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Research Article

Association Between Tooth Brushing Behaviours And Dental Abrasions Among Residents of A Tribal District in Himachal Pradesh – A Cross Sectional Study

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ABSTRACT

Aim: To determine an association between tooth brushing behaviours and dental abrasions among residents of a tribal district in Himachal Pradesh.

Materials and Methods: The study was carried out on 550 adults (350 male and 200 female) aged 20 years and above who attended the Regional hospital at Reckongpeo in Tribal district of Kinnaur in the state of Himachal Pradesh. Study format comprises of patient demographic details and information on brushing behaviours. "P" value ≤0.05 was taken as statistically significant whereas ≤ 0.01 was considered as statistically highly significant.

Results: In this study statistically significant relationship was observed between abrasive lesions and majority of the factors related to the tooth brushing behaviours. Statistically significant difference was found between abrasions and age wise and gender wise comparison, tooth brushing frequency, changing habits of toothbrushes on fraying of toothbrush bristles. Whereas the association between prevailing dental abrasions and technique and strokes used during tooth brushing was statistically insignificant.

Conclusion: Keeping in mind an association and impact of brushing behaviour and abrasions dental professionals should make evidence-based recommendations to their patients and general masses. There is a need of demonstration of proper tooth brushing techniques to this group of population and education to modify their brushing behaviours for a sound dental health.

Key-words: Dental abrasion, tribal community, tooth brushing behaviour.

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INTRODUCTION

Tooth wear is a common but most commonly left untreated dental problem and noticed by the patient when he suffers from severe dental hypersensitivity.[1]Non-carious cervical lesions (NCCLs) have been attributed to toothbrush abrasion, acid corrosion and abfraction. Dental abrasion is the most prevalent form of NCCL.[2] An knowledge update of the multifactorial nature of tooth wear and its risk factors is very important in the diagnostic protocol and management strategy by dental professionals.[3] Tooth abrasion is defined as the loss of tooth substance that occurs in the absence of carious mechanisms at the cement-enamel junction of a tooth.[4] Cervical abrasion may vary in its clinical presentation among individuals, and may cause painful sensations linked to dentinal hypersensitivity and impair an individual's oral hygiene performance during tooth brushing.[5,6]

Tooth brushing is the most common means of oral prophylaxis at an individual level and in the light of its potential benefits to oral health, the adverse effects or damage caused by tooth brushing can be rated as rather small.[7] Specific cause of these lesions is unknown. However, despite there being a number of contrasting views, it has been suggested that they may be caused by a hard toothbrush, excessive brushing pressure and abrasive toothpaste. Wirdatul RD et al.,[8] and Bergstrom and Lavstedt[9] have revealed the role of tooth brushing techniques in the development of abrasive lesions. The mechanical means used to ensure adequate oral hygiene in preventive dentistry has been reported to be a probable main factor in the development of abrasion. Limited literature exists on the studies related to the association between tooth brushing and prevalence of abrasive lesions. This is a pioneer study conducted among the tribal population in the state of Himachal Pradesh, to determine the correlation between tooth brushing behaviours and occurrence of abrasive lesions.

MATERIALS AND METHODS

This cross-sectional study conducted from June 2013 to August 2013 among 550 adults aged 20 years and above who attended the tribal regional hospital, in the state of Himachal Pradesh. Inclusion Criteria: Those patients who were willing to participate in the study, using manual toothbrush for cleaning teeth, and those not having cervical carious lesions were included in the study. Exclusion Criteria: Patients not willing to participate in the study, using chewing twigs as means of cleaning teeth, those having generalized cervical carious lesions and class-V restoration done on the buccal surface were excluded from the study group. A questionnaire was completed and abrasion on the buccal surface of teeth was recorded using mirror, probe, and standard dental chair light by a single experienced examiner. The lesions, which were clearly identifiable at cement-enamel junction of teeth and which were discoloured, non-carious, “C” or “V” shaped, were taken as wedge-shaped defects and recorded for each patient. The subjects with abrasive lesions were classified according to gender, age, frequency of tooth brushing, tooth brushing technique, duration of changing worn out toothbrush.

Statistical methods: The data was analyzed using the software Statistical Package for Social Sciences version15. The data obtained were calculated by using Chi-square test. “*P*" values ≤ 0.05 was taken as statistically significant where as ≤ 0.01 was considered as statistically highly significant.

RESULTS:

550 patients were examined out of which 359 were males and 200 females. 98(28%) males and 28(14%) were presented with abrasions on teeth. [Table:1] Whole study population was divided into four age groups: 20-24, 25-34, 35-44, 45 and above. Elderly age group of 45 years and above have highest prevalence of abrasive lesions and the youngest age group of 20-24 years have lowest prevalence (41.66% vs 10.9%).[Table:2] Abrasion was highest among the subjects who brushed their teeth twice daily than those subjects who brush once daily (26.34% vs 15.73%). [Table: 3] Those subjects who were brushing their teeth with horizontal strokes were presented with more abrasive lesions than those subjects who were brushing with vertical or complex strokes.(27.82% vs 14.72% and14.47%).[Table:4]Presence of abrasions was highest among those who

were changing their brushes after fraying away of bristles after one month than those who changed it after 6 months (i.e. 33.33% vs. 11.17%).

