

Prevalence and Characteristics of Non-Carious Cervical Lesions in Abha City, Saudi Arabia

Meer Zakirulla, MDS* Amjad Yahya A Alhaydan** Mohammed Saleh Alqahtani** Safar Mohammed Abdullah, BDS*** Saad Mohammad H Alkhamash**** Haytham Awadh M Ulhaqban, BDS***** Hatem Saeed A Alqahtani, BDS***** Yahya Alshehri***** Muhannad Mousa Alharbi***** Rahaf Mousa Alharbi***** Raida Ahmed Al Moadi, BDS***** Nuran Jubran M Alqahtani, BDS***** Khalid Ali H Alammari** Saad Awdah Aldail**

ABSTRACT

Background: The aim of the study is to evaluate the prevalence of non-carious cervical lesions in Abha city, Saudi Arabia.

Methods: This study includes clinical examination of dental patients attending OPD at College of Dentistry, King Khalid University. A convenient sample size of 486 patients (Male=281; Female=205) participants aged between 20 and 60 years was included. Voluntary informed consent was obtained from the parents before the examination of the child. Dental examinations were carried out using a standard mouth mirror and dental probe. The following parameters were recorded: the diagnoses of abrasion, erosion, and abfraction and data was collected. The results were recorded and analyzed for statistical significance using the Chi-square test and t-test with a P-value of <0.05 considered significant.

Results: There were more male patients (58%), and the sex ratio was 1.37. Graduates were the most represented professional category (39%), and 311 (64%) patients resided in urban area. A total of 91 of the 486 patients who were examined in this study. All up, there were 91 patients, with 1432 teeth that were affected. The following NCCL were recorded, Abrasion lesions were encountered the most, and they concerned 610 teeth (42.5%), followed by Abfraction, which was found on 442 teeth or 30.8%. and erosion, which was diagnosed on 380 teeth or 26.5%.

Conclusions: In our study, the prevalence of NCCLs was 18.72% reported. The first molars are the most commonly affected teeth by NCCLs in the Saudi population, followed by premolars, canines, and incisors. This distribution may vary among different populations and can be influenced by dietary habits, oral hygiene practices, and other environmental factors. NCCLs are pathologies of the neck of the tooth that is of great concern both in terms their clinical and etiological diagnosis as well as their therapy.

Keywords: Prevalence, Non-Carious Cervical Lesions, Erosion, Abrasion, Dental Caries, Saudi Arabia

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- * Assistant Professor
Department of Pediatric Dentistry & Orthodontic Sciences
College of Dentistry, King Khalid University
Abha, Saudi Arabia.
E-mail: drzak786@gmail.com
- ** Intern
College of Dentistry, King Khalid University
Abha, Saudi Arabia.
- *** General Dentist in Medical Services
Ministry of Interior
Baha, Saudi Arabia.
- **** General Directorate of Health Affairs in Assir
Hospital Management Department
Abha, Saudi Arabia.
- ***** Resident Dentist
Maternity & Children Hospital
Khamis Mushayt, Aseer Region, Saudi Arabia.
- ***** Student
BMC College, Aseer, Saudi Arabia
- ***** General Dentist
Abha, Saudi Arabia.
- ***** General Dentist
Ministry of Health, Aseer, Saudi Arabia.

INTRODUCTION

Dental problems known as non-carious dental abnormalities (NCCLs) are distinguished by the gradual loss of dental substances, such as enamel, dentin, and cement. Unlike tooth lesions, which are primarily microbial in nature, NCCLs result from wear and tear on oral surfaces. These lesions differ significantly from abrupt alveolo-dental trauma, where substance loss occurs due to blunt force, either direct or indirect^{1,2}. The cervical region of the dental crown, which is especially prevalent and has medical significance, is where NCCLs can manifest. This article examines the preponderance, effects, and potential risk factors connected to NCCLs³. In recent years, NCCLs have gained recognition as a significant oral health issue due to their association with hypersensitivity, plaque retention, root fracture, and aesthetic concerns⁴. A systematic review found that NCCL prevalence rates in adults ranged widely, from 5% to 85%^{5,6}. However, the occurrence of NCCLs is influenced by the population studied and requires more review across a broader time variety, including old individuals. The cervical region of the teeth is where the dentin layer is inevitably lightest, making it functionally prone. It is in this area that the combined effects of eroding, scratching, and abfraction (stress flexure) can lead to the removal of the slim enamel surface or yet teeth decay. Dentin or pulp may be exposed when this occurs, potentially leading to hypersensitivity and other complications¹. Non-carious cervical lesions (NCCLs) are distinct from dental caries and are characterized by the loss of tooth structure at the cemento-enamel junction level². People with limited exposure to contemporary dental health tools have previously been found to have both tooth and non-carious cervical lesions. The higher occurrence of NCCLs does have an effect on appearance and function, causing distress and lowering the quality of life-related to dental health.

