



## Oral cancer in men and women: are there differences?

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**Abstract:** Introduction: Because female user habits for tobacco and alcohol are changing and the female incidence of oral squamous cell carcinoma (SCC) has increased, the aim of the study was to evaluate the possible differences between male and female patients suffering from oral SCC. Patients and methods: The files of 159 male and 119 female patients with oral SCC, who were treated between 1999 and 2008 with a minimum follow-up time of 12 months, were evaluated retrospectively. Special attention was paid to tobacco and alcohol use, TN status, recurrence, and metastases rate, as well as to patients without the mentioned risk factors. Results: A higher female median age (65.36 vs. 61.04 years) and female predominance was found in the group of patients older than 70 years, with a gender distribution of 53:46. Out of 23 female patients with oral maxillary SCC, 15 (65%) were without the risk factors of tobacco and alcohol, and from the 16 male patients suffering from oral maxillary carcinoma, only three (19%) were without the mentioned risk factors. Conclusion: In summary, compared to earlier studies, there was a higher proportion of females in (1) the group without the risk factors of tobacco and alcohol, (2) those with SCC of the hard plate and maxillary alveolus, and (3) in patients older than 70 years. There are fewer differences between metastases and recurrence rates. Further studies should be performed in female patients without risk factors and in maxillary cancer with emphasis on the human papilloma virus and infiltration rates

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# Oral cancer in men and women: are there differences?

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## Abstract

**Introduction** Because female user habits for tobacco and alcohol are changing and the female incidence of oral squamous cell carcinoma (SCC) has increased, the aim of the study was to evaluate the possible differences between male and female patients suffering from oral SCC.

**Patients and methods** The files of 159 male and 119 female patients with oral SCC, who were treated between 1999 and 2008 with a minimum follow-up time of 12 months, were evaluated retrospectively. Special attention was paid to tobacco and alcohol use, TN status, recurrence, and metastases rate, as well as to patients without the mentioned risk factors.

**Results** A higher female median age (65.36 vs. 61.04 years) and female predominance was found in the group of patients older than 70 years, with a gender distribution of 53:46. Out of 23 female patients with oral maxillary SCC, 15 (65%) were without the risk factors of tobacco and alcohol, and from the 16 male patients suffering from oral maxillary carcinoma, only three (19%) were without the mentioned risk factors.

**Conclusion** In summary, compared to earlier studies, there was a higher proportion of females in (1) the group without the risk factors of tobacco and alcohol, (2) those with SCC of the hard plate and maxillary alveolus, and (3) in patients older than 70 years. There are fewer differences between metastases and recurrence rates. Further studies should be performed in female patients without risk factors and in

maxillary cancer with emphasis on the human papilloma virus and infiltration rates.

