Erosive tooth wear knowledge in a Brazilian dental school: what has changed after a decade?

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ABSTRACT

This study aimed to assess knowledge related to erosive tooth wear (ETW) among patients, students and faculty members in a Brazilian dental school and compare it with data from a previous study conducted ten years earlier in the same academic environment. A controlled cross-sectional study involving 289 participants was conducted at a dental school in Belo Horizonte, Southeastern Brazil. Knowledge of ETW was evaluated through a self-administered questionnaire. Statistical analysis used chi-square test; z-test adjusted by Bonferroni correction ($p \leq 0.05$). Ethical approval and informed consent were obtained. Among the 289 participants, 71.0% had heard about ETW with a lower percentage among patients ($p<0.001$). Students and faculty members frequently mentioned eating disorders and acidic diet as the main etiological factors for ETW ($p<0.001$). However, patients acknowledged bacteria ($p=0.026$) and poor oral hygiene ($p=0.002$) as etiological factors. Comparison between present findings and data from the previous study showed no significant increase in participants who had heard about the condition ($p>0.499$). There was also no improvement in knowledge of ETW among patients ($p>0.227$), and no significant difference when patients were asked whether they had received preventive recommendations by students ($p=0.303$). However, there was a significant improvement in all variables regarding students' diagnostic skills ($p<0.005$) and in the knowledge of ETW signs and symptoms among faculty members ($p=0.030$). In conclusion, knowledge of ETW is still not fully incorporated by the sample. However, there was an improvement in students and faculty's diagnostic skills since the last study conducted in 2010.

Descriptors: Education, Dental. Students, Dental. Faculty, Dental. Patients. Tooth Erosion. Knowledge.

1 INTRODUCTION

The ideal academic environment prepares students for their future professional life[1]. Dental students should be able to diagnose oral implications, identify related-risk factors, and provide prompt preventive measures for their patients[2].

Erosive tooth wear (ETW) is an oral condition that has gained increased scientific attention over the last decades. It is an irreversible multifactorial condition, associated with chemical, behavioral and biological factors, characterized by progressive tooth structure loss due to a non-bacterial chemical process[3,4]. ETW is the third most frequently observed oral condition after dental caries and periodontal disease, presenting a prevalence similar to dentine hypersensitivity. However, it is still not routinely screened during standard dental examination[5].

Despite the increasing scientific evidence about ETW, studies conducted in academic fields worldwide have shown an alarming lack of knowledge of the condition among faculty, students and patients[6-10]. In other words, it is questionable whether ETW has been adequately addressed in dental schools, although it is part of the dental curricula[8].

The risk of developing erosive lesions varies depending on their background, behavior, medical issues and dietary practices[11]. Dentists can play a key role in educating and guiding patients to adopt healthier lifestyles, including nutritional recommendations[8,12,13]. In this sense, knowledge and awareness of ETW must be addressed not only for dental practitioners, but also for the general population[8]. Most patients are unaware of the condition possibly due to lack of professional counseling or forgetting the dentist's recommendations[7,14]. Moreover, patients usually seek treatment when erosive dental lesions are in advanced stages, with hypersensitivity or when there is imperative demand for restorative treatments[15], which turns this matter both theoretically and clinically relevant.

Assessing dental education related to ETW is fundamental to identify possible gaps and enhance faculty's ability to assist students and patients in properly understanding the condition. Therefore, the present study aimed to evaluate the knowledge related to ETW among faculty, students and patients in a Brazilian dental school, and compare it with findings from a previous study conducted ten years earlier in the same academic environment[7]. Considering teaching innovations[16], the growth of science popularization[17] and the increasing number of scientific studies on ETW, we hypothesize that knowledge of the condition in that academic environment has improved after a decade.

2 METHODOLOGY

Ethical aspects

The study was approved by the Research Ethics Committee of the Universidade Federal de Minas Gerais (UFMG) (ETIC 563/07). All participants were informed about the research objectives and were given a letter explaining the study proposal, as well as the informed consent/assent forms. Only participants who agreed and signed the informed consent/assent forms were included in the study.

Study design and settings

This is a cross-sectional study with a quantitative approach, carried out in Belo Horizonte, Brazil. The city is the capital of Minas Gerais's state and has approximately two and a half million inhabitants. Data collection was performed

during the second semester of 2018 and the first semester of 2019 at the Dental School of the UFMG, which had 129 faculty members and 664 regularly enrolled students in 2018. The dental curricula comprise 10 semesters, with dental practice beginning in the 2nd year of the undergraduate course.

Study subjects

The sample was selected according to the same eligibility criteria of a previous study conducted at the dental school in 2009 and 2010[7], when all permanent faculty, all second and fourth-year dental students and their patients were enrolled. Students from the second year were selected as they were initiating clinical practice activities in a primary care setting, attending adolescent patients. Those from the fourth year were at the end of the compulsory disciplines providing full assistance in primary care, attending adult patients. Since each student could assist more than one patient throughout the semester, only one patient per student was randomly selected.

Eligibility criteria

All permanent faculty from the Dental School of UFMG; all second and fourth-year dental students; literate patients assisted by second and fourth-year dental students were eligible. To be included in the research the participant needed to sign an informed consent/assent form.

