

UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL
FACULDADE DE ODONTOLOGIA
PROGRAMA DE PÓS-GRADUAÇÃO EM ODONTOLOGIA
NÍVEL MESTRADO
CLÍNICA ODONTOLÓGICA – ODONTOPEDIATRIA

Prevalência de erosão dentária e possíveis fatores de associação em crianças com
doença do refluxo gastroesofágico

Bruna Soares da Silva

Porto Alegre

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Dissertação apresentada ao Programa de Pós-graduação em Odontologia da Universidade Federal do Rio Grande do Sul como requisito parcial para a obtenção do título de Mestre em Odontologia, Área de Concentração em Clínica Odontológica/Odontopediatria.

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RESUMO

A erosão dentária se caracteriza pela perda de estrutura da superfície dental, gerada por um processo químico e sem a influência bacteriana. A associação entre manifestações da cavidade oral e a saúde sistêmica dos pacientes está sendo amplamente estudada, sendo os distúrbios gastrointestinais apontados como um dos responsáveis por alterações bucais de desgaste erosivo. O objetivo desse estudo foi avaliar a prevalência de erosão dentária em pacientes infantis portadores de DRGE. O estudo foi do tipo observacional transversal, com uma amostra composta por crianças de 5 a 12 anos que realizaram exame de endoscopia digestiva alta para diagnóstico da doença. Um questionário para coleta de dados sociodemográficos, história odontológica e hábitos alimentares foi realizado com os responsáveis e um exame da cavidade oral da criança foi realizado. Das 202 crianças avaliadas, 89,7% tiveram a erosão dentária associada com o diagnóstico positivo para DRGE. A análise do risco relativo mostrou associação de moderada a grande entre as duas alterações. A dieta não teve resultados significativos para o desenvolvimento da erosão. Pacientes que apresentam DRGE possuem um risco aumentado de desenvolvimento de erosão dentária devido à exposição ao ácido de origem intrínseca. O diagnóstico e a identificação precoce dos fatores envolvidos com a DRGE são cada vez mais importantes para estabelecer medidas preventivas para a instalação ou controle da evolução das sequelas dentárias.

Palavras-chave: erosão dental, desgaste erosivo, doença do refluxo, esofagite, dentes decíduos.

ABSTRACT

Dental erosion is characterized by the loss of structure of the dental surface, generated by a chemical process and without the bacterial influence. The association between manifestations of the oral cavity and the systemic health of patients is being extensively studied, with gastrointestinal disorders being pointed out as one of the factors responsible for oral changes of erosive wear. The aim of this study was to evaluate the prevalence of dental erosion in pediatric patients with GERD. The study was an observational cross-sectional study, with a sample of children from 5 to 12 years old who underwent examination of endoscopy to diagnose the disease. A questionnaire to collect sociodemographic data, dental history and eating habits was carried out with those responsible and an examination of the child's oral cavity was carried out. Of the 202 children evaluated, 89.7% had dental erosion associated with a positive diagnosis for GERD. The analysis of the relative risk showed a moderate to large association between the two changes. The diet did not have significant results for the development of erosion. Patients with GERD have an increased risk of developing dental erosion due to exposure to acid of intrinsic origin. The diagnosis and early identification of the factors involved with GERD are increasingly important to establish preventive measures for the installation or control of the evolution of dental sequels.

Keywords: dental erosion, erosive wear, reflux disease, esophagitis, primary teeth.

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1 Antecedentes e Justificativa

A erosão dentária é definida como a perda de tecido duro por um processo químico pré-estabelecido sem a influência bacteriana, causada pela presença de substâncias ácidas na cavidade oral. (JAEGGI; LUSI, 2006). Tal perda tecidual é um importante problema de saúde bucal que tem demonstrado um aumento significativo na sua ocorrência nas últimas décadas. As lesões podem apresentar-se desde uma perda de brilho do esmalte, até a presença de desgaste da superfície (DUANGTHIP et al, 2018; SANTOS, 2017).

Atualmente, a erosão dentária apresenta uma prevalência variada, tanto em adultos (4-82%), como em crianças (10-80%), pois diversos fatores podem estar associados à sua ocorrência (TAJI, SEOW, 2010; JAEGGI; LUSI, 2006). Dentre as principais etiologias da erosão dentária, estão os fatores extrínsecos, como o consumo frequente de refrigerantes, sucos de frutas e energéticos, e os fatores intrínsecos como a presença de ácido gástrico na cavidade bucal (que pode ocorrer devido a doença do refluxo gastroesofágico - DRGE), distúrbios alimentares, vômitos crônicos ou regurgitação persistente (SCHEUTZEL, 1996; BARTLETT, 2006).

A principal causa intrínseca é a DRGE, alteração em que o ácido clorídrico presente no estômago chega até a cavidade oral, deixando os dentes expostos a um meio ácido (ROSEN et al, 2018; BARTLETT, 2006). Acomete crianças e adultos e consiste em uma desordem fisiológica em que ocorre a passagem do conteúdo gástrico para o esôfago, com ou sem regurgitações/vômitos. Os episódios de refluxo podem acontecer várias vezes ao dia, principalmente após as refeições, e levam a alteração da qualidade de vida dos indivíduos (FERREIRA et al, 2021).

O quadro clínico da DRGE é heterogêneo, os sinais e sintomas são inespecíficos e com gravidade variável. Podem ser desde manifestações mais simples, como regurgitação frequente, azia e dores abdominais, até complicações severas como a inflamação da mucosa do esôfago (chamada de esofagite erosiva) (FERREIRA et al, 2021; KUMAR et al, 2018; SHAY et al, 2004). Quando atinge o grau de esofagite, a mucosa do esôfago se apresenta avermelhada, com erosões ou úlceras, e é detectada através do exame de endoscopia digestiva alta (EDA). Deve-se também considerar que a ausência de esofagite à endoscopia não exclui a DRGE, pois alguns pacientes apresentam a doença do refluxo endoscópico-negativa, ou seja, sem alterações detectadas (FERREIRA et al, 2021; MARTINS, ZAMBRANO E SCHNEIDER, 2011).

