Other Predisposing Factors in the Etiology of Periodontal Disease.

Some tortures are physical…
And some are mental……,
But the one that is both
Is dental.

~Ogden Nash

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Introduction

- *"Iatrogenic"*- derived from Greek word.

- **Iatro** -physician ,**Genic** or Gennan -induced by or produced by. This term was coined by Dr. David Kuhl.

- Any trauma that is induced in a patient by a physicians activity , manner or therapy –*Iatrogenic trauma*

•Inadequate dental procedures that contribute to the deterioration of the periodontal tissues are referred to as *iatrogenic factors.*

The various iatrogenic factors contributing in the etiology of periodontal disease are occurring during

- Restorative therapy
- Endodontic therapy
- Prosthetic therapy
- Orthodontic therapy
- Periodontal therapy
- Oral Surgery

Restorative Dentistry Procedures

•Characteristics of dental restorations that are important to the maintenance of periodontal health include:

- location of gingival margin for the restoration
- space between margin of the restoration and the unprepared tooth
- contour of restorations
- occlusion
- Materials
- restorative procedure itself

Margins of Restorations :

Overhanging margins contribute to the periodontal disease by :

1) Changing the ecologic balance of the gingival sulcus to an area that favors the growth of disease associated organisms (predominately gram negative anaerobic species) .

2) Inhibiting the patient's access to remove accumulated plaque.

- The location of the gingival margin for a restoration is directly related to the health status of adjacent periodontal tissues.

➢ Subgingival margins -large amounts of plaque, more severe gingivitis, and deeper pockets & rate of gingival fluid flow increases .

➢ Margins placed at the level of the gingival crest will induce less severe inflammation,

➢ Supragingival margins -a degree of periodontal health similar to that seen with non-restored surfaces.

- Roughness in the sub gingival area is considered to be a major contributing factor to plaque build up and subsequent gingival inflammation.

- The sub gingival zone is composed of :

❖The margin of the restoration

❖Luting material

❖The prepared as well as the unprepared tooth surface

Sources of marginal roughness include

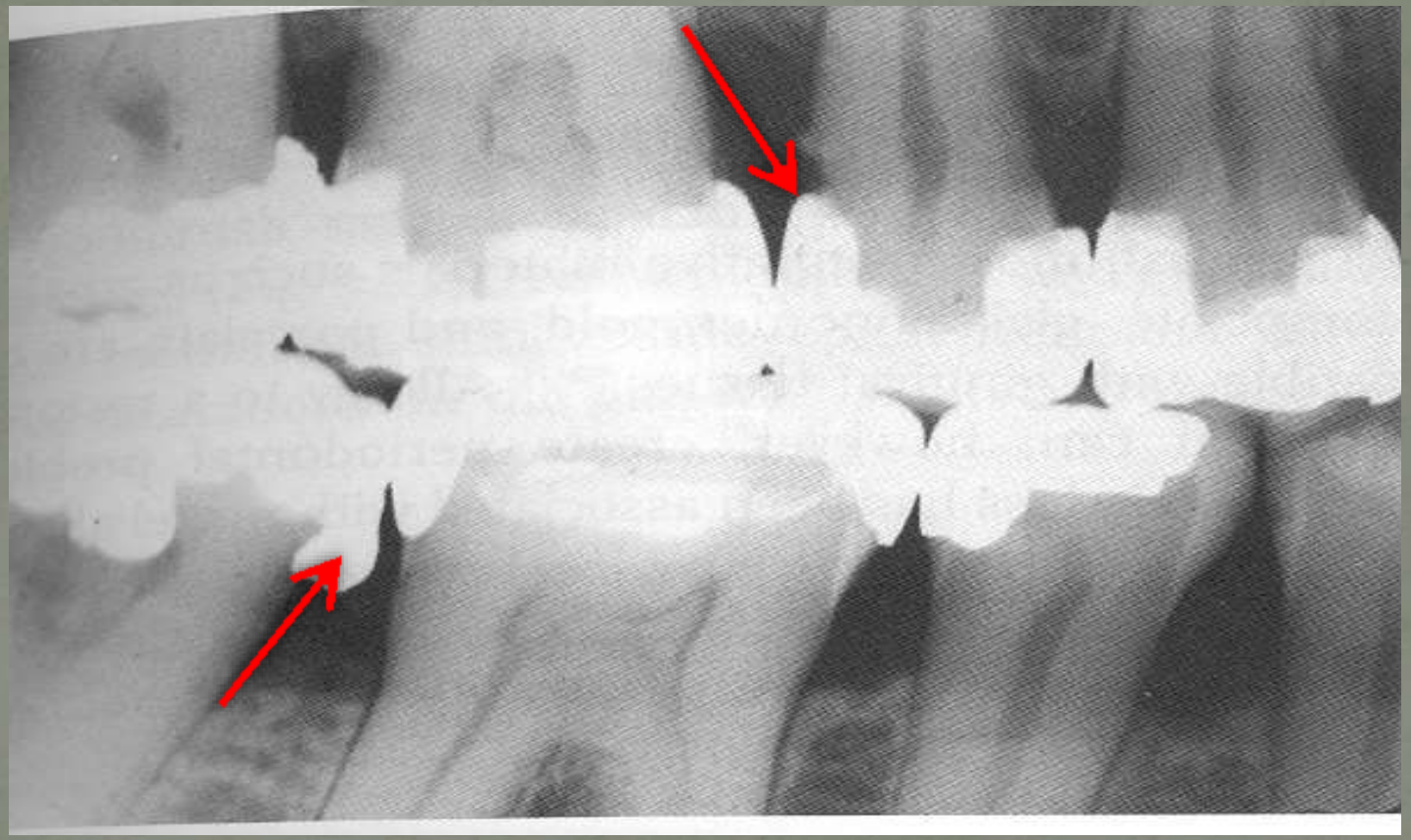
• grooves and scratches in the surface of carefully polished acrylic resin, porcelain, or gold restorations;

