

# Conservative dentistry

Lec. 2

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## **Caries Management (Diagnosis & treatment strategies)**

Traditional caries management has consisted of the detection carious lesions followed by immediate restoration. It means caries was managed by restorative dentistry, which is an irreversible process. Placing a restoration does not guarantees a sound future for the tooth & it may be the start of a restorative cycle in which the restoration will be repeated several times.

The introduction of adhesive restorative materials has allowed dentists to make smaller preparations which lead to preservation of hard dental tissues & allow elimination of G.V Blacks principles of extension for prevention. This conservative approach called (dynamic treatment concept).

### **The treatment goal in caries management should be:**

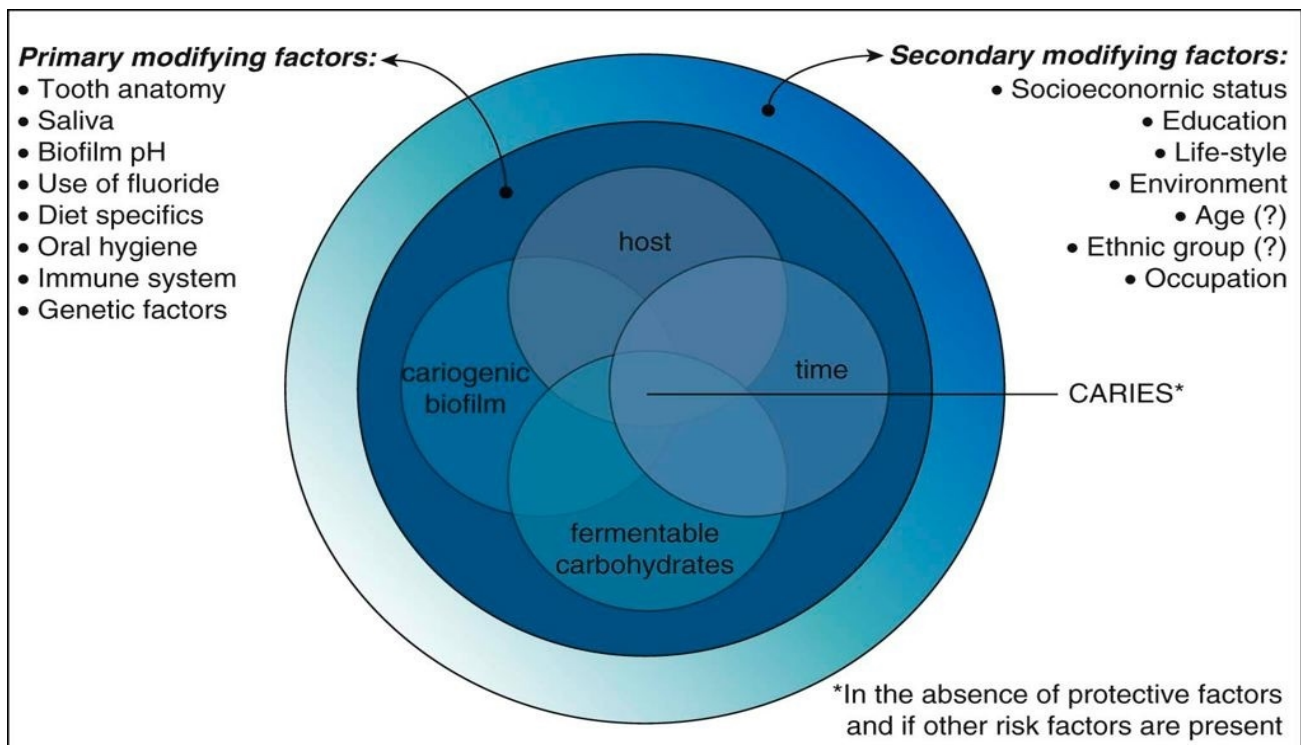
- To prevent new lesions from forming
- To detect lesions sufficiently early in process that they can be treated and arrested by non operative means.  
\*if these attempts have failed, restorations will be required to restore the integrity of the tooth surface
- The activity of caries should be determined and causative factors should be evaluated
- Caries risk should be assessed before treatment is considered
- Treatment should include preventive regimens to arrest the caries process.

