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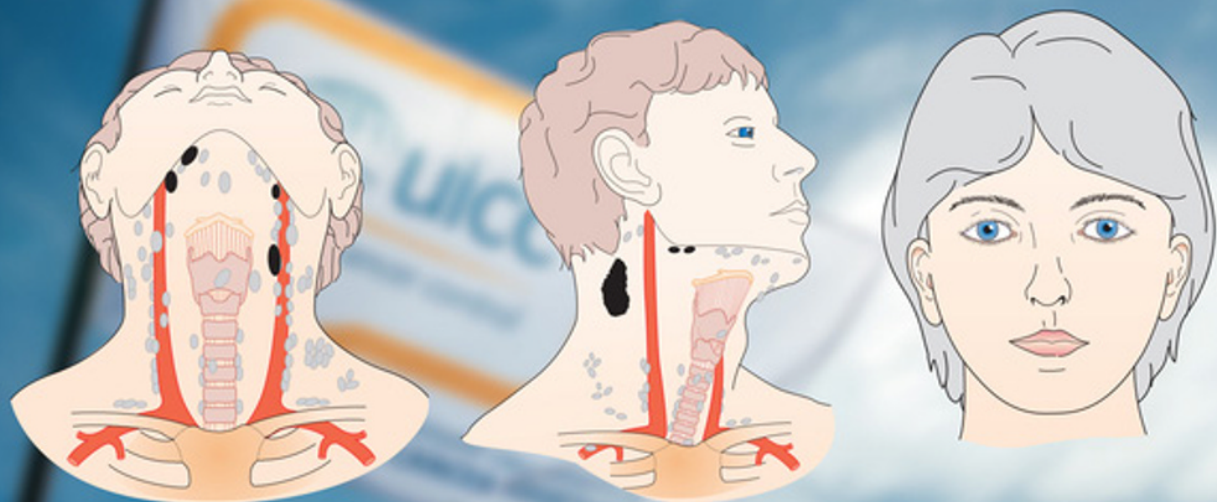
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# TNMA Atlas

SEVENTH EDITION

EDITED BY

JAMES D. BRIERLEY | HISAO ASAMURA  
ELISABETH VAN EYCKEN | BRIAN ROUS



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# TNM Atlas

**Illustrated Guide to the TNM Classification  
of Malignant Tumours**

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**Illustrated Guide to the TNM Classification  
of Malignant Tumours**

**SEVENTH EDITION**

EDITED BY

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# PREFACE TO THE SEVENTH EDITION

This new seventh edition of the *TNM Atlas* incorporates the changes in the TNM System that are in the eighth edition of the *TNM Classification of Malignant Tumours*.<sup>1</sup> In the eighth edition of the TNM Classification staging at many of the tumour sites is unchanged from the seventh edition. However, some tumour entities and anatomical sites have been newly introduced and some tumours contain modifications; this follows the basic philosophy of maintaining stability of the classification over time. The new additions are: p16 oropharyngeal carcinomas, carcinomas of the thymus, neuroendocrine carcinomas of the pancreas and sarcomas of the spine, pelvis, head and neck, retroperitoneum and thoracic and abdominal viscera. In addition, many tumour sites have important updates.

The Atlas's content follows the approach of depicting the Ts, Ns and Ms in graphic terms. The full-colour artwork is augmented with an increased number of clinical imaging studies illustrating many of the changes between the seventh and eighth editions of the *TNM Classification of Malignant Tumours*.

<sup>1</sup>Brierley, J.D., Gospodarowicz, M.K., Wittekind, C. (eds.) (2017) *TNM Classification of Malignant Tumours*, 8th edn. Chichester: Wiley-Blackwell.



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The editors wish to express their thanks to all who contributed to this seventh edition by comments, questions and their critical interest. In particular we would like to thank Professor Ch. Wittekind, Leipzig, Germany for his enormous contributions as co-editor of the 4th, 5th and 6th editions of the *TNM Atlas*, the 5th, 6th, 7th and 8th editions of the *TNM Classification of Malignant Tumours* and the 2nd, 3rd, 4th and 5th editions of the *TNM Supplement*. He was the driving force behind many of these editions.

The Editors have much pleasure in acknowledging the great help received from the members of the TNM Prognostic Factors Project Committee and the National Staging Committees Global Representatives and International Organizations listed on pages xv–xvi of the *TNM Classification of Malignant Tumours*, 8th edition. In addition, we would like to thank, Dr Brian O’Sullivan and Dr Shao Hui Huang for providing clinical images for the Head and Neck Tumours chapter, Mr Anthony Griffin, Dr Peter Chung and Dr Ali Hosni for providing clinical images for the Tumours of the Bone and Soft tissues chapter and Dr Richard Tsang for clinical Images in the Lymphoma chapter.

