

## Dental caries injuries in schoolchildren seeking for care at a university dental clinic in Southern Brazil

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**Abstract** The aim of this study was to assess the presence, severity, and consequences of dental caries lesions (DCL) in schoolchildren treated at the pediatric dental clinic of a public university. Children aged 8-11 years were included. The International Caries Detection and Assessment System (ICDAS) was used to evaluate DCL. Patients were classified by severity as: caries-free (sound surfaces); initial stage: at least one surface with a white spot; moderate stage: at least one surface with a cavitated lesion limited to the enamel or with the appearance of dentin shadowing; and advanced stage: at least one surface with cavitation and dentin exposure. Patients with at least one surface with active DCL were classified as having caries activity. The PUFA index (pulp involvement, ulcer due to root fragments, fistula, and abscess) was collected. Descriptive statistical analysis was performed, and the Fisher's Exact test was used to analyze the association between severity and caries activity. Of the 119 patients included, n=9 (7.6%) were caries-free, and a large proportion of patients had DCL in the most severe stage n (39.5%). Among those with DCL, 57 (47.9%) had at least one restored tooth, 8 (6.7%) had at least one tooth lost due to DCL, and n (65.4%) had active lesions. The prevalence of the PUFA index was 5.9%. It was also observed that active lesions were more concentrated in children with higher caries severity. The profile of patients seeking dental care at this institution is characterized by children with high caries index and advanced-stage lesions.

**Descriptors:** Dental Caries. Child. Observational Study.

### Caries dental en escolares que buscan atención en una clínica dental universitaria del sur de Brasil

**Resumen** El objetivo del estudio fue evaluar la presencia, severidad y consecuencias de las lesiones de caries dental (LCD) en escolares atendidos en la clínica odontopediátrica de una universidad pública. Se incluyeron niños de 8 a 11 años. Para la evaluación de las LCD se utilizó el International Caries Detection and Assessment System (ICDAS). Los pacientes fueron clasificados según la severidad en: sin caries (superficies sanas); estadio inicial: al menos una superficie con mancha blanca; estadio moderado: al menos una superficie con lesión cavitada limitada al esmalte o con apariencia de sombreado de la dentina subyacente; y estadio avanzado: al menos una superficie con cavitación y exposición de dentina. Los pacientes con al menos una superficie con actividad de LCD fueron clasificados con actividad de caries. Se recogió el índice PUFA (compromiso pulpar, úlcera debido a fragmentos de raíces, fístula y absceso). Se realizó un análisis estadístico descriptivo y se utilizó la prueba Exacta de Fisher para analizar la asociación entre la severidad y la actividad de la caries. Del total de 119 pacientes incluidos, n=9 (7,6%) estaban libres de LCD, una gran parte presentaba LCD en su estadio más severo n (39,5%). Entre aquellos con lesión de LCD, 57 (47,9%) tenían algún diente restaurado, 8 (6,7%) habían perdido algún diente debido a LCD y n (65,4%) tenían lesiones activas. La prevalencia del índice PUFA fue del 5,9%. También se observó que las lesiones activas estaban más concentradas en los niños con mayor severidad. El perfil de los pacientes que buscan atención odontológica en esta institución es de niños con un alto índice de caries dental y en estadio avanzado.

**Descriptorios:** Caries Dental. Niño. Estudio Observacional.

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## Cárie dentária em escolares que buscam atendimento em uma clínica odontológica universitária no sul do Brasil