Mais recentemente o desgaste erosivo dental passou a ser apontado como uma manifestação oral da DRGE, levando a perda das suas características anatômicas e o

dente atingido torna-se mais suscetível a sensibilidade dentinária (KUMAR et al, 2018; SPIJKER et.al, 2009; BARTLETT, 2005, SHAY et al, 2004).

Estudos anteriores já demonstraram haver associação entre as duas alterações e apontam que crianças com DRGE são consideradas população de risco ao desenvolvimento de erosão dentária em comparação a indivíduos saudáveis (KUMAR et al, 2018; LINNETT et al, 2002; DAVIES; SANDHU, 1995) Além disso, a severidade da erosão pode estar correlacionada com a presença de sintomas da DRGE e com o seu grau de acometimento (ERSIN et al, 2006).

Essa relação vem sendo estudada com mais detalhes nas áreas médica e odontológica para um melhor entendimento do processo de interação entre esses dois eventos, porém, ainda há necessidade de realização de novas pesquisas avaliando as duas alterações de forma a desenvolver medidas de prevenção que visem diminuir o desafio erosivo na cavidade oral.

2 Objetivo

2.1 Objetivo geral

- Avaliar a prevalência de erosão dentária em pacientes infantis portadores de DRGE.

2.2 Objetivos Específicos

- Comparar a ocorrência de erosão dentária entre pacientes infantis portadores ou não de DRGE.
- Estabelecer possível relação de fatores locais e sistêmicos associados à ocorrência de erosão dentária em pacientes infantis diagnosticados com DRGE.
- Estimar a possível interação de fatores extrínsecos, em associação com a DRGE, no desenvolvimento da erosão dentária.

3 Artigo Científico

Prevalence of dental erosion and possible association factors in children with gastroesophageal reflux disease: a cross-sectional study

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Keywords: erosion, reflux disease, erosive wear, deciduous teeth, esophagitis

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ABSTRACT

Dental erosion is characterized by the loss of structure of the dental surface, generated by a chemical process and without the bacterial influence. The association between manifestations of the oral cavity and the systemic health of patients is being extensively studied, with gastrointestinal disorders being pointed out as one of the factors responsible for oral changes of erosive wear. The aim of this study was to evaluate the prevalence of dental erosion in pediatric patients with GERD. The study was an observational cross-sectional study, with a sample of children from 5 to 12 years old who underwent examination of endoscopy to diagnose the disease. A questionnaire to collect sociodemographic data, dental history and eating habits was carried out with those responsible and an examination of the child's oral cavity was carried out. Of the 202 children evaluated, 89.7% had dental erosion associated with a positive diagnosis for GERD. The analysis of the relative risk showed a moderate to large association between the two changes. The diet did not have significant results for the development of erosion. Patients with GERD have an increased risk of developing dental erosion due to exposure to acid of intrinsic origin. The diagnosis and early identification of the factors involved with GERD are increasingly important to establish preventive measures for the installation or control of the evolution of dental sequels.

Keywords: dental erosion, erosive wear, reflux disease, esophagitis, primary teeth.

Introduction

Dental erosion is characterized by the loss of structure of the dental surface, generated by a chemical process and without the bacterial influence, being considered a multifactorial condition, with complex and common etiology in children and adolescents (COLOMBO et al, 2019; MESQUITA-GUIMARÃES et al, 2014; WILDER-SMITH et al, 2017). Its occurrence is related to the presence of acidic substances in the oral cavity, which lead to the dissolution of enamel and dentin and the decalcified surfaces become soft and more susceptible to wear by brushing and chewing forces (CANEPPELE et al, 2012).

The diagnosis is considered complex, as it involves a change in structure (mineral loss), which can range from softening of the enamel to surface loss (wear) in advanced stages (DUANGTHIP et al, 2018). Lesions are characterized by the loss of enamel shine,

with the surface appearing to be smooth, and in the presence of wear it is wider (in relation to depth), shallower and without sharp angles (SANTOS, 2017).

The development of this dental condition has increased over the years and its etiology is related to exposure to intrinsic factors such as chronic vomiting, persistent regurgitation, eating disorders and gastro-esophageal reflux disease (GERD) and / or extrinsic factors as industrial sources, acid medications and a diet rich in acidic foods and drinks (MESQUITA-GUIMARÃES et al, 2014; GOMES et al, 2017; BARTLETT; SHAH, 2006). The association between manifestations of the oral cavity and the systemic health of patients, as well as the behavioral issue regarding the ingestion of substances or liquids of an acidic nature has been widely studied. Gastrointestinal disorders have been proven to be responsible for oral changes, especially in children who are more likely to have these variations in the gastric system (KUMAR et al, 2018).

GERD is a physiological process that occurs several times during the day in infants, children, adolescents and adults and consists of the involuntary passage of gastric contents into the esophagus. At the end of the esophagus, there is a structure similar to a valve, called the sphincter, which has the function of keeping the acidic contents of the stomach inside it, however, due to a failure it cannot remain closed and the contents return to the esophagus with reflux gastroesophageal. When this situation occurs recurrently, the condition is called Gastroesophageal Reflux (FERREIRA et al, 2021; MARTINS, ZAMBRANO E SCHNEIDER, 2011).

