LEE KONG CHIAN SCHOOL OF MEDICINE

NANYANG TECHNOLOGICAL UNIVERSITY | Imperial College London

Neck Dissection

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REDEFINING MEDICINE, TRANSFORMING HEALTHCARE

History – radical neck

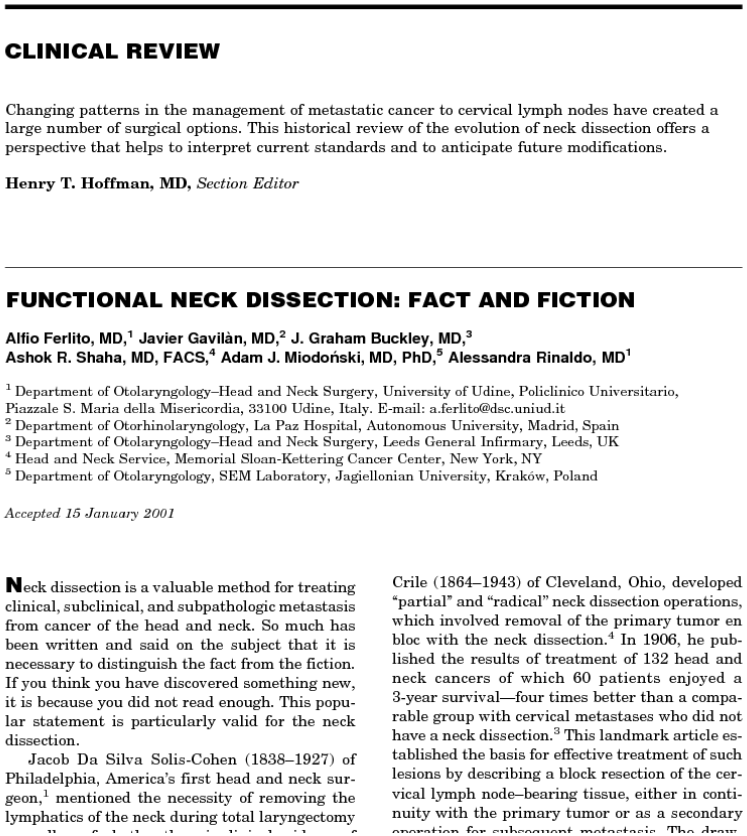
- Henry Butlin proposed enbloc removal of upper neck nodes with primary oral cavity cancers[1]
- 'Radical' neck dissection first described by George Crile (1906)
- 60/132 patients enjoyed 3 year survival – 4 times better than control group[2]

[1] Butlin HI, Spencer WG, Disease of the tongue, 2nd ed. London: Cassell, 1900

[2] Crile G. Excision of cancer of the head and neck. With special reference to the plan of dissection based on 132 patients. JAMA 1906;47:1780–1786

History – selective neck

- Solis-Cohen proposed removal of uninvolved nodes during laryngectomy in 1901
- Functional Neck Dissection was described by Suarez in 1963[1]
- Bocca popularised this, published outcome in 843 patients in 1984[2]



CLINICAL REVIEW

Changing patterns in the management of metastatic cancer to cervical lymph nodes have created a large number of surgical options. This historical review of the evolution of neck dissection offers a perspective that helps to interpret current standards and to anticipate future modifications.

Henry T. Hoffman, MD, *Section Editor*

FUNCTIONAL NECK DISSECTION: FACT AND FICTION

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Neck dissection is a valuable method for treating clinical, subclinical, and subpathologic metastasis from cancer of the head and neck. So much has been written and said on the subject that it is necessary to distinguish the fact from the fiction. If you think you have discovered something new, it is because you did not read enough. This popular statement is particularly valid for the neck dissection.

