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DENTISTRY STUDENTS' KNOWLEDGE ON THE MANAGEMENT OF NON-CARIOUS LESIONS

CONHECIMENTO DE DISCENTES DE ODONTOLOGIA SOBRE O MANEJO DE LESÕES NÃO CARIOSAS

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ABSTRACT: In recent decades, there has been an increase in the occurrence of non-carious lesions (NCLs) resulting mainly from erosive tooth wear. **Objective**: To assess the knowledge of students at two private dental institutions regarding the diagnosis and management of NCLs. **Method:** An *online* questionnaire was sent to students from the 5th semester onwards via a messaging application. For 3 months, socio-economic data and data on the diagnosis and management of NCLs were collected. All data was tabulated and stored in the SPSS 22.0 program and descriptive analyses were carried out. **Results:** The sample for this study consisted of 64 participants who answered the questionnaire in full. Of the total number of participants, 36 (56.3%) were from Rio de Janeiro and 28 (43.8%) from São Paulo. Most students (96.9%) considered that the condition had a multifactorial etiology, tried to distinguish the different types of alterations and, to this end, probably used an auxiliary method in the diagnosis (51.6%). The use of a desensitizing agent was considered by 89.1% of respondents. For restorative treatment, absolute isolation (57.8%), gingival retreatment techniques (79.7%) and an enamel bevel (60.9%) were present in the responses. **Conclusion:** The students at the private educational institutions taking part in this study demonstrated satisfactory knowledge in relation to the diagnosis and treatment of NCLs.

KEYWORDS: Tooth Abrasion; Tooth Wear; Erosion.

RESUMO: É possível perceber que o aumento da ocorrência de Lesões Não Cariosas (LNCs), resultantes principalmente do desgaste dental erosivo, vem aumentando nas últimas décadas. **Objetivo**: Avaliar o conhecimento de discentes de duas instituições privadas de Odontologia em relação ao diagnóstico e manejo das LNC. **Método:** Foi enviado um questionário *online* direcionado a discentes do 5º semestre em diante através de um aplicativo de mensagens. Durante 3 meses, dados socioeconômicos e sobre o diagnóstico e manejo das LNCs foram coletados. Todos os dados foram tabulados e armazenados no programa SPSS 22.0, e análises descritivas foram realizadas. **Resultados:** A amostra deste estudo foi composta por 64 participantes que responderam ao questionário por completo. Dentre o total de participantes, 36 (56,3%) eram do RJ e 28 (43,8%) da instituição de SP. A grande maioria dos discentes (96,9%) considerou que a condição tinha uma etiologia multifatorial, e procuraram distinguir os diferentes tipos de alterações, para isso, provavelmente foi utilizado um método auxiliar no diagnóstico (51,6%). O uso de um agente dessensibilizante foi considerado por 89,1% dos respondentes. Para o tratamento restaurador, isolamento absoluto (57,8%), técnicas de afastamento gengival (79,7%) e um bisel em esmalte (60,9%) estavam presentes nas respostas. **Conclusão:** Os discentes das instituições de ensino privadas participantes deste estudo demonstraram um conhecimento satisfatório em relação ao diagnóstico e tratamento das LNCs.

PALAVRAS-CHAVE: Abrasão Dentária; Desgaste Dentário; Erosão.

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INTRODUCTION

Prevention strategies, together with awareness of self-care, have contributed to the evolution of dentistry towards increasingly less invasive procedures. In contrast to this situation, there has been an increase in the incidence of non-carious lesions (NCLs) in recent decades, mainly due to the maintenance of teeth and the modern habits that accompany today's lifestyle. It is known that a diet rich in acidic drinks contributes to an increase in the incidence of tooth wear. This trend is especially prevalent among young people aged between 20 and 35 years old.[1–3]

Among dental wear without bacterial involvement are non-carious lesions characterized by the loss of dental tissue in the region close to the amelocementary junction or on the occlusal faces.[4,5] Thus, due to the loss of periodontal conjunctival insertion and dentin exposure caused by tooth wear, external stimuli (chemical, thermal, tactile and osmotic) can act and trigger dentin hypersensitivity, leading to a negative impact on quality of life.[6]

It is known that NCLs do not act in isolation and have a multifactorial character.[7] With regard to its frequency, a systematic review[8] found a worldwide prevalence of 46.7%, which was higher in older populations. The South American population, especially the Brazilian population, had the highest prevalence, 69%. In the Asian population, prevalence was 61% and in the American population, prevalence was 19%. The authors[8] pointed out that differences in study methodology, such as the inclusion of only abfraction and defects larger than 2mm, led to a reduction in this prevalence in the Americans. CNLs affect more teeth in the maxilla than in the mandible and the most affected teeth are the premolars[7].

