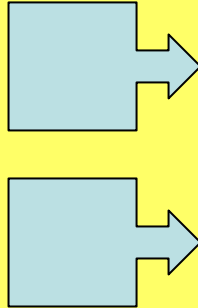


Post operative head and neck cancers - delineation issues

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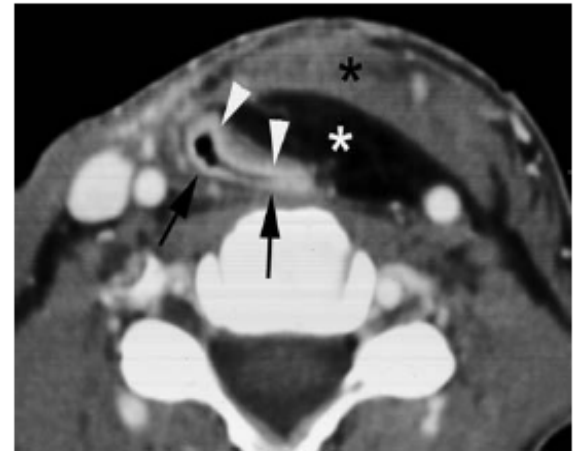
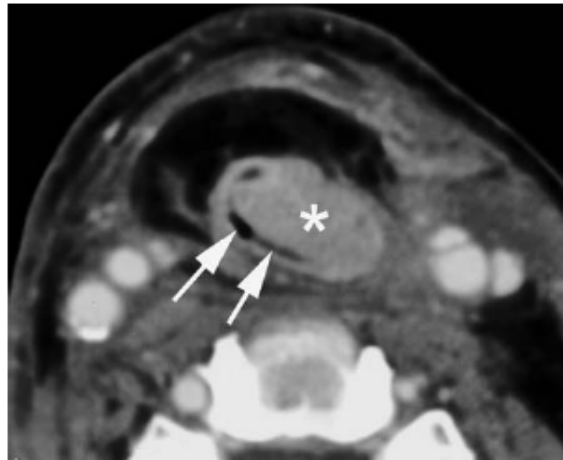
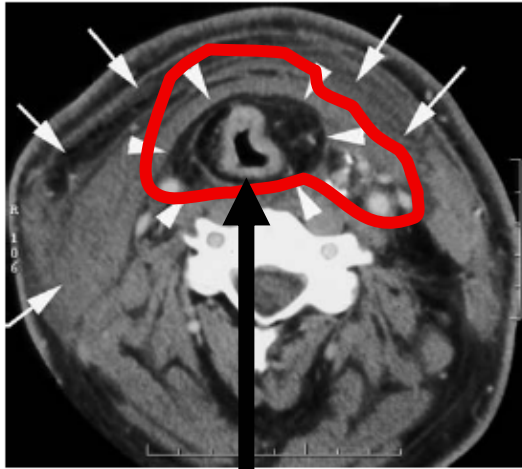
Indications for postoperative RT

- Residual disease (R1/R2 resection)
 - Close margin
 - Soft tissue extension/ ECE
 - Perineural extension
- 
- Revision Surgery/
High risk
- Consider in high
Risk CTV volume

Some basic facts in postoperative situations

- Staged reconstruction not advocated –so as not to delay post op RT
- Surgical information needed
- Anatomical barriers disrupted
- Local excision & regional dissection – a common field
- Entire surgical bed to be encompassed
- Lack of sufficient tissue
- Case for case greater volume of RT treated to include scar, drain sites.

Total laryngectomy + neopharynx reconstruction



Postop CTV Difficult to identify the bed!

For delineation may need to refer to the preop findings, surgeon's notes, preoperative CT scans or opposite side anatomy.

Guidelines for including the tumor bed

- Preop GTV + 2cm margin
- By Surgical clips or tissue inflammation or fibrosis (on CT scan), at times the graft may overlie the bed.
- To take care of residual disease, soft tissue extension and surgical spillage

Gregoire et al, Radiother Oncol, 2006:79;15-20

Lee et al, IJROBP, 2003:57;49-60

Postoperative CTV primary must include

Site	Procedure	Residual tu. + Tumor bed + margin	CTV must include
Buccal mucosa	WLE +SOND	+	GB sulcus (S-I), ITF, submanibular gland, lip to RMT
Tongue	Hemiglossectomy +SOND	+	Muscles, BOT, FOM, GT sulcus, ATP
Larynx	TL + RND	+	Entire Lx, PFS, vallecula, PES, PGS, thyroid cartilage, Tracheostomy site
Hypopharynx	TL+ PP+ NTT +RND+ GPU	+	PPS, PPW, hemiLx, I/L thyroid lobe, PGS, AEF

