



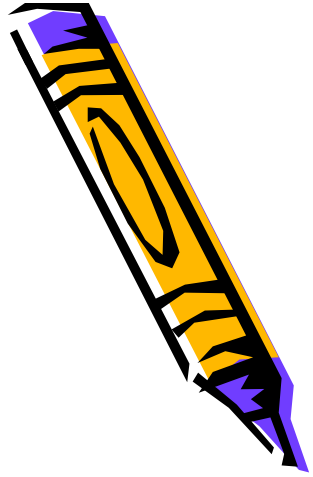
# Introduction to Operative Dentistry



DR. NASRIEN ATEYAH

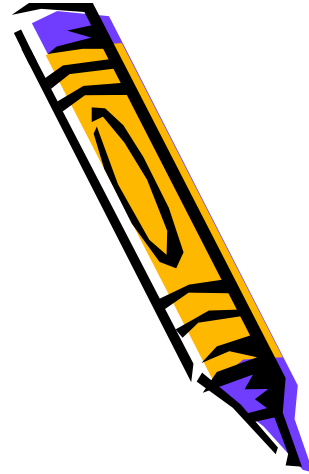
# Definition

- Operative Dentistry is the art and science of the **prevention**, **diagnosis**, **treatment** and **prognosis** of defects in the enamel and dentin of individual teeth.



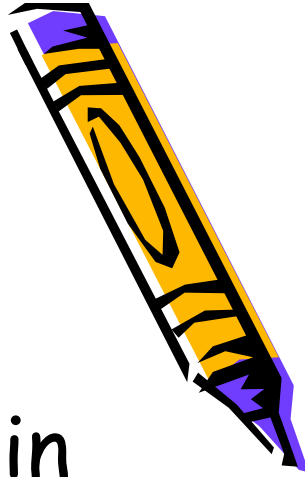
# History and Epidemiology

- Operative Dentistry was considered to be the **entirety** of the clinical practice of dentistry.
- Has been recognized as the **foundation** of dentistry and the base from which most other aspects of dentistry evolved.

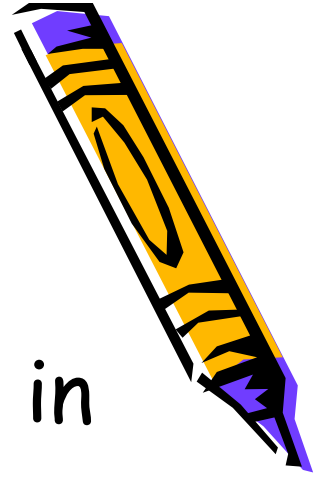


# History and Epidemiology

- In **United States**, dentistry originated in the **17<sup>th</sup> century** when several **barbers** were sent from England.
  - The practice of these early dentists consisted mainly of **tooth extraction** and practice of dentistry during the founding year was not based on scientific knowledge.



# History and Epidemiology

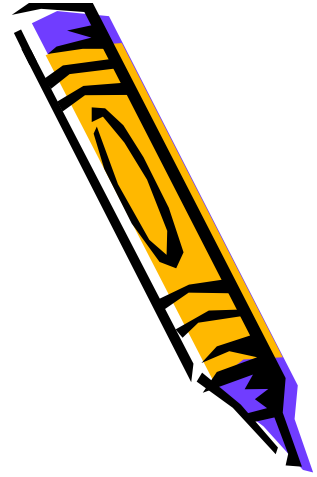


- Baltimore College of Dental Surgery in 1840 ⇒ dental education
- Harvard University in 1867 ⇒ dental program
- In France, Louis Pasteur discovered the role of microorganisms in disease ⇒ have a significant impact on the developing dental + medical profession.



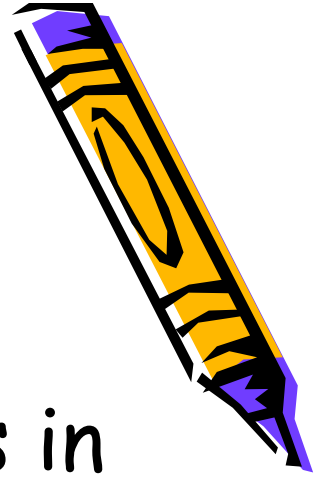
# History and Epidemiology

- In United States, **G.V. Black** became the foundation of the dental professions ⇒ related the clinical practice of dentistry to a scientific basis.
  - The scientific foundation for operative dentistry was further expanded by Black's son, **Arthur Black**.



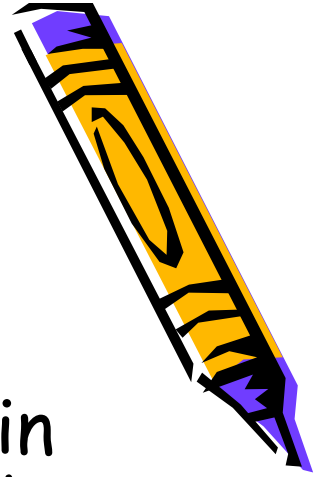
# History and Epidemiology

- Others made significant contributions in the early development of Operative Dentistry:
  - Charles E. Woodbury
    - E.K. Wedelstaedt
      - Waldon I. Ferrier
  - George Hollenback



# History and Epidemiology

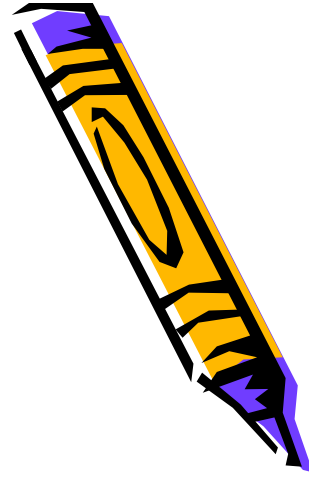
- Operative Dentistry plays an important role in enhancing dental health and new branched into dental specialities.
- Today, O.D. continues to be a **most active component** of most dental practice.
- Epidemiologically, demand for O.D. will not ↓ in the foreseeable future.





# Goal of Dental Sciences

- Elimination of disease and restoration of oral **health**, **form** and **function**.



# Function and Purpose



- An understanding and appreciation for **infection control**.
- Examination not only the **affected tooth** but also the **oral and systemic health** of the patient.
- A diagnosis of the dental problem and must be **correlated** with other bodily tissues.
- A treatment plan that has a potential to return the affected area to a **state of health and function**.

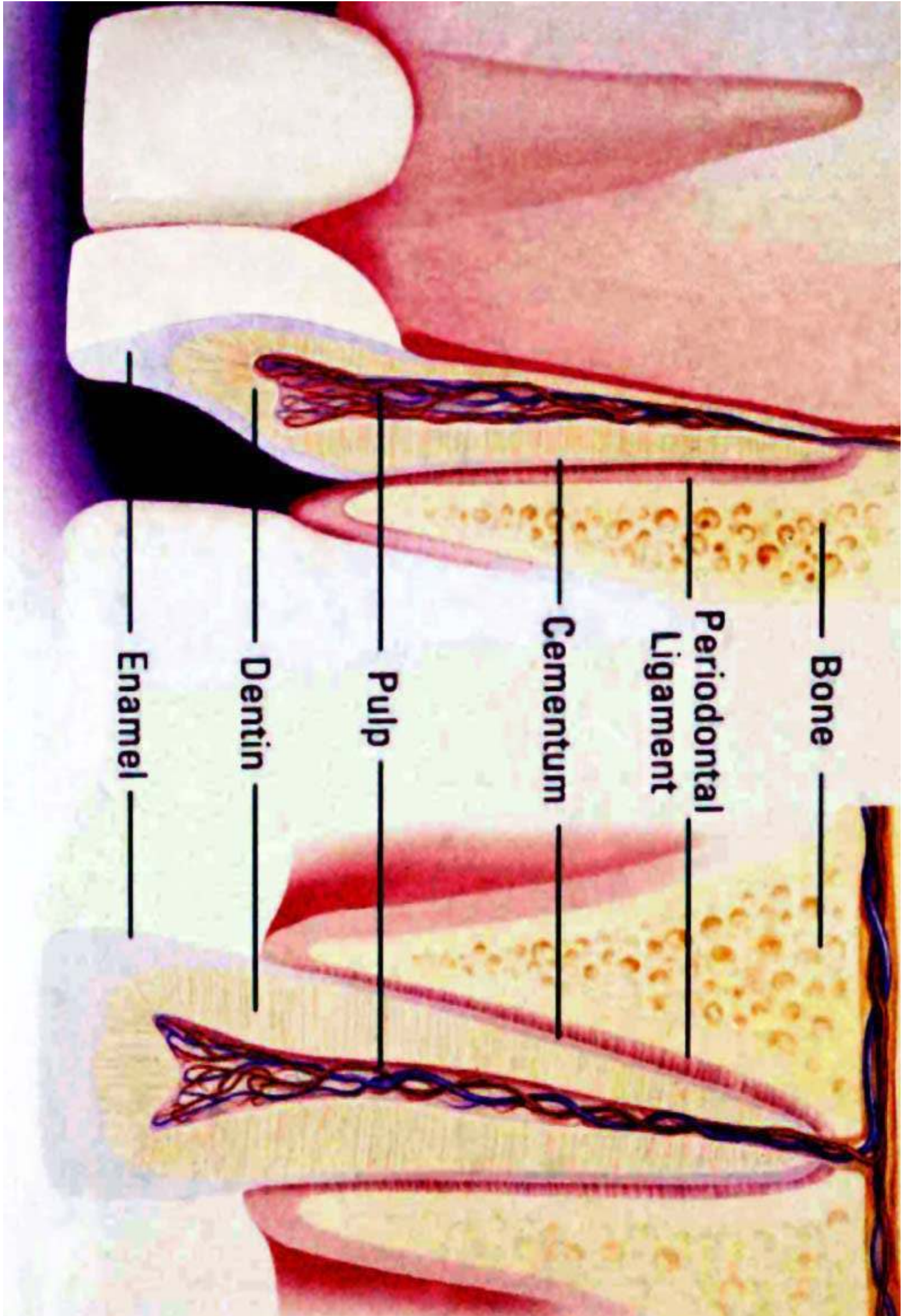


# Function and Purpose



- An understanding of **material** to be used to restore the affected area with a realization of both the material limitations and demands.
- An understanding of the **oral environment** into which the restoration will be placed.
  - To understand the biological basis and function of the various **tooth components** and **supporting tissues** although the knowledge of correct **dental anatomy**.





\_\_\_\_\_ Bone \_\_\_\_\_

\_\_\_\_\_ Periodontal \_\_\_\_\_

Ligament

\_\_\_\_\_ Cementum \_\_\_\_\_

\_\_\_\_\_ Pulp \_\_\_\_\_

\_\_\_\_\_ Dentin \_\_\_\_\_

\_\_\_\_\_ Enamel \_\_\_\_\_

# Purposes of Operative Dentistry

## *DIAGNOSIS*

Proper diagnosis is vital for treatment planning.

## *PREVENTION*

To prevent any recurrence of the causative disease and their defect.

## *INTERCEPTION*

Preventing further loss of tooth structure by stabilizing an active disease process.

## *PRESERVATION*

Preservation of the vitality and periodontal support of remaining tooth structure.

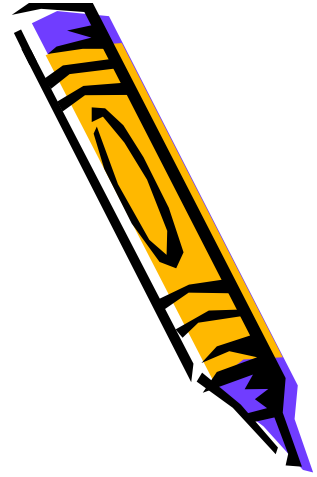
## *RESTORATION*

Includes restoring **form**, **function**, **phonetics**, and **esthetics**.



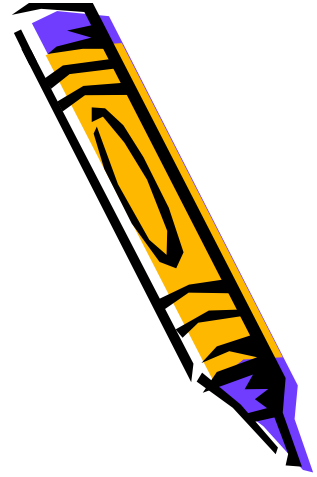
The placement of a restoration in a tooth requires the dentist to:

- Practice applied **human biology + microbiology**
- Possess highly developed **technical skills**
- Demonstrate **artistic abilities**



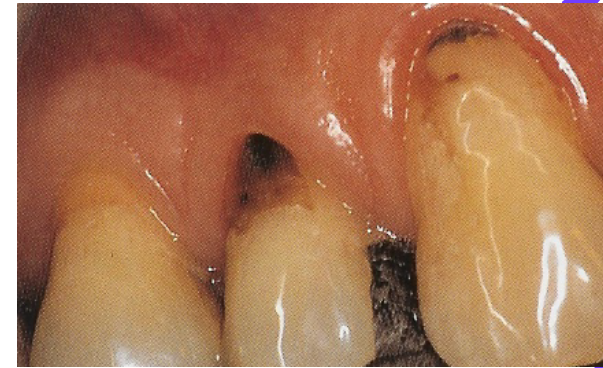
# Type of Lesion in Tooth Destruction

- Dental caries
- Tooth wear
- Trauma
- Developmental defect



# Dental Caries

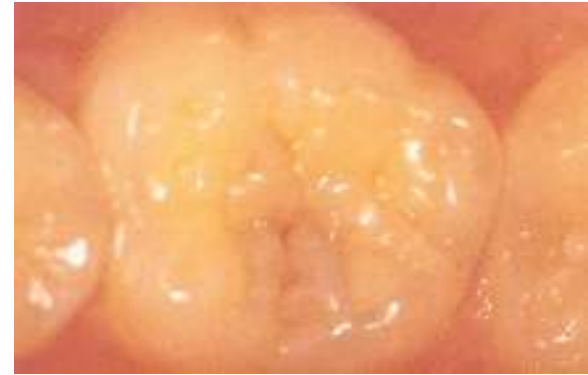
- Dental caries is an infectious microbiological disease of the teeth that results in localized **dissolution** and **destruction** of the calcified tissue, caused by the action of **microorganisms** and **fermentable carbohydrates**.



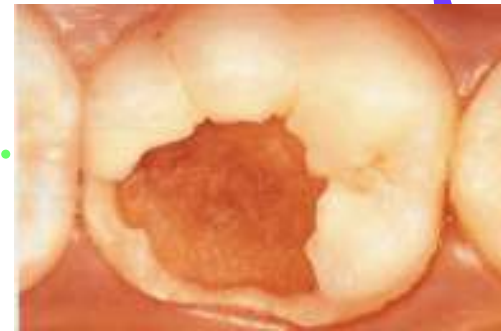


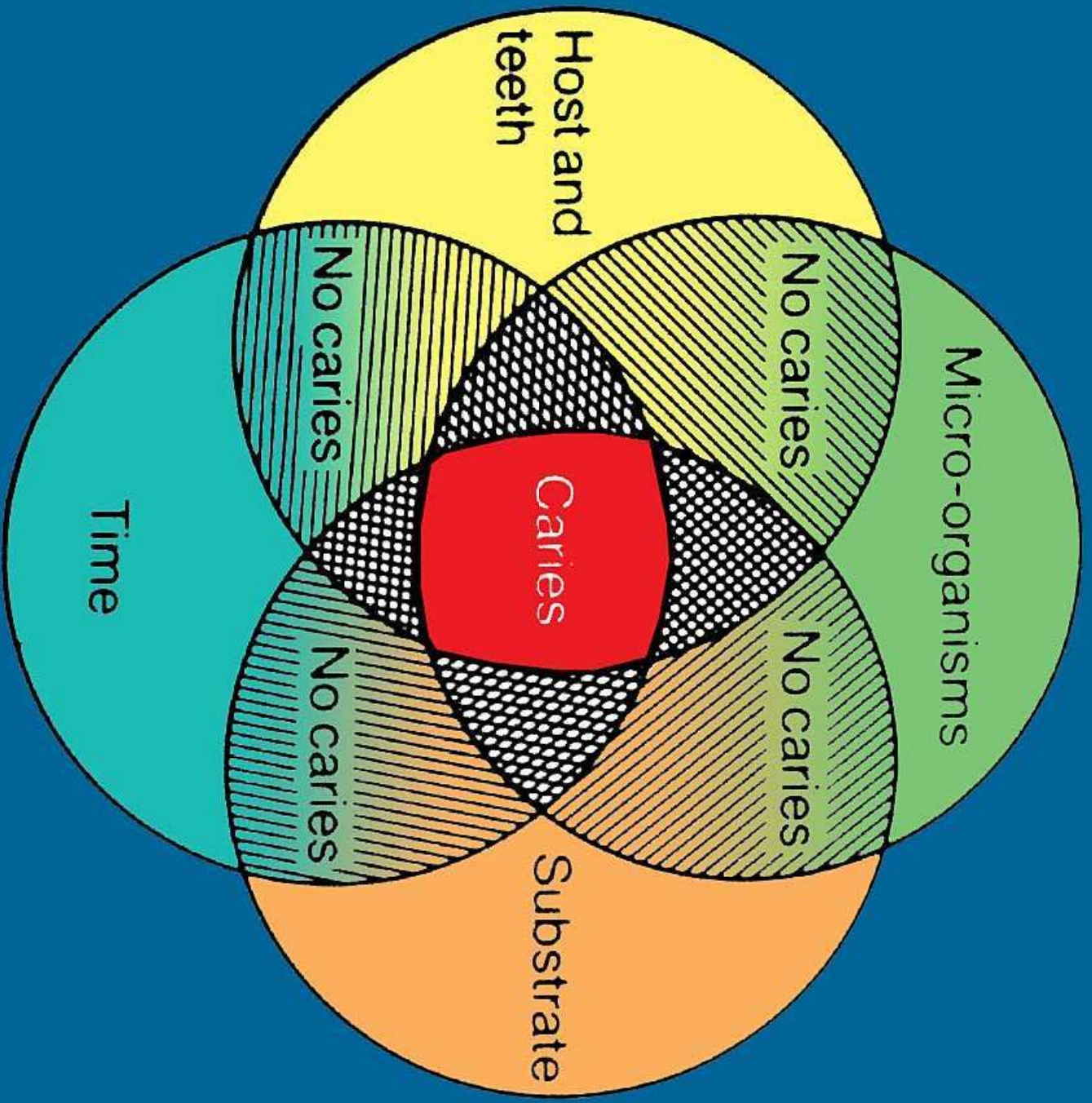
# Dental Caries

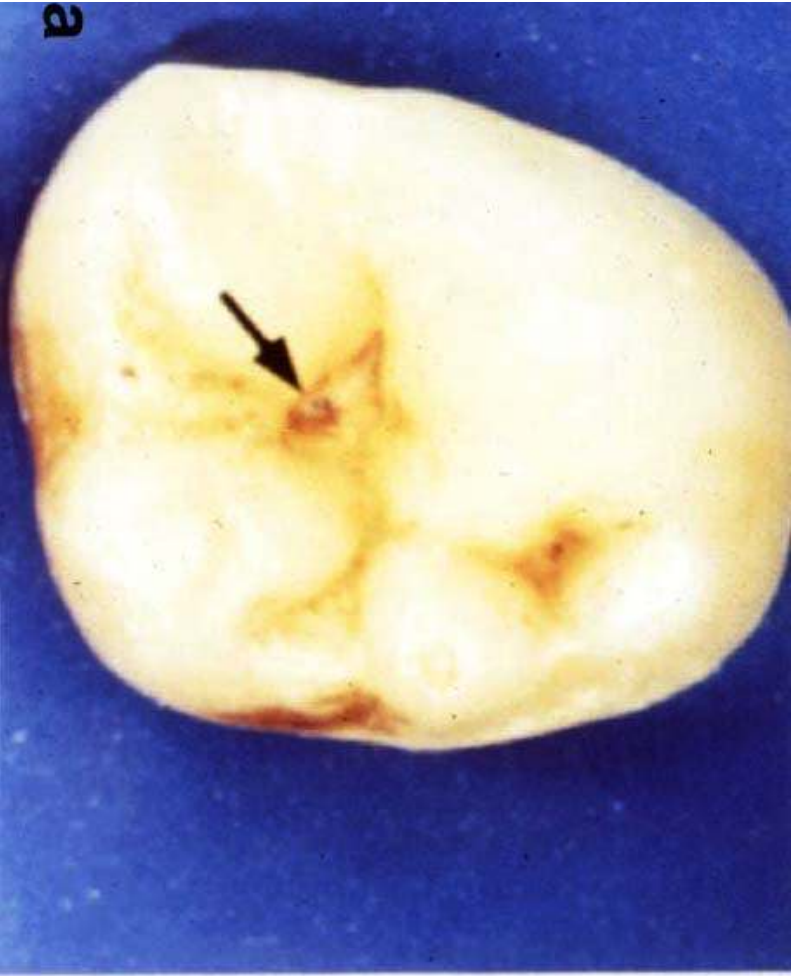
Characterized by



- Demineralization of the mineral portion of enamel + dentine.
- Disintegration of their organic material.
- As the disease approach the pulp may result in death of the pulp.
- It can be arrested or prevented.