There has also been a growing number of young patients with NCLs associated with dentinal hypersensitivity.[9] It is known that managing these lesions goes beyond simply covering them with composite resin. Health education, knowledge and the application of scientifically-based therapeutic protocols are essential to ensure the stability of the alterations and an effective and safe treatment. These protocols range from the use of desensitizing agents to the appropriate choice of restorative materials and adhesion techniques. From this perspective, the use of available scientifically-based treatment protocols is of fundamental importance in the clinical practice of dental surgeons.

It is essential that, during their academic training, students have access to up-to-date studies and learn to critically evaluate the available evidence. This prepares them to make well-founded clinical decisions and to apply the best treatments according to each patient's needs. In view of the above, the aim of this pilot study was to assess the knowledge of undergraduate students at two private dental institutions in relation to the diagnosis and management of CNL.

METHODOLOGY

This pilot study was cross-sectional, observational and descriptive in nature. It was previously submitted for evaluation and approval by the Research Ethics Committee of the School of Dentistry of the Federal University of Rio de Janeiro (6.701.479).

RESEARCH PARTICIPANTS

The study used a convenience sample of dental students from two private educational institutions: a university in Rio de Janeiro (RJ) and a college in Jundiaí (SP). Only students from the 5th

semester of the course were included, since they had already acquired basic knowledge for clinical practice and could already be experiencing patient care. The institutions were chosen because they had links with the researchers included in the project.

RESEARCH TOOLS

From 20/03/2024 to 01/06/2024, the researchers involved sent *an invitation via WhatsAp with access to a link* on Google's *"forms"* platform. Through this *link,* the participant accessed the Informed Consent Form. The invitation was sent to students in general, class representatives and those involved in academic leagues. After agreeing to participate, the students were given access to a questionnaire containing sociodemographic data (gender, age, self-declared skin color, schooling, family income, university/college of dentistry and semester) and then a questionnaire on NCLs. The questionnaire used was previously published[10] by researchers from the Veiga de Almeida University, however, it was modified and reduced in order to make it suitable and more concise for dentistry students. The students were invited to take part in the research freely and voluntarily, respecting their privacy in accordance with the General Law on the Protection of Personal Data.

To analyze the level of knowledge, the references used in this article were used as a scientific basis. A satisfactory level of knowledge was considered when more than 70% of positive responses were observed in questions 2, 5, 6, 8, 9 and 10 (depending on the depth). Also, within this panorama, question 1 was considered satisfactory if the student answered the multifactorial item. Results with less than 70% positive answers were considered unsatisfactory knowledge. Questions 3 and 4 were used to find out what content was being taught to undergraduates. Question 7 sought to analyze the search for knowledge on the subject outside the institutional environment.

DATA ANALYSIS

The data was computed and analyzed descriptively using SPSS (Statistical Package for the Social Sciences) 22.0 software.

RESULTS

The sample for this study consisted of 64 participants who answered the questionnaire and the objective questionnaire in full. Table 1 shows that most of the participants were women (78.1%), with an average age of 27.5 (SD: 7.4 years) and a family income of 1-3 minimum wages (35.9%). Of all the participants, 36 (56.3%) were from a private institution in Rio de Janeiro and 28 (43.8%) from São Paulo. In terms of semesters completed, most of the respondents (31.2%) were between the 5th and 6th semester.

Most students (96.9%) considered that the condition had a multifactorial etiology, tried to distinguish the different types of alterations and, to this end, probably used an auxiliary method in the diagnosis (51.6%). The use of a desensitizing agent was considered by 89.1% of respondents. For restorative treatment, absolute isolation (57.8%), gingival retreatment techniques (79.7%) and an enamel bevel (60.9%) were present in the responses.