This edition builds on the work by contributors to all previous editions. In particular we would like to thank Dr Leslie Sobin and Dr Christian Wittekind, who along with Dr Hisao Asamura edited the 6th edition. Contributors to all previous editions are listed in the 6th edition pp. x–xiv.



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Tumours of the Bone and Soft Tissue  
Gynaecological Tumours, Skin Tumours  
Thymic Tumours  
Breast, Urological, Adrenal Cortex Tumours



## PRELIMINARY NOTE

The TNM System for describing the anatomical extent of disease is based on assessment of three components:

- T – The extent of the primary tumour
- N – The absence or presence and extent of regional lymph node metastasis
- M – The absence or presence of distant metastasis

The addition of numbers to these three components indicates the extent of the malignant disease, thus:

T0, T1, T2, T3, T4 N0, N1, N2, N3 M0, M1

In effect, the system is a “short-hand notation” for describing the extent of a particular malignant tumour.

Each site is described under the following headings:

- 1) *Anatomy*  
Drawings of the anatomical sites and subsites are presented with the appropriate ICD-O-3 topography numbers.<sup>1</sup>
- 2) *Regional Lymph Nodes*  
The regional lymph nodes are listed and shown in drawings.
- 3) *T/pT Clinical and Pathological Classification of the Primary Tumour*  
The definitions for T and pT categories are presented. In the eighth edition (2017) of the TNM Classification the clinical and pathological classifications (T and pT) generally coincide, therefore the same illustrations are valid for the T and pT classifications for most sites.
- 4) *N/pN Clinical and Pathological Classification of Regional Lymph Nodes*  
The N and pN categories are presented in a fashion similar to the T and pT categories. Differences between N and pN definitions in the seventh edition arise in the case of carcinomas of the breast and penis and germ cell tumours of the testis.
- 5) *M/pM Clinical and Pathological Classification of Distant Metastasis*  
M localization is given only in selected cases because of its many possible variables.

Please visit the UICC <https://www.uicc.org/resources/tnm/publications-resources> or Wiley websites for any errata or updates.

<sup>1</sup>ICD-O *International Classification of Diseases for Oncology*, 3rd edn (2000), WHO, Geneva.



# HEAD AND NECK TUMOURS

## Introductory Notes

The following sites are included:

- Lip, oral cavity
- Pharynx: oropharynx, nasopharynx, hypopharynx
- Larynx: supraglottis, glottis, subglottis
- Nasal cavity and paranasal sinuses
- Malignant melanoma of upper aerodigestive tract
- Major salivary glands
- Thyroid gland

Carcinomas arising in the minor salivary glands of the upper aerodigestive tract are classified according to the rules for tumours of their anatomical site of origin, e.g., oral cavity.

## Regional Lymph Nodes (Figs. 1, 2, 3)

The definitions of the N categories for all head and neck sites except p-16 positive oropharynx, nasopharynx, mucosal malignant melanoma of the upper aerodigestive tract and thyroid are the same.

Midline nodes are considered ipsilateral nodes except in the thyroid.

The status of the regional lymph nodes in head and neck cancer is of considerable prognostic importance. In addition, it is helpful to subdivide the lymph nodes and possible metastasis into specific anatomical subsites and to group these lymph nodes into levels. A consensus guideline from DAHANCA, EORTC, HKNPCSG, NCIC CTG, NCRI, RTOG and TROG has been published and the nodal groups are listed below. However, a number of different classifications exist that use variable level numbers and therefore we recommend the levels be named rather than referred to by number to limit any confusion, although the levels used in the consensus document are given.<sup>1</sup> In the consensus classification, the retropharyngeal nodes are classified as Level VII, but in the classification used by the AJCC, Level VII described the upper mediastinal nodes.

<sup>1</sup>Grégoire, V., Ang, K., Budach, W., et al. (2013) Delineation of the neck node levels for head and neck tumors: a 2013 update. DAHANCA, EORTC, HKNPCSG, NCIC CTG, NCRI, RTOG, TROG consensus guidelines. *Radiother Oncol* 2014 110(1):172–181.

