The current role of elective neck dissection in management of early stage oral tongue cancer; a retrospective study

Osama A. El-Malt, MD [a]; Mostafa AT El-Sakkary, MD [a]; Zeiad S. Gad, MD, MRCS [a]; Mohamed M. Abdal Aziz, MBBCH [b]

[a]Surgical Oncology Department, National Cancer Institute, Cairo University, Egypt; [b]Surgical Oncology Department, Faculty of Medicine, Alexandria University, Egypt.

Corresponding author:
Zeiad S. Gad, MD
Ass. Prof. of Surgical Oncology, National Cancer Institute, Cairo University, Egypt
Address: 13th Abrag Othman, Kournish el Maadi, Cairo, Egypt, 11431.
Mobile: +201006084041
Email: z_gad@yahoo.com

Abstract: Background: Occult neck metastasis rate is too high in tongue cancer. Objective: To verify the current role of elective neck dissection (END) in management of early stage oral tongue cancer to minimize disease failure and improve survival. Study design: This retrospective study included 88 patients with stage I and II tongue cancer. The collected data were analyzed for detection of disease free survival (DFS) and recurrence rate. Results: Most lesions had been dealt with by surgery, either by wide local excision (22%) or hemiglossectomy (78%). The treatment of the neck was either by neck dissection (85.2%) or "wait and see" policy (14.8%). The rate of local and nodal recurrence was 7.9% and 20.4% respectively. Analysis of the association between DFS and different factors revealed significance associations with adoption of adjuvant therapy and the status of dissected lymph nodes. Conclusion: Controversy as regards neck management was still present.

[Osama A. El-Malt, MD; Mostafa AT El-Sakkary, MD; Zeiad S. Gad, MD, MRCS; Mohamed M. Abdal Aziz, MBBCH. **The current role of elective neck dissection in management of early stage oral tongue cancer; a retrospective study.** Cancer Biology. 2025;15(2):1-9]. ISSN: 2150-1041 (print); ISSN: 2150-105X (online). http://www.cancerbio.net 01. doi:10.7537/marscbj150225.01

Key words: Elective neck dissection; Occult metastasis; Squamous cell carcinoma; Survival rate; Wait and see.

Running title: Elective neck dissection in tongue cancer

Funding source: None
Conflict of interest: None

Introduction:

Cancer of the anterior 2/3 of the tongue accounts for about 37% of newly diagnosed cases of malignancy involving oral cavity.(1) Cervical metastasis is the most significant factor in the prognosis of oral squamous cell carcinoma (SCC) as early detection and treatment may prevent distant metastases.(2)

The assessment of cervical lymph nodes is extremely difficult clinically and radio diagnosis lacks considerable power to detect occult neck metastasis making the non-invasive neck staging methods limited to a maximum accuracy of 76%.(3) Rate of occult neck metastasis is too high in oral tongue cancer so taking the risk of regional recurrence by application of "wait and see" policy. Franceschi et al.(4) reported a 31% incidence of occult nodal metastasis in the clinically N0 neck for early oral tongue cancer and a 35% cervical node metastases on follow-up in patients with T1 or T2 lesions who did not undergo elective neck dissection**.** For T1 or T2 N0 oral SCC, sentinel lymph node biopsy could predict a pathologically negative neck in 96% of patients.(5) Skip metastasis is rare in early stage tongue cancer (T1,T2 SCC), so inclusion of level lV is not mandatory in elective neck dissection for clinically negative neck.(6)

There are currently three policies advocated for management of an N0 neck; elective neck irradiation (ENI), elective neck dissection (END) or close observation (wait and see). The choice of treatment takes into consideration T stage, site of primary, grade, compliance for follow-up, or the probability for occult metastasis.(7)

Numerous authors favor elective neck dissection if the presence of occult lymph node metastasis can be expected with a probability of 20% or more. Others prefer to adopt a "wait and see" policy, although this requires both great compliance from the patient and great expertise of the responsible physician to identify metastasis early.(8) Another argument in favor of END is the significant deterioration of the survival rate when neck dissection is due after clinical disease is detected.(9) Elective Supraomohyoid neck dissection (SOHND) detects occult metastases in early node-negative oral tongue SCC and is sufficient to remove the majority of lymph node metastases. Patients with early oral SCC exhibiting occult metastases should be considered as high risk patients, warranting additional therapeutic regimens.(10)

The aim of this study was to verify the current role of elective neck dissection in management of early stage oral tongue cancer through studying the incidence of occult and skip lymph node metastasis in early stage tongue, and evaluating the role of elective neck dissection in minimizing disease failure whether regionally or systemically in early stage tongue cancer and its role in improving survival. We tried to present the experience of our National cancer institute (NCI), Cairo University, Egypt in the management of tongue cancer and to verify the role of elective neck dissection in the management of early oral tongue cancer.

