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Submandibular Gland Involvement in Head and Neck Cancers: A Single-center Retrospective Study of 175 Cases

Baş ve Boyun Kanserlerinde Submandibular Bez Tutulumu: 175 Olguluk Tek Merkezli Retrospektif Çalışma

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ABSTRACT

Objective: The submandibular gland is routinely removed during level Ib neck dissection for head and neck cancer. This study evaluated the feasibility of gland preservation in appropriate patients considering oncological risks.

Methods: This retrospective study evaluated 175 patients with head and neck cancer who underwent neck dissection including Level Ib between 2015 and 2024. Level Ib nodal status was assessed in all patients, whereas submandibular gland involvement was evaluated in patients with at least one excised gland (n = 165). Overall survival (OS) and recurrence-free survival (RFS) were compared between gland-sparing and non-gland-sparing surgery in the oral cavity squamous cell carcinoma (SCC) cohort (n = 125) using the Kaplan-Meier method and log-rank test.

Results: The predominant histopathological type was SCC (89.1%), and the oral cavity was the most common tumor site (72.0%). Submandibular gland involvement was observed in 1 of 165 patients (0.6%). In the oral cavity SCC cohort, no statistically significant differences were found in OS (p = 0.288) or RFS (p = 0.936) between gland-sparing surgery (n = 12) and non-gland-sparing surgery (n = 113).

Conclusion: Submandibular gland involvement is rare, and gland-sparing surgery may be viable in carefully selected oral cavity SCC patients. Larger studies are required to clarify oncological reliability

Öz

Amaç: Submandibular bez, baş ve boyun kanserlerinde Level Ib boyun diseksiyonu sırasında rutin olarak çıkarılmaktadır. Bu çalışmada, onkolojik riskler göz önünde bulundurularak uygun hastalarda submandibular bezin korunmasının uygulanabilirliğinin değerlendirilmesi amaçlandı.

Yöntemler: Bu retrospektif çalışmada, 2015-2024 yılları arasında Level Ib'yi içeren boyun diseksiyonu uygulanan baş ve boyun kanserli 175 hasta değerlendirildi. Tüm hastalarda Level Ib lenf nodlarının durumu değerlendirildi; submandibular bez tutulumu ise en az bir submandibular bezi eksize edilen hastalarda (n = 165) incelendi. Glandüler koruyucu ve bez koruyucu olmayan cerrahi uygulanan hastalar arasındaki genel sağkalım (OS) ve nüksüz sağkalım (RFS), oral kavite skuamöz hücreli karsinom (SCC) kohortunda (n = 125) Kaplan-Meier yöntemi ve log-rank testi kullanılarak karşılaştırıldı.

Bulgular: En sık görülen histopatolojik tip SCC (%89,1) olup, en yaygın tümör lokalizasyonu oral kaviteydi (%72,0). Submandibular bez tutulumu 165 hastanın 1'inde (%0,6) saptandı. Oral kavite SCC kohortunda, bez koruyucu cerrahi (n = 12) ile glandüler koruyucu olmayan cerrahi (n = 113) arasında OS (p = 0,288) veya RFS (p = 0,936) açısından istatistiksel olarak anlamlı fark saptanmadı.

Sonuç: Submandibular bez tutulumu nadirdir ve dikkatle seçilmiş oral kavite SCC hastalarında submandibular bezin korunmasına yönelik

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ABSTRACT

and functional benefits and support patient selection criteria for preservation.

Keywords: Head and neck neoplasms, submandibular gland, neck dissection, squamous cell carcinoma of head and neck, mouth neoplasms, lymphatic metastasis

INTRODUCTION

Neck dissection is a major component of the treatment of head and neck cancers. Since the definition of radical neck dissection by Crile (1), many changes have occurred in neck dissections, such as modified radical neck dissection and selective neck dissections (1-3). Most head and neck cancers carry at least an intermediate risk of cervical metastasis (4). Neck metastasis can be diagnosed through physical examination or imaging techniques. The prognosis of head and neck cancers is directly related to neck involvement (5-7). In general, a risk of occult metastasis greater than 20% is considered an indication for elective neck dissection (8). Selective or functional neck dissection, rather than comprehensive neck dissection (modified radical or radical neck dissection), is more appropriate for elective neck dissection (9-11).

