Kantonsspital St.Gallen | Hals-Nasen-Ohrenklinik

Sommerschule SGORL 2012

Thema: Hals- und Gesichtschirurgie

Diagnostic and Treatment of the Neck

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Hals-Nasen-Ohrenklinik
Kantonsspital St. Gallen

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Agenda

- Staging
- Risk factors for lymph node metastases
- Classification
- Treatment of the N+ neck
- Neck dissection after primary chemoradiation
- Treatment of the N0 neck
- Results of neck treatment
- Neck dissection in salivary gland carcinomas
- Neck dissection in skin cancer
- Neck dissection in thyroid cancer
- Neck dissection in melanoma

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Suggested reading

- Medina J et al. Management of the Neck in Head and Neck Cancer, Part I. The Otolaryngologic Clinics of North America, Vol. 31, Number 4, 1998
- Medina J et al. Management of the Neck in Head and Neck Cancer, Part II. The Otolaryngologic Clinics of North America, Vol. 31, Number 5, 1998
- Robbins TK et al. Consensus Statement on the Classification and Terminology of Neck Dissection. Arch Otolaryngol Head Neck Surg 2008;134(5):536-538
- Ferlito A et al. Proposal for a rational classification of neck dissections. Head Neck 2011;33(3):445-50
- Broglie MA et al.Occult metastases detected by sentinel node biopsy in patients with early oral and oropharyngeal squamous cell carcinomas: Impact on survival. Head Neck. 2012 May 18. doi: 10.1002/hed.23017. [Epub ahead of print]
- Stoeckli SJ,Broglie MA. Sentinel node biopsy for early oral carcinoma. Curr Opin Otolaryngol Head Neck Surg. 2012 Apr;20(2):103-8
- Buck G, Huguenin P, Stoeckli SJ. Efficacy of neck treatment in patients with head and neck squamous cell carcinoma. Head Neck 2008 Jan;30(1):50-7

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Staging

- Sensitivity and specificity of palpation approx. 60 – 70 %
- cN (TNM UICC 2002) includes adequate imaging
- CT – US – MRI – PET/CT
- Imaging modality determined by primary tumor
- Criteria for malignancy critical for sensitivity and specificity
  - CT: LN>1cm (Level II>1.5cm), central necrosis, peripheral enhancement, extranodal spread
  - US: FNAC! Round shape, size, no hilus
- The higher the sensitivity, the lower the specificity

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Risk factors

- Localisation of the primary tumor
- Tumor size
- Grading
- Tumor thickness
- Infiltration depth
- Perineural Infiltration
- Mode of invasion
- Lymphangiosis carcinomatosa
- Molekular markers

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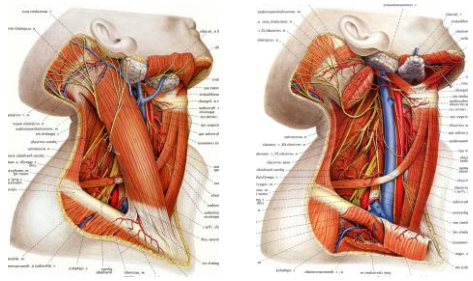
Anatomy



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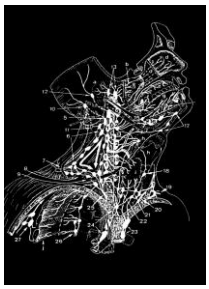
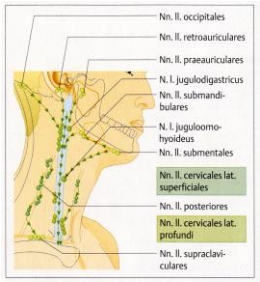
Lymphatic drainage





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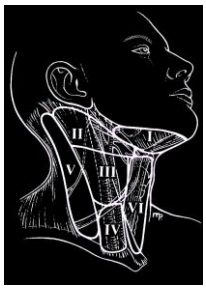
Classification

