An increasing amount of literature shows solid evidence that the depth of invasion (DOI) of oral cavity squamous cell carcinoma is an independent predictor for occult metastasis, recurrence, and survival (1-3). Furthermore, the DOI of the primary tumor has been a major criterion when deciding to perform elective neck dissection on oral cavity squamous cell carcinoma patients since as early as the mid-1990s (4). A cut-off value of 4 mm has conventionally been used when determining the need for elective neck dissection, based on a study by Kligerman et al. (4). Thereafter, several reports have proposed a range of cut-off points for improving survival, detection of occult nodal metastases, and decreasing risk of locoregional recurrence (5,6).

In the current 8th edition of the American Joint Committee on Cancer (AJCC) TNM classification system, the DOI of the primary tumor has been integrated into the T category for oral cavity squamous cell carcinoma and has shown to be a major element in reframing the staging system (7). Accordingly, primary tumors previously classified as T1 are now upstaged to T2 if there is presence of invasion of more than 5 mm beyond the basement membrane, and primary tumors that had been defined as T2 are upstaged to T3 if the DOI is more than 10 mm (7). However, how well this new staging system is able to act as a predictor for factors such as survival, occult metastasis, and recurrent disease is not fully established and is still up for debate.

In this perspective, a study recently published by Almangush et al. (8) aimed to evaluate the effectiveness of this new T category using a homogenous cohort of early oral tongue squamous cell carcinoma (OTSCC) has provided interesting information on the effectiveness of the updated classification system and the applicability of DOI as a predictor of clinical behavior for early-stage OTSCC.

The AJCC 8th edition employs a cut-off value of 5 mm DOI for upstaging from stage T1 to T2 and 10 mm for upstaging to T3. This may be questionable as it has been shown that an invasion depth of more than 4 mm increases the risk of locoregional metastasis and is associated with a poor prognosis (9-11), but with the new staging system, a large number of invasive tumors in which the DOI is less than 10 mm will stay in stage T1 or T2. Thus, Almangush et al. while evaluating the effectiveness of the AJCC 8th edition staging system, also proposed a new system where the cut-off point for DOI was 2 and 4 mm for T2 and T3, respectively. In regards to the updated AJCC manual, they reported that in their study population, many previously T1–T2 OTSCCs with cN0 were reclassified to T3 (advanced stage) when using the 8th edition, and such cases had a significantly lower survival rate (8). When using the authors’ proposed staging criteria, the results were similar as the survival analyses showed a significantly worse prognosis in the T3 cases compared to the T1 and T2 cases. However, using such a stringent DOI cut-off value resulted in a much higher percentage of previous T1, T2 cases being upstaged to T3 (161 out of 311 cases, compared to 20 cases when using the AJCC 8th edition). This may result in overtreatment and increased morbidity and mortality from unnecessary radiation therapy or radical neck dissections.

The 8th edition of the AJCC manual necessitates the measurement of DOI, and not tumor thickness for accurate staging. Strictly speaking, tumor thickness differs from DOI, although many clinicians use the two terms interchangeably.
DOI is defined as the extent of cancer expansion into the tissue beneath the epithelial basement membrane, while tumor thickness concerns the whole tumor dimension. DOI is known to be a better predictive parameter compared to tumor thickness (1). However, even though a new study suggests that DOI can be assessed with intraoral ultrasonography of the tongue using a T-shaped probe (12), it is still challenging to precisely measure DOI using just preoperative imaging (13). On the other hand, tumor thickness is relatively more easier to evaluate preoperatively with ultrasonography (14,15) and/or magnetic resonance imaging (16-18), and one study found that tumor thickness assessed on preoperative CT scans provided an accurate estimation of thickness measured histopathologically in OTSCC (19). A recent study revealed that there was similar stratification of disease-specific and overall survival in oral cavity cancer patients when using DOI or tumor thickness for AJCC 8th edition T staging (20). The authors also showed that in most cases the measurements of tumor thickness and DOI were not significantly different on histopathologic examination. Therefore, further research should analyze the benefit of integrating tumor thickness as measured by preoperative imaging in the T staging. This might be more clinically useful when deciding on a treatment plan than DOI, which can only be accurately measured postoperatively on histopathologic examination. Evaluation of DOI in preoperative biopsies may not be truly representative (21).

The AJCC 8th edition also made major modifications in regards to the staging of papillary thyroid cancer, such as the raising of the age cut-off from 45 to 55 years. Kim et al. reported the effectiveness of this change using the clinical and genetic data of 505 papillary thyroid cancer patients (22). Interestingly, genomic analysis revealed that patients ≥55 years had 103 differently expressed genes when compared with the other age groups and had altered signaling pathways associated with more aggressive thyroid cancer. Likewise, genomic analysis using mRNA expression according to DOI in oral tongue cancer may be helpful in examining the effectiveness of the new DOI criterion.