Materials and Methods

This retrospective study included patients with early stage oral tongue cancer presented at our NCI during a time period of six years (2007-2013).

Inclusion criteria:

Stage I and II tongue cancer:

- Tumors of the tongue (primary) must be less than 4 cm without invasion to surroundings clinically or following pathological examination postoperatively.
- Negative neck either by clinical examination, by FNAC or by radiological investigation

Exclusion criteria:

- Any tumor more than 4cm or invading surrounding tissues either by examination or by pathological examination following surgery.
- Positive neck either clinically or by preoperative investigations like FNAC or radiological ones

Data were collected by revising hospital records of patients diagnosed as early stage oral tongue cancer and their management. Data included; age, sex, initial clinical presentation, laboratory investigations, U/S and CT results, biopsy results, treatment for the tongue lesion [wide local excision (WLE) or hemiglossectomy], treatment for the neck (type of neck dissection if performed, radiotherapy, or Observation), pathological features (tumor size, grade, margins, and lymph node status), post-operative course and follow up (postoperative complications, local recurrence and regional or distant failure).

The collected data were statistically analyzed and through the analyzed data assessment was done for:

- Disease free survival (to the date of recurrence whether local or distant)
- Local failure (recurrence)
- Distant failure (recurrence)

Statistical methods:

Data were analyzed using IBM SPSS advanced statistics version 20 (SPSS Inc., Chicago, IL). Numerical data were expressed as mean and standard deviation (SD) or median and range as appropriate. Qualitative data were expressed as frequency and percentage (%). For quantitative data, comparison between two groups was done using Mann-Whitney test (non-parametric t-test). Comparison between 3 groups was done using Kruskal-Wallis test (non-parametric ANOVA) then post-Hoc "Schefe test" was used for pair-wise comparison based on Kruskal-wallis distribution. Survival analysis was done using Kaplan-Meier method and comparison between two survival curves was done using log-rank test. All tests were two-tailed. P-value<0.05 was considered significant.

Results

This study included 144 patients presented to our NCI by oral tongue cancer but only 88 patients were staged clinically and radiologically as early stage (stage I, stage II).

The 88 patients included in the study fulfilled the criteria needed and had complete data with almost regular follow-up visits. 52.3% of patients were <60 yrs the remaining 47.7% were ≥60yrs with a mean age of 59.2 yrs (Table 1).

Half of cases were males and the other half were females. We considered that smoking was the most important habit special to search for, and the study showed that about 47% were non smokers and the remaining 53% were smokers.

In this study we found that there were different types of presenting symptoms (Table 2) with tongue ulcer being the most common presentation followed by tongue mass.

Most lesions were at lateral margins (right or left) with about 53.4% and 40.9% for each one respectively and only 4.5% for midline lesions. The

size of the tongue lesions (as regards maximum diameter) was variable ranged from (0.5 to 5 cm) with a median of 2.5 cm.

Investigations were done for such cases to verify or to exclude malignancy by biopsy [in 70.5% (n=62) of patients] and to assess neck status by either U/S neck (in 64% of patients) or CT head and neck (in 36% of patients).

Most lesions had been dealt with by surgery and not radiotherapy, either by

WLE [in 22% (n=19) of patients] or hemiglossectomy [in 78% (n=69) of patients]; hemiglossectomy was the main form of management modality that had been adopted. The treatment of the neck in this study was either by neck dissection [in 85.2% (n=73) of patients] or "wait and see" policy [in 14.8% (n=15) of patients].

Types of neck dissection done in this study were variable; the most common type used was MRND [in 53.3% (n=40) of patients], followed by SOHND in 30.7% (n=23) of patients], then RND [in 16% (n=12) of patients].

As regards pathology of the primary tongue lesion, this study revealed that SCC formed about 95% of cases while other types like adenocarcinoma, cylindroma, adenoidcysic carcinoma and malignant melanoma formed the other 5%.