Standard level Ib dissection, including the excision of the submandibular gland (SMG) with the surrounding lymph nodes and adipose tissue, is part of elective or comprehensive neck dissections (9,12). Submandibular glands do not contain intraparenchymal lymph nodes, unlike the parotid gland, which includes an average of 10 to 20 intraglandular lymph nodes (13). This raises the question: "Is it feasible to perform level Ib neck dissection while preserving the SMG in selected cases without compromising oncological outcomes?"

The SMG is one of the major salivary glands responsible for salivary function. Removal of a single SMG usually does not cause clinically significant xerostomia. However, bilateral dissection or adjuvant radiotherapy may increase the risk of this complication (14). In addition, there is a low risk of hypoglossal and lingual nerve paralysis complications after SMG excision (15).

Therefore, in this study, we aimed to evaluate SMG involvement in routine histopathological analyses of neck dissection specimens obtained from patients with head and neck cancers. In addition, oncological outcomes were compared between gland-sparing and non-gland-sparing surgery in the oral cavity squamous cell carcinoma (SCC) cohort, in which gland-sparing procedures were performed.

MATERIALS AND METHODS

This study was a retrospective analysis of patients who underwent neck dissection, including level Ib, for head and neck cancer at a single tertiary referral center between January 1, 2015, and January 1, 2024. All patients were evaluated by a surgical team consisting of otolaryngology specialists, and surgery was performed by a senior head and neck surgeon.

The exclusion criteria were as follows:

1. Patients who had previously been treated at our center or another institution and had developed SCC recurrence,

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cerrahi uygulanabilir bir seçenek olabilir. Onkolojik güvenilirliği ve fonksiyonel yararları daha net ortaya koymak ve bez koruma için hasta seçim kriterlerini belirlemek amacıyla daha geniş kapsamlı çalışmalara ihtiyaç vardır.

Anahtar Sözcükler: Baş ve boyun neoplazmları, submandibular bez, boyun diseksiyonu, baş ve boyun skuamöz hücreli karsinomu, ağız neoplazmları, lenfatik metastaz

2. Patients with incomplete clinical data,

3. Cases in which primary treatment was administered using a non-surgical method.

A total of 175 patients who underwent neck dissection including level Ib were included, and level Ib nodal status was assessed in all cases. SMG involvement could be evaluated in patients in whom at least one SMG was excised (n = 165); the remaining 10 patients had no SMG submitted for histopathologic assessment because of bilateral gland preservation. Survival analyses, including overall survival (OS) and recurrence-free survival (RFS), were restricted to the oral cavity SCC cohort (n = 125) to minimize heterogeneity related to tumor site and histopathology.

The study was conducted in accordance with the Declaration of Helsinki and was approved by the Institutional Ethics Committee of Gazi University (approval no: 2026-13; date: 13/01/2026). Due to the retrospective design, informed consent was waived in accordance with institutional regulations.

All patients who presented with various symptoms and were diagnosed with head and neck cancer based on imaging and biopsy results were clinically evaluated. The local and/or regional spread of the tumors was assessed through detailed physical examination and necessary radiological imaging methods [computed tomography (CT), magnetic resonance imaging (MRI), positron emission tomography (PET) etc.]. After diagnosis and preoperative staging, all cases were discussed at a multidisciplinary oncology council meeting. In accordance with the council's decisions, surgical excision was performed in all patients deemed appropriate.

All patients were staged using the American Joint Committee on Cancer staging system (8th edition) based on clinical, radiological, and pathological data obtained during the preoperative and postoperative periods (16).

Based on the pathology data obtained after surgery, patients were classified according to the histopathological data and anatomical locations of head and neck cancer. Level Ib involvement was assessed in all patients (n = 175). Histopathological SMG involvement was assessed in patients with at least one excised SMG specimen (n = 165).

Patients who underwent submandibular gland-sparing surgery (n = 15) were identified based on the following characteristics at the time of their original procedure:

- Patients who were evaluated preoperatively with imaging and clinically as NO,
- Patients who underwent elective neck dissection,
- Patients who underwent bilateral neck dissection with SMG preservation performed on the elective clinically NO side.

Among these patients, 12 had oral cavity SCC and were included in the survival analyses comparing gland-sparing and non-gland-sparing surgery.