Gingival recession serves as a vital medical indication for the presence of NCCLs. The prevalence and severity of NCCLs tend to rise with age^{7,8}. This suggests that dietary and lifestyle modifications may impact how common NCCLs are in different age groups. Nevertheless, potential risk factors for NCCLs have not been adequately analyzed and reported independently for each age group. To acquire a deeper comprehending of the threat factors associated with NCCLs within different age groups, thorough demographic studies are essential. These studies may contain a wide range of age groups to identify time-critical risk factors properly. Despite numerous global studies, an accusative occurrence of NCCLs remains challenging to define. No standardized preponderance info exists because most research has focused on dental health practitioners. Addressing this awareness distance through dedicated demographic research is crucial to enhancing our understanding of NCCLs⁹. Non-carious dental abnormalities (NCCLs) represent a distinct type of dental problem characterized by the gradual loss of dental elements unrelated to bacterial activity. Their preponderance, effect and potential risk factors require further exploration across various communities and time groupings. By extensively studying NCCLs, we enhance our ability to detect, prevent, and manage these lesions properly, inevitably improving oral health and the quality of life for individuals globally. In light of this lack of documentation, and to contribute to a better understanding of NCCLs, it seemed relevant to study these lesions by determining their prevalence of non-carious cervical lesions in Abha city, Saudi Arabia.

METHODS

This study included clinical examination of dental patients attending OPD at College of Dentistry, King Khalid University. A convenient sample size of 486 patients (Male=281; Female=205) participants aged between 20 and 60 years was taken for study. The examiners was trained and calibrated against each other before the start of the study. Explanation of the study's objective was given to the participants

during examinations. Voluntary informed consent was obtained from the parents before the examination of the child. Dental examinations were carried out using a standard mouth mirror and dental probe. The following parameters was recorded: the diagnoses of abrasion, erosion, and abfraction were based on the morphology of the clinical forms of each of these lesions as already described in the literature. Ethical approval for the survey was obtained from the Scientific Research Committee of King Khalid University, College of Dentistry [IRB/ KKUCOD/ETH/2022-23/050].

Three examiners were calibrated and well familiar with the diagnosis of HSPM, which would help to reduce the magnitude of error caused by study design. The results will recorded and analyzed for statistical significance using the Chi-square test and t-test with a P-value of <0.05 considered significant. Both descriptive and analytical statistical dimensions were used to describe the primary variables by SPSS 18 (IBM Corporation, Armonk, NY, USA) software.

RESULTS

In this study, 486 patients (Male=281; Female=205) participants aged between 20 and 60 years was taken for study. 16% of study subjects were of 20-30 years, 54% were of 31-40 years, 22% were of 41-50 years, and 8% were >50 years [Table 1].

Table 1. Demographic data includes age, gender, year of experience, and level of education

AGE	Total (n)-486	%
20-30 years	78	16%
30-40 years	262	54%
40-50 years	107	22%
>50 years	39	8%
GENDER		
Male	281	58%
Female	205	42%
Area of residence		
Rural	175	36%
Urban	311	64%
Educational Level		
Primary school	82	17%
High School	98	20%
Graduate	190	39%
Postgraduate	116	24%

There were more male patients (58%), and the sex ratio was 1.37. Graduates were the most represented professional category (39%), and 311 (64%) patients resided in urban area. Distribution of Abrasion according to age of the children shown in Table 2. A total of 91 of the 486 patients who were examined in this study. All up, there were 91 patients, with 1432 teeth that were affected. The following NCCL were recorded, Abrasion lesions were encountered the most, and they concerned 610 teeth (42.5%), followed by Abfraction, which was found on 442 teeth or 30.8%. and erosion, which was diagnosed on 380 teeth or 26.5%. Distribution of noncarious cervical lesions (NCCLs) according to tooth type is shown in Figure 1. Distribution of NCCLs according to the dental arches (the maxilla and the mandible) is shown in Figure 2.

