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Original Article

Prevalence of Non-Carious Tooth Wear in Patients

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ABSTRACT

Non-carious lesions caused by tooth wear include hypersensitivity, bad oral cleanness (plaque formation), cosmetic complications and tooth fractures. It is associated with a number of dental problems if present. **Objective:** To determine the frequency of non-carious lesions in tooth wear among patients attending the dental OPD. **Methods:** A descriptive and cross-sectional study which was carried out in the Dental department of Army Medical and Dental College Rawalpindi for one-year duration from January 2021 to December 2021. After formal approval by the Ethics Review Committee; regardless of the gender, 180 subjects of age 20-60 years were studied by means of the Tooth Wear Index of Knight and Smith. Five surfaces of each tooth were examined in the maxillary and mandibular arches: buccal (B), cervical (C), lingual (L) and occlusal /incisal (O and I). **Results:** It was instituted that non-carious tooth wear prevalence was probable in premolars trailed by molars and less pronounced in incisors. The surfaces of O&I were most susceptible to injury, trailed by the surfaces of cervical. The carious tooth wear was less likely in lingual surfaces. Descriptive statistical analysis was used to obtain results on the incidence of non-carious tooth wear by giving the median, standard deviation and mean. **Conclusions:** Premolars and molars are the teeth mostly affected by non-carious tooth wear, and the incisors are the minimum teeth which are affected. The surfaces most affected were O&I, trailed by the cervical surface with a lower incidence of lingual surface lesions.

INTRODUCTION

Non-carious tooth structure loss is caused by age, diet, medications, chemical trauma, pathology and wear, erosion, wear and abfraction etc. related to oral habits [1, 2]. The tooth structure loss will cause deterioration of aesthetics, oral function loss, sensitivity and pain. Sensitivity due to these lesions is very painful state which affect directly your life quality [3]. Various researches have shown that oldness plays a role in the occurrence and progression of these lesions. The lesions' structure itself is not an adequate indicator of etiology as it depends on multi-dimensional factors [4, 5]. Non-carious cervical lesions are the common defects in the non-carious tooth structures around the cervical area. It causes discomfort to patients due to loss of tooth surface, oversensitivity and aesthetic problems [6]. If left untreated, these lesions can compromise the structural integrity of the teeth and the viability of the pulp [7]. It is very difficult to detect and classify changes that arise as a consequence of these non-carious cavities in the tooth structure. The wear defects appearance can vary from superficial defects to deeper defects with cup like hollowed defect, sharp edges, incisal edges flattening and wedge-shaped lesions or cusp tips around the cervical region [8]. The elderly population is more susceptible to the development of advanced changes in a greater percentage and more broadly than the younger population [9]. In addition, the facial parts of the tooth are subject to faster wear defects than the lingual parts. These changes are more common in premolars than in canines,

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and in the buccal rather than the lingual segments [10, 11]. The study covered a wide age assortment, counting old and young patients. The aim of the study was to determine the frequency of non-carious lesions in tooth wear among patients attending the dental OPD. In Pakistan; no such study was held where we found such non-carious tooth lesions. After we know the frequency of occurrence, we can find the various etiological factors associated with the cause of such lesions, and then design treatments for such lesions along with lifestyle changes.

METHODS

This descriptive and cross-sectional study was held in the Dental department of Army Medical and Dental College Rawalpindi for one-year duration from January 2021 to December 2021. After formal approval by the Ethics Review Committee; regardless of the gender, 180 subjects of age 20-60 years were studied by means of the Tooth Wear Index of Knight and Smith and a convenient sampling method was used for the study. The WHO calculator was used for sample size calculation. Patients with acrylic partial dentures, removable cast, acrylic crowns/ any fixed partial dentures, porcelain or metal dentures, patients with restored lesions of cervical area with treatment, deposits of calculus covering 1/3 of the tooth cervical, or missing two or more teeth in any quadrant were excluded. Five surfaces of each tooth were examined in the maxillary and mandibular arches: buccal (B), cervical (C), lingual (L) and occlusal /incisal (O and I). Calibration was performed by comparison of identical documented results from 20 subjects. The visual examinations were done with a high-intensity dental lamp and dental mirror, and intraoral findings were noted with Williams graduated periodontal probe in supine position of patients. A detailed inspection was carried out to checked for the occurrence of any lesion. Grounded on the symptom status and exposure of dentin, results were documented conferring to the specified TWI. SPSS 23.0 and Origin 8.5 Pro software were applied for tabular and graphical representation of data. Descriptive statistical information namely median, mean, variance, mode, standard error, standard deviation and values were assessed with Microsoft Excel.

