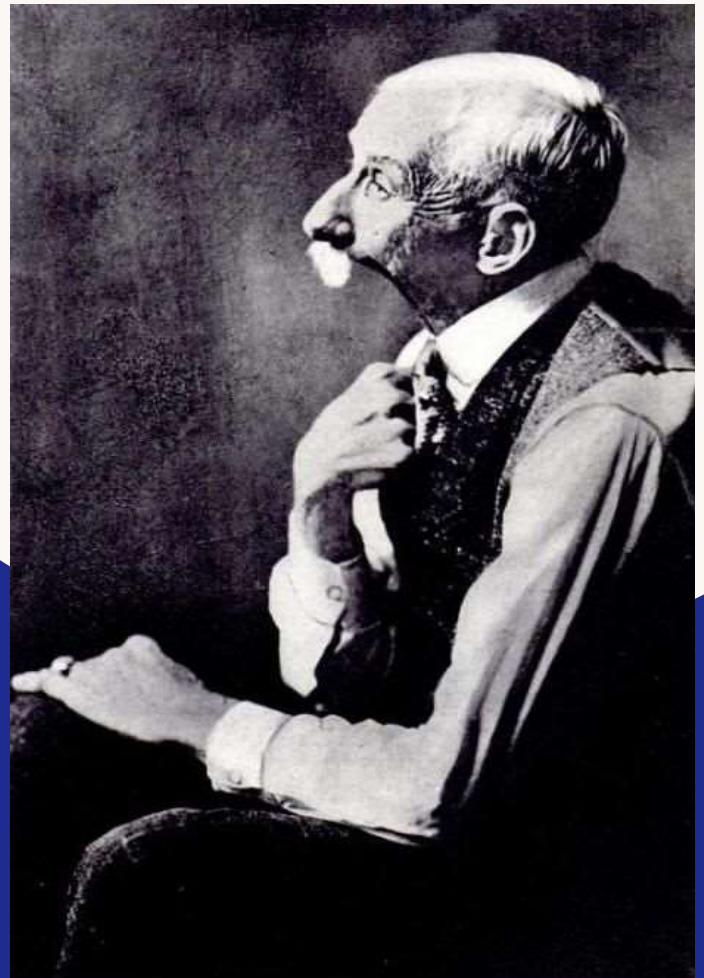
TMJ ANKYLOSIS

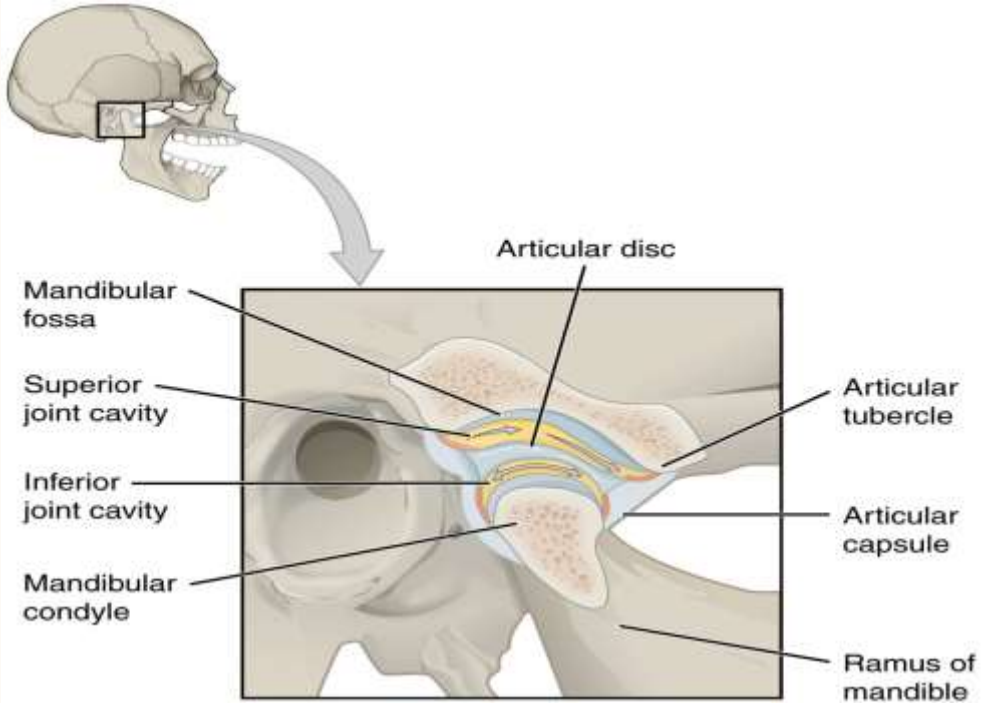


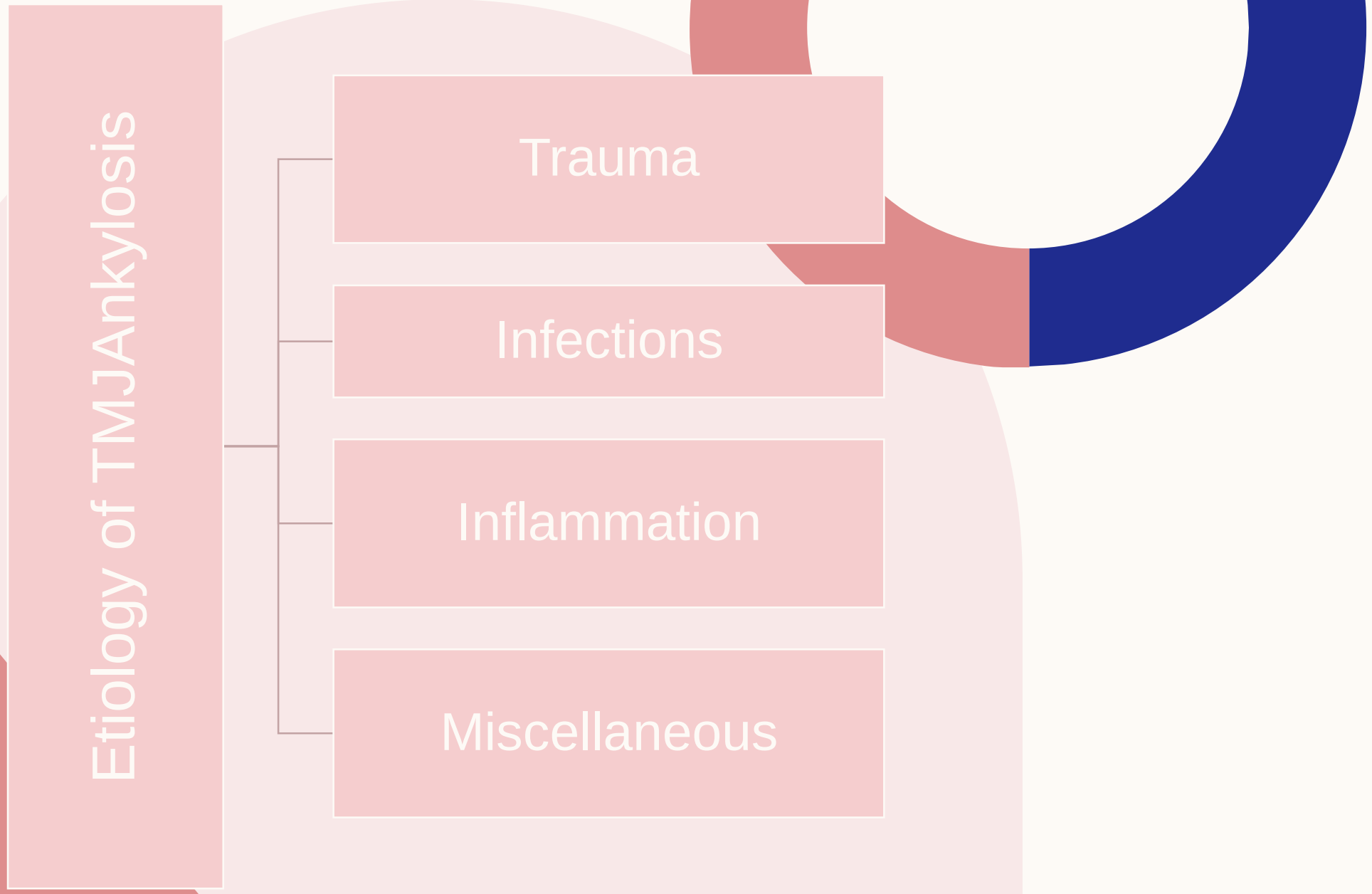
CONTENTS

INTRODUCTION

Ankylosis-: A pathological fusion between two articulating surfaces of a point.

TMJ Ankylosis-: The pathological fusion between the glenoid fossa of the temporal bone and condylar process of the mandible .

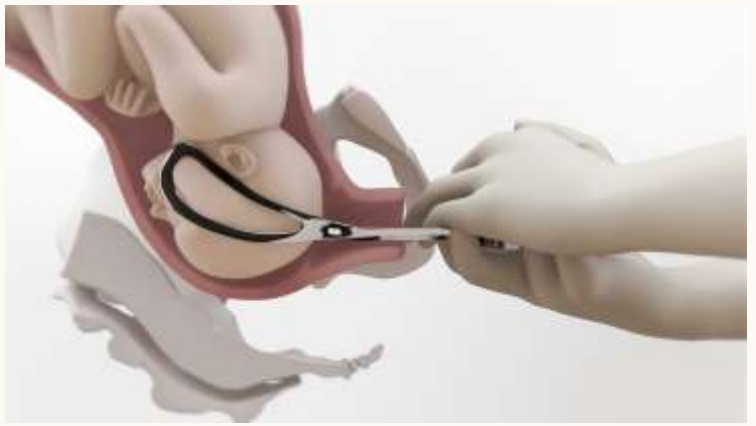



Etiology of TMJAnkylosis
Trauma
Infections
Inflammation
Miscellaneous

TRAUMA

- Fall on the chin leading to indirect injuries to TMJ like hemarthrosis, confusion.
- Intracapsular and Extracapsular fractures of condyle.
- Birth trauma =Application of forceps during labor.