This change results in a variable spectrum of symptoms, such as pain and discomfort, frequent regurgitation, heartburn, among others (KUMAR et al, 2018). Reflux symptoms can impair the quality of life of patients and result in long-term complications, such as esophagitis and peptic stricture in the esophagus, lung disease, upper airway problems and even manifestations in the oral cavity, the most common being dental erosion (SHAY, 2004; GURSKI, et al 2006). Esophagitis is a important manifestation of GERD and is characterized by inflammation of the esophageal mucosa caused by frequent episodes of reflux, which can present in a milder form (initial mucosal inflammation) to a more severe episode (appearance of mucosal ulcers). Diagnosis is made through the examination of upper digestive endoscopy (FERREIRA et al, 2021).

Pace et al (2008) performed a systematic review in which they assessed the prevalence of dental erosion in individuals with GERD. The results showed an average prevalence of dental erosion in 32.5% of adults and 17% of children and concluded that clinical examination of the oral cavity for signs of dental erosion should become routine in patients with GERD. Also, a recent longitudinal study was performed by Wilder-Smith et al

(2017), in which they recruited adults with erosive tooth wear and referred them to assess gastric acid exposure due to GERD. In 88% of cases, patients had reflux episodes more than once a day, indicating that exposure to stomach acid may, in fact, be related to the development of tooth erosion.

Other studies found in the literature also point out that children and adults with GERD should be considered as a population at risk of developing dental erosion compared to healthy individuals. In addition, the severity of erosion could be correlated with the presence of GERD symptoms and its degree of involvement (DAVIES; SANDHU, 1995; LINNETT et al, 2002; ERSIN et al, 2006; HOLBROOK et al, 2009).

However, the literature is still scarce regarding studies that have assessed the magnitude of this association, GERD and dental erosion, especially in children. Thus, the aim of this study was to assess the prevalence of dental erosion in child patients with GERD.

Materials and Methods

Study Design

The present study was carried out in continuation of the research already presented by Quoos et al in 2020 (Erosive Tooth Wear and Erosive Esophagitis in Children: An Observational Study in Porto Alegre) and by Silva et al, in 2021 (High Prevalence of Dental Erosion in Children with Erosive Esophagitis). This is a cross-sectional observational study, evaluating the occurrence of dental erosion in patients with GERD and was developed by the Faculty of Dentistry of the Federal University of Rio Grande do Sul through its Graduate Program in Dentistry, in partnership with the Santa Casa de Misericórdia of Porto Alegre, together with the Pediatric Gastroenterology team of the Santo Antônio Children's Hospital.

Sample

The sample consisted of children aged 5 to 12 years, who underwent the examination of upper digestive endoscopy (EDA) for the diagnosis of GERD, in the period corresponding to the years 2016 to 2019.

Inclusion criteria

- Children from 5 to 12 years old;
- Conducting the EDA exam with a medical report;
- Individuals who do not use dental prostheses or orthodontic appliances.

Exclusion Criteria

- Children with changes in mental or motor capacity, such as cerebral palsy or syndromes;
- Individuals whose legal guardians have a deficit that makes them unable to understand the questionnaires.

Interview

Those responsible were interviewed through a questionnaire containing questions about demographic and socioeconomic data, medical history, behavioral factors, oral hygiene habits (Annex 1). A questionnaire on GERD was also applied to collect data such as signs and symptoms of the disease and use of medication, as well as data on habits and food intake (Annex 2). The time of interviews was on average 5 minutes. The interviewer was a different researcher than the examiner.

Clinical Examination

Two examiners, different from the interviewer, trained and calibrated in the clinical diagnosis of dental erosion, were responsible for the clinical evaluation of the patients' oral cavity. The examiners were accompanied by an assistant responsible for recording the data collected in the medical record. The participants were examined in the Digestive Endoscopy room of the Hospital da Criança Santo Antônio, prior to the endoscopic examination, with the patient already sedated by the medical team. During the examination, a flat odontoscope was used to assess erosive lesions and a flashlight to illuminate the oral cavity, held by the assistant. The use of disposable procedure gloves, mask and hat, as well as glasses for individual protection, were part of the biosafety criteria.

After this dental examination, an upper gastrointestinal endoscopy exam was conducted by a Doctor from the Pediatric Gastroenterology Team at Hospital da Criança Santo Antônio, with the issuance of a medical report with the diagnosis or not of GERD.

Measurement of Dental Structure Loss

The loss of tooth structure was measured using the BEWE Index, with scores measured for each dental surface (Bartlett, et al, 2008; Wiegand, et al, 2006; Mulic, et al, 2010; Dixon, et al, 2012; Mantonakim, et al, 2013):

0	Sound Surface
1	Initial loss of tooth surface structure
2	Tissue loss in <50% of the dental surface
3	Large tissue loss in > 50% of the dental surface

Measurement of Gastroesophageal Reflux Disease

The presence or absence of esophagitis in the EDG examination was used as standard for the diagnosis of GERD. Esophagitis can be classified into different degrees, depending on its severity. The most widely used for diagnosis is the Los Angeles Classification System, divided into four degrees (A to D) (LUNDELL et al, 1999; KUSANO et al, 1999):

A	One or more erosions of a maximum of 5 mm, not continuous between the apexes of two pleats of esophageal mucosa.
B	One or more erosions larger than 5mm, not continuous between the apexes of two folds of esophageal mucosa.
C	Continuous (or converging) erosions between apexes of at least two mucous folds, but which involve less than 75% of the circumference of the esophagus.
D	One or more erosions that involve at least 75% of the circumference of the esophagus.

Training and Calibration

The examiner received training to perform the clinical examination through an expository class, with explanation and demonstration of Bewe's indices. The inter and intra-examiner calibration to perform the clinical examination was performed by analyzing 30 photographs, of dental erosion cases involving all bewe indices, and was performed in two moments with an interval of at least seven days. Two examiners, including a gold standard, performed the calibration. The weighted kappa value between and within the examiner reached a minimum value of 0.8 before the evaluations started.