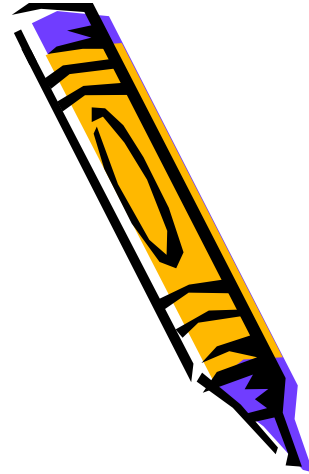
# Classification of Decay

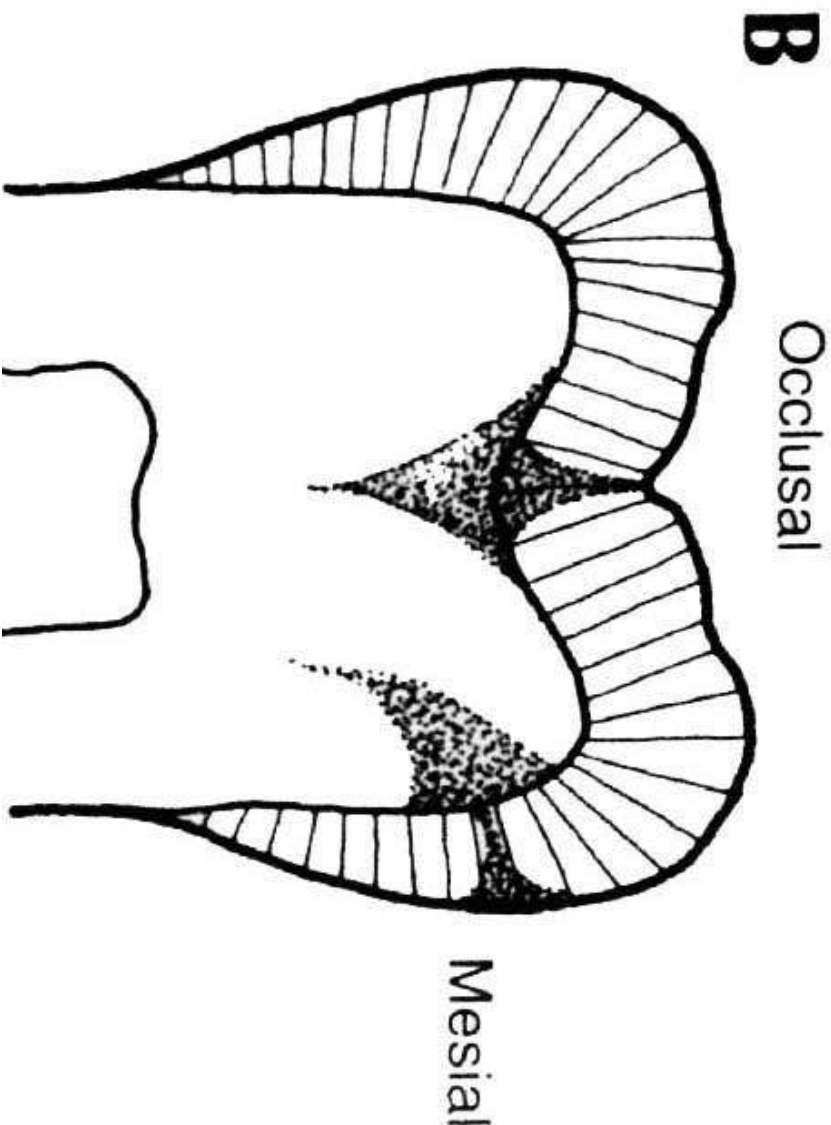
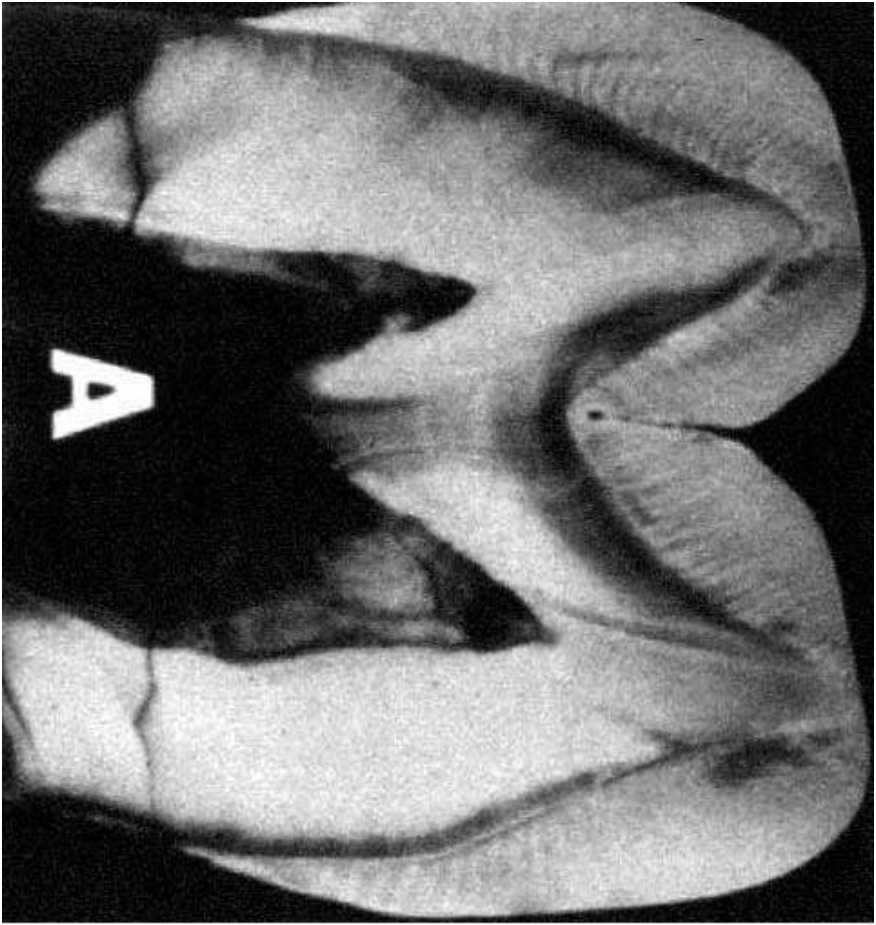
- Based on anatomy of the surface involved
- Pit and fissures carious lesions
  - *Class I* – begin in the depth of pits and fissures in enamel

## – Occur:

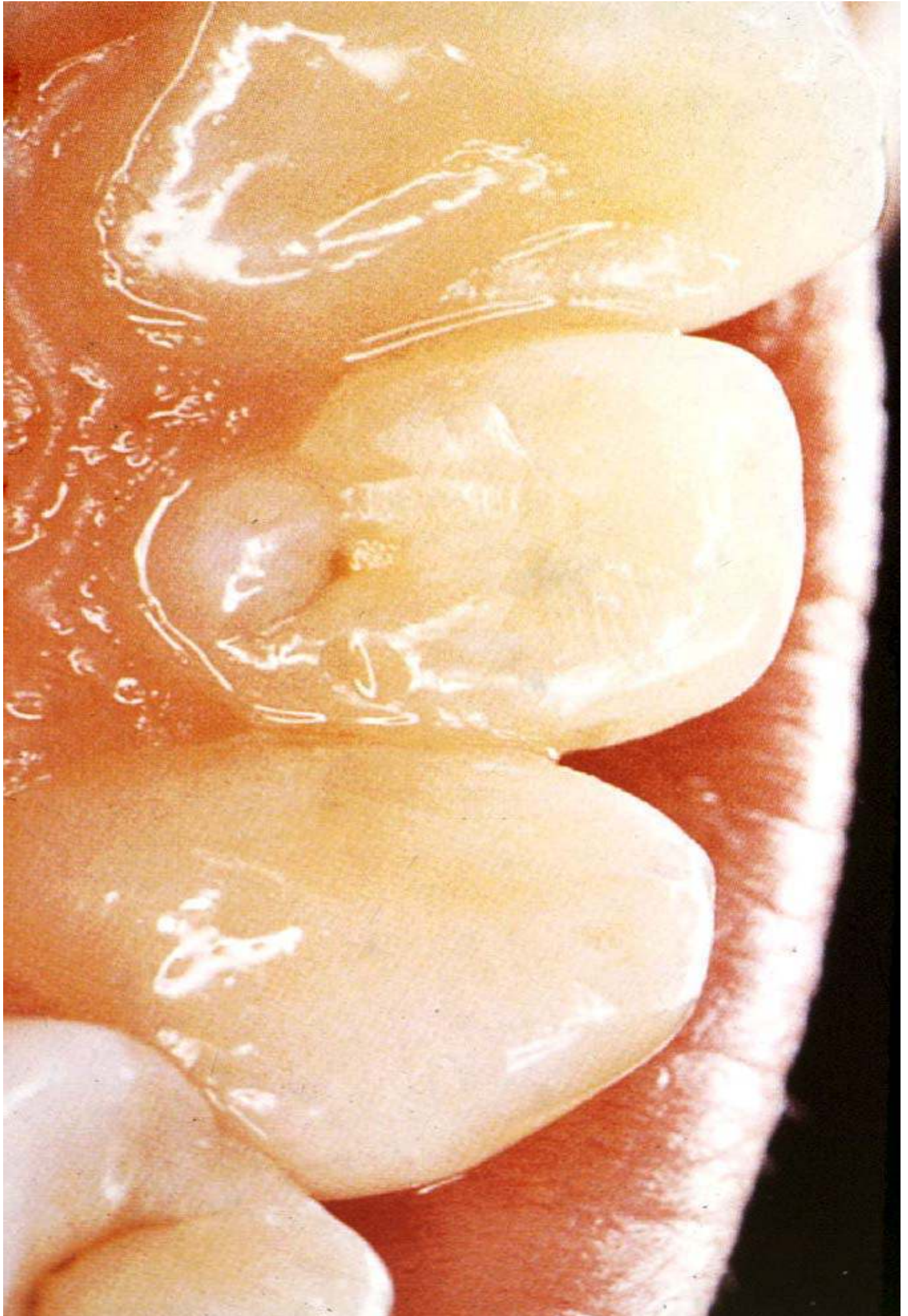
- *Occlusal surface of post. teeth*

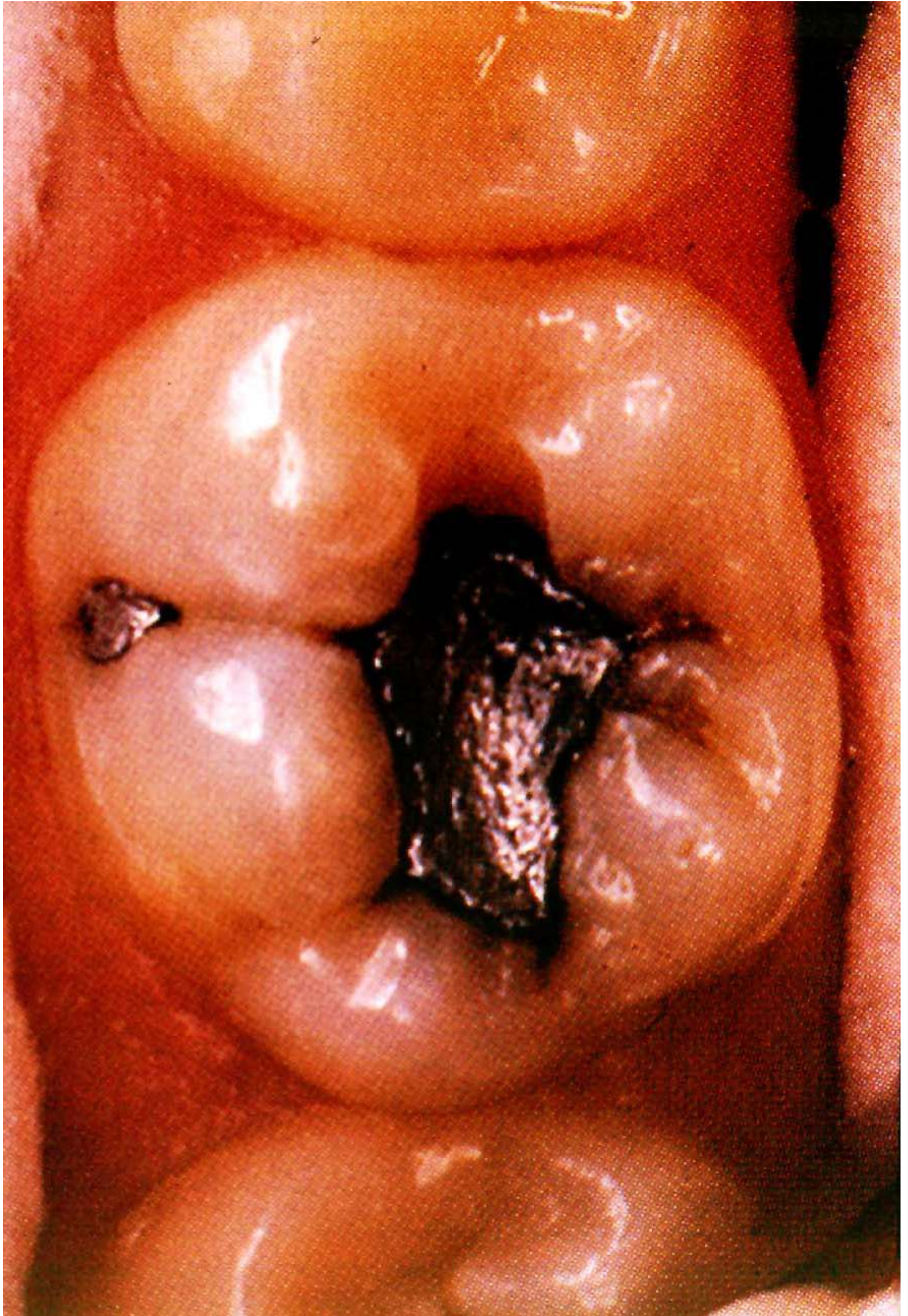
*Lingual fossa of maxillary incisors*



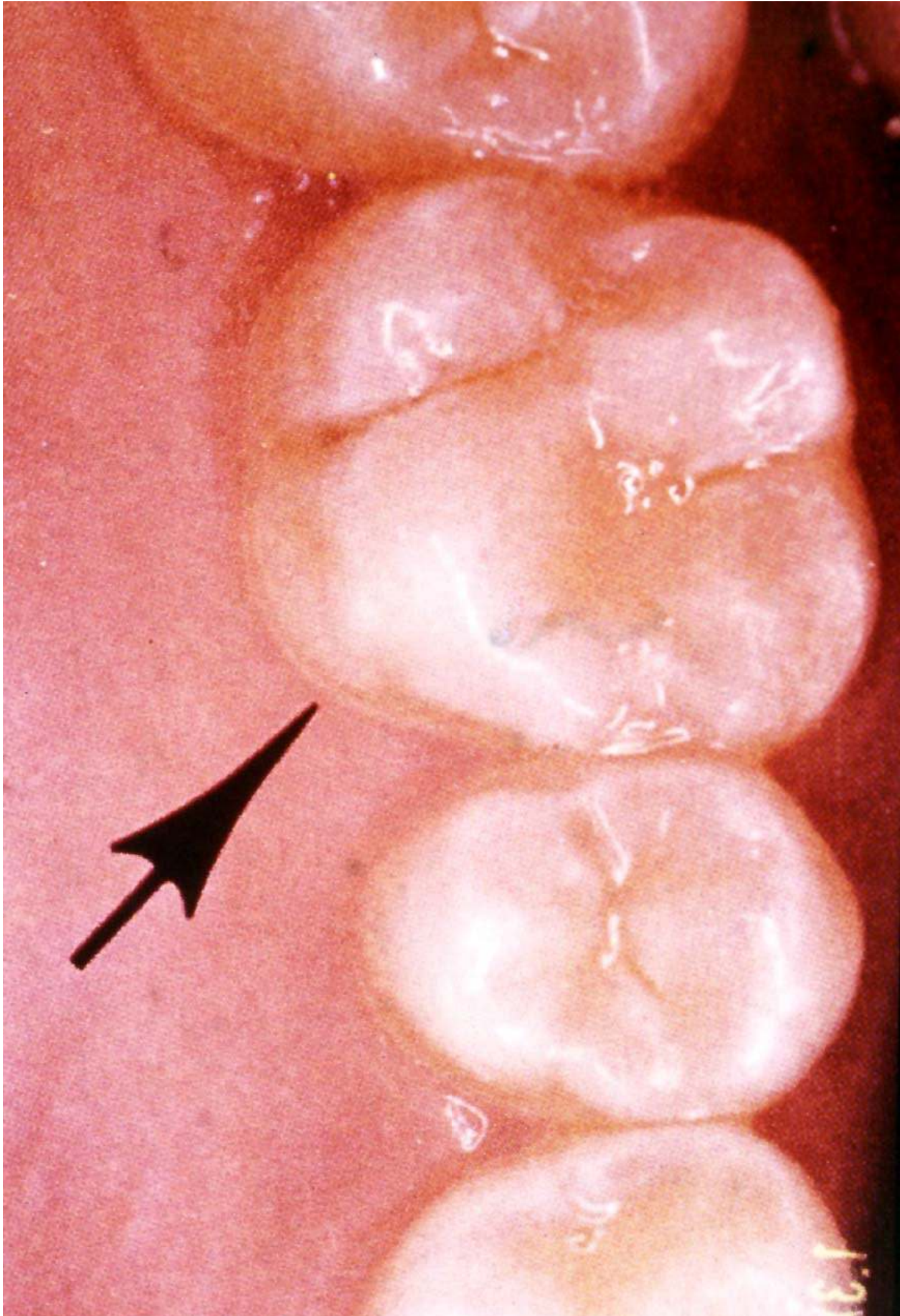




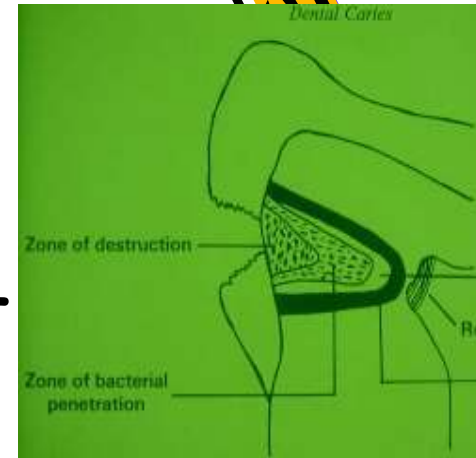








# Smooth Surface Carious Lesions



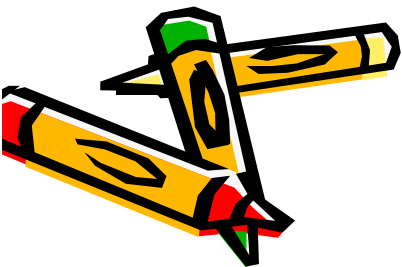
- Occur on the smooth surface of the anatomic crown of a tooth in area that are most inaccessible to the natural cleansing action of the lips, cheeks and tongue.

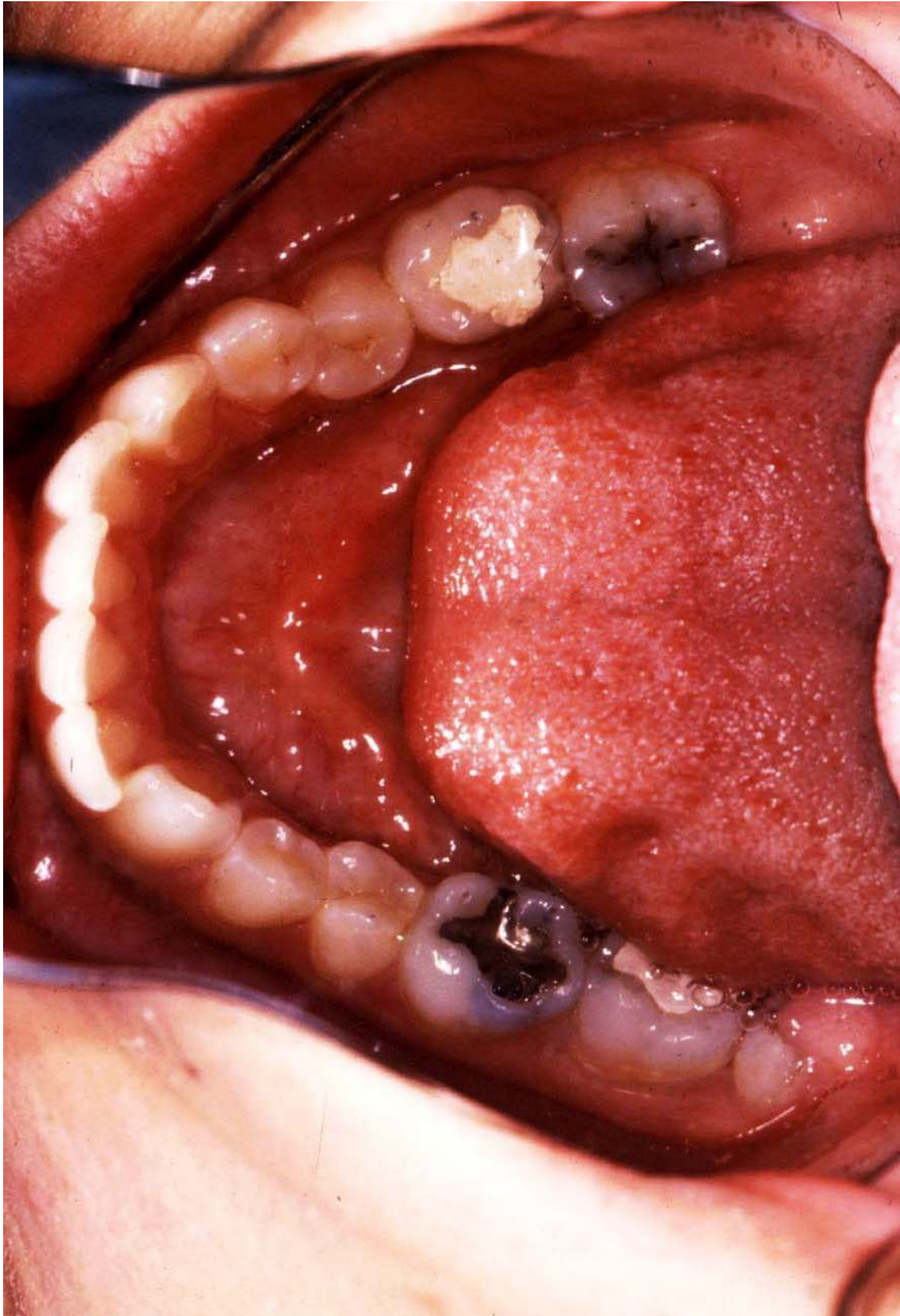
– Proximal surfaces – **class II**

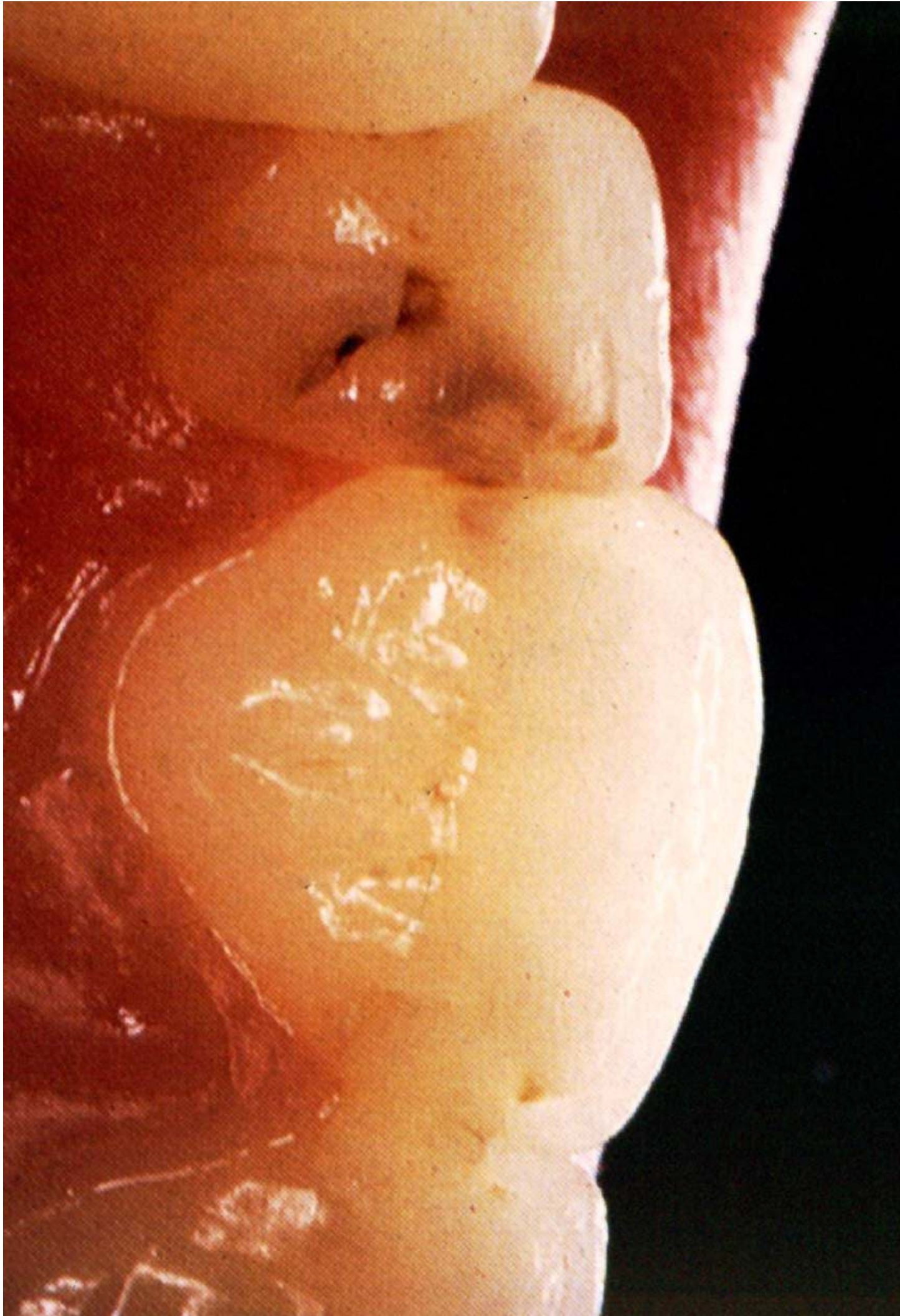
– Facial and lingual surfaces –  
**class III, IV, V**

