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Neoplasms of the Oral Cavity

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CHAPTER OUTLINE

- Introduction
- WHO Classification (2022): Oral versus Oropharyngeal Tumors
- Neoplastic Conditions
- Malignant Tumors
- Minimum Data Sets Reporting
- Hard Palate and Upper Alveolar Ridge

INTRODUCTION

Neoplasms of the oral cavity are abnormal growths that develop within the mouth. They may be benign, showing slow growth and limited spread or malignant, with aggressive behavior and potential to invade surrounding tissues. These tumors can arise from different structures such as the oral mucosa, jaw bones or tooth-forming tissues. Their presentation varies from painless swellings to ulcerative or infiltrative lesions, and accurate diagnosis requires clinical evaluation, imaging, and histopathology. In essence, they represent a wide spectrum of conditions ranging from harmless lesions to serious cancers that demand early recognition and proper management.

WHO CLASSIFICATION (2022): ORAL VERSUS OROPHARYNGEAL TUMORS

The recent WHO classification distinguishes tumors of the oral cavity from those of the oropharynx. Soft tissue, lymphoid, neural tumors, and melanomas are described in their respective sections, while oropharyngeal tumors specifically include those arising in the base of the tongue, tonsils, and adenoids.

WHO Classification (2022)—Oral Cavity and Mobile Tongue Tumors

Nonneoplastic Lesions

- Necrotizing sialometaplasia
- Multifocal epithelial hyperplasia
- Oral melanoacanthoma

Epithelial Tumors

- **Papillomas:** Squamous papilloma
- Oral potentially malignant disorders
  - Oral epithelial dysplasia
  - Proliferative verrucous leukoplakia
  - Submucous fibrosis
  - HPV-associated oral epithelial dysplasia
- Squamous cell carcinomas
  - Oral squamous cell carcinoma

- Verrucous carcinoma of the oral cavity and mobile tongue
- Carcinoma cuniculatum

Tumors of Uncertain Histogenesis

- Congenital granular cell epulis
- Granular cell tumor
- Ectomesenchymal chondromyxoid tumor
- Melanotic neuroectodermal tumor of infancy

WHO Classification (2022)—Oropharyngeal Tumors (Base of Tongue, Tonsils and Adenoids)

Benign Oropharyngeal Lesions

Hamartomatous polyps

Epithelial Tumors

- Squamous cell carcinoma, HPV-associated
- Squamous cell carcinoma, HPV-independent

HPV-16 is the subtype of HPV most frequently associated with oral cancers and is a well-established etiological cause of oral carcinoma. Diffuse p16 marker positivity is an accurate method for predicting high-risk HPV infection in oral epithelial dysplasias, including both high-risk and low-risk lesions. However, combining p16 immunohistochemistry (IHC) with HPV DNA detection is considered a more accurate predictor for the prognostication of these lesions.

NEOPLASTIC CONDITIONS

Squamous Cell Carcinoma

It is the most common malignant neoplasm of the mouth and oral cavity. More than 90% of cancers in the oral cavity and oropharynx are squamous cell carcinomas. In the oral cavity, it affects the alveolar ridge, gingiva or palate.

Etiopathogenesis

Epidemiology and risk factors of oral cancers are similar to those of squamous cell carcinomas elsewhere in the upper aerodigestive tract, with tobacco consumption and, less commonly, alcohol use being the major risk factors. Human papillomavirus (HPV) infection is also associated with an increased risk of oral cancer, though not as strongly as with oropharyngeal cancers.

Gross Features

- It arises on the lower lip as well as at several intraoral sites, strongly associated with cigarette smoking and tobacco chewing.
- It has varied appearances. In the early stages, it may present as a plaque, irregular thickening or an ulcerated mucosal lesion. White lesions (leukoplakic) may show only intraepithelial carcinoma on histology.

Histology

- Oral squamous cell carcinomas show the same histologic features as neoplasms of the same name occurring elsewhere. Early invasion is difficult to assess. Verrucous carcinomas also pose a diagnostic problem due to their well-differentiated nature.
- SCC is graded using the four-tier system of Broders' grading. If a three-tier system is used, it should be indicated in the report.

Variants of Squamous Cell Carcinoma

Spindle Cell Carcinoma

- **Adenoid (or acantholytic SCC):** Cases in which loss of intercellular adhesion in the center of tumor islands resembles glandular differentiation. The tumor exhibits a pseudo-glandular or alveolar appearance because of acantholysis.
- **Adenosquamous carcinoma:** Mixtures of true adenocarcinoma (glandular) and SCC.
- **Basaloid squamous cell carcinoma:** Basaloid squamous cell carcinoma is an aggressive variant of squamous cell carcinoma that shows a predilection for the upper aerodigestive tract (oral cavity, oropharynx, esophagus, and larynx), though it may also occur in other sites such as the lung.