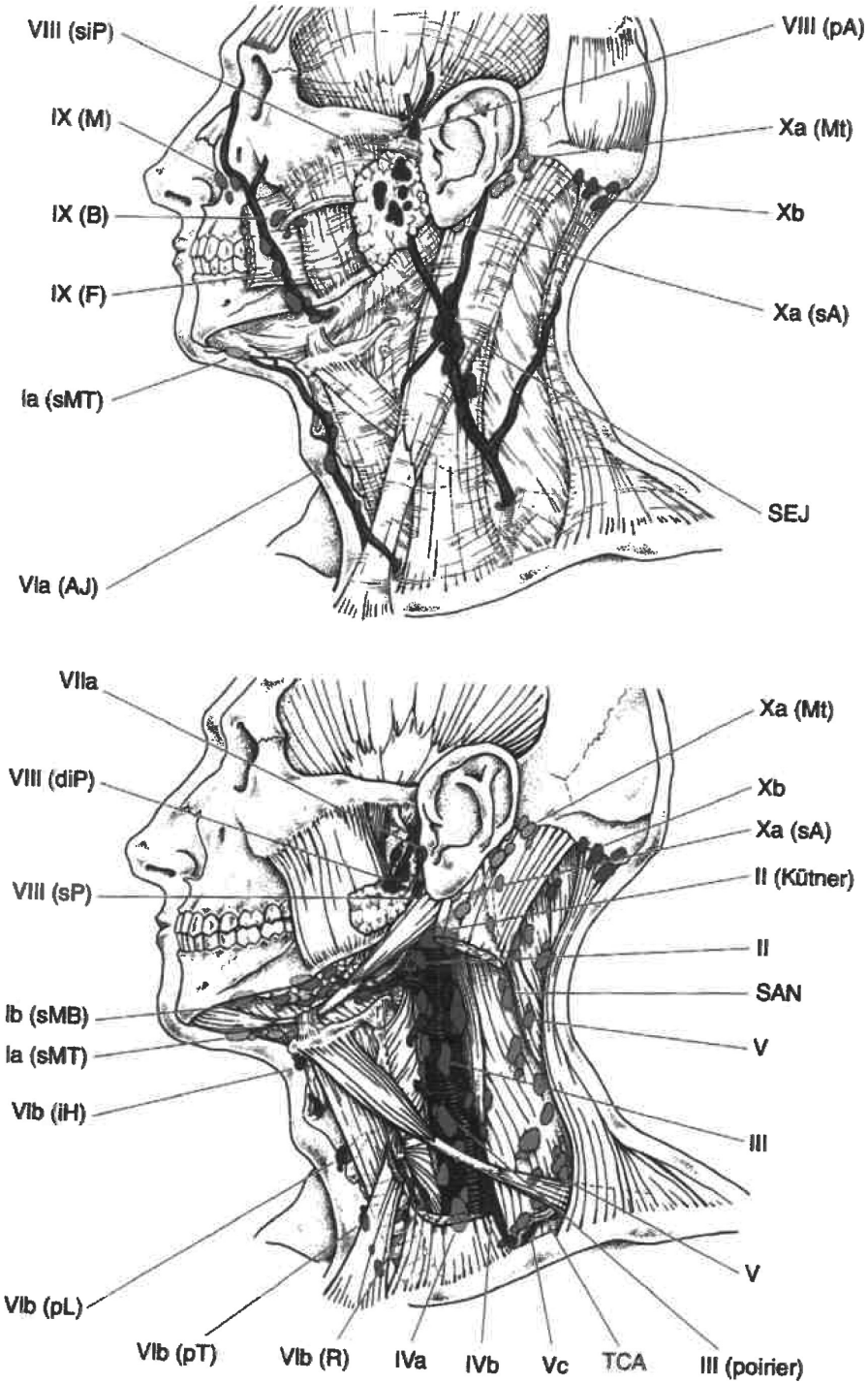
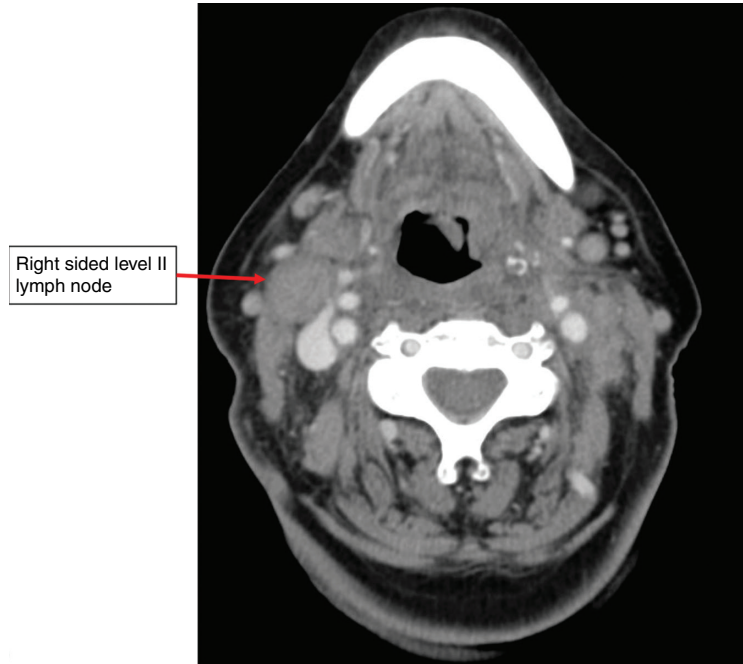
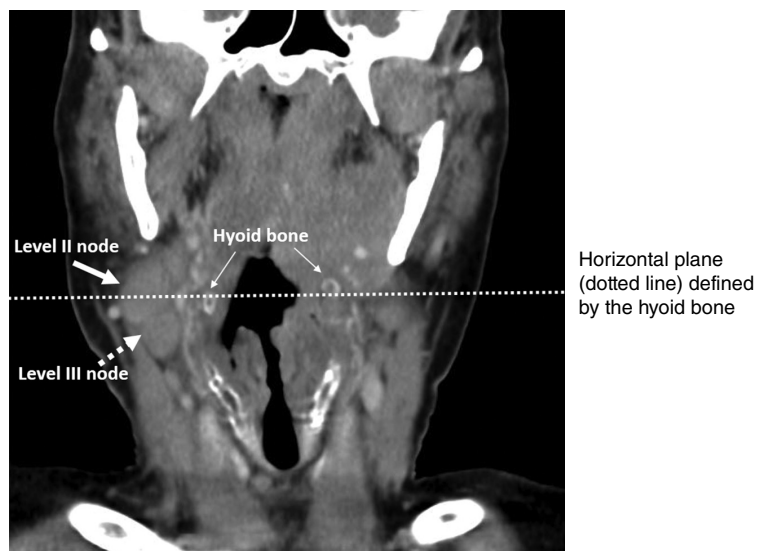