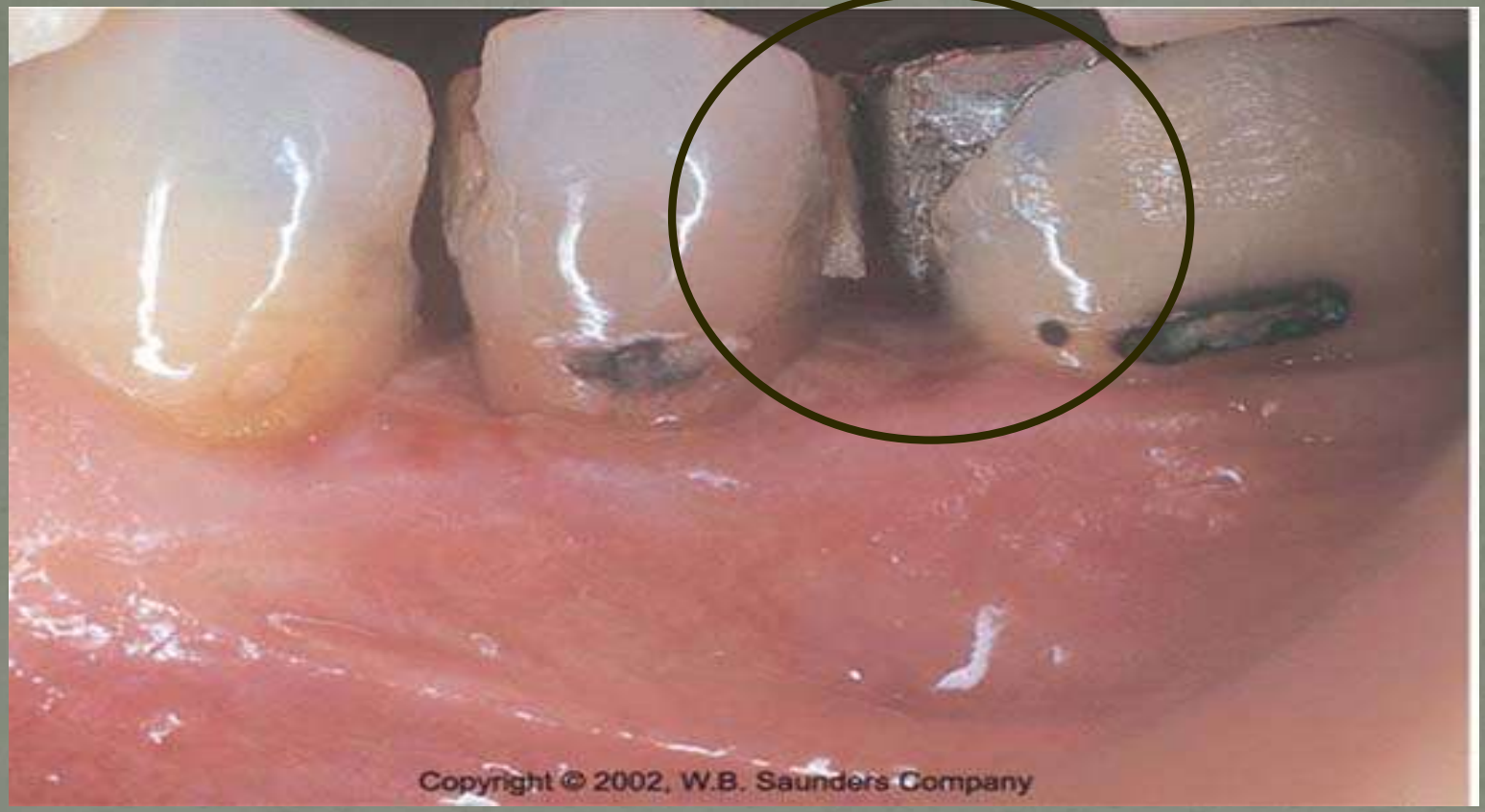
• separation of the restoration margin and luting material from the cervical finish line,

•dissolution and disintegration of the luting material between the preparation and the restoration

•inadequate marginal fit of the restoration.

MULTIPLE OVERHANGING RESTORATION

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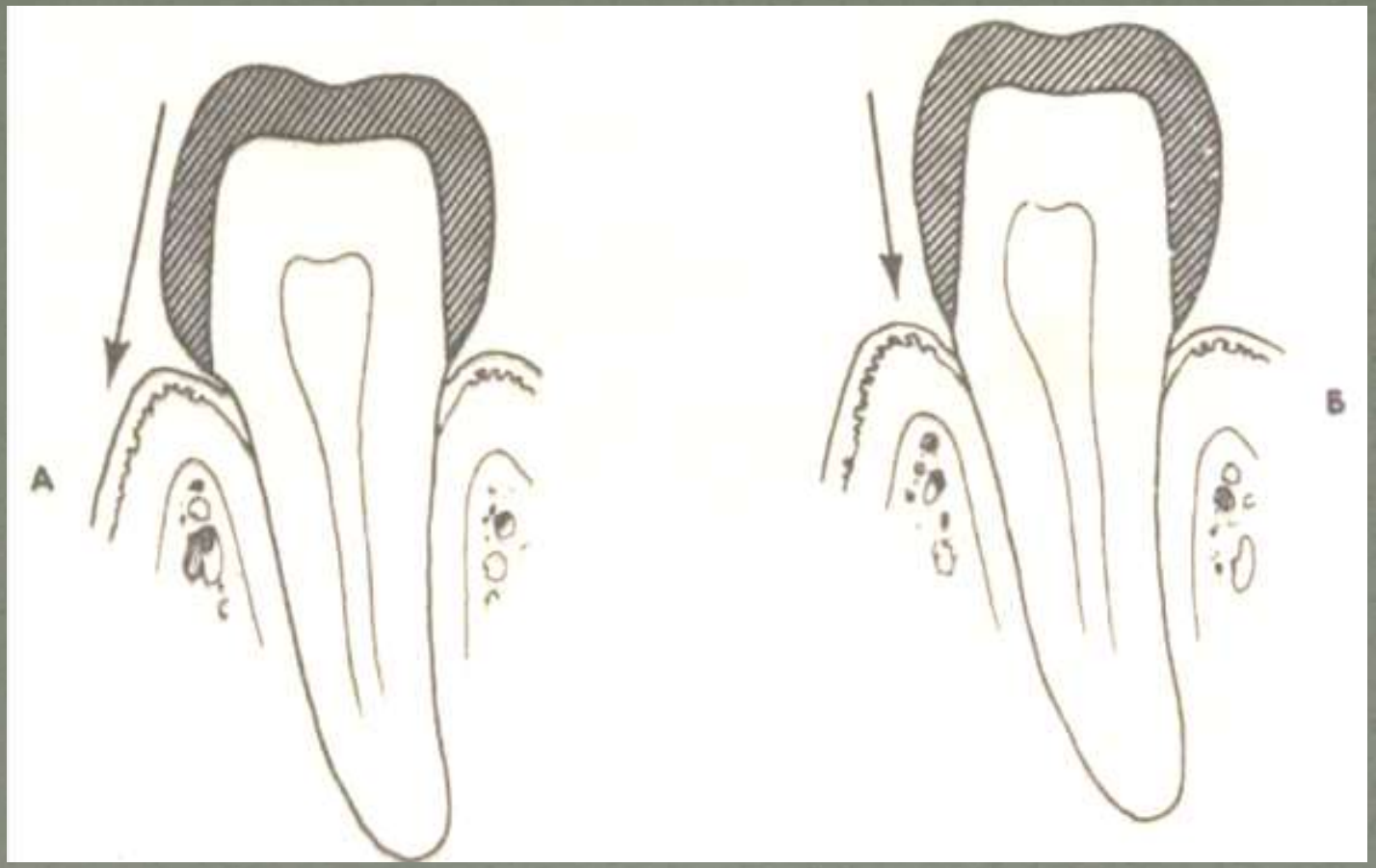
- Restorations that fail to reestablish adequate interproximal embrasure spaces are associated with papillary inflammation.
- The contour of the occlusal surface as established by the marginal ridges and related developmental grooves normally serves to deflect food away from the interproximal spaces.
- The integrity and location of the proximal contacts along with the contour of the marginal ridges and developmental grooves typically prevent interproximal food impaction.



