TOOTH PREPARATION

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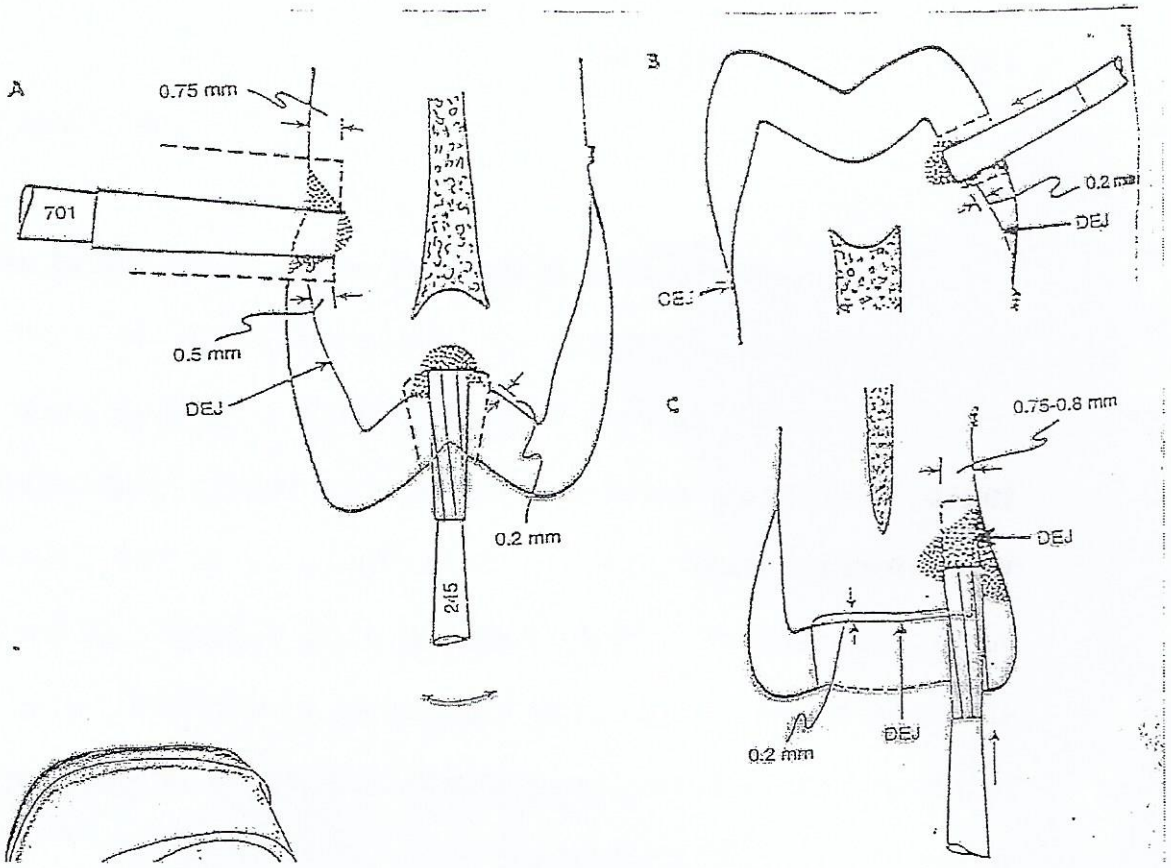
Tooth preparation is defined as the mechanical alteration of a defective, injured, or diseased tooth to best receive restorative material that will reestablish a healthy state **for the tooth, including esthetic corrections where indicated, along with normal form and function.** Included **in the procedure of preparing the tooth is** the removal of all defective or friable tooth structure because remaining infected or friable tooth structure may result in further caries progression, sensitivity or pain, or fracture of the tooth and/or restoration.

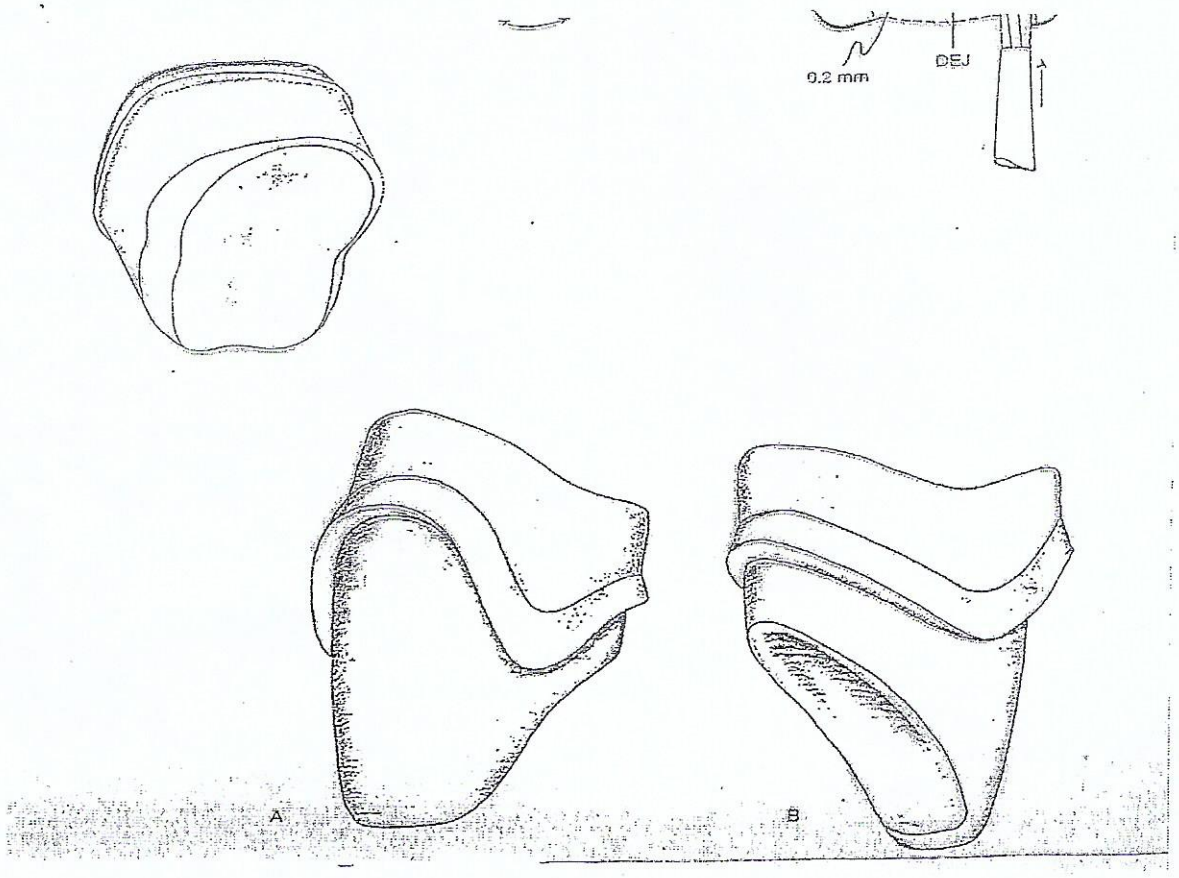
Intracronal and Extra coronal Tooth Preparations:

An ***intracoronal*** tooth preparation is usually "boxlike," having both internal and external preparation walls With a conservative tooth preparation for treatment of a small lesion, much of the tooth crown, as well as crown surface, is not involved. Nevertheless, the remaining tooth usually is weakened, and the restoration may or may not restore the tooth strength.



extracoronal preparation

"stump like," having walls or surfaces that result from removal of most to all of the enamel. The extra coronal restoration ,termed a *crown,* envelops the remaining tooth crown and thereby usually restores some of its strength.



The first stage of tooth preparation

Initial tooth preparation stage

mechanical alterations of the tooth are extended to sound tooth structure (sound dentin or enamel supported by non carious dentin) in all directions (facially, lingual, gingival, incisally or occlusally, mesially, and distally) The preparation walls are designed in the initial stage of tooth preparation to both retain the restorative material in the tooth and resist potential fracture of the tooth or restoration from masticatory forces delivered principally in the long axis of the tooth.

The second stage of tooth preparation:

completion of the tooth preparation.

It includes excavating any remaining, infected carious dentin; removing old restorative material if indicated; protecting the pulp; incorporating additional preparation design features that both minimize the chance of tooth or restoration fracture against oblique forces and maximize the retention of the material in the tooth; finishing preparation walls, particularly regarding the margins; and performing the final procedures of cleaning, inspecting, and, sometimes, sealing the preparation before placement of the restorative material. (Bonded restorations).

TOOTH PREPARATION TERMINOLOGY

Simple, Compound, and Complex Tooth Preparations

A tooth preparation is termed ***simple*** if only one tooth surface is involved ***compound*** if two surfaces are involved and ***complex*** for a preparation involving three (or more) surfaces.

Abbreviated Descriptions of Tooth Preparation

For brevity in records and communication, the description of a tooth preparation is abbreviated by using the first letter, capitalized, of each tooth surface involved. Examples are:

(1) an occlusal tooth preparation is an O.

(2) a preparation involving the mesial and occlusal surfaces is an MO.

(3) a preparation involving the mesial, occlusal, and distal surfaces is an MOD .

Tooth Preparation Walls

Internal Wall

An internal wall is a prepared (cut) surface that does not extend to the external tooth surface.

Axial wall

An axial wall is an internal wall parallel with the long axis of the tooth .

A **pulpal wall** is an internal wall that is both perpendicular to the long axis of the tooth and occlusal of the pulp.

External Wall

An external wall is a prepared (cut) surface that extends to the external tooth surface, and such a wall takes the name of the tooth surface (or aspect) that the wall is toward.

Floor (or Seat)

A floor (or seat) is a prepared (cut) wall that is reasonably flat and perpendicular to those occlusal forces that are directed occlusogingivally (generally parallel to the long axis of the tooth). Examples are the pulpal and gingival walls Such floors may be purposefully prepared to provide stabilizing seats for the restoration, thus distributing the stresses in the tooth structure.

Enamel Wall.

The enamel wall is that portion of a prepared external wall consisting of enamel.

Dentinal Wall

The dentinal wall is that portion of a prepared external wall consisting of dentin, in which mechanical retention features may be located.

Tooth Preparation Angles

Although the junction of two or more prepared (cut) surfaces is referred to as an angle.

