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CAMILA MEZZARI CARLOS

MONITORAMENTO CLÍNICO DE LESÕES DE CÁRIE INATIVAS SEM CAVIDADE EM SUPERFÍCIES OCLUSAIS DE DENTES PERMANENTES

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Trabalho de Conclusão de Curso apresentado ao Curso de Graduação em Odontologia da Faculdade de Odontologia da Universidade Federal do Rio Grande do Sul como requisito parcial para obtenção do título de Cirurgião-Dentista.

Orientadora: Profª. Drª. Juliana Jobim Jardim

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RESUMO

CARLOS, Camila Mezzari. **Monitoramento clínico de lesões de cárie inativas sem cavidade em superfícies oclusais de dentes permanentes**. 2015. 25 f. Trabalho de Conclusão de Curso (Graduação em Odontologia) – Faculdade de Odontologia, Universidade Federal do Rio Grande do Sul, Porto Alegre, 2015.

O objetivo deste estudo retrospectivo foi avaliar as mudanças de diagnóstico de lesões inativas sem cavidade em superfícies oclusais de dentes permanentes ao longo do tempo. Os prontuários de pacientes atendidos na Faculdade de Odontologia da Universidade Federal do Rio Grande do Sul, Brasil, entre 2009 e 2014 foram analisados. A coleta de dados incluiu características demográficas, gengivite, placa visível, experiência de cárie coronária e presença de atividade de cárie. Superfícies oclusais hígidas também foram incluídas na análise. O diagnóstico da superfície oclusal dos dentes permanentes foi coletado do primeiro e último exame dentário de cada paciente (média de tempo entre exames: 13 meses). Modelos de regressão logística foram utilizados para a análise dos dados. O total de 12,802 prontuários foram avaliados. Dentre estes, 901 apresentaram ao menos uma lesão sem cavidade inativa no primeiro exame e foram utilizados no estudo. O total de 2,164 lesões sem cavidade inativas foram identificadas, e a maioria delas permaneceu inalterada (85.77%, n = 1,856). As seguintes mudanças de diagnóstico foram observadas: 198 (9.15%) lesões com cavidade inativas; 13 (0.60%) lesões ativas sem cavidade; 26 (1.20%) lesões cavitadas ativas; 46 (213%) superfícies restauradas; 1 (0.05%) superfícies seladas; 2 (0.09%) próteses fixas; e 22 (1.02%) dentes extraídos. Alto índice CPO-S e presença de atividade de cárie foram estatisticamente associados com mudança de diagnóstico de lesões sem cavidade inativas (P<0.05). Lesões sem cavidade inativas em superfícies oclusais apresentaram um menor risco para progressão para lesões ativas quando comparadas às superfícies hígidas em pacientes cárie-ativos (presença de ao menos uma lesão de cárie ativa) (P<0.05). Em conclusão, grande parte das lesões sem cavidade inativas permaneceu inalterada ao longo do tempo. Experiência e atividade de cárie foram indicadores de risco para mudança de diagnóstico de lesões sem cavidade inativas.

Palavras-chave: Cárie dentária. Estudo retrospectivo. Diagnóstico oral. Análises de regressão.

ABSTRACT

CARLOS, Camila Mezzari. **Clinical monitoring of inactive non-cavitated caries lesions in occlusal surfaces of permanent teeth**. 2015. 25 p. Final paper (Graduation in Dentistry) – Faculdade de Odontologia, Universidade Federal do Rio Grande do Sul, Porto Alegre, 2015.