**Resumo** O objetivo do estudo foi avaliar a presença, severidade e consequências de lesões de cárie dentária (LCD) em escolares atendidos na clínica odontopediátrica de uma universidade pública. Foram incluídas crianças de 8 a 11 anos. Para avaliação das LCD usou-se o *International Caries Detection and Assessment System* (ICDAS). Classificou-se o paciente quanto à severidade em: sem cárie (superfícies hígdas); estágio inicial: pelo menos uma superfície com mancha branca; estágio moderado: pelo menos uma superfície com lesão cavitada limitada ao nível de esmalte ou com aparência de sombreamento da dentina subjacente; e estágio avançado: pelo menos uma superfície com cavitação e exposição de dentina. O paciente com pelo menos uma superfície com atividade de LCD foi classificado com atividade de cárie. O índice PUFA (envolvimento pulpar, úlcera devido a fragmentos de raízes, fístula e abscesso) foi coletado. Foi realizada análise estatística descritiva e utilizado o teste Exato de Fisher para analisar a associação da severidade com atividade de cárie. Do total de 119 pacientes incluídos, n=9 (7,6%) estavam livres de LCD, grande parte tinha LCD no seu estágio mais severo n (39,5%). Dentre os que tinham lesão de LCD, 57 (47,9%) tinham algum dente restaurado, 8 (6,7%) algum dente perdido por LCD e n (65,4%) tinham lesões ativas. A prevalência do índice PUFA foi 5,9%. Também se verificou que as lesões ativas estavam mais concentradas às crianças com maior severidade. O perfil de pacientes que buscam atendimento odontológico nessa instituição é de crianças com alto índice de cárie dentária e em estágio avançado.

**Descritores:** Cárie Dentária. Criança. Estudo Observacional.

## INTRODUCTION

Dental caries is the result of a chemical dissociation of the tooth surface caused by metabolic events that occur in the biofilm in the presence of sugars. The disease can affect the enamel, dentin and cementum, clinically manifesting itself in various ways<sup>1</sup>. In most developed countries, its prevalence has shown a downward trend in recent decades; however, in developing countries, such reduction has not been observed. Dental caries is still among the most prevalent chronic diseases worldwide<sup>2,3</sup>.

The American Academy of Pediatric Dentistry (AAPD) recognizes dental caries as a frequent and complex chronic disease in childhood. The disease is one of the main causes of pain and infection and can have serious consequences for the quality of life of affected children and their families<sup>4,5</sup>. The prevalence of dental caries is high in Brazil, and in the last oral health survey<sup>6</sup>, the prevalence in 12-year-old children was 56.5% and of these, more than 75% required treatment related to dental caries<sup>6</sup>.

It is important to emphasize that the association between dental caries and socioeconomic factors is well established<sup>7</sup>. The Brazilian situation reflects the great socioeconomic contrast and the difficult access to dental care services, resulting from the limited supply of public services and the high cost of private practice for a large part of the population<sup>8</sup>. One of the impacts of this reality is the high prevalence of seeking dental care when there is presence of oral problems or pain<sup>9</sup>. In Brazil, the presence of toothache in childhood is common, as revealed by a study carried out on a sample of schoolchildren, which identified toothache prevalence of 35.7% in the last six months and 17.3% in the last four weeks<sup>10</sup>. It is known that in childhood, untreated dental caries is the main factor associated with toothache<sup>11</sup>.

The caries criterion proposed by the World Health Organization measures the disease only at the cavitation level<sup>12</sup>, since it evaluates a large number of people and with few technical resources. The International Caries Detection and Assessment System (ICDAS) index measures the superficial changes and potential histological depth of caries lesions based on the surface characteristics, measuring their severity. This test requires more time and resources, but is important due to its ability to identify caries lesions in their most incipient clinical stages and to classify lesions according to their severity.

Knowing the dental caries condition, its severity and consequences in school-aged patients seeking dental care is essential to reduce inequities and establish adequate service planning for both rehabilitation and prevention. Thus, the aim of this study was to evaluate the dental caries conditions in schoolchildren treated at the Children's Clinic of the School of Dentistry of Pelotas (FOP), Federal University of Pelotas (UFPel), describing its severity and consequences. Secondly, to compare it with the dental training, analyzing how these findings are related to dental practice in the Dentistry course.

## METHOD

This is a cross-sectional observational study based on a clinical study conducted at the FOP-UFPel Children's Clinic (identifier: NCT03969628). The article was written in accordance with the Strengthening the reporting of observational studies in epidemiology (STROBE) guidelines<sup>13</sup>. The city of Pelotas is located in the state of Rio Grande do Sul and has approximately 330 thousand inhabitants, according to the latest IBGE census<sup>14</sup>.

The FOP Children's Clinic is a reference in the care for children in the municipality and nearby regions, providing completely free care to patients. It provides care for children aged 0-12 years in 3 disciplines, which is provided by undergraduate students in the seventh, eighth and ninth semesters with supervision and assistance from faculty advisors.