In our study we found that most of cases were SCC and the most common grade was grade 2 (75%) followed by grade 1 (12.5%) then the grade 3 (6.8%), verrucous subtype is only found in one case. (Adenocarcinoma, malignant melanoma and cylindroma didn't have grades).

Lymph node (LN) dissection was carried out in 75 cases out of the 88 ones (85.2%), the number of the harvested LN ranged from one to 38 with a median of 17.

The cases that had positively harvested LN were 26 cases (34.7%), and cases that had negatively harvested ones were 49 (65.3%).

Number of positively harvested LN ranged between 1 to16 with a median of 5, while negatively harvested ones ranged between 2 to 38 with a median of 15.

As regards adjuvant therapy that was mainly in the form of radiotherapy, 39 cases (44.3%) had postoperative radiotherapy.

As regards postoperative recurrence, in our study we found that local recurrence occurred in 7 cases out of the 88 cases (7.9%). Out of the 69 cases treated by hemiglossectomy there were 4 cases of local recurrence (5.8%)while the other group treated by WLE (19 cases) there were 3 cases of recurrence (15.8%).

As regards nodal recurrence, out of the 88 cases there was recurrence in 18 cases (20.4%). Among who adopted wait and see policy (13 cases) 2 cases had nodal recurrence (15.4%), those who had ND (75 cases) recurrence occurred in 16 cases (21.3%); nodal recurrence was lowest in SOHND that seemed to be superior to other modalities (Table 3).

The time of recurrence considered from the date of surgery to the date of appearance of recurrence at either neck or tongue was in the range of 4 to 14 months with a median of 9 months.

As regards postoperative recurrence treatment in this study, there were 2 modalities of treatment for managing postoperative recurrence (surgery and radiotherapy). Surgery was adopted in 66.7% (n=12) of patients, while radiotherapy was given to 33.3% (n=6) of patients.

In our study disease free survival (DFS) was estimated from the end of surgery to the date of appearance of 1 St Recurrence (in cases who suffered of recurrence) or last follow up and during which the patient was completely free (in non recurrent cases). The disease free survival period ranged between 4 and 53 months with a median of 42 months (The patient had a follow up range between 13 to 54 months with a median of about 43 months).

Analysis of the association between DFS and different factors implicated in this study at 54 months of follow up revealed that there was statistical significance association between DFS and 2 factors (adoption of adjuvant therapy and the status of dissected LN). It was clear that DFS was longer in patients who received adjuvant therapy (Table 4, Figure 1) and in patients who had negative LN (Table 4, Figure 2). It also raised the question of adoption of wait and see policy for treatment of N0 (negative neck) in early stage tongue cancer as there was neither statistical significance in DFS between patients who had neck dissection and who had watchful waiting (Table 4, Figure 3) nor between different types of neck dissection done in this study (Table 4, Figure 4). (Figures are note shown).

Table (1): Age distribution among cases

Age group	Frequency	Percent
28-40	7	8.0%
41-50	13	14.8%
51-60	31	35.2%
61-70	18	20.5%
71-80	15	17.0%
81-83	4	4.5%
Total	88	100.0%

Table (2): Frequency of presenting symptoms

The presenting symptom	Frequency	Percentage
ulcer	31	35.2
mass	20	22.7
nodule	13	14.8
rubbery areas	7	8.0
ulcerating mass	14	15.9
unremarkable gross	1	1.1
nodule on scar	1	1.1
mucosal thickening	1	1.1
Total	88	100.0

Table (3): Frequency of nodal recurrence among cases who had neck dissection in relation to the type of dissection used to treat them.

Type of neck dissection	No recurrence	recurrence	total	Percentage of recurrence
MRND	28	12	40	30%
SOHND	21	2	23	8.7%
RND	10	2	12	16.7%
Wait and see	11	2	13	15.3%
Total	70	18	88	20.4%

