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The Prevalence of Non-Carious Cervical Lesions and Their Associated Risk Factors among Students at Babol Dental School in 2023

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ABSTRACT

Background and Objective: Being aware of the prevalence and risk factors associated with non-carious cervical lesions (NCCLs) is of great importance for their prevention and clinical management. Accordingly, this study was conducted to examine the frequency of NCCLs and the risk factors associated with them among students of Babol Dental School.

Methods: This observational-analytical study was conducted on 210 students of Babol Dental School. A questionnaire containing demographic information and questions related to hygiene and dietary habits was provided to the participants. Then, each student was examined, and the teeth were scored based on the Smith and Knight index. The frequency of NCCLs was investigated according to sex, location and characteristics of the lesion, and its association with the involved jaw, toothbrushing method, diet, and gastroesophageal reflux.

Findings: Of the 210 students, 47 (22.4%) had NCCL lesions. The frequency of lesions did not show a significant relationship with sex, involved jaw, type and method of toothbrushing, frequency of consuming fruit, pickles, and soft drinks, smoking, gastroesophageal reflux, or dry mouth; however, the frequency of lesions demonstrated a statistically significant difference in terms of anterior or posterior position and buccal or lingual location ($p<0.001$ and $p=0.001$, respectively), and most lesions were anterior (61.7%) and buccal (57.4%). Furthermore, the frequency of lesions had a significant relationship with bulimia nervosa ($p=0.03$).

Conclusion: According to the results of the present study, no relationship was found between hygiene and dietary habits and the presence of NCCLs. However, a significant relationship was observed between bulimia nervosa and NCCLs.

Keywords: *Tooth Wear, Dental, Prevalence, Bulimia.*

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Introduction

Non-carious cervical lesions (NCCLs) are a clinical condition associated with the loss of dental tissue near the gingival margin and around the cementoenamel junction. On clinical examination, NCCL lesions appear smooth, hard, and light yellow or dark brown in color, and extend toward the root surface. These lesions are not associated with dental caries and have no relationship with bacteria (1-4). Non-carious cervical lesions are also referred to by the terms abfraction lesions, cervical wear, cervical abrasions, abfraction-like cervical lesions, and vestibular cervical dental abfraction (5).

The morphological characteristics of NCCLs are distinguished by two distinct patterns: wedge-shaped lesions with sharp internal line angles and saucer-shaped lesions with wider and more rounded line angles. To classify the morphology of wedge-shaped NCCL lesions, Sugita introduced an edge-angle scale: <45°, 45-90°, 90-135°, and >135° (6). Each of these lesion types is associated with various factors; unfortunately, the relative contribution of these different etiological factors to the development and progression of these lesions remains unclear (7, 8).

In 1908, Black proposed several possible etiological factors for the formation of these lesions, including incomplete tooth formation, friction caused by abrasive tooth powder, the action of an unknown acid secreted by the patient's salivary gland, physiological resorption such as that observed in primary teeth, and the effect of alkaline fluids on calcium salts. Experimentally, neither friction caused by abrasive tooth powder nor the action of acids produced lesions with sharp and clean margins like those found in the oral cavity, nor were alkalis able to dissolve enamel and dentin until calcium salts had been removed. Therefore, Black concluded that he had no theory to offer that could explain the formation of these lesions (9). Today, NCCLs are considered a common pathological phenomenon resulting from changes in lifestyle and diet, with their prevalence and severity increasing with age (10).

What is accepted as the etiology of non-carious cervical lesions (NCCLs) is that NCCLs are not caused by a single factor but are multifactorial, representing a combination of attrition and abrasion wear, biocorrosion, and occlusal risk factors such as occlusal interference during jaw movements, heavy occlusal forces in parafunctional habits such as bruxism, and premature contacts during movement from centric occlusion to maximum intercuspation (5, 11).

Predominantly, occlusal compressive forces along with tensile stresses cause flexure in the cervical regions of teeth, resulting in the loss of microstructures of dental tissue—dentin and enamel—and ultimately disruption and dissolution of hydroxyapatite crystals; this is hypothesized to have a positive association with the formation of NCCLs. Additionally, improper use of a toothbrush or acid erosion can also be considered among the factors involved in the occurrence of this lesion (12).