Permanent faculty members who were out of office during data collection; permanent faculty members involved in the research and participants who took part in the pilot study were excluded.

After defining the eligibility criteria, the sample was categorized as follows: Group 1 (permanent faculty, n = 123), Group 2 (second-year dental students, n = 52), Group 3 (fourth-year dental students, n = 53), Group 4 (patients treated by second-year dental students, n = 52) and Group 5 (patients treated by fourth-year dental students, n = 53).

Pilot study

A pilot study with approximately 20% of the total sample, respecting the proportion of respondents in each group, was conducted to test the research methodology. Participants who took part in the pilot study were excluded from the main study.

Data collection

Participants answered a self-administered questionnaire to collect information about knowledge of ETW. The questionnaire was based on the instrument used in the previous study.[7] Since it has shared and specific questions for each group (faculty, students and patients), three different questionnaires were elaborated, with 12 to 18 multiple-choice questions.

The questionnaire consisted of two sections. The first contained items about demographic characteristics, including the gender and age of the participant. The second assessed respondents' knowledge of ETW including questions about etiology, prevalence and prevention. Students and faculty were also asked about diagnostic methods, clinical practices, and attitudes related to ETW on a routine basis.

Students were initially contacted in the classroom to optimize data collection, so that as many students as possible were approached at one time. Those who were not in class on the day of data collection were contacted later. Faculty were contacted in the clinics and in their respective offices. Faculty and students answered the questionnaire according to their availability, in order not to interfere with academic activities. Patients

were approached in the clinics waiting rooms, in order not to interfere with their clinical care. All questionnaires were coded to ensure participant's anonymity and confidentiality. To minimize sample losses, up to five attempts were made to receive the questionnaire answered by the participants.

Statistical analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS for Windows, version 22.0, SPSS Inc., Chicago, USA). Descriptive analysis used frequency and distribution measurements. Knowledge of ETW was evaluated and compared through quantitative analysis. The process involved a bivariate analysis using the chi-square test and the z-test for proportion comparison adjusted by Bonferroni correction for multiple comparisons. The level of statistical significance was set at 5% with a confidence interval of 95%.

3 RESULTS

The final sample consisted of 289 participants (92.0% response rate), of whom 170 were female (58.8%) and 119 were male (41.2%), with a mean age of 34.3 $\pm$ 17.2 years.

Among the 289 participants, 71.0% had heard about ETW, with a lower percentage among patients ($p<0.001$). Regarding the source of information, whereas the majority of second and fourth-year students reported they had heard about the condition at the Dental School, the sources of information most mentioned by faculty members were books, scientific papers and scientific congresses ($p<0.001$) (table 1).

Eating disorders and an acidic diet were the etiological factors more frequently mentioned, with a lower percentage among patients ($p<0.001$). Conversely, more patients reported that bacteria ($p=0.026$) and poor oral hygiene ($p=0.002$) were etiological factors related to ETW. Over 55% of the sample reported that hard-bristled toothbrush and an abrasive toothpaste do not contribute to ETW, with significant difference between groups ($p=0.021$) (table 1).

Regarding knowledge of dietary factors related to ETW, 52.8% of participants believed that sugar contributes to this dental implication, with higher percentages being observed among faculty and patients ($p=0.001$). However, when compared to students and faculty members, patients were prone to believe that sugared candies such as chocolate ($p=0.028$) and gum ($p=0.004$) are risk factors of erosive wear. Most of the sample believed that citrus juice and citrus fruits contribute to erosion (90.8%), with lower percentages among patients ($p<0.001$). In addition, most participants reported that wine (60.7%) and isotonic drinks (68.4%) do not contribute to erosive wear (table 2).

Concerning the knowledge related to ETW epidemiology, 89.7% of the sample believed that ETW can affect deciduous and permanent teeth, and 79.4% of the participants reported that some teeth may be more affected than others, with a lower percentage among faculty members ($p=0.048$). Concerning its prevalence, 70.6% of participants reported that both sexes are similarly affected by ETW (table 3).

Reducing the consumption of acidic beverages was the most frequently mentioned preventive measure (91.3%), with lower percentages among patients ($p<0.001$). Conversely, increasing the frequency of tooth brushing was not reported as a preventive measure by most participants (81.6%), but the intragroup analysis showed that unlike students and faculty, patients believed this practice helped to prevent ETW ($p<0.001$) (table 3).

Table 1. Knowledge of erosive tooth wear, sources of this information and its etiological factors according to patients, students and faculty