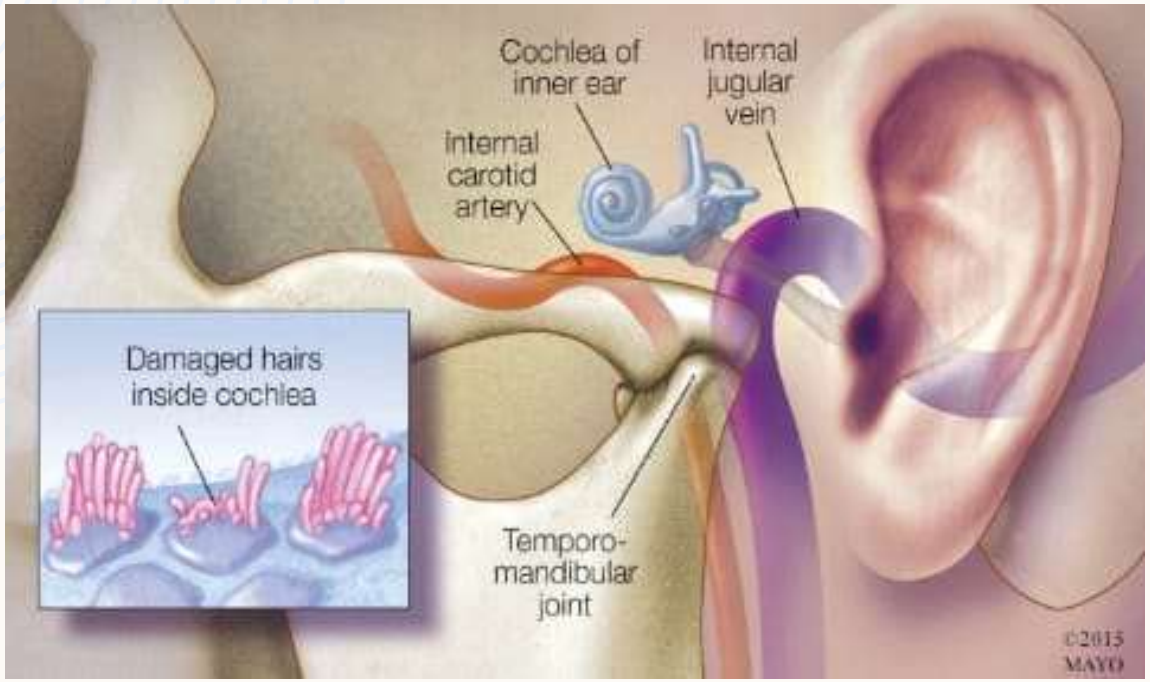
Trauma ball hit

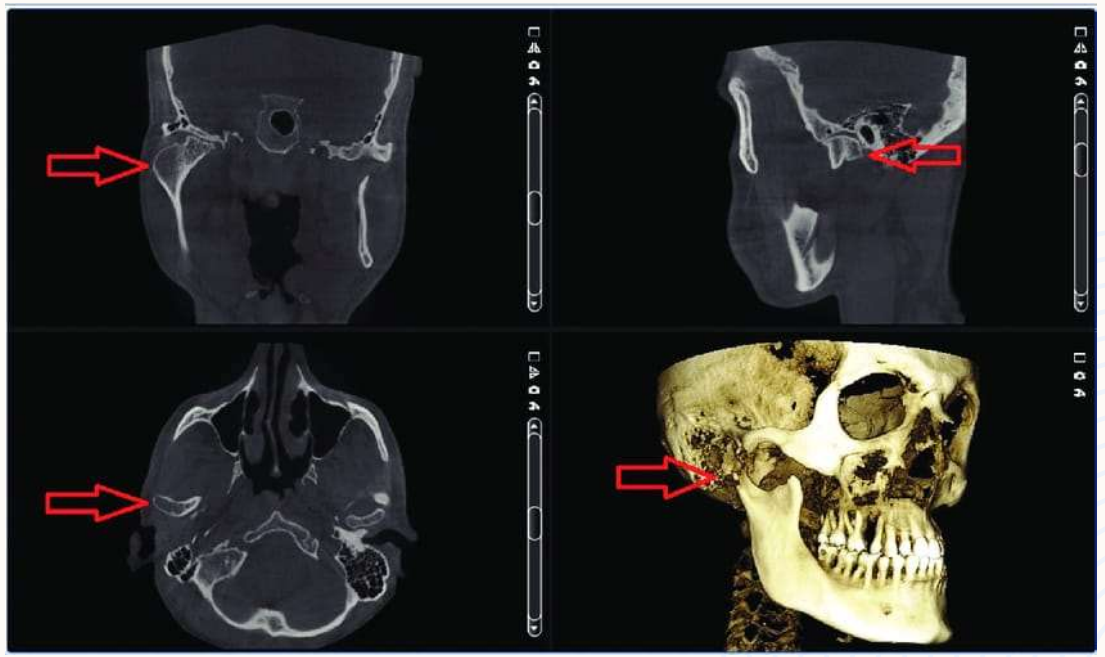


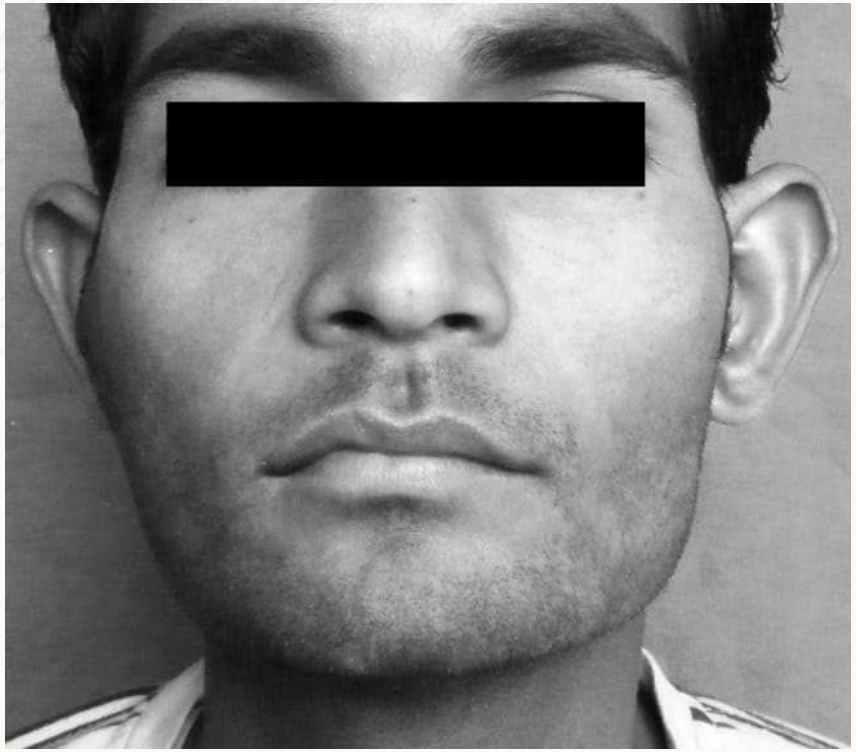
Birth Forceps

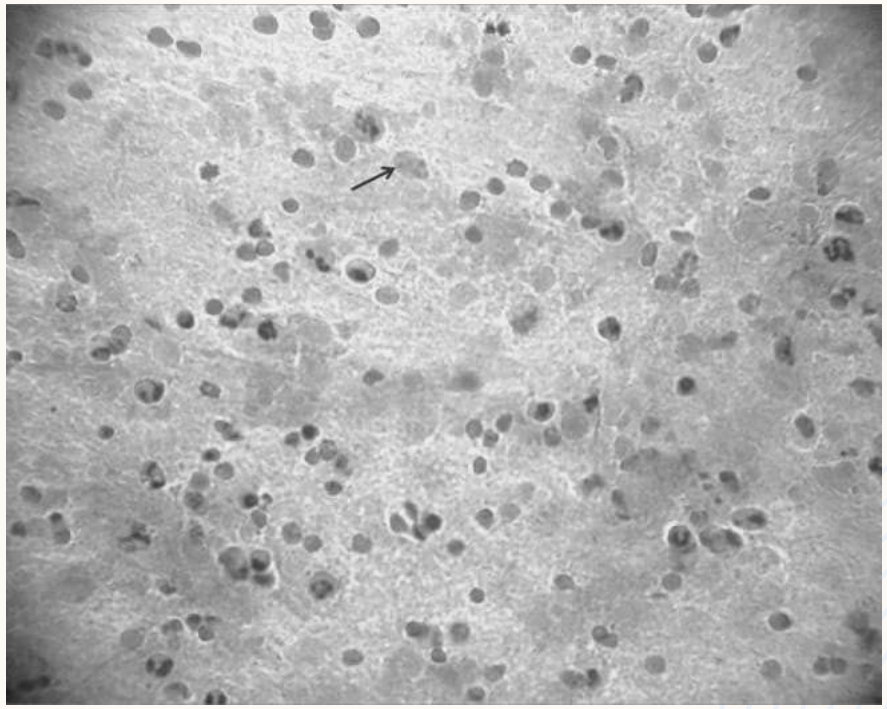
INFECTIONS

a) Middle ear infections : Chronic suppurative otisis media (CSOM)
b) Septic fractures of condyle , zygomatic arch.
c) Osteomyelitis of condyle.
d) Mastoiditis.
e) Hematogenous infections.
f) Infections = Tuberculosis
Syphillis
Actinomycosis.


Cochlea of inner ear
Internal jugular vein
Internal carotid artery
Damaged hairs inside cochlea
Temporo-mandibular joint
©2015 MAYO







INFLAMMATORY JOINT PATHOLOGIES

- Osteoarthritis – Degenerative joint disorder
- Rheumatoid arthritis – Autoimmune
- Septic Arthritis

MISCELLANEOUS

- Small pox , Scarlet fever, Typhoid.
- Long term dislocation of TMJ.
- Untreated Condylar fractures.
- Radiotheropy.
- Bifid Condylar.

PATHOPHYSIOLOGY

Intracapsularfracture of bone

Bleeding within joint cavity (Hemarthrosis)

