

Dental Considerations in Impacted Third Molar

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Abstract:- Impacted third molars are common. Factors influencing the Impaction such as Age, Gender, Medical History, Impaction Type, Relationship between impacted third molar and inferior alveolar nerve, Type of local anaesthetic technique and so on. Complications like Dry socket, Nerve Injury, Infection, Swelling, Haemorrhage and even fracture occurs in mandible.

Keywords:- Impaction, Osteomyelitis, Dentigerous cyst, Odontogenic keratocyst, Odon tomes, Odontogenic Fibroma, Ameloblastoma, Alveolar Osteitis, Paresthesia.

I. INTRODUCTION

The term "impaction" origin from Latin word "impactus," signifying an organ/ structure due to an abnormal condition, it is not in normal position.[1] Impacted wisdom teeth because of inability to fully erupt into the mouth, primarily by obstruction from another tooth. This condition affecting 72% population. It is due to improper in teeth and jaw size. It is classified based on impaction direction, depth compared to the biting surface of adjacent teeth, and tooth crown extent that penetrates through bone / oral mucosa. In ancient times , about wisdom teeth Darwin, Plato and Hippocrates described.[3] It can result in the pericoronitis, dental caries, food Impaction, pain, pathological development conditions. As the prophylactic removal of impacted teeth is becoming normal in nowadays. [1] Third molars erupting in the age of 17 to 21 years. [5]



Fig. 1: Impacted third molars



Fig. 2: Impacted molar in mandible

II. EPIDEMIOLOGY

The Third molar erupts in the age between 17 and 25. Occurs in mandible than in maxilla. The prevalence of mandibles third molar impaction is more in men than in women. The third molar is common when impaction of tooth is considered with a frequency range of 18%– 32%.

III. DURBECK'S THEORIES OF IMPACTION

A. Orthodontic theory (small jaw-decreased space):

Jaws develop in downward and forward direction, while teeth move in a forward direction, when presence of a dense bone the movement of the teeth in forward direction decreases. Growth of the jaw and movement of the teeth occurs in forward direction, so anything which interferes with such moment will cause an impaction.

B. Nodine's Phylogenic theory:

Nature tried to eliminate the disused organs. Due to changing in the nutritional habits, use of large powerful jaws has been practically eliminated. Thus, over centuries the maxilla and mandible are decreased in size leaving insufficient room for third molars.

C. Mendelian theory:

Heredity is the most common cause. The hereditary transmission of smaller jaws and larger teeth from parents to siblings. This can be an important etiological factor in the occurrence of impaction.

D. Pathological theory:

Chronic infections that affect an individual may bring the condensation of osseous tissue further preventing the growth and development of the jaws.

E. Endocrinal theory:

Increase / decrease in growth hormone secretion may affect the size of the jaws.[3]

IV. AETIOLOGY

- **Local causes:** The pressure is not regular and position of the nearby tooth, lack of space due to undeveloped jaws, obstruction of soft and hard tissue by mechanical /physical barrier such as fibromatosis, compact bone, odontogenic cyst and tumours.
- **Systemic causes:** Heredity and conditions that interfere with child development-rickets, retardation of facial growth, anemia, congenital syphilis, TB, malnutrition and endocrine disorders. [18]

V. CLASSIFICATION

The Winters classification for the impacted molar:

- Mesio angular
- Bucco Angular
- Linguo Angular
- Inverted
- Disto angular
- Unusual
- Vertical
- Horizontal .[8]

A. Pell and Gregory:

Based on relationship between anterior border of the lower jaw and the impacted third molar

- Class I: The AP diameter of the tooth is equal to the space between the anterior border of the ramus of the mandible and the distal surface of the 2nd molar tooth.
- Class II: The mesio distal circumference of the tooth is greater than the available space for the tooth.
- Class III: Tooth is completely located in ramus of mandible.[9]