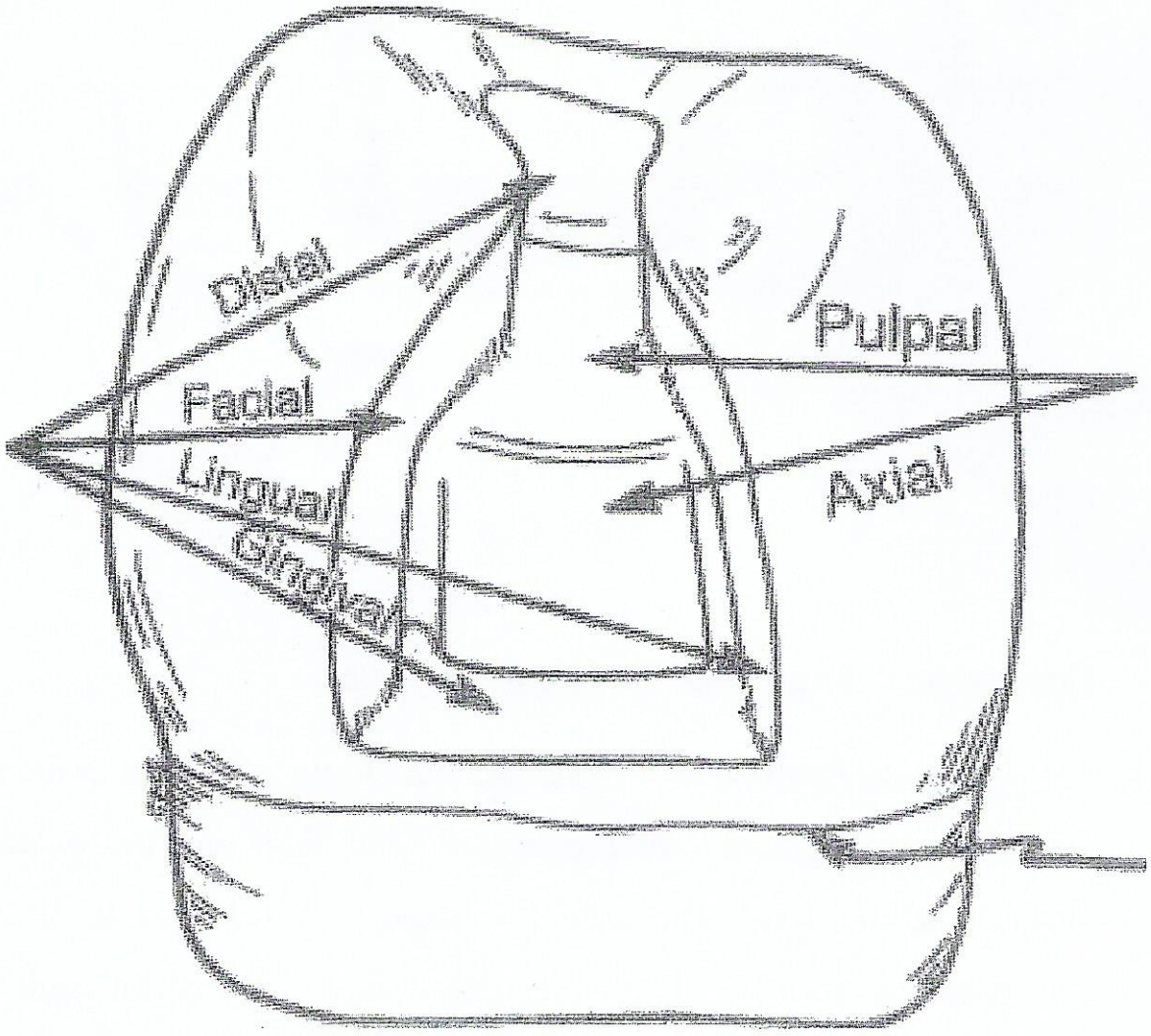
Line Angle

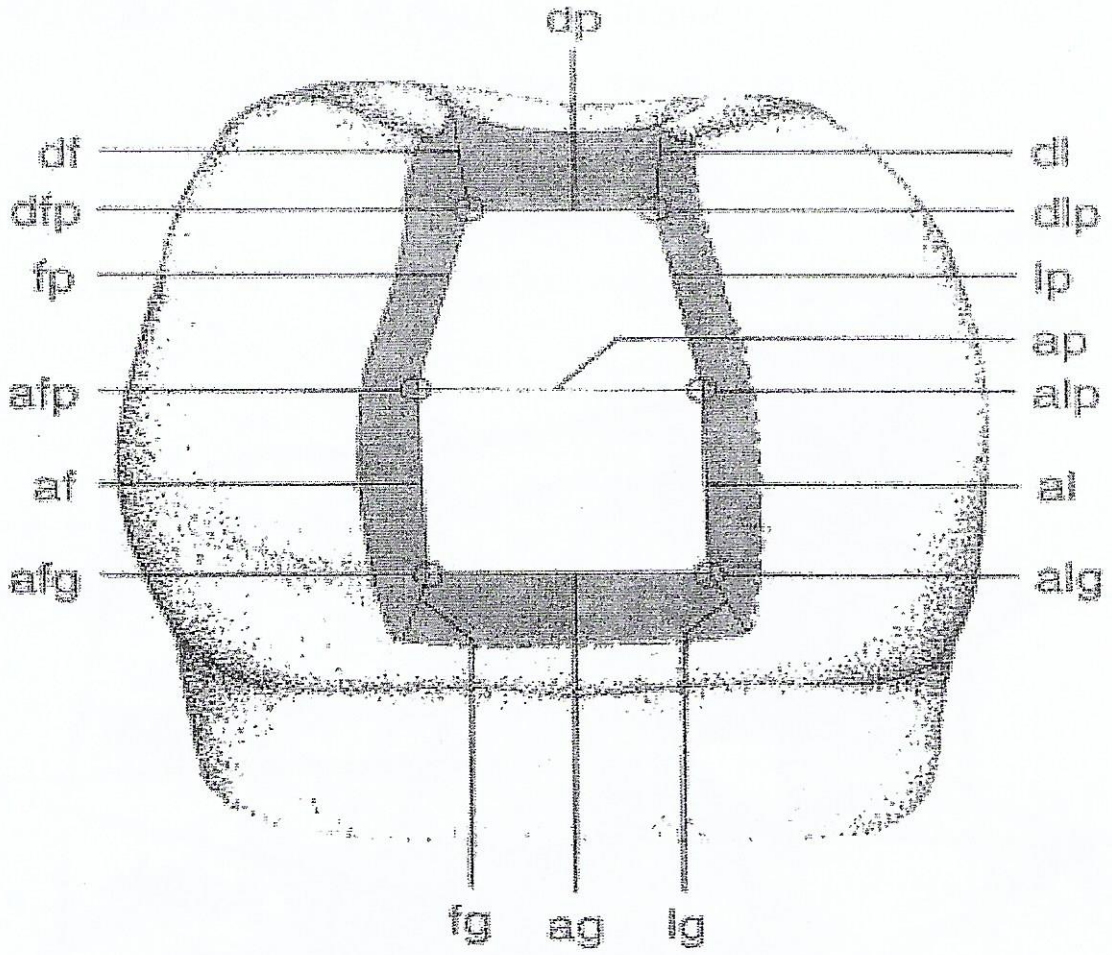
A line angle is the junction of two planal surfaces of different orientation along a line an internal line angle is a line

