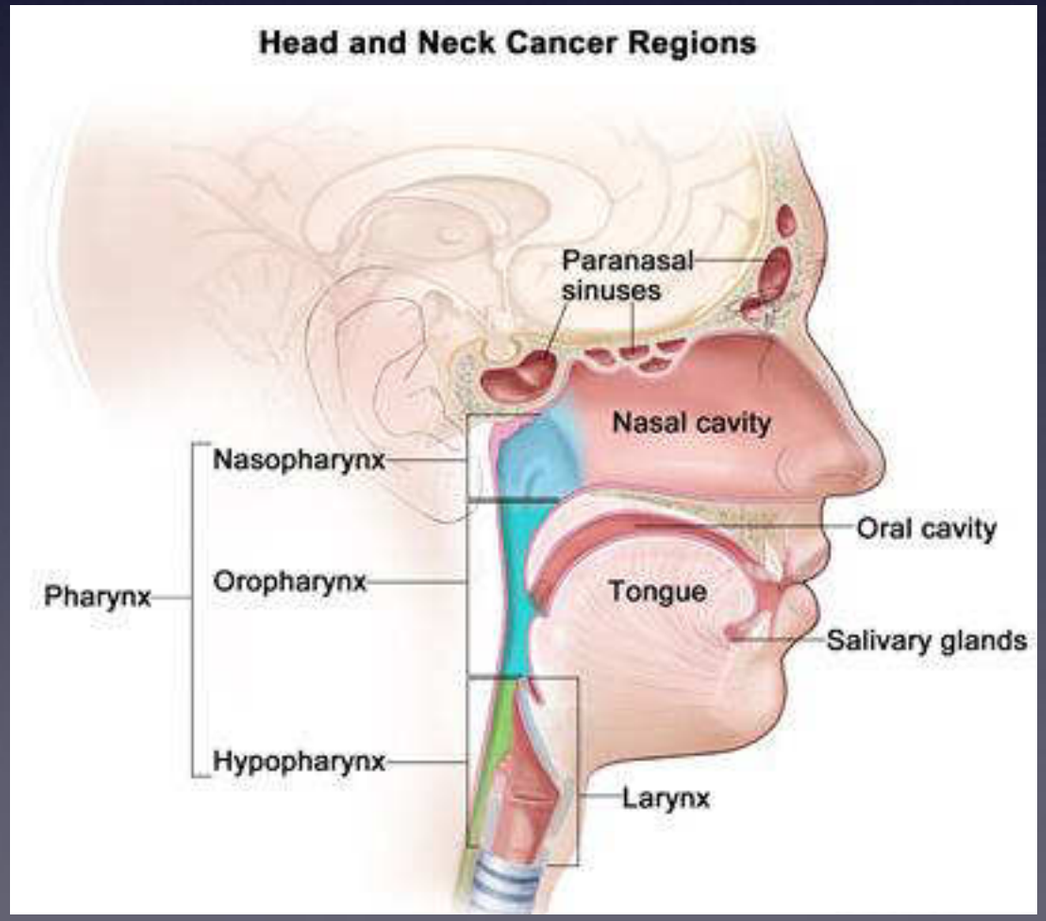
Head and Neck Pathology

Macroscopy and Dissection

Dr Tim Bracey

Outline

- Introduction - importance of macro
- Lip, tongue and oropharynx
- Larynx
- Bony resections
- Salivary glands*
  will not be covered specifically here
  use basic principles
- Neck dissections



Introduction

- Most complex head and neck specimens are for primary neoplasia of oropharynx, larynx, jaws and salivary glands
  - Most commonly smoking and alcohol-related SCC
  - Other main group is HPV related SCC tonsil / tongue base (maybe other sites!)
  - Other primary and secondary malignancy

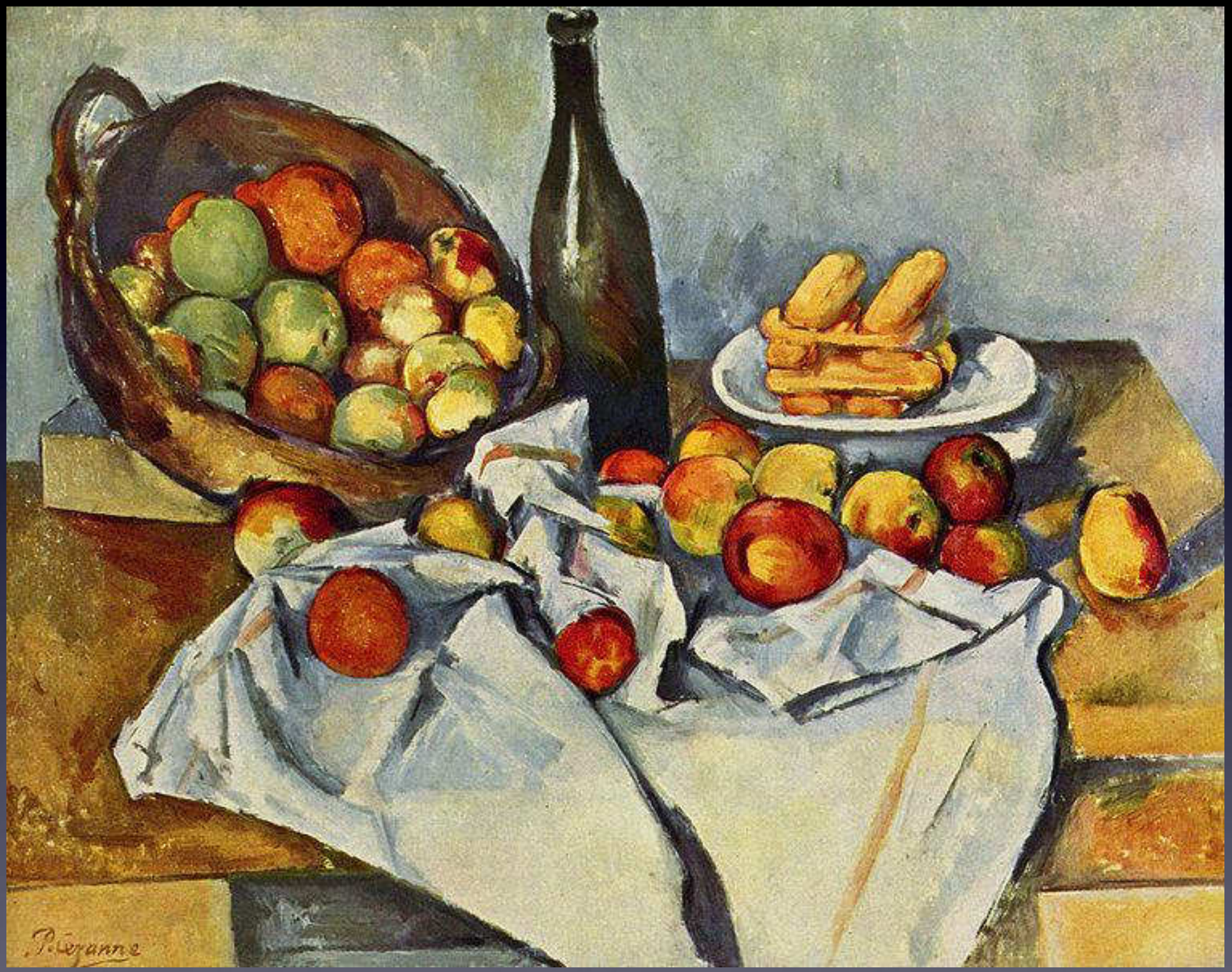
Correlate correlate correlate!

- Diagnosis should be established by preoperative biopsy (always check before starting, may only have cytology)
- Correlate with radiology if possible (what structures may be involved - target your dissection)
- Correlate with surgeon - which margin / margins are they most worried about?
- IF IT DOESNT MAKE SENSE DONT START!
- Photographs - correlate with micro (eg. does the cancer extend beyond macro impression)
- Macro margins - correlate with micro

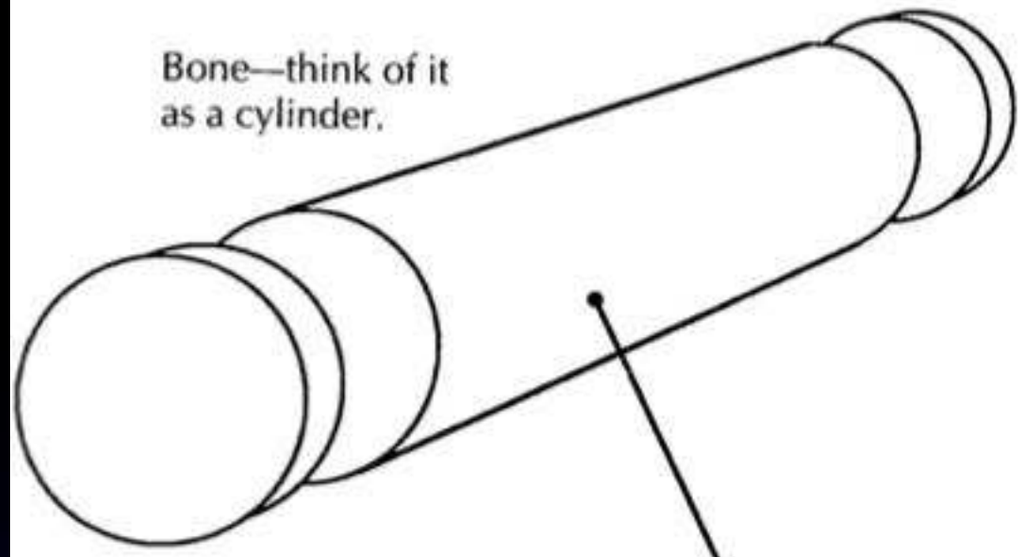
Identify the anatomy and orient components

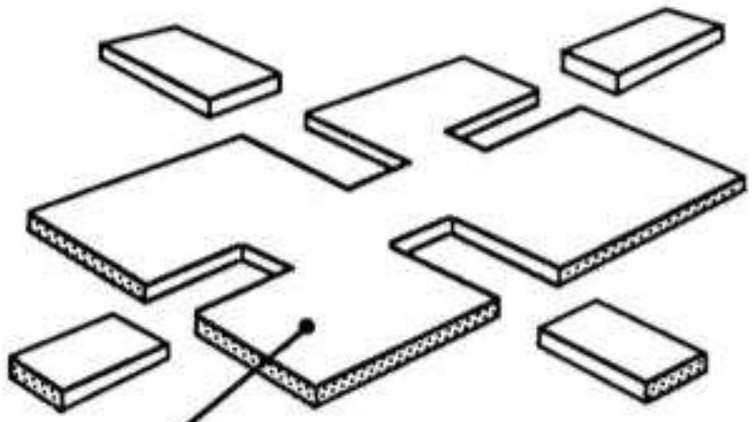
Treat nature in terms of the cylinder, the sphere, and the cone, all in perspective.

Cézanne

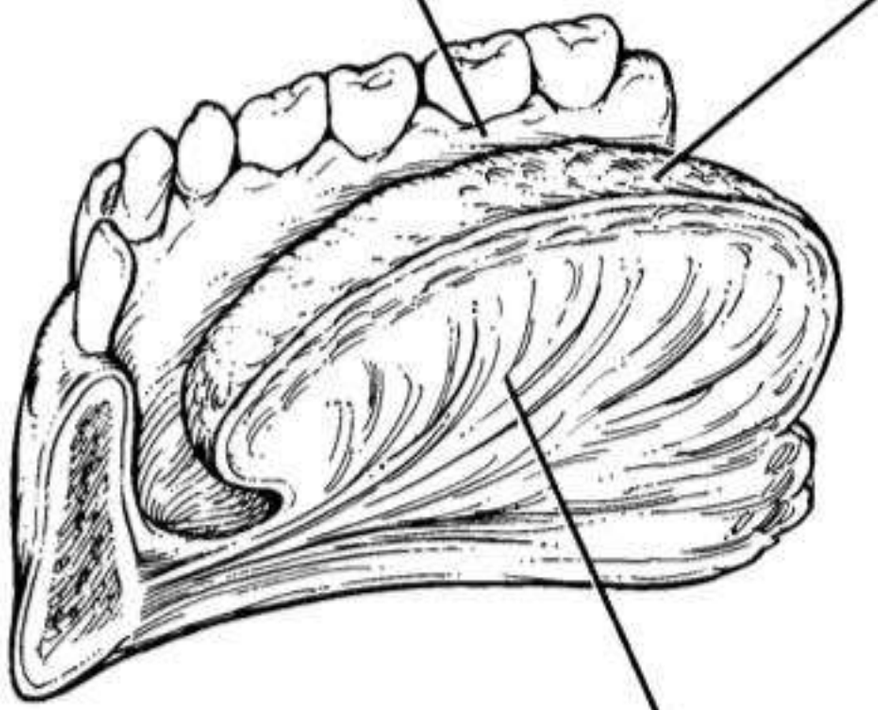


Bone—think of it as a cylinder.



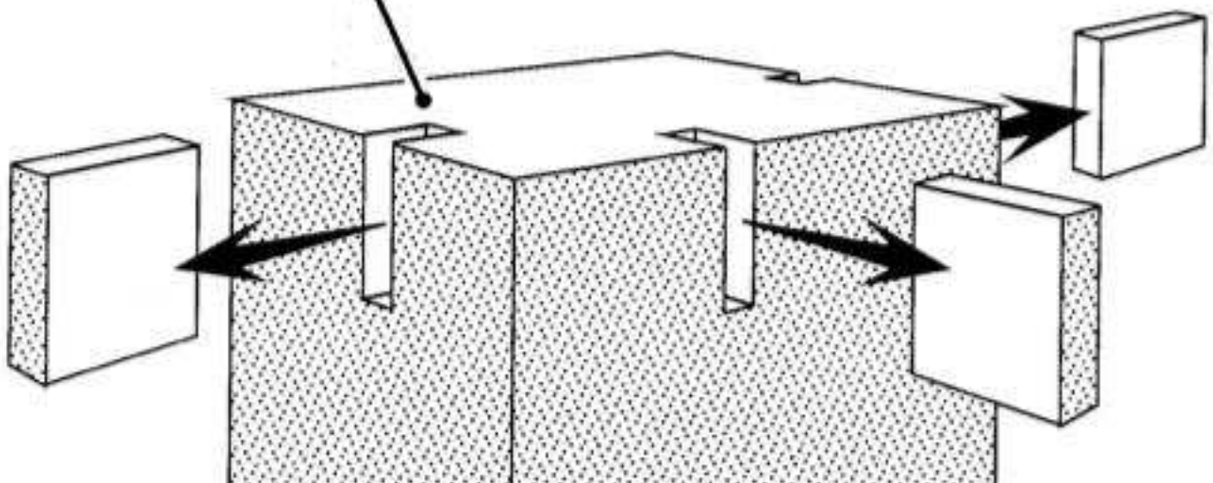


Epithelium—treat it as a square sheet.



