Research Article

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Non-carious Lesions among Patients attending Department of Conservative Dentistry and Endodontics of a Dental College

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ABSTRACT

Introduction: Non-carious lesion (NCL) is a physiological process. It is considered pathological if degree of destruction is excessive causing functional, aesthetic and sensitivity problems. Its aetiology is considered multifactorial and complex involving erosion, abrasion, attrition, and abfraction.

Objective: To determine the percentage of non-carious lesions in patients attending in Conservative Dentistry and Endodontics in Peoples Dental College.

Materials and Method: This analytical, cross-sectional study was conducted from January to March 2020 over a period of three months in department of Conservative Dentistry and Endodontics in People's Dental College and Hospital. Ethical clearance was taken from Nepal Health Research Council (Ref. 1497). Total of 690 patients recruited by convenience sampling were examined under good illumination using diagnostic instrument like mouth mirror and straight probe. Written informed consent was taken from all the patients. Data were collected on a proforma designed for the study. Patients were asked questions and had to undergo intraoral examination. Statistical analysis was done using Statistical Package of Social Sciences Statistics for Windows, version 16.0 (SPSS Inc., Chicago, Ill., USA).

Result: The prevalence of attrition, abrasion, erosion and abfraction from 690 patients examined were found to be 463 (67.10%), 171 (24.78%), 56 (8.11%) and 14 (2.02%) respectively.

Conclusion: NCL is the common problem which is multifactorial and irreversible. The age group mostly affected by NCL was between 40-60 years.

Keywords: Abfraction; abrasion; attrition; erosion; non-carious lesion.

INTRODUCTION

Non-carious lesion (NCL) is a physiological process that occurs at the cementoenamel junction and proximal surface in the absence of carious mechanism.[1] It is irreversible, multifactorial caused due to physiological, pathological, parafunctional habits like bruxism, medication, faulty tooth brushing, diet, occupation, gastrointestinal problems and acid regurgitation.[2] It is considered pathological if destruction is excessive causing functional, aesthetic and sensitivity problems.[3]

Dental abrasion is the mechanical wear due to repeated friction or physical contact with foreign objects.[4] Dental erosion is the loss of tooth substance by nonbacterial chemical process either intrinsic acid reflux or extrinsic sources like

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diet particularly soft drinks and environmental chemicals.[5] Abfraction is the pathological loss of tooth structure caused by biomechanical loading forces that result in the flexure at the cervical margin which is caused by parafunctional activity.[5] Dental attrition is physiologic wearing of tooth due to tooth to tooth contact as in mastication and occurs in incisal or occlusal surfaces and sometimes proximal surfaces.[6] Many studies have been done focusing on carious lesion, whereas focus on NCL is undervalued and very less study has been done in our country. The objective of this study was to determine the occurrence of NCL and its different causes.

MATERIALS AND METHOD

This analytical cross-sectional study was conducted from January 2020 to March 2020 over a period of three months. This study was conducted in department of Conservative Dentistry and Endodontics in People's Dental College and Hospital. Ethical clearance was taken from Nepal Health Research Council (Ref. 1497) before conducting the study. Total of 690 patients recruited by convenience sampling were examined under good illumination using diagnostic instrument like mouth mirror, straight probe and tweezer for the lesion attrition, erosion, abrasion, and abfraction. Written informed consent was taken from all the patients. Both male and female patients above twenty years were examined. Teeth with radiologic signs of internal resorption or pulpal calcifications, periapical changes and with orthodontic braces were excluded from the study.

Based on the study of Dodhiya et al.,[3] the estimated proportion of the population (p) was calculated 53.25% as prevalence of NCL, at 95% confidence interval and tolerated margin of error (d) of 7%, and using formula $n=Z^2p(100-p)/d^2$, the sample size was calculated as 688. Thus, we examined 690 participants.