In bilateral neck dissections, SMG preservation was performed only on the elective clinically N0 side; however, contralateral therapeutic SMG excision was performed in 5 of these patients.

The preoperative appearance of the lower lip in a patient with lower lip SCC who underwent submandibular gland-sparing surgery (Figure 1), along with the intraoperative views of the Level Ib dissection before (Figure 2) and after dissection (Figure 3), are presented.

Statistical Analysis

Statistical analyses were performed using SPSS software (IBM SPSS Statistics 27). Descriptive statistics included continuous variables as mean $\pm$ standard deviation or median (minimum-maximum) and categorical variables as number and percentage (%). Pearson's chi-square test was used to evaluate relationships between categorical variables in intergroup comparisons. When expected cell counts were <5 , Fisher's exact test was used. Some categorical variables were grouped and recoded prior to significance analyses; for example, anatomical tumor subtypes were divided into three main groups: Oral cavity, salivary gland, and others. The Kaplan-Meier method was used for survival analyses, and the log-rank test was used to compare differences between groups. Survival analyses were performed in the oral cavity SCC cohort ($n = 125$), comparing patients who underwent submandibular gland-sparing surgery ($n = 12$) with those who underwent non-gland-sparing surgery ($n = 113$). The clinicopathological characteristics of the gland-sparing and non-gland-sparing groups within the oral cavity SCC cohort were summarized descriptively. No formal between-group hypothesis testing was performed for these characteristics because of the small and markedly unequal group sizes. Follow-up duration was defined as the interval from surgery to death or the last documented clinical contact. Median follow-up was estimated using the reverse Kaplan-Meier method. OS was calculated from the date of surgery to death from any cause, with surviving patients censored at the last documented follow-up. RFS was defined as the

interval from the date of surgery to the first documented local, regional, or distant recurrence. Patients who remained recurrence-free were censored at the last documented follow-up, whereas patients who died without a documented recurrence were censored at the date of death.

RESULTS

The general characteristics of the patients who underwent neck dissection are summarized in Table 1. A total of 175 patients were included in this study. Of the 175 patients, the SMG was available for evaluation in 165; direct gland involvement was identified in 1/165 (0.6%). The predominant histology was SCC ($n = 156$, 89.1%). The mean age of the patients was 65.8 ± 13.8 years (range, 18-94 years). Fifty-eight percent of the patients were male ($n = 102$) and 42% were female ($n = 73$). Histopathological examination after surgery revealed that SCC was the most common type (89.1%). This was followed by mucoepidermoid carcinoma (3.4%), adenoid cystic carcinoma (1.7%), and other types (5.7%) of salivary gland cancer. In terms of anatomical localization, the most common tumor location was the oral cavity (72.0%). This was followed by laryngeal (9.1%), salivary gland (7.4%), neck skin (4.0%), maxillary and paranasal sinus (3.4%), oropharyngeal, nasopharyngeal, and SCC cases of unknown primary origin.

When patients were examined in terms of staging:

- pT4 was the most common stage among the 175 patients, observed in 47 cases (26.9%) in this group. pT4 is followed by pT1 ($n = 43$, 24.6%), pT2 ($n = 42$, 24%), pT3 ($n = 34$, 19.4%), and pTX ($n = 9$, 5.1%) stages. In patients classified as pTX, the size or degree of invasion of the primary tumor was not determined.



Figure 1. Preoperative appearance of lower lip squamous cell carcinoma in a patient who underwent submandibular gland-sparing Level Ib neck dissection (gland-sparing case).

