

Atraumatic restorative treatment for cavity control in schoolchildren from a municipality in Western region of Paraná state**Tratamento restaurador atraumático no controle da cárie em escolares de um município do Oeste do Paraná****Tratamiento restaurador atraumático en el control de caries en estudiantes de un municipio del Oeste de Paraná****Received: 12/03/2020****Approved: 16/08/2020****Published: 03/10/2020****Helena Pfeffer¹****Gabriela Nascimento Salles²****Mariângela Monteiro de Melo Baltazar³****Marina Berti⁴****André Luiz Marçal Terreri⁵****Daniela Pereira Lima⁶**

This is a cross-sectional study, carried out in 2017, at a school in the city of Cascavel, PR, Brazil. It consists of a clinical examination of oral health conditions and ART in children aged between 4 to 12 years, and aims to stimulate oral health care and increase the coverage of restorative services, control and prevention of cavities in schoolchildren. The data had descriptive analysis. 158 children participated and most were not indicated for Atraumatic Restorative Treatment (67.84%). In the primary dentition, the average of teeth with cavities, with indication for extraction and fillings was 4.77. In teeth with cavities lost and filled by adult tooth, the average was 0.41. The treatments in descending order were: restoration of 1 surface (46.50%), 2 or more (24.04%), pulp treatment (6.01%), extraction (5.46%) and in 17.49% of cases no information. The results suggest effectiveness and continuity of these actions, with a view to improving oral health conditions of students with limited access to dental services.

Descriptors: Dental caries; Health; Epidemiology.

Trata-se de um estudo transversal, composto por exame clínico das condições de saúde bucal e TRA, em crianças de 4 a 12 anos realizado em 2017, numa escola da cidade de Cascavel, com o objetivo de estimular o cuidado com a saúde bucal, aumentando a cobertura de serviços restauradores, o controle e prevenção da doença cárie em escolares. Os dados tiveram análise descritiva. Participaram 158 crianças e a maioria não foi indicada ao Tratamento Restaurador Atraumático (67,84%). Na dentição decídua a média de cariados, com extração indicada e obturados foi de 4,77. Em cariados perdidos e obturados por dente permanente a média foi de 0,41. Os tratamentos em ordem decrescente foram: restauração de 1 superfície (46,50%), 2 ou mais (24,04%), tratamento pulpar (6,01%), extração (5,46%) e em 17,49% dos casos sem informação. Os resultados sugerem efetividade e a continuidade dessas ações, com vistas a melhora as condições de saúde bucal de escolares com acesso limitado a serviços odontológicos.

Descritores: Cárie dentária; Saúde; Epidemiologia.

Se trata de un estudio transversal, que consiste en un examen clínico de las condiciones de salud bucal y TRA, en niños de 4 a 12 años de edad, realizado en 2017 en una escuela de la ciudad de Cascavel, PR, Brasil, con el objetivo de estimular el cuidado de la salud bucal mediante el aumento de la cobertura de los servicios restauradores, el control y la prevención de la caries en los estudiantes. Los datos tuvieron un análisis descriptivo. Participaron 158 niños y la mayoría de ellos no fueron indicados para el Tratamiento Restaurador Atraumático (67,84%). En la dentición decidua el promedio de caries, con extracción indicada y empastes fue de 4,77. En los dientes con carie perdidos y empastados por diente permanente la media fue de 0,41. Los tratamientos en orden decreciente fueron: reparación de 1 superficie (46,50%), 2 o más (24,04%), tratamiento de la pulpa (6,01%), extracción (5,46%) y el 17,49% de los casos sin información. Los resultados sugieren la eficacia y la continuidad de esas medidas, con miras a mejorar las condiciones de salud bucal de los estudiantes con acceso limitado a los servicios odontológicos.

Descriptorios: Caries dental; Salud; Epidemiología.

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INTRODUCTION

Many oral health conditions are recognized as public health problems due to their prevalence, severity, individual and community impact, and costs that result in the health system¹. Untreated, dental cavities is considered the most prevalent health condition worldwide². With regard to the child population, it is known that this oral health condition is the most frequent chronic disease³.

