Exodontia

Complications of Extraction - Part I

INTRODUCTION

COMPLICATION:-any adverse , unplanned events that tend to increase the morbidity above what would be expected from a particular operative procedure under normal circumstances.

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SOURCES OF COMPLICATIONS:

Surgical complications may arise from either one or a combination of the following factors.

- THE PATIENT- medically compromised leading to

an persistent haemorrhage or delayed healing.

- THE CLINICIAN

-level of training

- skills and experience.

-attitudes towards total patient care.

- THE SURGICAL PROCEDURE
  risks depend on

  -complexity of the procedure.
  -local anatomy of the surgical site
  -proximity of important vital structures.

Possible Complications

- Failure to -secure anaesthesia
  -remove the tooth with either forceps or elevator

- Fracture of-crown of the tooth /root
  -alveolar bone
  -maxillary tuberocity
  -adjacent or opposing tooth
  -mandible

- Dislocation of -adjacent tooth
  -TMJ
- Displacement of the root
  -into the soft tissues
  - maxillary antrum
  -under G.A in dental chair

- Excessive haemorrhage
  - During tooth removal
  - on completion of the extraction
  - postoperatively
- Damage to
  - gums/lips/tongue/floor of mouth
  - inferior dental nerve & branches
  - lingual nerve

- Postoperative pain
  - damage to hard & soft tissues
  - dry socket
  - acute osteomyelitis of mandible
  - traumatic arthritis of TMJ

- Postoperative swelling due to
  - odema
  - haematoma formation
  - infection
- Trismus
- Oro-antral communication
- Syncope
- Respiratory arrest
- Cardiac arrest
- Anaesthetic emergencies.

- Failure to -secure anaesthesia

- Failure to -remove the tooth with either forceps or elevator

Fracture of -crown of the tooth /root
-alveolar bone
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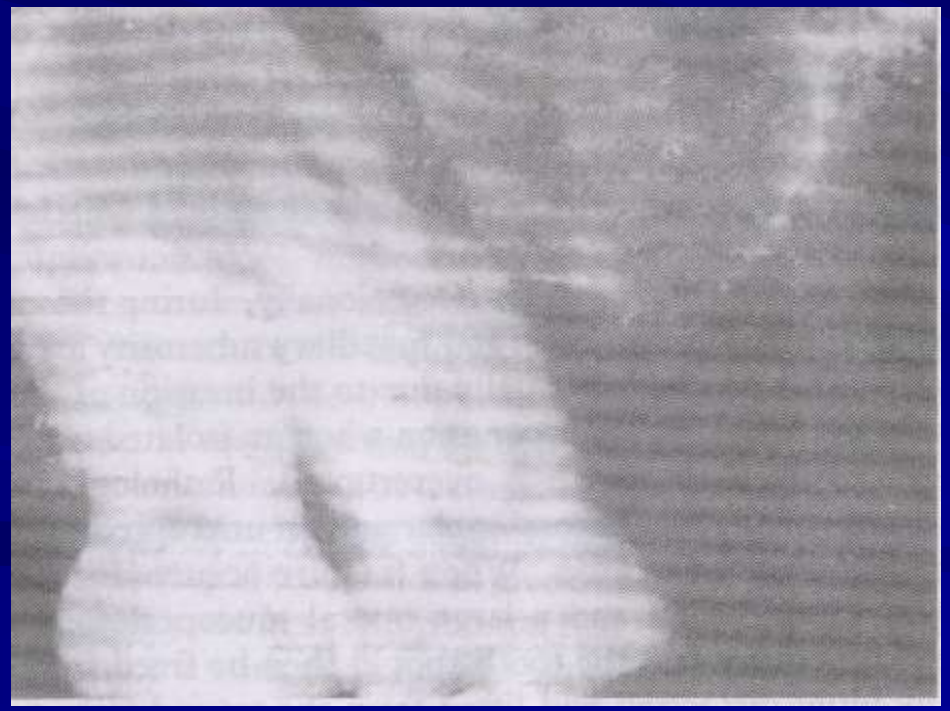

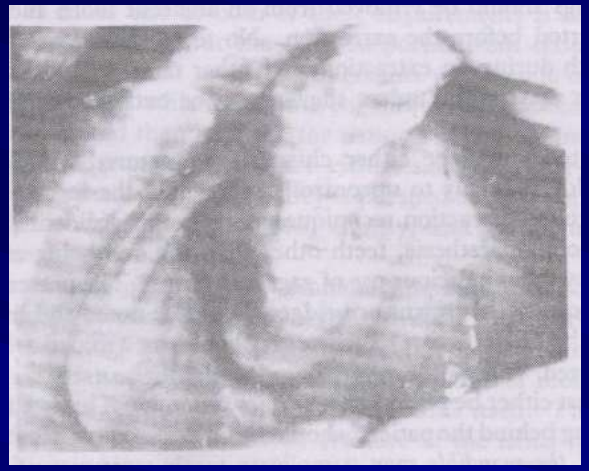

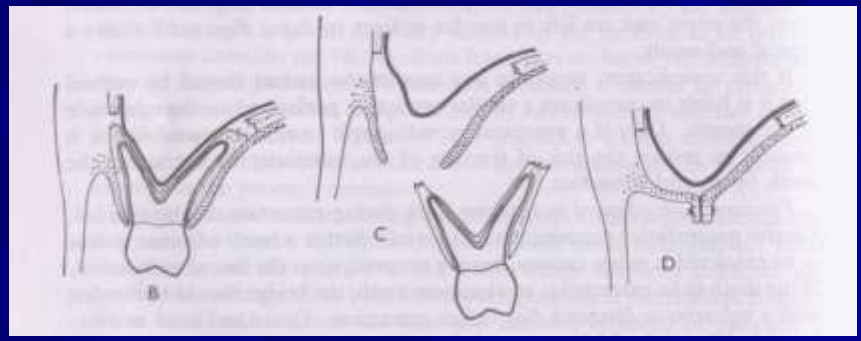
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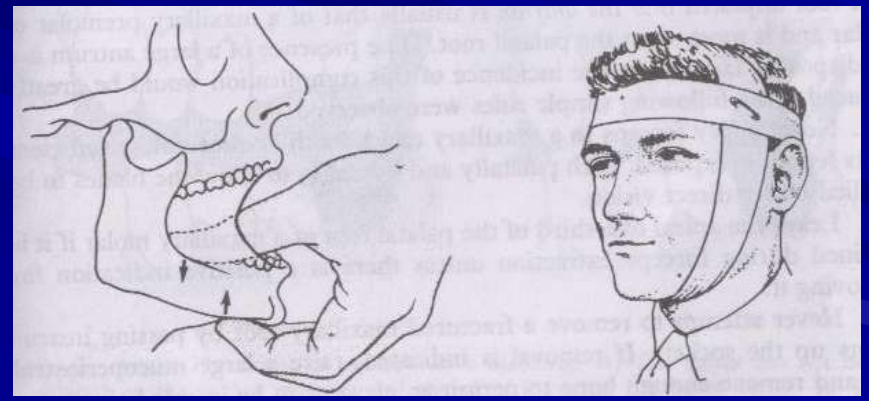
- Dislocation of

  -adjacent tooth

  -TMJ



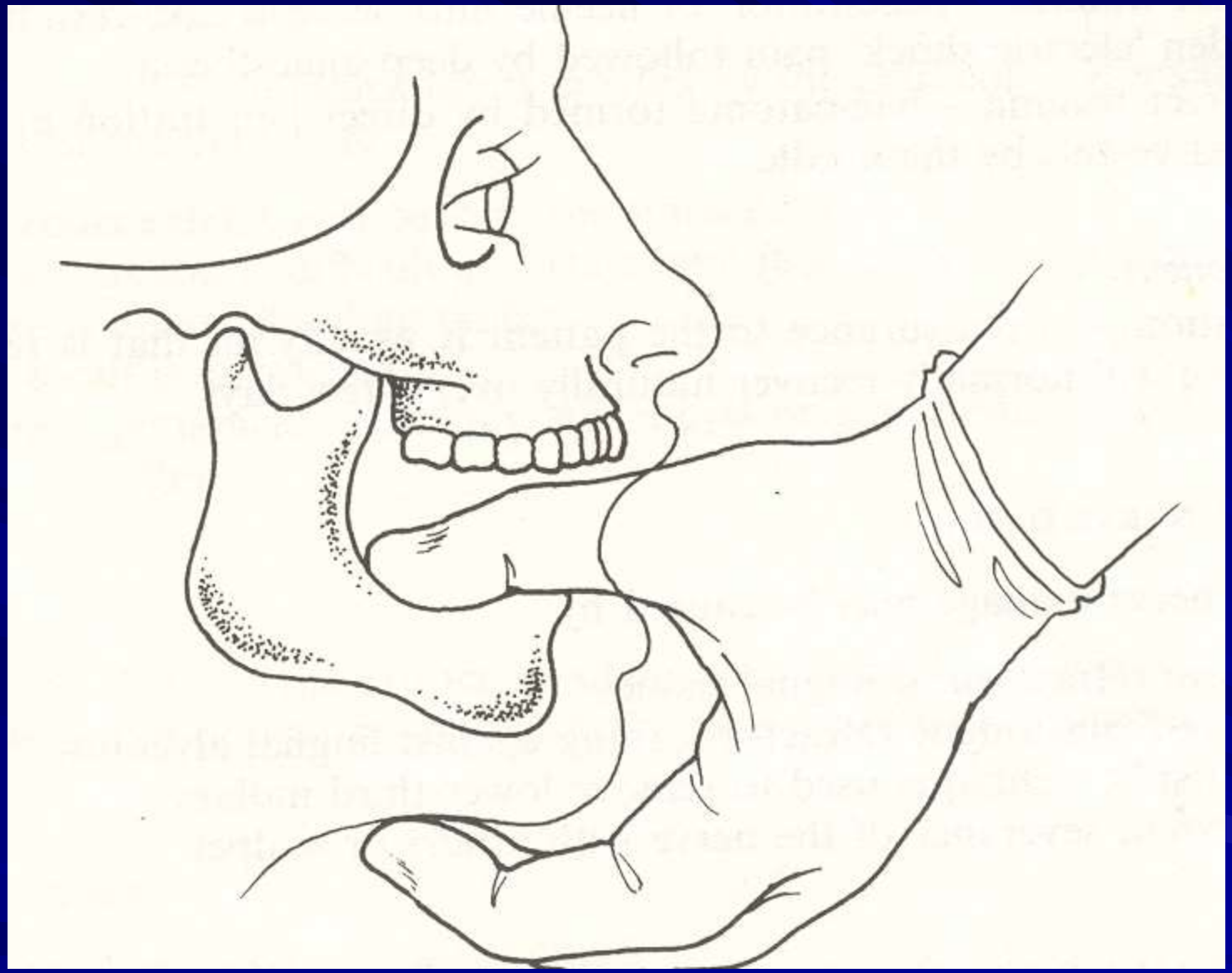
Dislocation of condylar :