Table: 1 GENDERWISE PREVALENCE OF ABRASION

Gender	Number of of subjects	Abrasions	
		present	%
Male	350	98	28%
Female	200	28	14%
Total	550	126	22.9%

Chi-quare=18.27, P=0.0016 (highly significant)

Table: 2 AGE WISE DISTRIBUTION OF ABRASION IN THE STUDY POPULATION

Age Group	Number of Subjects	Abrasion Present	%	Abrasion Absent	%
20-24	55	6	10.9	49	89.1
25-34	305	80	26.22	225	73.78
35-44	178	35	19.66	143	80.34
45 and above	12	5	41.66	7	58.34
Total	550	126	22.9	424	77.1

Chi-square=18.11, P=0.032 (statistically significant)

Table: 3 TOOTH BRUSHING FREQUENCY AND PRESENCE OF ABRASION

Frequency	Number of Subjects	Abrasion Present	%	Abrasion Absent	%
Once daily	178	28	15.73	140	84.27
Twice daily	372	98	26.34	225	73.66
Total	550	126	22.9	424	77.1

Chi-square=23.24, P=0.001 (statistically highly significant)

Table:4 TOOTH BRUSHING TECHNIQUE AND PRESENCE OF ABRASION

Brushing Technique	Number of Subjects	Abrasion Present	%	Abrasion Absent	%
Horizontal	345	96	27.82	249	72.18
Vertical	129	19	14.72	110	83.28
Complex	76	11	14.47	65	83.53
Total	550	126	22.9	424	77.1

Chi-square=4.527, *P*=0.216 (statistically not significant)

Table:5 DURATION OF CHANGING TOOTHBRUSH AND PRESENCE OF ABRASION

Duration of changing of Tooth Brush	Number of Subjects	Abrasion Present	%	Abrasion Absent	%
Every month	45	15	33.33	30	66.66
two months	119	36	30.25	83	69.75
Three Months	88	53	28.19	135	71.81
Six months or more	198	22	11.17	176	88.89
Total	550	126	22.9	424	77.1

Chi-square=19.26, P=0.029 (statistically significant)

DISCUSSION

The etiology of cervical abrasion is multifactorial and is a result of additive effect of various factors. Literature shows that tooth brushing behaviours plays an important role in the occurrence of these lesions.[10] The present

results confirm an association between improper method and frequency of tooth brushing, changing of toothbrush and cervical abrasion. However, many things remain unknown regarding the causes of abrasion. Male subjects were found to have more abrasive lesions than female subjects. Radentz et al., [11] and Ozgoz et al., [12] reported that frequency of cervical abrasions was higher among males than females and this difference was statistically highly significant. Similar results were obtained in the present study. However, different results were obtained in the studies.[2,3] where the distribution of abrasions among gender was not significant. Despite the contradictory views, more abrasive lesions among males were found in the studies conducted by Ashley [13] and Hawkins et. al., [14] suggests that men exert higher pressure on teeth while brushing than females and the duration of brushing is longer for men.

People in this tribal district are aware about maintenance of oral hygiene as the percentage of the subjects brushing twice daily is higher than those brushing once a day. Frequency of tooth brushing has shown a significant relationship with cervical abrasive lesions in the present study. Those brushing twice daily have significantly higher prevailing cervical abrasion than those brushing once daily. Again duration of tooth to toothbrush contact have proved its effect. Higher the frequency of daily brushing more is the number of cervical abrasions. Similar results were found in the study conducted by Akgul et al.,[18] whereas Tomasik [19] have revealed the results which were statistically significant.

Method of brushing with different strokes as was depicted in this study i.e. horizontal, vertical and complex strokes also show its effect on the occurrence of abrasions. Those subjects brushing with predominately horizontal strokes were having higher abrasions than those with vertical and complex strokes. Statistically however this difference was not significant. Similar results were found in the studies [20,21] however contrasting results were revealed in the studies.[22]where the difference among different population was statistically insignificant.

Brushing technique has also shown statistically significant results with the formation of wedge‐shaped defects. It has been shown that depending on the tooth brushing technique, forces of different severity and shapes would occur in the cervical region of teeth. These differences in the techniques have become influential in the investigation of relations between them and the prevalence of cervical tooth lesions. A study conducted by Ullman A *et al*.,[16] has shown similar results, whereas the study conducted by Litonjua *et al*.,[17] showed contrasting results.

Duration of changing the toothbrush has also shown to be directly effective on the occurrence of abrasions. Those subjects who admitted of changing their brush due to fraying of bristles after 1 month have significantly more number of lesions than those who change it after 6 months or more. Similar results have been obtained in a study conducted in Turkey. [22]

CONCLUSION

The study reveals that a relationship between tooth abrasions and brushing frequency, technique, and duration of changing toothbrush. It is a multifactorial problem in which all the above mentioned factors they collectively responsible for the occurrence of cervical lesions. Individual oriented factors, especially brushing technique and daily frequency of brushing, seem to be of prime importance for the occurrence and severity of abrasion and seem to exert a greater influence than other associated factors.

PUBLIC HEALTH SIGNIFICANCE

Abrasion, being a self‐inflicted destructive process, the damage and morbidity caused by it can be prevented by effective oral health instructions. The subjects under study which belong to the tribal district are well aware of the oral hygiene practices. In order to prevent this problem we should try to combat the problem from its early stages and to educate the people and demonstrate the correct brushing technique and frequency. These efforts of educating them must be reinforced and will definitely reduce the burden of this dental problem.

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