pre-molar teeth. On the other hand, among those who presented agenesis on lateral incisors, 16.7% of them presented agenesis only in one of the lateral incisors, without any other anomaly, while 83.3% of them presented other anomalies, including agenesis in other lateral incisors. There was no association between the gender of the patients and this agenesis (chi-squared test, pre-molar: p=0.968; lateral incisor: p=0.490). These results are presented on table 2.

In this study, 655 dental agenesis were observed, in which 76.5% involved third molar teeth. From the anomalies observed in this study, 32% involved the upper right hemiarch, 29.1% the upper left, 19.9% the lower right and 19% involved the lower left hemiarch.

4. DISCUSSION

There are many studies on the prevalence of dental anomalies, but few talk about the association among different anomalies on the same individual. This can be explained by the difficulty to compare results with several variables, like this one, samples with different sizes, different ethnics and ways of interpreting distinct images.

The presence of dental anomalies is usually missed by most patients because there are no symptoms. However, even silent, these dental variations might be associated to clinical problems, such as teeth cysts, radicular reabsorption, and late eruption of other dental elements. Besides, it may cause aesthetic issues, as in the case of micro teeth (such as conoids – lateral incisors of reduced size).

The radiographic exams used in this study were evaluated by a single observer[3-6] and the compliance of the intra-observer analysis (0.83) was considered high, as seen in other studies about dental anomalies[6,7].

The population researched hereby was mostly composed by female individuals[3,8-13] aged between 6 and 15 years old, as many other studies about this subject[3,4,5,7,14,15] however, diverging from many authors who used extremely different age range[6,7,11,14] what may compromise the sample as older patients might have cases of undocumented dental extractions. Thus, using a reduced age range, the probability of error regarding dental extractions was decreased. It was also taken into consideration the bone density in regions which might have suffered some kind of exodontia.

The sample was composed by individuals who did not present any kind of syndrome[12,15] as many syndromes are characterized by shape or quantity alterations of dental elements, i.e., this study tried to evaluate the population in general, without tending to alterations which could be already expected in certain kinds of patients. Images from patients wearing orthodontic braces or orthodontic retainer were not used, as seen in most studies[3,5,11,15] in order to avoid any kind of tendentious sample, as many patients search for orthodontic treat-

ments because of aesthetic issues and these might be caused by dental anomalies.

It was observed, in the total sample, a prevalence of 27.6% of dental anomalies, which matches a published study[6]; however, it is different from others[2,16], what may be attributed to the different age range, different kinds of population and ethnics found on several existent studies. When comparing the prevalence between both genders, there was no association between the gender.

In the number dental alterations, frequencies of 20.1% of agenesis were observed in the total sample, which matches some known studies[8,10,11] and are diverging from the prevalence found by others[2,3,4,17]. These diverging data might be associated to the population studied as well as the different age range used in the studies. When assessing age range, the percentage changed to 6.1% in patients aged between 6 and 9 years old and 27.7% in patients aged between 10 and 15 years old. Still considering number alterations, there was a prevalence of 2.1% supernumerary teeth, diverging from some studies[18,19],but very close to numbers published in others[2,12,20].

Regarding shape alterations, a prevalence of 5.8% of microdontia could be observed, close to a study previously published about this anomaly; however[21], diverging from many other studies[2,19,20,22]. Still in relation to teeth shape alteration, a prevalence of 0.3% of macrodontia was found, a number close to a study carried out in 2012[19]. Little could be compared regarding this variable as the studies about it are scarce. Back to alterations on teeth configuration, a frequency of 3.1% of taurodontism was found, a number close to a study already published[20], but diverging from others[2,14,19]. In the prevalence of taurodontism, distinct populations and some subjectivity present on the diagnosis criteria might have been determinant in relation to this result. At last, the rate found for fusion was 0.1%, a number close to previous studies[19,20]. No case of concrescence was found [19].

In relation to the alteration of position studied, transposition, four cases were found (0.3%), same number as a study already published[7]. The prevalence found was small and might be related to the fact that, as this alteration interferes a lot in the aesthetic part of the patients, more episodes could have been found in patients submitted to orthodontic treatment.