Blinding

The principal examiner was blinded to the EDA medical report and to the responses to the questionnaires applied to those responsible. Only after examining the oral cavity did the examiner have access to the information.

Statistic

All statistical procedures will be performed with the Statistical Package for the Social Sciences (SPSS) 15.0 for Windows (SPSS, Chicago, IL, USA) using the chi-square test to compare means between groups. For the distribution of normality, the Kolmogorov - Smirnov test was used. the prevalence ratio (PR) and the odds ratio (OR) were calculated to assess the degree of association between the two changes studied. The level of significance was set at 0.05.

Ethical aspects

This study was submitted to the Research Committee of the Faculty of Dentistry at UFRGS and to the Research Ethics Committee at UFRGS (CAAE 04071812.6.0000.5347). Prior to conducting the clinical examination, all legal guardians for the participants signed the Free and Informed Consent Form (Annex 3), accepting to participate in the study. At the end of the clinical examination, legal guardians were informed about the participant's oral condition and, when necessary, were instructed to seek dental care at the FO-UFRGS Children's Clinic or at the family's preferred dental service. All data collected were protected by confidentiality and the participants were referred to by codes.

Results

During the current study period, 202 children aged 5 to 12 years were evaluated, both for GERD and erosive tooth wear. Of these, 39 were diagnosed with esophagitis, while 121 had teeth with erosive lesions. Among children with GERD (n = 39), 89.7% had dental erosion when examining the oral cavity. Table 1 shows the data regarding the general characteristics of the sample in relation to the presence or absence of esophagitis.

Table 2 shows the data regarding the distribution of dental erosion between the two groups evaluated. The average Bewe index for the groups with and without esophagitis were 1.77 and 0.93, respectively, with a p value <0.001, for equal means. The RR was 1.72, while the OR was 8.03, being considered a moderate to large association magnitude between the two changes. The percentage of dental erosion distribution according to the degree of esophagitis severity is shown in graph 1.

In relation to diet, in children without esophagitis, the consumption of acidic beverages showed an association with the development of dental erosion, whereas in patients who had gastric involvement (with GERD), this association was not significant. In

relation to fruit consumption, in neither of the two groups the results were associated with dental erosion.

Graph 1 – Percentage of distribution of dental erosion according to the degree of severity of esophagitis. 0 = without esophagitis; 1 = Grade A of esophagitis; 2 = Grade B esophagitis; 3 = Grade C of esophagitis

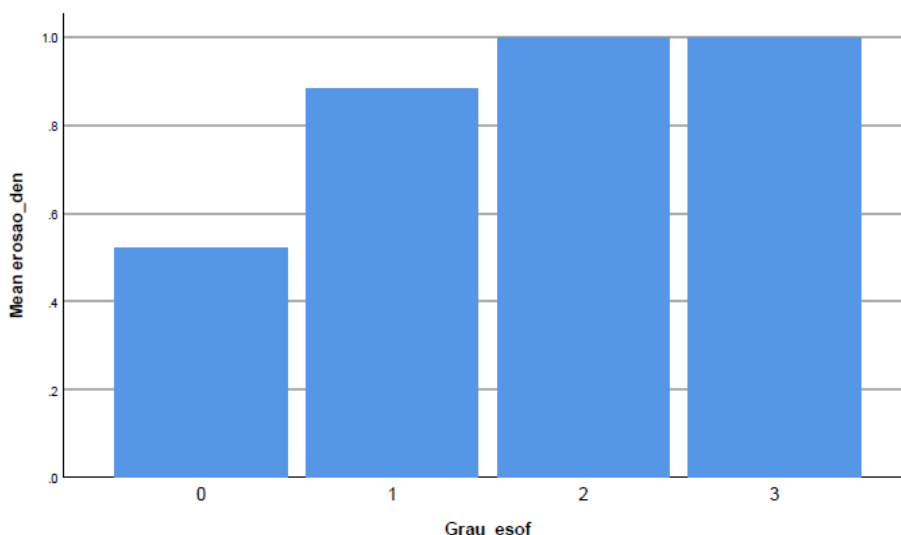


Table 1 – General characteristics of the sample in relation to the presence or not of GERD

	With GERD n=39	Without GERD n=163	p
Idade	9.1±2.6	8.6±2.2	0.24
Womem	14 (35,9%)	94 (57,7%)	0,20
Male	25 (64,1%)	69 (42,3%)	
Consumption of Acid Drinks			0.109
▪ None	35.9	48.8	
▪ Moderate	30.8	16.0	
▪ Intense	33.3	35.6	
Consumption of Acid Fruits			0.230
▪ None	15.4	8.1	
▪ Light	41.0	32.9	
▪ Moderate	23.0	37.9	
▪ Intense	20.5	21.1	
GERD Symptoms			0,161
▪ Vomiting / Regurgitation	17 (70,8%)		
▪ Burps	10 (41,6%)		
▪ Abdominal pain	11 (45,8%)		
▪ Refuse to eat	8 (33,3%)		
▪ None	5 (20,8%)		

Table 2 – Distribution of dental erosion in relation to groups with and without GERD

	With GERD n=39	Without GERD n=163	PR	p
Tooth Erosion	89,7%	52,1%	1,7	<0.001
Degree of Dental Erosion				
0	4 (10,3%)	78 (47,9%)		
1	8 (20,5%)	33 (20,2%)		0.001
2	20 (51,3%)	38 (23,3%)		
3	7 (17,9%)	14 (8,6%)		
Mean Erosion	1,77	0,93		0.026

Discussion

As already presented so far, erosive wear is the softening of the dental surface by acidic substances of intrinsic or extrinsic origin, or a combination of both, and this exposure must be frequent and / or over a long period, leading to irreversible loss of dental structure (MAGALHÃES, WIEGAND, BUZALAF, 2014). This study found a statistically significant association between the experience of dental erosion in children with GERD. These findings are in agreement with studies found in the literature, in which children with chronic gastric acid reflux had a higher risk of developing dental erosion compared to healthy individuals (OLIVEIRA et al, 2016; CORREA et al, 2012; GURSKI, et al 2006; WENHAO et al, 2016). No presente estudo, 59,4% da população na faixa etária de 5 e 12 anos apresentaram um ou mais dentes com lesão erosiva (BEWE).