- Concept of risk levels
- MSKCC/Robbins
- Risk levels
  - I-III for oral cavity
  - II-IV for oropharynx, hypopharynx, supraglottis, glottis T3/4
  - II-V for nasopharynx
  - VI for thyroid, subglottis, oesophagus



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Classifikation Neck Dissection

- cN0: prophylactic – selectiv – electiv
  - risk level according to primary tumor
- cN+: therapeutic - modified radical – radical – Typ I – Typ II – Typ III
  - Level I-V
  - SAN, SCM, IJV

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Classification Neck Dissection AAO-HNSF

- Radical Neck Dissection (I-V + XI,IJV,SCM)
- Modified Radical Neck Dissection (I-V)
- Selectiv Neck Dissection
  - Supraomohyoid Neck Dissection (I-III)
  - Lateral Neck Dissection (II-IV)
  - Posterolateral Neck Dissection (II-V)
  - Neck Dissection of the anterior compartment (VI)
- Extended Radical Neck Dissection

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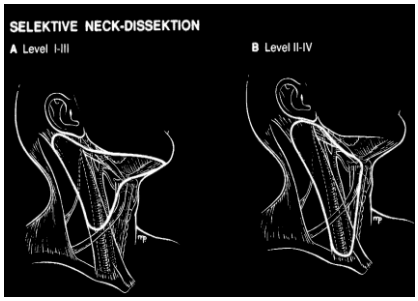

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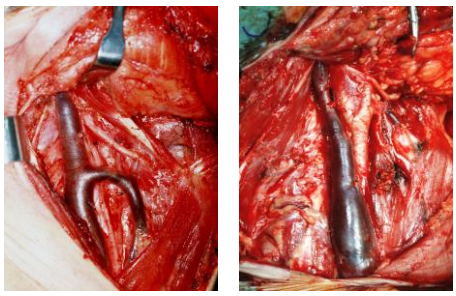

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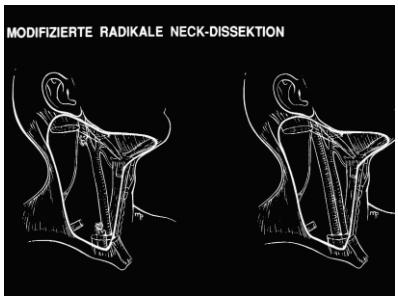

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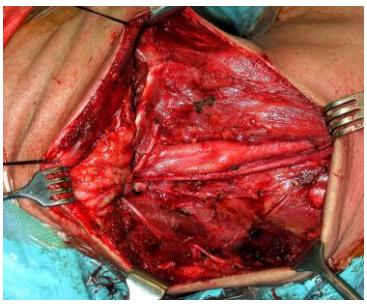

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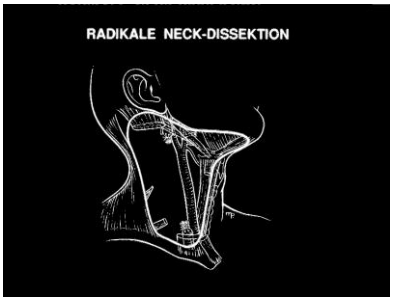

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Proposed Classification of Neck Dissection

Proposed nomenclature	Nomenclature recommended by AAO-HNS/AHNS
ND (I V, SCM, IJV, CN XI)	Radical neck dissection
ND (I V, SCM, IJV, CN XI, and CN XII)	Extended neck dissection with removal of the hypoglossal nerve
ND (I V, SCM, IJV)	Modified radical neck dissection with preservation of the spinal accessory nerve
ND (II IV)	Selective neck dissection (II IV)
ND (II IV, VI)	Selective neck dissection (II IV, VI)
ND (II IV, SCM)	NA
ND (I III)	Selective neck dissection (I III)
ND (I III, SCM, IJV, CN XI)	NA
ND (II, III)	Selective neck dissection (II, III)
ND (IIA, III)	Selective neck dissection (IIA, III)
ND (VI)	Selective neck dissection (VI)
ND (VI, VIII)	Selective neck dissection (VI, VIII)