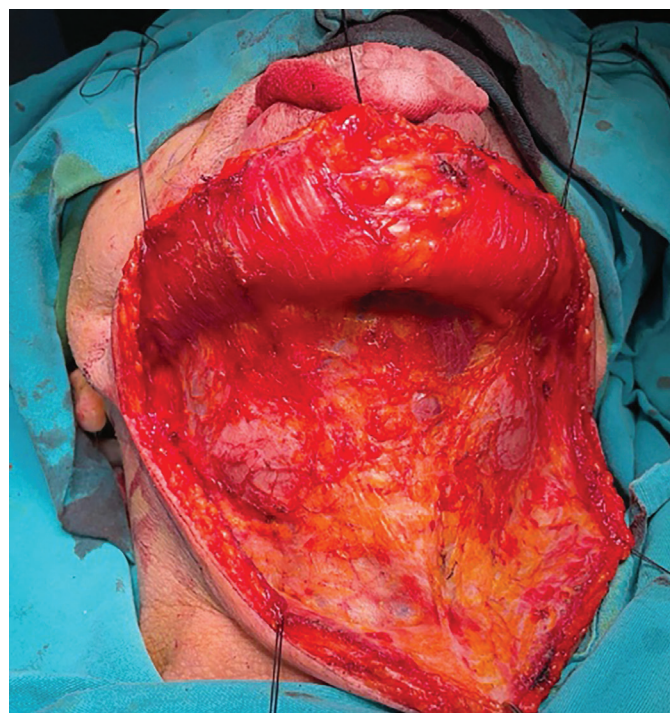


Figure 2. Intraoperative view before Level Ib dissection in the submandibular gland-sparing approach (same patient as Figure 1).

• When evaluated in terms of pN stage, most patients were in the pN0 stage, with this group being the largest subgroup, comprising 98 patients (56%). The distributions of the other nodal stages were as follows: pN3 (n = 31, 17.7%), pN2 (n = 24, 13.7%), pN1 (n = 19, 10.9%), and pNX (n = 3, 1.7%). The pNX stage refers to patients whose regional lymph node status could not be assessed.

Therapeutic neck dissection was performed in 62.3% of the patients, whereas elective neck dissection was performed in 37.7%. The seemingly high frequency of therapeutic neck dissection in our cohort is due to cases with clinically and radiologically suspicious or positive lymph nodes on preoperative imaging (CT/MRI/PET) being classified as therapeutic; nevertheless, some of these cases were ultimately found to be pN0 on final histopathological examination.

When the postoperative pathology reports of the patients were examined, Level Ib involvement was detected in 34 patients (19.4%), whereas no involvement was detected in 141 patients (80.6%). SMG involvement was observed in only one patient (0.6%) who had undergone surgery for lower lip SCC. In this patient, metastatic disease was observed in the ipsilateral level Ib, with involvement of the SMG likely resulting from direct extension of the metastatic lymph node. Submandibular gland-sparing surgery was performed in 15 patients (8.6%). The pathological evaluation demonstrating SMG invasion is presented in Figure 4.

The distribution of patients with level Ib lesions according to anatomical localization is shown in Table 2. Level Ib involvement showed significant differences according to the anatomical localization of the tumor ($p = 0.005$). The rate of level Ib involvement is higher, especially in tumors originating from the salivary glands and oral cavity.

Table 3 presents level Ib involvement according to oral cavity subsites. Due to limited sample sizes in certain subsites, these areas were combined for analysis. No statistically significant differences in

level Ib involvement were detected among the oral cavity subsites ($p = 0.112$). However, higher rates of level Ib involvement were observed in the buccal plus retromolar subgroup (37.5%) and the combined alveolar/mandible, hard palate, and floor of mouth subgroup (30.0%), although these differences did not achieve statistical significance.

Table 4 presents the main clinicopathological characteristics of the oral cavity SCC cohort according to SMG preservation status. The mean age was 62.2 ± 11.0 years in the gland-sparing group and 67.0 ± 13.1 years in the non-gland-sparing group. Tongue tumors were the most frequent subsite in both groups, accounting for 33.3% and 39.8% of cases, respectively. In the gland-sparing group, 7 of 12 patients (58.3%) had pT1-pT2 disease, 4 (33.3%) had pT4 disease, and 9 (75.0%) were pN0 on final pathological staging. The corresponding proportions in the non-gland-sparing group were 61.1%, 18.6%, and 62.8%, respectively. These characteristics are presented descriptively to illustrate the composition of the two clinically selected groups.

