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**ARMANDO KOICHIRO KAIEDA**

**A MÁ OCLUSÃO E SUA RELAÇÃO COM A APARÊNCIA DENTAL  
E IMPACTO NAS ATIVIDADES DIÁRIAS DE ADOLESCENTES  
BRASILEIROS**

***MALOCCLUSION, DENTAL APPEARANCE AND IMPACT ON  
DAILY PERFORMANCE IN BRAZILIAN ADOLESCENTS***

PIRACICABA  
2015





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UNIVERSIDADE ESTADUAL DE CAMPINAS  
FACULDADE DE ODONTOLOGIA DE PIRACICABA

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***MALOCCLUSION, DENTAL APPEARANCE AND IMPACT ON  
DAILY PERFORMANCE IN BRAZILIAN ADOLESCENTS***

Tese apresentada à Faculdade de Odontologia de Piracicaba da Universidade Estadual de Campinas como parte dos requisitos exigidos para a obtenção do título de Doutor em Odontologia, na Área de Saúde Coletiva.

Thesis presents to the Piracicaba Dental School of the University of Campinas in partial fulfillment of the requirements for the degree of Doctor in Dentistry, in Public Health Area.

Orientadora: Profa. Dra. Karine Laura Cortellazzi Mendes

Este exemplar corresponde à versão final da tese defendida pelo aluno Amando Koichiro Kaieda e orientada pela Profa. Dra. Karine Laura Cortellazzi Mendes

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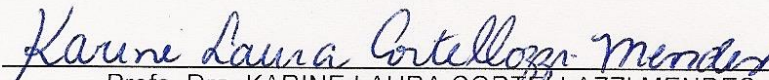
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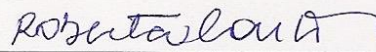
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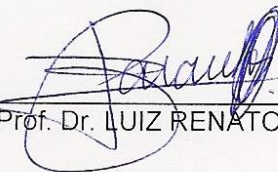


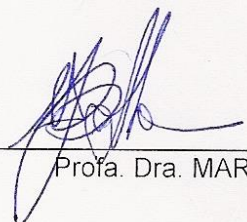
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## RESUMO

O objetivo deste estudo foi avaliar a relação entre a má oclusão com a aparência dental e o impacto da saúde bucal no desempenho das atividades diárias em adolescentes brasileiros. Trata-se de um estudo transversal analítico em adolescentes de 13 a 19 anos de idade procedentes de 21 escolas estaduais do município de Piracicaba e 34 Unidades de Saúde da Família. As variáveis dependentes foram satisfação com aparência dental e o impacto oral nas atividades diárias (OIDP). As variáveis independentes a nível individual foram, sexo, idade, componentes do Índice de Estética Dental (DAI) e a nível contextual foi utilizado o Índice de Exclusão Social (SEI). A análise estatística utilizada foi o modelo de regressão multinível estimado pelo procedimento PROC GLIMMIX (“Generalized Linear Models-Mixed”), considerando as variáveis individuais como nível 1 e a contextual como nível 2, com nível de significância de 5%. No capítulo 1, participaram da pesquisa 882 adolescentes, sendo que os participantes do sexo feminino mostraram-se mais satisfeitos com a aparência dos dentes. A insatisfação com a aparência dental foi encontrada no overjet maxilar, diastema, irregularidade anterior maxilar, irregularidade mandibular anterior, mordida aberta anterior e na relação molar. A satisfação com a aparência dental foi influenciada pelo sexo e por componentes do DAI. No capítulo 2, dos 877 entrevistados no presente estudo, a prevalência de impacto sócio dental foi 39,6%. A atividade diária que apresentou maior impacto foi comer (31,7 %). A dor (57,2%) foi o sintoma mais relatado no momento da entrevista quando relacionado com a atividade de comer. Os voluntários do sexo masculino apresentaram maior impacto nas atividades diárias. Houve um aumento no OIDP com uma maior perda de dentes no arco dental superior, overjet maxilar e idade. Existe relação entre as características individuais e o OIDP em adolescentes brasileiros. O SEI avaliado no capítulo 1 e 2 não foram significativos no modelo. Pode-se concluir que a má oclusão apresentou um impacto significativo na avaliação da aparência dental e no

OIDP, porém não apresentou significância quando relacionados com a variável do Índice de Exclusão Social.

**Palavras-chave:** Adolescente, Má Oclusão, Vulnerabilidade Social, Saúde Bucal, Qualidade de Vida.



## ABSTRACT

The aim of this study was to evaluate the relationship between malocclusion, dental appearance, and impact of oral health on daily performance in Brazilian adolescents. It is an analytical cross-sectional study in 13 to 19 year-old adolescents from 21 state schools and 34 Family Health Units in Piracicaba. The dependent variable was satisfaction about dental appearance and Oral Impact on Daily Performance (OIDP), and the independent variables were classified as individual (gender, age and the components of DAI - Dental Aesthetic Index) and contextual (Social Exclusion Index – SEI). The statistical analysis used was multilevel regression model estimated by PROC GLIMMIX procedure ("Generalized Linear Mixed Models"), considering the individual variables such as level 1 and contextual as Level 2, and the level of significance of 5%. In chapter 1, 882 adolescents participated in the survey, and females showed to be more satisfied with their dental appearance. The dissatisfaction with dental appearance was related to maxillary overjet, diastema, anterior maxillary irregularity, anterior mandibular irregularity, anterior open bite, and molar relationship. Satisfaction with dental appearance was influenced by gender and by DAI components. In Chapter 2, the prevalence of OIDP was 39.6% in the 877 subjects of the study. Among the daily performance activities, eating was the one with the greatest impact (31.7%). Pain was the symptom most reported to be related with the activity of eating (57.2%). The male volunteers presented greater impact on their daily performance. There was an increase in the OIDP as the increase of missing teeth in the upper jaw, jaw overjet and age. There is a relationship between individual characteristics and the OIDP in Brazilian adolescents. The SEI assessed in Chapter 1 and 2 were not significant in the model. In this context, the general conclusion of this study is that malocclusion has a significant impact on dental appearance and on OIDP, but not in Social Exclusion Index.

**Keywords:** Adolescent, malocclusion, Social Vulnerability, Oral Health, Quality of Life



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## INTRODUÇÃO

O estilo de vida exerce forte influência sobre os níveis de saúde e na qualidade de vida, em crianças e adolescentes, sendo documentado na literatura da saúde (Topolski et al., 2001; Zahran, 2007). Nesse sentido, o levantamento epidemiológico, acompanhamento e intervenção sobre comportamentos de risco à saúde são considerados por diversas agências de saúde como prioridades de saúde pública (Currie et al., 2004; Prevention, 2005).

A adolescência é caracterizada por mudanças psíquicas, físicas, biológicas e sociais. É uma fase de transição entre a infância e a fase adulta (Costa et al., 2008), período em que ocorrem as maiores oportunidades e desafios associados a saúde. Essa fase apresenta características próprias em função do ambiente sociocultural no qual o indivíduo é inserido. Os adolescentes são, portanto, um grupo em exposição crescente a várias situações de vulnerabilidade, o que pode representar uma ameaça ao seu futuro. Com isso, é importante a abordagem nos jovens a partir de um olhar biopsicossocial para compreendê-los como o resultado da interação dos processos de desenvolvimento com condições socioeconômicas e das influências culturais (Thiengo et al., 2002).

A saúde é fortemente influenciada pelo estilo de vida do indivíduo, seja por fatores sócio-demográficos ou psicossociais. O adolescente, mostra-se mais vulnerável nestes casos, já que não desfruta mais dos cuidados ou da atenção recebida na infância, e não possui a maturidade de um adulto (Davoglio et al., 2009). As transformações decorrentes nesta fase de amadurecimento do adolescente podem causar grande impacto, seja no seu autoconceito ou na autoestima, exercendo um papel importante no seu comportamento frente a essas mudanças (Almeida Filho et al., 2003; Davoglio et al., 2009).

Entretanto, o planejamento da saúde envolve não só conhecer a prevalência de uma doença, como também identificar indivíduos que se apresentam prejudicados por tal condição. Adoecer é um processo que pode ser afetado pelas relações de vizinhança, de trabalho e pelas relações do indivíduo

com instituições como a escola e centros de saúde (Falceto et al., 2000; Araújo e Santos, 2012). O sucesso e a adesão ao tratamento muitas vezes depende de conhecer a dinâmica familiar e como que o adoecer pode afetar no indivíduo, na família abrangendo todos os aspectos (Beavers, 1982; Pinosof e Wynne, 1995; Falceto et al., 1996; Araújo e Santos, 2012).

Por essa razão, pode-se observar um aumento de estudos sobre as iniquidades em saúde, na tentativa de compreender relações como pobreza e saúde ou de acordo com diferentes critérios de estratificação socioeconômica, com propósito de entender os mecanismos de produção dessas iniquidades (Almeida Filho et al., 2003). Alguns estudos vem sendo desenvolvidos no intuito de solucionar essas dificuldades, englobando mais variáveis como, interação de fatores psicossociais na geração de problemas de saúde ou coletando informações sobre a percepção das pessoas sobre sua posição no seu meio social (Adler, 2006; Sheiham et al., 2011).