- **Microscopically**, tumor islands demonstrate squamous differentiation admixed with solid nests that display peripheral palisading and a thick basement membrane, with cystic spaces containing mucoid or hyaline material and occasional spindle cell components.
- **Immunohistochemically**, the tumor is positive for high molecular weight keratin, typically detected using the 34βE12 antibody.
- **Verrucous carcinomas (Ackerman's tumor):** It occurs in the oral cavity, most commonly in the buccal mucosa and lower gingiva, but it can also arise in the larynx, nasal cavity, esophagus, penis, anorectal region, vulva, vagina, uterine cervix, and skin. Grossly, it presents as a large, fungating, soft papillary growth. Microscopically, diagnosis may be difficult because of its well-differentiated character. Massive acanthotic lesions with minimal atypia are seen, and broad bulbous processes of acanthotic cells with columns of centrally located keratin push into the underlying stroma, accompanied by a pronounced inflammatory cell infiltrate in the lamina propria. Overall, verrucous carcinoma carries a better prognosis than conventional squamous cell carcinoma.
- **Papillary squamous cell carcinoma:** It occurs in the oropharynx of elderly individuals and shows frequent association with HPV infection.
- **Carcinoma cuniculatum (CC):** Carcinoma cuniculatum is a rare epithelial carcinoma of insidious onset. It is most often seen in the oral cavity, particularly the gingiva and buccal mucosa, but may also occur in the esophagus, genitals, and foot. Clinically, its slow growth can mimic benign conditions such as osteomyelitis or dental abscesses, though malignantly it must be differentiated from verrucous carcinoma. Patients typically present with swelling, ulcers, and pain. Histologically, it appears as a deeply infiltrative tumor with complex proliferation of well-differentiated squamous epithelium forming tunnels and cystic cavities filled with keratinous material. Clinically, it has a warty keratinized surface resembling verrucous carcinoma. The incidence is low, accounting for only about 2.7% of oral SCC cases. It is usually diagnosed late and considered a low-grade variant of SCC. Carcinoma cuniculatum rarely metastasizes and is generally managed by surgical excision.
- **Spindle cell (sarcomatoid) carcinoma:** It presents as an ulcerated and infiltrative mass or as a polypoid growth in the lip, tongue or other portions of the oral cavity. Immunohistochemically, it is positive for keratin 5/6, epithelial membrane antigen (EMA), membranous epithelial cadherin, and nuclear p63.

Odontogenic Tumors

- **Lymphoepithelioma-like carcinoma:** Occasionally found in the oral cavity or oropharynx and is microscopically similar to the lymphoepithelioma of the nasopharynx and tonsil.
- **NUT (midline) carcinoma:** It occurs in midline structures of the head and neck. Rearrangement of the NUT gene on chromosome 15q14 is seen.
- **Microscopy:** It shows islands of undifferentiated carcinoma with keratinization. Immunohistochemical profile: CK8/18 positive in the undifferentiated areas and CK5/6 positive in the keratinizing areas.
- Basal cell carcinoma, nevi and malignant melanoma, etc., are covered on chapter on skin.

Ameloblastoma

It is the most common benign odontogenic tumor occurring in the mandible. The World Health Organization defines it as a benign but locally aggressive tumor with a high tendency to recur, consisting of proliferating odontogenic epithelium lying in a fibrous stroma. It originates from the residual epithelium of the tooth germ, the epithelium of odontogenic cysts (stratified squamous epithelium) or the epithelium of the enamel organ. Ameloblastoma represents approximately 1% of oral tumors, with about 80% occurring in the mandible, usually in the third molar region, while the remaining 20% occur in the upper jaw.

It occurs most commonly in the fourth decade of life. These tumors are typically painless and slowly growing, and they characteristically produce multicystic or 'soap bubble' radiolucencies on imaging. Their growth pattern is by local expansion with progressive destruction of adjacent tissues.

Etiology

- Signaling pathways, such as WNT and Akt, along with growth factors like fibroblast growth factor, play an important role in the pathogenesis, particularly in the solid type of ameloblastoma.
- Bone morphogenetic proteins, ameloblastin, enamel matrix proteins, calretinin, syndecan-1, and matrix metalloproteinases also contribute significantly to pathogenesis. Tumor suppressor genes such as p53 and p63 are involved by altering pathways of differentiation and acting as mitogens.

Ameloblastoma is classified into:

- **Solid/multicystic (most common):** Accounts for about 86% of cases, with multicystic ameloblastomas being the predominant type.
- Extraosseous or peripheral
- Desmoplastic ameloblastoma
- Unicystic ameloblastoma.

Microscopy

The classic pattern, described as follicular, is composed of epithelial islands showing peripheral palisading of elongated cells with reversed polarity, meaning the nuclei are located at the end of the cell away from the basement membrane. The central, looser areas resemble the stellate reticulum of the tooth germ (Fig. 34.1).

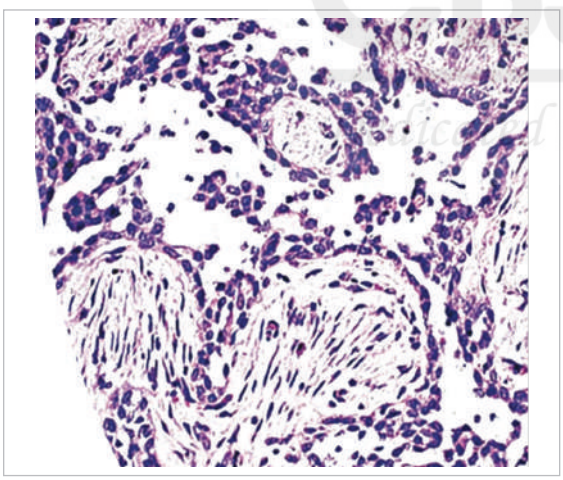


Fig. 34.1: Microscopy of ameloblastoma

The plexiform pattern consists of interconnecting strands and cords of epithelium, within which stellate reticulum-like areas are difficult to identify.

Other recognized patterns of ameloblastomas include the acanthomatous and basaloid types.

