

# FREQUENCY OF POSSIBLE FACTORS ASSOCIATED WITH NON-CARIOUS CERVICAL LESIONS IN PERMANENT TEETH

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## ABSTRACT

*Non-cariou cervical lesions are frequently associated with sensitivity which is a major problem for the patients. Moreover, lesions occurring along the anterior teeth result in poor aesthetic. Thus, both functional and aesthetic concerns are associated with these lesions.*

*The purpose of this study was to determine the frequency of possible factors associated with the NCCLs in permanent teeth. Ninety-six patients with an average age of 50.29 years, who were referred to the operative department of Islamabad Medical and Dental Hospital with non-cariou cervical lesions (NCCL) were clinically examined. A questionnaire of associated factors including parafunctional habits, type of toothbrush, brushing technique, gastro-reflux disorder, malocclusion and intake of carbonated drinks was designed to determine the frequency of possible factors associated with NCCLs. Descriptive statistics, frequencies and cross tabs were used for data analysis. Results showed a positive association between the NCCLs and possible factors under study. However, the highest frequency associated with NCCLs was recorded 85.4% with the use of carbonated drinks.*

**Keywords:** Abrasion tooth, Erosion tooth, Abfraction, Non-cariou cervical lesions

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## INTRODUCTION

The term non-cariou cervical lesions (NCCLs) refer to the loss of dental tissues at the cement-enamel junction, without bacterial involvement. On clinical examination, these lesions may present as a variety of defects, with small depressions in mild disease to large wedge or disc shaped defects in severe cases. These lesions have a multifactorial and complicated etiology, in which erosion, abrasion, and abfraction are found to have an important role.<sup>1</sup>

In erosive lesions, loss of mineralized tooth structure occurs by the action of acids either in the diet or through gastric contents. The lesion develops by demineralization of hard tooth tissue followed by loss

of bulk of tissues, leaving the underlying structures covered by a soft deposit.<sup>2</sup>

On the other hand, mechanical wear of tooth structure occurring due to frequent physical contact of objects leads to abrasion.<sup>3</sup> Abfraction lesions are theorized to develop due to abnormal loading of teeth often in eccentric directions. This loading causes abnormal flexure of teeth leading to wedge shaped lesions, micro fractures and tissue loss in the neck area of teeth.<sup>4</sup>

Considering the possible factors such as the occlusal interferences, premature contacts, bruxism, clenching, dietary habits, saliva, age and stomach disorders could contribute to the etiology of the NCCLs.<sup>5</sup> Any occlusal interference causing tensile stress in the cervical region of teeth can lead to NCCLs in this region. However, occlusal factors alone do not appear enough to cause NCCLs.<sup>6</sup> Dietary habits including consumption of acidic fruits, carbonated drinks and alcohol consumption are strongly linked to development of NCCLs. Elderly people are more prone to present with NCCLs, owing to the fact that they remain exposed to risk factors for more time. This finding is supported by previous studies showing increase in the incidence of these lesions with increasing age.<sup>7,8</sup> Statistics from previous studies show a high prevalence of NCCL lesions from canine to the first molar tooth. Moreover, maxillary canine

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is more frequently associated with abrasion than the mandibular canine.<sup>9</sup> According to Oginni, NCCL cases in right-handed patients were more common on the left side of their dentition due to more vigorous brushing on that side.<sup>10</sup>

Gingival recession (GRs) and apical migration of gingiva increase with age. Prolonged exposure of root surfaces secondary to GRs increases the risk of developing NCCLs. Likewise, the positive correlation between severe GRs and high levels of cervical dentine hypersensitivity (CDH) are in line with the theory that root exposure makes the tissue more vulnerable to the influence of CDH risk factors. NCCLs are the most important factor involved in dentin exposure above the gingival margin further causing dentin hypersensitivity (DH).

NCCLs in the anterior teeth present a dual problem of sensitivity and compromised aesthetics. Cervical region of anterior teeth is the aesthetic zone and maxillary teeth are most commonly affected compared to mandibular teeth. Premolars are the most commonly involved teeth followed by first molars and canines.

### Rationale

Considering the problems such as sensitivity and loss of tooth structure arising from non-carious cervical lesions and the necessity of awareness towards the possible factors associated with these lesions. This study will try to establish the frequency of contributing factors and the knowledge regarding the prevalence of these lesions. The knowledge about the contributing factors and prevalence of these lesions would guide the strategies for their prevention and cure.

The purpose of this study was to determine the frequency of related factors associated with NCCLs and their effects on permanent teeth. These lesions are a major aesthetic concern for patients. Identification of all the causative factors would enable effective prevention and restoration of NCCLs.

### MATERIALS AND METHODS

This was a cross-sectional study conducted at Islamabad Dental Hospital. The duration of the study was 6 months. A sample size of 96 patients including both males and females was calculated using Epi-tools sample size calculator. Purposive sampling was done for patient selection according to inclusion criteria. The inclusion criteria were patients above 18 years of age till 80 years with symptomatic or asymptomatic NCCLs. Exclusion criteria included 1) Patients exhibiting active periodontal disease, 2) rampant uncontrolled caries, 3) patients undergoing orthodontic procedure.

Informed consent was taken from all the patients before asking questions and conducting the clinical ex-

amination. Medical history, drug history and presence of vomiting, gastric reflux and heartburn was inquired and the frequency of these conditions was also recorded.