Causes :

- Application of excessive force
- Failure to support the mandible while extracting a difficult tooth
- More likely to occur under general anesthesia when mastication muscles are relaxed

Management :

Reduction is done with the thumb wrapped with gauze or bandage to avoid injury by teeth and placed on the occlusal surfaces of mandibular posterior teeth and finger under the lower border of the mandible.Mandible is then pushed downward backward rotating the chin upwards .with this manpower the condyles are moved downwards and backwards over the articular commissures of temporal bone.



REDUCTION OF DISLOCATED CONDYLES

Patient should be warned not to open his mouth too widely or to yawn for postoperatively .patient is instructed to support the jaw during yawning.

•extra oral bandage support for the joint is applied and worn until tender ness in the affected joint subsides.

•Failure to reduce dislocation reduction can be attempted under 5-10mg of IV/IM valium

•Failure to reduce the dislocation or if there is resistance encountered LA solution is injected high in the buccal sulcus bilaterally adjacent to max third molar region similar to the technique of posterior superior alveolar nerve block. This helps in paralyzing lateral pterygoid muscles and over comes, Muscular spasm under GA it is easy to reduce dislocation .It is valuable to check the occlusion at the end of any extraction

Displacement of the root

into the soft-tissues

maxillary antrum

Damage to adjacent tissues

- Gums/lips/ floor of the mouth
- Inferior dental nerve & branches
- Lingual nerve.

Soft tissues damage:

Mucosal tears :

Management **: c**losure of tear after completion of surgical procedure.

Punctures : caused due to uncontrolled force (elevator)

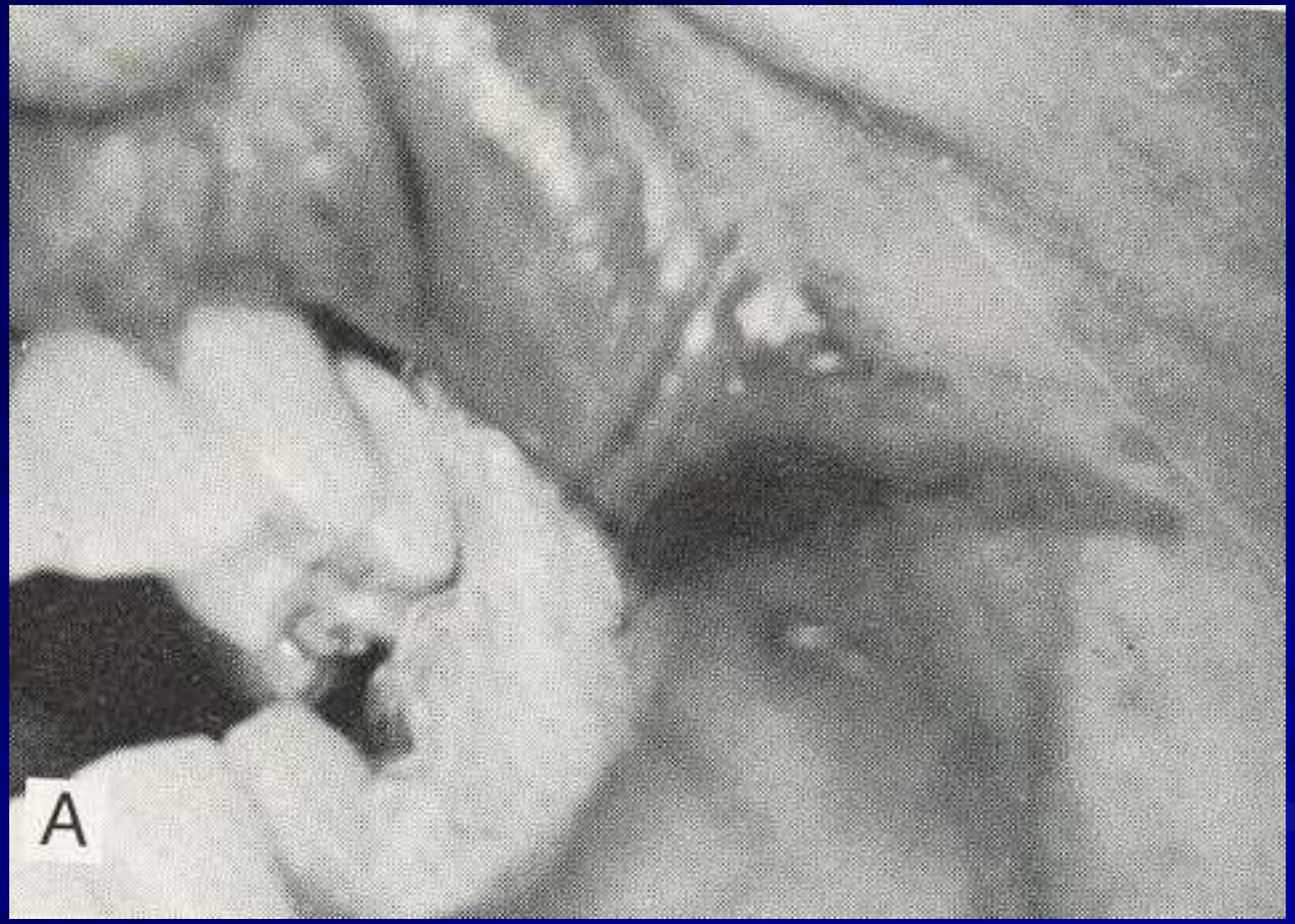
common areas : upper – posterior palate

lower - tongue and floor of mouth

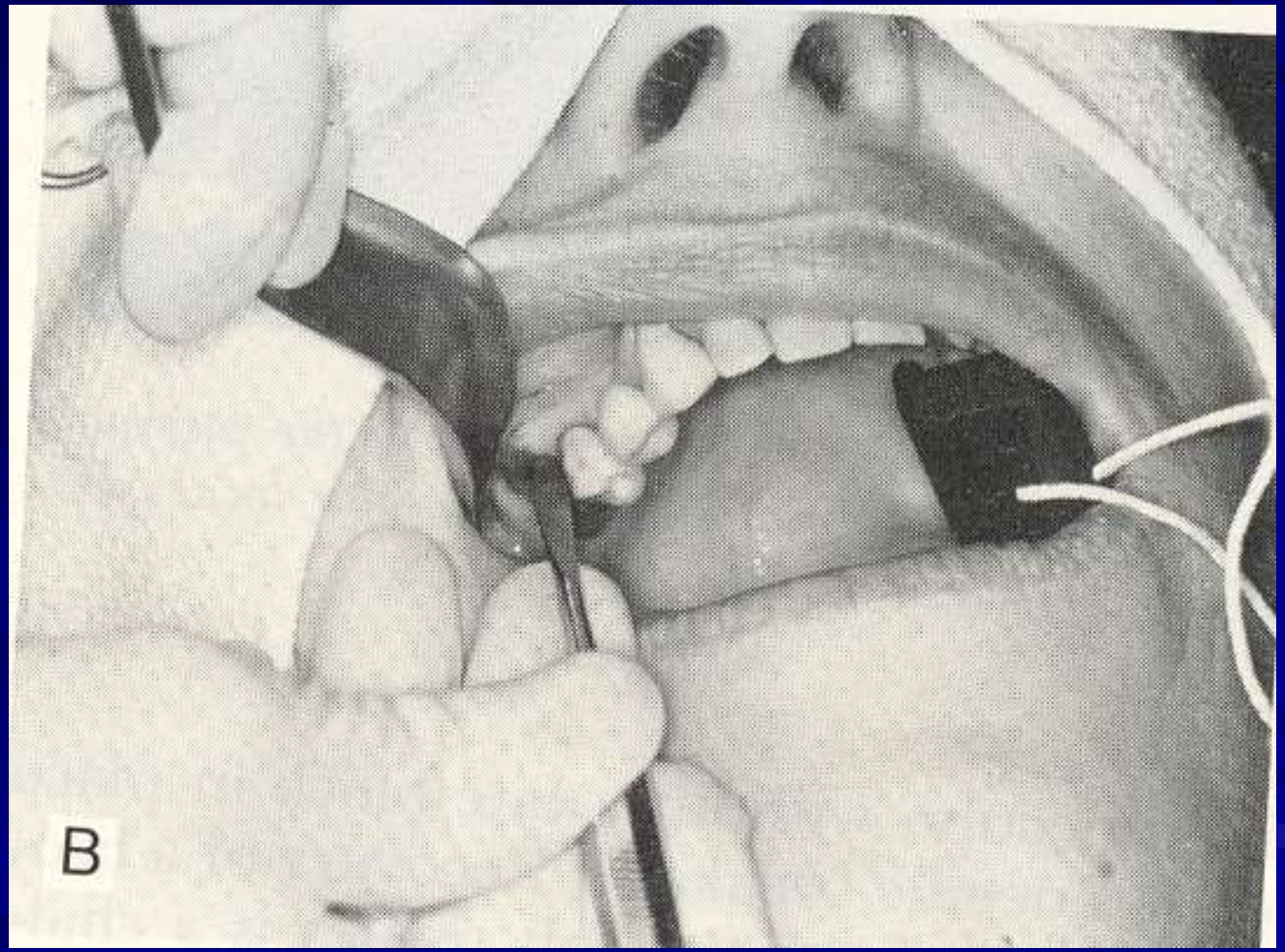
Crush injuries **:** gingival tissues lacerated by blades of forceps due to carelessness.