Malignant Ameloblastomas

They exhibit denser cellularity with cytologic atypia and show invasive borders.

Odontogenic Keratocyst (OKC)

Also known as 'keratocystic odontogenic tumor,' this lesion is an aggressive developmental keratocyst arising from the dental lamina. It has a marked tendency to recur and can expand the jaw bones. It typically occurs in the mandible (Fig. 34.2), though it may also be found in the maxilla. In rare cases, it can undergo malignant transformation.

Cementoblastoma

It is a rare benign tumor associated with the roots of teeth, arising from the cementum. It most often occurs in the posterior mandible and typically presents with swelling and pain. The incidence of cementoblastomas is reported to be less than 0.69–8% of all odontogenic tumors.

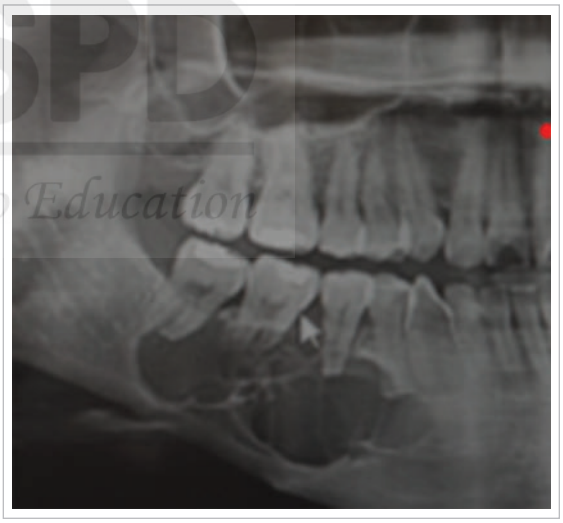


Fig. 34.2: Image of odontogenic keratocyst of the right mandible

Ossifying Fibroma

A benign fibro-osseous lesion that most commonly occurs in the mandible and typically affects women in the 3rd and 4th decades of life. These are slow-growing tumors of the jawbones, particularly in the premolar and molar regions. Small lesions are often detected incidentally on routine dental radiographs, whereas larger lesions may present with an enlarging mass or cause malocclusion. Surgical excision is the treatment of choice, but because of the high recurrence rate, long-term follow-up is essential.

Juvenile ossifying fibroma (JOF) is a distinct subtype of ossifying fibroma, further classified into two forms: (i) **Psammomatoid JOF**–usually involves the bones of the orbit and paranasal sinuses. (ii) **Trabecular JOF**–typically affects the bones of the upper and lower jaws.

Odontoma

A common mixed odontogenic tumor, composed of dental tissue elements like enamel and dentin. It usually does not cause symptoms but can interfere with tooth eruption.

Primary Bone Tumors

Brown Tumor

- Brown tumor is a bone lesion that develops in conditions of excessive osteoclast activity, most commonly in hyperparathyroidism. Despite the name, it is not a true neoplasm, though it can mimic one clinically and radiographically. It frequently affects the maxilla and mandible, but any bone may be involved. On radiographs, brown tumors typically appear as radiolucent lesions.
- Brown tumors consist of fibrous tissue, woven bone, and supporting vasculature (Fig. 34.3), but lack a mineralized matrix. Osteoclasts resorb the trabecular bone laid down by osteoblasts, and this cycle of reparative bone deposition followed by further resorption can extend beyond the normal contours of the bone. As the lesion expands and involves the periosteum, it often results in bone pain.
- The brown color is due to hemosiderin.

Osteoid Osteoma

- Small, benign, bone-forming tumor associated with pain and limited growth potential.
- Nidus <1.5 cm [lesions larger than this are arbitrarily considered osteoblastomas (Fig. 34.4)].
- Children, adolescents, and young adults (most patients 5–24-year-old).
- **Sex ratio:** Male:Female = 3:1.
- Long bones, especially femur and tibia (≈50%); virtually any bone may be affected, including facial bones.
- Clinical features include intense localized pain, worse at night. Pain relieved by NSAIDs due to prostaglandin E2 release and nerve endings in the reactive zone.

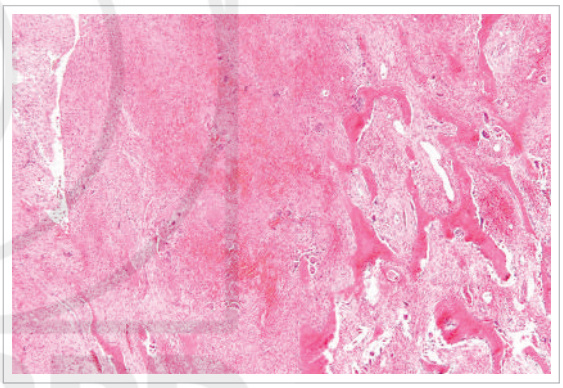


Fig. 34.3: Low power view of a brown tumor with fibrous tissue, woven bone, and hemorrhage

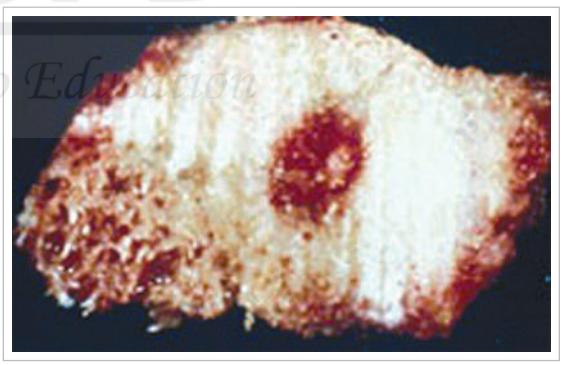


Fig. 34.4: Central nidus of osteoid osteoma with a sclerotic periphery

- **Microscopy**
  - Small, circumscribed lesion.
  - Anastomosing, irregular trabeculae or solid, sclerotic nidus of woven bone with variable mineralization
  - Rimmed by a single layer of osteoblasts, with frequent osteoclasts.
  - Loose, fibrovascular stroma
  - Surrounded by thick sclerotic bone
  - Lymphoplasmacytic synovitis may be seen with juxta-articular tumors.