Nos últimos anos tem se observado a redução da doença cárie em crianças e adolescentes no Brasil (Dini et al., 1999; Narvai et al., 2000; Narvai et al., 2006; Rigo et al., 2010), E com isso estudos na saúde tem então direcionado a atenção para outros problemas, como as más oclusões (Peres et al., 2002; Moura e Cavalcanti, 2007; Brandão, 2011), pois, tais enfermidades são também consideradas como problemas de saúde pública (Marques et al., 2005; Dias e Gleiser, 2008) e a forma de se conhecer as condições de saúde ou doença na população é utilizando os índices epidemiológicos (Rigo et al., 2010). Na Ortodontia, os índices também são utilizados como ferramentas para avaliar a prevalência e a gravidade das más oclusões, possibilitando assim realizar estudos com finalidades de priorizar atendimentos de acordo com o nível de urgência, por exemplo (Dias e Gleiser, 2008; Hassan e Amin, 2010; Brandão, 2011).

As más oclusões “representam desvios de normalidade das arcos dentais, do esqueleto facial ou de ambos, com reflexos variados nas diversas funções do aparelho estomatognático (Sabbadini, 2012), bem como na aparência e autoestima dos indivíduos afetados” (Bresolin, 2000; Moura et al., 2013). A má

oclusão apresenta origem multifatorial, com interação de vários fatores ambientais (perda dental) e/ou genéticas (anomalias dentais quanto à forma e número) que podem influenciar no crescimento e desenvolvimento dos maxilares (Moyers, 1979).

No planejamento e no diagnóstico da má oclusão também deve-se avaliar a face do indivíduo, uma vez que a aparência facial influencia no julgamento da atratividade pessoal e da autoestima (Tung e Kiyak, 1998). Entretanto, ter percepção de sua própria aparência envolve inúmeros aspectos que nem sempre estão relacionados com a gravidade da má oclusão apresentada (Mehra et al., 1998; Tung e Kiyak, 1998). O estudo de Moura e Cavalcanti, (2007), mostrou que apesar dos jovens possuírem problemas oclusais, de diferentes graus, os mesmos os considerava como aceitável, corroborando os achados de Maltagliati e Montes, (2007), no qual os pacientes queixavam-se sobre a posição do incisivo superior, mas pouco perceberam sobre as anomalias esqueléticas associadas.

Entretanto, outros achados mostram que quando o fator estético está envolvido, deve-se dar importância para a aparência dental também, pois, quando desagradável, pode caracterizar uma pessoa, além de prejudicar seu desempenho profissional e ter um efeito negativo na sua autoestima (Shaw et al., 1980; Cons et al., 1983; Helm et al., 1986; Bedos et al., 2009; Badran, 2010; Seehra et al., 2011a; Seehra et al., 2011b; Moura et al., 2013). Entretanto a preocupação com a estética facial modifica com a idade e na condição sociocultural no qual o indivíduo encontra-se inserido (Stenvik et al., 1996). Portanto também seria interessante utilizar índices sócio dentais, como o OIDP (Oral Impact on Daily Performance) (Adulyanon et al., 1996), que avalia atividades diárias nos âmbitos físicos, psicológicos e sociais, para auxiliar no planejamento de ações para essa população.

Com o desenvolvimento dos diversos índices, alguns estudos epidemiológicos sobre as más oclusões mostram alta prevalência, dessas oclusopatias, em diferentes grupos etários, tais como: 62% em indivíduos de 10 a 14 anos (Marques et al., 2005), 76% em indivíduos de 12 a 17 anos (Onyeaso,

2004), 77,3% em indivíduos de 6 a 12 anos (Suliano et al., 2005), 95,73% em indivíduos de 6 a 12 anos (Almeida-Pedrin et al., 2008), 63,8% (Mtaya et al., 2009), 66,7% em indivíduos de 12-14 anos (Garbin et al., 2010), em indivíduos de 12 anos), 42,99% em indivíduos de 15 anos (Brandão, 2011). Portanto os resultados dos índices possibilitariam realizar estudos sobre um melhor gerenciamento de recurso humano e financeiro para suprir as necessidades dos indivíduos portadores das enfermidades (Brandão, 2011). No levantamento epidemiológico de saúde bucal realizado no Brasil em 2010, onde a prevalência das más oclusões consideradas como severa e muito severa foram iguais a 6,6% e 10,3% em adolescentes de 15 a 19 anos (Brasil, 2010).

No tratamento das más oclusões, mesmo em países que a oferecem pelo Sistema Público de Saúde, como no caso da Finlândia, os recursos destinados para tais fins, raramente suprem a demanda dos pacientes para a Ortodontia, sendo necessário uma seleção de pacientes, para assegurar o serviço aos que possuem maior necessidade de tratamento (Väkiparta et al., 2005).

Existem poucos estudos precedentes sobre levantamentos epidemiológicos das más oclusões e seus impactos na faixa etária de 13 a 19 anos com a vulnerabilidade neste grupo populacional.

Portanto, o objetivo desta tese foi investigar a relação entre a má oclusão com a aparência dental e o impacto da saúde bucal no desempenho das atividades diárias em adolescentes brasileiros.

## CAPITULO 1

### **Malocclusion and dental appearance in underprivileged Brazilian adolescents**

#### **ABSTRACT**

**Objective:** To investigate the relationship between the malocclusion and dental appearance in underprivileged Brazilian adolescents. **Materials and Methods:** This analytical cross-sectional study was conducted in 2012-2013 at Piracicaba, Brazil, evaluating 882 adolescents (13 to 19 years old, from 21 state schools and 34 Family Health Units). The dependent variable was satisfaction with dental appearance and the independent variables were classified as individual (components of DAI (Dental Aesthetic Index), gender, and age) and contextual (Social Exclusion Index – SEI). For statistical analysis, multilevel regression models were estimated. The individual variables were considered Level 1 and the contextual variable, Level 2, considering the level of significance of 5%. **Results:** The mean age of the adolescents was 15.3 years. Female adolescents affirmed they were more satisfied with their dental appearance than males. There was an increase in dissatisfaction with oral health with the increase in maxillary overjet, midline diastema, maxillary anterior irregularity, mandibular anterior irregularity, anterior open bite and antero–posterior molar relationship. SEI was not significant. **Conclusion:** Satisfaction with dental appearance is influenced by gender and by the DAI components related to maxillary overjet, diastema, maxillary and mandibular misalignment, anterior open bite and molar relationship, and was not affected by the social exclusion index.

**Key Words:** Malocclusion, Social Behavior, Adolescent.

## INTRODUCTION

Self-image is a subjective perception they have for themselves and of looking at different aspects of life. In modern society, physical appearance directly influences social interaction, in which adults with a pleasing appearance tend to have greater socialization, be more successful in the workplace, and be more desirable as friends (1,2).

The concern of adolescents about self-image and appearance can be considered an expression of the highest level of self-criticism (3,4). Negative self-image has been reported to influence behavioral and psychiatric problems in adolescence (1).

Malocclusion has been demonstrated to be the cause of various functional, aesthetic and psychosocial problems (5-8). Studies have shown dissatisfaction of adolescents with their appearance to be associated with factors such as weight, height and dental aesthetics. In addition, there is positive association between adolescents being less physically attractive and bullying at school (3,7,9-11). When there is an aesthetic involvement, individuals may be submitted to adverse judgments in relation to their overall attractiveness, social acceptance, ability and personality (2,6,12-17). As far as aesthetic commitment is concerned, the teeth, smile and malocclusion has large influence.

Furthermore, some socioeconomic deprived populations have minor demand to oral health services and orthodontic treatment, and whether this is because of their lower perceived need, higher satisfaction with appearance, or non-uniformity of dental attendance is not yet clear (18).

Malocclusions are highly prevalent and affect not only oral function and appearance, but also have economic, psychological and social influence on the formation of body image, emotional development and self-esteem of a subject (8,18,19). The major factors that determine the perceived need for orthodontic treatment may be aesthetic, functional, or social. The opinion of adolescents about their perception is of extreme relevance, since a pessimistic perception can lead to



various negative impact in their lives (20). The aim of this study was investigate the relationship between the malocclusion characteristics and dental appearance self-perception in underprivileged Brazilian adolescents.

## **MATERIAL AND METHODS**

### **Ethical criteria**

This study was approved by the Research Ethics Committee of FOP-UNICAMP, in accordance with resolution 196/96 of the National Health Council, Ministry of Health, under Protocol No.027/2011, assuring the ethical and legal criteria in the research.

### **Type of Study and Location**

This study is a Analytical Cross Sectional, and was performed in municipality of Piracicaba, State of São Paulo, Brazil, in the period from 2012-2013, including adolescents from 13 to 19 years old, who have been receiving Primary Health Care from Family Health (PHC-FH) teams, and were enrolled in public schools in territories covered by these PHC- FH units.