The aim of this retrospective study was to assess the diagnosis changes of inactive non-cavitated caries lesions in occlusal surfaces from permanent teeth in the course of time. The records of patients treated at the Faculty of Dentistry of the Federal University of Rio Grande do Sul, Brazil, between 2009 and 2014 were reviewed. Data extraction consisted of demographic characteristics, gingivitis, visible plaque, coronal caries experience and caries activity status. Occlusal sound surfaces were also included in the analysis. The score of occlusal surfaces of permanent teeth was collected from the first and last patient's assessment (mean time between assessments: 13 months). Logistic regression models were used for data analysis. A total of 12,802 records were analyzed. Of them, 901 records presented at least one inactive non-cavitated lesion and were enrolled in the study. A total of 2,164 inactive non-cavitated lesions were identified, and the majority of them remained unchanged (85.77%, n = 1,856). The following changes were also recorded: 198 (9.15%) inactive cavitated lesions, 13 (0.60%) active non-cavitated lesions, 26 (1.20%) active cavitated lesions, 46 (2.13%) filled surfaces, 1 (0.05%) sealed surfaces, 2 (0.09%) crowns, and 22 (1.02%) missing surfaces. Higher DMF-S scores and a positive caries activity status were statistically significantly associated with diagnosis changes of inactive non-cavitated lesions ($P<0.05$). Inactive non-cavitated lesions in occlusal surfaces presented a lower risk of progression to active lesions in relation to sound surfaces in patients with a positive caries activity status (presence of at least one active caries lesion) ($P<0.05$). In conclusion, the majority of inactive non-cavitated caries lesions remained unchanged in the course of time. Caries experience and caries activity status were risk indicators for diagnosis changes of inactive non-cavitated caries lesions.

Keywords: Dental caries. Retrospective studies. Oral diagnosis. Regression analyses.

SUMÁRIO

1 INTRODUÇÃO

A doença cárie pode ser entendida como um processo multifatorial e crônico resultante do desequilíbrio no processo de desmineralização e remineralização entre a estrutura dentária e o meio bucal. Em uma situação de equilíbrio, este processo ocorre de forma natural e contínua (WILLMOT, 2004) de acordo com as flutuações do pH bucal. Quando há um desequilíbrio, este favorece a perda mineral e depende da interação entre fatores como o substrato cariogênico, a microbiota bucal e a suscetibilidade dentária. A progressão da desmineralização dentária ocorre lentamente, podendo ser interrompida após a identificação precoce de seus sinais clínicos e o estabelecimento de medidas preventivas (FEJERSKOV, 2004; KIDD; FEJERSKOV, 2004).

O diagnóstico precoce de uma lesão cariosa possibilita a realização de tratamentos conservadores em detrimento aos procedimentos invasivos (FEJERSKOV, 2004; PEREIRA et al., 2001). Existem diferentes métodos de diagnóstico da lesão (EGGERTSSON et al., 1999), sendo que o exame tátil-visual é o recurso atualmente preconizado pela literatura (CAROUNANIDY; SATHYANARAYANAN, 2009). Este método informa não somente a quantidade de perda mineral, mas também a atividade da lesão, que são critérios que definem a conduta clínica a ser seguida (ANGNES et al., 2005; CAROUNANIDY; SATHYANARAYANAN, 2009; KIDD; FEJERSKOV, 2004). A avaliação da atividade da lesão é desafiadora, visto que depende da habilidade do cirurgião-dentista em identificar mudanças sutis no tecido dentário. Os critérios clínicos desenvolvidos para este tipo de avaliação são baseados nas propriedades físicas de reflexão da luz e textura das lesões (EKSTRAND et al., 1997; KIDD et al., 1992].

Manchas brancas rugosas em esmalte representam o primeiro sinal clínico de desmineralização da superfície dentária, sendo caracterizadas pelo aumento da porosidade superficial devido à saída de minerais para o meio bucal. A lesão em esmalte apresenta-se ativa quando a superfície encontra-se rugosa e opaca, e inativa quando lisa e brilhante (FERREIRA et al., 2009). Quando cavitadas, as lesões ativas apresentam-se com coloração marrom-clara e tecido dentinário amolecido. Já as lesões cavitadas inativas apresentam escurecimento e endurecimento dentinário (FERREIRA et al., 2009).

A compreensão da natureza dinâmica do processo carioso permite a paralisação da progressão da lesão cariosa nos seus diferentes estágios (NYVAD; FEJERSKOV, 1997).