Variables	Patients (2nd year) n (%)*	Patients (4th year) n (%)*	Students (2nd year) n (%)*	Students (4th year) n (%)*	Faculty n (%)*	Total n (%)*	p value**
Knowledge							
Have you ever heard about erosive tooth wear?							
Yes	10 (19.6) [a]	8 (16.7) [a]	51 (100) [b]	48 (100) [b]	90 (98.9) [b]	207 (71.6)	**< 0.001**
No	41 (80.4)	40 (83.3)	0	0	1 (1.1)	82 (28.4)	
Sources of information							
Television							
Yes	1 (10.0) [a]	5 (62.5) [b]	0 [c]	3 (6.3) [a,c]	7 (7.8) [a]	16 (7.7)	**< 0.001**
No	9 (90.0)	3 (37.5)	51 (100)	45 (93.8)	83 (92.2)	191 (92.3)	
Internet							
Yes	3 (30.0) [a,b]	1 (12.5) [a,b]	8 (15.7) [a]	21 (43.8) [b]	26 (28.9) [a,b]	59 (28.5)	**0.036**
No	7 (70.0)	7 (87.5)	43 (84.3)	27 (56.3)	64 (71.1)	148 (71.5)	
Dental School							
Yes	6 (60.0) [a]	4 (50.0) [a]	51 (100) [b]	47 (97.9) [b]	50 (55.6) [a]	158 (76.3)	**< 0.001**
No	4 (40.0)	4 (50.0)	0	1 (2.1)	40 (44.4)	49 (23.7)	
Book or scientific publications							
Yes	NA	NA	12 (23.5) [a]	19 (39.6) [a]	73 (81.1) [b]	104 (55.0)	**< 0.001**
No	NA	NA	39 (76.5)	29 (60.4)	17 (18.9)	85 (45.0)	
Congresses or courses							
Yes	NA	NA	3 (5.9) [a]	5 (10.4) [a]	63 (70.0) [b]	71 (37.6)	**< 0.001**
No	NA	NA	48 (94.1)	43 (89.6)	27 (30.0)	118 (62.4)	
Etiological factors							
Bacteria							
Yes	5 (50.0) [a]	2 (28.6) [a,b]	6 (11.8) [b]	7 (14.6) [b]	10 (11.1) [b]	30 (14.6)	**0.026**
No	5 (50.0)	5 (71.4)	45 (88.2)	41 (85.4)	80 (88.9)	176 (85.4)	
Poor oral hygiene							
Yes	6 (60.0) [a]	5 (71.4) [a]	12 (23.5) [b]	6 (12.5) [b]	22 (24.4) [b]	51 (24.8)	**0.002**
No	4 (40.0)	2 (28.6)	39 (76.5)	42 (87.5)	68 (75.6)	155 (75.2)	
Hard-bristled toothbrush and abrasive toothpaste							
Yes	2 (20.0) [a,b]	2 (28.6) [a,b]	24 (47.1) [a]	12 (25.0) [b]	46 (51.1) [a]	86 (41.7)	**0.021**
No	8 (80.0)	5 (71.4)	27 (52.9)	36 (75.0)	44 (48.9)	120 (58.3)	
Eating disorders							
Yes	2 (20.0) [a]	3 (42.9) [a,b]	44 (86.3) [c,d]	44 (91.7) [d]	68 (75.6) [c,b]	161 (78.2)	**<0.001**
No	8 (80.0)	4 (57.1)	7 (13.7)	4 (8.3)	22 (24.4)	45 (21.8)	
Acidic diet							
Yes	5 (50.0) [a]	3 (42.9) [a]	49 (96.1) [b]	47 (97.9) [b]	87 (96.7) [b]	191 (92.7)	**<0.001**
No	5 (50.0)	4 (57.1)	2 (3.9)	1 (2.1)	3 (3.3)	15 (7.3)	
Nail biting							
Yes	4 (40.0) [a]	3 (42.9) [a]	13 (25.5) [a]	2 (4.2) [b]	9 (10.0) [b]	31 (15.0)	**0.001**
No	6 (60.0)	4 (57.1)	38 (74.5)	46 (95.8)	81 (90.0)	175 (85.0)	
Bruxism							
Yes	3 (30.0) [a]	1 (14.3) [a,b]	11 (21.6) [a]	3 (6.3) [b]	19 (21.1) [a]	37 (18.0)	0.133
No	7 (70.0)	6 (85.7)	40 (78.4)	45 (93.8)	71 (78 9)	169 (82.0)	

* Excluded missing cases; ** Different letters on the same line indicate statistical difference by the chi-square test (significant at $p<0.05$) and equal letters do not differ significantly; NA: Not applicable.

Table 2. Dietary factors that contribute to erosive tooth wear according to patients, students and faculty

