

Chase M. Heaton, MD
UCSF Department of Otolaryngology – Head and Neck Surgery

Submandibular gland transfer


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No disclosures

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Xerostomia


- ~90% of HNSCC patients receive radiotherapy
- Most common serious and long-term adverse affect following radiotherapy
 - QOL impacts: taste, chewing, swallowing, dry mouth, speech, sleep
 - Heightened susceptibility to dental disease, ORN
- ~60% decrease in saliva production 2 weeks after 23Gy
- PERMANENT and UNRESERVABLE after 39 Gy ("SMG sparing dose")**
- Incidence of mod/severe xerostomia 30-38% after one year, 22-36% after two years even with IMRT advances



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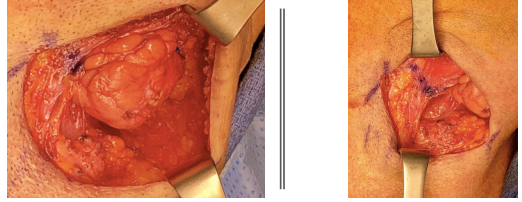
SMG contribution

- 1.5-2L saliva production per day
- Mucinous saliva produced by the SMGs contribute more to **unstimulated/resting flow rate** and QOL than the stimulated serous saliva of the parotid
- SMG resection patients compared to controls
 - No difference in stimulated salivary flow
 - Unstimulated salivary flow: 0.6ml/min vs 0.94ml/min (**1/2 liter less per day!**)



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Gland transfer = gland protection

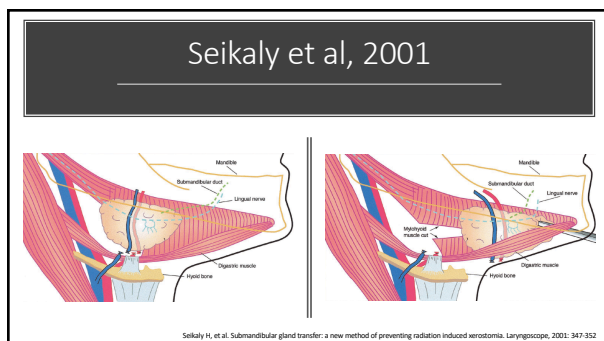


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Learning objectives

- Why perform submandibular gland transfer?
- Is the procedure surgically feasible? Does it reduce the radiation dose received by the gland?
- What patients would benefit from a submandibular gland transfer?
- What are the objective and patient subjective outcomes after the procedure?
- What are the potential pitfalls?

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Seikaly H, et al. Submandibular gland transfer: a new method of preventing radiation induced xerostomia. Laryngoscope, 2001; 117:352

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Surgically feasible

Submandibular Gland Transfer:
A New Method of Preventing
Radiation-Induced Xerostomia

Paul Achile, MD, Naveh, PhD, HBSP, Timothy Mallow, MD, MD, Linda Oehler, BS, Richard Liu, MD, Donald Fleming, MD

- 25 patients
- ~45 minute procedure
- No major complications
 - Facial edema
- No disease recurrence on side of transfer

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Phase II study: SMG transfer prior to radiation (RTOG 0244)

- 44 patients
- Photography review by two reviewers
- **Reproducible** procedure (ie "per protocol") in 77% of patients in a **multicenter setting**
- 74% were prevented from radiation-induced acute xerostomia

Jin N, et al. A phase II study of submandibular gland transfer prior to radiation for prevention of radiation-induced xerostomia in head and neck cancer (RTOG 0244). Int J Radiation Biol Phys. 2012; 437-442.

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Objective gland movement...

Table 3: SMG location*

	Preoperative (mm)	P Value	Postoperative (mm)	P Value
Anteroposterior length difference	2.5 (-4-5)	.28	10.5 (-1-17)	<.001
Anterior margin difference	0 (0-0)		13.5 (0-16)	<.001
Posterior margin difference	-18 (-9-3)	.10	7.2 (0-16)	<.001
Superior margin difference	0.2 (-3-6)	.79	-7.5 (-15-0)	<.001

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...and preserved salivary flow

TABLE II.
Salivary Flow Rates in Milliliters per Minute.