Biocorrosion and tooth wear are also among the proposed mechanisms for the initiation and progression of NCCLs. The simultaneous occurrence of these factors can also accelerate lesion progression. The biocorrosion mechanism associated with NCCLs occurs through the action of endogenous and exogenous acids that cause demineralization of dental tissues. Endogenous acids are produced and released from the stomach and reach the mouth as a result of gastroesophageal reflux disease or neurotic eating disorders (bulimia), whereas exogenous acids affect dental tissues through an acidic diet or occupational exposure. Dietary habits, including the consumption of acidic beverages and alcoholic drinks, are also associated with tooth erosion (1). The pooled prevalence of non-carious cervical lesions worldwide has been reported as 4.7%; nevertheless, considerable variation exists in the reported prevalence rates of non-carious cervical lesions across studies, ranging from 5% to 85%, 9.1% to 93%, and 0.8% to 85.7% (12-14).

Students have long study hours, psychological stress, and physical inactivity, which increase the risk of physical injury, particularly to the teeth. On the other hand, given their different lifestyle—which increases the interaction between stress, erosion, and friction—these individuals may be predisposed to the development or worsening of NCCLs. Differences in implementation methods in terms of sample size, age, and type of study population, as well as the naming and definition of lesions and diagnostic and assessment methods, contribute to the variation in reported prevalence rates of NCCL lesions. NCCLs may compromise esthetics and function. Awareness of their prevalence, characteristics, and etiology among different populations can enhance clinical management and the success of required restorative treatments. Since no study has been conducted to date regarding the frequency of non-carious cervical lesions and their associated risk factors among the dental student population of Babol University of Medical Sciences, and given the contradictions in previous study data, this study was conducted to investigate the frequency of non-carious cervical lesions and their associated risk factors among students of Babol Dental School.

Methods

Following approval by the Ethics Committee of Babol University of Medical Sciences (IR.MUBABOL.REC.1402.057), this observational-analytical study enrolled 210 students who were studying at Babol Dental School at the time of the investigation. A questionnaire containing demographic information and questions regarding hygiene and dietary habits was prepared and, after explanation by a senior dental student (examiner) under the supervision of a restorative dentistry specialist and with the permission of the participating student, was completed. Participants were then subjected to an oral examination using a probe, mirror, and dental unit light, and the teeth were examined for the presence of non-carious cervical lesions. Each tooth was scored based on the Smith and Knight index (5) (Table 1).

Table 1. The Smith and Knight Index

Score	Criterion
1	Minor change in contour
2	Lesion with a depth of less than 1 mm
3	Lesion with a depth of 1–2 mm
4	Lesion with a depth of more than 2 mm or exposure of the pulp or secondary dentin

Additionally, the morphological characteristics of NCCL lesions were evaluated in terms of the angle formed at the pulpal wall (triangular, rounded, and combined) and the position of the lesion relative to the free gingiva (supragingival or subgingival). The presence or absence of dentin hypersensitivity was also assessed using a tactile stimulus (probe) by drawing across the lesion surface in two axes, axial and mesiodistal. Furthermore, the presence or absence of parafunctional habits was determined by observing flattened cusps. Gingivitis was confirmed upon observation of marginal gingival inflammation, and periodontitis was confirmed in the presence of attachment loss. Joint disorder was assessed in the presence of sound or pain in the TMJ region during mouth opening and closing.

Students were assigned one point based on hygiene and dietary habits related to the factors causing NCCLs mentioned in the questionnaire, for each of the following items: brushing more than twice a day, using a hard toothbrush or whitening toothpaste, brushing horizontally and with excessive force, gastroesophageal acid reflux, being a smoker, and consuming fruit, pickles, or drinking sweet carbonated beverages more than once a day. Students who received a score of 5 or more were placed in the at-risk group for NCCL development.

Data were analyzed using SPSS version 26 (Inc., Chicago, United States) with descriptive statistics and chi-square and Fisher's exact tests; $p<0.05$ was considered significant.