The pain caused by tooth decay can interfere with the act of eating, causing the child to grow more slowly, underweight and have sleeping problems^{4,5}; which can affect school performance with a significant decrease in attention during activities, generating learning deficit⁴.

With regard to primary dentition, although the prevalence data are very diverse, there is a significant increase in cavities as age increases⁶. In Brazil, according to the National Oral Health Survey (SB Brazil 2010)⁶, 53.4% of children had cavities at age five, with a lower prevalence in the southeast region.

In the years 2016 and 2017, the dentistry students at the Universidade Estadual do Oeste do Paraná - Campus Cascavel (UNIOESTE) carried out epidemiological surveys on the oral health conditions of schoolchildren at a municipal school in the town of Cascavel, in the state of Paraná, in a very socially vulnerable region, these epidemiological surveys showed a great demand for restorative services with a high prevalence of the decayed component.

Having this information and knowing the difficulties of access of this population to Basic Health Units (BUS), it was decided to develop an extension project that would better assist the school population, aiming at increasing the attention to oral health in this region of high vulnerability social^{7,8}.

The project entitled as: "Atraumatic Restorative Treatment in the Control of Cavities in Schoolchildren in Cascavel Velho - PR" (institutional register 50243/2017), aimed to develop in children the ability to become a knowledge multiplier, contributing to oral health promotion and behavioral changes in the family, school and social environment. It was proposed to develop in the child the importance of health care, awakening them to the importance of attention to oral conditions and demystifying the fear of the dentist⁹.

It is known that the clinical care of a dentist involves many equipment, materials and protocols. Based on this, for the best progress of the project, it was decided to take action that used a technique that did not need the conventional clinical environment (dental chair and equipment), with a high coverage and that could be performed in other practice scenarios: o Atraumatic Restorative Treatment (ART). ART is considered a painless, fast, efficient technique, based on the principles of minimally invasive dentistry and useful in bringing children and dentists closer together, which favors the growth of adults without fear of facing dental care¹⁰⁻¹³.

ART is considered by the Ministry of Health a protocol for individualized extra-clinical care, for: bedridden, institutionalized and universalized for primary teeth with monitoring. As a collective approach, it can be used to reduce complexity of treatments and tooth loss in populations with a high prevalence of cavities, until these individuals can be scheduled for care at the health unit¹⁴.

Therefore, the aim of this study was to stimulate oral health care, increasing the coverage of restorative services, the control and prevention of cavities in schoolchildren.

METHOD

This is a cross-sectional study, consisting of clinical examination of oral health conditions and ART, in children aged 4 to 12 years old that participated in the extension project Atraumatic Restorative Treatment in Cavities Control in schoolchildren from Cascavel Velho - PR enrolled in the afternoon period of the Municipal School Irene Rickli, in the Cascavel Velho neighborhood

in the municipality of Cascavel-PR, in 2017, with a systematic sample. The project followed four phases, described in Chart 1.

In the first phase of the project, children from each class were called and each received an oral health kit, containing an individual toothbrush holder and a toothbrush. Then, these groups received guidance on brushing techniques and underwent supervised toothbrushing, along with topical application of 0.2% sodium fluoride (in accordance with the risk of cavities). These kits were later stored at the school, so that supervised brushing could be carried out weekly on the project.

At this moment, the Free and Informed Consent Form (ICF) was sent so that parents and/or guardians would authorize, or not, the child's participation in the extension project. These terms were handed over to the school management, so that they could be passed on to the parents of each student.

In the second phase, an epidemiological survey was carried out on the children who brought the signed FICF, using the Dental Condition Index and Treatment Needs (DCITN), making it possible to extract the Index of decayed, missing and filled teeth (DMFT and dmft) according to the criteria of the World Health Organization¹⁵. From the DMFT, the Significance Caries Index was performed in the polarization group, the SiC Index¹⁶.