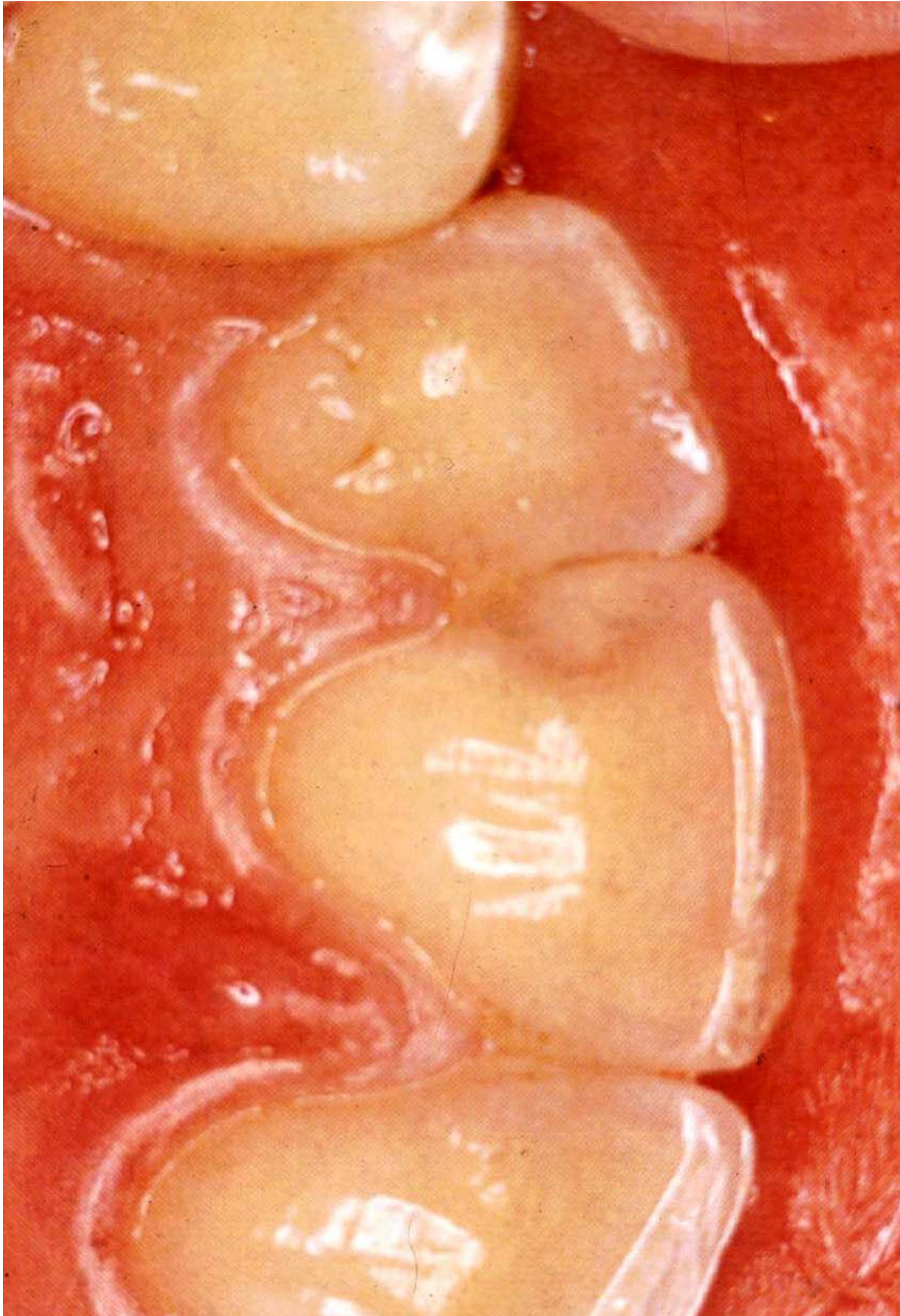


Root caries on **cementum**



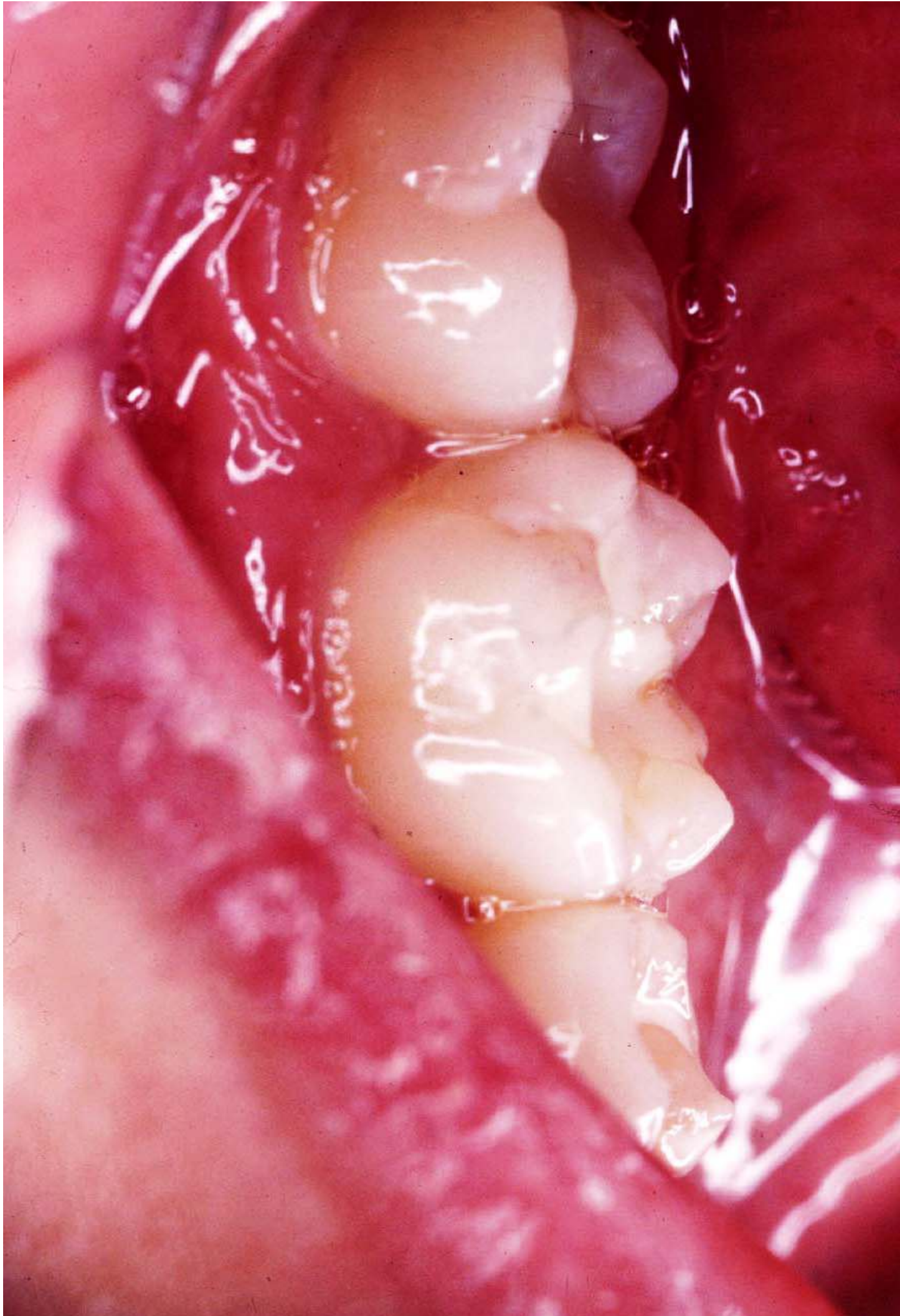




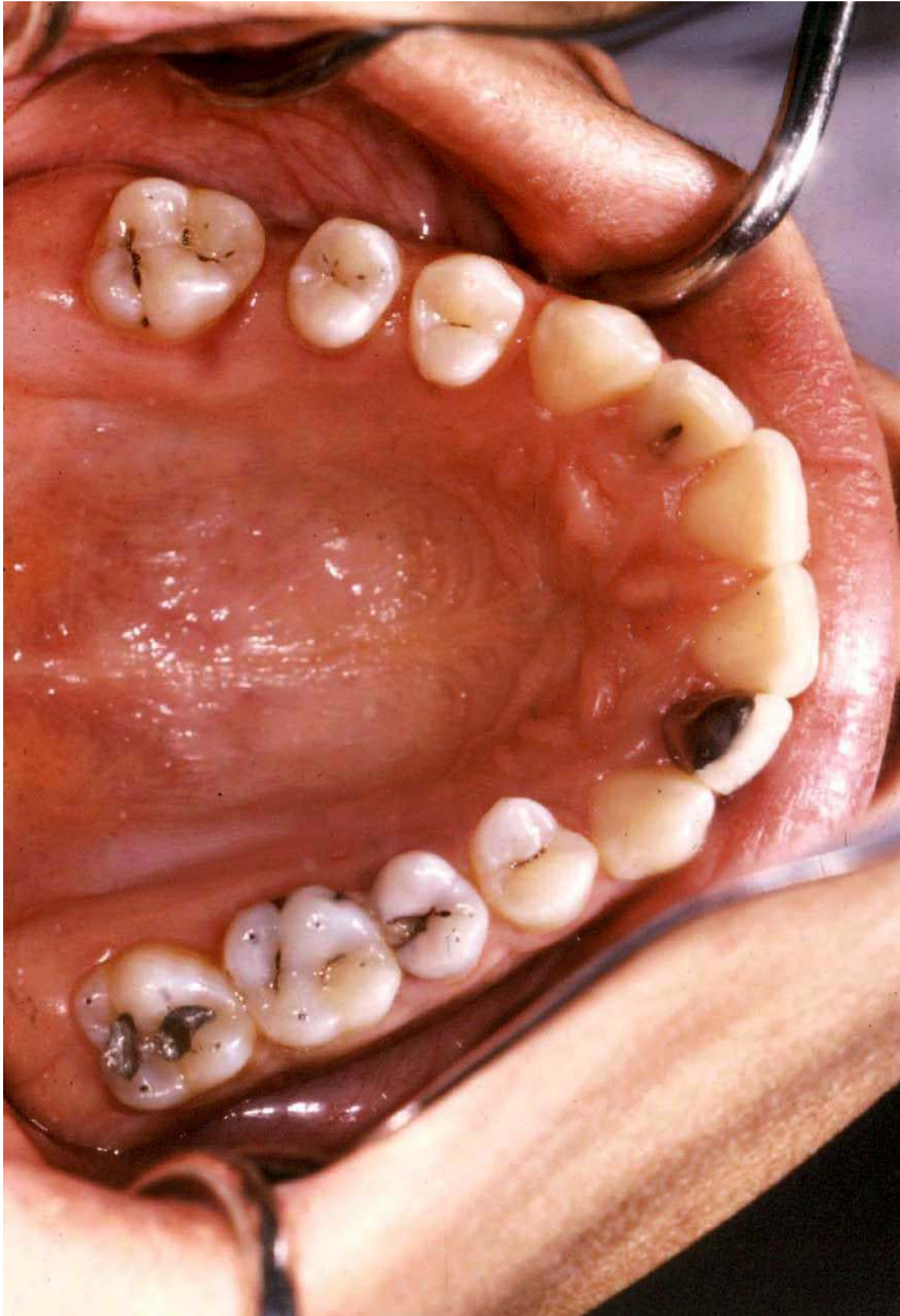












# Tooth Wear

- Maybe defined as the surface loss of dental hard tissues other than by caries or trauma.

- *Erosion:*

- Loss of dental hard tissue as a result of a **chemical process** not involving **bacteria**.

- Causative agent  $\Rightarrow$  **acid**

- Source of acid  $\Rightarrow$  **dietary , stomach**

- Affected area  $\Rightarrow$  **palatal surface ant., buccal surface post.**



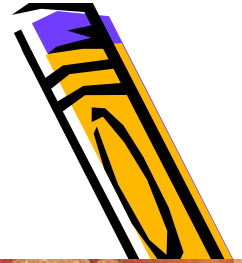
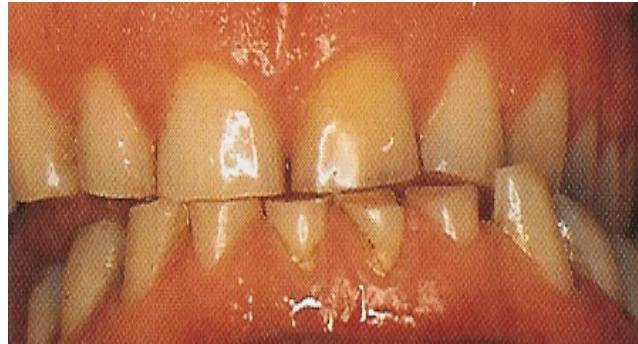
# Tooth Wear

- *Attrition:*

- Mechanical wear between opposing teeth commonly occurs in combination with erosion.

- Causative agent ⇒ *abrasive diet , bruxism*

- Affected area ⇒ *occlusal or incisal surface*



# Tooth Wear



- *Abrasion:*

- Wearing away of tooth substance by **mechanical means** other than by opposing teeth:

- Causative agent  $\Rightarrow$  *over vigorous tooth brushing*

- Affected area  $\Rightarrow$  *buccally at cervical margin.*

**Dish-shaped or V-shaped**



# Trauma

- Traumatic injuries are acquired suddenly.
- May involve the hard dental tissues and the pulp  $\Rightarrow$  required immediate operative management.

- *Local injuries:*

- Laceration of the lip, tongue, and gingival tissue

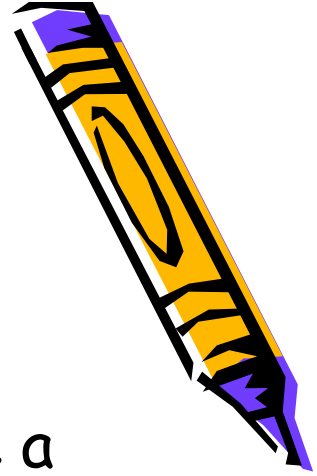
Fracture – alveolar bone, root, crown

Subluxation of a tooth





# Developmental Defect



- Teeth do not always develop normally and there are a number of defects in tooth structure or shape which occur during **development** and become apparent on eruption.
- Teeth are often unsightly or prone to excessive tooth wear  
⇒ *require restoration to*