Data collection was carried out from July 2019 to March 2020. A total of 119 children aged 8-11 years who underwent screening at the Children's Clinic were included. The exclusion criteria were children with fixed devices, with systemic problems or with some disability, or with serious behavioral problems.

The project was approved by the FOP-UFPel Research Ethics Committee Protocol No. 3.282.962. After accepting to participate, the parents or legal guardians of children signed the Free and Informed Consent Form and the children signed the Assent Form.

Parents / guardians answered a questionnaire and the following data were collected: gender, age, income (in Brazilian currency), guardians' schooling, and skin color (white, black, brown, indigenous, or yellow).

Clinical examination was then performed on the child by a single examiner trained and calibrated to assess dental caries. The examiner's training for dental caries consisted of a theoretical activity with the presentation of criteria and then discussion of projected images with all criteria variants to resolve possible doubts. Ten children, who were not part of the sample and with similar age of study participants were evaluated. The examiner's weighted Kappa index (AMM) was compared to a gold standard examiner (MSA) with experience in epidemiological studies and was 0.95. For caries activity, Kappa was 0.91.

Tooth surfaces were cleaned with toothbrush and fluoride toothpaste and the examination was performed using ICDAS<sup>15</sup> and assessment of caries activity by surface in deciduous and permanent teeth.

For the ICDAS, the simplified classification was used and the child was classified according to the dental caries severity as: 1) caries-free: sound teeth; 2) initial stage: presence of at least one surface with white spot lesion (active or inactive); 3) moderate stage: presence of at least one surface with cavitated lesion limited to the enamel level or with appearance of shadowing of the underlying dentin; and 4) advanced stage: at least one surface with cavitation and dentin exposure. Caries activity was classified as active or inactive considering the visual criteria proposed by Nyvad et al. (1999)<sup>16</sup> and if the child presented a surface classified as active, he/she would be considered to have caries activity.

In addition, the index to measure the consequences of untreated dental caries, the PUFA index (pulp involvement, ulcer due to root fragments, fistula and abscess) was also collected<sup>17</sup>. Training was carried out with images and discussion of criteria.

Data was descriptively analyzed. The absolute and relative frequency of dental caries, its severity and consequences (PUFA) were presented. The Fisher's exact test was used to analyze the association of caries severity with the presence of caries lesion activity. The STATA 13.0 software was used.

## RESULTS

A total of 119 children aged 8-11 years and mean age of 9.6 years were included. Of these, 52.9% were female. Family income ranged from R\$ 240,00 to R\$ 5.000,00, with mean value of R\$ 1.950,00. The schooling of parents / guardians ranged from 0 to 16 years, with mean of 9.3 years. The skin color of children reported by parents / guardians was mostly white (71.9%).

