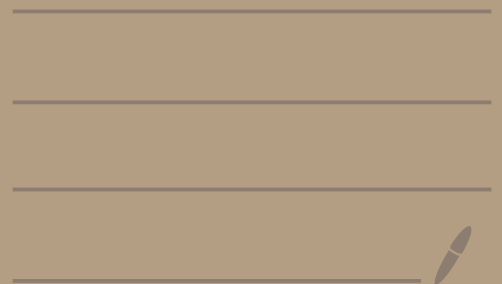


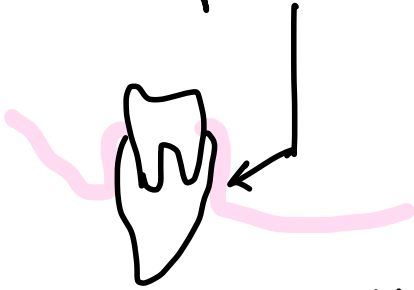
Management of Mandible in Oral Cavity Malignancies



Mandibular Resection in HNSCC

→ Routes of spread to the mandible (James Brown)

* Point of abutment



- mc route in dentate mandible.
- Sharpey's fibers binding the mucosa to bone.

* Occlusal surface



- mc route in edentulous mandible.

Other routes

- mandibular foramen
- gingiva
- mental foramen
- periodontal membrane
- neck nodes eroding into inferior border of mandible.

with the latter being associated with significantly worse disease free survival.¹⁸¹ He also described seven potential routes of tumor into the mandible:

- Through the occlusal route
- Through the periodontal membrane
- Through the attached gingiva
- Via the mental foramen
- Via the mandibular foramen
- Through abutment of the lower mandible in the neck
- Through cortical bone defects in the edentulous ridge

The evaluation of mandible involvement by oral cancer requires a combination of clinical and radiological

→ pattern of mandible involvement

- on buccal side → alveolar crest.

- on lingual side → point of attachment.

→ Evaluation of mandibular invasion:

- OPG - > 30% erosion needed to be identified.

- CT - more specific

- MRI - more sensitive - problem solving tool.

Contiguous involvement =
marrow involvement is disease related
only hyperostical erosions may be after recent dental extraction.

3 imaging findings that alter management }
1. mandible invasion
2. IIF involvement
3. Buccinator involvement → skin margin.

* Paramandibular spread

- No direct invasion of mandible.

- But if tumor is extending below mylohyoid line, there won't be sufficient height to do marginal mandibulectomy.



→ Types of mandibular resection

① Periosteal stripping :

Indication - No bony erosion

- Tumor close to mandible
- Adequate margin (0.5cm) without bone excision.

Contraindication

- Close margin
- Periosteal invasion
- Prior RT
- Edentulous mandible.

② Marginal mandibulectomy

Indication

- No / superficial bony erosion.
- Periosteal involvement.
- Tumor close to mandible to achieve margin without bony resection.

not an absolute
contraindication.

Contraindication

- Prior RT - multiple breaks in Periosteum leading to multiple potential sites of invasion.
- Edentulous mandible / pipe stem mandible.
- Gross bony erosion.
- Palamandibular spread below mylohyoid line.
- Can't preserve residual 1cm height of mandible.

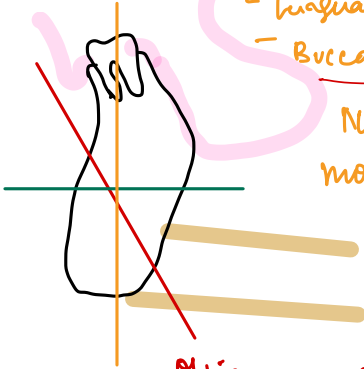
* Types of marginal mandibulectomy:

Vertical marginal

- Lingual plate resection
- Buccal plate resection →

Not preferred as more prone to fracture.

Not done
Buccal plate is the stronger side more soft tissue attachments.