MALIGNANT TUMORS

Osteogenic Sarcoma

Osteogenic sarcoma (osteosarcoma) is the most common primary bone tumor in young adults. It most frequently arises in the long bones and is rare in the jaw bones. When it occurs in the mandible, it is referred to as mandibular or gnathic osteosarcoma, and represents a high-grade malignant neoplasm.

About 4–6% of gnathic osteosarcomas occur in the maxillofacial region. Osteogenic sarcoma of the mandible is more common in women, with the horizontal ramus being the most frequent site of involvement. Surgical excision is the treatment of choice, and depending on the location of the neoplasm, a hemimandibulectomy is often performed. When osteogenic sarcoma occurs in the maxilla, the lesions are most commonly found in the alveolar ridge, sinus floor, and palate.

The OS of the jaws usually presents at a later age compared to OS occurring at other skeletal sites. It has a lower incidence of metastasis and is associated with a higher survival rate.

The exact etiology is unknown, but genetic factors have been implicated. Cases of gnathic OS are also associated with other bone diseases such as Paget's disease, fibrous dysplasia, enchondromatosis, and hereditary multiple exostosis. A history of previous radiation therapy to the jaw region has been observed in some patients, suggesting a possible link between OS and excessive bone cellular activity. On imaging, gnathic OS typically shows a mixed radiographic pattern with both sclerotic and lucent areas.

Osteoclastoma

- **Nature:** Considered a potentially malignant tumor.
- **Age group:** Most common in the 3rd and 4th decades of life; rare after 40 years.
- **Sex predilection:** More common in women.
- **Location:** Classically around the knee joint—"to the knee I go, from the elbow I flee."
- **Radiology:** X-ray shows a characteristic soap-bubble appearance.
- **Microscopy:** Giant cells uniformly distributed throughout the lesion. Presence of foam cells. Partial or predominant cyst formation.

Ewing's Sarcoma

Ewing's sarcoma is a rare, malignant, and aggressive small round cell tumor. It is an uncommon malignancy that usually occurs in childhood and adolescence, accounting for about 10–15% of all primary malignant bone tumors in young adults. Although any bone may be affected, involvement of the jaw or facial bones is extremely rare, with only occasional cases reported in the literature.

Ewing's sarcoma can affect the mandible, although it is more commonly seen in the long bones, pelvis, and chest wall. It is a highly malignant, small round cell tumor that primarily affects children and young adults. When it involves the mandible or other bones of the head and neck, it is considered less typical but not rare.

Features of Ewing's Sarcoma in the Mandible

Clinical presentation:

- Rapidly growing swelling in the jaw region.
- Pain or tenderness in the affected area.
- Loosening of teeth or dental pain.
- Numbness of the lower lip or chin (mental nerve involvement).
- Fever or general malaise, sometimes mimicking infection.

Appearance on imaging:

- Moth-eaten appearance due to bone destruction with poorly defined borders.

- Onion-skin periosteal reaction, more typical in long bones but occasionally seen in the jaws.
- Expansile soft tissue mass extending beyond bony limits.
- **Histopathology:** Sheets of small, round, blue cells with a high nuclear-to-cytoplasmic ratio.
- **Immunohistochemistry:** CD99 (MIC2 gene product) typically positive.
- **Molecular genetics:** EWSR1–FLI1 translocation is characteristic.

Diagnosis

- CT or MRI is used to assess the extent of bone involvement and soft tissue spread.
- Biopsy is required for a definitive diagnosis, supported by histopathology and genetic testing.

Prognosis

- Better prognosis is seen when the disease is diagnosed early and treated aggressively. Metastatic disease or local recurrence can occur and significantly worsen outcomes.
- Dentists should maintain a high index of suspicion when evaluating rapidly enlarging intraoral or extraoral swellings, as early recognition and diagnosis can improve clinical management and survival.
- Ewing's sarcoma of the orbital bones is rare but can occur. The orbital bones—including the frontal bone, zygomatic bone, and maxilla—may be involved when Ewing's sarcoma arises in the head and neck region.

Features of Ewing's Sarcoma in the Orbital Bones

Clinical Presentation

Proptosis (bulging of the eye) may occur due to the mass pushing the eye forward as a result of rapid swelling, and it must be differentiated from conditions such as orbital cellulitis or other inflammatory lesions. Pain is rarely present, though vision changes can develop as the tumor enlarges and compresses the optic nerve or surrounding tissues, leading to blurred vision, diplopia (double vision) or even vision loss.

Ptosis with restricted eye movement may occur if the tumor involves the muscles or nerves of the orbit.

Radiographic Appearance

- **Bone destruction:** The tumor typically causes destructive changes in the orbital bones, which can be demonstrated on imaging studies such as CT or MRI. These scans reveal not only bony destruction but also a soft tissue mass component that extends beyond the bony confines and involves adjacent tissues.

