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Oral Cavity Cancer

Updated by Brian Deegan

BACKGROUND

What is the incidence of oral cavity cancer (OCC) in the United States?

Show Answer

~24,000 cases/yr of OCC in the United States

What % of H&N cancers are OCCs?

Show Answer

OCCs comprise **25%–30%** of all H&N cancers.

What are the anatomical borders and of what structures does the OC consist?

Show Answer

Lips, gingiva, upper/lower alveolar ridge, buccal mucosa, retromolar trigone (RMT), hard palate, floor of mouth (FOM), oral tongue.

What is the most and least commonly involved site in OCC?

Show Answer

The lower **lip is the most common site** (38%), and the **buccal mucosa is the least common site** (2%). The tongue is involved 22% of the time. (Krolls SO et al., J Am Dent Assn 1976)

What CNs provide motor and sensory innervation to the oral tongue?

Show Answer

Motor: CN XII
Sensory: CN V3 (lingual branch)
What CNs provide the tongue with taste sensation?

Show Answer

Ant two-thirds of tongue: CN VII (chorda tympani)
Post one-third of tongue: CN IX
Which nerve provides motor innervation to the lips?

Show Answer

The **facial nerve** (CN VII) provides motor innervation to the lips.
Where is the ant-most border of the OC?

Show Answer

The **vermilion border of the lips** is the ant-most border of the OC.
Where is the post-most border of the OC?

Show Answer

The **hard/soft palate junction superiorly and the circumvallate papillae inferiorly.**
What are some premalignant lesions of the OC, and which type has the greatest propensity to progress to invasive cancer?

Show Answer

Erythroplakia (~30% progression rate) **and leukoplakia** (4%–18% progression rate)
What are some risk factors that predispose to OCC?

Show Answer

Tobacco and alcohol. Also, betel nut consumption, periodontal Dz, sun exposure (lip).

What are the sup and inf spans of levels II–IV LN chains/levels?

Show Answer

Level II: skull base to bottom of hyoid
Level III: infrahyoid to bottom of cricoid
Level IV: infra-cricoid to clavicles
Where are the levels IA–IB nodes located?

Show Answer

Level IA nodes are **submental** (space b/t the ant belly of the digastric muscles), and level IB nodes are **submandibular** (space lat the digastric muscle and mandible).
Where are the levels V–VI nodes located?

Show Answer

Level V nodes are in the **post triangle.** Level VI nodes are in the central compartment **paratracheal/prelaryngeal region.**
What is the Delphian node?

Show Answer

The Delphian node is a **midline prelaryngeal level VI node.**
What is the estimated risk of LN involvement with a T1–T2 primary of the lip, FOM, oral tongue, and buccal mucosa?

Show Answer

The risk of LN involvement is **~5% for the lip, 20% for the oral tongue, and 10%–20% for the other OC T1–T2 primaries.**
What is the estimated risk of LN involvement with a T3–T4 primary of the lip, FOM, oral tongue, and buccal mucosa?

Show Answer

The risk of LN involvement is **~33% for the lip and 33%–67% for the**

other OC T3–T4 primaries.
What is the nodal met rate for a T1 vs. T2 lesion of the oral tongue?

Show Answer

The nodal met rate is **14% for T1 tongue lesions and 30% for T2 tongue lesions.** (Lindberg R et al., Cancer 1972)
What is the overall and stage-by-stage nodal met rate for FOM lesions?

Show Answer

Overall: 20%–30%

T1: 10%
T2: 30%
T3: 45%
T4: >50%

(Lindberg R et al., Cancer 1972)
Lesions located where in the OC predispose to bilat LN mets?

Show Answer

Midline and anterolat OC lesions (tongue, FOM) predispose to bilat LN mets.
Which OC cancer has the greatest propensity for LN spread?

Show Answer

Oral tongue cancer has the greatest propensity for LN spread.
What OC subsite is 2nd only to the oral tongue in propensity for nodal spread?

Show Answer

The **alveolar ridge/RMT** has the 2nd highest propensity for LN spread (3rd highest is FOM).
Can ant oral tongue lesions involve other LN levels without involving

level I LNs?

Show Answer

Yes. ~13% of ant tongue lesions skip the level I LNs. (Byers RM et al., Head Neck 1997)
Which anatomic structure divides the oral tongue from the base of tongue (BOT)?

