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Comparison of Handedness and Toothbrush-Related Cervical Dental Abrasion in Left- And Right-Handed Individuals

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Abstract

Background: Dental abrasion or cervical abrasion is the pathological wear of tooth substance due to abnormal mechanical processes not directly related to mastication. Improper toothbrushing combined with vigorous force is associated with cervical abrasion. In this study, we investigated the comparison of handedness and toothbrush-related cervical dental abrasion in left- and right-handed individuals.

Materials and methods: 500 patients were randomly selected those who fulfilled the eligibility criteria. Subjects participating in this study were divided into 2 groups according to their hand preference of brushing. Handedness was determined by a questionnaire that focused on handedness using the Turkish version of the Edinburgh Handedness Inventory. The left handed (group I) included 200 and the right handed (group II) 300 patients.

Results: In this research, both male and female exhibited higher tooth wear score in both groups, which was not statistically significant. It was also found that right handed individual had more cervical abrasion and less calculus on the right side and similarly left handed individual had more cervical abrasion and less calculus on the left side. This study also confirmed that clinical attachment loss was also present on the left and right side of both the groups.

Keywords: Cervical Abrasion, calculus, clinical attachment loss, left and right handedness.

Introduction

Dental abrasion is defined as the wear of teeth by any substance other than the tooth. Cervical region is the most commonly abraded site and these lesions come under the group of non carious cervical lesions.[1] Friction between tooth substrate and any extrinsic agent leads to abrasion. Toothbrush abrasion is influenced by many factors.[2] If there is prolonged contact between bristles and tooth surface, the rate of abrasion is increased further. The force and frequency applied to the brush also play an important role in abrasion. The abrasivity of the toothpaste has also been associated with cervical abrasion. The crown of the tooth becomes more vulnerable to physical and chemical stimuli due to the gradual reduction of the enamel thickness towards the cemento-enamel junction and the density of the enamel surface near the dentino-enamel junction. In addition, the strength of the enamel in the cervical third is less due to the direction of the dental rods, which become flat.[3] Clinically, the cervical abrasion in its initial state is observed as a small horizontal groove near the cementoenamel junction on the vestibular surface of the crown of the tooth.[4] Cervical abrasions are becoming an increasingly important factor when considering the long-term health of the dentition. However, the force of brushing varies with the brushing technique, the stiffness of the bristles, age and brushing habits of each specific individual.[5] It has been found that right and left handedness may have an effect on levels of abrasion. Therefore, this study will investigate the comparison of handedness and toothbrush-related cervical dental abrasion in left- and right-handed individuals.

Material And Methods

The present study was carried out in Kothiwal Dental College, Moradabad. 500 patients were randomly selected those who fulfilled the eligibility criteria. Subjects participating in this study were divided into 2 groups according to their hand preference of brushing. Handedness was determined by a questionnaire that focused on handedness using the Turkish version of the Edinburgh Handedness Inventory. The left handed (group I) included 200 and the right handed (group II) 300 patients. Calculus index and clinical attachment loss was also recorded.

Inclusion Criteria

- Those who have given the written informed consent
- Healthy males and females with no systemic disease.
- Brush once a day
- Duration – between one and three minute
- Horizontal brushing
- Similar type of toothpaste
- Cervical abrasion on Maxillary posterior teeth only

Exclusion Criteria

- Orthodontic treatment
- Congenital abnormalities
- Oral lesion or conditions
- Periodontally compromised teeth
- Those who use electronic tooth brush

Evaluation of clinical oral conditions and oral hygiene performance

A dental examination was performed in a dental chair using a standard operating light, an explorer, a CPI probe and a mouth mirror. All measurements was made by a single examiner in order to achieve better standardization.

Measurement of tooth wear

The presence and type of cervical defects in each person was diagnosed using the tooth wear index (TWI) by B.G.N Smith and J.K Knight in 1984.

Calculus index was recorded by calculus index simplified by John c. Greene and Jack R. Vermillion in 1964.Clinical attachment loss was recorded by CPITN Index (WHO, FDI).

Results

Table 1 shows clinical variable of subjects in terms of tooth wear index (TWI), calculus index and clinical attachment loss of right side. On comparing the mean values of tooth wear index and clinical attachment loss of right handed individual it was statistically higher on the right side (p<0.000) and while comparing calculus index, it was higher on left side (P<0.000).

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

Table 2: Comparison of tooth wear index, calculus index and clinical attachment loss among right handed individuals on two different sides.

	Mean	P value
TWI RIGHTSIDE	1.665	0.000
TWI LEFTSIDE	.6927	
CI RIGHTSIDE	.312	0.000
CI LEFTSIDE	.600	
CAL RIGHTSIDE	1.294	0.000
CAL LEFTSIDE	.871	

Statistical analysis was performed by analysis of variance (ANOVA)

Table 3: Comparison of tooth wear index, calculus index and clinical attachment loss among left handed individuals on two different sides.

	Mean	P value
TWI RIGHTSIDE	1.665	0.000
TWI LEFTSIDE	.6927	
CI RIGHTSIDE	.312	0.000
CI LEFTSIDE	.600	
CAL RIGHTSIDE	1.294	0.000
CAL LEFTSIDE	.871	

Statistical analysis was performed by analysis of variance (ANOVA).