Foods and beverages the sample believes contribute to erosive tooth wear	**Patients (2nd year)** n (%)*	**Patients (4th year)** n (%)*	**Students (2nd year)** n (%)*	**Students (4th year)** n (%)*	**Faculty** n (%)*	**Total** n (%)*	**p value****
Sugar							
Yes	7 (70.0) [a,b]	7 (100) [b]	17 (34.0) [c]	22 (47.8) [a,c]	50 (61.0) [a]	103 (52.8)	**0.001**
No	3 (30.0)	0	33 (66.0)	24 (52.2)	32 (39.0)	92 (47.2)	
Diet soda							
Yes	3 (30.0) [a]	3 (42.9) [a,b]	43 (84.3) [c]	35 (72.9) [b,c]	70 (77.8) [c]	154 (74.8)	**0.005**
No	7 (70.0)	4 (57.1)	8 (15.7)	13 (27.1)	20 (22.2)	52 (25.2)	
Sugared soda							
Yes	8 (80.0) [a]	5 (71.4) [a]	44 (86.3) [a]	36 (75.0) [a]	77 (85.6) [a]	170 (82.5)	0.588
No	2 (20.0)	2 (28.6)	7 (13.7)	12 (25.0)	13 (14.4)	36 (17.5)	
Citric fruit juice							
Yes	1 (10.0) [a]	3 (42.9) [a]	51 (100) [b]	47 (97.9) [b]	85 (94.4) [b]	187 (90.8)	**<0.001**
No	9 (90.0)	4 (57.1)	0	1 (2.1)	5 (5.6)	19 (9.2)	
Non-citric fruit juice							
Yes	1 (10.0) [a]	0 [a,b]	0 [b]	1 (2.1) [a,b]	8 (8.9) [a]	10 (4.9)	0.092
No	9 (90.0)	7 (100)	51 (100)	47 (97.9)	82 (91.1)	196 (95.1)	
Wine							
Yes	3 (30.0) [a]	3 (42.9) [a]	20 (39.2) [a]	20 (41.7) [a]	35 (38.9) [a]	81 (39.3)	0.975
No	7 (70.0)	4 (57.1)	31 (60.8)	28 (58.3)	55 (61.1)	125 (60.7)	
Energy drink							
Yes	4 (40.0) [a,b]	0 [b]	23 (45.1) [a]	29 (60.4) [a]	48 (53.3) [a]	104 (50.5)	**0.015**
No	6 (60.0)	7 (100)	28 (54.9)	19 (39.6)	42 (46.7)	102 (49.5)	
Isotonic drink							
Yes	4 (40.0) [a,b]	0 [b,c]	4 (7.8) [b]	17 (35.4) [a,b]	40 (44.4) [a]	65 (31.6)	**<0.001**
No	6 (60.0)	7 (100)	47 (92.2)	31 (64.6)	50 (55.6)	141 (68.4)	
Milk							
Yes	1 (10.0) [a]	0 [a,b]	0 [b]	1 (2.1) [a,b]	2 (2.2) [a,b]	4 (1.9)	0.348
No	9 (90.0)	7 (100)	51 (100)	47 (97.9)	88 (97.8)	202 (98.2)	
Citric fruit							
Yes	3 (30.0) [a]	2 (28.6) [a]	50 (98.0) [b]	46 (95.8) [b]	86 (95.6) [b]	187 (90.8)	**<0.001**
No	7 (70.0)	5 (71.4)	1 (2.0)	2 (4.2)	4 (4.4)	19 (9.2)	
Non-citric fruit							
Yes	1 (10.0) [a]	0 [a,b]	1 (2.0) [a,b]	0 [b]	8 (8.9) [a]	10 (4.9)	0.095
No	9 (90.0)	7 (100)	50 (98.0)	48 (100)	82 (91.1)	196 (95.1)	
Chocolate							
Yes	5 (50.0) [a]	2 (28.6) [a]	7 (13.7) [b]	6 (12.5) [b]	10 (11.1) [b]	30 (14.6)	**0.028**
No	5 (50.0)	5 (71.4)	44 (86.3)	42 (87.5)	80 (99.9)	176 (85.4)	
Pickles							
Yes	0 [a]	1 (14.3) [a]	8 (15.7) [a]	13 (27.1) [a]	57 (63.3) [b]	79 (8.3)	**<0.001**
No	10 (100)	6 (85.7)	43 (84.3)	35 (72.9)	33 (36.7)	127 (61.7)	
Vinegar							
Yes	2 (20.0) [a]	2 (28.6) [a]	42 (82.4) [b]	40 (83.3) [b]	64 (71.1) [b]	150 (72.8)	**<0.001**
No	8 (80.0)	5 (71.4)	9 (17.6)	8 (16.7)	26 (28.9)	56 (27.2)	
Diet gum							
Yes	2 (20.0) [a]	0 [a,b]	2 (3.9) [a,b]	2 (4.2) [a,b]	4 (4.4) [b]	10 (4.9)	0.426
No	8 (80.0)	7 (100)	49 (96.1)	46 (95.8)	86 (95.6)	196 (95.1)	
Sugared gum							
Yes	7 (70.0) [a]	6 (85.7) [a]	14 (27.5) [b]	13 (27.1) [b]	27 (30.0) [b]	67 (32.5)	**0.004**
No	3 (30.0)	1 (14.3)	37 (72.5)	35 (72.9)	63 (70.0)	139 (67.5)	

* Excluded missing cases; ** Different letters on the same line indicate statistical difference by the chi-square test (significant at $p<0.05$) and equal letters do not differ significantly

Table 3. Knowledge of epidemiology and preventive measures related to erosive tooth wear reported by patients, students and faculty