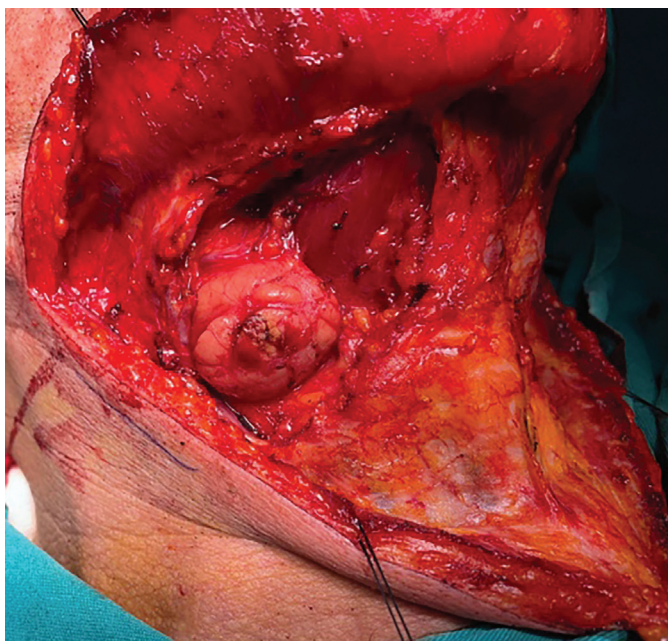


Figure 3. Intraoperative view after completion of Level Ib dissection with preservation of the submandibular gland (same patient as Figure 1).

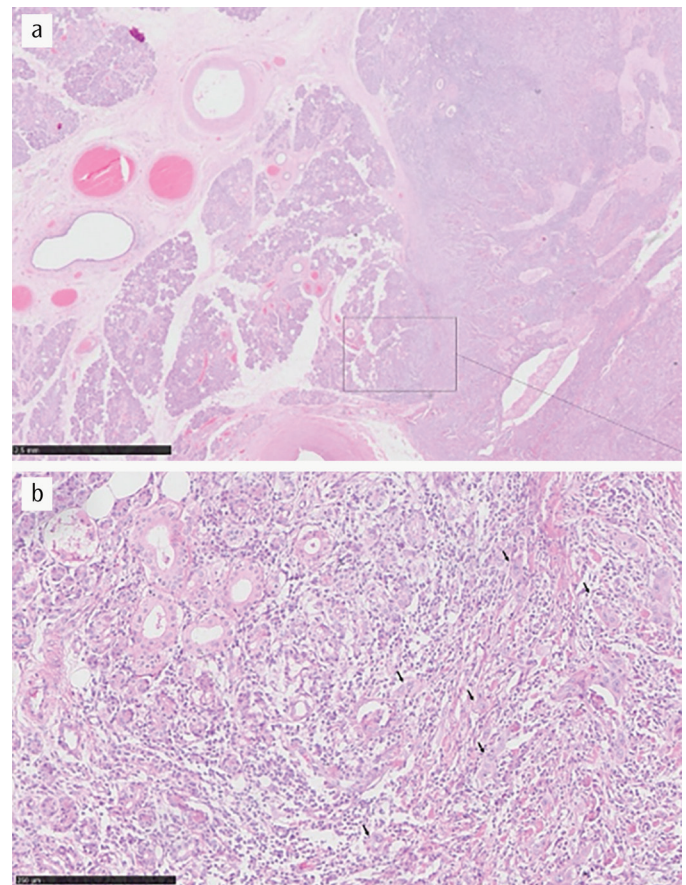


Figure 4. Pathological specimen image demonstrating submandibular gland involvement (non-gland-sparing case).

a) Low-power histological section demonstrating squamous cell carcinoma infiltrating the submandibular gland parenchyma (H&E, x13). The boxed area indicates the region shown at a higher magnification. b) High-power view of the highlighted area showing infiltrating nests and cords of squamous cell carcinoma (arrow) within the submandibular gland stroma (H&E, x140).

H&E: Hematoxylin and eosin.

Table 1. General characteristics of patients who underwent neck dissection.

Variable (n=175)	n	Percentage (%)	Mean $\pm$ SD/min-max
Age			65.8 $\pm$ 13.8 18-94
Gender			
Male	102	58	
Female	73	42	
Histopathologic subtype of tumor			
SCC	156	89.1	
Mucoepidermoid carcinoma	6	3.4	
Adenoid cystic carcinoma	3	1.7	
Others	10	5.7	
Anatomical subtype of head and neck cancer			
Oral cavity	126	72	
Oropharynx	3	1.7	
Larynx	16	9.1	
Salivary gland	13	7.4	
Nasopharynx	2	1.1	
Maxilla and paranasal sinus	6	3.4	
Unknown primary SCC	2	1.1	
Skin cancer of the head and neck	7	4.0	
Type of neck dissection			
Elective	66	37.7	
Therapeutic	109	62.3	
Level Ib involvement			
Present	34	19.4	
Absent	141	80.6	
Submandibular gland involvement (n = 165)			
Present	1	0.6	
Absent	164	99.4	
Submandibular gland-sparing surgery			
Present	15	8.6	
Absent	160	91.4	
pT stage			
pT1	43	24.6	
pT2	42	24	
pT3	34	19.4	
pT4	47	26.9	
pTX	9	5.1	
pN stage			
pN0	98	56	
pN1	19	10.9	
pN2	24	13.7	
pN3	31	17.7	
pNX	3	1.7	