angle whose apex points into the tooth an external line angle is a line angle whose apex points away from the tooth.

Point Angle.

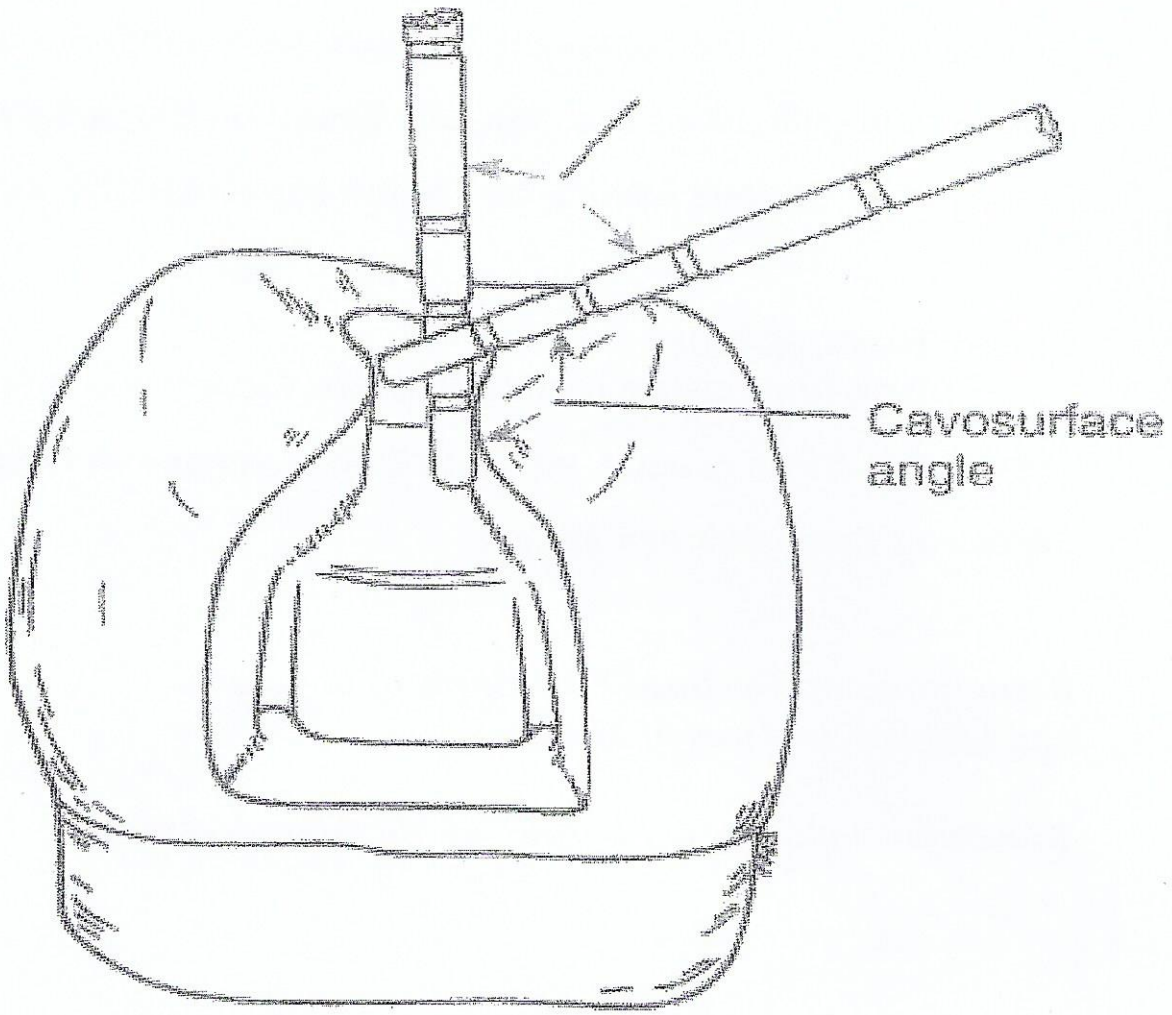
A point angle is the junction of three planal surfaces of different orientation.





Cavosurface* Angle *and Cavosurface Margin

The *cavosurface angle is* the angle of tooth structure formed by the junction of a prepared (cut) wall and the external surface of the tooth the actual j unction is referred to as the *cavosurface margin*. The cavosurface angle may differ with the location on the tooth, the direction of the enamel rods on the prepared wall, or the type of restorative material to be used.