**Keywords** Oral cancer · Gender distribution · Women · Tobacco · Alcohol

## Introduction

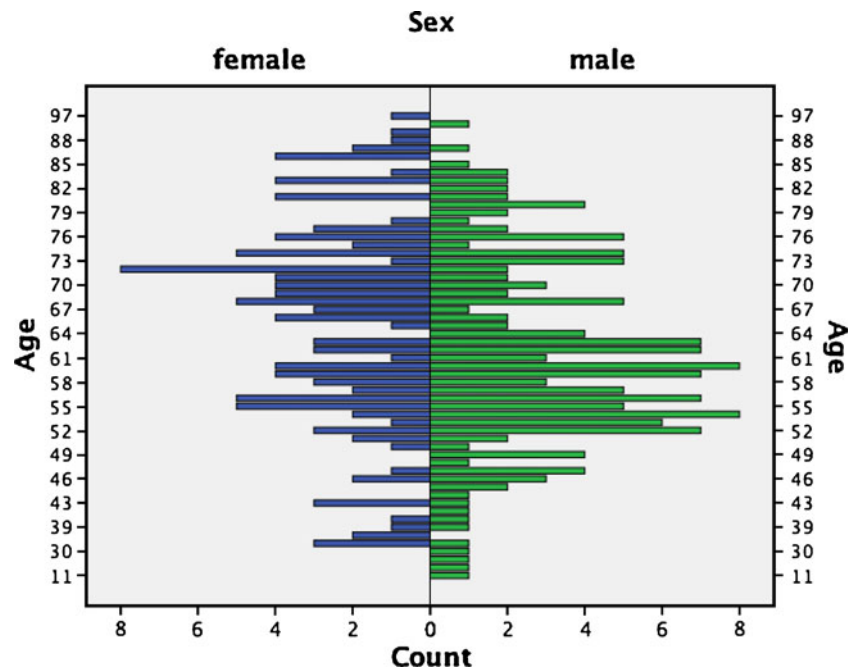
The male/female ratio for oral tumors is rapidly declining [1], but is still 3:1 in most Western countries [2]. One of the main reasons for the change in the gender distribution may be the increased exposure of women to tobacco and alcohol, as both factors have long been implicated as a risk factor for oral cancer. One hypothesis regarding lung cancer claims that women may be more susceptible to the effect of tobacco [3]. Therefore, it would be of interest to investigate whether this hypothesis could be supported for oral cancer.

Several authors [4] have shown that clinical stage and treatment performed are independent predictors for metastases. But the question arises whether female patients have a higher rate of recurrence or metastases. In the literature, only a very few studies so far have focused on the difference between men and women with regard to oral cancer [2]. The aim of the present study was to investigate the possible differences in women and men suffering from oral squamous cell carcinoma (SCC) with regard to distribution of localization, survival rate, rate of metastases, and recurrence.

## Patients and methods

Chosen for evaluation were 278 patients with oral SCC who were treated between 1999 and 2008 at a single center (Department of Craniomaxillofacial and Oral Surgery,

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**Fig. 1** Distribution of age

University Hospital, Zurich). Recurrences and carcinomas in situ were excluded. Disease outcome was evaluated by recurrence, presence of a second cancer, or metastases. The gender distribution (male/female) was 159:119, and the mean follow-up time was 35.97 months (12–107 months).

## Results

### Age

The median age for the 159 male patients was 61.04 years (11–94 years) and for the 119 female patients, 65.36 years (34–97 years). In the group of patients older than 70 years, the female/male ratio was 53:46 (Fig. 1).

### Risk factors

Of the 119 female patients, 42% were regular smokers, and from the 159 male patients, 63% smoked regularly (Table 1). With regard to alcohol consumption, 36% of the female patients and 64% of the male patients drank regularly (see Table 1).

Neither alcohol nor tobacco risk factors were found in 22/159 (13.8%) of the male patients and in 46/119 (38.7%) of the females.

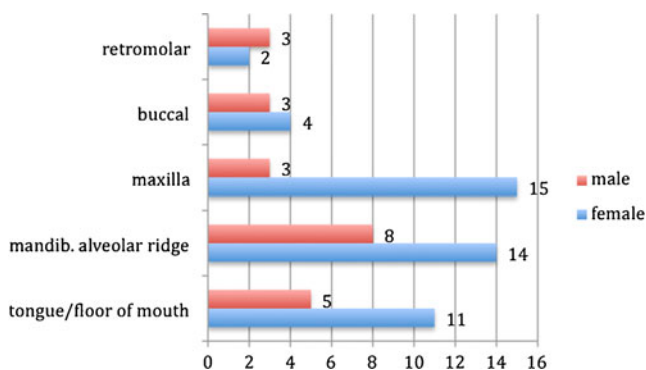
### Location in regard to missing risk factors

Concerning the location distribution, most striking was the prevalence in females of SCC of the hard palate and

maxillary alveolus, with a gender distribution of 23:16. With regard to missing risk factors (tobacco and alcohol), there was still a predominance for oral maxillary carcinoma in women. For male patients, the highest proportion was found for carcinomas of the mandibular alveolar ridge (Fig. 2).