SCC: Squamous cell carcinoma.

Table 2. Distribution of patients with level Ib lesions according to anatomical localization.

Tumor location	Level Ib involvement present (n, %)	Level Ib involvement absent (n, %)	Total (n, %)	Pearson chi-square (χ^2)	df	p-value
Oral cavity (group 1)	26 (20.6%)	100 (79.4%)	126 (72.0%)	10.475	2	0.005
Salivary gland (group 2)	6 (46.2%)	7 (53.8%)	13 (7.4%)			
Other sites (group 3)	2 (5.6%)	34 (94.4%)	36 (20.6%)			
Total	34 (19.4%)	141 (80.6%)	175 (100%)			

Table 3. Level Ib involvement according to oral cavity subsites.

Oral cavity subsite	Level Ib involvement present n (%)	Level Ib involvement absent n (%)	Total n (%)	Pearson chi-square (χ^2)	df	p-value
Lip	8 (19.5)	33 (80.5)	41 (32.5%)	5.988	3	0.112
Tongue	6 (12.2)	43 (87.8)	49 (38.9%)			
Alveolar/mandible + hard palate + floor of mouth	6 (30.0)	14 (70.0)	20 (15.9%)			
Buccal + retromolar	6 (37.5)	10 (62.5)	16 (12.7%)			
Total	26 (20.6)	100 (79.4)	126 (100%)			

Table 4. Clinicopathological characteristics of the oral cavity SCC cohort according to submandibular gland preservation status.

Characteristic	Non-gland-sparing (n = 113)	Gland-sparing (n = 12)	Total (n = 125)
Age, years, mean $\pm$ SD	67.0 $\pm$ 13.1	62.2 $\pm$ 11.0	66.5 $\pm$ 13.0
Sex			
Male	58 (51.3)	8 (66.7)	66 (52.8)
Female	55 (48.7)	4 (33.3)	59 (47.2)
Tumor subsite			
Lip	38 (33.6)	3 (25.0)	41 (32.8)
Tongue	45 (39.8)	4 (33.3)	49 (39.2)
Alveolar/mandible + hard palate + floor of mouth	17 (15.0)	2 (16.7)	19 (15.2)
Buccal + retromolar	13 (11.5)	3 (25.0)	16 (12.8)
pT stage			
pT1	38 (33.6)	3 (25.0)	41 (32.8)
pT2	31 (27.4)	4 (33.3)	35 (28.0)
pT3	20 (17.7)	1 (8.3)	21 (16.8)
pT4	21 (18.6)	4 (33.3)	25 (20.0)
pTX	3 (2.7)	0 (0.0)	3 (2.4)
pN stage			
pN0	71 (62.8)	9 (75.0)	80 (64.0)
pN1	13 (11.5)	1 (8.3)	14 (11.2)
pN2	12 (10.6)	1 (8.3)	13 (10.4)
pN3	17 (15.0)	1 (8.3)	18 (14.4)

SCC: Squamous cell carcinoma.

Tables 5 and 6 present the effects of submandibular gland-sparing surgery on OS and RFS in the oral cavity SCC cohort. Because gland-sparing procedures were performed in selected oral cavity SCC cases, survival analyses were restricted to this subgroup to minimize heterogeneity related to tumor site and histopathology.

The median follow-up duration for the oral cavity SCC survival cohort was 74.0 months (observed range, 1-116 months), as estimated using the reverse Kaplan-Meier method.

