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Prevalence of Oral Lesions in Patients Undergoing Orthodontic Treatment: A Cross-Sectional Observational Study

Ms. Sowmiya M[1], Ms. Shubaprabha B P[2], Ms. Sowbaranica S[3], Mr. Thirumalaivasan M[4], Dr. Gowrishankar P[5], Prof. Dr. Raghu Dhanapal[6], Prof. Dr. Kavitha Muthu[7]

[1,2,3,4]Intern, Department of Oral Pathology and Oral Microbiology, RVS Dental College and Hospital
[5]Reader, Department of Oral Pathology and Oral Microbiology, RVS Dental College and Hospital
[6]Professor, Department of Oral Pathology and Oral Microbiology, RVS Dental College and Hospital
[7]Professor & Head, Department of Oral Pathology and Oral Microbiology, RVS Dental College and Hospital

ABSTRACT:
Orthodontic treatment, while beneficial for improving dental alignment and function, can pose various oral health challenges, including the development of oral lesions. These lesions may result from the mechanical forces exerted by orthodontic appliances, poor oral hygiene, or trauma to soft tissues. Understanding the prevalence and types of oral lesions in orthodontic patients is essential for developing strategies to prevent and manage these conditions. The study seeks to explore the correlation between these factors and the occurrence of oral lesions, highlighting the need for regular monitoring and preventive measures during orthodontic treatment to ensure optimal oral health. Furthermore, this research highlights the critical need for regular monitoring of oral health during orthodontic treatment and the importance of patient education regarding proper oral hygiene techniques and the management of appliance-related irritation. Preventive measures, such as routine professional cleanings and the use of adjunctive products such as chlorhexidine mouthwash, usage of dental floss, educating with appropriate brushing technique, recommending the usage orthodontic waxes and accompanied dietary counselling may help in reduction of the incidence of these lesions.

KEYWORDS: orthodontic appliance, traumatic ulcer, gingivitis, dental caries, prevalence

INTRODUCTION AND BACKGROUND:

As the recent generation have shown increased incidence of orthodontic malocclusions and are much more self awared to get it corrected through various orthodontic treatments. Even though the orthodontic treatment aims to enhance dental aesthetics and function by correcting the malocclusions, it can also tend to create conditions that predispose patients to various oral lesions like mucosal abrasions, ulcers, carious and non-carious lesions, gingival hyperplasia due to mechanical trauma from appliances, poor oral hygiene etc.Thus a cross section observational study is much needed to provide detailed assessment of prevalence,

types and potential risk factors associated with oral lesions in patients undergoing orthodontic treatment.[1-5]

AIMS AND OBJECTIVES:

This study aims to fill the gap by conducting a thorough observational analysis of oral lesions among patients undergoing orthodontic treatment. By identifying the common oral lesions, their locations in the oral cavity and the factors contributing for that, this study will contribute valuable insights into the management and prevention of oral complications in orthodontic practice. It also aids in development of preventive strategies and treatment protocols to minimize the occurrence and the severity of the oral lesions in patients undergoing orthodontic treatment.

MATERIALS AND METHODS:

A non-probable, convenient sampling with the sample size of 150 was selected from the outpatients undergoing orthodontic treatment in and around Coimbatore from 2024-25 and a cross-sectional observational study was conducted. The human ethical committee at RVS Dental College and Hospital approved the study before it was carried out. The sample includes patients aged among 15-35 years. A detailed oral examination was performed to identify the presence of oral lesions, which were categorized into common types such as ulcers, mucosal irritation, gingival inflammation, and other pathologies. In addition to clinical examination, data were collected on key factors such as demographic information (age, gender), orthodontic appliance type (e.g., traditional braces, aligners), duration of treatment, patient's oral hygiene practices, manifestation of the new lesions due to orthodontic intervention and its site, treatment undergone for such oral lesions were recorded under the informed consent of the patient.[6-8]

The study group has been categorised into

GROUP 1 – patients with fixed orthodontic appliance

GROUP 2 – patients with removable orthodontic appliance

GROUP 3 – patients with clear aligners

The oral lesions expected to be present in the patients undergoing orthodontic treatment includes,[9-12] ulcers (traumatic/lichenoid/herpetic/aphthous),dental caries/ enamel hypoplasia, dry mouth or xerostomia, erythematous oral lesions, gingivitis, gingival enlargements, keratotic lesions, hyperplastic / exophytic growth, allergic reactions. The armamentarium used for this cross section observational prevalence study includes mouth mirror, probe, glove, face mask, cotton, good light illumination, data sheet.

INCLUSION CRITERIA:

- Patients who are undergoing orthodontic treatment in RVS Dental College and Hospital
- Patients of age 15-35 years

EXCLUSION CRITERIA:

- Patients with other systemic illness

RESULTS:

The data were collected and the oral lesions manifested in the patients undergoing orthodontic treatment were listed out in the excel sheet. Further, the data was statistically analysed using T-test and p-value-hypothesis testing to estimate the prevalence of oral lesions in patients undergoing orthodontic treatment.