  A characteristic 'moth-eaten' pattern is seen in bone lesions of Ewing's sarcoma, including those involving the orbital bones. Histopathology reveals sheets of small, round, blue cells with a high nuclear-to-cytoplasmic ratio, which are typically positive for the CD99 marker on immunohistochemistry. Molecular studies often demonstrate the EWSR1–FLI1 translocation, the same genetic abnormality found in Ewing's sarcoma at other sites.
- **Chemotherapy:** As in other locations, systemic chemotherapy is a critical component of treatment for orbital Ewing's sarcoma. The tumor is chemosensitive, and chemotherapy is typically administered both before and after surgery or radiation therapy.

  Prognosis depends on several factors, including the size of the tumor, whether it has spread beyond the orbit, and how well it responds to initial treatment.

  While rare, Ewing's sarcoma can occur in the orbital bones and requires prompt diagnosis to manage its rapid progression and prevent complications such as vision loss or metastasis.

Chondrosarcoma

Chondrosarcoma is a less common malignant tumor of cartilage that usually presents in the anterior maxilla. Clinically, it gives rise to a painless swelling and may occasionally cause displacement of teeth in the upper jaw.

Metastatic Tumors

Metastatic tumors from primary sites such as the breast, lung, kidney or prostate may spread to the bones of the jaw, most often the mandible. Clinically, they present as swelling, pain or even pathological fractures.

Langerhans Cell Histiocytosis

A condition characterized by abnormal proliferation of Langerhans cells. It often affects the jaws in children and may mimic periodontal disease or present as bony lesions.

Dentists should be wary and suspect a neoplasm when the patient has:

- Persistent nonhealing ulcers or growth with unexplained pain.
- Mobile teeth without a relevant cause.
- Radiographic findings of a tumor may include radiolucent or mixed radiolucent–radiopaque images.

Early recognition of these features and prompt referral to specialists are essential for effective management.

MINIMUM DATA SETS REPORTING

Biopsy of the Oral Cavity and Tongue

- Measure the specimen in three dimensions (length, width, depth).
- Describe any gross lesion and its location—whether at the tip of the tongue, dorsum, lateral or ventral surface—and comment on whether the midline is involved (carcinomas of the midline carry a greater risk of developing bilateral metastasis). Alternatively, note if the lesion is in another region of the oral cavity such as the buccal mucosa, gingiva, etc.
- Submit the entire specimen for sectioning.

Hemiglossectomy

- State the overall size of the specimen.
- Measure along three dimensions (length, width, depth).
- Ink the base, posterior, and medial surgical margins with India ink.
- Measure the size of the tumor.
- Record its location and the distance from the posterior and medial margins.
- Describe the tumor—whether ulcerative, proliferative or plaque-like—and note its cut surface and depth of involvement.
- Make multiple parallel transverse slices at intervals of approximately 0.5 cm (Fig. 34.5)

Lymphatic Drainage of Tongue

The anterior third of the tongue drains into level IV (lower deep cervical) lymph nodes and level I nodes, less frequently into the submental nodes.

The middle third of the tongue drains primarily into level III (jugulo-carotid) nodes, and less often into level I and level II lymph nodes.

The posterior third of the tongue drains into level II (jugulo-digastric) lymph nodes, and less often into level I and level III nodes.

Tissue bits are submitted according to the level of lymph nodes removed and involved, and reported accordingly.

Bits

- **ABC:** Three bits of tumor to include the entire thickness with base (including one bit taken from the site of maximum depth of invasion).
- **DEF:** Three bits from surgical margins—(1) Posterior (2) Medial and (3) Lateral mucosal surgical margins (Fig. 34.5).

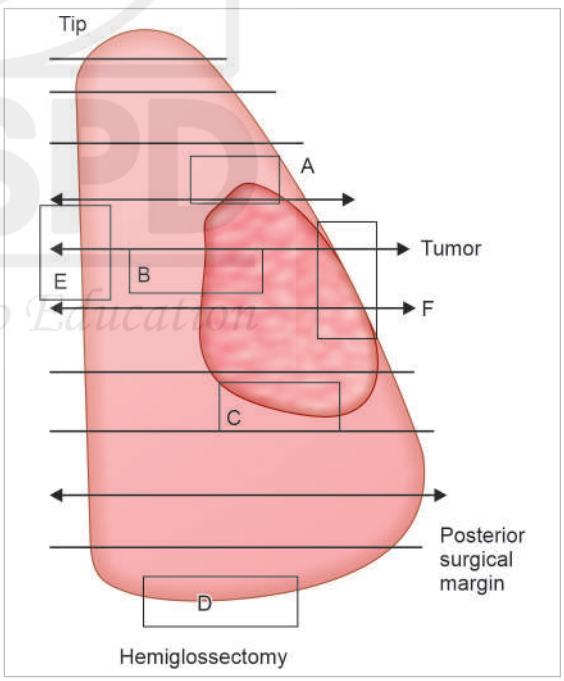


Fig. 34.5: Grossing of a hemiglossectomy specimen

Synoptic Reporting – Oral Cavity and Oropharynx Resection (Epithelial Malignancy)

Primary tumor

Site .....

Subsite (s) .....