### **Study Universe**

Piracicaba was have an estimated population of 368,843 inhabitant and a Human Development Index of 0.84, in 2012. The city is composed of 68 suburbs distributed throughout five administrative regions (North, South, East, West and Center), and there were a total number of 12,539 adolescents in the age range from 13 to 19 years. In 2012, according to data from the Municipal Secretary for Health, there were a total number of 34 PHC-FHs, among which, there were 12 units with Primary Dental Care teams. On an average, 320 adolescents between the ages of 13 and 19 years were enrolled in each of the PHC-FHs, totaling approximately 11,000 individuals. According to the Secretary for Education, the municipality had 43 high schools and a total number of 9,356 schoolchildren in this

age range enrolled. All public high schools (n=21) in the territorial areas covered by the PHC were enrolled. In the 34 PHC units, the free and informed consent forms to participate in the study were handed by the community health agents during home visits. At the schools, the forms were handed to the teachers who distributed them to the selected adolescents, in order to obtain parents' or guardians' authorization afterward.

### **Sample size**

The sample size was calculated considering a standard error of 5%, interval of confidence of 95%, test power of 0.80, OR=1.5 and 60% response of the non exposed group. Thus, the minimum sample size to be considered was 884 adolescents. To minimize possible losses during the survey, the sample size was increased by 20%, to 1060 adolescents.

### **Inclusion and exclusion criteria**

We excluded adolescents that had systemic diseases, significant facial asymmetry, dental dysgenesis and orthodontic treatment before inclusion in the study. Finally, individuals who did not agree to participate in the study and those absent in the day of the exam were excluded from the sample.

### **Clinical examination**

The exams were performed at the schools and PHC-FHs by two previously trained examiners, assisted by two note-takers, using the standardized clinical record chart, under artificial light, and with previous tooth brushing performed under supervision of an Oral Health Technician. For each exam, a periodontal probe and a plane dental mirror No.5 were used (21).The clinical examination for malocclusion was performed according to the DAI index, which is a continuous scale to assess severity levels in order to prioritize treatment need (22).

### **Calibration**

Before the beginning of the study, a calibration process was conducted between the examiners, in order to obtain an acceptable consistency for all the clinical conditions, i.e., values above 0.91 for KAPPA statistics (23). After the calibration process, the data of the examiners was considered reproducible, as the mean inter-examiner Kappa value was 0.95 and mean intra-examiner Kappa value was 0.96.

### **Study instruments and variables**

The dependent variable of the study was self-perception of Oral Health (“Are you satisfied with the appearance of your teeth?”) classified as High satisfaction, Satisfaction, Low satisfaction and High dissatisfaction by the questionnaire used (24).

The independent variables were classified into individual and contextual types. Clinical (DAI components) and demographic characteristics (age, sex) were considered individual variables (Level 1). In Level 2 (contextual variable), the Social Exclusion Index (25) (SEI) was analyzed, with reference to the characteristics of the suburbs.

The DAI is an orthodontic index based on socially defined aesthetic standards (22,26). The clinical and aesthetic components combine a single result of the physical and aesthetic aspects of occlusion (22,27).

The DAI includes 11 parameters of dentofacial anomalies (clinical and esthetic aspects) of the anterior teeth (22). Based on DAI cut-off points, individuals were classified into four grades of malocclusion: 1) Grade 1- indicated normal or minor malocclusion/no treatment need or slight need ( $DAI \leq 25$ ); 2) Grade 2- definite malocclusion/treatment was optional ( $26 \leq DAI \leq 30$ ); 3) Grade 3- severe malocclusion/treatment was highly desirable ( $31 \leq DAI \leq 35$ ); and 4) Grade 4- very severe malocclusion/treatment was mandatory ( $DAI \geq 36$ ).

The Social Exclusion Index (SEI) of the 36 suburbs where the adolescents resided was collected at the Piracicaba Research and Planning Institute and the

Municipal Secretary for Social Development Performances (28). The purpose was to quantify some of the attributes of social inequalities between the suburbs, ranging from -1 (most vulnerable) to 1 (least vulnerable). This index analyzes 7 dimensions: poverty, concentration of younger than 19 year-old people in total population, literacy rate in people older than 5 year-old, educational level of parents' or guardians, rate of formal employment, rate of violence, and discrepancy in income distribution.

### **Data Analysis**

In the present study, the self-perception of oral health was considered a response variable. The multilevel regression models were estimated by the PROC GLIMMIX - "Generalized Linear Models-Mixed"- procedures using the SAS 9.2, statistical software (29).

In the analysis, the individual variables were considered Level 1 and the variable SEI, Level 2, and statistical significance was evaluated at the level of significance of 5%. Initially, a model was estimated with the intercept only, in order to study the proportion of variance due to the suburbs in relation to the individuals. This model served as the basis for evaluating the reduction in the variance of the other models studied (Model 1). After this, the individual variables (Model 2) were tested, and later, the variable SEI was included (Model 3). Adjustment of the model was evaluated by  $-2$  Res Log Likelihood (the lower, the better the fit of the model).

### **RESULTS**

The final sample was composed of 882 adolescents with a mean age of 15.3 years (SD = 1.01). Of these, 469 (55.97 %) were female and 413 (44.03 %) were male.

Table 1 shows the frequency of the response variable as regards self-perception of oral health. Most adolescents answered they had low satisfaction with the appearance of their teeth (35.6%) and 30.1% were highly dissatisfied.

Table 2 shows the distribution, median, minimum and maximum value of Social Exclusion Index and DAI components.

Table 1. Distribution of perception on dental appearance.

Self-perception of oral health	n	%
High satisfaction	63	7.1
Satisfaction	240	27.2
Low satisfaction	314	35.6
High dissatisfaction	265	30.1

Table 2. Mean, median, minimum and maximum value of SEI and DAI variables.

	Mean	Minimum	Maximum
SEI	-0.49	-1.00	0.79
DAI components	Median	Minimum	Maximum
Number of missing visible teeth (maxillary)	0.00	0.00	3.00
Number of missing visible teeth (mandibular)	0.00	0.00	3.00
Anterior Maxillary overjet	3.00	0.00	14.00
Anterior Mandibular overjet	0.00	0.00	4.00
Incisal segment Crowding	1.00	0.00	2.00
Incisal segment Spacing	0.00	0.00	2.00
Midline diastema	0.00	0.00	5.00
Largest anterior irregularity Maxillary	0.00	0.00	8.00
Largest anterior irregularity Mandibular	1.00	0.00	7.00
Anterior open bite	0.00	0.00	9.00
Antero – posterior molar relationship	0.00	0.00	2.00

SEI - Social Exclusion Index; DAI – Dental Aesthetic Index.

The multilevel model for self-perception of oral health may be observed in Table 3. When the individual variables were included in Model 2, the reduction in -2 Res Log Likelihood was approximately 3.3%. The variable Social Exclusion Index (SEI) was not significant in the model ( $p=0.3886$ ).

Therefore, for this population, the variation in self-perception of oral health was explained by the variables related to the individuals (age, sex, and DAI) and not the suburbs (SEI). Considering the level of significance of 5%, by Model 2, it was observed that the volunteers of the female sex presented a higher satisfaction with oral health in comparison with the male sex ( $p < 0.0001$ ). There was an increase in dissatisfaction with oral health with the increase in maxillary overjet ( $p = 0.0561$ ), midline diastema ( $p = 0.0008$ ), maxillary anterior irregularity ( $p < 0.0001$ ), mandibular anterior irregularity ( $p = 0.0209$ ), anterior open bite ( $p = 0.0118$ ) and antero–posterior molar relationship ( $p = 0.0327$ ) (Table 3).

Table 3. Multilevel model for perception of dental appearance.

Variable	Model 1			Model 2			Model 3		
	Estimate*	#EP	p-value	Estimate	EP	p-value	Estimate	EP	p-value
Intercept	2.88	0.03	<0.0001	2.86	0.03	<0.0001	2.86	0.03	<0.0001
Individual Level									
Sex (Ref=Male)				-0.23	0.06	<0.0001	-0.23	0.06	<0.0001
Maxillary Overjet				0.03	0.02	0.0561	0.03	0.02	0.0561
Midline Diastema				0.15	0.04	0.0008	0.15	0.04	0.0008
Largest anterior irregularity Maxillary				0.12	0.02	<0.001	0.12	0.02	<0.001
Largest anterior irregularity Mandibular				0.07	0.03	0.0209	0.07	0.03	0.0209
Anterior open bite				0.11	0.04	0.0118	0.11	0.04	0.0118
Antero-posterior molar relationship				0.10	0.01	0.0327	0.10	0.01	0.0327
Suburb Level									
Social Exclusion Index (SEI)									\$ns
2 Res Log Likelihood	2359.74			2281.40			2281.40		

\* Parameter Estimate, # Standard error of Parameter Estimate \$ Not significant (p=0,3886)

## DISCUSSION

Oral health Self-perception differs from each individual and is influenced by the social and cultural environment in which they live (25,30). The individual perception about dental appearance or treatment needs is not always the same, and it does not always coincide with the perception of a professional (31,32). Therefore, since opinions may be divergent, it is extremely important to know the point of view of adolescents in order to make decisions about treatment planning. The DAI index was used in this study to evaluate the clinical and aesthetic components of malocclusion (11,19,33,34).