**Improve appearance or function**

**– Protect the underlying tooth structure**

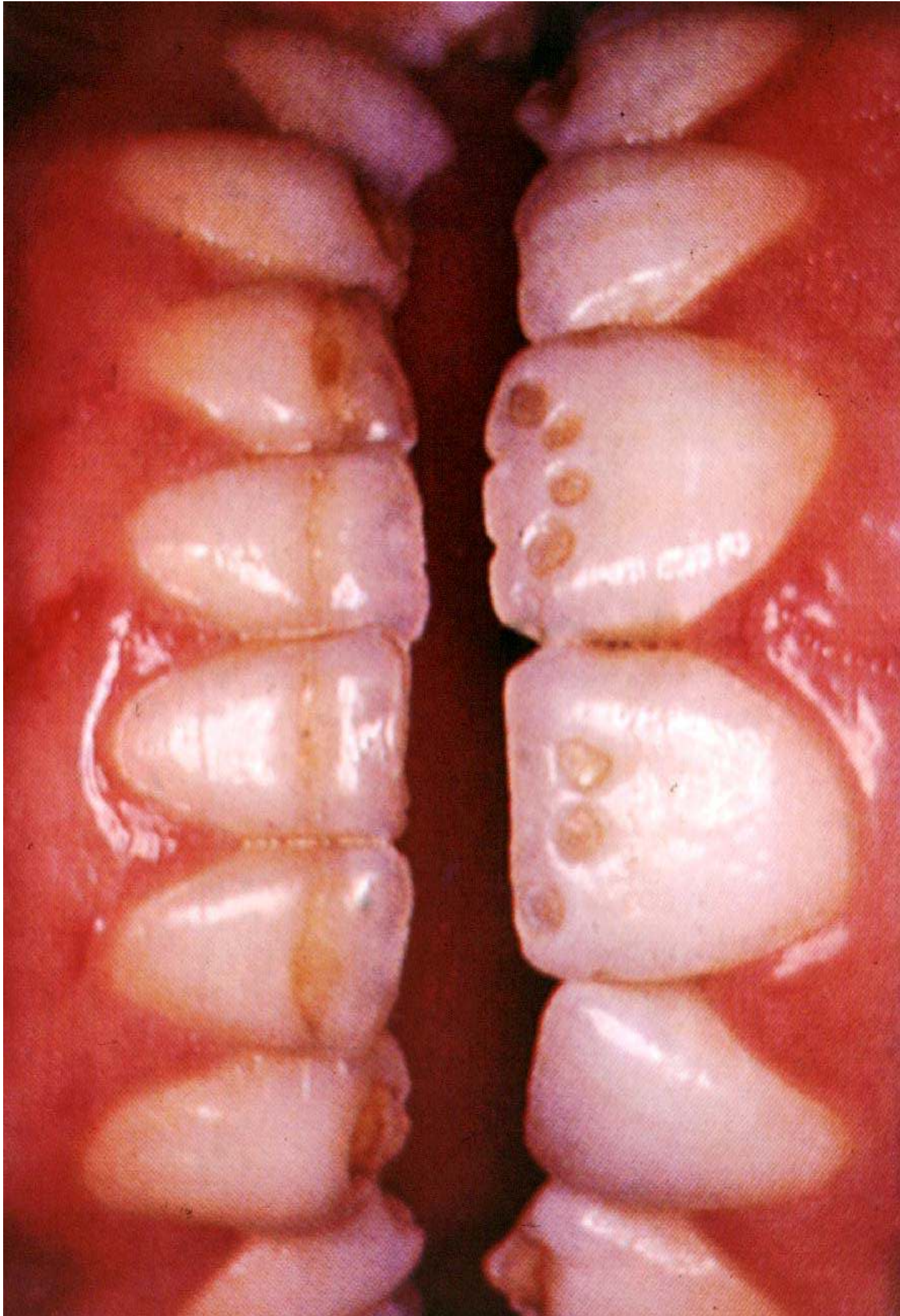
Enamel hypoplasia

Hypo mineralized enamel

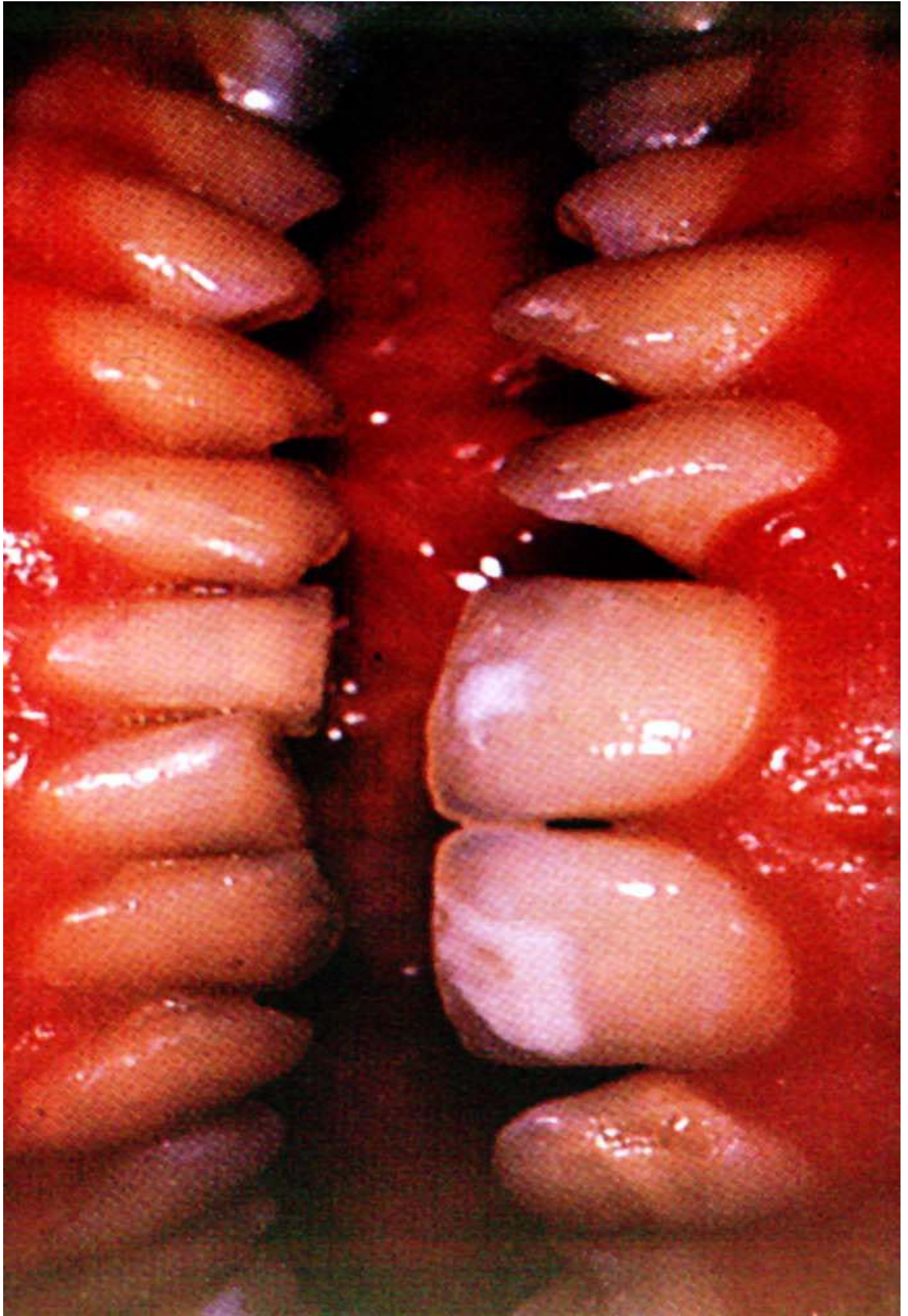
Enamel fluorosis

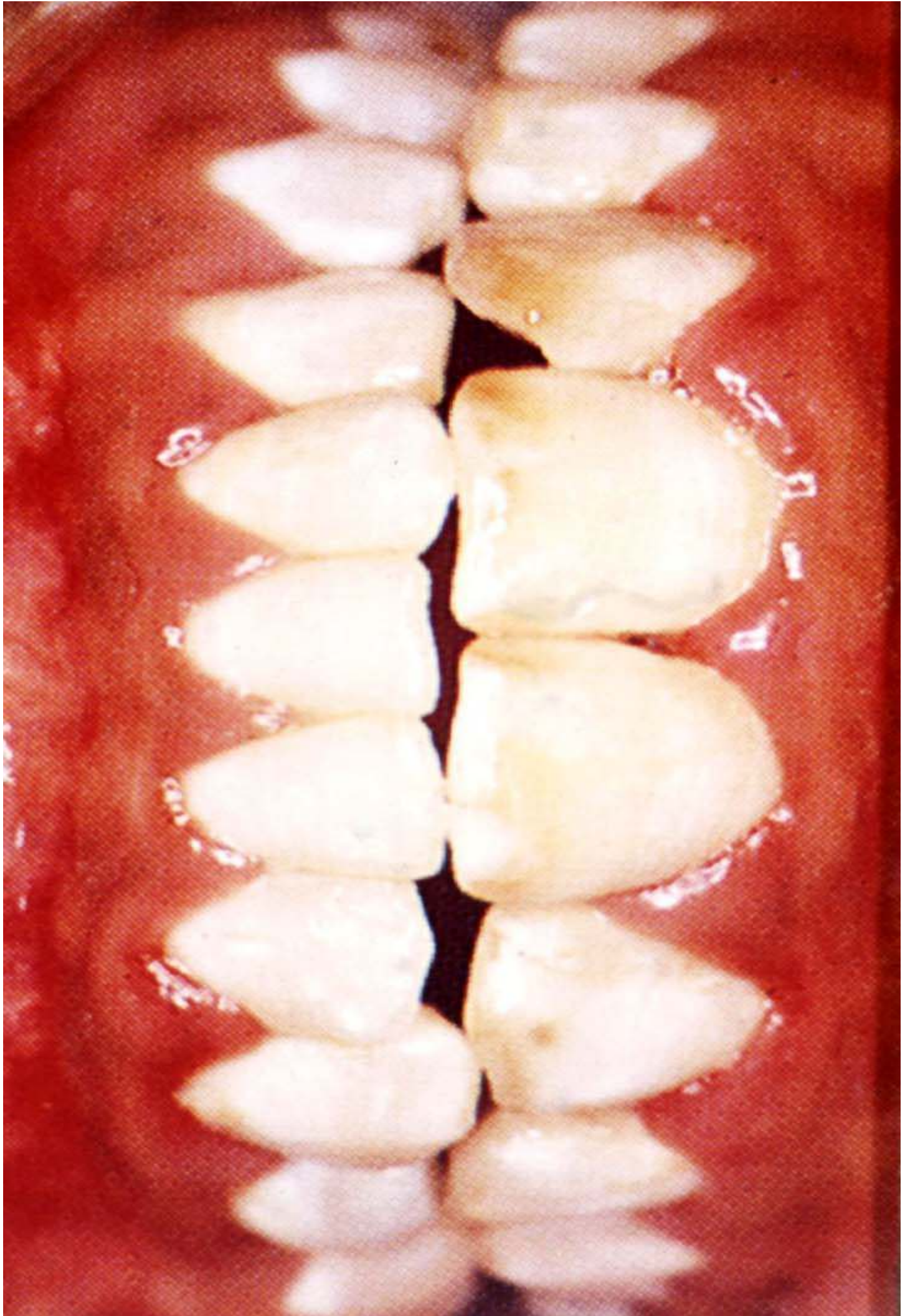
Tetracycline stain









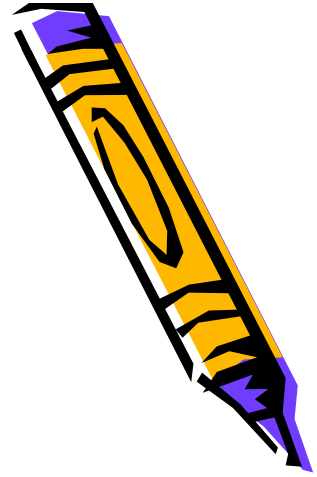




# Relationship between operative dentistry and other dental specialties

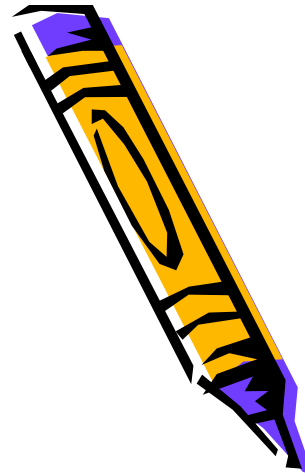
When an operative procedure is performed, there are general guidelines when operative treatment should occur relative to other form of care like:

- Pedodontics •
- Endodontics •
- Periodontics •
- Orthodontics •
- Oral surgeries •
- Prosthodontics •



# Relationship between operative dentistry and other dental specialties

*Pedodontics:* restorative treatment •  
involved.



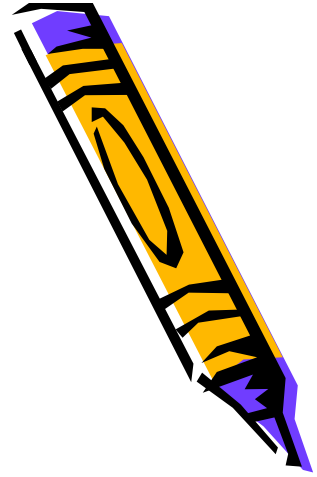
***Endodontics:*** root canal treatment.

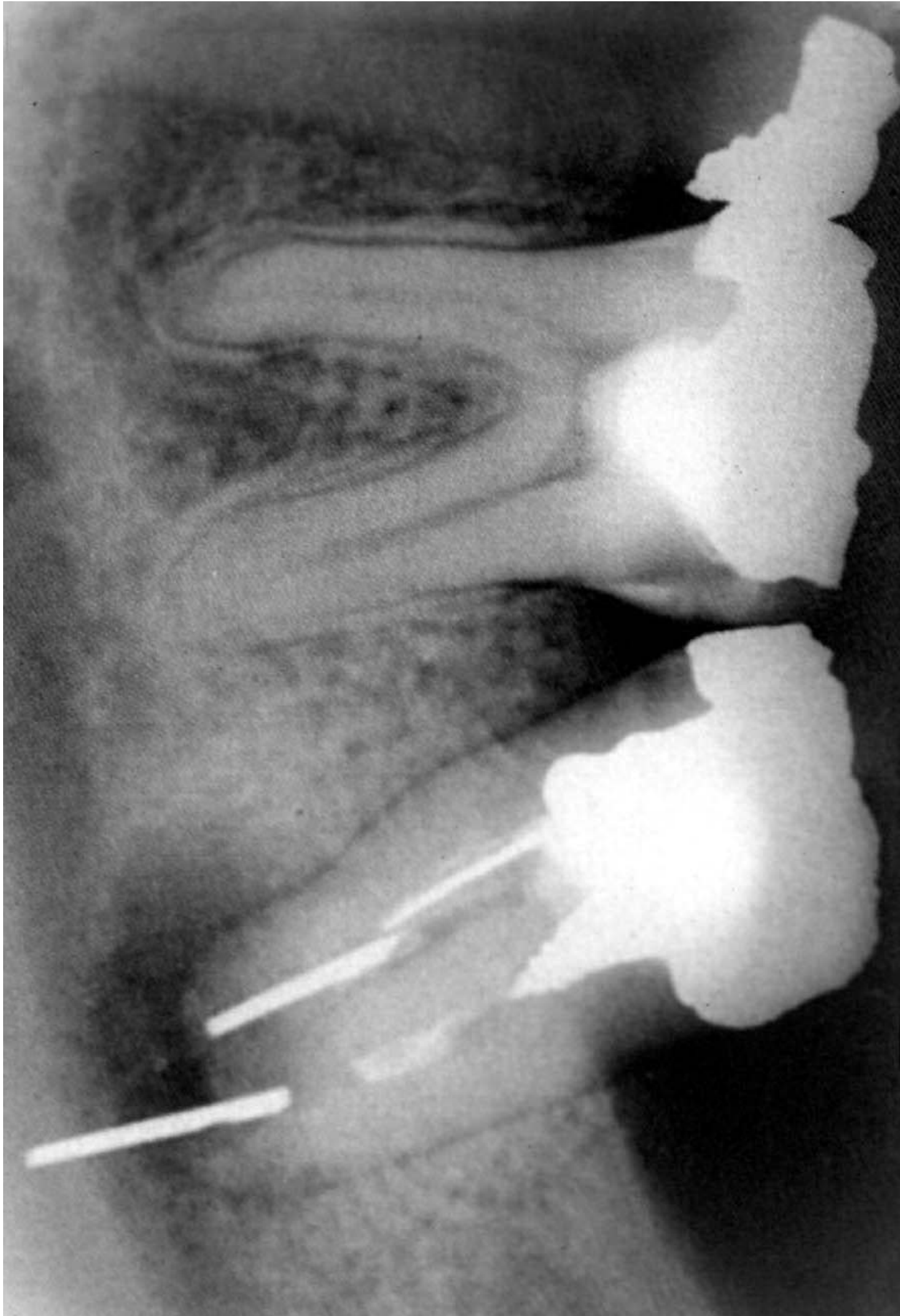
Pulpal / periapical area must be evaluated before operative therapy is initiated.

➤ Large restoration

➤ Cast restoration

➤ Improper root canal treatment

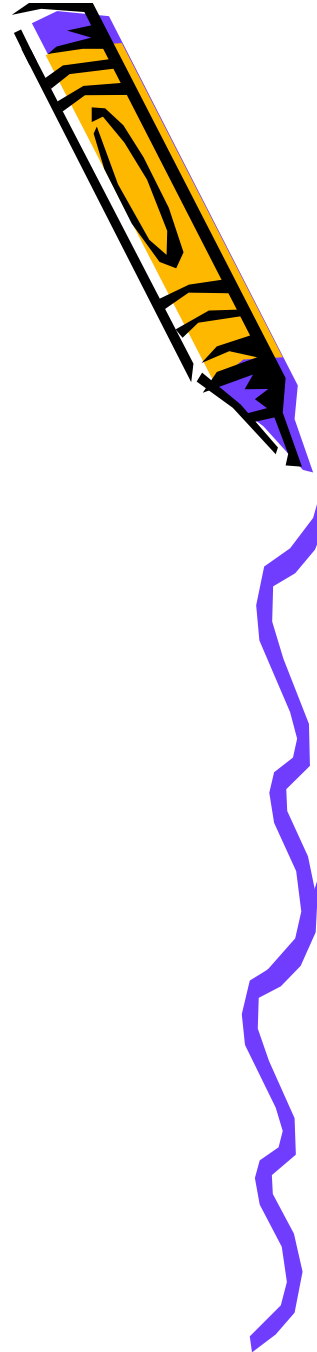




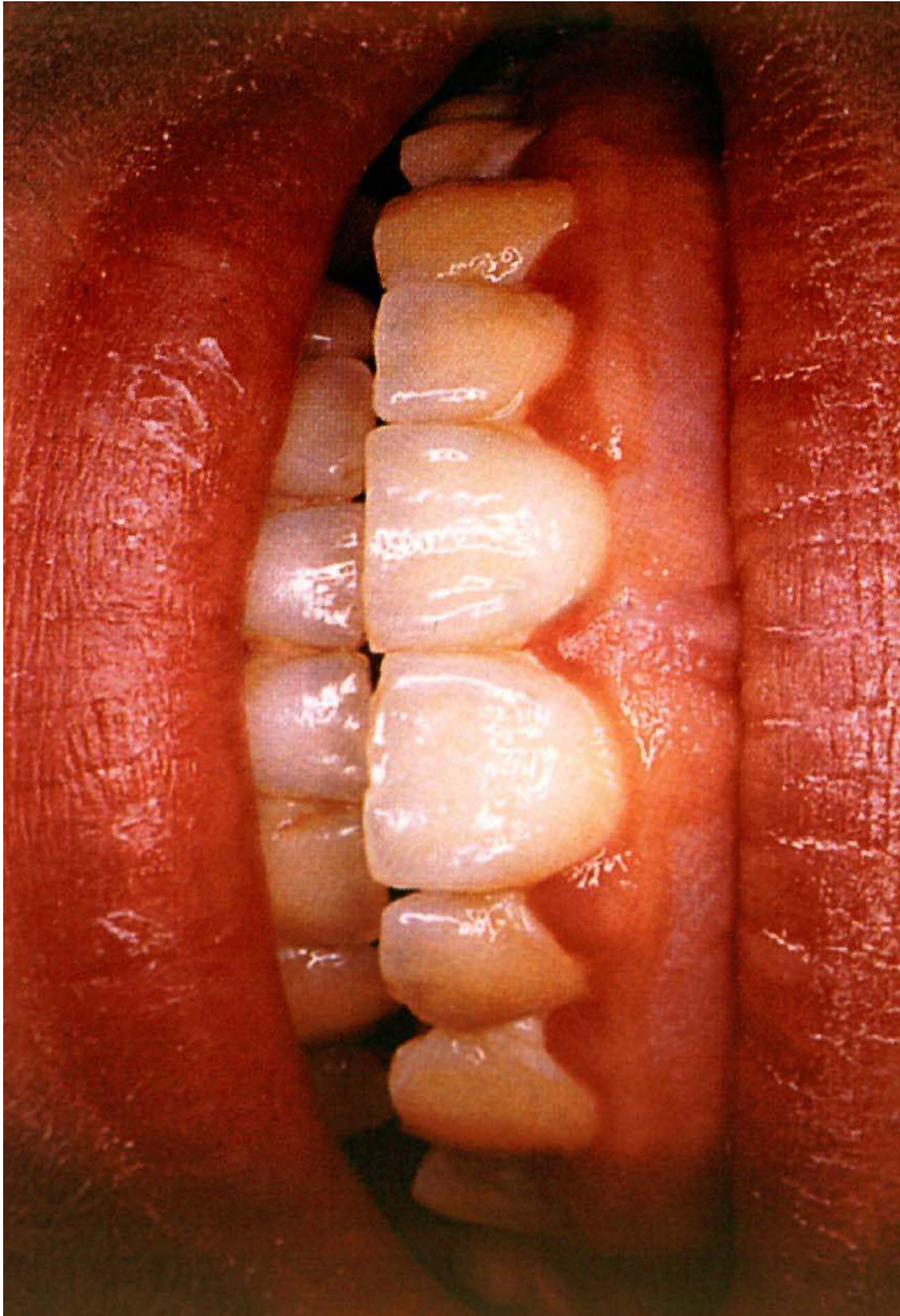
***Periodontics:*** gingival treatment.

Generally periodontal tx. should precede operative care to create a more **desirable environment** for performing operative treatment.

Deep caries lesion often requires caries control or root canal treatment **prior** to periodontal treatment.



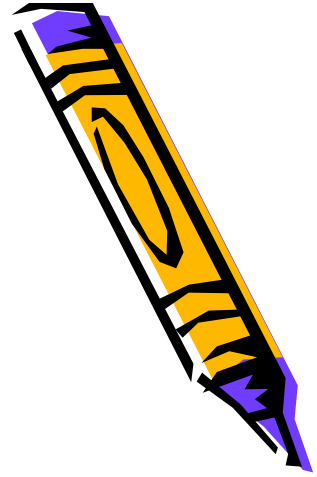


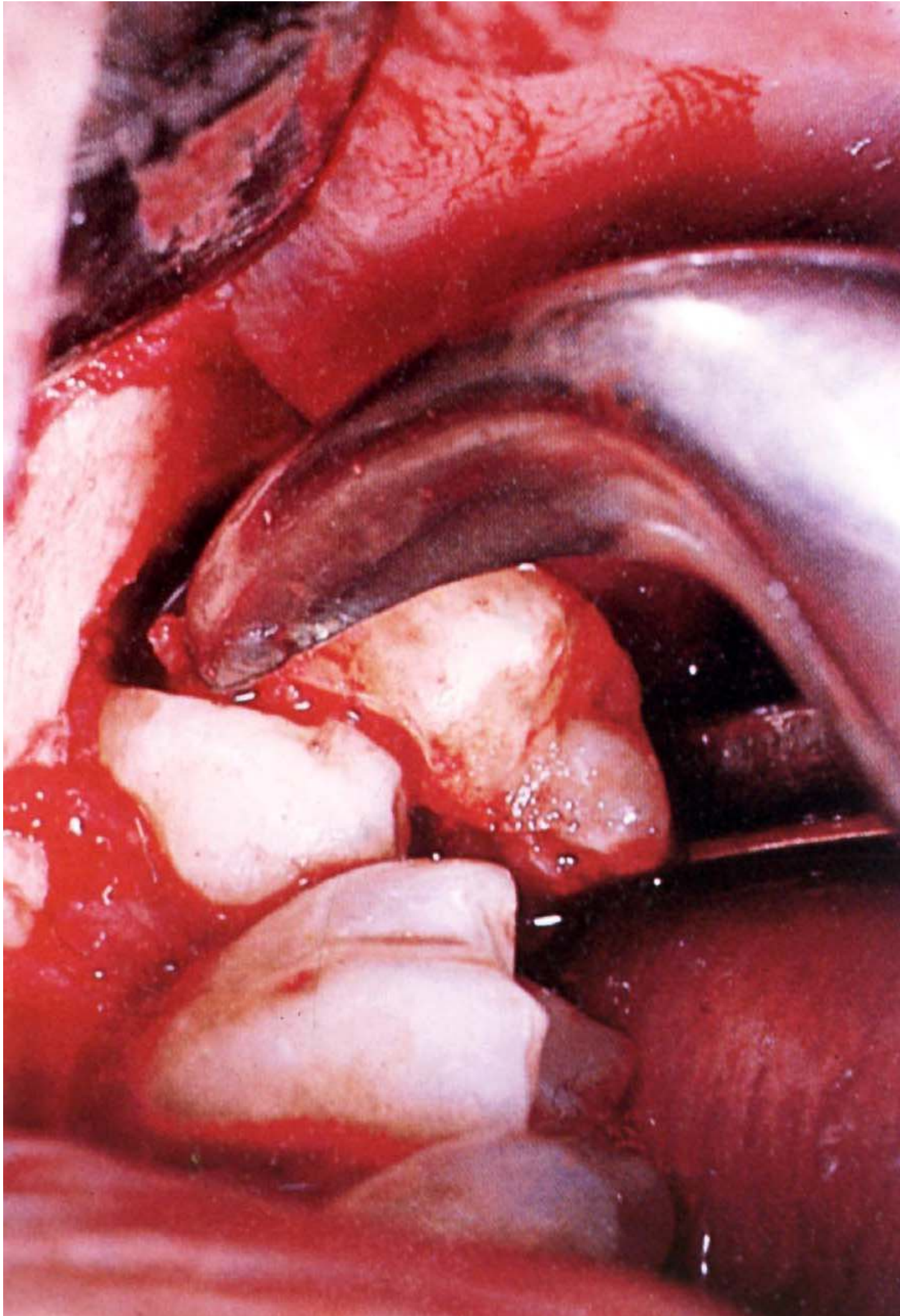


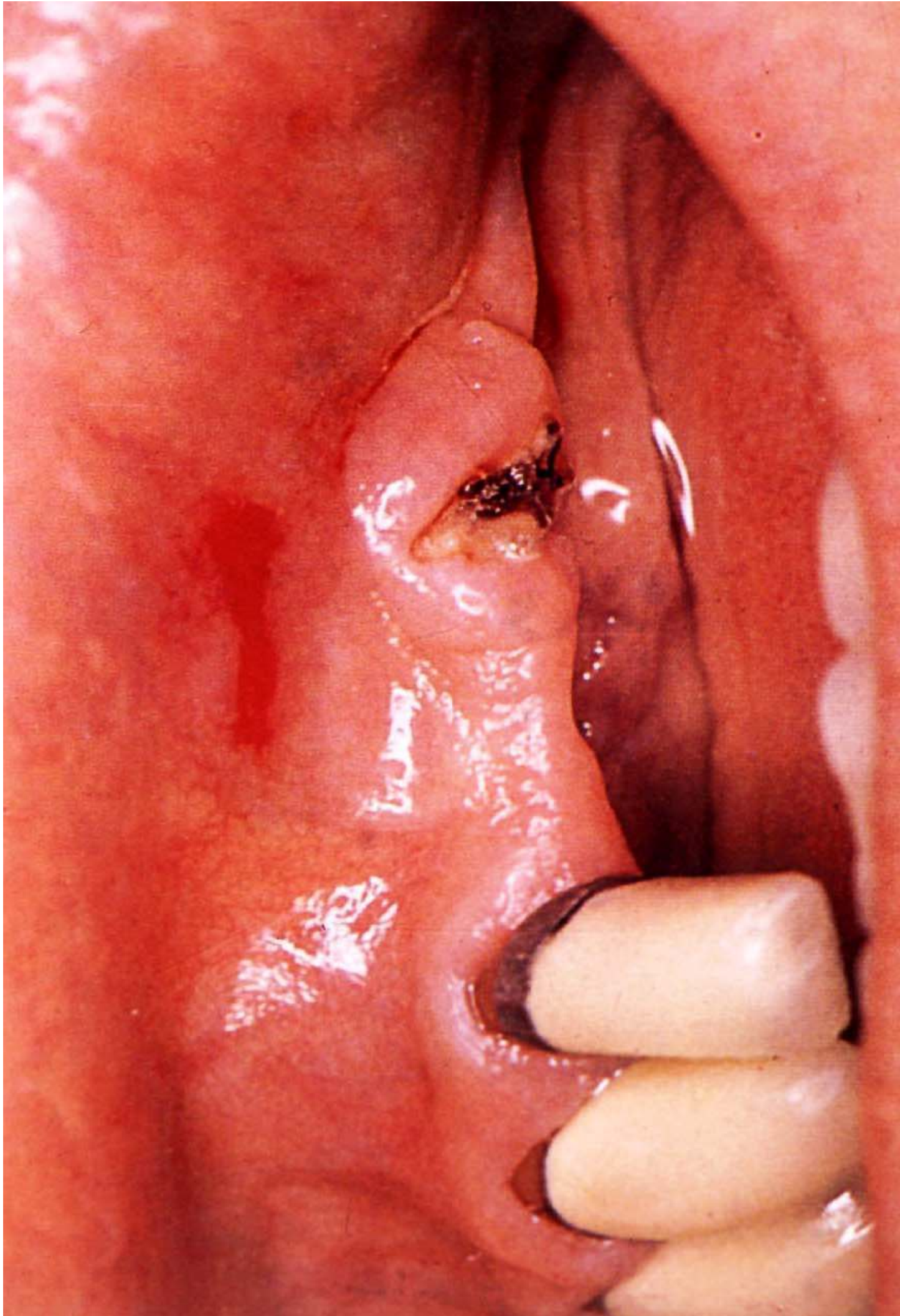
# Relationship between operative dentistry and other dental specialties

- *Oral surgery*

- Impacted, unerupted, and hopelessly involved teeth should be removed **prior** to operative treatment.