Previous studies carried out with Brazilian school-aged children reported values between 58 and 78% of prevalence of dental erosion, and our results are in accordance with the average values in Brazil (FARIAS ET AL, 2013; MURAKAMI, CORREA, RODRIGUES, 2006; SANTANA ET AL, 2018). A recent European study indicated that about 30% of the population aged 18 to 35 years has at least one tooth with advanced erosive tooth wear (BARTLETT et al. 2013). These findings highlight the importance of an early diagnosis so that preventive measures can be carried out, in addition to indicating that the fact that the individual has erosive wear on the primary dentition can serve as a predictor of erosion on the permanent dentition.

In the partial presentation of the results of this research, Quoos et al (2020) and Silva et al (2021) parallel a positive relationship between the two associations, bringing in the results of 100% and 96%, respectively, patients diagnosed with GERD and the presence of dental erosion. With the continuity of the sample, we reached results that 89.7% of children with GERD had erosive tooth wear diagnosed on oral examination, with OR values indicating a moderate to severe association between the two alterations. In the RR evaluation, the magnitude of the association was 1.72, that is, reflux esophagitis

promoted a 72% increase in the occurrence of dental erosion. Picos, Badea and Dumitrascu (2018) carried out a systematic review in which six of the ten articles included had a significant association between dental erosion and GERD and the mean value of individuals with both changes was 48.81%. This difference between the findings of the present study can be explained by the fact that most of the studies included in the review were carried out with patients over 18 years old. When the only study with children and adolescents was evaluated, the prevalence found was 98.1%, corroborating the results found in our research.

As the stomach is a source of intrinsic acid, the regurgitation of stomach contents in the mouth, frequently and for a long period of time, has been shown to be a cause of erosive tooth wear. Previous studies had already identified an increased prevalence of loss of tooth structure in groups of people who had eating disorders with frequent vomiting, bulimia nervosa and rumination (CARVALHO et al, 2016). In the present study, 70.8% of the children evaluated had frequent vomiting / regurgitation as the main symptoms of GERD, following the findings in the literature. In addition, other signs and symptoms of the disease such as frequent belching, abdominal pain and refusing to eat have also been reported, but have shown no connection with the development of dental erosion.

Graph 1 showed that as the degree of severity of esophagitis increases, the higher the Bewe indices found in the teeth, reaching a ratio of 100% in the higher degrees. In a study with children with GERD, Oliveira et al (2016) also reported that the teeth showed more severe erosion when compared to children without the disease. This is due to the fact that the acid, which is a potent corrosive agent, is able to chelate the calcium from hydroxyapatite present on the tooth surface, an alteration that leads to a reduction in salivary supersaturation and alters the permeability and solubility characteristics of dentin, leading to a greater loss of mineral (GOMES et al, 2017).

Table 2 also shows that the average dental erosion was relatively higher in patients with GERD (1.77) compared to healthy individuals (0.93). These data also indicate that the group with the disease has higher rates of wear on the dental surface. It is important to note that the critical pH from which the dental enamel is dissolved is around 5.5, while the pH of gastric reflux can reach values around 2.5, being highly plausible that the enamel and dentin are more soluble in the presence of stomach acid (PAPÔSO, CRUZ, LOPES, 2010; CORREA ET AL, 2012; SHIMAZU, ET AL 2017). Therefore, the more severe the GERD, the greater the amount of acid that reaches the oral cavity, either due to a greater frequency of reflux episodes or for a longer duration of the same, and consequently the greater the mineral loss of the dental surface, which demonstrates the

high relationship between the severity of the disease and the highest levels of Bewe's index (PAPÔSO, CRUZ, LOPES, 2010; WENHAO et al, 2016).

Regarding extrinsic factors, the consumption of acidic fruits did not show an association relationship in either group. This may be due to the fact that children have a greater predilection for fruits with less acidic characteristics, such as bananas, which was the preference in 27.7% of cases. When assessing the consumption of acidic beverages, the association with dental erosion was significant in patients without GERD, while those who had the disease showed no relationship between dental condition and extrinsic factors. In a recent study, Oliveira et al (2016) also found no association between acid diet and dental erosion, but they argue that as the etiology of erosion is multiple, eating habits are a risk factor for the development of erosive lesions and should be investigated.

In some cases, GERD manifests itself silently, and without symptoms, making diagnosis difficult. Traditional tests, such as EDA and 24-hour pH-metry, can be useful to diagnose and identify complications of the disease, but even these tests may not detect GERD (GURSKI, et al 2006). Thus, the presence of dental erosion can serve as a clinical sign that reflux is occurring, helping in the diagnosis of the disease. The importance of multidisciplinary work is inserted here, making the dentist an essential part in this scenario of referring the patient to the gastroenterologist. It is important to detect and treat GERD in children and adults to prevent or minimize long-term dental damage (PAPÔSO, CRUZ, LOPES, 2010; GURSKI, et al 2006).

Among the limitations of the study are the difficulty in diagnosing GERD, as it can present silently, without signs and symptoms, being endoscopic negative, and also because the exam was performed by different physicians. In the dental field, oral examinations were also performed by more than one researcher and there is a difficulty in detecting dental erosion in cases where caries lesions, wear or other dental changes were present.