Bone fragments with highosteogenicpotential

Organization of hematoma within joints

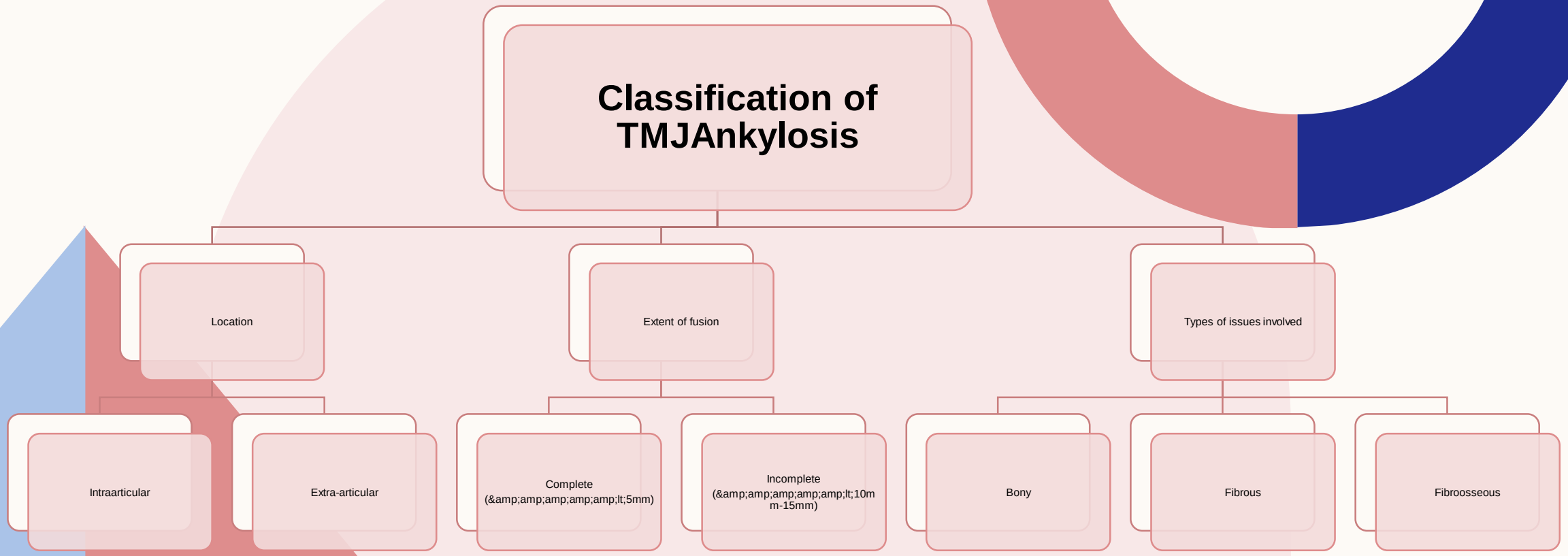
Fibrosis leading to restriction

Gradual bone formation

Ankylosis

←Immobility due to pain

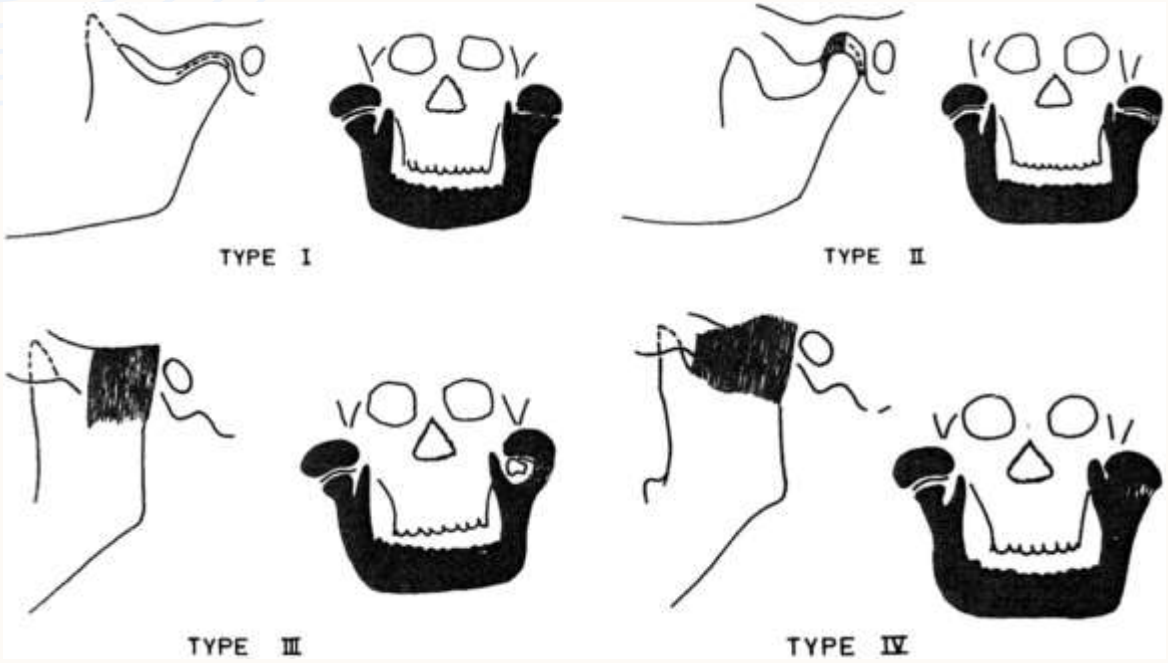
Classification of TMJAnkylosis

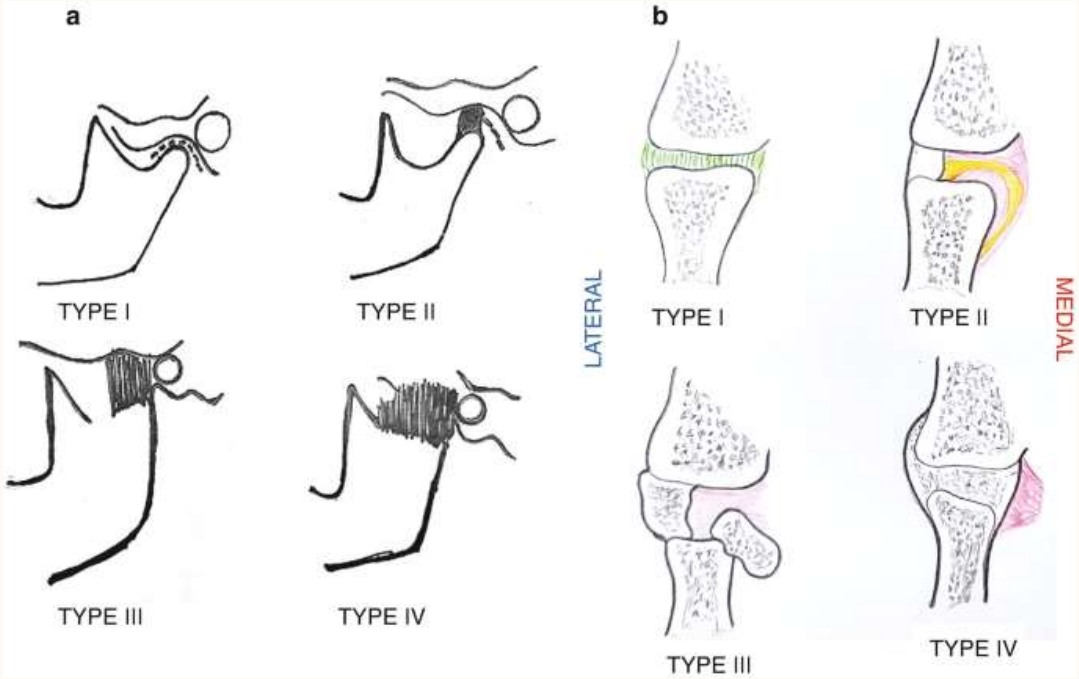


Sawhney Classification

Grading of TMJ Ankylosis (1986) -: Depending on the radiological picture of the lesion, sawhney has proposed the grading of the TMJ ankylosis.

Type I	• Condylar head is present without much distortion , fibrous adhesion make movement limited.
Type II	• Bony fusion of misshaped head of condyle and articular surface. No involvement of sigmoid notch and coronoid process.
Type III	• A bony block bridging across thezygomaticarch and the ramus. Medially an atrophic , dislocated fragment of former head of condyle. Elongation of coronoid process seen.
Type IV	• Normal anatomy of TMJ is totally destroyed by complete bony block between ramus and skull base.


TYPE I
TYPE II
TYPE III
TYPE IV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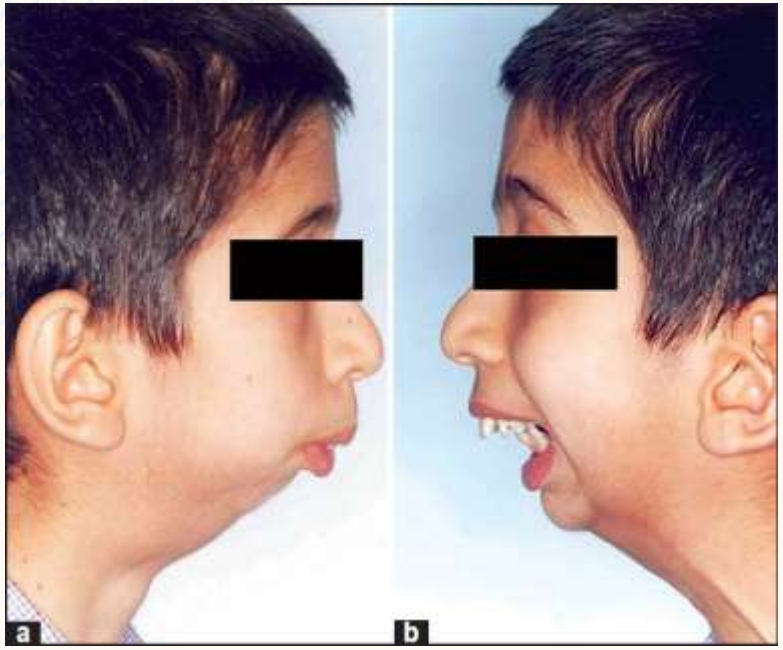
TYPE I
TYPE II
TYPE III
TYPE IV
LATERAL
MEDIAL
TYPE I
TYPE II
TYPE III
TYPE IV

CLINICAL FEATURES

- **Bilateral TMJ Ankylosis**

- Trismus = Mouth opening is decreased gradually. It is severely restricted to bony ankylosis as compared to fibrous ankylosis .
- Joint movements are poorly papable.In case of fibrous ankylosis, the joint movements are better felt as compared to bony ankylosis. In children the false joint movements are papable due to stretching in the cranial structures during forced opening.
- Restricted vertical growth of ramus.
- Prominent gonial angle with accentuated antigonial angle , due to pull from suprahyoid group of muscles.
- Bird face deformity.
- Convex facial profile.
- Poor oral hygiene due to difficulty in openning mouth.
- Rampant caries and periodontal problems .

- In long standing ankylosis the boney morphology is totally lost and replaced by a block of bone at the skull
- Crowding of teeth , the lower incisors often exibit supraeruption and fanning and often tend to touch the palatal muscosa.
  It is a compensatory phenomenon as the mandible is too for posteriorly placed as compared to the maxilla
- The overall physical growth of the child is restricted due to malnourishment.
- Snoring in the case of bilateral ankylosis cases due to decrease in posterior pharyngeal space
- The patient suffers from psychological problems due to the facial disfigurement.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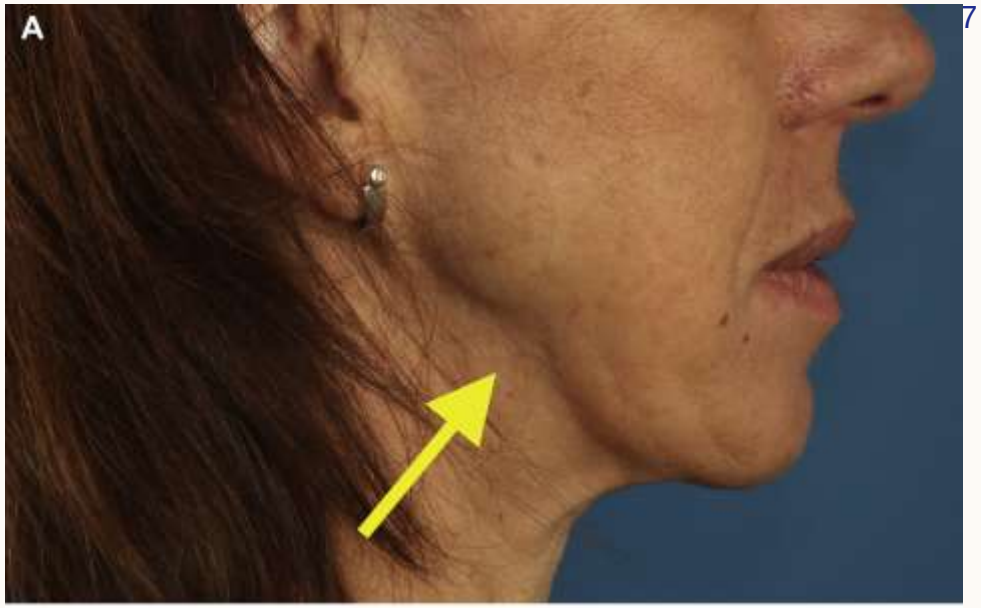
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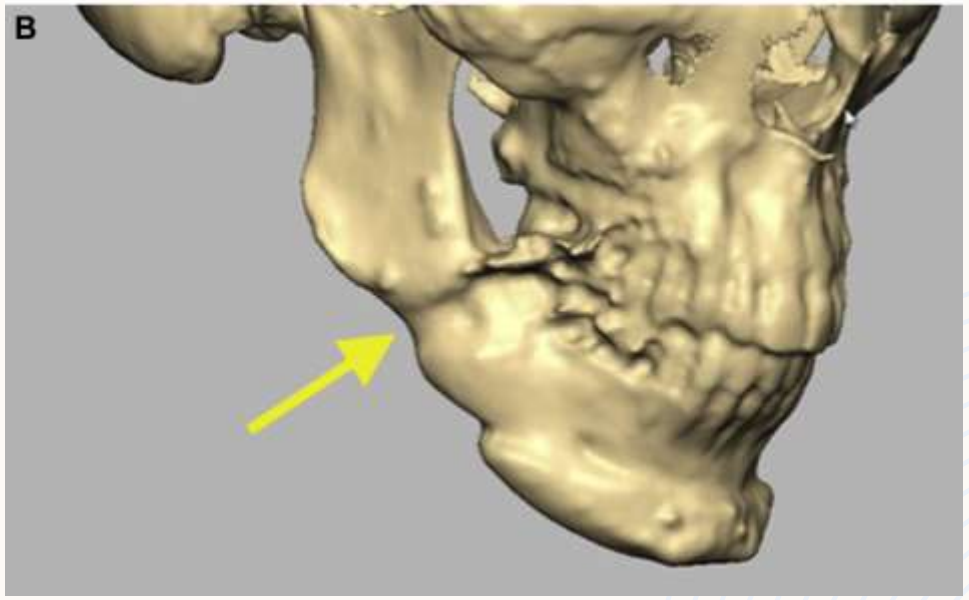
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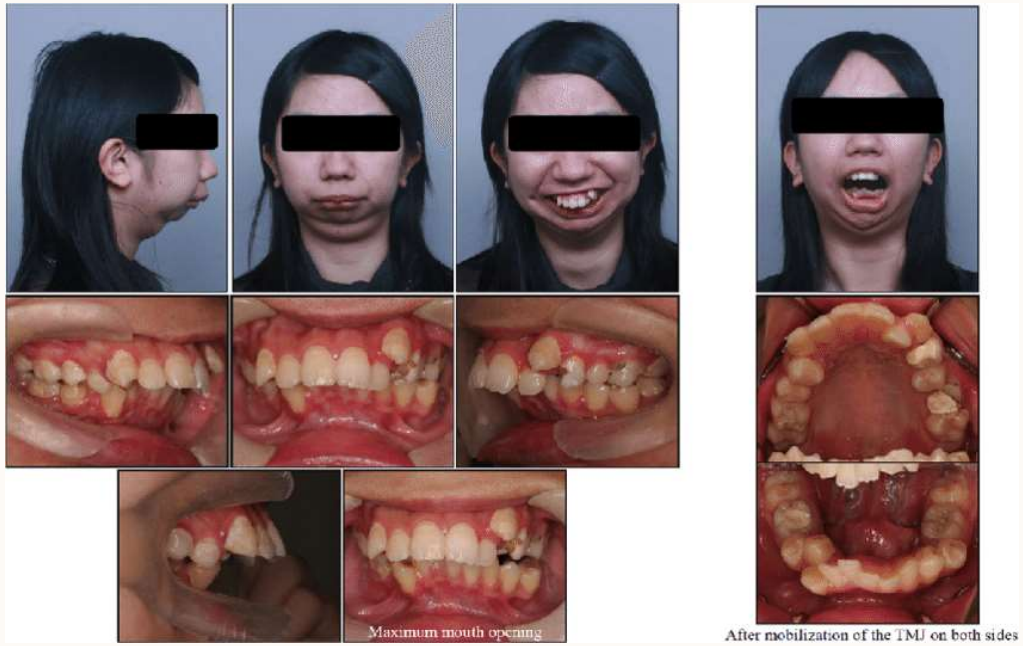
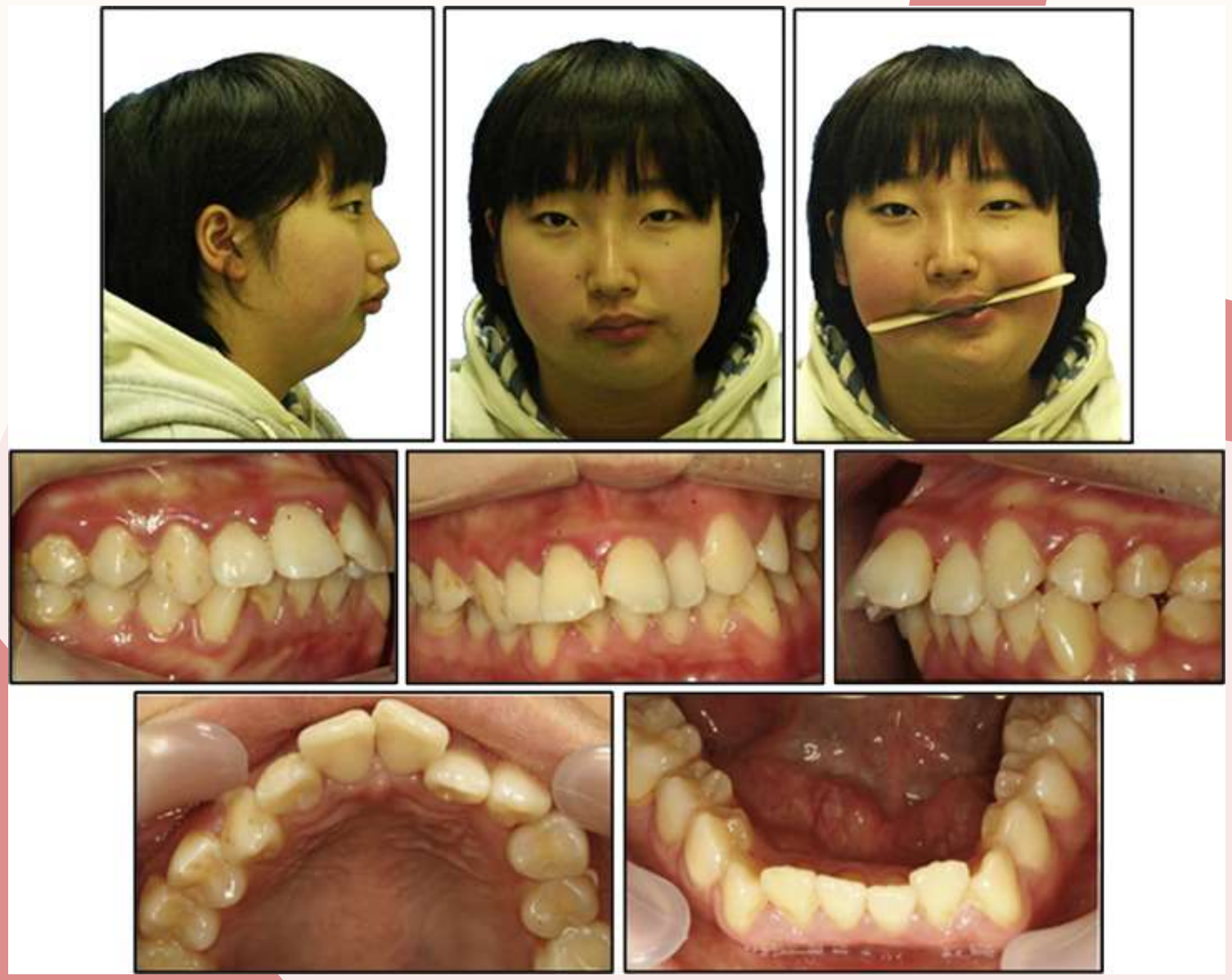

