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A cross-sectional study on the etiological causes of cervical lesions among patients without caries in Lahore, Pakistan

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Abstract---Background and Aim: Non-carious cervical lesions (NCCLs) are defined as any deterioration of the tooth tissue in terms of abrasion, composition, and erosion during normal and/or pathological function. The present study aimed to assess different etiological causes of cervical lesions among patients without caries in the population of Lahore, Pakistan. Materials and Methods: A cross-sectional analytical study was carried out on 62 patients aged 16-60 years in the Department of Dentistry of a Tertiary Care Hospital of Lahore, Pakistan from July 2022 to December 2022. Patients were categorized into two groups: Group-I (Non-carious dental lesions patients) and Group-II (without non-carious dental lesions patients). All the patients underwent clinical examinations and answered a

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questionnaire which included inquiries related to oral hygiene, personal impressions, eating habits, teeth appearance and functionality, and it also emphasized on the different etiologies of non-carious dental lesions.Results: Out of the total 62 patients, the study and the control groups consisted of 38 (61.3%) and 24 (38.7%) patients respectively. Age-wise distribution of the patients was as follows: 19 (30.6%) in 16-30 years, 12 (19.4%) in 31-45 years, and 31 (50%) in 46-60 years. The incidence of non-carious cervical lesions was significantly higher in males 79% (n=30) than females 21% (n=8). The incidence of vertical, circular and horizontal tooth brushing methods was 33%, 50%, and 17% respectively. The dentinal sensitivity at the cervical region has been detected in 46.7% patients as compared to no dentinal sensitivity in 53.3% patients. Conclusion: The present study observed several etiological causes such as eating habits, bruxism and improper tooth brushing techniques which were found to be significantly associated with non-carious cervical lesions.

Keywords---cervical lesions, etiological causes, bruxism, tooth brushing techniques, dentinal sensitivity.

Introduction

Complicated and multi-factorial etiologies such as abfraction, abrasion and erosion contribute to the development of Non-carious cervical lesions (NCCLs) [1, 2]. Tooth flexure caused by occlusal loading forces at the cervical region leads to tooth tissue's loss by micro fractures which in turn leads to the formation of these lesions [3]. Numerous investigations have reported that NCCLs' development is by the abrasion of teeth which is rendered as to be the primary cause [4, 5]. With advancement of age, the issue of keeping the teeth intact for a longer duration by these patients is an important issue faced by majority of the dentists. Therefore, tooth associated wear and NCCLs are becoming more common and critical highlights for patient care in the routine clinical practice [6]. The cemento-enamel interface loss without caries leading to the destruction of tooth structure is distinguished as NCCLs [7, 8]. The root fracture, hypersensitivity, cosmetic issues and plaque retention are the major oral health issues in NCCLs' patients [9]. A previous investigation reported that the incidence of NCCLs varied from 5% to 85% among the adult population [10].

NCCLs have got a complex etiology comprising of a relationship between occlusal tension, friction generated by abrasion and attrition type of tooth wear and acids inducing the erosion [11]. There are several types of loads that put a strain on the dental structures while they are in an occlusal stress. A cyclic load is one of the examples that can occur during mastication [12]. A malocclusion can induce occlusal problems readily. According to a study, malocclusion can affect the quality of life and the appearance of the teeth of an individual in 56% of the population [13]. The number of individuals seeking orthodontic surgery because of NCCLs is growing with every passing day. Erosive tooth wear (ETW) is the loss of morphology and normal tooth surface structure by acids. The cusp's and

occlusal plane's flattening are typical alterations in ETW found on the occlusal surfaces of the affected teeth [14]. Surface flattening and gingival edge's undamaged rim formation are common symptoms of ETW found on the smooth surfaces of teeth. Also, concavities may form at these sites, which are often wider than deep [15]. NCCLs are prevalent clinical disorders that can have a negative impact on the structural integrity, pulpal vitality, dentinal sensitivity and the overall morphology of the teeth involved [16, 17]. The current study aimed to relate etiological variables to non-carious cervical lesions (NCCLs) in patients who did not have dental caries.