Abbreviations: AAO-HNS, American Academy of Otolaryngology Head and Neck Surgery; AHNS, American Head and Neck Society; ND, neck dissection; SCM, sternocleidomastoid muscle; IJV, internal jugular vein; CN XII, hypoglossal nerve; CN XI, spinal accessory nerve; NA, not available.
Note: Other suggested acronyms: SAN, spinal accessory nerve; ECA, external carotid artery; ICA, internal carotid artery; CCA, common carotid artery; CN VII, facial nerve; CN X, vagus nerve; SN, sympathetic nerve chain; PN, phrenic nerve; SHN, shin; PG, parotid gland; SG, submandibular gland; DCM, deep cervical muscles.

Ferlito A et al. Head Neck 2011

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Therapy of the N+ neck

- Lymph node metastases are the most important prognostic factor
- N+ reduces the survival rate in the range of 50%
- Poor prognosis:
  - Multiple positive nodes
  - ECS
  - Involvement of level IV/V
- USgFNAC most accurate modality
- Treatment modality according primary tumor
  - Surgery: Neck dissection
  - Radiation or chemoradiation

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Neck dissection in the N+ neck

- level I – V
- Resect only infiltrated structures !
  - In particular CN XI !
- No need for en-bloc resection with primary tumor
- Bilateral neck dissection
  - Bilateral lymph node metastases
  - Primary tumor crossing the midline
- Postoperative RT
  - N2a, N2b, N3
- Postoperative RCT
  - ECS

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Controversy of the cN0 neck

- Clinical staging for occult metastases achieves max. sensitivity of approx. 75%
- Size of micrometastases 0.2 - 2 mm
- occult metastases in approx. 30%
- Prophylactic treatment of the cN0 neck is standard of care
- Lack of prospective trials

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Treatment options of the cN0 neck

- Wait and scan
  - USgFNAC
  - 20% failure rate in expert hand
  - Extensive salvage neck dissection because of advanced stage
  - Postoperative radiation because of advanced stage and ECS
- Selectiv neck dissection
  - Histologic staging
  - High control rate (90-95%)
- Primary radiation
  - No histologic staging
  - Control rate comparable to neck dissection
- Sentinel-Lymphnode-Biopsy
  - Select tumors
  - Most accurate histologic staging
  - High success rate

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Sentinel Node Biopsy

- > 30 % occult metastases in elective neck dissection in cN0
- ~ 70 % overtreatment !
- Goals
  - Improve staging
  - Reduce morbidity/costs
  - Be equally effective as elective neck dissection

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Concept of SLN biopsy

- Hypothesis:
  - SLN = first draining lymph node for a tumor of a specific site
  - all other lymph nodes are only reached subsequently
  - If metastases occur, they occur first in the SLN
- Goal:
  - localization and selective excision of the SLN
    - → SLN tumor free → no neck dissection
    - → SLN with tumor → neck dissection
- Principle:
  - 99Tc labeled colloid mimicks lymphatic drainage of tumor cells

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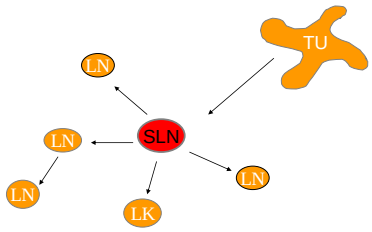
Concept of SLN biopsy



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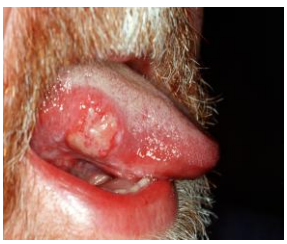
Indications for SNB

Primary site/TNM

Oral cavity T1/2
Oropharynx T1/2

Supraglottic Larynx
Hypopharynx



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Indications for SNB
Oral Cavity/Oropharynx

- Unilateral Tumor cN0
  - Staging ipsilateral neck
- Midline Tumor cN0
  - Staging both necks
- Midline Tumor cN+ (ipsi)
  - Staging contralateral neck
- Unpredictable lymphatic drainage due to previous neck dissection/irradiation