Results

In this study, 210 students with a mean age of 22.37±3.17 years were examined, of whom 60% were male. Forty-seven students (22.4%) had NCCL lesions. Based on hygiene and dietary habits, only 3 students (1.4%) were at risk of developing NCCLs. Examination results showed that 42 students (20.0%) had NCCLs alone, 11 students (5.2%) had dentin hypersensitivity alone, and 5 students (2.4%) had NCCLs accompanied by dentin hypersensitivity. Among the students, only 4 (1.9%) had temporomandibular joint disorder, and the others did not. Furthermore, 165 students (78.6%) had healthy periodontal status, 43 students (20.5%) had gingivitis, and only 2 students (1.0%) had periodontitis. 198 students (94.3%) had no parafunctional habits, and of the 12 cases with parafunctional habits, 8 (3.8%) had bruxism and 4 (1.9%) had clenching. 199 students (94.8%) had no flattened cusps, and 11 students (5.2%) had flattened cusps. Table 2 shows the frequency of lesions based on the involved jaw, anterior-posterior position, and buccal-lingual location. Differences in position ($p<0.001$) and lesion location ($p=0.001$) were statistically significant.

The frequency of rounded lesions (53.2%) was significantly higher than other forms ($p=0.009$). The frequency of lesions based on lesion position relative to the gingiva was statistically different ($p<0.001$), such that supragingival lesions (74.5%) had the highest frequency and combined supra- and subgingival lesions (17%) had the lowest frequency. Grade 1 had the highest frequency and grade 3 the lowest frequency among the lesions, and grade 4 was not observed (Table 2).

Table 2. Frequency of lesions based on the involved jaw, position, location, morphology, position relative to the gingiva, and lesion grade

Variable	Number(%)	p-value*
Involved jaw		
Maxilla	13(27.7)	
Mandible	14(29.8)	0.401
Both	20(42.6)	
Anterior-posterior position of the lesion		
Anterior	29(61.7)	
Posterior	1(2.1)	<0.001
Both	17(36.2)	
Buccal-lingual location of lesions		
Buccal	27(57.4)	
Lingual	6(12.8)	0.001
Both	14(29.8)	
Lesion position		
Supragingival	35(74.5)	
Subgingival	14(29.8)	<0.001
Combined	8(17)	
Lesion grade		
Grade 1	42(89.4)	
Grade 2	4(8.5)	<0.001
Grade 3	1(2.5)	

Grade 4	0(0)	
Morphology		
Rounded	25(53.2)	
Triangular	14(29.8)	0.009
Combined	8(17.0)	

*Chi-square test

The frequency of NCCLs by sex, toothbrushing frequency, type of toothpaste used, and toothbrushing intensity did not show a statistically significant difference (Table 3). The frequency of NCCLs by toothbrushing method, frequency of fruit consumption, frequency of pickle consumption, frequency of soft drink consumption, frequency of smoking, gastroesophageal reflux, dry mouth, and bulimia is presented in Table 4. Among these, a significant relationship was observed only between NCCL lesions and bulimia (p=0.03).

Table 3. Frequency of NCCLs according to sex, toothbrushing frequency, type of toothpaste used, toothbrushing intensity, and toothbrushing method

Variable	NCCL		p-value*
	Present Number(%)	Absent Number(%)	
Sex			
Female	17(20.2)	67(79.8)	0.543
Male	30(23.8)	96(76.2)	
Toothbrushing frequency			
Once a day	24(25.3)	71(74.7)	
Twice a day	18(20.0)	72(80.0)	0.842
More than twice a day	4(20.0)	16(80.0)	
Once or several times a week or month	1(20.0)	4(80.0)	
Type of toothpaste used			
Regular	34(22.7)	116(77.3)	
Anti-sensitivity	8(25.8)	23(74.2)	0.720
Whitening	5(17.2)	24(82.8)	
Toothbrushing intensity			
Low	3(25.0)	9(75.0)	
Moderate	36(20.3)	141(79.7)	0.178
High	8(38.1)	13(61.9)	
Toothbrush type			
Soft	12(19.4)	50(80.6)	
Medium	34(23.3)	112(76.7)	0.529
Hard	1(50.0)	1(50.0)	
Toothbrushing method			
Horizontal	2(15.4)	11(84.6)	
Vertical	11(39.3)	17(60.7)	
Rotational	5(23.8)	16(76.2)	0.186
Vibratory (electric toothbrush)	2(12.5)	14(87.5)	
Combined	27(20.5)	105(79.5)	