Fig. 1 Source: Modified from Lengele B et al., *Radiother Oncol*, 2007; 85(1): 146–155.



**Fig. 2** Axial CT scan showing enlarged right upper jugular (deep cervical) Level II lymph node measuring 2.5 cm in greatest dimension.



**Fig. 3** Coronal CT scan showing the same enlarged right upper jugular (deep cervical) Level II lymph node measuring 2.5 cm in greatest dimension, but also an enlarged right medial jugular (deep cervical) Level III lymph node measuring 1.5 cm in greatest dimension. Horizontal plane (dotted line) delineated by the hyoid bone that defines Level II nodes superiorly from Level III nodes inferiorly is marked. This is classified as cN2b: metastasis in multiple ipsilateral lymph nodes, none more than 6 cm in greatest dimension without extranodal extension.

1. Submental nodes
2. Submandibular
3. Cranial jugular (deep cervical) nodes
4. Medial jugular (deep cervical) nodes
5. Caudal jugular (deep cervical) nodes
6. Dorsal cervical (superficial cervical) nodes along the spinal accessory nerve
7. Supraclavicular nodes
8. Prelaryngeal and paratracheal (syn. anterior cervical) nodes
9. Retropharyngeal nodes
10. Parotid nodes
11. Buccal nodes (syn. facial nodes)
12. Retroauricular (syn. mastoid, posterior auricular) and occipital nodes

The lymph node groups are defined as follows

### 1. **Submental group**

Lymph nodes within the triangular boundary of the anterior belly of the digastric muscle and the hyoid bone.

### 2. **Submandibular group**

Lymph nodes within the boundaries of the anterior and posterior bellies of the digastric muscle and the body of the mandible.

### 3. **Upper (cranial) jugular group**

Lymph nodes located around the upper third of the internal jugular vein and adjacent spinal accessory nerve, extending from the hyoid bone (clinical landmark) to the skull base. The posterior boundary is the posterior border of the sternocleidomastoid muscle, and the anterior boundary is the lateral border of the sternohyoid muscle. This group includes the jugulodigastric node, which is the most cranial jugular node.

### 4. **Middle (medial) jugular group**

Lymph nodes located around the middle third of the internal jugular vein, extending from the carotid bifurcation superiorly to the omohyoid muscle (surgical landmark) or cricothyroid notch (clinical landmark) inferiorly. The posterior boundary is the posterior border of the sternocleidomastoid muscle, and the anterior boundary is the lateral border of the sternohyoid muscle. This group includes the jugulo-omohyoid lymph node located between the omohyoid muscle and the internal jugular vein.

### 5. **Lower (caudal) jugular group**

Lymph nodes located around the lower third of the internal jugular vein, extending from the omohyoid muscle superiorly to the clavicle inferiorly. The posterior boundary is the posterior border of the sternocleidomastoid muscle, and the anterior boundary is the lateral border of the sternohyoid muscle.