A. over contour that tends to accumulate plaque below the height of contour (plaque harbor) B. under contoured crown without deflecting contours may lead to food impaction

- ***Food impaction*** is the forceful wedging of food into the periodontium by occlusal forces.

- As the teeth wear down, their originally convex proximal surfaces become flattened and the wedging effect of the opposing cusp is exaggerated.

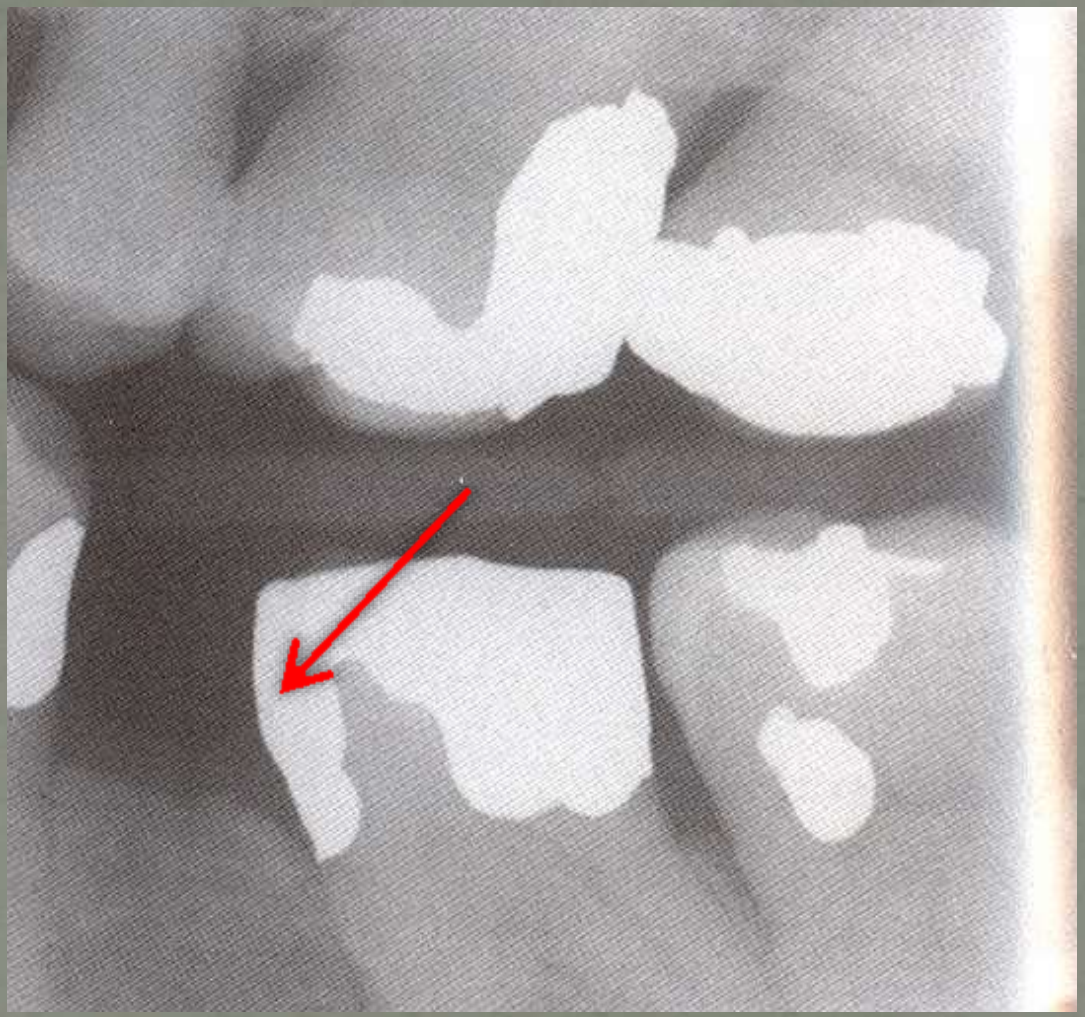
- Cusps that tend to forcibly wedge food into interproximal embrasures are known as ***plunger cusps***.

•Occlusal interferences, grasping contacts, plunger cusps and off-axis forces can produce trauma from occlusion, leading to pain, tooth mobility and gingival recession along with the existing plaque .

- Plunger cusp effect may also be observed when missing teeth are not replaced and the proximal contacts of adjacent teeth is altered.