Table (4): Association between disease free survival and different factors implicated in the study (age, sex… etc.) at 54 months of follow up

	number	Disease free survival	P-value
Whole group	88	79.88%	
Age: <60 yrs ≥60 yrs	 46 42	 73.91% 85.71%	 0.180
Gender: Male: Female:	 44 44	 72.73% 86.36%	 0.124
Special habits: Smoker: Non smoker:	 46 42	 73.91% 85.71%	 0.169
Site of primary: Rt lateral margin: Lt lateral margin Post 1/3,midline	 47 36 5	 78.72% 80.56% 80%	 0.981
Presentation: Ulcer: Mass: Nodule: Rubbery areas: Ulcerating mass:	 31 20 13 10 14	 83.87% 75.00% 92.31% 70.00% 72.43%	 0.558
Surgery for primary: Hemiglossectomy: WLE:	 69 19	 81.16% 79.55%	 0.404
Type of neck dissection: Supraomohyoid ND: RND: MRND:	 23 12 40	 91.30% 83.33% 70.00	 .123
Grade: G1 G 2,3	 11 72	 63.64% 80.50%	 0.242
LN status: Positive LN: Negative LN:	 49 26	 89.80% 57.69%	 .0017
Adjuvant therapy: Had adjuvant therapy: Hadn't adjuvant therapy:	 49 39	 89.80% 66.67%	 0.0086
Neck treatment: Wait and see: Neck dissection:	 13 75	 84.62% 78.67%	 0.616

Figure legends (Figures are not shown):

Figure (1): Comparison between cases that had postoperative adjuvant therapy versus those who hadn't as regards cumulative survival. Test Statistics for Equality of Survival Distributions for adjuvant therapy (P=0.009).

F**igure (2):** Comparison between pathological results of neck dissection (positive versus negative) as regards cumulative survival. Test Statistics for Equality of Survival Distributions for Positive LNs (P=0.002).

F**igure (3):** Comparison between the two different modalities for neck treatment as regards cumulative survival. Test Statistics for Equality of Survival Distributions for Neck LN (P=0.616).

Figure (4): Represents the type of neck dissection in relation to cumulative survival. Test Statistics for Equality of Survival Distributions for Dissection type (P=0.124).

Discussion

The study tried to highlight the importance of which strategy we have to follow in management of the neck in node negative patients (N0), in patients with early stage tongue cancer.

As regards early stage cases at N.C.I there were about 144 cases of tongue cancer during last 6 years but only 88 (61%) were staged as stage I, II. The neck was staged clinically and radiologically as N0 but about 34% of them harbor metastasis from primary tongue lesion by pathological examination of dissected LN. U/S is ideal for examining superficial structures in the neck, but examination of large necks and deep structures is more difficult making it an inappropriate technique for local staging of many primary head and neck cancers. Ultrasound is extremely useful in differentiating solid from cystic mass lesions, and can detect calcification. Evaluation of the internal structure and the margins of neck nodes will facilitate differentiation between benign and malignant nodes.(11)

The pattern of local spread of oral cavity tumours is mainly along muscle fibers, which may be associated with displacement, infiltration or obliteration of fatty facial planes and interfaces, with later involvement of neurovascular bundles and periosteal surfaces as the tumor enlarges. Subsequently a soft tissue mass may be detectable as it enlarges by CT.(12) In our study we found that about 64% of cases had US neck done and the other had CT head and neck for staging the disease that might reflect that early stage tongue cancer cases could be staged clinically and we might depend on US neck beside clinical examination to accurately stage the neck. Biopsies of tongue lesions should endeavour the deep margin of the tumor in addition to mucosa at the periphery of the tumor. Deep biopsies may give an indication of tumor depth, but also multi factorial histological malignancy grading of the most dysplastic areas of the invasive form may help in assessing the risk of cervical metastasis.(13) In our study 62% of patients had a biopsy of the tongue primary lesion before surgery and the other group of patients used the excision biopsy as both diagnostic and treatment tool for the primary lesion.

In our study the strategy for attacking the primary was mainly based on surgery and not radiotherapy nor the new trend of photodynamic therapy. Both WLE and hemiglossectomy were used A standardized treatment strategy has not yet been developed, various therapies such as surgery, Brachytherapy, Chemotherapy, and Radiation therapy is chosen to treat patients with tongue cancers in different hospitals. In general, tongue cancer is usually treated surgically and additional adjuvant therapy is carried out if patients have advanced cancers.(14)

Lesions of the oral tongue are more likely to be symptomatic than lesions of the base of the tongue, although despite this many patients still present with a four to six-month history of symptoms prior to seeking medical advice and they mostly present by tongue ulcer**.** The majority of patients with cancer of the oral tongue present with stage I/II disease which contrasts significantly with cancers of the base of the tongue that are usually stage III/IV at presentation.(15) In our study we found that the most common presentation was ulcer at the tongue mainly on lateral sides followed by mass and nodule.

