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IMPACTO DAS MÁS OCLUSÕES NAS ATIVIDADES DIÁRIAS DE ADOLESCENTES

Tese apresentada à Faculdade de Odontologia de Piracicaba, da Universidade Estadual de Campinas, para a obtenção do Título de Doutor em Odontologia. Área de concentração em Saúde Coletiva.

Orientador: Prof. Dr. Marcelo de Castro Meneghim

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Lute pelos seus
sonhos, suas metas, seus ideais, pois afinal...

"Sem sonhos, a vida não tem brilho.
Sem metas, os sonhos não têm alicerces.
Sem prioridades, os sonhos não se tornam reais. Sonhe, trace metas,
estabeleça prioridades e corra riscos para executar seus sonhos.
Melhor é errar por tentar do que errar por omitir!"

Augusto Cury

Resumo

Este estudo foi composto por dois artigos cujo objetivo principal foi determinar as necessidades de tratamento ortodôntico em adolescentes e avaliar o impacto que as más oclusões possuem nas atividades diárias desses indivíduos. A amostra probabilística por conglomerados contou com 528 escolares de 15 anos selecionados em 10 escolas públicas de Piracicaba no ano de 2010. Os exames foram realizados por dois examinadores calibrados seguindo recomendações da OMS. Um questionário semi-estruturado foi enviado aos pais para a obtenção das informações socioeconômicas e obtenção do TCLE. A avaliação dos impactos orais nas atividades diárias (Oral Impacts on Daily Performances - OIDP) foi avaliada através de medida de condição específica (CS-OIDP). Os índices DAI (Dental Aesthetic Index), IOTN (Index of Orthodontic Treatment Need) e ICON (Index of Complexity, Outcome and Need) foram utilizados para a obtenção das características específicas da oclusão e categorização das necessidades de tratamento ortodôntico. A auto-percepção da estética dental foi avaliada através do Oral Aesthetic Subjective Impact Scale (OASIS) e a auto-estima através do Global Self-evaluation (GSE). O interesse em realizar tratamento ortodôntico foi avaliado através de ferramenta específica. **Artigo 1:** Avaliou a concordância diagnóstica dos índices DAI, IOTN e ICON na determinação das necessidades de tratamento ortodôntico em saúde pública e avaliou a relação entre as necessidades normativas e a presença de impacto nas atividades diárias atribuídos à má oclusão . A comparação das proporções das necessidades de tratamento ortodôntico foi realizada através do teste *qui*-quadrado. Os índices foram dicotomizados em categorias "com necessidade" e "sem necessidade de tratamento ortodôntico. A concordância diagnóstica foi avaliada através de estatística *K*appa. Análise bivariada foi realizada para avaliação da relação existente entre as necessidades normativas e a presença de impactos nas atividades diárias. As necessidades de tratamento de acordo com os critérios adotados foram: 20,65% (n=109) DAI; 19,79% (n=104) IOTN (DHC); 4,73% (n=25) IOTN (AC) and 21,78% (n=115) ICON. A concordância diagnóstica dos índices foi fraca (*K*appa variando 0,018-0,235; p=0.00). Apenas a concordância IOTN (DHC)-ICON foi boa (*K*appa 0.499; p=0.00). As necessidades normativas apresentaram relação estatisticamente significante com a presença de impactos nas atividades diárias. **Artigo 2:** Avaliou os indicadores de risco para a presença de impactos nas atividades diárias atribuídos à má oclusão . O índice OIDP foi utilizado como variável dependente para a classificação da presença de impacto e o índice DAI utilizado para avaliação da oclusão. As demais variáveis independentes, auto estima, auto-avaliação estética, interesse ortodôntico e condições sócio-econômicas foram incluídas no modelo. Para análise estatística utilizou-se teste de *q*ui-quadrado e regressão logística uni e multivariada (α = 5%). A presença de má oclusão , necessidade normativa de tratamento, presença de apinhamento, apinhamento maxilar, auto-estima, auto-percepção estética e interesse ortodôntico apresentaram relação estatisticamente significativa com a presença de impactos

nas atividades diárias. Um terço dos indivíduos apresentaram impactos nas suas atividades diárias atribuídos as más oclusões. Necessidade de tratamento obrigatória, apinhamento em um ou mais segmentos, apinhamento maxilar ≥ 2 mm, baixa auto-estima, auto-percepção negativa e ausência de interesse ortodôntico foram considerados indicadores de risco.

Palavras Chave: Oclusão Dentária, Qualidade de Vida, Ortodontia, Necessidades e demandas de serviços de saúde.

Abstract

The present study was composed by 2 articles which aims were evaluate the orthodontic treatment needs in adolescents and to evaluate the presence of impacts on daily performances attribute to malocclusion on daily activities. Adolescents were selected, using two-stage cluster sampling. 528 15-year old students were selected from 10 public schools in Piracicaba, SP, Brazil. The exams were carried out by two previously calibrated examiners in accordance with WHO recommendations. A semi-structured questionnaire was sent to the parents to collect information on socioeconomic level. Face-to-face structured interview was used to collect the data about the condition-specific feature of oral impact on daily performances attributed to malocclusions (CS-OIDP) in the past six months. Intraoral examinations were conducted to register all the necessary malocclusion features and to obtain the DAI, IOTN and ICON indices and to determine the normative orthodontic treatment. The subjects were evaluated to their self-esteem (global self-evaluation) and self-perception of oral esthetics (oral aesthetic subjective impact scale). Orthodontic concern was also assessed through questionnaires. **Article 1:** the aim of this study was to estimate the diagnostic agreement between dental aesthetic index (DAI), index of orthodontic treatment need (IOTN) and index of complexity outcome and need (ICON) assessments of orthodontic treatment needs and test the association between the normative needs and the presence of impacts on daily performances attributed to malocclusion. DAI, IOTN and ICON were dichotomized into ´yes´ or ´no´ categories of treatment need and agreement was calculated using Kappa statistics. The results indicate that orthodontic treatment needs according to the criteria adopted were: 20.65% (n=109) DAI; 19.79% (n=104) IOTN (DHC); 4.73% (n=25) IOTN (AC) and 21.78% (n=115) ICON. Agreement of the indices was weak (*K*appa ranging 0.018-0.235; p=0.00). Only the comparison IOTN (DHC)-ICON presented a good relationship (*K*appa 0.499; p=0.00). Normative needs showed significant relation to oral impacts on daily performances attributed to malocclusions. **Article 2:** The second study aimed to evaluate the risk indicators of impacts on daily performances attributed to malocclusion. The dental aesthetic index (DAI) was considered for clinical assessment. The (CS-OIDP) instrument was used to assess the presence of impact, as de dependent variable. The self-esteem (global self-evaluation), self-perception of oral esthetics (oral aesthetic subjective impact scale), orthodontic concern and socioeconomic variables were the independent variables. Multiple logistic regressions were used in the data analysis. The results indicated that presence of malocclusion (p = 0.00), normative need (p = 0.00), anterior crowding (p = 0.00), maxillary anterior crowding (p = 0.00), self-esteem (p = 0.03), esthetic self perception (p = 0.00) and orthodontic interest (p = 0.00) were significantly associated with the presence of impacts. Logistic regression indicates that mandatory normative need, anterior crowding in one or more segments, maxillary anterior crowding ≥ 2 mm, low self esteem, negative esthetic self perception, no orthodontic concern are risk indicators to oral impacts. 1/3 of 15-year old

adolescents sample presented impacts on daily performances attributed to malocclusion on the past six months.
Key-words: Dental occlusion, Quality of Life, Orthodontics, Health services needs and demand.

Sumário

Introdução

A transição epidemiológica das doenças bucais no Brasil, expressada pela redução da doença cárie dental em crianças e adolescentes tem direcionado à atenção a outros problemas bucais, como as más oclusões. Segundo os dados da Organização Mundial de Saúde (OMS), estas são consideradas como o terceiro problema odontológico de saúde pública, superadas na escala de prioridades apenas pela cárie dental e problemas periodontais (Dias & Gleiser, 2008).

Para a avaliação e planejamento das necessidades de cuidado em saúde dirigidas para a organização de serviços de atenção à saúde bucal para inferir resolutividade a qualquer problema de saúde pública, deve-se inicialmente conhecer não só a prevalência da enfermidade, como também determinar aqueles indivíduos em que o problema causa maior prejuízo (Marques *et al*., 2006). No que tange aos problemas oclusais, estas considerações podem nortear a elaboração de planos de ação mais equitativos, direcionados para aqueles identificados como portadores de más oclusões graves e com maior dano para sua saúde, função, estética, e adequado desempenho de suas atividades diárias (Miguel, 1998; Chew & Aw, 2002).

Inúmeros estudos têm apresentado aumentos na freqüência das más oclusões em diversos países e regiões do mundo, destacando que nas populações modernas a freqüência de más oclusões esperada na população varia de 40% a 80%, e a necessidade de tratamento entre 30% à 75%. (Proffit & Fields, 2000; Evensen & Øgaard, 2007).

Deve ser ressaltado que a saúde bucal engloba um conceito amplo no qual a prevenção da cárie dentária e doença periodontal é apenas um dos pontos básicos e fundamentais. Todavia, os fatores oclusais, o crescimento harmônico da face e a correta erupção e implantação dos dentes nas bases ósseas visando uma oclusão balanceada são aspectos que devem ser levados em consideração dentro do conceito de prevenção (Faltin Jr. & Faltin, 1999).

Nos últimos anos, uma série de publicações tem mostrado o panorama epidemiológico das más oclusões em regiões representativas do Brasil (Silva Filho *et al*., 1989; Martins *et al*., 1998; Ramos *et al*., 2000; Alves *et al*., 2009). A maioria destes estudos teve como objetivo principal a identificação da distribuição de algumas anomalias da oclusão, tais como, mordidas cruzadas, mordidas abertas, hábitos bucais deletérios e classificação sagital das más oclusões (Classe I, II e III), sendo portanto de grande utilidade para interpretação de características específicas da combinação de oclusão e posição dentária permitindo a compreensão de um resultado final observável de todos os fatores que podem estar relacionados nas más oclusões dentárias (Tomita *et al*., 2000), porém pobremente focados nas reais finalidades dos estudos epidemiologicos, que devem fornecer subsídios à elaboração de estratégias de saúde pública.

Contudo, a simples avaliação da prevalência das más oclusões não permite, por si só, elaborar qualquer programação de atendimento preventivo ou curativo, pois não fornece uma idéia da intensidade desse fenômeno nos variados grupos que compõem cada comunidade (Pinto, 2000). Além disso dependendo da região em que a análise é realizada e das características do grupo populacional em estudo, a hierarquia tradicional dos problemas bucais pode estar alterada, e a cárie dental apresentar baixa prevalência, com níveis controlados e não alarmantes, fazendo com que esta não seja apenas o principal foco de atenção das estratégias de saúde bucal (Narvai *et al*., 2006).

Outro ponto de interesse é que poucos serviços de saúde pública apresentam um setor ou um programa de trabalho voltado para os problemas ortodônticos, ficando a maioria da população com necessidades acumuladas e sem acesso tanto aos recursos mais simples de prevenção, quanto a aqueles de tratamento mais complexo (Frazão, 1999). A elevada prevalência demonstrada pelos estudos populacionais acaba por gerar uma expectativa de demanda exagerada para os serviços. No Brasil, isto é particularmente importante, pois nas instituições públicas em que este tratamento poderia ser oferecido, os recursos não são suficientes para atender a demanda e, nesse caso, um sistema de priorização estaria indicado (Dias & Gleiser, 2008)

A utilização de índices que avaliam a necessidade de tratamento ortodôntico pode estimar o grau dessa necessidade e, com isso, contribuir para o dimensionamento dos recursos humanos e financeiros necessários para supri-la (Shaw *et al.*, 1995). Entretanto, sabe-se que mesmo nos países em que o tratamento ortodôntico é integralmente financiado pelo sistema público de saúde, os recursos destinados à atenção em saúde bucal raramente são suficientes para acolher demandas ortodônticas ilimitadas ao serviço (Vakiparta et. al, 2005). Portanto, levando-se em consideração a natureza multifatorial das más oclusões, que incluem expectativas e necessidades psicológicas do paciente, as características físicas da oclusão, e inclusive fatores socioeconômicos, torna-se difícil estandardizar julgamentos e determinar apenas necessidades normativas de tratamento (Baume & Marechaux, 1974; McLain & Proffit, 1985; Koochek *et al.*, 2001).

Apesar da reconhecida importância epidemiológica da validade e confiabilidade dos índices ortodônticos na determinação das necessidades de tratamento, medidas clínicas possuem limitações sobre as funções da cavidade bucal ou da pessoa como um todo (Locker, 1989). Índices clínicos são essenciais para a mensuração de agravos e doenças bucais, porém são pobremente focados quando usados isoladamente como medidas de saúde e de determinação de necessidades de tratamento (Sheiham *et al.* 1982).