Jacob Da Silva Solis-Cohen (1838–1927) of Philadelphia, America's first head and neck surgeon,[1] mentioned the necessity of removing the lymphatics of the neck during total laryngectomy

Crile (1864–1943) of Cleveland, Ohio, developed "partial" and "radical" neck dissection operations, which involved removal of the primary tumor en bloc with the neck dissection.[4] In 1906, he published the results of treatment of 132 head and neck cancers of which 60 patients enjoyed a 3-year survival—four times better than a comparable group with cervical metastases who did not have a neck dissection.[3] This landmark article established the basis for effective treatment of such lesions by describing a block resection of the cervical lymph node–bearing tissue, either in continuity with the primary tumor or as a secondary

[1] Ferlito A et. al. Functional Neck Dissection: Fact and Fiction. Head Neck 2001;23:804-8

[2] Bocca E, Pignataro O, Oldini C, Cappa C. Functional neck dissection: an evaluation and review of 843 cases. Laryngoscope 1984;94:942–945

Why do a neck dissection?

- Eradicate disease

  'When a single nodal metastasis exists at presentation or subsequently develops, the cure rate halves' [1]
- Stage the neck to guide further treatment and prognostic information
- Surgical access to primary tumour or for microvascular anastomosis

[1] Spiro RH, Alfonso AE, Farr HW, Strong EW. Cervical node metastases from epidermoid carcinoma of the oral cavity and oropharynx. A critical assessment of current staging. Am J Surg 1974;128:562-567.

Tumour biology

- Incidence of nodal metastases depends mainly on the site and the size of the primary tumour
  - 1% for early glottic tumours, 80% for nasopharyngeal carcinomas

- The majority of tumours will metastasise in a predictable manner but certain tumours will fast track to remote sites
  - nasopharyngeal cancers to level V
  - tongue cancers to jugulo-omohyoid nodes
  - pattern of spread will be disrupted by previous surgery or radiotherapy

Tumour biology

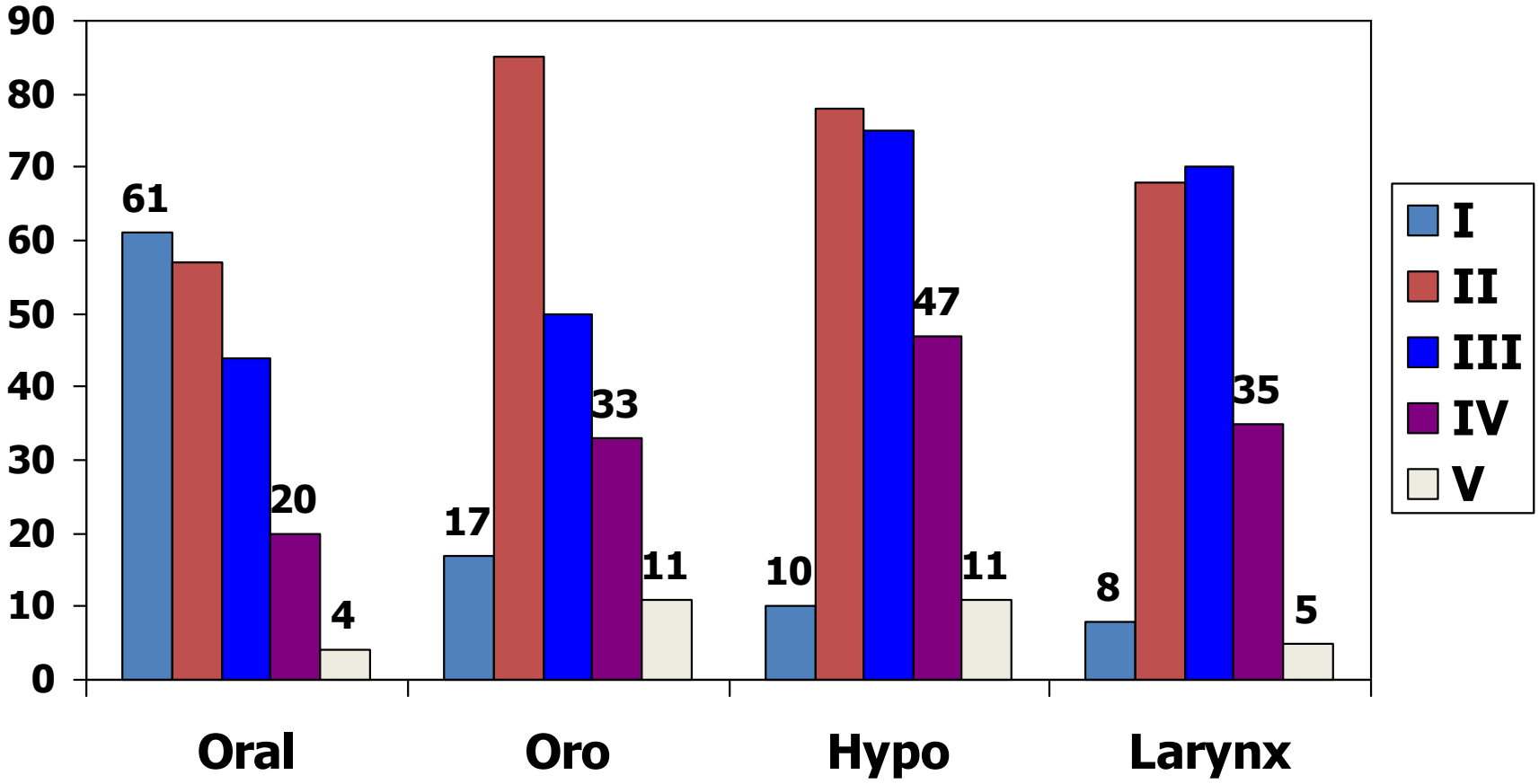
- Possibility of bilateral nodal disease should be considered especially when the primary site involves
  - Tongue base
  - Nasopharynx
  - Supraglottic larynx