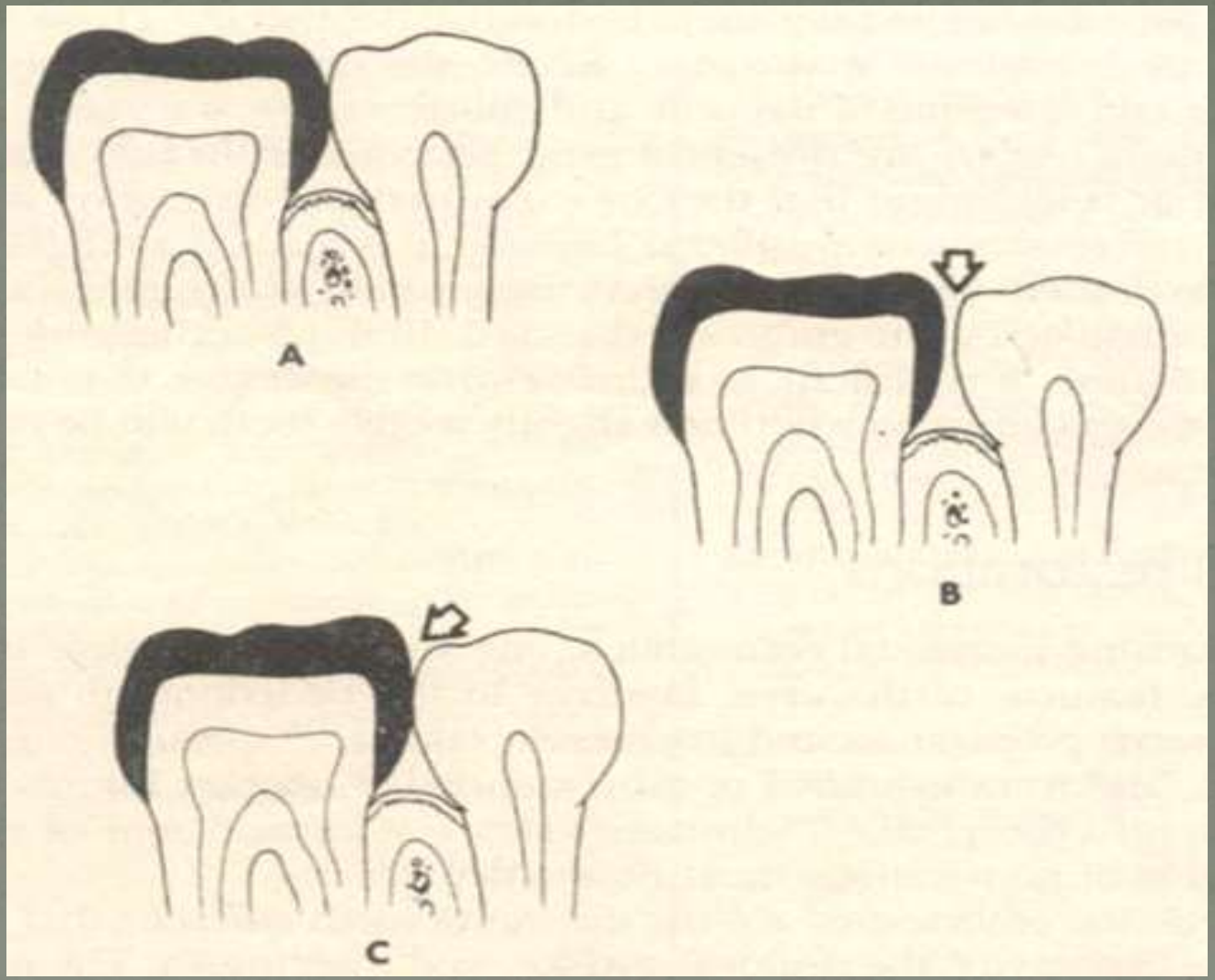
- An intact, firm proximal contact precludes the forceful wedging of food into the inter proximal embrasure space, whereas a light or open contact is conducive to impaction.

OPEN CONTACT AND MARGINAL RIDGE DISCREPENCY



Classification of Factors leading to food impaction (Hirschfeld et al) :

- Class I: uneven occlusal wear
- Class II: opening of the contact point as a result of loss of proximal support or from extrusion
- Class III: congenital morphologic abnormalities
- Class I V: Improperly constructed restorations (iatrogenic)



A. correctly placed contacts B. open contacts conducive to food impaction C. unequal height of the marginal ridges, which guides food into the occlusal embrasure and may cause the contact to open

Sequel of Food Impaction

Feeling of pressure or urge to dig

↓

Vague pain radiating deep in the jaws

↓

Gingival bleeding

↓

Gingival recession

↓

Periodontal abscess

↓

Varying degree of periodontal inflammation with tooth elevation in the socket

↓

Destruction of alveolar bone

Root caries

Materials

- **Restorative materials**
- **Pontic materials**

- In general, restorative materials are not in themselves injurious to the periodontal tissues. One exception to this may be self-curing acrylics.