Show Answer

The **circumvallate papillae** divide the oral tongue from the BOT.
What is the most common site of minor salivary cancers?

Show Answer

Hard palate
What are common sites of DM for cancers of the OC?

Show Answer

Lungs, bones, and liver
What anatomic structure divides the FOM anteriorly into 2 halves?

Show Answer

The **lingual frenulum** divides the FOM anteriorly.
Where is the Wharton duct located, and what gland does it drain?

Show Answer

The Wharton duct **opens at the ant FOM** (midline) and **drains the submandibular gland.**
From where in the OC do most gingival cancers arise?

Show Answer

Most (80%) gingival cancers arise from the **lower gingiva.**
Do most lip cancers arise from the upper or lower lip?

Show Answer

Most (~90%) lip cancers arise from the **lower lip.**
What are some benign lesions that arise from the lip?

Show Answer

Benign lip lesions include **keratoacanthoma, actinic keratosis, hemangiomas, fibromas, HSV, and chancre.**
What nodal groups drain the tip of the tongue, the ant tongue, and the post tongue?

Show Answer

Tip of tongue: level IA
Ant tongue: level IB and level III (midjugular)
Post tongue: level IB and level II
Which OC site lesions are notorious for skipped nodal mets?

Show Answer

Ant oral tongue lesions can skip levels II–III and involve only level IV (so a full neck dissection is typically needed).
What features of lip cancer predict for nodal spread?

Show Answer

DOI, high grade, large size, invasion of buccal mucosa/dermis, or recurrent Dz after resection
What nodal stations are involved with upper vs. lower lip lesions?

Show Answer

Upper lip lesions spread to preauricular, facial, parotid, and IA–IB LNs; lower lip lesions spread to levels IA–IB and level II LNs.

WORKUP/STAGING

A pt presents with tongue deviation to the left. What CN is involved?

Show Answer

The **left CN XII** (hypoglossal) is involved with left tongue deviation (deviation is toward the involved nerve).
A pt presents with an OC lesion and ipsi ear pain. What nerve is responsible?

Show Answer

The **auriculotemporal nerve** (branch of **CN V3**) causes ear pain in OCC.
Which lesions in the OC are most and least likely to present with +LNs?

Show Answer

Most likely: tongue, FOM
Least likely: lips, buccal mucosa, gingiva
What are some common presenting signs with OC lesions?

Show Answer

Asymptomatic red/raised lesion, ill-fitting dentures, bleeding mass, pain, dysphagia (d/t tongue fixation), trismus (pterygoid/masticator space involvement), and otalgia
What does the typical workup of OC lesions entail?

Show Answer

OC lesion workup: H&P with palpation, mirror/fiber optic exam, Bx, CBC, CMP, CT/MRI H&N, chest imaging, consider PET/CT for stage III or greater.
What is the DDx for lesions of the OC?

Show Answer

SCC, minor salivary gland tumors, lymphoma, melanoma, sarcoma, plasmacytoma, and ameloblastoma
What defines T categories of the OC (AJCC 8th edition)?

Show Answer

T1: ≤2 cm, ≤5 mm DOI (DOI is NOT tumor thickness)
T2: ≤2 cm, DOI >5 mm and ≤10 mm, **or** >2 cm but ≤4 cm and DOI ≤10 mm
T3: >4 cm **or** DOI >10 mm
T4a: LIP: invasion of bone or involved inf alveolar nerve, FOM, skin of face
OC: invasion of adjacent structures (bone, deep tongue muscles, maxillary sinus, skin)
T4b: very advanced (invasion of masticator space, pterygoid plates, skull base, carotid artery), typically unresectable

What is the clinical nodal staging OCC (AJCC 8th edition)?

Show Answer

N1: single ipsi, ≤3 cm, ENE(–)
N2a: single ipsi >3 cm and ≤6 cm ENE(–)
N2b: multiple ipsi, ≤6 cm and ENE(–)
N2c: bilat or contralat, ≤6 cm and ENE(–)
N3a: >6 cm and ENE(–)
N3b: clinically overt ENE(+)

What is the pathologic nodal staging OCC (AJCC 8th edition)?

