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Association Between Cervical Abrasion and age and its Influence on Gender - A Retrospective Study

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ABSTRACT

Cervical lesions are often characterized by defects seen in the gingival third of a tooth crown which may be in the facial or lingual surface. Pathological loss of tooth structure caused by factors other than dental caries such as cervical abrasion is referred to as non-carious cervical lesions (NCCL). Cervical abrasion is an example of NCCL in which a constant exposure of the tooth to mechanical forces leads to pathological wearing away of the hard tissues. In most of the cases, cervical tooth lesions are revealed to be more common as the age increases. Several studies have reported the difference in the prevalence of cervical abrasion between males and females. Many reports suggest that cervical abrasion is commonly associated with improper tooth brushing habits. To evaluate the prevalence of cervical abrasion between genders and its influence on age. It is a retrospective study conducted using the case records of Saveetha Dental College and Hospital, Chennai, India from June 2019 to March 2020. Data including the patient's name, patient's identification number (PID), age, gender and presence of cervical abrasion were retrieved from the patients' case records. A total of 742 consecutive case records were retrieved and analysed. Cervical abrasion was observed in 371 individuals of this study. High prevalence of cervical abrasions was seen in males (70.9%) compared to females (29.1%). Most of the cases were observed in individuals within the 41-50 years age group (28.8%), and the least was seen within the 11-20 years age group (0.3%). Within the limits of the study, most of the cervical abrasion cases are recorded in individuals within the 41-50 years age group with higher predilection in males. There is a statistically significant association of cervical abrasion with age and gender.

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INTRODUCTION

Cervical lesions are often characterized by defects seen in the gingival third of a tooth crown which may be in the facial or lingual surface (Amin *et al.*, 2018). They can be classified into carious cervical lesions (CCL) and non-carious cervical lesions (NCCL) (Terry *et al.*, 2003; Hussainy, 2018). Carious cervical lesions are also referred to as cervical caries and root caries. CCLs involve the presence of carious lesions at the cervical region, root surface or proximal surfaces, which can be either primary or

secondary caries (Amin *et al.*, 2018). Pathological loss of tooth structure caused by factors other than dental caries such as cervical abrasion are referred as non-carious cervical lesions (NCCL) (Bartlett and Shah, 2006; Bomfim *et al.*, 2015).

NCCLs are often characterized by shallow depression, disk-shaped lesions with flat, sharp or indented floors. Based on previous studies, these lesions are said to have a multifactorial etiology with the surface of the lesions varying according to the causative factors (Kumar *et al.*, 2015). NCCLs may lead to dental caries and plaque, tooth sensitivity and loss of structural integrity and pulp vitality after a prolonged period of time (Kumar and Antony, 2018; Ramesh *et al.*, 2018).

Cervical abrasion is an example of NCCL in which a constant exposure of the tooth to mechanical forces leads to pathological wearing away of the hard tissues. (Vaghasiya *et al.*, 2018; Sewerin, 1970). Based on previous reports, it is believed that cervical abrasion is a multifactorial process in which its etiologies include improper tooth brushing, use of abrasive dentifrices or other abrasive agents such as coal (Rajendran *et al.*, 2019; Ramanathan and Solete, 2015). A study revealed that the composition and amount of dentifrices may contribute to the development of abrasive lesions (Siddique, 2019; Rajakeerthi and Nivedhitha, 2019).

Many reports suggest that improper brushing habits which include the brushing technique, duration and forces applied while brushing mainly contribute to cervical abrasion (Bishop *et al.*, 1985; Hattab and Yassin, 2000). It has been suggested that individuals who brushed their teeth in a horizontal manner and with the brushing frequency of at least twice daily compared to those with poor brushing habits tend to exert more forces on the cervical area of the teeth (Noor, 2016; Teja, 2019).

In most of the cases, cervical tooth lesions are revealed to be more common as the age increases, but they are equivocal in terms of gender (Bergström and Eliasson, 1988; Rajendran *et al.*, 2019). However, several studies have reported the difference in the prevalence of cervical abrasion between males and females, in which Radentz et al., revealed that males have more lesions compared to females with the difference between genders came nearer to being of statistical significance.

This is later confirmed by other studies such as Vaghasiya et al., who reported more cases of cervical lesions in males compared to females (Radentz *et al.*, 1976; Vaghasiya *et al.*, 2018). Another study reported on female predilection when it comes to cervical lesions (Sangnes and Gjermo, 1976).

Structure of enamel may be affected over a period of time following the loss of dental tissues and eventually leads to the exposure of dentin surfaces in the advanced stages. In most cases, cervical lesions usually begin in a painless and unrecognizable manner, but as the lesion progresses, patients usually start complaining of tenderness and non-aesthetic appearance of the teeth (Ramamoorthi *et al.*, 2015; Manohar and Sharma, 2018).