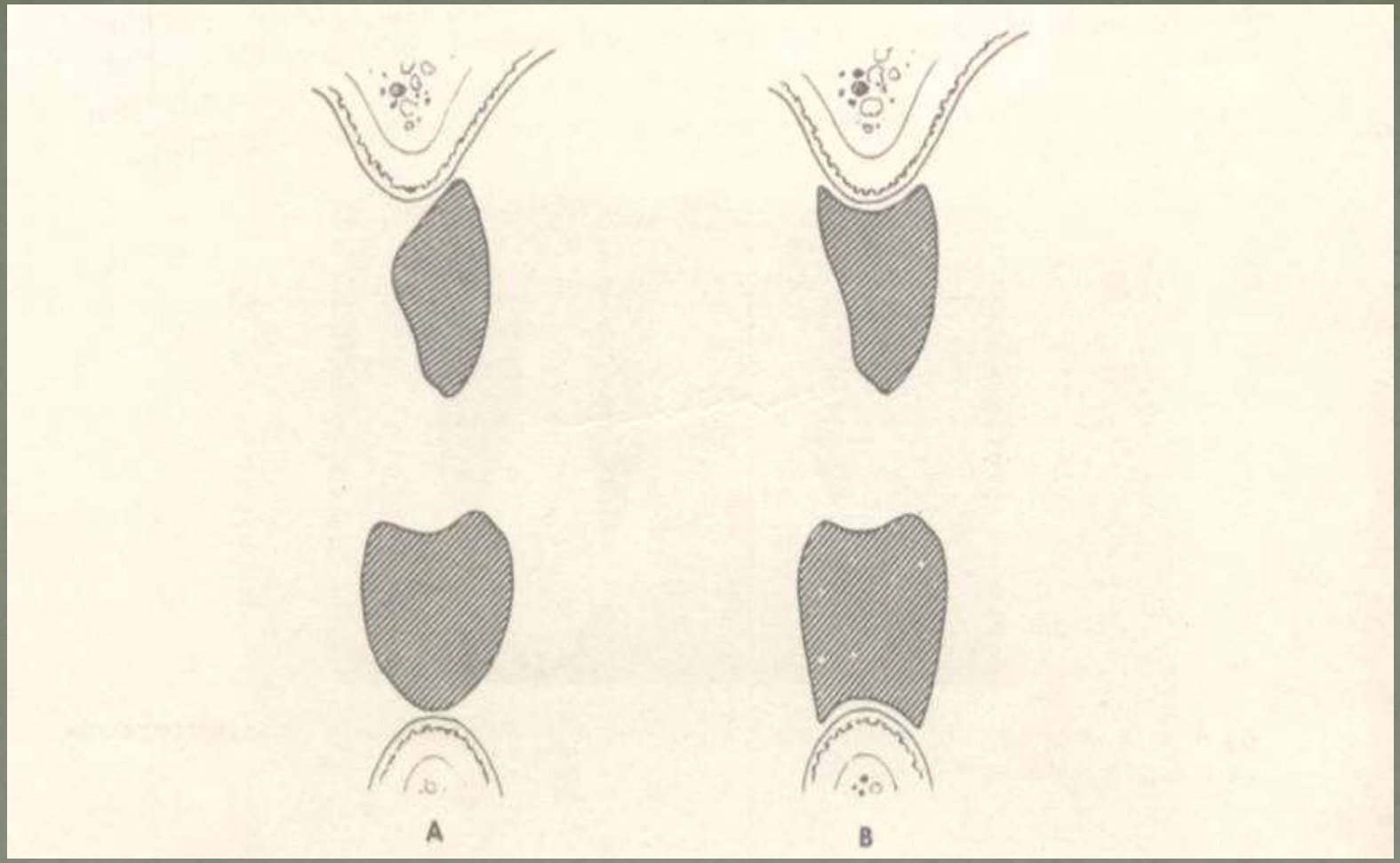
- Plaque that forms at the margins of restorations is similar to that founded on adjacent non-restored tooth surfaces.

- The composition of plaque formed on all types of restorative materials is similar, with the exception of that formed on silicate.

- Although surface textures of restorative materials differ in their capacity to retain plaque, all can be adequately cleaned if they are polished and accessible to methods of oral hygiene.

- The under surface of pontics in fixed bridges should barely touch the mucosa.

- Access for oral hygiene is inhibited with excessive pontic to tissue contact, thereby contributing to plaque accumulation that will cause gingival inflammation and possibly formation of pseudo pockets .



A. proper construction of Pontic B. improper construction of Pontic, a saddle that makes cleaning difficult

Pontics materials

Placed over the tissue : great area of plaque accumulation.

Leave a slight clearance : patient can get it to clean.

-Glazed porcelain: best tissue response.

-More important how the prosthesis is constructed rather than what material it is made of .

Crown margins

Four factors

- Fit
- location
- smoothness
- Material

Rough margins : hard to keep clean

Zinc phosphate cement - irritation & plaque accumulation.

Long span bridge impinging on tissues

Violation of biological width

The dimension of space that the healthy gingival tissues occupy above the alveolar bone is the ***biologic width*** .The connective tissue attachment occupies 1.07mm of space above the crest of the alveolar bone and the junctional epithelium below the base of the gingival sulcus occupies another 0.97 mm of space above the connective tissue attachment.

• Restorations may need to extended gingivally to create adequate resistance and retentive forms in the preparation.

• When the restoration margin is placed too far below the gingival crest ,it impinges on the gingival attachment apparatus and creates a violation of biologic width.

• One possibility is that bone loss of an unpredictable nature & gingival tissue recession occur as the body attempts to create room between the alveolar bone and the margin to allow space for tissue reattachment.

• This is more likely to occur in areas where the alveolar bone surrounding the tooth is very thin.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Damage resulting from Prosthetic Therapy

Design of Removable Partial Dentures

- Investigations have shown that after the insertion of partial dentures, the mobility of the abutment teeth, gingival inflammation, and periodontal pocket formation increases.

- Partial dentures favor the accumulation of plaque, particularly if they cover the gingival tissue.

- Partial dentures that are worn during both night and day induce more plaque formation than those worn only during the daytime.

•These observations emphasize the need for careful and personalized oral hygiene instruction to avoid harmful effects of partial dentures on the remaining teeth and periodontium.

•The presence of removable partial dentures induces not only quantitative changes in dental plaque but also qualitative changes, promoting the emergence of spirochetal microorganisms.

Inflammation of the palatal mucosa due to an ill fitting denture

Poorly designed dentures causes damages to

1) Mucous membrane
2) Gingival margins specifically , leading in time to severe damage to the supporting structures of the teeth.
3) Alveolar bone
4) Teeth

Damage to the mucous membrane can be caused by failing to cover sufficient area, thus overloading the area which is covered.

A loose denture causes frictional damage by movement.

RPD with the clasp impinging on the gingival margin and a rough class V filling favoring plaque accumulation

Potential Complications to Endodontic Therapy

- As with any therapeutic modality, complications may arise during endodontic treatment.
- Those of iatrogenic nature such as perforations of the floor of the pulp chamber or the root during access, can occur during instrumentation or preparation for a post.
- These accidents may result in periodontal defects, and treatment should be instituted as soon as the perforation occurs.