*Chi-square test

Table 4. Frequency of NCCLs according to the frequency of fruit consumption, frequency of pickle consumption, frequency of soft drink consumption, frequency of smoking, gastroesophageal reflux, dry mouth, and bulimia

Variable	NCCL		p-value*
	Present Number(%)	Absent Number(%)	
Frequency of fruit consumption			
Once or more per day	28(28.9)	69(71.1)	0.205
Once or several times per week	16(17.4)	76(82.6)	
Several times a month, but not daily or weekly	2(12.5)	14(87.5)	
Never or rarely	1(20.0)	4(80.0)	
Frequency of pickle consumption			
Once or more per day	8(25.8)	23(74.2)	0.954
Once or several times per week	21(22.6)	72(77.4)	
Several times a month, but not daily or weekly	13(21.3)	48(78.7)	
Never or rarely	5(20.0)	20(80.0)	
Frequency of soft drink consumption			
Once or more per day	4(16.0)	21(84.0)	0.841
Once or several times per week	20(22.0)	71(78.0)	
Several times a month, but not daily or weekly	17(24.3)	53(75.7)	
Never or rarely	6(25.0)	18(75.0)	
Smoking frequency			
Never	32(20.4)	125(79.6)	0.28
Previously smoked	6(37.5)	10(62.5)	
Currently smoke	9(24.3)	28(75.7)	
Gastroesophageal reflux			
Yes	11(33.3)	22(66.6)	0.10
No	36(20.3)	141(79.7)	
Dry mouth			
Yes	6(24.0)	19(76.0)	0.836
No	41(22.2)	144(77.8)	
Bulimia			
Yes	7(43.8)	9(56.3)	0.033
No	40(20.6)	154(79.4)	

*Chi-square test

Discussion

The results of this study showed that the frequency of NCCLs among dental students of Babol University of Medical Sciences was 22.4%. No relationship was observed between hygiene and dietary habits and the prevalence of NCCLs. However, a significant relationship was observed between bulimia and the occurrence of NCCLs. In the study by Zuza et al., a significant relationship was also observed (15). However, in other studies, no significant relationship was observed between NCCLs and bulimia (16, 17). According to the study by Zuza et al., a decrease in dental surface pH to below 4.5 causes demineralization and accelerates the loss of enamel and dentin tissue, especially when mechanical and chemical factors

interact together, such as immediate toothbrushing, which leads to erosion, abrasion, and attrition. However, in that study, it was stated that despite all these points, the precise mechanism of wear caused by neurotic eating disorders such as bulimia is not exactly known (15). In the present study, the prevalence rate of NCCLs was observed to be higher in the anterior region (61.7%) than in the posterior region (2.1%). However, in the study by Upadhyay et al., it was determined that the highest prevalence of NCCLs was observed in premolars (55%) and molars (25%), with a decreased incidence in anterior teeth (central (2%), lateral (7%), and canine (8%)) (18).

In the present study, no significant relationship was observed between the frequency of soft drink consumption, smoking, and gastroesophageal reflux, which is consistent with the study by Teixeira et al. (5). However, in the study by Upadhyay et al., a relationship was found between the use of various beverages—which also has a high correlation with smoking—as external factors, and gastroesophageal reflux and vomiting as internal factors with the potential to cause wear due to low pH, and NCCL lesions (18). Skalsky Jarkander et al. also demonstrated the existence of a relationship between soft drink consumption and the prevalence of erosive lesions in their study (19).

In the study by Hasselkvist et al., despite the higher frequency of NCCLs among individuals who frequently consumed fruit, fruit juices, carbonated and energy drinks, no statistically significant relationship was recorded (20). This finding is consistent with the present study, which showed a higher prevalence of the lesion in individuals with more frequent fruit and soft drink consumption, but this difference was not statistically significant. The consumption of acidic pH beverages, particularly holding them in the mouth before swallowing, can increase the likelihood of demineralization of the tooth surface. In some studies, smoking has been claimed as a potential etiological factor for NCCLs, but no significant relationship between smoking and NCCL frequency was recorded in this study (20). Smoking and the heat generated by its consumption cause dry mouth and reduced salivary flow, which may affect tooth wear and the loss of integrity of the tooth surface structure.

