

## ORIGINAL ARTICLE

# Tobacco and alcohol use after head and neck cancer treatment: influence of the type of oncological treatment employed

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## SUMMARY

**Objective:** To assess the cigarette smoking and alcohol intake maintenance rate in patients treated for head and neck squamous cell carcinoma and to compare the observed outcome with the type of oncological treatment employed. **Methods:** One hundred and ten patients treated for high aero-digestive tract squamous cell carcinoma were included and divided into a surgical group, treated with a surgery, and a medical group, treated with chemotherapy and/or radiation. The patients were interviewed to determine whether or not they had persisted with the smoking and drinking behavior after treatment. The habit maintenance rate was compared with the treatment modality employed. The relationship between the oncological status of the patients and the cigarette smoking and alcohol intake rates found was also tested. **Results:** Among smokers, 35% maintained the habit after treatment. The medical group had a significantly higher percentage of patients maintaining smoking compared with the surgical group (58.3% vs 25.0%;  $p = 0.004$ ). Among alcohol users, 16.6% kept drinking alcoholic beverages, with a percentage also shown higher for the medical group (23.8% vs 13.3%), but with no statistically significant difference. The oncological status of patients was not related to the maintenance of the habits studied. **Conclusion:** Smoking and alcoholism maintenance rates are high after head and neck squamous cell carcinoma is treated, especially if we consider smoking in patients treated with chemotherapy and/or radiation. A more effective multidisciplinary approach is required in order to obtain better rates of tobacco and alcohol quitting, especially in patients undergoing non-surgical treatments.

**Keywords:** Smoking; smoking cessation; ethanol; head and neck neoplasms; treatment outcome.

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**Conflicts of interest:** None.

## INTRODUCTION

Smoking and alcoholism are well-known risk factors for head and neck squamous cell carcinoma (SCC) development. Among the patients treated for this condition, about 20% to 50% go on smoking after the treatment is complete<sup>1,2</sup>. Some authors relate smoking and alcoholism after head and neck SCC treatment to lower scores in quality of life questionnaires, in addition to a lower overall survival<sup>3-7</sup>. Aarstad *et al.*<sup>8</sup> showed smoking levels are associated with a lower quality of life in patients successfully treated for head and neck SCC and, in those patients who have a drinking-to-cope behavior regarding their previous oncological history, lower scores are also found in quality of life questionnaires.

According to some authors, continued smoking after treatment is highly related to alcoholism maintenance and both habits are related to lower body mass indexes in treated patients<sup>9</sup>. Continued use of tobacco increases relapse and a second primary tumor risk<sup>10,11</sup>, reduces the radiotherapy efficacy, exacerbates or extends complications secondary to head and neck cancer treatment, such as mucositis and xerostomia, in addition to impaired pulmonary function and wound healing<sup>12</sup>. Heavy alcohol intake is also related to higher relapse indexes and to a second primary tumor<sup>13</sup>.

Recently, many patients carrying a head and neck SCC have undergone non-surgical treatments, particularly concurrent radiotherapy and chemotherapy aiming to preserve the organs affected by the primary tumor. Such a therapeutic option has been used more often for tumors located in the larynx and the throat, with a good oncological outcome, compared with conventional treatment outcome, i.e., surgery and adjuvant radiotherapy. In a literature search, we found only a report where the authors studied the relationship between smoking cessation and the treatment modality employed<sup>14</sup>. In this study, Garces *et al.*<sup>14</sup> demonstrated, in a group of patients treated for head and neck SCC found in several sites, that those treated with radiation alone had lower smoking cessation rates than those undergoing a surgery as a part of the early disease treatment. However, the authors do not discriminate how many patients underwent total laryngectomy in the surgical group and this reduces the outcome impact, though not making it invalid.

Thus, with a growing number of patients with head and neck SCC undergoing non-surgical treatment, we need to debate whether smoking and alcoholism maintenance rates in this group of patients are the same as in patients undergoing surgical treatment. If a really significant difference in the cessation of risk factors among available therapeutic modalities is proved, smoking and drinking cessation strategies should be adjusted depending on the oncological treatment employed. Thus, this study objective is to assess the smoking and alcoholism maintenance

rate in patients treated for head and neck squamous cell carcinoma and determine whether the treatment modality has any impact on the observed outcome. We sought to determine whether maintaining the risk habits relates to the post-treatment oncological status.