Dessa forma, novas abordagens para avaliação dos pacientes e planejamento das intervenções são necessárias para modificação do modelo tradicional de determinação das necessidades de tratamentos (Mechanic, 1995), especialmente no que se relacionam as más oclusões, visto que uma multiplicidade de fatores está envolvida. Todavia torna-se imprescindível incorporar além de medidas clínicas, dimensões sociais e psicológicas para a avaliação das más oclusões, uma vez que somente o dano ou incapacidade clínica não constituem uma base suficiente para a avaliação das necessidades de tratamento (Sheiham & Tsakos, 2007).

Embora haja um consenso entre os ortodontistas que a população é motivada a procurar cuidados ortodônticos por causa dos efeitos físicos, psicológicos e sociais adversos das más oclusões (Birkeland *et al.*, 1999;

Coyne *et al.*, 1999), há necessidade de uma avaliação mais rigorosa e detalhada dos impactos sociodentais de más oclusões não tratadas na qualidade de vida (Zhang *et al.*, 2006).

Partindo do pressuposto, este trabalho foi delineado e dividido em dois capítulos. No primeiro capítulo foi abordada a concordância diagnóstica dos métodos tradicionalmente aceitos de determinação de necessidades normativas de tratamento ortodôntico, e as possíveis relações com a presença de impactos nas atividades diárias atribuídos à má oclusão. No segundo capítulo foram levantados quais os principais indicadores de risco para a presença deste impacto.

Proposição

O presente estudo foi realizado em formato alternativo conforme deliberação da Comissão Central de Pós-Graduação (CCPG) da Universidade Estadual de Campinas – UNICAMP n°001/98 e foi composto por dois capítulos, cujos objetivos são:

CAPÍTULO 1: ***Diagnostic Agreement of Different Indices for the Assessment of Orthodontic Treatment Needs and its Relation to Malocclusions Impacts on Daily Performances***

Objetivo: Avaliar a concordância diagnóstica dos índices de determinação de necessidade de tratamento ortodôntico e testar a associação entre as necessidades normativas detectadas e a presença de impactos nas atividades diárias atribuídos à má oclusão ;

CAPÍTULO 2: ***Risk Indicators of Impacts on Daily Performances Attributed to Malocclusion Among Brazilian Adolescents.***

Objetivo: Testar a associação entre a presença de impacto com as características da oclusão e variáveis biopsicossociais e avaliar os indicadores de risco de impactos nas atividades diárias atribuídos à má oclusão

Diagnostic Agreement of Different Indices for the Assessment of Orthodontic Treatment Needs and its Relation to Malocclusions Impacts on Daily Performances*

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ABSTRACT

Introduction: the aim of this study was to estimate the diagnostic agreement between dental aesthetic index (DAI), index of orthodontic treatment need (IOTN-DHC and AC) and index of complexity outcome and need (ICON) assessments of orthodontic treatment needs and test the association between the normative needs and the presence of impacts on daily performances attributed to malocclusion. **Methods:** The random sample included 528 subjects aged 15-years. The condition specific feature of oral impact on daily performances (CS-OIDP) instrument was used to assess the presence of impact. The DAI, IOTN and ICON were used for clinical assessment. Indices were dichotomized into ´yes´ or ´no´ categories of treatment need and agreement was calculated using Kappa replication statistics. The comparison of proportion of treatment need and the association with presence of impacts was made by qui-square test. **Results:** The orthodontic treatment needs according to the criteria adopted was: 20.65% (n=109) DAI; 19.79% (n=104) IOTN (DHC); 4.73% (n=25) IOTN (AC) and 21.78% (115%) ICON. Agreement of the indices was weak (*K*appa ranging 0.018-0.235). Only the comparison IOTN (DHC)-ICON presented a good relationship (*K*appa 0.499). Normative needs showed significant relation to oral impacts on daily performances attributed to malocclusion. **Conclusion:** The determination of orthodontic treatment needs in public health should consider clinical normative and oral health-related quality of life measures.

Key-words: Malocclusion; Oral impacts; Orthodontic need.

1. INTRODUCTION

Determining the need for orthodontic treatment in public health is a difficult task especially when resources are scarce. Even in countries where orthodontic treatment is fully funded by the public health system, resources for oral health care are rarely sufficient to meet the unlimited demand for orthodontic services. Consequently, the selection of patients is needed to ensure that treatment is provided to individuals with the greatest need[1]. In fact, there are difficulties to determine such need, as the diversity of malocclusions, the character sometimes elective and the different options of treatment.

Nevertheless, a suggestion to categorize these patients would be to use some occlusal index[2]. Several of these indices have been widely used to assess the prevalence and severity of malocclusions in epidemiological studies and categorize individuals into groups according with the level of urgency of treatment, seeking to act as effective methods for achieving a more uniform assessment orthodontic treatment need [3,4]. Several malocclusion assessment methods have been developed, but none of them has been universally accepted[5]. Although no absolute consensus has been reached on the individual characteristics and occlusal features that should be assessed in order to objectively establish treatment need[6], in the recent literature, the orthodontic treatment need indices used in epidemiological studies of malocclusion in different countries have tended to coincide in many ways, to unify criteria, and have been recognized by various international associations. Such indices include the Dental Aesthetic Index (DAI)[7] and the Index of Orthodontic Treatment Need (IOTN)[8]. The DAI links the clinical and Aesthetic Components (ACs) mathematically to arrive at a single mark which combines the physical and aesthetic aspects of the occlusion. It is based on a social acceptability scale of occlusal conditions[9] and it has been used in many studies to determine orthodontic treatment need in different countries[10-15]. A DAI scale that divided the continuous index score defined by the equation into four malocclusion severity levels was established, making it easier to use and encouraging its

application in orthodontic care programs or malocclusion prevalence studies[16]. It was included in the World Health Organization Oral Health Survey Methods[17].

Unlike the DAI, the IOTN classifies malocclusions according to the presence of particular occlusal features which are considered important for dental health and aesthetics in order to identify individuals who would derive the most benefit from orthodontic treatment. IOTN[7] consists of two distinct components: Dental Health Component (DHC) and Aesthetic Component (AC)[18]. The DHC is an attempt to synthesize all the possible harmful effects of malocclusion in an objective and reproducible method for assessing treatment need. All occlusal characteristics judged to be interfering on longevity and satisfactory operation of occlusion were classified using a scale of five degrees in order of increasing need for orthodontic treatment. The AC is the subjective part of IOTN order to reflect the socio-psychological need of orthodontic treatment demonstrated by the patient or evaluated by the professional. It consists of a rating scale of dental attractiveness illustrated by 10 color photographs numbered. The two components are analyzed separately and although they cannot be united into a single score, they can be combined to classify the patient and has been used for this purpose in many epidemiological studies[19-23].

The Index of Complexity, Outcome, and Need (ICON)[24], has been validated and proposed as a useful tool to objectively measure orthodontic treatment need. The index was developed based on subjective judgments of an international panel of 97 orthodontists from nine countries about the need, complexity of treatment and acceptability in a diverse sample of pre-treatment and post-treatment study models. ICON promises to be more cost-effective to maintain international standards in orthodontic services as well as encourage international comparison of data[25-27].

Despite the recognized epidemiological importance of occlusal index and the validity and reliability in the determination of orthodontic treatment needs, clinical measures have serious limitations on the functions of the oral cavity or the person as a whole[28]. New approaches to assessing patients and planning interventions are needed to change the traditional model of determining the

needs of treatment[29], especially as related to malocclusion, since a multiplicity of factors is involved. Evaluation of oral impacts on daily performances (OIDP) is one of the measures of quality of life related to oral health (Oral Health Related Quality of Life - OHRQoL) specifically designed to give impacts to specific oral problems according to individual perception. This makes OIDP a useful tool to assess care needs and to prioritize health care with oral health[30]. This reinforce the point stated by some authors[31,32] that normative measures should be used in combination with quality-of-life questionnaires to cover the malocclusion dimension of oral health.

Based on these considerations the aim of this study was to evaluate the diagnostic agreement between DAI, IOTN and ICON assessments of orthodontic treatment needs and test the association between the normative needs and the presence of impacts on daily performances attributed to malocclusion using the condition-specific feature of oral impacts on daily performances (CS-OIDP).

2. MATERIAL AND METHODS

Ethical aspects

The study was approved by the Ethics Committee in Research of the School of Dentistry of Piracicaba, State University of Campinas, protocol number 005/2010 and an Informed consent form was obtained prior to the survey.

Study Group (Sample)

The sample size for this cross-sectional study was calculated to give a standard error of 5% or less. A 95% CI level and a 29% prevalence of oral impacts on daily performances due to malocclusion were used for the calculation[33]. The minimum sample size to satisfy the requirements was estimated to be 316. To minimize possible losses during the survey, the sample size was increased by 20%, to 380 teenagers. Adolescents were selected, using two-stage cluster sampling. First, a random sample of 10 secondary

schools was selected from a list of the 30 public schools in Piracicaba (São Paulo, Brazil). To ensure sample representativity, distribution was correlated in proportion to the actual distribution in the city schools. The next stage was the random selection of 15-year old adolescents from the list of names of each previously chosen school. The representative sample had 615 adolescents examined because in this survey other variables (caries, periodontal conditions) were also collected and they needed a larger sample to be representative. Subjects who were undergoing or had previously orthodontic treatment were excluded; this represented 11.05 % (*n= 86*) of 15-year old adolescents initial sample. The final sample for statistical analysis consisted of 528 subjects (243 boys and 285 girls).

Examination methodology

The exams were carried out by two previously calibrated examiners. Theoretical activities with discussions on diagnosis criteria of malocclusions were performed by the examiners. In the practical activities with clinical examinations and data analyzes inter-examiner mean Kappa>0.89 was obtained. After a one week period the same volunteers participating in the initial calibration exercises were evaluated again for intra-examiner agreement with maximum and minimum kappa values of 1.00 and 0.75 respectively. Approximately 10% of the sample was re-examined in order to verify the intra-examiner reproducibility. The exams were conducted in accordance with the recommendations of the World Health Organization[34] using CPI probes ("ball point"), and dental mirrors #5.

Intraoral examinations were conducted to register all the necessary malocclusion features and to obtain the DAI, IOTN and ICON indicess (overjet, overbite, anterior and posterior crossbite, open bite, displacement of the teeth, diastemas, impeded eruption, hypodontia, clefts of the lip and/or palate, and molar relationship). Face-to-face structured interview was used to collect the data about the condition-specific feature of oral impact on daily performances attributed to malocclusions (CS-OIDP)[35] in the past six months, demographic data including age and sex, and the IOTN (AC).

Indices and variables used

The DAI results were classified on the four-grade scale[36] and individuals placed in level 3 (severe malocclusion; treatment highly desirable) and 4 (very severe/ handicapping malocclusion; treatment mandatory) were considered to require treatment.

The DHC of the IOTN and the IOTN AC were determined in a three-grade scale[37]. Individuals who met the criteria (IOTN DHC ≥4 and/or IOTN AC ≥8) where considered with requirements for a definite need for treatment.

For ICON a previously validated methodology[38] was used, and a cutoff point (ICON ≥ 42) was adopted to estimate treatment need.

The three indices (DAI, IOTN and ICON) were dichotomized into 'yes' or 'no' categories of orthodontic treatment need. For determining treatment needs for DAI, IOTN (DHC) and IOTN (AC) indices only the malocclusions with greater severity (most severe categories of each index) were included in 'yes' category, because they are considered priority in terms of public health.

The OIDP[35] Index was used to collect information on sociodental impacts. The OIDP Index assesses the serious oral impacts on eight daily performances, namely, eating, speaking, cleaning mouth, relaxing, smiling, studying, emotion, and social contact. If an adolescent reported an impact on any of the eight performances, the frequency of the impact (on a scale ranging from 1 to 3) and the severity of its effect on daily life (on a scale ranging from 1 to 3) were scored. If no impact was reported, then a zero score was assigned. Thereafter, adolescents were asked to identify oral problems that, in their opinion, caused the impact. Only those condition-specific oral impacts on daily performances related to ''bad position of teeth,'' ''space between teeth,'' and ''deformity of mouth or face,'' hereafter referred as condition-specific impacts (CSI), were considered in the analysis as sociodental impacts attributed to malocclusion or conditions related to orthodontics. The impact score per performance was estimated by multiplying the corresponding frequency and severity scores. The overall CSI score was the sum of the eight performance scores (ranging from 0 to 72) multiplied by 100 and divided by 72[39,40]. Then, the

prevalence of CSI on daily performances related to malocclusion was calculated as the percentage of adolescents with a CSI score greater than zero.

Statistical Analysis

Descriptive statistics were used to show the data according to the severity scales of each index and proportions of the population in need of orthodontic treatment. *C*hi-square test was used to compare the proportions of the population in need of orthodontic treatment.

Unweighted Kappa statistics were used to analyze the agreement between the DAI, IOTN(DHC), IOTN(AC) and ICON dichotomized into "yes" or "no" categories of orthodontic treatment need. The agreement was defined using the scale of Landis and Koch (1977). Bivariate analyses using the *C*hi-square test (χ^2) at 5% significance level were performed to test the influence of independent variables (presence of malocclusion/ normative need) on dependent variable (CSI).