The corresponding epithelial and soft tissue margins can be combined in the same section.

Soft tissue—treat it as a cube.



What blocks are needed to complete the staging and minimum dataset?

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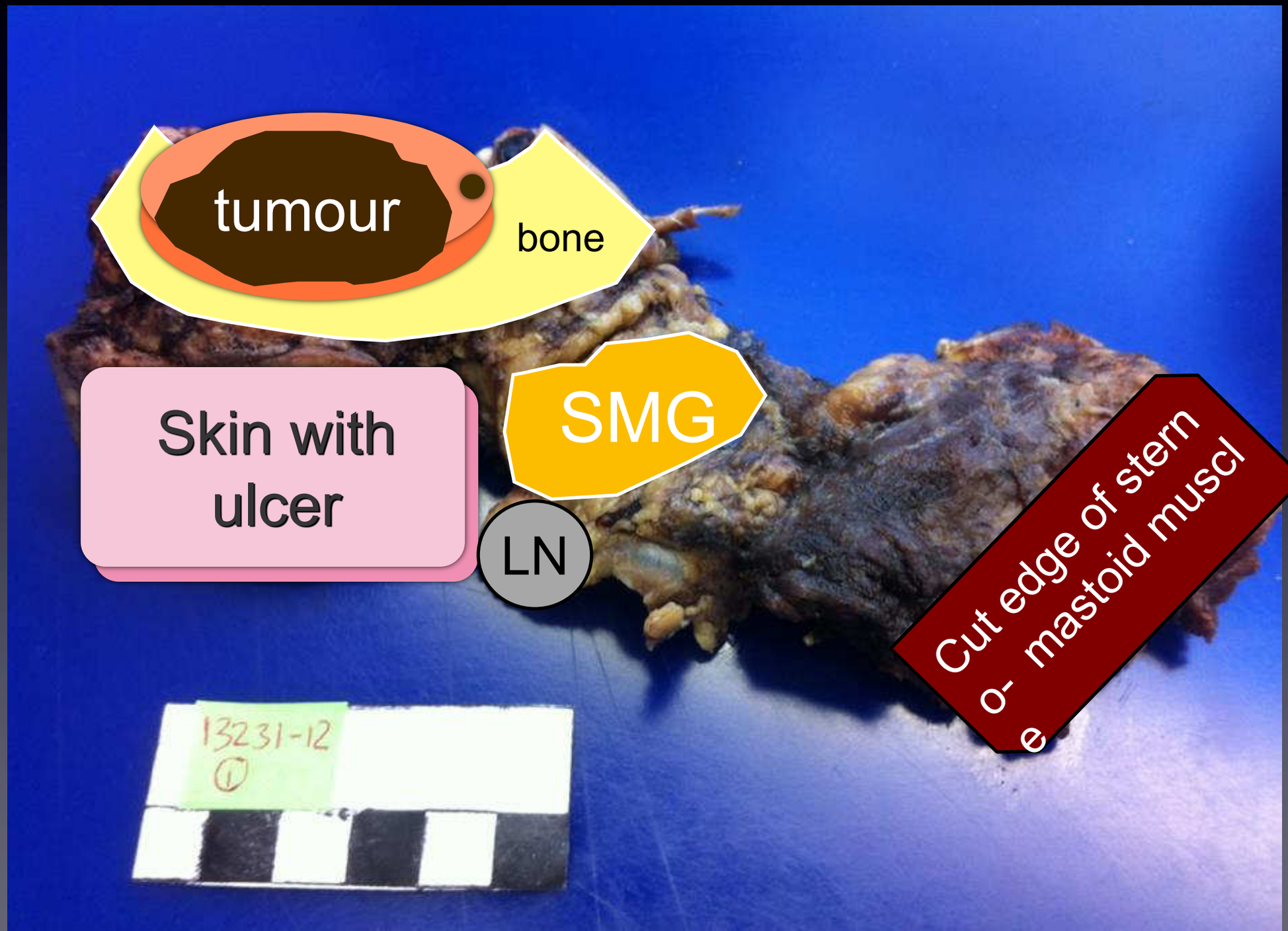
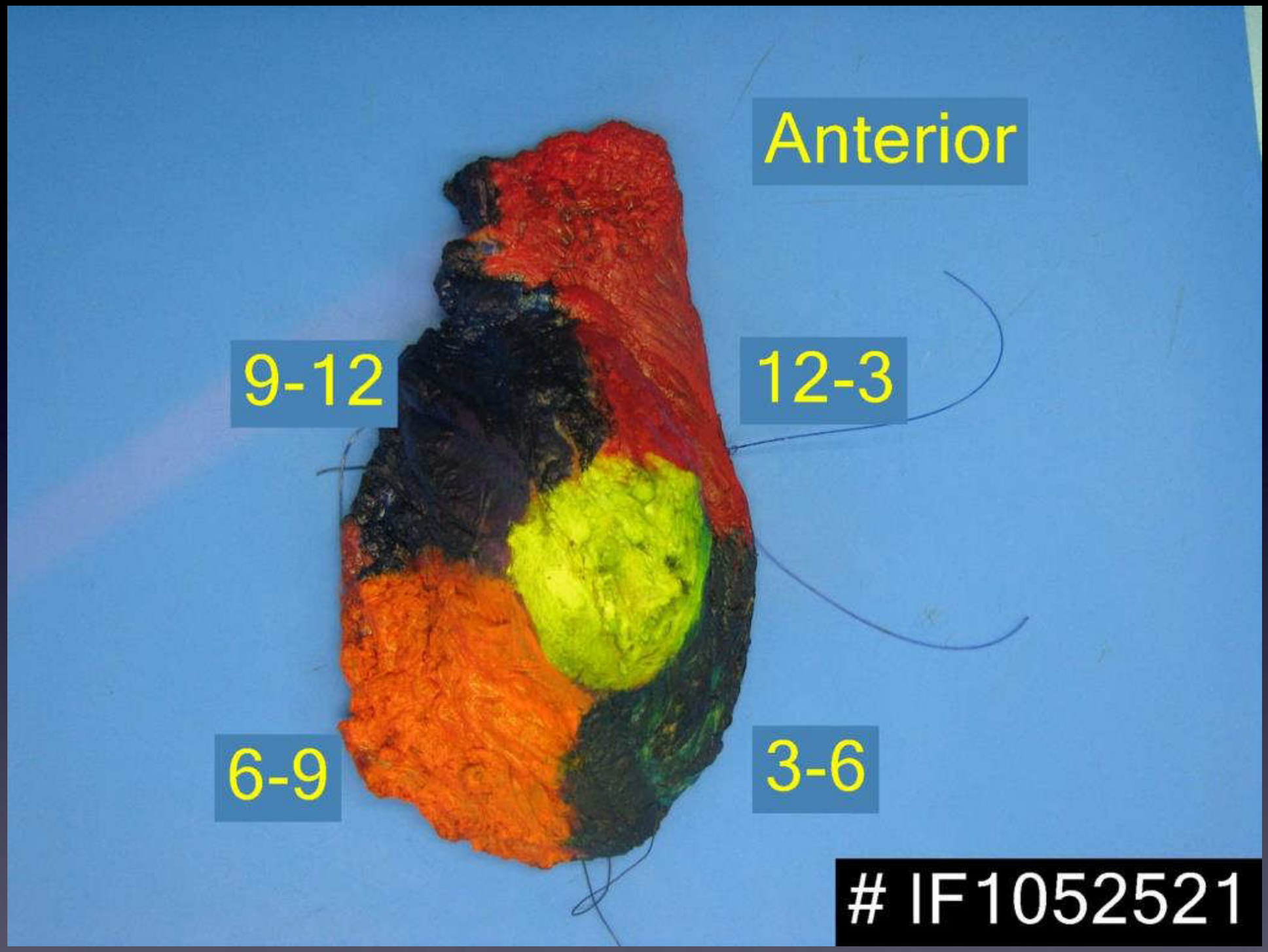
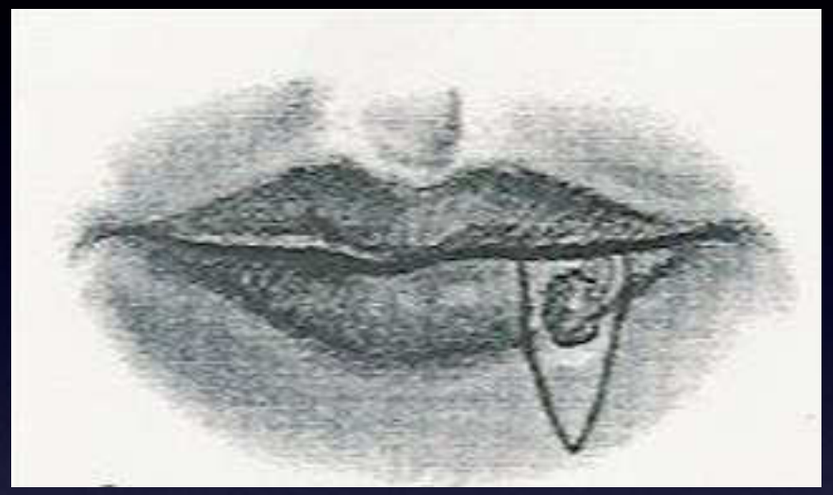


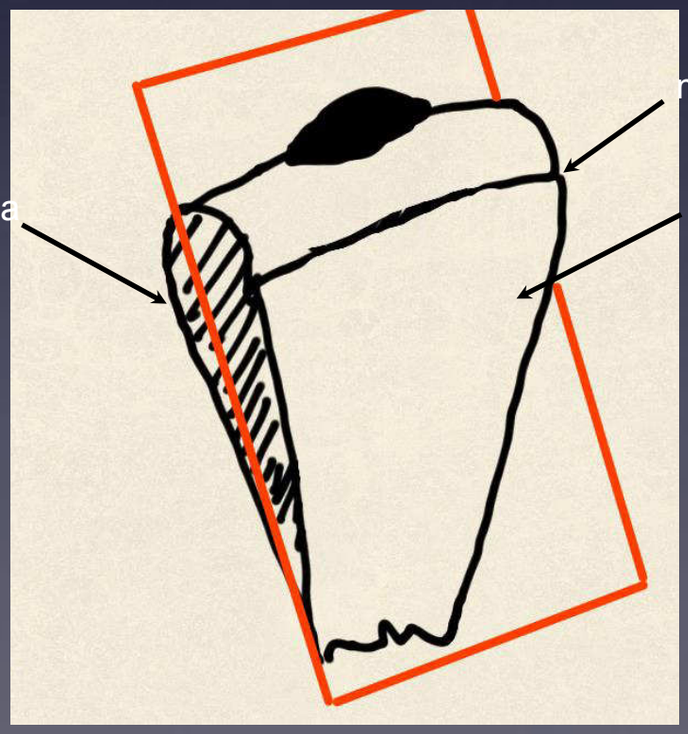


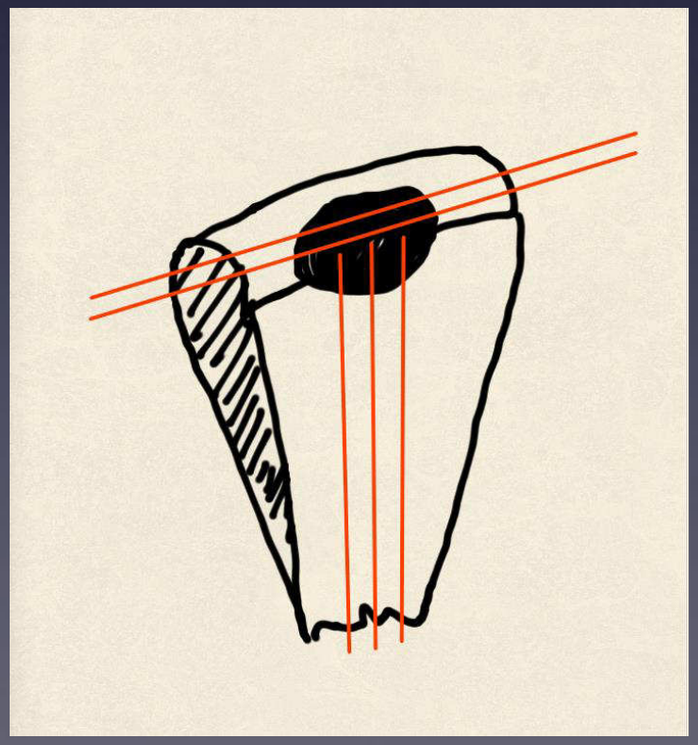
If you use clock-face orientation remember to convert back to anatomical margins in your report
*establish a memorable colour scheme

Lip cancers



Vermillion border (sun damage). Need to assess...
*Size of lesion
*Depth of invasion
*Peripheral and deep margins





Measure the tumour macroscopically (unless larger microscopically)

4.2.1 Maximum diameter of tumour

The macroscopic diameter (in millimetres) should be used (Figure 1), unless the histological extent is greater than macroscopically apparent, in which case the microscopic dimension is used. As for other tissues, e.g. breast, measurements are made pragmatically, acknowledging distortion of tissues by fixation and processing.

[Tumour size is the major contributor to stage; level B.]