Avaliações clínicas de superfícies oclusais evidenciaram a viabilidade de inativação de lesões ativas em esmalte por meio de tratamentos não-operatórios - como a instrução e motivação para o controle efetivo de placa com a utilização de dentifrícios fluoretados, bem como observaram que estas lesões permaneceram inativas após 3 anos de acompanhamento (CARVALHO et al., 1991; CARVALHO et al., 1992; MALTZ et al., 2003). De acordo com Nyvad (1999), o controle de doença cárie pode ser viável por meio da aplicação profissional de fluoretos, uso diário de dentifrício fluoretado, modificações nos hábitos alimentares e adequada higiene bucal. Estudo *in vitro* conduzido por Yamazaki et al. (2007) indicou que concentrações baixas de flúor encontradas no biofilme e fluido oral (0,19 ppm F ou maior) já possuem efeito na prevenção do desenvolvimento de lesões nas superfícies dentárias hígidas, bem como observou que concentrações mais altas (25,0 ppm F) atuam no controle da progressão de lesões incipientes (YAMAZAKI et al., 2007).

Estudos *in vitro* e *in situ* têm demonstrado que a superfície dentária apresenta maior resistência frente a um novo desafio cariogênico após o processo de inativação da lesão cariosa, o que pode ser resultante da reincorporação de minerais ácido resistentes e do polimento superficial (KOULOURIDES; CAMERON, 1980; MALTZ et al., 2006; NEUHAUS et al., 2013). Assim, pode-se sugerir que não há necessidade de cuidados específicos para superfícies inativas quando comparados àqueles normalmente aplicados às superfícies hígidas (MALTZ et al., 2006). Em relação aos estudos clínicos, investigações recentes incluindo crianças e adolescentes indicaram que superfícies com lesões não-cavitadas inativas não apresentam um maior risco para o desenvolvimento de lesões ativas quando comparadas às superfícies hígidas (GUEDES et al., 2014; ZENKNER et al., 2015). Entretanto, este resultado não pode ser considerado um consenso na literatura, visto que estudos conduzidos em 2003 (NYVAD et al., 2003) e em 2012 (FERREIRA ZANDONÁ et al., 2012) observaram um maior risco de progressão e cavitação para lesões não-cavitadas inativas em relação às superfícies hígidas.

Frente à escassez de estudos relacionados ao acompanhamento clínico de lesões sem cavidade inativas e aos resultados contraditórios presentes na literatura, o objetivo deste estudo foi avaliar as alterações de diagnóstico de lesões sem cavidade inativas de superfícies oclusais de dentes permanentes ao longo do tempo.

2 ARTIGO CIENTÍFICO

Clinical monitoring of inactive non-cavitated caries lesions in occlusal surfaces of permanent teeth

C.M. Carlos[1], M.S. Moura[1], S.L. Henz[1], B. Barbachan e Silva[1], J.J. Jardim[1]

[1]Department of Social and Preventive Dentistry, Faculty of Dentistry, Federal University of Rio Grande do Sul, Porto Alegre, RS, Brazil

Short title

Clinical monitoring of inactive caries lesions

Key words

Dental caries, retrospective studies, oral diagnosis, regression analyses

Corresponding author

Juliana Jobim Jardim

Department of Social and Preventive Dentistry, Faculty of Dentistry, Federal University of Rio Grande do Sul

Ramiro Barcelos, 2492, Bom Fim, Porto Alegre, RS, Brazil - CEP: 90035-003

Tel: +55 51 330 851 93

Fax: +55 51 330 852 47

e-mail: jujobim@yahoo.com

Declaration of interests

The authors declare that they have no proprietary, financial, professional, or other personal interest of any kind in any product, service, or company that could influence the position presented in or the review of the manuscript "**Clinical monitoring of inactive non-cavitated caries lesions in occlusal surfaces of permanent teeth**".