This study showed that patients with GERD have an increased risk of developing dental erosion due to exposure to acid of intrinsic origin. The diagnosis and early identification of risk factors are increasingly important to establish preventive and / or therapeutic measures, since the greater the degree of severity of esophagitis, the greater the Bewe indexes found in teeth, reaching a relationship 100% in the highest grades. It is emphasized once again that the dentist may be the first health professional to diagnose a systemic disease through its oral manifestations in the absence of other characteristic signs and symptoms. And with this action, allow the patient to be treated for GERD, contributing to their better quality of life. Further studies with a multidisciplinary approach

should be conducted in order to obtain more knowledge about the interaction GERD versus Dental Erosion, aiming at a better clinical management of both pathologies.

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4 Considerações Finais

As evidências científicas apontam que há uma forte associação entre a erosão dentária e a DRGE, como demonstrada em nosso estudo. As crianças que apresentam refluxos constantes têm uma maior predisposição a perda de estrutura mineral dos dentes devido à presença do ácido estomacal na cavidade oral, em comparação às crianças que não apresentam a patologia.

As manifestações da DRGE geram mudanças qualidade de vida do indivíduo, pois em geral apresentam dores abdominais e no peito, azia e vômitos frequentes. Em relação aos dentes, a perda mineral leva a alteração na morfologia podendo afetar a função do dente atingido e, em casos mais severos, pode levar sensibilidade dentinária devido à exposição da dentina (BARTLETT, 2005).

Muitas são as condições que podem estar relacionadas com a perda de estrutura da superfície dental, portanto devem ser investigados fatores como a dieta e alterações sistêmicas, e suas possíveis interações, para que se possa fazer um correto plano de tratamento para erosão dentária (SOUZA et al, 2010; VASCONCELOS, VIEIRA, COLARES, 2010). Ainda, a presença de desgaste erosivo na dentição decídua pode servir como um preditor de risco para ter desgaste também na dentição permanente, devendo ser estabelecidas medidas preventivas e orientações aos pais ou responsáveis sobre o desenvolvimento da alteração (GANSS, KLIMEK, GIESE, 2001).

Os resultados deste estudo mostram que pacientes que apresentam DRGE devem receber uma atenção especial dos profissionais de odontologia para identificar possíveis alterações dentárias decorrentes da doença. Por outro lado, o dentista também pode ser o primeiro profissional da saúde a identificar alterações no sistema gastroenterológico, através do diagnóstico da erosão dentária.

Destaca-se aqui a importância de uma assistência multidisciplinar no atendimento à saúde do indivíduo de forma integral (MACEDO, 2007). A interação entre o cirurgião-dentista e o médico gastroenterologista deve ser rotina no caso da presença de DRGE e/ou erosão dentária.

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Anexo 1 – Ficha clínica (Anamnese e Exame clínico):

NOME:	FICHA Nº:
-------	-----------

IDENTIFICAÇÃO DO PACIENTE

NOME:

IDADE:

DATA DE NASCIMENTO: ____/____/____

COR:

SEXO:

SÉRIE/ANO ESCOLAR:

ENDEREÇO RESIDENCIAL:

CIDADE:

TELEFONE: ()

PAI:

PROFISSÃO/ ESCOLARIDADE:

MÃE:

PROFISSÃO/ ESCOLARIDADE:

RENDA FAMILIAR:

TELEFONE PARA CONTATO: ()

OBSERVAÇÕES:

ANAMNESE

a) Período Pré e pós-natal (Primeiros anos de vida)

Gestação:

Parto:

Aleitamento materno exclusivo () sim () não Quanto tempo?

Aleitamento materno complementado () sim () não Quanto tempo?

OBS:

b) História médica anterior

Doenças de infância (época):

Doenças sistêmicas (época):

Medicamentos:

OBS:

c) História médica atual

Estado geral de saúde:

Medicamentos:

Alergia:

OBS:

d) História odontológica

Época da erupção dos primeiros dentes decíduos:

Primeira experiência (época):

Motivo:

Traumatismo (s) dentário (s) (época):

Tipo:

Tratamento:

OBS:

e) Higiene bucal

Quem realiza?

Frequência diária:

Período:

Usa dentífrício?

Usa fio/fita dental?

OBS:

Nome: _____ Data: _____

ICDA S					
	V	P	M	D	U
18					
17					
16					
15	55				
14	54				
13	53				
12	52				
11	51				
	V	P	M	D	U
21	61				
22	62				
23	63				
24	64				
25	65				
26					
27					
28					
	V	P	M	D	U
38					
37					
36					
35	75				
34	74				
33	73				
32	72				
31	71				
	V	P	M	D	U
41	81				
42	82				
43	83				
44	84				
45	85				
46					
47					
48					

BEWE					QUADRANTE
	V	U	PL		
18					
17					
16					
15	55				
14	54				
13	53				
12	52				
11	51				
	V	U	PL		
21	61				
22	62				
23	63				
24	64				
25	65				
26					
27					
28					
	V	U	PL		
38					
37					
36					
35	75				
34	74				
33	73				
32	72				
31	71				
	V	U	PL		
41	81				
42	82				
43	83				
44	84				
45	85				
46					
47					
48					
TOTAL					

Códigos ICDA S	
0 – Superfície lígida	
1 – Lesão não-cavitada ativa	
2 – Lesão não-cavitada Inativa	
3* – Microcavidade em esmalte	
4* – Sombreamento	
5* – Cavidade em dentina	
6 – Destruição coronária	
R0 – Restauração	
R1 – Restauração alterada	
R2 – Restauração com lesão adjacente	
* ativa (a) ou Inativa (I)	