Early detection of NCCLs is very important in order to prevent its further progression into the severe condition and to provide the appropriate preventive measures (Janani *et al.*, 2020; Jose *et al.*, 2020). Similar to other diseases, proper diagnosis is an integral part of the treatment which helps a dentist to provide proper treatment (Ravinthar and Jayalakshmi, 2018; Nasim and Nandakumar, 2018) This study is done to evaluate the prevalence of cervical abrasion between genders and its association with age.

MATERIALS AND METHODS

A retrospective study was conducted by reviewing 86,000 patient case records of the Saveetha Dental College and Hospital, Chennai, India. In the study, 742 consecutive case records of patients for a period of June 2019 to March 2020 with signed informed consent were sorted. A total of two examiners were involved in this study. An effort had been made to confirm that the sorted case records contained information of cervical abrasion. Prior permission use of the case records analysis was obtained from the University. All the case records of completely edentulous patients were excluded on subjecting to selection criteria.

Information on age, gender and presence of cervical abrasion were collected from the patient's case records. Age of the patients were categorized for statistical convenience as 11-20, 21-30, 31-40, 41-50, 51-60, 61-70 and 71-80 years. Data was entered in Excel and analyzed using SPSS software version 23.0. Descriptive analysis was done to assess the prevalence of cervical abrasion in different age groups and gender. Chi-square test was used to evaluate the association of cervical abrasion with age and gender. The significant level test was set such that $p<0.05$ is considered significant.

RESULTS AND DISCUSSION

A total of 742 patients were evaluated in this study, out of where cervical abrasion was observed in 371 individuals. This study shows the presence of a statistically significant association between cervical abrasion and age and gender ($p<0.001$).