Abstract

The aim of this retrospective study was to assess the diagnosis changes of inactive non-cavitated caries lesions in occlusal surfaces from permanent teeth in the course of time. The records of patients treated at the Faculty of Dentistry of the Federal University of Rio Grande do Sul, Brazil, between 2009 and 2014 were reviewed. Data extraction consisted of demographic characteristics, gingivitis, visible plaque, coronal caries experience and caries activity status. Occlusal sound surfaces were also included in the analysis. The score of occlusal surfaces of permanent teeth was collected from the first and last patient's assessment (mean time between assessments: 13 months). Logistic regression models were used for data analysis. A total of 12,802 records were analyzed. Of them, 901 records presented at least one inactive non-cavitated lesion and were enrolled in the study. A total of 2,164 inactive non-cavitated lesions were identified, and the majority of them remained unchanged (85.77%, n = 1,856). The following changes were also recorded: 198 (9.15%) inactive cavitated lesions, 13 (0.60%) active non-cavitated lesions, 26 (1.20%) active cavitated lesions, 46 (2.13%) filled surfaces, 1 (0.05%) sealed surfaces, 2 (0.09%) crowns, and 22 (1.02%) missing surfaces. Higher DMF-S scores and a positive caries activity status were statistically significantly associated with diagnosis changes of inactive non-cavitated lesions ($P<0.05$). Inactive non-cavitated lesions in occlusal surfaces presented a lower risk of progression to active lesions in relation to sound surfaces in patients with a positive caries activity status (presence of at least one active caries lesion) ($P<0.05$). In conclusion, the majority of inactive non-cavitated caries lesions remained unchanged in the course of time. Caries experience and caries activity status were risk indicators for diagnosis changes of inactive non-cavitated caries lesions.

Introduction

Dental caries is a multifactorial and chronic disease that results from a disturbance of equilibrium between demineralization and remineralization process [Willmot, 2004]. Considering the current methods commonly used to diagnose caries disease, the visual-tactile method is the one that allows identify the caries lesion and its activity status [Carounanidy and Sathyanarayanan, 2009; Kidd and Fejerskov, 2004].

Active caries lesions indicate a higher mineral loss and, consequently, a progress status [Ferreira et al., 2009]. However, when the mineral re-deposition predominates, it is possible to identify remineralization aspects such as the polishing and arrestment of lesions [Fejerskov, 1997; Nyvad et al., 1999]. Nyvad et al. (1997) indicated local fluoride therapy, daily use of fluoride tooth-paste, dietary habits changes, and effective oral hygiene as important methods for tissue remineralization [Nyvad and Fejerskov, 1997]. Studies including children and adolescents have shown that non-operative treatment in occlusal surfaces promotes lesions arrestment, and the results remained stable after 1, 2 and 3 years of follow-up [Carvalho et al., 1991; Carvalho et al., 1992; Maltz et al., 2003].

In vitro and *in situ* studies investigating remineralized surfaces have demonstrated greater resistance to mineral loss compared to sound surfaces [Koulourides and Cameron, 1980; Maltz et al., 2006; Neuhaus et al., 2013]. Thus, it could be suggested that remineralized surfaces need a similar care to that normally given to sound surfaces [Maltz et al., 2006]. In clinical studies, recent investigation including children and adolescents observed that surfaces with inactive non-cavitated caries lesions do not present a higher risk for active caries lesion development when compared to sound surfaces [Guedes et al., 2014; Zenkner et al., 2015]. However, this finding could not be considered a consensus in the literature, taking into account that clinical studies conducted in 2003 [Nyvad et al., 2003] and 2012 [Ferreira Zandoná et al., 2012] observed a higher risk of progression and cavitation to inactive non-cavitated caries lesions in relation to sound surfaces.

Therefore, the aim of the present study was to assess the diagnosis changes of inactive non-cavitated caries lesions in occlusal surfaces of permanent teeth in the course of time.

Materials and Methods

This retrospective study was performed in the Faculty of Dentistry of the Federal University of Rio Grande do Sul, Porto Alegre, Brazil. The records of patients treated in the undergraduate dental clinics between 2009 and 2014 were reviewed. All patient’s records presenting at least two dental examinations (mean time = 13 months; min 0.2 month – max 7 years) and at least one inactive non-cavitated caries lesion or sound surface in occlusal surface of permanent tooth provided the source of the longitudinal data used in the present study.

