

# Conservative Dentistry

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## **Patient Evaluation, Diagnosis and Treatment Planning**

Excellence in dental care is achieved through the dentist's ability to assess the patient, determine his needs, and design an appropriate plan of treatment.

### **Infection control:**

Before the examination and diagnosis, attention is given to infection control. Before during and after any patient visit, appropriate infection control measure must be instituted. Barrier protection of personnel using masks, protective eyewear and gloves is now a standard requirement for dental procedures.

### **Patient Assessment:**

**Medical history:** the medical systemic care phase includes aspects of treatment that affect the patient systemic health. Comprehensive medical history that helps to identify condition that could alter, complicate or contraindicate dental procedures.

For example the dentist may identify contagious disease (hepatitis, Aids...) that require special precautions or procedures, allergies that may contraindicate the use of certain drugs, or systemic diseases & heart problems that may demand prophylactic antibiotic coverage or need for medical referral or consultation before initiating dental care.

### **Dental history & Chief Complaint:**

**Chief complaint:** is generally the first information obtained, these symptoms or problems expressed by the patient in his own words relating to the condition that prompted the patient to seek treatment. By his discussion, the dentist accomplishes two important goals:

1. The patient feels that his problem have been recognized & the doctor-patient relationship begins positively.
2. By writing C.C (chief complaint) the dentist is assured that it will not be omitted from the Problem list.

**Dental history:** a brief history of past dental treatment can provide useful

information about patient's tolerance for dental treatment. Questions about previous episodes of fractured or lost restorations, trauma infection, sensitivity & pain can give information that will alter the dentist to possible problems & guide him to clinical & radiographic examination. Patients may not volunteer this information; hence specific questions regarding thermal sensitivity, discomfort during chewing, gingival bleeding & pain are necessary.

### **Clinical Examination:**

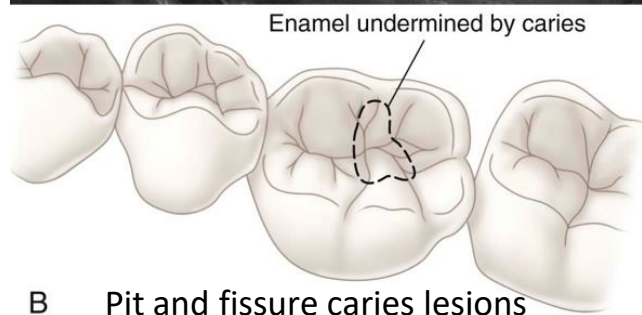
The intraoral assessments involve an examination of the periodontium, dentition and occlusion.

#### **1. Evaluation of the dentition:**

- **Assessment of caries risk & plaque:** the determination of baseline caries risk & plaque levels at the time of initial examination provides a basis for communication with the patient & the dentist, & it is important information in establishing a prognosis for restorative care. The visual examination of the dentition should be conducted in a dry field, with adequate lighting, using a mirror & explorer.

- **Detection of caries lesions:**

1. **Pit and fissure caries lesions:** it may begin in small enamel defects that lie near DEJ, so it is difficult to detect early on radiograph (it must be extensive to be detected radiographically). Tactile examination with firm application of sharp explorer into fissure & a sticky sensation felt on removal of the explorer has been the classic sign of pit & fissure caries. Clinical studies have shown this method to be unreliable, producing many false-positive & false-negative diagnosis, in addition an explorer can cause cavitation in a demineralized pit & fissure, preventing the possibility of remineralization. Visual observation with magnification of a clean dry tooth has been found to be reliable nondestructive method. Pit & fissure lesions appear as a gray or gray-yellow opaque area that show through the enamel. Tactile



examination of fissures with sharp probe is unreliable method because the explorer can damage a white spot lesion by breaking through intact surface zone & cause a cavity which will trap dental plaque & encourage lesion progression. A variety of new technologies are being evaluated for detection of caries lesions like air abrasion & laser.

2. Smooth-surface caries lesions: proximal caries are the most difficult to detect clinically, it is inaccessible to both visual & tactile examination, proximal lesions usually detected by radiograph in posterior teeth while in anterior teeth may be diagnosed radiographically or with visual examination; using transillumination. Smooth caries on buccal & lingual surface can be easily detected by visual & tactile examination.

• **Assessment of the pulp**: each tooth that has extensive restoration & teeth with pulps of questionable vitality; should be tested.