## *Orthodontics*

Include extrusion or realignment of teeth to provide spacing, stress distribution, function and esthetics.

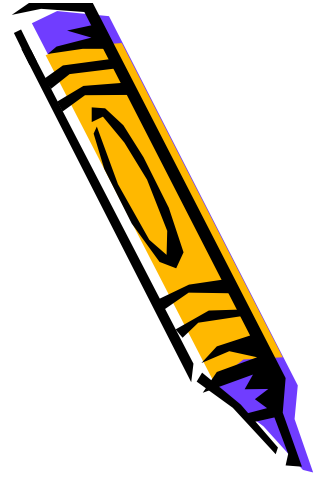
All teeth must be free of caries by operative treatment before ortho treatment is completed

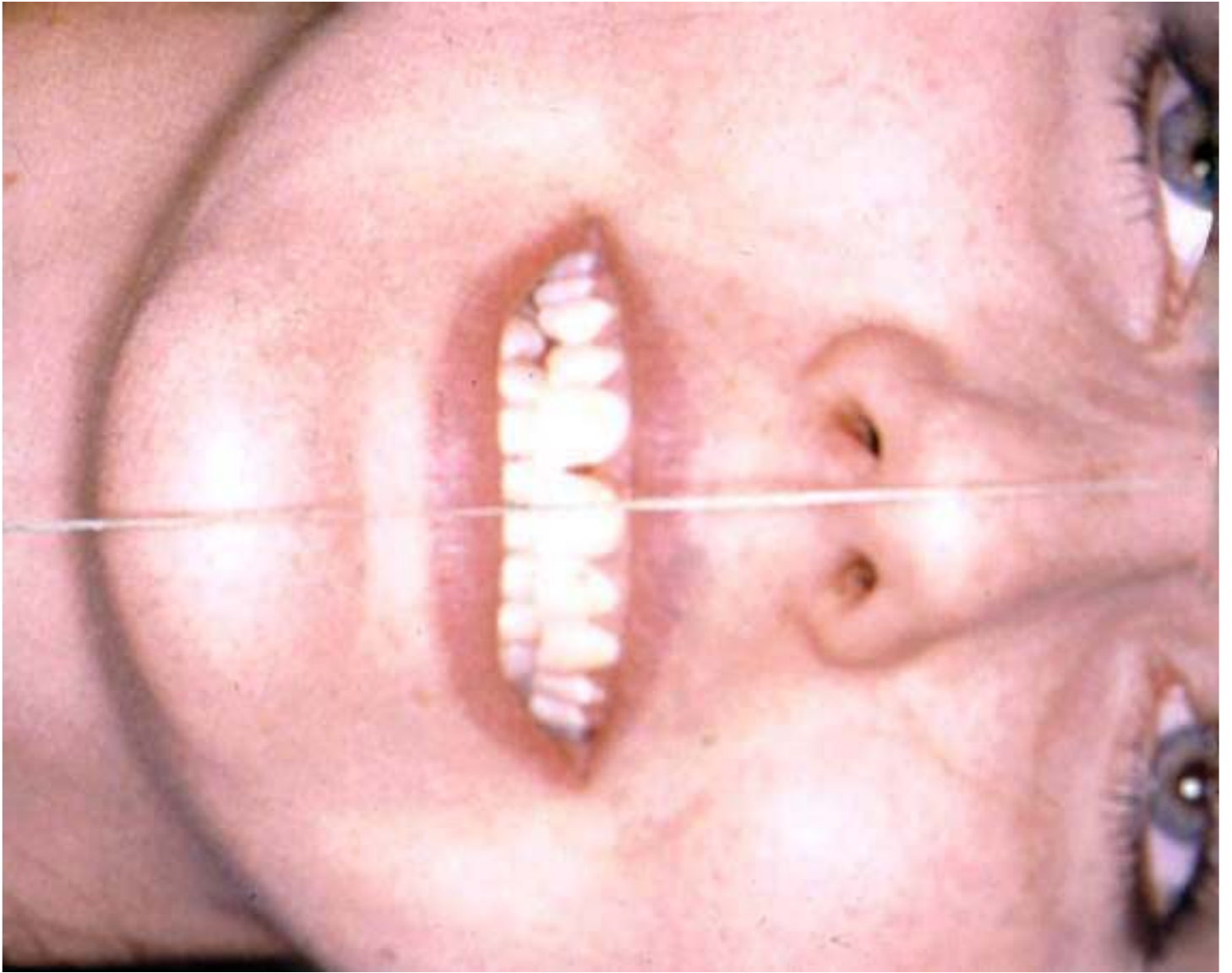


# Relationship between operative dentistry and other dental specialties

## □ *Occlusions*

- ❖ Occlusions should be evaluated
- ❖ occlusal adjustment should occur *before* the definitive restoration treatment occur.

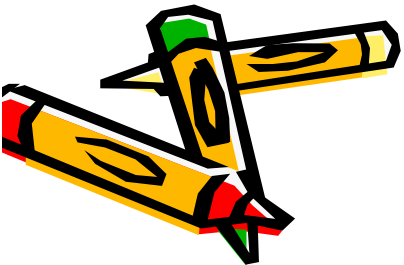
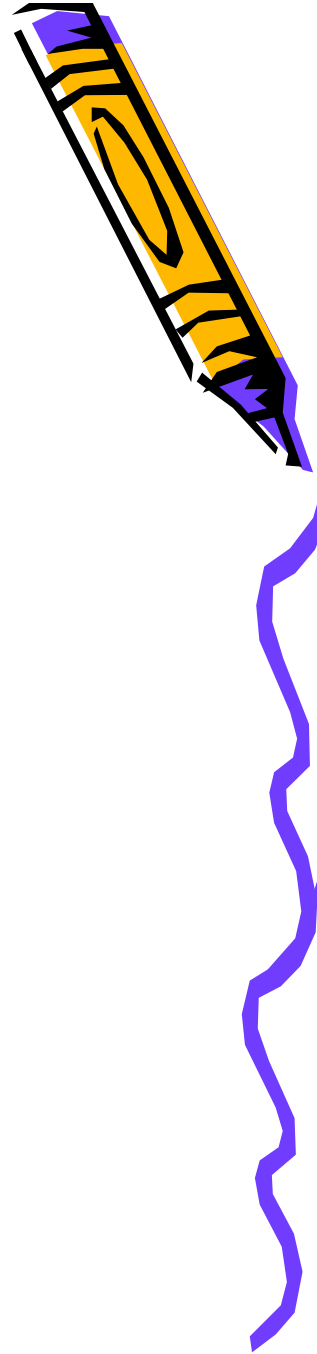




## □ *Fixed and removable prosthodontics*

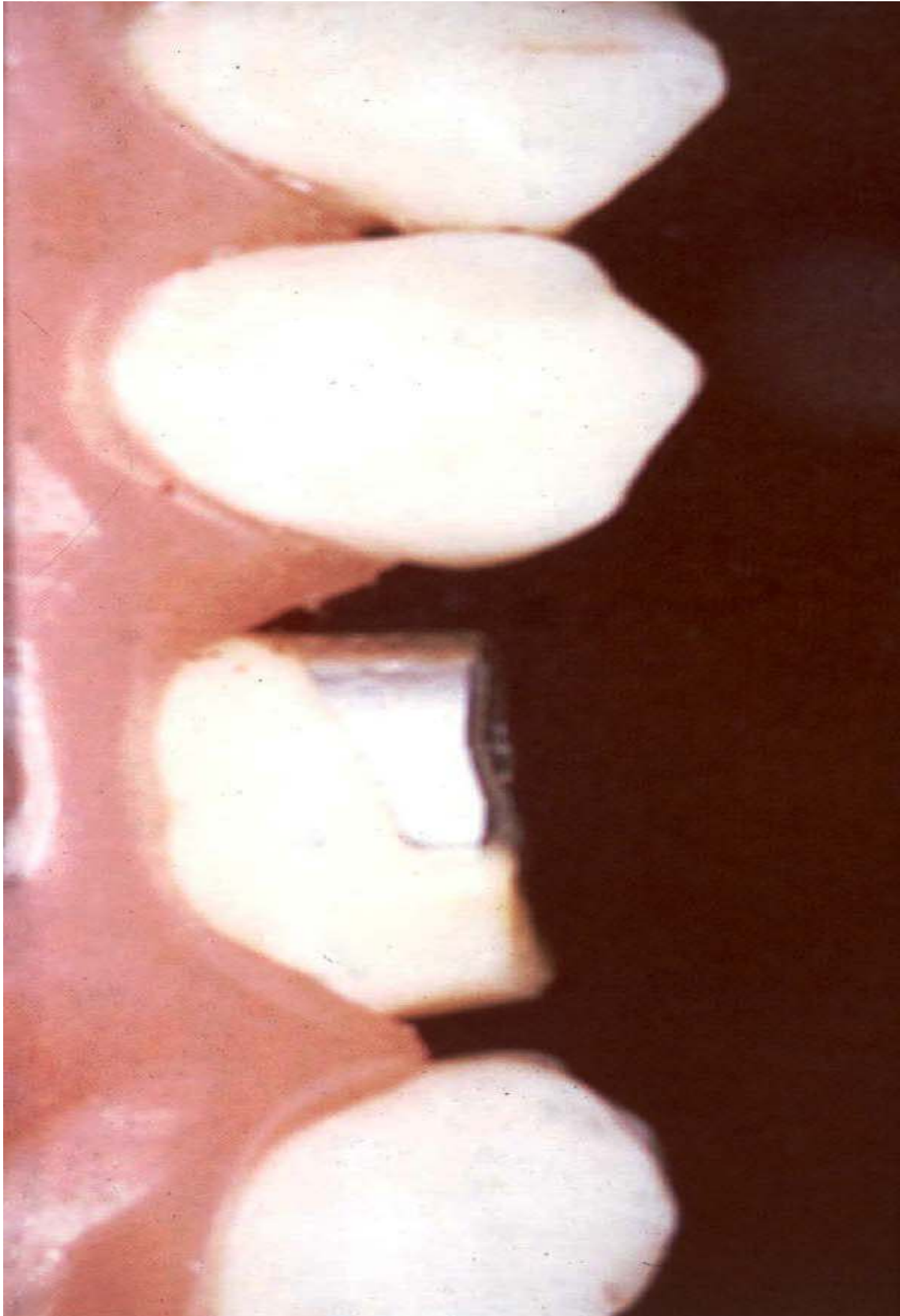
❖ A restoration must be placed as a foundation to provide improved retention for a full crown.

❖ Cavity preparation and appropriate restorative materials must correlate with design of the contemplated removable prosthesis













# Factors Influencing Dental Practice

- Because of the dynamic status of dental practice, many developments and advancements will occur in the future.
- Advances in *technology, science and materials* will have a significant impact on the future of and demand for dental practice.
- Demographics  $\Rightarrow$  **population**  $\uparrow$  and will change

Economic factors

Dental health

Dental manpower



---

Country

Dentist

Population Ratio

---

UK

1

3,000

SWEDEN

1

800

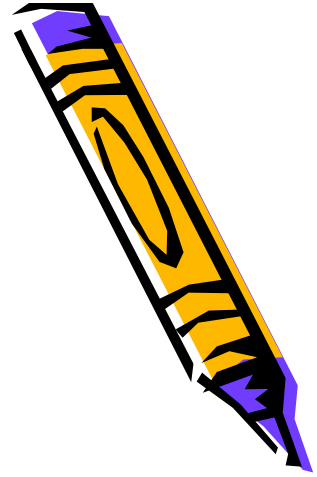
SAUDI  
ARABIA

1

8,000



- Dentist must continue to broaden its **knowledge** on biologic basis.
- Practitioners must continually familiarize themselves with the **advances** being made.
- Increased research activity and continued practitioner adaptability will result in **improved oral health of population** throughout the world.



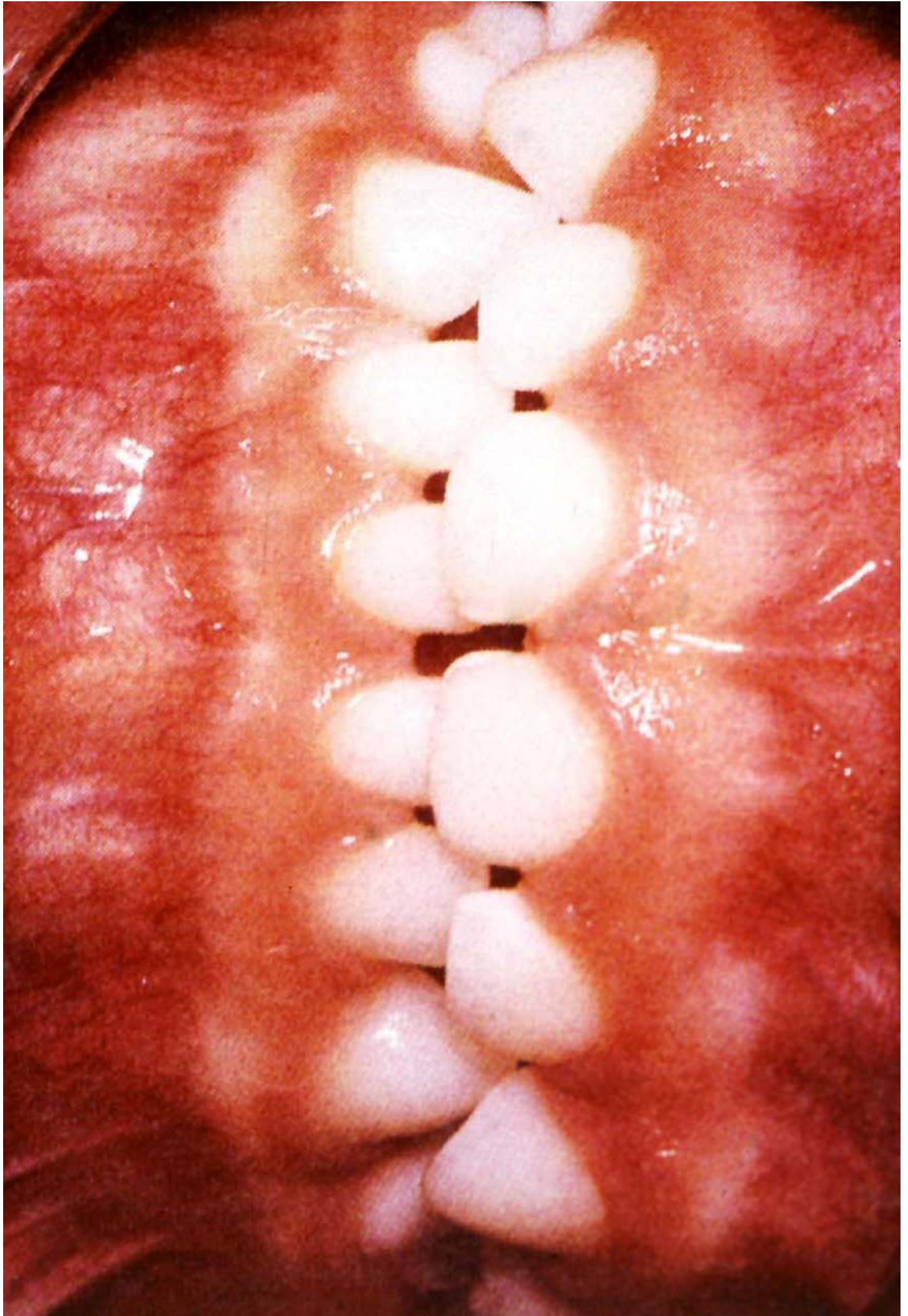
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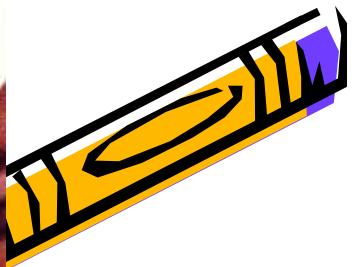
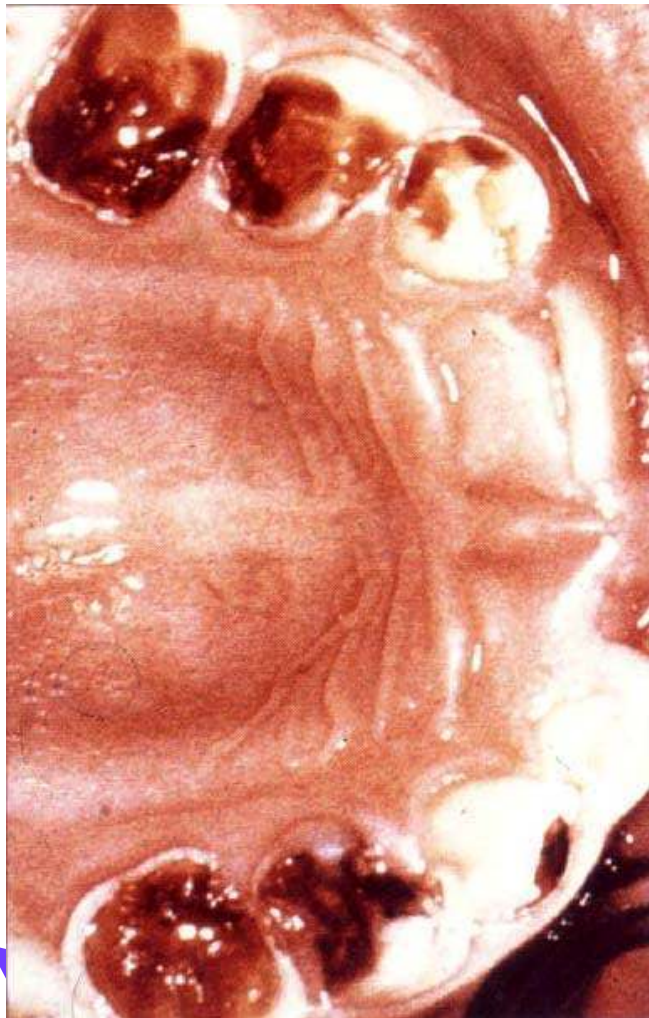


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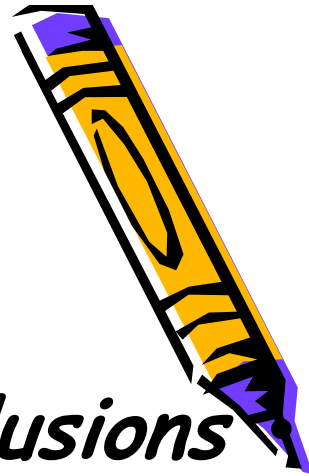
Best Friends







# Relationship between operative dentistry and other dental specialties



## *Occlusions*

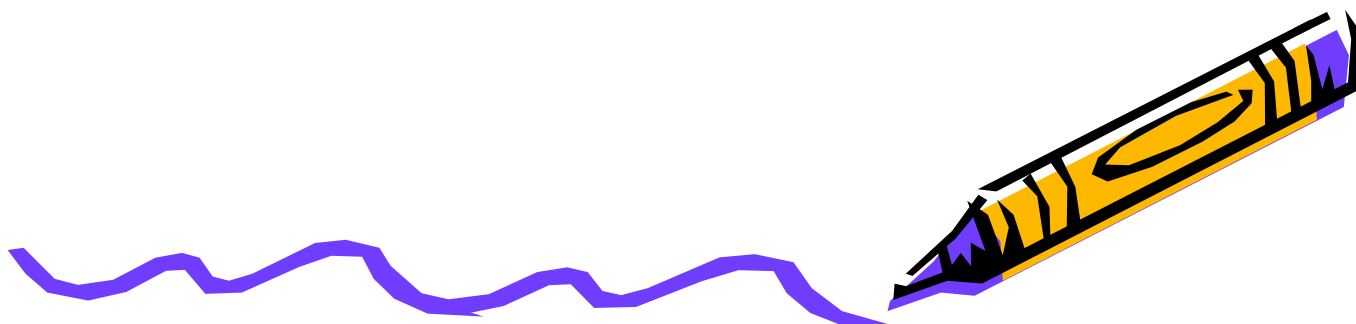
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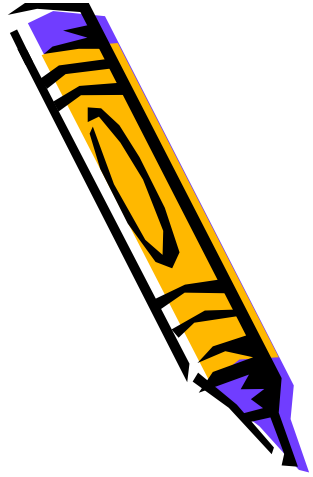


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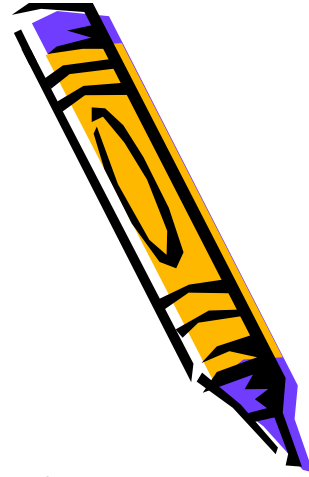
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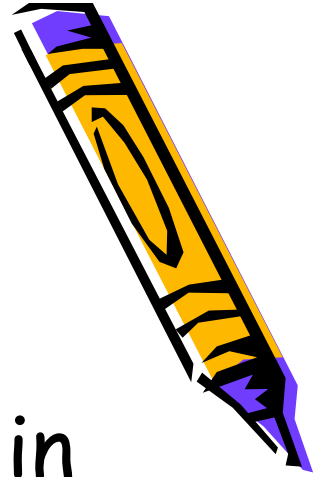
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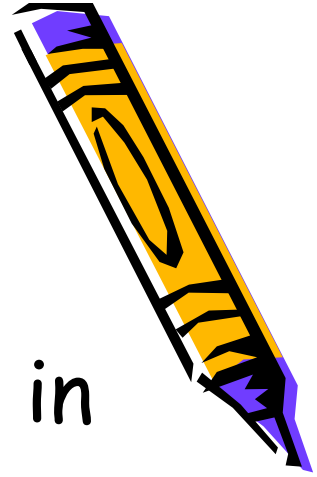
# History and Epidemiology

- In **United States**, dentistry originated in the **17<sup>th</sup> century** when several **barbers** were sent from England.
  - The practice of these early dentists consisted mainly of **tooth extraction** and practice of dentistry during the founding year was not based on scientific knowledge.





# History and Epidemiology

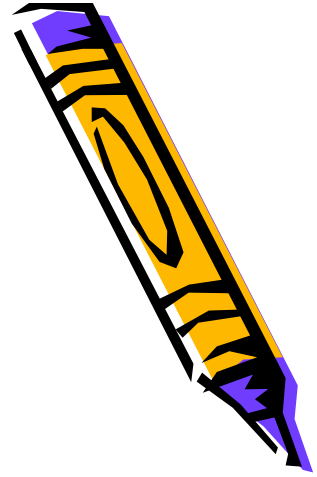


- Baltimore College of Dental Surgery in 1840 ⇒ dental education
- Harvard University in 1867 ⇒ dental program
- In France, Louis Pasteur discovered the role of microorganisms in disease ⇒ have a significant impact on the developing dental + medical profession.