The effect of submandibular gland-sparing surgery on OS is shown in Table 5. In the oral cavity SCC cohort, 12 patients underwent gland-sparing surgery, whereas 113 patients underwent non-gland-sparing surgery. Kaplan-Meier log-rank analysis showed no statistically significant difference in OS between the gland-sparing and non-gland-sparing groups (mean OS: 88.6 ± 7.1 vs. 84.8 ± 4.4 months, respectively; log-rank $\chi^2 = 1.128$, $p = 0.288$).

The effect of submandibular gland-sparing surgery on RFS is shown in Table 6. No statistically significant difference in RFS was observed between the gland-sparing and non-gland-sparing groups (mean RFS: 74.2 ± 10.9 vs. 94.4 ± 4.2 months, respectively; log-rank $\chi^2 = 0.006$, $p = 0.936$).

DISCUSSION

A review of the literature revealed that SMG involvement in head and neck cancers occurs at a notably low rate. In the absence of risk factors, submandibular gland-preserving surgery can be considered within the framework of oncologically safe. In our study, the detection of SMG involvement in only one patient out of a sample of 165 supports the existing literature.

Spiegel et al. (13) studied the involvement of SMG in neck dissections (unilateral or bilateral) performed for head and neck SCC in 169 subjects. 196 SMG were resected. Glandular invasion was observed in nine SMG (4.6%), glandular invasion was observed (3 cases; extension from level Ib lymph node metastasis, and six cases showed direct extensions from the primary tumor). They suggested that transplantation or replantation of the contralateral SMG may be a safe oncological procedure (13).

Subramaniam et al. (17) studied the determinants of level Ib involvement in 585 neck dissections from an OSCC cohort. In 226

N+ cases, 21 (9.3%) had direct tumor invasion of the SMG. The risk factors for SMG involvement were tumor diameter >4 cm and DOI >10 mm. Based on their findings, they proposed a submandibular gland-sparing neck dissection for early stage OSCC. In a study by Kalloli et al. (18), SMG involvement was observed in five (1.6%) of 281 patients with OSCC who underwent neck dissection. SMG involvement was from level Ib metastasis in three cases (0.9%) and from direct extension of the primary tumor in two cases (0.6%). Pasha et al. (19) studied involvement of SMG in a case series (149 patients) of oral cavity SCC. The SMG was involved in seven cases (4.7%), all of whom had level Ib metastasis. In addition, two of them had direct extension from the primary origin (floor of mouth). Iocca et al. (20) designed a retrospective multicenter study of SMG involvement in 642 patients with oral cavity SCC. SMG involvement was observed in 12/642 (1.9%) and 12/852 (1.4%) per patient and gland, respectively. pN0 cases were associated with reduced SMG involvement. In addition, they performed a meta-analysis of SMG involvement in 4458 cases and 5037 glands. The involvement rates were 1.8% [99% confidence interval (CI) 1.1-2.7] and 1.6% (99% CI 1.0-2.4), respectively.

Gu et al. (21) performed a prospective non-randomized cohort study examining the impact of SMG preservation in early stage buccal SCC. A total of 137 patients were included in this study. A total of 31 patients underwent SMG-sparing neck dissection. The 5-year locoregional control rates in the SMG-sparing and SMG-excision groups were 74% and 75%, respectively ($p = 0.970$). In addition, the 5-year DSS rates were 74% and 69%, respectively. Likewise, Du et al. (22) retrospectively studied the outcomes of SMG preservation and excision in neck dissection for cT1-2N0 floor of mouth SCC. The 5-year LCR rates for SMG preservation and excision groups were found to be 84% and 73%, respectively.

In another study on this subject, a retrospective study of 317 cases conducted by Rahman et al. (23) reported a SMG involvement rate of 3.8%. The study showed that the most important risk factors for SMG involvement were level Ib lymph node involvement [odds ratio (OR), 13.6], extranodal spread (OR, 67), and perineural invasion (OR, 5). It has been emphasized that in early stage buccal mucosal cancers at the cT1-T2N0 stage, preservation of the SMG may be possible without compromising oncological safety in the

Table 5. Effect of submandibular gland-sparing surgery on overall survival in the oral cavity SCC cohort.

Submandibular gland-sparing surgery	Total patients	Number of events	Mean OS (months) $\pm$ SE	Log-Rank χ^2	df	p-value
No	113	34	84.8 ± 4.4	1.128	1	0.288
Yes	12	1	88.6 ± 7.1			
Total	125	35	86.1 ± 4.2			

SCC: Squamous cell carcinoma, OS: Overall survival, SE: Standard error.