- a. The application of cold: is a valuable method of vitality testing. A cotton pellet saturated with an aerosol refrigerant spray such as (tetrafluoroethane), is placed on the tooth to determine vitality or a pencil of ice made by freezing water inside a sterilized anaesthetic cartridge.
- b. Electric pulp tester: another method of vitality test. However this test has limitations, it cannot be used in a wet field or on teeth with metallic restorations unless measures are taken to insulate adjacent teeth. Also the method does not reflect the health of the pulp or its prognosis.
- c. A cavity test: used when previous thermal & electric pulp tester failed to provide a clear picture of pulp vitality & a restoration is indicated. So the preparation initiated without using anesthetic. If pain or sensitivity is elicited when dentin is cut with a bur, pulpal, vitality is confirmed.
- d. A percussion test: is performed by gently tapping the occlusal or incisal surfaces of the suspected tooth and adjacent teeth with the end of the handle of a mouth mirror to determine the presence of tenderness pain on percussion suggests possible injury to the periodontal membrane from pulpal or periodontal inflammation. Care must be taken when interpreting a positive response on maxillary teeth because teeth in close proximity to maxillary sinuses also may exhibit pain on percussion when the patient has maxillary sinusitis.
- e. Palpation test: is performed by rubbing the index finger along the facial and

lingual mucosa overlying the apical region of the tooth, an alveolar abscess in an advanced stage or other periapical pathosis may cause tenderness to palpation.

- **Evaluation of existing restorations:**

The following criteria are used to evaluate existing restoration:

- a. **Structural integrity:** this evaluation involves determining whether it is intact or whether portions of the restoration are partially or completely fractured or missing. **The presence of fracture line indicates replacement of the restoration.**
- b. **Marginal opening:** for amalgam restorations the existence of marginal ditching does not indicate the replacement of the restoration; because the margins of amalgam restorations become relatively well sealed from the accumulation of corrosion products, unless signs of recurrent caries are present.

For **composite restoration**, the marginal gap should be considered for repair or replacement of the restoration. Replacement of the restoration indicated when tooth structure adjacent to the marginal gap becomes carious or: by marginal staining that is esthetically unacceptable especially in anterior teeth.

- c. **Restoration-related periodontal health:** examination of restoration must include the effect of that existing restoration on the health of the adjacent periodontium. Problems commonly encountered in this area are:
  - ✓ Surface roughness
  - ✓ Interproximal **overhangs**
  - ✓ Impingement on the zone of attachment (called the biologic width)

All three of these phenomena can cause inflammation within the periodontium even in the absence of impingement on biologic width. rough subgingival margins can harbor bacterial plaque to generate an inflammatory response.

- d. **Occlusal contacts & interproximal contacts:** all interproximal contact should

be assessed with thin dental floss by the dentist. Contacts should allow the smooth passage of floss. Contacts that are open or excessively light should be evaluated to determine whether pathosis, food impaction or annoyance to the patient has resulted.

In occlusal contact of all restorations should be evaluated to determine whether they are serving their masticatory function without creating a symptomatic or pathogenic occlusion. Restorations whose occlusal contacts are creating primary occlusal trauma should be altered or replaced to resolve problem. Restorations that are in significant infra-occlusal (out of occlusion) may permit the super eruption of opposing teeth & should be considered for replacement.

e. Caries: the dentist must use a combination of visual, tactile & radiographic examinations to detect the presence of caries lesion. A radiolucent area surrounding a radiopaque restoration or the presence of soft tooth structure generally indicates caries & must be repaired or replaced.

f. Esthetics: some of the more common esthetic problems found in the existing restoration are:

- ✓ Display of metal.
- ✓ Discoloration or poor shade match in tooth colored restoration.
- ✓ Poor contour in tooth-colored restoration.
- ✓ Poor periodontal tissue response in anterior restoration.

- **Evaluation of occlusion & occlusal wear:**

The occlusion can have significant effects on the restorative treatment plan.

The following factors should be evaluated during occlusal examination:

- ✓ Occlusal interference between the occlusion contacts as well as the stress placed on maximum intercuspation.
- ✓ The number & position of occlusal contacts as well as the stress placed on the occlusal contacts.
- ✓ The amount & pattern of attrition of teeth & restoration resulting from occlusal function.

✓ The inter-arch space available for placement of needed restoration. The number and position of occlusal contacts strongly influence the selection of restorative materials as well as the design of the preparation & restoration.

**Attrition:** excessive occlusal wear caused by occlusal parafunction (bruxism) in these instances, facets on opposing teeth match well. Prevention is accomplished with use of an occlusal resin appliance (night guard, bite plane) & education of the patients.

### **Abfraction:**

Abfraction is defined as the pathologic loss of tooth substance caused by biomechanical loading forces. The loss of structure is usually seen as wedge-shaped cervical lesions at the cemento-enamel junction (CEJ) that may not be carious. This theory is used as an alternative explanation for areas that historically were attributed to toothbrush abrasion. They are also referred to as noncarious cervical lesions (NCCLs).

- **Evaluation of tooth integrity & fracture:**

Cracked-tooth syndrome: it is a fairly common result of incomplete tooth fracture. Patients suffering cracked tooth syndrome often experience cold sensitivity & sharp pains of short duration while chewing. The cusps most commonly fractured are the nonfunctional cusps. Often patients with multiple cracked teeth have parafunctional habits or malocclusions. Cracked-tooth syndrome is an age-related phenomenon, the greatest occurrence is found among patients between 33-50 years of age.

This syndrome is often difficult to diagnose. The patient is unable to identify the offending tooth & evaluation tools such as radiograph, visual examination, percussion & pulp tests are typically non diagnostic.