As previously mentioned, malocclusion may cause various functional (10,35), aesthetic (6,7,36-38) and psychosocial disorders (8,11,39), in addition to negative impact on the quality of life of individuals (40). Therefore, in the present study the Multilevel Regression Analysis was used to enable analysis not only of the relationship between individual variables, but also the contextual variable, which may influence the self-perception of oral health in adolescents.

There is no consensus in the literature about gender and dental appearance self-perception (7,13,19,26,30,41-46). In this study, the girls affirmed they were more satisfied with their dental appearance than the boys, differing from authors who mentioned that boys were more satisfied (13,19,30,41-45), and others who have reported not difference between the sexes (7,26,46). Consequently, it possible to notice this dental appearance perception may vary depending on the local culture and customs by boys and girls.

The DAI components associated with dissatisfaction with the appearance of the teeth were: Largest anterior irregularity maxillary, largest anterior irregularity mandibular, anterior open bite, spacing between the maxillary anterior incisors (diastema), molar relationship and anterior maxillary overjet. The "lost tooth" component was not associated with dissatisfaction with the appearance of teeth in this study, in disagreement with the findings (46), who studied adolescents at high school, aged between 12 and 13 years, verifying that the "lost teeth" DAI component influenced dissatisfaction with the appearance of teeth.



Studies involving social psychology have indicated that physical attractiveness have influenced better interaction between persons, including the good or bad impression it causes (47-49). The importance that people give to the appearance of their teeth must be considered, since the orthodontist may prioritize the correction of the anterior irregularity, in order to improve the self-perception and restore their confidence and self-esteem (2,7,13,46,47,49-51).

The influence of malocclusion on the appearance satisfaction can also be observed in other populations studied (4,18). We must consider that self-image is based on our perception of how other persons react to us, and when we compare our physical attributes to those of others, with the culture of each population having a strong influence on this judgment (52). In this context, the problem of adolescent self-image and satisfaction with their appearance is closely linked to the overall perception of their teeth, and not strictly to malocclusion alone (32).

Therefore, the main finding of this study was that the more severe the malocclusion, the more dissatisfied the adolescents would be with their appearance, and that as anterior misalignment was more visible, it would make their social acceptance more difficult. When the aesthetic factor was involved, direct psychosocial impacts were observed, such as shyness, being ashamed to smile and upset about the negative effects on their self-esteem.

## **CONCLUSION**

Sex, maxillary overjet, Largest anterior maxillary/mandibular irregularity, anterior open bite and the molar relationship were the factors that had a influence on satisfaction about the dental appearance, however, the characteristics of the suburb (social exclusion index) had not relationship with dental appearance.

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## CAPÍTULO 2

### **Malocclusion and relationship with the Oral Impact on Daily Performance among underprivileged Brazilian adolescents**

#### **ABSTRACT**

**Introduction:** The Oral Impact on Daily Performance is the instrument that quantifies perception of oral problems by frequency and severity. This study investigated the relationship between the malocclusion with the Oral Impact on Daily Performance (OIDP) among underprivileged Brazilian adolescents. **Methods:** An analytical cross-sectional study, was conducted with 877 adolescents aged 13-19 years-old. The dependent variable was OIDP. The independent variables were classified as individual (components of DAI (Dental Aesthetic Index), gender and age) and contextual variables (Social Exclusion Index - SEI). The multilevel regression model was estimated by the Generalized Linear Models-Mixed procedure, considering the individual variables as being Level 1 and the contextual variables as being Level 2. Statistical significance was evaluated at level of significance of 5%. **Results:** Male were found to have higher impact of OIDP. The prevalence of OIDP was 39.6%. Among the daily performance activities, eating was the one with the greatest impact (31.7%). Pain was the symptom most reported (57.2%) to be related with the activity of eating. There was an increase in OIDP with an increase in lost teeth in the maxillary arch and maxillary overjet in millimeters. The daily activities that showed the greatest impact of oral problems were eating, and smiling without feeling embarrassed. The symptom pain was most frequently reported by the participants at the time of the interview, when related to the activity of eating. **Conclusions:** Adolescents of the male sex had greater impact on their daily activities. The increased loss of teeth and overjet also contributed to the greater impact on daily activities of adolescents.

**Key-Words: Social Vulnerability, Adolescent Behavior.**

## INTRODUCTION

Malocclusion is an important health problem worldwide<sup>1</sup>, and has a multifactorial origin; that is to say, there is an interaction of environmental and/or genetic factors that may influence the growth and development of the maxillar<sup>2</sup>.

Epidemiological inquiries into malocclusion in various countries, particularly Europe and North America, have related that these oral disturbances are highly prevalent and affect not only oral function and appearance<sup>3</sup>, but economic, psychological<sup>4,5</sup> and social<sup>6</sup> factors as well.

Therefore, patients' perceptions are also important indicators of need for treatment, and would be complementary to clinical diagnosis.<sup>7</sup> However, according to the literature, concern about facial aesthetics may change with age and by the individual's surroundings, social and cultural conditions.<sup>8</sup>

When considering socio-cultural conditions, we may not exclude the environment and the situation in which the adolescent individual lives. Risk and protective factors may also influence the social strata in an unequal manner, either with harmful or salutary effects that affect youngsters, increasing the inequalities in health. From this perspective, the development and evaluation of public policies is fundamental, not only because of the effect they have on collective health, but also due to the result of their interventions on the pre-existent condition of inequalities in health.<sup>9</sup>

The use of indexes that evaluate the need for orthodontic treatment enables better management of human and financial resources to meet individuals' needs with regard to malocclusion.<sup>10</sup> The index recommended for epidemiological surveys, by the WHO (World Health Organization), is the DAI (Dental Aesthetic Index), which evaluates dentofacial anomalies by means of ten occlusal characteristics, in accordance with socially acceptable standards for dental esthetics.<sup>11</sup>

The oral impacts on daily performances (OIDP) was developed<sup>12</sup>, for use in cross-sectional surveys, with the aim of discriminating between groups, and



assessing the impacts on individuals' ability to perform daily activities. The OIDP scale has previously been described and has been shown to have acceptable validity when applied to a rural population in Thailand. The use of sociodental indicators such as OIDP is therefore able to prioritize individuals who need more attention to treatment.<sup>13</sup>

In spite of the literature demonstrating previous studies about malocclusions and their impacts, there are few that approach this age-range of 13 to 19 years, in which different physical, psychological and/or social transformations occur.

Considering the multi ethnic formation of Brazilian society, the current research should take into account the cultural diversity contexts of life from the individuals. In the case of young people, it becomes crucial to better understand the many "adolescents and Brazilian youths".<sup>14</sup>

Similarly, there is evidence that the socio-economic context influences the self-perception of malocclusion in individuals from higher social strata<sup>15</sup>. Considering the increase in income and purchasing power of social underprivileged classes in Brazil in the recent years, since it is supposed greater access to many products and services, including orthodontic treatments.<sup>16</sup>

Access to healthcare and conclusion of the treatment may improve the quality of life. In 2013, Oliveira et al<sup>17</sup>. concluded that there is an improvement in individual well-being as a result of orthodontic intervention, but a negative impact when non-completion of treatment occurs.

In this context, this study has important contributions to understanding the elements that can impact the quality of life of adolescents, especially underprivileged ones, because it was performed within their life context. Therefore the aim of the present study was investigated the relationship between the malocclusion with the Oral Impact on Daily Performance (OIDP) among underprivileged Brazilian adolescents.

## **MATERIAL AND METHODS**

### **Type of Study and Location**

The data of this analytical cross-sectional study were collected in the period from 2012-2013, in Municipality of Piracicaba, SP, Brazil.

### **Study Universe**

The participants of this study were adolescents from 13 to 19 years-old, being cared for by Primary Health Care - Family Health teams (PHC-FH) that provide primary health care for all family members residing in a circumscribed area (about 4,000 persons). The adolescents were enrolled in public schools (located in the territories covered by these PHC-FH units) and in the PHC-FH units. The greatest extent of social exclusion in the municipality occurs in these regions.

The estimated population of the municipality of Piracicaba was 368,843 inhabitants, with a Human Development Index (HDI) of 0.84, in 2012. Piracicaba comprises 68 suburbs that are distributed throughout 5 administrative regions (North, South, East, West and Center) with a total of 12,539 adolescents in the age-range from 13 to 19 years.<sup>18</sup>

The Secretary for Education informed the municipality had 43 high schools and a total number of 9,356 schoolchildren in this age-range enrolled.

