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ORIGINAL ARTICLE

PREVALENCE OF NON-CARIOUS TOOTH WEAR IN PATIENTS REPORTING AT ABBOTTABAD INTERNATIONAL DENTAL HOSPITAL

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ABSTRACT

Non-carious tooth wear lesions are associated with a number of dental complaints including sensitivity, esthetic complications, poor oral hygiene (plaque accumulation) and tooth fracture etc. Cervical area is one of the commonest site where such type of lesions can be present. There is no data that is available regarding prevalence of such lesions in our population. The objective of this study was to find the prevalence of non-carious tooth wear lesions in patients reporting at Abbottabad International Dental Hospital. The study was conducted over a period of six months on patients reporting at Dental OPD of Abbottabad International Dental Hospital. This study which is descriptive in nature was conducted after formal approval of Ethical Review Board of Abbottabad International Medical & Dental College. Irrespective of the gender 344 patients between age 20 to 60 years were examined using Smith and Knight tooth wear index (TWI). Five surfaces i.e. Cervical (C), Buccal (B), Occlusal / Incisal (O & I), Lingual (L) of every tooth in both the maxillary and mandibular arch were examined. It was found that the prevalence of non-carious tooth wear is likely in molars followed by premolars and least evident in incisors. O&I surfaces were more prone to damage followed by the cervical surfaces. Lingual surfaces are least prone for non-carious tooth wear. Descriptive statistics, mean, median, and standard deviation were applied to the data to conclude the prevalence outcomes of non-carious tooth wear. Molars and premolars were the most affected teeth with non-carious tooth wear and incisors were least affected teeth. O&I surfaces were more affected followed by the cervical surface with least occurrence of these lesions on lingual surface.

Keywords: *Tooth wear, Non-carious, Cervical lesions.*

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INTRODUCTION

Non carious loss of tooth structure[1] is associated with age, diet, medication, chemical insults, pathologies and oral habits including abrasion, erosion, attrition and abfraction etc.[2] Loss of tooth structure will result in compromised esthetics, loss of oral functions, pain and sensitivity. Sensitivity caused by such lesions is an extremely painful condition that can directly affect the quality of life. Many studies have found that the age factor is involved in the prevalence and development of these lesions. Lesions' structure is itself not a suitable predictor for etiology because of its dependency on multidimensional factors.[3,4]

Non-carious cervical lesions (NCCLs) are one of the most commonly occurring non carious tooth structure loss at the cervical area. Tooth surface loss leads to the discomfort for patients because of hypersensitivity and esthetic issues. These lesions, if left untreated, can jeopardize teeth's structural integrity and pulp vitality. Lesions formed as a result of such non carious loss in

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tooth structure are very difficult to detect and classify. Appearance of wear defects may range from shallow to more profound defects having sharp edges, cup like hollowed defect, flattening of incisal edges and/or cusp tips and wedge like lesions in cervical area etc. The older population is more prone to develop a higher percentage and more extensively developed lesions as compared to the younger ones.[5] Further, facial aspects of tooth tend to have wear defects more rapidly as compared to lingual. Such lesions are more prevalent in premolar as compared to canines and in buccal segments than lingual ones.[6]

Non-carious tooth wear defects can be clinically examined using a graduated Williams' periodontal probe and flat mirror. If there exists any irregularity in any of the tooth's surface the probe gets retained. These changes and irregularities are evaluated and recorded using a standard tooth-wear index, i.e., Smith and Knight tooth-wear index (TWI).[7] Researchers have agreed that Smith and knight TWI is reasonable for lesions monitoring and epidemiological investigations.[8,9]

In this study wide age range, including young and old patients were included. Objective of present study is to find the prevalence of non- carious loss of tooth structure among patients reporting at dental OPDs of Abbottabad International Medical & Dental College. No such study has been conducted in Pakistan in which we find prevalence of such non carious tooth lesions. Once the prevalence is known we can find different etiological factors involved in causing such lesions and later devise treatment modalities for such lesions along with modification in life styles.