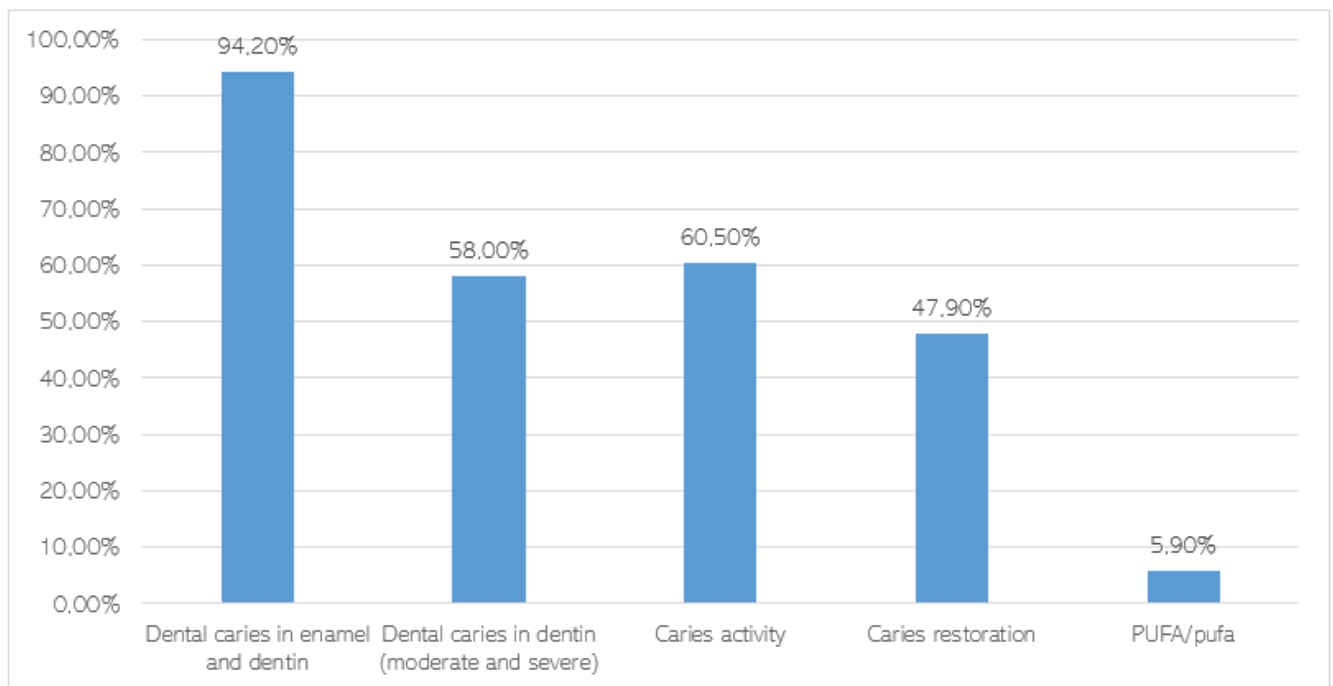
Regarding dental caries, Table 1 shows the distribution of caries prevalence in relation to severity using the ICDAS and the association with lesion activity. Few children were free of caries (7.6%) and the largest number had caries in its most severe stage (39.5%). Regarding lesion activity, significant association with severity was found ( $p < 0.001$ ). In the moderate and advanced stages, greater concentration of active lesions was identified.

**Table 1.** Caries severity according to the International Caries Detection and Assessment (ICDAS) and association with lesion activity in schoolchildren aged 8-11 years treated at the FOP-UFPel Children's Clinic.

Caries severity	n	%	Caries activity*			
			No activity	%	With activity	%
Sem cárie	9	7.6%	9	100.0	0	0.0
Estágio inicial	41	34.4%	34	82.9	7	17.1
Estágio moderado	22	18.5%	1	4.5	21	95.5
Estágio avançado	47	39.5%	3	6.4	44	93.6
Total	119	100.0%	47	39.5	72	60.5

\* Fisher's exact test, P-value <0.001

Among those who had some caries lesion, 57 (47.9%) had some tooth restored due to caries, 8 (6.7%) had some tooth lost due to caries and 60.5% had active lesions (Figure 1). Regarding the PUFA indicator, which shows the consequences of untreated dental caries, the prevalence was 5.9% (Figure 1).



**Figure 1.** Prevalence of dental caries, caries activity, restoration due to caries and PUFA (pulp involvement, ulcer due to root fragments, fistula and abscess) in schoolchildren aged 8-11 years treated at the FOP-UFPel Children's Clinic.

## DISCUSSION

The present study showed that children treated at the FOP-UFPel Children's clinic had high prevalence of dental caries

and only 7.6% of children did not have any caries lesions. Meanwhile, the majority of children had dental caries at advanced stage and active lesions.

It is known that teeth with initial caries lesions do not generate symptoms and are generally not noticed by guardians or children<sup>18</sup>. However, the advanced caries category, when the tooth has exposed dentin, is generally associated with symptoms and/or the disease already presents signs noticed by parents. Thus, it could be inferred that the search/referral for curative care and pain that occurs in various dental services<sup>17</sup> also seems to be a reality at the FOP Children's Clinic.

In Brazil, it is predictable that children who seek dental care will have high prevalence of oral problems. The most prevalent injury that leads children to seek care is dental caries<sup>19</sup>, mainly because the development of untreated cavitated carious lesions can cause pain, loss of sleep, impairment to chewing, speech and breathing<sup>20</sup>, in addition to school absences. The consequences related to oral symptoms and functional limitations are easily perceived by parents / caregivers and, because they affect the daily activities of children, they cause concern and consequent search for a solution to the problem<sup>21</sup>.