### 6. **Dorsal cervical nodes along the spinal accessory chain**

This forms the "posterior triangle group". This comprises predominantly the lymph nodes located along the spinal accessory nerve and the transverse cervical artery.

### 7. **Supraclavicular nodes**

The posterior boundary is the anterior border of the trapezius muscle, the anterior boundary is the posterior border of the sternocleidomastoid muscle, and the inferior border is the clavicle.

### 8. **Anterior cervical nodes**

Lymph nodes surrounding the midline visceral structures of the neck, extending from the level of the hyoid bone superiorly to the suprasternal notch inferiorly. On each side, the lateral boundary is the medial border of the carotid sheath. Located within

this compartment are the perithyroidal lymph nodes, paratracheal lymph nodes, lymph nodes along the recurrent laryngeal nerves and precricoid lymph nodes. Node group 8 (prelaryngeal and paratracheal nodes) may be further subdivided as follows:

- 8a: cranial paratracheal (suprathyroidal)
- 8b: thyroidal (perithyroidal)
- 8c: caudal paratracheal (infrathyroidal, lateral tracheal)
- 8d: prelaryngeal
- 8e: pretracheal near the thyroid isthmus (Delphian)

#### 9. **Retropharyngeal nodes**

These lie in the buccopharyngeal fascia, behind the upper part of the pharynx and in front of the arch of the atlas.

#### 10. **Parotid nodes**

These may be subdivided into superficial (in front of the tragus on top of the parotid fascia) and deep parotid nodes. The latter are located underneath the parotid fascia and include intraglandular nodes directly in the parotid gland. The preauricular and infra-auricular (infra- or subparotid) nodes are assigned to the parotid nodes.

#### 11. **Buccal (facial) nodes**

These include the buccinator nodes located deep on the buccinator muscle, the nasolabial nodes located underneath the nasolabial groove, the molar nodes located in the surface of the cheek and the mandibular nodes located outside the lower jaw.

#### 12. **Retroauricular (syn. mastoid, posterior auricular) and occipital nodes**

The regional lymph nodes for thyroid include the upper (superior) mediastinal lymph nodes, which may be subdivided into tracheo-oesophageal (posterior mediastinal) and upper anterior mediastinal nodes. Cervical and mediastinal lymph nodes are not divided by a fascia; the left brachiocephalic vein is considered as the boundary.

For the tumour entities listed below, a clinical and a pathological N classification have been introduced in the 8th edition of the UICC TNM Classification of Malignant Tumours:

- Lip and oral cavity
- Oropharynx (p-16-negative or oropharyngeal without p-16-IH performed)
- Hypopharynx
- Pharynx
- Nasal cavity and paranasal sinuses
- Unknown primary – cervical nodes
- Major salivary glands
- Skin carcinoma of head and neck

### **N Classification – Regional Lymph Nodes**

- |     |  |
|-----|--|
| N1  | Metastasis in a single ipsilateral lymph node, 3 cm or less in greatest dimension without extranodal extension (Fig. 4)                          |
| N2a | Metastasis in a single ipsilateral lymph node, more than 3 cm but not more than 6 cm in greatest dimension without extranodal extension (Fig. 5) |
| N2b | Metastasis in multiple ipsilateral lymph nodes, none more than 6 cm in greatest dimension without extranodal extension (Fig. 6)                  |

Any head or neck primary except p16-positive oropharynx, nasopharynx, malignant melanoma of upper aerodigestive tract and thyroid gland