According to data from the Municipal Secretary for Health, in 2012, there were a total number of 34 PHC-FH units, and among them there were 12 units with Primary Dental Care (PDC) teams. On an average, 320 adolescents between the ages of 13 to 19 years were enrolled in each of the PHU-FH units, totaling approximately 11,000 individuals.

It is important to emphasize that the PHC units are distributed in the less favored socioeconomic regions of the municipality. All public high schools (n=21) in the territorial areas, covered by the PHCs were enrolled.

### **Sample Size**

The sample size was calculated considering a standard error of 5%, interval of confidence of 95%, test power of 0.80, OR=1.5 and 45% percent

response of the non exposed group.<sup>19</sup> Thus, the minimum sample size to be considered was 806 adolescents. To minimize possible losses during the survey, the sample size was increased by 20%, to 916 adolescents. Of these, 877 individuals from 13 to 19 years of age were examined, and a non response rate of 4% was obtained.

### **Inclusion and exclusion criteria**

The criteria for inclusion in the sample were: absence of systemic diseases, difficulties with communication, or neuromotor problems, absence of severe hypoplasia and absence of orthodontic appliance. The criteria for exclusion from the sample were: individuals who did not agree to participate in the study, and those absent on the day of the exam.

### **Clinical Examination**

For each exam, a ball point probe and plane oral mirror were used according to the World Health Organization codes and criteria.<sup>1</sup>

The exams were performed on the premises of the PHC-HF units and at the state high schools, by two examiners (previously calibrated and helped by two note-takers), under artificial light, and with brushing performed before the exam, under the guidance of a Dental Assistant.

### **Calibration**

The process of calibrating the two examiners for the clinical conditions was conducted by a Gold Standard examiner. The theoretical-practical activities of the training and calibration exercises consisted of a total of 7 periods - 1 theoretical lasting 4 hours, 4 clinical training sessions of 4 hours each (total of 16h) and 2 calibration exercises lasting 4 hours (total of 8h). The training stage consisted of a theoretical discussion, with a practical stage afterwards, in which the examiners evaluated 12 adolescents per period, Discussions between the examiners and the Gold Standard examiners were held with the purpose of obtaining an estimate of the extension and nature of diagnosis, up to which point the acceptable consistency remained above 0.91, measured by KAPPA statistics for all the clinical conditions.<sup>20</sup> The final calibration exercise consisted of 2 periods (total of 8h) with

mean inter-examiner Kappa values of 0.95. In order to verify maintenance of the diagnostic criteria and intra-examiner error, 10% of the sample was re-examined, showing mean Kappa values of 0.96.

### **Study instruments and variables**

The OIDP<sup>12</sup> is a socio-dental indicator, with focus on the measure of impact that interferes in people's ability to perform their daily activities. It measures the oral impacts that affect eight daily performances, classified as physical (eating and appreciating food, speaking and clearly pronouncing words, cleaning the teeth), psychological (sleeping and relaxing, smiling, laughing and showing the teeth without embarrassment, maintaining a normal emotional state without becoming irritated) and social (working, playing a social role and finding satisfaction in social encounters). It uses a logical approach to quantify the impact, evaluating the frequency and severity distributed on a scale of five points. The score of the severity measures gives the relative importance of the informant's perception of the impact on daily performance.

The outcome variable OIDP was divided into terciles, according to the prevalence of impact: OIDP equal to 0, from 1 to 6, and higher than 7. This instrument was divided, considering the median of the score (frequency x severity) related to the impact on daily activities of the participants, in order to form groups of more homogeneous sizes.

The DAI is a quantitative index that evaluates the degree of esthetic impact of dentition. In epidemiology, the DAI may be used as an index of the severity of malocclusion and as an index of the need for orthodontic treatment.<sup>21</sup>

The theoretical concepts on which DAI are based, allow the affirmation that the more the dental aspect of a person deviates from the social norms, the more the probability of the person presenting social limitations, and consequently the need for orthodontic treatment. In order to obtain the value of DAI, ten occlusal components are evaluated, according to socially defined patterns for dental esthetics: missing teeth; anterior crowding, anterior spacing, diastema in the midline, greater maxillary anterior irregularity, greater mandibular anterior

irregularity, maxillary overjet, negative horizontal, anterior open bite and anteroposterior intermolar relationship.<sup>21,22</sup>

The Social Exclusion Index<sup>23</sup> (contextual variable) of the 36 suburbs where the adolescents resided was collected at the Piracicaba Research and Planning Institute and the Municipal Secretary for Social Development Performances<sup>24</sup>. The purpose was to quantify some of the attributes of social inequalities between the suburbs, ranging from -1 (suburbs with the worst indices—most vulnerable) to 1 (suburbs with the best indices—least vulnerable). Of the 877 study subjects, 96.1% resided in suburbs with the worst social exclusion indices (negative indices).

### **Statistical analysis**

In the present study, the OIDP were considered the dependent variable, categorized into tertiles (OIDP=0; OIDP 1-6 and OIDP>7)

The multilevel regression models were estimated by the PROC GLIMMIX Procedures; that is, “Generalized Linear Models-Mixed” of the SAS statistical program analysis.<sup>25</sup> The individual variables were considered Level 1 and the variable SEI, Level 2, and the statistical significance was evaluated at level of significance of 0.05. Initially, a model was estimated with the intercept only, in order to study the proportion of variance due to the suburbs in relation to the individuals. This model served as the basis for evaluating the reduction in the variance of the other models studied (Model 1). After this, the individual variables (Model 2) were tested, and later, the variable SEI was included (Model 3).

### **Ethical Aspects**

This study was approved by the Research Ethics Committee of FOP-UNICAMP, in accordance with resolution 196/96 of the National Health Council, Ministry of Health, under Protocol No.027/2011.

The Terms of Free and Informed Consent to participate in the Study were handed to the Community Health Agents during home visits. At the schools, the

Terms were handed to the teachers who distributed them to the selected schoolchildren, for obtaining parents' or guardians' authorization afterwards.

## **RESULTS**

The participants in this research were 877 adolescents, of whom 466 were girls and 411 boys. The mean age was 15.31 years (SD=1.09).

Among the interviewees in the present study, the daily activities that showed the greatest impact of oral problems in the previous six months were eating (31.7 %), and smiling without feeling embarrassed (18.5%). The symptom pain (57.2%) was most frequently reported by the participants at the time of the interview, when related to the activity of eating, however, in the daily activity of smiling; pain/ discomfort (46.3%) and dissatisfaction with appearance (43.8%), were the most prevalent symptoms.

The prevalence of dental social impact on the sample studied was 39.6%, Table 1 shows the distribution of the OIDP values according to the individual (components of DAI) and contextual (IEX) variables. The sociodental impact was divided into tertiles (OIDP equal to 0, 1 to 6 and higher than 7) and associated with each characteristic of malocclusion (DAI) presented by the participant, to show the behavior of the variables in comparison with the distribution of the median.

Table 1 - Distribution of OIDP values according to the individual and contextual variables

Variables	OIDP = 0	OIDP 1-6	OIDP > 7
	Median (minimum-maximum)	Median (minimum-maximum)	Median (minimum-maximum)
Number of missing teeth in the maxilla	0(0-2)	0(0-2)	0(0-3)
Number of missing teeth in the jaw	0(0-1)	0(0-3)	0(0-1)
Maxilar Overjet	3(0-11)	3(0-11)	3(0-9)
Mandibular Overjet	0(0-3)	0(0-2)	0(0-4)
Crowding	1(0-1)	1(0-2)	1(0-2)
Spacing	0(0-2)	0(0-2)	0(0-2)
Diastema	0(0-5)	0(0-5)	0(0-4)
Maxilar misalignment	0(0-8)	0(0-5)	0(0-6)
Mandibular misalignment	0(0-5)	0(0-4)	1(0-7)
Anterior open bite	0(0-6)	0(0-5)	0(0-9)
Molar ratio	0(0-2)	0(0-2)	0(0-2)
Social exclusion index	-0.47(-1.00 – 0.79)	-0.61(-1.00 – 0.10)	-0.51(-1.00 – 0.37)

Table 2 shows the results of OIDP multilevel analysis (dependent variable). When they were included in the model the variables of individual reduction in 2 Res Log Likelihood (which evaluates the fit of the model, and the lower it is, the better is the model) was 1.8% and when included and the neighborhood variable reduction was 0.03%.

Volunteers of the male gender presented higher OIDP; that is, greater impact on daily activities ( $p < 0.0001$ ). There was an increase in OIDP with an increase of lost teeth in the maxillary arch (0.0477), maxillary overjet in millimeters ( $p = 0.0171$ ) and age ( $p < 0.0001$ ). The social Exclusion Index was not significant ( $p = 0.0913$ ).

Table 2. Parameters of the estimated multilevel multiple regression models, adjusted to describe the influence of the variables on the OIDIP.