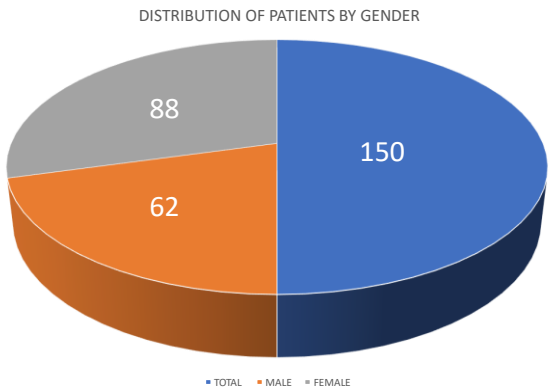
Out of 150 patients, 62 (41%) were male, 88 (58%) were female. The prevalence was found to be at the rate of 51% of traumatic ulcer in labial and buccal mucosa, tongue in orthodontic patients as the most common lesion,38% of gingivitis,9.3% of dental caries, 2% of gingival recession ,0.7% of gingival hyperplasia and proliferative ulceration on palatal mucosa. Among the 150 samples, almost 147 (98%) were found to be incident with oral lesions occurred due to fixed orthodontic appliance, 2(1.3%) due to removable orthodontic appliance,1(0.7%) due to clear aligners. These results were found to be statistically significant ($p \leq 0.05$).

Factors such as e.g., arch wire injuries/traumas, orthodontic buttons trauma, poor oral hygiene were significantly associated with an increased risk of developing oral lesions. Brackets from fixed orthodontic appliance mostly caused erosions and desquamations, whereas arch wire caused ulcerations.