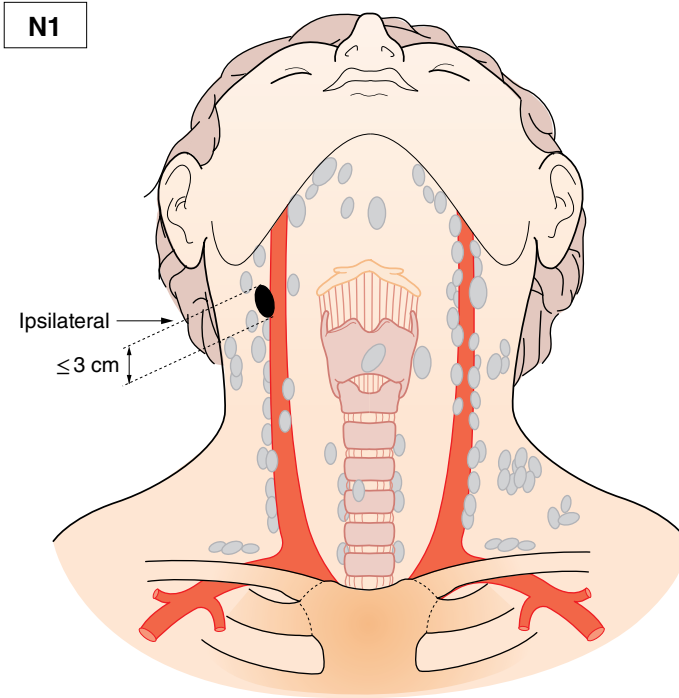


Fig. 4

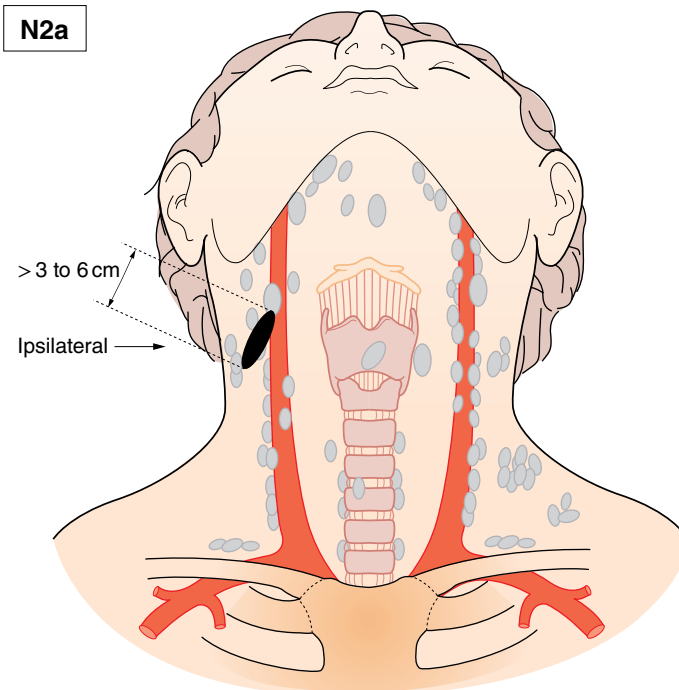


Fig. 5

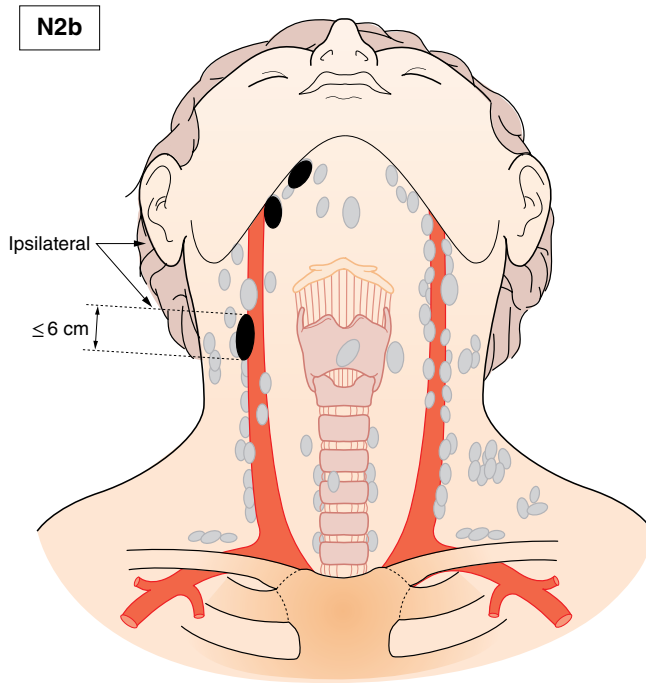


Fig. 6

N2c Metastasis in bilateral or contralateral lymph nodes, none more than 6 cm in greatest dimension without extranodal extension (Fig. 7)

