

Original Article

EVALUATION OF CERVICAL WEAR AND OCCLUSAL WEAR IN SUBJECTS WITH CHRONIC PERIODONTITIS - A CROSS SECTIONAL STUDY

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Abstract :

Tooth wear (attrition, erosion and abrasion) is perceived internationally as a growing problem .The loss of tooth substance at the cemento- enamel junction because of causes other than dental caries has been identified as non-carious cervical lesions (NCCLs) or cervical wear. NCCLs can lead to hypersensitivity, plaque retention, pulpal involvement, root fracture and aesthetic problems.

Hence study was done to evaluate association of cervical wear with occlusal wear from clinical periodontal prospective in individuals with chronic periodontitis. Periodontal parameters like plaque index, gingival index, gingival recession and tooth mobility were assessed .The levels of cervical wear and occlusal wear were determined according to tooth wear index. Premolars were more likely to develop cervical wear than anterior teeth (incisors, canines) and molars. In conclusion, the significant association of cervical wear with the periodontal status suggested the role of abrasion and its possible combined action of erosion in the etiology of NCCLs.

Keywords : Non Carious Cervical Lesions, Tooth Wear Index, Periodontal Status,

Introduction :

Periodontitis is a multi-factorial infectious disease of the supporting tissues of the teeth. ⁽¹⁾ Microbial dental plaque as the initiator of periodontal disease, however the manifestation and progression of periodontitis is influenced by wide variety of determinants and factors including subject characteristics social behavioral factors, systemic factors genetic factors, tooth factors ,microbial composition of dental plaque and other emerging factors .

⁽²⁾ Clinically, patients suffer from gradual loss of tooth attachment in the alveolar bone leading to periodontal pockets, receding gums, loose teeth, and eventually tooth exfoliation. ⁽³⁾

Causative factors include periodontal disease, mechanical action of aggressive tooth brushing, uncontrolled orthodontic movement, improper restoration, tooth mal position and frenum pull. Root exposure resulting from gingival recession leads to tooth sensitivity, root abrasion, chemical erosion, root caries and adverse esthetics. in many instances, cervical lesions involve both the crown and the exposed root causing the disappearance of the anatomic cemento- enamel junction. ⁽⁴⁾

Tooth wear (attrition, erosion and abrasion) is perceived internationally as a growing problem. The loss of tooth substance at the cemento- enamel junction because of causes other than dental caries has been identified as non- carious cervical lesion (NCCLs) or cervical wear. NCCLs can lead to hypersensitivity, plaque retention, pulpal involvement, root fracture and aesthetic problems. The increasing prevalence of NCCLs with the ageing of population represents a challenge in dental profession, and several etiologic factors such as abrasion, erosion and abfraction may be implicated in the initiation and

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Gingival recession is defined clinically as exposure of the root surface by an apical shift in the position of the gingiva and may involve one or more tooth surfaces.

progression of NCCLs .Abrasion is the physical tooth wear that may arise from excessive tooth brushing and abrasive contents in tooth pastes. Erosion is defined as the chemical tooth wear caused by acids, acting on plaque-free tooth surfaces , of intrinsic or extrinsic origin .Abfraction has been hypothetically described as the micro fracture and loss of tooth substance in the cervical region owing to stress induced flexure created by non-axial occlusal forces has also been considered to be involved in NCCLs. ⁽⁵⁾

Aims and objective of the study:

To evaluate association of gingival recession and NCCLs in individuals with chronic periodontitis.

To evaluate association of cervical wear with occlusal wear from periodontal prospective.

Materials and methods :

This study was conducted on 20 subjects selected from department of Periodontics, A.B. Shetty Memorial Institute of Dental Sciences, Deralakatte Mangalore. The study was approved by institutional ethical committee, and an informed written consent was obtained. Subjects aged 30–60 years, presenting with multiple NCCLs were included in this cross-sectional retrospective study. Subjects with present or past history of gastro esophageal reflux disease, heartburn, frequent vomiting, xerostomia, bruxism or parafunctional habits (e.g. bruxomania) were excluded from this study. Subjects with minimum compliment of 20 natural teeth excluding third molars were included, those with artificial crowns or extensive occlusal fillings were excluded from the study. Subjects diagnosed with chronic generalised Periodontitis based on gingival index score of ≥ 1 and attachment loss of ≥ 3 mm in more than 30% of the sites were included in the study. The teeth of which the level of cervical wear corresponded to Smith and Knight tooth wear index level 2 or more (defect depth more than 2 mm) were considered to have NCCLs in this study. The bucco-lingual depth of NCCLs was measured by means of a periodontal probe. No further classification of NCCLs was made with respect to their clinical appearances whether wedge-shaped or rounded.

The screening examination included:

The periodontal examination in subjects was carried out by using a Williams periodontal probe. To assess the severity of gingival inflammation, gingival index (LOE AND SILLNESS):1963, Gingival recession (GR) was determined by Millers Index for recession. The assessment of tooth mobility was determined according to Miller Tooth Mobility index 1938. PLAQUE INDEX (SILLNESS AND LOE): 1964. To assess the extent and severity of dental erosion ,attrition ,abrasion as well as any combination of these conditions- Tooth Wear Index - B.G.N. Smith and J.K. Knight in 1984. ⁽⁵⁾(Table 1)

All measurements were carried out by the same examiner.

Results :

All subjects brushed twice a day, used manual toothbrush, out of 20 subjects 15(75%) were using horizontal brushing technique and 5 subjects (25%) were using circular brushing technique.