All these errors of technique and their sequelae are preventable.

Failure to handle the soft tissues carefully during a surgical procedure may cause an edematous swelling, soreness and delayed healing.



SOFT TISSUE INJURY



MOUTH PROP HELD TO PREVENT SOFT TISSUE INJURY

NERVE POSING PROBLEMS:

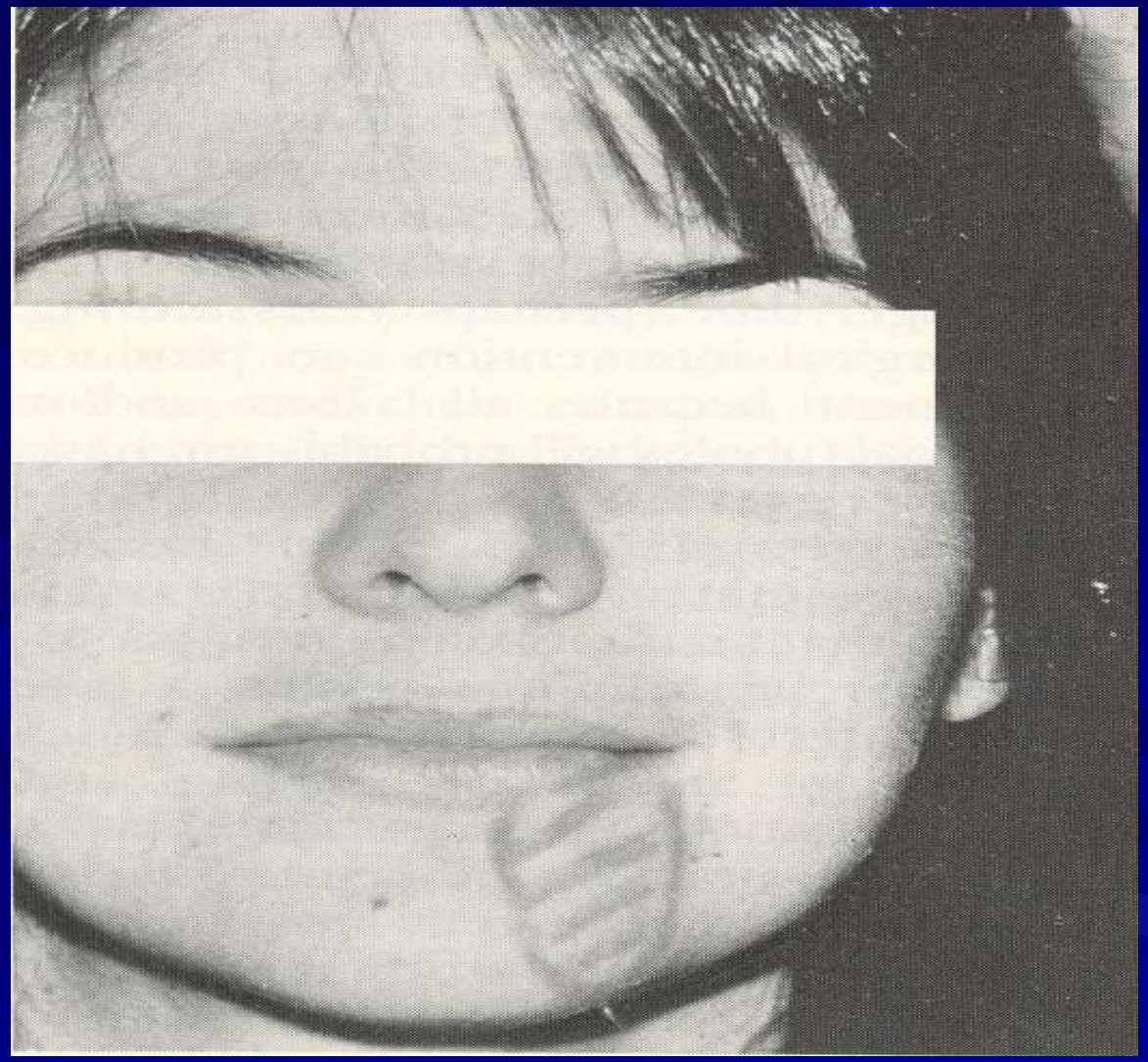
Inferior alveolar nerve :

- close proximity of mandibular third molar roots.
- Careless surgical technique,
- roots are curved around the canal or grooved

Lingual nerve :

Lingual nerve is in close proximity to roots of mandibular third molar .

- Risk of damage while taking incision and during elevation of lingual periostium.
- Risk of direct trauma form bur or chisels



AREA OF SENSORY DEFICIT FOLLOWING INFERIOR ALVEOLAR NERVE INJURY

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Prevention:

The nerve injury can be prevented by Careful surgical technique –

- Proper placement of incision,
- Careful bone removal
- Retraction and less manipulation

Management :

Patient should be warned preoperatively about the possible consequences and the probable outcome on.

- **Mental nerve :**
- Injury is caused due to surgery in the area of mental nerve.
- Over extension of incision in the depth of mucobuccal fold in premolar region
- Removal of bone encroaching on mental foramen just below and between premolar root apices.
- Incision and drainage of abscess situated in the region of premolar.

Prevention:

- The nerve injury can be prevented by good knowledge of anatomy and good surgical technique
- Proper planning of incision
- Careful reflection of mucoperiosteal flap
- Incision and drainage of abscess be done by Hiltons method in order to minimize risk of damaging mental nerve and
- Protection of mental nerve with a retractor.

POST OPERATIVE PAIN ;

Damage to hard and soft tissues :

Traumatized hard tissues:

-bruising of bone during instrumentation or from allowing a bur to over heat during bone removal.

Avoidance of these errors of technique and attention to the smoothing of sharp bone edges and socket toilet eliminate this cause of pain.

Soft tissue injury

DRY SOCKET

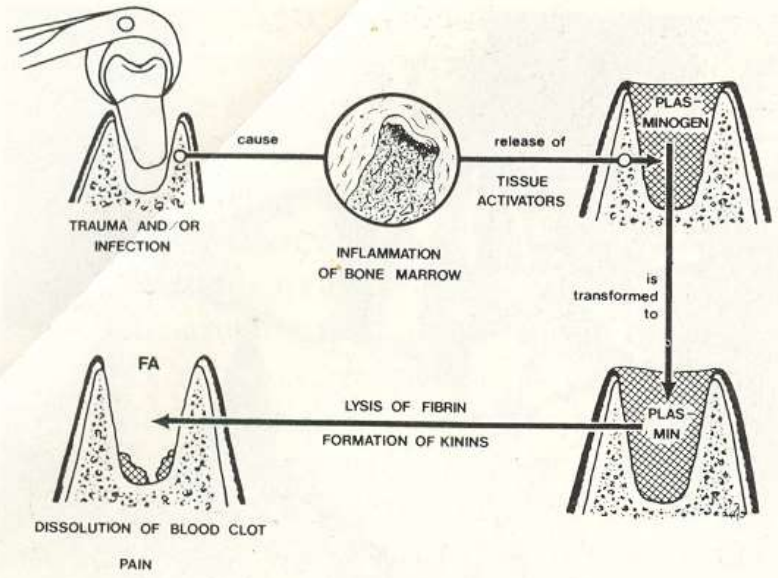
-ALVEOLAR OSTEITIS

-FIBRINOLYTIC ALVEOLITIS

The condition is characterized by an acutely painful tooth socket containing blare bone and broken down blood clot.