Oral SCC continues to affect more males than females with a ratio of 1.5-1 in the fifth or sixth decade of their lives. However, there is an increasing trend of oral cancer affecting young people under the age of 45 years.(16) This was similar to what has been found in our study as the highest incidence was between the ages of 50-70 years (about 56%) with a mean age of 59 years and there was considerable incidence in the age between 30-50 years (about 22%). Male and female were equally affected in contrast to male predominance in most other studies.

The dominant risk factors are tobacco and alcohol abuse, which are strongly synergistic. Alcohol and tobacco account for 75% of the disease burden of oral malignancies in Europe, the Americas and Japan.(17) This study revealed association between smoking and development of tongue cancer as 53% were smokers

but it didn't seem to affect DFS when comparing smokers and non smokers.

Pathological examination of the primary tongue lesion revealed that about 95.5% of cases were SCC and the remaining 4 cases were other rare tumors so it seemed that our study confirmed that SCC was the most prevalent type of malignancy in the tongue like other studies.(18)

Out of the 75 cases that had neck dissection there were about 26 cases (34.7%) that had positive nodes (occult metastasis), this was similar to other study.(19) The lymph nodes at highest risk of occult metastases from oral cavity cancers are those at levels I, II, and II. The metastatic rates to these sites are 58% (level I), 51% (level II), 26% (level III), 9% (level IV), and 2 % (level V).(20)

There is no debate as regards the suggestion that node-positive patients with SCC of the oral tongue should undergo therapeutic neck dissection. However, what remains controversial is whether END should be performed for the clinically node-negative patients. Because of the high incidence of occult nodal metastasis in these patients, many authors have proposed prophylactic neck dissection of N0 cases. However, the cosmetic and functional defects associated with radical neck dissection are sometimes very severe, markedly hampering the activities of daily living of these patients. There have also been some negative reports about prophylactic neck dissection.(21)

Currently the treatment dilemma that most head and neck oncology surgeons face is the treatment of the N0 neck in oral SCC. Three treatment options are available; observation with therapeutic neck dissection once regional metastases becomes apparent, END or ENI.(22)

There is great controversy regarding the optimal therapy for clinically negative necks. The proponents of observation cite the morbidity of END as a reason to observe. Another argument for close observation is that with close follow-up, any cervical metastasis can be detected early and then treated with adequate therapy. Moreover the occult metastatic rate to the neck from oral cavity cancer is 34%. Hence, it is argued that nearly 2/3 of patients would be exposed to the morbidity of a neck dissection unnecessarily.(20)

Study comparing glossectomy and neck observation versus glossectomy and neck dissection for T1 and T2 SCC of the oral tongue concluded that survival in the observation group was 33%, compared with 55% in the neck dissection group, and that locoregional control increased from 50% to 91% when neck dissection was performed.(23) Mendenhall et al.(24) showed that ENI reduced the neck failure rate in patients with controlled primary tumors and N0 necks from 18% to 1.9%. Another study reported that END provided a 95% control rate for neck recurrences compared with 38% without ENI in T1 N0 SCC of the oral tongue.(25)

In the current study there were about 75 cases out of 88 ones who had neck dissection and the remaining 13 cases had a watchful waiting policy as treatment for N0 neck; the comparison between the 2 strategies in treatment as regards DFS showed that there was no statistical significance with DFS of 78.67% in patients who had neck dissection and 84.62% in patients who had watchful waiting. The recurrence in patients who had neck dissection was 21.2% and in patients who had a watchful waiting was 15.4% with total of 18 cases who had recurrence out of 88 (20.5%). This might be explained by either that follow up period wasn't long enough or that watchful waiting was a trustable strategy.

There has been a debate about the relative efficacy of SOHND and that of a classic RND. Several studies have shown that there is no statistically significant difference in locoregional recurrence between a selective neck dissection and a RND.(26) Byers et al.(27) noted a skip metastasis rate of 15% to level IV in SCC of the oral tongue and advocated that dissection of level IV should be included in a selective neck dissection. It has been demonstrated that level IV need to be dissected only if there are suspicious nodes in level II or III.

In conclusion, there is voluminous literature supporting the use of selective neck dissection for surgical treatment of N0 necks in oral cavity carcinoma. This procedure has relatively low morbidity when compared with the classic RND. In our study, there was use of RND in 16% of patients, MRND in 53% of patients and SOHND in about 30% of cases. It was clear that node +ve ND results bad impact on survival that was statistically significant. Unfortunately during revision of pathological reports there was no specification about which level was involved except in few cases so identification of the level with high frequency of involvement couldn't be accomplished. But there was no significant association between the type of neck dissection and DFS.