CLASSIFICATION OF TOOTH PREPARATIONS

Classification of tooth preparations according to the anatomic areas involved as well as by the associated type of Treatment was presented by Black and is designated as Class I, Class II, Class III, Class IV, and Class V 4 Since Black's original classification, an additional class has

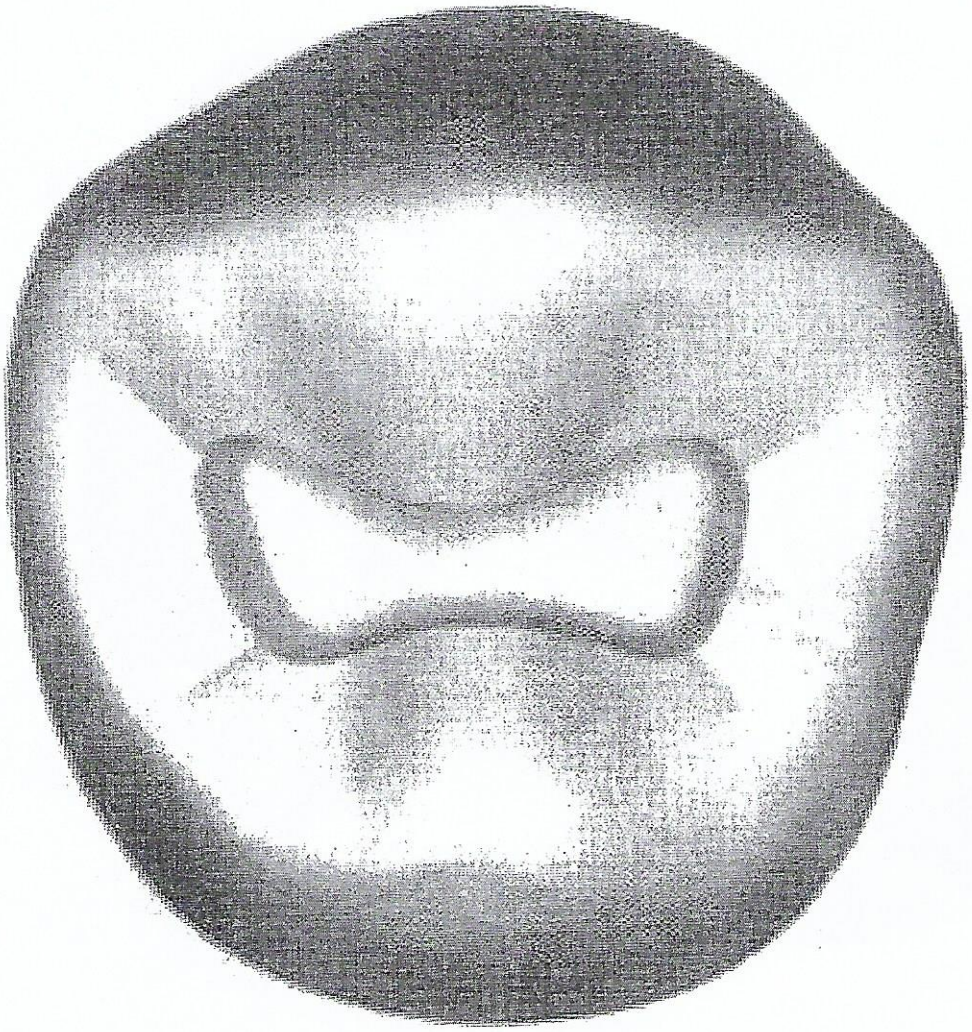
been added, Class VI. Class I refers to pit-and-fissure lesions, whereas the remaining classes are smooth-surface lesions. Classification was originally based on the observed frequency of carious lesions on certain aspects of the tooth.

Class I Restorations

` All pit-and-fissure restorations are *Class I,* and they are assigned to three groups, as follows. ***Restorations on Occlusal Surface of Premolars and Molars.***

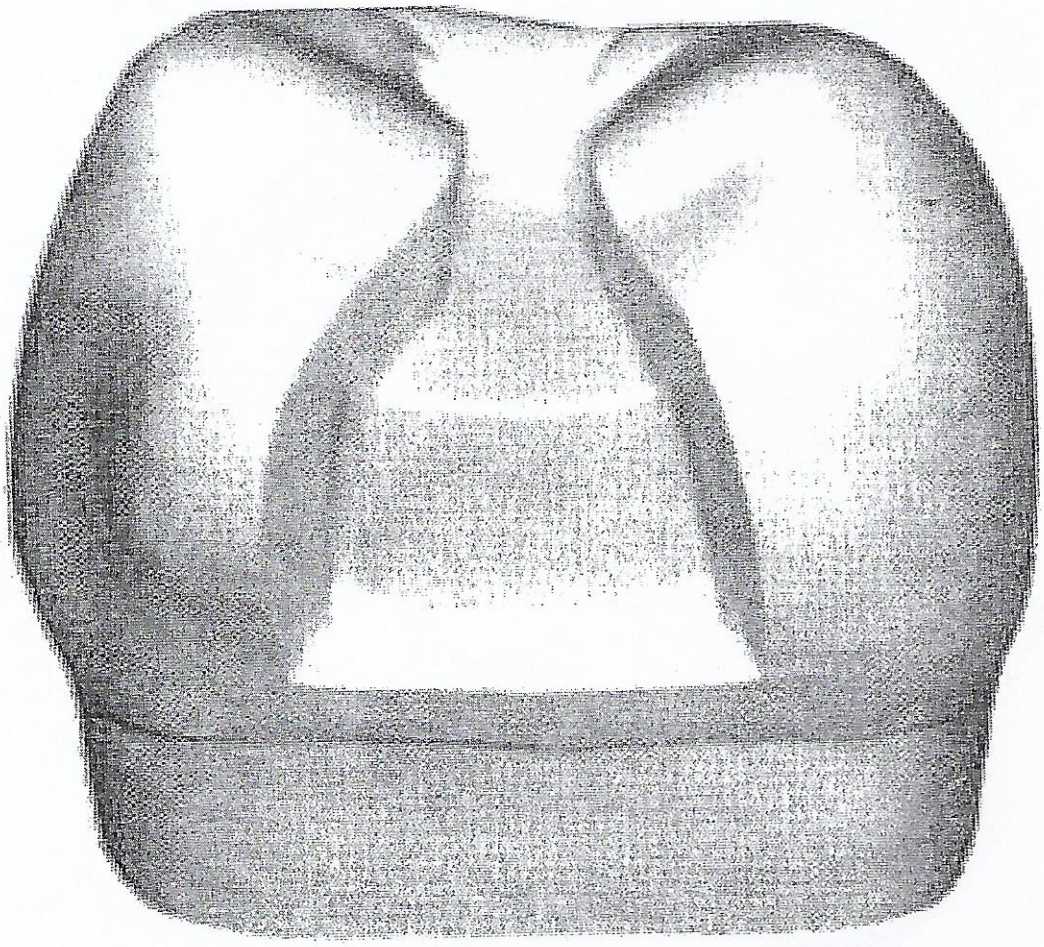
Restorations on Occlusal Two Thirds of the Facial and Lingual Surfaces of Molars.