Flach G et al 2011

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Lymphoscintigraphy

- Approximately 2 hours before surgery
- Peritumoral injection of 4 x 20 MBq ^{99m}Tc labeled colloid (Nanocoll^{R})
- Dynamic imaging in the ap- projection
- Static imaging in the ap and lateral projection
- Static imaging in the anterior oblique projection
- Marking of the SLN on the skin surface
- SPECT/CT

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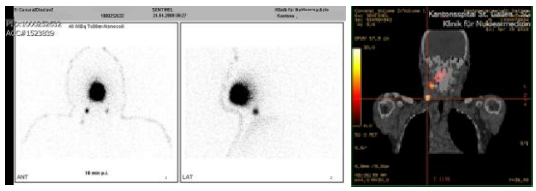
SPECT/CT



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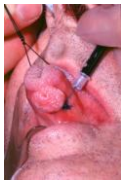
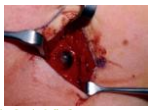
Intraoperative identification of sentinel node with blue dye





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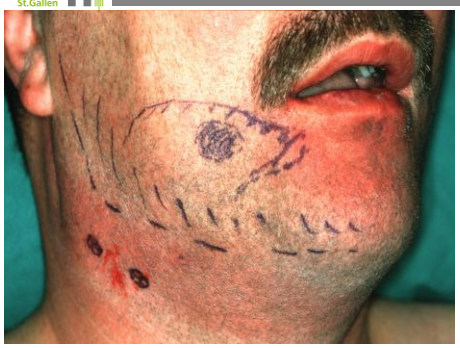

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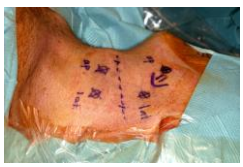

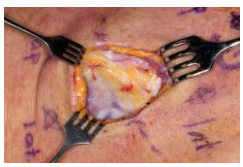

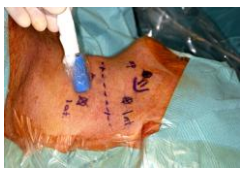

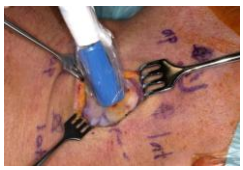

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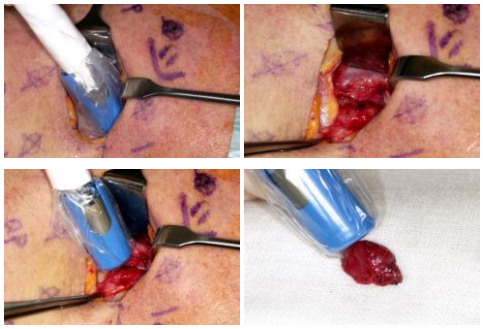

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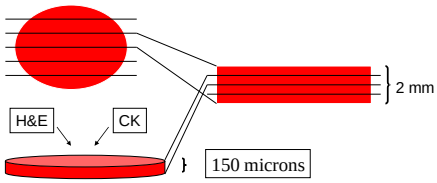
Histopathologic work-up



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Occult Metastases

	Isolated tumor cells	Micrometastases	Macrometastases
Size	Single tumor cells or small clusters	Smaller than 2mm	Larger than 2mm
Contact with lymph sinus wall	Yes *	Yes	Yes
Invasion of lymph sinus wall	No	Yes	Yes
Extrasinusoidal stromal reaction	No	Usually yes	Usually yes
Extrasinusoidal tumor cell proliferation	No	Yes	Yes

Hermanek et al, 1990

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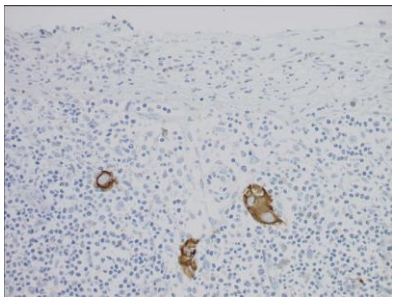
ITC (CK)