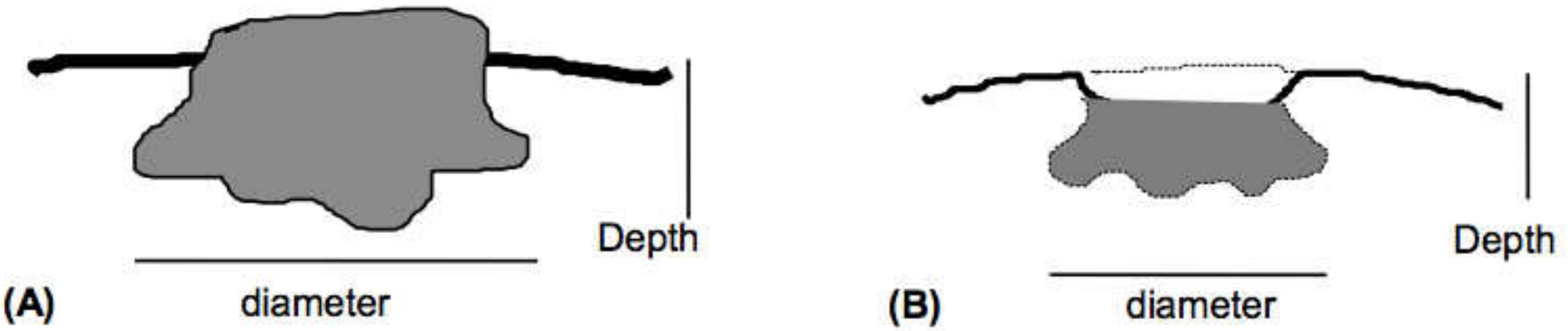


Figure 1: Descriptors of the size of the primary carcinoma for (A) nodular carcinoma and (B) ulcerated carcinoma. Note that depth of invasion refers to the depth of greatest spread in presumed continuity below the top of the adjacent mucosa. For both nodular and ulcerated tumours, the line of the original mucosal surface is reconstructed to determine the true thickness.

Depth of invasion of >5mm upstages from T1 to T2 in TNM8 and >10mm from T2 to T3

Measure margins microscopically
Try to avoid approximating margins (eg. >2mm as what constitutes a clear margin is highly subjective)

4.2.6 Distance from invasive carcinoma to surgical margins

Measure the distance (in millimetres) histologically for both mucosal and deep margins. From a surgical point of view, > 5mm is clear, 1–5 mm is close and <1 mm is involved. Incomplete resection or the presence of dysplasia at the margin is associated with a significantly increased risk of local recurrence.[33-36] In the 'Comments' section it may be noted that if the tumour has an infiltrating pattern of invasive front (or vascular or perineural spread ahead of the invasive front) and a close margin, this may be associated with a high risk of local recurrence. Conversely, it may be acceptable to have a close margin for a well-circumscribed tumour with a cohesive growth pattern.

[Margin status is a predictor of local recurrence and may require consideration of adjuvant therapy, level B/C.]

Cohesive vs non-cohesive growth pattern

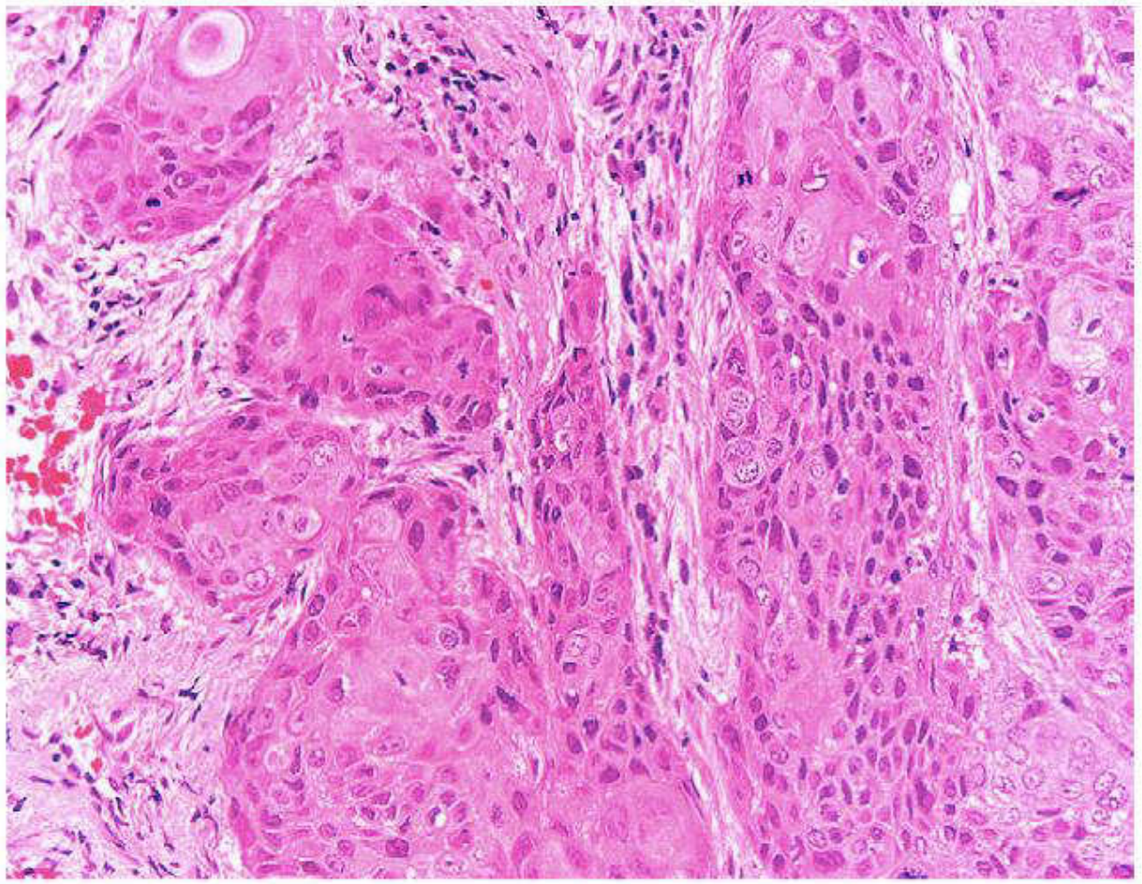


Figure 7 Well-defined cohesive tumour islands at the invasive front

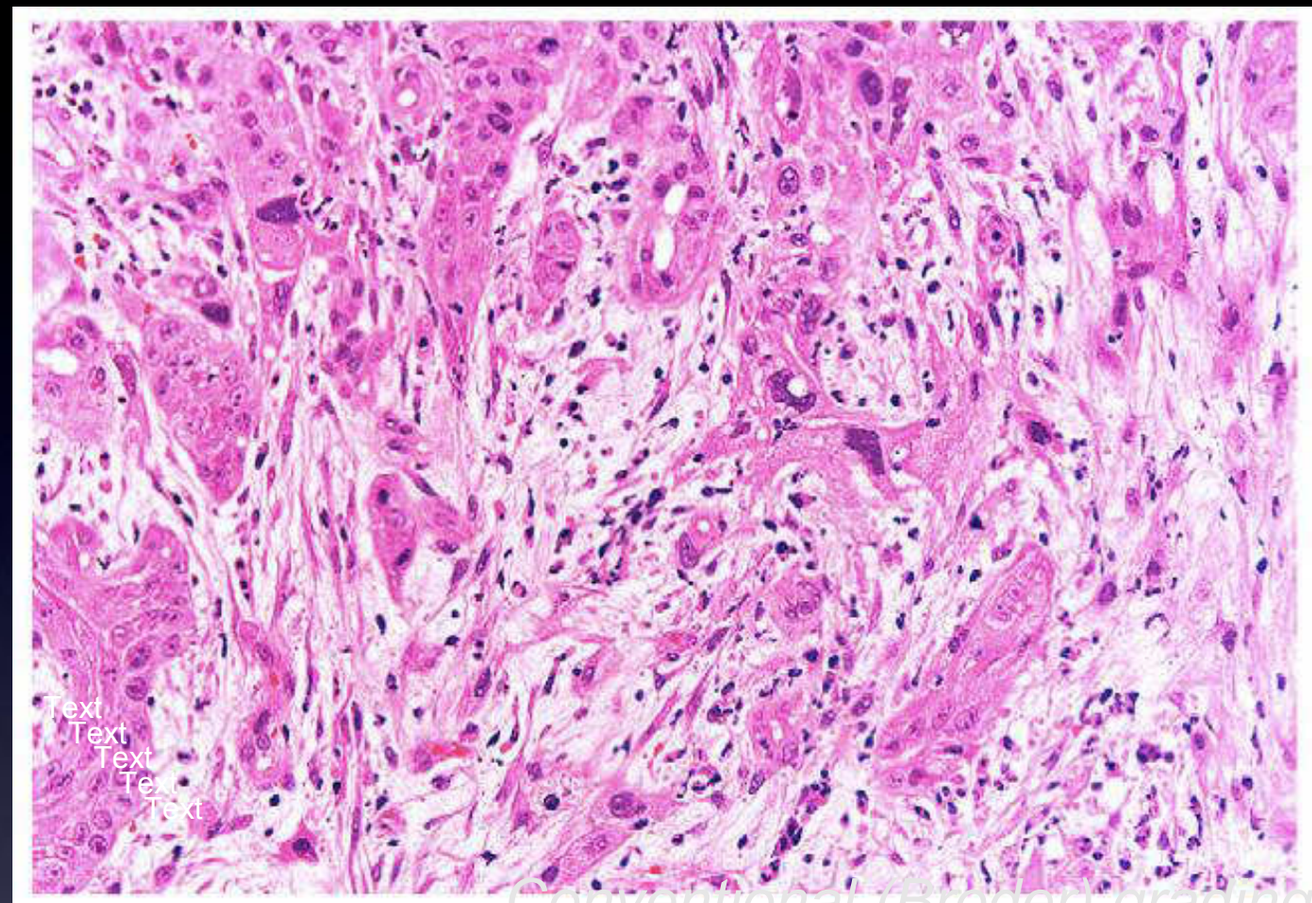


Figure 8 Non-cohesive pattern of infiltration.

Pattern of invasion.

The pattern of invasion by the carcinoma at its deep margin is of proven prognostic value for oral carcinomas.[4,6,16,27-28]

Scoring systems for histopathological features of squamous carcinomas include features related to differentiation and to the tumour/stromal interaction.[3-5,29] While these have the potential to improve the consistency of reporting, they are not in widespread use and it is suggested that the recording of differentiation and invasive pattern is made separately.

The patterns of tissue invasion by carcinoma are a continuous spectrum. For prognostic purposes, two groups are recognised: carcinomas composed of broad cohesive sheets of cells or strands of cells >15 cells across (Figure 2 a,b,c), and carcinomas composed of narrow strands, non-cohesive small groups or single cells (Figure 2 d,e,f).[6, 29-32]

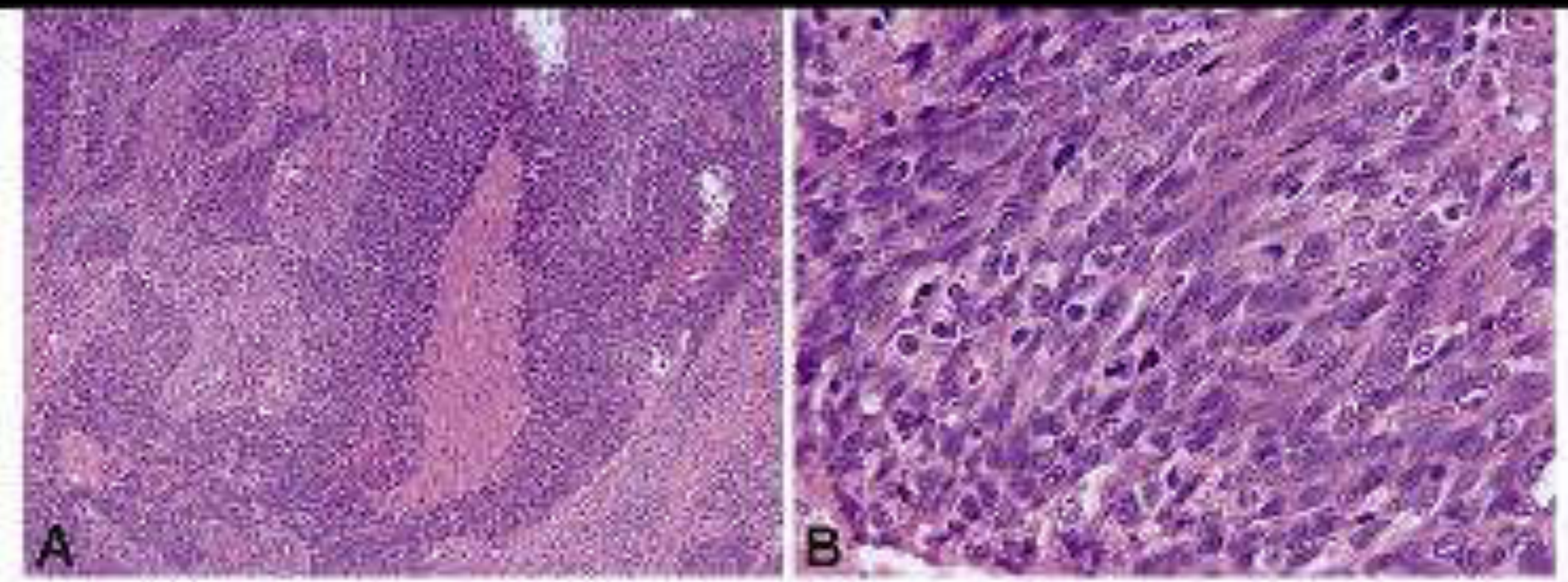
[Level of evidence is good for oral and lingual carcinomas, level B.]

Text
Text
Text
Text
Text

Conventional (Broder) grading (well, moderate, poorly differentiated) correlates poorly with patient outcome in head and neck cancer.