ETIOLOGY

TRAUMA AND INFECTION



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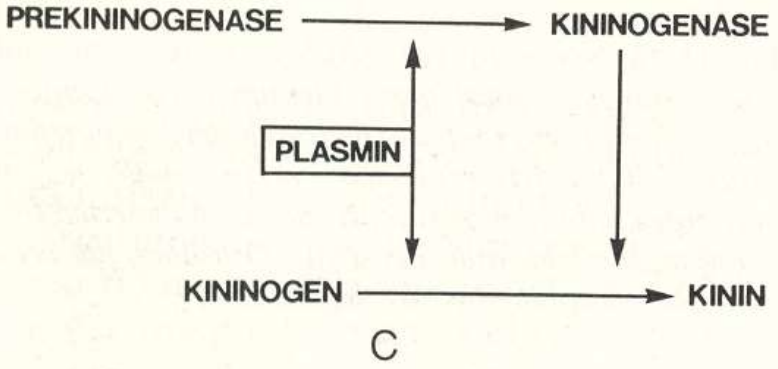

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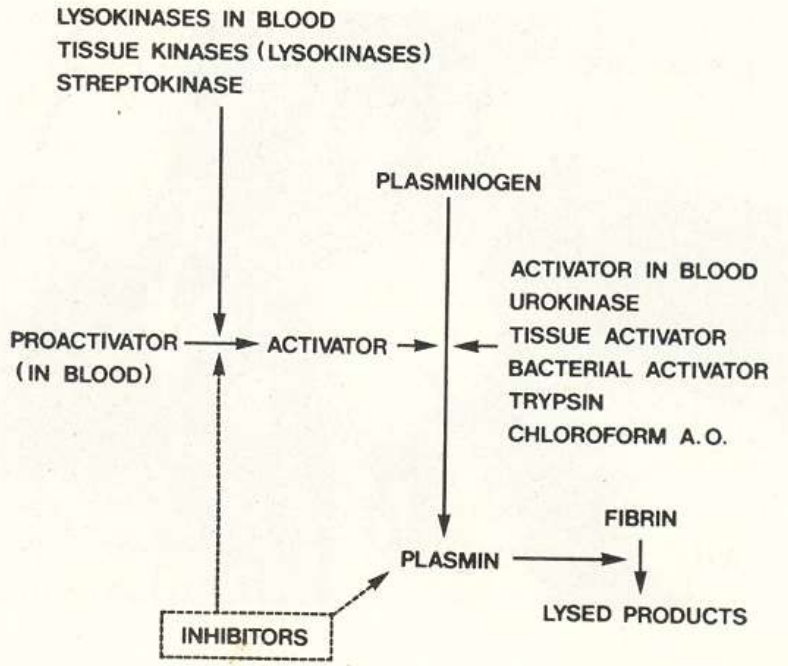

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FIG. 11-26. *Alveolar osteitis. (A) Etiology and pathogenesis. (B) Components of the fibrinolytic system and their relationships. (C) Main components of the kinin-forming system. Plasmin is the activator. (From: Birn, H.: Etiology and pathogenesis of fibrinolytic alveolitis ["dry sock socket"]. Int. J. Oral Surg. 2:211, 1973.)*

PREDISPOSING FACTORS :

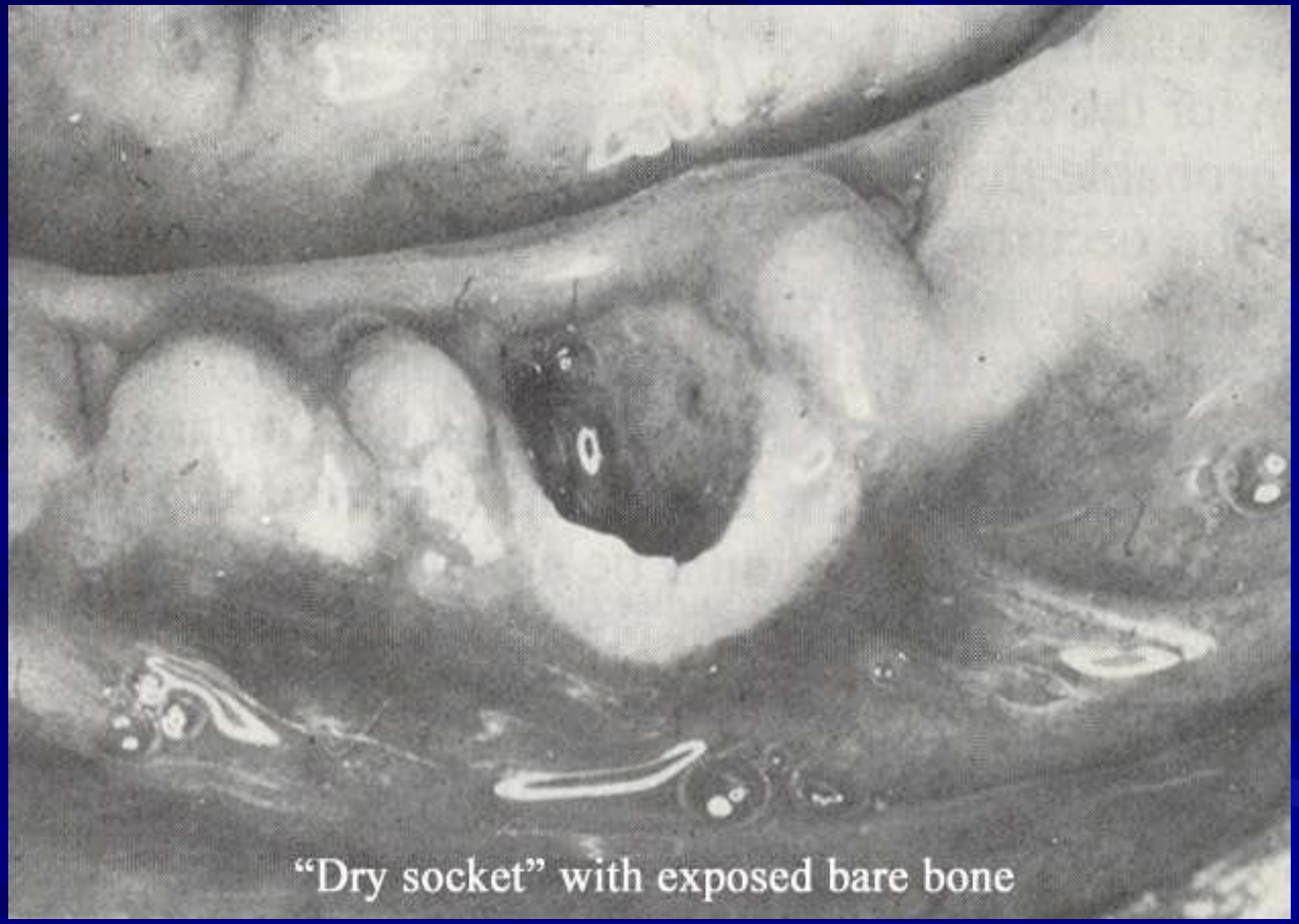
Infection

Trauma : use of excessive force during extractions

Vasoconstrictors

Mandibular teeth show higher incidence of dry socket than maxillary teeth.

Bacteriological origin : a number of bacteria are known to possess fibrinolytic activity. Treponema denticolum may have an etiological role in the genesis of dry socket.



"Dry socket" with exposed bare bone

DRY SOCKET CONTAINING DEGENERATING BLOOD CLOT

PREVENTION

Following measures should be employed

1. scaling of the teeth any gingival inflammation should be treated prior to extraction
2. Minimum amount of local anesthetic solution necessary for producing analgesia should be administered
3. Teeth should be removed in the least trauma
4. Prophylactic use of antibiotics especially **metronidazole** from the day of extraction for 3-4 days reduces the incidence of dry socket significantly.It also has been shown to provide prompt relief from pain of given large doses for 5 days.
5. Wound debridement
6. nerve blocks preferred to LA infiltrations

MANAGEMENT

The aim of treatment should be the relief of pain and the speeding of resolution.

1. the socket should be irrigated with warm normal saline and all, degenerating blood clot removed
2. Sharp bony spurs : should be either excised with longer forceps or removed with a wheel stone.
3. A loose dressing composed of zinc oxide and oil of clove On cotton – wool is tucked into the socket. It must not be packed highly in the socket or it may set hard and be very difficult to remove.

Analgesic tablets and hot saline mouth bath are prescribed.Most patients treated in this manner report relief of pain but some require further dressing or even chemical cauterization of the exposed bare painful bone to control the symptoms

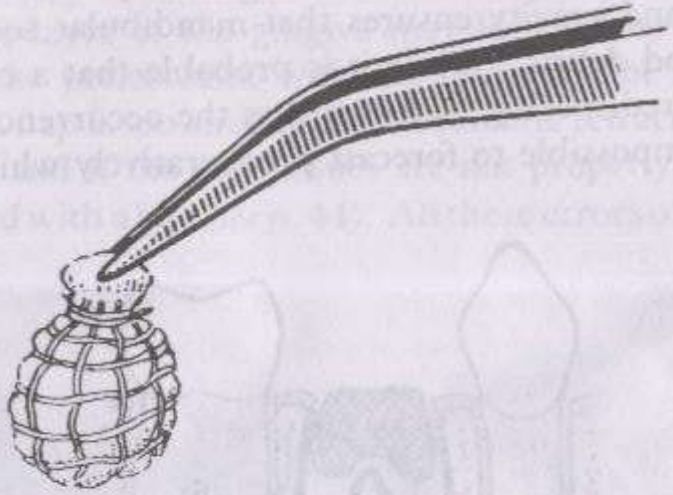


Fig. 109.—A pom-pom.