The examination was carried out with a wooden spatula and flashlight and, when necessary, the aid of a probe and mirror, with the examiner sitting and the child standing. At this stage, screening for ART was also carried out according to the selection criteria according to Frencken and collaborators (1996) which included: teeth with cavities in the intermediate phase with access through occlusal or proximal, cavity that allows the insertion of manual instrument, without indicated extraction, and absence of pulp exposure, fistula, abscess, as well as absence of painful symptoms that could characterize irreversible pulpitis¹⁷.

In the case of students in whom the technique cannot meet all the need for treatment (extractions, endodontics and extensive restorations), they were referred to the dental clinic of the Pediatric Dentistry discipline at the Universidade Estadual do Oeste do Paraná (UNIOESTE), in order to continue addressing needs of greater complexity.

All students had their data and information recorded in clinical files, prepared especially for this project.

In the third phase, the Atraumatic Restorative Treatment was performed on the children screened with the signed Informed Consent Form and who agreed to receive the procedure. The service took place in a well-lit place on the school premises, using desks, benches, tables, mats, lamps and what else was necessary, and possible, for the best accommodation of those involved. This phase was the longest, due to the number of children seen, and in some cases the patient was seen in more than one session.

Regarding the execution of the ART technique, the decayed tissue was removed using a dentin spoon, until the moment when all the softened, infected dentin was removed, leaving only the affected dentin, which is capable of remineralization. After that, the cavity was conditioned with 11.5% polyacrylic acid for 15 seconds, improving the retention properties of the Glass Ionomer Cement (GIC), and the excess acid was removed with a cotton ball and then washed with water using a syringe. Then, the cavity was dried with the aid of a cotton ball, then the GIC, properly manipulated, was introduced into the cavity with the aid of an exploratory probe, using digital pressure with a vaseline finger, in order to avoid syneresis and imbibition¹⁷. The ionomer cement of choice was Maxion R[®] because it is available for use in the dental clinic of UNIOESTE.

When all the selected children received the ART, the fourth phase of the project began, which aimed to end activities at the school, where dynamics and workshops were held, in order to reaffirm the importance of oral health and oral hygiene.

Table 1. Characterization of the Atraumatic Restorative Treatment extension project in the Control of Caries in schoolchildren from Cascavel Velho - PR. 2017.

| Phase | Description of activities |
|-------|--|
| 1 | Distribution of oral health kits, supervised brushing, topical application of fluoride and delivery of the Informed Consent Form (ICF) |
| 2 | Epidemiological survey using the Dental Condition and Treatment Needs Index (DCTNI) and selection for ATR. |
| 3 | ART. |
| 4 | Closing of activities at school, dynamics and workshops. |

The study received approval from the Research Ethics Committee of the Universidade Estadual do Oeste do Paraná - UNIOESTE (CAAE: 78320117.0.0000.0107).

The information was tabulated in Microsoft Excel ® spreadsheets, and descriptive data analysis was performed. To check for a statistically significant association between the variables, the Chi Square test was performed with a 5% significance level. All analyzes were performed using the licensed program XLStat Version 2017¹⁸.

RESULTS

171 children enrolled in the afternoon period participated in this study. Of these, 13 (7.6%) were excluded due to change of school and/or period. Children who did not show indication for ART were also excluded, making a total of 116 (67.84%) children excluded. Thus, a total of 42 (24.56%) children took part in the third stage of the research (performing ART in children).

The characterization of the subjects was carried out with variables, namely: age, gender and indication for treatment (ART). Table 1 shows the respective absolute and relative frequencies of the qualitative variables analyzed to establish a general profile of the individuals who participated in the research.

It was found that, in percentage, most of the individuals who participated in the research were female (93; 54.39%), although statistically there is no difference between the proportions of the two genders (p-value = 0.105; Table 1).

In addition, most individuals were 6 years old (30; 17.55%) (p-value <0.0001; Table 1) and, among the patients evaluated, most were not indicated for ART (116; 67.84%) (p-value <0.0001; Table 1).