## METHODS

The protocol described below is a cross-sectional study approved by the Ethics and Research Committee in our institution and follows the Resolution 196/96 of the National Health Board. Patients with squamous cell carcinoma in the high aero-digestive tract were included if they had undergone oncological treatment with an intention to cure purpose completed at least three months before their protocol inclusion. The patients were randomly selected in an outpatient routine service over two months as they came for scheduled follow-up visits. There was no prior review of the patient record which could compromise the case selection random character. The patients were interviewed for maintenance of smoking and/or alcoholism habits after treatment. All patients were informed about the study objectives and gave a written informed consent before the interview. The interview was always conducted by the same health team professional attending the patient (F.R.P.). Over the interview, the patient was asked about his/her status regarding tobacco and ethylic alcohol habits and, in case the status was abstinence, for how long. Habit maintenance was defined as a setting in which the patient did not have a smoking and/or alcohol cessation or if he/she resumed these habits after an abstinence period. Habit cessation was considered when the patient had not been smoking or drinking alcoholic beverages for at least 30 days from the interview date. This definition was based on literature data<sup>15</sup>. It is important to stress that, in our practice, patients treated for high aero-digestive tract SCC are instructed about the relationship between smoking and/or alcoholism and their underlying disease and they are advised to give up these habits. As a rule, no drug intervention is established to promote smoking and/or alcoholism withdrawal in these patients.

The data regarding the treated disease and the patient habits previously to cancer diagnosis were collected from the patients' medical records. From this information, all tumors were restaged according to the TNM classification by the *Union Internationale Contre le Cancer* – UICC, 6<sup>th</sup> edition – 2002. The oncological status was obtained from clinical assessment carried out during the visit preceding the interview. The following data was then registered in a standard card:

1. Patient's age (at the diagnosis) and gender;
2. Primary tumor site and stage (clinical stages from I to IV);
3. Type of treatment (surgical or non-surgical);

4. Smoking and alcohol use status before the treatment (YES or NO);
5. Smoking and alcohol use maintenance after the treatment (YES or NO);
6. Oncological status: Alive and disease-free or alive and with the disease;
7. Time elapsed from the tumor diagnosis to the interview (stratified into four categories to allow for the analysis: 3 to 12 months; 12 to 24 months; 24 to 36 months; > 36 months)

EXCLUSION CRITERIA:

- Patients with nasopharynx or lip tumors, since other risk factors are involved at these sites;
- Patients undergoing palliative care.

The patients were allocated into two groups, with the surgical group being initially treated with surgery (regardless any adjuvant treatment administered), and the medical group was initially treated with chemo and/or radiotherapy (regardless any rescue performed in the follow-up). The maintenance rate of studied habits was compared with the treatment modality employed (medical or surgical) through the chi-square test. The relationship between the oncological status of patients (alive and disease-free or alive and having the disease) and the smoking and alcohol use rates found was also tested. Statistical significance was considered when  $p < 0.05$  (a error).

RESULTS

Over the two-month duration study, 110 patients that met the inclusion criteria and accepted to participate in the study were selected. Out of them, 94 were male and the mean age was  $57.2 \pm 10.2$  years at the diagnosis. Most patients had high stage disease (stages III and IV), with the most frequent sites being mouth, throat and larynx (Figures 1 and 2). At the diagnosis, 80 patients were smokers, 66

Figure 1 – Primary site at diagnosis. Percentage and absolute values.

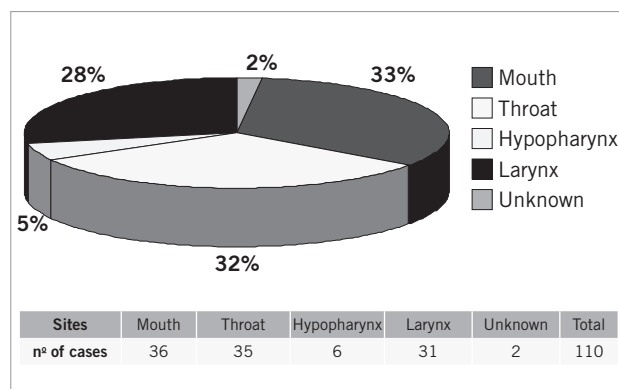
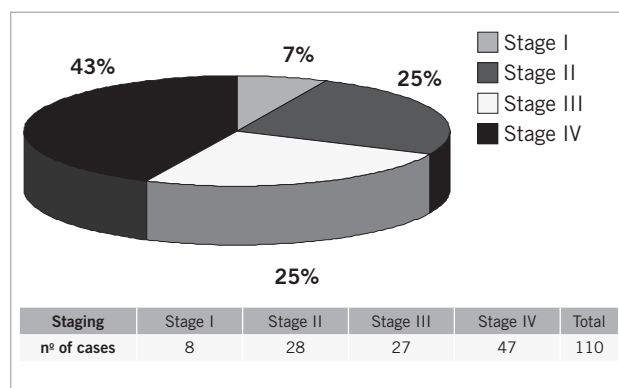