Variables	Patients (2nd year) n (%)*	Patients (4th year) n (%)*	Students (2nd year) n (%)*	Students (4th year) n (%)*	Faculty n (%)*	Total n (%)*	p value**
Epidemiology							
Both dentitions (deciduous and permanent) can be affected							
Yes	6 (60.0) [a]	6 (100) [a,b]	49 (98.0) [b]	44 (91.7) [a,b]	77 (86.5) [a,b]	182 (89.7)	**0.008**
No/do not know	4 (40.0)	0	1 (2.0)	4 (8.3)	12 (13.5)	21 (10.3)	
The prevalence among men and women is similar							
Yes	7 (77.8) [a]	6 (100) [a]	33 (64.7) [a]	29 (61.7) [a]	67 (76.1) [a]	142 (70.6)	0.103
No	2 (22.2)	0	18 (35.3)	18 (38.3)	21 (23.9)	59 (29.4)	
A group of teeth (anterior or posterior) is more affected							
Yes	9 (90.0) [a,b]	5 (83.3) [a,b]	41 (80.4) [a,b]	44 (91.7) [b]	63 (70.8) [a]	162 (79.4)	**0.048**
No	1 (10.0)	1 (16.7)	10 (19.6)	4 (8.3)	26 (29.2)	42 (20.6)	
Preventive measures							
Reduce sugar consumption							
Yes	9 (90.0) [a]	5 (71.4) [a,b]	13 (25.5) [b]	23 (47.9) [a,b]	35 (38.9) [b]	85 (38.9)	**0.001**
No	1 (10.0)	2 (28.6)	38 (74.5)	25 (52.1)	55 (61.1)	121 (58.7)	
Reduce acidic beverages consumption							
Yes	6 (60.0) [a]	3 (42.9) [a]	50 (98.0) [b]	46 (95.8) [b]	83 (92.2) [b]	188 (91.3)	<**0.001**
No	4 (40.0)	4 (57.1)	1 (2.0)	2 (4.2)	7 (7.8)	18 (8.7)	
Reduce fruits consumption							
Yes	0 [a]	0 [a]	10 (19.6) [a]	3 (6.3) [a]	8 (8.9) [a]	21 (10.2)	0.068
No	10 (100)	7 (100)	41 (80.4)	45 (93.8)	82 (91.1)	185 (89.8)	
Increase toothbrushing frequency							
Yes	9 (90.0) [a]	5 (71.4) [a]	6 (11.8) [b]	8 (16.7) [b]	10 (11.1) [b]	38 (18.4)	<**0.001**
No	1 (10.0)	2 (28.6)	45 (88.2)	40 (83.3)	80 (88.9)	168 (81.6)	
Use soft-bristled toothbrush and less abrasive toothpaste							
Yes	5 (50.0) [a,b]	3 (42.9) [a,b]	27 (52.9) [a,b]	18 (37.5) [b]	59 (65.6) [a]	112 (54.4)	**0.040**
No	5 (50.0)	4 (57.1)	24 (47.1)	30 (62.5)	31 (34.4)	94 (45.6)	
Use fluoride							
Yes	4 (40.0) [a]	2 (28.6) [a]	8 (15.7) [a]	11 (22.9) [a]	34 (37.8) [a]	59 (28.6)	0.061
No	6 (60.0)	5 (71.4)	43 (84.3)	37 (77.1)	56 (62.2)	147 (71.4)	
Use mouthwashes							
Yes	2 (20.0) [a,b]	3 (42.9) [b]	1 (2.0) [a,c]	0 [c]	6 (6.7) [a,c]	12 (5.8)	**0.001**
No	8 (80.0)	4 (57.1)	50 (98.0)	48 (100)	84 (93.3)	194 (94.2)	

* Excluded missing cases; ** Different letters on the same line indicate statistical difference by the chi-square test (significant at $p<0.05$) and equal letters do not differ significantly

With respect to clinical practices related to ETW, 60.0% of patients reported not having received information on preventive measures and nearly 50.0% of second and fourth-year dental students reported not advising patients about the condition. However, 63.6% of students said their clinical supervisor advised them to examine their patients for ETW. Among the faculty members, 56.7% reported providing this guidance to their students and 70.0% reported never having supervised the care of any patient affected by erosive wear.

Regarding the diagnosis of this condition, most students and faculty reported knowing the clinical signs of erosive wear, with no difference between the groups (p=0.268), but 60.1% were unaware of an index to quantify the condition. Approximately half of the academic sample

(47.0%) reported feeling prepared to diagnose ETW only in advanced stages of the condition, with higher percentages among faculty members regarding the confidence to perform the diagnosis in its early stages (p<0.001). In addition, the analysis detected that the academic experience was proportional to the care of patients affected by ETW (p<0.001) (table 4).

Table 4. Clinical practices related to attitudes, prevention and diagnosis of erosive tooth wear among students and faculty

Clinical practices related to erosive tooth wear	Students (2nd year) n (%)*	Students (4th year) n (%)*	Faculty n (%)*	Total n (%)*	p value**
Do you know the clinical features (signs and symptoms) of erosive tooth wear?					
Yes	45 (88.2) [a]	43 (89.6) [a]	83 (95.4) [a]	171 (91.9)	0.268
No	6 (22.8)	5 (10.4)	4 (4.6)	15 (8.1)	
Are you aware of the existence of an index to quantify erosive tooth wear?					
Yes	24 (47.1) [a]	14 (29.2) [a]	37 (41.6) [a]	75 (39.9)	0.175
No	27 (52.9)	34 (70.8)	52 (58.4)	113 (60.1)	
Do you feel prepared to diagnose erosive tooth wear?					
Yes, in early and advanced stages	4 (8.0) [a]	5 (10.4) [a]	40 (46.0) [b]	49 (26.5)	
Yes, but only in advanced stages	30 (60.0) [a]	24 (50.0) [a,b]	33 (37.9) [b]	87 (47.0)	**<0.001**
No	16 (32.0) [a,b]	19 (39.6) [b]	14 (16.1) [a]	49 (26.5)	
Have you ever taken care of a patient affected by erosive tooth wear at the Dental School?					
Yes	5 (9.8) [a]	21 (43.8) [b]	68 (77.2) [c]	94 (50.2)	
No	39 (76.5)	22 (45.8)	10 (11.4)	71 (38.0)	**<0.001**
I do not know	7 (13.7)	5 (10.4)	10 (11.4)	22 (11.8)	