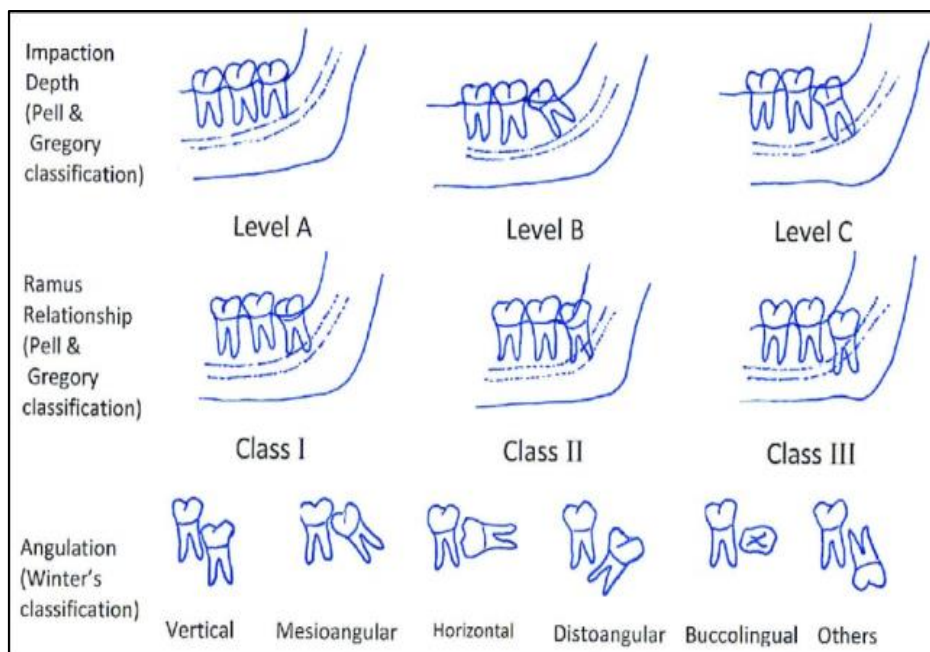


Fig. 3: Pell and Gregory and winters classification

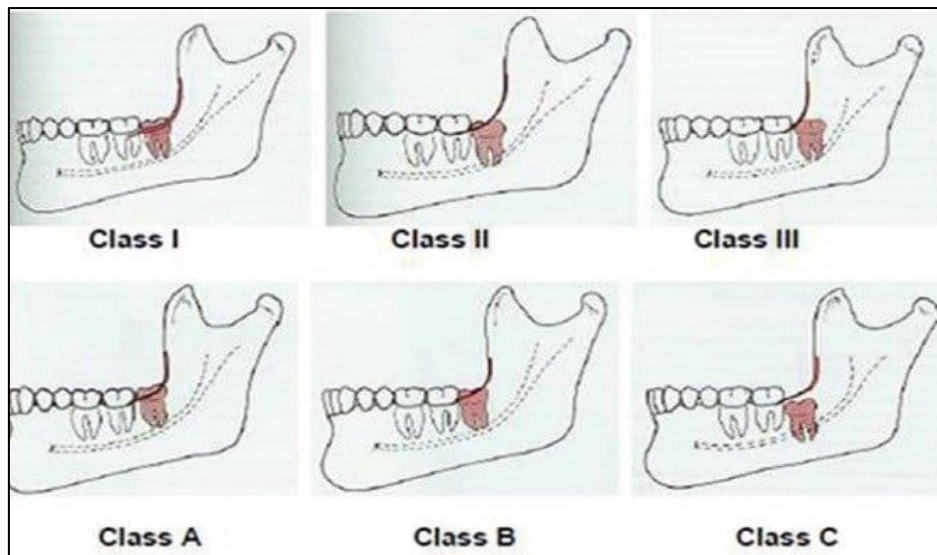


Fig. 4: Pell and Gregory classification

Based upon bone covering impacted tooth with relation to occlusal plane.

- Position A: The tooth occlusal plane is equal /above the occlusal line.
- Position B: The tooth occlusal plane is lower the occlusal plane, but over the CEJ of the second molar.
- Position C: The tooth occlusal plane is under the CEJ of the second molar with respect to the long axis of impacted second molar.

Based on the tissue overlying the impacted teeth

- Soft tissue impaction
- Partial bony impaction
- Full bony impaction.[10]

B. Signs of impaction:

When wisdom teeth communicate with the mouth, the most common symptom is the signs of inflammation which are dollar and tumour, as well as bleeding of tissue surrounding the tooth. This covering is known as the operculum and is referred to as pericoronitis. [11] Low-grade prolonged periodontitis commonly seen on both the wisdom tooth and the second molar, leading to symptoms such as halitosis and gingival bleeding. The teeth may remain without any signs or symptoms, even if impaction is present. [12]

Pathological changes associated with wisdom teeth Impaction include:

C. Signs and symptoms:

- Dental Caries
- Dolor
- bulging
- Altered sensation
- Pocket formation in gingiva
- Pericoronitis

➤ Radiological changes:

- Noninflammatory:
 - ✓ Root dissolution (internal or external) .
 - ✓ Bone loss in between the teeth
 - ✓ Hyperactive dental follicle.

• Mild inflammatory:

- ✓ Pericoronitis
- ✓ Periapical abscess.

• Severe inflammatory:

- ✓ Osteomyelitis

➤ Radiological signs of cysts and benign tumours:

- A dentigerous cyst
- Keratocystic odontogenic tumour
- Odontoma
- Ameloblastoma
- The odontogenic fibroma

➤ Radiological signs of malignant tumours:

- Squamous cell carcinoma (SCC)
- Fibro sarcoma
- Mucoepidermoid carcinoma [5]

D. Osteomyelitis:

Infection from microbes causes bone and their marrow materials get inflamed that leads to dental abscess.

➤ Clinical features:

Severe pain, restricted mouth opening (trismus), increase in body temperature, paresthesia of lip, lymphadenopathy.

➤ Radiological features:

Lytic changes are found in bone.

Radiolucent appearance.