3. RESULTS

Table I shows descriptive results of malocclusion severity and treatment need according to the categories proposed for each index. The orthodontic treatment needs according to the criteria proposed in this cross-sectional study for 15-year old adolescents was: 20.65% (n=109) for DAI, 19.79% (n=104) IOTN (DHC); 4.73% (n=25) IOTN (AC) and 21.78% (n=115) ICON.

Table II and III showed that the agreement of the indices for determining the need for orthodontic treatment was weak (*K*appa ranging 0.018-0.236; p=0.00; IC 95 %) and only for comparison IOTN (DHC) - ICON analysis presented a good relationship (*K*appa 0.499; p=0.00; IC 95%).

Bivariate analyses using the *C*hi-square test demonstrated that there were statistical significant relation (*p*=0.00) between the normative needs identified and the presence of oral impacts on daily performances atributted to malocclusion (CSI > 0) (Table III).

4. DISCUSSION

The percentage of adolescents with orthodontic treatment needs in this study is comparable with other investigations that employed the DAI[11,41] and IOTN[8,19,22]. The lacks of epidemiologic studies employing the ICON do not allow comparison of data in terms of proportional identification of persons needing treatment.

Malocclusion assessment methods are designed for different purposes and are divided into diagnostic classification indices, epidemiological indices, treatment need or priority indices, treatment outcome indices, and indices of complexity and need[5,43,44].

Irrespective of the index employed in the professional assessment of treatment need (DAI, IOTN-DHC or ICON), the results obtained were very similar and there were no statistically significant differences in the proportion considered in need of treatment: 20.65% for DAI, 19.79% IOTN (DHC); and 21.78% ICON; except for self-assessed need 4.73% IOTN (AC) ($p<0.00$), but this lower prevalence of self-perceived needs is supported by the literature[2].

Nonetheless, on calculating the Kappa statistics, only weak agreement was found in most relationships (*K*appa ranging 0.018-0.236; p=0.00; IC 95 %). Only for comparison IOTN (DHC) - ICON the agreement was good (*K*appa 0.499; p=0.00; IC 95%). Johnson et al.[45] also found that DAI and IOTN indices assessed the same number of children with malocclusions requiring orthodontic treatment, but not all were ranked similarly by each index.

Previous studies[45,46] found significant correlations between DAI and IOTN (DHC) although they did not use kappa statistics as the agreement measure. It would appear logical to presume that the two indicess will differ in certain cases, as there are evident differences in how they work and how they score certain occlusal features[47].

The significant differences found for IOTN (AC) is justified because methods proposed for measuring a patient's need for orthodontic treatment are more or less arbitrary, because the consequences of different types of malocclusion are imperfectly defined and the indices measure the occlusal traits

rather than estimate the physiologic and psychosocial effects of the malocclusion[48].

There is no comparative data on population samples comparing the three indices evaluated in this study because the ICON, in addition to targeting treatment needs is an index that allows comparison of complexity and outcome of treatments. When the ICON was compared to IOTN for this purpose was felt to be the most valid with respect to identifying treatment failure and its use would enable international comparison of results[49]. The results of this study showed good agreement in the comparison IOTN (DHC) - ICON which leads us to infer the possibility of its use for epidemiological purposes. One of this disadvantages is that it do not categorize patients in terms of severity.

The 3 indices are reliable and valid for assessing malocclusion. Because there is no universally accepted method that defines all characteristics of a malocclusion, it can be said that this is a multifactorial problem[50].

The findings of this study also coincide with those of Jenny and Cons[16]. DAI and IOTN are different in nature, designed and drawn up using methods that are not comparable, so although they try to measure the same condition (orthodontic treatment need), they do not do it in the same way and, obviously, there are cases in which they differ. In the IOTN-DHC[26], the basis for the treatment need grades, founded on an extensive review of the literature on this subject, is that certain occlusal features are potentially detrimental to the dental health of the individual. For this reason, it takes into account certain conditions and aspects of the dentition which, while often not aesthetically detrimental, could be dentally or functionally negative. The DAI[7] is based on dental aesthetics, and its constituent features do not include functional considerations or potential risks to the dentition. It was developed by asking approximately 2000 adolescents and adults to rate the aesthetics of 200 photographs of occlusal configurations, representing the entire spectrum of possible malocclusions, then selecting those which were considered the least acceptable by the study population. For this reason, unlike the IOTN, the DAI does not take into account possible occlusal findings that could be functionally detrimental to the individual but are not aesthetically significant. On this point of view the

discussion gets philosophical, because the IOTN includes information of greater significance for oral health. The DAI includes characteristics of aesthetically acceptable dentition; but should be considered that this index was included in the World Health Organization Oral Health Survey Methods[17]

The differences found in the determination of orthodontic treatment depending on which particular index (DAI, IOTN, ICON or any other) is used to reinforce the point stated by some authors[31,32] that normative measures should be used in combination with quality-of-life questionnaires to cover the malocclusion dimension of oral health. This statement reinforces the findings of this survey because the normative needs are statistically associated with the presence of oral impacts on daily performances attributed to malocclusion.

5. CONCLUSION

The oclusal indices tested in this work detected the similar proportion of orthodontic treatment needs in the population; although they do not have good diagnostic agreement. The determination of orthodontic treatment needs in public health should consider clinical normative and oral health-related quality of life measures.

REFERENCES

1. Väkiparta MK, Kerosuo HM, Nyström ME, Heikinheimo KA. Orthodontic treatment need from eight to 12 years of age in an early treatment oriented public health care system: a prospective study. Angle Orthod. 2005 May;75(3):344-9.

2. Chew MT, Aw AK. Appropriateness of orthodontic referrals: self-perceived and normative treatment needs of patients referred for orthodontic consultation. Community Dent Oral Epidemiol. 2002 Dec;30(6):449-54.

3. Järvinen S. Indices for orthodontic treatment need. Am J Orthod Dentofacial Orthop. 2001 Sep;120(3):237-9. Review.

4. Uçüncü N, Ertugay E. The use of the Index of Orthodontic treatment need (IOTN) in a school population and referred population. J Orthod. 2001 Mar;28(1):45-52.

5. Shaw WC, Richmond S, O'Brien KD. The use of occlusal indices: a European perspective. Am J Orthod Dentofacial Orthop. 1995 Jan;107(1):1-10.

6. Richmond S, O'Brien K D, Roberts C, Andrews M. Dentists' variation in the determination of orthodontic treatment need. Br J Orthod. 1994 Feb;21(1):65-8.

7. Cons N C, Jenny J, Kohout F J 1986 DAI: the Dental Aesthetic Index. College of Dentistry. University of Iowa, Iowa City.

8. Brook P H, Shaw W C. The development of an index of orthodontic treatment priority. Eur J Orthod. 1989 Aug;11(3):309-20.

9. Jenny J, Cons NC, Kohout FJ, Frazier PJ. Test of a method to determine socially acceptable occlusal conditions. Community Dent Oral Epidemiol. 1980 Dec;8(8):424-33.

10. Ansai T, Miyazaki H, Katoh Y, Yamashita Y, Takehara T, Jenny J, Cons NC. Prevalence of malocclusion in high school students in Japan according to the Dental Aesthetic Index. Community Dent Oral Epidemiol. 1993 Oct;21(5):303-5.

11. Estioko LJ, Wright FAC, Morgan MV. Orthodontic treatment need of secondary schoolchildren in Heidelberg, Victoria: an epidemiologic study using the Dental Aesthetic Index. Community Dent Health. 1994 Sep;11(3):147-51.

12. Otuyemi OD, Ogunyinka A, Dosumu O, Cons NC, Jenny J, Kohout FJ, Jakobsen J. Perceptions of dental aesthetics in the United States and Nigeria. Community Dent Oral Epidemiol. 1998 Dec;26(6):418-20.

13. Esa R, Razak LA, Allister JH. Epidemiology of malocclusion and orthodontic treatment need of 12-13-year-old Malaysian schoolchildren. Community Dent Health. 2001 Mar;18(1):31-6.

14. Baca-Garcia A, Bravo M, Baca P, Baca A, Junco P. Malocclusions and orthodontic treatment needs in a group of Spanish adolescents using the Dental Aesthetic Index. Int Dent J. 2004 Jun;54(3):138-42.

15. Bernabé D, Flores-Mir C. Orthodontic treatment need in Peruvian young adults evaluated through Dental Aesthetic Index. Angle Orthod. 2006 May;76(3):417-21.

16. Jenny J, Cons NC. Establishing malocclusion severity levels on the Dental Aesthetic Index (DAI) scale. Aust Dent J. 1996 Feb;41(1):43-6.

17. World Health Organization 1997 Oral health surveys: basic methods. WHO, Geneva.

18. Brook PH, Shaw WC. The development of an index of orthodontic treatment priority. European Journal of Orthodontics. Eur J Orthod. 1989 Aug;11(3):309-20.

19. Burden DJ, Holmes A. The need for orthodontic treatment in the child population of the United Kingdom. Eur J Orthod. 1994 Oct;16(5):395-9.

20. Hamdan AM. Orthodontic treatment need in Jordanian school children. Community Dent Health. 2001 Sep;18(3):177-80.

21. Mugonzibwa EA, Kuijpers-Jagtman AM, Van't Hof MA, Kikwilu EN. Need for orthodontic treatment among Tanzanian children. East Afr Med J. 2004 Jan;81(1):10-5.

22. Chestnutt IG, Burden DJ, Steele JG, Pitts NB, Nuttall NM, Morris AJ 2006 The orthodontic condition of children in the United Kingdom. Br Dent J. 2006 Jun 10;200(11):609-12;

23. Souames M, Bassigny F, Zenati N, Roirdan PJ, Boy-Lefevre ML. Orthodontic treatment need in French schoolchildren: an epidemiological study using the Index of Orthodontic Treatment Need. Eur J Orthod. 2006 Dec;28(6):605-9.

24. Daniels C, Richmond S. The development of the index of complexity, outcome and need (ICON). J Orthod. 2000 Jun;27(2):149-62.

25. Richmond S, Ikonomou C, Williams B, Ramel S, Rolfe B, Kurol J. Orthodontic treatment standards in a public group practice in Sweden. Swed Dent J 2001;25:137-44.

26. Firestone AR, Beck M, Beglin FM, Vig KWL. Validity of the index of complexity, outcome, and need. Angle Orthod 2002;72: 15-20.

27. Liepa A, Urtane I, Richmond S, Dunstan F. Orthodontic treatment need in Latvia. Eur J Orthod 2000;25:279-84.

28. Locker D. An introduction to behavioural science and dentistry. London: Routledge; 1989.

29. Mechanic D. Emerging trends in the application of the social sciences to health and medicine. Soc Sci Med 1995; 40: 1491-1496.

30. Gherunpong S, Tsakos G, Sheiham A. A socio-dental approach to assessing children's orthodontic needs. Eur J Orthod. 2006 Aug;28(4):393-9. Epub 2006 May.

31. Tsakos G, Gherunpong S, Sheiham A. Can oral health-related quality of life measures substitute for normative needs assessment in 11 to 12-year-old children? J Public Health Dent. 2006 Fall;66(4):263-8.

32. Klages U, Claus N, Wehrbein H, Zentner A. Development of a questionnaire for assessment of the psychosocial impact of dental aesthetics in young adults. Eur J Orthod. 2006 Apr;28(2):103-11.

33. Kirkwood BR. Essentials of medical statistics. Oxford: Blackwell Science; 2000. p 38-40, 191-200.

34. WHO. Oral health surveys: basic methods. 4th edn. Geneva: WHO;1997.

35. Bernabé E, Tsakos G, Messias de Oliveira C, Sheiham A. Impacts on daily performances attributed to malocclusions using the condition-specific feature of the Oral Impacts on Daily Performances Index. Angle Orthod. 2008 Mar;78(2):241-7.

36. Jenny J, Cons NC. Establishing malocclusion severity levels on the Dental Aesthetic Index (DAI) scale. Aust Dent J. 1996 Feb;41(1):43-6.

37. Burden DJ, Pine CM, Burnside G. Modified IOTN: an orthodontic treatment need index for use in oral health surveys. Community Dent Oral Epidemiol. 2001 Jun;29(3):220-5.

38. Firestone AR, Beck FM, Beglin FM, Vig KW. Validity of the Index of Complexity, Outcome, and Need (ICON) in determining orthodontic treatment need. Angle Orthod. 2002 Feb;72(1):15-20.

39. Adulyanon S, Sheiham A. Oral Impact on daily performances. In: Slade GD, ed. Measuring Oral Health and Quality of Life. Chapel Hill: University of North Carolina; 1997:151–160.

40. Gherunpong S, Tsakos G, Sheiham A. Developing and evaluating an oral health-related quality of life index for children: the Child-OIDP. Community Dent Health. 2004;21: 161–169.

41. Esa R, Razak IA, Allister JH. Epidemiology of malocclusion and orthodontic treatment need of 12-13-year-old Malaysian schoolchildren. Community Dent Health. 2001 Mar;18(1):31-6.

43. Firestone AR, Beck FM, Beglin FM, Vig KWL. Evaluation of the peer assessment rating (PAR) index as an index of orthodontic treatment need. Am J Orthod Dentofacial Orthop 2002;122: 463-9.