RESULTS

The statistics displayed that the surfaces of O&I were frequently intricate, with a predominance of nearly 62% non-carious tooth wear. In addition, it was observed that non-carious tooth wear had an incidence of 15% on the buccal surface, 17% on the cervical and 6% on the lingual surface. The average score of non-carious tooth wear in the maxillary teeth with reference to knight and smith TWI was 0.035 at cervical, 0.065 at buccal and 0.195 at O&I surfaces with SD of 0.28, 0.27 and 0.19, correspondingly. Similarly, the average score of non-carious tooth wear in the last maxillary teeth was 0.10350 at cervical, 0. 116 at buccal and 0.311 at O&I surfaces with SD of 0. 529, 0. 57 and 0. 87, correspondingly (Table 1).

ARCH	Tooth Number	C Mean ± SD	B Mean ± SD	O&I Mean ± SD	L Mean ± SD
Maxillary Teeth	18	0.035 ± .28	0.065 ± 0.27	0.195 ± 0.68	0
	17	0.129 ± .47	0.126 ± 0.51	0.446 ± 0.95	0.011 ± 0.13
	16	0.116 ± .51	0.142 ± 0.53	0.666 ± 1.11	0.015 ± 0.16
	15	0.129 ± 0.51	0.125 ± 0.47	0.336 ± 0.83	0.024 ± 0.15
	14	0.155 ± 0.46	0.103 ± 0.38	0.325 ± 0.85	0.035 ± 0.21
	13	0.141 ± 0.56	0.065 ± 0.32	0.386 ± 0.82	0.064 ± 0.30
	12	0.041 ± 0.35	0.049 ± 0.27	0.18465 ± 0.47	0.059 ± 0.28
	11	0.054 ± 0.26	0.035 ± 0.22	0.185 ± 0.44	0.046 ± 0.26
	21	0.052 ± 0.33	0.039 ± 0.21	0.185 ± 0.482	0.051 ± 0.29
	22	0.071 ± 0.36	0.045 ± 0.23	0.176 ± 0.47	0.04 ± 0.24
	23	0.082 ± 0.39	0.076 ± 0.41	0.456 ± 0.86	0.035 ± 0.24
	24	0.103 ± 0.41	0.115 ± 0.46	0.298 ± 0.73	0.017 ± 0.16
	25	0.149 ± 0.45	0.105 ± 0.40	0.252 ± 0.69	0.013 ± 0.10
	26	0.162 ± 0.56	0.172 ± 0.65	0.515 ± 0.99	0.029 ± 0.19
	27	0.125 ± 0.45	0.129 ± 0.56	0.486 ± 0.93	0.023 ± 0.19
	28	0.103 ± 0.53	0.116 ± 0.56	0.31 ± 0.87	0.024 ± 0.19

Table 1: Average Score of all Maxillary Teeth Conferring to Knight and Smith Twi

The average score of non-carious tooth wear in the mandibular teeth with reference to knight and smith TWI was 0.082 at cervical, 0.098 at buccal and 0.316 at O&I surfaces with SD of 0.482, 0.503 and 0.811, correspondingly. Similarly, the average score of non-carious tooth wear in the last mandibular teeth was 0.083 at cervical, 0.112 at buccal and 0.424 at O&I surfaces with SD of 0.49, 0.585 and 0.95 correspondingly (Table 2).

ARCH	Tooth Number	C Mean ± SD	B Mean ± SD	O&I Mean ± SD	L Mean ± SD
Mandibular Teeth	48	0.082 ± 0.482	0.098 ± 0.50	0.316 ± 0.81	0.006 ± 0.08
	47	0.099 ± 0.44	0.122 ± 0.49	0.489 ± 0.93	0.006 ± 0.08
	46	0.169 ± 0.58	0.162 ± 0.59	0.78 ± 1.18	0
	45	0.162 ± 0.52	0.111 ± 0.44	0.382 ± 0.86	0.018 ± 0.17
	44	0.198 ± 0.51	0.084 ± 0.35	0.246 ± 0.66	0.016 ± 0.16
	43	0.138 ± 0.51	0.062 ± 0.32	0.421 ± 0.89	0.047 ± 0.32
	42	0.082 ± 0.41	0.069 ± 0.32	0.169 ± 0.45	0.053 ± 0.34
	41	0.094 ± 0.44	0.053 ± 0.29	0.175 ± 0.45	0.047 ± 0.39
	31	0.112 ± 0.48	0.064 ± 0.23	0.195 ± 0.46	0.048 ± 0.31
	32	0.116 ± 0.45	0.056 ± 0.26	0.139 ± 0.39	0.054 ± 0.35
	33	0.212 ± 0.63	0.086 ± 0.39	0.403 ± 0.85	0.049 ± 0.31
	34	0.179 ± 0.51	0.115 ± 0.40	0.210 ± 0.61	0.006 ± 0.079
	35	0.199 ± 0.61	0.1440 ± 0.48	0.349 ± 0.82	0
	36	0.131 ± 0.50	0.135 ± 0.59	0.622 ± 1.06	0
	37	0.128 ± 0.42	0.170 ± 0.63	0.605 ± 1.013	0.02451 ± 0.22
	38	0.083 ± 0.48	0.113 ± 0.58	0.424 ± 0.95	0