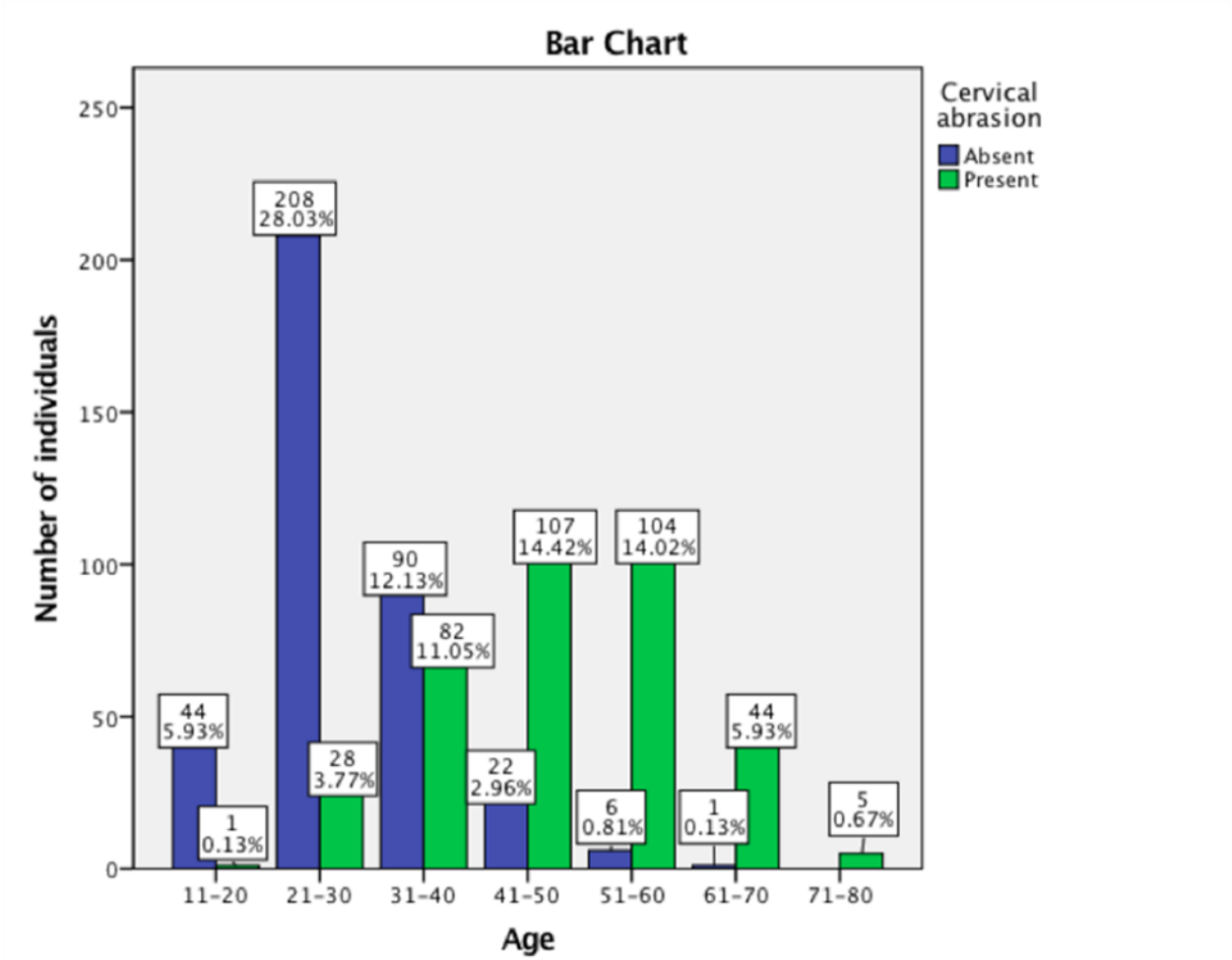

Figure 1: Bar graph showing the association between cervical abrasion and its frequency among different age groups

Among the individuals with cervical abrasions, the majority of them are within the 41-50 years age group (28.8%) while individuals within 11-20 years of age (0.3%) are the least affected with cervical abrasion in this study (Pearson's Chi-Square p-value -0.001, (<0.05), hence statistically significant). [Figure 1], The X-axis represents the age groups. Y-axis representsthe number of patients of each age group.

There is a higher prevalence of cervical abrasion seen in males (70.9%) as compared to females (29.1%) (Pearson's Chi-Square p-value 0.001(<0.05), hence, statistically significant). [Figure 2], The X-axis represents the genders. Y-axis represents the number of patients of each gender.

A previous study reported that there is a significant association between cervical lesion and age (p<0.001), but the similar association is not observed with gender and type of tooth. In their study, it was revealed that there is no significant difference in the number of cases between males (49.6%) and females (50.4%) (Amin *et al.*, 2018). Similarly, another study mentioned that the presence of NCCLs has no association with gender (p>0.05) (Sadaf and Ahmad, 2014).

Several studies mentioned there is an increase in the incidence and severity of cervical lesions in older individuals (Amin *et al.*, 2018; Vaghasiya *et al.*, 2018). According to a study by Vaghasiya et al., higher prevalence of cervical abrasion is seen in individuals within the 31-40 years age group (32.5%) while the least affected are those within the 21-30 years age group (17%) (Vaghasiya *et al.*, 2018). It is often described in previous studies that the occurrence of cervical abrasion increases with age which is commonly associated with improper brushing technique and lack of awareness on proper oral hygiene seen in older age groups.

A study reported the higher prevalence of cervical abrasions among males (68.5%) compared to females (31.5%) (Vaghasiya *et al.*, 2018). Overall findings by a previous study, revealed higher cervical abrasion cases seen in males than females in