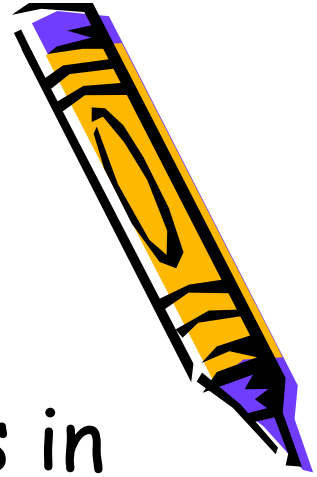
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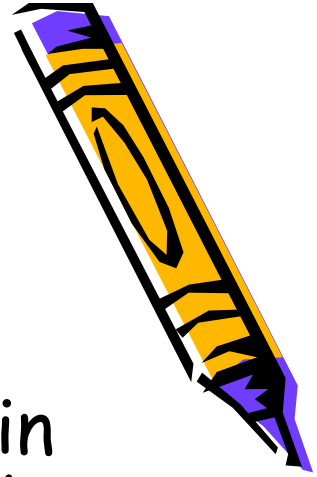
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- Others made significant contributions in the early development of Operative Dentistry:
  - Charles E. Woodbury
  - E.K. Wedelstaedt
  - Waldon I. Ferrier
  - George Hollenback



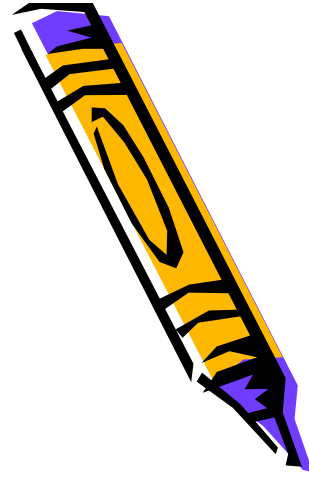
# History and Epidemiology

- Operative Dentistry plays an important role in enhancing dental health and new branched into dental specialities.
- Today, O.D. continues to be a **most active component** of most dental practice.
- Epidemiologically, demand for O.D. will not ↓ in the foreseeable future.



# Goal of Dental Sciences

- Elimination of disease and restoration of oral **health**, **form** and **function**.



# Function and Purpose



- An understanding and appreciation for **infection control**.
- Examination not only the **affected tooth** but also the **oral and systemic health** of the patient.
- A diagnosis of the dental problem and must be **correlated** with other bodily tissues.
- A treatment plan that has a potential to return the affected area to a **state of health and function**.

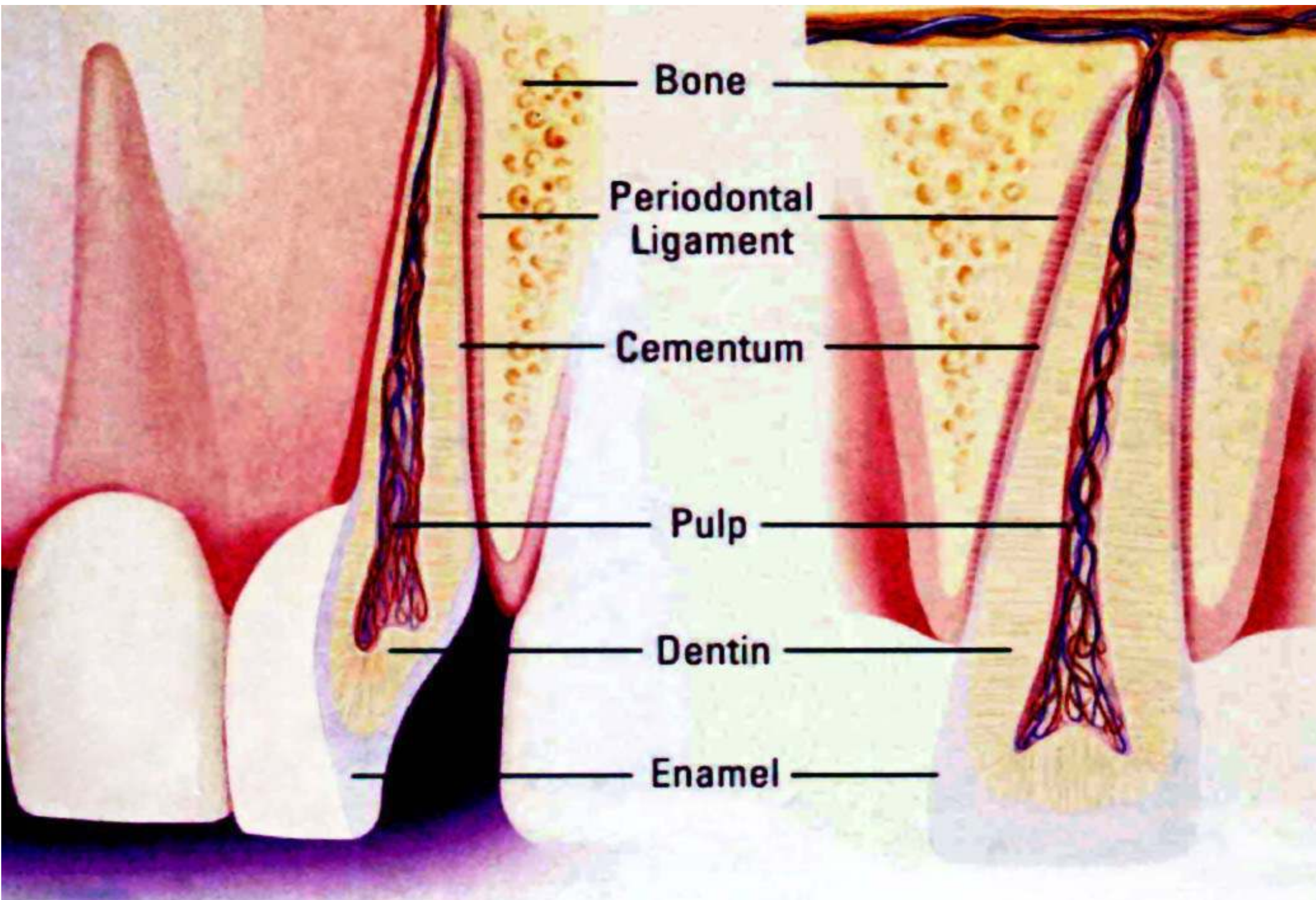


# Function and Purpose



- An understanding of **material** to be used to restore the affected area with a realization of both the material limitations and demands.
- An understanding of the **oral environment** into which the restoration will be placed.
  - To understand the biological basis and function of the various **tooth components** and **supporting tissues** although the knowledge of correct **dental anatomy**.





Bone

Periodontal  
Ligament

Cementum

Pulp

Dentin

Enamel



# Purposes of Operative Dentistry

## *DIAGNOSIS*

Proper diagnosis is vital for treatment planning.

## *PREVENTION*

To prevent any recurrence of the causative disease and their defect.

## *INTERCEPTION*

Preventing further loss of tooth structure by stabilizing an active disease process.

## *PRESERVATION*

Preservation of the vitality and periodontal support of remaining tooth structure.

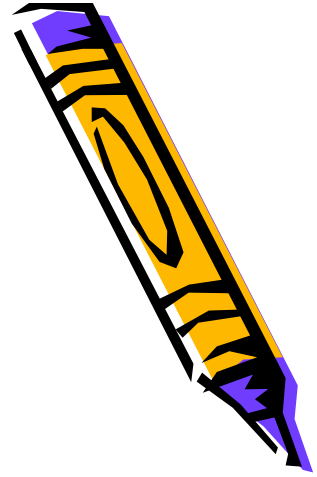
## *RESTORATION*

Includes restoring **form**, **function**, **phonetics**, and **esthetics**.



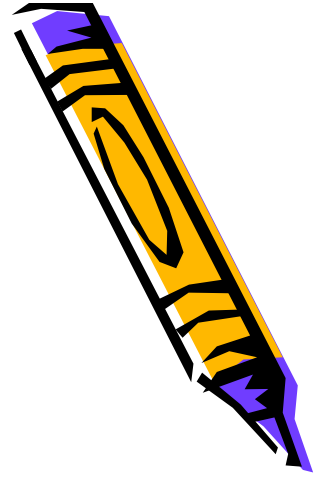
The placement of a restoration in a tooth requires the dentist to:

- Practice applied **human biology + microbiology**
- Possess highly developed **technical skills**
- Demonstrate **artistic abilities**



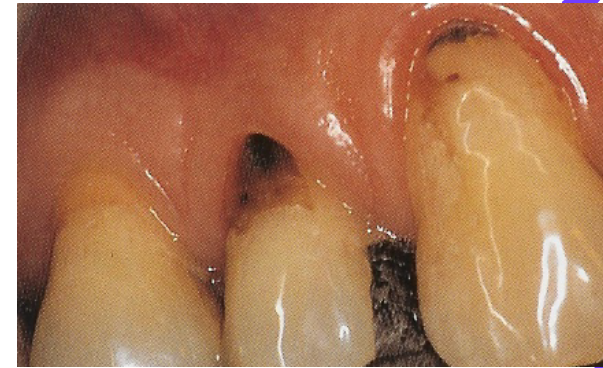
# Type of Lesion in Tooth Destruction

- Dental caries
- Tooth wear
- Trauma
- Developmental defect



# Dental Caries

- Dental caries is an infectious microbiological disease of the teeth that results in localized **dissolution** and **destruction** of the calcified tissue, caused by the action of **microorganisms** and **fermentable carbohydrates**.

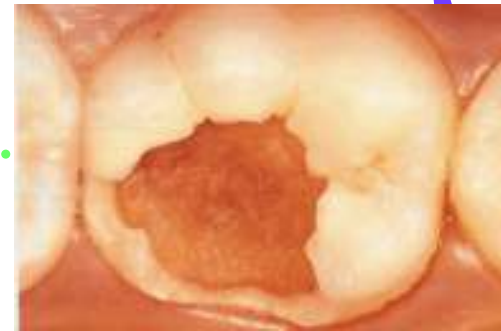


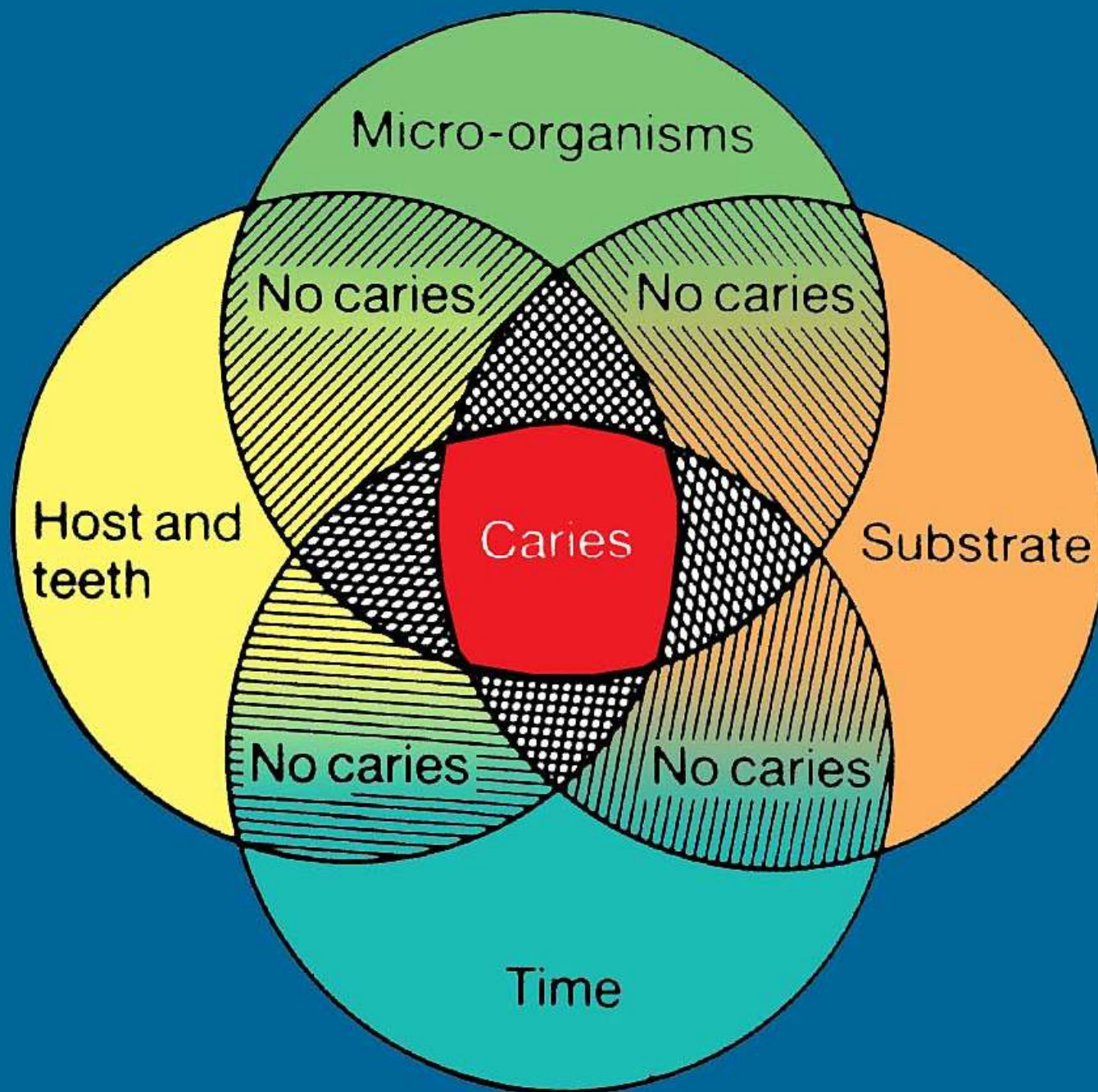
# Dental Caries

Characterized by



- Demineralization of the mineral portion of enamel + dentine.
- Disintegration of their organic material.
- As the disease approach the pulp may result in death of the pulp.
- It can be arrested or prevented.







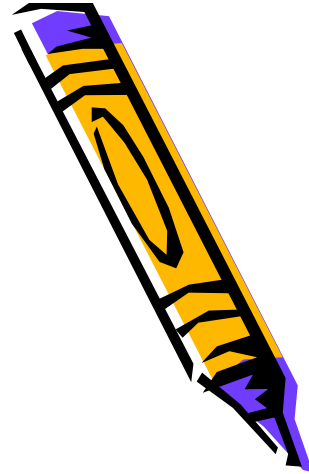
# Classification of Decay

- Based on anatomy of the surface involved
- Pit and fissures carious lesions
  - *Class I* – begin in the depth of pits and fissures in enamel

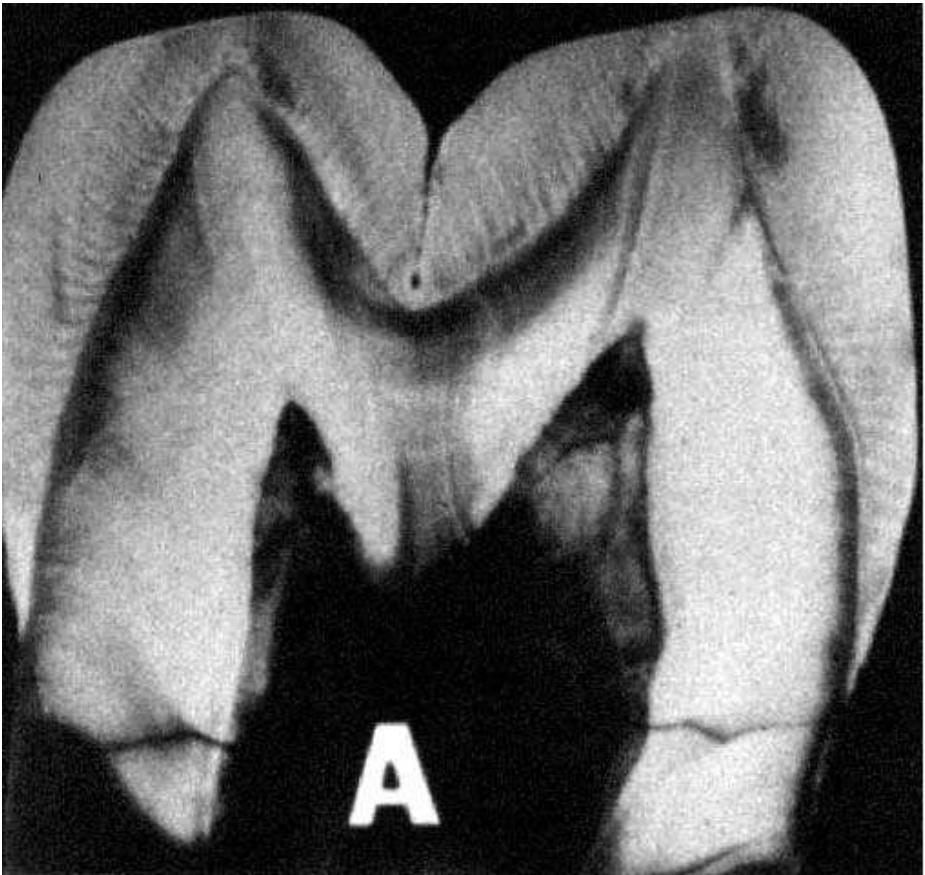
## – Occur:

- *Occlusal surface of post. teeth*

*Lingual fossa of maxillary incisors*

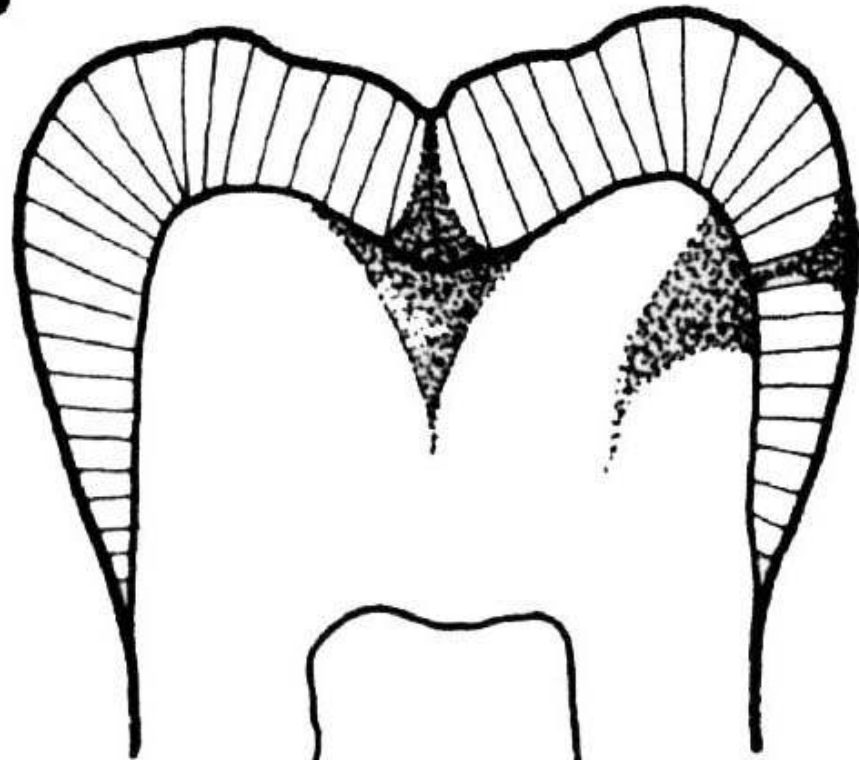






**B**

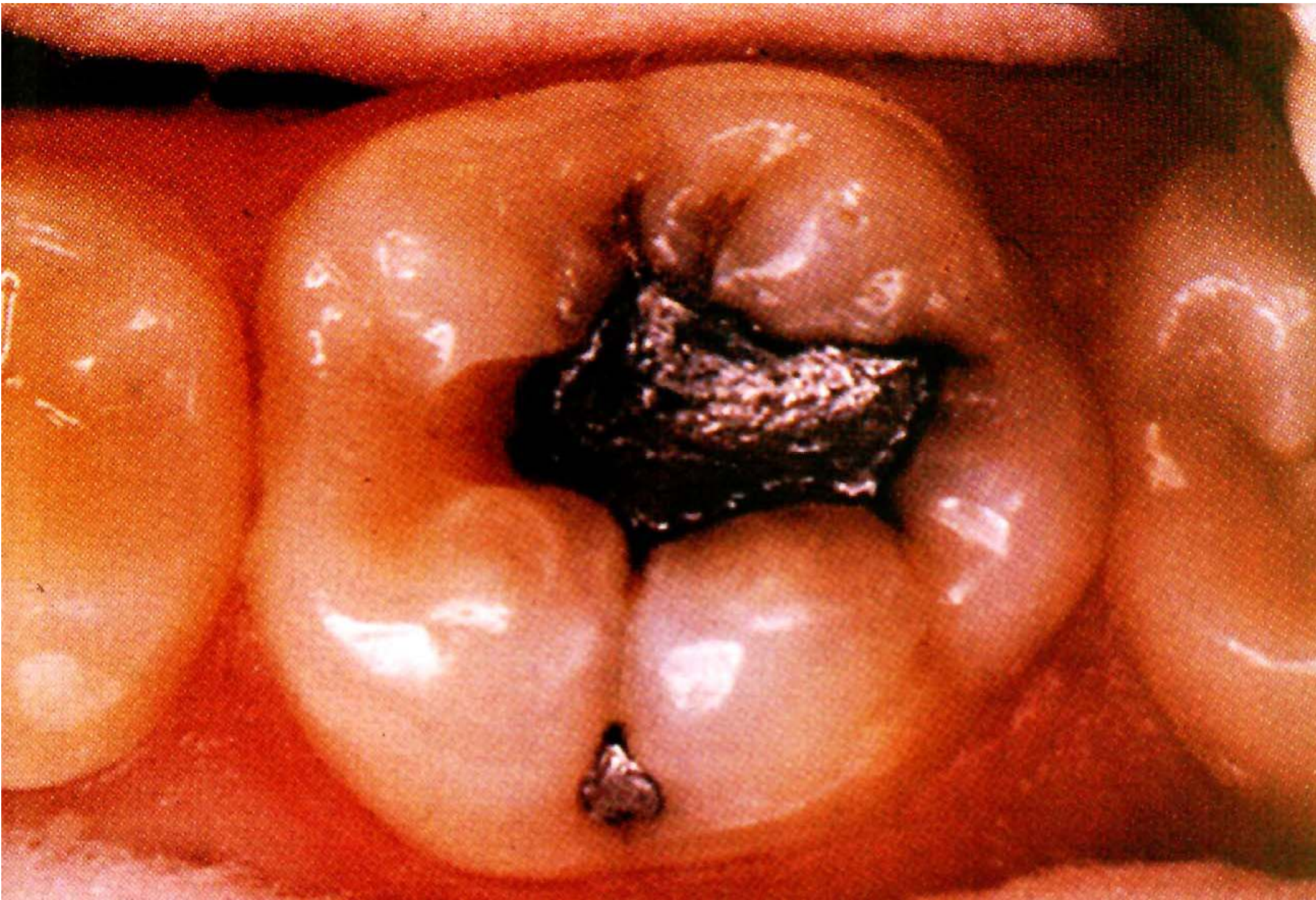
Occlusal

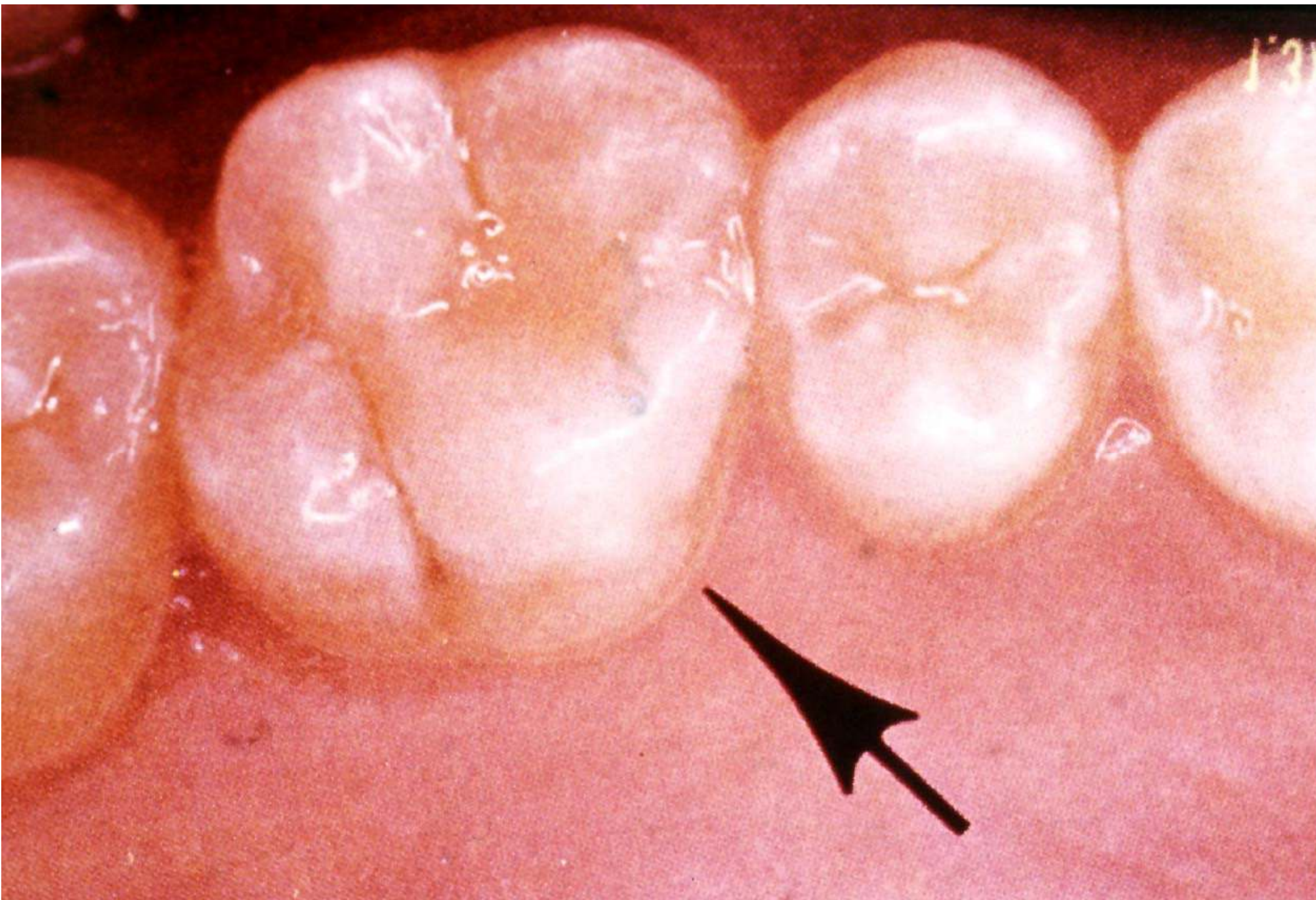


Mesial

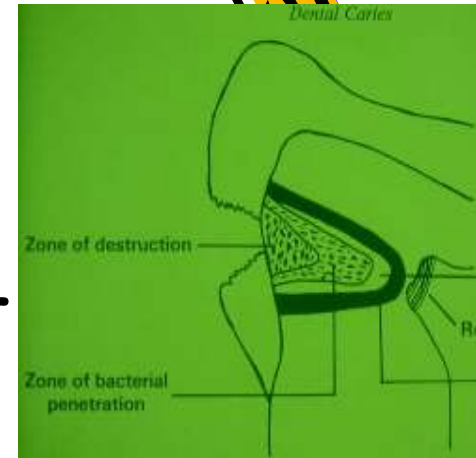








# Smooth Surface Carious Lesions



- Occur on the smooth surface of the anatomic crown of a tooth in area that are most inaccessible to the natural cleansing action of the lips, cheeks and tongue.

– Proximal surfaces – **class II**

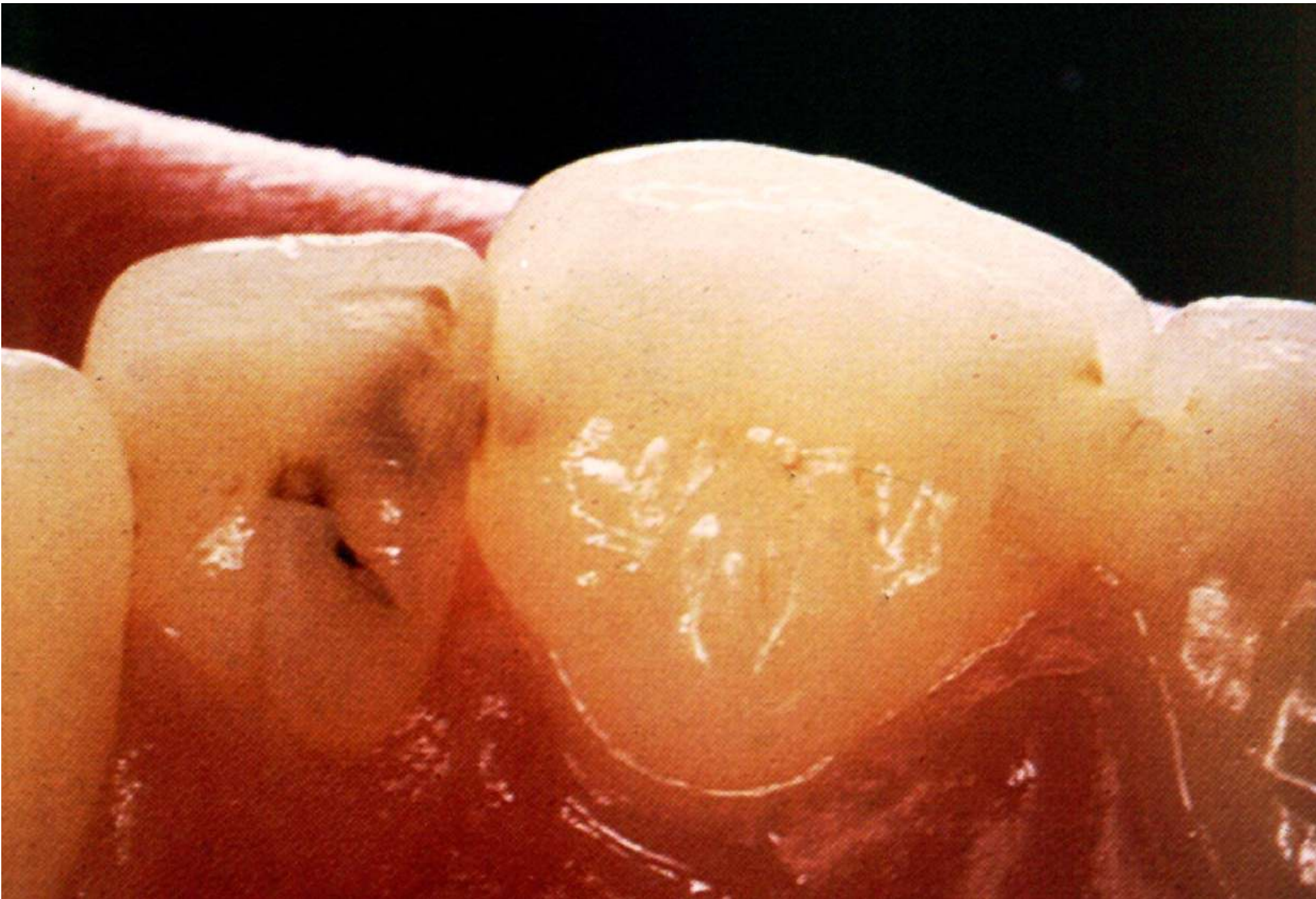
– Facial and lingual surfaces –  
**class III, IV, V**



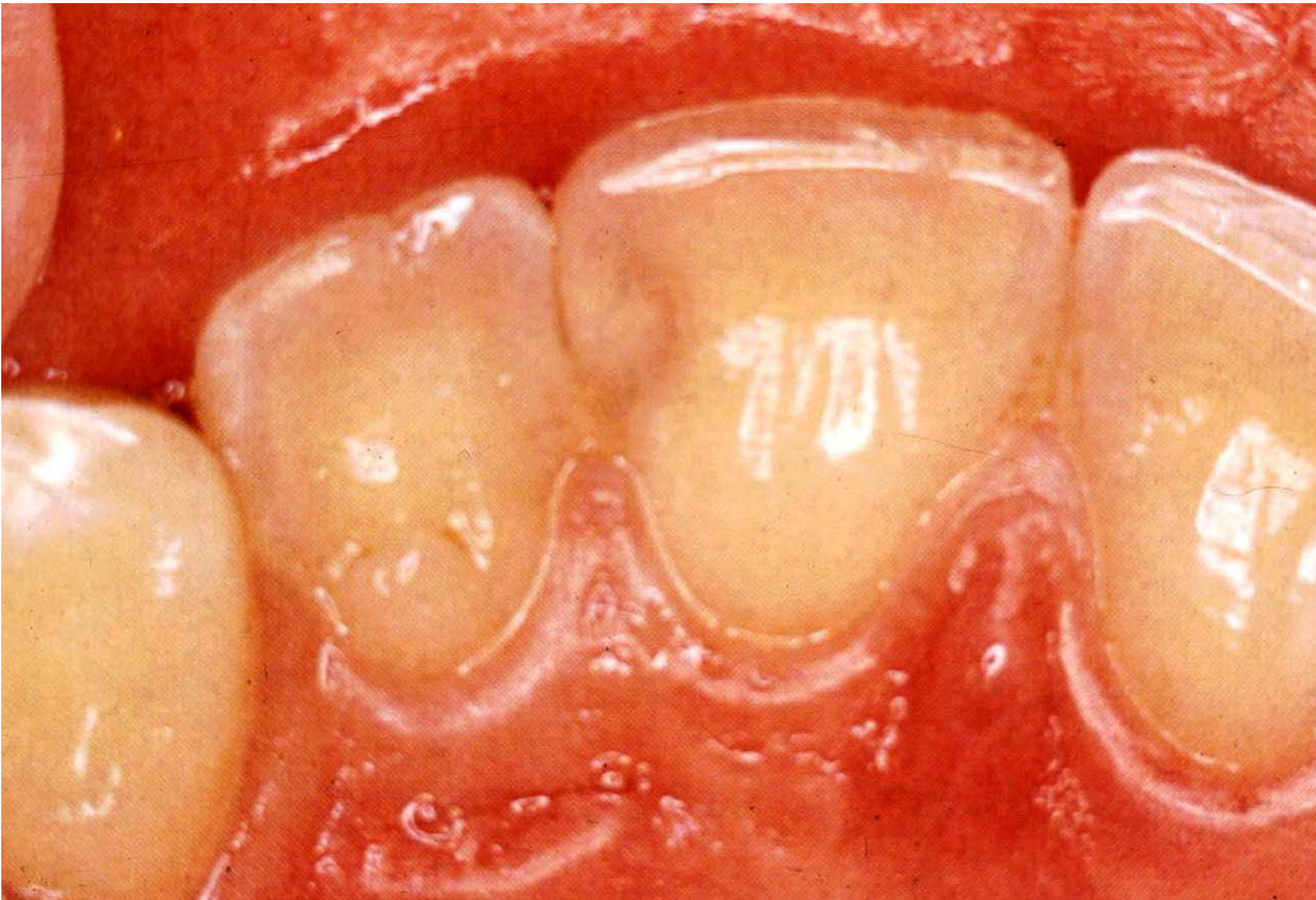
Root caries on **cementum**



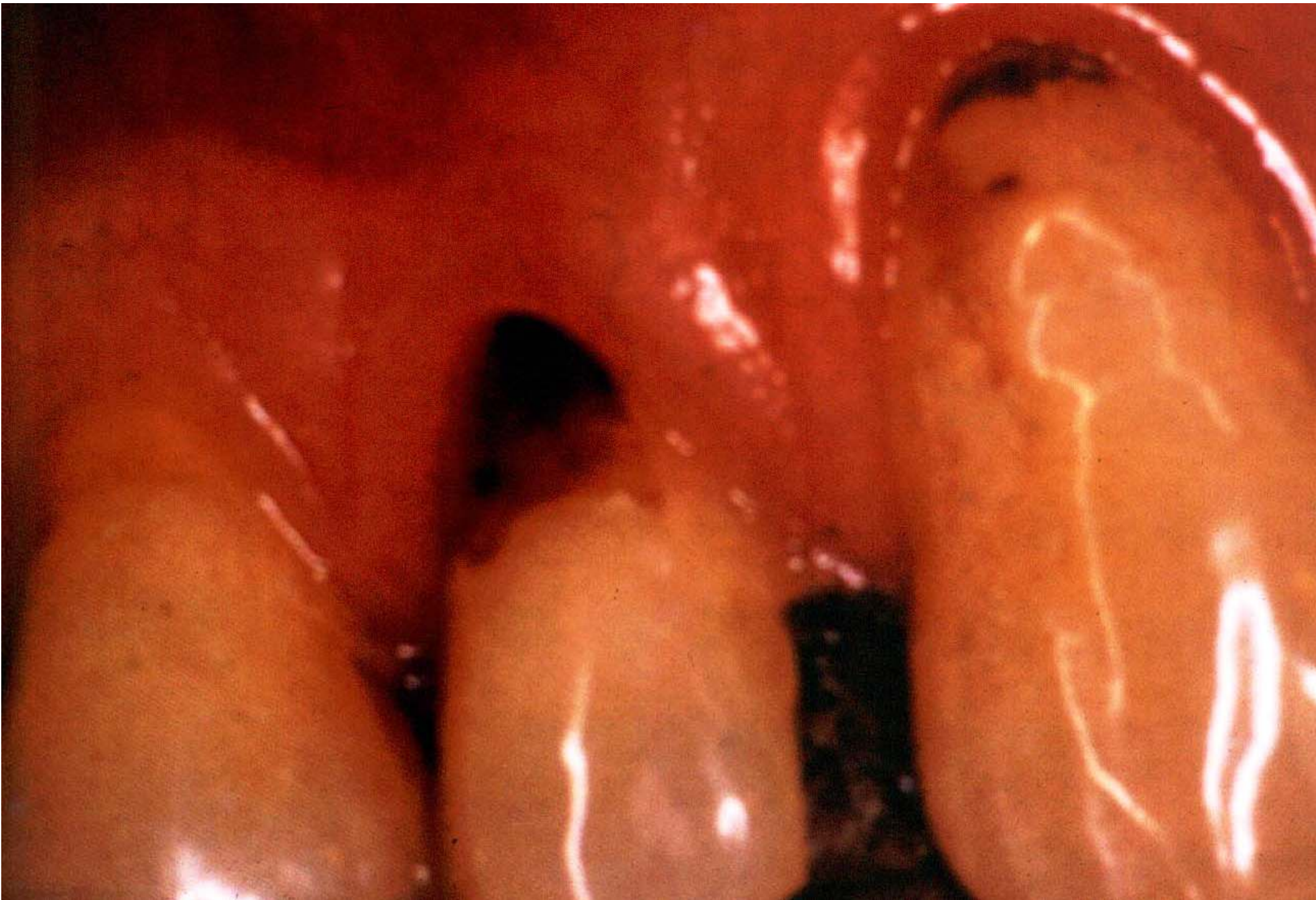
















# Tooth Wear

- Maybe defined as the surface loss of dental hard tissues other than by caries or trauma.

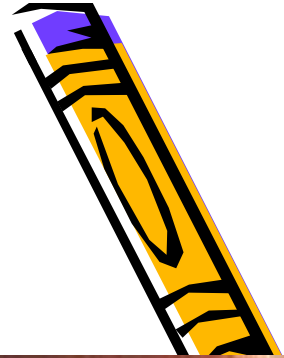
- *Erosion:*

- Loss of dental hard tissue as a result of a **chemical process** not involving **bacteria**.

- Causative agent  $\Rightarrow$  **acid**

- Source of acid  $\Rightarrow$  **dietary** , **stomach**

- Affected area  $\Rightarrow$  **palatal surface ant.** ,  
**buccal surface post.**



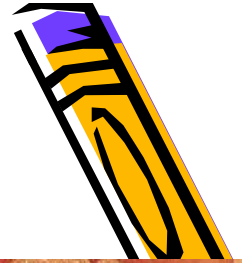
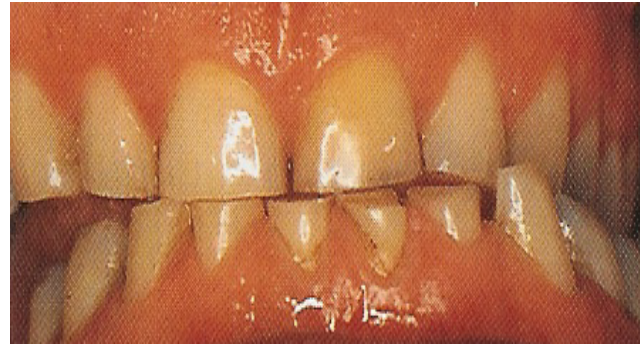
# Tooth Wear

- *Attrition:*

- Mechanical wear between opposing teeth commonly occurs in combination with erosion.

- Causative agent ⇒ *abrasive diet , bruxism*

- Affected area ⇒ *occlusal or incisal surface*



# Tooth Wear



- *Abrasion:*

- Wearing away of tooth substance by **mechanical means** other than by opposing teeth:

- Causative agent  $\Rightarrow$  *over vigorous tooth brushing*

- Affected area  $\Rightarrow$  *buccally at cervical margin.*

**Dish-shaped or V-shaped**





# Trauma

- Traumatic injuries are acquired suddenly.
- May involve the hard dental tissues and the pulp  $\Rightarrow$  required immediate operative management.

- *Local injuries:*

- Laceration of the lip, tongue, and gingival tissue

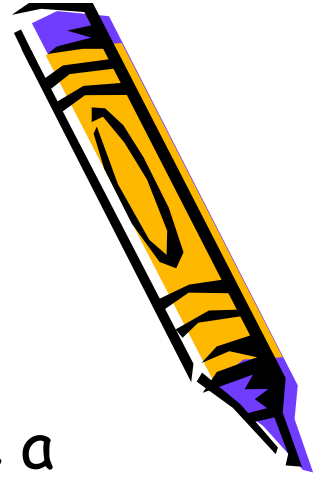
Fracture – alveolar bone, root, crown

Subluxation of a tooth





# Developmental Defect



- Teeth do not always develop normally and there are a number of defects in tooth structure or shape which occur during **development** and become apparent on eruption.
- Teeth are often unsightly or prone to excessive tooth wear  
⇒ *require restoration to*

**Improve appearance or function**

**– Protect the underlying tooth structure**

Enamel hypoplasia

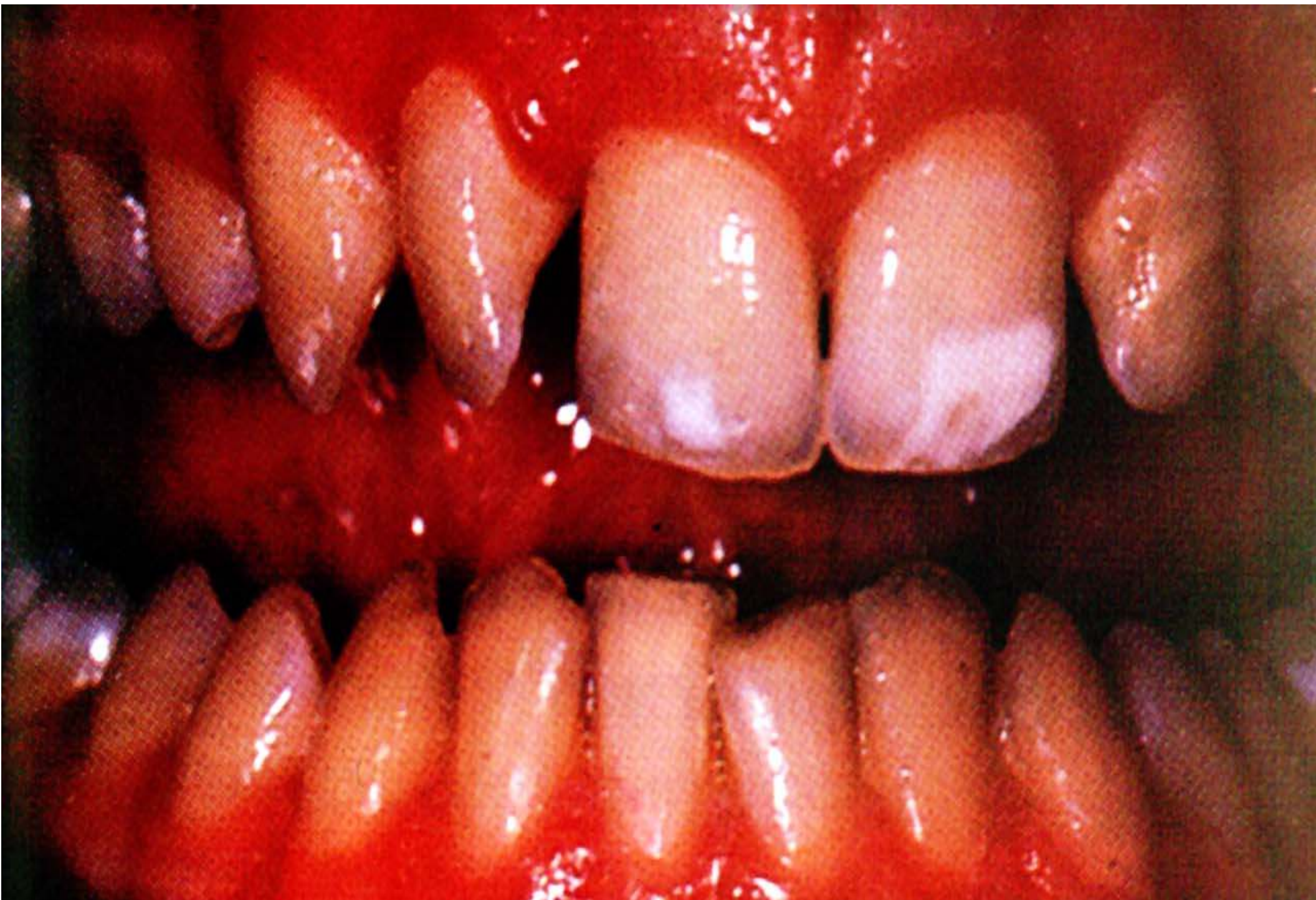
Hypo mineralized enamel

Enamel fluorosis

Tetracycline stain











# Relationship between operative dentistry and other dental specialties

When an operative procedure is performed, there are general guidelines when operative treatment should occur relative to other form of care like:

Pedodontics •

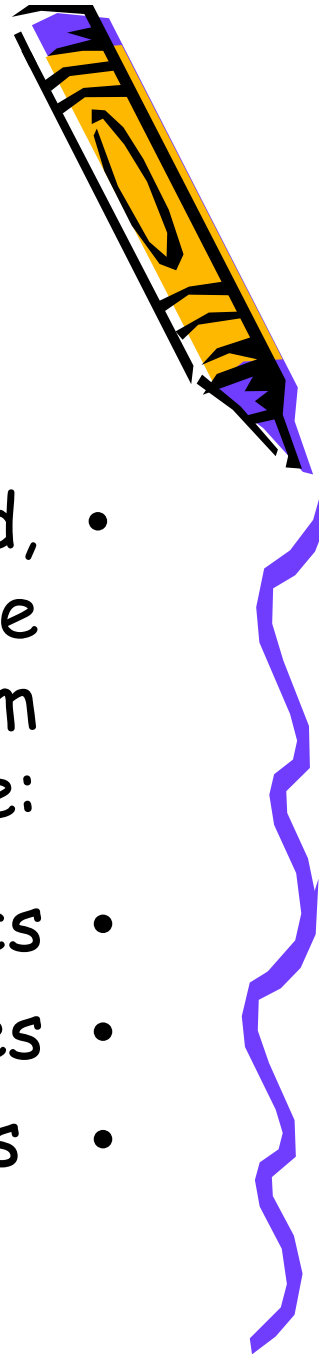
Endodontics •

Periodontics •

Orthodontics •

Oral surgeries •

Prosthodontics •





# Relationship between operative dentistry and other dental specialties

*Pedodontics:* restorative treatment •  
involved.