Improper obturation

Periodontal Complications Associated with Orthodontic Therapy

Orthodontic therapy may affect the periodontium by

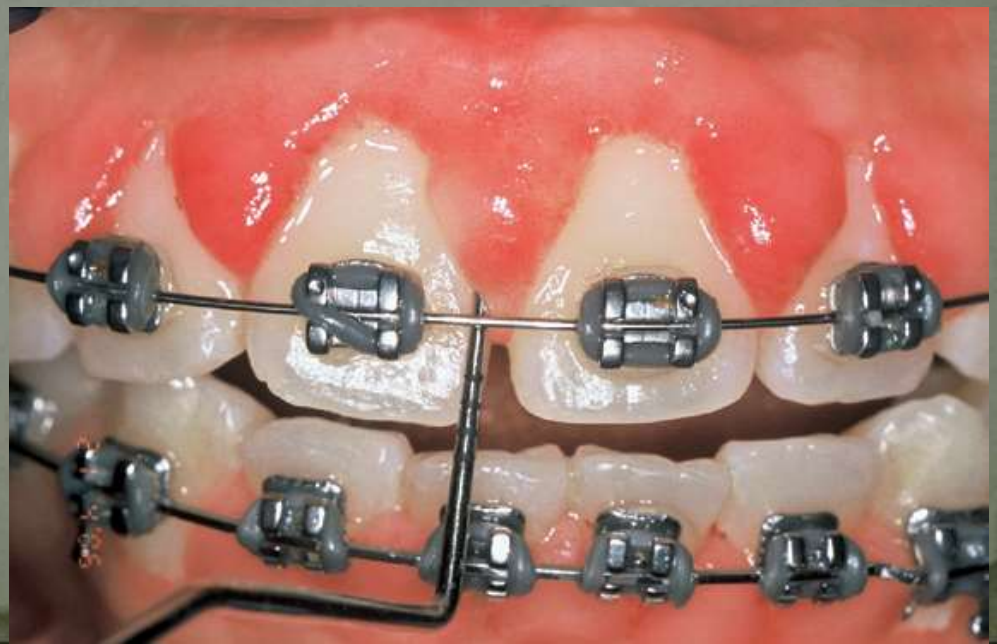
- favoring plaque retention,
- by directly injuring the gingiva as a result of over extended bands, and
- by creating excessive forces, unfavorable forces, or both on the tooth and supporting structures .

Plaque Retention and Composition

Orthodontic appliances not only tend to retain bacterial plaque and food debris, resulting in gingivitis, but also are capable of modifying the gingival ecosystem.

An increase in *Prevotella melaninogenica, Prevotella intermedia, and Actinomyces odontolyticus* and a decrease in the proportion of facultative microorganisms was detected in the gingival sulcus following the placement of orthodontic bands.

More recently, ***AAcomitans*** was found in at least one site for 85% of children wearing orthodontic appliances compared with only 15% of the control subjects who were positive for *AAcomitans*.



Irritation from Orthodontic bands

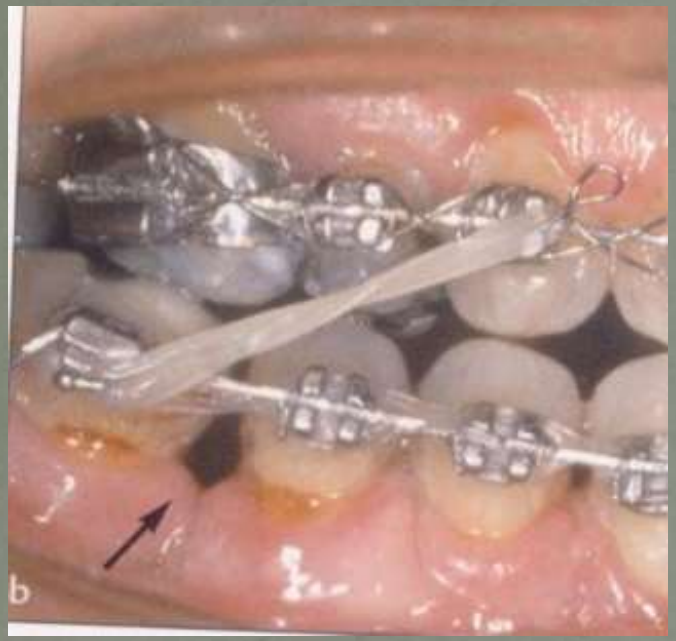
- Orthodontic treatment is often started soon after eruption of the permanent teeth, when the junctional epithelium is still adherent to the enamel surface.

- Orthodontic bands should not be forcefully placed beyond the level of attachment because this will detach the gingiva from the tooth and result in apical proliferation of the junctional epithelium increasing the chances of recession.

Use of excessive unfavorable forces produces root resorption and necrosis of the periodontal ligament with resultant tooth mobility and pain.

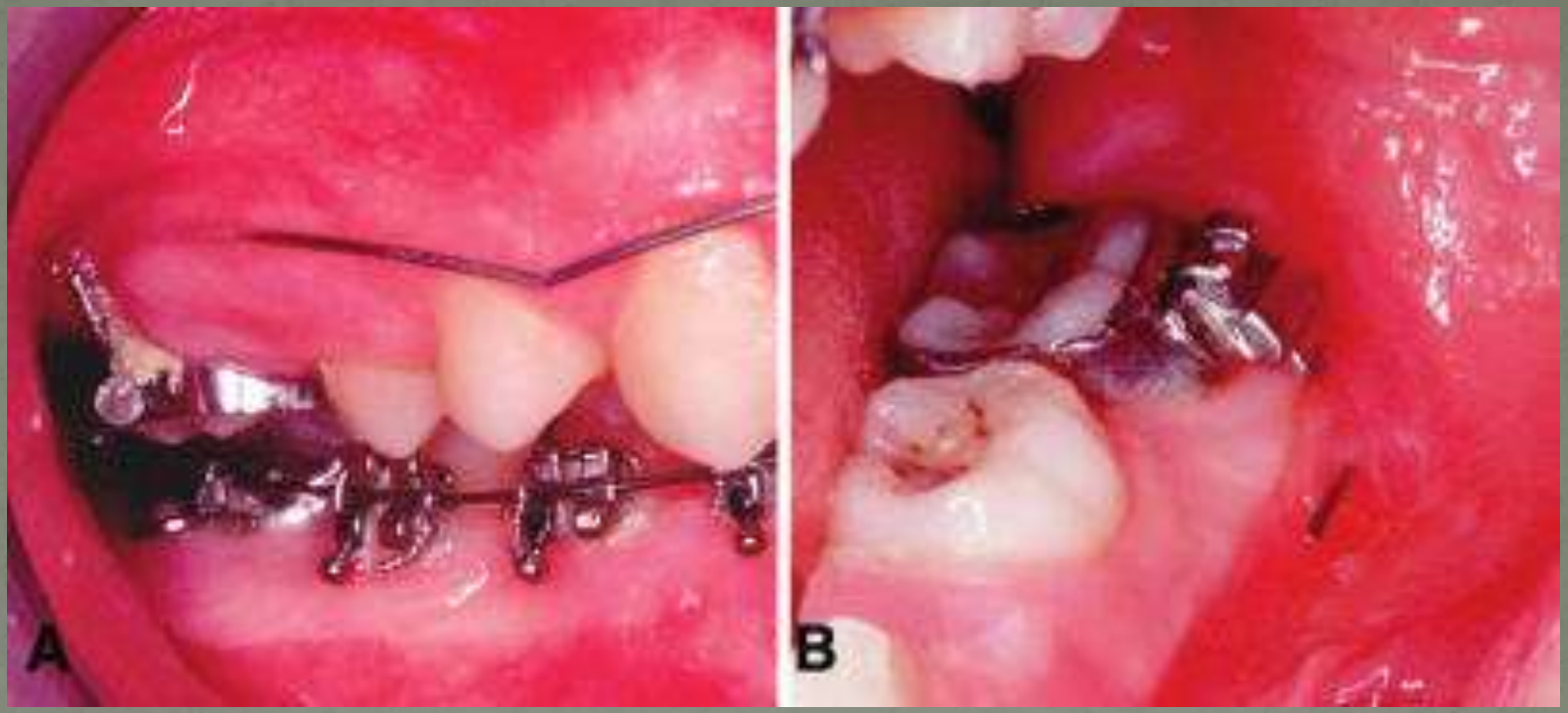
Labial movement of teeth may cause fenestrations and dehiscence in the buccal alveolar bone due to thin cortical plate and gingiva (washboard gingiva).