Variable	Model 1			Model 2			Modelo 3		
	Estimate*	#EP	p-value	Estimate	EP	p-value	Estimativa	EP	p-valor
Intercept	1.59	0.04	<0.0001	-0.22	0.39	0.5795	-0.31	0,39	0,4332
Individual level									
Sex (Ref=Male)				0.30	0.05	<0.0001	0.30	0,05	<0,0001
Age				0.10	0.02	<0.0001	0,10	0,02	<0.0001
Number of missing teeth in the maxillary				0.28	0.13	0.0408	0,27	0,14	0,0477
Overjet maxilar (milímetros)				0.04	0.01	0.0165	0.04	0,01	0,0171
Neighborhood level									
Index of social exclusion							-0.22	0,13	0,0913
2 Res Log Likelihood	2162.69			2123.31			2122.74		

\* Parameter Estimate, #Standard error of parameter estimate



## DISCUSSION

Malocclusion has a negative effect on the quality of life of adolescents, irrespective of dental caries or traumatic dental lesions.<sup>26</sup> Consequently, there may be significant social impact on the adolescent's life, particularly when they are included in different social contexts that reflect inequalities in health.

In view of this, it is important to analyze the frequency and severity of malocclusions and occlusal characteristics, in accordance with socially acceptable patterns for dental esthetics, in order to verify their impact on the daily activities of adolescents.

Considering the lack of studies that relate the frequency of different facial patterns correlated with malocclusions, and the repercussion of contextual factors on young individuals, it is necessary to develop researches that investigate the relationship of DAI components and contextual variables with sociodental impact.

In the present study, the volunteers of the male sex presented more sociodental impact on daily activities than those of the female sex. This difference was not found<sup>27</sup>, however, some studies have related that girls have greater perception of this impact when the esthetic factor is involved.<sup>4,28</sup>

With regard to the "missing teeth" component of DAI, in this study greater impact was verified when there was an increase in the number of teeth lost, corroborating the findings<sup>29</sup> and contradicting the results that did not find the same differences between the participants<sup>30</sup>. The imbalance of the stomatognathic system resulting from the loss of teeth, also leads to changes in mastication and phonation, causing difficulty and discomfort in performing these activities. In addition to this, social relationships may also be harmed in these individuals, since they feel embarrassed to smile and engage in conversation because of their precarious oral appearance.<sup>31</sup>

The greater the maxillary overjet, the greater was the sociodental impact verified, differing from the study<sup>28</sup> that found greater impact related to mandibular overjet. Alterations in facial cranial growth may lead to Class II type malocclusions

(maxillary overjet), which are related to oral functional changes, such as respiration, mastication and speech.<sup>32</sup>

Some studies have shown that when there is esthetic involvement, there is impact on oral daily activities of adolescents.<sup>28,33</sup>

In fact, good appearance has become a synonym of health for the majority of the population, and thus the need for a "perfect smile" was created. In the study of Peres<sup>34</sup>, the majority of occlusal problems in anterior teeth were observed to be associated only with dissatisfaction with appearance, showing that these problems presented no physiological problem perceptible by these individuals. However, another study revealed that the characteristics of malocclusion resulting from the absence of teeth, open bite, mandibular overjet, and molar relationship, are considered risk factors that may affect speech and masticatory function.<sup>35</sup>

Therefore, it is important to consider the individual perception of such impacts, since many factors can influence different priorities of each individual in its demand for orthodontic treatment, such as culture, environment, etc. In 2010, Li and collaborators<sup>36</sup> concluded that native Chinese prioritize the appearance improvement in the orthodontic treatment. However, in this same study, foreigner inhabitants from the same locality reported to be the improvement of masticatory function the main objective for orthodontic treatment, being the aesthetic appearance a secondary factor of priority. Nowadays, the orthodontic treatment is a motivation to the adolescents for taking care of their teeth.<sup>37</sup> However, it is important to consider the risk of a careless orthodontic treatment.

The present concept of health is known to involve both the clinical signs of disease and subjective aspects.<sup>38</sup> As regards oral health, subjective measurements seek to reflect the patient's perception about his/her oral condition<sup>39</sup>, starting with an evaluation of the number of teeth present, through to a self-assessment of his/her appearance.

Different levels of oral health have been observed to lead to different impacts on people's daily lives, and it is considered relevant that the social and

psychosocial dimensions of individuals may help in improving clinical diagnoses of disease and identification of families in a vulnerable situation.<sup>40</sup>

Patussi and collaborators<sup>41</sup> argued that there is a sufficient body of evidence to affirm the relationship existent between individual and socioeconomic variables related to the area of residence of individuals. In this context, Vazquez<sup>42</sup> *et al.* verified the relationship existent between the social exclusion index and the number of carious teeth and DMFT. However, no evidence of the relationship between social exclusion and sociodental impact was found in another study<sup>43</sup>, corroborating the findings of the present study.

The influence of malocclusion with dental appearance and the Oral Impact on Daily Activities of Brazilian adolescents in vulnerable situations was assessed by multilevel analysis, cited by several researchers for providing legitimacy to verify the relationship between the individual and their environment.<sup>44,45</sup> Few studies have used this technique to assess the relationship of the individual and its context<sup>43</sup>, showing the relevance of this research, which is important to improve the knowledge and the use of this analysis in the scientific community.

It is important to point out that the present study has some limitations. Due to the study design being transversal, it is not possible to establish a temporal cause and effect relationship. Additionally, the fact that the socioeconomic information was obtained from adolescents and their parents in a self-reported manner may eventually confer some bias of measurement.<sup>46</sup>

Its prudence to adopt of the reflection that indicators based on normative criteria are insufficient to measure the impact of the oral condition on the daily lives of individual. They point out deficiencies in the planning of health actions guided exclusively by these indicators; that is, they affirm that objective indexes alone must not be sufficient to change public health policies.<sup>43</sup>

Therefore, continuity of the study is suggested, by means of new study designs that may, in a broader manner, answer the complex questions involved in the impacts oral health may have on the adolescent's life. From this aspect, it is also opportune to adopt qualitative methods of study, which seek to go more

deeply into the meanings oral health and its impacts have on this group of individuals.

## **CONCLUSIONS**

Considering the results, it was concluded that malocclusion is an oral impact factor in the daily activities of Brazilian adolescents in Piracicaba (SP).

Adolescents of the male sex had greater impact on their daily activities. The increased loss of teeth and overjet also contributed to the greater impact on daily activities of adolescents.

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## **CONSIDERAÇÕES GERAIS**

No presente estudo a má oclusão impactou no desempenho das atividades diárias dos adolescentes de Piracicaba. Os adolescentes que apresentaram overjet aumentado, demonstraram ter maior impacto no desempenho das atividades diárias ainda que controlado por fatores demográficos e socioeconômicos. Além da má oclusão, o sexo e as perdas dentárias na região anterior, também foram associados ao maior impacto das atividades diárias.

A percepção da aparência dental pode ser influenciada pelos componentes da má oclusão. Neste estudo a insatisfação com a aparência dos dentes foi relacionada com o sexo e alguns componentes do DAI, à saber, overjet maxilar, diastema, irregularidade anterior maxilar, irregularidade mandibular anterior, mordida aberta anterior e na relação molar.

O diferencial deste estudo foi avaliar a relação da má oclusão com a aparência dental e o impacto sócio dental, influenciando na qualidade de vida de adolescentes que vivem em um contexto social vulnerável. É sabido que, ao compreender esta relação, possa-se pensar em um planejamento de ações que assegurem o tratamento ortodôntico aos que possuem maior necessidade.

## **CONCLUSÃO**

Dentre os principais problemas bucais que acometem os indivíduos de 13-19 anos de idade, a má oclusão desempenha um papel importante. Ela afeta o posicionamento dos dentes, ocasionando efeito negativo na autoestima dos indivíduos, principalmente nos adolescentes, que se encontram na fase de diversas mudanças comportamentais, físicas e psíquicas. Além disso, a má oclusão impactou no desempenho das atividades diárias em várias dimensões sociais, físicas, funcionais e psicológicas influenciando na qualidade de vida.

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**COMITÊ DE ÉTICA EM PESQUISA**  
**FACULDADE DE ODONTOLOGIA DE PIRACICABA**  
**UNIVERSIDADE ESTADUAL DE CAMPINAS**



**CERTIFICADO**

O Comitê de Ética em Pesquisa da FOP-UNICAMP certifica que o projeto de pesquisa "**Risco e vulnerabilidade às doenças bucais em adolescentes da cidade de Piracicaba, SP, Brasil**", protocolo nº 027/2011, dos pesquisadores Antonio Carlos Pereira, Armando Koichiro Kaieda, Fabiana de Lima Vazquez, Jaqueline Vilela Bulgarelli, Karine Laura Cortellazzi e Sílvia Leticia Freddo, satisfaz as exigências do Conselho Nacional de Saúde - Ministério da Saúde para as pesquisas em seres humanos e foi aprovado por este comitê em 21/05/2011, com alterações em 18/06/2015.