## IN Conclusion

The 1st step in caries management start with detection of the caries lesion whether it is *active or arrested*.

## ETIOLOGY OF DENTAL CARIES:

The factors involved in the caries process, which include the tooth, dental plaque & diet since then the model has been supplemented with factors of time, fluoride, saliva & social & demographic factors.



## Rate of Caries Progression:

During the dental examination, the presence of open cavities and fillings represents the *prevalence* of the disease - which is the most important indicator of the balance between resistance factors and caries inducing agents. The *incidence* of the disease must also be evaluated. Caries incidence may be determined by observing the speed at which existing lesion, enlarge, or by observing the development of new carious lesions between two clinical examinations. The placement of new restorations within a short period of time indicates a high caries risk. The number of cavities, and their active or inactive status should be noted: Dark hard tissues indicate inactive dental lesions. The presence of lesions on smooth dental surfaces indicates a high caries risk situation. Furthermore, the



development of carious lesions with minimal plaque deposits indicates a very high risk for caries.

## Caries Risk Assessment

### **Why is it a vital part of Treatment Planning?**

Patient's caries risk status will affect the treatment (materials and procedures, treatment or no treatment) you are going to prescribe.

Patient's caries risk will determine recall intervals and radiograph exposure intervals. For the high risk patients (caries active or caries prone), a strategy to control the disease should be formulated and documented in the treatment plan. It is very easy to focus narrowly on treating the signs and symptoms ONLY (restorative needs); thus failed to identify the underlying cause of the disease. Failure to address the underlying cause of the disease will allow the disease to continue.

Restoration alone do not and will not treat the disease.

### **Caries Risk Assessment Goals**

- Identify the underlying reason(s) - **EDUCATE** the patient.
- **FORMULATE** control measures.
- **ASSESSING** patient's ability to change (habits).

These goals are as important if not more important than the restorative part of your treatment plan.

Success/failure of the restorative phase will depend on whether you can achieve the goals stated above.

## Methods for detection of dental caries

### 1- Conventional caries diagnostic methods

#### 1. Visual inspection methods

Magnifying Mouth Mirror, Magnifying Lens



#### 2. Visual-tactile methods probe:

The use of explorer is condemned because..?



#### 3. Radiographic methods

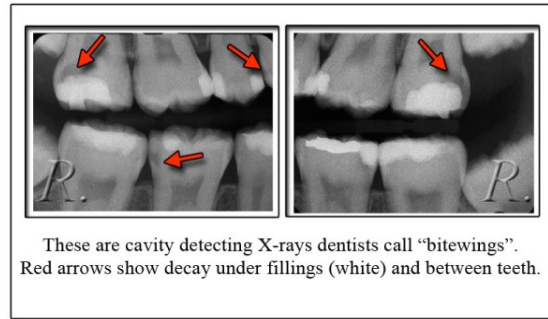
Drawbacks of conventional radiographs

[Bitewing

1) It presents a 2-D three-dimensional

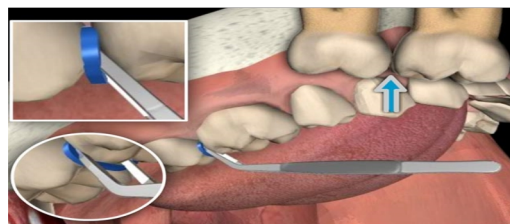
and IOPA):  
image of a  
object.