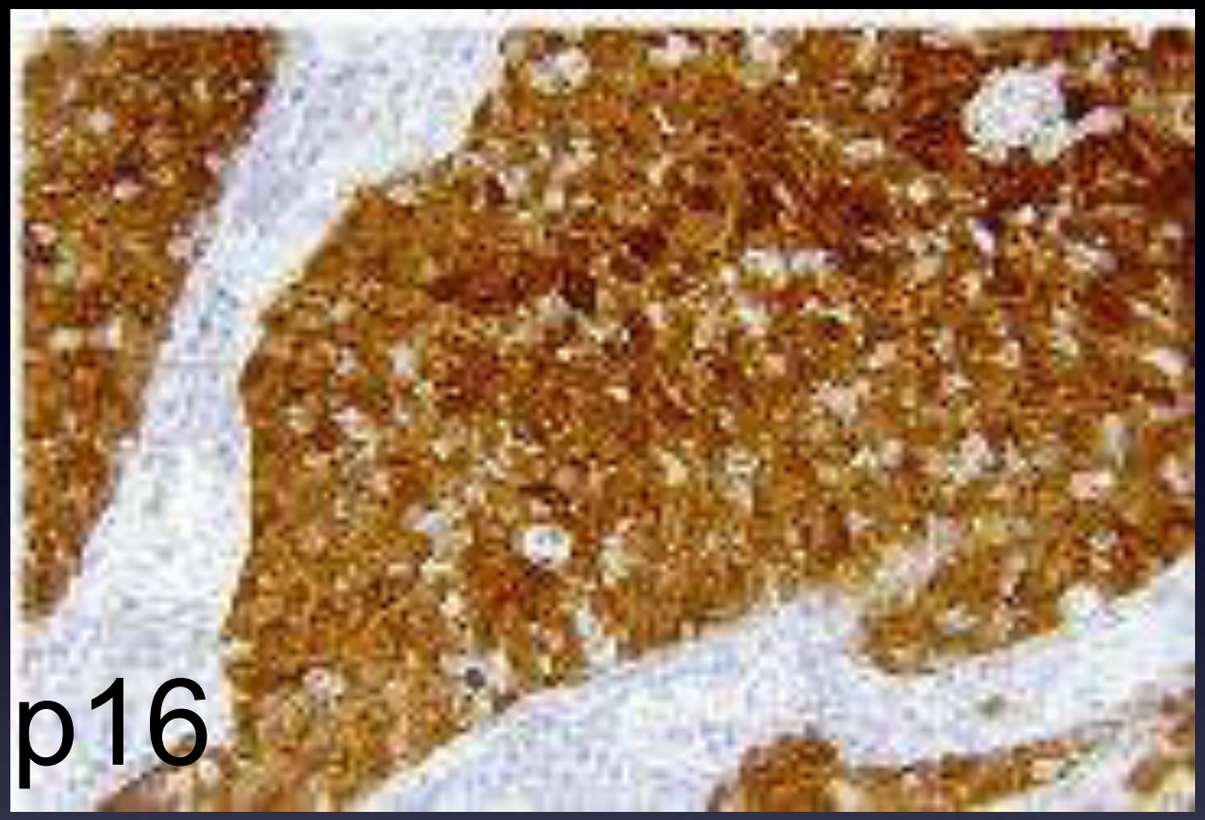
Cohesive vs non-cohesive growth pattern is the best predictor of overall survival (even when assessed in small biopsies)

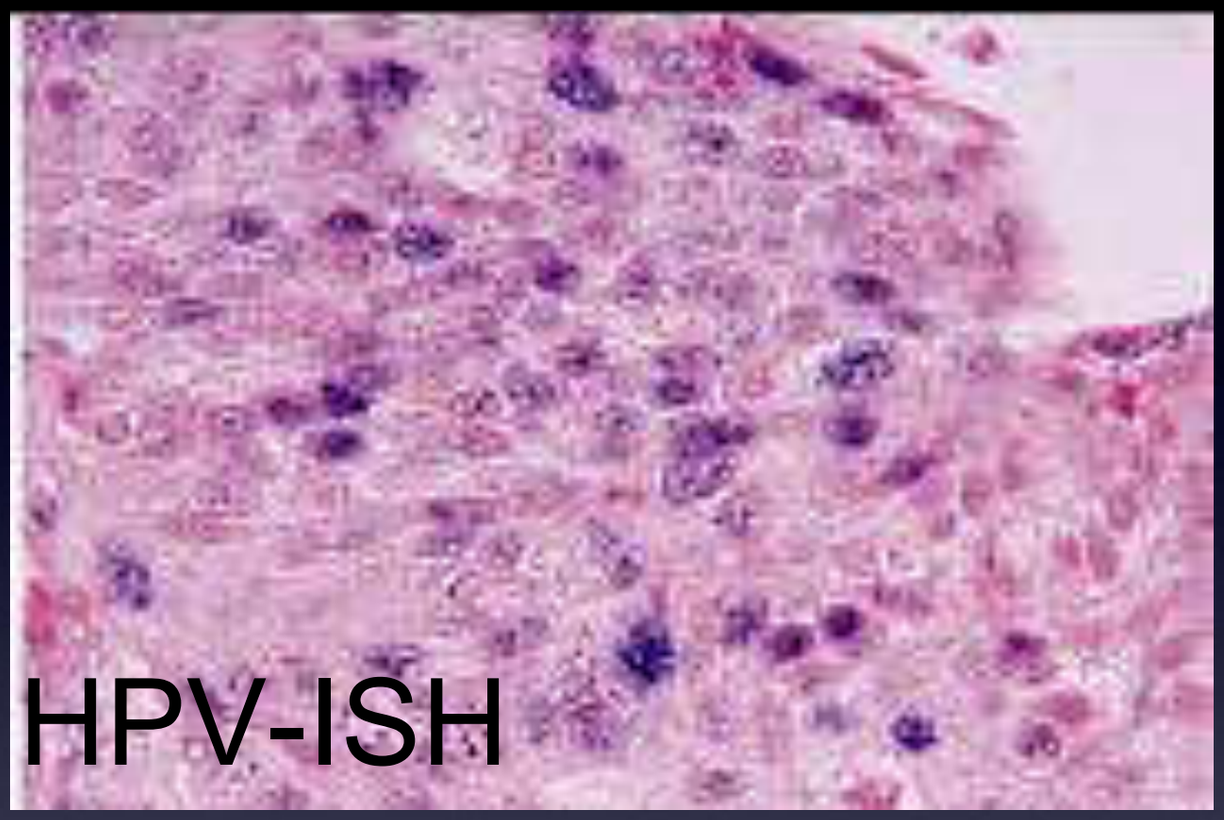
HPV-related non-K SCC



Compared with typical keratinising SCC these are...

* Usually tonsil or tongue base primary (primary often occult or tiny with cystic neck mass)
* “Basaloid” or darker staining with comedo necrosis, scanty cytoplasm, infiltrating lymphocytes, no keratin pearls or whorls (can have focal keratinisation)
* Resemble reticulated epithelium of tonsillar crypt (therefore better described as well differentiated!)
* younger patients higher socioeconomic not smokers or drinkers
* better response to treatment and more than 50% survival benefit (smoking adversely affects this prognostic benefit)

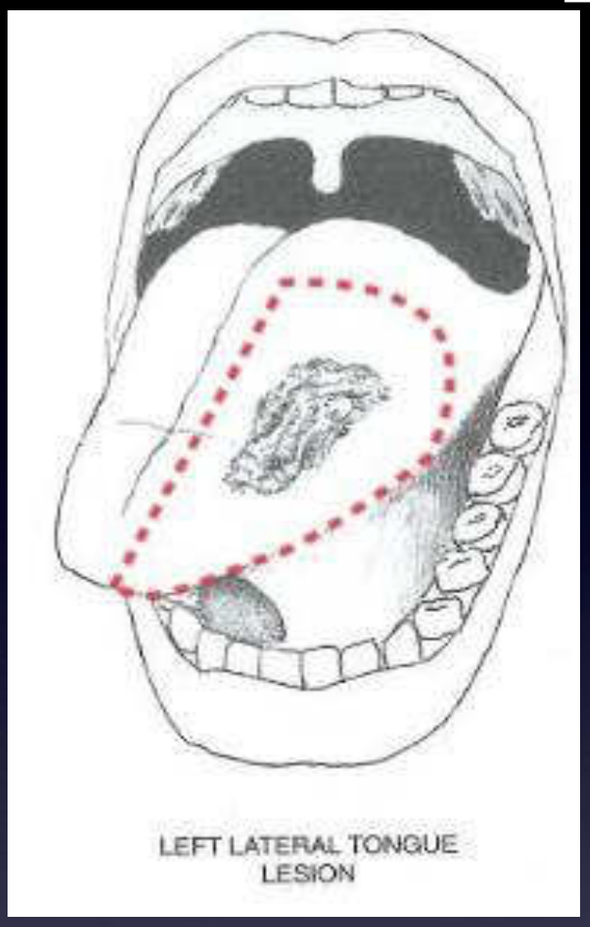


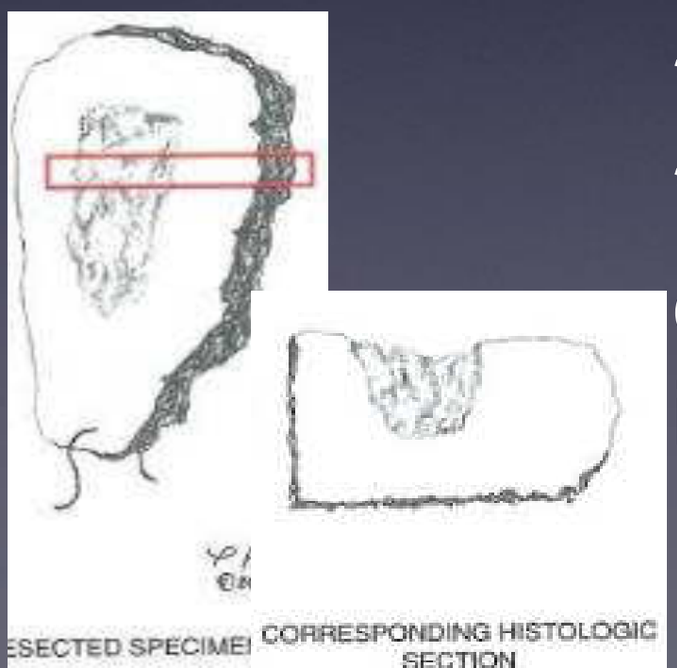


- Clinical rationale for testing to predict outcome, reassure patient and identify eligibility for trials

- Useful for pathologists to confirm diagnosis in “poorly differentiated” and identify likely primary site in metastatic lymph node with occult primary

Tongue Cancer





Most commonly lateral borders of anterior 2/3 tongue (oral tongue. compare with HPV disease)

Smokers disease

Often deeply invasive below a small ulcer

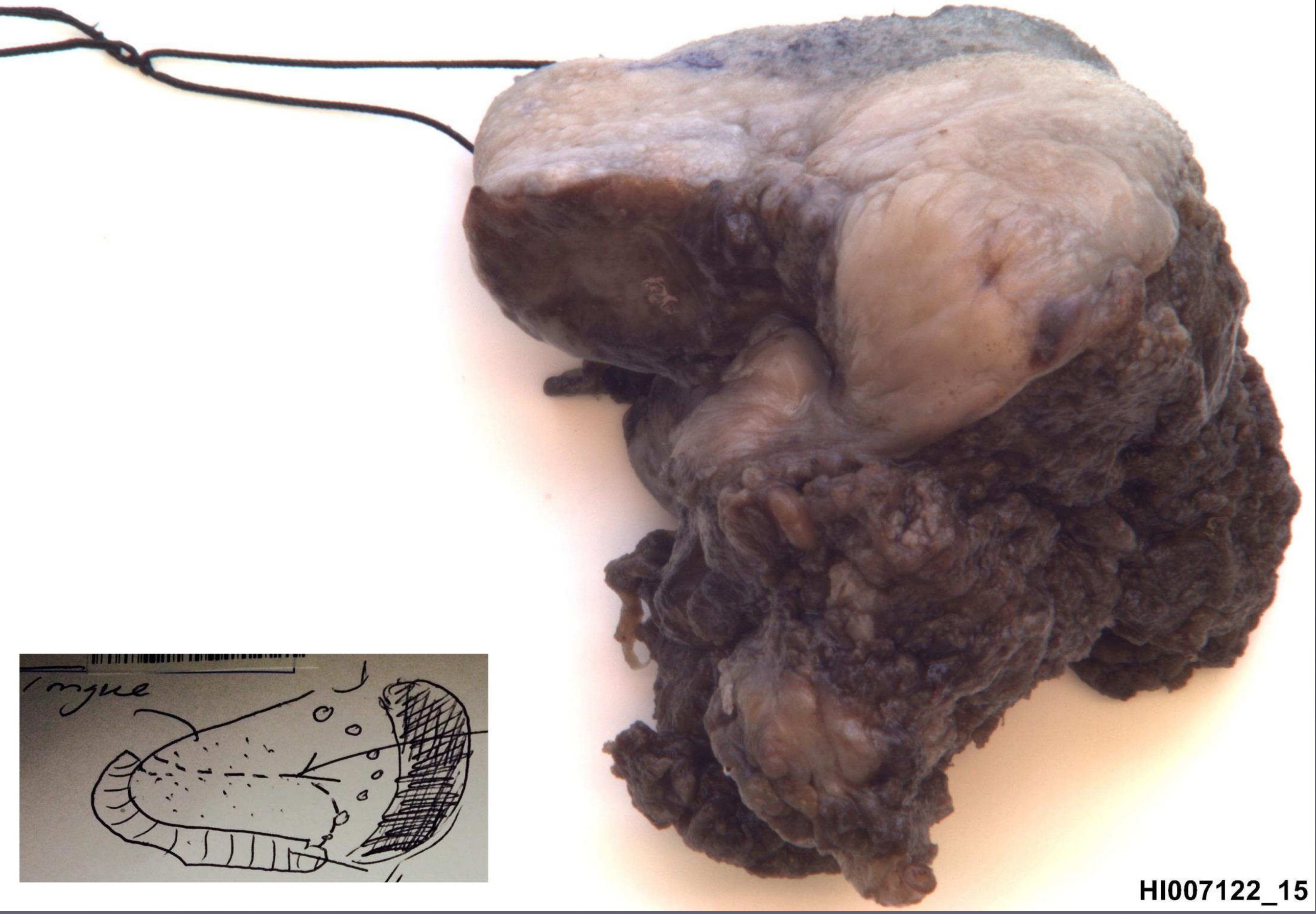
Have a low threshold for embedding whole specimen

*Size of lesion (T1 <2cm, T2 2-4cm, T3 >4cm)

*Depth of invasion

*Peripheral and deep margins

* T4 disease usually needs radiology correlation or when bone or extrinsic muscles included in resection