The Ethics Committee in Research of the Piracicaba Dental School - University of Campinas, certify that the project "**Risk and Vulnerability for oral diseases in teenagers in Piracicaba, SP, Brazil**", register number 027/2011, of Antonio Carlos Pereira, Armando Koichiro Kaieda, Fabiana de Lima Vazquez, Jaqueline Vilela Bulgarelli, Karine Laura Cortellazzi and Sílvia Leticia Freddo, comply with the recommendations of the National Health Council - Ministry of Health of Brazil for research in human subjects and therefore was approved by this committee on May 21, 2011; with alterations on Jun 18, 2015.

**Prof. Dra. Fernanda Miori Pascon**  
Secretária  
CEP/FOP/UNICAMP

**Prof. Dr. Jacks Jorge Junior**  
Coordenador  
CEP/FOP/UNICAMP

Nota: O título do protocolo aparece como fornecido pelos pesquisadores, sem qualquer edição.  
Notice: The title of the project appears as provided by the authors, without editing.



## ANEXO 2

### Ficha Clínica

Nome: \_\_\_\_\_

Data do exame: \_\_\_/\_\_\_/\_\_\_

USF: \_\_\_\_\_

AVALIAÇÃO DA OCLUSÃO										DAI
DENTICÃO										
Mx	Md	Overjet	Overjet	Apinhamento	Espaçamento	Diastema	Desalinhamento	Desalinhamento	Mordida	Relação
Dentes perdidos pré-a-pré (0-10)		Maxilar	Mandibular	Anterior (0.1.2) segmentos	Anterior (0.1.2) segmentos	anterior	maxilar	mandibular	aberta anterior	Molar anterior
		mm	mm			mm	mm	mm	mm	0, 1= ½ CUSP, 2=1 CUSP

## ANEXO 3

### QUESTIONÁRIO OIDP

Nos últimos 6 meses, seus dentes ou a sua boca causaram dificuldade para você desempenhar alguma dessas atividades diárias ?

		1 à 5	0 à 5		1 à 5	0 à 22
	PRESENÇA DO IMPACTO	FREQ	SEVERIDADE Efeito no dia-a-dia	SCORE	SINTOMA	PROBLEMA
Comer Ex: refeições, sorvete	[ ] SIM [ ] NÃO					
Falar claramente	[ ] SIM [ ] NÃO					
Limpar a boca	[ ] SIM [ ] NÃO					
Dormir/Relaxar	[ ] SIM [ ] NÃO					
Manter o seu estado emocional punoçam se irritou e descair	[ ] SIM [ ] NÃO					
Estudar Ex: ir à escola, aprenderem sala de aula, fazer o dever de casa	[ ] SIM [ ] NÃO					
Contato Social Ex: sair com amigos, ir à casa de um amigo	[ ] SIM [ ] NÃO					
Sorrir Ex: Sorrir sem se embaraçar	[ ] SIM [ ] NÃO					

**Frequência:** 1- menos de uma vez ao mês , 2- Uma ou duas vezes ao mês, 3- Uma ou duas vezes por semana, 4- Três ou quatro vezes por semana, 5- Todos ou quase todos os dias (5 ou mais vezes por semana)

**Severidade:** 0- Nenhuma gravidade, 1- Muito pouco grave , 2- Pouco grave, 3- Gravidade moderada, 4- Muito grave, 5- Extremamente grave

**Sintoma:** Qual tem sido o principal sintoma? 1- Dor, 2- Desconforto, 3- Limitação na função (por ex, mastigar, morder ou abrir bem a boca), 4- Insatisfação com a aparência 5- Outros (especificar) \_\_\_\_\_

**Problema:** Você poderia especificar qual o problema que você tem tido com a sua boca, dentes, ou dentadura?

0 – não consegue identificar

**Dentes:** 1- Dor de dente, 2- Falta de dente , 3- Dente mole, 4- Cor dos dentes, 5- Posição dos dentes (dente torto ou muito para frente), 6- Formato/tamanho dos dentes

**Boca:** 7- Deformidade na boca ou rosto, 8- Úlcera bucal ou escoriações doloridas (não relacionados à prótese), 9- Sensação de queimação na boca, 10- Respiração difícil , 11- Distúrbio no paladar, 12- Gosto desagradável

**Gengivas:** 13- Hemorragias gengivais, 14- Afastamento da gengiva, 15- Abscesso gengival

**Mandíbula:** 16- Barulho desagradável ou estalo na articulação mandibular, 17- Mandíbula travada; travamento anterior, 18- Obturação quebrada ou de cor diferente do dente, 19- Dentadura solta ou mal colocada, 20- Aparelhos ortodônticos, 21- outros (especificar), 22- Sem resposta

ANEXO 4

Nome _____	Ficha nº _____
------------	----------------

**GOES**  
**Parte I**

5- Você já morou em outra cidade além de Piracicaba?  
 Sim. Se sim, qual foi? \_\_\_\_\_  
 Não.

6- Há quanto tempo você está estudando nesta escola? \_\_\_\_\_ anos  
 A escola é: pública  ou particular

7- Quantos irmãos e irmãs você tem? \_\_\_\_\_ irmãos \_\_\_\_\_ irmãs  
 8- Considerando a ordem de nascimento entre os seus irmãos, faça um círculo se você é o:  
 Primeiro Segundo Terceiro Quarto Quinto Outro. Qual?

9- Você já foi alguma vez reprovado de ano na escola?  
 Sim  Não  Não sei/não me lembro

10- Quantas pessoas moram sempre na sua casa, incluindo seus pais, irmãos, irmãs, avós, avôs, tios, tias, primos, sobrinhos, amigos e empregados domésticos? \_\_\_\_\_ pessoas.

11- VOCÊ trabalha?  Sim Não

Se a resposta for Sim, onde? \_\_\_\_\_ quantas horas por dia? \_\_\_\_\_ Você faz o quê em seu trabalho? \_\_\_\_\_

12- Seu PAI está trabalhando no momento?  
 Sim  Não  Não sei/não me lembro

13- O que o seu PAI fazia ou faz em seu trabalho principal? (Descreva detalhadamente as tarefas mais frequentes que ele desenvolve - ou desenvolvia - em seu trabalho).  
 \_\_\_\_\_  
 \_\_\_\_\_

14- Sua MAE está trabalhando no momento?  
 Sim  Não  Não sei/não me lembro

15- O que a sua MAE fazia ou faz em seu trabalho principal? (Descreva detalhadamente as tarefas mais frequentes que ela desenvolve - ou desenvolvia - em seu trabalho).  
 \_\_\_\_\_  
 \_\_\_\_\_

16- Sua MAE estudou?  
 Sim  Não  Não sei/não me lembro

17- Marque no quadro abaixo a opção que melhor representa o grau de escolaridade da sua MAE  
 Ela não foi a escola. Ela não lê e nem escreve escola, mas lê e escreve  
 1º grau incompleto. Até qual série? \_\_\_\_\_  1º grau completo  
 2º grau incompleto  2º grau completo  3º grau completo

18- Seu PAI estudou?  
 Sim  Não  Não sei/não me lembro

19- Marque no quadro abaixo a opção que melhor representa o grau de escolaridade do seu PAI  
 Ele não foi a escola. Ele não lê e nem escreve mas lê e escreve  
 1º grau incompleto. Até qual série? \_\_\_\_\_  1º grau completo  
 2º grau incompleto  2º grau completo  3º grau completo

**Parte 2 - Saúde bucal**  
 Agora nós gostaríamos de saber algumas coisas sobre a saúde dos seus dentes e da sua boca!

20- Como você classifica a saúde dos seus dentes e da sua boca?  
 Excelente  Muito Boa  Boa  Mais ou menos  Ruim

21- Você está satisfeito com a aparência dos seus dentes?  
 Muito satisfeito  Satisfeito  Aceitável  Insatisfeito

22- Você já foi ao dentista?  
 Sim  Não (Vá para a questão 23)  
 Lembre-se: você só deve responder da questão 23 a 26, caso tenha respondido SIM na questão 22. Na dúvida volte até a questão 22 e confirme.