Restorations on Lingual Surface of Maxillary Incisors.



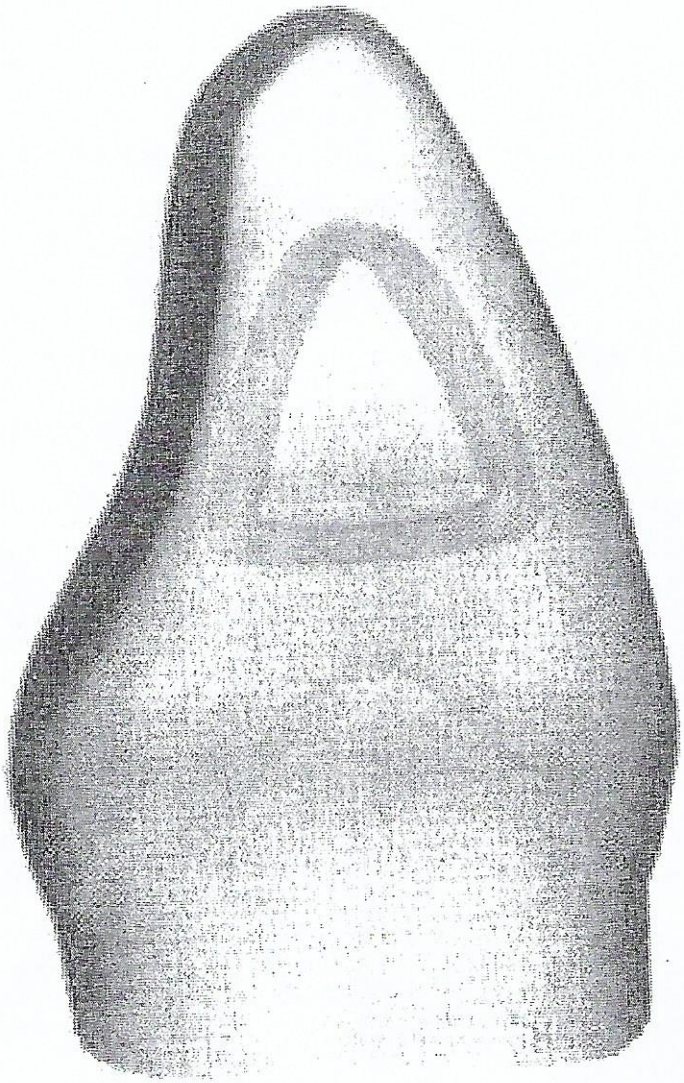
Class II Restorations

Restorations on the proximal surfaces of posterior teeth are *Class II.* A proxim oocclusal **(MO) conventional preparation**.



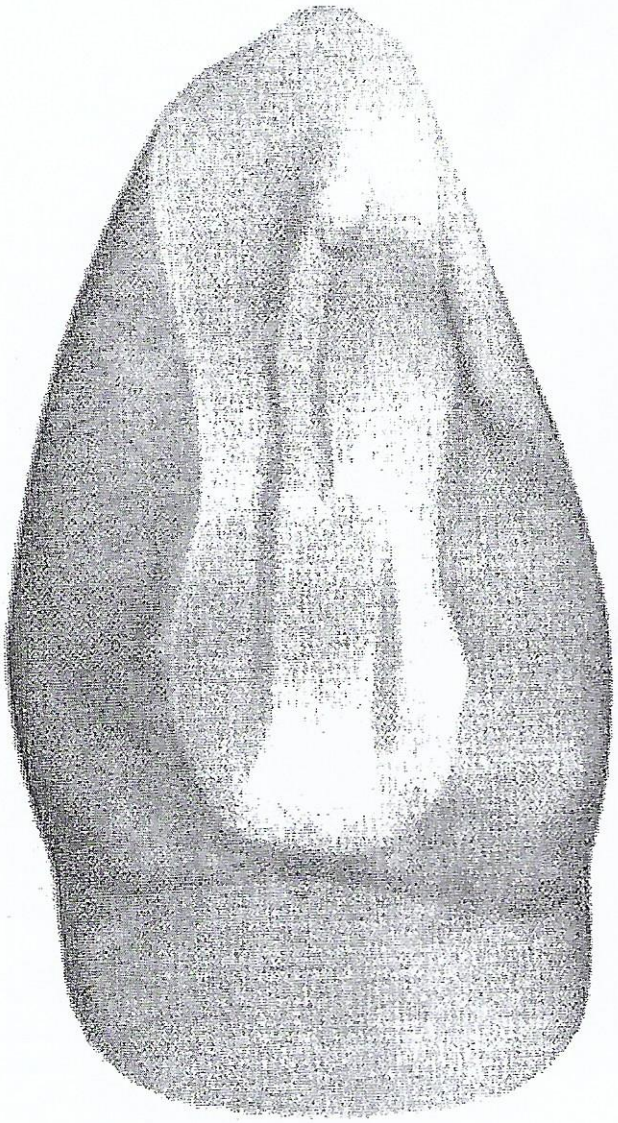
Class III Restorations

Restorations on the proximal surfaces of anterior teeth that do *not* involve the incisal angle.