44. Ovsenik M, Farcˇnik F, Verdenik I. Comparison of intra-oral and study cast measurements in the assessment of malocclusion. Eur J Orthod 2004;26:273-7.

45. Johnson M, Harkness M, Crowther P, Herbison P. A comparison of two methods of assessing orthodontic treatment need in the mixed dentition: DAI and IOTN. Aust Orthod J. 2000 Jul;16(2):82-7.

46. Freer E, Freer TJ. Variations in treatment need using four screening methods. Aust Orthod J. 1999 Apr;15(4):214-8.

47. Beglin FM, Firestone AR, Vig KW, Beck FM, Kuthy RA, Wade D. A comparison of the reliability and validity of 3 occlusal indices of orthodontic treatment need. Am J Orthod Dentofacial Orthop. 2001 Sep;120(3):240-6.

48. Järvinen S, Väätjä P. Variability in the assessment of need for orthodontic treatment when using certain treatment-need indicess. Community Dent Oral Epidemiol 1987;15:245-8.

49. Fox NA, Chapple JR. Measuring failure of orthodontic treatment: a comparison of outcome indicators. J Orthod. 2004 Dec;31(4):319-22.

50. Tang ELK, Wei SHY. Recording and measuring malocclusion: a review of the literature. Am J Orthod Dentofacial Orthop 1993;103:344-51.

Table I - Distributions of DAI, IOTN (DHC - AC) and ICON levels of orthodontic treatment need in the subjects.

Grade	Category	Total n (%)	X^2 (p)	Dicotomization
DAI				
≤25 (grade 1)	Normal malocclusion	301 (57.01)		
26–30 (grade 2)	Definite malocclusion	118 (22.35)	0.5578	
31–35 (grade 3)	Severe malocclusion	60 (11.36)		Treatment need
≥36 (grade 4)	Very severe (handicapping)	49 (9.28)		grade 3-4
IOTN (DHC)				
DHC 1-2	Normal or minor malocclusion	258 (48.86)		
DHC 3	Moderate malocclusion	166 (31.44)	0.6803	Treatment need
DHC 4-5	Severe/Very severe alocclusion	104 (19.70)		DHC 4-5
IOTN (AC - Self-perceived)				
AC 1-4	Normal or minor malocclusion	470 (89.02)		
AC 5-7	Moderate malocclusion	33 (6.25)	< 0.0001	Treatment need
AC 8-10	Severe/ Very severe	25 (4.73)		DHC 8-10
ICON				
< 42	No need	413 (78.22)	0.1531	Treatment need
≥ 42	Need	115 (21.78)		ICON ≥ 42

Table II - Analysis of diagnostic agreement

Comparisons	**Kappa**	***p*-value**	**Agreement**
DAI - IOTN (DHC)	0.018	0.339	weak
DAI - ICON	0.026	0.278	weak
DAI - IOTN (AC)	0.046	0.075	weak
IOTN (DHC) - ICON	0.499	0.000	good
IOTN (DHC) - IOTN (AC)	0.236	0.000	weak
ICON - IOTN (AC)	0.164	0.000	weak

Table III - Analysis of diagnostic agreement

	IOTN				
DAÍ	No Treatment need	Treatment need	Kappa	*p*-value	agreement
Treatment need	86	23	0.018	0.339	weak
No Treatment need	338	81			
	ICON				
DAÍ	No Treatment need	Treatment need	Kappa	*p*-value	agreement
Treatment need	83	26	0.026	0.278	weak
No Treatment need	330	89			
	IOTN (AC)				
DAÍ	No Treatment need	Treatment need	Kappa	*p*-value	agreement
Treatment need	101	8	0.046	0.075	weak
No Treatment need	402	17			
	ICON				
IOTN (DHC)	No Treatment need	Treatment need	Kappa	*p*-value	agreement
Treatment need	38	66	0.499	0.000	good
No Treatment need	375	49			
	IOTN (AC)				
IOTN (DHC)	No Treatment need	Treatment need	Kappa	*p*-value	agreement
Treatment need	85	19	0.236	0.000	weak
No Treatment need	418	6			
	AC				
ICON	No Treatment need	Treatment need	Kappa	*p*-value	agreement
Treatment need	99	16	0.164	0.000	weak
No Treatment need	404	9			

Table III - Bivariate analysis between the presence of impact on daily performances due malocclusion (*CS-OIDP*) and normative needs determined by DAI, IOTN (DHC/AC) and ICON.

Normative Needs	Presence of impact on daily performances			X^2	p
	No (CSI = 0) n (%)	***Yes*** (CSI > 0) n (%)	Total n (%)		
DAI					
Normal	231 (61.93)	70 (45.16)	301 (57.01)		
Definite malocclusion (treatment elective)	83 (22.25)	35 (22.58)	118 (22.35)	20.88	0.00
Severe malocclusion (treatment highly desirable)	35 (9.38)	25 (16.13)	60 (11.36)		
Handicapping (treatment mandatory)	24 (6.43)	25 (16.13)	49 (9.28)		
IOTN (DHC)					
DHC 1-2 (normal or minor malocclusion - no need)	205 (55.26)	53 (33.76)	258 (48.86)		
DHC 3 (moderate malocclusion - borderline need)	105 (28.30)	61 (38.85)	166 (31.44)	21.05	0.00
DHC 4 e 5 (Severe/ Very severe - needs treatment)	61 (16.44)	43 (27.39)	104 (19.70)		
IOTN (AC) Self-perceived					
Scan 1-4 (normal or minor malocclusion - no need)	343 (92.45)	127 (80.89)	470 (89.02)		
Scan 5-7 (moderate malocclusion - borderline need)	17 (4.58)	16 (10.19)	33 (6.25)	15.46	0.00
Scan 8-10 (severe/ very severe - needs treatment)	11 (2.96)	14 (8.92)	25 (4.73)		
ICON					
Need	53 (14.29)	62 (39.49)	115 (21.78)	41.14	0.00
No need	318 (85.71)	95 (60.51)	413 (78.22)		

Risk Indicators of Impacts on Daily Performances Attributed to Malocclusion among Brazilian Adolescents*

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ABSTRACT

Introduction: The aim of this study was to test the association between the presence of impact on daily performances due to malocclusion and bio-psychosocial variables and to evaluate the risk indicators of impacts attributed to malocclusion. **Methods:** A probabilistic sample included 528 subjects aging15-year. The dental aesthetic index (DAI) was used for clinical assessment. The condition specific feature of oral impact on daily performances (CS-OIDP) instrument was used to assess the presence of impact. The subjects were evaluated to their self-esteem (global self-evaluation) and self-perception of oral esthetics (oral aesthetic subjective impact scale). Orthodontic concern and socioeconomic variables were also assessed through questionnaires. Multiple logistic regression was used in the data analysis. **Results:** Presence of malocclusion (p = 0.00), normative need (p = 0.00), anterior crowding (p = 0.00), maxillary anterior crowding (p = 0.00), self-esteem (p = 0.03), esthetic self perception (p = 0.00) and orthodontic concern (p = 0.00) were significantly associated with the presence of impacts. Logistic regression indicates that mandatory normative need, anterior crowding in one or more segments, maxillary anterior crowding ≥ 2 mm, low self esteem, negative esthetic self perception, no orthodontic concern are risk indicators to oral impacts. **Conclusion:** 1/3 of 15-year old adolescents sample presented negative impacts on daily performances attributed to malocclusion. Mandatory normative need, anterior crowding in one or more segments, maxillary anterior crowding ≥ 2 mm, low self esteem, negative esthetic self perception, lack of orthodontic interest were risk indicators.

Key-words: Malocclusion; Oral impacts; Orthodontic need.

1. INTRODUCTION

Recently, there is increased emphasis on the need of health services based on scientific evidence[1]. Therefore, it becomes essential to incorporate in clinical measures, social and psychological dimensions to the assessment of malocclusion, since only the damage or clinical disability does not constitute a sufficient basis for the assessment of treatment need[2]. There is conflicting evidence on the effects of malocclusion and orthodontic treatment on people's lives[3,4]. A recent review concluded that there is a need for a more comprehensive and rigorous evaluation of the sociodental impacts of untreated malocclusion on quality of life[5]. It was suggested that this evaluation should be on representative population-based epidemiological samples rather than patient-based studies. The studies should use specific, rather than generic, oral health–related quality-of-life (OHRQoL) measures.

Authors[6] described a comparison of the discriminative ability of a generic instrument (Oral Health Impact Profile - OHIP-14) and a condition-specific Oral Health Related Quality of Life (OHRQoL) measure (Condition-Specific form of the Oral Impacts on Daily Performances attributed to malocclusion - (CS-OIDP) in subjects with and without normative need for orthodontic treatment. They concluded that CS-OIDP attributed to malocclusion was better able than OHIP-14 to discriminate between subjects with and without normative needs for orthodontic treatment. Recent studies have reported that the aesthetic effects resulting from malocclusion significantly affect the quality of life of schoolchildren aged between 10 and 14 years[7,8,9]. However there is lack of evidence in the literature about the effects of malocclusion in the quality of life of adolescents.

A report from the World Health Organization (WHO) International Expert Committee on Dental Health stated that an anomaly should be regarded as requiring treatment if the disfigurement or functional defect is, or it is likely to be, an obstacle to the patient's physical or emotional well-being[10]. Some reports showed conflicting results about attractiveness and self-esteem[11], social class and the uptake of orthodontic treatment[12], and the hypothesis that children with visible malocclusion were likely to be socially and psychologically

disadvantaged[13], demonstrating that the full impact of malocclusion on people's lives have not been well defined.

The use of sociodental indicators allow to assess the impact of malocclusion and consequent aesthetic, functional and social changes that will produce in the individuals' daily performances, since the same type of malocclusion have different psychosocial impacts[14]. This means that a particular malocclusion may be perceived differently by people[15,16] and is assumed that individual perception as the trigger for seeking orthodontic treatment[17,18] related or not to the severity of malocclusion[14,19]. In this context it is important to understand aspects related to malocclusion that can influence on quality of life of adolescents, as a public health problem. The aim of this study was to test the association between the presence of impact on daily activities due to malocclusion and bio-psychosocial variables using the condition-specific feature of the oral impacts on daily performances index (CS-OIDP) and to evaluate the risk indicators of impacts attributed to malocclusion.

2. MATERIAL AND METHODS

Ethical aspects

The study was approved by the Ethics Committee in Research of the School of Dentistry of Piracicaba, State University of Campinas, protocol number 005/2010 and an Informed consent form was obtained prior to the survey.

Study Group (Sample)

The sample size for this cross-sectional study was calculated to give a standard error of 5% or less. A 95% CI level and a 29% prevalence of oral impacts on daily performances due to malocclusion were used for the calculation[20]. The minimum sample size to satisfy the requirements was estimated to be 316. To minimize possible losses during the survey, the sample size was increased by 20%, to 380 teenagers. Adolescents were selected, using two-stage cluster sampling. First, a random sample of 10 secondary

schools was selected from a list of the 30 public schools in Piracicaba (São Paulo, Brazil). To ensure sample representativity, distribution was correlated in proportion to the actual distribution in the city schools. The next stage was the random selection of 15-year old adolescents from the list of names of each previously chosen school. The representative sample had 615 adolescents examined, because in this survey other variables (caries; periodontal conditions) were also collected and they needed a larger sample to be representative. Subjects who were undergoing or had previously orthodontic treatment were excluded; this represented 11.05 % (*n= 86*) of 15-year old adolescents initial sample. The final sample for statistical analysis consisted of 528 subjects (243 boys and 285 girls).

Examination methodology

The exams were carried out by two previously calibrated examiners. Theoretical activities with discussions on diagnosis criteria of malocclusions were performed by the examiners. In the practical activities with clinical examinations and data analyzes inter-examiner mean Kappa>0.89 was obtained. After a one week period the same volunteers participating in the initial calibration exercises were again evaluated for intra-examiner agreement. Maximum and minimum kappa values obtained were 1.00 and 0.75 respectively. Approximately 10% of the sample was re-examined in order to verify the intra-examiner reproducibility. The exams were conducted in accordance with the recommendations of the World Health Organization[21] using CPI probes ("ball point"), dental mirrors #5 under natural light.

Intraoral examinations were conducted to register all the necessary malocclusion features and to obtain the DAI index. Face-to-face structured interview was used to collect the data about the oral impact on daily performances attributed to malocclusions (CS-OIDP)[17] in the past six months and demographic data including age and sex. Self-administered questionnaires were used to the other variables.