Show Answer

N1: single ipsi, ≤3 cm, ENE(–)
N2a: single ipsi ≤3 cm and ENE(+) **or** single ipsi >3 cm and ≤6 cm ENE(–)
N2b: multiple ipsi, ≤6 cm and ENE(–)
N2c: bilat or contralat, ≤6 cm and ENE(–)
N3a: >6 cm and ENE(–)
N3b: single ipsi >3 cm ENE(+) **or** multiple ipsi/contra/bilat nodes any with ENE(+)

Are radiographic findings alone sufficient for ENE?

Show Answer

No. Radiographic evidence alone is insufficient. Exam findings are required (e.g., skin involvement, tethering to adjacent structures, CN findings, etc.), though radiographic evidence should be in support of the physical exam.
What is the OCC group staging?

Show Answer

Stage I: T1 N0
Stage II: T2 N0
Stage III: T3 N0 **or** N1 (T1–T3)
Stage IVA: T4a **or** N2
Stage IVB: T4b **or** N3
Stage IVC: M1
If RT is anticipated for OCC, what should be done and when should it be done before starting Tx?

Show Answer

Dental evaluation (teeth extractions, fluoride trays) should be done 10–14 days before RT.
What is the most common location involved in oral tongue cancers?

Show Answer

The **lat undersurface of the tongue in the middle to post 3rd** is most commonly involved.
What is the overall bilat nodal involvement rate for oral tongue cancers?

Show Answer

5% of oral tongue cancers present with bilat neck Dz (most nodal Dz is ipsi).
If N+, there is an ~30% risk for bilat Dz.
What 2 factors are most predictive of nodal involvement in oral tongue cancers?

Show Answer

DOI and tumor thickness are most predictive of LN mets in oral tongue cancers.
What are the 2 most important prognostic factors after Sg alone for buccal mucosa cancers?

Show Answer

DOI ≥3 mm or tumor thickness ≥6 mm are the most important prognostic factors for buccal mucosa cancers. (Urist MM et al., Am J Surg 1987)

TREATMENT/PROGNOSIS

In general, what is the Tx paradigm for OCC?

Show Answer

OCC Tx paradigm: **Sg +/- PORT (+/- chemo)**
What pathologic features of the OCC primary lesion call for prophylactic/elective neck management?

Show Answer

Tumor thickness >2 mm, grade III Dz, +LVI, lower alveolar ridge and RMT, and a recurrent lesion are features that increase the need for prophylactic neck management.
What are the indications for PORT?

Show Answer

N2 or N3, low neck nodes or >2 LN levels, T3/T4, +/close margins, no neck dissection in high-risk pts, and LVI, PNI are indications for PORT.
In what circumstances should chemo be added to PORT?

Show Answer

Chemo should be administered with RT if there is a **+margin, +ECE** (per Bernier and Cooper adj RCT of PORT vs. PORT + chemo). (Bernier J et al., NEJM 2004; Bernier J et al., J Head Neck 2005; Cooper JS et al., IJROBP

2012)
When is bilat neck dissection recommended for lesions of the OC?

Show Answer

Bilat neck dissection is recommended with ≥**N2c Dz** (bilat or bulky LNs).
For what OC sites is definitive RT preferred?

Show Answer

Definitive RT is preferred (over Sg) for **lip commissure and RMT lesions with tonsillar pillar involvement.**
What is generally considered a close margin?

Show Answer

<5 mm
What are the indications for PORT to the primary site for OC lesions?

Show Answer

+ or close margin, PNI/perivascular invasion, and T3–T4 Dz are indications for PORT.
What RT doses are typically used in OCC?

Show Answer

PORT: **60 Gy** (–margins) to **66 Gy** (+margins) in 2 Gy/fx
Definitive RT: **70 Gy** to gross Dz +/– chemo
When is brachytherapy indicated for OCC?

Show Answer

Definitive: early (T1–T2) lip/early oral tongue/FOM lesions—LDR to **66–70 Gy** in 1 Gy/hr
As a supplement: T4 tongue/FOM lesions, 40% of total dose or ~**30 Gy**
For oral tongue lesions, which modality is associated with better LC: LDR or HDR?

Show Answer

Both modalities yield similar results. 5-yr LC was 76%–77% for both HDR and LDR techniques in a phase III comparison. (Inoue T et al., IJROBP 2001)

What are the common LDR and HDR doses used with an interstitial implant for OCC?

Show Answer

LDR: 60–70 Gy (0.4–0.6 Gy/hr)
HDR: 60 Gy (5 Gy bid × 12 fx)

What alternate teletherapy modalities can be employed for superficial OC lesions?