In conclusion, further studies are warranted to substantiate the prognostic value of OTSCC staging according to the 8th edition of the AJCC Cancer Staging Manual.

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Footnote

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References

1. Shim SJ, Cha J, Koom WS, et al. Clinical outcomes for T1-2N0-1 oral tongue cancer patients underwent surgery with and without postoperative radiotherapy. Radiat Oncol 2010;5:43.
2. O’Brien CJ, Lauer CS, Fredricks S, et al. Tumor thickness influences prognosis of T1 and T2 oral cavity cancer--but what thickness? Head Neck 2003;25:937-45.
3. Ganly I, Goldstein D, Carlson DL, et al. 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 2013;119:1168-76.
4. Kligerman J, Lima RA, Soares JR, et al. Supraomohyoid neck dissection in the treatment of T1/T2 squamous cell carcinoma of oral cavity. Am J Surg 1994;168:391-4.
5. Pentenero M, Gandolfo S, Carrozzi M. Importance of tumor thickness and depth of invasion in nodal involvement and prognosis of oral squamous cell carcinoma: a review of the literature. Head Neck
2005;27:1080-91.
6. Byers RM, El-Naggar AK, Lee YY, et al. Can we detect or predict the presence of occult nodal metastases in patients with squamous carcinoma of the oral tongue? Head Neck 1998;20:138-44.
7. Amin MB, Greene FL, Edge SB, et al. The Eighth Edition AJCC Cancer Staging Manual: Continuing to build a bridge from a population-based to a more “personalized” approach to cancer staging. CA Cancer J Clin 2017;67:93-9.
8. Almangush A, Mäkitie AA, Mäkinen LK, et al. Small oral tongue cancers (≤4 cm in diameter) with clinically negative neck: from the 7th to the 8th edition of the American Joint Committee on Cancer. Virchows Arch 2018;473:481-7.
9. Ganly I, Patel S, Shah J. Early stage squamous cell cancer of the oral tongue—clinicopathologic features affecting outcome. Cancer 2012;118:101-11.
10. Xie N, Wang C, Liu X, et al. Tumor budding correlates with occult cervical lymph node metastasis and poor prognosis in clinical early-stage tongue squamous cell carcinoma. J Oral Pathol Med 2015;44:266-72.
11. Melkane AE, Mamelle G, Wycisk G, et al. Sentinel node biopsy in early oral squamous cell carcinomas: a 10-year experience. Laryngoscope 2012;122:1782-8.
12. Iida Y, Kamiyo T, Kusafuka K, et al. Depth of invasion in superficial oral tongue carcinoma quantified using intraoral ultrasonography. Laryngoscope 2018;128:2778-82.
13. Glastonbury CM, Mukherji SK, O’Sullivan B, et al. Setting the Stage for 2018: How the Changes in the American Joint Committee on Cancer/Union for International Cancer Control Cancer Staging Manual Eighth Edition Impact Radiologists. AJNR Am J Neuroradiol 2017;38:2231-7.
14. Mark Taylor S, Drover C, Maceachern R, et al. Is preoperative ultrasonography accurate in measuring tumor thickness and predicting the incidence of cervical metastasis in oral cancer? Oral Oncol 2010;46:38-41.
15. Lodder WL, Teertstra HJ, Tan IB, et al. Tumour thickness in oral cancer using an intra-oral ultrasound probe. Eur Radiol 2011;21:98-106.
16. Preda L, Chiesa F, Calabrese L, et al. Relationship between histologic thickness of tongue carcinoma and thickness estimated from preoperative MRI. Eur Radiol 2006;16:2242-8.
17. Okura M, Iida S, Aikawa T, et al. Tumor thickness and paralingual distance of coronal MR imaging predicts cervical node metastases in oral tongue carcinoma. AJNR Am J Neuroradiol 2008;29:45-50.
18. Jung J, Cho NH, Kim J, et al. Significant invasion depth of early oral tongue cancer originated from the lateral border to predict regional metastases and prognosis. Int J Oral Maxillofac Surg 2009;38:653-60.
19. Madana J, Laliberte F, Morand GB, et al. Computerized tomography based tumor-thickness measurement is useful to predict postoperative pathological tumor thickness in oral tongue squamous cell carcinoma. J Otolaryngol Head Neck Surg 2015;44:49.
20. Dirven R, Ebrahimi A, Moeckelmann N, et al. Tumor thickness versus depth of invasion - Analysis of the 8th edition American Joint Committee on Cancer Staging for oral cancer. Oral Oncol 2017;74:30-3.
21. Almangush A, Leivo I, Siponen M, et al. Evaluation of the budding and depth of invasion (BD) model in oral tongue cancer biopsies. Virchows Arch 2018;472:231-6.
22. Kim K, Kim JH, Park IS, et al. The Updated AJCC/TNM Staging System for Papillary Thyroid Cancer (8th Edition): From the Perspective of Genomic Analysis. World J Surg 2018;42:3624-31.

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