2) It may cause overlapping of the teeth due to faulty angulations



#### 4. Tooth separation:

Separating the teeth for visualizing the posterior proximal surfaces. This method uses orthodontic bands and achieve slow separation



### 2. Advanced caries diagnostic methods

#### **1. Electronic caries monitors:**

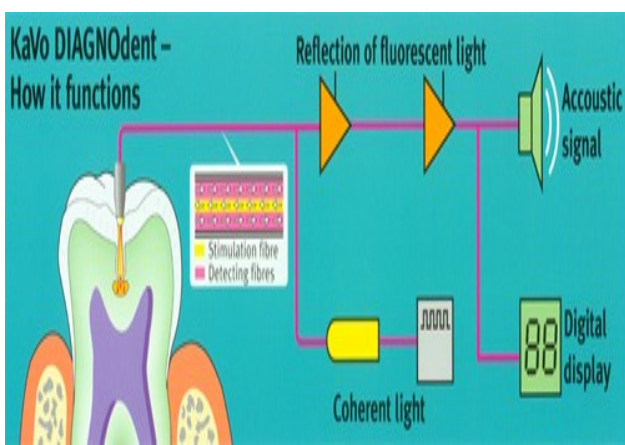
Are based on the principle that porous carious lesion has lower conductive value than intact structure.



#### **2. Intraoral camera for caries detection & for patient motivation**

#### **3. Laser system (diagnodent)**

It operates by illuminating a tooth surface with pulses of red laser light and then



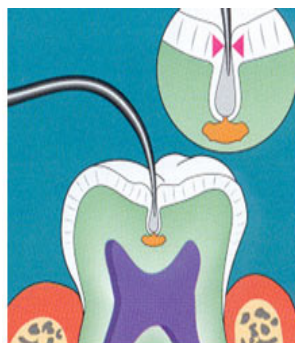
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s the emitted fluorescence. Changes in the mineral content and porosity of tooth surface result in changes in patterns of fluorescence.

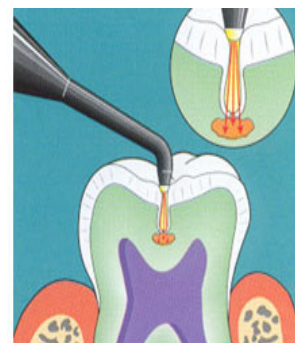
#### 4. Caries detector dye

Modern management of caries involves removing infected dentin, It is now clearly established that these dyes do not stain bacteria but instead stain the organic matrix of less mineralized dentin.. Clearly,

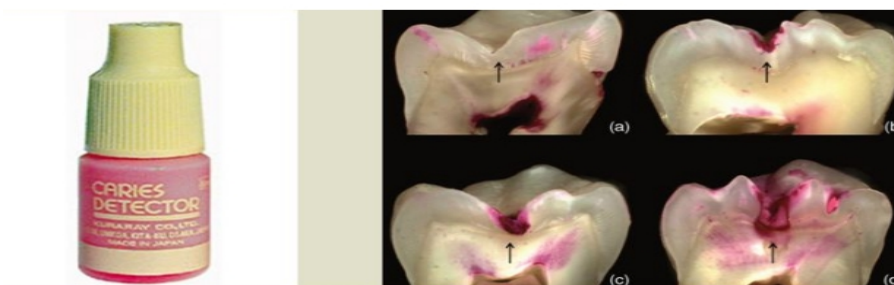
the routine use of dyes an understanding of their limitations result in excessive removal of sound tooth structure and increased likelihood of mechanical pulp exposures.



Dental Explorer (pick) attempting to detect dental decay. Note that the tip is too small to reach the decay. The decay will not be detected until the cavity is much larger.



Same area and size of decay being detected with the DIAGNOdent. The cavity may be treated while the decay is still very small.



these without

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#### Assessing Caries Activity:

	active	Arrested
Occlusal lesion	-Frosted surface, plaque covered white spot lesion.  -cavitated lesion; include micro cavities to cavities involving dentine which is visible on bitewing radiograph.	-shiny surface white or brown spot lesion
proximal	-appear on radiograph  -appear on radiograph with	✓ - Successive, reproducible, bite-wing radiographs showing no lesion progression.