**Table 1** Characteristics of the male and female patients

Characteristics	Male (n=159) n (%)	Female (n=119) n (%)
<i>Alcohol</i>		
Regular	102 (64)	43 (36)
Irregular	25 (16)	14 (12)
Quit	6 (4)	2 (2)
None	26 (16)	60 (50)
<i>Tobacco</i>		
Regular	100 (63)	50 (42)
Quit	21 (13)	11 (9)
None	38 (24)	58 (49)
<i>Recurrence</i>		
Recurrence	28 (18)	25 (21)
No recurrence	127 (80)	92 (78)
Second tumor	4 (2)	2 (1)
<i>Metastases</i>		
Cervical metastases	21 (13%)	23 (19%)
Distant metastases	9 (6%)	4 (4%)
None	129 (81%)	92 (77%)



**Fig. 2** Distribution of tumor location of all patients without known risk factors (tobacco/alcohol)

**TN status**

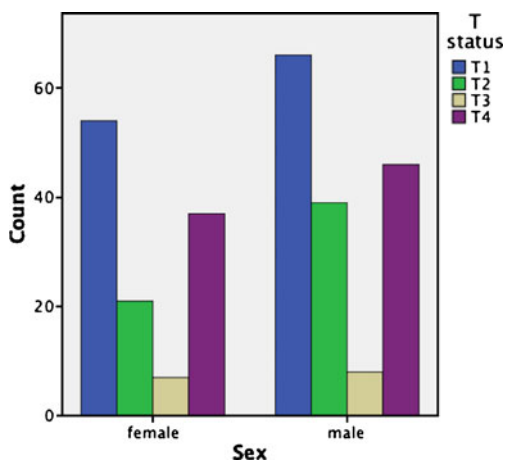
No differences were found in regard to primary T and N status (Figs. 3 and 4). In both groups, the highest proportion was found for T1 and N0 status.

**Recurrence and metastasis rates**

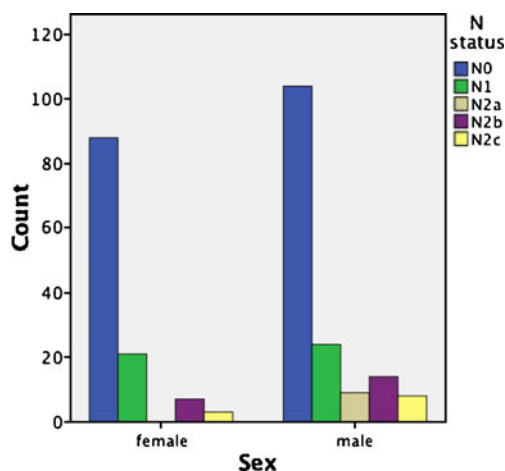
Concerning recurrence rates, the cancer recurred in 28/159 (18%) of the male patients and in 25/119 (21%) of the female patients. Second tumors were observed in 4/159 men and in 2/119 women. In the female group, the median time for recurrence was 16.9 months (vs. 15.2 for men) (Fig. 5). Cervical lymph node metastases were seen in 21/159 (13%) male patients and in 23/119 (19%) female patients, and distant metastases in 9/159 (6%) male and 4/119 (4%) female patients.

**Discussion**

More female patients seem to be developing oral cancer, as shown by Reddy et al. [1], with the incidence rate of oral



**Fig. 3** Distribution of T status

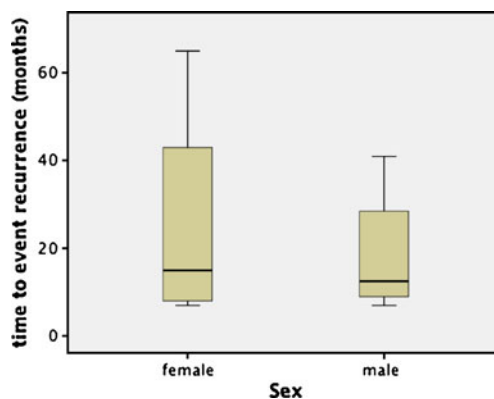


**Fig. 4** Distribution of N status

cancer for women rising from 966 in 1985–1986–1762 in 2005–2006. Therefore, 159 male and 119 female patients with oral SCC were studied and compared for special characteristics. With an approximate gender distribution of 3:4 (female/male) in comparison to a ratio of 1:3 in most Western countries, the female proportion is higher in our study population.