Total of 510 teeth of 20 subjects were clinically examined in the study of which 210 teeth exhibited NCCLs (41.1%) these teeth displayed signs of cervical and occlusal wear in varying degree no pulpal exposure was observed .47.6% (100) of NCCLs were on right side of the jaw and 52.3%(110) were on left side of jaw. 42.15% (215) of teeth exhibited recession and 99% of teeth examined were firm and non-mobile. Significant association of NCCLs with gingival recession (Table 2). Premolars (5.7) were significantly more affected with cervical wear than incisors (1.6) and molars (3.15) (Table 3). The mean of teeth with both occlusal and cervical wear was (1.75) less compared to mean of teeth with only cervical wear (7.7) only occlusal wear (0.8) inferring that cervical wear and occlusal wear are not associated with each other.(Table 4 and 5)

Discussion :

In the present study our findings demonstrated that premolars were more influenced with NCCLs .The teeth with more gingival recession and non-mobile teeth developed deeper NCCLs .The teeth with both cervical wear and occlusal wear was not significant.

Table 1 : Tooth Wear Index - B.G.N.Smith and J.K.Knight in 1984

Score	Surface	Criteria
0	O/I	No loss of enamel surface characteristics.
	C	No loss of contour
1	O/I	Loss of enamel surface characteristics.
	C	Minimal loss of contour.
2	O/I	Loss of enamel exposing dentine for less than one third of surface. Loss of enamel just exposing dentine.
	C	Defect less than 1 mm deep.
3	O/I	Loss of enamel exposing dentine for more than one third of surface. Loss of enamel and substantial loss of dentine.
	C	Defect less than 1-2 mm deep
4	O/I	Complete enamel loss - pulp exposure - secondary dentin exposure. Pulp exposure or exposure of secondary dentine.
	C	Defect more than 2mm deep - pulp exposure - secondary dentine exposure.

O: occlusal; I: incisal; C: cervical

Table2 : spearman correlation between total no of teeth with tooth wear and no of teeth with recession and tooth wear

			total no of teeth with tooth wear	no of teeth with recession and toothwear
Spearman's rho	total no of teeth with tooth wear	Correlation Coefficient	1.000	.864**
		Sig. (2-tailed)	.	.000
		N	20	20
	no of teeth with recession and toothwear	Correlation Coefficient	.864**	1.000
		Sig. (2-tailed)	.000	.
		N	20	20

** . Correlation is significant at the 0.01 level (2-tailed).

Table 3 : Number of teeth with mean tooth wear in anteriors ,premolars and molars

	no of teeth with tooth wear in ant teeth	no of teeth with tooth wear in premolar teeth	no of teeth with toothwear in molars
N Valid	20	20	20
Mean	1.60	5.70	3.15
Std. Deviation	1.818	1.689	2.183

Table 4 : Mean of teeth with only occlusal wear ,teeth with only cervical wear and teeth with both cervical wear and occlusal wear

	teeth with only occlusal wear	no of teeth with only cervical wear	total no of teeth with both cervical wear & occlusal wear
N	Valid	20	2020
Mean	.85	7.75	1.75
Std. Deviation	1.226	3.823	.910

Table 5: Spearman correlation between total no of teeth with tooth wear and total no of teeth with both cervical wear and occlusal wear

			total no of teeth with tooth wear	total no of teeth with both cervical wear and occlusal wear
Spearman's rho	total no of teeth with tooth wear	Correlation Coefficient	1.000	.202
		Sig. (2-tailed)	.	.392
		N	20	20
	total no of teeth with both cervical wear and occlusal wear	Correlation Coefficient	.202	1.000
		Sig. (2-tailed)	.392	.
		N	20	20

. Correlation is not significant at the 0.01 level (2-tailed)

It is preferred to brush 3 teeth initially would develop more cervical wear besides hardness of bristles and content of toothpaste, stiffness of filament would be the etiology of cervical wear. It's been said that aggravation of abrasion at the tooth cervix is mainly because of combined action of abrasion and erosion, hence forceful brushing of tooth surface softened by acidic substances of intrinsic or extrinsic origin is an etiology of NCCLs.⁽⁶⁾

Gingival crevicular fluid is shown to be more acidic and may be erosive when in contact with teeth in cervical region. The food substances with pH of value less than 5.5 can become erosive and demineralize the teeth.⁽⁷⁾

Occlusal loading force applied to the teeth are transmitted through them to PDL supporting structure which may cushion and dissipate the resultant stress thus mobile teeth are less likely to develop stress concentration that can cause abfraction indicating correlation of cervical tooth surface lesion with tooth stability and PDL support.⁽⁸⁾

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Stress that concentrate to produce abfraction in teeth usually are transmitted by occlusal loading force. Occlusal interference, premature contacts, habits of bruxism and clenching all may act as stressors. Tooth contact during swallowing occurs 1500 times daily according to Shore these repetitive static and cyclic occlusal loads also could contribute to the formation of erosive, an abrasive or both the odontolytic effect may become highly significant.⁽⁹⁾

Conclusion:

Gingival recession leading to denudation of root surface which in turn could lead to abrasion and erosion, aggressive tooth brushing could be the possible, predisposing factor for NCCLs initiation and progression. NCCL can lead to hypersensitivity, plaque retention, pulpal involvement, root fracture and aesthetic problems. The increasing prevalence of NCCLs with the ageing of population represents a challenge in management of the same in dental profession.