Table 2: Average Score of all Mandibular Teeth Conferring to Knight and Smith Twi

The CI of cervical surface was 0.0199, for buccal surface 0.01515, for lingual surface was 0.0070 and for O&I was

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0.0629(Table 3).

Tooth surfaces	Confidence Level (95.0%)	Upper Bound Confidence Interval	Lower Bound Confidence Interval
C	0.0199	0.1366	0.1038
B	0.01515	0.1166	0.0895
O&I	0.0629	0.4097	0.2888
L	0.0070	0.0336	0.0185

Table 3: CI of Mean Knight and Smith Scores for all Surfaces at Confidence Level of 95%

DISCUSSION

The age ranged in this study from 30 to 39 years (120 patients). Lai et al., stated in their analysis that the maximum patients were found in the advanced and middle age groups [12]. Smith et al., exhibited that the age groups containing younger patients had a substantially lesser association with the existence of non-carious tooth wear in comparison to the elder age groups [13, 14]. In 2019, Zuza et al., examined 560 teeth and noticed that the teeth with the severe non-carious lesions of the cervical area were inferior premolars [15]. The common level of index was one, and the severity and extent of the lesions augmented with time of life [16]. The outcomes are comparable to this research in which the incidence of non-carious tooth wear in both the right and left premolars is significant on both the occlusal/incisal and cervical surfaces [17]. As shown above, pathological tooth wear increases with age, reflecting the fact that tooth wear is an age-related phenomenon. With age, the guidance of the canines is replaced by a group function due to the wear of the canines [18]. This change causes increased wear at the rear. Front steering can reduce the risk of rear wear, but increases the likelihood of front wear. The reflection of similar features was observed in the tested sample. It was observed that the occlusal contact surfaces also increased with time. After a certain period of life, the wear surfaces develop when some of their surfaces are used for occlusal contact at maximum intersection. The remainder of the face of the facet is involved in functions during inter-occlusive contact movements [19, 20]. With wear, the occlusal space decreases, causing the remaining points on the occlusal surface to mesh. In patients with gastro-esophageal reflux disease, an increase in the degree of tooth wear was found. Tooth wear in this population is caused by the reflux of stomach acid into the mouth [21]. Patients with a history of increased vomiting showed greater tooth wear. The acidic vomiting into the mouth is acidic due to the presence of stomach acid that contains hydrochloric acid. After vomiting episodes, vigorous brushing may result in further loss of softened enamel and dentin. One study found that 50% of elderly subjects and 27% of people at their middle-age who checked by the dentist had non-carious tooth wear with minimum one tooth equal to or greater than a millimeter and in need of treatment [22]. Depending on the health of the oral cavity, tooth wear without caries can seriously affect a person's quality of life [23]. These injuries are hard to repair. Dental studies showing awareness of the non-carious tooth structure loss from an earlier age, and many contradictory outcomes were reported about its occurrence. Haralur et al., stated the incidence of 92%, one other study found it to be 3% [24]. This inconsistency in the outcomes can be partially explained by the inclusion of diverse inhabitants with different distributions of age groups and local variables. While the Robinson and Shulman analysis was grounded on statistics from younger men, Bergstrom used population statistics from 60-year-old elderly [25].

CONCLUSIONS

Premolars and molars are the teeth mostly affected by non-carious tooth wear, and the incisors are the minimum teeth which are affected. The surfaces most affected were O&I, trailed by the cervical surface with a lower incidence of lingual surface lesions. Maximum patients had no symptoms and had no serious complaints of sensitivity.

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