As previously mentioned, most children in this study had caries in the most advanced stage, when there is greater need for surgical procedures and, consequently, more invasive ones. It is known that more invasive procedures require greater cooperation from children, are the procedures that generate more fear and require greater number of consultations to adapt their behavior in the pediatric dental clinic. A longitudinal study carried out with children in the same age group as participants in this study showed that, even with the child's familiarization with the dental environment, complex procedures, such as tooth extractions, restorations using rubber dams or anesthesia and endodontic treatments, were associated with negative behavior<sup>22</sup>. Through data obtained, it was observed that many of the children treated at the FOP service will require more invasive procedures, which is a negative aspect both for children and their families, as well as for the service organization.

It is also an aspect that deserves to be highlighted when thinking about the education of future professionals, as they should be warned that more complex cases, which end up being referred to a reference service such as FOP, do not reflect the routine of the dentist.

Furthermore, it was also found that active lesions were more concentrated in those with more severe lesions, a finding that was already expected. It is known that cavitated lesions are more prone to progression and one of the factors that explains this fact is the presence of dental biofilm inside the cavity due to the difficulty in accessing it through oral hygiene<sup>23</sup>. The decision on treatment is directly linked to the prognosis and the speed of the lesion progression. Thus, in situations of active and cavitated lesions, surgical treatment is almost mandatory<sup>23</sup>. The preponderant factor for late diagnosis is the difficulty of the dentist in controlling lesions in a non-invasive manner. Therefore, it is necessary to resort to certain clinical procedures and, even if minimally invasive, they cause irreversible and early damage to dental structures.

The concept of Minimally Invasive Dentistry (MID) is the application of a work philosophy that changes the traditional mechanistic treatment model to an approach that promotes health and preserves oral health<sup>24</sup>. It is noteworthy that this alternative to conventional treatment allows for new clinical approaches with conservative preparations in the treatment of carious lesions, promoting greater dental structure preservation, and concomitantly, aims to control the etiological factors of the disease in order to reduce the risk factors of patients, both in the possibility of the occurrence of a disease (in patients without caries activity) and in the possibility of new caries lesions (in patients with caries activity).

It is noteworthy that this is the philosophy of student training at the Children's Clinic, in which minimal intervention becomes essential. Undergraduates who are exposed to these principles will be able to, when completing internships at Basic Health Units, stimulate and encourage dentists to adopt the techniques and attitudes of this most recent strategy for treating caries lesions.

With regard to ICDAS, it is known that its approach is based on evidence. It is a detection and evaluation system that classifies caries process stages based on histological extension and activity. It aims to serve as a basis for diagnosis and evaluation in the various fields of Dentistry, such as clinical practice, teaching, research and public health, as it provides a simplified language for caries stages. It is important to highlight that this system has improved teaching in cariology,

as it allows visual inspection, evaluation, diagnosis and risk in a standardized and clear manner, assisting students and future professionals in the planning and decision-making at the different caries stages<sup>25</sup>. According to the Consensus Guidelines for Teaching Dental Caries in Undergraduate Dentistry Courses in Brazil regarding the dental caries diagnosis, the undergraduate Dentistry student must collect and record information on the presence of different caries process stages and determine the lesion activity according to its different stages. Thus, the use of ICDAS in a university pediatric dentistry clinic meets one of the important domains for acquiring skills for the future professional<sup>26</sup>.

If left untreated, dental caries can progress and reach the pulp tissue, causing pain, forming abscesses, and even leading to the risk of septicemia. The PUFA index is an excellent epidemiological and educational tool for reporting the consequences of untreated caries lesions in a population<sup>17</sup> and is also a complementary index for diagnosing the severity of the current condition of the disease. In this sample, the PUFA index, despite the high prevalence of children with the most severe caries stage, had prevalence of 5.9%. Compared with other Brazilian studies, the prevalence of the sample in this study was lower, since other studies have reported indices of 17.9% for children aged 10 years<sup>27</sup> and 17.8% for children aged 12 years<sup>28</sup>.