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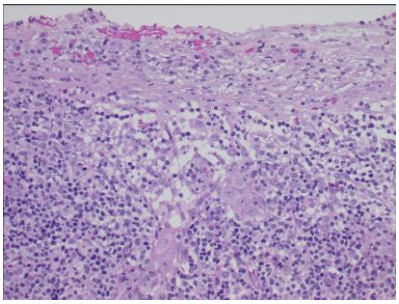
ITC (H&E)



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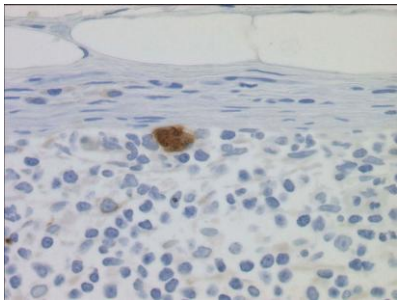
Detritus (CK)



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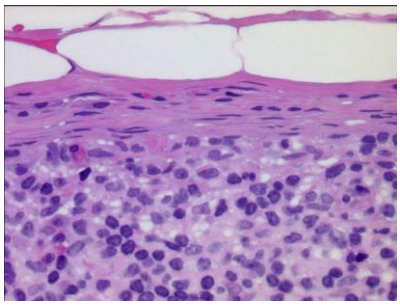
Detritus (H&E)



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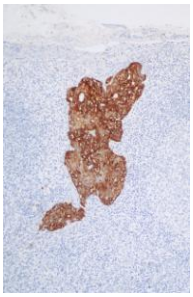
Micrometastasis



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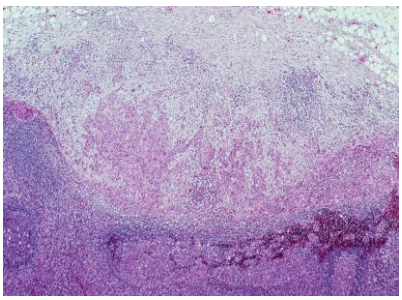
Macrometastasis with ECS



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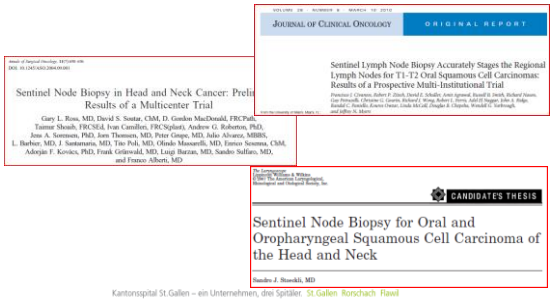
Validation in the context of END
„Proof of Principle“



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Observational Trials

- Ross G et al. *Arch Otolaryngol Head Neck Surg 2002*
  - n = 43 pts
  - SNB – (28) ⟹ observation (mean f.u. 18 months)
  - SNB + (15) ⟹ neck dissection

⟹ 1/28 SNB – developed neck disease
⟹ NPV = 96%

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Observational Trials

- Stoeckli SJ 2007
  - n = 50 pts
  - SNB – (30) ⟹ observation (mean f.u. 19 mts)
  - SNB + (20) ⟹ neck dissection

⟹ 2/30 SNB – developed neck disease
⟹ NPV = 94%

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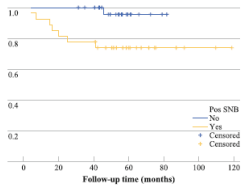
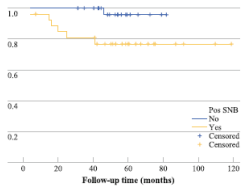
Longterm Results: n = 79 / f.u. ~ 60 months

Neck control rate:
N0 96% vs N+ 74% (p = 0.013)



DSS:
N0 96% vs N+ 77% (p = 0.024)