When seeking to evaluate which teeth were attempted most in the studied sample, a frequency of 11.1% was found for the upper right third molar, 10% for the upper let third molar, 6.7% for the lower right third molar and 6,1% for the lower left third molar. This fact might be related to the frequency of agenesis in the total sample (n=655) and in the sample when excluding the third molars (n=154), which are the most attempted teeth by dental agenesis[17,23].

Among the 921 anomalies observed in this study, 71.1% of them were dental agenesis, 14.0% were microdontias, 9.1% were taurodontism, 4.2% were supernumerary teeth, 0.8% were macrodontia, 0.5% were teeth transposition and 0.2% were dental fusions. Dental agenesis was mostly observed on tooth 18 (24.9%), microdontia on tooth 12 (44.2%), taurodontism on tooth 37 (23.8%), supernumerary on tooth 11 (15.4%), macrodontia also on tooth 11 (42.9%), dental transposition on teeth 13/14 (60.0%) and fusion on teeth 32/33 and 41/42 (50% - 1 in each pair).

From the 33 cases of supernumerary teeth, 33% were of mesiodens, fact that can be associated to documented reports[24] of this kind of alteration in which was verified a higher presence of these teeth in the medium line.

The presence of agenesis in pre-molars showed a strong association between this dental absence and the appearance of other kinds of anomalies on the same patient. From the studied images, 62.7% presented other kind of anomaly associated to the pre-molar agenesis, as well as in other study[10] that found association between this factor and other agenesis on the same individual, as well as the appearance of microdontia.

The lateral incisors agenesis were evaluated and the conclusion was that there is also a strong association (83.3% presented other kind of anomaly) between this kind of dental absence and the appearance of other abnormalities on the same individual, like other studies[11,15] that found association between the lack of the upper lateral incisor and other agenesis and microdontias.

When assessing the most attempted hemiarches in the sample, it was verified that 32% of the dental anomalies affected the upper right hemiarch, 29.1% the upper left hemiarch, 19.9% the lower right hemiarch and 19% the lower left hemiarch, which is directly related to the teeth that were mostly attempted in the whole sample, the third molars, which were more absent in the maxilla than in the jaw[23].

Thus, according to what was observed in this study, the panoramic radiographies continue to be great exams to detect problems which require a wide vision of the maxilla, being the chosen examination in order to investigate abnormalities on the dental development of the individual.

5. CONCLUSION

Based One might, can conclude that:

- Among the population studied, the most predominant anomaly was dental agenesis (20.1%). There was no association between the gender (male or female) and the appearance of the abnormalities researched.
- According to the observation of the mostly affected quadrants by the 8 variables analyzed, the upper ones were the ones which had more teeth attempted.
- Regarding the frequency between agenesis of pre-molars and lateral incisors, a strong relation was

observed between them and the appearance of other anomalies on the same individual, what may suggest that there is genetic association between the mechanisms that promote the manifestation of these findings.

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LOWER INCISOR EXTRACTION AS A THERAPEUTIC OPTION IN DENTISTRY A CASE REPORT

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ABSTRACT

Currently, several orthodontic treatment are proposals to resolve cases of patients with mandibular anterior crowding therefore. The objective of this work is to show a case well diagnosed and successful, and focus on the opinion of different authors on when and what individuals indicate the extraction of a lower incisor and the best time to perform the extractions, their effects on vertical control and facial profile of patients, its benefits. We concluded that the extraction of a lower incisor are not routine procedures, but there are great chances of clinical success when asked about accurate diagnosis and the correct time.

KEYWORDS: Extraction, incisive, orthodontics.

1. INTRODUCTION

Throughout time, several treatment options have been suggested as an option for the treatment of cases where the patient presents a severe lower anterior crowding. Among these the most used methods are: distal movement of posterior teeth, the arch expansion, vestibular projection of the incisors, and interproximal stripping premolar extraction. However, the extraction of a lower incisor can be a very effective treatment option in carefully selected cases. However, it needs careful planning of each case, including evaluating the potential for relapse to the chosen option[1,2.3].

The first case report with lower incisor extraction, as a treatment option, dating from 1904, which was published the treatment of a patient where an incisor had previously been removed and he decided to remove one second incisor as a treatment option[4,5].