Oblique marginal

(Preferred the most as it provides adequate margins from the point of abutment / entry of tumor) → tumor below mylohyoid line

buccal side involves, tumor above mylohyoid line.

- Horizontal
- Reverse marginal for neck node sliding into lower border of mandible

* Precautions in marginal mandibulectomy:

- Residual mandibular height - atleast 1cm
- Boat / Saucer shaped defect.
- Adequate soft tissue clearance

Arch of the mandible more amenable to marginal mandibulectomy
Height of mandible anteriorly - 4 cm
Posteriorly - 3 - 3.5 cm.

③ Segmental mandibulectomy:

Indication:

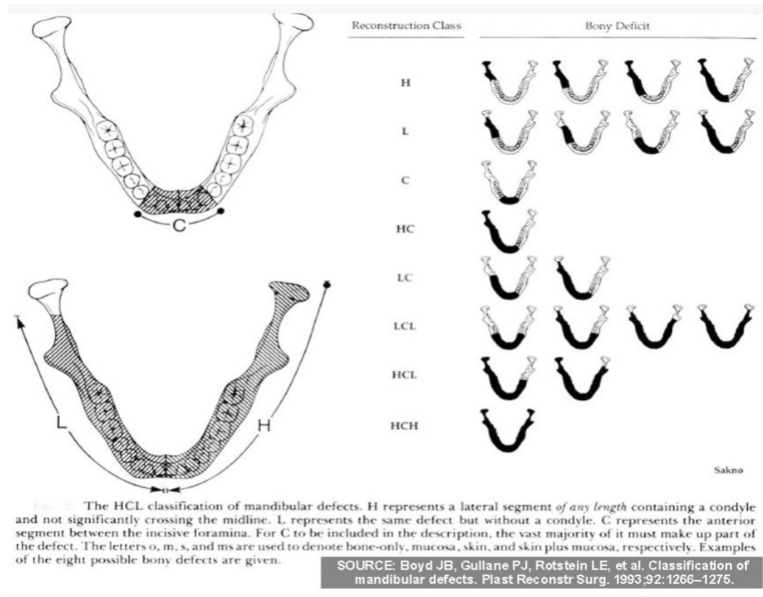
- Gross bony erosion
 - Gross paramandibular spread, ^{periosteal} involvement
 - Prior RT
 - Edentulous mandible
- } Relative indications.

Types of Segmental resection:

- posterior segmental
- lateral segmental
- central / Anterior segmental
- Arch preserving - Condyle & Coronoid process removed, but central arch preserved.
- Hemimandibulectomy
- Extended hemimandibulectomy - crossing midline.

→ mandibular defect classification :

