

# Metastatic involvement of level IIb nodal station in oral squamous cell carcinoma: A clinicopathological study

## ABSTRACT

**Background:** The purpose of this study was to determine the prevalence of Level IIb metastasis in patients with oral squamous cell carcinomas (OSCCs).

**Materials and Methods:** A total of 110 newly diagnosed oral cavity cancer patients requiring surgery as the primary modality were included in the study. Preoperative clinical examinations were done and tumor-node-metastasis staging was noted. Intraoperatively, Level IIb nodal tissue was dissected and sent separately.

**Results:** A total of 129 neck dissections (58 SOHD, 67 modified neck dissections, and 4 radical neck dissections) were carried out in 110 patients (males = 80 and females = 30), 91 patients required unilateral neck dissection, and 19 patients required bilateral neck dissection. Out of these 129 neck dissections, only 4 (3.2%) neck dissections (in a total of 3 patients out of 110 patients) had Level IIb positive (with bilateral Level IIb involvement in one patient).

**Conclusions:** Dissection of the Level IIb region in patients with OSCC may be required only in cases with advanced N stage, positive Level IIa lymph nodes, and extracapsular spread. Furthermore, in tongue cancers (high propensity of isolated Level II involvement), retromolar trigone, and floor of mouth cancers, routine Level IIb clearance should be considered.

**Keywords:** Level IIb, lymph node, neck dissection, nodal metastasis, oral squamous cell carcinoma

## INTRODUCTION

The treatment and management of malignancies of the head and neck, including oral cavity is directly altered by the presence of metastatic cervical lymphadenopathy. The lymphatic drainage is site specific and occurs in a predictable manner.<sup>[1]</sup>

The main routes of the cervical lymph node spread are through the first-station nodes (Levels I and II) and second-station nodes including the Levels III, IV, and V.<sup>[2]</sup>

Several modifications to the classical radical neck dissection (RND) have been employed aiming to reduce the morbidity. Several reports have suggested spinal nerve dysfunction with associated morbidity even in patients who undergo modified or selective neck dissections. Hence, the option of omitting dissection at sublevels IIb and V in patients with clinically negative neck is being considered by some investigators.<sup>[3-5]</sup>

Level IIb lymph nodes contained in the submuscular recess are the lymph nodes lying over the fascia of the splenius capitus and levator scapulae, above the spinal

**PARTHA S. CHAKRABORTY, ASHOK KUMAR DAS<sup>1</sup>,  
ASHUTOSH VATSYAYAN<sup>2</sup>, TASHNIN RAHMAN<sup>1</sup>,  
RAJJYOTI DAS<sup>1</sup>, SEEMANTA KUMAR MEDHI<sup>1</sup>,  
KISHORE DAS<sup>1</sup>, JAGGANATH DEV SHARMA<sup>3</sup>**

Department of Oral and Maxillofacial Surgery, Regional Dental College and Hospital, Departments of <sup>1</sup>Head and Neck Oncology and <sup>3</sup>General Pathology, Dr. Bhubaneswar Borooah Cancer Institute, Guwahati, Assam, <sup>2</sup>Department of Head and Neck Surgical Oncology, HCG Cancer Centre, Ahmedabad, Gujarat, India


**Address for correspondence:** Dr. Ashutosh Vatsyayan, Department of Head and Neck Oncology, HCG Cancer Centre, Sola-Science City Road, Off S.G Highway, Ahmedabad, Gujarat, India. E-mail: maxfacsurgeon@outlook.com

**Received:** 23-10-2018, **Revised:** 13-11-2018, **Accepted:** 22-11-2018

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**For reprints contact:** reprints@medknow.com

**How to cite this article:** Chakraborty PS, Das AK, Vatsyayan A, Rahman T, Das R, Medhi SK, *et al.* Metastatic involvement of level IIb nodal station in oral squamous cell carcinoma: A clinicopathological study. *Natl J Maxillofac Surg* 2019;10:8-12.

Access this article online	
<b>Website:</b> www.njms.in	<b>Quick Response Code</b> 
<b>DOI:</b> 10.4103/njms.NJMS_78_18	

accessory nerve, posterolaterally bordered by the sternocleidomastoid muscle, and superiorly by the skull base.<sup>[6]</sup>

The incidence of nodal metastasis at Level IIb in oral cavity cancer has been recently investigated to look for the feasibility of avoiding dissection in this area as this procedure may cause postoperative shoulder syndrome even in the presence of an integral spinal accessory nerve. The purpose of this study is to clinicopathologically determine the incidence of Level IIb involvement in oral cavity squamous cell carcinomas and the effect of different T-staging as well as other cervical nodal involvement on Level IIb station.