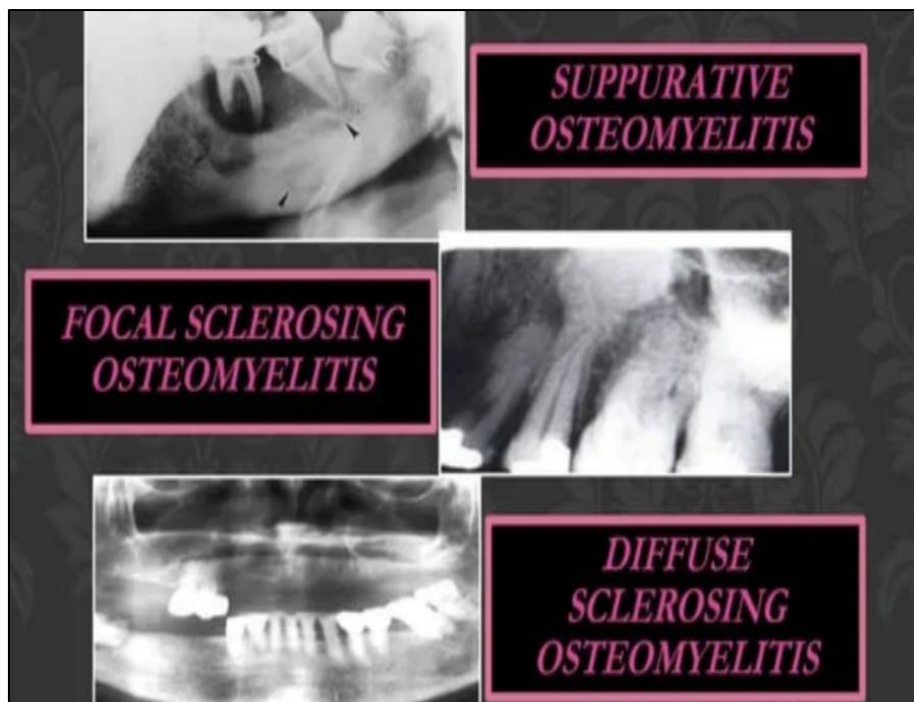


Fig. 5: Osteomyelitis radiographic image

➤ *Histological features:*

- **ACUTE SUPPURATIVE OSTEOMYELITIS**
 Inflammatory exudates present on the medullary spaces. Mainly polymorphonuclear leukocytes present. Bony

trabeculae lined by osteoblastic cells then as the time period varies it become destroyed ,bone undergoes slow progression of resorption and lose its viability.

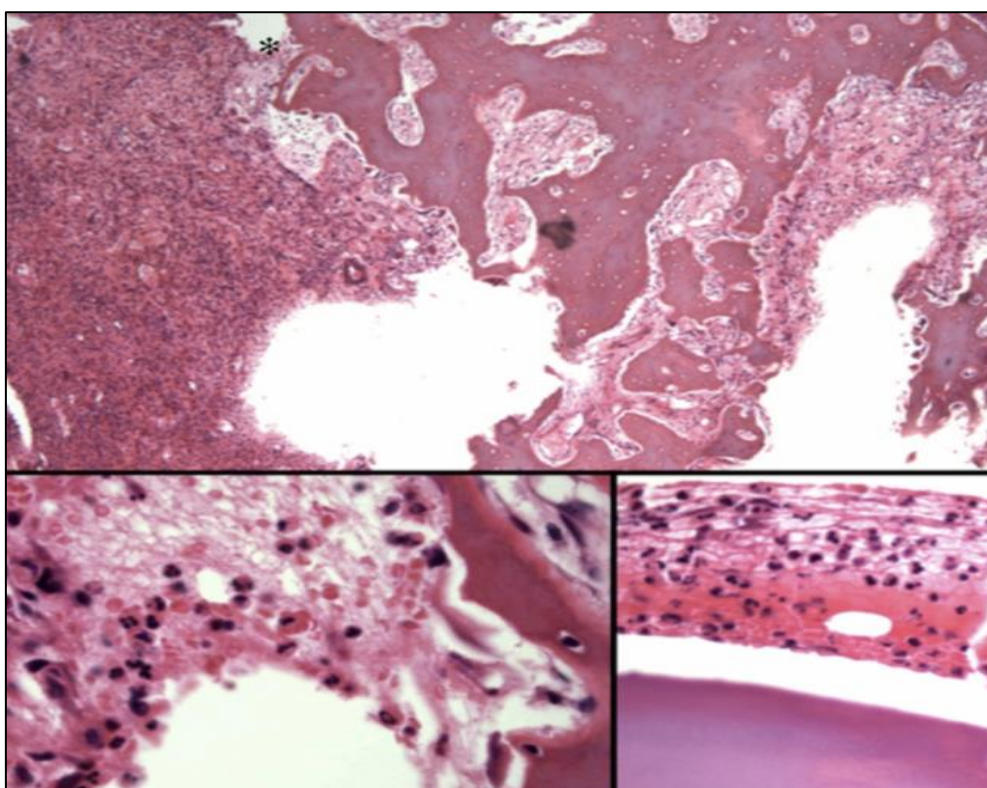


Fig. 6: Acute suppurative osteomyelitis histological image

- **CHRONIC SUPPURATIVE OSTEOMYELITIS**

Presence of abscess shows pockets and scattered connective tissue appearance. Presence of inflammatory cells around trabeculae.

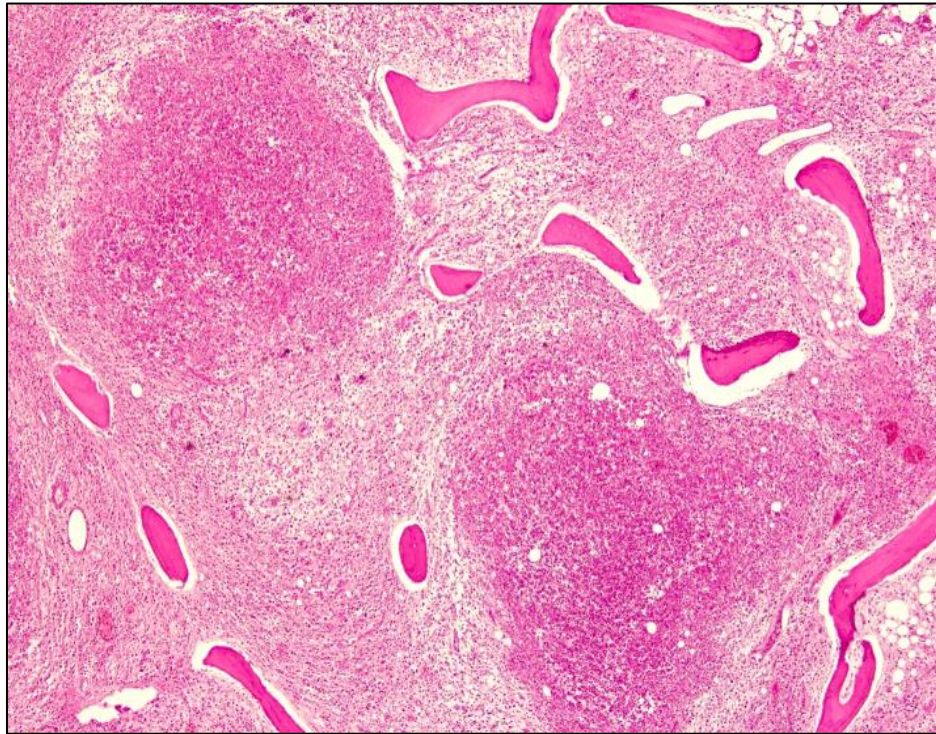


Fig. 7: Chronic suppurative osteomyelitis histological image

- **FOCAL SCLEROSING OSTEOMYELITIS**

Empty lacunae, dense bony trabeculae, it shows pagetoid appearance due to resting and reversal lines. There is total subsiding of osteoblastic cells.