The two most useful tests are:

- ✓ **Transillumination:** when a tooth with a crack is transilluminated from either the facial or lingual direction, light transmission is interrupted at the point of the crack. This results in the portion of the tooth on the side away from the light appearing quite dark.

- ✓ **Biting test:** it is the most definitive means of localizing the crack, by having the patient bite a wooden stick, rubber wheel; the patient feel a pain when releasing the bite from the wooden stick (not during biting) the dentist will be able to reproduce the patient's symptom & identify the fractured tooth.

In treatment of incomplete tooth fracture, the tooth sections are splinted together with a cuspal coverage restoration. This may include the use of an amalgam restoration, a crown or indirectly fabricated restoration or resin composite.

- **Esthetic evaluation:**

In addition to an esthetic evaluation of existing restorations assessment of the esthetics of the entire dentition should be completed. Commonly encountered esthetic problems that are related to restorative dentistry include:

1. Stained or discolored anterior teeth.
2. Unaesthetic contours in anterior teeth (length, width, incisal edge shape or axial contour).
3. Unaesthetic position or spacing of anterior teeth.
4. Carious lesions & unaesthetic restoration.
5. Unaesthetic color &/or contour of tissue adjacent to anterior restorations.

The restorative treatment of esthetic problems may range from conservative therapy such as micro abrasion or bleaching to more invasive care such as the placement of resin veneers, ceramic veneers, or complete coverage crowns. Additionally periodontal, endodontic or orthodontic procedures may be helpful depending on the nature of the problem.

## **2. Evaluation of the periodontium:**

From a restorative dentistry perspective, the periodontium must be evaluated

for two reasons:

- To determine the effect that the periodontal health of the teeth will have on the restorative dentistry treatment plan.
- To determine the effect that planned & existing restorations will have on the health of the periodontium.

Evaluation of periodontium consists of a clinical assessment of attachment levels, bony support, tooth mobility, qualitative assessment of tissue health, and radiographic evaluation of supporting bone. The most consistent clinical indicator of inflammation is bleeding on probing. Any bleeding by gentle probing should be noted.

The qualitative assessment of periodontal tissue health includes tissue color, texture, contours, edema & sulcular exudates are noted. The presence of specific local factors such as plaque, calculus & their relationship to tissue inflammation should be noted.

During examination of periodontium, the dentist must estimate the location of margins for future restorations & their potential to impinging on the biologic width.

### **3. Evaluation of radiograph:**

The radiographic examination is an essential component of the comprehensive evaluation. Clinical situations for which radiograph may be indicated includes:

- Previous periodontal or root canal therapy.
- History of pain or trauma.
- Large or deep restorations.
- Deep carious cavity.
- Swelling and mobility of teeth, fistula or sinus tract infection.
- Abutment teeth for fixed or removable partial prosthesis.
- Unusual tooth morphology or color.
- Missing teeth with unknown reason.

In evaluating radiographic findings for restorative purposes, the dentist should note open interproximal contacts, marginal openings, overhanging restoration, periapical radiolucencies within the bony of the tooth.



The dentist must interpret abnormal radiographic finding with caution. For example when the clinician evaluates radiolucencies that appear to represent carious tooth structure but may in fact represent nonpathologic processes as in a radiographic phenomenon known as (burnout) which is a radiolucency not cause by caries, it occurs when x-ray beam traverses a portion of the tooth with less thickness than surrounding areas most commonly seen in cervical area of the tooth. So the dentist must be careful not to mistakenly diagnose as demineralized tooth structure. Also the dentist must be cautious in diagnosing caries beneath existing restorations because certain radiolucent dental materials have a radiographic appearance similar, to that of carious tooth structure.

#### ❖ Treatment Plan:

Having completed a comprehensive examination, the dentist lists the problem related to restorative dentistry. Planning the restoration of individual teeth requires the consideration of four factors:

1. The amount & form of remaining tooth structure.
2. The functional need of each tooth.
3. The esthetic needs of each tooth.
4. The final objective of the overall treatment plan.

Treatment sequence: when the completed treatment has been visualized & the design of the restorations required has been established the final step in establishing the restorative dentistry treatment plan is sequencing the treatment.

Restorative treatment aimed at the control of active disease generally consists of direct restorative procedures using amalgam, resin composite or glass ionomer material. The sequence of treatment within the disease-control phase is dictated by three considerations:

1. Severity of the disease process (i.e. the most symptomatic tooth, the tooth with the deepest lesion, or the most debilitated tooth is restored).
2. Esthetic needs.
3. Effective use of time.

At each appointment, treatment is rendered in the area in most acute need of restorative treatment. When possible the restorations should be completed quadrant by quadrant to optimize the use of time.

Practice:

**1. the most radiolucent material among the following is:**

- A. Amalgam
- B. Glass ionomer
- C. composite resin
- D. Calcium hydroxide

**2. The purposes of cavity preparation is/are:**

- A. Removal of all the defects of enamel, dentin and cementum
- B. To locate the margins of restoration as conservatively as possible
- C. To allow for esthetic and functional placement of restorative material
- D. All of the above

Answer:

- 1. D
- 2. D