## MATERIALS AND METHODS

From May 2013 to May 2014, 110 newly diagnosed oral cavity cancer patients attending Head-and-Neck Outpatient Department, Dr. B. Borooah Cancer Institute, Guwahati, requiring surgery as the primary modality were included in the study. Preoperative clinical examinations were done and tumor-node-metastasis staging was noted. Any clinical Level II involvement was documented. Intraoperatively, Level IIb involvement was documented. Intraoperatively, Level IIb nodal tissue was dissected and sent separately. Postoperative adjuvant therapy was given as indicated.

## RESULTS

A total of 129 neck dissections (58 SOHDs, 67 modified neck dissections, and 4 RNDs) were carried out in 110 patients (males = 80 and females = 30), 91 patients required unilateral neck dissection and 19 patients required bilateral neck dissection [Figures 1 and 2]. Out of these 129 neck dissections, only 4 (3.2%) neck dissections (in a total of three patients out of 110 patients) had Level IIb positive (with bilateral Level IIb involvement in one patient).

Out of the total of 110 patients, 57 patients were clinically N0, whereas 53 patients were cN+. Out of these 53 patients, 41 were cN1, 12 were cN2 (N2a = 7, N2b = 4, and N2c = 1), and cN3 was seen in none of the patients [Figure 3].

Out of the total 110 patients, 51 (46.36%) patients were found to have positive neck nodes in postoperative histopathology status. Out of 57 patients having cN0, 13 (22.8%) were pN+, whereas out of 41 patients having cN1, 26 were found to be pN+. All cN2 ( $n = 12$ ) patients were pN+. Hence, out of 110 patients, 51 were found to be pN+.

Out of the 59 patients who had cNo neck, none of them had Level IIb involvement. Three patients (four neck dissection

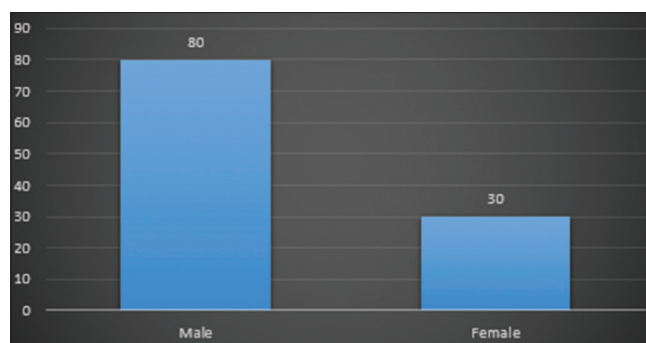


Figure 1: Total number of patients included in the study (total = 110, male = 80 and female = 30)

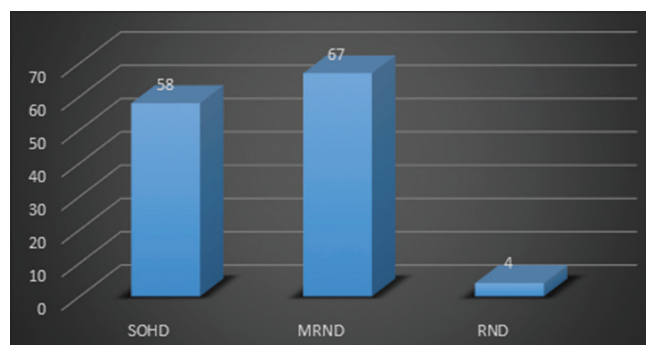


Figure 2: Different types of neck dissection (total = 129, SOHD = 58, modified neck dissections = 67, radical neck dissection = 4)

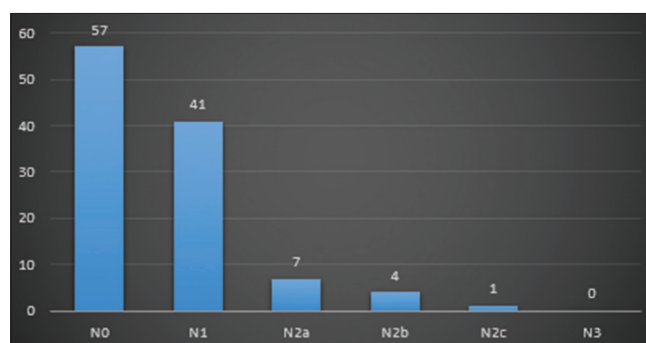


Figure 3: Nodal status

all of which were RND) had Level IIb positive [Figure 4]. This included one patient with cN2c (floor of mouth primary) and was found to have bilateral pN+ and with bilateral Level IIb involvement, one patient with cN2b (primary in retromolar trigone [RMT]), and one patient with cN1 (primary in tongue).