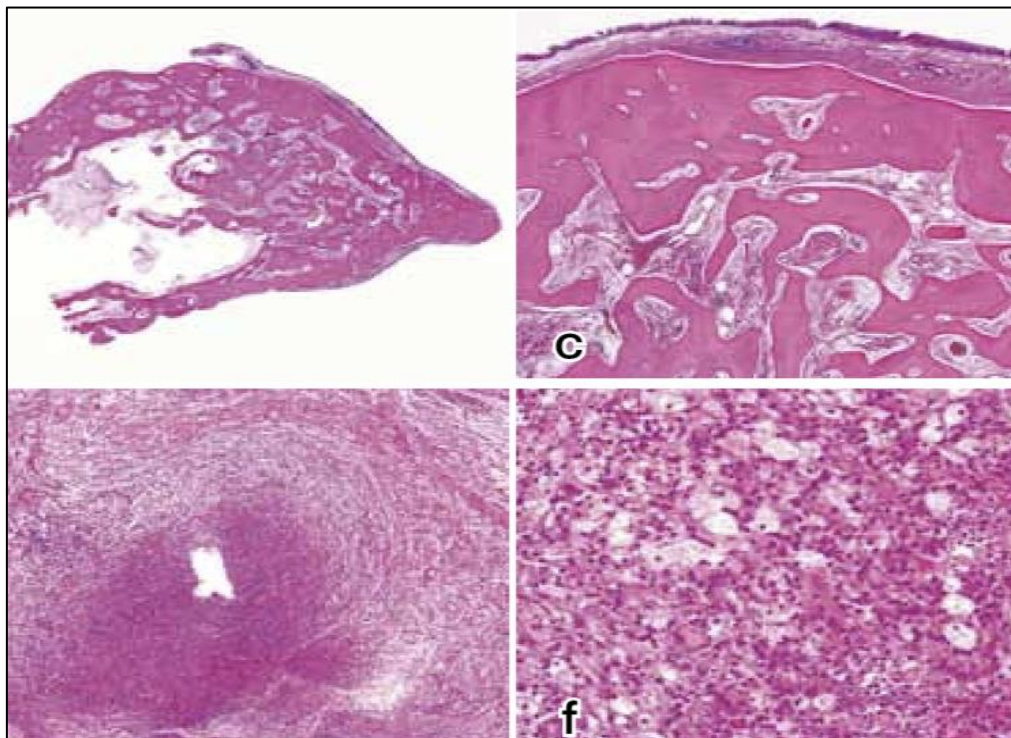


Fig. 8: Focal sclerosing osteomyelitis histological image

• **DIFFUSE SCLEROSING OSTEOMYELITIS**

Trabeculae appears dense and irregular. The bone shows 'Mosaic pattern' due to repair and resorption takes place. Presence of polymorphonuclear leukocytes, fibrous soft tissue, proliferation of fibroblasts.

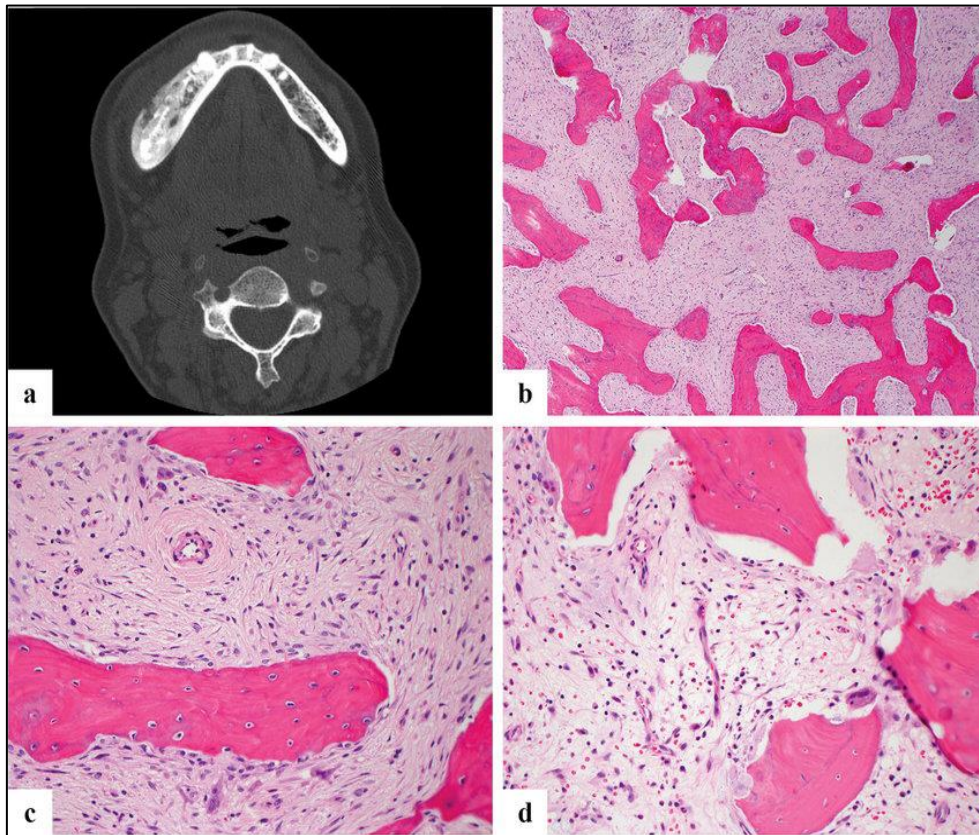


Fig. 9: Diffuse sclerosing osteomyelitis histological image

➤ **Treatment:**

- Wound debridement
- Drainage of abscess cavity
- Antimicrobial therapy
- Hyperbaric oxygen therapy.[17]