Tumour biology

Oral cavity, anterior to circumvallate papillae	→	I-III, rarely to IV-V
Oropharynx	→	Mainly II, then III-IV, low rate to I, rarely V
Supraglottic larynx & hypopharynx	→	Mainly II, then III-IV, rarely I-V
Nasopharynx	→	Widespread II-V

Lindberg R. Distribution of cervical lymph node metastases from squamous cell carcinoma of the upper respiratory and digestive tracts. Cancer 1972;29:1446–8

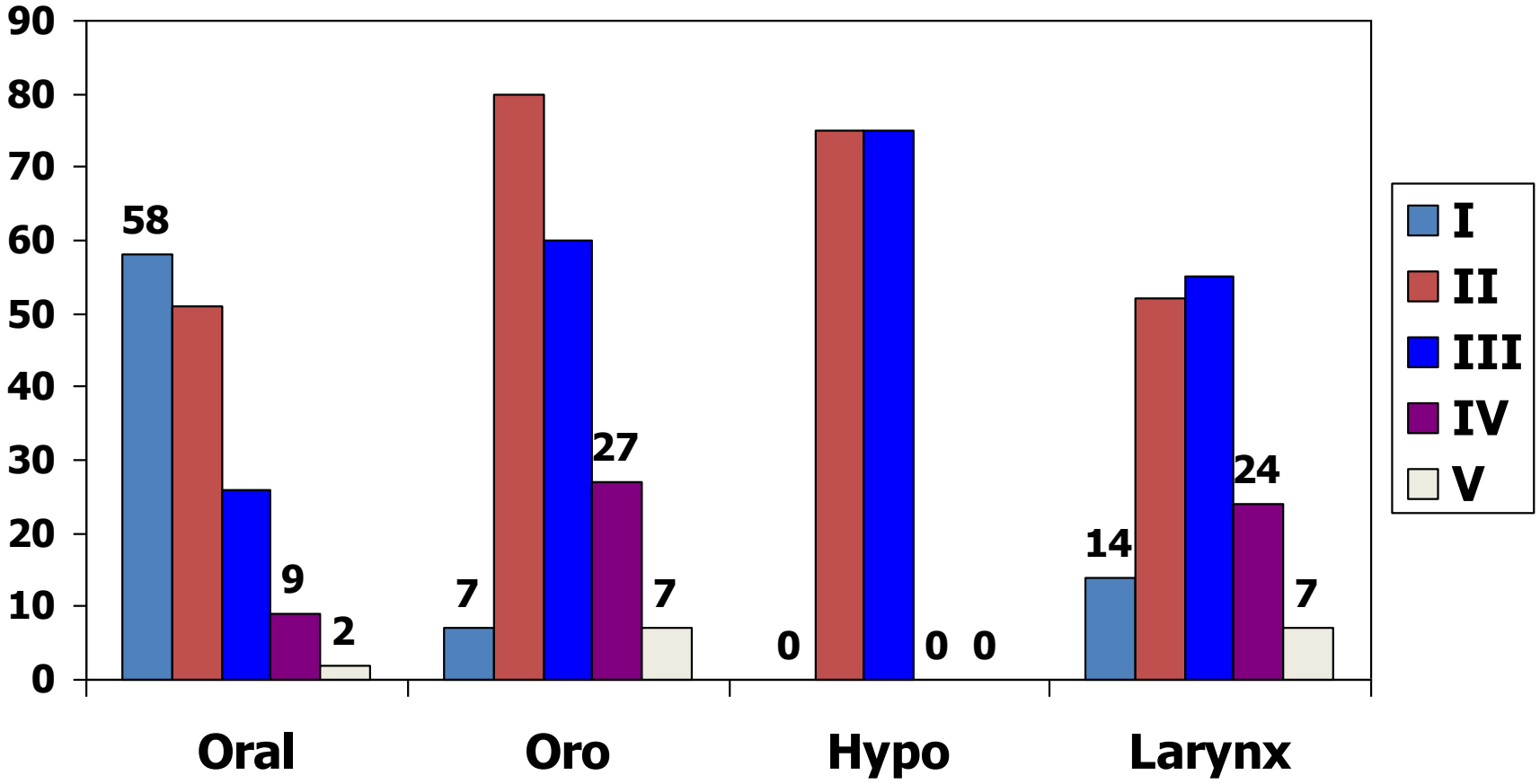