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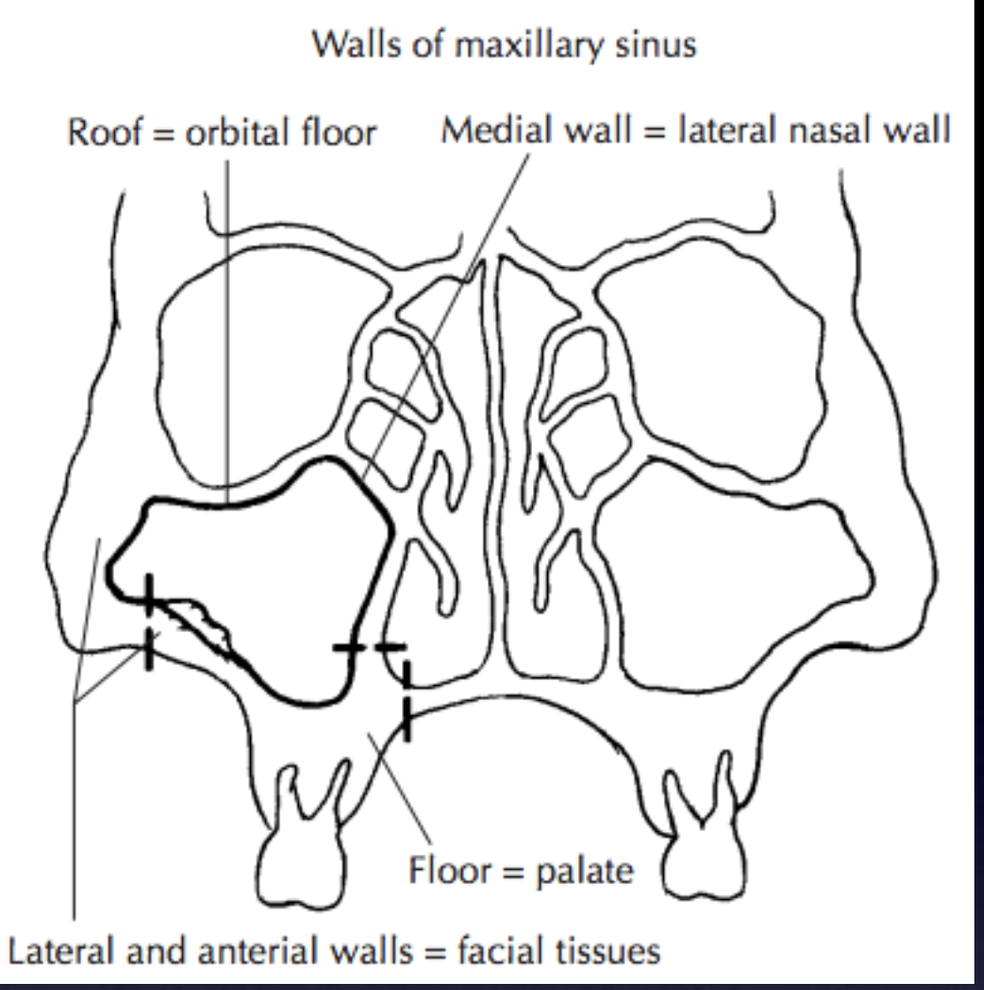
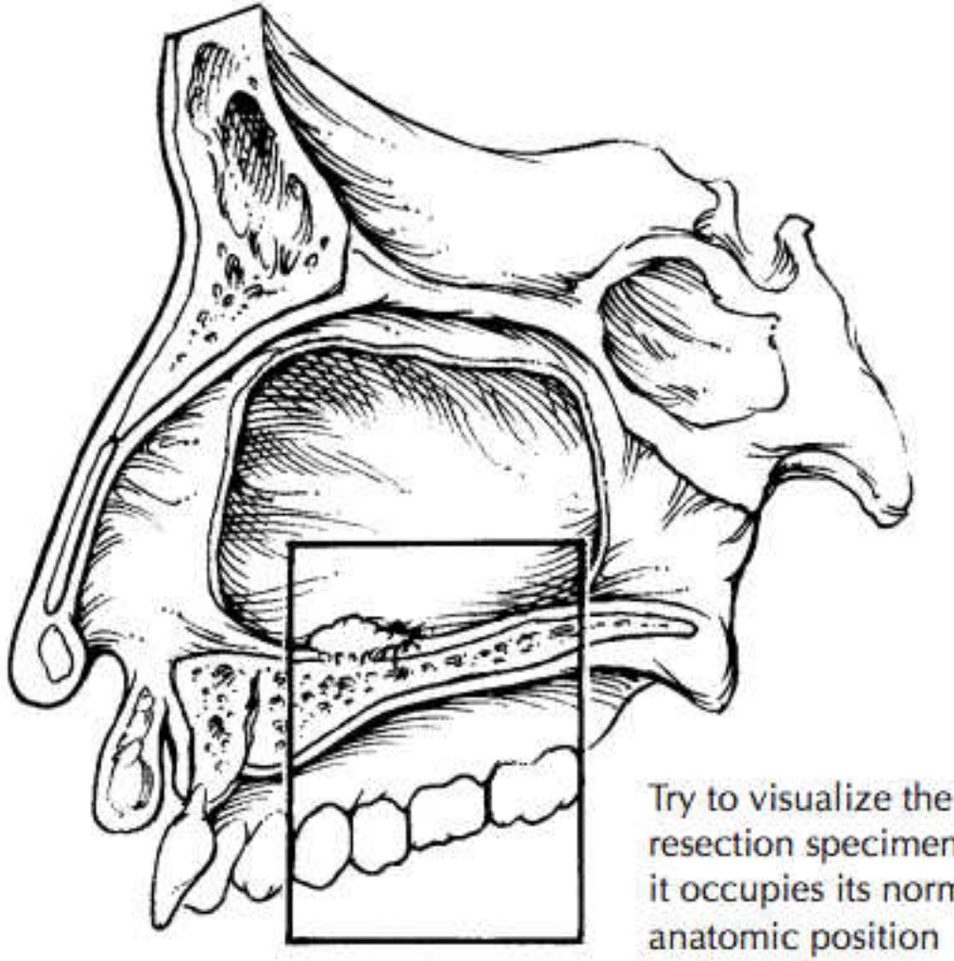
Maxilla





- Correlate with radiology
- Ink and trim mucosal margins (Don’t confuse sinuses for surgical margins!)
- Decalcify with 10% formic acid (about 10 days optimal)
- Take blocks to correlate macro and micro size, depth of invasion and assess for bone invasion

Mandible

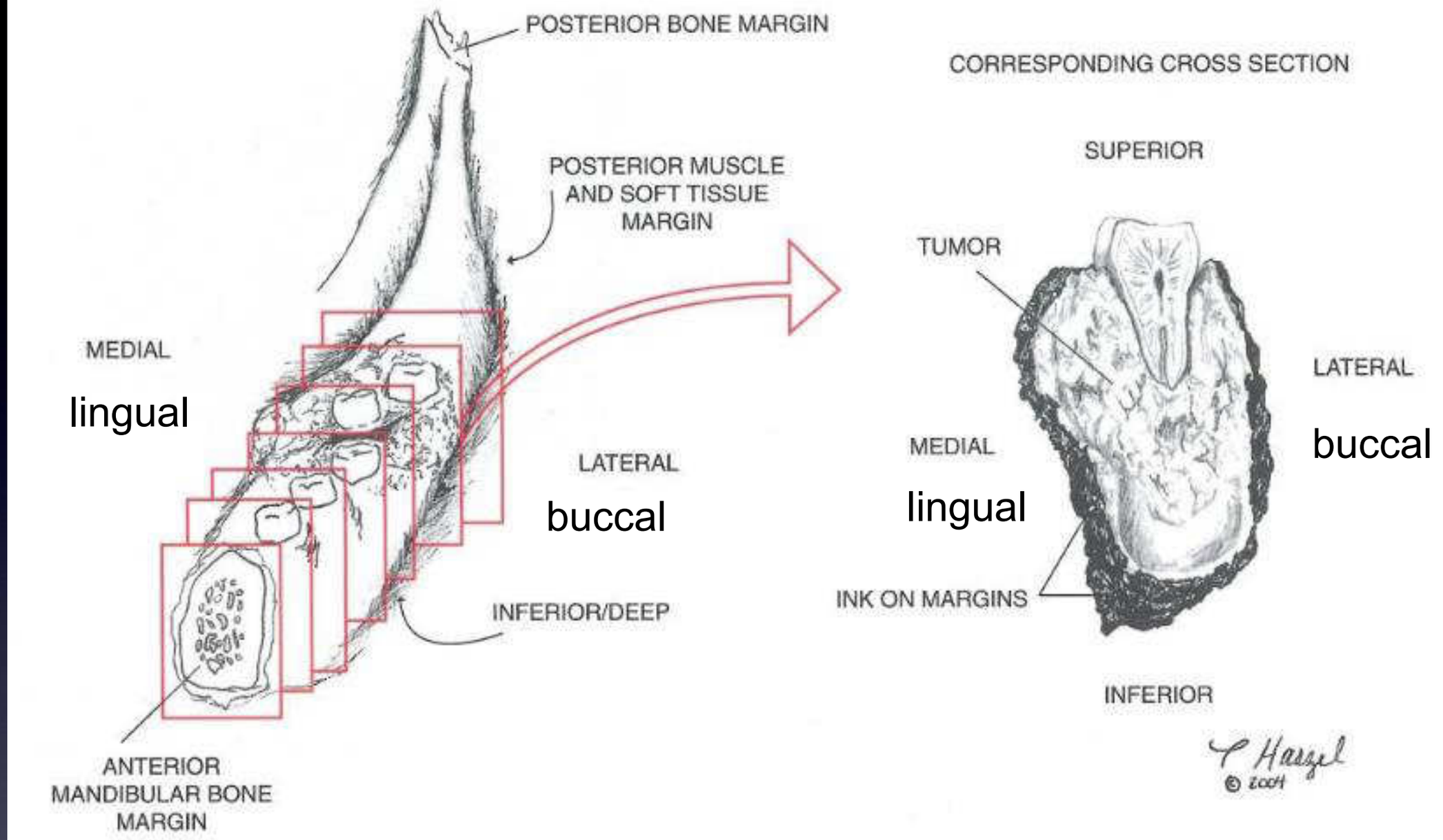
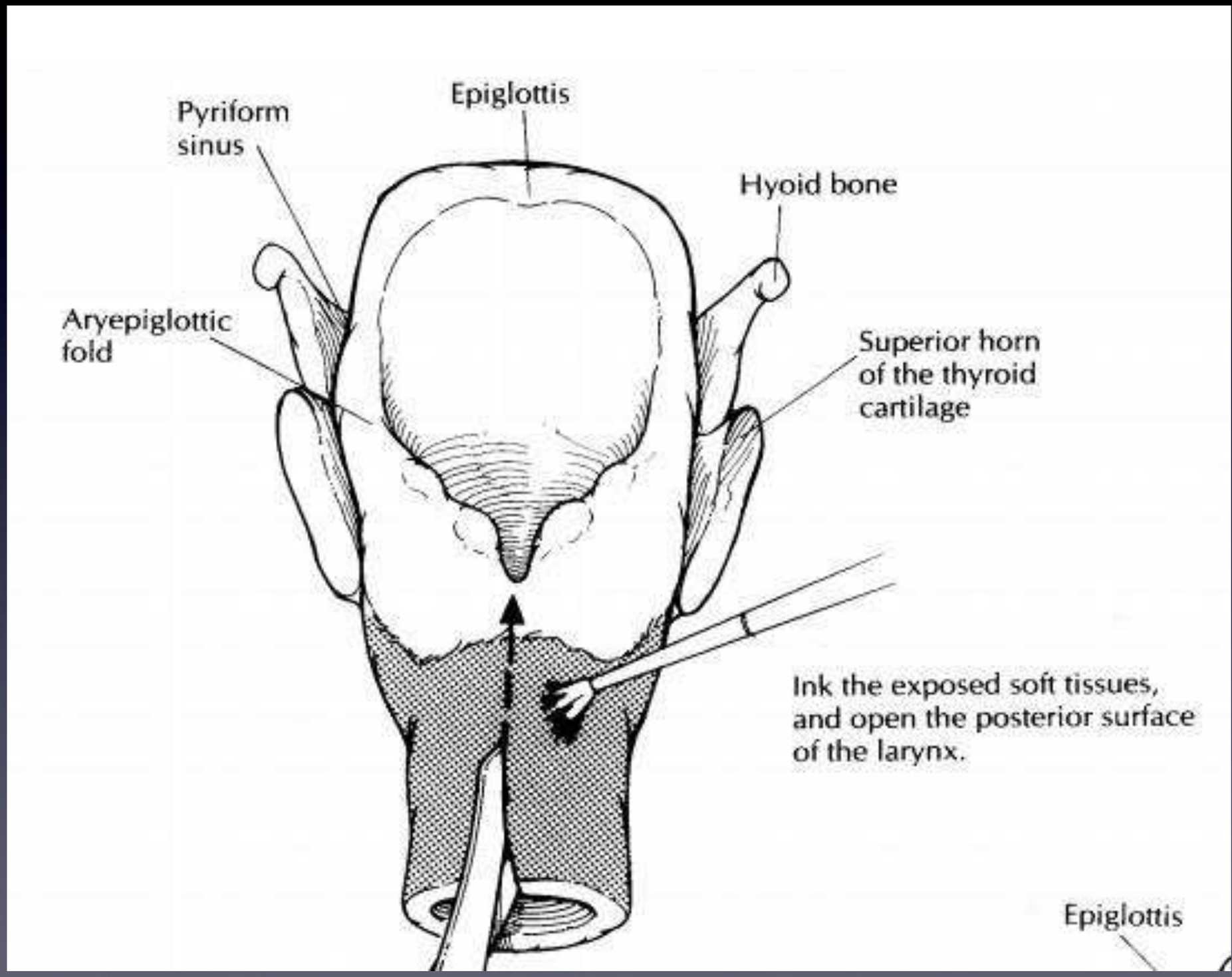
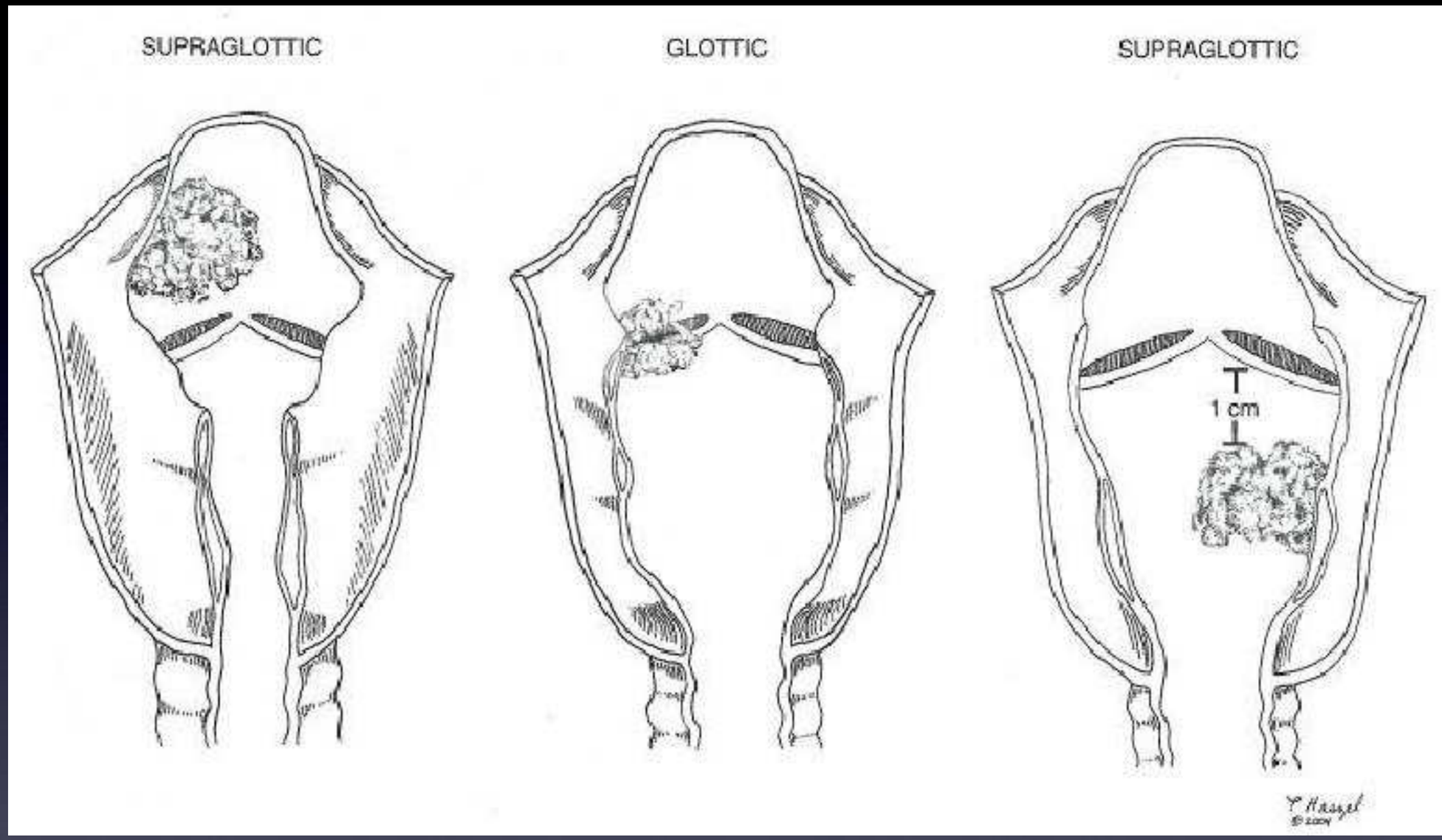