23- Qual o tipo de serviço odontológico (dentista) que você geralmente usa?  
 Particular  Público (No centro de saúde)  Público (No dentista da escola)  
 Público (Na faculdade de odontologia)  Plano de saúde  Convênio  
 Outros, quais? \_\_\_\_\_  Não sei/não me lembro

24- Qual foi a última vez que você foi ao dentista?  
 Estou em tratamento no momento  Há menos de seis meses  Há 7-12 meses  
 Há 13-24 meses  Mais de 24 meses  Não sei/não me lembro

25- Qual foi o motivo pelo qual você procurou o dentista desta última vez que você esteve lá?  
 Dor  Extrair o dente  Para tratar os dentes  Para revisão  
 Fazer limpeza, aplicar fluor, etc...  Outros. Quais? \_\_\_\_\_

26- Qual o motivo mais frequente pelo qual você vai ao dentista?  
 Para revisões frequentes (Vá para a questão 28)  
 Apenas quando tenho um problema (Vá para a questão 28)  
 Não sei/não me lembro (Vá para a questão 28)

Questionário Goes et al., 2007, Pergunta número 21

## ANEXO 5

### Comprovante de submissão do artigo a European Journal of Orthodontics

ScholarOne Manuscripts

<https://mc.manuscriptcentral.com/ejo>



#### Submission Confirmation

Thank you for your submission

Manuscript ID EJO-2015-0A-0380

Title Malocclusion and dental appearance in underprivileged Brazilian adolescents

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Paranhos, Luiz Renato  
Vazquez, Fabiana

Authors Sarracini, Karin  
Soares, Angélica  
Ambrosano, Glaucia Maria  
Pereira, Antonio  
Cortellazzi, Karine

Date Submitted 11-Sep-2015

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## **ANEXO 6**

### **TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO**

Convidamos você a participar da nossa pesquisa: "Risco e vulnerabilidade às doenças bucais em adolescentes brasileiros". As informações contidas neste documento serão fornecidas pelos pesquisadores da Faculdade de Odontologia de Piracicaba – Unicamp: Prof. Dr. Antonio Carlos Pereira, Profa Dra Elaine Pereira da Silva Tagliaferro e alunos de pós-graduação, Fabiana de Lima Vazquez, (doutorado), Armando Koichiro Kaieda (doutorado), Jaqueline Vilela Bulgareli(doutorado), Silvia Leticia Freddo(doutorado), Karine Laura Cortellazzi (pós-doutorado) para convidar e firmar acordo consentimento livre e esclarecido, através do qual você autoriza a participação de seu filho (a), com total conhecimento da natureza dos procedimentos e riscos a que se submeterá, com a capacidade de livre-arbítrio e livre de qualquer coação, podendo desistir quando quiser.

#### **JUSTIFICATIVA**

Estudos para conhecer a ocorrência de doenças e condições bucais na população são de grande importância. O conhecimento do estado dos dentes do seu filho(a) pode ajudá-lo a buscar tratamento antes que o problema se torne mais grave. Além disso, estes estudos também fornecem informações para a criação de programas educativos e planejamento que dão assistência à saúde da boca, trazendo benefícios para toda a população.

#### **OBJETIVOS**

O objetivo deste trabalho é avaliar o risco de doenças bucais em uma população adolescente de 13 a 19 anos no município de Piracicaba-SP.

#### **METODOLOGIA**

- Somente depois que concordar em participar e assinar este documento, seu filho(a) será considerado voluntário. Você não deve se sentir obrigado a assinar nenhum documento e pode pedir todos os esclarecimentos que achar necessário. Você responderá, em seguida, a um questionário com questões socioeconômicas, comportamentais, demográficas e psicossociais Além disso, os indivíduos que tiverem os piores e melhores índices de cárie serão entrevistados, sendo a entrevista gravada e mantida as informações em sigilo.
- Para participar da pesquisa, seu filho(a) responderá a 2 questionários simples sobre questões de saúde bucal, dor de dente, educação e prevenção em saúde, escolaridade, moradia, renda. As respostas ficarão sobre a responsabilidade da pesquisadora principal e você terá garantia de sigilo em relação às respostas emitidas.
- Seu filho(a) passará por um exame de sua boca, avaliando seus dentes e gengiva. Seu filho será avaliado quanto à cárie, doença da gengiva, problema na posição dos dentes, fluorose (excesso de ingestão de flúor nos dentes). Esse exame será também mantido em segredo e guardado com pesquisadora responsável. Caso seja necessário, seu filho receberá uma carta para procurar tratamento.

#### POSSIBILIDADE DE INCLUSÃO EM GRUPO CONTROLE/PLACEBO

Não haverá grupo controle e placebo neste estudo.

#### MÉTODOS ALTERNATIVOS PARA OBTENÇÃO DA INFORMAÇÃO

Não existem métodos alternativos para obtenção da informação.

#### DESCRIÇÃO CRÍTICA DOS DESCONFORTOS E RISCOS PREVISÍVEIS

Você passará por um exame de seus dentes e sua gengiva, realizado em local separado e utilizando materiais esterilizados, que causam leve incômodo. O instrumental apresenta ponta arredondada para não causar nenhum tipo de dano ou machucado. Este exame será realizado em sala separada, evitando qualquer tipo de constrangimento por parte dos voluntários. Não há previsão de riscos aos participantes desta pesquisa.

#### DESCRIÇÃO DOS BENEFÍCIOS E VANTAGENS DIRETAS AO VOLUNTÁRIO

Como benefício, o paciente receberá, através da pesquisa, avaliação de cárie, doenças da gengiva e problemas na mordida, possibilitando o diagnóstico precoce de possíveis problemas existentes. O adolescente que estiver com algum problema receberá uma carta por escrito para procurar tratamento indicado. Além disso, você estará contribuindo com uma pesquisa científica que visa melhorar a qualidade do serviço prestado à comunidade.

#### FORMA DE ACOMPANHAMENTO E ASSISTÊNCIA AO SUJEITO

Os pesquisadores responsáveis acompanharão seu filho e darão assistência durante a pesquisa ou quando você solicitar, resolvendo problemas relacionados à pesquisa ou dúvidas a respeito da mesma.

#### FORMA DE CONTATO COM A PESQUISADORA E COM O CEP

Para entrar em contato com os pesquisadores: Você terá contato direto com os pesquisadores Fabiana de Lima Vazquez (19) 92850726, Armando Koichiro Kaieda (19) 996511691, Jaqueline Vilela Bulgareli (19)999651819, Silvia Leticia Freddo (49) 999327999, Karine Laura Cortellazzi (19) 81282190 ou pelos e-mail [fabilivazquez@gmail.com](mailto:fabilivazquez@gmail.com), [armandokaieda@hotmail.com](mailto:armandokaieda@hotmail.com), [jaquelinebulgareli@gmail.com](mailto:jaquelinebulgareli@gmail.com), [freddente@hotmail.com](mailto:freddente@hotmail.com), [karinecortellazzi@gmail.com](mailto:karinecortellazzi@gmail.com).

Em caso de dúvida quanto aos seus direitos como voluntário da pesquisa, entre em contato com o Comitê de Ética em Pesquisa Humana da Faculdade de Odontologia de Piracicaba, situado na Av. Limeira, 901 CEP:13414-903, Piracicaba-SP, Fone/Fax: (19) 2106-5349; e-mail: cep@fop.unicamp.br; site: [www.fop.unicamp/cep](http://www.fop.unicamp/cep).

#### GARANTIA DE ESCLARECIMENTOS

Você tem a garantia de que receberá respostas para qualquer pergunta e suas dúvidas sobre os procedimentos, sobre os riscos, os benefícios e outros assuntos relacionados com a pesquisa serão esclarecidos. Os pesquisadores também assumem o compromisso de dar as informações obtidas durante o estudo, mesmo que isso possa afetar sua vontade em continuar participando do estudo.

## GARANTIA DE RECUSA À PARTICIPAÇÃO OU SAÍDA DO ESTUDO

Você tem liberdade para retirar seu consentimento ou se recusar a continuar a participar do estudo, a qualquer momento, conforme determinação da Resolução 196/96 do CNS do Ministério da Saúde. Caso deixe de participar do estudo por qualquer razão, você não sofrerá qualquer tipo de prejuízo ou punição não perderá o direito ao tratamento na Unidade de Saúde da Família.

## GARANTIA DE SIGILO

Nós, os pesquisadores, prometemos resguardar todas as suas informações sobre a pesquisa e vamos tratar estas informações com impessoalidade, não revelando sua identidade.

## GARANTIA DE RESSARCIMENTO

Não há previsão de ressarcimento de despesa, visto a pesquisa será realizada em horário onde o usuário estará na unidade de saúde para consulta, após a realização da mesma, e, portanto, você não terá gastos para participar da pesquisa.

## GARANTIA DE INDENIZAÇÃO E/OU REPARAÇÃO DE DANOS

Como não há riscos ou danos previsíveis, neste caso, não haverá indenização previsível. Caso ocorra algum imprevisto, ficam os pesquisadores responsáveis em indenizar em comum acordo com os voluntários, eventuais danos decorrentes desta pesquisa.

Consentimento:

Eu, \_\_\_\_\_  
\_\_\_\_\_, RG n\_\_\_\_\_, responsável por \_\_\_\_\_, certifico ter lido todas as informações acima citadas e estar suficientemente esclarecido de todos os itens pelos pós-graduandos Fabiana de Lima Vazquez, Armando Koichiro Kaieda, Jaqueline Vilela Bulgareli, Silvia Leticia Freddo, Karine Laura Cortellazzi, pesquisadores responsáveis na condução da pesquisa. Estou plenamente de



acordo e aceito participar desta pesquisa "Risco e vulnerabilidade às doenças bucais em adolescentes brasileiros". E recebi uma cópia desse documento.

Piracicaba, \_\_\_\_\_ de \_\_\_\_\_ de 2012.

Nome: \_\_\_\_\_ RG: \_\_\_\_\_

Assinatura: \_\_\_\_\_

Assinatura do Pesquisador: \_\_\_\_\_