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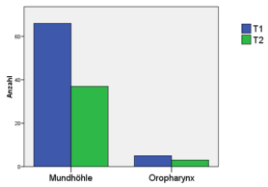
Observational trial: update

- 2003 to 2010
- 111 patients
- Mean follow-up 31 months (2-82Mt)



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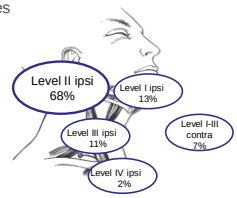
Results

- Detection rate of SNs
  - 96% Lymphoscintigraphy
  - 96% SPECT/CT
    - better spatial resolution
  - 99% intraoperative hand-held gammaprobe

Outcome data – observational trials

- Pos SNB in 48/129 patients (37%)
  - 16/63 (25%) ITC
  - 28/63 (44%) Micrometastases
  - 19/63 (30%) Macrometastases



- Neck recurrence
  - Mean 16 months (range 3-35months)

	Neck recurrence	
	No	Yes
SLN -	55	3
SLN +	25	6

- **Negative predictive value of negative SNB = 95%**

Survival

OS: N0 98% vs N+ 71%
(p = 0.003)

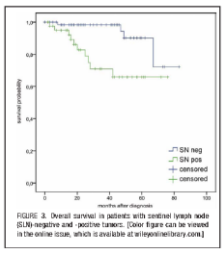


FIGURE 3. Overall survival in patients with sentinel lymph node (SLN)-negative and -positive tumors. [Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.]

DSS: N0 95% vs N+ 76%
(p = 0.001)

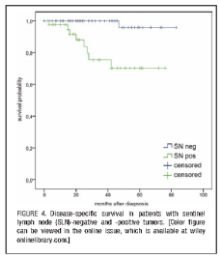


FIGURE 4. Disease-specific survival in patients with sentinel lymph node (SLN)-negative and -positive tumors. [Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.]

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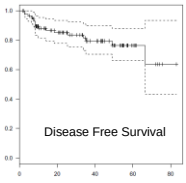
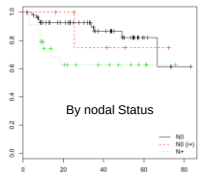
- Disease-free survival (DFS) at 5 years
  - N0 82.1% (70.0-96.3%)
  - N0 (i+) 75% (42.6-100.0%)
  - N+ 62.8% (44.9-87.7%)





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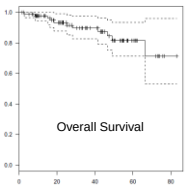
- Overall survival (OS) at 5 years
  - N0 89.2% (77.8-100%)
  - N0 (i+) 66.7% (30-100%)
  - N+ 65.6% (46.1-93.2%)



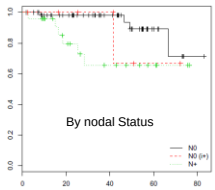


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TABLE 1. Hazard ratio for overall survival, disease-specific survival, and disease-free survival.

Covariate	HR (95% CI)	*p* value
OS		
SLNB positivity	4.871 (1.523–15.578)	.006
ECS	7.959 (1.679–37.909)	.009
T classification	3.253 (1.099–9.626)	.033
Sex	1.474 (0.511–4.257)	.437
RT	1.378 (0.178–10.669)	.760
Tumor site	1.154 (0.863–1.951)	.593
Age	1.037 (0.992–1.083)	.110
DSS		
SLNB positivity	16.068 (2.004–128.840)	.009
ECS	13.295 (2.532–69.804)	.002
T classification	3.544 (0.910–14.566)	.068
RT	2.064 (0.255–16.709)	.497
Sex	1.523 (0.409–5.673)	.531
Tumor site	1.111 (0.586–2.175)	.759
Age	1.034 (0.97–1.091)	.227
DFS		
SLNB positivity	15.969(1.996–128.007)	.009
ECS	13.274 (2.527–69.729)	.002
T classification	3.613 (0.902–14.467)	.070
RT	2.063 (0.255–16.701)	.497
Sex	1.538 (0.413–5.727)	.521
Tumor site	1.113 (0.586–2.162)	.755
Age	1.034 (0.969–1.092)	.222

Abbreviations: HR, Hazard ratio; OS, overall survival; DSS, disease-specific survival; DFS, disease-free survival; CI, confidence interval; SLNB, sentinel lymph node biopsy; ECS, extracapsular spread; RT, radiation therapy.