The use of postoperative radiation therapy (PORT) following neck dissection is advised in the presence of multiple metastatic lymph nodes and any node with extracapsular spread (ECS). The use of PORT for limited nodal disease is more controversial. The variability in the proposed indications for PORT raises the following question: should PORT be performed for patients with any histologically positive node or only for patients with more than

three nodes?(28) There is study that showed that among the patients with ECS, the survival rate was significantly lower in the PORT group than in the non-PORT group in patients with a fewer number of metastatic lymph nodes, whereas there was no significant difference in the survival between the PORT group and non-PORT group in patients with more than three metastatic lymph nodes, suggesting that PORT might be effective for patients with a larger number of metastatic lymph nodes.(29)

In comparison with our study, there was about 44.3% who had PORT. The DFS was statistically significant between the two groups (P=0.0086). DFS for patients who had PORT was 89.8% while those who hadn't was 66.67%. It was clear that PORT was an important factor to minimize recurrence at both primary site and neck.

As regards recurrence whether local at primary site or at the neck, out of the 88 cases there was 7 cases of recurrence at the tongue primary site (92%) and 18 cases had nodal recurrence (20.4%) on follow up. In comparison with other study with a median follow-up of 66 months, the 5-year rates of local recurrence-free survival, regional recurrence-free survival, and disease-specific survival were 89%, 79.9%, and 85.6%, respectively. Regional recurrence was ipsilateral in 61% of patients and contralateral in 39% of patients. Patients who developed recurrence in the neck had a significantly poorer disease-specific survival compared with those who did not (33% vs 97%).(30) These results were comparable to our study except that 5-year survival can't be estimated due to small follow up period.

Finally, the current study showed that controversy as regards neck management was still present as both options of treatment had the same results but in comparison with other studies done in large scale it seemed that END or ENI were the adopted treatment in many centers and the only controversy in ND is that which type should we adopt but in our study it was clear MRND was the ideal as regards node yield for examination (not SOHND like other studies).

NO necks have to be dealt with although both watchful waiting and ND results as regards DFS were equal but follow up in Egypt isn't regular to make it reliable option.

References:

1. Parkin DM, Bray F, Ferlay J, Pisani P (2005) Global cancer statistics,2002. CA Cancer J Clin 55, 74-108.

2. Gray L, Woolgar J, Brown J (2000) A functional map of cervical metastases from oral squamous cell carcinoma. Acta Otolaryngol 120, 885-890.

3. Stuckensen T, Kovacs AF, Adams S, Baum RP (2000) Staging of the neck in patients with oral cavity squamous cell carcinomas: a prospective comparison of PET, ultrasound, CT and MRI. J Craniomaxillofac Surg 28, 319-324.

4. Franceschi D, Gupta R, Spiro RH, Shah JP (2993) Improved survival in the treatment of squamous carcinoma of the oral tongue. Am J Surg 166, 360–365.

5. Civantos FJ, Zitsch RP, Schuller DE, Agrawal A, Smith RB, Nason R, et al. (2010) Sentinel lymph node biopsy accurately stages the regional lymph node for T1-T2 oral squamous cell carcinoma. Results of multi-institutional trial. J Clin Oncol 28, 1395-1400.

6. Balasubramanian D, Thankappan K, Battoo AJ, Rajapurkar M, Kuriakose MA, Iyer S (2012) Isolated skip nodal metastasis in T1,T2 oral squamous cell carcinoma. Otolaryngol Head Neck Surg 147, 275-277.

7. Shah JP, Gil Z (2009) Current concepts in management of oral cancer surgery. Oral Oncol 45, 394-401.

8. Capote A, Escorial V, Munoz-Guerra MF, Rodríguez-Campo FJ, Gamallo C, Naval L (2007) Elective neck dissection in early-stage oral squamous cell carcinoma--does it influence recurrence and survival? Head Neck 29, 3-11.

9. Godden DR, Ribeiro NF, Hassanein K, Langton SG (2002) Recurrent neck disease in oral cancer. J Oral Maxillofac Surg 60, 748-753.

10. Huang SF, Kang CJ, Lin CY, Fan KH, Yen TC, Wang HM, et al. (2008) Neck treatment of patients with early stage oral tongue cancer: comparison between observation, supraomohyoid dissection, and extended dissection. Cancer 112, 1066-1075.