1. Boyd (HCL classification)



2. Urken classification

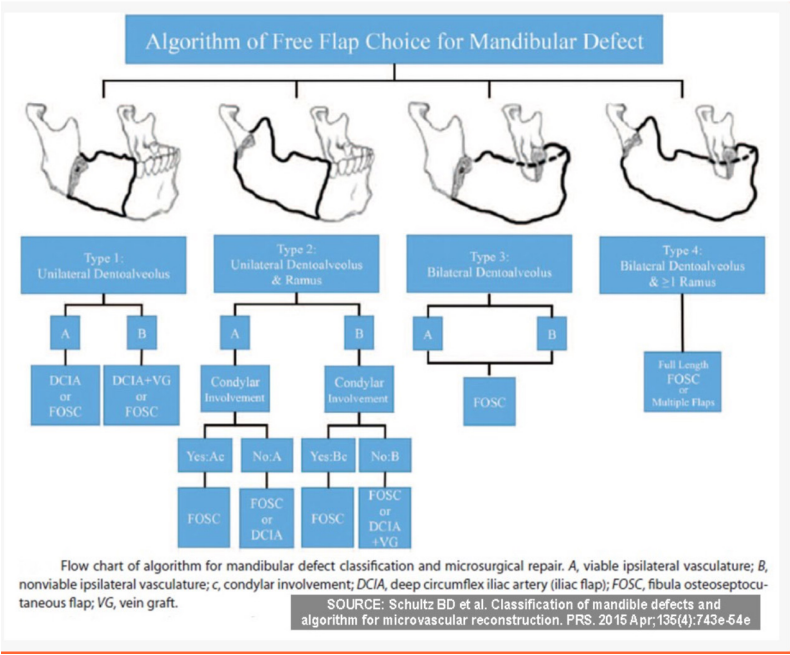
DEFECT	ABBREVIATION*	DEFECT	ABBREVIATION*
BONE		CUTANEOUS DEFECT	
Condyle	C	Cheek	C ^C
Ramus	R	Neck	C ^N
Body	B	Mentum	C ^M
Symphysis		Lips	C ^L
Total	S	Upper	C ^{UL} _{1/4} C ^{UL} _{1/2} C ^{UL} _{3/4} C ^{UL} _T
Hemi	S ^H	Lower	C ^{LL} _{1/4} C ^{LL} _{1/2} C ^{LL} _{3/4} C ^{LL} _T
MUCOSA		NEUROLOGIC DEFECT	
Labial	L	Inferior alveolar	N _{IA}
Buccal	B	Lingual	N _L
Soft palate		Hypoglossal	N _H
Hemi	SP ^H	Facial	N _F
Total	SP ^T		
Floor of mouth			
Anterior	FOM ^A		
Lateral	FOM ^L		
Pharynx			
Lateral	PH ^L		
Posterior	PH ^P		
TONGUE			
Mobile			
1/4 1/2 3/4	T ^M _{1/4} T ^M _{1/2} T ^M _{3/4}		
Nonfunctional	T ^{NF}		
Tongue base			
1/4 1/2 3/4	T ^B _{1/4} T ^B _{1/2} T ^B _{3/4}		
Nonfunctional	T ^{NF}		
Total glossectomy	TG		

*For marginal resection, add superscript ^M.

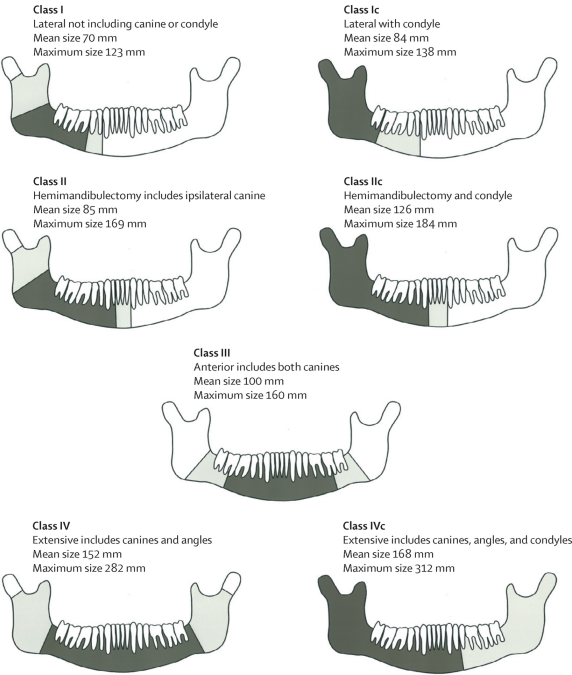
*For bilateral nerve defect, add superscript ^B.