Maximum mouth opening
After mobilization of the TMJ on both sides

UNILATERAL TMJ ANKYLOSIS

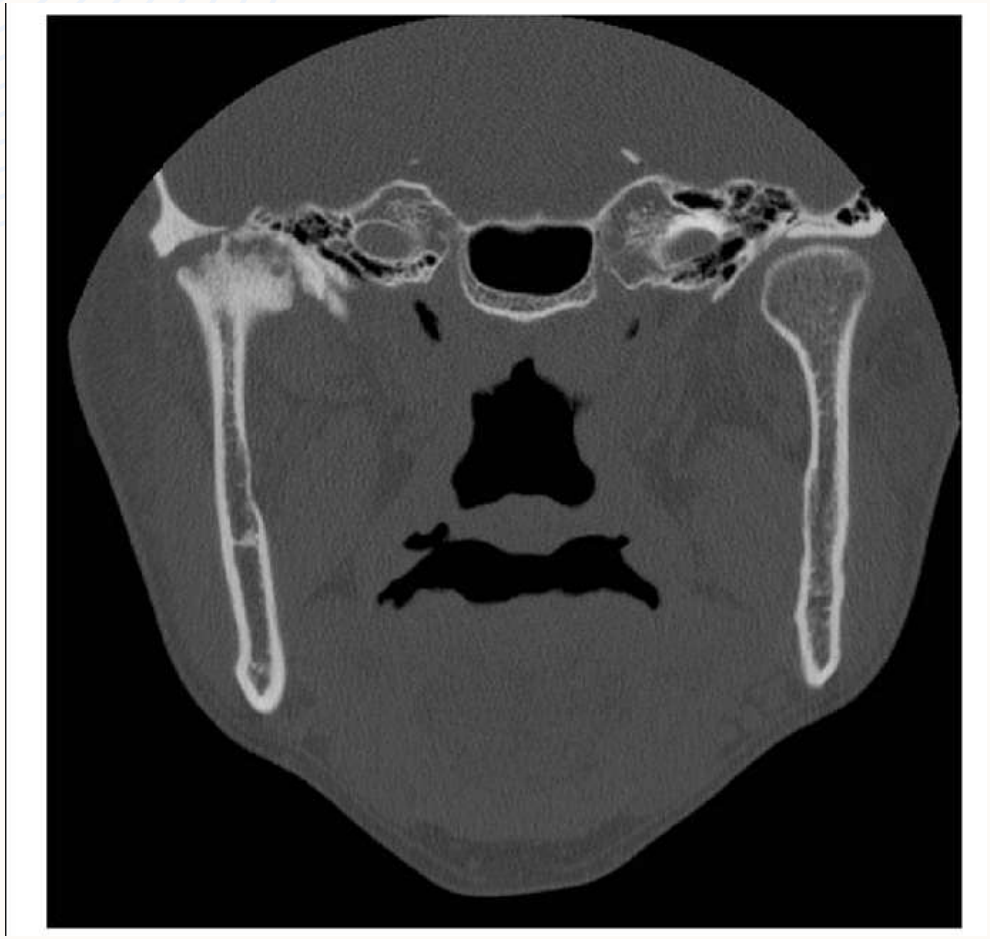
- Deviation of chin to the affected side in case of unilateral ankylosis due to restricted vertical and horizontal growth of the mandible on the affected side. While the other side keeps on growing normally.

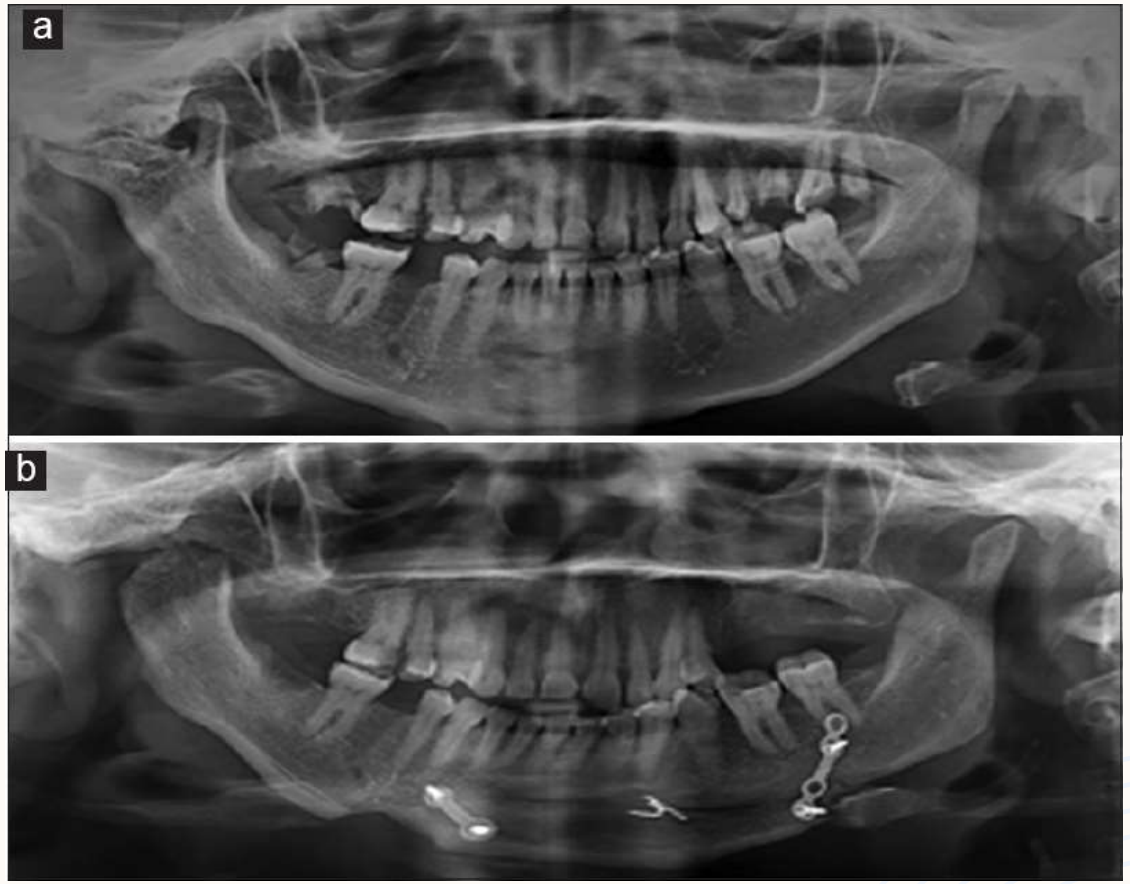
- Fullness of face on the affected side , while the normal side is flattened.
- Crossbite on ipsilateral side .
- Well defined antigonial notch on affected side
- The ramal height and lower facial height on ipsilateral side are shorter and lesser than contralateral side.