Indices and variables used

The CS-OIDP Index was used to collect information on sociodental impacts. The OIDP Index assesses the serious oral impacts on eight daily performances, namely, eating, speaking, cleaning mouth, relaxing, smiling, studying, emotion, and social contact. If an adolescent reported an impact on any of the eight performances, the frequency of the impact (on a scale ranging from 1 to 3) and the severity of its effect on daily life (on a scale ranging from 1 to 3) were scored. If no impact was reported, then a zero score was assigned. Thereafter, adolescents were asked to identify oral problems that, in their opinion, caused the impact. Only those condition-specific oral impacts on daily performances related to ‘‘bad position of teeth,’’ ‘‘space between teeth,’’ and ‘‘deformity of mouth or face,’’ hereafter referred as condition-specific impacts (CSI), were considered in the analysis as sociodental impacts attributed to malocclusion or conditions related to orthodontics. The impact score per performance was estimated by multiplying the corresponding frequency and severity scores. The overall CSI score was the sum of the eight performance scores (ranging from 0 to 72) multiplied by 100 and divided by 72[22,23]. Then, the prevalence of CSI on daily performances related to malocclusion was calculated as the percentage of adolescents with a CSI score greater than zero.

Self-administered questionnaires were used to evaluate the variables: Self-esteem assessed with the global negative self-evaluation (GSE)[24] dichotomized into high (GSE = 1 to 2.69) and low (GSE = 2.7 to 6) self-steem; Self-perception regarding dental esthetics assessed with the oral aesthetic subjective impact scale (OASIS)[25] dichotomized into positive (OASIS < 14) or negative (OASIS > 14) self perception. Furthermore, it contained two questions about satisfaction with dental appearance and desire for orthodontic treatment that allowed by the sum of its individual points obtaining a score of orthodontic concern[26] (with/no interest). The parents also answered a questionnaire about information on socioeconomic level[27] (monthly family income, number of people living in the household, parents’ educational level) of the families. The mean family monthly income was calculated according to the Brazilian minimum wage in 2011 (approximately US$269.84)

Statistical Analysis

The dependent variable impact on daily performances attribute to malocclusion was dichotomized according the absence (CSI = 0) or presence (CSI > 0) of condition-specific impact. Bivariate analyses using the Chi-square test (χ^2) at 5% significance level were performed to test the influence of independent variables (presence of malocclusion, normative need, occlusion characteristics and biopsychosocial variables) on dependent variables. After that, multiple logistic regression analyses were performed in order to identify the risk indicators for the presence of impact. Only the independent variables that showed significant association were selected for the regression analysis in order to eliminate variables that would make little contribution to the model. The logistic regression models were adjusted estimating the Odds Ratios (OR), their 95% confidence intervals (CI), and significance levels. All statistical tests were performed using the SAS software (SAS Institute Inc. 8.2, 2001) at 5% significance level.

3. RESULTS

The prevalence of impacts on daily performances attributed to malocclusion on the sample of 15-year old adolescents were 29.35% (*n= 155*), and these 43.23% (*n= 67*) were boys and 56.77% (*n=88*) girls.

Table 1 shows the association of independent variables with presence of impacts under the Chi-square test. Presence of malocclusion (p = 0.00), normative need (p = 0.00), anterior crowding (p = 0.00) and maxillary anterior crowding (p = 0.00) were significantly associated with the presence of impacts.

Regarding the biopsychosocial variables (Table 2), self-esteem (p = 0.03), esthetic self perception (p = 0.00), orthodontic interest (p = 0.00) were significantly associated with the presence of impacts.

Logistic regression results (Table 3) show that the following variables: mandatory normative need, presence of anterior crowding in one or more segments, maxillary anterior crowding ≥ 2 mm, low self esteem, negative

esthetic self perception, and lack of orthodontic concern are risk indicators to oral impacts on daily performances attributed to malocclusion.

4. DISCUSSION

The results of this study reports a 29.35% prevalence of oral impacts on daily performances attributed to malocclusion during the past 6 months in 15-year old adolescents. A figure similar to that was reported in Thai[28] 11- to 12-year-old children (20.3%) and Brazilian[29] 10- to 14-year-olds (27.0%).

The presence of malocclusion, normative need of orthodontic treatment, presence of anterior crowding, and maxillary anterior crowding were the characteristics of occlusion that were significantly associated with the presence of CSI-impacts on daily performances. This is particularly important because patient-based assessment provides more substantive information concerning the impacts of oral disorders and the patients are considered to be the best persons to judge their own oral health-related quality of life[4,30]. According to the review by Cunningham and Hunt[4] only limited data are available on orthodontic patients' OHRQoL. For this reason, it is important to use self-report instruments to determine the patients' own views and feelings along with clinical outcome indicators.

Although this study found associations between some occlusal characteristics and the presence of impact, recent studies showed contradictory results on the existing evidence on the effects of malocclusion and its treatment in function, appearance, and on social and psychological welfare. Neither the psychosocial effects of malocclusion nor the benefits of orthodontic treatment had been consistently supported[4,31]. These results are conflicting, as to the other side there are statements that patients with severe malocclusion or dentofacial deformities reported significantly higher levels of oral health impacts than the general population, and it seems that severe malocclusion impairs patients' quality of life more than many other oral conditions[32], which leads to the inference that in these cases, with the presence of malocclusion and severe impact on quality of life the orthodontic treatment is mandatory.

In this study the gender does not have influence in the presence of oral impacts. This is not in agreement with the study of McGrath and Bedi[33] in which females reported severe oral impacts more often when compared with males, but these findings corroborates the studies of Bernabe et al[8] and Birkeland et al[34].

In relation to biopsychosocial variables evaluated, self-esteem, esthetic self perception and orthodontic interest were associated to CSI according to bivariate analysis. This reinforces the need to incorporate sociodental indicators[2,5] in the assessment of orthodontic treatment needs, since in this study group of 15-year old adolescents 42.99% showed malocclusions, and of these 20.65% with conditions of interest to public health (highly desirable or mandatory normative need). It also should be taken into account that orthodontic concern prevalence was 56.82% for the whole sample. These results also confirmed that dentofacial characteristics play an important role in social interaction and psychological well-being[7].

The socioeconomic status (month family income) did not negatively influence quality of life outcomes in this sample. This is consistent with the findings of other researchers[17,35,36,37.]. Locker[34] and Shaw et al[38] concluded that the negative influence on OHQOL in subjects with lower socioeconomic status was because of poorer general oral health, such as greater decay and periodontal disease.

Low self esteem was a risk indicator to CSI-impacts on daily performances. Dentofacial problems are detrimental because of their adverse effect on adolescent's self-esteem[38] and possible unfavorable social responses[39]. The self-esteem (*SE*) results, support the findings of Marques et al[29] who identified low SE as a risk factor for worsening malocclusion esthetic effects, and Onyeaso[40] who found significant positive associations between SE and orthodontic concern.

Negative esthetic self perception and lack of orthodontic interest (orthodontic concern) figuring as risk indicators in the model reinforce the statement that tooth irregularities handicap appearance and as a result social well-being may be compromised[38,41,42], however the extension of this impact is

not easily defined[42,44]. The provision of dental care should be based on the ability to bring benefits to patients. The benefits of dental treatment must, therefore, be balanced against their associated risks and costs in order to safeguard individuals from procedures and interventions which may be of little benefit, or even harmful, and to avoid wasting limited financial resources[2].

There are evidences that persons who sought orthodontic treatment reported worse OHQOL. They also had more severe malocclusions and greater esthetic impairment[45]. This corroborates the results of this study that found mandatory normative need as risk indicator to CSI-Impacts and also to premise of the need to incorporate sociodental indicators to clinical measures in the assessment of orthodontic treatment needs[2].

The presence of anterior crowding in one or more segments, and maxillary anterior crowding ≥ 2 mm as risk indicators to CSI also rekindled the debate on self-perceived need. In this study, more severe occlusal conditions were evaluated but these seemed not to have strength in the model. For example anterior maxillary overjet **≥** 4mm, anterior mandibular overjet, anterior openbite ≥ 2mm malocclusions that are of concern for many orthodontists, in patients evaluation did not seemed to bring impacts on daily activities, being well tolerated.

The presence of biopsychosocial variables as risk indicators to CSI in the results of this study indicates that orthodontic treatment needs cannot be evaluated from a strictly clinical measure or professional viewpoint (normative need).

5. CONCLUSION

In this cross-sectional study of Brazilian adolescents aged 15-year old, mandatory normative need, anterior crowding in one or more segments, maxillary anterior crowding ≥ 2 mm, low self esteem, negative esthetic self perception, and lack of orthodontic concern were the main risk indicators to oral impacts on daily performances attributed to malocclusion

REFERENCES

1. Sheiham A, Maizels JE, Cushing AM. The concept of need in dental care. Int Dent J 1982; 32: 265-270

2. Sheiham A, Tsakos G. Oral health needs assessments. In: Pine C, Harris R, editors. Community Oral Health. Mew Malden: Quintessence Publishing Co. Limited; 2007. p. 59-79.

3. O'Brien K, Kay L, Fox D, Mandall N. Assessing oral health outcomes for orthodontics—measuring health status and quality of life. Community Dent Health. 1998 Mar;15(1):22-6.

4. Cunningham SJ, Hunt NP. Quality of life and its importance in orthodontics. J Orthod. 2001 Jun;28(2):152-8

5. Zhang M, McGrath C, Hagg U. The impact of malocclusion and its treatment on quality of life: a literature review. Int J Paediatr Dent. 2006 Nov;16(6):381-7.

6. Bernabé E, de Oliveira C, Sheiham A. Comparison of the discriminative ability of a generic and a condition-specific OHRQoL measure in adolescents with and without normative need for orthodontic treatment. Health Qual Life Outcomes. 2008 Aug 21;6:64.

7. Marques LS, Ramos-Jorge ML, Paiva SM, Pordeus IA. Esthetic impact and quality of life among Brazilian schoolchildren. Am J Orthod Dentofacial Orthop. 2006 Mar;129(3):424-7.

8. Bernabé E, Tsakos G, Messias de Oliveira C, Sheiham A. Impacts on daily performances attributed to malocclusions using the condition-specific feature of the Oral Impacts on Daily Performances Index. Angle Orthod. 2008 Mar;78(2):241-7.

9. Väkiparta MK, Kerosuo HM, Nyström ME, Heikinheimo KA. Orthodontic treatment need from eight to 12 years of age in an early treatment oriented public health care system: a prospective study. Angle Orthod. 2005 May;75(3):344-9.

10. World Health Organization. Standardization of reporting of dental diseases and conditions. Report of an expert committee on dental health. Geneva: WHO; 1962.

11. Kenealy PM, Gleeson K, Frude N, Shaw W. The importance of the individual in the “causal” relationship between attractiveness and self-esteem. J Community Appl Soc Psychol 1991;1:45-56.

12. Kenealy P, Frude N, Shaw W. The effects of social class on the uptake of orthodontic treatment. Br J Orthod. 1989 May;16(2):107-11.

13. Kenealy P, Frude N, Shaw W. An evaluation of the psychological and social effects of malocclusion: some implications for dental policy making Soc Sci Med. 1989;28(6):583-91.

14. Kiyak HA. Cultural and psychological influences on treatment demand. Seminars in Orthodontics 2000;26:504-14.

15. Kok YV, Mageson P, Harradine NWT, Sprod AJ. Comparing a Quality of Life measure and the Aesthetic Component of the Index of Orthodontic Treatment Need (IOTN) in accessing orthodontic treatment need and concern. J Orthod. 2004 Dec;31(4):312-8

16. Patel RR, Tootla R, Inglehart MR. Does oral health affect self perceptions, parental ratings and video-based assessments of children’s smiles. Community Dent Oral Epidemiol. 2007 Feb;35(1):44-52.

17. Bernabe E, Tsakos G, Oliveira CM, Sheiham A. Impacts on daily performances attributed to malocclusions using the condition specific feature of the oral impacts on daily performances index. Angle Orthodontist. 2008;78:241-7.

18. Zhang M, McGrath C, Hagg U. Changes in oral health-related quality of life during fixed orthodontic appliance therapy. American Journal of Orthodontics and Dentofacial Orthopedics 2008;133:25-30.

19. Mandall NA, Wright J, Conboy F, Kay E, Harvey L, O´Brien K et al. Index of orthodontic treatment need as a predictor of orthodontic treatment uptake. Am J Orthod Dentofacial Orthop. 2008 Jan;133(1):25-9.

20.Kirkwood BR. Essentials of medical statistics. Oxford: Blackwell Science; 2000. p 38-40, 191-200.

21. WHO. Oral health surveys: basic methods. 4th edn. Geneva: WHO;1997.

22. Adulyanon S, Sheiham A. Oral Impact on daily performances. In: Slade GD, ed. Measuring Oral Health and Quality of Life. Chapel Hill: University of North Carolina; 1997:151–160.

23. Gherunpong S, Tsakos G, Sheiham A. Developing and evaluating an oral health-related quality of life index for children: the Child-OIDP. Community Dent Health. 2004;21: 161–169.b

24. Alsaker F, Olweus D. Global self-evaluations and perceived instability of self in Norwegian preschoolchildren and schoolchildren. J Early Adolesc 1986;6:269-78.

25. Mandall NA, McCord JF, Blinkhorn AS, Worthington HV, O'Brien KD. Perceived aesthetic impact of malocclusion and oral selfperceptions in 14-15-year-old Asian and Caucasian schoolchildren in greater Manchester. Eur J Orthod 2000;22:175-83.

26. Chew MT, Aw AK. Appropriateness of orthodontic referrals: self-perceived and normative treatment needs of patients referred for orthodontic consultation. Community Dent Oral Epidemiol 2002;30(6):449-54.