E. Dentigerous cyst:

It is a developmental cyst of the mouth which surrounds the crown of the tooth which is impacted resulting in fluid accumulation between the enamel and reduced enamel epithelium.

➤ **Clinical features:**

Accompanied with impacted, unerupted, embedded tooth, compound odontoma, and supernumerary tooth.

➤ **Radiological features:**

Radiolucent area which is symmetrical in nature around the crown of tooth ;it may be central, lateral or circumferential in nature.



Fig. 10: Dentigerous cyst radiographic image

➤ *Histological features:*

It has a layer of stratified squamous non keratinized epithelium covering the lumen. Rete peg formation is absent except in secondary infection condition. The connective tissue wall is thickened and consists of a loose connective tissue which is fibrous in nature or a collagenized myxomatous tissue. Within the connective tissue wall of

dentigerous cysts presence of numerous islands of odontogenic epithelium is seen .In cysts with inflammation, Roston bodies are seen within the lining epithelium which is peculiar curved or linear. The cyst lumen content is thin watery consistency and yellow in colour.

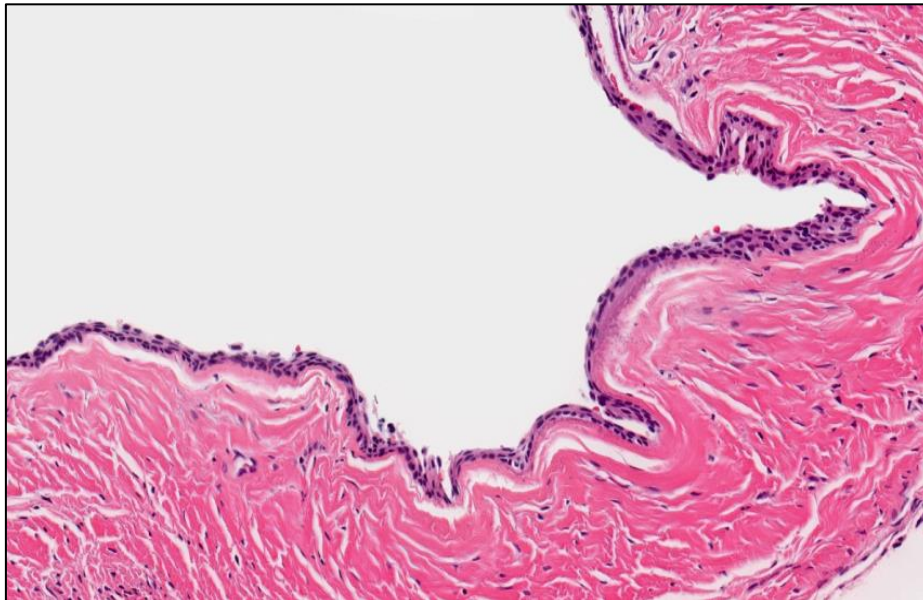


Fig. 11: Dentigerous cyst histological image

➤ *Treatment:*

- Small lesion: completely removed surgically
- Large lesion: surgical drain. [17]

F. *Odontogenic keratocyst:*

The criteria for OKC:

It consists of keratin which is produced by the epithelium (ortho and para keratin) which fills the cyst lumen.

There should be a flattened interface in between connective tissue and epithelium.

Basal cells which are in palisade arrangement.

➤ *Clinical features:*

This is characterized by pain, bone expansion and swelling of soft tissue along with teeth and lip paresthesia.

➤ *Radiological features:*

The okc consists of radiolucent area which is unilocular with scalloped border and peripheral rim is defined well.



Fig. 12: Odontogenic keratocyst radiographic image

➤ *Histological features:*

Odontogenic keratocyst consist of 6 to 8 cell thickness of para keratinized stratified squamous epithelium. The surface keratin shows corrugated or wave like appearance. The

palisaded basal layer is consist of hyperchromatic, cuboidal or columnar cells. Presence of daughter cysts in the fibrous cyst wall.