Códigos BEWE	
0 – Nenhum desgaste erosivo	
1 – Perda Inicial de textura	
2* – Defeito nítido, perda de tecido duro, MENOS de 50% da área da superfície.	
3* – Defeito nítido, perda de tecido duro, MAIS de 50% da área da superfície.	
* Dentina frequentemente envolvida	

Anexo 2 – Questionário DREG e Dieta

Nome:		Data:						
QUESTIONÁRIO DRGE (GSQ-Y Modificado)								
SINTOMAS	QUESTÃO A Por quantas vezes o sintoma ocorreu nos últimos 7 dias? (por exemplo, 0, 1,2,3,etc)	QUESTÃO B Numa escala de 1 a 7 quão grave é o sintoma usualmente? 1= nenhum pouco grave 7= muito grave (deixe a questão B em branco se sua resposta na questão A foi 0 - zero)						
1. VÔMITO/REGURGITAÇÃO Vômito/ alimento ou líquido que volta para boca da criança, gosto ruim na boca.	Quantas vezes nos últimos 7 dias (não deixe em branco)	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: left;">Nenhum pouco grave</td> <td style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </td> <td style="text-align: right;">Muito grave</td> </tr> <tr> <td></td> <td style="text-align: center;">1 2 3 4 5 6 7</td> <td></td> </tr> </table>	Nenhum pouco grave	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Muito grave		1 2 3 4 5 6 7	
Nenhum pouco grave	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Muito grave						
	1 2 3 4 5 6 7							
2. ENGASGANDO AO COMER Tosse/engasgos quando a criança está ingerindo comida ou líquidos.	Quantas vezes nos últimos 7 dias (não deixe em branco)	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: left;">Nenhum pouco grave</td> <td style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </td> <td style="text-align: right;">Muito grave</td> </tr> <tr> <td></td> <td style="text-align: center;">1 2 3 4 5 6 7</td> <td></td> </tr> </table>	Nenhum pouco grave	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Muito grave		1 2 3 4 5 6 7	
Nenhum pouco grave	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Muito grave						
	1 2 3 4 5 6 7							
3. DOR ABDOMINAL, DOR NA BARRIGA. Queimação, volume, inchaço na parte de cima do abdômen, calor na barriga.	Quantas vezes nos últimos 7 dias (não deixe em branco)	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: left;">Nenhum pouco grave</td> <td style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </td> <td style="text-align: right;">Muito grave</td> </tr> <tr> <td></td> <td style="text-align: center;">1 2 3 4 5 6 7</td> <td></td> </tr> </table>	Nenhum pouco grave	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Muito grave		1 2 3 4 5 6 7	
Nenhum pouco grave	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Muito grave						
	1 2 3 4 5 6 7							
4. ARROTOS Anote somente episódios involuntários.	Quantas vezes nos últimos 7 dias (não deixe em branco)	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: left;">Nenhum pouco grave</td> <td style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </td> <td style="text-align: right;">Muito grave</td> </tr> <tr> <td></td> <td style="text-align: center;">1 2 3 4 5 6 7</td> <td></td> </tr> </table>	Nenhum pouco grave	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Muito grave		1 2 3 4 5 6 7	
Nenhum pouco grave	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Muito grave						
	1 2 3 4 5 6 7							
5. DIFICULDADE DE ENGOUR Criança reclama que o alimento ou líquido parece que fica parado e que ela tem que engolir várias vezes ou tomar mais água pra 'descer' a comida.	Quantas vezes nos últimos 7 dias (não deixe em branco)	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: left;">Nenhum pouco grave</td> <td style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </td> <td style="text-align: right;">Muito grave</td> </tr> <tr> <td></td> <td style="text-align: center;">1 2 3 4 5 6 7</td> <td></td> </tr> </table>	Nenhum pouco grave	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Muito grave		1 2 3 4 5 6 7	
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	1 2 3 4 5 6 7							
6. RECUSOU-SE A COMER Por causa de dor ou desconforto no estômago.	Quantas vezes nos últimos 7 dias (não deixe em branco)	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: left;">Nenhum pouco grave</td> <td style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </td> <td style="text-align: right;">Muito grave</td> </tr> <tr> <td></td> <td style="text-align: center;">1 2 3 4 5 6 7</td> <td></td> </tr> </table>	Nenhum pouco grave	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Muito grave		1 2 3 4 5 6 7	
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	1 2 3 4 5 6 7							
7. DOR OU DESCONFORTO NO PEITO Sensação de queimação, azia, inchaço na região do osso do peito.	Quantas vezes nos últimos 7 dias (não deixe em branco)	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: left;">Nenhum pouco grave</td> <td style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </td> <td style="text-align: right;">Muito grave</td> </tr> <tr> <td></td> <td style="text-align: center;">1 2 3 4 5 6 7</td> <td></td> </tr> </table>	Nenhum pouco grave	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Muito grave		1 2 3 4 5 6 7	
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	1 2 3 4 5 6 7							

10. ATIVIDADES DIÁRIAS Suas atividades diárias foram afetadas pela azia? Sim Não	----- Quantas vezes nos últimos 7 dias (não deixe em branco)	OBSERVAÇÕES - talvez devêssemos colocar "arrotos molhados" ou líquido que volta na boca, como um item separado.
11. SONO Seu sono foi afetado por causa da azia?	----- Quantas vezes nos últimos 7 dias (não deixe em branco)	- calor ou quente na barriga? - Questão 4: Conta quando associado à bebida com gás