Node negative neck - CTV definitions



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CT-based delineation of lymph node levels and related CTVs in the node-negative neck: DAHANCA, EORTC, GORTEC, NCIC, RTOG consensus guidelines

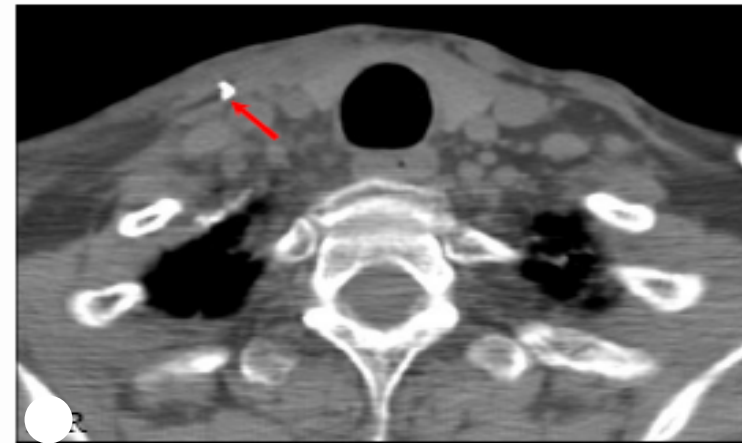
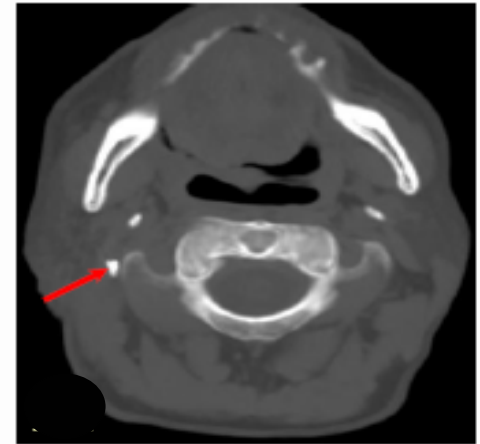
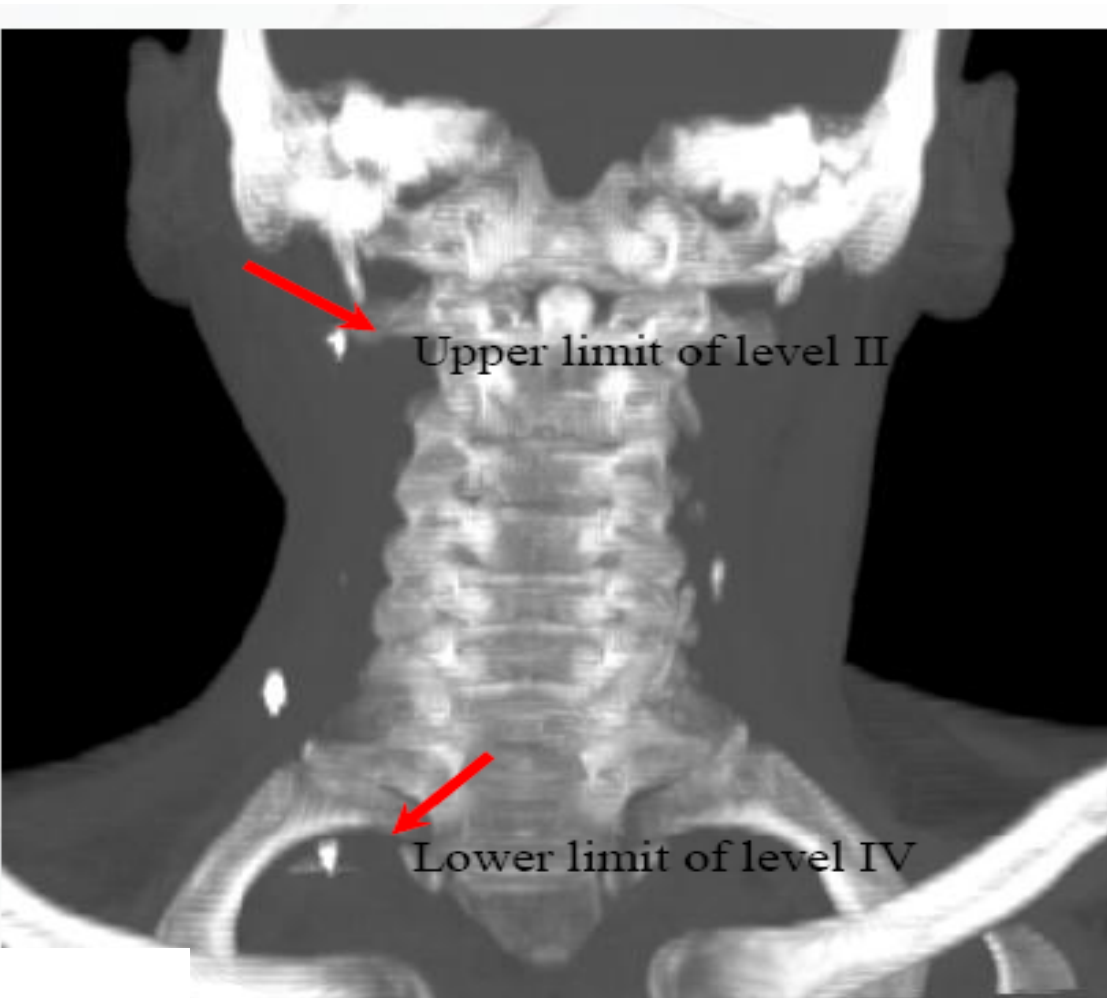
Vincent Grégoire^{a,*}, Peter Levendag^{b,1}, Kian K. Ang^c, Jacques Bernier^d, Marijel Braaksma^b,
Volker Budach^e, Cliff Chao^c, Emmanuel Coche^f, Jay S. Cooper^c, Guy Cosnard^f,
Avraham Eisbruch^c, Samy El-Sayed^g, Bahman Emami^c, Cai Grau^h, Marc Hamoirⁱ,
Nancy Lee^c, Philippe Maingon^j, Karin Muller^b, Hervé Reyhler^k