It should be emphasized that the children in this sample are part of a group that sought care at FOP. Urgency cases are prioritized and care is provided, whenever possible, for pain relief or to avoid worse consequences. Thus, it is possible that many of the children who participated in this study had already undergone emergency care, and the prevalence of pulp exposure, ulcers, fistulas and abscesses was higher before they were included in the present study. A study with children treated at the emergency department in this same location showed that the majority (82%) sought care due to pain, and that the most frequently performed intervention was endodontic intervention<sup>29</sup>.

It is expected that the FOP Children's Clinic, as a reference for pediatric dental care in the region, will receive more complex cases, compared to a Basic Health Unit (UBS), for example. And even though both offer free public services, the patient profile and the search for treatment are different. FOP performs more complex procedures on patients with high risk of caries. Therefore, the data found in this study cannot be extrapolated.

It is important to highlight that the care provided at the FOP Children's Clinic is performed by undergraduate students under the supervision of their faculty advisors. Their first contact with the Pediatric Dentistry clinic is with patients of the same age as the sample of this study. Patients with dental caries associated with pain may present greater anxiety during treatment and may cause more behavioral problems, such as refusal of treatment, crying, fear, lack of cooperation, and other problems that also cause stress for care providers, and may negatively influence the quality and execution of the clinical work, regardless of their cognitive and technical skills<sup>30</sup>. In addition to impacting the academic life of students, both in their perceptions and in their future professional choices. Thus, it should be considered that complex cases should be handled by more experienced and skilled academics, in more advanced semesters, in order to make the service more decisive and positive for everyone involved, children, parents/guardians and students.

Another factor that leads to reflection in terms of teaching and learning is the fact that students have contact almost exclusively with children already with oral problems. Individual approaches to clinical issues are undeniably important for their training. However, it should be highlighted that the Dentistry curriculum should be more comprehensive; the vision of this future professional should not be purely biological, individual and focused on the disease; their experience should also take into account collective issues with a focus on health<sup>31</sup>.

## CONCLUSION

The profile of patients who seek pediatric dental care at FOP is composed of children with high dental caries rates, with dental caries lesions in their most advanced stage and the majority with active lesions. These results reflect the failure of public health services, especially primary care, in pediatric dental care. This finding is important both to guide public policies in planning prevention programs and to warn about the need to organize the system to meet the demand for dental treatment of this population.