Table 4: Comparison of Tooth Wear Index, Calculus Index, Clinical Attachment Loss Among Male And Female.

	Right Side			Left Side		
	Male	Female	P Value	Male	Female	P Value
Right Handed (TWI)	1.647	1.680	0.648	0.675	0.707	0.347
Left Handed (TWI)	0.270	0.261	0.817	1.726	1.757	0.410
Right Handed(Calculus Index)	0.305	0.318	0.506	0.597	0.602	0.322
Left Handed(Calculus Index)	0.850	0.818	0.094	0.304	0.273	0.758
Right Handed (Clinical Attachment Loss)	1.291	1.298	0.147	0.846	0.893	0.988
Left Handed (Clinical Attachment Loss)	0.380	0.469	0.217	1.234	1.572	0.476

Table 4:Shows the clinical variable of subjects in terms of gender with handedness. It was found that there were no statistical significant differences between men and women according to the TWI, CI, and CAL in right and left handed individual.

Discussion

Dental abrasion or cervical abrasion is the pathological wear of tooth substance due to abnormal mechanical processes not directly related to mastication. Improper toothbrushing combined with vigorous force is associated with cervical abrasion. Horizontal toothbrushing is especially implicated in increased prevalence of cervical abrasion .[6,7] Hand skill and motivation are important factors in proper brushing activities.[8,9] Coren and Porac [10] reported that there was a significant association between hand skill and handedness. It was reported that left- and right-handers exhibit fundamental differences in measures

of preference and proficiency.[11] other studies on handedness showed that there was little difference in motor control, or performance on visio-spatial tasks, between left- and right handed individuals.[12,13] So, in this study, it was thought that there might be an association between handedness and toothbrushing- related cervical tooth defects depending on improper tooth-brushing.

In this study, we investigated the relationship between tooth-brushing-related cervical dental abrasion and handedness in left- and right-handed individuals. In this research, both male and female exhibited higher TWI score in both groups, which was not statistically significant. These may be related to long-term exposure to faulty brushing in the cervical dental area. In this study it was also found that right handed individual had more cervical abrasion and less calculus on the right side and similarly left handed individual had more cervical abrasion and less calculus on the left side. It may be due to brushing load influences abrasion of the enamel and can change the dexterity of the individuals which in turn can bring about a change in maintaining the health of the oral cavity. This study also confirmed that clinical attachment loss was also present on the left and right side of both the groups. It may be related to the mechanical trauma caused by toothbrushing. This study concludes that cervical abrasion depends on the handedness of the individual. It can be stated that right-handed individuals tend to brush the right side of the oral cavity more and similarly left-handed individuals tend to brush the left side of the oral cavity.

References

1. Shay, K. (2004) ‘The evolving impact of aging America on dental practice’, The journal of contemporary dental practice, 5(4), pp. 101–110.
2. Mannerberg, F. (1960) Appearance of tooth surface as observed in shadowed replicas in various age groups,in long-term studies, after tooth-brushing, in cases of erosion and after exposure to citrus fruit juice. Gleerup
3. Krolo, M. and Kovačević, A. (2015) ‘Noncarious Cervical Lessions: From Etiology to Therapy’, Smile DentalJournal, 110(2481), pp. 1–5.
4. Björn, H., Lindhe, J. and Gröndahl, H. G. (1966) ‘The abrasion of dentine by commercial dentifrices’,Odontologisk revy, 17(2), pp. 109–120.
5. Siddique, R. et al. (2019) ‘Qualitative and quantitative analysis of precipitate formation following interaction of chlorhexidine with sodium hypochlorite, neem, and tulsi,Journal of conservative dentistry: JCD, 22(1),pp. 40–47
6. Grippo JO, Simring M, Coleman TA. Abfraction, abrasion, biocorrosion, and the enigma of noncarious cervical lesions: a 20-year perspective. J Esthet Restor Dent 2012;24(1):10–23. DOI: 10.1111/j.1708-8240.2011.00487.x.
7. Grippo JO. Abfractions: a new classification of hard tissue lesions of teeth. J Esthet Dent 1991;3(1):14–19. DOI: 10.1111/j.1708-8240.1991. tb00799.x.
8. Tezel A, Orbak R, Canakci V. The effect of right or left-handedness on oral hygiene. Int J Neurosci 2001;109:1e9.
9. Brayer WK, Mellonig JT, Dunlap RM, Marinak KW, Carson RE. Scaling and root planning effectiveness: the effect of root surface access and operator experience. J Periodontol 1989;60:67e72.
10. Coren S, Porac C. Fifty centuries of right-handedness: the historical record. Science 1977;198:631e2.
11. Tan U. Relation of hand performance and preference in male and female left-handers to familial sinistrality and writing hand. Int J Neurosci 1999;52:211e24.
12. Annett M. Left, right, hand and brain: the right shift theory. London:Lawrence Erlbaum Associates, 1985.

13. Henderson NJ, Stephens CD, Gale D. Left-handedness in dental under- graduates and orthodontic specialist. Br Dent J 1996;181:285e8.