The assessment involved clinical examination and a questionnaire to help determine the frequency of underlying causative factors. The questionnaire was filled in by the examining doctor. This questionnaire included patient demographic that is name, age and gender. Patients were asked about the active complaints of sensitivity to air from triple syringe and unsightly appearance due to these lesions. Questions were asked about bruxism, teeth clenching and nail biting. The type of tooth brush being used and the technique employed for brushing was also enquired. Patients were asked about the dietary pattern and whether there was a high intake of carbonated drinks and citric juices in the diet. This was followed by a complete clinical examination of oral cavity. The type of NCCLs and the frequency of associated factors was recorded as summarized in Table 1.1

The data collection was encoded, entered and analyzed by the researcher using SPSS version 22.0 and presented in the form of frequencies and cross tabs. Descriptive statistics and frequencies of the data were determined to know the frequency of possible factors associated with NCCLs.

### RESULTS

A total data of 96 patients, 49 males (51%) and 47 females (49%) was collected. Mean age of patients was 50.29 years. Results showed the frequency of possible factors associated with NCCLs. The highest frequency recorded was of carbonated drinks (85.4%) followed by malocclusion (65.6%) and type of toothbrush (65.6%). Parafunctional habits had the third highest frequency of 58.3% in the study population. Results were presented in the form of bar graphs and table as shown in Table 1 and Fig 1

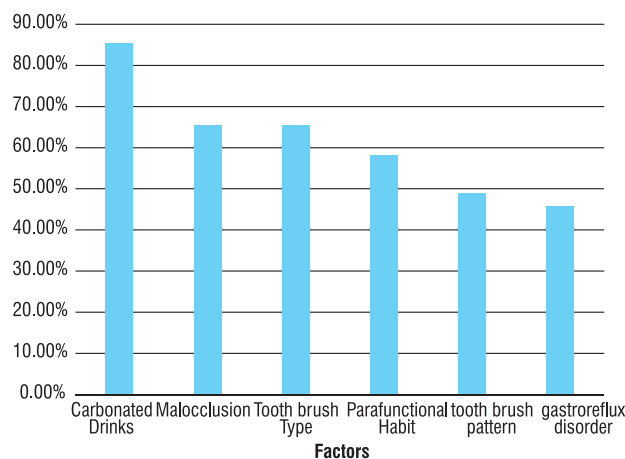


Fig 1: shows percentages of possible factors associated with NCCLs

TABLE 1: FREQUENCY TABLES OF POSSIBLE FACTORS ASSOCIATED WITH NCCLS

Factors	Abrasion	Abfraction	Erosion	Frequency	Percentage
Carbonated Drinks	30	29	23	82	85.40%
Malocclusion	17	33	13	63	65.60%
Toothbrush Type	8	33	22	63	65.60%
Parafunctional Habit	19	35	2	56	58.30%
Toothbrush pattern	26	15	6	47	49%
Gastro reflux disorder	16	8	20	44	45.80%

## DISCUSSION

Although non-carious cervical lesions are prevalent to a various degree in different populations, its exact etiology has been a matter of debate for long. It is believed that multiple factors contribute towards these lesions either individually or simultaneously. These mechanisms include friction, corrosion and stress which in turn lead to micro fractures and structure loss.<sup>12,18</sup> Results of present study found a high frequency of carbonated and citrus fruit juices consumption.

Cervical tooth surface being closer to gingival margin is less prone to self-cleaning, therefore dietary acids may exhibit their erosive effects for a much longer duration in these areas. This result agrees with the result of Bartlett *et al.* study which included almost 3000 subjects. It could be assumed from these findings that carbonated drinks having a low pH create a favorable environment leading to demineralization of tooth surface.<sup>13</sup>

In a study conducted by Bernhardt O *et al*, it was found that habits related to oral hygiene practices such as frequency of tooth brushing, the technique and type toothbrush being used are considered to be an important factor causing NCCLS.<sup>14</sup> Present study results showed a significantly higher frequency of horizontal pattern of brushing and the use of soft and medium toothbrush more frequent in the study population. The abrasion was most common lesion with the horizontal pattern of brushing. These findings indicate a significant impact of pattern of brushing in the development of NCCLS.

Current study also has a high frequency of malocclusion in study population which is in agreement with findings of previous studies. It has been reported that malocclusion causes higher tensile stresses at the cervical areas of teeth as compared to normal occlusion, which may contribute to producing non-carious cervical lesions.<sup>15</sup> Farah M and Manzoor A showed a significant variation on the type of tooth brush used among other factors contributing to NCCLS.<sup>16,17</sup>

The limitations of this study must be considered and highlighted. The study sample was not nationally representative and could be considered a convenience

sample. Although the patients reporting at Islamabad Dental Hospital provide an easily accessible sample of Islamabad and its periphery areas, a study with a nationwide representative sample is needed. Future studies can be useful in formulating effective preventive measures to minimize the occurrence of NCCLS.

## CONCLUSION

The present study concludes that multiple etiological factors contribute to the development of Non Carious Cervical Lesions. Use of acidic and carbonated drinks greatly predisposed to development of NCCLS.

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#### CONTRIBUTIONS BY AUTHORS

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| <b>1 Quratul-Ain Zafar:</b> | Designed questionnaire, Evaluated patients, Writeup of the research article, Compiled data and evaluated results, submitted for publication. |
| <b>2 Beenish Qureshi:</b>   | Approved research topic, Supervised questionnaire design and data collection, Verified results, Proof Reading.                               |
| <b>3 Sumia Sattar:</b>      | Screened patients according to inclusion criteria, performed data collection.  |
| <b>4 Huma Khalid:</b>       | Screened patients according to inclusion criteria, performed data collection.  |