Isolated Level IIb involvement was not observed in any neck dissection, and it occurred only in association with a pN+ Level IIa, with perinodal spread seen in all the four specimens.

Isolated Level IIa involvement was observed in three patients all with primary in tongue (3/11) and hence showed a 27.2% chance of isolated Level IIa involvement in tongue cancers.

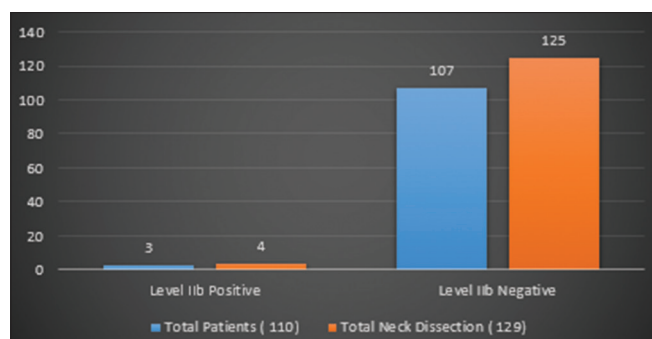


Figure 4: Status of Level IIb node

On a median follow-up of 18 months, 29 (26.4%) patients presented with residual or recurrent disease. Most of the failure occurred locally (79.3%) and only 6 (20.6%) patients had regional failure and out of these one regional failure was observed in pN0 patient.

## DISCUSSION

Oral cancer accounts for 10.7% of all solid tumors in males and females in high-incidence areas, such as India.<sup>[7]</sup> Metastases to the regional lymph nodes are the single most important prognostic factor in predicting local and distant failure as well as survival. The nodal metastasis reduces the survival by 50%.<sup>[8]</sup>

Nodal metastasis in oral cancers is largely predictable with the Levels I to III being most commonly involved. Skip metastasis to the Levels IV or V in the absence of disease in the upper level is around 4%–5% except in the tongue where it approaches 16%.<sup>[9,10]</sup> The cancer of the buccal mucosa and lower alveolus together called the gingivobuccal complex cancer, which is the most common form of oral cancer in India.<sup>[11]</sup> Lymph nodal metastasis even with the mandibular involvement is <50%. Clinically enlarged nodes are often inflammatory or reactive.<sup>[12,13]</sup> Although a variety of tools are available for the detection of nodal metastasis, 20%–50% of clinically node-negative patients are found to have metastasis on final histopathology report.<sup>[14-16]</sup> They develop clinical disease usually within 2 years if the neck is not treated initially.<sup>[15,16]</sup> The incidence of occult metastases varies with the site, size, and thickness of the primary tumor. Elective treatment of neck is indicated if this incidence reaches 15%–20%.<sup>[17]</sup> D'Cruz *et al.* (2015)<sup>[18]</sup> carried a prospective, randomized, controlled trial, evaluating the effect on survival of elective node dissection (ipsilateral neck dissection at the time of the primary surgery) versus therapeutic node dissection (watchful waiting followed by neck dissection for nodal relapse) in patients with lateralized stage T1 or T2 oral squamous cell carcinomas. They concluded that

among patients with early-stage oral squamous cell cancer, elective neck dissection resulted in higher rates of overall and disease-free survival as compared to therapeutic neck dissection.

The standard treatment for patients with clinically palpable metastatic lymph nodes has been comprehensive neck dissection. Classical RND involves resection of Level I–V lymph nodes along with the tail of parotid, submandibular gland, sternocleidomastoid muscle, internal jugular vein, and spinal accessory nerve. Although it is an oncologically safe procedure that significantly reduces the risk of regional recurrences, it produces significant postoperative morbidity, mainly shoulder dysfunction. Aiming to reduce the morbidity, several modifications to this procedure have been employed.<sup>[17]</sup>

Several reports have suggested spinal nerve dysfunction with associated morbidity even in patients who undergo modified or selective neck dissections. Hence, the option of omitting dissection of sublevels IIb and V in patients with clinically negative neck is being considered by some investigators.<sup>[3-5]</sup>