Table 6. Effect of submandibular gland-sparing surgery on recurrence-free survival in the oral cavity SCC cohort.

Submandibular gland-sparing surgery	Total patients (N)	Number of events (N)	Mean RFS (months) $\pm$ SE	Log-Rank χ^2	df	p-value
No	113	21	94.4 ± 4.2	0.006	1	0.936
Yes	12	2	74.2 ± 10.9			
Total	125	23	94.2 ± 4.1			

SCC: Squamous cell carcinoma, SE: Standard error, RFS: Recurrence-free survival.

absence of these high-risk factors. Finally, Jakhetiya et al. (24) reported an SMG involvement rate of 1.32% in their retrospective study of 303 patients who underwent neck dissection due to oral cavity SCC. The study noted that submandibular invasion occurred either through direct infiltration of the primary tumor or through extracapsular spread from adjacent metastatic lymph nodes, and that isolated intraglandular metastasis was not observed.

When the data from our study were examined, the pathological data of 165 patients who underwent surgery for head and neck cancer revealed that SMG involvement was detected in only one patient (0.6%), which is a very low rate of occurrence. This finding is similar to the 1.32% rate reported by Jakhetiya et al. (24) and the rates of 1.9% per patient and 1.4% per gland reported in Iocca et al.'s (20) multicenter retrospective study. In the literature, tumor diameter >4 cm, depth of invasion (DOI) >10 mm, level Ib lymph node involvement, extranodal spread, and perineural invasion have been identified as the most important risk factors for SMG involvement. Since SMG involvement was detected in only one patient in our study, risk factor analysis could not be performed, which is one of the main limitations of our study.

In the present study, survival analyses were restricted to the oral cavity SCC cohort to minimize heterogeneity related to tumor site and histopathology, as gland-sparing procedures were performed in selected oral cavity SCC cases. No statistically significant difference was observed in OS or RFS between the gland-sparing and non-gland-sparing groups ($p = 0.288$ and $p = 0.936$, respectively). These findings are in line with the studies by Gu et al. (21) and Du et al. (22), which reported comparable oncological outcomes between SMG-sparing and SMG-excision approaches in selected oral cavity SCC cohorts. Nevertheless, the survival analysis included only 12 patients in the gland-sparing group, with one OS event and two RFS events. These low event counts limited the ability to detect between-group differences; therefore, the absence of statistically significant differences should not be interpreted as evidence of equivalence between the two surgical approaches. Together with the retrospective, non-randomized design and potential selection bias, these survival findings should be considered exploratory.

Study Limitations

The main limitations of this study include its retrospective design, the inability to perform risk factor analysis due to the very low number of SMG involvement events, and the limited sample size of the gland-sparing subgroup. In addition, gland-sparing surgery was performed only in selected clinically N0 oral cavity SCC cases, which may have introduced selection bias. Therefore, the survival analysis should be regarded as exploratory rather than confirmatory.

CONCLUSION

In the present study, SMG involvement was identified in 0.6% of patients who underwent neck dissection for head and neck malignancy. In the oral cavity SCC cohort, no statistically significant difference was found in OS or RFS between patients who underwent submandibular gland-sparing surgery and those who did not. Although the limited number of SMG involvement events precluded a comprehensive risk factor analysis, our findings support the

existing literature suggesting that SMG preservation may be a feasible approach in carefully selected low-risk oral cavity SCC patients without clinical or radiological evidence of level Ib nodal involvement.

Ethics

Ethics Committee Approval: The study was conducted in accordance with the Declaration of Helsinki and was approved by the Institutional Ethics Committee of Gazi University (approval no: 2026-13; date: 13/01/2026).

Informed Consent: The requirement for informed consent was waived due to the retrospective design; however, written informed consent for publication of clinical and intraoperative images was obtained from the patient.

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Footnotes

Authorship Contributions

Surgical and Medical Practices: E.A., B.Ö., U.A., M.Y., M.D., Concept: M.A., Design: M.A., E.A., Data Collection or Processing: M.E.Z., E.A., Analysis or Interpretation: M.E.Z., B.Ö., U.A., M.Y., M.D., Literature Search: M.A., M.E.Z., Writing: M.A., B.Ö., U.A., M.Y., M.D.

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