Data were collected on a proforma prepared for the study. The patients were asked questions and they had to undergo oral examination. Data were entered in Microsoft Excel spreadsheet and statistical analysis was done using Statistical Package for the Social Science (SPSS) Statistics for Windows, version 16.0 (SPSS Inc., Chicago, III., USA). Association between variables were analysed using chi-square test and fisher's exact test.

RESULT

The prevalence of attrition, abrasion, erosion and abfraction from 690 patients examined were found to be in 463 (67.10%), 171 (24.78%), 56 (8.11%) and 14 (2.02%) respectively. Most commonly affected age group for attrition and erosion was found to be 20-40 years (219, 47.30%) and 40-60 years (23, 41%) respectively. Most commonly affected age for abfraction was found to be 49 years (2, 14.30%). In case of abrasion, maximum number of patients were of 45 years of age (11, 6.40%), followed by 65 and 50 years of age (9, 5.30%). Overall age group affected with these wasting diseases was found to be 40-60 years.

In this present survey, 42 (6.08%) with abrasive lesion had hypersensitivity, 16 (2.31%) with erosive lesion had hypersensitivity and 115 (16.66%) patients with attrition had hypersensitivity. The association between NCL and hypersensitivity was statistically non-significant.

There was higher prevalence rate of non-carious lesion in patient eating mixed diet. Out of total number of patients with erosive lesions, 39 (69.64%) patients consumed alcohol and 46 (82.14%) patients consumed cold drinks. While, there were only nine (16.07%) patients, with GI regurgitation. There was significant amount of association found between alcohol consumption and prevalence of erosion. Only 17 (30.35%) patients with erosion used medication for Peptic Ulcer Disease.

When gender was compared, there was no significant association found between gender and the prevalence of non-carious lesion. This means there was equal chance for both genders to be affected by non-carious lesion.

Occlusion in 425 (61.59%) patients with attrition was Angle's Class I normal occlusion. There were very less patients with attrition, who had bruxism 45(6.52%) and nail-biting habit 24 (3.47%). There was no significant association found between bruxism and prevalence of attrition or abfraction.

Most patients with abrasion, used toothpaste (158, 22.89%), 108 (15.65%) patients brushed once

Table 1: The prevalence of non-carious lesion.

Questions		Attrition		Abrasion		Erosion		Abfraction	
		n (%)	P	n (%)	P	n (%)	P	n (%)	P
Age group	<20	6 (0.86%)	<0.001	-	<0.001	1 (0.14%)	0.014	-	0.186
	20-40	219 (31.73%)		36 (5.21%)		20 (2.89%)		5 (0.72%)	
	40-60	165 (23.91%)		97 (14.05%)		23 (3.33%)		8 (1.15%)	
	≥60	73 (10.57%)		38 (5.50%)		12 (1.73%)		1 (0.14%)	
Gender	Male	260 (37.68%)	0.098	84 (12.17%)	0.115	35 (5.07%)	0.186	11 (1.59%)	0.063
	Female	203 (29.42%)		87 (12.60%)		21 (3.04%)		3 (0.43%)	
Diet	Mixed	454 (65.79%)	0.545	167 (24.20%)	0.854	54 (7.82%)	0.454	14 (2.02%)	0.733
	Veg	9 (1.30%)		4 (0.57%)		2 (0.28%)		-	
Hypersensitivity	Present	115 (16.66%)	<0.001	42 (6.08%)	0.068	16 (2.31%)	0.088	3 (0.43%)	0.881
	Absent	348 (50.43%)		129 (18.69%)		40 (5.79%)		11 (1.59%)	
Total		463 (67.10%)		171 (24.78%)		56 (8.11%)		14 (2.02%)	

daily, while 62 (10.18%) patients brushed twice daily whereas, 96 (13.91%) patients used medium bristled brush. Maximum number of patients used right hand for brushing (155, 21.73%) and their method of brushing was mainly horizontal (71, 10.28%) followed by combination of horizontal and vertical (56, 8.11%). Prevalence of abrasive lesion was almost equal among male (84, 12.17%) and female (87, 12.60%) patients. A total of 619 (89.71%) patients used their right hand for brushing, while 71 (10.28%) used their left hand.