METHODOLOGY

Patients visiting dental OPD of Abbottabad International Dental Hospital, Abbottabad were examined for the purpose of this study. The study was officially approved by the Institutional Review Board of Abbottabad International Medical & Dental College, Abbottabad. Informed written consent was taken from all the participants after explaining the entire study in their own language. This cross-sectional study was conducted on 344 patients and convenience sampling was used for the study. Sample size was calculated by WHO calculator. Patients were examined irrespective of their gender between age 20 to 60 years. Patients with restorations, using removable cast or acrylic partial denture, having any fixed partial dentures/ crowns made up of acrylic, porcelain or metal, already restored cervical lesions, calculus deposits covering the cervical 1/3rd of the tooth or the patients with two or more missing teeth in any of the quadrants were excluded. Smith and Knight Wear Index (TWI) was used to score buccal, lingual, occlusal/incisal, and cervical surfaces for tooth wear and recorded on a specially designed proforma. Calibration was done by comparing the duplicate recorded scorings of 15 patients. Dental mirror and high-intensity dental light were employed for visual examinations along with Williams graduated periodontal probe for recording the intraoral findings while the patients were lying in the supine position. A thorough examination was done to check the presence of lesions, if any. Based on the condition of symptoms and dentin exposure, scores were recorded according to mentioned TWI.

SPSS version 23 and Origin 8.5 Pro was used for the graphical and tabular representation of data. Descriptive statistics info, i.e., mean, median, mode, variance, standard deviation, standard error, and confidence interval values were evaluated using Microsoft Excel.

RESULTS

Data showed that O & I surfaces were the most commonly involved surfaces with prevalence of almost 63% of Non-Carious Tooth Wear. It was further noted that Non Carious Tooth Wear had a prevalence of 17% for cervical, 15% for buccal and 5% for lingual surface.

DISCUSSION

In the present study, significant number of patients were between 30-39 years in age (146 patients). On the contrary, Zin Yun Lai et al concluded in their study that maximum number of patients lied in the middle and older age groups. W. A. J. Smith et al showed that younger age groups had a significantly lower correlation with the presence of non-carious tooth wear than older age groups.[1]

J. Borcic et al (2004) studied 555 teeth and found that teeth with most non carious cervical lesions and greater severity were the lower premolars. The most frequent index level was 1, and the prevalence and severity of the lesions increased with age. The results are similar to this study where in both, the right and left premolar, the prevalence of non-carious tooth wear was found to be significant in occlusal/incisal surfaces along with cervical surface as well.

Selma Jakupovic et al studied 210 subjects and revealed that cervical lesions were found on 51.4% examined teeth.[10] Yang. J et al concluded that the proportion of subjects or teeth with NCCLs significantly increased with age which was similar to the present study. They also observed that pre-molars were the most commonly affected teeth.[11,12] In present study, it was found that premolars and molars were most affected followed by canines and least in incisors.

Wenjuan Yan and Dehong Yang concluded that the posterior mandibular teeth especially the first premolars followed by the molars were the teeth commonly involved.[13]