Therapeutic dissections n = 776



Shah JP, et al. The patterns of cervical lymph node metastases from squamous carcinoma of the oral cavity. Cancer 1990;66:109–13

Shah JP. Patterns of cervical lymph node metastasis from squamous carcinomas of the upper aerodigestive tract. Am J Surg 1990;160:405–9

Elective dissections n = 343



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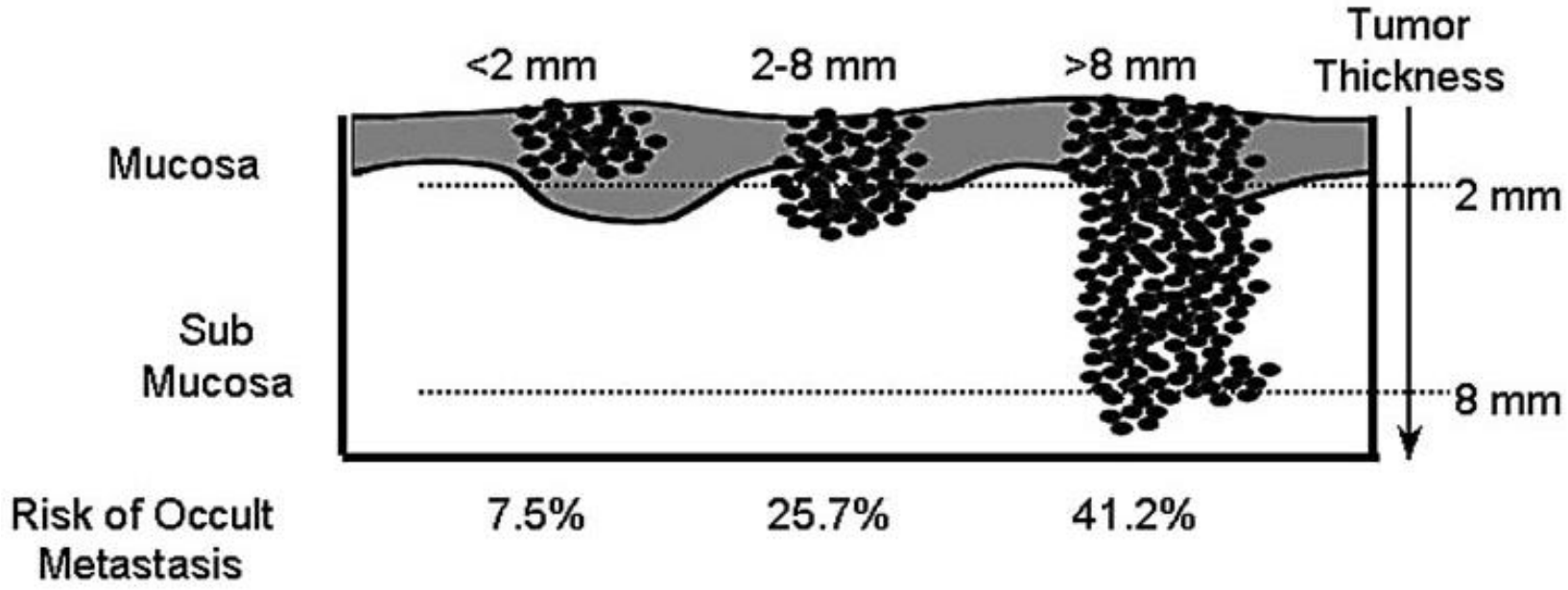
Oral cavity tumours