Methodology

A cross-sectional analytical study was carried out on 62 patients aged 16-60 years in the Department of Dentistry of a Tertiary Care Hospital of Lahore, Pakistan from July 2022 to December 2022. Patients were categorized into two groups: Group-I (Non-carious dental lesions patients) and Group-II (without non-carious dental lesions patients). All the patients underwent clinical examinations and answered a questionnaire which included inquiries related to oral hygiene, personal impressions, eating habits, teeth appearance and functionality, and it also emphasized on the different etiologies of non-carious dental lesions. The sample size was calculated based on the confidence interval of 95% and margin of error of 5%. The final sample size was 62.

Results

Out of the total 62 patients, the study and the control groups consisted of 38 (61.3%) and 24 (38.7%) patients respectively. Age-wise distribution of the patients was as follows: 19 (30.6%) in 16-30 years, 12 (19.4%) in 31-45 years, and 31 (50%) in 46-60 years. There were 45 (72.6%) male and 17 (27.4%) female study participants in totality. The incidence of non-carious cervical lesions was significantly higher in males 79% (n=30) than females 21% (n=8). The incidence of vertical, circular and horizontal tooth brushing methods was 33%, 50%, and 17% respectively. The dentinal sensitivity at the cervical region has been detected in 46.7% patients as compared to no dentinal sensitivity in 53.3% patients. The demographic details of the patients are shown in Table-I. Frequency of carbonated drinks and sweets' consumption is shown in Table-II. Different types of tooth brushing techniques are represented in Figure-I. Table-III shows the distribution of patients based on the presence of bruxism and hypersensitivity.

Table I
Demographic details of the patients

Characteristics	(n) (%)
Age Groups (years)	
16-30	19 (30.6)
31-45	12 (19.4)
46-60	31 (50)
Gender	
Male	45 (72.6)
Female	17 (27.4)

Table II
Frequency of carbonated drinks and sweets' consumption

Frequency	Study group (n=38) (%)	Control group (n=24) (%)
Once/week	3 (7.9)	2 (8.3)
Twice/week	5 (13.2)	2 (8.3)
Thrice/week	1 (2.6)	2 (8.3)
Four times/week	1 (2.6)	0 (0)
Once/day	10 (26.3)	5 (20.8)
2-3 times/day	10 (26.3)	8 (33.3)

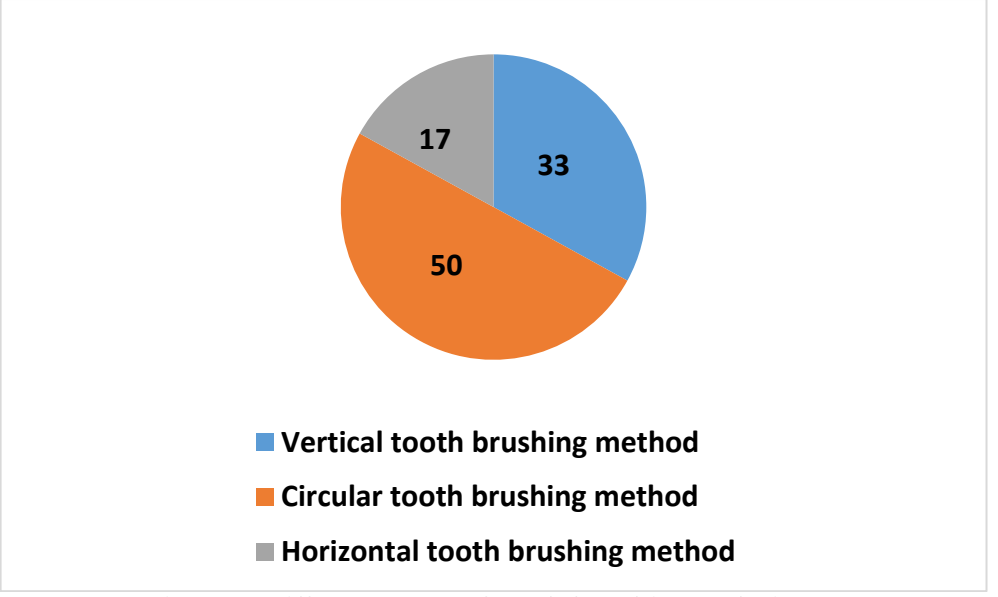

Figure I. Different types of tooth brushing techniques

Table III
Distribution of patients based on the presence of bruxism and hypersensitivity