27. Meneghim et al. Classificação socioeconômica e sua discussão em relação à prevalência de cárie e fluorose dentária Ciência & Saúde Coletiva, 12(2):523-529, 2007.

28. Gherunpong S, Tsakos G, Sheiham A. A socio-dental approach to assessing children's orthodontic needs. Eur J Orthod. 2006;28:393–399.

29. Marques LS, Ramos-Jorge ML, Paiva SM, Pordeus IA. Malocclusion: aesthetic impact and quality of life among Brazilian schoolchildren. Am J Orthod Dentofacial Orthop. 2006;129:424–427.

30. de Oliveira CM, Sheiham A. The relationship between normative orthodontic treatment need and oral health-related quality of life. Community Dent Oral Epidemiol. 2003 Dec;31(6):426-36.

31. Kenealy PM, Kingdon A, Richmond S, Shaw WC. The Cardiff dental study: a 20-year critical evaluation of the psychological health gain from orthodontic treatment. Br J Health Psychol. 2007 Feb;12(Pt 1):17-49.

32. Rusanen J, Lahti S, Tolvanen M, Pirttiniemi P. Quality of life in patients with severe malocclusion before treatment. Eur J Orthod. 2010 Feb;32(1):43-8.

33. McGrath C , Bedi R Gender variations in the social impact of oral health . Journal of the Irish Dental Association 2000 46 : 87 – 95.

34. Birkeland K, Boe OE,Wisth P. Subjective evaluation of dental and psychological results after orthodontic treatment. J Orofac Orthop 1997;58:44-61.

35. Shaw WC. Factors influencing the desire for orthodontic treatment. Eur J Orthod 1981;3:151-62.

36. Locker D. Measuring oral health: a conceptual framework. Community Dent Health 1988;5:3-18.

37. Thomas CW, Primosch RE. Changes in incremental weight and well-being of children with rampant caries following complete dental rehabilitation. Pediatr Dent 2002;24:109-13.

38. Shaw WC, Richmond S, O'Brien KD, Brook P, Stephens CD. Quality control in orthodontics: indices of treatment need and treatment standards. Br Dent J 1991;170:107-12.

39. Arndt EM, Travis F, Lefebvre A, Niec A, Munro IR. Beauty and the eye of the beholder: social consequences and personal adjustment for facial patients. Br J Plast Surg 1986;39:81-4.

40.Onyeaso CO. An assessment of relationship between selfesteem,orthodontic concern, and dental aesthetic index (DAI) scores among secondary school students in Ibadan, Nigeria. Int Dent J 2003;53:79-84.

41. Graber LW, Lucker GW. Dental esthetic self-evaluation and satisfaction. Am J Orthod. 1980 Feb;77(2):163-73.

42. Helm S, Kreiborg S, Solow B. Psychosocial implications of malocclusion: a 15-year follow-up study in 30-year-old Danes. Am J Orthod. 1985 Feb;87(2):110-8.

43. Hamamci N, Başaran G, Uysal E. Dental Aesthetic Index scores and perception of personal dental appearance among Turkish university students. Eur J Orthod. 2009 Apr;31(2):168-73.

44. Birkeland K, Bøe OE, Wisth PJ. Relationship between occlusion and satisfaction with dental appearance in orthodontically treated and untreated groups. A longitudinal study. Eur J Orthod. 2000 Oct;22(5):509-18.

45. Feu D, de Oliveira BH, de Oliveira Almeida MA, Kiyak HA, Miguel JA. Oral health-related quality of life and orthodontic treatment seeking. Am J Orthod Dentofacial Orthop. 2010 Aug;138(2):152-9.

Table 1 - Bivariate analysis between the presence of impact on daily performances due malocclusion (*CS-OIDP*) and the occlusion characteristics.

	Presence of impact on daily performances				
	No (CSI = 0) n (%)	***Yes*** (CSI > 0) n (%)	Total n (%)	X^2	p
Malocclusion					
Absent	231 (61.93)	70 (45.16)	301 (57.01)	12.56	0.00
Present	142 (38.07)	85 (58.84)	227 (42.99)		
Normative need					
Elective	83 (22.25)	35 (22.58)	118 (22.35)	12.56	0.00
Highly desirable	35 (9.38)	25 (16.13)	60 (11.36)		
Mandatory	24 (6.43)	25 (16.13)	49 (9.28)		
Missing tooth					
None	347 (93.03)	149 (96.13)	496 (93.94)	1.85	0.17
1 or more	26 (6.97)	6 (3.87)	32 (6.06)		
Anterior Crowding					
None	143 (38.34)	33 (21.29)	176 (33.33)	14.32	0.00
1 or 2 segments	230 (61.66)	122 (78.71)	352 (66.67)		
Maxillary anterior crowding					
< 2mm	285 (76.41)	80 (51.61)	365 (69.13)	31.54	0.00
≥ 2mm	88 (23.59)	75 (48.39)	163 (30.87)		
Mandibular anterior crowding					
< 2mm	268 (71.85)	99 (63.87)	367 (69.51)	3.29	0.07
≥ 2mm	105 (28.15)	56 (36.13)	161 (30.49)		
Anterior segment spacing					
None	294 (78.76)	121 (78.06)	415 (78.56)	0.03	0.86
1 or 2 segments	79 (21.24)	34 (21.94)	113 (21.44)		
Median diastema					
< 2mm	356 (95.70)	142 (92.21)	498 (94.68)	2.63	0.11
≥ 2mm	17 (4.30)	13 (7.79)	30 (5.32)		
Anterior maxillary overjet					
< 4mm	329 (88.20)	130 (83.87)	459 (86.63)	1.81	0.18
≥ 4mm	44 (11.80)	25 (16.13)	69 (13.07)		
Anterior mandibular overjet					
No	358 (95.98)	143 (92.26)	501 (94.89)	3.12	0.08
Yes	15 (4.02)	12 (7.74)	27 (5.11)		
Anterior openbite					
< 2mm	356 (95.70)	149 (96.13)	505 (95.83)	0.05	0.82
≥ 2mm	17 (4.30)	6 (3.87)	23 (4.17)		
Overbite					
until 2/3 coverage	351 (94.10)	146 (94.19)	497 (94.13)	0.00	0.97
more 2/3 coverage	22 (5.90)	9 (5.81)	31 (5.87)		
Crossbite					
Absent	322 (86.33)	126 (81.29)	448 (84.85)	2.16	0.14
Present	51 (13.67)	29 (18.71)	80 (15.15)		
Molar relation					
Class I	301 (80.70)	122 (78.71)	423 (80.11)	1.40	0.50
Class II	53 (14.21)	21 (13.55)	74 (14.02)		
Class III	19 (5.09)	12 (7.74)	31 (5.87)		

Table 2 - Bivariate analysis between the presence of impact on daily performances due malocclusion (*CS-OIDP*) and the biopsychosocial variables.

	Presence of impact on daily performances			X^2	p
	No (CSI = 0) n (%)	***Yes*** (CSI > 0) n (%)	Total n (%)		
Gender					
Female	197 (52.82)	88 (56.77)	285 (53.98)	0.69	0.41
Male	176 (47.18)	67 (43.23)	243 (46.02)		
Self-esteem (GSE)					
High	263 (70.51)	94 (60.65)	357 (67.61)	4.87	0.03
Low	110 (29.49)	61 (39.35)	171(32.39)		
Esthetic self-perception (OASIS)					
Positive	284 (76.14)	84 (54.19)	368 (69.70)	24.97	0.00
Negative	89 (23.86)	71 (45.81)	160 (30.30)		
Orthodontic concern					
Yes	188 (50.40)	112 (72.26)	300 (56.82)	21.32	0.00
No	185 (49.60)	43 (27.74)	228 (43.18)		
Monthly family income					
< 3 minimum wages	228 (61.13)	109 (70.32)	337 (63.83)	4.01	0.05
≥ 3 minimum wages	145 (38.87)	46 (29.68)	191 (36.17)		
Nº people living					
< 4 people	205 (54.96)	71 (45.81)	276 (52.27)	3.68	0.06
≥ 4 pepole	168 (45.04)	84 (54.19)	252 (47.73)		
Father educational level					
< 8 years	233 (62.47)	98 (63.23)	331 (62.69)	0.03	0.88
≥ 8 years	140 (37.53)	57 (36.77)	197 (37.31)		
Mother educational level					
< 8 years	242 (64.88)	106 (68.83)	348 (66.03)	0.03	0.88
≥ 8 years	131 (35.12)	49 (31.17)	180 (33.97)		

Table 3 - Logistic regression considering the CSI > 0 as dependent variable.

	Odds ratio	CI (95%)	*p*
Normative need			
Normal*	1.0		
Elective	0.84	(0.49-1.43)	0.515
Highly desirable	1.21	(0.63-0.570)	0.570
Mandatory	1.98	(1.01-0.047)	0.047
Anterior Crowding			
None*	1.0		
1 or 2 segments	2.05	(1.29-3.2)	0.002
Maxillary anterior crowding			
< 2mm*	1.0		
≥ 2mm	2.48	(1.58-3.88)	0.000
Self-esteem (GSE)			
High*	1.0		
Low	1.51	(1.01-2.27)	0.044
Esthetic self-perception (OASIS)			
Positive*	1.0		
Negative	2.30	(1.51-3.49)	0.000
Orthodontic Concern			
Yes*	1.0		
No	0.52	(0.34-0.80)	0.003

Considerações Gerais

Os resultados deste estudo mostram uma prevalência de necessidades de tratamento ortodôntico e de impacto nas atividades diárias relacionados às màs-oclusões com considerável importância epidemiológica. A partir de 2004, o Brasil possui uma Política de Saúde Bucal (Brasil Sorridente) do Governo Federal, que normatiza que além da atenção básica, a população passará a ter acesso também a tratamentos especializados. Isso deverá ser possível através da implantação e/ou melhoria dos Centros de Especialidades Odontológicas (CEO). Os CEO são unidades de referência para as equipes de Saúde Bucal de atenção básica e normativamente devem ofertar, de acordo com a realidade epidemiológica de cada região e município, procedimentos clínicos odontológicos complementares aos realizados na atenção básica (Brasil, 2004).

Com base nestas considerações, administradores de saúde pública e epidemiologistas precisam de ferramentas epidemiológicas eficazes para classificar a estética dental e a real necessidade de tratamento das oclusopatias com base em uma escala de normas sociais para uma aparência dental socialmente aceitável, considerando os impactos das más oclusões na vida do indivíduo e a real necessidade de cuidados em saúde, de maneira que seja possível a desenvolver o planejamento em saúde bucal de acordo com a realidade epidemiológica vivenciada.

Deve-se salientar que independentemente do índice utilizado para avaliar necessidade de tratamento os resultados obtidos foram muito semelhantes e não houve diferença estatisticamente significativa nas proporções de indivíduos com necessidade de tratamento. Os índices avaliados possuem natureza diferente, e foram concebidos e elaborados com métodos de difícil comparação. Por isso, embora eles tentem medir a mesma condição (necessidade de tratamento ortodôntico), eles não fazem isso da mesma maneira e, obviamente, há casos em que diferem, fato que é expressado pela baixa concodância diagnóstica encontrada nos resultados.

O IOTN é dividido em dois componentes que são projetados para avaliar parâmetros oclusais diferentes e não são unificados. No IOTN DHC, a base para as categorias de necessidade de tratamento, são fundamentadas em uma extensa revisão da literatura sobre certas características oclusais potencialmente prejudiciais para a saúde bucal do indivíduo. Por esse motivo, ele leva em consideração certas condições e aspectos da dentição que, embora muitas vezes não causem grave prejuízo estetico, podem ser prejudiciais aos dentes ou à estabilidade do sistema estomatognático (Ex: Mordida cruzada anterior ou posterior com desvio funcional, dentes impactados, sobremordida, etc). A diferença é clara sobre a análise dos principais motivos pelos quais o IOTN seleciona certos indivíduos que o DAI não. Na maioria dos casos, foi por causa da existência de uma mordida cruzada posterior ou anterior, com má oclusão funcional, sobremordida com sinais de indentações na mucosa vestibular ou palatina, um score de IOTN AC maior que 7, ou uma irregularidade dental maior que 4mm.

O DAI é baseado em estética dentária e seus elementos constituintes não incluem considerações de carácter funcional ou riscos potenciais para a dentição. Ele foi desenvolvido com base no julgamento 2000 adolescentes e adultos sobre a estética de 200 fotografias de configurações oclusais, representando todo o espectro das possíveis más oclusões, selecionando aqueles que foram considerados os menos aceitáveis pelo estudo populacional. Por esta razão, ao contrário do IOTN, o DAI não leva em conta os resultados oclusais que poderiam ser funcionalmente prejudiciais para o indivíduo, mas não são esteticamente significativos. Além disso, o sistema de pontuação do IOTN AC baseia-se na resposta do próprio indivíduo, isto é, sobre como a má oclusão é auto-avaliada através da comparação com uma das fotografias da escala, organizadas a partir do arranjo mais ao menos atrativo. Estes motivos podem explicar por que o IOTN seleciona certos indivíduos que o DAI não.