Lim *et al.*<sup>[3]</sup> carried out a study to determine whether Level IIb lymph nodes can be saved in elective supraomohyoid neck dissection (SOHND) as a treatment for patients with squamous cell carcinoma of the oral cavity. Seventy-four patients with squamous cell carcinoma of the oral cavity and with no palpable lymph nodes at the neck who underwent an elective SOHND were prospectively studied. Of the 74 patients, 24 (32%) had lymph nodes positive for microscopic metastatic squamous cell carcinoma. Four (5%) of the 74 patients had involvement of Level IIb lymph nodes. There was no instance of isolated metastasis to Level IIb lymph nodes without involvement of other nodes in the SOHND specimens. There were six cases of the ipsilateral neck recurrences, and of these, two patients (3% of all patients) developed recurrences in the Level II lymph nodes. They concluded that Level IIb lymph node metastasis was rare in this study, and nodal recurrence in this area after SOHND in squamous cell carcinoma of the oral cavity was infrequent. Therefore, this region may be preserved in elective SOHND in patients with squamous cell carcinoma of the oral cavity. Dabholkar and Kapre<sup>[9]</sup> carried out a nonrandomized prospective observational study where 65 patients of oral cavity cancers were evaluated. All patients underwent Level IIb dissection. Out of 67 neck dissections (27 elective and 40 therapeutic), seven patients had Level IIb positive for metastases (10.44%) with no isolated or contralateral metastases at Level IIb and direct correlation with Level IIa nodes. There was no statistical association of Level IIb positivity with stage or site

of primary. They concluded that Level IIb dissection can be avoided in N0 necks. For therapeutic neck dissections, Level IIb should be cleared if there are positive nodes at Level IIa.

However, we also found that most of the literature available on the incidence and patterns of nodal metastasis is from the Western world where tongue and floor of the mouth cancers are more common than gingivobuccal complex cancers. Prediction of the lymphatic spread could help in choosing the appropriate surgical procedure for both clinically positive and negative necks. Therefore, the present study was designed to determine the incidence of Level IIb involvement in different oral cavity subsites cancer.

In this study, a total of 129 neck dissections were carried out in 110 patients; where, 19 requiring bilateral neck dissection. Out of this 129 neck dissections, only four had Level IIb positive (with bilateral Level IIb involvement in one patient).

None of the patients those who were clinically N0 had Level IIb involvement. The percentage of occult metastases at Level IIb alone was 0%. They occur only in combination with other level involvement in cN+ neck.<sup>[18]</sup> In this study, positive Level IIb was always associated with a positive Level IIa and perinodal spread. The only case in which Level IIb was positive bilaterally had primary in floor of the mouth and had a cN2c staging. In other two cases, the primary was in tongue and RMT region with clinical nodal staging cN1 and cN2b, respectively. These results show that the risk of Level IIb depends on cN staging, perinodal spread, and its Level IIa status. However, we could not find any significant relationship between T-Stage and Level IIb involvement; however, subsites such as tongue, RMT, and floor of mouth can be considered as critical subsites when considering surgical clearance regarding Level IIb even in cN0 cases. Manola *et al.* and Silverman *et al.* too found similar results.<sup>[16,20]</sup>

## CONCLUSIONS

Level IIb dissection can be avoided in clinically no neck in oral cavity cancer. Hence, the operative time can be shortened by avoiding an unnecessary step, also providing the added advantage of minimal morbidity due to possible spinal accessory nerve injury. The identification of several risk factors such as advanced N stage, positive Level IIa lymph nodes, and extracapsular spread may help to further delineate which subset of patients undergoing selective neck dissection is likely to benefit from dissection of the Level IIb. Furthermore, in tongue cancers (high propensity of isolated Level II involvement), RMT, and floor of mouth cancers

(high propensity of early and extensive regional metastasis), routine Level IIb clearance should be considered. By preserving Level IIb, we can limit the potential morbidity associated with dissection without compromising the oncologic integrity of Level IIb as a staging or therapeutic procedure in the management of head-and-neck cancer. Furthermore, the molecular study of detecting micrometastasis could be useful in determining a more accurate percentage of nodal involvement.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