Clinical assessment

The clinical assessment was performed by undergraduate students supervised by clinical associated professors and/or graduate students of the Cariology/Dentistry group. The final diagnosis was determined by the supervisors. Gingivitis and dental plaque stagnation was assessed using the gingival bleeding index and visible plaque index [Ainamo and Bay, 1975], respectively. The protocol for routine clinical assessing of dental surfaces demanded teeth cleaning and drying, relative isolation and artificial light. The following scores were recorded: (1) sound surface, (2) inactive non-cavitated caries lesion, (3) active non-cavitated caries lesion, (4) inactive cavitated caries lesion, (5) active cavitated caries lesion, (6) filled surface, (7) sealed surface, (8) crown, and (9) missing surface. Caries assessment was performed using the Nyvad criteria [Nyvad et al., 1999].

Data extraction

One researcher (CMC) extracted data from the patient's records. The demographic characteristics were also assessed.

The score of each occlusal surface of permanent teeth was collected from the first and last patient's assessment. Data on gingivitis, visible plaque, coronal caries experience (DMF-T and DMF-S) [Maltz and Barbachan e Silva, 2001] and caries activity status were also collected. The number of supervisors was recorded (n =5).

Data analysis

The primary outcome was the absence or presence of diagnosis changes of inactive non-cavitated caries lesions and sound surfaces when comparing the two patient's records. Diagnosis changes of inactive non-cavitated caries lesions and sound surfaces to active caries lesions (non-cavitated and cavitated) of patients with a positive activity status in the first examination was categorized into absent and present, and was modeled as outcome for a secondary analysis.

Gingivitis was categorized according to the percentage of bleeding sites on probing (≤20%, 21% to 59%, and ≥60%). Percentage of sites with visible plaque was categorized into ≤20%, 21% to 59%, and ≥60% [Badersten et al., 1990; Claffey et al., 1990]. Caries activity status was classified as negative and positive. Patient's age and DMF-T and DMF-S scores were modeled as continuous variables.

Data analysis was performed using STATA software (Stata 11.1 for Windows, Stata Corporation, College Station, Texas, USA). Pair-wise comparisons of crude estimates were performed using Mann-Whitney and Chi-square tests at a significance level of 5%. Logistic regression models were applied to assess the association between diagnosis changes and explanatory variables. Estimates were adjusted for sociodemographic and clinical variables. A preliminary analysis using univariate models was performed, and variables showing associations with a P<0.25 were added to the multivariate models. Maintenance of variables in the final model was determined by a combination of a P<0.05 and analyses of confounders and interactions [Hosmer and Lemeshow, 2000]. Odds ratio (OR) and 95% confidence interval (CI) were estimated and reported.

Ethical considerations

The study protocol was approved by the Federal University of Rio Grande do Sul Research Ethics Committee (protocol nº 624.094). This study obtained a certificate of confidentiality to protect the privacy and welfare of patients.

Results

A total of 12,802 records were reviewed, which accounted for all the patients examined in the undergraduate dental clinics between 2009 and 2014 (Figure 1). Nine hundred and one records met the selection criteria and were included in the present study (mean age of patients = 31.19±0.29). All records comprised sound surfaces at the first assessment, and 550 records presented inactive non-cavitated caries lesions.

The mean DMF-T and DMF-S scores were 12.40 (SD = 0.13) and 30.43 (SD = 0.46), respectively. Table 1 shows the study sample distribution and diagnosis changes of inactive non-cavitated caries lesions and sound surfaces according to demographic and clinical characteristics. The majority of diagnosis changes if inactive non-cavitated caries lesions was observed among women, individuals with >20% to <60% of bleeding sites, individuals presenting ≤20% of sites with visible plaque, and those presenting a positive activity status. According to sound surfaces, a higher number of diagnosis changes was found in woman, individuals with ≤20% of bleeding sites, individuals presenting ≤20% of sites with visible plaque, and those presenting a negative activity status.