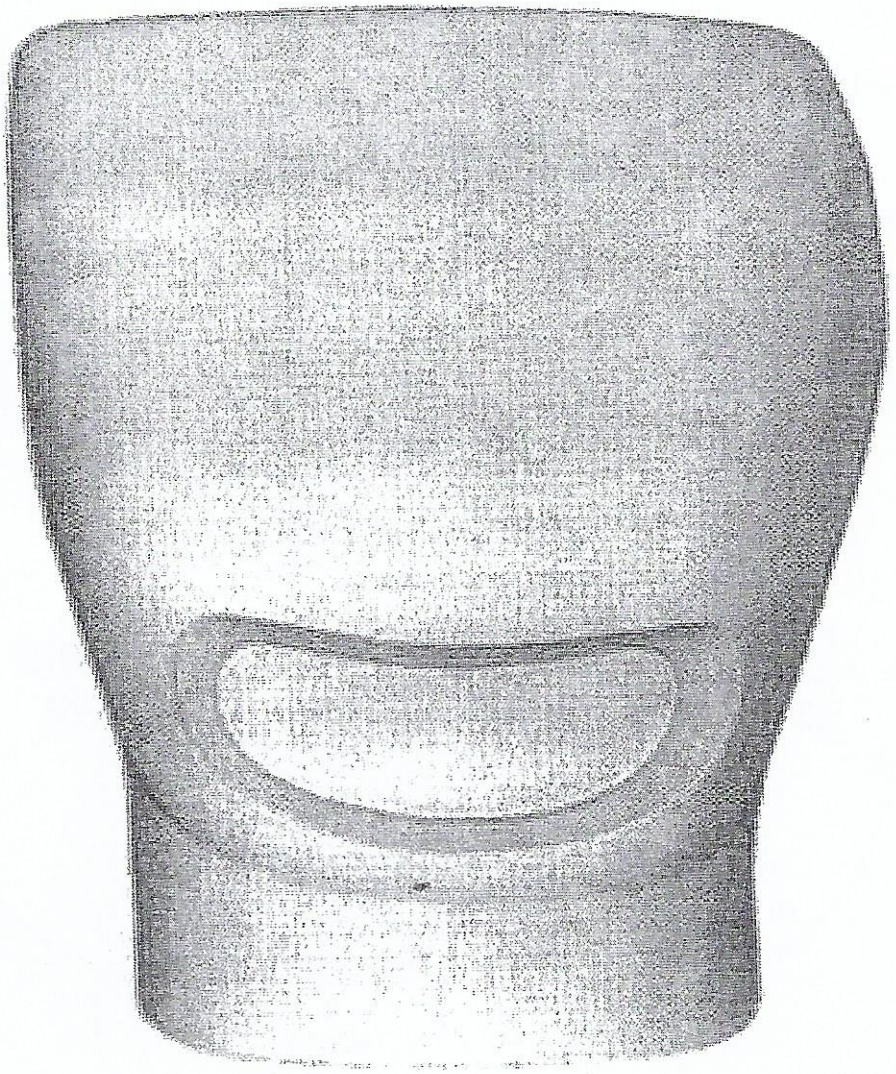
Class IV Restorations

Restorations on the proximal surfaces of anterior teeth that do involve the incisal edge are *Class IV*.



Class V Restorations

Restorations on the gingival third of the facial or lingual surfaces of all teeth (except pit-and-fissure lesions) are *Class V*.

