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An insight into etiology and management of non-carious cervical lesions among Indian population

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Abstract

Background: The purpose of this study was to investigate on various etiological factors for occurrence of non-carious cervical lesions among Indian population.

Methods: This study was carried out on 100 participants who reported to dental op for dental checkup. A structured questionnaire was distributed to all the participants and requested to complete the questionnaire within the scheduled time frame. Upon completion all the participants were subjected to a routine oral examination for any evidence of non-carious lesion. The oral findings were recorded and the results were evaluated and analysed using SPSS software.

Results: The results of our study showed that improper tooth brushing technique was the predominant etiological factor, and attrition being the most common occurrence as NCCL in the oral cavity particularly involving the mandibular first molars with clinical and statistical significance of $P<0.05$ respectively.

Conclusion: our study concludes that, creation of awareness regarding proper usage of toothbrush and prevention of improper brushing techniques and abnormal oral habits may save the life of the dentition.

Key words: improper tooth brushing; oral habits; attrition.

Introduction

Loss of tooth structure in the cervical area of non carious lesion may cause esthetic problems and discomfort because of dentinal hypersensitivity. Based on the morphological pattern of the lesions examined by electron microscopy, suggested that eccentric occlusal trauma also might yield to loss of tooth structure in the cervical area. Literature [1,2] suggests an idea that many lesions are caused not only by the processes of abrasion, attrition or erosion especially those lesions that affect a single tooth. Findings of a tooth with a lesion adjacent to a tooth without a lesion; artificial teeth in complete dentures, teeth of pre historical people and chemically inert restorative materials such as gold have reinforced the likely existence of a different etiologic factor. Since the prevalence of cervical lesions is increasing, identification of the risk factors remains a key factor for diagnosis, prevention and treatment.

Materials and Methods

This study was carried out on 100 subjects between ages

of 20-50 years, who reported to out-patient department for preliminary dental checkup. The purpose of this study was explained in detail and informed consent was obtained from the participants willing to participate in the study. Ethical committee clearance was obtained from review board. A structured questionnaire was distributed to all the participants and requested to complete the questionnaire within the scheduled time frame. Upon completion all the participants were subjected to routine oral examination clinically with the aid of dental mirrors and dental probe with surface reflection. All the surfaces of the tooth were examined for possible evidence of non-carious lesion. The clinical findings were recorded and results were evaluated and analysed with chi-square test statistically using SPSS software.

Results

A total of 100 patients who reported to dental op for dental checkup were included in the present study with age group between 20-50 years. Oral findings of non-carious cervical lesion was recorded and the results were evaluated clinically and analyzed with chi-square test using SPSS software.

Etiological factor

Improper tooth brushing techniques was more prevalent causative factor over 90% of Indian population followed by parafunctional oral habits in 10% of population which showed statistical significant results P<0.05 respectively (table 1).

Etiological Factor	NCCLS	P Value
Improper Tooth Brushing	90%	0.04
Parafunctional Habit	10%	1.00

Table I: Etiological factor

Type of lesion vs oral region

On oral examination, attrition was the most predominant non carious lesion presenting 68% in the mandible region and 32% in the maxilla region which showed a statistical significant results P<0.05 respectively (fig 1, table 2).

NCCLS	Maxilla	Mandible	P Value
Attrition	8%	92%	0.028
Abrasion	88%	4%	0.040
Erosion	50%	50%	1.000
Abfraction	50%	50%	1.000

Table 2: type of lesion vs oral region

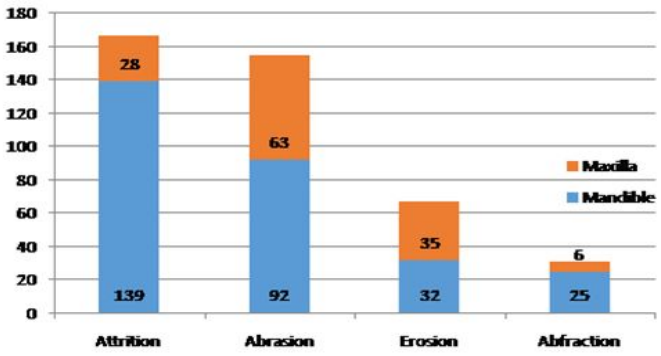

Fig 1: Type of lesion VS Oral region

Type of lesion vs age group

On comparing the type of lesions relating to age of patients, attrition (>50%) was a common occurenc between age groups of 30-34 and 40-45 years with statistical significance of P<0.05 respectively when compared with the other non-carious lesions (fig 2, table 3).