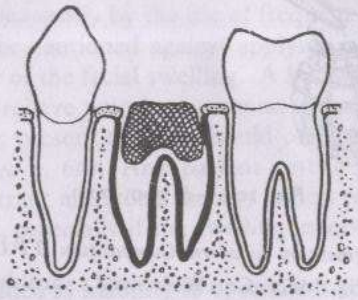


Fig. 108.—A sedative dressing tucked into a 'dry socket'.

A pack composed of whiteheads varnish (pigmentum iodoform compositum BPC. it can be left insitu 2-3 weeks and the socket will be found granulating when dressing is removed

Pigmented iodoform composition B.P.C

Benzoin ,Sumatra in coarse powder	3g
Prepared strorax	2g
Balsam of Tolm	1.5g
Iodoform	3g

Solvent ether to fl.oz(28.4ml)

DRESSING ; First 24 hours then every alternate day then every 3-4 days / or more than 2 weeks regular check up

If pain persists , it may require chemical cauterizaton of exposed bare painful bone.

IRRIGATE THE SOCKET

PLACE A ANTISEPTIC DRESSING

DISPOSABLE PLASTIC SYRINGE USED TO IRRIGATE THE CANAL

ACUTE OSTEOMYELITIS OF THE MANDIBLE

difficult to differentiate between a patient affected with a severe ‘dry socket ‘ and one suffering from acute osteomyelitis of the mandible .

-impairement of labial sensation

- acute osteomyelitis of the mandible - pyrexia ,

- pain is very severe.

PREDISPOSING FACTOR : Traumatic extraction of lower molar under LA, in the presence of acute gingivitis, periodontitis or pericoronitis.

The following measures to be undertaken prior to undertaking any surgical intervention.

1. to do prophylactic sealing of teeth whenever indicated
2. to treat acute condition first and control the infections

A patient suffering from this condition should be admitted as an emergency to a hospital where facilities for its effective treatment exist

TRAUMATIC ARTHRITIS OF THE TMJ

May complicate difficult extractions if the lower jaw is not supported. The risk can be minimize if supporting the mandible during surgery. Difficult extractions Should be done surgically.

MANAGEMENT :

-rest to the temperomandibular joints
-analgesics and anti inflamamotry agents
-If it is known that the patient has a history of a previous dislocation of the TMJ it is a wise precaution to get him to hold a dental prop tightly between his teeth on the contra lateral side during a dental extraction

TEMPEROMANDIBULAR JOINT INJURIES

A, ***Trauma to the capsule*** :

The main cause is due to the stretching of the capsule of TMJ during extraction procedure when excessive force is applied

This can be prevented by providing adequate stability to TMJ during extraction.

It is usually associated with post operative pain and limitation of movement.

Conservative management's-

•rest to the joint.

•Soft diet analgesics

•Restriction of mouth opening.

•Analgesics

Patient should be warned not to open his mouth too widely or to yawn for postoperatively .patient is instructed to support the jaw during yawning.

•extra oral bandage support for the joint is applied and worn until tender ness in the affected joint subsides.

•Failure to reduce dislocation reduction can be attempted under 5-10mg of IV/IM valium

•Failure to reduce the dislocation or if there is resistance encountered LA solution is injected high in the buccal sulcus bilaterally adjacent to maxillary third molar region similar to the technique of posterior superior alveolar nerve block. This helps in paralyzing lateral pterygoid muscles and over comes, Muscular spasm under GA it is easy to reduce dislocation .It is valuable to check the occlusion at the end of any extraction

Other Complications of Extraction

Part-II

– Excessive Haemorrhage
– Postoperative swelling
– Oro-antral communication
– Respiratory arrest
– Cardiac arrest
– Anaesthetic emergencies
– Trismus
– Syncope.

Post extraction Bleeding.

- Causes

  Local

  Systemic

Local causes-

- Trauma
  - Mechanical dislodgement of the clot
  - Damage to blood vessel or soft tissue
  - Fracture of alveolar bone
  - Damage to nutrient blood vessel

- Infection
  - Presence of granulation tissue
  - Chronic inflammation of gingiva
  - Acute infection of bone and soft tissue

- Local abnormality
  - Unusually large bone marrow space
  - Presence of Haemangioma.

Systemic causes

- Vascular abnormality

Vascular purpura due to-
Allergic reaction
Drugs like atropine
Purpura fulminants

Infection
Bacterial- septicaemia, scarlet fever, typhoid
Viral- small pox, measles
Protozoal-malaria, toxoplasmosis

*Structural malformation

Heriditary

- heriditary hemorrhagic telengectesia
- Ehlor danlos syndrome

Acquired

-drug therapy like asprin

- Anti coagulant therapy
- Long term antibiotics
- Anticancer drugs
- Alcoholism
- Vit K deficiency
- Liver diseases

- Deficiency of any factor

- Platelet disorder

Thrombocytopenia
Idiopathic thrombocytopenic purpura
AIDS- associated thrombocytopenic purpura

- Coagulation defects

Haemophilia
Liver disease
Von wille brand disease

- Rare causes

Aplastic anaemia
Chronic renal failure
Lupus erythematosis
Disseminated intravascular coagulation

- Disorder related to systemic disease
- Haematologic malignancies- leukaemia,
- multiple myeloma
- Aplastic anaemias
- Hypertension
- Renal diseases
- Chronic liver diseases

Management

- Physical

Pressure packs

Use of LA solution with vasoconstrictors

Socket suturing

Hemostatic forceps

Splints

Thermal measures-cautery, hot saline packs

Posture

Bed rest

Hemostatics

- TOPICAL

- VASOCONSTRICTORS

Adrenaline

Noradrenaline

- ABSORBABLE AGENTS

Oxidized cellulose

Oxidized regenerated cellulose

Gelatin sponge

Fibrin foam

Calcium alginate

- THROMBOPLASTIC AGENTS

Thrombin

Russel viper venom

- CHEMICAL AGENTS

Tannic acid

Ferric chloride

Zinc chloride

Alum

Hydrogen peroxide

- SOCKET PLUGS

Bone wax

Whitehead’s varnish on ribbon gauze

Systemic agents

- ENDOGENOUS

Whole blood

Fresh frozen plasma

Cryoprecipitate

Freeze dried HAHG

Freeze dried animal AHG

- EXOGENOUS

Adrenochrome

Premarin

Ethamsylate

Vitamin K

Epsilon amino caproic acid(EACA)

Topical Hemostatics

- Vasoconstrictors

  Adrenaline (1:1000) used topically to control the capillary oozing from the soft tissues.

Drawback- High conc increases the risk of systemic toxicity-rebound hypertension.

Contraindicated in CVS diseases,diabetics or hyperthyroidism.

Gel foam:

- ✓ Gelfoam should be moistened in saline or thrombin solution prior to application and all the air should be removed from interstices.

Oxycel:

- It is oxidised cellulose and an application releases cellulosic acid, which has marked affinity for Hemoglobulin.
- It should be applied dry.

Surgicel :

- ✓ It can be applied dry or it can be soaked in thrombin solution.
- ✓ If tooth socket is packed with gelfoam or any other absorbable hemostatic agent, the flap can be sutured across the socket.

Fibringlue:

- ✓ It is a biological adhesive containing thrombin, fibrinogen, factor XIII and aprotinin.

- **Botroclot:** (hemocoagulase solution)
- It has multifaceted hemocoagulant action .
- It can be used in patients with normal hemocoagulant factors or in patients showing anomalies in the coagulation biochemical process.
- It shortens both the bleeding and coagulation time.
- On topical application the blood coagulation process starts immediately

WHITE HEAD'S VARNISH ON RIBBON GAUZE

Useful to control stubborn, persistent bleeding from within the bone Eg: inferion dental canal

maintains a positive pressure over the bleeding area in the bone which allows for the vessels to contract and form a clot

plug is removed after 2 days

Composition- Benzoin- 10 gm

iodoform- 10 gm

Storax - 7.5 gm

Tolu balsam – 5 gm

Ether – to make 100 ml

Systemic agents

- ETHAMSYLATE(Dicynene)

Restricts hemorrhage at the site of operation

Mechanism of action-

↑capillary wall resistance

↓bleeding time

↑platelet adhesiveness

↑rate of release of intrinsic thromboplastin

DOSAGE-2-3 , 2ml ampules im/iv 1-2 hrs before operation OR

2-3 ampules following surgery followed by 1amp/2tabs every 4-6 hrs.

- VITAMIN K-(Phytomenadione)

Promotes the hepatic biosynthesis of prothrombin and factors VII , IX, X

Antidote to dental hemorrhage due to an anti coagulant.