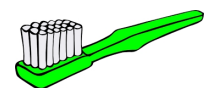
	<p>persistent gingival inflammation despite pt. attempt to remove plaque by flossing.</p> <p>-lesion not present at previous examination.</p>	
Smooth surface	<p>-white spot lesion close to gingival margin that may have frosted, plaque covered surface</p> <p>-cavitated, plaque covered lesion with or without exposed dentine, if dentine is exposed &amp; soft dentine is heavily infected..</p>	<p>- shiny surface white or brown lesion &amp; lesions are not plaque covered.</p> <p>- cavitated lesion; dark brown &amp; hard dentine at their base, are not plaque covered &amp; away from gingival margin.</p>
Root surface lesion	<p>- close to gingival margin, plaque covered.</p> <p>-soft or leathery consistency</p>	<p>- far from gingival margin, not plaque covered.</p> <p>-as hard as surrounding healthy root surface.</p>

## **Affected and Infected Dentin**

The carious dentin consists of two distinct layers—an outer layer and an inner layer. The outer layer *infected dentin* and the inner layer *affected dentin*. In tooth preparation, it is desirable that only infected dentin be removed, leaving affected dentin, which may be remineralized in a vital tooth after the completion of restorative treatment.

Infected dentin has bacteria present, and collagen is irreversibly denatured. It is not remineralizable and must be removed. Affected dentin has no bacteria, and the collagen matrix is intact, is remineralizable, and should be preserved. It is advisable, in caries removal, to remove all discolored dentin unless judged to be within 0.5 mm of the pulp. Because the discoloration is slight in acute caries, and the bacterial front is well behind the discoloration front, some discolored dentin may be left, although any “clinically remarkable” discoloration should be removed.

### **Treatment of the Lesion or Cavity:**



#### **1. Causal, noninvasive, or preventive treatment.**

a) Initial lesion: If the lesion is active

The general approach to active caries should be *preventive treatment*

- Reduce sugar consumption/ reduce frequent consumption by confining sugar to meal time. Use sugar substitutes.
- Plaque control: brushing twice daily with effective fluoride tooth paste. Use dental floss.

Application of topical fluoride gels, solutions, chlorhexidin rinse or gel and fluoridated varnishes.

*If the examination reveals active caries but initial' or incipient the dentist has to think of a way to arrest the lesion (remineralization) then restoration is never required.*

b) Cavitated lesions: cavitated lesions on the occlusal & proximal surface cannot be approached by preventive measures alone [in primary teeth this may be successful]. But cavitated lesions on free smooth surfaces are easily reached by the tooth brush if these cavities cleaned twice daily with fluoride tooth paste, can be arrested & converted into leathery or hard lesions.

### Sealants:

Fissures are more susceptible to caries than smooth surfaces. When active fissure caries has been diagnosed or if a high risk is established, sealants may be indicated, after acid etching, a lightly filled resin fissure sealant or a flowable resin composite is used to penetrate the fissures & prevent plaque accumulation. This is especially important during the period of tooth eruption also sealant is advisable in older patients with high caries risk.