According to the depth of treatment, the majority of participants (82.8%) chose to use a lining with glass ionomer cement. In addition, 73.8% of the participants considered using selective phosphoric acid on enamel if they opted for the self-etching adhesive system, according to the results shown in

Table 2. Table 2 also shows that most students reported that they had not attended any courses or lectures on the subject.

The results obtained indicated that most students had a satisfactory knowledge of non-carious lesions.

Table 1 – Data characterizing the sample in the cities of Rio de Janeiro, RJ and Jundiaí, SP, Brazil, in 2024.

Variable	n	%
Course City		
Jundiaí	28	43,8
Rio de Janeiro	36	56,3
Gender		
Women	50	78,1
Men	12	18,8
No reply	2	3,1
Race		
White	40	62,5
Brown	18	28,1
Black	4	6,3
No reply	2	3,1
Family income (minimum wage)		
1 to 3	23	35,9
4 to 6	22	34,4
7 to 10	9	14,1
Over 10	10	15,6
Semester		
10º	9	14,1
9º	5	7,8
8º	14	21,9
7º	10	15,6
6º	10	15,6
5º	16	25

Table 2 – Results of the questionnaire carried out with undergraduate students in the cities of Rio de Janeiro, RJ and Jundiaí, SP, Brazil, in 2024.

Variables	n	%
1) What is the etiology of NCL?		
Multifactorial	62	96,9
Unifactorial	1	1,6
Could not answer	1	1,6
2) In cases of NCL, do you try to distinguish between abfraction, abrasion and/or biocorrosion lesions ?		
Yes	57	89,1
No	7	10,9
3) Do you use any auxiliary methods to diagnose NCL?		
Yes	33	51,6
No	31	48,4
4) Do you use a specific type of questionnaire to diagnose NCLs?		
Yes	33	51,6
No	31	48,4
5) Is occlusal analysis important in the diagnosis?		
Yes	61	95,4
No	3	4,7
6) Do you recommend the use of desensitizing agents to help control dentin hypersensitivity?		
Yes	57	89,1
No, just covering the lesion	7	10,9
7) Have you ever attended a course or lecture on NCLs?		
Yes	28	43,8
No	36	56,3
8) For the restorative treatment of NCLs, do you think it is necessary to use gingival retraction/removal techniques?		
Yes, depending on the case	51	79,7
No	13	20,3
9) Do you think it is necessary to bevel the enamel before restoring the NCLs?		
Yes	39	60,9
No	25	39,1
10) Do you think it is necessary to line with IVC** or modified IVC before restoring with composite resin?		
Yes, always	1	1,6
Yes, depending on depth	53	82,8
Never	10	15,6

NCL: non-carious lesion. CIV: glass ionomer cement.

DISCUSSION

NCLs are frequently seen in the dentition of young patients and can compromise the longevity of affected teeth. Given the importance of proper diagnosis and treatment of NCLs, this study assessed the knowledge of dental students at two private educational institutions. A satisfactory knowledge of the subject acquired during the course was observed, since the majority of students reported not having taken part in courses or lectures on the subject.

NCLs are multifactorial in nature, according to the majority of responses obtained by the participants (96.9%). It is essential to consider the information gathered in the anamnesis, the extraoral, intraoral, periodontal and occlusal clinical examinations for a proper diagnosis. The vast majority of students reported trying to distinguish between abfraction, abrasion and/or biocorrosion lesions, making it clear that information from different sources was necessary to achieve this detailed diagnosis. Just over half of the participants also reported using auxiliary diagnostic methods. This result differed

from that found in a previous study of dental surgeons[10], showing that knowledge has improved over the years.