## REFERENCES

1. Fejerskov O, Bente KEN. Cárie dentária: fisiopatologia e tratamento. 3th. 2017.
2. Kassebaum NJ, Bernabé E, Dahiya M, Bhandari B, Murray CJL, Marcenes W. Global burden of untreated caries: A systematic review and metaregression. *J Dent Res* [Internet]. 2015;94(5):650–658. doi: <https://doi.org/10.1177/0022034515573272>
3. Petersen PE, Bourgeois D, Ogawa H, Estupinan-Day H, Ndiaye C. The global burden of oral diseases and risks to oral health. *Bull Wo Heal Org* [Internet]. 2005;83(9):661-9.
4. Casamassimo PS, Thikkurissy S, Edelstein BL, Maiorini E. Caries: Beyond the dmft: The human and economic cost of early childhood caries. *J Am Dent Assoc* [Internet]. 2009;140(6):650–657. doi: <https://doi.org/10.14219/jada.archive.2009.0250>
5. Oliveira TTDV, Menegaz AM, Rosário AMD, Romano AR, Scharodosim LR, Mendes FM, et al. Impact of dental caries severity and activity on oral health-related quality of life among children aged 8-11 years. *Braz Oral Res* [Internet]. 2023;28(37):e41. doi: <https://doi.org/10.1590/1807-3107BOR-2023>
6. Brasil. Ministério da Saúde. Projeto SB Brasil 2010: Pesquisa Nacional de Saúde Bucal – Resultados Principais [Internet]. Pesquisa Nacional de Saúde Bucal. 2011 [cited 2020 Sept 20]. Available from: [https://bvsms.saude.gov.br/bvs/publicacoes/pesquisa\\_nacional\\_saude\\_bucal.pdf](https://bvsms.saude.gov.br/bvs/publicacoes/pesquisa_nacional_saude_bucal.pdf)
7. Sisson KL. Theoretical explanations for social inequalities in oral health. *Commu Dent Oral Epid* [Internet]. 2007;35(2):81-88. doi: <https://doi.org/10.1111/j.1600-0528.2007.00354.x>
8. Antunes JLF, Junqueira SR, Frazão P, Bispo CM, Pegoretti T, Narvai PC. City-level gender differentials in the prevalence of dental caries and restorative dental treatment. *Heal Place* [Internet]. 2003;9(3):231-239. doi: [https://doi.org/10.1016/s1353-8292\(02\)00055-2](https://doi.org/10.1016/s1353-8292(02)00055-2)
9. Camargo MJB, Barros AID, Frazão P, Matijasevich A, Santos IS, Peres MA, et al. Predictors of dental visits for routine check-ups and for the resolution of problems among preschool children. *Rev Saude Public* [Internet]. 2012;46(1):87-97. doi: <https://doi.org/10.1590/s0034-89102012005000004>
10. Schuch H, Correa M, Torriani D, Demarco F, Goettems M. Perceived Dental Pain: Determinants and Impact on Brazilian Schoolchildren. *J Oral Facial Pain Head* [Internet]. 2015;29(2):168-176. doi: <https://doi.org/10.11607/ofph.1414>
11. Boeira GF, Correa MB, Peres KG, Peres MA, Santos IS, Matijasevich A, et al. Caries is the main cause for dental pain in childhood: Findings from a birth cohort. *Caries Res* [Internet]. 2012;46(5):488-495. doi: <https://doi.org/10.1159/000339491>
12. Petersen PE, Baez RJ. Oral health surveys: basic methods. 5th. World Health Organization; 2013 [cited 2021 May 23]. Available from: [https://apps.who.int/iris/bitstream/handle/10665/97035/9789241548649\\_eng.pdf?sequence=1&isAllowed=y](https://apps.who.int/iris/bitstream/handle/10665/97035/9789241548649_eng.pdf?sequence=1&isAllowed=y)
13. Cuschieri S. The STROBE guidelines. *Saud J Anaes* [Internet]. 2019;13(Suppl 1):S31-S34. doi: [https://doi.org/10.4103/sja.SJA\\_543\\_18](https://doi.org/10.4103/sja.SJA_543_18)
14. Censo. IBGE Censo 2010 [Internet]. Instituto Brasileiro de Geografia e Estatística. 2010 [cited 2021 May 23]. Available from: <https://www.ibge.gov.br/>
15. Pitts NB, Ekstrand K. International caries detection and assessment system (ICDAS) and its international caries classification and management system (ICCMS) - Methods for staging of the caries process and enabling dentists to manage caries. *Comm Dent Oral Epid* [Internet]. 2013;41(1):e41-52. doi: <https://doi.org/10.1111/cdoe.12025>
16. Nyvad B, Baelum V. Nyvad Criteria for Caries Lesion Activity and Severity Assessment: A Validated Approach for Clinical Management and Research. *Carie Res* [Internet]. 2018;52(5):397-405. doi: <https://doi.org/10.1159/000480522>
17. Monse B, Heinrich-Weltzien R, Benzian H, Holmgren C, Helderman WVP. PUFA - An index of clinical consequences of untreated dental caries. *Community Dent Oral Epidemiol* [Internet]. 2010;38(1):77-82. doi: <https://doi.org/10.1111/j.1600-0528.2009.00514.x>
18. Grangeiro LRV, França BAG, Drumond CL, Neta NBD, Fonseca-Silva T, Vieira-Andrade RG. Diagnóstico da cárie dentária na infância: relação entre os achados clínicos e a percepção dos pais. *Rev Bahiana Odontol* [Internet]. 2016;7(3):210-2019. doi: <https://doi.org/10.17267/2596-3368dentistry.v7i3.1010>
19. Sakai VT, Magalhães AC, Pessan JP, Silva SMB, Machado MAAM. Urgency treatment profile of 0 to 15 year-old