Right ☐ Left ☐ Midline ☐

Type of resection

Histological type: Squamous carcinoma ☐

Other/subtype

Differentiation Well ☐ Moderate ☐ Poor ☐

Maximum diameter .....(mm)

Maximum depth of invasion .....(mm)

Distance from invasive tumor to mucosal margin .....(mm)

Deep margin ..... (mm)

Bone margin (if present) .....(mm)

Vascular invasion ..... Yes ☐ No ☐

Nerve invasion ..... Yes ☐ No ☐

Bone/cartilage invasion ..... Yes ☐ No ☐

Severe dysplasia present in adjacent epithelium ..... Yes ☐ No ☐

Severe dysplasia present at margin ..... Yes ☐ No ☐

Reporting on Neck Node Dissection:

Neck dissection: ..... Yes ☐ No ☐

Side: Right ☐ Left ☐ Both ☐

Right Neck Dissection: Yes ☐ No ☐

Comprehensive ☐ Selective ☐

Node levels present: I ☐ II ☐ III ☐ IV ☐ V ☐ VI ☐ Other ☐

Total number of nodes ..... Yes ☐ No ☐

Number of positive nodes ..... Yes ☐ No ☐

Levels with metastases: I ☐ II ☐ III ☐ IV ☐ V ☐ VI ☐ Other ☐

Largest metastasis .....(mm)

Extracapsular spread ..... Yes ☐ No ☐

Levels with ECS .....

Left neck dissection: Yes ☐ No ☐

Comprehensive ☐ Selective ☐

Node levels present: I ☐ II ☐ III ☐ IV ☐ V ☐ VI ☐ Other ☐

Total number of nodes .....

Number of positive nodes .....

Levels with metastases: I ☐ II ☐ III ☐ IV ☐ V ☐ VI ☐ Other ☐

Largest metastasis .....(mm)

Extracapsular spread ..... Yes ☐ No ☐

Levels with ECS .....

Summary of Pathological Data

Tumor site.....

New primary ☐ Recurrence ☐ Not known ☐

Tumor type .....

pTNM stage pT ..... pN ..... pM .....

SNOMED codes

T ..... M .....

T ..... M .....

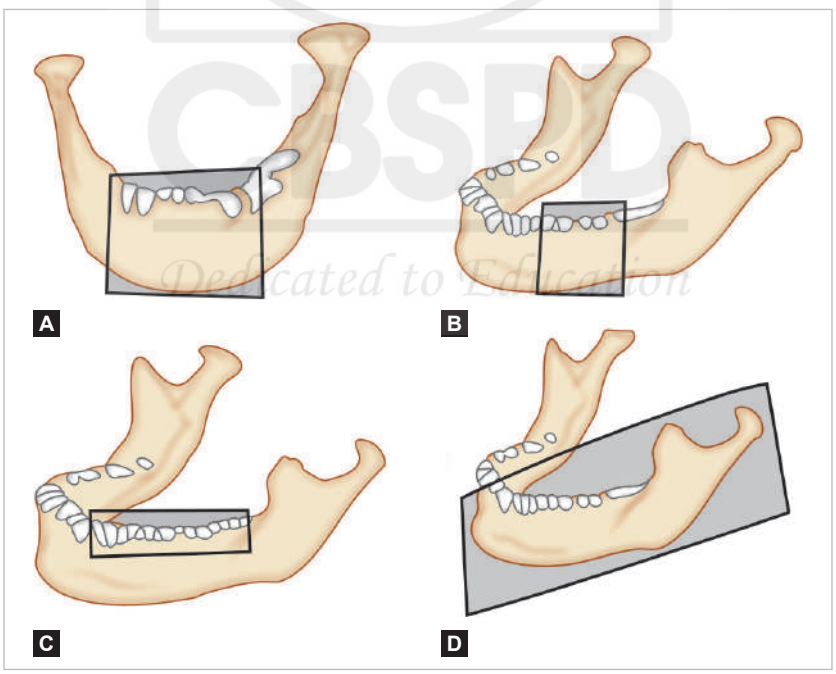
Resection of primary tumor: Clear ☐ Close ☐ Involved ☐

Signature ..... Date

Resections to Remove Oral Cancers

Oral cancers may involve the floor of the mouth, upper and lower alveolar ridges, and the retromolar gingiva. Bone is removed in many cases of malignancy. The various resections that may be performed include the following (Figs 34.6A to D):

- **Middle third mandibulectomy:** Removal of the full thickness of the middle portion of the mandible.
- **Segmental mandibulectomy:** A segment of the mandible close to the tumor is removed
- **Marginal mandibulectomy:** The upper part of the mandible adjacent to the tumor in the floor of the mouth is removed.
- **Hemimandibulectomy:** Removal of one half of the mandible.



Figs 34.6A to D: **A.** Middle third mandibulectomy; **B.** Segmental mandibulectomy; **C.** Marginal mandibulectomy; **D.** Hemimandibulectomy

Hemimandibulectomy

- Orient the specimen, state the side and type of resection.
- Measure the length along the alveolar border.
- Measure the skin flap, if present.
- Ink the mucosal surgical margins with India ink.
- State the site of the tumor—alveolar border, gingivo-buccal sulcus, buccal mucosa, floor of mouth or retromolar trigone.
- Measure the size of the tumor.
- Describe the tumor—whether ulcerative, proliferative or plaque-like and describe its cut surface.
- Section the tumor perpendicular to the long axis of the bone, with the depth of the cut extending right up to the periosteum.
- Measure the depth of involvement and state whether skin and underlying bone are grossly involved.

Bits

A, B, C : Three bits of tumor, with overlying skin included in one bit if present.

D : One bit of tumor with underlying adjacent bone.