Spiro RH, Huvos AG, Wong GY, et al. Predictive value of tumor thickness in squamous carcinoma confined to the tongue and floor of the mouth. Am J Surg 1986;152: 345–50

Oral cavity:
tumours > 4 mm thick predict mets

Original Article

Predictive Value of Tumor Thickness for Cervical Lymph-Node Involvement in Squamous Cell Carcinoma of the Oral Cavity

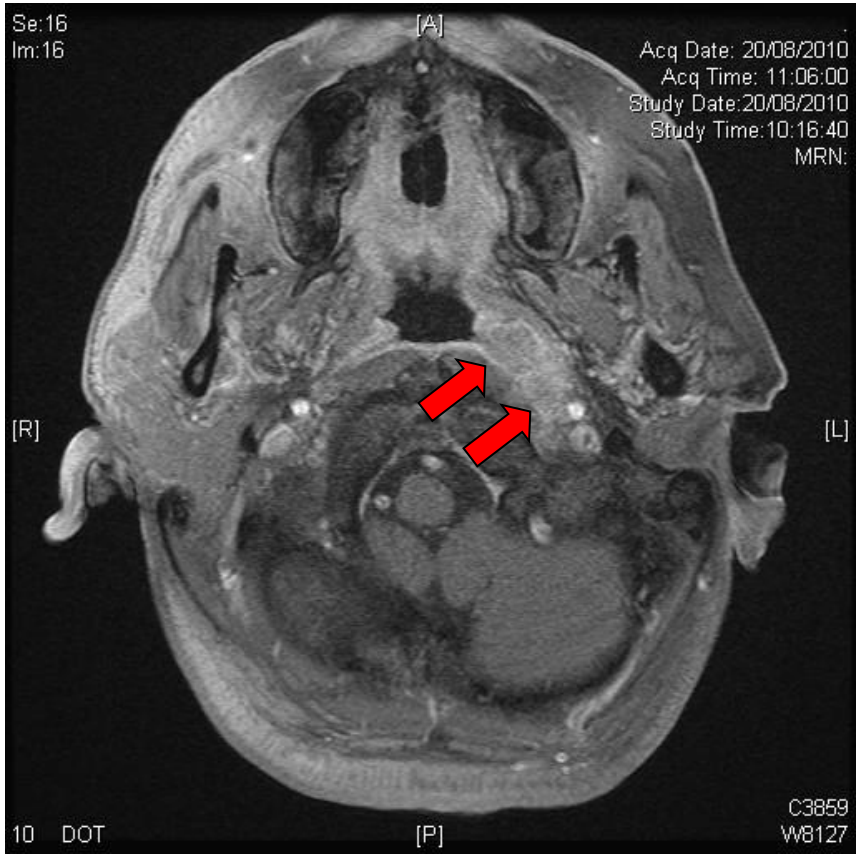
A Meta-analysis of Reported Studies

Shao Hui Huang, MSc[1,2], David Hwang, MB[2], Gina Lockwood, MMath[3], David P. Goldstein, MD[4,5], and Brian O'Sullivan, MD[2,4]

False negative rate of patients predicted by thickness not to have metastases rises significantly once tumour is more than 4 mm thick

Nasopharyngeal carcinoma
"an exception that proves the rule"

- 43 radical neck dissection specimens post-RT
  - In 70% there was more tumour bearing nodes than expected
  - 70% nodes involved had extra-capsular spread