At the first assessment, 2,164 inactive non-cavitated caries lesions were found (Table 2), and 1,856 (85.77%) remained stable in the course of time. In the multivariate model, higher DMF-S scores and a positive caries activity status were significantly associated with diagnosis changes of inactive non-cavitated caries lesions (Table 3).

A total of 3,953 sound surfaces were observed at the first assessment, and 1,109 diagnosis changes were observed in the course of time (Table 2). As shown in Table 4, higher age and DMF-T scores were significantly associated with diagnosis changes of sound surfaces in the multivariate model.

Multivariate model of diagnosis changes including only inactive non-cavitated caries lesions and sound surfaces from patients presenting a positive activity status indicated age (OR = 0.96; 95% CI = 0.94-0.98), DMF-T scores (OR = 1.07; 95% CI = 1.03-1.11), and the presence of >20% to <60% of sites with visible plaque (OR = 1.56; 95% CI = 0.99-2.45) as risk indicators of changes to active caries lesions (non-cavitated and cavitated). Dental surfaces classified as inactive non-cavitated caries lesions at the first assessment presented a lower risk of diagnosis changes to active caries lesions compared to sound surfaces (OR = 0.43; 95% CI = 0.28-0.68).

Discussion

The present study was conducted to assess the diagnosis changes of inactive non-cavitated caries lesions in occlusal surfaces of permanent teeth in the course of time. A total of 1,878 (86.78%) inactive non-cavitated caries lesions remained unchanged. Higher DMF-S scores and a positive caries activity status were significantly associated with the outcome. In relation to the missing teeth in the follow-up, once the present study only evaluated the occlusal surfaces, we do not have the information about the others surfaces. Moreover, most of them were third molars, so, the reason of the extraction indication can be variable. To the best of the authors' knowledge, this is the first retrospective study to show diagnosis changes of dental surfaces and their risk indicators.

This study demonstrated the ability of inactive non-cavitated caries lesions remain stable in the course of time, which may be supported by previous *in vitro* and *in situ* studies [Koulourides and Cameron, 1980; Maltz et al., 2006]. Maltz et al. (2006) evaluated the microhardness of enamel caries lesions after a period of arrestment throughout *in situ* models, and observed that these lesions did not present a decrease in microhardness when exposed to both same and new cariogenic challenge. The authors also indicated that arrested lesions presented similar microhardness when compared to sound enamel. Findings from Koulourides and Cameron (1980) showed that arrested lesions submitted to *in vitro* demineralization presented higher acid resistance than sound enamel. Moreover, study including *in situ* models found that arrested lesions were approximately two times more acid-resistant than sound surfaces after exposed to a similar intraoral acid challenge [Iijima and Takagi, 2000].

There are a few longitudinal clinical studies that evaluate inactive non-cavitated carious lesions [Guedes et al., 2014; Zenkner et al., 2015]. Zenker et al. (2015) demonstrated that inactive enamel lesions presented a similar risk for caries progression than sound occlusal surfaces in children and adolescents with regular access to fluoride and low caries prevalence after 1-year of follow-up. The presence of visible plaque on occlusal sites was the only predictor for caries incidence and lesion progress. Two-year cohort study conducted by Guedes et al. (2014) showed that active non-cavitated carious lesions on occlusal surfaces had around 60% higher risk to progress and around two-fold higher risk to become frankly cavitated, filled or a missed surface when compared to inactive enamel carious lesions. Although the present study did not evaluate progression of active carious lesions, it was observed that inactive non-cavitated caries lesions presented lower risk to become an active caries lesion when compared to sound surfaces in patients presenting a positive activity status. This result suggests a higher resistence to demineralization of inactive non-cavitated caries lesions.