DAHANCA: <http://www.dshho.suite.dk/dahanca/guidelines.html>

EORTC: <http://www.eortc.be/home/Radio/EDUCATION.htm>

RTOG: <http://www.rtog.org/hnatlas/main.htm>

CT based delineation of LN levels in the neck - Brussels-Rotterdam consensus guidelines



Patterns of failure

n	site	Follow up	LRR	Marginal recurrence	Comments
135	Ophx (80)	32 mo	21	4	Marginal recurrence occurred in Base skull level II LN region (beyond delineated region)

Eisbruch, 2004:IJROBP; 59:28-42

Som et al; Arch Otolaryngol HN Surg. 1999;129; 388-396

Target volume delineation

Proposal for the delineation of the nodal CTV in the node-positive and the post-operative neck

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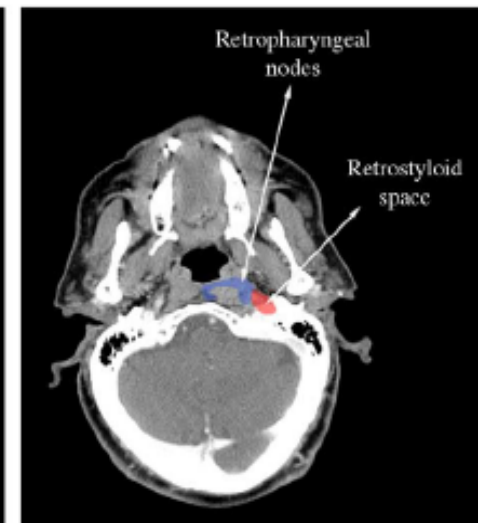
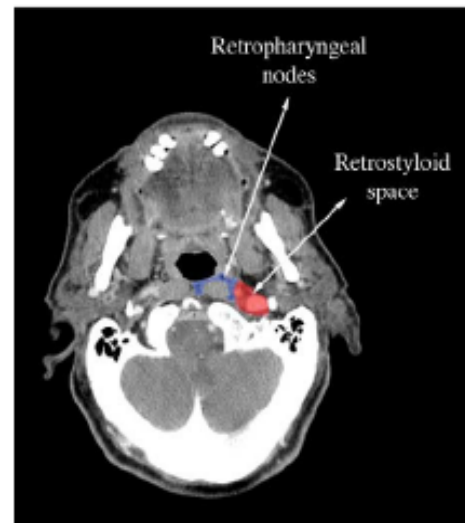
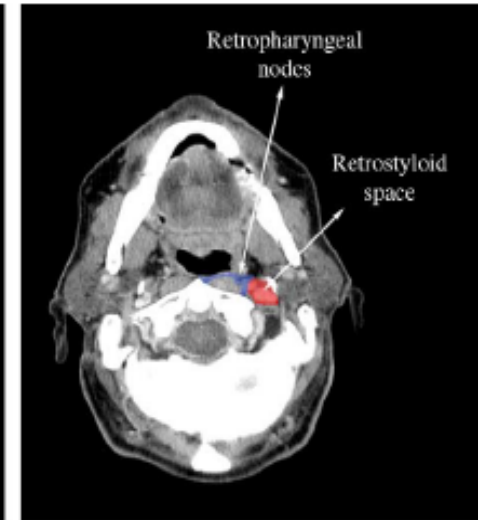
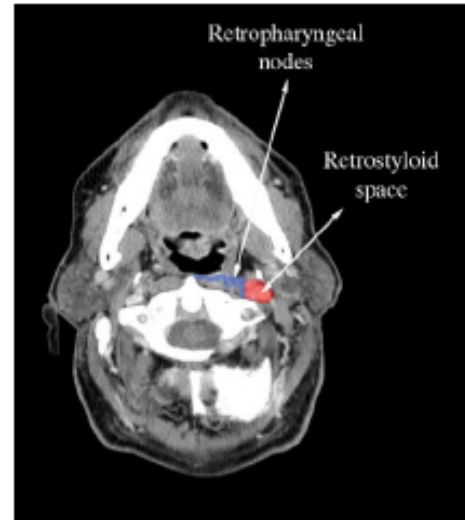
^c*Department of Head and Neck Surgery and Head and Neck Oncology Program, Université Catholique de Louvain, Brussels, Belgium,* ^d*Department of Radiation Oncology, Rotterdam, The Netherlands*