Table 2: Distribution of Abrasion according to age of the participants

Age (Years)	Present		X ²	P-value
	n-610	%		
20-30	80	13	3.26	0.32
30-40	92	15		
40-50	207	34		
>50	231	38		

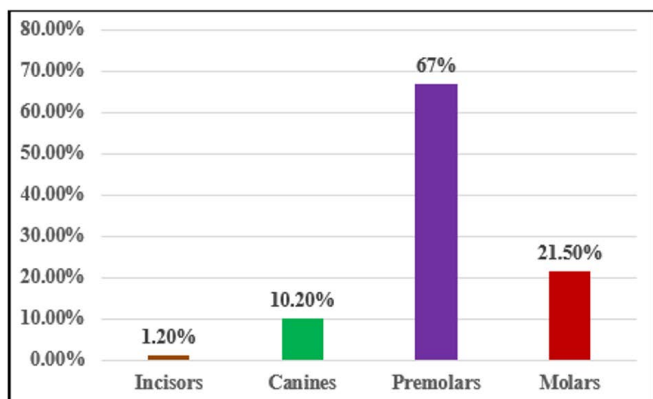


Figure 1: Distribution of noncarious cervical lesions (NCCLs) according to tooth type

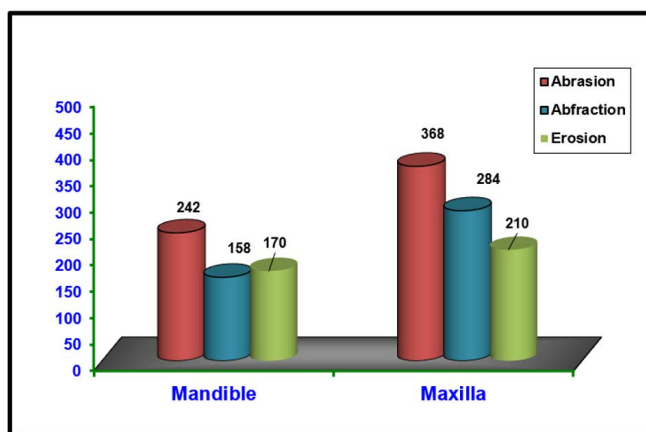


Figure 2: Distribution of NCCLs according to the dental arches (the maxilla and the mandible)

DISCUSSION

Non-carious cervical lesions (NCCLs) are indeed an important issue in the field of dentistry. NCCLs typically exhibit wedge-shaped or V-shaped lesions at the cervical region of teeth. These lesions often involve the loss of enamel and dentin, leaving a notch or depression near the gumline. The exact characteristics may vary depending on the causative factors, which can include abrasive toothbrushing, acidic diets, and bruxism (teeth grinding). These lesions are characterized by the gradual loss of dental substances, such as enamel, dentin, and cement, in the cervical region of the dental crown. Unlike carious lesions, which are primarily caused by microbial activity, NCCLs result from non-microbial factors, such as mechanical abrasion, erosion, and chemical factors. The prevalence of NCCLs can vary by region and population. In Abha city, Saudi Arabia, the prevalence of NCCLs may be influenced by local dietary habits, oral hygiene practices, and other environmental factors. NCCLs can lead to several oral health problems, including: hypersensitivity, plaque retention, root fracture and aesthetic concerns.