DOSE: emergency – slow iv infusion (5mg/min)

Normally 10mg capsules, 10-20 mg oral/ in /iv sufficient

For constant bleeding- 50-150 mg or blood transfusion.

POST OPERATIVE SWELLING : DUE TO

a.EDEMA :

If the soft tissues are not handled carefully during an extraction traumatic edema may be formed.

. The use of blunt instrument, the excessive retraction of badly designed flap, or a bur becoming entangled in the soft tissues predispose to this condition.

.IF sutures are tied too tightly post operative swelling due to edema or heamatoma formation may cause sloughing of the soft tissues and breakdown of the suture line.

Usually both conditions regress if the patient uses hot saline mouth baths frequently for 2-3 days.

INFECTION

- CAUSES:

-excessive trauma.

-surgery on inflammed tissues

-general lack or resistance- e.g: in leukemia.

-hematoma formation- collection of blood in a potential tissue space which serves as a good culture medium for bacteria

-poor patient compliance- poor oral hygiene

Clinical presentation

Local involvement

- Pain
- Erythema
- Swelling
- Pus formation
- Fistula formation

Systemic involvement

- Increased temperature
- Increased pulse rate
- Increased respiratory rate
- Lymphedenopathy
- Malaise
- Increased white cell count

Management

Local measures

-Incise and drain fluctuant swelling e.g: pus or hematoma

-Maintain drainage, i.e. drain tubes or strips, warm salt water mouth rinses

-Debride necrotic tissue and irrigate area

Systemic measures (in conjunction with local treatment)

-Analgesics

-Antimicrobial chemotherapy

DELAYED WOUND HEALING:

Delayed wound healing may be related to local or systemic factors.

Local Factors:

-infection

-foreign body reaction

-poor oral hygiene

-poor compliance

-dry socket

Systemic factors:

-age - elderly patient

-drug therapy-e.g: steroids

-disease – e.g: diabetes mellitus

-deficiency – e.g: anemia

Management:

1. Removal of the cause.
2. Local debridement of the wound with patient instruction on meticulous oral hygiene.

OROANTRAL COMMUNICATIONS:

- An oroantral communication is created by the extraction of maxillary premolars or molars where :
  - The roots extend well beyond the maxillary sinus floor
  - The extraction is difficult and traumatic
  - There is a lone standing molar
  - The tooth is ankylosed
  - The periapical pathology e.g: cyst or granuloma extending beyond the sinus floor

Diagnosis:

Bubbling through the extraction site occurs when the nose is blocked under pressure. The patient cannot suck through a straw.

Management:

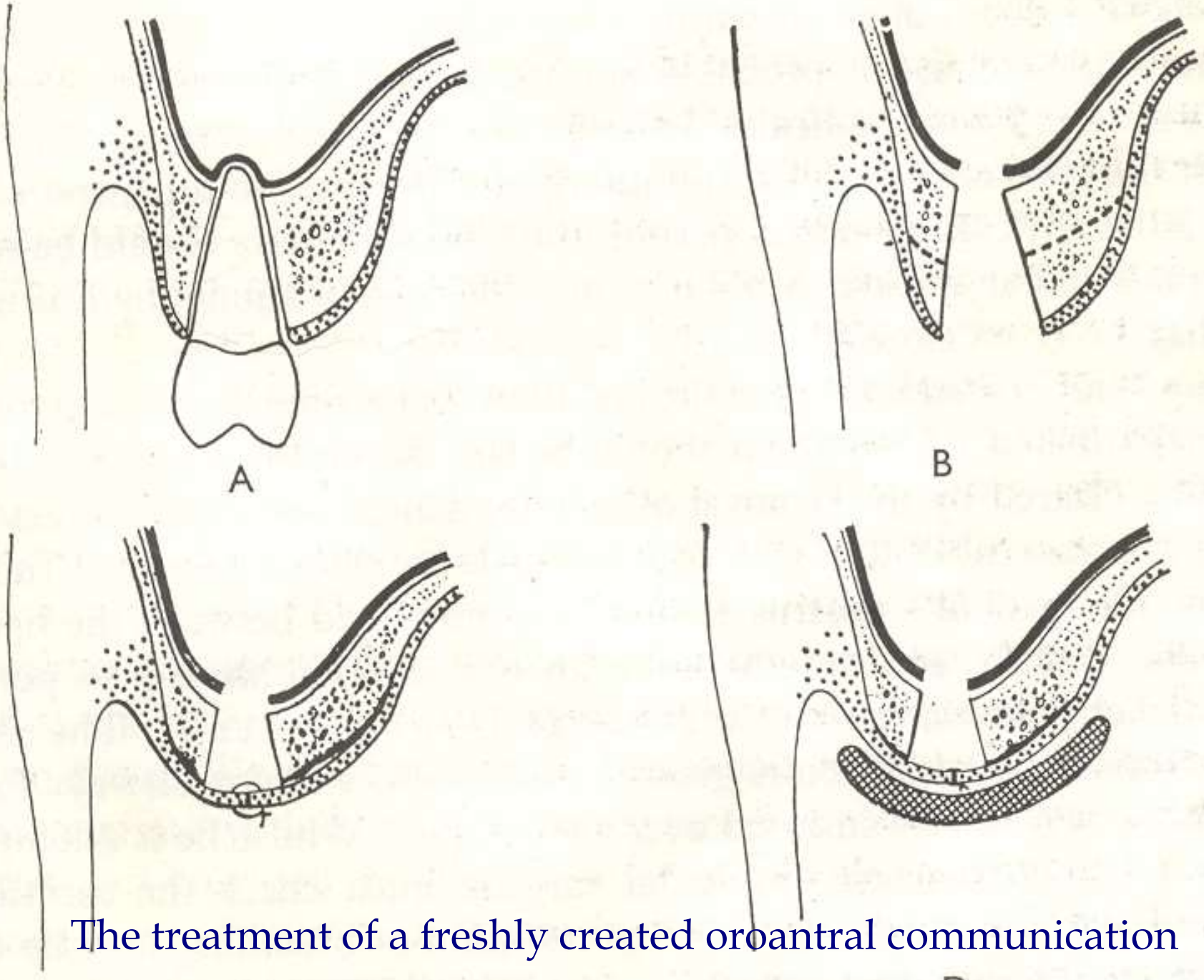
- **Immediate Rx alternatives:**

Replace the tooth and splint into position and plan to extract surgically at a later date or

Cover defect with anti septic – soaked ribbon/ gauze and remove in 2-3 weeks to allow healing by sec. intention or

Reduce bony socket edge and suture margins together

Immediate closure with a buccal advancement flap provided the sinus is clear of infection.



The treatment of a freshly created oroantral communication

Adjunctive measures:

Instruct patient not to blow nose from 7-10 days

Analgesics

Antibiotics

Nasal decongestants

Mucolytic agents

If oroantral communication fails to close in 2-3 weeks refer to specialist for surgical intervention.

Respiratory arrest

- Sk. Muscles become flaccid and pupils dilate

MANAGEMENT:

Lay the pt flat on the floor

Remove any foreign bodies by pulling the mandible upwards and forwards, to extend neck fully

Compress pt. nostril with thumb and finger, mouth-to-mouth resuscitation be performed to raise the chest every 3-4 sec.

Check carotid pulse and apex beat at regular intervals as respiratory cessation could be followed by cardiac arrest, which is more sinister.