Cranial extension- Retrostyloid space

Eisbruch et al observed marginal recurrences in **N+** neck at base skull

Explanation – positive LN may induce retrograde lymph flow

Consensus guidelines modified Level II delineation

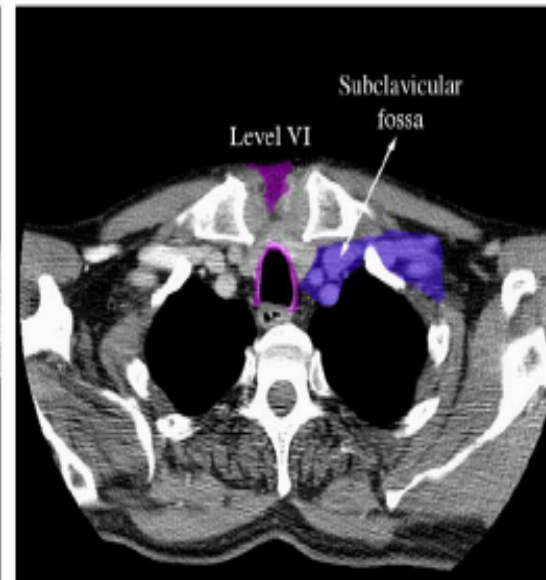
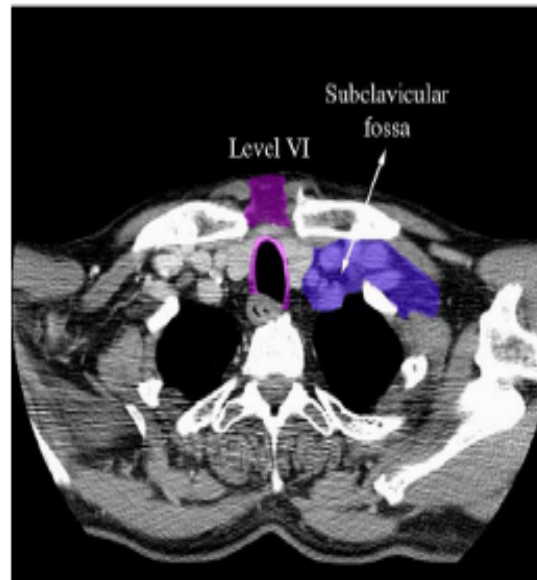
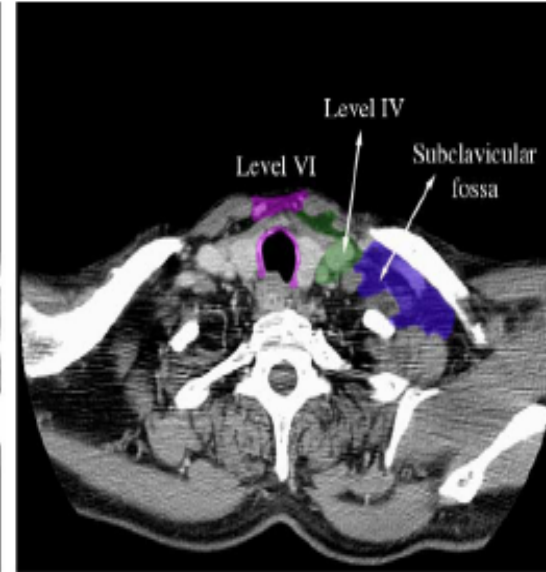
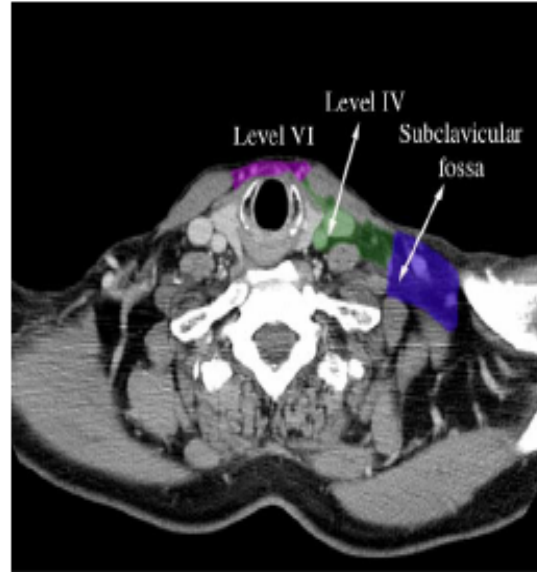