In a review of the literature, Levitch *et al.* found a prevalence of NCCL ranging from 5% to 85%¹⁰. Our study, which reported an NCCL prevalence of 18.72%, falls within this range. This prevalence is also close to the 17.10% prevalence determined by Faye *et al.* in 2005 in the Dakar region of Senegal¹¹. In the study by Medeiros *et al.*,¹² in footballers and published in 2020 in Brazil, NCCL was diagnosed in 39.5% of the participants. Igaraschi *et al.*,¹³ in Japan in 2017, quantified

the incidence of NCCL at 38.7%. In Burkina Faso, dental surgeons have estimated that NCCLs are frequent (60%) according to the work of Ndiaye *et al.*¹⁴ in 2015. NCCLs were equally distributed in both the upper and lower dental arches, and the most susceptible teeth were the first molars, followed by the premolars, canines, and incisors. Few variables, such as sex, the type of malocclusion, and especially the craniofacial pattern was expected to influence the prevalence of NCCLs. Different occlusal disorders combined with distinct craniofacial patterns, were expected to generate stress in the cervical vestibular regions of the teeth, and were capable of generating new NCCLs¹⁵. A meta-analysis demonstrated that some dietary components (carbonated drinks, acid snacks/sweets, and fruits juice) could increase erosion occurrence (Salas *et al.*, 2015), which is suggested as a risk factor for NCCLs. The softening/dissolving effect of acids on enamel, possibly related to heavy masticatory forces, could promote cervical hard tissue loss¹⁶. In relation to the role of brushing frequency in the development of NCCLs, some studies found that the force used for brushing together with the abrasive effect of toothpaste could increase the occurrence of NCCLs, especially with lesions of the abfraction type¹⁷.

Telles¹⁸ detected a higher prevalence of NCCLs in first molars among younger subjects (between the ages of 16 and 24 years) and speculated that NCCLs primarily develop in the first molar area and when they reach teeth more susceptible to the extrinsic agents such as brushing, the lesions begin to progress rapidly. Because first molars are the first erupted permanent teeth, it could be speculated that their longer presence in the oral cavity makes them more prone to erosive attack and abrasion, thus increasing the risk of NCCLs. However, two clinical studies using dental casts showed the presence of NCCLs was not found to be correlated with occlusal wear^{19,20}. In a study observing over 1000 subjects with similar numbers for different age groups examined, Yang *et al.* (2016) reported a positive correlation between NCCL dimension or depth and range of occlusal wear facets¹⁷. The management of NCCLs typically involves addressing the underlying causes, such as modifying oral hygiene practices, dietary habits, and treating any contributing medical conditions. Dental restorative procedures, such as dental bonding or the use of dental veneers, may be considered to restore the appearance and function of affected teeth²¹. Preventive measures include using a soft-bristle toothbrush, practicing proper toothbrushing techniques, avoiding excessive consumption of acidic foods and beverages, and seeking treatment for conditions like GERD or bruxism. In summary, NCCLs are a prevalent dental issue in Abha city, Saudi Arabia, and worldwide. They can have significant effects on oral health and aesthetics, making it important for individuals to be aware of risk factors and preventive measures to maintain healthy teeth and gums. Dental professionals play a crucial role in diagnosing and managing NCCLs to improve the overall oral health of patients.

CONCLUSION

Noncarious cervical lesions (NCCLs) form as smooth saucer like depressions or as V-shaped notches. NCCLs are pathologies of the neck of the tooth that is of great concern both in terms their clinical and etiological diagnosis as well as their therapy. The prevalence reported in this study is of importance to all oral health professionals, who need to be well aware that NCCL is increasingly a major reason for seeking care. In our study, the prevalence of NCCLs was 18.72% reported. The first molars are the most commonly affected teeth by NCCLs in the Saudi population, followed by premolars, canines, and incisors. This distribution may vary among different populations and can be influenced by dietary habits, oral hygiene practices, and other environmental factors. Diagnosing and treating NCCLs at the early stages are

crucial and should be treated at the earliest. The findings of the present study stress the need for educating present and future dentists regarding NCCLs, as well as for developing public health policies for the prevention and adequate treatment.

Authorship Contribution: All authors share equal effort contribution towards (1) substantial contributions to conception and design, acquisition, analysis and interpretation of data; (2) drafting the article and revising it critically for important intellectual content; and (3) final approval of the manuscript version to be published. Yes.

Potential Conflict of Interest: None

Competing Interest: None

Acceptance Date: 21 October 2023

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