* Excluded missing cases; ** Different letters on the same line indicate statistical difference by the chi-square test (significant at p<0.05) and equal letters do not differ significantly

The comparison between the present findings and data from the study conducted ten years earlier in the same academic environment[7] shows no significant increase in the number of participants who have already heard about ETW among the three groups (p>0.499). There was no improvement in knowledge of ETW, since none of the evaluated variables showed statistically significant differences for the patients. There were improvements in students' knowledge; present findings showed a lower percentage of students reporting that sugar contributes to erosive wear (p<0.001) and recommending toothbrushing to prevent the condition (p<0.001). However, current findings showed an increase in the number of students advising the reduction of fruit intake to prevent erosion (p=0.049). With respect to faculty members, there was a significant decrease in reports recommending the reduction of sugar (p=0.003) and brushing the teeth to prevent ETW (p<0.001) (table 5).

Comparison between both studies also shows a significant improvement in all variables regarding students' diagnostic skills (p≤0.005). In addition, the knowledge related to ETW signs and symptoms increased among current faculty members (p=0.030). The only significant improvement related to clinical practices was the increasing number of students who occasionally advise patients on preventing ETW and the decreasing percentage of students who do not give patients any preventive recommendation (p=0.001) (table 6). However, there was no significant difference between patients from the

present sample (40,0%) and from the previous study (58,8%) when they were asked whether they had received such guidance by the students (p=0.303).

Table 5. Knowledge of erosive tooth wear among patients, students and faculty members at the Dental School of Universidade Federal de Minas Gerais: comparison of present data (2021) and findings from 2011[7]

Variables related to erosive tooth wear	Groups								
	Patients		p value**	Students		p value**	Faculty		p value**
	2011 (n=86) n (%)*	2021 (n=99) n (%)*		2011 (n=107) n (%)*	2021 (n=99) n (%)*		2011 (n=74) n (%)*	2021 (n=91) n (%)*	
Knowledge									
Have you ever heard about erosive tooth wear?									
Yes	17 (19.8)	18 (18.2)	0.559	105 (98.1)	99 (100)	0.499	72 (98.6)	90 (98.9)	1.000
No	69 (80.2)	81 (81.8)		2 (1.9)	0		1 (1.4)	1 (1.1)	
Etiology									
Believe that sugar contribute to erosive tooth wear									
Yes	17 (100)	14 (82.4)	0.227	73 (70.9)	39 (40.6)	**<0.001**	50 (74.6)	50 (61.0)	0.083
No	0	3 (17.6)		30 (29.1)	57 (59.4)		17 (25.4)	32 (39.0)	
Preventive measures									
Reduce sugar consumption									
Yes	16 (94.1)	14 (82.4)	0.601	48 (46.2)	36 (36.4)	0.199	45 (63.4)	35 (38.9)	**0.003**
No	1 (5.9)	3 (17.6)		56 (53.8)	63 (63.6)		26 (36.6)	55 (61.1)	
Reduce fruits consumption									
Yes	0	0	NA	5 (4.9)	13 (13.1)	**0.049**	11 (15.7)	8 (8.9)	0.222
No	17 (100)	17 (100)		98 (95.1)	86 (86.9)		59 (84.3)	82 (91.1)	
Reduce acidic beverages consumption									
Yes	12 (70.6)	9 (52.9)	0.481	94 (90.4)	96 (97.0)	0.083	66 (93.0)	83 (92.2)	1.000
No	5 (29.4)	8 (47.1)		10 (9.6)	3 (3.0)		5 (7.0)	7 (7.8)	
Brushing the teeth									
Yes	15 (88.2)	14 (82.4)	1.000	57 (54.8)	14 (14.1)	**<0.001**	32 (45.1)	10 (11.1)	**<0.001**
No	2 (11.8)	3 (17.6)		47 (45.2)	85 (80.8)		39 (54.9)	80 (88.9)	
Use fluoride									
Yes	10 (58.8)	6 (35.3)	0.303	52 (50.0)	19 (19.2)	**<0.001**	30 (42.3)	34 (37.8)	0.628
No	7 (41.2)	11 (64.7)		52 (50.0)	80 (80.8)		41 (57.7)	56 (62.2)	

* Excluded missing cases; ** chi-square test (significant at p<0.05); NA: not applicable (p value cannot be computed because there is a constant)

Table 6. Clinical practices related to diagnosis, attitudes and prevention of erosive tooth wear among students and faculty members at the Dental School of Universidade Federal de Minas Gerais: comparison of present data and findings from 2011[7]