FIGURE B-7

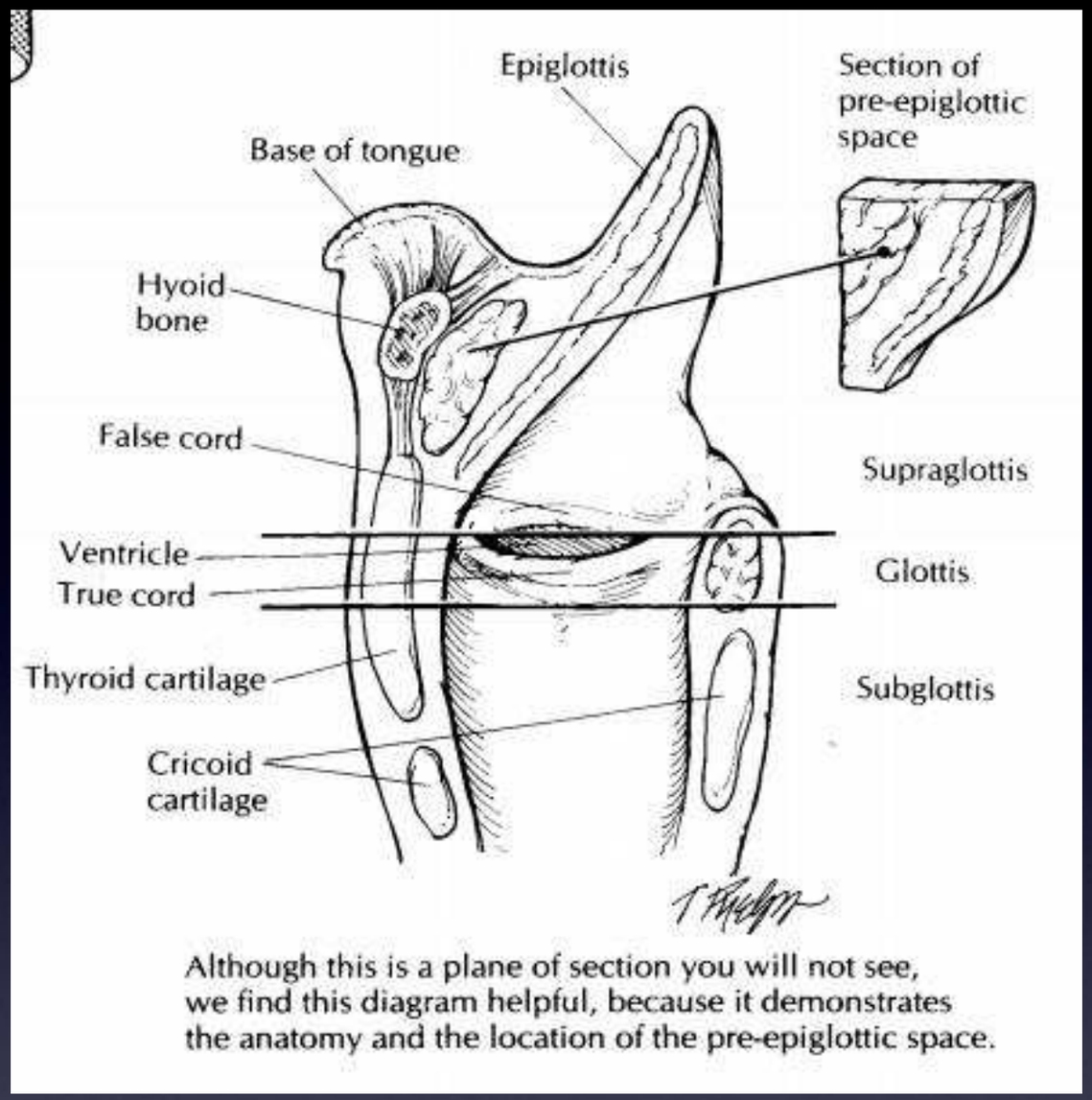
A left hemimandibulectomy and the standard approach for sectioning a specimen of this nature. The anterior and posterior bone margins should be removed first, and then the specimen serially sectioned from anterior to posterior. Reprinted by permission of Trisha Haszel, Des Moines, IA.

Confirming bone invasion and margin status is most important. SCC on gingiva is often associated with dysplasia


Epiglottis
Pyriform sinus
Hyoid bone
Aryepiglottic fold
Superior horn of the thyroid cartilage
Ink the exposed soft tissues, and open the posterior surface of the larynx.
Epiglottis



measure size of tumour, location of centre of tumour to crest of vocal cord and extent of supraglottic/subglottic extension



Although this is a plane of section you will not see, we find this diagram helpful, because it demonstrates the anatomy and the location of the pre-epiglottic space.

Base of tongue / vallecular margin usually critically important

Trim mucosal margins and decal in 10% formic acid, *or bone saw and decalcify in the blocks*

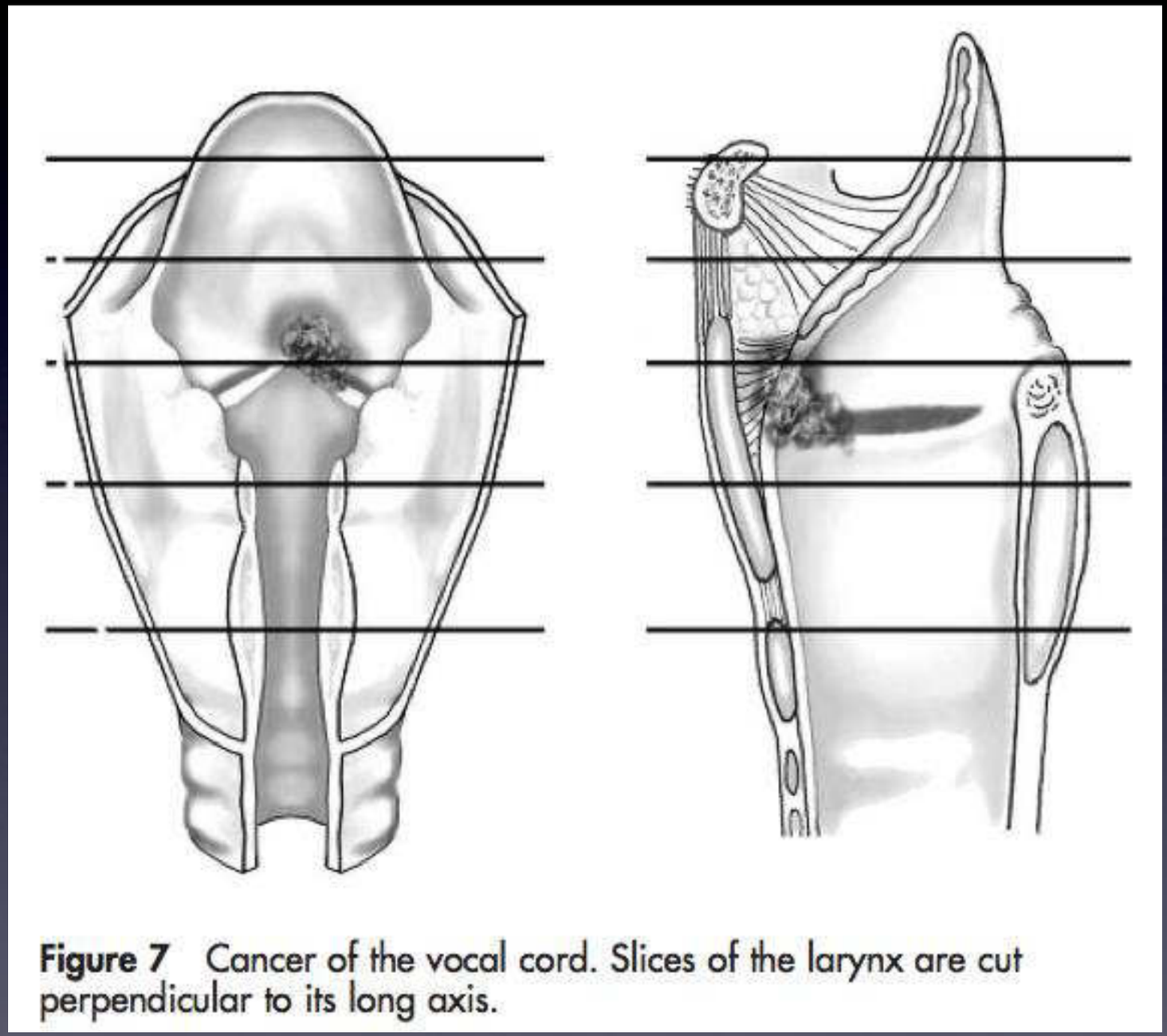
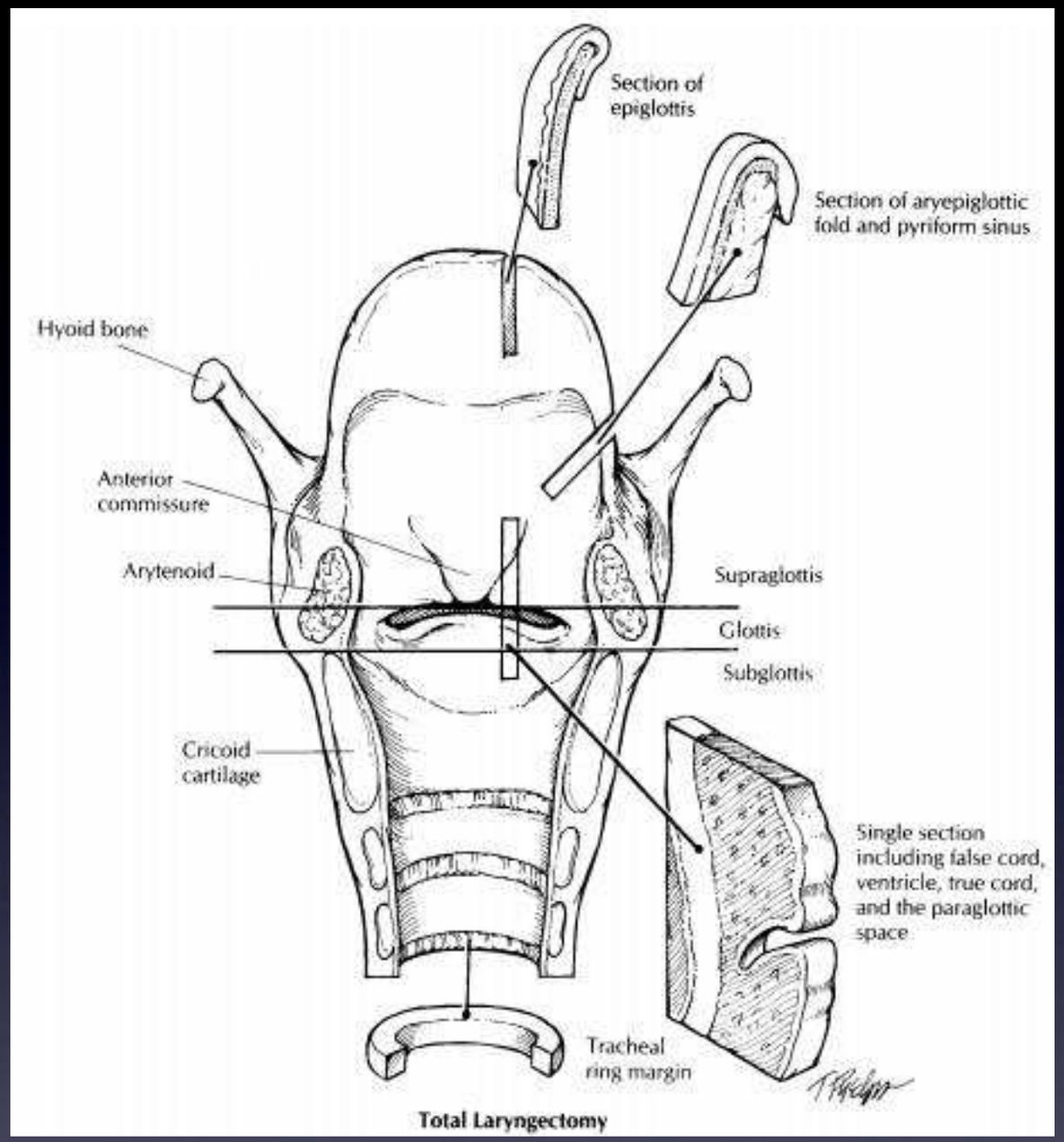


Figure 7 Cancer of the vocal cord. Slices of the larynx are cut perpendicular to its long axis.