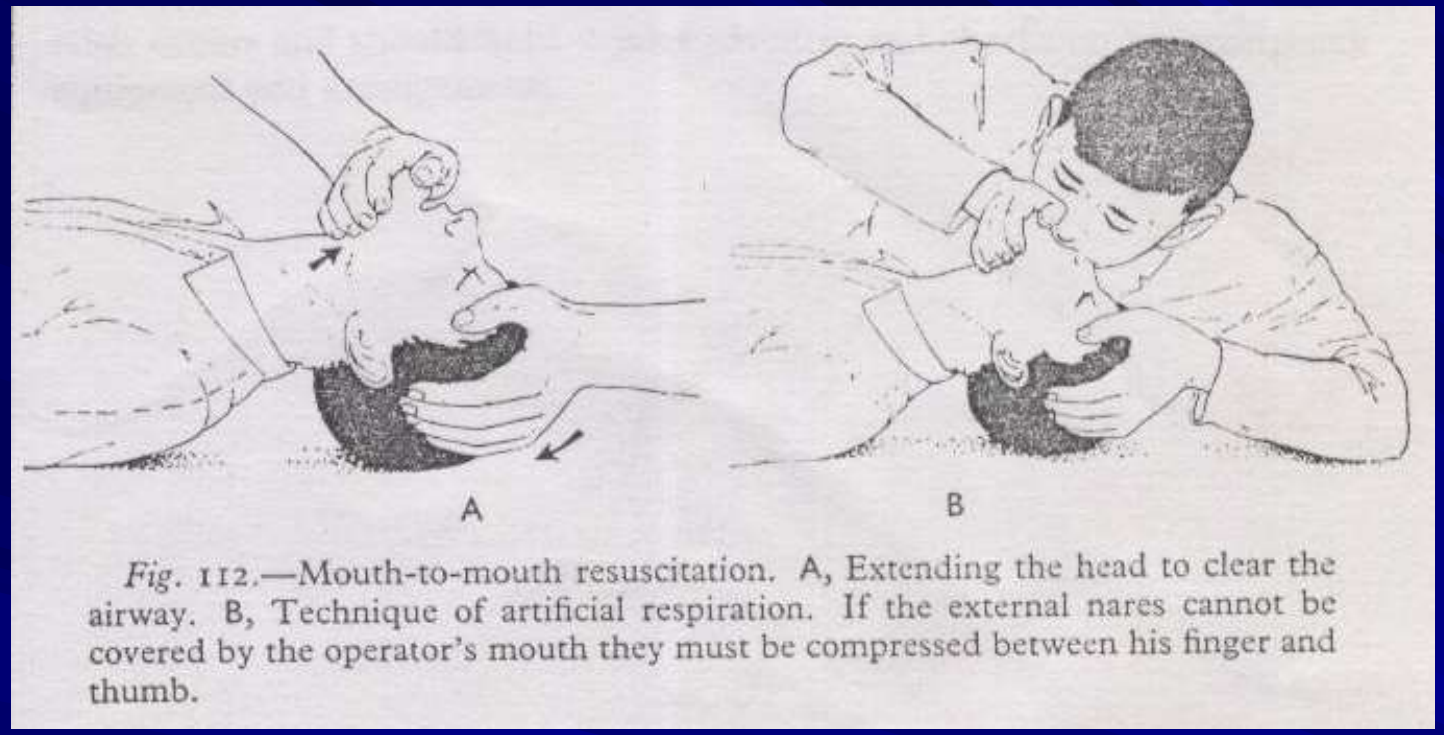


Fig. 112.—Mouth-to-mouth resuscitation. A, Extending the head to clear the airway. B, Technique of artificial respiration. If the external nares cannot be covered by the operator's mouth they must be compressed between his finger and thumb.

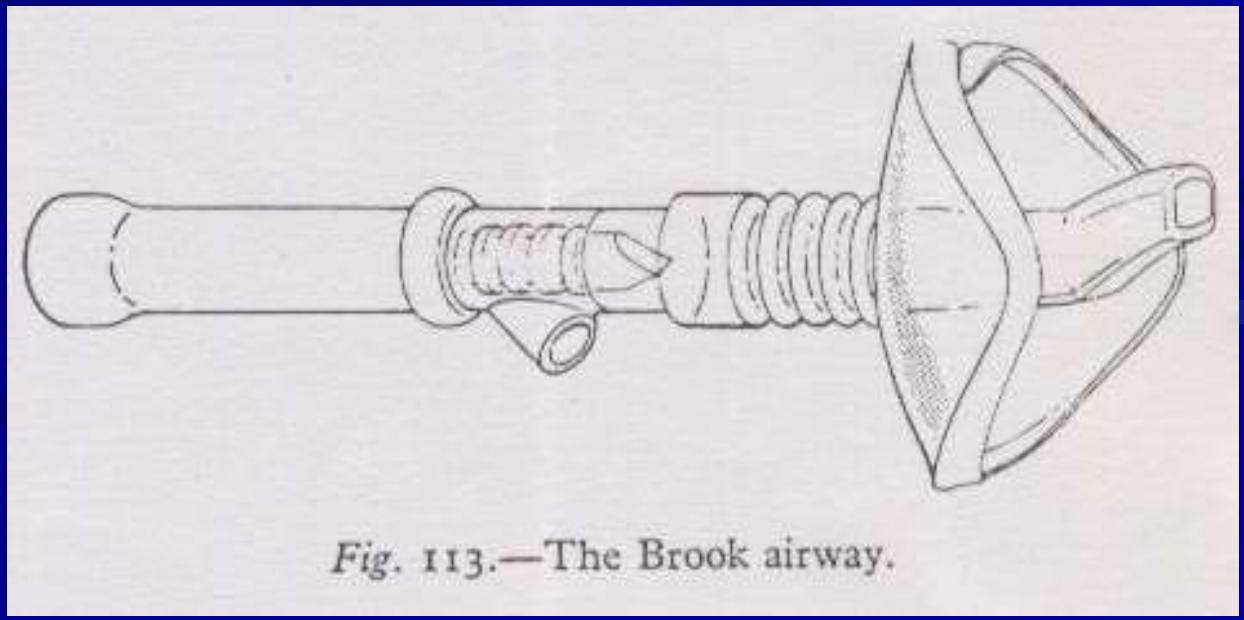
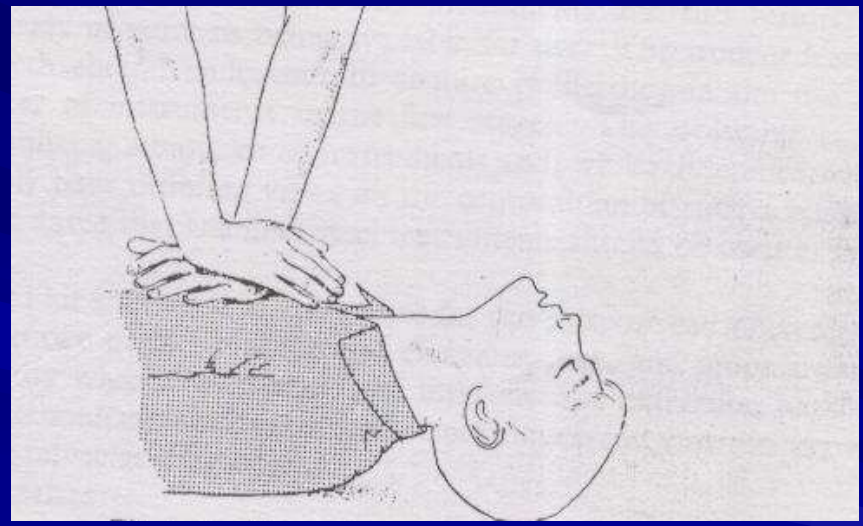


Fig. 113.—The Brook airway.

Cardiac arrest

- Unless reversed in 3mins,irreversible brain damage could occur due to cerebral anoxia.
- Pt has deathly pallor & grayness.
- Cold and sweaty skin
- Pulse and apex beat cannot be felt
- Heart sounds cannot be heard
- CPR is carried out until hospital services are available.



Anaesthetic emergencies

- May occur despite every care exercised
- Anesthetist and operator must be alertfor any warning sign
- In case of collapse STOP ANAESTHETIC IMMEDIATELY
- CPR ,respiratory relief by tracheotomy, laryngotomy must be performed.

Healing of Extraction Socket

Healing of extraction wounds

REMOVAL OF TOOTH

↓

INFLAMMATION, EPITHELIALIZATION, FIBROPLASIA AND REMODELING.

↓

HEALING BY SECONDARY INTENTION.

- Blood clot seals socket from oral environment

1st week- inflammatory stage

WBC's infilterate to break down bacterial

debris and bone fragments

Fibroplasia begins with in growth of fibroblasts and capillaries

Oral epithelium migrates down the side of the walls until it contact that of opposite side OR granulation at the bed.

Osteoclasts accumulates along the walls

2nd week:

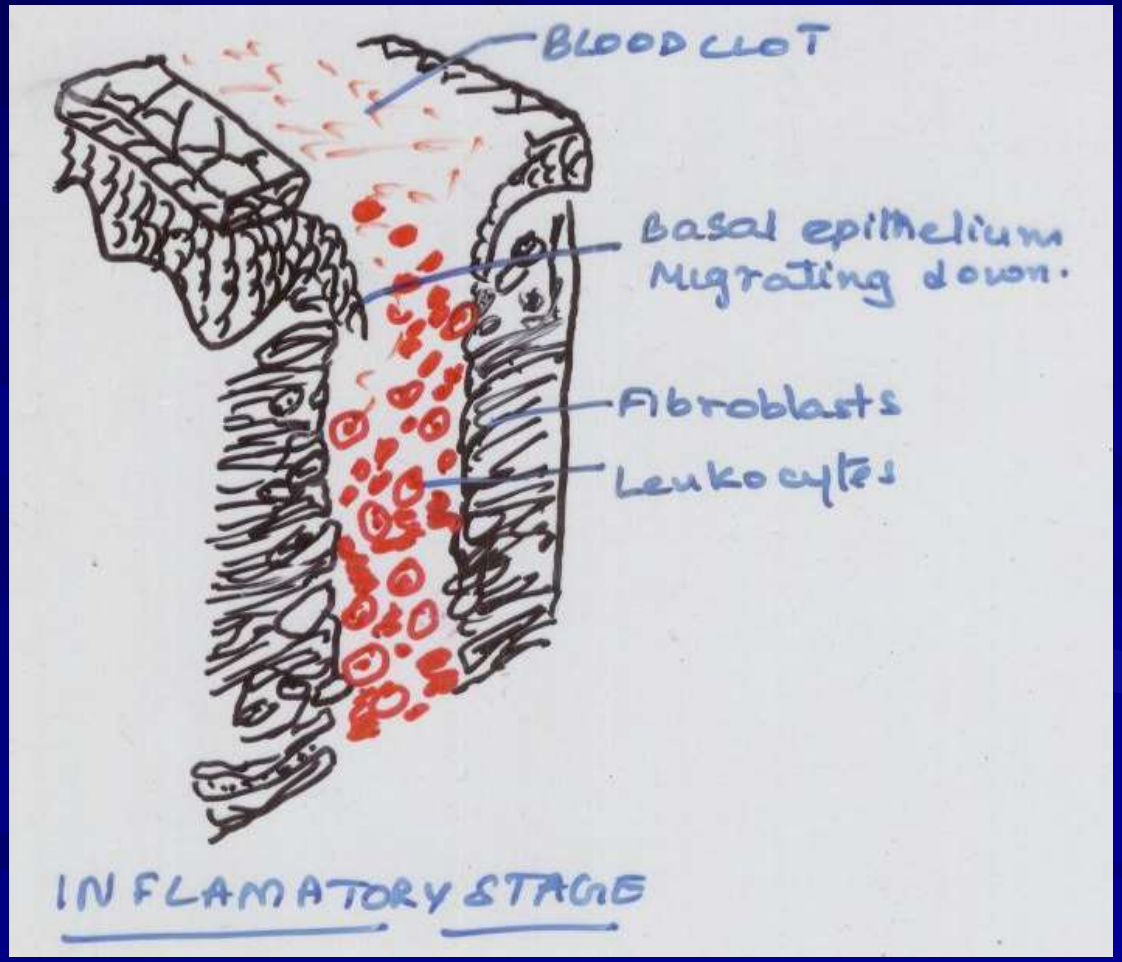
- Marked by large amount of granulation tissue filling the socket.
- Osteoid deposition along alveolar bone lining
- Continues up to 3-4 weeks
- Cortical bone resorption from crest and walls of the socket . New trabacular bone laid down across the socket.