In the present study, 2.1% of participants had severe wear. However, the study by Skalsky Jarkander et al. showed a prevalence of severe grade 3 and 4 wear of 18.3%, which is a higher prevalence than the present study, and according to the results of that study, wear was more prevalent (34.4%) and more severe in men than in women (28.2%), which is similar to the present study (19, 20). In the study by Teixeira et al., a difference in the distribution of NCCLs between men and women was also observed, which they attributed to greater chewing force (greater occlusal force) in men (5). In the study by Kolak et al., despite a higher percentage of men with multiple lesions, no significant difference was found in NCCL prevalence in relation to sex, similar to the present study (21).

The present study showed that NCCL frequency was higher in individuals who brushed with high intensity (38.1%), but this difference was not statistically significant. In the study by Teixeira et al., regarding the relationship between NCCLs and toothbrushing intensity, it was stated that the relationship between toothbrushing and NCCLs is largely inconclusive, and long-term projects should be conducted to determine with certainty whether this factor increases the incidence (5). However, in the study by Alvarez-Arenal et al., an increased prevalence of the lesion was observed, and this relationship was significant (22).

Such contradictory results may be related to differences between the study populations regarding diet, oral and dental hygiene habits, socioeconomic conditions, etc. Studies have shown that prolonged exposure of teeth to gastric acids leads to the dissolution of specific components of the tooth surface, loss and hypersensitivity of dentin, and severity of tooth wear and chemical degradation of structures. Regarding parafunctional habits, they are probably conducive to the loss of dental material in the cervical region; however, in this study, the opposite result was found, and no relationship was found in the present study,

which may be due to the applied method—which used a questionnaire and clinical examination to detect any occlusal wear instead of a laboratory method (5). In the present study, no significant relationship was observed between the type of toothpaste and NCCLs; however, in the study by Zimmer et al., a relationship was observed between abrasive toothpastes and NCCLs (16). In the present study, although NCCL prevalence increased slightly with increasing toothbrush hardness and among individuals using vertical brushing, no significant relationship was recorded between oral and dental hygiene factors and NCCL prevalence. This result is similar to the study by Kolak et al., which showed that although NCCL prevalence increased slightly with increasing toothbrush hardness and among individuals using horizontal brushing, no significant relationship was recorded between oral and dental hygiene factors and NCCL prevalence (21).

The present study showed that most of the lesions found (57.4%) were on the buccal surface, followed by both buccal and lingual surfaces (29.8%), which is consistent with the results of the study by Goodacre et al. (2). This can be attributed to the fact that the facial surface is more accessible for brushing compared to the lingual surface, and since the lingual surface of lower teeth is protected by the tongue and saliva produced by the submandibular and sublingual salivary glands, it is therefore less susceptible to wear. Dental hygiene habits such as daily brushing frequency, brushing technique, or toothbrush hardness are potentially important factors in the tooth wear process (21).

Since this study was conducted cross-sectionally, the causal relationship between some causes, factors, and the prevalence of NCCLs is unclear; consequently, longitudinal studies are needed to confirm these results. Additionally, the correlation between different variables in one group of individuals may appear by chance; therefore, a new sample population with a larger number of participants is necessary to obtain significant results.

The frequency of NCCLs in the population of 210 dental students of Babol was 22.4%. In this study, no relationship was observed between hygiene and dietary habits and the occurrence of NCCLs. However, a significant relationship existed between bulimia and NCCLs.