Patient No.	Preoperative Baseline	Postoperative Baseline	Preoperative Stimulated	Postoperative Stimulated
1	0.19	0.17	0.83	0.85
2	0.14	0.12	0.45	0.40
3	0.19	0.18	0.75	0.80
4	0.20	0.16	0.95	0.85
5	0.13	0.14	0.60	0.80
6	0.16	0.16	0.75	0.85
7	0.14	0.16	0.65	0.90
8	0.16	0.19	0.85	0.90
9	0.16	N/A	0.85	N/A
10	0.17	0.14	0.70	0.90
11	0.19	0.13	0.85	0.80
12	0.13	0.12	0.60	0.45
13	0.15	0.13	0.60	0.90
14	0.13	0.12	0.60	0.90
15	0.16	0.17	0.75	0.70
16	0.17	0.16	0.75	0.85
17	0.14	0.14	0.45	0.90
18	0.16	0.15	0.60	0.90
19	0.16	0.14	0.60	0.45
20	0.16	0.14	0.60	0.55
21	0.17	0.17	0.75	0.80
22	0.14	0.14	0.65	0.90
23	0.13	0.13	0.55	0.45
24	0.14	0.12	0.60	0.90
25	0.14	0.12	0.90	0.45

N/A = not available.

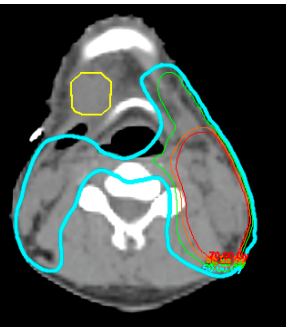
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Preserved gland function

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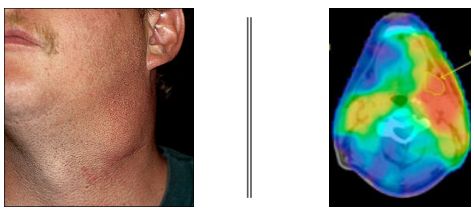
Radiation dose reduction

- Ipsilateral gland dosage ~50-70 Gy
- Transferred gland dosage ~26-30 Gy
 - IMRT alone goal is <39 Gy (~60% success rate)

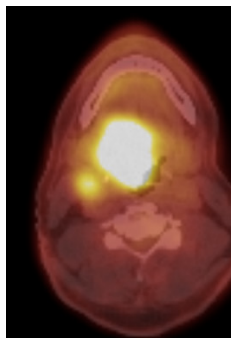


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Which patients will benefit?



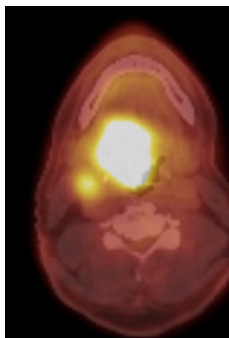
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cT3N1M0 (AJCC 8th edition)
Stage 2 HPV mediated right base of tongue SCC

Transfer indication(s)?

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Indication #1

- Base of tongue cancer, bilateral radiation
- Higher likelihood of contralateral nodal metastasis in BOT SCC
- Contralateral SMG can be spared if no clinical neck disease

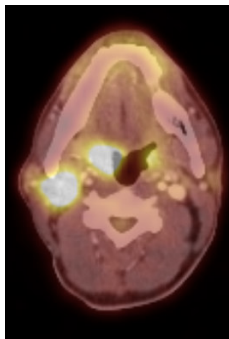
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cT3N2a (AJCC 7th edition)
Stage 4 p16+ right tonsil SCC

Transfer indication(s)?


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Indication #2

- Large tonsil tumor with >1cm extension onto soft palate or base of tongue, bilateral neck radiation
- Small tumors confined to tonsil have low risk of contralateral spread
- Higher likelihood of contralateral nodal metastasis with soft palate and BOT extension


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cT2N1 (AJCC 8th edition) Stage 1 HPV-mediated left tonsil SCC

Transfer indication(s)?

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Indication #3 – controversial

- Unilateral tonsil cancer, bilateral radiation recommended
- Clinical (*or radiographic*) evidence of extranodal extension (ENE) and/or bulky neck disease → increased risk of contralateral nodal metastasis

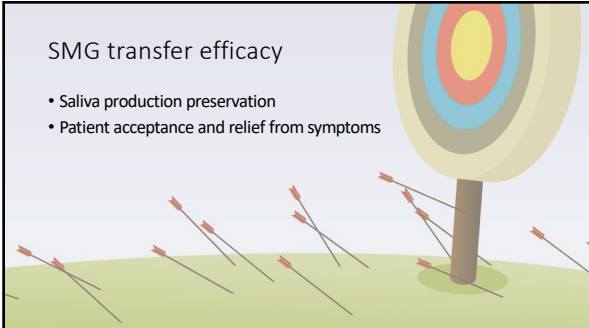
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SMG transfer efficacy