However, opposite findings were also observed [Ferreira Zandoná et al., 2012; Nyvad et al., 2003]. Ferreira-Zandoná et al. (2012) investigated a high-risk rural population of children and adolescents and found that only 6% of sound occlusal surfaces progressed after 2-year follow-up in contrast to 51% of inactive enamel lesions (non-cavitated and cavitated). A 3-year follow-up study conducted in adolescents with a high caries prevalence reported that 90% of sound surfaces had no caries progression [Nyvad et al., 2003]. However, caries progression on sound occlusal surfaces (5%) was markedly different from occlusal surfaces presenting inactive enamel lesions (30%). The authors also highlighted that inactive enamel lesions presented a greater risk of progression to cavitation than sound surfaces. The different results found in the present study could be explained by the lower mean time of follow-up (13 months) and the different sample characteristics, since this study not include only young people. The Faculty of Dentistry is a reference center for people who have oral diseases, including dental caries. For this reason, the sample of the present study comprises people with high caries prevalence too (about 60% of the patients included).

In conclusion, the majority of inactive non-cavitated caries lesions remained unchanged in the course of time. Thus, it could be suggested that inactive non-cavitated caries lesions require a similar clinical management to that applied to sound surfaces. Moreover, caries experience and caries activity status were risk indicators for diagnosis changes of inactive non-cavitated caries lesions.

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Table 1. Study sample distribution and diagnosis changes of inactive non-cavitated caries lesions and sound surfaces according to demographic and clinical characteristics

Variables	**Inactive non-cavitated caries lesions**		**Sound surfaces**	
	Absent changes (%)	Present changes (%)	Absent changes (%)	Present changes (%)
Sex				
Male	718 (38.23)	116 (40.56)	1,225 (43.09)	466 (41.98)
Female	1,160 (61.77)	170 (59.44)	1,618 (56.91)	644 (58.02)
Gingivitis, %				
≤20	720 (38.34)	111(38.81)	1,692 (59.51)	652 (58.74)
>20 to <60	940 (50.05)	147 (51.40)	981 (34.51)	379 (34.14)
≥60	218 (11.61)	28 (9.79)	170 (5.98)	79 (7.12)
Visible plaque, %				
≤20	873 (46.49)	132 (46.15)	2,081 (73.20)	731 (65.86)
>20 to <60	799 (42.55)	116 (40.56)	662 (23.29)	313 (28.20)
≥60	206 (10.97)	38 (13.29)	100 (3.52)	66 (5.95)
Caries activity status				
Negative	686 (36.53)	86 (30.07)	1,705 (59.97)	653 (58.83)
Positive	1,192 (63.47)	200 (69.93)	1,138 (40.03)	457 (41.17)
Total	1,878 (86.78)	286 (13.22)	2,843 (71.92)	1,110 (28.08)

Table 2. Diagnosis changes of inactive non-cavitated caries lesions and sound surfaces in the course of time.

Diagnosis	**Inactive non-cavitated caries lesions**	**Sound surfaces**
	n (%)	*n* (%)
Sound surface	0 (0)	2,844 (71.95)
Inactive non-cavitated caries lesion	1,856 (85.77)	528 (13.36)
Active non-cavitated caries lesion	13 (0.60)	31 (0.78)
Inactive cavitated caries lesion	198 (9.15)	110 (2.78)
Active cavitated caries lesion	26 (1.20)	31 (0.78)
Filled surface	46 (2.13)	219 (5.54)
Sealed surface	1 (0.05)	1 (0.03)
Crown	2 (0.09)	23 (0.58)
Missing surface	22 (1.02)	166 (4.20)
Total	2,164 (100.00)	3,953 (100.00)

Table 3. Association between diagnosis changes of inactive non-cavitated caries lesions and explanatory variables (unadjusted and adjusted logistic regression models).