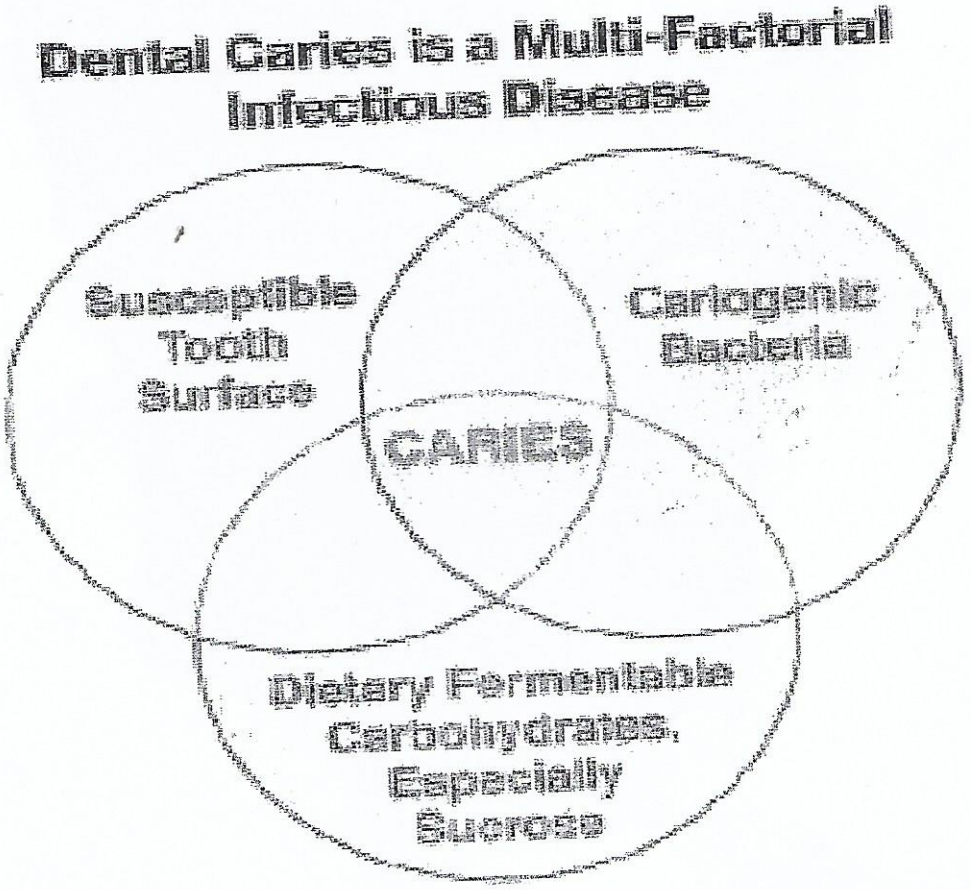


Class VI Restorations

Restorations on the incisal edge of anterior teeth or the occlusal cusp heights of posterior teeth.

CARIES TERMINOLOGY

Dental caries is an infectious microbiologic disease that results in localized dissolution and destruction of the calcified tissues of the teeth. Moreover, caries is episodic with alternating phases of demineralization and remineralization and these processes may be occurring simultaneously in the same lesion.



Classification of Dental Caries

Caries can be classified according to *Location*, *Extent*, and *Rate*.

According To *location*

Primary Caries.

Primary caries is the original carious lesion of the tooth With certain areas of the teeth, variations of this pathologic condition fundamentally influence tooth preparation and therefore should be emphasized. Accordingly, three ***morphologic types of primary caries*** are evident in clinical observation, namely, carious lesions originating:

(1) Enamel pits and fissures.
(2)Enamel, smooth surfaces.
(3) Root surfaces.

Residual Caries.

Residual caries is caries that remains in a completed tooth preparation, whether by operator intention or by accident. Such caries is not acceptable if at the DEJ or on the prepared enamel tooth It may be acceptable, however, when it is *affected dentin,* especially near the pulp (**Affected** and **Infected** Dentin).

Root-Surface Caries.

Root-surface caries may occur on the tooth root that has been both exposed to the oral environment and habitually covered with plaque present and often are prevalent in the older population. *Root caries is usually more rapid than other forms of caries, and thus should be detected and treated early.*

Secondary (Recurrent) Caries.

Secondary caries occurs at the junction of a restoration and the tooth and may progress under the restoration. It is often termed *recurrent caries.* This condition usually indicates that micro leakage is present, along with other conditions conducive to caries.

According to Extent of Caries

*Incipient Caries (**Reversible**);*

Incipient caries is the first evidence of caries activity in the enamel. On smooth surface enamel, the lesion appears opaque white when air-dried, and will seem to disappear (not be distinguishable from contiguous unaffected enamel) if wetted of demineralized enamel has not extended to the DEJ, and the enamel surface is fairly hard and still intact (smooth to the touch). The lesion can be *remineralized* if immediate corrective measures alter the oral environment, including plaque removal and control. This lesion., then, may be characterized as *reversible.* A remineralized lesion usually is either opaque white, or a shade of brown-to-black from extrinsic coloration, has a hard surface, and appears the same whether wet or dry.

Cavitated Caries (Nonreversible).

In cavitated caries, the enamel surface is broken (not intact), and usually the lesion has advanced into dentin. Usually remineralization is not possible and treatment by tooth preparation and restoration is often indicated.

According To Rate

Rate (Speed) of Caries

Acute (Rampant) Caries.

Acute caries, often termed *rampant caries,* is when the disease is rapid in damaging the tooth. It is usually in the form of many, soft, light-colored lesions in a mouth and is infectious Less time for extrinsic pigmentation explainsthe lighter coloration.

Chronic (Slow or Arrested) Caries.

Chronic caries is slow, or it may be *arrested* following several active phases. The slow rate results from periods when demineralized tooth structure is almost rematerialized (the disease is episodic over time because of changes in the oral environment). The condition may be in only a few locations in a mouth, and the

dentinal lesion typically is "open" (allowing debridement from tooth brushing), dark and hard, and this dentin is termed *sclerotic* or ***eburnated dentin***.

NONCARIOLIS TOOTH DEFECTS TERMINOLOGY

Abrasion

Abrasion is abnormal tooth surface loss resulting from direct friction forces between the teeth and external objects, or from frictional forces between contacting teeth components in the presence of an abrasive medium. Abrasion may occur from

(1) improper brushing techniques

(2) habits such as holding a pipe stem by the teeth,

(3) tobacco chewing

(4) vigorous use of toothpicks between adjacent teeth. Toothbrush abrasion is the most common example and is usually seen as a sharp, V-shaped notch in the gingival portion of the facial aspect of a tooth .

Erosion.

Erosion is the wear or loss of tooth surface by chemicomechanical action Regurgitation of stomach acid can cause this condition on the lingual surfaces of maxillary teeth (particularly anterior teeth). Other examples are the dissolution of the facial aspects of anterior teeth because of habitual sucking of lemons or the loss of tooth surface from ingestion of acidic medicines.

Attrition

Attrition is mechanical wear of the incisal or occlusal surface as a result of functional or Para functional movements of the mandible (tooth-to-tooth contacts) Attrition also includes proximal surface wear at the contact area because of physiologic tooth movement.