INVESTIGATIONS

- X – rays –
  - PA view of mandible
  - Panoramic view of the mandible.
  - Lateral oblique view of mandible.
  - Transcranial and Transpharyngeal views of TMJ.
- CT scan 2D and 3D reconstruction are very useful as they show the medial extent at ankylosis properly.
- X – ray chest to rule out pulmonary pathology and study the ribs in case costochondral graft or sternoclavicular joint graft is planned.
- Proper preoperative assessment of respiratory passage is required preoperatively as the intubation is often difficult due to trismus.
- Routine preoperative investigations are done to rule out any medical compromise , which may adversly affect the outcome of the surgery.

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MANAGEMENT

Aims of TMJ Ankylosis treatment.

i. Release of Ankylosis
ii. Prevention of re-ankylosis .
iii. Creation of functional joint.
iv. To restore vertical height of mandible .
v. To facilitate growth .
vi. Correction of residual facial deformities.

KABAN'S PROTOCOL

Kaban proposed a comprehensive protocol for the effective management of TMJ ankylosis , which is popularly known as Kaban's protocol.

Kaban , Perrot , Fisher (1990)

- Early surgical intervention.
- Aggressive surgical resection- A gap of at least 1-1.5 cm should be created.
- Ipsilateral coronoidectomy and temporalis myotomy after carrying out gap arthroplasty, the coronoidectomy on the same side should be carried out either seperately or in the combination with gap arthroplasty cut from same extraoral incision. The coronoid process is cut from the level of sigmoid notch till the Anterior border at the ramus.

  The temporalis muscle attachments are severed by carrying out temporalis myotomy . If oral opening is greater than 35mm is obtained , then there is no need to carry out contralateral coronoidectomy.

- Contralateral coronoidectomy and temporalis myotomy is neccesary through intra oral incision .
- Lining the glenoid fossa region with temporalis fascia.
- Reconstruction of the ramus with costochondral graft.
- Early mobilization and aggressive physiotherapy for the period of at least 6 months post operation.
- Regular long term follow up.
- To carry out cosmetic surgery at the later date when the growth of the patient is completed.

TREATMENT MODALITIES

- Brisement force.
- Condylectomy.
- Gap arthroplasty.
- Interpositional Arthroplasty.
- Artificial Replacement of the joint

.

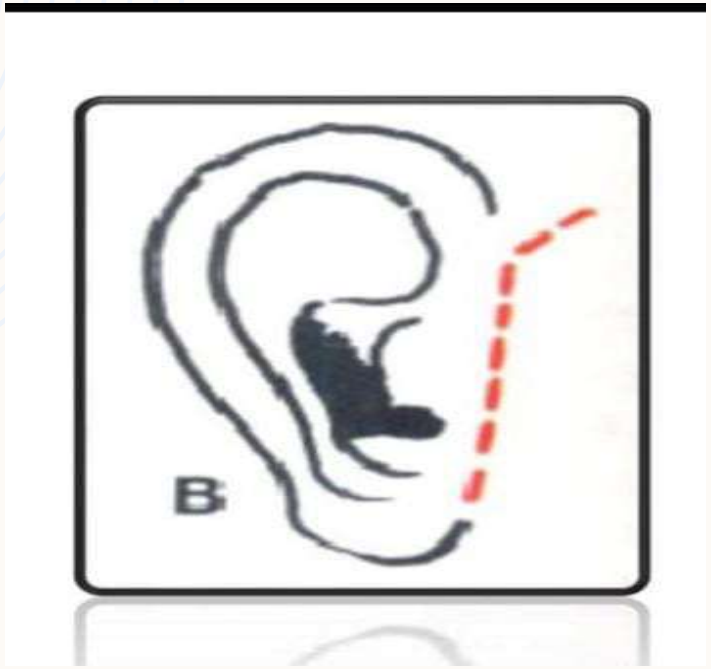
SURGICAL APPROACHES TO TMJ

Ideal requirements of incision are

- Give good and passive access to surgical site .
- Scar should be hidden in the skin folds or in the hair line.
- Avoid damage to adjacent important structures.

Incisions-

1. Preauricular incision .
2. Angulated vertical incision .(Thoma- 1958)
3. Hockey stick incision.
4. Al- kayat Bramley’s incision (Reverse question mark incision).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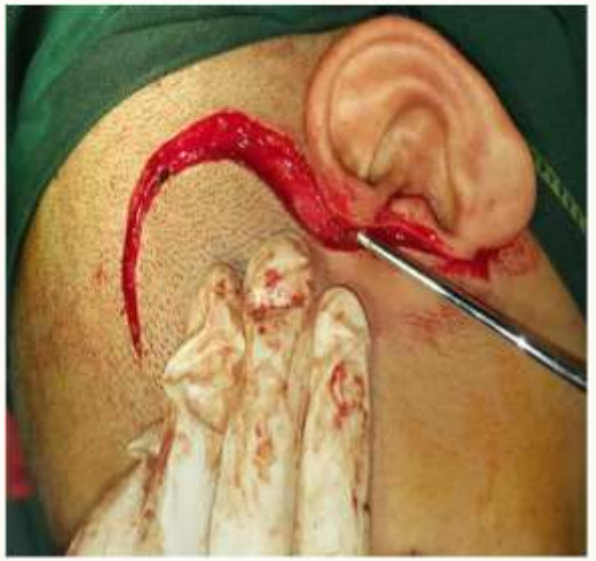

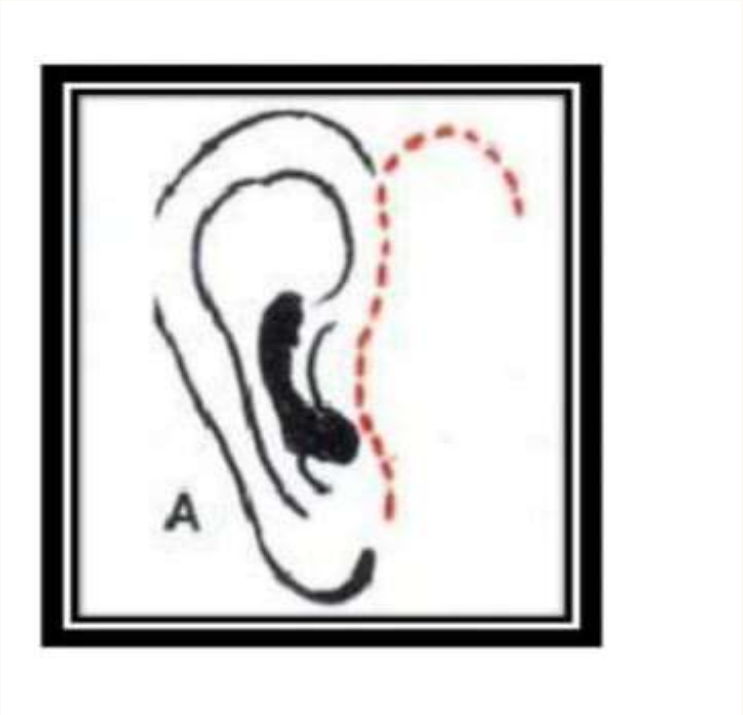
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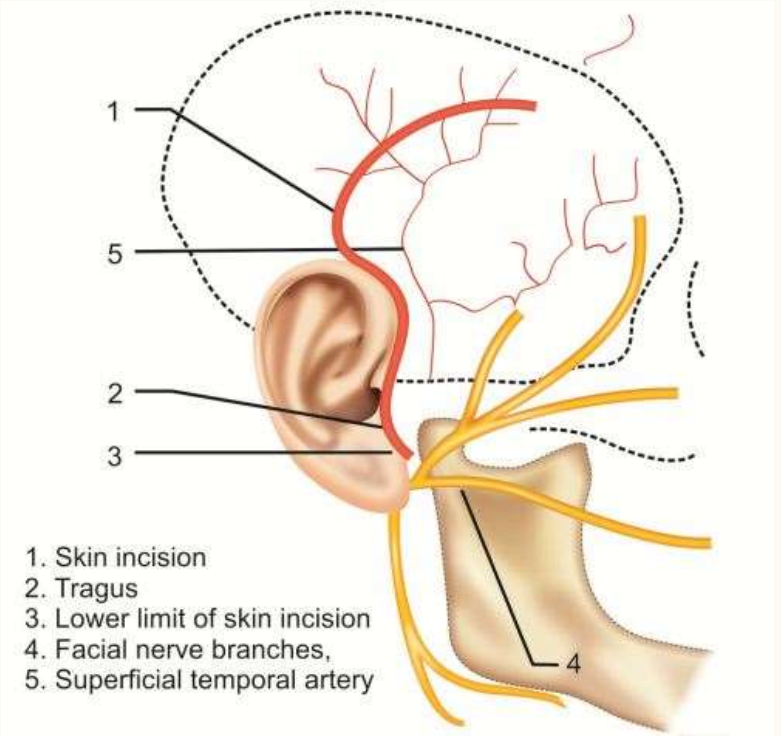
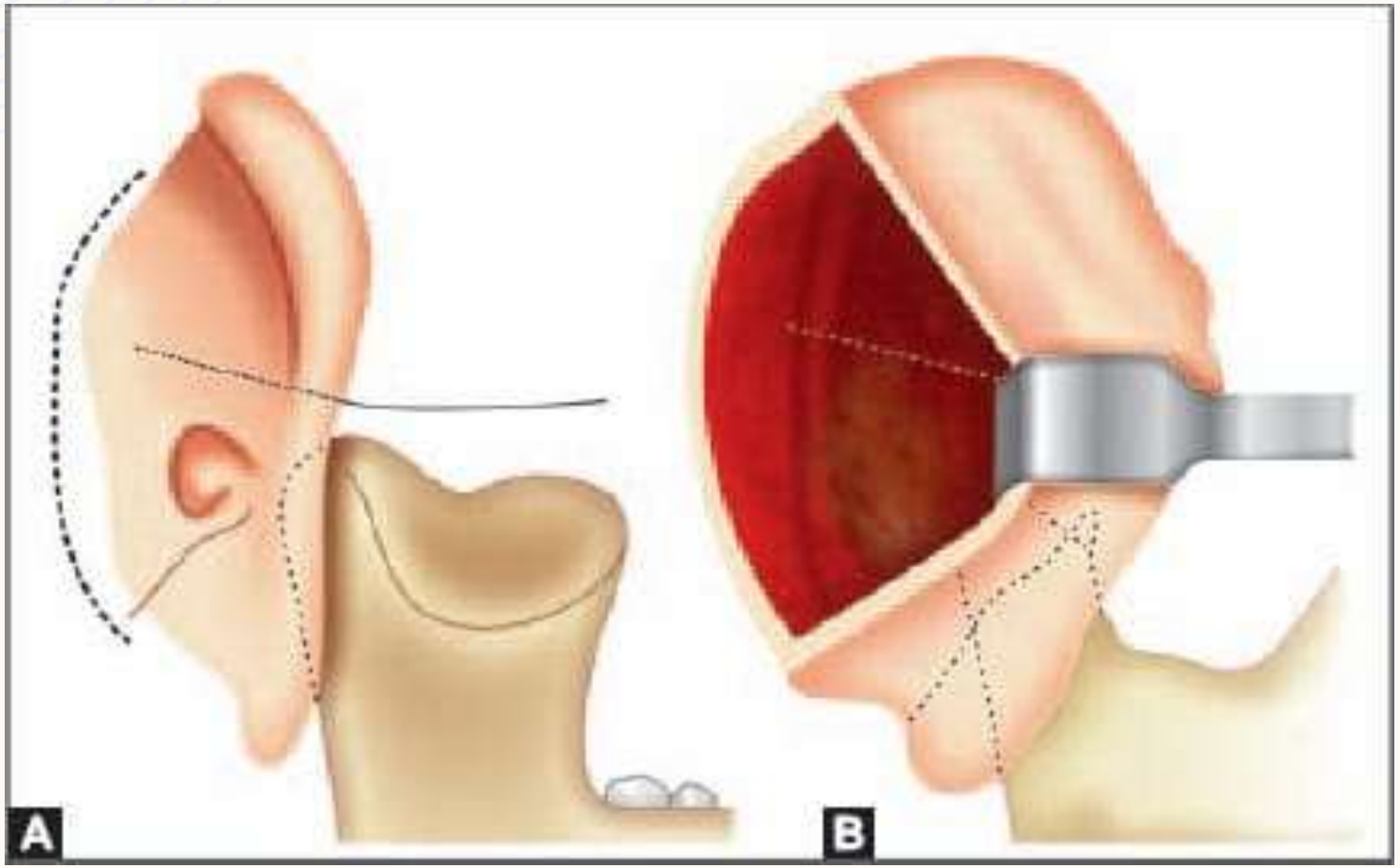
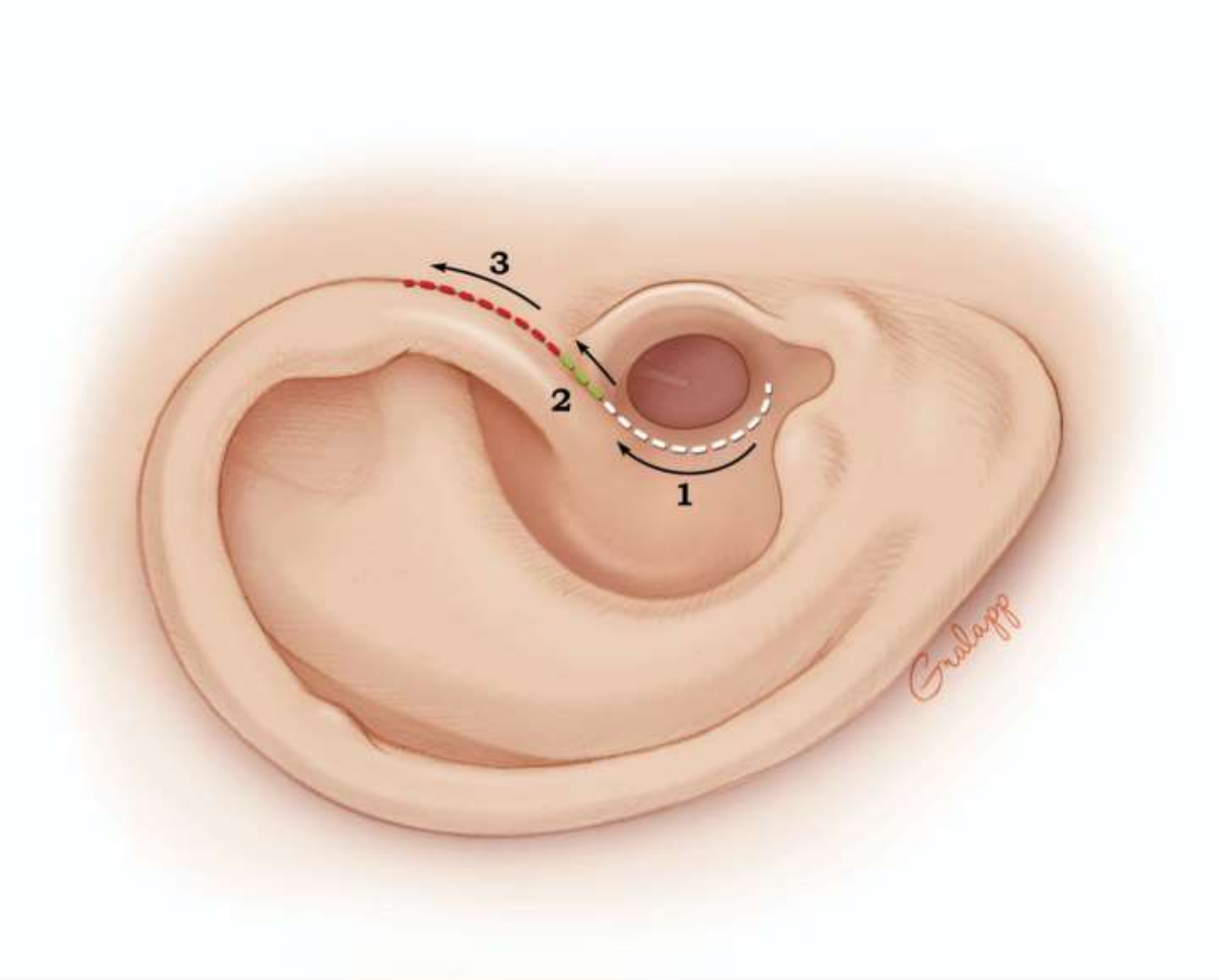