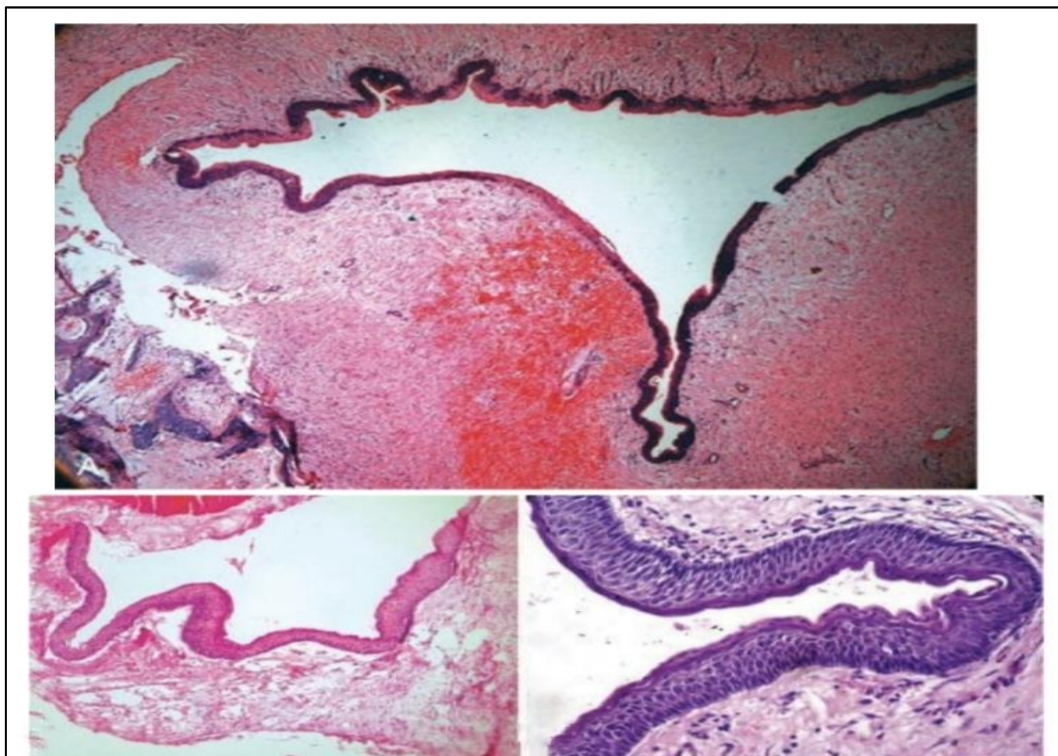


Fig. 13: Odontogenic keratocyst histological image

➤ *Treatment:*

Surgically removed.[17]

G. *Odontoma:*

Odontoma is a benign swelling which is odontogenic in nature.

➤ *Clinical features:*

Asymptomatic mostly

Consist of impacted tooth, unerupted tooth, retained deciduous teeth, infection of any kind, swelling.

It has three types:

Intraosseous odontoma

Extra osseous odontoma

Erupted odontoma

➤ *Radiological features:*

The odontoma is found as an irregular mass of calcified cells in between the roots of the teeth and it is surrounded by radiolucent layer and smooth periphery.

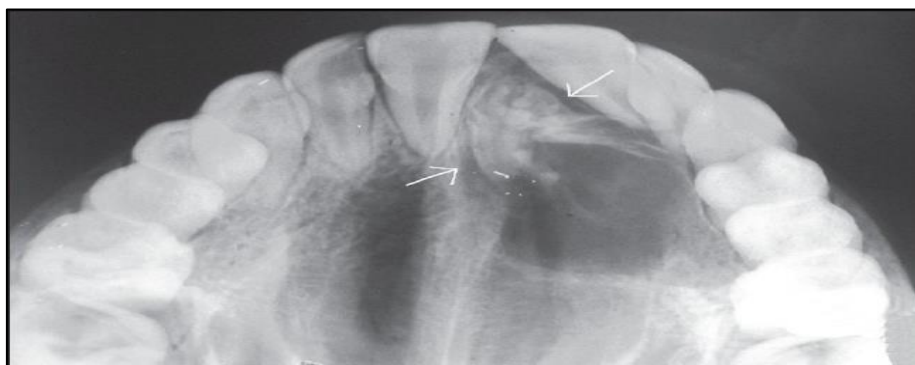


Fig. 14: Odontoma radiographic image

➤ *Histological features:*

The lesion shows a normal enamel, dentinal tissue, cementum and pulp. Early to the terminal maturation of hard

tissues it shows a noticeable enamel matrix and enamel organ .The presence of “ghost cells” can be seen in enamel forming cells of few odontomas.

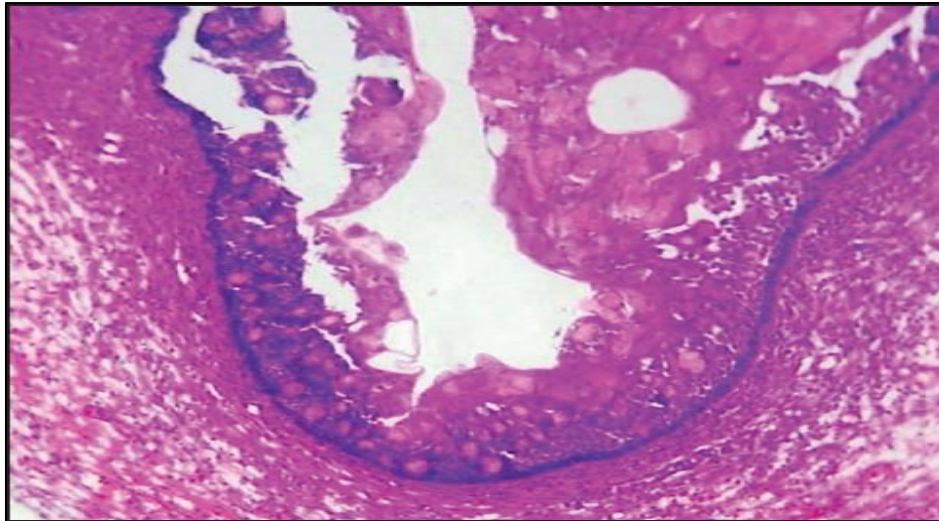


Fig. 15: Odontoma histological image

➤ *Treatment:*

Surgical removal with microscopic examination. [17]

H. Odontogenic fibroma:

It is a fibroblastic tumour containing changeable quantity of relatively non functional odontogenic epithelium. It is seen around the crown of an impacted tooth which resembles a small dentigerous cyst. Occurrence centrally or in the periphery.