For the ART to be performed, it was necessary that the child had brought the signed ICF, agreeing to receive the procedure and for the child to be present at school at the time of the procedures, of the 42 children selected to receive ART, 31 (73.80%) brought the ICF duly signed, agreed to receive the procedure and were at school at the time of the ART. Table 2 shows the frequency of patients who underwent treatment after being referred.

Table 3 shows the average of the DMFT and dmft indexes and the SiC Index that was used to define the severity of dental caries in the third group that had the most experience of the disease.

Table 1. Absolute and relative frequencies of qualitative variables linked to patient identification. Cascavel / PR, 2017.

| Variable | Categories | N | % | p-valor |
|---------------------|------------------------------------|-----|-------|---------|
| Gender | Female ^a | 93 | 54.39 | 0.105 |
| | Male ^a | 78 | 45.61 | |
| Age | 3 ^{ab} | 10 | 5.85 | <0.0001 |
| | 4 ^{ab} | 23 | 13.45 | |
| | 5 ^{ab} | 22 | 12.86 | |
| | 6 ^a | 30 | 17.55 | |
| | 7 ^{ab} | 23 | 13.45 | |
| | 8 ^a | 25 | 14.62 | |
| | 9 ^{ab} | 23 | 13.45 | |
| | 10 ^{ab} | 11 | 6.43 | |
| Recommended for ART | 12 ^b | 4 | 2.34 | <0.0001 |
| | Yes ^b | 42 | 24.56 | |
| | No ^a | 116 | 67.84 | |
| | Excluded from samples ^c | 13 | 7.60 | |

P-value of the chi-square test for k proportions. Freq.: absolute frequency; %: relative frequency;

Different letters mean that among the categories of the same variable there is a difference in the number of samples (sample frequency), that is, a statistical difference.

Table 2. Absolute and relative frequency of treatment adherence (TRA). Cascavel / PR, 2017

| Recommended for ART | n | % |
|---|----|-------|
| Total of recommended for ART | 42 | 100.0 |
| Recommended that completed treatment | 31 | 73.9 |
| Indicated that did not complete treatment | 11 | 26.19 |

Table 3. Average of CPO-D and CEO indices, and SiC Index. Cascavel / PR, 2017.

| | CPO-D | CEO |
|-----------|-------|------|
| Média | 0.41 | 4.77 |
| SiC Index | 1.30 | - |

Table 4 shows the frequencies of the Dental Condition Index and Need for Treatment (DCINT), according to the criteria of the World Health Organization¹⁵. These weigh all the teeth of the 31 patients referred to the ART who had a signed informed consent, agreed to receive the procedure and were at school at the time of the ART. Code 0 (without treatment), as well as codes 3 - crown for any reason, 4 - aesthetic facet, 7 - White spot remineralization and 8 - Sealant (whose frequency was null) were not considered.

Table 4. Absolute and relative frequency (%) of treatment needs, according to the respective codes. Cascavel/PR, 2017.

| Code/Treatment | Frequency | % |
|---------------------------------------|-----------|-------|
| 1 - Restoration of 1 surface | 86 | 46.50 |
| 2 - Restoration of 2 or more surfaces | 44 | 24.04 |
| 5- Pulp + restore | 11 | 6.01 |
| 6- Extraction | 10 | 5.46 |
| 9- No information | 32 | 17.49 |

DISCUSSION

In the observation of the indexes related to the children participating in the ART, they presented in the primary dentition the average of the dmft of 4.77. If compared to the national results of SB Brasil 2010, in the 5-year age group, the average dmft score in Brazil is 2.43 and, in the southern region of the country, it is 2.49⁶. A study carried out in 2013 in Cascavel-PR

showed that the general average of dmft in the municipality was 2.42¹⁹. Thus, it can be said that this group selected for this study has a higher prevalence of cavities when compared to national, regional and municipality data. This is due to the fact that it is an isolated sample of children who have cavity activity in a less economically favored region.