1
5
2
3
4
1. Skin incision
2. Tragus
3. Lower limit of skin incision
4. Facial nerve branches,
5. Superficial temporal artery

Post auricular incisions



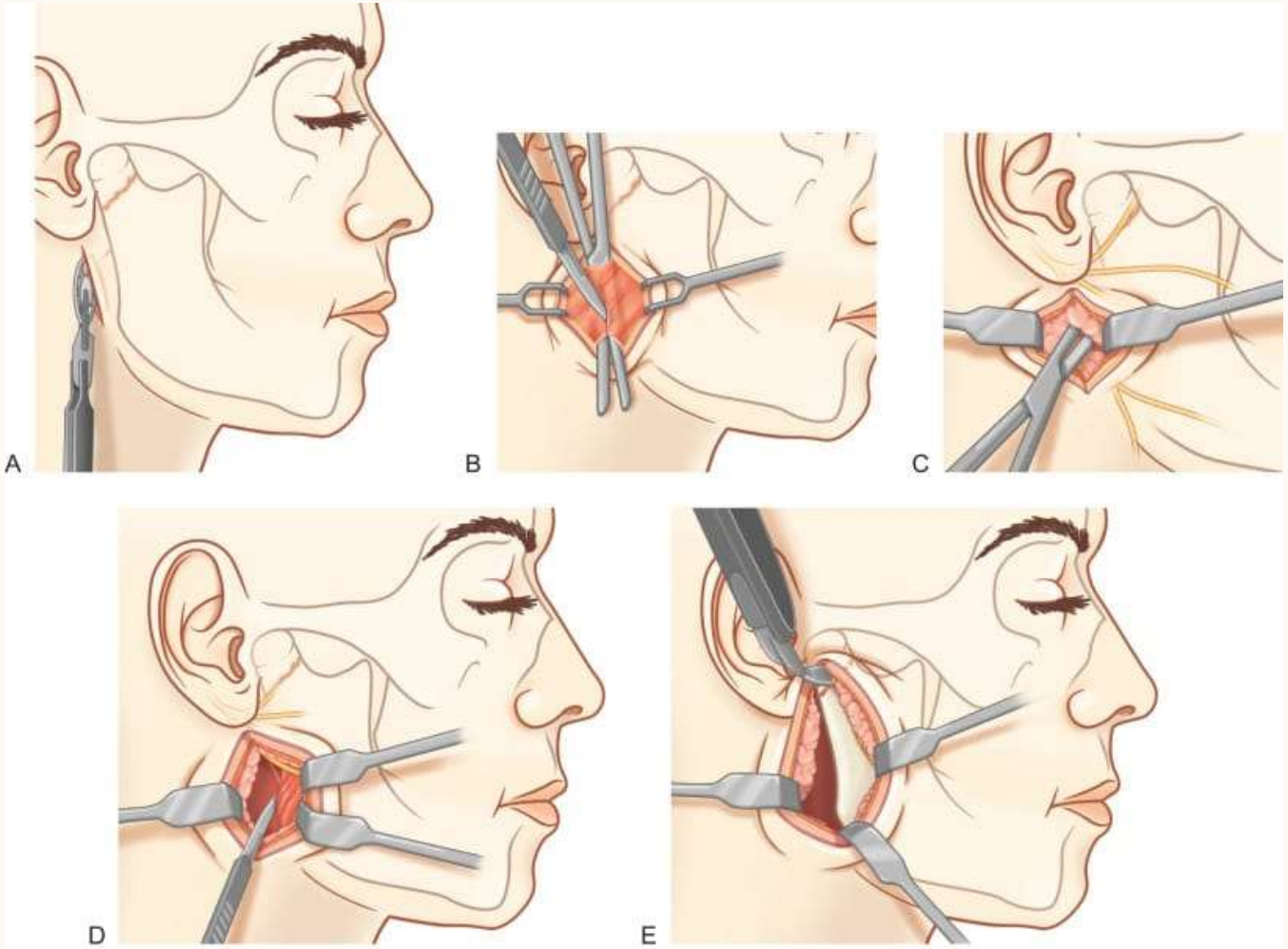
- Highly cosmetic
- Poor accessibility

Endural approach



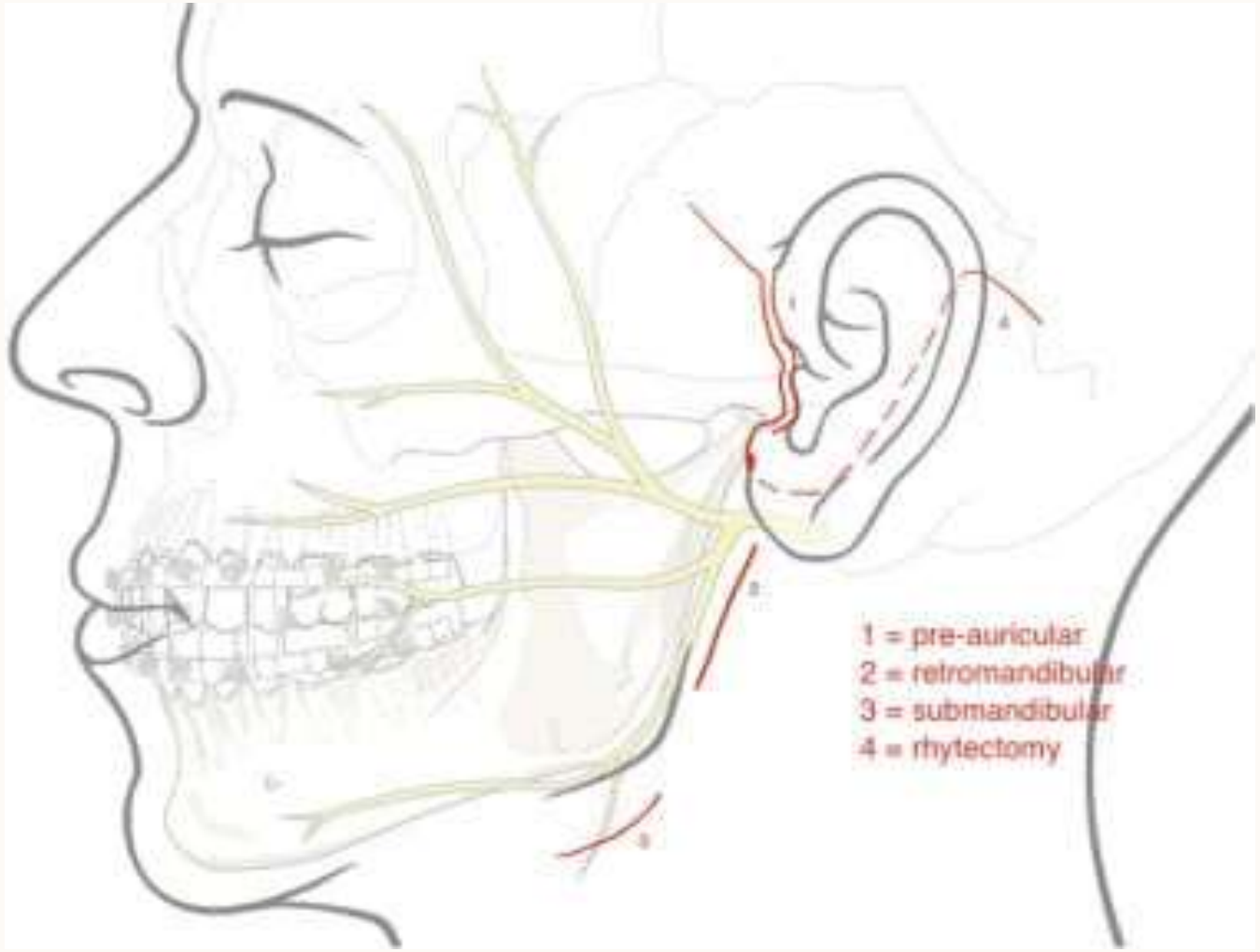
- Highly cosmetic
- Injury to facial nerve

Post ramal / Hind’s approach / Retromandibular



- 1 cm behind ramus of mandible
- Extends 1cm below ear lobe.