Improper post orthodontic care and/or retention leads to opening of extraction spaces. The gap created causes food impaction and pocket formation.



. Interdental fold following orthodontic molar extraction and space closure B. bone loss following space closure

Enlargement following ortho treatment



Burying of utility arch in buccal gingival invagination of an apically positioned molar tube in the gingiva

- It has been reported that the dentoalveolar gingival fibers that are located within the marginal and attached gingiva are stretched when teeth are rotated during orthodontic therapy.

- Surgical severing or removal of these gingival fibers in combination with a brief period of retention may reduce the incidence of relapse after orthodontic treatment intended to realign rotated teeth .

Miscellaneous

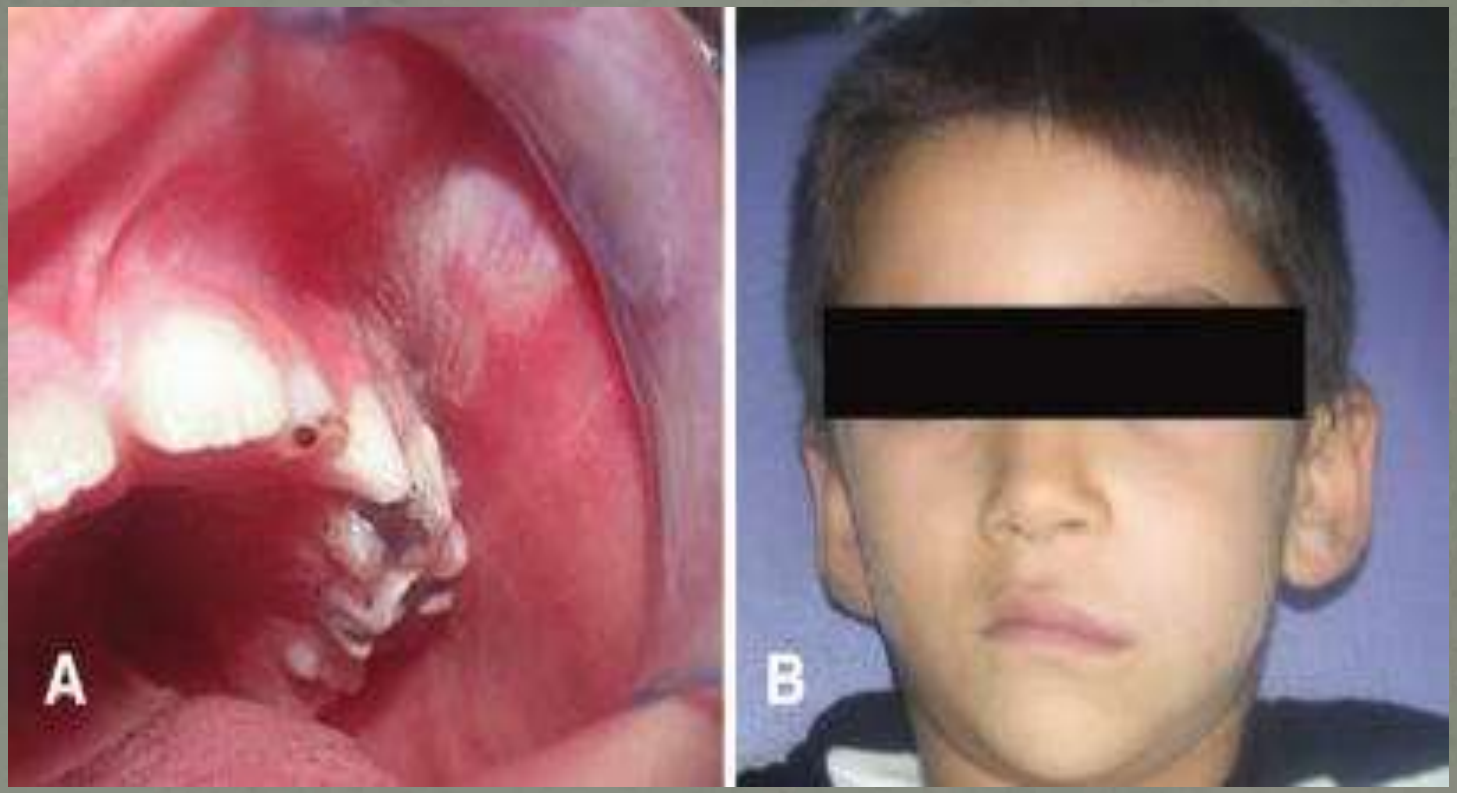
- **Chemical Irritation**

- Acute gingival inflammation may be caused by chemical irritation resulting from either sensitivity or nonspecific tissue injury.

- In allergic inflammatory states, the gingival changes range from simple erythema to painful vesicle formation and ulceration.

- Severe reactions to ordinarily innocuous mouthwashes, dentifrices, or denture materials are often explainable on this basis.