- children assisted at urgency dental service from Bauru Dental School, University of São Paulo. *J Appl Oral Sci* [Internet]. 2005;13(4):340-4. doi: <https://doi.org/10.1590/s1678-77572005000400005>
20. Martello RP. Prevalência de cárie precoce e fatores associados em uma coorte de nascidos vivos de 2006, de áreas cobertas pela estratégia de saúde da família no município de Rondonópolis-MT [Dissertação]. Juiz de Fora: Universidade Federal de Juiz de Fora; 2010. doi: [https://doi.org/10.34037/978-989-54942-7-9\\_8\\_2](https://doi.org/10.34037/978-989-54942-7-9_8_2)
  21. Jokovic A, Locker D, Stephens M, Guyatt G. Agreement between mothers and children aged 11-14 years in rating child oral health-related quality of life. *Community Dent Oral Epidemiol* [Internet]. 2003;31(5):335-43. doi: <https://doi.org/10.1034/j.1600-0528.2003.00012.x>
  22. Cademartori MG, Costa VPP, Corrêa MB, Goettems ML. The influence of clinical and psychosocial characteristics on children behaviour during sequential dental visits: a longitudinal prospective assessment. *Eur Arch Paediatr Dent* [Internet]. 2020;21(1):43-52. doi: <https://doi.org/10.1007/s40368-019-00444-6>
  23. Braga MM, Mendes FM, Gimenez T, Ekstrand KR. O Uso Do ICDAS para Diagnóstico E Planejamento Do Tratamento Da Doença Cárie [Internet]. *Pro-Odonto Prevenção*. 2012 [cited 2021 May 04]. Available from: [https://edisciplinas.usp.br/pluginfile.php/4402882/mod\\_resource/content/2/Cariologia%20Leitura%20Complemtar.pdf](https://edisciplinas.usp.br/pluginfile.php/4402882/mod_resource/content/2/Cariologia%20Leitura%20Complemtar.pdf)
  24. Tumenas I, Pascotto R, Saade JL, Bassani M. Odontologia minimamente invasiva. *Rev Assoc Paul Cir Dent* [Internet]. 2014;68(4):283-95. doi:
  25. ABENO. Consenso das Diretrizes para o Ensino de Cárie Dentária nos Cursos de Graduação em Odontologia do Brasil [Internet]. 2022. Available from: [https://abeno.org.br/wp-content/uploads/2022/05/ensino\\_carie\\_abeno-laoha\\_-zmm\\_fcs\\_v2.pdf](https://abeno.org.br/wp-content/uploads/2022/05/ensino_carie_abeno-laoha_-zmm_fcs_v2.pdf)
  26. Andrade R. Alterações de mucosa bucal em crianças pré-escolares: prevalência e fatores determinantes [Dissertation]. 2011. 68 p. Diamantina: Universidade Federal dos Vales do Jequitinhonha e Mucuri; 2011.
  27. Mota-Veloso I, Soares MEC, Alencar BM, Marques LS, Ramos-Jorge ML, Ramos-Jorge J. Impact of untreated dental caries and its clinical consequences on the oral health-related quality of life of schoolchildren aged 8–10 years. *Qual Life Res* [Internet]. 2016;25(1):193-9. doi: <https://doi.org/10.1007/s11136-015-1059-7>
  28. Silva MP, Vettore MV, Rebelo MAB, Vieira JMR, Herkrath APCDQ, Queiroz AC, et al. Clinical Consequences of Untreated Dental Caries, Individual Characteristics, and Environmental Factors on Self-Reported Oral Health Measures in Adolescents: A Follow-Up Prevalence Study. *Caries Res* [Internet]. 2020;54(2):176-184. doi: <https://doi.org/10.1159/000506438>
  29. Shqair AQ, Gomes GB, Oliveira A, Goettems ML, Romano AR, Schardozim LR, et al. Dental emergencies in a university pediatric dentistry clinic: A retrospective study. *Braz Oral Res* [Internet]. 2012;26(1):50-56. doi: <https://doi.org/10.1590/s1806-83242012000100009>
  30. Cardoso CL, Loureiro SR. Estresse e comportamento de colaboração em face do tratamento odontopediátrico. *Psicol em Estud* [Internet]. 2008;13(1):133–141. doi: <https://doi.org/10.1590/S1413-73722008000100016>
  31. Reibnitz Júnior C, Caetano JC, Prado ML. Contribution of dental care in the resolution of people's health problems: The viewpoint of Dentistry students. *Physis Rev Saude Colet* [Internet]. 2009;19(1). doi: <https://doi.org/10.1590/S0103-73312009000100010>

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