Submandibular / Risdon’s approach

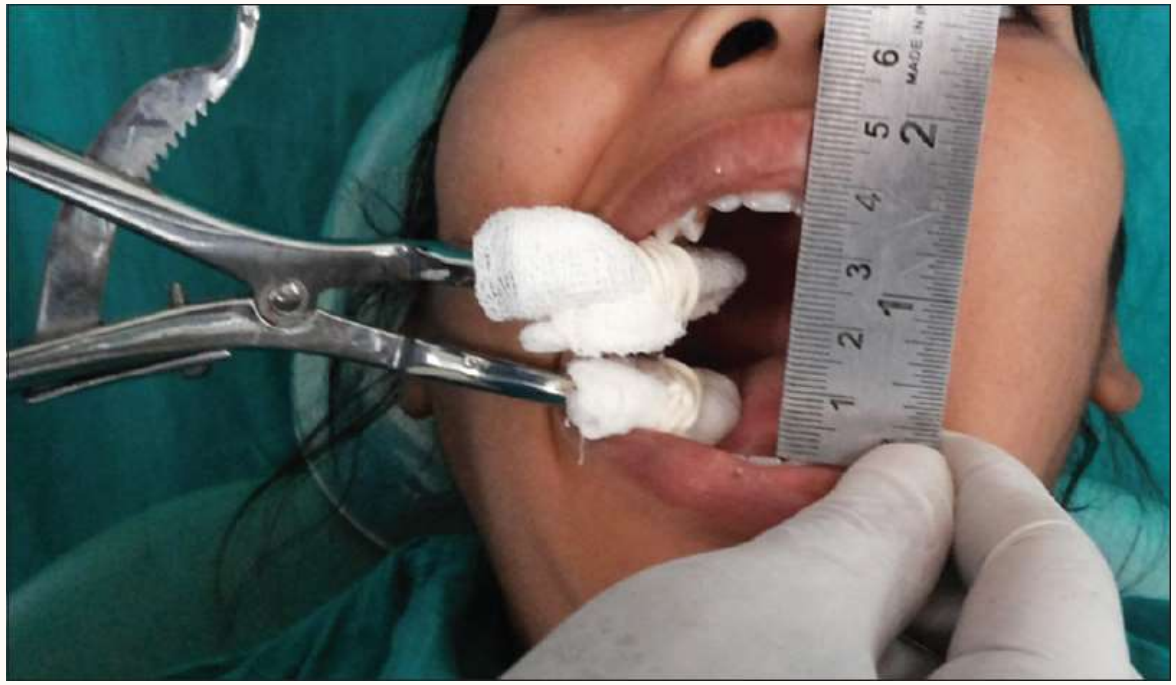


BRISEMENT FORCE

- Brisement force is the forceful mouth opening , under general anesthesia using heavy mouth gags.

For the fibrous ankylosis .

When the condylar head is not deformed and joint space is not severely norrowed, this method may be used.



CONDYLECTOMY

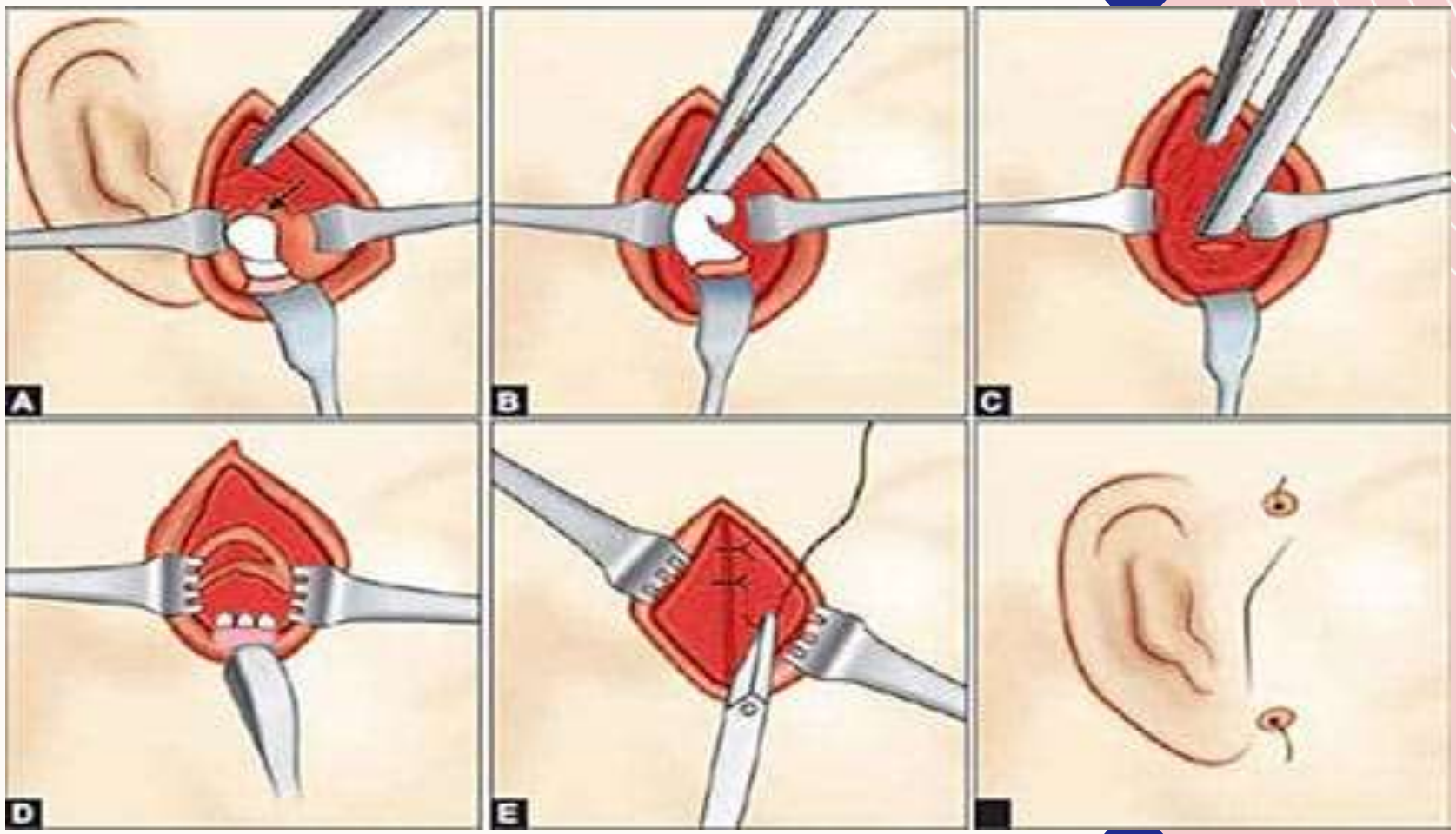
This procedure is done in cases of fibrous ankylosis and early stages of bony ankylosis .

Radiologically and clinically after surgical exposure one can see the demarcation between the roof of the glenoid and head of the condyle.

Particular incision is given .

Horizontal osteotomy at the level of condylar neck. Vital structures on the medial surfaces of the condylar neck should be protected by using special condylar retroctor inspected prior to bony cut.

The condylar head then should be seperated from the superior attachment carefully.The rest of the strump should be smoothened out and wound is closed in layers.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GAP ARTHROPLASTY

When identification of the previous joint structure is impossible and mobilization at the level of joint be comes difficult , Gap arthroplasty is done.

Gap Arthroplasty- Level of section is below that of previous joint space and in which no substance is interposted between the two cut bony surfaces.

Section consists of two horizontal osteotomy cuts and removal of bony wedge for creation of gap between the roof of glenoid fossa and ramus.

Recommended to create a mint gap of at least 1cm to prevent reankylosis.

As the medial aspect is the close proximity to internal maxillary artery, hence bone is removed carefully by using large round bur, until the medial bone is thinned out enough to be reddily removed by using hand chiesel or osteotome.

It is important to create a gap of equal dimension both laterally and medially, so that the possibilty of medial reankylosis due to bone contact is avoided.