NCCLS	30-34	35-40	>40	P Value
Attrition	49%	0	51%	0.051
Abrasion	3%	67%	30%	0.042
Erosion	30%	35%	35%	0.495
Abfraction	30%	33%	37%	0.284

Table 3: type of lesion vs age groups

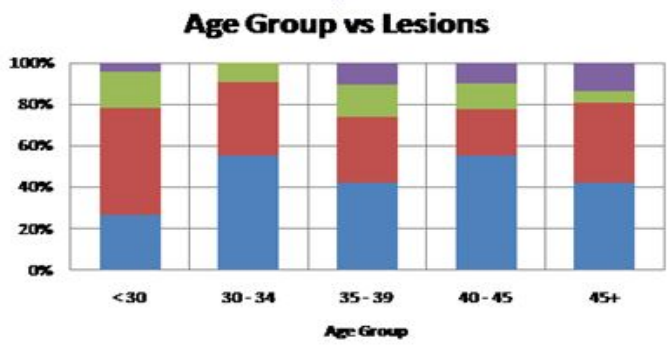

Fig 2: type of lesion vs age group

Frequency of lesions

Considering the frequency of lesions the number of lesions per subject in the group with non-carious cervical lesions ranged from 1 to 14, with a mean difference of 2.8 (1.24) SD respectively (fig 3).

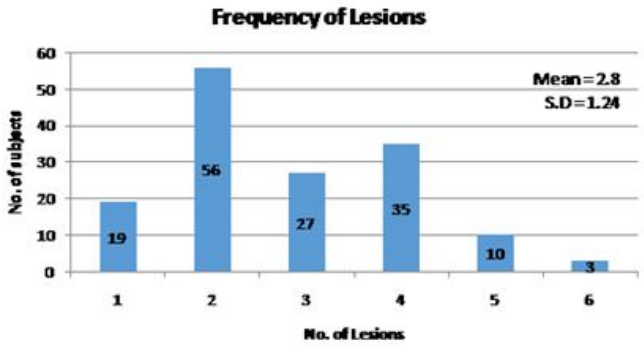

Fig 3: Frequency of lesions

Type of lesion

Attrition was considered to be the more predominant non carious cervical lesions followed by abrasion, erosion and abfraction (fig 4).

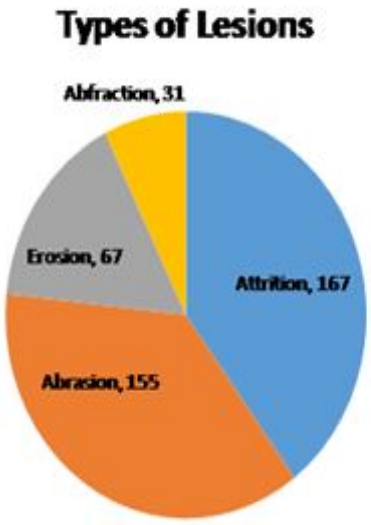

Fig 4**:** Type of lesions

Type of lesion vs tooth position

Comparing the tooth position related to the non-carious lesion, attrition was seen in the tooth position 36 and 46 followed by abrasion in 34 and 35 respectively (fig 5).