DISCUSSION

Non-carious lesion is the universal problem in daily clinical dental practice which is multifactorial and irreversible. Non-carious lesions begin from an early age and its aetiological factors are mutually interrelated. However, the prevalence of Non carious lesion increases as the age of the patient increases. In present study, we found more patients from 40-60 years age group to be affected with NCL. The result is in accordance to the studies done by Al-Zarea et al. and Ahmed et al.[2,4]

In the present study, no significant association was observed between gender and the prevalence of non-carious lesion, which is in agreement with other previous study done by Dodhiya et al.[3] However in a study done by Rusu et al. had found a higher degree of wear in male gender.[7]

In this study, we found higher prevalence rate of non-carious lesion in patient eating mixed diet. This may be because of more masticatory force required for chewing non-vegetarian diet. However, in a study done by Smits et al. shows more prevalence of non-carious lesion in patient eating vegetarian diet as compared with non-vegetarian diet.[8] We know mixed diet includes both vegetarian and non-vegetarian diet, thus higher prevalence of non-carious lesion in patients eating mixed diet can be linked with its higher prevalence in vegetarian diet.

Dental erosion is caused by acid of nonbacterial origin, either from intrinsic or extrinsic sources. It is well established that the consumption of alcohol and cold drinks are risk factor for dental erosion. The low pH of these drinks has corrosive action on dental hard tissue. Moreover, level of damage depends on frequency of intake. In our present study, we found significant amount of association between alcohol, and cold drink consumption and prevalence of erosion, which is in agreement with study done by Manarte et al.[9] However, there were less number of NCL patient with GI regurgitation. Dental erosive lesions are seen in GI regurgitation but its severity depends on the duration, the frequency of reflux, the pH and type of acid, and the quality and quantity of saliva.[10] This can be the relevant cause of having less non-carious lesion in GI regurgitation in our study.

In this present survey there was no association with brushing technique and abrasive lesion and type of brush they used. This may be because of better patient knowledge regarding frequency, duration, technique of brushing, amount of force applied to brush teeth, and hardness of bristles, and coarseness and quantity of the dentifrice to be used. However, this result is not in agreement with

studies in Dodhiya et al.[3] Previous studies show that inappropriate brushing techniques can cause the wearing of the canine and premolar vestibular faces with the modification of the anatomical contour of the tooth.[11,12]

There was no significant association found between bruxism and prevalence of attrition and abfraction in the present study. This result is not in agreement with the study done Ommerborn et al., which showed sleep bruxism has a significant role in formation of non-carious lesion.[1] This variation could be because of less number of patients with bruxism in present study.

Loss of enamel and exposure of dentinal tubules to oral environment causes sensitivity problem in patients with NCL.[13] In this present survey, forty-two patients with abrasive lesion, sixteen patients with erosive lesion and one hundred and sixteen patients with attrition had hypersensitivity. We found no association between NCL and hypersensitivity. In contrast, literature review shows a positive and significant correlation between severity of tooth wear in the cervical region of teeth and hypersensitivity perceived by the patients.[14] This may be because of questionnaire based study rather than using definitive thermal tests to elicit actual response.

This study was based on convenience sampling of 690 patients. The factors which were not considered in this study were behavioral factors, pressure applied during brushing, pH of the oral environment and salivary pH which are also the causes of non-carious lesions.

CONCLUSION

The age group most affected by non-carious lesion was 40-60 years. There was significant association between erosive lesion and consumption of alcohol and cold drinks but not between gender and prevalence of non-carious lesion. Though no association was observed between attrition and malocclusion further studies have to be done with more number of participants.

Conflict of Interest: None.

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