In the DMFT index, the Brazilian average was 2.07, in the South, the average was 2.066, and, in the survey carried out in Cascavel-PR in 2013, this average was 1.91¹⁹. In the study presented here, this figure was 0.41.

In addition, in the present study, cavity experience in the polarization group (SiC = 1.31) presented a lower value than that recommended by Bratthal (2000) in the age group of 12 in 2015 (SiC = 3.0)²⁰. These results can be explained by the fact that in the sample most children had few erupted permanent teeth, as they were in the age group of six years old (30; 17.55%) and with permanent teeth present for a short time on display at oral cavity.

The Cascavel Velho neighborhood in the municipality of Cascavel, in the state of Paraná, is located in a region of extreme social vulnerability and it is known that there is a directly proportional relationship between the population's socioeconomic level and the prevalence and severity of dental cavities. The greater the poverty, the greater the prevalence of this disease, emphasizing that, in populations with lower socioeconomic status, they are also rarely treated²¹. A study demonstrated that the high level of education comes with more opportunities to access health information²².

In view of these data, oral hygiene instructions and distribution of brushes in collective action were made, aiming to raise awareness/motivate children about the importance of oral health and about cavities. In the chosen age group (4 to 12 years) the proposal was to prevent the appearance of cavities in the first permanent molars, as well as to intervene in those already affected by the disease through curative procedures (ART). The low DMFT average gave the opportunity, through prevention and awareness, to keep this index low.

ART is a simple, low-cost technique that does not require anesthesia, uses only manual instruments, such as dentine spoons, to remove decayed tissue and immediately restores the cavity with an adhesive restorative material¹¹. Since 1994, it has been recommended by the World Health Organization (WHO) and the International Dental Federation (IDF) as part of oral health programs in developing countries²³.

The survey also included a survey of the Need for Treatment according to WHO criteria¹⁵ to measure and compare the experience of dental caries, which was applied to the participating children screened to receive the ART. This survey sought to control the surfaces affected by caries in each tooth, to fit them, or not, to the procedure at school and also so that cases of pulp treatment or extraction could be referred to the dental clinic of the University or Basic Unit of health.

As disclosed by SB Brasil (2010), the need for treatment for dental caries shows a low percentage in all age groups in the country. It was also observed that in regions where there are inequalities in caries, there is a greater demand for treatment: restoration, pulp treatment or extraction⁶.

According to the survey in the South, the percentage of individuals examined who did not need treatment at 5 years of age was 89.7% and at 12 years of age 94.1%. In these age groups the greatest need is highlighted by the need to restore only 1 surface, with a percentage of 5.5% at 5 years and 3.5% at 12 years and restoration of 2 or more surfaces, with a percentage of 3.0% at 5 years of age and 1.4% at 12 years⁶.

In accordance with the Brazilian standard, the greatest need for treatment found was the restoration of 1 surface (46.50%), followed by restorations of 2 or more surfaces (24.04%). It is also possible to notice a low percentage of teeth with indication for extraction and pulp treatment.

CONCLUSION

The development of this type of research is extremely important, especially in areas of high social vulnerability by motivating children in school to change habits, promoting self-care, encouraging healthy oral hygiene habits and thereby making them multipliers that knowledge in your family environment.

ART performed in a school environment increases the coverage of restorative services, promoting atraumatic restorations, helping in the control and prevention of caries disease.

The study's limitation is the fact that it is in a single institution and in a short observation period. Despite this, the results found suggest the effectiveness of this type of program carried out with students. Thus, the continuity of these collective actions becomes essential in the dissemination of this information, to strengthen and reiterate procedures that improve the oral health conditions of students with limited access to dental services.

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CONTRIBUTIONS

André Luiz Marçal Terreri, Marina Berti and Mariângela Monteiro de Melo Baltazar contributed to writing and review. **Gabriela Nascimento Salles** collaborated in the collection and analysis of data and writing. **Daniela Pereira Lima** and **Helena Pfeffer** participated in the study design, data collection and analysis, writing and review.

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