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Tongue squamous cell carcinoma in non-smoking and non-drinking patients and clinical cases of orthodontic interest

**Dr. Ankita Gupta¹, Dr. Abhishek R Naik², Dr. Kishor B. Bagalkot³, Dr. Paran Joshi⁴,
Dr. Deepti Garg⁵, Dr. Nissy Prem Sagar⁶**

¹Senior lecturer, Department of oral medicine and radiology, Sree bankey bihari dental college and research centre, Ghaziabad, Uttar Pradesh.

²Oral medicine and radiology, Oxford dental college, Bommanahalli, Bangalore

³Professor, Department of Orthodontics, PMNM Dental College and Hospital, Bagalkot, Karnataka.

⁴Associate professor, Department of Prosthodontics, College of dental sciences, Rao, Indore.

⁵Sr. Lecturer, Department of Prosthodontics Including Crown & Bridge, Maharishi Markandeshwar College of Dental Sciences & Research Mullana, Ambala (Haryana) India

⁶Bachelors in Dental Surgery (Maharashtra), PGD HCA (Ontario).

Corresponding Author : Dr. Paran Joshi

Associate professor, Department of Prosthodontics College of dental sciences, Rao, Indore.

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Abstract

Background: This study was conducted to assess tongue squamous cell carcinoma in non-smoking and non-drinking patients and clinical cases of orthodontic interest.

Material and methods: This study comprised of 20 patients undergoing orthodontic treatment. The demographic profile of the patients was made. The subjects were asked to give consent to be a part of the study. The subjects belonged to the age range of 25-55 years. The mean age of the subjects was 32.5 years. Thorough intraoral clinical examination of the subjects was conducted. The subjects were examined for signs of oral squamous cell carcinoma. Statistical analysis had been conducted using SPSS software.

Results: In this study, there were 20 patients, of which 12 (60%) were male and 8 (40%) were female. 5 subjects belonged to the age group of 25-30 years. 3 subjects belonged to the age group of 31-35 years. 6 subjects belonged to the age group of 36-40 years. 2 subjects belonged to the age group of 41-45 years. 3 subjects belonged to the age group of 46-50 years. 1 subject belonged to the age group of 51-55 years. In this study, among 3 subjects, oral squamous cell carcinoma was present while in 17 subjects, it was absent. Among non-smokers, oral squamous cell carcinoma was seen in only 1 subject and was absent in 12 subjects. Among non-drinkers, the condition was absent in 5 subjects and was present in 2 subjects only.

Conclusion: The prevalence of oral squamous cell carcinoma was less in non-smokers and non-drinkers. The condition was also evident in subjects undergoing orthodontic treatment.

Keywords: OSCC, Orthodontics, Smoking, Drinking, Treatment.

Introduction

Oral squamous cell carcinoma (OSCC) is the most common oral malignancy, representing up to 80-90% of all malignant neoplasms of the oral cavity.¹ Although oral cancer incidence is highly variable worldwide, it is accepted that oral cavity ranks from the 6th to the 9th most common anatomical location for cancer, depending mostly on the country (and even specific region in some countries) and gender of the patients.² Despite this mean incidence, it can represent the most common location for cancer in some specific regions, especially in southeastern Asia.³ Major etiological and predisposing factors for OSCC include mostly smoking and drinking habits, and ultraviolet radiation (specifically for lip cancer), but several other factors such as human papillomavirus (HPV) and *Candida* infections, nutritional deficiencies and genetic predisposition have been also associated.^{4,5} OSCC is a disease of adults and elderly and its most common clinical aspect is an ulcerated lesion with necrotic central area surrounded by elevated rolled borders.⁶

Although the main demographic and clinicopathological information on OSCC can be similar in most studies, it is accepted that some features can be quite variable from country to country and even from different regions in the same country.⁷⁻¹⁰

This study was conducted to assess tongue squamous cell carcinoma in non-smoking and non-drinking patients and clinical cases of orthodontic interest.

Material and methods

This study comprised of 20 patients undergoing orthodontic treatment. The demographic profile of the patients was made. The subjects were asked to give consent to be a part of the study. The subjects belonged to the age range of 25-55 years. The mean age of the subjects was 32.5 years. Thorough intraoral clinical examination of the subjects was conducted. The subjects were examined for signs of oral squamous cell carcinoma. Statistical analysis had been conducted using SPSS software.

Results

Table 1: Gender-wise distribution of subjects

Gender	Number of subjects	Percentage
Males	12	60
Females	08	40
Total	20	100

In this study, there were 20 patients, of which 12 (60%) were male and 8 (40%) were female.

Table 2: Age-wise distribution of subjects

Age (Years)	Number of subjects	Percentage
25-30	05	25
31-35	03	15
36-40	06	30
41-45	02	10
46-50	03	15
51-55	01	05

5 subjects belonged to the age group of 25-30 years. 3 subjects belonged to the age group of 31-35 years. 6 subjects belonged to the age group of 36-40 years. 2 subjects belonged to the

age group of 41-45 years. 3 subjects belonged to the age group of 46-50 years. 1 subject belonged to the age group of 51-55 years.

Table 3: Prevalence of oral squamous cell carcinoma in orthodontic subjects

Prevalence	Number of patients	Percentage
Present	03	15
Absent	17	85
Total	20	100

In this study, among 3 subjects undergoing orthodontic treatment, oral squamous cell carcinoma was present while in 17 subjects, it was absent.