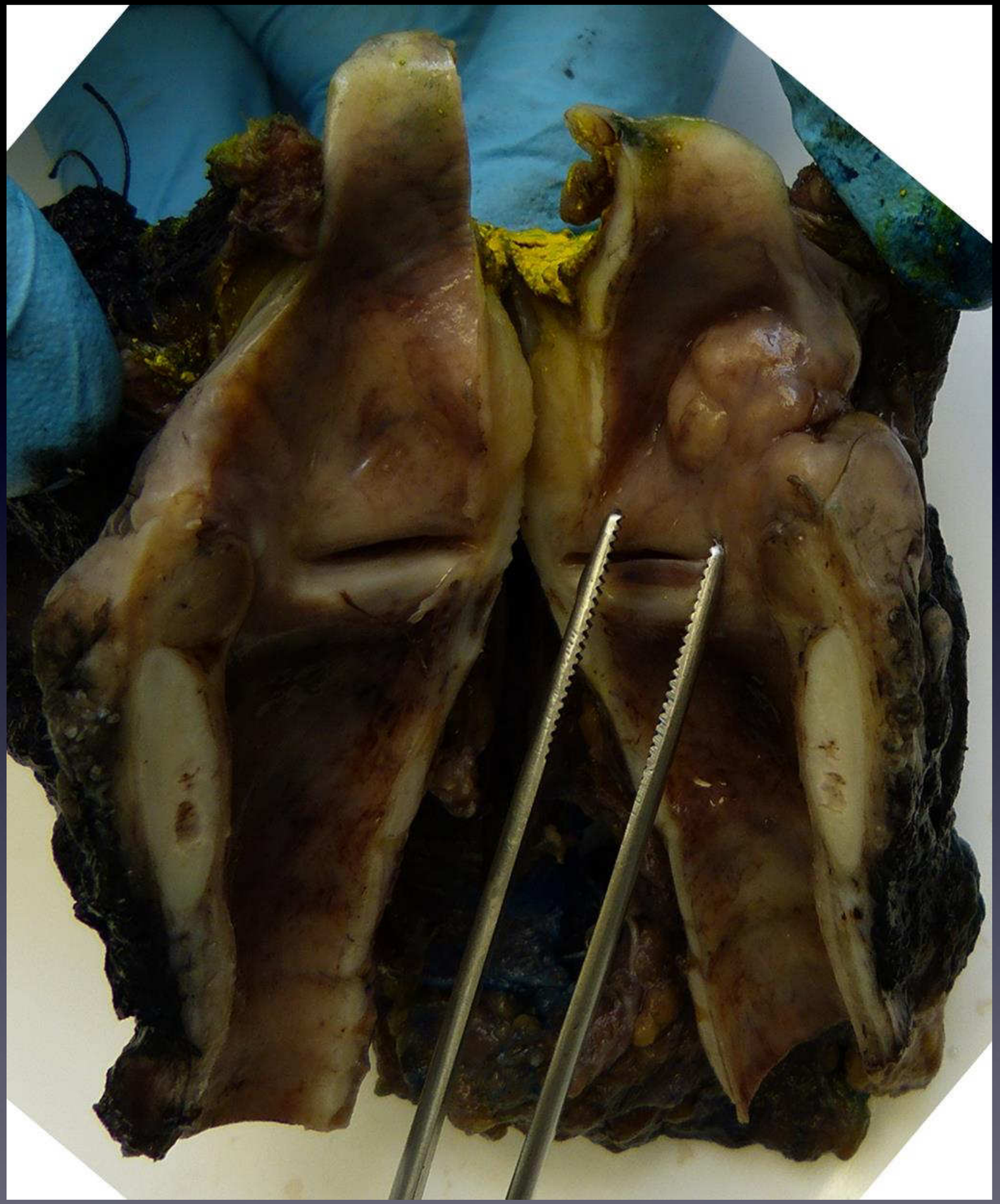
Megablocks are great for demonstrating tumour and correlating pathology with cross-sectional imaging

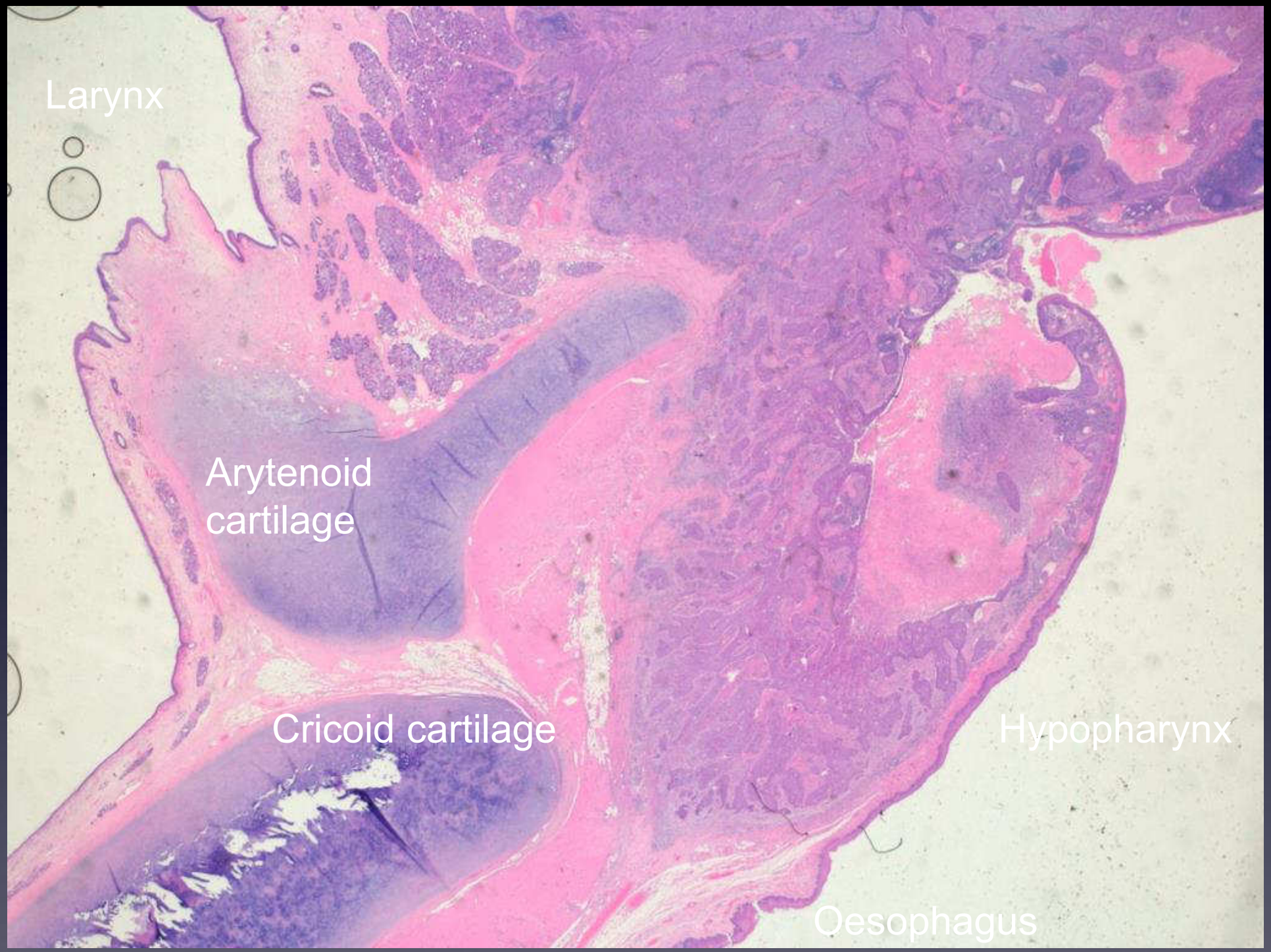
Megablock at level of vocal cord showing SCC invading right arytenoid cartilage and superficial SCC crossing midline at the anterior commisure

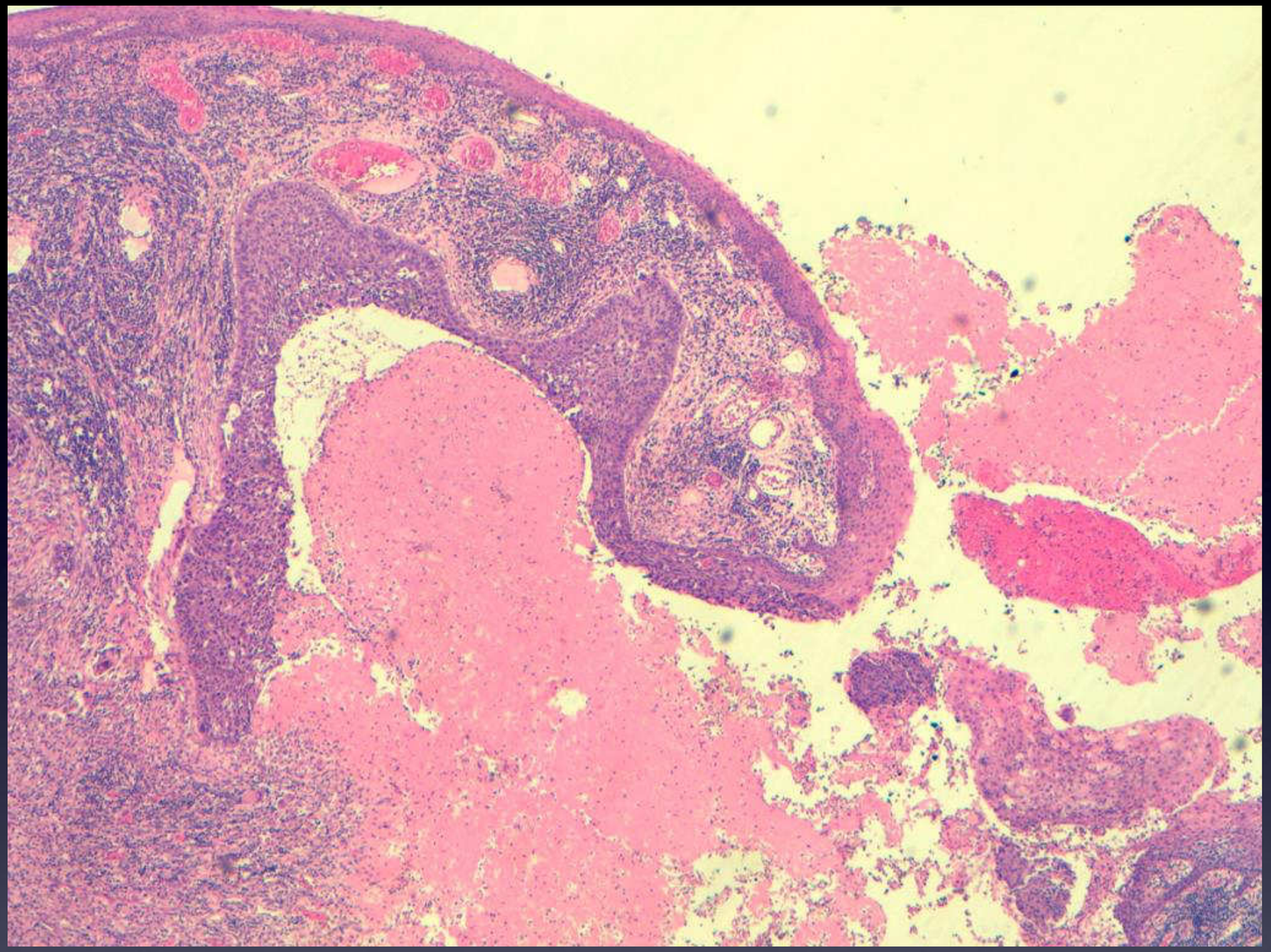


Saggital sections can be useful to show relationship of tumour to vocal cord and demonstrate subglottic extension, ideally combined with at least one megablock

Larynx or pharynx tumour?