## **II. Symptomatic (invasive or restorative) treatment:**

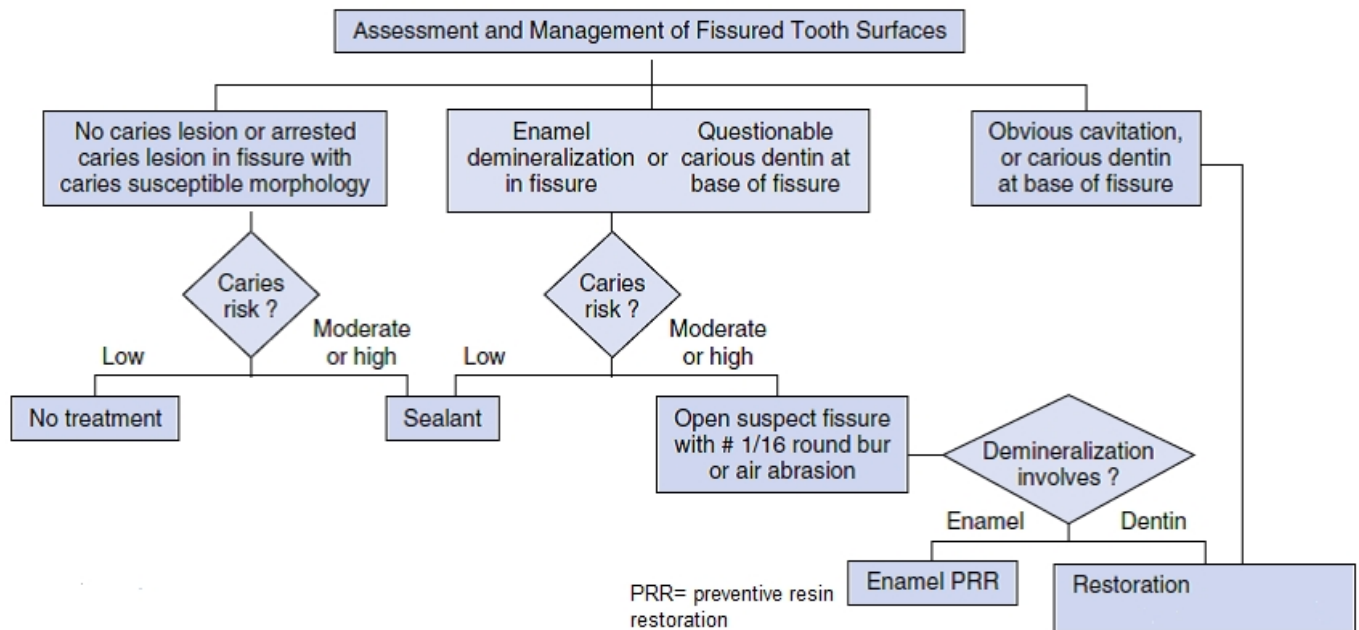
It is necessary to have well-defined criteria for the decision the restore due to caries. The most important reason for placing restoration is to aid plaque control.

The following indications for restorative treatment:

- 1 . The tooth is sensitive to hot, cold, sweetness...
2. Occlusal & proximal lesions extended into dentin.
3. The pulp is endangered.
4. Previous attempts to arrest the lesion have failed & there is evidence that the lesion is progressing.
5. The patient's ability to provide effective home care is impaired.
6. Drifting is likely to occur through loss of proximal contact.

## 7. Esthetic reasons.

Treatment will be directed in such a way that infected dental tissue is removed & the remaining cavity is adapted so that the restorative material can be optimally



placed.

## New technologies for caries removal & cavity preparation

**1. Air abrasion:** air abrasion removes tooth structure using a steam of aluminum oxide particles generated from compressed air. The abrasive particles strike the tooth with high-velocity & remove amount of tooth structure.



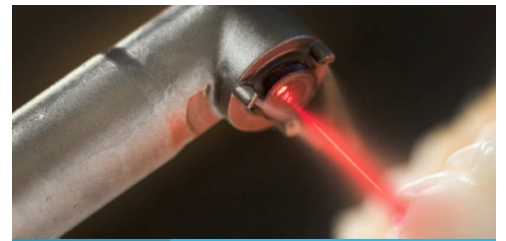
Clinical application of air abrasion includes:



- Removal of superficial enamel defects.
- Cleaning fissures & surface preparation for sealant preventive resin restoration.
- Small class I & V preparation.



2. **Laser devices:** laser devices that are capable of cutting dental hard tissues effectively & can be used for operative procedures.



3. **Polymeric burs (SmartPrep):** a selective caries-removal rotating instrument possessing slightly lower mechanical properties than sound dentin. However, soon it became clear that if the bur touches sound or caries-affected dentin, it quickly becomes dull and produces undesirable vibration, making further cutting impossible.



4. **Ceramic burs:** slow-speed rotary cutting instruments made of ceramic materials. The manufacturer claims that besides its high cutting efficiency in infected, soft dentin, the use of this instrument for caries removal replaces both the explorer and the excavation spoon.