Table 4: Prevalence of oral squamous cell carcinoma in non-smokers and non-drinkers

Prevalence	Number of non-smokers	Number of non-drinkers
Absent	12	05
Present	01	02
Total	13	07

Among non-smokers, oral squamous cell carcinoma was seen in only 1 subject and was absent in 12 subjects. Among non-drinkers, the condition was absent in 5 subjects and was present in 2 subjects only.

Discussion

Head and neck squamous cell carcinoma (HNSCC) is one of the most common tumors worldwide, with nearly 900,000 cases per year. The majority of HNSCC arises from the oral cavity (oral squamous cell carcinoma = OSCC).¹¹ Men are typically four times more likely to be affected by this tumor entity than women.¹¹ Similar to other aerodigestive tract tumors, the main risk factors are tobacco (both smoked and ‘smokeless’) and alcohol use. Tobacco smoke contains a complex mixture of chemicals thought to cause cancer via DNA damage, when misreplicated, leads to an increased burden of somatic mutations and thus an increased likelihood of acquiring “driver” mutations in cancer genes.¹² DNA damage caused by acetaldehyde, which is produced during the breakdown of ethanol, is a known mechanism of alcohol carcinogenicity.

Furthermore, alcoholic drinks might act as a solvent to penetrate other carcinogens through the mucosa.¹³ This is also a possible reason for the known synergistic effect of alcohol and tobacco consumption on the development of OSCC. Heavy alcohol consumption and

concurrent tobacco use can increase the risk of developing OSCC by a factor of 35.¹⁴ However, about 10–15% of OSCC patients have never smoked or consumed alcohol outside the recommended limits.¹⁵ Preliminary studies suggest that this group of OSCCs in NSND patients is a distinct subset of tumors. For example, Koo et al. showed that this type of carcinoma occurs more frequently in women than men and is associated with better outcomes.¹⁶ In addition, carcinomas in NSND patients appear to be localized in different areas of the oral cavity compared to patients who smoked and drank (SD).¹⁶

This study was conducted to assess tongue squamous cell carcinoma in non-smoking and non-drinking patients and clinical cases of orthodontic interest.

In this study, there were 20 patients, of which 12 (60%) were male and 8 (40%) were female. 5 subjects belonged to the age group of 25-30 years. 3 subjects belonged to the age group of 31-35 years. 6 subjects belonged to the age group of 36-40 years. 2 subjects belonged to the age group of 41-45 years. 3 subjects belonged to the age group of 46-50 years. 1 subject belonged to the age group of 51-55 years. In this study, among 3 subjects, oral squamous cell carcinoma was present while in 17 subjects, it was absent. Among non-smokers, oral squamous cell carcinoma was seen in only 1 subject and was absent in 12 subjects. Among non-drinkers, the condition was absent in 5 subjects and was present in 2 subjects only.

Yesensky JA et al (2018)¹⁷ conducted a study in which they utilized a questionnaire querying the lifetime oral health status of 54 patients. Demographics and extensive oral health history were collected. The majority of patients (74%) had prior exposure to metallic dental hardware. The younger population with almost exclusively oral tongue cancer had a high prevalence of metallic orthodontic braces (40%) within 15 years before diagnosis. In the 51+ year age group, 82% had crowns, dental implants, and/or dentures with metallic elements. Exposure to metallic dental hardware has increased in the past few decades given the rise of orthodontic braces and older adults retaining more teeth. Although this study does not prove a causal relationship between oral cavity SCC and dental hardware, this is a step toward identifying and investigating their role.

Fiedler M et al (2023)¹⁸ The aim of this study was to investigate the clinical, histopathologic, and immunologic differences of oral squamous cell carcinoma of never-smokers/never-drinkers and smokers drinkers. Immunohistochemical staining for CD4, CD8, FoxP3, CD1a, and p16 was performed in 131 oral squamous cell carcinomas from smokers drinkers and never-smokers/never-drinkers. Associations of smoking/drinking status with

clinicopathologic data, immunohistochemical antibody expression, and survival were examined. Oral squamous cell carcinoma in never-smokers/never-drinkers was associated with the female gender ($p < 0.001$). Never-smokers/never-drinkers were older at diagnosis than smokers/drinkers ($p < 0.001$). Never-smokers/never-drinkers had more tumors in the maxilla, mandible, and tongue ($p < 0.001$). Pre-existing oral potentially malignant disorders appeared to be more common in never-smokers/never-drinkers ($p < 0.001$). Perineural invasion was more common in smokers/drinkers ($p = 0.039$). Never-smoking/never-drinking was associated with better overall survival ($p = 0.004$) and disease-specific survival ($p = 0.029$). High CD4+ T cell infiltration was associated with never-smoking/never-drinking ($p = 0.008$). Never-smokers/never-drinkers also showed increased CD8+ T cell infiltration ($p = 0.001$) and increased FoxP3+ Treg infiltration ($p = 0.023$). Furthermore, the total group of tumor-infiltrating lymphocytes was associated with never smoking/never drinking ($p = 0.005$). To conclude, oral squamous cell carcinoma of the never-smokers/never-drinkers appears to be a distinct type of tumor, as it appears to have unique clinical and pathologic features and a more immunogenic microenvironment.

Conclusion

The prevalence of oral squamous cell carcinoma was less in non-smokers and non-drinkers. The condition was also evident in subjects undergoing orthodontic treatment.

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