4 - 6 weeks:

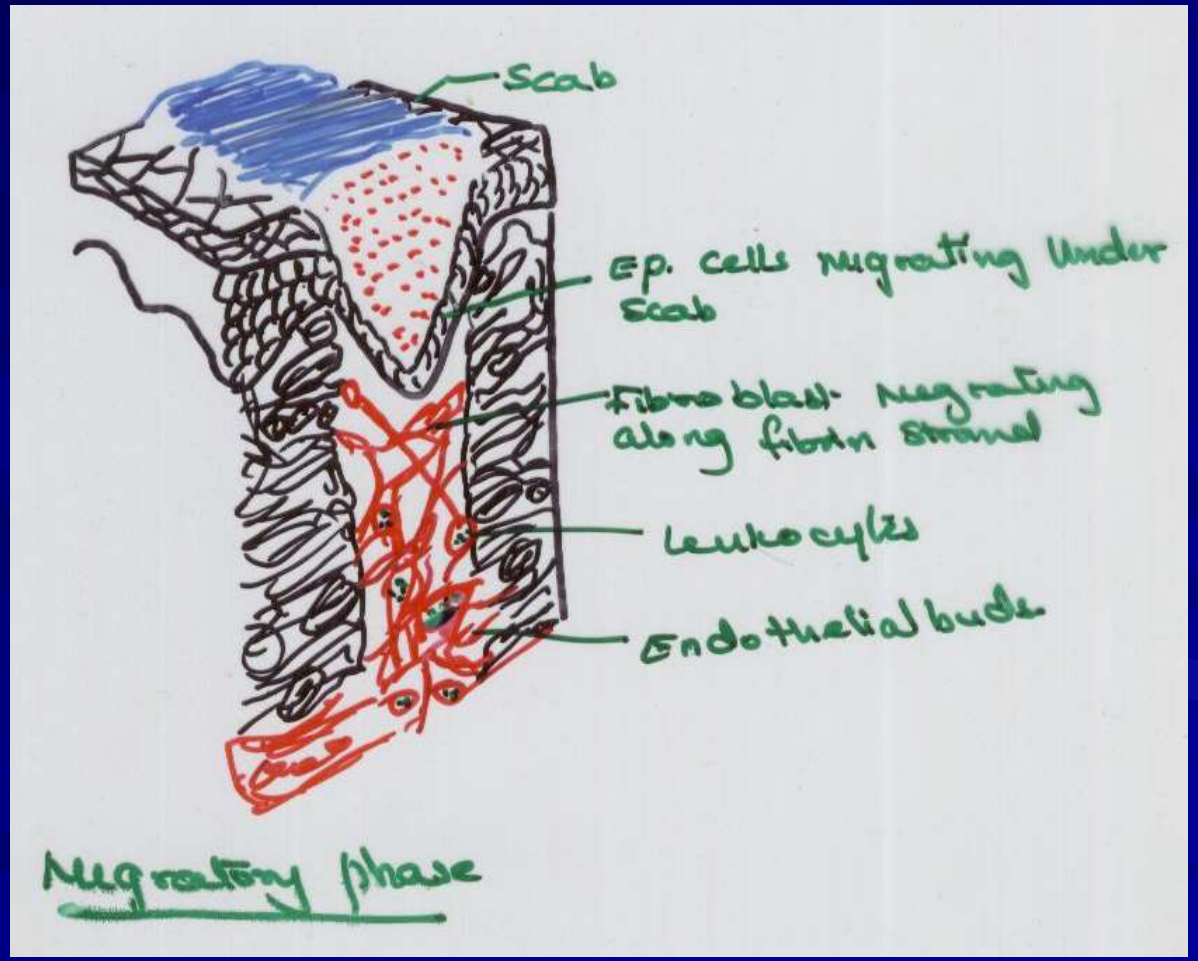
Cortical bone lining the socket is fully resorbed and seen radio graphically as loss of lamina dura.

The epithelium moves towards the crest and levels with adjacent crestal gingiva.

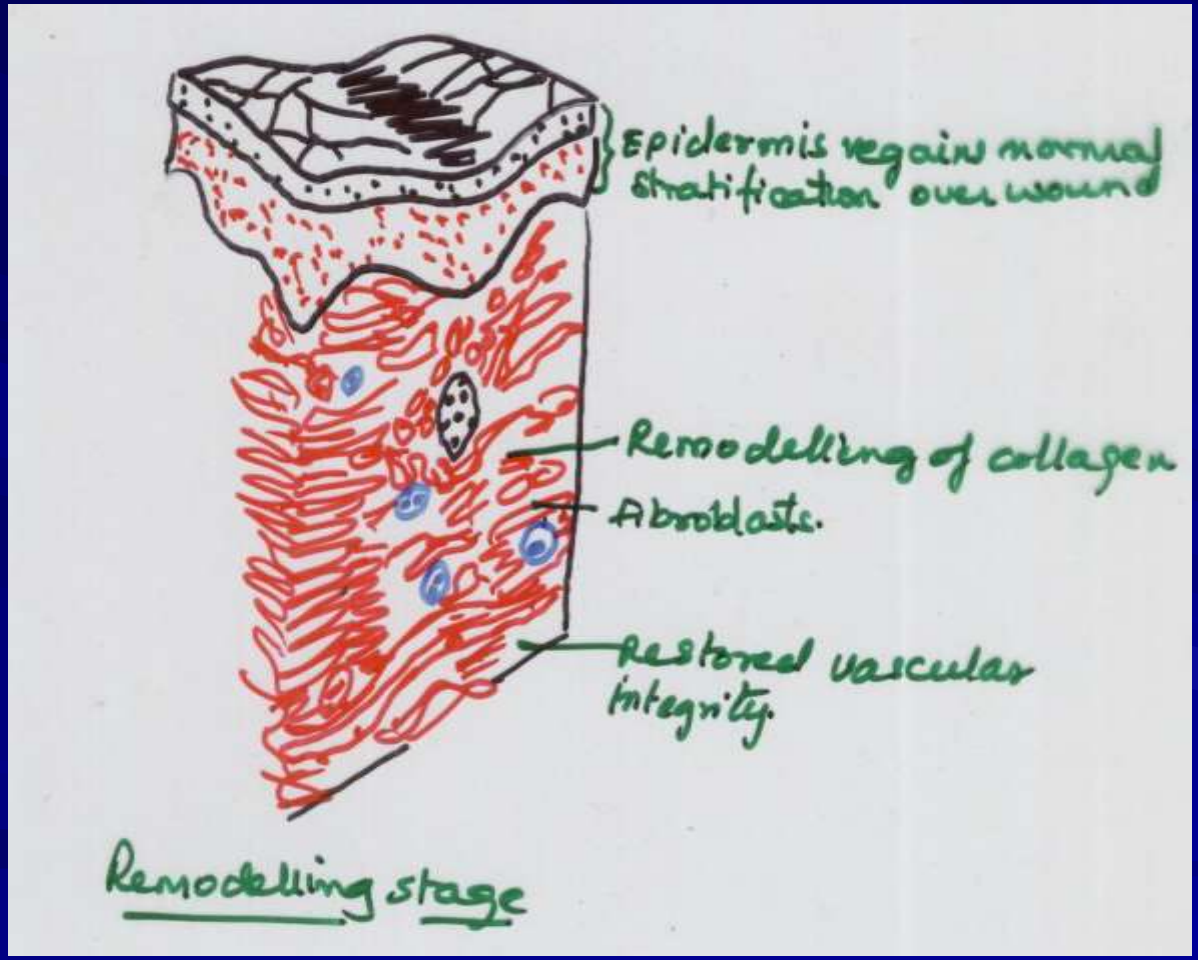
Inflammatory stage



Migratory phase



Remodeling stage



THANK YOU