O ICON (index of complexity, outcome, and need) foi desenvolvido para abordar as questões relativas à complexidade do tratamento necessário, da melhoria e resultados do tratamento baseado na opinião de um painel

internacional de profissionais e destinado ao uso no contexto da prática especializada. Este índice pode fornecer meios para comparação de limiares de tratamento em vários países e serve de base para normas de garantia da qualidade em ortodontia. Na avaliação precisa da necessidade de tratamento, o desempenho do ICON pareceu concordar com o DAI e IOTN, na comparação dos percentuais determinados (com necessidade/sem necessidade), entretanto ainda é um índice que precisa de maiores estudos populacionais para estabelcer uma conclusão a respeito do objetivo específico de determinação de necessidade de tratamento.

Além dos motivos expostos, uma análise mais aprofundada deve ser levada em consideração quando se analisam as diferenças entre os índices. O DAI e o ICON são índices cumulativos, enquanto o IOTN não. Isto tem consequências para os resultados finais, visto que o IOTN não vai selecionar uma pessoa com anomalias oclusais diversas que não atinjam o nível 4 ou 5 do DHC IOTN, se nenhuma dessas condições for de uma gravidade que realmente determine a necessidade de tratamento mandatória. Deste ponto de vista, o IOTN é um índice que determina “tudo ou nada”. O DAI, por outro lado, leva em conta 10 situações oclusais, com pesos de acordo com a sua contribuição relativa ao comprometimento estético causado pela má oclusão, em seguida a soma indica chegar a uma pontuação final. O ICON foi desenvolvido da mesma maneira. Como cada uma das situações pode contribuir para um pequeno grau para a pontuação final, não é possível determinar exatamente quais condições oclusais específicas são discrepantes entre os índices (DAI, ICON e IOTN), porque é sempre devido a soma de diversos fatores.

As diferenças encontradas na determinação da necessidade de tratamento ortodôntico, dependendo do índice específico pode ser utilizada para reforçar o ponto de vista de alguns autores (Tsakos *et al*., 2006; Klages *et al*., 2006) que enfatizam que medidas normativas devem ser usadas em combinação com questionários de qualidade de vida para identificar a dimensão má oclusão na saúde bucal, visando dimensionar o impacto que as

condições clínicas apresentam ao bom desempenho das atividades diárias dos indivíduos.

Conclusão

Os índices de determinação de necessidades de tratamento ortodôntico avaliados (DAI, IOTN e ICON) apresentaram baixa concordância diagnóstica, em virtude dos critérios preconizados pelos mesmos para selecionar pacientes em que o tratamento é mais indicado. Os resultados deste estudo também indicaram uma relação estatisticamente significante entre necessidade de tratamento ortodôntico em saúde pública e a presença de impactos nas atividades diárias atribuídos especificamente às más oclusões. Os principais indicadores de risco para impacto nas atividades diárias atribuídos as más oclusões foram: Necessidade de tratamento ortodôntico mandatória, apinhamento anterior em um ou mais segmentos, apinhamento maxilar ≥ 2 mm, baixa auto-estima, auto-percepção estética negativa e ausência de interesse ortodôntico.

Referências*

Alves JAO, Forte FDS, Sampaio FC. Condição socioeconômica e prevalência de más oclusões em crianças de 5 e 12 anos na USF Castelo Branco III: João Pessoa/Paraíba. Rev. dent. press ortodon. ortopedi. Facial. 2009; 14(3):52-59.

Baume LJ, Marechaux S. Uniform methods for the epidemiologic assessment of malocclusion. Am J Orthod Dentofacial Orthop. 1974; 66:121-9.

Birkeland K, Katle A, Lovgreen S, Boe OE, Wisth PJ. Factors influencing the decision about orthodontic treatment. A longitudinal study among 11- and 15-year-olds and their parents. J Orofac Orthop. 1999; 60:292–30.

Chew MT, Aw AK. Appropriateness of orthodontic referrals: self-perceived and normative treatment needs of patients referred for orthodontic consultation. Community Dent Oral Epidemiol. 2002; 30(6):449-54.

Coyne R, Woods M, Abrams R. The community and orthodontic care. Part I: community-perceived need and demand for orthodontic treatment. Aust Orthod J. 1999;15:206–213.

Dias PF, Gleiser R. O índice de necessidade de tratamento ortodôntico como um método de avaliação em saúde pública. Rev. dent. press ortodon. ortopedi. Facial. 2008; 13(1):74-81.

Evensen JP, Øgaard B. Are malocclusions more prevalent and severe now? A comparative study of medieval skulls from Norway. Am J Orthod Dentofacial Orthop. 2007; 131(6): 710-716.

* De acordo com a norma UNICAMP / FOP, baseadas na norma do International Comitee of Medical Journal Editors - Grupo de Vancouver. Abreviatura de periódicos em conformidade com o Medline.

Faltin JR, K; Faltin RM. Ortodontia preventiva na saúde bucal. In: KRIGER, L. e cols. ABOPREV – Promoção de saúde bucal. São Paulo: Artes Médicas, 1999. p.350-61.

Frazão P. Epidemiologia da oclusão dentária na infância e os sistemas de saúde. [Tese]. São Paulo: Faculdade de Saúde Pública/ USP; 1999.

Koochek A-R, Yeh MS, Rolfe B, Richmond S. The relationship between index of complexity, outcome and need, and patients' perceptions of malocclusion: a study in general dental practice. Br Dent J 2001; 191:325-9.

Locker D. An introduction to behavioural science and dentistry. London: Routledge; 1989.

Marques LS, Ramos-Jorge ML, Paiva SM, Pordeus IA. Malocclusion: esthetic impact and quality of life among Brazilian schoolchildren. Am J Orthod Dentofacial Orthop. 2006; 129(3):424-7.

Martins JCR, Sinimbu CMB, Dinelli TCS, Martins LP, Raveli DB. Prevalência de má oclusão em pré-escolares de Araraquara: relação da dentição decídua com hábitos e nível sócio econômico. Rev. dent. press ortodon. ortop. 1998; 3(6):35-43.

McLain JB, Proffit WR. Oral health status in the United States: prevalence of malocclusion. J Dent Educ 1985; 49:386-96.

Mechanic D. Emerging trends in the application of the social sciences to health and medicine. Soc Sci Med 1995; 40: 1491-1496.

Miguel JAM. Estudo epidemiológico da severidade das más oclusões em escolares de 12 anos de idade da Rede Municipal de Ensino do Rio de Janeiro. 1998. [Dissertação]. Rio de Janeiro: Faculdade de Odontologia/UERJ, 1998.

Narvai PC, Frazão P, Roncalli AG, Antunes JLF. Cárie dentária no Brasil: declínio, iniqüidade e exclusão social. Rev Panam Salud Publica. 2006; 19(6):385–93.

Pinto VG. Saúde bucal coletiva. São Paulo: Ed. Santos; 2000.

Proffit W, Fields HW Jr. Contemporary orthodontics. St Louis: Mosby; 2000.

Ramos AL, Gasparetto A, Terada HH, Furquim LZ, Basso P, Meireles RP. Assistência ortodôntica preventiva- interceptora em escolares do município de Porto Rico Parte I: prevalência das más oclusões. Rev. dent. press ortodon. ortoped. Facial 2000; 5(3):9-13

Shaw WC, Richmond S, O'Brien KD. The use of occlusal indices: a European perspective. Am J Orthod Dentofacial Orthop. 1995; 107(1):1-10.

Sheiham A, Maizels JE, Cushing AM. The concept of need in dental care. Int Dent J 1982; 32: 265-270

Sheiham A, Tsakos G. Oral health needs assessments. In: Pine C, Harris R, editors. Community Oral Health. Mew Malden: Quintessence Publishing; 2007. p. 59-79.

Silva Filho, OG. et al. Prevalência de oclusão e má oclusão na dentadura mista em escolares da cidade de Bauru (SP). Rev Assoc Paul Cirur Dent, 1989 (43): 287-90.

Tomita N, Bijella VT, Franco LJ. Relação entre hábitos bucais e más oclusões em pré-escolares. R Saúde Pública 2000; 34(3): 299-03

Väkiparta MK, Kerosuo HM, Nyström ME, Heikinheimo KA. Orthodontic treatment need from eight to 12 years of age in an early treatment oriented public health care system: a prospective study. Angle Orthod. 2005; 75(3):344-9.

Zhang M, McGrath C, Hägg U. The impact of malocclusion and its treatment on quality of life: a literature review. Int J Paediatr Dent. 2006; 16(6):381-7.

ANEXO 1 - *Ficha adotada para o exame clínico*

Projeto de Pesquisa: Epidemiologia de Cárie Dental, Doenças Periodontais, Más-Oclusões e Hábitos Bucais Deletérios e suas correlações com variáveis Psicossociais em escolares da cidade de Piracicaba - SP

Pesquisadores: Luale Leão Ferreira; Gustavo Brandão; Gustavo Garcia

Examinador | Data do Exame | Ficha Nº

Ficha de Exame

IDENTIFICAÇÃO

Escola: | Turma | Período

Nome: | Nascimento | Idade | Sexo [ ]M [ ]F | Raça

AVALIAÇÃO DE CÁRIE DENTÁRIA

C: _____ P: _____ O: _____ CPOD: _____

	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Coroa																
Coroa																
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38

0 = Hígido, 1= Cariado, 2=Restaurado + cárie, 3=Restaurado sem cárie, 4=Perdido por cárie, 5=Perdido por outras razões, 6=Selante, 7=Apoio ponte ou coroa, 8=Não erupcionado, 9=Dente excluído

AVALIAÇÃO CONDIÇÃO PERIODONTAL e IHOS

	16/17	11	26/27	37/36	31	46/47
SANGRAMENTO						
	16 V	11 V	26 V	37 V	31 V	46 V
INDUTO (0-3)						
CÁLCULO (0-3)						

AVALIAÇÃO DA OCLUSÃO

Tratamento/ aparelho ortodôntico anterior a este exame [ ]SIM [ ]NÃO [ ]Em tratamento

DAI

DENTIÇÃO: Mx | Md — Dentes perdidos pré-a-pré (0-10)

OCLUSÃO: Overjet Maxilar mm | Overjet Mandibular mm

ESPAÇO: Apinhamento anterior (0, 1=1 SEG., 2=2 SEG.) | Espaçamento anterior | Diastema anterior mm | Desalinhamento maxilar mm | Desalinhamento mandibular mm

Mordida aberta anterior mm | Relação Molar (0, 1=½ CUSP, 2=1 CUSP)

ICON

Estético (CE IOTN (1-10))	ESPAÇOS: Apinhamento superior (0-5)	Espaçamento superior (0-3)	Mordida Cruzada (0-1)	VERTICAL: Mordida aberta anterior (0-4)	Sobremordida (0-3)	Relação ântero-posterior bucal (0-4)

IOTN

RELAÇÃO MOLAR: [ ] Classe I [ ] Classe II [ ] Classe III

SOBRESSALIÊNCIA EXAGERADA:
- [ ] GRAU 2: 3,5 – 6 mm (com competência labial)
- [ ] GRAU 3: 3,5 – 6 mm (sem competência labial)
- [ ] GRAU 4: 6 – 9 mm
- [ ] GRAU 5: > 9 mm

SOBRESSALIÊNCIA NEGATIVA:
- [ ] GRAU 2: 0 a 1 mm
- [ ] GRAU 3: 1 a 3,5 mm
- [ ] GRAU 4: > 3,5 mm (sem dificuldade mastigatória ou de fala)
- [ ] GRAU 4: 1 a 3,5 mm (com dificuldade mastigatória ou de fala)
- [ ] GRAU 5: > 3,5 mm (com dificuldade mastigatória ou de fala)

SOBREMORDIDA EXAGERADA:
- [ ] GRAU 2: > 3,5 mm (sem contato gengival)
- [ ] GRAU 3: Completa, sem trauma
- [ ] GRAU 4: Completa, com trauma

MORDIDA ABERTA ANTERIOR OU POSTERIOR:
- [ ] GRAU 2: 1 – 2 mm
- [ ] GRAU 3: 2 – 4 mm
- [ ] GRAU 4: > 4 mm

APINHAMENTO:
- [ ] GRAU 2: 1 – 2 mm
- [ ] GRAU 3: 2 – 4 mm
- [ ] GRAU 4: > 4 mm

MORDIDA CRUZADA ANTERIOR OU POSTERIOR:
- GRAU 2: < 1 mm
- GRAU 3: 1 – 2 mm
- GRAU 4: > 2 mm
- GRAU 4: MCP lingual total

AUSÊNCIA DENTÁRIA:
- [ ] GRAU 4: até 1 dente ausente por quadrante
- [ ] GRAU 5: + de 1 dente ausente em qualquer um dos quadrantes