TABLE 2. Hazard ratio for overall survival, disease-specific survival, and disease-free survival of different size of metastases.

Covariate	HR (95% CI)	*p* value
OS		
ITCs	4.06 (0.73–22.55)	.109
Micrometastases	4.81 (1.28–18.08)	.02
Macrometastases	6.58 (1.32–32.75)	.02
DSS		
ITCs	10.1 (0.62–163.1)	.103
Micrometastases	18.26 (1.8–146.1)	.013
Macrometastases	19.49 (2.01–188.44)	.010
DFS		
ITCs	10.1 (0.62–163.1)	.103
Micrometastases	18.26 (1.8–146.1)	.013
Macrometastases	19.42 (2.0–187.8)	.010

Abbreviations: HR, Hazard ratio; OS, overall survival; DSS, disease-specific survival; DFS, disease-free survival; CI, confidence interval; ITCs, isolated tumor cells.

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Conclusion

- SNB for early oral and oropharyngeal SCC is feasible
- SNB is the most accurate staging procedure for the cN0
- SNB seems to be accurate in longterm follow-up of observational studies
- Occult metastases detected by SNB have impact on survival

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Neck dissection in salivary gland cancer

- Neck dissection in N+
- Adjuvant RT in N+
- N0 controversial
  - Neck dissection in large (T3/4) and/or high grade tumors
  - Alternatively: RT of the neck

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Neck dissection in skin cancer

- Do always stage the neck ! US !
- Lymphatic drainage of the skin
  - Vertical line through the ear canal divides anterior from posterior lymphatic drainage
  - Parotid and facial lymph nodes are crucial

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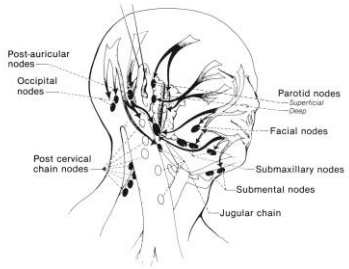
Lymphatic drainage of the skin



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Treatment Options

- Neck dissection +/- Parotidectomy
  - According to Location of the Primary Tumor
  - Preservation of Spinal Accessory Nerve, Internal Jugular Vein and Sternocleidomastoid muscle (and Facial Nerve)
- Radiotherapy

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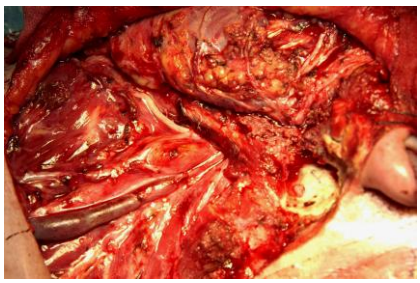

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Evidence in SCC of the skin

- No evidence for benefit of END vs. watchful waiting
- Little evidence for SNB
- Strong evidence for adjuvant radiation after neck dissection pN > 1 and/or ECS

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Evidence in Melanoma

- Good evidence against END
- Increasing evidence for SNB
- Some evidence for adjuvant radiation after neck dissection pN+ with multiple nodes

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Algorithm for SCC

- No prophylactic END in clinically and radiologically cN0 neck
- Therapeutic Neck Diss in cN+ necks
- Parotidectomy, if lymphatic drainage runs through the gland
- Adjuvant radiation in N > 1 and/or ECS

Algorithm for Melanoma

- No prophylactic END in clinically and radiologically cN0 neck
- SNB in clinically and radiologically cN0 neck if Breslow > 1mm
- Therapeutic Neck Diss +/- parotidectomy in cN+ necks (no distant metastases in PET)
- Adjuvant radiation after neck diss with multiple lymph node metastases