SOURCE: Urken et al. Oromandibular reconstruction using microvascular composite free flaps. Arch Otolaryngol Head Neck Surg. 1991;117:733-744

3. Schwartz classification



4. Brown's classification (based on 4 pivot points)



- ≥ Angles
- ≥ canines

Landmark trials for mandibular preservation :

TABLE 1. Studies Evaluating the Role of Induction Chemotherapy for Mandibular Preservation in Patients With Locally Advanced Oral Cavity Carcinomas

Study	Trial Design	Patients Enrolled	Sample Size	Induction Chemotherapy Regimen	Response Rate to Induction Chemotherapy	Mandible Preservation Rate	Adjuvant Therapy	Oncological Outcomes
Licitra et al ⁹⁸	Phase III RCT comparing induction chemotherapy followed by surgery versus surgery alone	Untreated locally advanced resectable oral cavity squamous cell carcinoma; T2-T4 (>3 cm), N0-2	195	CF x 3 cycles: cisplatin 100 mg/m ² + 5FU 1000 mg/m ² as a 120-hour infusion once every 21 days	82% -CR: 28 (33%) -PR: 42 (49%)	21%; 95% CI, 7-34 (segmental mandibulectomy performed in 31% in the induction chemotherapy arm v 52% in the up-front surgery arm)	Adjuvant RT administered for high-risk patients. Criteria for high risk: -Positive surgical margins -Invasion of soft tissues of the face (cheek, chin) -Involvement of > 3 lymph nodes -Extracapsular tumor spread 32 (33%) in induction chemotherapy arm v 45 (46%) in the up-front surgery arm 13% difference; 95% CI, 0-27	5-yr EFS: induction chemotherapy arm 57% (95% CI, 46 to 67) v up-front surgery arm: 46% (95% CI, 36-57); <i>P</i> = .499 5-yr OS: Induction chemotherapy: 55% (95% CI, 45 to 66), and up-front surgery: 55% (95% CI, 44 to 65); <i>P</i> = .767
Chaukar et al ¹³	Phase II RCT comparing induction chemotherapy, followed by mandibular preservation surgery versus up-front surgery followed by adjuvant therapy	Untreated cT2-T4 and NO/N1, M0 oral squamous cell carcinoma, which required mandibular resection for paramandibular disease, with no clinicoradiologic bone erosion	68	DCF x three cycles: Docetaxel 75 mg/m ² on day 1 + cisplatin 75 mg/m ² on day 1 + 5FU 750 mg/m ² on days 1-5; once every 21 days	38.2% CR: 1 (2.9%) PR: 12 (35.2%) SD: 16 (47.3%) PD: 2 (5.8%)	47% (95% CI, 31.49 to 63.24) Induction chemotherapy arm (n = 34): 14 (41.1%) underwent segmental mandibulectomy, 15 (44.1%) underwent marginal mandibulectomy, and 5 (14.8%) no surgery In up-front surgery arm, all 34 (100%) patients underwent segmental mandibulectomy	All patients in both arms received adjuvant RT with or without chemotherapy In induction chemotherapy arm: 26 (76.4%) received adjuvant CRT (weekly cisplatin 30 mg/m ²) and 3 (8.8%) received RT alone In up-front surgery arm, 16 (47%) received adjuvant CRT (weekly cisplatin 30 mg/m ²), 16 (47%) received adjuvant RT alone, and 2 (5.8%) were observed	Median DFS: Induction chemotherapy arm: 3.8 years (range, 0.04-9.38) and up-front surgery arm: 3.4 years (range, 0.13-8.74); HR 0.911 (95% CI, 0.516 to 1.607); <i>P</i> = .715 Median OS: Induction chemotherapy arm: 4.1 years (0.12-9.38) and up-front surgery arm: 3.4 years (range, 0.29-8.74); HR, 0.899 (95% CI, 0.510 to 1.587); <i>P</i> = .747

used pre-NACT
tumor volume for
margins.

used post NACT
status for margins → fib PORT
for all patients irrespective of
pathology report.

Abbreviations: CF, cisplatin + fluorouracil; CR, complete remission; CRT, chemoradiation; DCF, docetaxel + cisplatin + fluorouracil; DFS, disease-free survival; EFS, event-free survival; FU, fluorouracil; HR, hazard ratio; OS, overall survival; PD, progressive disease; PR, partial remission; RCT, randomized controlled trial; RT, radiation; SD, stable disease.