With regard to the use of desensitizers, a large proportion of students (89.1%) indicated the use of desensitizers in accordance with currently recommended treatment protocols. Potassium nitrate is a chemical agent with neural action and is considered effective. It acts on nerve impulse transmission, preventing repolarization from occurring. Depolarization occurs when the concentration of potassium ions increases in the nerve endings, inactivating the action potential and preventing pain. Its effect is interrupted when the product is no longer used.[11,12]

When asked about the form of insulation, 56.9% said that they recommend absolute insulation. They were probably since the use of a rubber dam produces better humidity control. One of the challenges of this method is gingival recession, especially in thin periodontium. However, the existing difficulties can be circumvented through modification techniques with additional clamps and stabilizers. In addition, the use of a gingival retraction wire associated with relative isolation can also be an alternative method.[13]

The sandwich technique consists of lining with glass ionomer cement (GIC) with subsequent coating with composite resin (CR), and has shown interesting retention rates in the dentin of teeth with NCL when compared to restorations with CR alone.[14] In this study, most of the students (82.8%) said that they recommend using this technique depending on the depth of the NCL, demonstrating mastery of important concepts in the adhesion of restorative materials. Furthermore, the sandwich technique is even more advantageous as it reduces the polymerization contraction inherent in composite resins.[15]

It is known that adhesion to enamel is a relatively simple technique, while adhesion to dentin represents a major challenge. In addition, NCLs exhibit a dentin surface layer with altered physical properties due to the body's natural defense mechanisms, making demineralization of this region an even more challenging process.[14] Although long-term clinical success has been achieved with total conditioning systems, the demand for simplified application has increased, resulting in self-etching adhesive systems.[16] Self-conditioning adhesives applied after etching with phosphoric acid followed by rinsing restricted to enamel tend to achieve better clinical results.[17] In this study, the majority of students (73.8%) opted for the use of selective phosphoric acid on enamel with the use of this type of system, indicating up-to-date knowledge on the subject. There is no conclusive scientific evidence in the literature as to whether or not to use bevels in cervical restorations; however, the majority of participants reported using this additional resource during restorations. It is worth noting that “the absence of evidence does not imply evidence of absence”, a phrase popularized and well discussed in an editorial[18] which emphasizes the relevance of research in dentistry, highlighting its importance in training dentists and characterizing it as an essential tool for professional development and improving clinical practice.

The survey showed that most students had not attended any courses or lectures on the subject. This result is noteworthy since, due to the relevance of the topic, it is very common to find it highlighted at academic congresses and conferences. On the other hand, it may be that the search for complementary content beyond that discussed during the undergraduate course is not happening in this population.

The research was carried out using data collected through a questionnaire which has limitations inherent to the instrument itself, such as memory bias. Another limitation of this research was the low rate of student participation. It is believed that the way the participants were recruited was poorly planned and consequently a small number of students were interested in taking part in the research. Given the small sample, the researchers opted to carry out a descriptive analysis and not separate the

results between the institutions involved. It is worth noting that the participation of students in scientific research should be encouraged and valued, as it helps to develop critical thinking, essential skills and an understanding of science. This allows them to apply theoretical concepts in practice, contributing to the advancement of knowledge and innovative solutions. It's worth highlighting here the advantage of using an *online* platform for research with young adults. Accessibility, convenience, agility in data collection, a reduced cost and sustainability by avoiding the use of paper are all positive points when using this type of instrument.

CONCLUSION

It can be concluded that students at both educational institutions have satisfactory knowledge of the protocol for diagnosing and treating NCLs, in line with current scientifically-based studies.

Due to the growing number of cases caused by exposure to etiological factors and the aging of the population, prevention should always be emphasized, and new studies are of fundamental importance to establish restorative techniques and materials with positive long-term results.