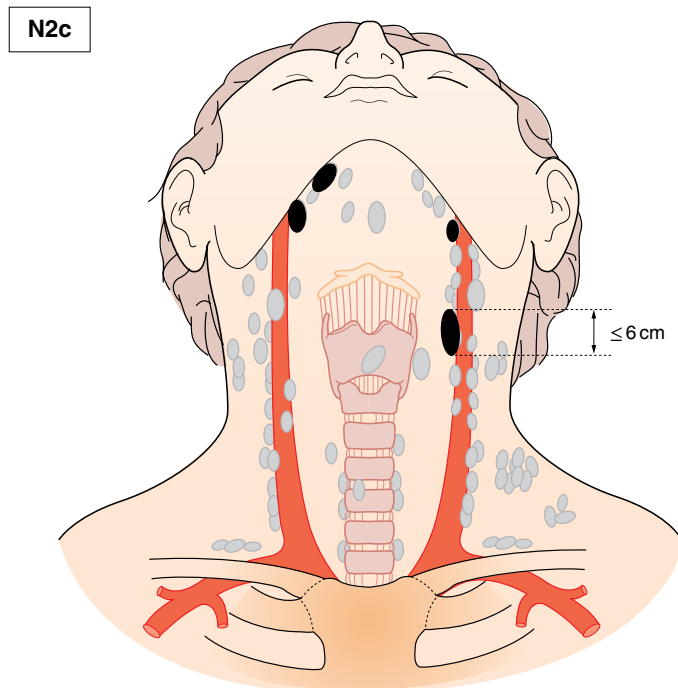
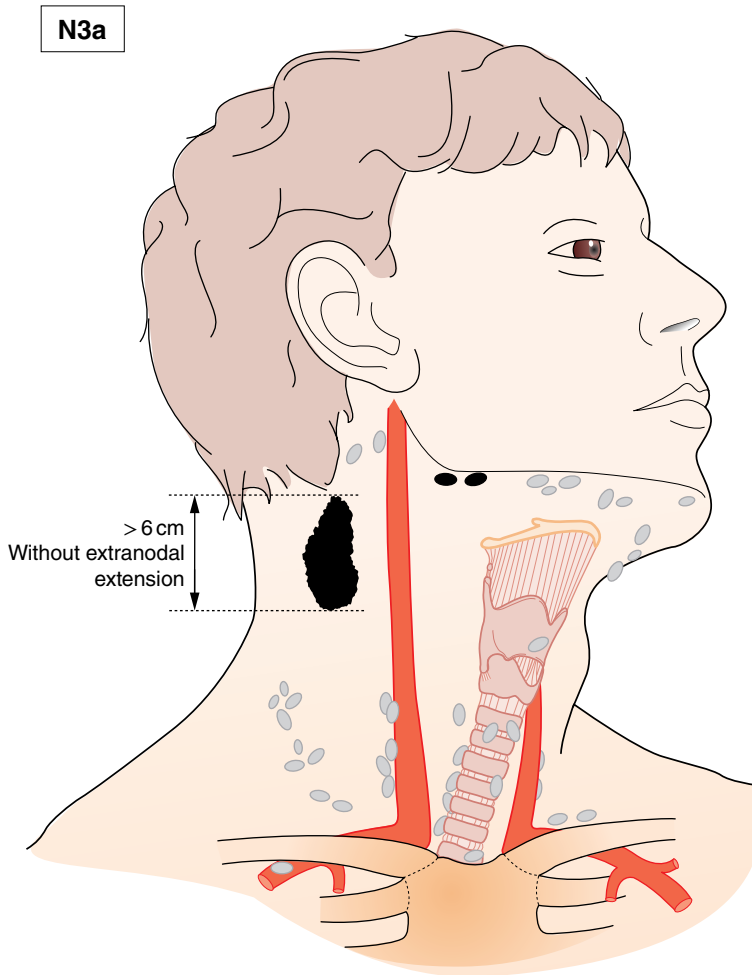


Fig. 7

N3a Metastasis in a lymph node more than 6 cm in greatest dimension without extranodal extension (Fig. 8)



**Fig. 8**

N3b Metastasis in a single or multiple lymph node(s) with extranodal extension (Figs. 9, 10)

**Note**

Midline nodes are considered ipsilateral nodes.