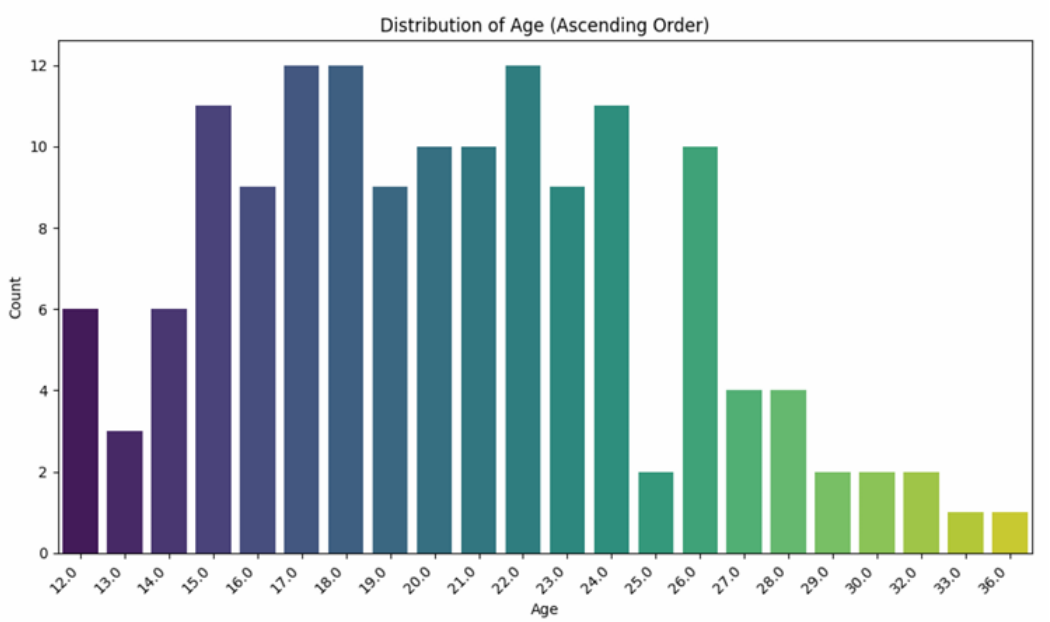
Fig.1.GINGIVITIS

Fig.2.DENTAL CARIES

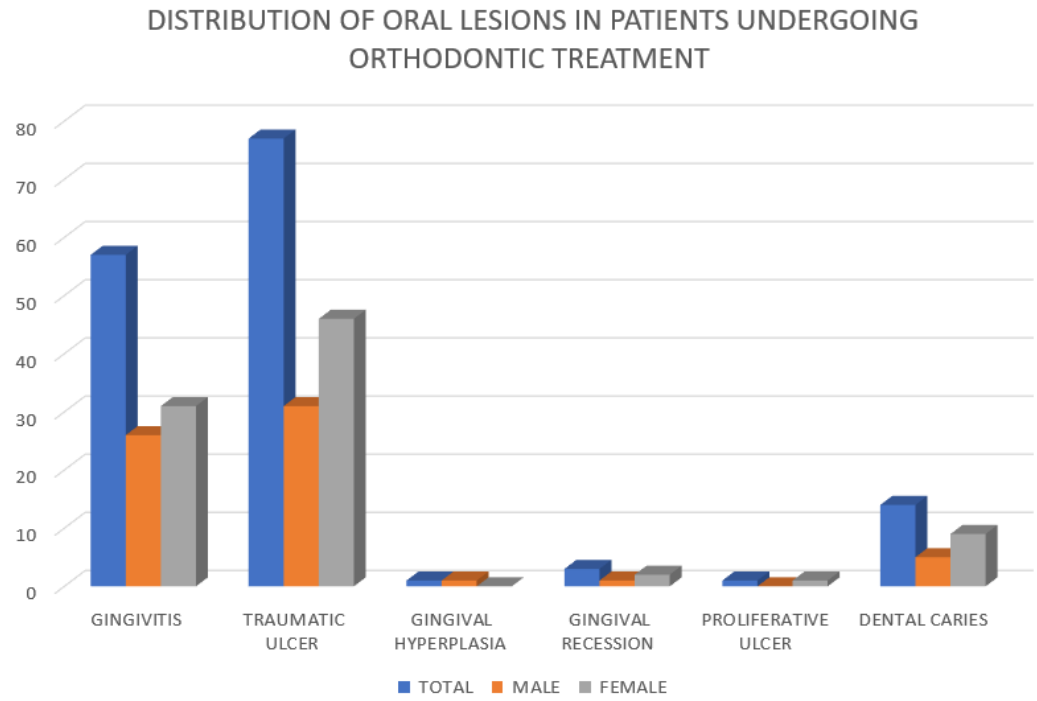
Fig.3.TRAUMATIC ULCER



GRAPH 1- DISTRIBUTION OF PATIENTS ON GENDER BASIS



GRAPH 2- DISTRIBUTION OF AGE AMONG 150 PATIENTS



GRAPH 3 – DISTRIBUTION OF ORAL LESIONS IN PATIENTS UNDERGOING ORTHODONTIC TREATMENT (GENDER WISE)

GRAPH 4 – DISTRIBUTION OF ORAL LESIONS IN SPECIFIC GROUPS

DISCUSSION:

The prevalence of oral lesions in patients undergoing orthodontic treatment is a well-documented concern, with studies showing a significant incidence of conditions like traumatic ulcer, gingival inflammation, and dental caries. These lesions are often attributed to the mechanical irritation caused by brackets, wires, and other orthodontic appliances, which can lead to discomfort and even hinder treatment compliance. Poor oral hygiene exacerbates the issue, as braces trap food and plaque, increasing the risk of gingivitis and other infections. Additionally, changes in salivary flow, dietary factors, and the inability to maintain optimal oral care due to the complexity of cleaning around braces further contribute to lesion formation. The prevalence of these oral issues can vary, but they are commonly reported among orthodontic patients, especially in younger and female demographics. Effective management involves a combination of regular monitoring by orthodontists, patient education on oral hygiene practices, the use of protective devices like orthodontic wax, and pain management strategies. Oral lesions are relatively common among orthodontic patients, with significant variation in prevalence depending on factors such as treatment duration, appliance type, and oral hygiene practices.[13,14] The findings highlight the importance of preventive measures such as maintaining proper hygiene, avoiding irritants, and managing diet can help reduce the incidence and severity of oral lesions, ultimately improving the patient's comfort and the overall success of orthodontic treatment. Further studies are needed to explore the long-term effects and the efficacy of preventive intervention[15,16]

In consistent to the study by Gupta et al., traumatic lesions were more prevalent in fixed orthodontic patients in the present study while the frequency of lichenoid, candidiasis, and exophytic lesions was higher in the removable treatment group.[17] Rashidi et al., in their study on 56 orthodontic patients in Iran assessed the frequency of aphthous ulcers, allergic ulcers, lichenoid reactions, exophytic lesions, traumatic ulcers, recurrent intraoral herpetic lesions, and candidiasis at the onset of treatment and two and four weeks later.[18] The majority of lesions were noted in the buccal mucosa in the present study. This finding was in agreement with the results of Baricevic et al.,[19] and Travess et al., [20]who reported that ulcerative lesions develop in fixed orthodontic patients due to mucosal irritation by orthodontic appliances. These lesions are due to extension of unsupported arch wire near the molar tubes and the irritation from the canine hooks soldered to the arch wire resting against the lower lip. Consistent with previous research, our study found that a notable percentage of orthodontic patients developed oral lesions, with a higher frequency of lesions occurring in patients with fixed appliances. To mitigate the occurrence of oral lesions, it is crucial for orthodontic patients to adopt stringent oral hygiene practices, including brushing after every meal and using interproximal cleaning devices like floss or interdental brushes. While our study offers valuable insights into the prevalence of oral lesions among orthodontic patients, the sample size was relatively small, and we were unable to control for all potential confounding factors, such as dietary habits or pre-existing oral conditions.

CONCLUSION:

Orthodontists might emphasize the use of orthodontic wax and other preventive measures sto reduce mechanical irritation and recommend regular visits to monitor the condition of the oral mucosa. In some cases, topical corticosteroids may be prescribed to manage more severe lesions. Future studies with larger and more diverse samples could help to identify additional risk factors and develop more targeted preventive strategies.

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