  - 27.5% had tumour along XI nerve
  - 70% nodes were in posterior triangle



Wei WI et. al. Pathological basis of surgery in the management of postradiotherapy cervical metastasis in nasopharyngeal carcinoma. Arch Otolaryngol Head Neck Surg. 1992 Sep;118(9):923-9

Which neck dissection?

- Radical Neck Dissection
- Modified Radical Neck Dissection
  - Type I spare XI nerve
  - Type II spare XI and IJV
  - Type III spare XI, IJV and SCM
- Selective Neck Dissection
  - Supra-omohyoid (I-III)
  - Anterolateral (I-IV)
  - Lateral (II-IV)
  - Posterolateral (II-V)
  - Central (VI)

Robbins KT, Medina JE, Wolfe GT, Levine PA, Sessions RB, Pruet CW. Standardizing neck dissection terminology.Official report of the Academy's Committee for head and neck surgery and oncology. Arch Otolaryngol HeadNeck Surg 1991;117:601–605.

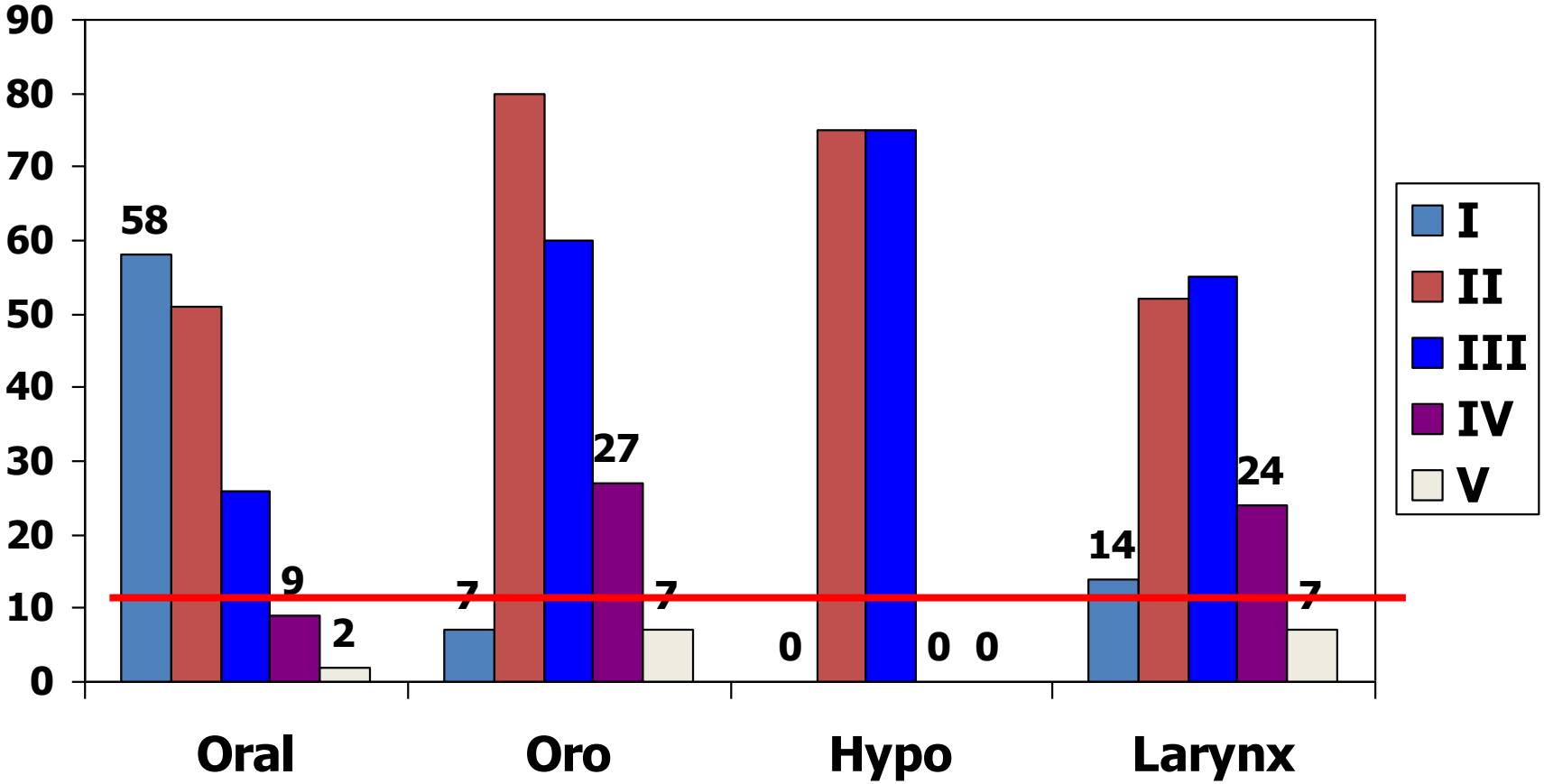
When to do a neck dissection?