TABLE 1: AVERAGE SCORE OF ALL MAXILLARY TEETH ACCORDING TO SMITH & KNIGHT TWI

ARCH	Tooth Number	C		B		O&I		L	
		mean	SD	mean	SD	mean	SD	mean	SD
Maxillary Teeth	18	0.03488	0.2622	0.0407	0.27229	0.19186	0.65984	0	0
	17	0.10465	0.48365	0.12209	0.50902	0.44186	0.93652	0.01744	0.1311
	16	0.12791	0.50181	0.14535	0.52554	0.66279	1.10245	0.01744	0.16985
	15	0.13953	0.49869	0.12209	0.47341	0.33721	0.82399	0.02326	0.15093
	14	0.14535	0.49112	0.10465	0.37499	0.32558	0.85635	0.03488	0.21314
	13	0.15116	0.58189	0.06977	0.31635	0.38953	0.8534	0.06395	0.30826
	12	0.05814	0.31869	0.04651	0.26039	0.18023	0.47939	0.05233	0.27029
	11	0.05814	0.29984	0.03488	0.21314	0.18023	0.44139	0.04651	0.26039
	21	0.05233	0.3287	0.03488	0.21314	0.18605	0.48323	0.05233	0.29106
	22	0.06977	0.36751	0.0407	0.22543	0.17442	0.47545	0.0407	0.24996
	23	0.0814	0.3651	0.07558	0.40419	0.45349	0.8456	0.03488	0.23893
	24	0.11047	0.46386	0.11047	0.46386	0.2907	0.73029	0.01744	0.16985
	25	0.13953	0.49869	0.10465	0.4049	0.26744	0.69859	0.01163	0.10736
	26	0.15698	0.58535	0.17442	0.65138	0.51744	0.99253	0.02907	0.19992
	27	0.12209	0.49743	0.12791	0.54632	0.47093	0.93164	0.02326	0.18559
	28	0.10465	0.52968	0.11628	0.55944	0.31395	0.86744	0.02326	0.18559

TABLE 2: AVERAGE SCORE OF ALL MANDIBULAR TEETH ACCORDING TO SMITH & KNIGHT TWI

ARCH	Tooth Number	C		B		O&I		L	
		mean	SD	mean	SD	mean	SD	mean	SD
Mandibular Teeth	48	0.08721	0.48108	0.09884	0.50259	0.31395	0.81189	0.00581	0.07614
	47	0.09884	0.41347	0.12209	0.48557	0.48256	0.92566	0.00581	0.07614
	46	0.15116	0.58189	0.16279	0.59855	0.75	1.17369	0	0
	45	0.16279	0.51475	0.11047	0.438	0.32558	0.80003	0.01744	0.16985
	44	0.1686	0.50715	0.08721	0.35564	0.24419	0.66457	0.01744	0.16985
	43	0.13372	0.50608	0.06395	0.32663	0.43023	0.89104	0.0407	0.31219
	42	0.0814	0.41022	0.06977	0.31635	0.16279	0.44158	0.05233	0.3287
	41	0.09884	0.44078	0.05233	0.24778	0.18023	0.45441	0.04651	0.3206
	31	0.11047	0.48836	0.06395	0.28872	0.18023	0.45441	0.04651	0.3206
	32	0.10465	0.44601	0.05814	0.27972	0.13953	0.39421	0.05233	0.34598
	33	0.20349	0.63832	0.08721	0.38705	0.40698	0.85548	0.04651	0.3206
	34	0.17442	0.51092	0.11628	0.4017	0.21512	0.60629	0.00581	0.07614
	35	0.19767	0.60743	0.14535	0.4791	0.34884	0.85397	0	0
	36	0.13372	0.50608	0.13372	0.52862	0.62791	1.03633	0	0
	37	0.12791	0.49005	0.1686	0.63019	0.60465	1.05564	0.02326	0.21472
	38	0.08721	0.48108	0.11047	0.56579	0.42442	0.94149	0	0

Management of dentin hypersensitivity, restoration of functions, restoring old lesions and prevention of development of new lesions have always been a challenge for dentists. They are commonly present on teeth surface without any plaque. In a study, the prevalence range of these lesions was found to be between five percent to eighty-five percent.[14] Similar broad ranges were found in multiple studies suggesting the diverse variations in non-carious tooth wear, making it difficult to be diagnosed.

TABLE 3: CONFIDENCE INTERVALS OF MEAN SMITH & KNIGHT SCORES FOR ALL SURFACES AT 95% CONFIDENCE LEVEL

Tooth surfaces	Confidence Level (95.0%)	Upper Bound Confidence Interval	Lower Bound Confidence Interval
C	0.015072376	0.133168626	0.103023874
B	0.014500469	0.112066094	0.083065156
O&I	0.058533893	0.409187643	0.292119857
L	0.00700194	0.03352819	0.01952431