Bross and Coombs [5] presumed that an exposure of women to both alcohol and tobacco risk factors causes a downward shift in the age of onset of oral cancer. But in the present study, the median age was higher in female than in male patients (65.36 vs. 61.04 years); furthermore, a female predominance was found in the group of patients older than 70 years with a gender distribution of 53:46. One reason for this disparity could be the higher life expectation for women in general, leading to a higher incidence of cancer in elderly.

Another factor often discussed is the rising consumption of tobacco and alcohol by women. The present data concerning regular tobacco use (63% male, 42% female) and alcohol (64% male, 36% female) were similar to the



**Fig. 5** Time to recurrence

data of Girod et al. [6], which demonstrated a rate of 48.5% for tobacco use in females and 34.5% for alcohol. In the literature, the proportion of women with SCC of the oral cavity and oropharynx who are not exposed to the risk factors of tobacco and alcohol use seems to be higher than that of men (27%–41% vs. 1.56%–11%) [7–9]. In the present study, 22 (13.8%) of 159 male patients neither used tobacco nor drank alcohol, and in the female group it was 46 (38.7%) of 119 patients.

Luce et al. [8] also noted that more women suffered from oral cancer than from hypopharynx cancer; in the present study only oral cancer was studied; therefore, no data are available to support this fact. But in the present study the high number of oral maxillary carcinomas (hard palate and maxillary alveolar ridge) in women was striking (23 female vs. 16 male), as has been published previously [10]. Out of these 23 female patients, 15 (65%) were without the tobacco and alcohol risk factors; but from the 16 male patients suffering from oral maxillary carcinoma, only three (19%) were without the mentioned risk factors. Some authors associated different anatomical sites of oral SCC like tongue or buccal mucosa with tobacco or alcohol use [11–13], this could be one reason for the higher number of oral maxillary SCC. Also, Bundgaard et al. [14] found that out of 161 patients with intra-oral SCC, 23 were non-users of tobacco and alcohol and the non-user group contained especially older women.

In general, the recurrence rate after treatment varies between 18% and 76% [15, 16]. In the present study group the recurrence rates were lower than shown in previous studies: for men they were 18% and for women, 21%. A slightly higher difference was seen concerning cervical lymph node metastases, which occurred in 13% of the male patients and 19% of the female patients. Therefore in clinical practice, there seems to be no need for a gender dependent follow-up.

The strength of the present study is the high number of patients (278) and the minimum follow-up time of 12 months. But one weakness is the lack of information concerning human papilloma virus (HPV) PCR; that has not been performed in most of the cases and should be the subject of further studies. Smith et al. [17] showed in a study of 193 oral cavity/oropharynx cancer patients that the prevalence of oncogenic mucosal HPV is higher in younger-age cancer cases whose sexual practices are typically associated with sexual transmission of the virus. But in clinical practice, a regular HPV screening in oral cancer independent of age and gender should be performed, particularly in regard to possible radiotherapy. Therefore, a comparison with the patients in the present study would be of further interest.

## Conclusion

In summary, in the present study population there was a higher female proportion of SCC, first, without the risk factors of tobacco and alcohol; second, for SCC of the hard palate and maxillary alveolus; and third, in patients older than 70 years. There are fewer differences between this study and other studies with regard to metastases and recurrence rates. Further studies should particularly emphasize female patients without risk factors, and maxillary cancer with an emphasis on human papilloma virus and infiltration rates.

**Conflict of Interest** The authors declare that they have no conflict of interest.

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