□

AVALIAÇÃO DA DIETA																							
Com que frequência você consome as seguintes bebidas e frutas? 0=nunca ou raramente; 1=algumas vezes; 2=todos ou quase todos os dias	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>Refrigerante</td> <td>Água com Gás</td> <td>Laranja</td> <td>Banana</td> <td>Pêssego</td> <td></td> </tr> <tr> <td>Suco de fruta</td> <td>Gatorade</td> <td>Abacaxi</td> <td>Limão</td> <td>Kiwi</td> <td></td> </tr> <tr> <td>Iogurte</td> <td>Chá enlatado</td> <td>Morango</td> <td>Maçã</td> <td>Uva</td> <td></td> </tr> </table>	Refrigerante	Água com Gás	Laranja	Banana	Pêssego		Suco de fruta	Gatorade	Abacaxi	Limão	Kiwi		Iogurte	Chá enlatado	Morango	Maçã	Uva					
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De que forma você ingere líquido engarrafado?	<table border="1" style="width: 100%;"> <tr> <td style="width: 5%;">1</td> <td style="width: 60%;">Pela boca da garrafa vagarosamente</td> <td style="width: 5%;">3</td> <td style="width: 25%;">Com canudo</td> </tr> <tr> <td>2</td> <td>Pela boca da garrafa rapidamente</td> <td>4</td> <td>Com copo</td> </tr> </table>	1	Pela boca da garrafa vagarosamente	3	Com canudo	2	Pela boca da garrafa rapidamente	4	Com copo														
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Você costuma ingerir líquido antes de dormir? <table border="1" style="width: 100%;"> <tr> <td style="width: 5%;">1</td> <td style="width: 15%;">Sim</td> </tr> <tr> <td>2</td> <td>Não</td> </tr> </table>	1	Sim	2	Não	Qual Líquido? <table border="1" style="width: 100%;"> <tr> <td style="width: 5%;">1</td> <td style="width: 15%;">Nenhum</td> <td style="width: 5%;">4</td> <td style="width: 15%;">Leite</td> <td style="width: 5%;">7</td> <td style="width: 55%;">Outros</td> </tr> <tr> <td>2</td> <td>Água</td> <td>5</td> <td>Refrigerante</td> <td></td> <td>.....</td> </tr> <tr> <td>3</td> <td>Suco</td> <td>6</td> <td>Chá</td> <td></td> <td></td> </tr> </table>	1	Nenhum	4	Leite	7	Outros	2	Água	5	Refrigerante		3	Suco	6	Chá		
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Você costuma ingerir líquido no meio da noite? <table border="1" style="width: 100%;"> <tr> <td style="width: 5%;">1</td> <td style="width: 15%;">Sim</td> </tr> <tr> <td>2</td> <td>Não</td> </tr> </table>	1	Sim	2	Não	Qual Líquido? <table border="1" style="width: 100%;"> <tr> <td style="width: 5%;">1</td> <td style="width: 15%;">Nenhum</td> <td style="width: 5%;">4</td> <td style="width: 15%;">Leite</td> <td style="width: 5%;">7</td> <td style="width: 55%;">Outros</td> </tr> <tr> <td>2</td> <td>Água</td> <td>5</td> <td>Refrigerante</td> <td></td> <td>.....</td> </tr> <tr> <td>3</td> <td>Suco</td> <td>6</td> <td>Chá</td> <td></td> <td></td> </tr> </table>	1	Nenhum	4	Leite	7	Outros	2	Água	5	Refrigerante		3	Suco	6	Chá		
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ANEXO 3 - Termo de Consentimento Livre e Esclarecido

UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL

Faculdade de Odontologia

Termo de Consentimento Livre e Esclarecido

Caro responsável,

Esta pesquisa intitulada '**Ocorrência de erosão dentária: possíveis fatores de associação e possibilidades de prevenção em crianças com doença do refluxo gastroesofágico.**', está sendo realizada pela Faculdade de Odontologia da Universidade Federal do Rio Grande do Sul (UFRGS) e tem como objetivo determinar as condições de saúde bucal de crianças de 7 a 12 anos de idade referidas pela Clínica Infanto-Juvenil da FO-UFRGS e Setor de Endoscopia Pediátrica do Hospital da Criança Santo Antônio (Santa Casa de Misericórdia – Porto Alegre), contribuindo para que medidas de prevenção e tratamento de doenças bucais, em especial a erosão dentária, sejam estabelecidas.

Os responsáveis pelos participantes serão submetidos a uma entrevista sobre dados pessoais e comportamentais. As crianças participantes do estudo receberão limpeza dos dentes, exame bucal e coleta de saliva em um único dia com duração prevista de aproximadamente 1 hora. Os possíveis desconfortos associados a estes procedimentos são aqueles decorrentes de um exame odontológico comum. Serão utilizados materiais esterilizados e descartáveis.

Os participantes terão como benefício o acesso ao diagnóstico de qualquer alteração bucal e receberão, posteriormente, um relatório do exame realizado associado a um encaminhamento para tratamento odontológico se necessário. Esse tratamento será garantido na Clínica Infanto-Juvenil da FO-UFRGS.

As informações coletadas durante a entrevista e o exame bucal, assim como a identidade do participante ficarão sob poder restrito dos participantes. Fica, ainda, assegurada a liberdade dos indivíduos de recusarem-se a participar ou retirarem-se da pesquisa a qualquer momento sem que isso traga consequências aos mesmos.

Toda e qualquer dúvida poderá ser esclarecida pelo pesquisador Fernando Borba de Araújo que estarão à disposição através dos telefones (51) 3308-5027 ou (51) 3308-5193 e no endereço Rua Ramiro Barcelos, 2492.

Eu, _____ responsável legal pelo menor _____, declaro que fui informado do objetivo e dos procedimentos que serão realizados nesta pesquisa, bem como sei dos meus direitos e dos deveres dos pesquisadores. Declaro, ainda, que recebi uma cópia deste termo.

Porto Alegre, ____ de _____ de 201_

Responsável: Prof Dr. Fernando Borba de Araújo

Comitê de Ética em Pesquisa da UFRGS – Telefone: (51) 3308-5187.