- Saliva production preservation
- Patient acceptance and relief from symptoms



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Jha et al, 2003 – prospective clinical trial

- 76 patients who underwent SMG transfer followed by radiation
- No other sialogogues/salivary gland protectants
- Salivary flow studies*
- University of Washington Quality of Life Questionnaire

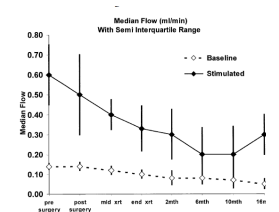
Jha N, et al. Prevention of radiation induced xerostomia by transfer of the submandibular gland to the submental space. Radiotherapy and Oncology, 66, 2003: 289-94.

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Salivary flow following radiation

- Stimulated and unstimulated salivary flow rates: preop, 2 weeks post op, and 2, 6, 10, 16, and 24 weeks following radiation
- Transferred gland retains ~70% of baseline salivary output (23% for non transferred gland)

* flow evaluations do not correlate with patient symptom of xerostomia



Time Point	Baseline (ml/min)	Stimulated (ml/min)
pre surgery	~0.10	~0.60
post surgery	~0.10	~0.50
mid wt	~0.10	~0.40
end wt	~0.10	~0.30
2wks	~0.10	~0.25
6wks	~0.10	~0.20
10wks	~0.10	~0.20
16wks	~0.10	~0.25
24wks	~0.10	~0.30

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Patient reported outcomes

- University of Washington QOL questionnaire
- 10-20 = minimal/no xerostomia

Surgery + Transfer + XRT Patients (percentage of patients with saliva QOL scores 10-20 with 95% confidence limits)

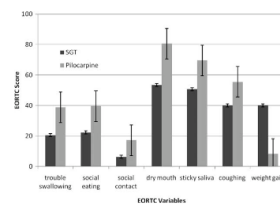
Period	N	Percent 10-20	95% CI
Pre XRT	43	97.7	(93.2, 100.0)
Post XRT	37	81.0	(68.7, 93.5)
2 months follow up	34	64.7	(48.6, 80.8)
6 months follow up	28	71.4	(54.7, 88.1)

- Patients with 2+ years f/u: 83% in the SMG transfer group reported normal amount of saliva compared to none in the non-SMG transfer group

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SMG transfer vs pilocarpine

- Surgery is the treatment of choice
- Swallowing, social eating, sticky saliva, dry mouth, coughing
- 0.05ml/min vs 0.01ml/min
- Phase III RCT closed at 6 month interim analysis



Reiger JA, et al. Functional outcomes related to the prevention of radiation induced xerostomia: oral pilocarpine vs submandibular gland transfer. Head and Neck, 2012.

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Potential pitfalls

- Another procedure – think about patient candidacy early
- Wrong patient selection – unnecessary surgery
- Infection, complication → radiation delay
- Patient confusion, counseling

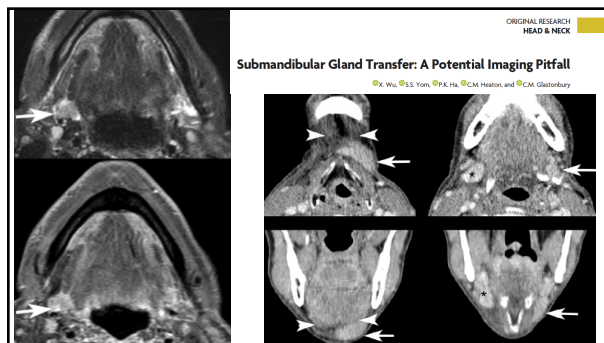


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Recurrence?



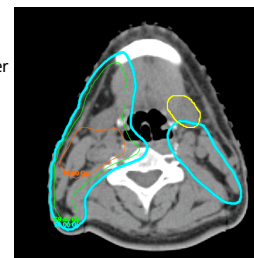
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Even if it isn't perfect...

- 5-10% dose reduction per millimeter



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My thoughts on SMG transfer

- Surgically feasible, small learning curve
- Think early about the patients who will benefit
- Reproducible objective results, but more importantly...
- Improved QOL for your patients

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Thank you!
chase.heaton@ucsf.edu



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