## REFERENCES

- Mukherji SK, Armao D, Joshi VM. Cervical nodal metastases in squamous cell carcinoma of the head and neck: What to expect. *Head Neck* 2001;23:995-1005.
- Alkhalil M, Smajilagić A, Redzić A. The lymph node neck metastasis in oral cancer and elective neck dissection as method of the choice. *Med Glas* 2007;4:94-6.
- Lim YC, Song MH, Kim SC, Kim KM, Choi EC. Preserving level IIb lymph nodes in elective supraomohyoid neck dissection for oral cavity squamous cell carcinoma. *Arch Otolaryngol Head Neck Surg* 2004;130:1088-91.
- Elsheikh MN, Mahfouz ME, Elsheikh E. Level IIb lymph nodes metastasis in elective supraomohyoid neck dissection for oral cavity squamous cell carcinoma: A molecular-based study. *Laryngoscope* 2005;115:1636-40.
- Villaret AB, Piazza C, Peretti G, Calabrese L, Ansarin M, Chiesa F, *et al.* Multicentric prospective study on the prevalence of sublevel IIb metastases in head and neck cancer. *Arch Otolaryngol Head Neck Surg* 2007;133:897-903.
- Silverman DA, El-Hajj M, Strome S, Esclamado RM. Prevalence of nodal metastases in the submuscular recess (level IIb) during selective neck dissection. *Arch Otolaryngol Head Neck Surg* 2003;129:724-8.
- Sunny L, Yeole BB, Hakama M, Shirri R, Sastry PS, Mathews S, *et al.* Oral cancers in Mumbai, India: A fifteen years perspective with respect to incidence trend and cumulative risk. *Asian Pac J Cancer Prev* 2004;5:294-300.
- Johnson JT, Barnes EL, Myers EN, Schramm VL Jr, Borochovit D, Sigler BA, *et al.* The extracapsular spread of tumors in cervical node metastasis. *Arch Otolaryngol* 1981;107:725-9.
- Rao RS, Deshmane VH, Parikh HK, Parikh DM, Sukthankar PS. Extent of lymph node dissection in T3/T4 cancer of the alveolo-buccal complex. *Head Neck* 1995;17:199-203.
- Byers RM, Weber RS, Andrews T, McGill D, Kare R, Wolf P, *et al.* Frequency and therapeutic implications of "skip metastases" in the neck from squamous carcinoma of the oral tongue. *Head Neck* 1997;19:14-9.
- Pathak KA, Das AK, Agarwal R, Talole S, Deshpande MS, Chaturvedi P, *et al.* Selective neck dissection (I-III) for node negative and node positive necks. *Oral Oncol* 2006;42:837-41.
- Dhawan IK, Verma K, Khazanchi RK, Madan NC, Shukla NK, Saxena R, *et al.* Carcinoma of buccal mucosa: Incidence of regional lymph node involvement. *Indian J Cancer* 1993;30:176-80.
- Diaz EM Jr, Holsinger FC, Zuniga ER, Roberts DB, Sorensen DM.

- Squamous cell carcinoma of the buccal mucosa: One institution's experience with 119 previously untreated patients. *Head Neck* 2003;25:267-73.
14. Kane SV, Gupta M, Kakade AC, D' Cruz A. Depth of invasion is the most significant histological predictor of subclinical cervical lymph node metastasis in early squamous carcinomas of the oral cavity. *Eur J Surg Oncol* 2006;32:795-803.
  15. Zbären P, Nuyens M, Caversaccio M, Stauffer E. Elective neck dissection for carcinomas of the oral cavity: Occult metastases, neck recurrences, and adjuvant treatment of pathologically positive necks. *Am J Surg* 2006;191:756-60.
  16. Ferlito A, Silver CE, Rinaldo A. Elective management of the neck in oral cavity squamous carcinoma: Current concepts supported by prospective studies. *Br J Oral Maxillofac Surg* 2009;47:5-9.
  17. Kowalski LP, Sanabria A. Elective neck dissection in oral carcinoma: A critical review of the evidence. *Acta Otorhinolaryngol Ital* 2007;27:113-7.
  18. D'Cruz AK, Vaish R, Kapre N, Dandekar M, Gupta S, Hawaldar R, *et al.* Elective versus therapeutic neck dissection in node-negative oral cancer. *N Engl J Med* 2015;373:521-9. Published online 2015 May 31.
  19. Dabholkar JP, Kapre NM. Level IIB neck dissection in oral cavity cancers- when should one address it? *Indian J Surg Oncol* 2016;7:303-6.
  20. Manola M, Aversa C, Moscillo L, Villano S, Pavone E, Cavallo C, *et al.* Status of level IIB lymph nodes of the neck in squamous cell carcinoma of the oral tongue in patients who underwent modified radical neck dissection and lymph node sentinel biopsy. *Acta Otorhinolaryngol Ital* 2011;31:130-4.