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References

1.Penoni DC, Gomes Miranda MEDSN, Sader F, Vettore MV, Leão ATT. Factors Associated with Noncarious Cervical Lesions in Different Age Ranges: A Cross-sectional Study. Eur J Dent. 2021;15(2):325-31.
2.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):e1-18.
3.Yu DH, Jia LL, Li JY. [Effects of various surface treatments on the bonding efficacy of noncarious cervical sclerotic lesions]. Hua Xi Kou Qiang Yi Xue Za Zhi. 2020;38(4):438-42. [Chinese]
4.Lai ZY, Zhi QH, Zhou Y, Lin HC. Prevalence of non-carious cervical lesions and associated risk indicators in middle-aged and elderly populations in Southern China. Chin J Dent Res. 2015;18(1):41-50.
5.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;95:103285.
6.Sugita I, Nakashima S, Ikeda A, Burrow MF, Nikaido T, Kubo S, et al. A pilot study to assess the morphology and progression of non-carious cervical lesions. J Dent. 2017;57:51-6.
7.Yoshizaki KT, Francisconi-Dos-Rios LF, Sobral MA, Aranha AC, Mendes FM, Scaramucci T. Clinical features and factors associated with non-carious cervical lesions and dentin hypersensitivity. J Oral Rehabil. 2017;44(2):112-8.
8.Hayashi M, Kubo S, Pereira PNR, Ikeda M, Takagaki T, Nikaido T, et al. Progression of non-carious cervical lesions: 3D morphological analysis. Clin Oral Investig. 2022;26(1):575-83.
9.Abdalla R, Mitchell RJ, Ren YF. Non-carious cervical lesions imaged by focus variation microscopy. J Dent. 2017;63:14-20.
10.Peumans M, Politano G, Van Meerbeek B. Treatment of noncarious cervical lesions: when, why, and how. Int J Esthet Dent. 2020;15(1):16-42.
11.Silva AG, Martins CC, Zina LG, Moreira AN, Paiva SM, Pordeus IA, et al. The association between occlusal factors and noncarious cervical lesions: a systematic review. J Dent. 2013;41(1):9-16.
12.Du JK, Wu JH, Chen PH, Ho PS, Chen KK. Influence of cavity depth and restoration of non-carious cervical root lesions on strain distribution from various loading sites. BMC Oral Health. 2020;20(1):98.
13.Soares ARDS, Chalub LLFH, Barbosa RS, Campos DEP, Moreira AN, Ferreira RC. Prevalence and severity of non-carious cervical lesions and dentin hypersensitivity: association with oral-health related quality of life among Brazilian adults. Heliyon. 2021;7(3):e06492.
14.Johansson AK, Lingström P, Birkhed D. Comparison of factors potentially related to the occurrence of dental erosion in high- and low-erosion groups. Eur J Oral Sci. 2002;110(3):204-11.
15.Zuza A, Racic M, Ivkovic N, Krunic J, Stojanovic N, Bozovic D, et al. Prevalence of non-carious cervical lesions among the general population of the Republic of Srpska, Bosnia and Herzegovina. Int Dent J. 2019;69(4):281-8.
16.Zimmer R, Barbosa GF, Portella FF, Soares PV, Reston EG. Association between non-carious cervical lesions, dentin hypersensitivity and anxiety in young adults: A cross-sectional study. J Dent. 2025;153:105563.
17.Otsu M, Hamura A, Ishikawa Y, Karibe H, Ichijyo T, Yoshinaga Y. Factors affecting the dental erosion severity of patients with eating disorders. Biopsychosoc Med. 2014;8:25.
18.Upadhyay D, Panchal MA, Dubey RS, Srivastava VK. Corrosion of alloys used in dentistry: A review. Materials Science and Engineering: A. 2006;432(1-2):1-11.
19.Skalsky Jarkander M, Grindefjord M, Carlstedt K. Dental erosion, prevalence and risk factors among a group of adolescents in Stockholm County. Eur Arch Paediatr Dent. 2018;19(1):23-31.
20.Hasselkvist A, Johansson A, Johansson AK. Association between soft drink consumption, oral health and some lifestyle factors in Swedish adolescents. Acta Odontol Scand. 2014;72(8):1039-46.

21.Kolak V, Pešić D, Melih I, Lalović M, Nikitović A, Jakovljević A. Epidemiological investigation of non-carious cervical lesions and possible etiological factors. J Clin Exp Dent. 2018;10(7):e648-56.
22.Alvarez-Arenal A, Alvarez-Menendez L, Gonzalez-Gonzalez I, Alvarez-Riesgo JA, Brizuela-Velasco A, deLlanos-Lanchares H. Non-carious cervical lesions and risk factors: A case-control study. J Oral Rehabil. 2019;46(1):65-75.