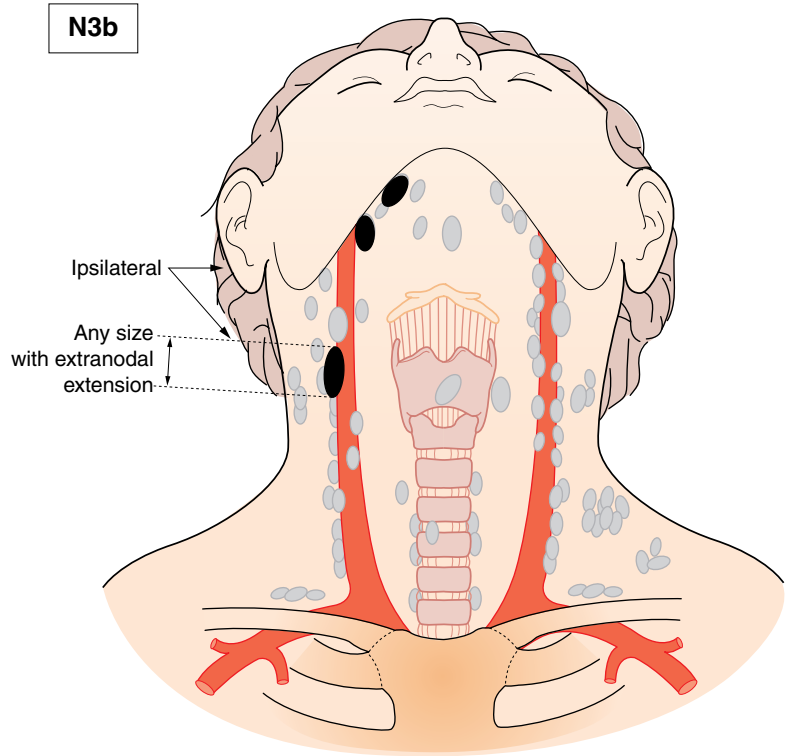
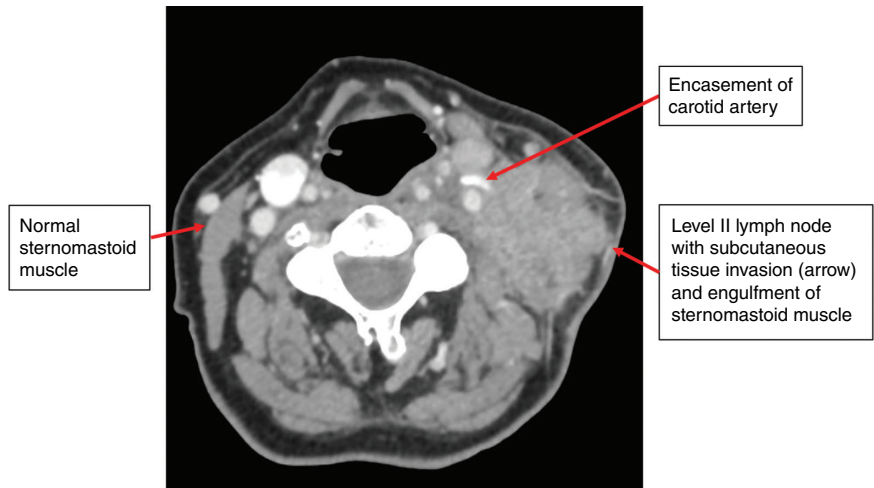


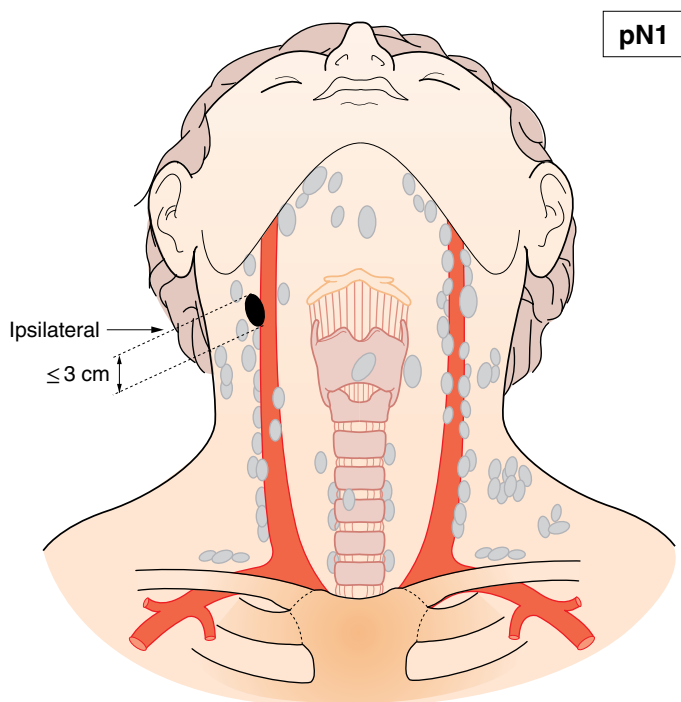
Fig. 9



**Fig. 10** Axial CT scan showing clinically fixed right upper jugular (deep cervical) Level II lymph node with subcutaneous tissue invasion, engulfment of sternomastoid muscle and encasement of the carotid artery. This is classified as cN3b.

### pN Classification – Regional Lymph Nodes

- pN0** Histological examination of a selective neck dissection specimen will ordinarily include 6 or more lymph nodes. Histological examination of a radical or modified radical neck dissection specimen will ordinarily include 10 or more lymph nodes. If the lymph nodes are negative, but the number ordinarily examined is not met, classify as pN0. When size is a criterion for pN classification, measurement is made of the metastasis, not of the entire lymph node.
- pN1** Metastasis in a single ipsilateral lymph node, 3 cm or less in greatest dimension without extranodal extension (Fig. 11)



**Fig. 11**

- pN2** Metastasis as described below:
- pN2a** Metastasis in a single ipsilateral lymph node, 3cm or less in greatest dimension with extranodal extension (Fig. 12), or more than 3 cm but not more than 6 cm in greatest dimension without extranodal extension (Fig. 13)

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