Figure 2 – Staging at diagnosis. Percentage and absolute values.



were alcoholics, and 61 were both smokers and alcoholics. Most non-smoker or non-alcoholic patients at the diagnosis had at least one of these habits in their medical history. By comparing the treatment modality groups (surgical versus medical treatment), a sample homogeneity was observed regarding the patient age, the tumor clinical stage, and the elapsed time between the tumor diagnosis and the interview (Table 1).

Table 1 – Comparison of groups according to the treatment modality concerning patients' age, tumor clinical stage, elapsed time between tumor diagnosis and the interview

Analyzed Variable	Treatment		Significance
	Surgical	Medical	
Age	57.3 ± 10.3 years	56.8 ± 10.1 years	$p = 0.801$ (t Student)
Stage			
I	8.6%	3.4%	$p = 0.156$ (chi-square)
II	29.6%	13.8%	
III	24.7%	24.1%	
IV	37.1%	58.7%	
Time to interview			
3 - 12 months	14.8	27.6%	$p = 0.454$ (chi-square)
12 - 24 months	29.6	20.7%	
24 - 36 months	27.2	24.1%	
> 36 months	28.4	27.6%	

**Table 2** – Total Smoking – medical group x surgical group. Absolute values and percentage

Smoking	Treatment		Total
	Medical	Surgical	
Yes	14 (58.3%)	14 (25%)	
No	10 (41.7%)	42 (75%)	
Total	24 (100%)	56 (100%)	80

p = 0.004 chi-square test

**Table 3** – Smoking when total laryngectomies were excluded – medical group x surgical group. Absolute values and percentage

Smoking	Treatment		Total
	Medical	Surgical	
Yes	14 (58.3%)	12 (27.3%)	
No	10 (41.7%)	32 (72.7%)	
Total	24 (100%)	44 (100%)	68

p = 0.012 chi-square test

**Table 4** – Post-treatment alcoholism - medical group x surgical group. Absolute values and percentage

Alcoholism	Treatment		Total
	Medical	Surgical	
Yes	5 (23.8%)	6 (13.3%)	
No	16 (76.2%)	39 (86.7%)	
Total	21 (100%)	45 (100%)	66

p = 0.307 – Fisher's exact test

Among the smokers, 35% maintained the habit after the treatment. By comparing the treatment modalities, there was a significantly higher percentage of patients maintaining smoking in the medical group over the surgical group (58.3% vs. 25.0%; p = 0.004 – chi-square test; Table 2). Among the 56 smokers in the surgical group, 12 (21.4%) underwent total laryngectomy and the remainder underwent other kinds of surgery. After excluding the patients undergoing total laryngectomy because of the mechanical difficulty this operation brings on the smoking act and by comparing the post-treatment smoking rates in the surgical and medical groups, a significantly higher percentage of patients maintaining cigarette smoking was again found in the medically-treated group (58.3 vs. 27.3%; p = 0.012 – chi-square test; Table 3). Among the patients undergoing total laryngectomy, only two patients (16.6%) kept on smoking. Among the alcoholics, 16.6% continued drinking, a percentage that showed higher in the medical group than in the surgical group, but with no statistically significant difference (23.8% vs. 13.3%; p = 0.307 – chi-square test; Table 4). The patients' oncological status at the interview showed no relationship with the studied habit maintenance (Table 5).

**Tabela 5** – Oncological status x smoking and alcoholism maintenance or not

Habit	Status			
	Smoking*	Alive and disease-free	Alive and with the disease	Total
Yes	24 (34,8%)	4 (36,4%)		
No	45 (65,2%)	7 (63,6%)		
Total	69 (100%)	11 (100%)		80
Alcoholism**				
Yes	8 (14%)	3 (33,3%)		
No	49 (86%)	6 (66,7%)		
Total	57 (100%)	9 (100%)		66