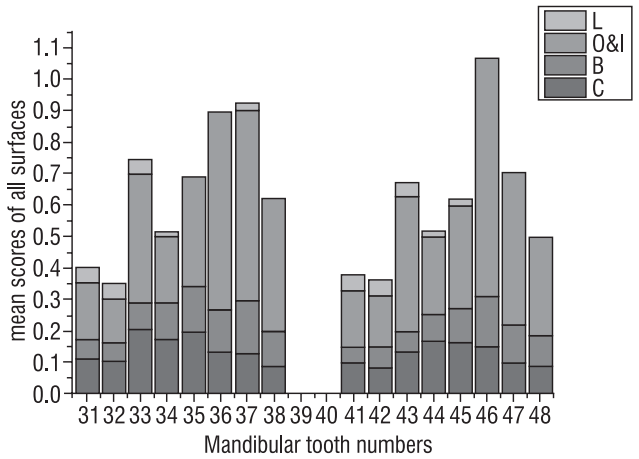

Fig 1: Prevalence of Non-Carious Tooth Wear on All Surfaces of Mandibular Teeth

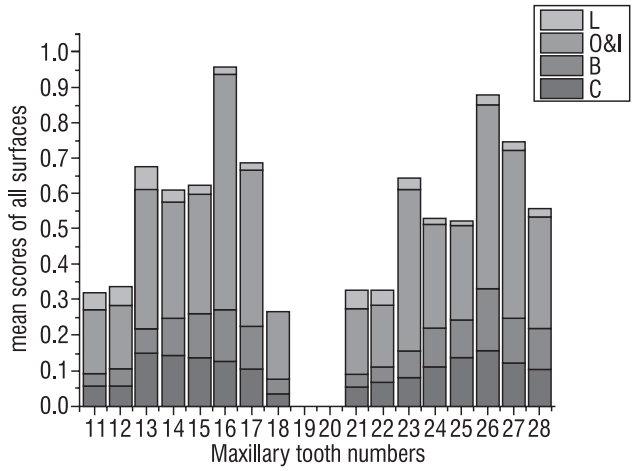

Fig 2: Prevalence of Non-Carious Tooth Wear on All Surfaces of Maxillary Teeth

A study presented that 49 percent of older patients and 26.3 percent of middle-aged persons who visited dentists had non-carious tooth wear in at least one tooth, which was greater than or equal to one millimeter and needed treatment. Based on oral health, non-carious tooth wear can seriously affect the life quality of a person.[15,16] These lesions are difficult to restore.[17]

The dental research has many studies showing knowledge of non-carious tooth structure loss from an earlier age, and many conflicting results have been presented about their prevalence. Bergstrom et al. found

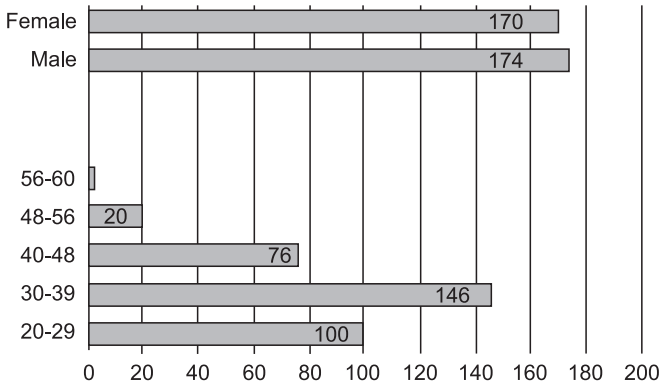

Fig 3: Prevalence of Non-Carious Tooth Wear with respect to gender and age Distribution

the prevalence to be 90% while in another study, it was found to be 2%. This discrepancy in results can be partly described by coverage of different populations with a diverse range of age distributions and local variables.[18] Shulman and Robinson's study was based on the data from young males, while Bergstrom took data from the elder population having age up to 60 years.

CONCLUSIONS

Most commonly involved surfaces presenting with non-carious lesions were the occlusal surfaces of molars and premolars followed by their cervical surfaces in this sample group. Molars showed highest scores of TWI. Lingual surfaces were the least involved surfaces in all the teeth. Most of the patients were asymptomatic without any severe complaint of sensitivity.

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