Head and neck squamous cell carcinoma

- N+ neck
  - If primary disease is to be resected
  - After definite radiotherapy, if there is residual nodal disease
  - (After radiotherapy, if neck disease pre-treatment was bulky (N3) i.e. 'planned neck dissection')
- N0 neck (elective neck dissection)
  - If primary disease is to be resected and the rate of 'occult' metastases is 20% or more

Weiss MH, Harrison LB, Isaacs RS. Use of decision analysis in planning a management strategy for the N0 neck. Arch Otolaryngol Head Neck Surg 1994;120:699-702.

Elective dissections n = 343



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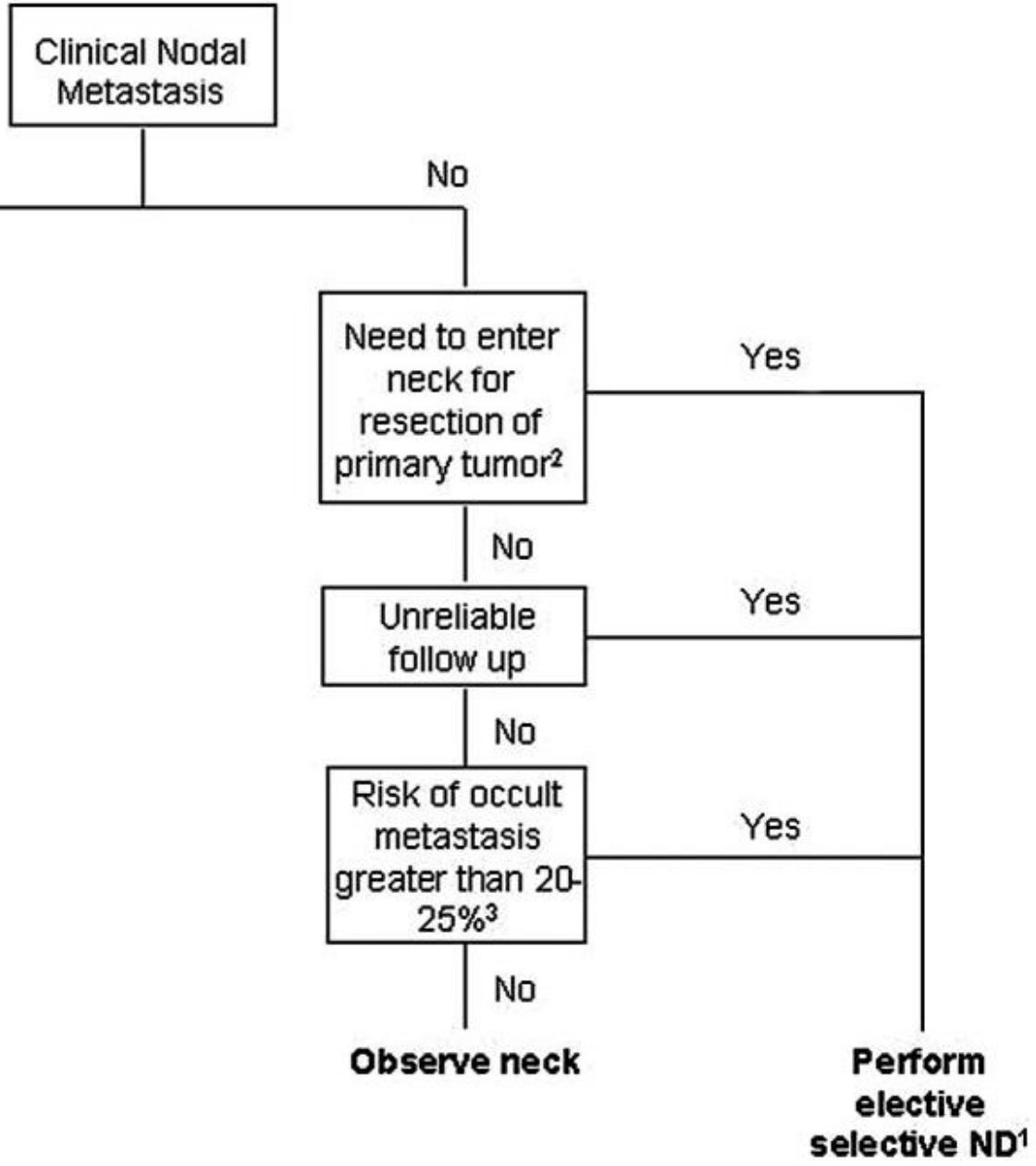

[1]Oral cavity - SOHND
Oropharynx - LND or ALND
Hypopharynx/larynx - LND

[2] Mandibulotomy, lateral pharyngotomy, supraglottic laryngectomy for example

[3] Primary located in oropharynx, hypopharynx or supraglottic larynx. Oral cavity tumor greater than 2 mm thick

Why not observe the N0 neck closely?

60% of patients who recurred in the neck presented with N2 or greater disease

77% had evidence of extracapsular spread

Such patients required more extensive therapy than if they had undergone elective treatment

Andersen P, Cambronero E, Shaha AR, Shah JP. The extent of neck disease after regional failure during observation of the N0 neck. Am J Surg 1996 Dec;172(6):689–91

When to do a neck dissection?

Differentiated thyroid cancer

In N1a+, level VI (central compartment) neck dissection

In N1b+, level II-V (posterolateral) and level VI neck dissection

In N0 papillary thyroid cancer, if age > 45, male, >T2, offer elective level VI dissection

Medullary thyroid ca

In N0, level VI-VII neck dissection

In N0 and pT2-T4, or N1+ disease, add level IIa-Vb neck dissection

Guidelines for the management of thyroid cancer. British Thyroid Association 2007

When to do a neck dissection

Salivary gland malignancy

If N+, modified radical neck dissection. XI may be difficult to preserve

If N0, consider level I-III and Va if high grade histology (e.g. high grade mucoepidermoid, undifferentiated, ca-ex pleo, SCC) T3-4, old age, SMG cancers and recurrent cancers

THANK YOU!