Show Answer

An **intraoral cone** can be employed for superficial OC lesions: orthovoltage (100–250 keV) or electrons (6–12 MeV).

Why is a tongue depressor/bite block used when irradiating the OC?

Show Answer

A tongue depressor is used to **spare the sup OC/palate and to surround the lat oral tongue lesion with other mucosa** to minimize air tissue interfaces and maximize dose buildup.

What kind of surgical resection is typically performed for leukoplakia or CIS of the lip?

Show Answer

Vermilionectomy with advancement of the mucosal flap ("lip shave"), which involves simple excision from the vermilion to the orbicularis muscle.

When is Sg an option for cancers of the lip?

Show Answer

Sg is an option **if the lesion involves <30% of the lip, if it is a T1 lesion, or the lesion does** not **involve the oral commissure;** otherwise, use RT. Sg is typically WLE with primary closure (W-shaped excision) and with a 0.5-cm gross margin.

When is definitive RT used for cancers of the lip?

Show Answer

Definitive RT is used for lip tumors **>2 cm, large lesions** (**>50% of the lip), upper lip lesions, or if the lesion involves the oral commissure.**

Is elective nodal RT of the neck required for T1–T2 cancers of the lip?

Show Answer

No. Elective nodal RT is not needed b/c the occult nodal positivity rate is only ~5%.

What are the doses used for the Tx of T1–T2 cancers of the lip?

Show Answer

T1: 50 Gy (2.5 Gy × 20)
T2: 60 Gy (2.5 Gy × 24) with 100–250 keV photons or 6–9 MeV electrons + 1-cm bolus

When is PORT indicated for lip cancers?

Show Answer

PORT is indicated for lip cancers in case of **T4 Dz (bone invasion), +margin, extensive PNI, +ECE, ≥2 nodes+, or T3–T4 Dz without dissection of the neck.**

What randomized evidence supports PORT over Sg alone for stages III–IV SCC of the buccal mucosa?

Show Answer

Indian data. Mishra RC et al. showed improved 3-yr DFS with PORT (68% vs. 38%). (Eur J Surg Oncol 1996)

Is bilat neck RT required for stage III–IV buccal mucosa lesions?

Show Answer

No. Ipsi RT may be sufficient for stages III–IV buccal mucosa lesions. (Lin CY et al., IJROBP 2008)
What must the PORT field include for gingival lesions with PNI?

Show Answer

PORT fields for gingival lesions with PNI must include the **entire hemimandible** (from the mental foramen to the temporomandibular joint).
What randomized data support the need for PORT for OC lesions based on specific risk factors?

Show Answer

MDACC series (Ang KK et al., IJROBP 2001): pts with a +margin, PNI, and ECE had higher failure rates.
For RMT/alveolar ridge tumors, in what circumstances is RT preferred over Sg and vice versa?

Show Answer

Definitive RT preferred if there is no bone erosion or if the lesion extends to the ant tonsillar pillar, soft palate, or buccal mucosa. If there is bone erosion, then Sg is preferred → PORT.
What is the preferred management approach for hard palate lesions?

Show Answer

Generally, initial Sg is preferred for all cases, except if there is extension to the soft palate or RMT, in which case definitive RT can be considered.
Per NCCN guidelines, what is the recommended time interval b/t Sg and PORT for OCC?

Show Answer

Per **NCCN** guidelines, the recommended time interval b/t Sg and PORT for OCC is **6 wks.**

FOLLOW-UP/TOXICITY

Why is brachytherapy generally avoided for gingival lesions?

Show Answer

There is a **high risk of osteoradionecrosis** with brachytherapy for gingival lesions.

To avoid malnutrition during a course of RT or CRT, pts need at least how many calories/day?

Show Answer

To avoid malnutrition during a course of RT or CRT, pts need at least **2,000 calories/day.**

The mandible should be kept at or below what RT dose?

Show Answer

The max mandibular RT dose should be **≤70 Gy.**

What does the f/u for OCC pts entail (NCCN 2018)?

Show Answer

OCC follow-up: H&P + laryngoscopy (q1–3 mos for yr 1, q2–6 mos for yr 2, q4–8 mos for yrs 3–5, and q12 mos if >5 yrs), imaging (for signs/Sx), annual TSH (if the neck is irradiated), speech/hearing/dental evaluation, and smoking cessation