REFERENCES

1. Schlueter N, Luka B. Erosive tooth wear - A review on global prevalence and on its prevalence in risk groups. Br Dent J. 2018;224(5). https://doi.org/10.1038/sj.bdj.2018.167
2. Schlueter N, Amaechi BT, Bartlett D, et al. Terminology of Erosive Tooth Wear: Consensus Report of a Workshop Organized by the ORCA and the Cariology Research Group of the IADR. Caries Res. 2020;54(1). https://doi.org/10.1159/000503308
3. Pereira MLD, Silva RCB da, Augusto C de AF, et al. Social, nutritional, and behavioral aspects associated with erosive tooth wear - considerations and preventive aspects. Res Soc Dev. 2021;10(1). https://doi.org/10.33448/rsd-v10i1.11897
4. Lyttle HA, Sidhu N, Smyth B. A study of the classification and treatment of noncarious cervical lesions by general practitioners. J Prosthet Dent. 1998;79(3). https://doi.org/10.1016/S0022-3913(98)70248-3
5. Yoshizaki KT, Francisconi-dos-Rios LF, Sobral MAP, Aranha ACC, Mendes FM, Scaramucci T. Clinical features and factors associated with non-carious cervical lesions and dentin hypersensitivity. J Oral Rehabil. 2017;44(2). https://doi.org/10.1111/joor.12469
6. Telles D, Pegoraro LF, Pereira JC. Incidence of noncarious cervical lesions and their relation to the presence of wear facets. J Esthet Restor Dent. 2006;18(4). https://doi.org/10.1111/j.1708-8240.2006.00015.x
7. Demarco FF, Cademartori MG, Hartwig AD, et al. Non-carious cervical lesions (NCCLs) and associated factors: A multilevel analysis in a cohort study in southern Brazil. J Clin Periodontol. 2022;49(1). https://doi.org/10.1111/jcpe.13549
8. Teixeira DNR, Thomas RZ, Soares PV, Cune MS, Gresnigt MMM, Slot DE. Prevalence of noncarious cervical lesions among adults: A systematic review. J Dent. 2020;95. https://doi.org/10.1016/j.jdent.2020.103285
9. Favaro Zeola L, Soares PV, Cunha-Cruz J. Prevalence of dentin hypersensitivity: Systematic review and meta-analysis. J Dent. 2019;81. https://doi.org/10.1016/j.jdent.2018.12.015
10. Modena RA, Pires AFS, Tannure PN, Cavalcante LMA, Schneider LFJ. Conhecimento de cirurgiões-dentistas sobre o diagnóstico e o tratamento de lesões cervicais não cariosas: um estudo piloto em rede colaborativa. Rev da Fac Odontol - UPF. 2016;21(2). https://doi.org/10.5335/rfo.v21i2.5795

11. Moura GF, Zeola LF, Silva MB, Sousa SC, Guedes FR, Soares PV. Four-session protocol effectiveness in reducing cervical dentin hypersensitivity: A 24-week randomized clinical trial. Photobiomodulation, Photomedicine, Laser Surg. 2019;37(2). https://doi.org/10.1089/photob.2018.4477
12. Ahmed DRM, Shaath DG, Alakeel JB, Samran AA. Influence of Diode Laser for the Treatment of Dentin Hypersensitivity on Microleakage of Cervical Restorations. Biomed Res Int. 2021;2021. https://doi.org/10.1155/2021/9984499
13. Goodacre CJ, Eugene Roberts W, Munoz CA. Noncarious cervical lesions: Morphology and progression, prevalence, etiology, pathophysiology, and clinical guidelines for restoration. J Prosthodont. 2023;32(2). https://doi.org/10.1111/jopr.13585
14. de Paula AM, Boing TF, Wambier LM, et al. Clinical performance of non-carious cervical restorations restored with the “Sandwich Technique” and composite resin: A systematic review and meta-analysis. J Adhes Dent. 2019;21(6). https://doi.org/10.3290/j.jad.a43696
15. Bezerra IM, Brito ACM, de Sousa SA, Santiago BM, Cavalcanti YW, de Almeida L de FD. Glass ionomer cements compared with composite resin in restoration of noncarious cervical lesions: A systematic review and meta-analysis. Heliyon. 2020;6(5). https://doi.org/10.1016/j.heliyon.2020.e03969
16. Digole V, Warhadpande M, Dua P, Dakshindas D. Comparative evaluation of clinical performance of two self-etch adhesive systems with total-etch adhesive system in noncarious cervical lesions: An in vivo study. J Conserv Dent. 2020;23(2). https://doi.org/10.4103/JCD.JCD_166_20
17. Gonçalves DFM, Shinohara MS, Carvalho PRMDA, et al. Three-year evaluation of different adhesion strategies in non-carious cervical lesion restorations: A randomized clinical trial*. J Appl Oral Sci. 2021;29. https://doi.org/10.1590/1678-7757-2021-0192
18. Feres M, Feres MFN. Absence of evidence is not evidence of absence. J Appl Oral Sci. 2023;31. https://doi.org/10.1590/1678-7757-2023-ed001