Accidental contact with Formocresol



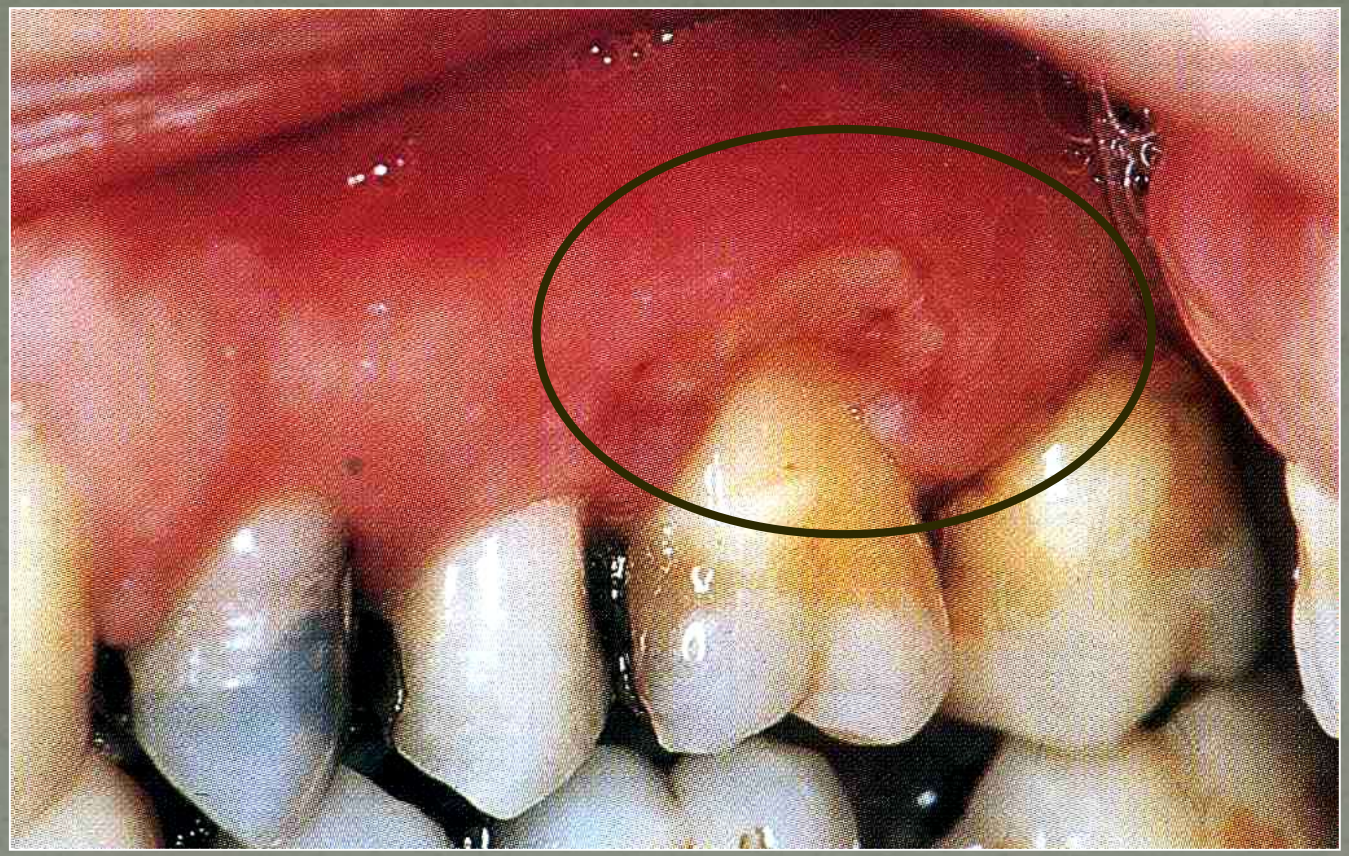
IRRIGATION RELATED MISHAPS

SODIUM HYPOCHLORITE ACCIDENT

BEFORE

AFTER

Hydrogen peroxide accidents causes rapid swelling due to the production of nascent oxygen from the solution.



Injury from a heated ultrasonic tip

Radiation Therapy

- Radiation therapy has cytotoxic effects on both normal cells and malignant cells.

- A typical total dose of radiation for head and neck tumors is in the range of 5000 to 8000 centi Grays.

- The total dose of radiation is generally given in partial incremental doses referred to as *fractionation*.

- Fractionation helps minimize the adverse effects of the radiation while maximizing the death rate for the tumor cells.

•The mucositis typically develops 5 to 7 days after radiation therapy is initiated.

•The severity of the mucositis can be reduced by asking the patient to avoid secondary sources of irritation to the mucous membrane, such as smoking, alcohol, and spicy foods.

•Use of a chlorhexidine digluconate mouthrinse may help reduce the mucositis

•Saliva production is permanently impaired when salivary glands that are located within the portal of radiation receive 6000 cGy.

•Xerostomia results in greater plaque accumulation and a reduced buffering capacity from what saliva is left.

•The use of effective oral hygiene, professional dental prophylactic cleanings, fluoride applications, and frequent dental examinations are essential to control caries and periodontal disease.

- Irradiated patients should be covered with prophylactic antibiotics before receiving appropriate nonsurgical periodontal therapy following the patient's initial recovery from radiation therapy.

- Dental and periodontal infections have the potential to be a severe risk to a patient who has been treated with head and neck radiation.

PARAFUNCTIONAL HABITS

- BRUXISM:
  - excessive grinding of teeth.
- Symptoms:
  - Hypersensitive teeth
  - Headaches
  - Tooth wear
  - Damage to restorations
- Types :
  - Sleep : nocturnal
  - Awake : mania

- Causes:
  - largely unknown
  - Subconscious habit
  - Psychosocial factors: stress

- Treatment:
  - Night guards
  - Medications
  - Hypnotherapy
  - Removal of occlusal prematurities.

ORAL HABITS

- OCCUPATIONAL:
  - Wire : Electrician
  - Nails : Cobbler
  - Needles : Tailor

- NEUROSIS:
  - Lip biting
  - Cheek biting
  - Finger nail biting

- OTHERS:
  - Pipe smoking
  - Tobacco chewing
  - Mouth Breathing
  - Tongue thrusting
  - Tooth brush trauma
  - Thumb sucking

- SELF INFLICTED INJURIES:
  - Dental piercing.

•**CONCLUSION:**

•Care should be taken during therapeutic procedures & evaluation of the procedure has to be done.

•Unnecessary mishaps should be avoided.

•Early recognition and treatment should be done. prevention should be the main goal of our public health authorities .

•The skill, experience and up to date knowledge of the dentists are the main factors to prevent the possible iatrogenic traumas.

•Although ‘to err’ is human ,careful practice is very important for the principle “Primum non nocere” (“First do no harm”).

Your patient may not always care how much *you know*, but will always want to know how much *you care.*