Variables related to erosive tooth wear	Groups					
	Students		p value**	Faculty		p value**
	2011 (n=107) n (%)*	2021 (n=99) n (%)*		2011 (n=74) n (%)*	2021 (n=91) n (%)*	
Diagnosis						
Have you ever taken care of a patient affected by erosive tooth wear at the Dental School?						
Yes	17 (16.4)	26 (26.3)		55 (76.4)	68 (77.2)	
No	56 (53.8)	61 (61.6)	**0.005**	11 (15.3)	10 (11.4)	0.676
I do not know	31 (29.8)	12 (12.1)		6 (8.3)	10 (11.4)	
Do you know its signs and symptoms?						
Yes	52 (50.5)	88 (88.9)	**<0.001**	62 (84.9)	83 (95.4)	**0.030**
No	51 (49.5)	11 (11.1)		11 (15.1)	4 (4.6)	
Are you aware of the existence of an index to quantify it?						
Yes	18 (17.5)	38 (38.3)	**0.001**	23 (32.4)	37 (41.6)	0.124
No	85 (82.5)	61 (61.7)		48 (67.6)	52 (58.4)	
Do you feel prepared to diagnose it?						
Yes, in early and advanced stages	4 (3.8)	9 (9.2)		33 (45.8)	40 (46.0)	
Yes, but only in advanced stages	36 (34.6)	54 (55.1)	**0.001**	22 (30.6)	33 (37.9)	0.404
No	64 (61.6)	35 (35.7)		17 (23.6)	14 (16.1)	
Clinical practices						
Are you advised by clinical supervisors (faculty members) to examine your patient for erosive tooth wear?						
Yes, on a regular basis	2 (1.9)	4 (4.0)				
Yes, but only occasionally	26 (25.0)	32 (32.4)	0.350	NA	NA	
No	76 (73.1)	63 (63.6)				
Do you advise your patients how to prevent erosive tooth wear?						
Yes, on a regular basis	4 (3.8)	1 (1.0)				
Yes, but only occasionally	26 (25.0)	49 (49.5)	**0.001**	NA	NA	
No	74 (71.2)	49 (49.5)				
Do you advise students to examine their patients for erosive tooth wear?						
Yes, on a regular basis				18 (25.3)	16 (17.8)	
Yes, but only occasionally	NA	NA		16 (22.5)	34 (37.8)	0.152
No				30 (42.3)	29 (32.2)	
I am not a clinical supervisor at the Dental School				7 (9.9)	11 (12.2)	

* Excluded missing cases; ** chi-square test (significant at p<0.05); NA: not applicable

4 DISCUSSION

Due to its irreversible nature, recognizing the early signs and symptoms of ETW and its causal factors is important to properly manage the condition and develop appropriate preventive strategies[8]. However, little is known about knowledge of this dental implication in academic field[7,8,10], and its place in dental curricula is still unclear[8]. Our focus in the present study was not to delve into critique and normative aspects of dental school curriculum, instead we aimed to evaluate the knowledge related to ETW among the academic population. The findings might reflect whether this topic has been adequately covered among the present sample and if there were improvements compared to a previous study[7].

Comparison between both studies showed that most students and faculty members have already heard about ETW, but there was no increase in knowledge among patients. Despite greater dissemination and scientific production on the subject[18], patients' awareness is still deficient in this academic environment. This means that they are still not being properly clarified. More encouraging findings were reported in Norway, once nearly 88% of the interviewed patients had heard about ETW[19]. It could result from the increased focus on ETW by the Norwegian media, contributing to increased awareness of the local population. However, it is worth noticing that only 56% of the patients with erosive lesions were aware of it, and less than half of them remembered their dentist mentioning the condition[19].

The current study showed that students and faculty members considered eating disorders and acidic foods the main etiological factors for ETW, and there were some improvements in students' knowledge, as most reported that sugar does not contribute to erosion. Conversely, most patients still believe that sugar consumption and poor oral hygiene contribute to the condition. Patients' misconceptions were also detected in previous studies[7,10] suggesting a confusion between the etiology of ETW and dental caries[10]. Moreover, nearly 80% of patients believed that brushing their teeth more frequently and reducing sugar consumption were recommended to prevent ETW, whereas students and faculty members mainly reported reducing the consumption of acidic beverages.

Remarkably, the previous research[7] reported that knowledge was higher among fourth-year dental students compared to second-year students. In the present study, there was almost no significant difference between both groups. In fact, there was a curricular change at the Dental School in 2013. Theoretical content on ETW began to be taught in the second year of the course, instead of the fourth year, suggesting that the anticipation on the content related to erosion helped to improve the knowledge gap between students.

Although most participants correctly stated that soft drinks, fruit juices and citrus fruits can contribute to erosive wear, they did not identify the same potential for beverages such as wine and isotonic drinks. In contrast, a study conducted in the Netherlands found that almost all participants correctly answered questions about oral implications related to sports drinks, energy drinks and sodas[9]. In the Dutch study, patients were informed about their dental condition by their dentists and through leaflets, the internet and even by some mobile applications and e-mails, and this personalized information was preferred by the participants[9]. Based on these findings, it might be interesting to design new strategies to approach patients at the Dental School, combining guidance provided during oral care with individualized written and

online support.

Concerning patients´ knowledge of ETW, there were no significant changes since the previous study conducted ten years earlier[7]. Less than 20% has heard about the condition and less than half of them reported having received guidance from dental students about this oral implication. The lack of clarification can lead to unhealthy habits, a Norwegian study showed that participants who were unaware of the erosive potential of acidic beverages were more likely to consume fruit juice and soft drinks several times a day[19].