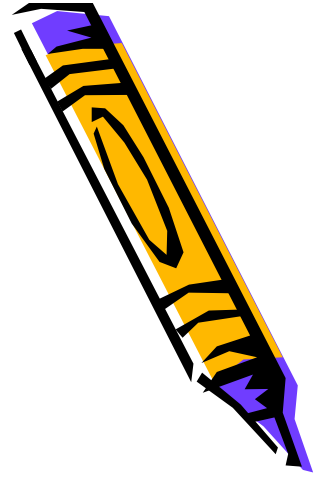
***Endodontics:*** root canal treatment.

Pulpal / periapical area must be evaluated before operative therapy is initiated.

➤ Large restoration

➤ Cast restoration

➤ Improper root canal treatment

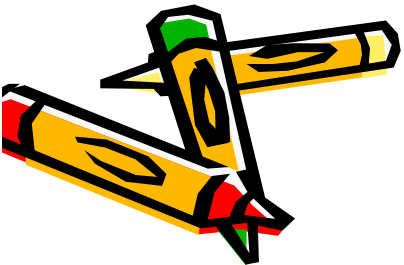
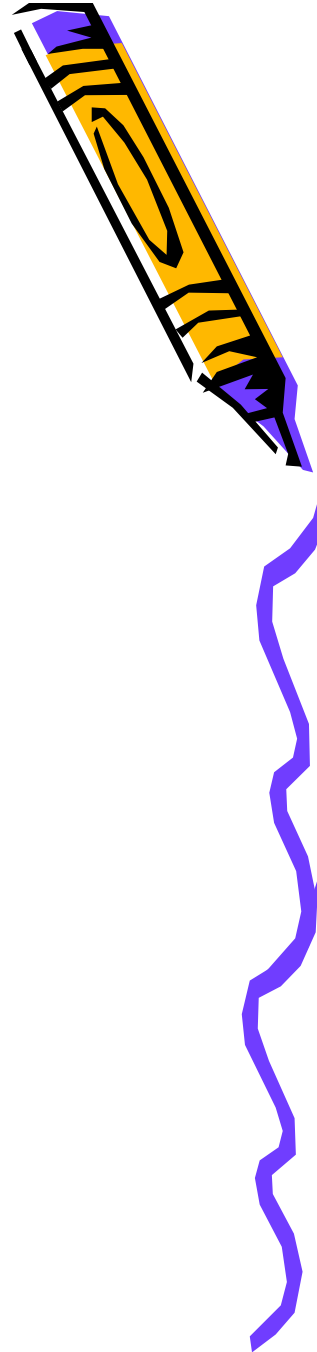




***Periodontics:*** gingival treatment.

Generally periodontal tx. should precede operative care to create a more **desirable environment** for performing operative treatment.

Deep caries lesion often requires caries control or root canal treatment **prior** to periodontal treatment.

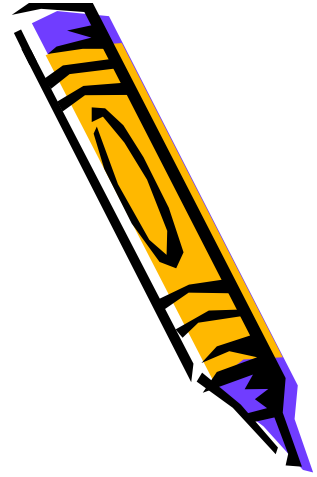


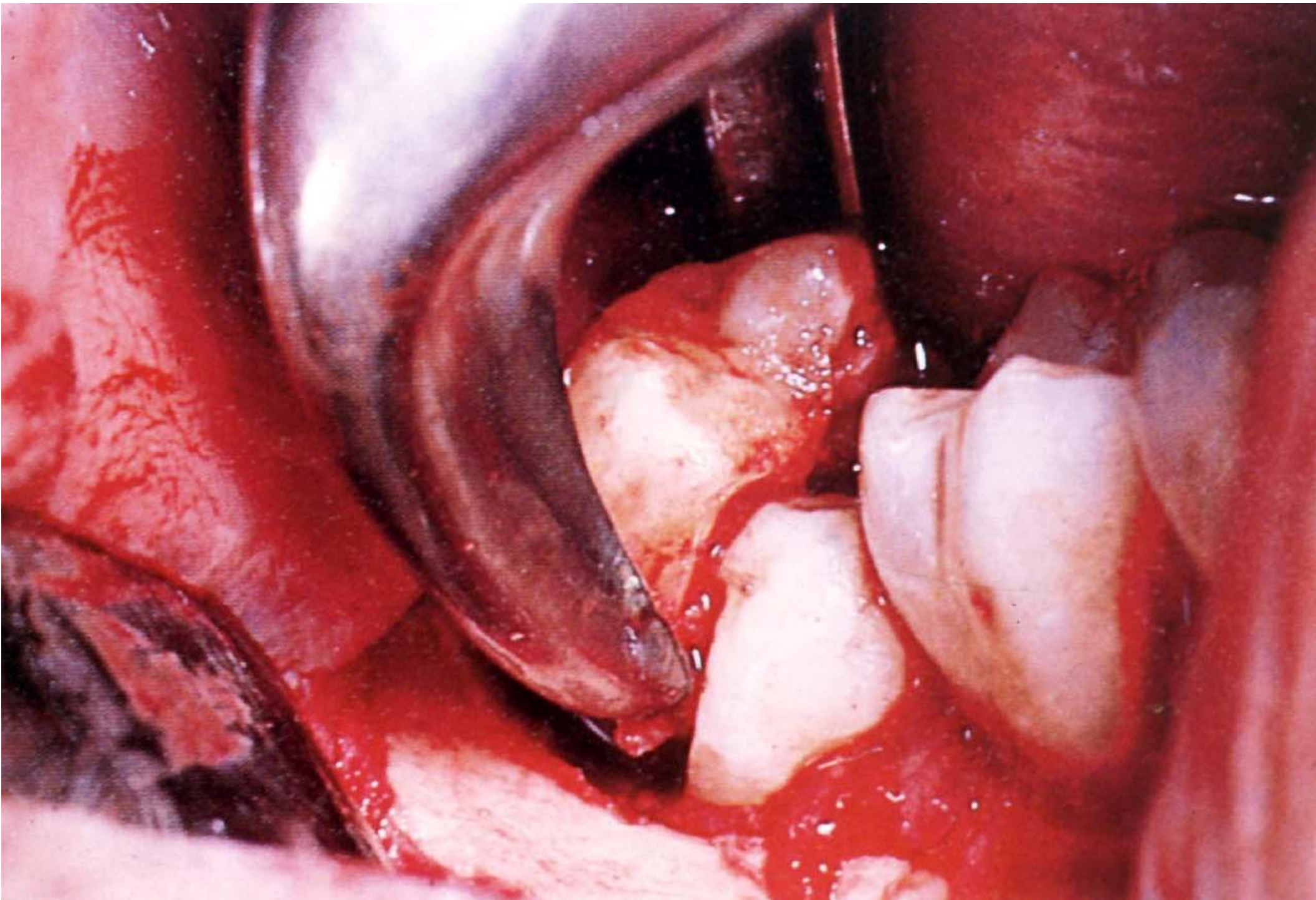


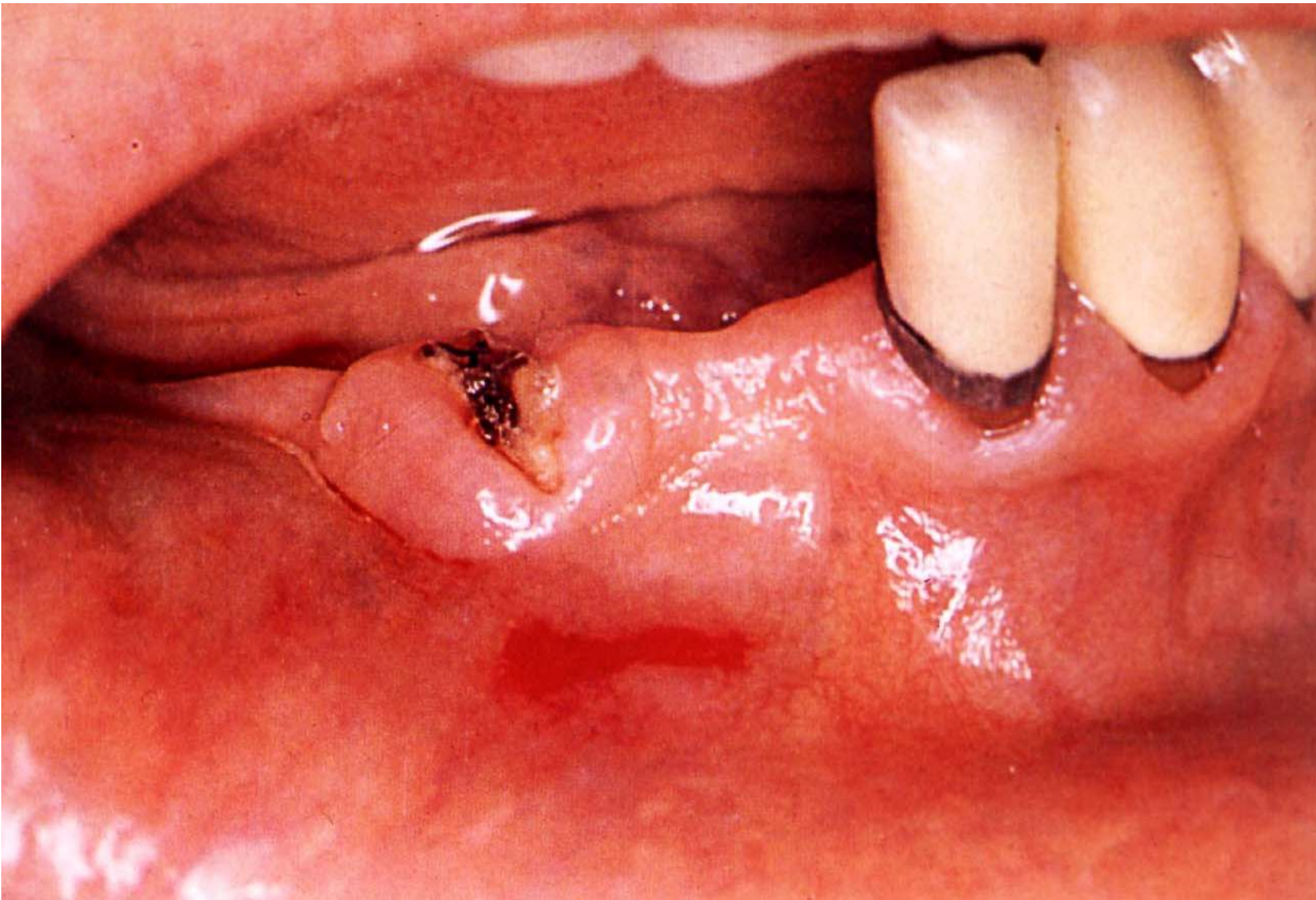
# Relationship between operative dentistry and other dental specialties

- *Oral surgery*

- Impacted, unerupted, and hopelessly involved teeth should be removed **prior** to operative treatment.





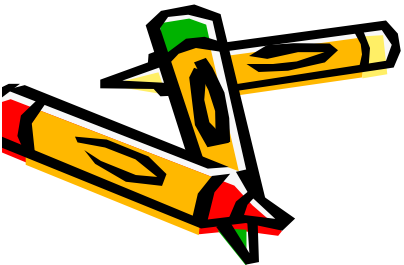




## *Orthodontics*

Include extrusion or realignment of teeth to provide spacing, stress distribution, function and esthetics.

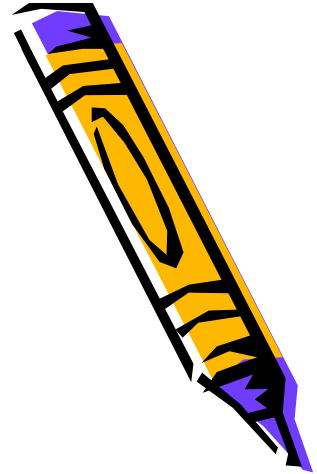
All teeth must be free of caries by operative treatment before ortho treatment is completed



# Relationship between operative dentistry and other dental specialties

## □ *Occlusions*

- ❖ Occlusions should be evaluated
- ❖ occlusal adjustment should occur *before* the definitive restoration treatment occur.

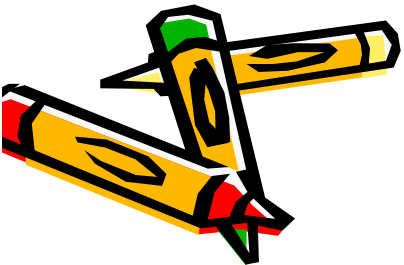
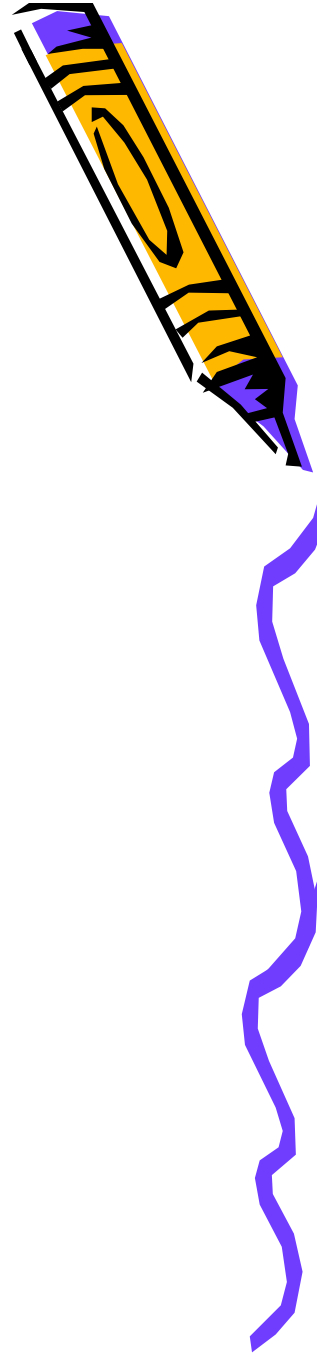




## ❑ *Fixed and removable prosthodontics*

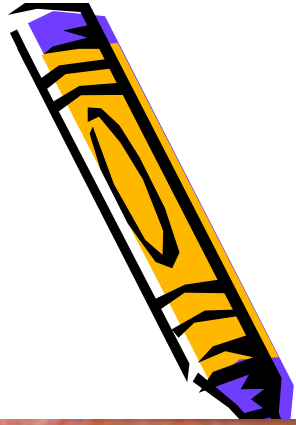
❖ A restoration must be placed as a foundation to provide improved retention for a full crown.

❖ Cavity preparation and appropriate restorative materials must correlate with design of the contemplated removable prosthesis













# Factors Influencing Dental Practice

- Because of the dynamic status of dental practice, many developments and advancements will occur in the future.
- Advances in *technology, science and materials* will have a significant impact on the future of and demand for dental practice.
- Demographics  $\Rightarrow$  **population**  $\uparrow$  and will change

Economic factors

Dental health

Dental manpower





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Country

Dentist

Population Ratio

---

UK

1

3,000

SWEDEN

1

800

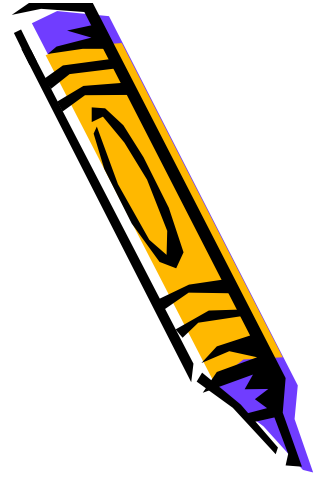
SAUDI  
ARABIA

1

8,000



- Dentist must continue to broaden its **knowledge** on biologic basis.
- Practitioners must continually familiarize themselves with the **advances** being made.
- Increased research activity and continued practitioner adaptability will result in **improved oral health of population** throughout the world.

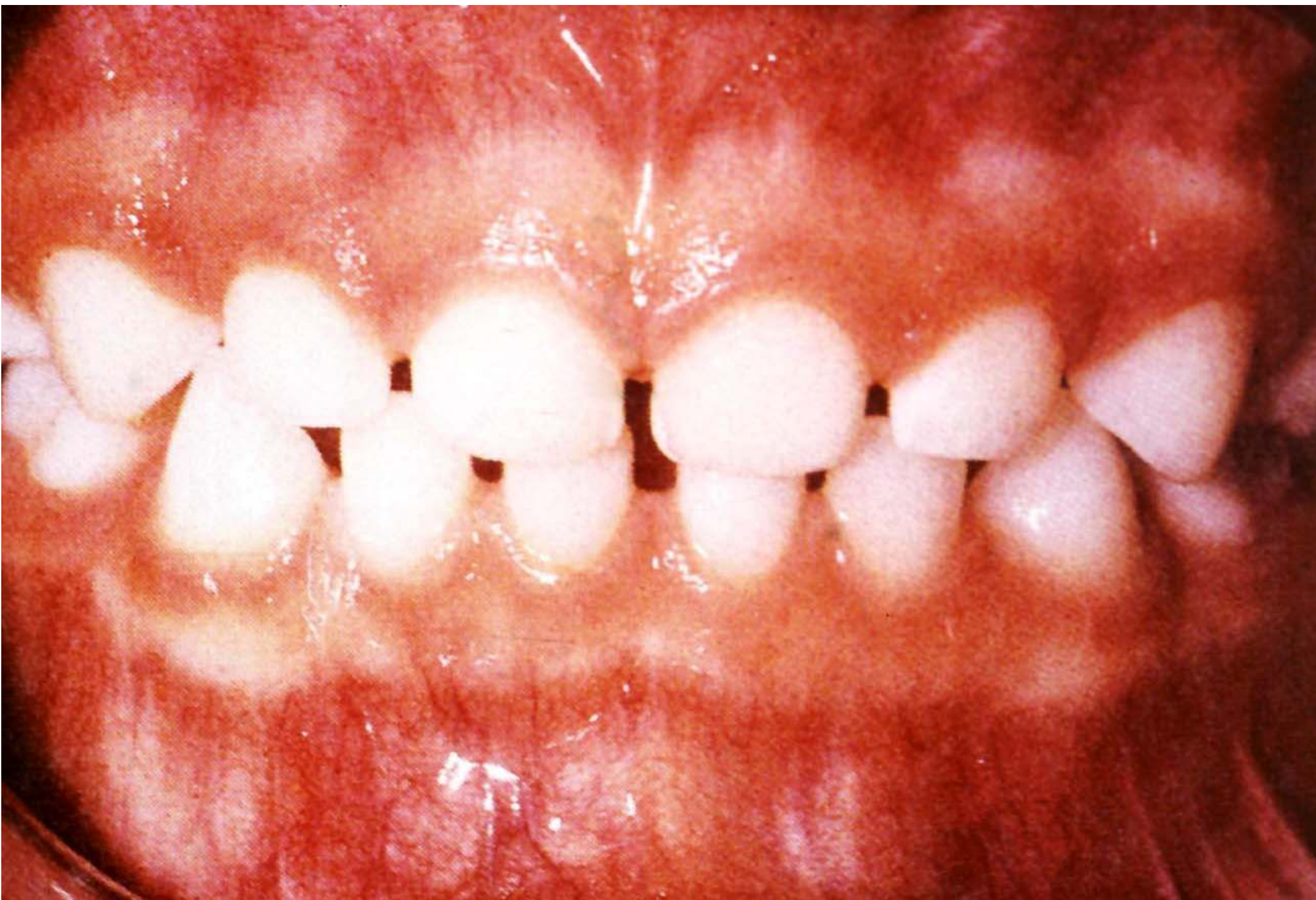


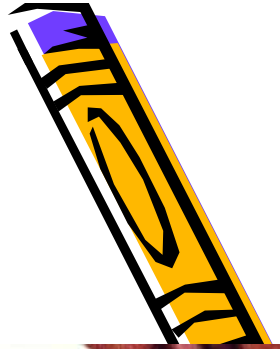
THANK YOU



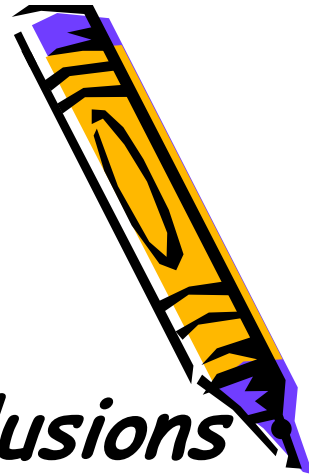
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— Best Friends —





# Relationship between operative dentistry and other dental specialties



## *Occlusions*

Occlusions should be evaluated; any occlusal adjustment should – occur *before* the definitive restoration treatment occur.

## *Fixed and removable prosthodontics*

A restoration must be placed as a foundation to provide improved – retention for a full crown.

Cavity preparation and appropriate restorative materials must – correlate with design of the contemplated removable prosthesis.