The extraction of a lower incisor has the advantage of creating space in the area that is most prone to crowding. However, the treatment may affect the quality of previous dental relations. The excessive overjet and overbite can be induced by discrepancies in the anterior tooth mass caused by the removal of one lower incisor[6,7,8].

The best indication for this approach constitutes the malocclusion Class I, with the lower anterior crowding that approximates the dimensions of a lower incisor, with normal upper teeth, perfect intercuspation, crowding higher mild or nonexistent, balanced soft tissue profile, overjet and minimal or moderate overbite[3,9,10,11].

Orthodontic planning cases with less crowding should be taken into account some measurements as the discrepancy models, cephalometric and Spee curve, so that you know what the size of the required space and then good planning of the case[11,12,13].

Another assessment that deserves mention is the quantification of Bolton discrepancy, the Bolton analysis have an increased percentage and the origin of this value is the upper incisors with reduced mesiodistal diameter to the point of compromising the aesthetics, the chosen procedure is the anatomic restoration of these with restorative dentistry. However, if there is significant lower excess, two alternatives can be chosen: extraction of an incisor or inteproximal wear (stripping) of the incisors[14,15,16].

To define what will be extracted incisor, some aspects should be considered including: amount of space deficiency; Bolton discrepancy; relationship between the average top and bottom line, and periodontal health, indicating the extraction of the incisor that is outside the arc causing the discrepancy in most cases is the central incisor[6,12,7].

According to Valinoti (1994)[13], there is a strong relationship between crowding correction stability and intercanine away. It is believed that because of treatment with extraction of an incisor keep this distance or even reduce it, in anticipation of a future natural decrease, would bring greater stability to the final result[4,5,18].

Thus, the main advantage of the orthodontic treatment with extraction of an incisor presents a considerable reduction in the treatment time, since the tooth removed is close to the problem, in addition to mechanical simplicity, translated into little concern for anchoring and maintenance of intercanine and greater stability after

treatment[1,3,6].

This paper aims to present an alternative approach to orthodontic treatment of patients with lower anterior crowding. Through a case report in which it was found that the extraction of the lower central incisor has proven to be a viable alternative for treating this type of malocclusion class.

2. CASE REPORT

A patient with 9 years old, female, leukoderma, attended the dental clinic of the Faculty Inga, had the esthetic complaint as malposition of the lower teeth. Clinical examination and models there was a dental molar class I relationship, the normal overjet, deep overbite (Figure 1).

Figure 1. Initial extraoral facial Photography.

The discrepancy lower models indicate excess dental mass of less than 1.1 mm. Thus, we confirm that the extraction of the incisor is the alternative most appropriate in this case (Figure 2).

Figure 2. Initial intraoral facial photographs.

Considering the characteristic of the facial pattern, discrepancy models and positioning of the lower incisors in their bone bases, the treatment plan proposed as a viable alternative to the case, removal of tooth 41 was suggested, chosen by the smaller size, position (Figure 3).

Figure 3. Final front smile Photography; right side and left side.

The patient was followed for 5 years for evaluation of orthodontic treatment and verification of stability. The end result shows a Class I relationship of canines, upper midline coinciding with the middle of the lower central incisor, good alignment and leveling and no diastema (Figure 4 and 5).

Figure 4. Final panoramic radiograph.

Figure 5. Final photography; extraoral facial.

3. DISCUSSION

This report indicates that it is possible to obtain excellent and intercisal occlusal relationships in a case with three lower incisors. The Bolton tooth size analysis had limited diagnostic value in these two cases, which, both the one and the other showed moderate excesses in the lower incisors[4,6,7].

The results concluded shown in this article, be more than one option for a negotiation with a lower incisor missing may help in achieving high standards of workmanship[1,12,13].

The clinician does not have to accept the proportions of tooth size and extent of the arc as undesirable elements, which, for better or worse, must be computed on a treatment plan. These proportions can be commonly altered with a selective and judicious removal of interproximal enamel[4,16,18].

4. CONCLUSION

Based on the aspects evaluated, and in the literature evidenced by clinical cases presented here, we can conclude that extraction of a mandibular incisor is a very effective therapeutic approach for judiciously selected situations.

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