E, F, G, H : Four bits of mucosal surgical margins—anterior, medial, posterior, and lateral.

J : One bit of bone surgical margin (Figs 34.7A and B)

Middle Mandibulectomy

The procedure for grossing this specimen is the same as described above.

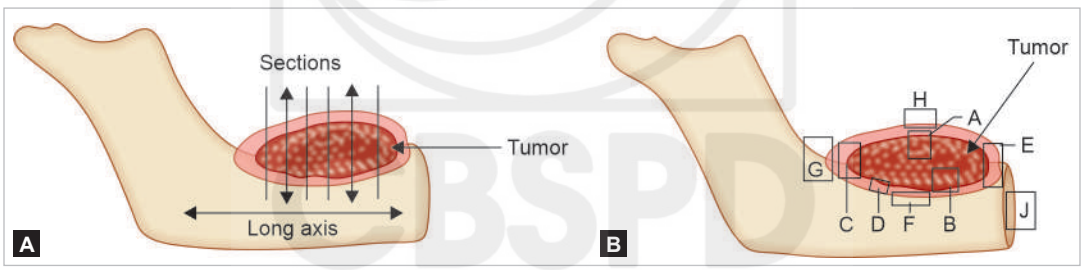
Bits

ABC : Three bits of tumor, with overlying skin included in one of the bits if present.

D : One bit of tumor with underlying bone.

EFGH : Four bits of mucosal surgical margins—anterior, left lateral, posterior, and right lateral.

JK : Two bits of bone surgical margins—left lateral and right lateral (Fig. 34.8).



Figs 34.7A and B: Left hemimandibulectomy specimen showing neoplasm on the lower alveolar border

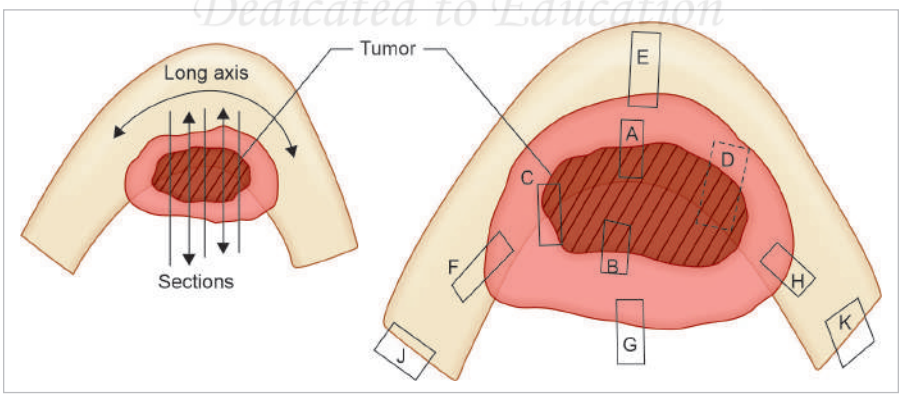


Fig. 34.8: Middle mandibulectomy to show tumor in the floor of the mouth

Intraosseous Tumors: Jaw Resection for Tumor

- Fix the specimen in formalin overnight in the refrigerator at 4°C.
- Paint the surgical margins with India ink.
- Take surgical margins-anterior, posterior, superior and external.
- Cut the specimen with a saw into parallel slices approximately 0.5 cm thick.
- Take representative bits from the tumor with adjacent bone for decalcification.
- Bony surgical margins should also be taken.

Minimum data set report in cases of mandibulectomy:

Form to fill for primary tumor and mandibulectomy

Site .....

Subsite(s) .....

Right ☐ Left ☐ Midline ☐

Type of resection .....

Location of tumor ..... (alveolar border, buccal mucosa, gingival sulcus, etc.)

Bone involved grossly ..... Yes ☐ No ☐

No. of teeth present Type of teeth

Length of mandible ..... cm

Length of mandible at alveolar border ..... cm

Appearance of bone c/s .....

Size of tumor ..... cm

Type of tumor

Ulcerative ☐ Proliferative ☐ Cystic ☐ Solid cystic ☐

Tumor thickness ..... cm

Resection Margins

Soft tissue involved ..... Yes ☐ No ☐

Distance of closest soft tissue margin from tumor ..... cm

Yes ☐ No ☐

Measurement of skin flap if present ..... cm × ..... cm

Bone Margins Involved

Bony margins: Anterior (only margin for hemimandibulectomy.) ..... Yes ☐ No ☐

Marginal mandibulectomy; margin involved – Anterior ☐ Posterior ☐ Inferior ☐

Middle third mandibulectomy; margin involved – lateral right cut margin ☐ lateral left cut margin ☐

Vascular invasion ..... Yes ☐ No ☐

Nerve invasion ..... Yes ☐ No ☐

Histological type of tumor ..... Grade .....

Signature: ..... **Date:** .....

HARD PALATE AND UPPER ALVEOLAR RIDGE

The upper alveolar ridge includes the alveolar process of the maxilla and its covering mucosa. Which extends from the line of attachment of mucosa in the upper gingivo-buccal gutter to the junction of the hard palate. Its posterior margin is the upper end of the pterygopalatine arch.

The hard palate is the semilunar area between the upper alveolar ridge and the mucous membrane covering the palatine process of the maxillary bones. It is bounded in front and at the sides by the alveolar ridge, at the back; it is continuous with the soft palate and separates the oral from the nasal cavity. The lymphatic drainage of the hard palate is mainly to level I and level II nodes, and it may also be bilateral.