➤ *Clinical features:*

It occurs more frequently in the older age group of 40 years. Marked female predilection. It is more common in the anterior region and in maxilla. It is usually asymptomatic with the presence of swelling of jaws .It causes loosening of teeth/localized bony expansion (signs).

➤ *Radiological features:*

It produces an expansile, multilocular radiolucency similar to that of ameloblastoma. Margins are sclerotic and well defined. Large lesions can cause root resorption and divergence.

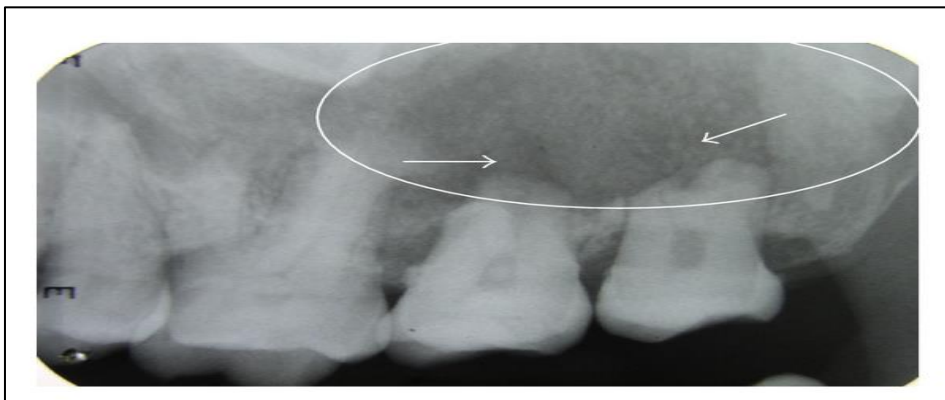


Fig. 16: Odontogenic fibroma radiographic image in maxilla



Fig. 17: Odontogenic fibroma radiographic image in mandible

➤ *Histological features:*

Peripheral odontogenic fibroma - consists of a marked cellular fibrous connective tissue parenchyma with scanty / numerous nonneoplastic islands, strands, and cords of columnar / cuboidal, sometimes vacuolated odontogenic

epithelium. The epithelium is generally deep in lesion, away from the epithelium surface and found to have “cuffing” calcifications. Presence of mature fibrous connective tissue stroma and highly vascular, in the less cellular areas.

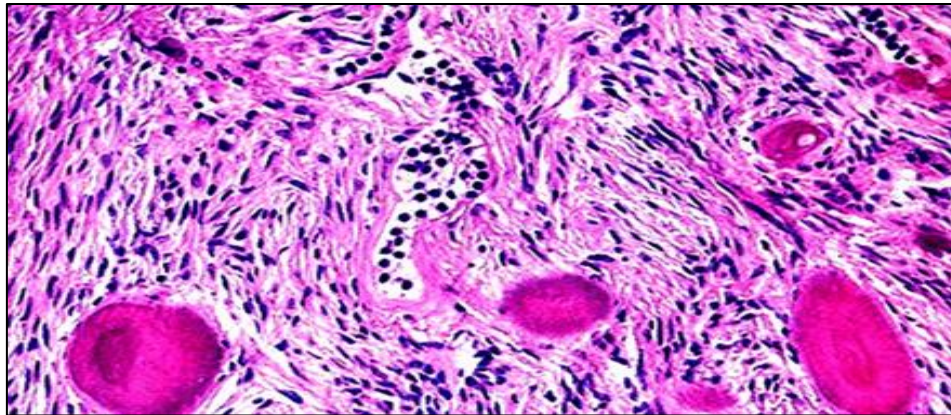


Fig. 18: Peripheral odontogenic fibroma histological image

- Central odontogenic fibroma - consists of inactive looking odontogenic epithelial islands in a cellular / collagenous connective tissue. The epithelium may be

absent totally or can be conspicuous. In odontogenic epithelium hard tissue formation like cementum, osteoid, dentinoid-like material can be seen.

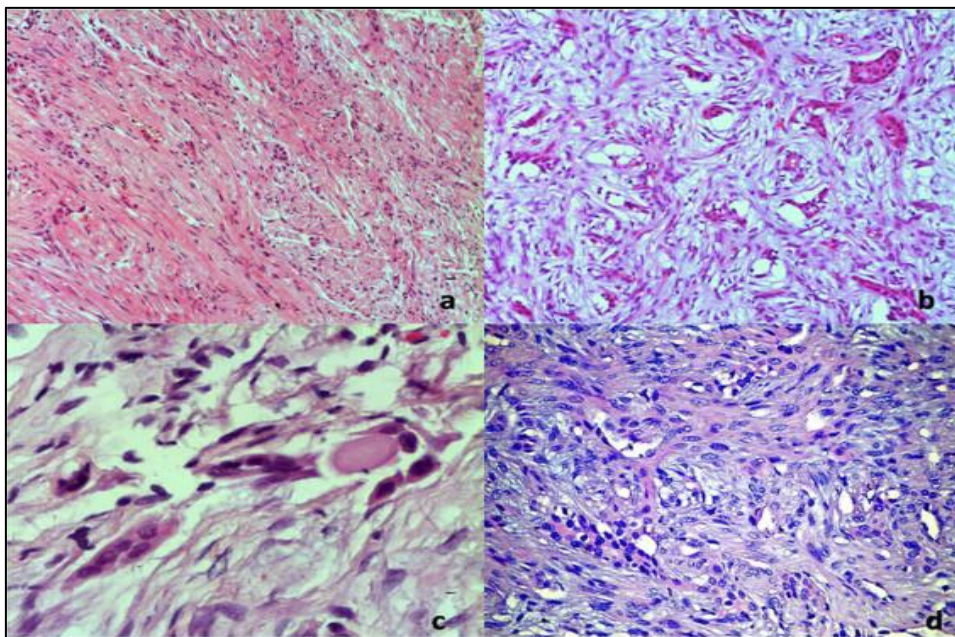


Fig. 19: Central odontogenic fibroma histological image

➤ *Treatment:*

The lesion is treated with enucleation and curettage. Surgical excision is done. Recurrence is not common. [17]

I. *Ameloblastoma:*

Ameloblastoma is a true benign tumour of enamel organ.