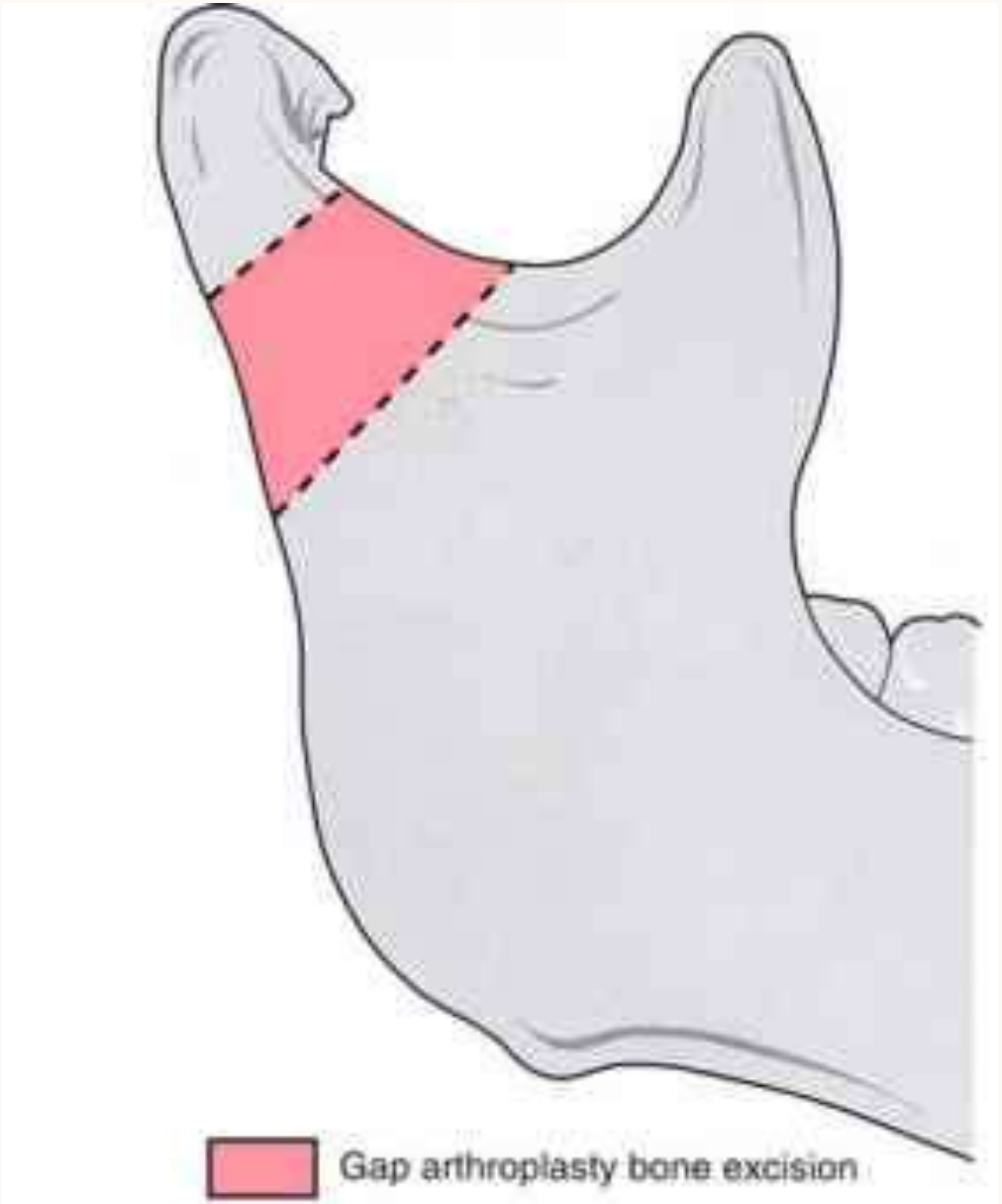


Fig. 20.6 Gap arthroplasty. The hatched area is the bony

INTERPOSITIONAL ARTHROPLASTY

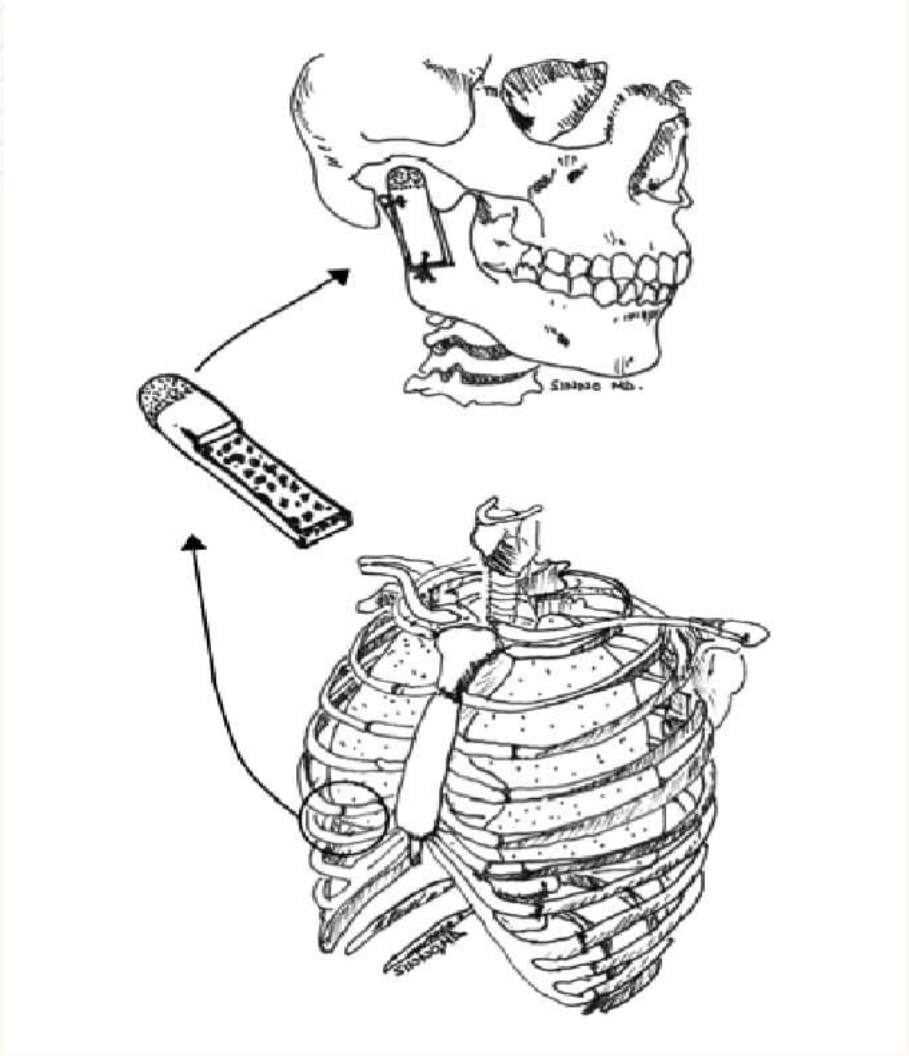
- Recurrence of ankylosis is less likely when something is interposed between the two cut bony surfaces .
- Interpositional arthroplasty involves the creation of gap , but in addition a barrier (autogenous or alloplastic) is inserted between the cut bony surfaces to minimize the risk of recurrence and to maintain the vertical height of the ramus.

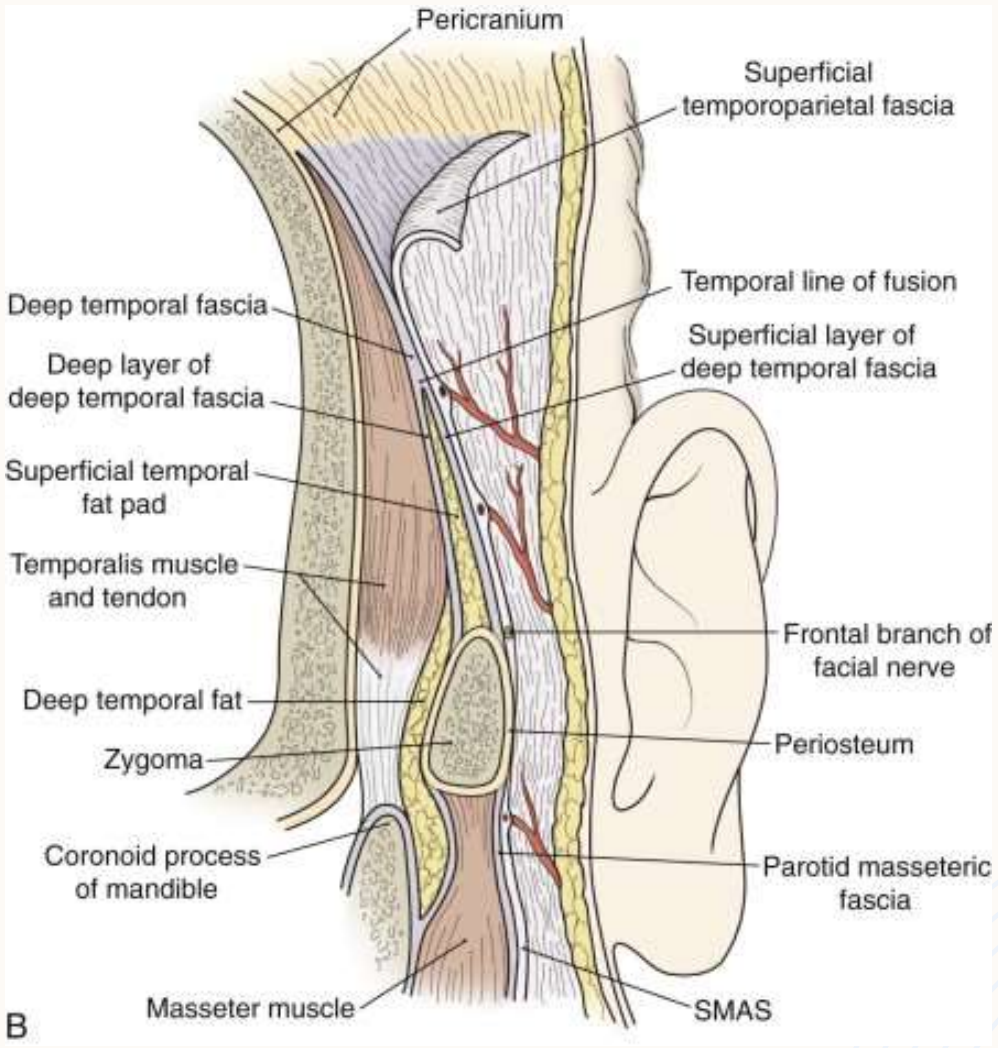
Interpositional material used :-

- **Autogenous** = Cartilagenous graft
  (Costochondral,
  Metatarsal ,
  Sternoclavicular ,
  Auricular cartilage)
  Temporal muscle
  Temporal fascia
  Dermis .

- **Alloplast** =

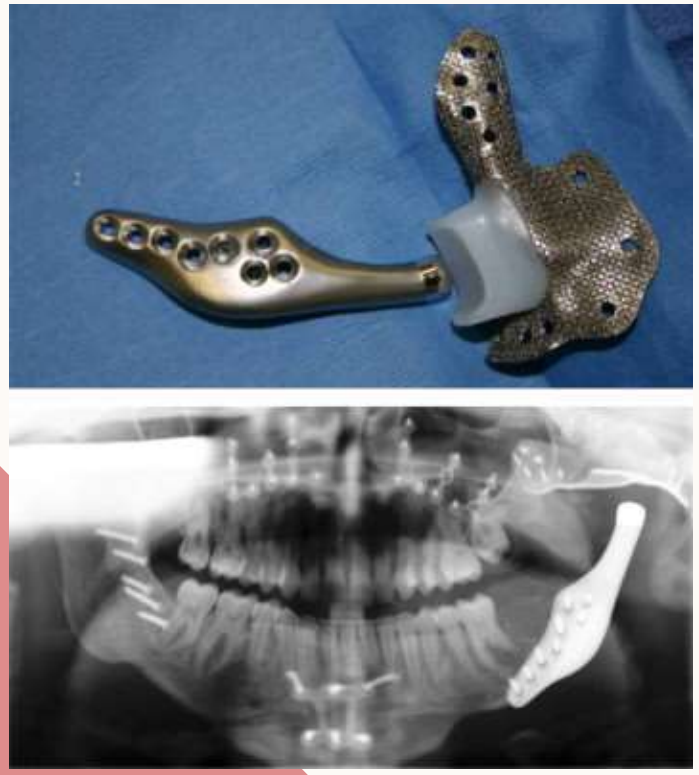
1. Metallic – Titanium ,
   316 L stainless steel
   Gold
2. Non – metallic – Silastic
   Teflon
   Acrylic
   Nylon
   Ceramic implant.
3. Heterogenous - Chromatized submucosa of pig bladder.

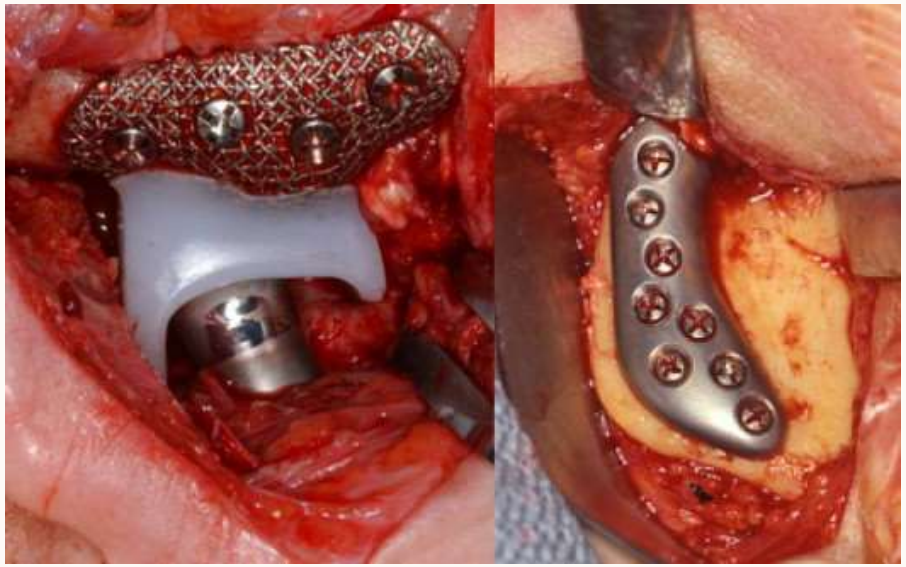



Pericranium
Superficial temporoparietal fascia
Temporal line of fusion
Deep temporal fascia
Superficial layer of deep temporal fascia
Deep layer of deep temporal fascia
Superficial temporal fat pad
Temporalis muscle and tendon
Frontal branch of facial nerve
Deep temporal fat
Periosteum
Zygoma
Coronoid process of mandible
Parotid masseteric fascia
Masseter muscle
SMAS
B

ARTIFICIAL REPLACEMENT OF THE JOINT

Prefabricated condylar prosthesis made of steel , vitallium or titanium have been also used extensively. Fossa liners along with specially constructed TMJ prosthesis reconstruct the entire joint . These are commercially available or custom fabricated.





COMPLICATIONS DURING TMJ SURGERY

- **During anaesthesia –**

a. As the patient cannot open the mouth , awake blind intubation has to be done, where patient's cooperation is required , which is very difficult to obtain from younger group of patients.

b. Because of small mandible and altered position of larynx, intubation poses a problem.

c. Aspiration of blood clot , tooth or foreign body during extubation as throat cannot be packed prior to surgery.

d. Danger of falling back of tongue and obstructing airways is always there, after extubation.

- **During surgery –**

a. Haemorrhage due to damage to any of the superficial temporal vessels, transverse facial artery, inferior alveolar vessel and internal maxillary vessels , pterygoid plexus of veins.
b. Damage to external auditory meatus.
c. Damage to zygomatic and temporal branch of facial nerve.
d. Damage to glenoid fossa and thus leading entry into middle cranial fossa.

- **During Postoperative follow-up**

a. Infection
b. Open bite
c. Recurrence of ankylosis.

THANK YOU