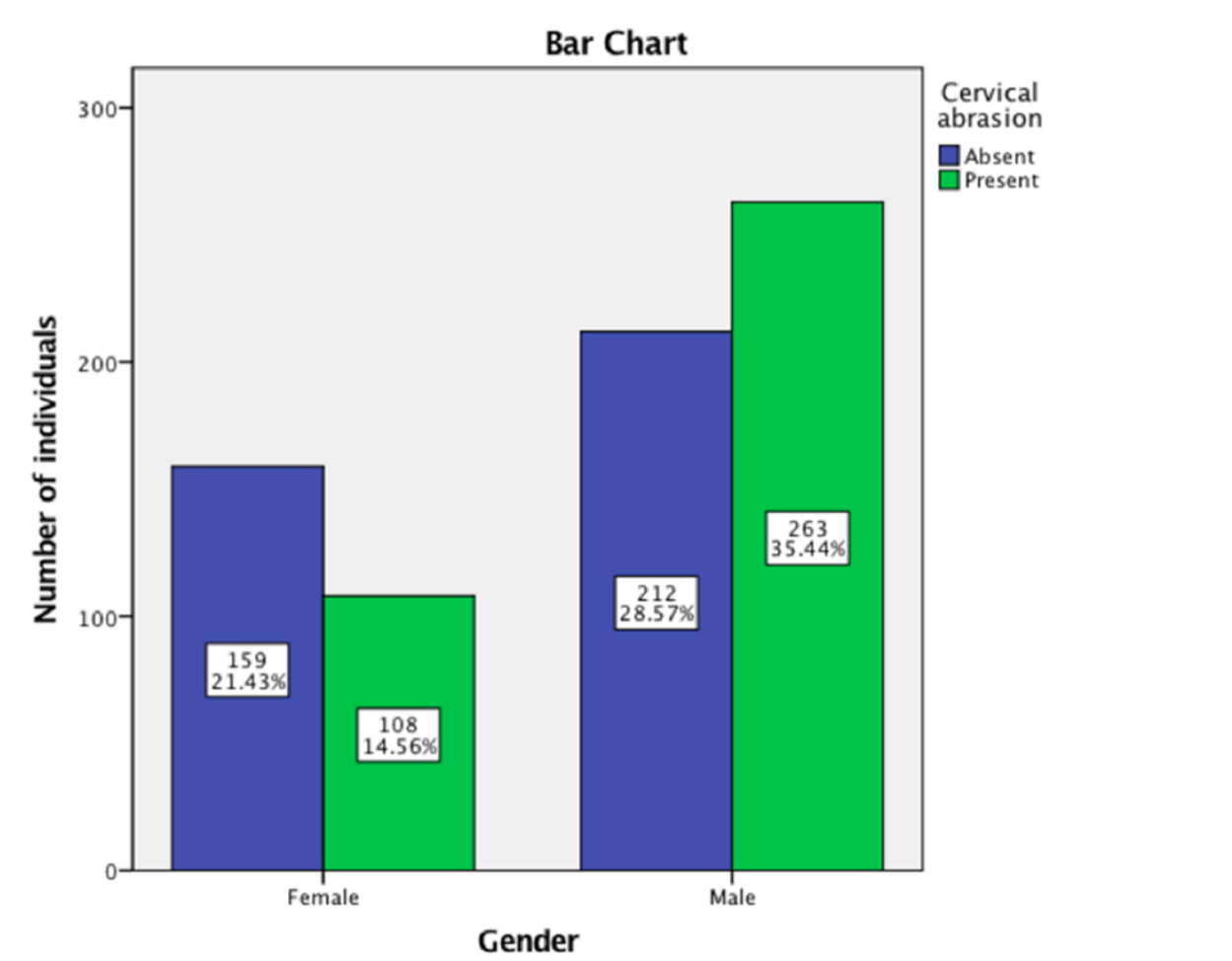

Figure 2: Bar graph showing the association between cervical abrasion and its frequency among genders

both urban and rural areas (Deshpande *et al.*, 2012). However, a study by Atalay et al. found the prevalence of cervical abrasions in females (54%) than males (46%) (Atalay and ozgunaltay, 2018). Higher prevalence of cervical abrasions is often attributed to the application of greater force and longer duration of tooth brushing by males as compared to females.

Several studies have mentioned tooth brushing habit as one of the major etiological factors for cervical abrasion, mainly in terms of its technique, frequency and hardness of brittle (Yan, 2014). A previous study reported the statistically significant association between abrasion and brushing habits, which includes its technique, frequency and duration of changing toothbrush. Some studies revealed that males tend to brush their teeth for a longer period of time with more pressure which explains the higher incidence of cervical abrasion in males as compared to females (Ashley, 2001; Hawkins, 1986). Individuals who brush twice daily show a significantly higher risk of developing cervical abrasion than those who brush once daily due to the longer duration of the tooth to tooth brush contact with more forces exerted on the tooth (Bhardwaj *et al.*, 2016).

Development of cervical abrasion is also influenced by the method of tooth brushing with various strokes such as horizontal, vertical and complex motion. A previous study reported the higher incidence of cervical abrasion in patients who are brushing with horizontal stroke compared to those with vertical and complex strokes (Litonjua *et al.*, 2004; Spranger, 1995).

Duration of changing toothbrush is also another risk factor for cervical abrasion as individuals who change their toothbrush after a month due to fraying of the bristles have higher tendency to develop cervical abrasion than those who change their toothbrush after six months or more (Attin *et al.*, 2004).

Limitations

The present study had a few limitations of study

design. Since it is a retrospective study, follow up of subjects was not possible to extrapolate the study results. This study also failed to assess the other confounding variables such as education, socioeconomic status and habits of the patients. A further prospective study, including all possible factors for cervical abrasions, has to be investigated to prove the hypothesis.

Future Scope

Further studies to be done to provide the basis for the treatment of cervical abrasions in the early stages with an emphasis on the proper brushing technique and frequency in order to reduce the risk of cervical abrasion in the community.

CONCLUSION

Within the limits of the study, most of the cervical abrasion cases are recorded in individuals within the 41-50 years age group with higher predilection in males. There is a statistically significant association of cervical abrasion with age and gender. It is concluded that age and gender have an influence on the incidence of cervical abrasion.

AUTHOR CONTRIBUTIONS

The first author (Nur Liyana Hannah Binti Izham Akmal) performed the original draft preparation, statistical analysis, interpretation, manuscript writing and editing. The second author (Dr. Adimulapu Hima Sandeep) contributed to topic selection, methodology, data design, analysis, interpretation and critical revision of the manuscript.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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