*Eisbruch et al,
Int J Radiat Oncol, 2004;59;28-42*

Gregoire et al, Radiother Oncol, 2006;79;15-20

Caudal extension

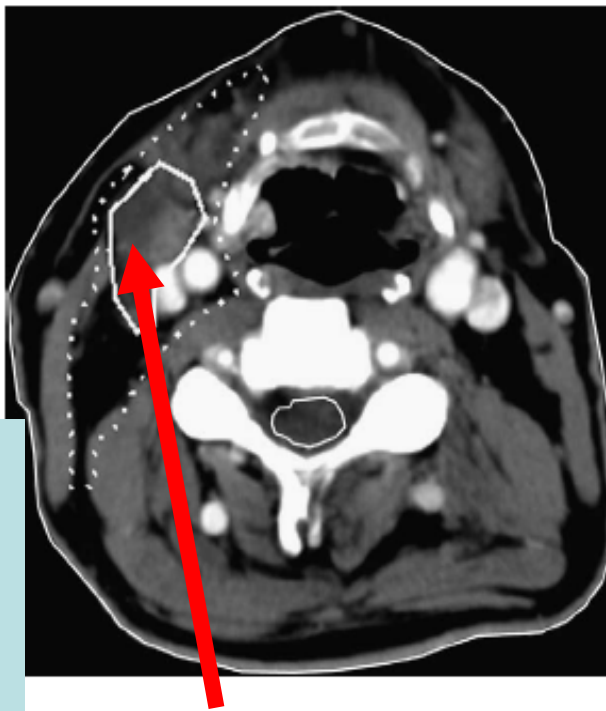
- In Level IV LN involvement – SCF to be included
- SCF – Fatty space up to clavicles



ECE- another issue in N+ disease!

Size	Involve	Spread
<1cm	26%	<1cm
>3cm	81%	large

Fascia is a barrier.
Once disrupted,
cells migrate easily in
fatty tissue along muscle
fibres.



Node involving the muscle

Entire muscle in that level to be included!

Neck dissection - another example



In Neck Dissection-
LN level I-V
Internal Jugular vein
Sternocleidomastoid
Spinal Accessory N

IJV removed on left side

For delineation may need to refer to preoperative CT scans or opposite side anatomy.

Do we include the scar in Post op situations?

- Traditionally speaking – Yes?
- Reasons – tumor cells get entrapped in scar - hypoxic fibrotic zone
- Dose required – 50Gy
- Boost -10Gy incases of extensive scarring & +ve margins
- Scar recurrence rate falls from 30% to 10% with RT

Fletcher GH, 3rd edition, Lea & febiger,1980

Do we need to bolus the scar?

- Traditionally speaking – Yes!
- Especially with 4-6MV linac as compared to Cobalt for reasons of depth of build up.
- Thickness depends upon the beam energy

- IMRT using Linacs or Tomotherapy questioned the need.
- Reasons – oblique incidence of multiple beams
- Better surgical techniques

Answer – probably safe omit in IMRT

How to place the bolus?
Inside the cast
Add as structure on TPS

Summary

For delineation one may need to refer to preoperative findings, preoperative CT scans, Surgical information or take help from opposite side anatomy.