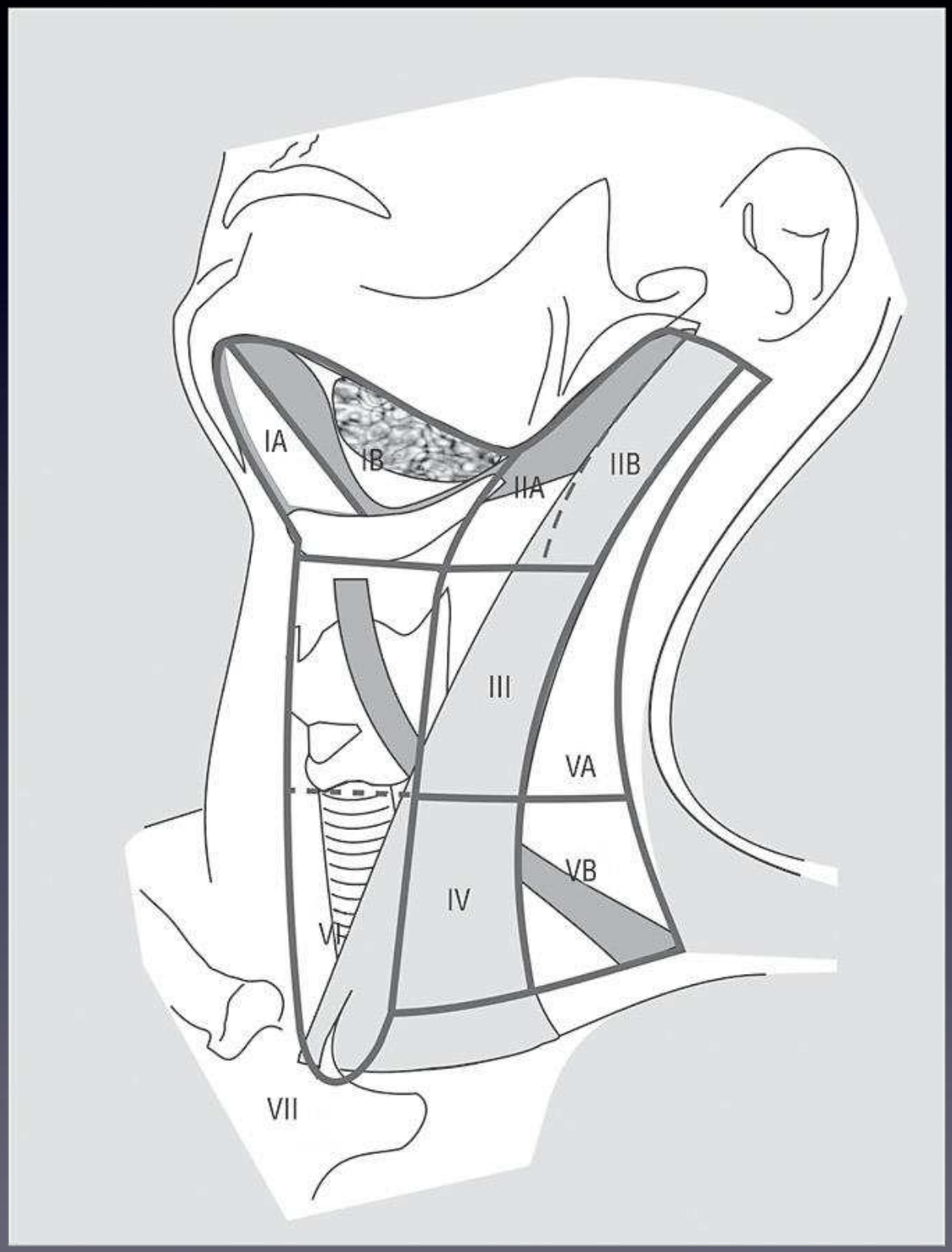



Larynx
Arytenoid cartilage
Cricoid cartilage
Hypopharynx
Oesophagus



Carcinoma in situ bordering the ulcer in the hypopharynx. Tumour extends into larynx under the mucosa. Therefore this was a hypopharyngeal SCC invading the larynx not vice versa (Radiology and ENT surgeon took a lot of convincing!)

Neck Dissections



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REVIEW

Neck dissections: A practical guide for the reporting histopathologist

Julia Woolgar*, Asterios Triantafyllou

Oral Pathology, Department and School of Dental Sciences, The University of Liverpool, Liverpool L3 5PS, UK

- Most commonly levels I-IV

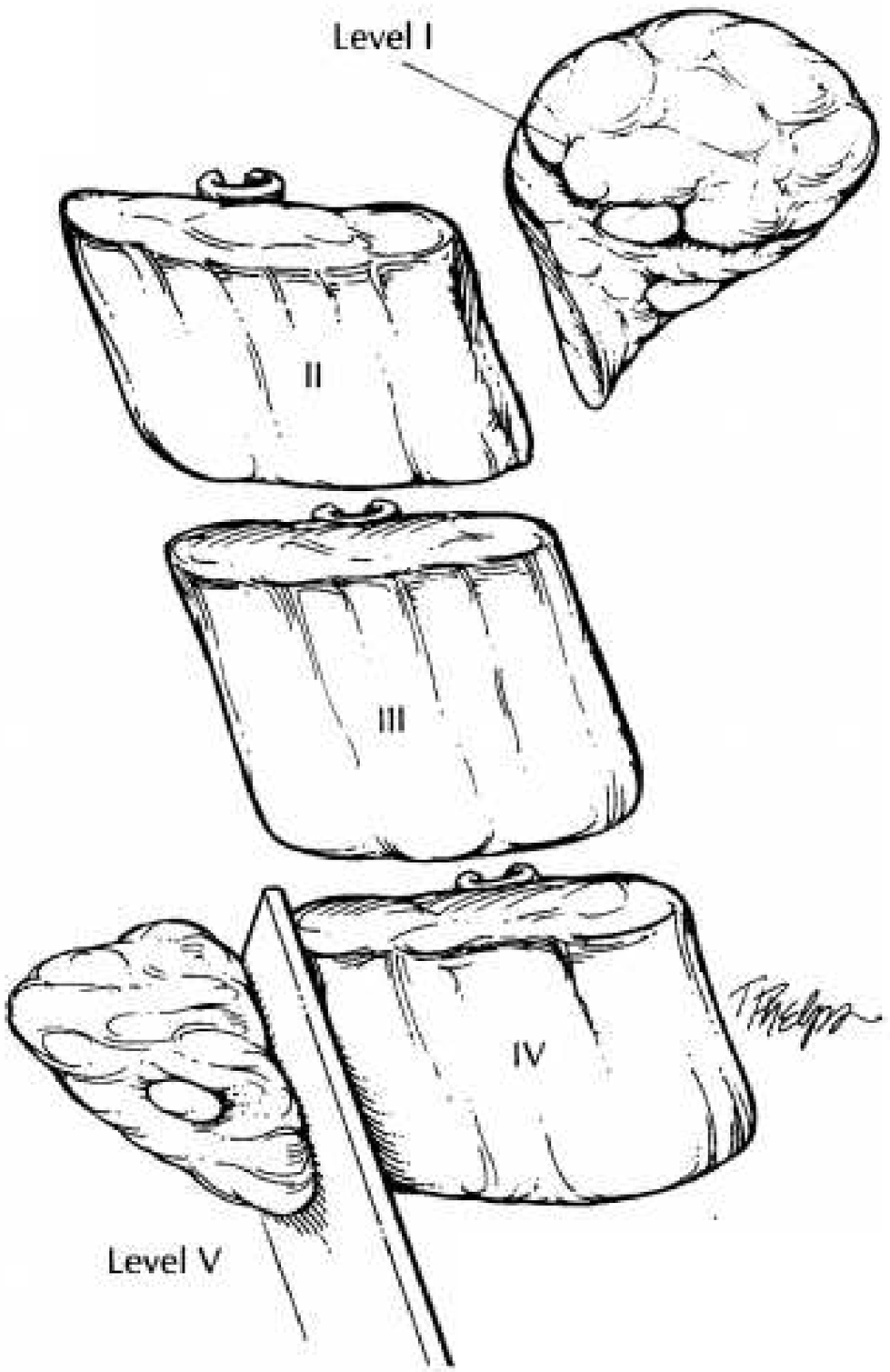
- In separate pots or pinned to a sponge or cork board with levels labelled (if you're very lucky!)

- If not labelled, levels I-IV can be approximated by location of submandibular gland and sternomastoid muscle

Which side of the neck?

Radical Neck Dissection

1. Orient the specimen. The submandibular gland occupies the most anterosuperior aspect of the resection, and the internal jugular vein lies over the medial surface of the sternocleidomastoid muscle.
2. Open the vein, and sample any lesions.
3. Separate off each level, identify all of the lymph nodes, and submit each node for histology.
4. Examine the submandibular gland, and submit a section for histology.
5. Section the muscle, and submit a section of it if any lesions are encountered.



Cervical Lymph Nodes - anatomical levels and nodal characteristics

Level	Usual number of nodes	Shape/Size	Sites drained
I	6-10	Spherical <18mm	Lower lip, FOM, oral tongue
II	10-20	Bean-shaped, flat or round <25mm	Submental, submandibular, occipital, parotid, oropharynx and larynx
III	5-10	Long, slender, flat <20mm	Upper jugular nodes, oropharynx, mid-portion of oral tongue
IV	5-10	Bean-shaped, and spherical <25mm	Upper and middle jugular nodes, tip of tongue, anterior FOM, hypopharynx, thyroid, cervical oesophagus and larynx
V	20-30	Flat, round and bean-shaped, <15mm	Occipital and posterior auricular nodes. Nasopharynx, skin of scalp and neck
VI	10-20	Small, ovoid, <10mm	Thyroid gland, glottic and subglottic larynx, apex of piriform fossa, cervical oesophagus

Reporting neck dissections

- Place multiple small nodes whole in a single cassette
- Sections of larger nodes (try to predict involvement in your macro and estimate number of nodes per cassette)
- Identify the largest node in each level and whether it shows extracapsular spread.
  **Large nodal mets only need the extracapsular areas sampled for histology*
- Look for invasion of fat or muscle fibres - *if equivocal, RCPath recommends stating as **present**, as there should be a low threshold for adjuvant therapy in these cases*
- Combine data with any previous excisions (eg. tongue or tonsil tumour) to complete the TNM stage *eg. pT2 (25mm tonsil HPV +ve SCC) N2b (3 of 22 lymph nodes, largest met 32mm in LII with ECS)*
- *No clear guidance yet about how to report "sterile nodes" post neoadjuvant*

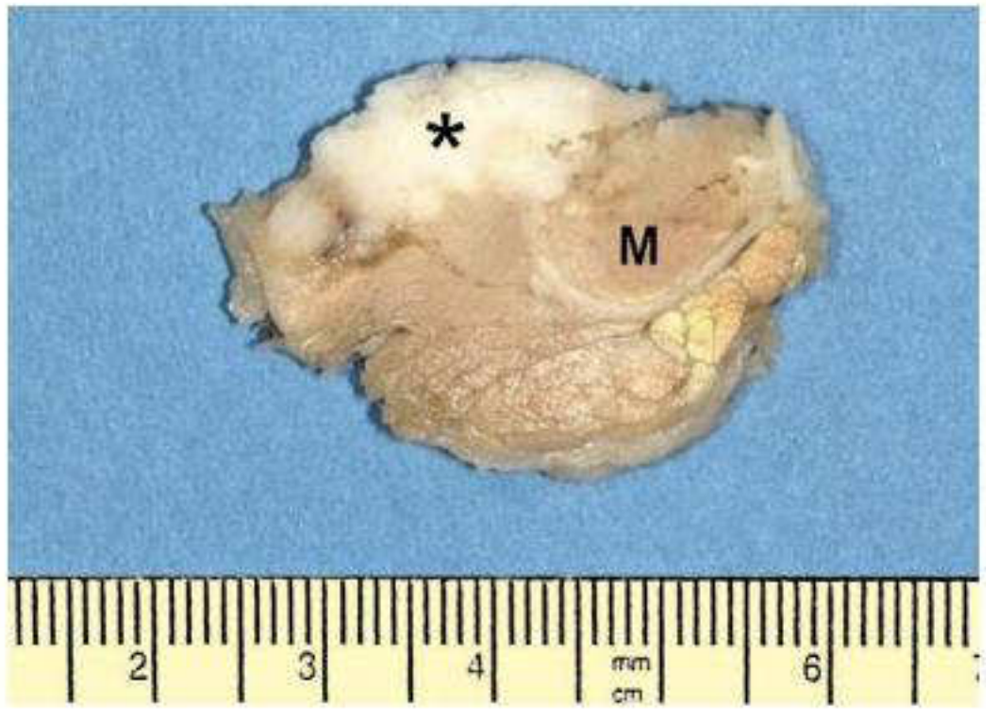
Recording extracapsular spread

Macroscopic or only microscopic.

Estimation of distance in mm from “reconstructed” node capsule.

Reference to tissues and structures involved.

Microscopic, 2mm



Macroscopic to SCM (M)

Macroscopic to SCM

Summary

- Basic principles of cutup apply to head and neck specimens
- Review anatomy and radiology and be prepared to focus your sampling towards staging parameters and important margins
- SCC is better assessed by examining growth pattern (cohesive and non-cohesive) than conventional grading (particularly in HPV related disease). Neck nodes are often bigger than the (sometimes occult) primary tonsil/tongue base tumour
- Mucosal margins can be sampled before bone decalcification
- Exact margins (eg. not >2mm) should be stated to allow pathology reports to survive changes in staging definitions

Plymouth Herald
14 June ·

I am extremely grateful to Gary Doel who raised fund s for the Exakt pathology saw consequently reduced t urnaround times and accuracy of Plymouth head and neck cancer rep orting

Plymouth builder Gary Doel is recovering from cancer and is today flying to Brazil to follow England's progress in the World Cup

Read his story here: http://ow.ly/y0z46

Gary's World Cup dream after cancer fight

A BUILDER who is recovering from cancer is flying to Brazil to follow England's progress through the World Cup. Gary Doel, aged 53, was diagnosed with cancer of the tonsils in September last year...

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References and Acknowledgments

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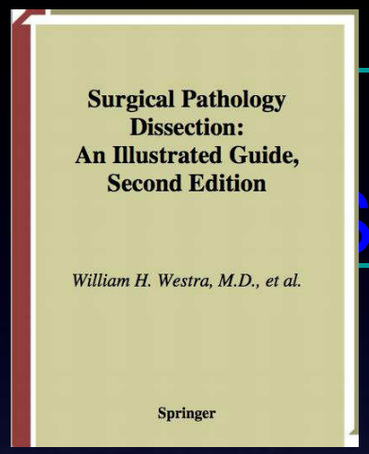

http://elib.fk.uwks.ac.id/asset/archieve/e-book/BEDAH%20-SURGERY/Surgical_Pathology_Dissection_2nd.pdf

RCPath minimum datasets
http://www.rcpath.org/clinical-effectiveness/dataset-and-tissue-pathways

Dr Miranda Pring – UBHT / Bristol University

Dr Julia Woolgar - Consultant Histopathologist (University of Liverpool)

USA Professors Justin Bishop (UT Southwestern) William Westra (Johns Hopkins) and for remote