- [ ] Fenda labial ou palatal: GRAU 5
- [ ] Decíduo submerso ou anquilosado: GRAU 5
- [ ] Erupção impedida por apinhamento, má posição, supranº, decíduo retido ou patologia: G. 5
- [ ] Dente parcialmente erupcionado, inclinado ou impactado contra os adjacentes: GRAU 4
- [ ] Supranumerário: GRAU 4
- [ ] Oclusões pós-normais ou pré-normais sem outras anomalias: GRAU 2
- [ ] Maloclusões pequenas, incluindo apinhamento <1mm: GRAU 1

COMPONENTE DE SAÚDE DENTAL (DHC)

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

COMPONENTE ESTÉTICO (AC)

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5 [ ] 6 [ ] 7 [ ] 8 [ ] 9 [ ] 10

1. Você está satisfeito(a) com a aparência dos seus dentes? [ ] Muito satisfeito [ ] Satisfeito [ ] Insatisfeito [ ] Muito insatisfeito
2. Você acha que você precisa colocar aparelho nos dentes? [ ] Definitivamente não [ ] Eu acho que não [ ] Eu acho que sim [ ] Definitivamente sim
3. Porquê ? _____

ANEXO 2 - *Questionário Oral Impacts on Daily Performaces (CS-OIDIP)*

QUESTIONÁRIO OIDP – *Oral Impacts on Daily Performances Attributed to Malocclusions (CS-OIDP)*

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

	PRESENÇA DO IMPACTO	1 à 3 FREQUÊNCIA	SEVRIDADE Efeito no dia –a-dia	*SCORE*	*CSI* Condição Específica de impacto
Comer Ex: Refeição, sorvete	[ ] SIM [ ] NÃO				
Falar claramente	[ ] SIM [ ] NÃO				
Limpar a boca	[ ] SIM [ ] NÃO				
Dormir/Relaxar	[ ] SIM [ ] NÃO				
Manter o seu estado emocional (humor) sem se irritar ou estressar	[ ] SIM [ ] NÃO				
Estudar Ex: ir à escola, aprender em 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: Sorir sem se envergonhar					

CSI = Identificar aquelas condições especificas de impactos orais relacionados à "má-posição dos dentes", "espaço entre os dentes" e "deformidade da boca e da face"

ANEXO 3 - *Questionários de Avaliação de Auto-Estima (GSE) e Auto-percepção de Má Oclusão (OASIS)*

QUESTIONÁRIO DE AVALIAÇÃO DE AUTO-ESTIMA

AUTO-AVALIAÇÃO NEGATIVA GLOBAL (GSE)

Às vezes sinto que sou um fracasso
[ ] Não vale em situação alguma
[ ] Não vale bem
[ ] Não vale um tanto
[ ] Vale razoavelmente
[ ] Vale bem
[ ] Vale exatamente

Às vezes eu realmente me sinto um inútil
[ ] Não vale em situação alguma
[ ] Não vale bem
[ ] Não vale um tanto
[ ] Vale razoavelmente
[ ] Vale bem
[ ] Vale exatamente

Eu gostaria de mudar muitas coisas em mim mesmo
[ ] Não vale em situação alguma
[ ] Não vale bem
[ ] Não vale um tanto
[ ] Vale razoavelmente
[ ] Vale bem
[ ] Vale exatamente

Eu sinto que não tenho muito do que me orgulhar
[ ] Não vale em situação alguma
[ ] Não vale bem
[ ] Não vale um tanto
[ ] Vale razoavelmente
[ ] Vale bem
[ ] Vale exatamente

No geral, tenho tendência a sentir que sou um fracasso
[ ] Não vale em situação alguma
[ ] Não vale bem
[ ] Não vale um tanto
[ ] Vale razoavelmente
[ ] Vale bem
[ ] Vale exatamente

Muitas vezes eu quis ser outra pessoa
[ ] Não vale em situação alguma
[ ] Não vale bem
[ ] Não vale um tanto
[ ] Vale razoavelmente
[ ] Vale bem
[ ] Vale exatamente

QUESTIONÁRIO DE AUTO-PERCEPÇÃO DE MÁ-OCLUSÃO

Como você se sente considerando a aparência de seus dentes ?

Sem preocupação 1 – 2 – 3 – 4 – 5 – 6 – 7 muito preocupado

Você tem observado que outras pessoas comentam sobre a aparência de seus dentes ?

Nunca 1 – 2 – 3 – 4 – 5 – 6 – 7 Sempre

Você evita sorrir devido a aparência de seus dentes ?

Nunca 1 – 2 – 3 – 4 – 5 – 6 – 7 Sempre

Você já cobriu a boca com a mão, no momento de sorrir, devido à aparência de seus dentes ?

Nunca 1 – 2 – 3 – 4 – 5 – 6 – 7 Sempre

Você gostaria de corrigir os dentes para melhorar sua aparência ?

SIM [ ] NÃO [ ]

IOTN – AC [ ] **OASIS TOTAL:**

ANEXO 4 - *Protocolo de entrevista para obtenção das informações sobre os impactos das condições bucais nas atividades diárias (OIDP).*

O índice de OIDP (de Oliveira, Sheiham, 2003; Bernabé et al., 2008) é utilizado para coletar a informação a respeito dos impactos sociodentais. Este índice avalia os impactos bucais em oito desempenhos diários: Comer, falar, limpeza da boca, relaxar, sorrir, estudar, emocional e contato social.

Os dados são coletados em entrevistas estruturadas frente-a-frente o examinador. Durante as entrevistas, os adolescentes fornecem informações sobre os impactos na vida diária nos últimos seis meses.

Tabela – As oito atividades diárias avaliadas através do índice OIDP

Atividade	Descrição	Exemplo
Comer	**Comendo sua comida**	**Refeição, sorvete, bebidas quentes**
Falar	**Falando e pronunciando claramente**	
Limpeza da boca	**Limpando a boca e os dentes**	**Escovar os dentes bochechas**
Relaxar	**Dormindo e relaxando**	**Lendo gibis, assistindo TV**
Emocional	**Mantendo o estado emocional usual sem ficar irritado**	
Sorrir	**Sorrindo, gargalhando e mostrando os dentes em vergonha**	
Estudar	**Realizando suas atividades escolares**	**Indo para escola, participando na sala de aula, fazendo dever de casa**
Contato Social	**Relacionando-se com as pessoas**	**Saindo com os amigos, indo a casa dos amigos**

Se um adolescente relatar um impacto em algum das oito atividades, a freqüência do impacto (em uma escala que varia de 1 a 3) e a severidade de seu efeito no dia-a-dia (em uma escala que varia de 1 a 3) são marcados. Se nenhum impacto for atribuído será adotado o escore zero.

Depois disso, os adolescentes são perguntados a identificar os problemas orais que, em sua opinião, causaram o impacto. Somente aquelas condições específicas de impactos orais relacionados à “má-posição dos dentes”, “espaço entre os dentes” e “deformidade da boca e da face”, considerados como impactos de condição específica são considerados na análise sócio-dental atribuídas às más-oclusões ou à ortodontia.

O escore do impacto do será estimado multiplicando-se as contagens correspondentes da freqüência e da severidade. A contagem total da condição específica será a soma das oito contagens das performances (que poderá

variar de 0 a 72) multiplicadas por 100 e divididas por 72 (Gherunpong et al., 2004). Então, a predominância de condições específicas nas performances diárias relativas à má-oclusão será calculada como a porcentagem dos adolescentes com um escore de condições específicas maior que zero.

Além disso, entre aqueles adolescentes que relatam uma condição específica de impacto, a intensidade do impacto em cada performance (que poderá variar de 1 a 9) é classificado em um dos cinco níveis:

- (1) → Impacto Muito pequeno
- (2) → Impacto Pequeno
- (3 – 4) → Impacto Moderado
- (6) →Impacto Severo
- (9) → Impacto Muito severo

A intensidade total da condição específica de impacto é estimada então como o impacto o mais severo em algumas das oito performances. Finalmente, a extensão de condição específica de impacto será calculada como o número de performances afetadas (variando de um a oito performances).

ANEXO 5 - *Metodologia de Avaliação da Auto-Estima*

Escala de auto-avaliação negativa global *(Global Negative Self-Evaluation)*

Utilizada para avaliar a auto-estima dos adolescentes. Consiste de uma escala com seis itens, sendo que cada item possui seis alternativas de resposta que são quantificadas em ordem crescente (1 a 6) seguindo a disposição na escala. Desse modo, para se classificar a auto-estima, somam-se todas as alternativas de resposta obtidas em cada item e divide-se por seis. Assim, obtém-se o valor da auto-estima individual inserido em quatro categorias: 1-1,69 auto-avaliação muito pouco negativa; 1,7-2,69 auto-avaliação pouco negativa; 2,7-3,99 alguma auto-avaliação negativa; 4,0-6,0 auto-avaliação muito negativa. Os estudos mais atuais sobre a avaliação de auto-estima (BIRKELAND et al., 2000) têm utilizado este instrumento por este apresentar confiabilidade e validade satisfatórias quando usada em adolescentes.

ANEXO 6 - *Metodologia de Avaliação da Auto-percepção Estética*

Escala Ortodôntica do Impacto Estético Subjetivo (Orthodontic Aesthetic Subjective Impact Score - OASIS)

A primeira parte contém cinco itens, sendo que cada item possui sete alternativas de resposta que são quantificadas em ordem crescente (1 a 7) seguindo a disposição na escala. A segunda parte do instrumento é constituída pelo componente estético (AC) do Índice de Necessidade do Tratamento Ortodôntico (IOTN). Este instrumento consiste de uma escala visual com uma série de fotografias com diferentes arranjos dentários (variando do mais atrativo – 1, ao menos atrativo – 10) de forma que permita aos adolescentes identificarem qual fotografia do IOTN-AC mais se assemelha com a aparência dos seus dentes anteriores. Durante a aplicação deste componente, foi feita a seguinte pergunta aos participantes: "você poderia me dizer qual dessas 10 fotografias mais se assemelha com os seus dentes?" A fotografia escolhida pelo adolescente fornece uma indicação da necessidade de tratamento ortodôntico devido a uma preocupação com a estética (BROOK; SHAW, 1999). O resultado (OASIS) final é obtido através da soma das respostas do questionário com o valor da fotografia selecionada no IOTN-AC, de forma a obter-se um único escore. Através de análise descritiva – distribuição de freqüências obter-se-á a mediana (medida de centro adequada para distribuições assimétricas) (SOARES; SIQUEIRA, 1999), tornando possível classificar a autopercepção da estética dental dos adolescentes em: autopercepção positiva e autopercepção negativa.

ANEXO 7 - *Metodologia de Avaliação do Interesse Ortodôntico*

Você está satisfeito com a aparência dos seus dentes?

(1) Muito satisfeito

(2) Satisfeito

(3) Insatisfeito

(4) Muito insatisfeito

Você acha que precisa colocar aparelho nos dentes?

(1) Definitivamente não

(2) Não, eu não acho

(3) Sim, eu acho

(4) Definitivamente sim

Interesse ortodôntico

(somatório das 2 respostas anteriores)

Sem interesse: Escore de 2 a 5.

Com interesse: Escore de 6 a 8.

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 **"Epidemiologia de cárie dental, doenças periodontais, más-oclusões e hábitos bucais deletérios e suas correlações com variáveis psicossociais em escolares da cidade de Piracicaba"**, protocolo nº 005/2010, dos pesquisadores Luale Leão Ferreira, Gustavo Antonio Martins Brandão, Gustavo Garcia, Marcelo de Castro Meneghim e Rosana de Fátima Possobon, satisfaz as exigências do Conselho Nacional de Saúde - Ministério da Saúde para as pesquisas em seres humanos e foi aprovado por este comitê em 08/03/2010.

The Ethics Committee in Research of the School of Dentistry of Piracicaba - State University of Campinas, certify that the project **"Epidemiology of dental caries, periodontal diseases, malocclusion and oral habits and their correlations with psychosocial variables in students in Piracicaba - SP"**, register number 005/2010, of Luale Leão Ferreira, Gustavo Antonio Martins Brandão, Gustavo Garcia, Marcelo de Castro Meneghim and Rosana de Fátima Possobon, 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 at 03/08/2010.

Prof. Dr. Pablo Agustin Vargas
Secretário
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.

ANEXO 8 - *Certificado de Aprovação Comitê de Ética em Pesquisa*

ANEXO 9 - ***Submissão Artigo 1***

Submission Confirmation for

American Journal of Orthodontics

Para gb_net@hotmail.com
De: **ees.ajodo.0.f810a.da972cbe@eesmail.elsevier.com** em nome de **American Journal of Orthodontics** (ckburke@aol.com)
Enviada: terça-feira, 1 de março de 2011 7:19:10
Para: gb_net@hotmail.com

Dear Dr. Brandão,

Your submission entitled "Diagnostic Agreement of Different Indices for the Assessment of Orthodontic Treatment Needs and its Relation to Malocclusions Impacts on Daily Performances" has been received by journal American Journal of Orthodontics & Dentofacial Orthopedics

You will be able to check on the progress of your paper by logging on to Elsevier Editorial Systems as an author. The URL is http://ees.elsevier.com/ajodo/.

Your manuscript will be given a reference number once an Editor has been assigned.

Thank you for submitting your work to this journal.

Kind regards,

American Journal of Orthodontics & Dentofacial Orthopedics