➤ *Clinical features:*

The presenting complaint is a slowly progressive, pain is absent, hard swelling which resembles hardness of bone leads to changes in symmetry of face.

Large lesions may be associated with mobile teeth, pain, and paresthesia. The medullary spaces can be

infiltrated, leading to erosion of the cortical bone, and these lesions are characterized by being locally invasive.

➤ *Radiological features:*

The ameloblastoma has classically been described as a multilocular cyst-like lesion of the jaw, displaying a soap bubble appearance. This appearance is particularly true in advanced cases of ameloblastoma. The tumour appears within septa of bone as radiolucent mass. However, in many reports, the lesion is unilocular and lacks characteristic features. Thinning of cortical plate is observed in advanced lesions that expand the jaw, and sometimes displacement of impacted third molars can be noted in a panoramic radiograph. [17]



Fig. 20: Ameloblastoma radiographic image

➤ *Histological features:*

Histopathology subtypes seen in Ameloblastoma are:

- **Follicular pattern** most common. The tumour consists of follicles which vary in size and shape and are separated by fibrous tissue. The structure of follicles resembles enamel organ with centrally stellate cells and peripheral with cuboidal or columnar cells. In central stellate area cystic changes are seen.
- **Plexiform pattern** is next common after follicular pattern. The tumour epithelium forms irregular plexiform

masses. The stroma is scanty. Micro cyst is seen in stroma.

- **Acanthomatous pattern** is seen as squamous metaplast within the tumour cells which are seen as islands.
- **Basal cell pattern** is similar to basal cell carcinoma skin.
- **Granular cell pattern** consist of tumour cells with acidophilic granularity and Combination of morphologic pattern. [19]

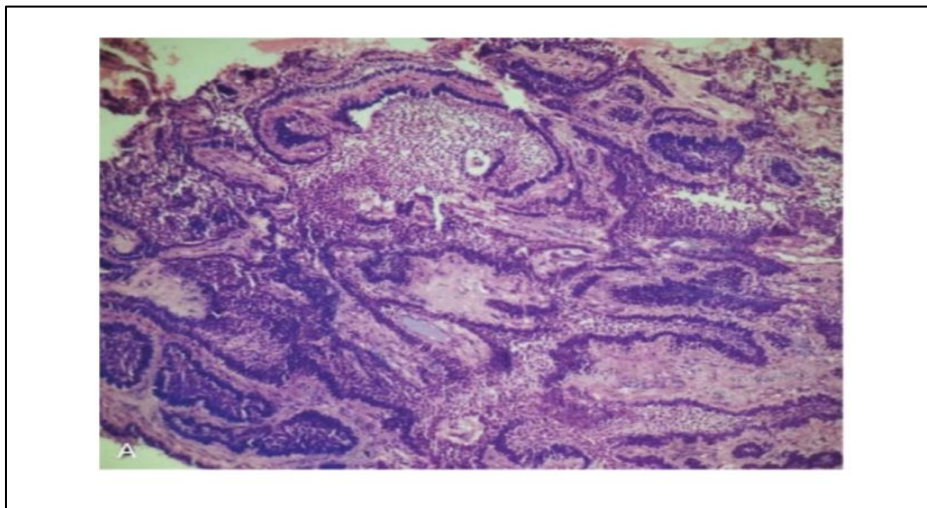


Fig. 21: Ameloblastoma histological image

➤ *Treatment and prognosis:*

A cure for the patient can be achieved through the complete removal of the neoplasm. The surgical plan should be influenced by the presence of the lesion in the maxilla or mandible, as the spread of the ameloblastoma is facilitated by the cancellous bone of the maxilla, while the density of the cortical plates in the mandible limits the spread of the neoplasm. [17]

VI. DIAGNOSIS

The impacted tooth assessed by physical and radiological records. Physically assessed by inspection and palpation of the TMJ, mandible movement, mobility in the lips and cheeks, measuring the size and contours of the tongue, and examining the soft tissue above the impacted molar. Radiologically assessed by root morphology, follicular sac size, surrounding bone density, second molar

contact and overlying tissues in impacted teeth, evaluating the inferior alveolar nerve, relationship between the body and ramus of the lower jaw, relationship between adjacent teeth and the buccal to lingual position of the impacted molar.[5]

VII. MANAGEMENT

The treatment follows the patient's complaint and the history, the physical and radiological findings then patient's opinion. Third molar is somehow not erupting occlusally if it does it damages the dental follicle and the surrounding bone types. Extracting third molar is due to correcting the pathology.[5]

VIII. COMPLICATIONS

Complications may arise from the extraction of the tooth. Most third molar extraction is done without any problem. Instead of serious complications, patient may experience bleeding, constant pain and swelling, ulceration, dry socket, dentoalveolar fracture, pricking and burning sensation of the inferior alveolar nerve and lingual nerve, TMJ injury, and even mandible fracture.[15]

IX. CONCLUSION

Wisdom teeth are the last molar erupted. Males are present with impacted teeth than females. Partial eruption in wisdom tooth allows micro-organisms to accumulate in it and causes various infections. These infections present pain, swelling, systemic disease, jaw stiffness. Due to difficult reaching location and position of tooth partially erupted are exposed to dental caries and periodontal infection. Extraction is the treatment given for impacted tooth.

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