Characteristics	Study group (n=38)	Control group (n=24)
Bruxism		
Present	16	6
Absent	22	18
Hypersensitivity		
Present	14	15
Absent	24	9

Discussion

The present study mainly focused on the etiological causes of cervical lesions among patients without caries and found that eating habits, bruxism and improper tooth brushing techniques were the different etiologies associated with the non-carious cervical lesions (NCCLs). The erosive tooth wear (ETW) occurrence has been investigated around the globe [18]. This (ETW) is common in

many parts of the world, including Europe [19]. A recent study reported that at least one tooth with advanced erosive tooth wear (ETW) was found in approximately 30% of the population of 16 years to 30 years cases mostly [20]. Adults in the modern society are reported to seek malocclusion correction in large numbers and it has become the fastest rising demand of the current era [21].

A variety of theories have been proposed to characterize the etiology of NCCLs, with the relationship of occlusal stress factors, corrosion and friction being among them mostly [22]. The dental structure's weakness is basically caused by malocclusion and occlusal interferences enhancing the stress concentration in the cervical area. This stress concentration is basically increased by numerous factors such as age, orthodontic movement type, root length, surgery time span, and severity of malocclusion, root length and bone loss amount [23]. Another study considered other variables such as gender, craniofacial pattern and the type of malocclusion that influences the NCCLs' prevalence [24]. It was hypothesized that occlusal abnormalities combined with craniofacial characteristics would cause tension in the neck region of the tooth. Nonetheless, none of these variables had any effect on the occurrence of NCCLs during the scenario of an orthodontic surgery. A previous study reported that with age advancement, the person's overall bodily metabolism slows down. Consequently, more time is required to achieve the desired surgical outcomes [25].

Regurgitation of stomach contents into the mouth is one of the reasons for ETW (erosive tooth wear), however for higher risk, regular regurgitation over a prolonged period of time is required. Bio-corrosion has been recommended as a term to encompass all kinds of chemical, biological, and electrochemical deteriorations occurring in/on the tooth structure [26, 27]. ETW lesions can penetrate dentin and must be differentiated clinically and on the histological grounds from attrition, which is induced by opposing tooth activity and results in the formation of lesions which are often flat, sharply edged and shiny [28]. Solid or liquid ingestion behaviors such as sucking short and infrequent swallows or holding the liquid in the oral cavity should be avoided [29]. The straw use is recommended because it prevents the anterior teeth from coming into direct contact with the ingested liquid and it goes straight into the esophagus via the oro-pharynx [30, 31].

Numerous investigations have reported that the major risk factor in any food material (solid or liquid) is its pH and the erosive potential of it could be determined by the concentration of calcium ions present in the tooth structure which acts as a major protective factor against any possible ETW. Moreover, tooth structure loss induced by tooth brushing is time dependent and appears to be affected by a variety of parameters such as action duration, frequency and brushing force as well as its technique [32]. Dentinal sensitivity is usually associated with non-cariogenic dental lesions. A brief, acute pain like response to a stimulus is referred to as dentinal hypersensitivity. As per the literature search, tooth sensitivity may be a transitory sign of abfraction lesions in their early stages [33]. The dentinal remineralization and abfraction's chronic nature slowly reduces the sensitivity of the affected tooth [34]. Abfraction's clinical symptoms appear to rely on the nature and underlying etiological cause's severity [35].

Conclusion

It has been observed that several etiological causes such as eating habits, improper tooth brushing technique and bruxism are associated with non-carious cervical lesions such as dental tissue erosion, attrition, abfraction and abrasion.

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