11. Ferlito A, Shaha AR, Silver CE, Rinaldo A, Mondin V (2001) Incidence and sites of distant metastases from head and neck cancer. ORL J Otorhinolaryngol Relat Spec 63, 202-207.

12. Mukherji SK, Isaacs DL, Creager A, Shockley W, Weissler M, Armao D (2001) CT detection of mandibular invasion by squamous cell carcinoma of the oral cavity. AJR Am J Roentgenol 177, 237-243.

13. Woolgar JA (1999) Histological distribution of cervical lymph node metastases from intraoral/oropharyngeal squamous cell carcinomas. Br J Oral Maxillofac Surg 37, 175-180.

14. Tateda M, Shiga K, Saijo S, Yokoyama J (2000) A clinical study of oral tongue cancer. Tohoku J Exp Med 192, 49-59.

15. Gujrathi D, Kerr P, Anderson B, Nason R (1996) Treatment outcome of squamous cell carcinoma of the oral tongue. J Otolaryngol 25, 145-149.

16. Jerjes W, Upile T, Petrie A, Riskalla A, Hamdoon Z, Vourvachis M, et al (2010) Clinicopathological parameters, recurrence, locoregional and distant metastasis in 115 T1-T2 oral squamous cell carcinoma patients. Head Neck Oncol 2, 9.
17. Gorsky M, Epstein JB, Oakley C, Le ND, Hay J, Stevenson-Moore P (2004) Carcinoma of the tongue: a case series analysis of clinical presentation, risk factors, staging, and outcome. Oral Surg Oral Med Oral Pathol Oral Radiol 98, 546-552.
18. Knegt PP, Keus RB, Roodenburg JL (2006) The practice guideline 'Carcinoma of the oral cavity and oropharynx. Ned Tijdschr Geneeskd 150, 83-88.
19. Oliver RJ, Dearing J, Hindle I (2000) Oral cancer in young adults: report of three cases and review of the literature. Br Dent J 188, 362-365.
20. Shah JP, Candela FC, Poddar AK (1990) The patterns of cervical lymph node metastases from squamous carcinoma of the oral cavity. Cancer 66, 109–113.
21. Kokemueller H, Brachvogel P, Eckardt A, Hausamen JE (2002) Neck dissection in oral cancer – clinical review and analysis of prognostic factors. Int J Oral Maxillofac Surg 31, 608-614.
22. Jalisi S (2005) Management of the clinically negative neck in early squamous cell carcinoma of the oral cavity. Otolaryngol Clin North Am 38, 37-46.
23. Shah JP, Lydiatt W (1995) Treatment of cancer of the head and neck. CA Cancer J Clin 45, 352–368.
24. Mendenhall WM, Million RR, Cassisi NJ (1980) Elective neck irradiation in squamous cell carcinoma of the head and neck. Head Neck Surg 3, 15–20.
25. Spaulding CA, Korb LJ, Constable WC, Constable WC, Cantrell RW, Levine PA (1991) The influence of extent of neck treatment upon control of cervical lymphadenopathy in cancers of the oral tongue. Int J Radiat Oncol Biol Phys 21, 577–581.
26. Pitman KT, Johnson JT, Myers EN (1997) Effectiveness of selective neck dissection for management of the clinically negative neck. Arch Otolaryngol Head Neck Surg 123, 917–922.
27. Byers RM, Weber RS, Andrews T, McGill D, Kare R, Wolf P (1997) Frequency and therapeutic implications of 'skip metastases' in the neck from squamous carcinoma of the oral tongue. Head Neck 19, 14–19.
28. Jackel MC, Ambrosch P, Christiansen H, Martin A, Steiner W (2008) Value of postoperative radiotherapy in patients with pathologic N1 neck disease. Head Neck 30, 875–882.
29. Chen TC, Wang CT, Ko JY, Lou PJ, Yang TL, Ting LL, et al. (2010) Postoperative radiotherapy for primary early oral tongue cancer with pathologic N1 neck. Head Neck 32, 555–61.
30. Ganly I, Goldstein D, Carlson DL, Patel SG, O'Sullivan B, Lee N, et al. (2013) Long-term regional control and survival in patients with "low-risk," early stage oral tongue cancer managed by partial glossectomy and neck dissection without postoperative radiation: the importance of tumor thickness. Cancer 119, 1168-1176.

1/17/2025