Variables	**Unadjusted model**			**Adjusted model**		
	OR	95% CI	*P*	OR	95% CI	*P*
Sex						
Male	1.00					
Female	1.10	0.85-1.42	0.45			
Age, years	0.99	0.98-1.00	0.39			
Gingivitis, %						
≤20	1.00					
>20 to <60	1.01	0.77-1.32	0.91			
≥60	0.83	0.53-1.29	0.41			
Visible plaque, %						
≤20	1.00					
>20 to <60	0.96	0.73-1.25	0.76			
≥60	1.21	0.82-1.80	0.31			
DMF-S scores	1.00	1.00-1.01	<0.001	1.00	1.00-1.01	<0.001
Caries activity status						
Absent	1.00					
Present	1.33	1.02-1.75	0.03	1.32	1.00-1.73	0.04

OR, odds ratio; 95% CI, 95% confidence interval.

Table 4. Association between diagnosis changes of sound surfaces and explanatory variables (unadjusted and adjusted logistic regression models).

Variables	**Unadjusted model**			**Adjusted model**		
	OR	95% CI	*P*	OR	95% CI	*P*
Sex						
Male	1.00					
Female	1.04	0.90-1.20	0.52			
Age, years	1.02	1.02-1.03	<0.001	1.01	1.00-1.01	<0.001
Gingivitis, %						
≤20	1.00					
>20 to <60	1.00	0.86-1.16	0.93			
≥60	1.20	0.90-1.59	0.19			
Visible plaque, %						
≤20	1.00					
>20 to <60	1.34	1.14-1.57	<0.001			
≥60	1.87	1.36-2.59	<0.001			
DMF-T scores	1.09	1.07-1.10	<0.001	1.07	1.06-1.08	<0.001
Caries activity status						
Negative	1.00					
Positive	1.04	0.91-1.20	0.51			

OR, odds ratio; 95% CI, 95% confidence interval.

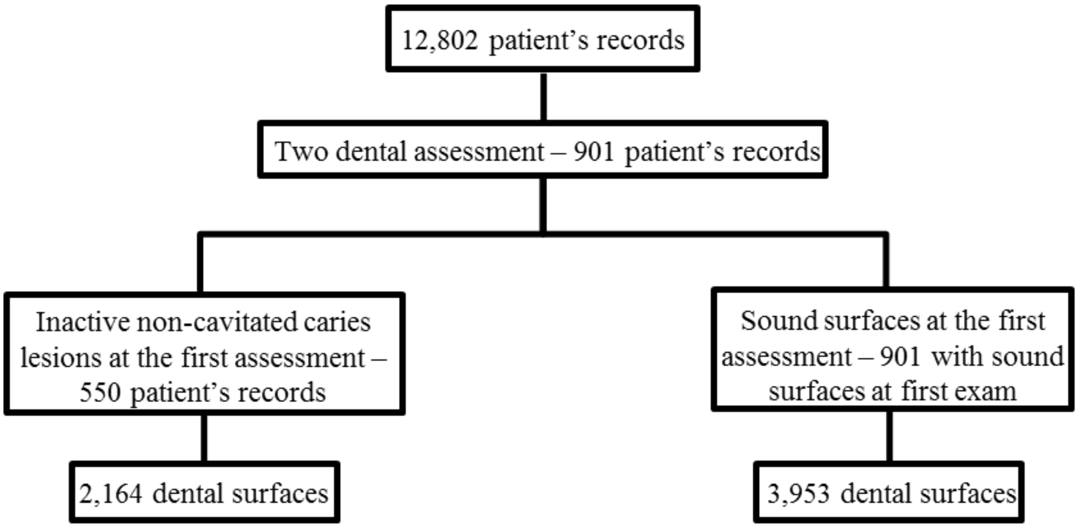

Figure 1. Flowchart of data extraction.

3 CONCLUSÃO

O presente estudo objetivou avaliar as mudanças de diagnóstico de lesões não-cavitadas inativas em superfícies oclusais ao longo do tempo. O estudo concluiu que grande parte destas lesões permaneceram estáveis. Portanto, é possível sugerir que lesões sem cavidade inativas não requerem manejo clínico diferenciado daquele normalmente direcionado às superfícies hígidas. Uma vez que a lesão cariosa esteja paralisada, podemos considerá-la cicatriz de um processo de cárie já consolidado.

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