Even though most students and faculty members reported knowing the clinical characteristics of ETW, more than half do not know if there is an index to quantify the condition. A study conducted in Yemen found that most of dental surgeons did not use an index to quantify ETW[10]. In an Icelandic study, 96.0% of the dentists reported that they recorded erosive lesions, but did not use any index or scale[20]. Many indices to record ETW lesions are currently used in the epidemiological field, each one with its pros and cons, but the major point is the need for standardization[21]. Due to this need for a standardized and internationally accepted index, the Basic Erosive Wear Examination (BEWE) has been designed to provide a simple tool for use in general practice and to allow comparison to other indices[22].

With respect to ETW diagnosis, there was an improvement among student's knowledge since the last study[7]. However, although most of the present sample reported they know ETW pathognomonic features, less than half feel prepared to diagnose ETW in its early stages. A study among Yemeni dental community detected similar findings, approaches to ETW early diagnosis were insufficient[10]. Similar results were also observed in a study conducted in 2015, in which only half of dental professionals were aware of ETW in its early stages, its causes, and prevention methods. In addition, nearly half the participants reported they could reach a diagnosis only when erosive lesions were more evident[10]. Moreover, it was detected a significant proportion of dentists advising patients to take muscle relaxants and reduce sugar consumption to prevent ETW[10]. These findings reinforce the difficulty in the differential diagnosis between attrition, abrasion and ETW[23].

The importance of identifying early signs and evaluating etiological factors associated to ETW has been highlighted in the Consensus of the European Federation of Conservative Dentistry[24]. However, it is important to consider the difficulty in diagnosing initial lesions of ETW and in distinguishing its differential diagnosis[8,21,23]. ETW tends to be undiagnosed especially during its early stages. In other words, the lack of patients' clarification is only a consequence of a major problem. Why knowledge of ETW has not improved among patients? In fact, the question to be made is: why are dental students and dental professionals not educating their patients with respect to this dental implication? The answer is simple: out of sight, out of mind. Since many professionals and students do not know how to identify erosive processes, they do not even foresee the possibility of its occurrence.

It is important to detect the source of this issue, and it is obviously related to dental education. In dental academic fields, the focus of cariology education is clearly aimed towards teaching dental caries[8]. However, North American and Latin American studies have already warned that the cariology core curriculum should also encompass erosive and non-erosive tooth wear in addition to dental

caries[25-27]. Moreover, we suggest academic fields to include items related to ETW in protocols used during patients' anamneses, to guide dental training and professionals during oral examinations. In addition, we fully agree with suggestions related to longitudinal learning, continuing education, use of an ETW index and dietary counseling to raise awareness among dental students[8].

5 CONCLUSION

Knowledge of erosive tooth wear is still not fully incorporated in the present sample. However, there was an improvement in students' and faculty's diagnostic skills compared to a previous study conducted ten years earlier. Special emphasis should be placed on providing information to patients, since no improvement related to ETW knowledge was detected among this group. To achieve this goal, it is fundamental to guarantee knowledge of ETW, especially related to its early diagnoses, among students and dental professionals.

RESUMO

Conhecimento sobre desgaste dentário erosivo em uma faculdade de Odontologia brasileira: o que mudou depois de uma década?

Este estudo teve como objetivo avaliar o conhecimento relacionado ao desgaste dentário erosivo entre pacientes, alunos e docentes de uma faculdade de odontologia brasileira, e compará-lo com um estudo anterior, realizado dez anos antes, no mesmo ambiente acadêmico. Trata-se de um estudo transversal controlado, envolvendo 289 participantes, que foi realizado em uma faculdade de odontologia em Belo Horizonte, sudeste do Brasil. O conhecimento do desgaste erosivo foi avaliado por um questionário autoaplicável. A análise estatística utilizou o teste qui-quadrado e teste Z ajustado pela correção de Bonferroni ($p \leq 0,05$). Aprovação ética e consentimento informado foram obtidos. Dentre os 289 participantes, 71,0% já ouviram falar sobre o desgaste dentário erosivo, com menor percentual entre os pacientes ($p<0,001$). Alunos e docentes frequentemente mencionaram transtornos alimentares e dieta ácida como os principais fatores etiológicos para o desgaste erosivo ($p<0,001$). No entanto, os pacientes relataram bactérias ($p=0,026$) e má higiene bucal ($p=0,002$) como fatores etiológicos. A comparação entre os resultados atuais e o estudo anterior não mostrou aumento significativo quanto aos participantes que tinham ouvido falar sobre a essa implicação dentária ($p>0,499$). Também não houve melhora no conhecimento do desgaste erosivo entre os pacientes ($p>0,227$), e nenhuma diferença significativa quando eles foram questionados se haviam recebido recomendações preventivas dos alunos ($p=0,303$). No entanto, houve uma melhora significativa em todas as variáveis em relação às habilidades diagnósticas dos alunos ($p<0,005$) e no conhecimento dos sinais e sintomas do desgaste erosivo entre os docentes ($p=0,030$). Em conclusão, o conhecimento do desgaste dentário erosivo ainda não está totalmente incorporado pela amostra. No entanto, houve uma melhoria nas habilidades de diagnóstico dos alunos e docentes desde o último estudo, realizado em 2010.

Descritores: Educação em Odontologia. Estudantes de Odontologia. Docentes de Odontologia. Pacientes. Erosão Dentária. Conhecimento

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