Maxillectomy may be performed for tumors involving the maxillary sinus, upper alveolar border or hard palate (Fig. 34.9).

Figure 34.10 shows cut section of maxilla to show the normal relationships:

- Orient the specimen and measure along the alveolar border.

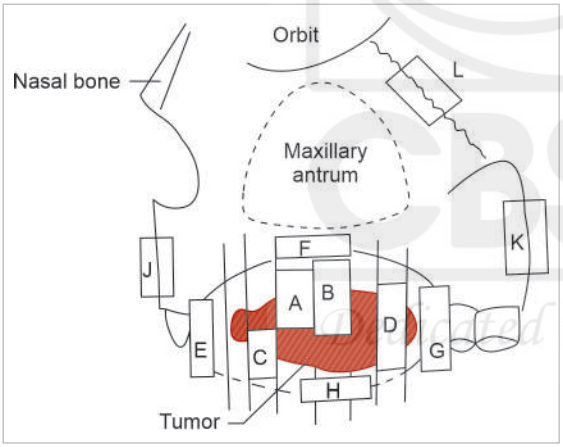


Fig. 34.9: Maxillectomy for tumor at the upper alveolar border

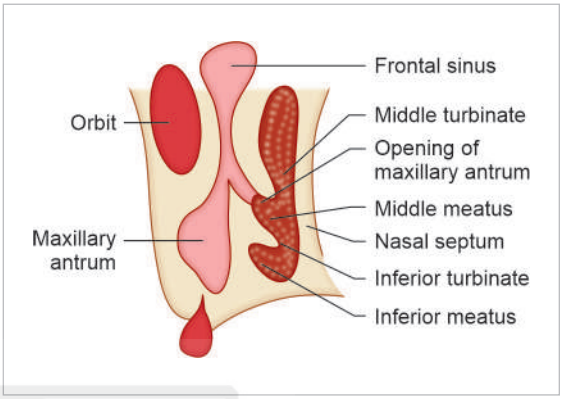


Fig. 34.10: Cut section of maxilla

- Ink the mucosal surgical margins.
- Describe the extent of resection and mention whether the following structures are present—superior, middle, and inferior turbinates, medial and lateral pterygoid plates of the sphenoid, air cells of the ethmoid, floor of the orbit, zygoma, muscles pterygoids, masseter, and temporalis.
- State the site and extent of the tumor.
- Measure the size of the tumor.
- Describe the tumor—whether ulcerative, proliferative or plaque-like and describe its cut surface.
- Describe the condition of the maxillary sinus.
- Make parallel sections perpendicular to the long axis of the bone.

Bits

A, B, C : Three bits of tumor

D : One bit of tumor with underlying bone.

E, F, G, H : Four bits of mucosal surgical margins; these include anterior, lateral, posterior, and medial (brought forward in figure).

J, K, L : Three bits of bony surgical margins; these include anterior, posterior, and superior bony surgical margins.

Synoptic Reporting .....

Type of resection: .....

Maxillectomy: Full Partial:

Alveolar ridges: Upper: Size:

Bony tumor: Epithelial Tumor:

Extent of tumor: ..... × ..... cm

Histological Grade: .....

Soft tissue surgical margins involved: ..... Yes ☐ No ☐

Medial: Lateral (distal): .....

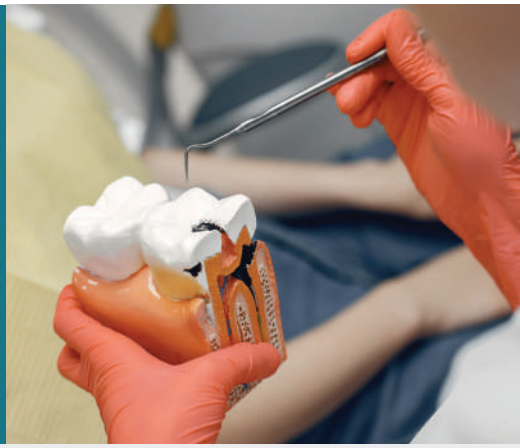
Bony margins involved: ..... Yes ☐ No ☐

Margin distance away from tumor: ..... mm

Evidence of metastasis: .....

Signature: ..... **Date:** .....

STUDENT ASSESSMENT



LONG ANSWER QUESTIONS

1. Discuss squamous cell carcinoma of the oral cavity with reference to its etiology, pathology, clinical features, and management.
2. Describe the premalignant lesions and conditions of the oral cavity, highlighting their clinical presentation, pathology, and risk of malignant transformation.

SHORT ANSWER QUESTIONS

1. What is verrucous carcinoma of the oral cavity?
2. What are the salivary gland tumors of the oral cavity?

SHORT NOTES

1. Risk factors for carcinoma of the oral cavity
2. Oral melanoma

MULTIPLE CHOICE QUESTIONS

1. **The most common malignant tumor of the oral cavity is:**
   a. Verrucous carcinoma
   b. Adenocarcinoma
   c. Squamous cell carcinoma
   d. Mucoepidermoid carcinoma
2. **The oral cavity site with the highest incidence of carcinoma is:**
   a. Hard palate
   b. Floor of the mouth
   c. Buccal mucosa
   d. Tongue (lateral border)
3. **Which of the following salivary gland tumors is most commonly seen in the oral cavity?**
   a. Warthin tumor
   b. Pleomorphic adenoma
   c. Adenoid cystic carcinoma
   d. Acinic cell carcinoma

ANSWER KEY

1. c **2.** d **3.** b