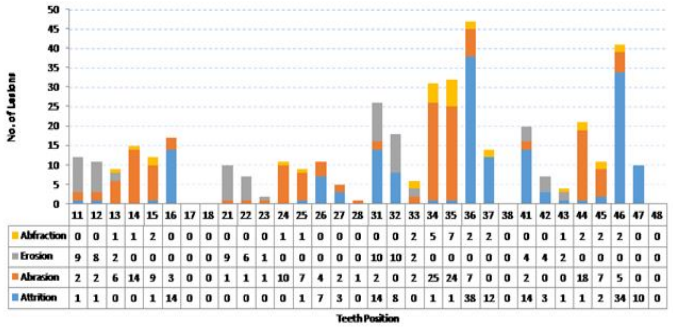

Fig 5: Type of lesion VS Tooth position

Discussion

The purpose of this study was to investigate on the etiological factors and its prevalence for the occurrence of non-carious cervical lesions. The formation of NCCLs has been influenced researchers and clinicians to look after the causes. Various hypotheses have been proposed for its etiology, One of the theories is based on a biomechanical concept, in which the enamel breaks away at the cervical margin due to tooth bending under lateral occlusal forces and progressively exposes the dentin, where the process continues lead to the development of the lesion [1-3].

In vitro investigation for the development of NCCLs, found that non-carious cervical lesions were created through horizontal brushing. In our study attrition was the most predominant non carious lesions when compared with other types of lesion due to improper brushing techniques (90%) commonly affecting the mandible (>50%) particularly involving the mandibular first molars while abrasion affecting the mandibular premolars (37%) and the maxillary tooth with statistical significance of $P<0.05$. This positive outcome was in correlation with Bergstrom et al [4] and smith et al [5]. While, Kawagoe et al [10] and Bernheart et al [11] reported that cervical lesions demonstrate occlusal wear, which would indicate a bruxing habit and not all individuals with severe bruxing occlusal wear exhibit cervical non-carious lesion [10,11].

The results of study by Ommerborn et al [12] showed a direct link between aging and the amount of NCCL since

tooth wear is accumulative process. In the younger age group, tooth wear was less prominent whereas, in older age group it becomes more prominent. It seemed that 45-years old age is the turning point for occurring NCCLs. The mechanism of this phenomenon is remained to discover. Moreover, the abrasion shown high percent cases at age 26-35 year, this might be due to wrong brushing techniques [13,14] while, In our study, attrition was prominent between 30-34 and 40-45 years and abrasion occurring at age group of 35-40 years which showed a statistical significance of $P<0.05$.

Literature [15-17] has proven that, people with poor oral hygiene had a lower occurrence of NCCL's. Expressed in percentages, men without NCCL's had good oral hygiene in 53.9% of cases, average hygiene in 14.5% and poor oral hygiene in 31.6% of the cases. Considering the large number of studies in which author claim that the toothbrush causes NCCL development, and others claim the opposite. We cannot completely exclude the role of toothbrush as one of the etiological factor.

Michael et al [18] and Grippo et al [19] suggested that consumption of hard foods has greater influence on the occurrence of non-carious cervical lesions. From the results of his study he explained by the theory of increased occlusal force, because the abnormal occlusal loading forces are thought to cause tooth flexure, resulting in compressive and tensile forces in the cervical region of the tooth. Such tooth flexure may cause micro-fractures in the crystalline structure of the enamel and dentin, which may make the tooth susceptible to non-carious cervical lesion as well as to caries.

Management of an NCCL by restoration is required in order to strengthen the tooth, decrease stress concentrating, check the progress of the lesion and prevent hypersensitivity. Care should be taken to restore a cervical abrasion with no visible occlusal facet or co axial strain and to use a restorative material that possesses enough abrasive resistance. Glass inomer cement also have the desirable modulus of elasticity and flexibility to endure the squeezing effect experienced by the restorative materials at the cervical area. However, because of low abrasive resistance and high solubility, many authors [20] have suggested the use of the sandwich technique instead of GICs or composite resins alone. This is advantageous for deep cervical lesions, or for lesions that lack enamel in cervical margins.

Conclusion

The results of our study conclude that attrition was the most predominant non-carious cervical lesion followed by abrasion. Of varying etiological factors the prevalence of abnormal tooth brushing and parafunctional habits being the risk factors for occurrence of NCCL. Prevention of such etiology can be accomplished by creating oral health awareness program among unaware population to save the life of tooth.

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