\*p = 0.165 – Fisher's exact test \*\* p = 1.000 – Fisher's exact test

## DISCUSSION

Despite continuing government efforts to make the population aware of tobacco harm, the smoking index in the world adult population is still high. In Brazil, one-fourth of the population is estimated to be nicotine dependent and subject to the morbidity and mortality caused by tobacco<sup>16</sup>. Alcoholic beverage consumption, a more socially accepted habit, is also high and begins increasingly earlier in many countries<sup>17,18</sup>. For a long time, these habits have been known to be related to the development of many diseases, particularly some malignant neoplasms. As for the high aero-digestive tract SCC, smoking and/or alcoholism history occurs in almost all diagnosed patients. Despite they had been warned of the increased risk of relapse and other malignant tumor development related to continuing tobacco and alcohol use<sup>12,13</sup>, a significant percentage of patients treated for head and neck malignant tumors maintain or resume those habits after the treatment<sup>1,2</sup>. In addition, both persisting smoking and alcoholism are correlated with preexisting comorbidity worsening and a worse quality of life in this group of patients<sup>3-5,8</sup>. In recent years, with an increasing number of head and neck SCC cases primarily treated with chemotherapy and radiation, a seemingly increasing number of patients maintaining or resuming smoking and/or alcohol use has been observed in our outpatient practice, in spite of the medical, nursing and psychological team guidance. This clinical impression led us to carry the current study out.

The first remarkable result in our report regards the high index of patients maintaining smoking after the treatment (35%). This outcome is comparable to data found in literature<sup>1,2,12</sup>. A smoking cessation rate significantly higher was observed among patients undergoing surgical treatment and this confirmed our initial clinical impression. At first, the reasons why this group of patients has higher smoking cessation indexes may be related to a mechanical difficulty to smoking imposed by most head and neck SCC operations. However, after the patient's re-

covery and speech rehabilitation, only total laryngectomy partially prevents smoking resumption. Actually, Chan *et al.*<sup>15</sup> showed the tumor site was the only statistically significant finding associated with smoking cessation after the diagnosis: 64.2% of patients with hypopharynx and larynx SCC quit smoking, whereas only 35.8% of patients with throat or oral cavity SCC did it ( $p = 0.01$ ). Thus, we excluded from our analysis the patients undergoing total laryngectomy and compared the treatment groups again: one more time, there was a significantly higher smoking cessation in the surgical group. This outcome makes us consider other factors, in addition to the mechanical restriction imposed by the surgery performed, contribute to the higher smoking cessation index in surgically treated patients. The psychological impact of surgical treatment, in addition to the functional and cosmetic changes imposed by an oncological surgery, might lead to the higher smoking cessation rate observed in the current study.

Regarding alcoholism, we observed the maintenance or resumption rate was lower than for smoking, thus suggesting chemical and/or psychological dependence can be lower than that for tobacco. A comparison between the treatment groups showed similar results to those observed for smoking, i.e., a higher alcoholism cessation index for patients in the surgical group, as there was no statistical significance. No kind of surgery was required to be excluded from the analysis, since all interviewed patients had reached an appropriate rehabilitation of their swallowing ability postoperatively. Despite all operated patients had an appropriate swallowing when they were interviewed, many of them remained several weeks on a postoperative diet delivered by an enteral tube alone. Except for the total laryngectomy cases, most operated patients undergoing a transient tracheostomy and naso-enteral feeding tube placement had their respiratory function restored ahead of the swallowing function, with the tracheostomy being removed before the enteral tube. Therefore, these patients could resume smoking earlier than they used alcohol again. This rehabilitation time difference for respiratory and swallowing functions cooperated for the higher alcoholism cessation index in surgically treated patients.

Despite several authors have reported an increased risk of disease relapse and new primary tumor development in patients maintaining or resuming smoking and/or alcoholism after head and neck SCC treatment<sup>10-12,19-21</sup>, in the current study, the oncological status of patients did not show any relationship with maintenance or resumption of these habits. Another important finding that deserves to be pointed out is the observed results were not influenced by occasional confounders, since the treatment modality groups are homogenous for patient age, clinical stage and time elapsed between the tumor diagnosis and the interview.

## CONCLUSION

In short, the current study results demonstrated that smoking and alcoholism maintenance and/or recurrence rates are high in patients treated for head and neck SCC in Brazil, meaning only patient advice is not enough as a strategy leading to this habit cessation. It is crucial head and neck surgeons, as well as other related specialists understand nicotine and alcohol dependence is related to complex neurological, psychic and behavioral mechanisms described in detail in literature<sup>16,22,23</sup> and that success in interruption and abstinence of these habits does not depend solely on the patient comprehension and will. More efficacious measures aiming at tobacco and alcohol cessation and non-resumption are required, mainly for the group of patients undergoing non-surgical treatment.

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