

Patient Evaluation, Diagnosis and Treatment Planning

Excellence in dental care is achieved through the dentist ability to assess the patient, determine his need and designs an appropriate treatment plan.

Pretreatment considerations consisting of patient assessment, examination and diagnosis, and treatment planning are the foundation of sound dental care.

Infection Control

Before the examination and diagnosis, attention is given to infection control. Before, during and after any patient visit, appropriate infection control measures must be instituted. Barrier protection of personnel using masks, protective eyewear, gloves and gowns 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 conditions that could alter, complicate or contraindicate dental procedures. For example, the dentist may identify

- 1 .Contagious diseases that require special precautions, procedures, or referral
2. Allergies or medications that may contraindicate the use of certain drugs;
3. Systemic diseases and cardiac abnormalities that demand less strenuous procedures or prophylactic antibiotic coverage; and
- 4 .Physiologic changes associated with aging that may alter clinical presentation and influence treatment.

Chief Complaint

It is generally the first information obtained. Chief complaints are symptoms or problems expressed by the patient in his own words relating to the condition that prompted the patient to seek treatment. The patient should be encouraged and guided to discuss all aspects of the current problem, including onset, duration, symptoms, and related factors.

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 and pain can give information that will alter the dentist to possible problems and guide him to clinical and radiographic examination.

Patients may not volunteer this information; hence specific questions regarding thermal sensitivity, discomfort during chewing, gingival bleeding and pain are warranted. When there is a history of symptoms indicative of pulpal damage or incomplete tooth fracture, specific diagnosis tests should be performed during the examination.

Clinical Examination

Clinical examination is the "hands-on" process of observing both normal and abnormal conditions. Diagnosis is a determination and judgment of variations from normal.

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

The clinical examination is performed systematically in a clean, dry, well illuminated mouth. Proper instruments including a mirror, explorer, and periodontal probe are required. An accurate examination can occur only when the teeth are clean and dry. This may require initial scaling, flossing, and a tooth brushing prophylaxis before clinical examination of the teeth.

Elements of the clinical examination include:

1 .EVALUATION OF THE DENTITION

A. Assessment of caries risk and plaque: the determination of baseline caries risk and plaque levels at the time of initial examination provides a basis for communication with the patient and the dentist, and it is important information in establishing a prognosis for restorative care. The patient can be given instructions for good oral hygiene. Once plaque assessment completed an examination of other areas can be accomplished.

B. Detection of caries lesions:

** 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 radio graphically). Tactile examination with firm application of sharp explorer into fissure and a sticky sensation felt on removal of the explorer has been the classic sign of pit and fissure caries. Clinical studies have shown this method to be unreliable, producing many false-positive and false-negative diagnosis, in addition an explorer can cause cavitation in a demineralized pit and fissure, preventing the possibility of remineralization.

**Visual observation with magnification of a clean dry tooth has been found to be reliable non-destructive method. Pit and fissure lesions appear as a gray or gray yellow opaque area that show through the enamel.

Fiber optic trans illumination may be helpful in visualizing pit and fissure lesion.

A variety of new technologies are being evaluated for detection of caries lesions like air abrasion and laser.

** Smooth-surface caries lesions: proximal caries are the most difficult to detect clinically, it is inaccessible to both visual and tactile examination, proximal lesions usually detected by radiograph in posterior teeth while

in anterior teeth may be diagnosed radiographically or with visual examination; using trans illumination.

Smooth caries on buccal and lingual surface can be easily detected by visual and tactile examination.

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

1 .The application of cold and hot is a valuable method of vitality testing. A cotton pellet saturated with an aerosol refrigerant spray such as (tetra fluoro ethane), is placed on the tooth to determine vitality or a pencil of ice made by freezing water inside a sterilized anesthetic cartridge. Hot application is also helpful by applying a heated piece of gutta-percha on the tooth surface.

2 .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.

3 .A test cavity: used when previous thermal and electric pulp tester failed to provide a clear picture of pulp vitality and 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.

Other tests that should be conducted during examination are

Percussion test: This 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.

Palpation: This 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 peri apical pathosis may cause tenderness to palpation .

D. Evaluation of existing restorations

The following criteria are used to evaluate existing restoration:

1. 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.

2. 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. The presence of marginal gap is less critical for restorations with anti-cariogenic properties, e.g. glass ionomer cement. As studies have shown that tooth structure adjacent to GI cement restorations is less susceptible to caries; 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.

3. Caries: the dentist must use a combination of visual, tactile and 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 and must be repaired or replaced.

4 .Restoration-related periodontal health: examination of restorations must include an assessment of the effect that existing restoration have on the health of the adjacent periodontium. Problems commonly encountered in this area are:

a. Surface roughness.

b. Interproximal overhangs.

c. Impingement on the zone of attachment (called the biologic width) [the area approximately 2mm in the apico coronal dimension, occupied by the junctional epithelium and the connective tissue attachment].

All three of these phenomena can cause inflammation within the periodontium even in the absence of impingement on biologic width. Open or rough subgingival margins can harbor bacterial plaque to generate an inflammatory response. Gingival inflammation around crown may also be due to an allergic reaction to material in the crown.

5 .Occlusal and interproximal contacts: the dentist should assess all interproximal contact with thin dental floss. 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 .

The occlusal contacts 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 the problem. Restorations that are in significant infra-occlusal may permit the super eruption of opposing teeth and should be considered for replacement.

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

- a. Display of metal.
- b. Discoloration or poor shade match in tooth colored restoration.
- c. Poor contour in tooth-colored restoration.
- d. Poor periodontal tissue response in anterior restoration.
- E. Evaluation of tooth integrity and fractures

Cracked-tooth syndrome: is a common result of incomplete tooth fracture. Patients suffering cracked tooth syndrome often experience cold sensitivity and 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 and evaluation tools such as radiograph, visual examination, percussion and pulp tests are typically non diagnostic.

The two most useful tests are:

□ Trans illumination: when a tooth with a crack is trans illuminated 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 dentist will be able to reproduce the patient's symptom and 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 onlay or resin composite.

F. Esthetic Evaluation

In addition to an esthetic evaluation of existing restorations, an 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 and unaesthetic restoration.

5- Unaesthetic color and/or contour of tissue adjacent to anterior restorations, this includes: excessive gingival display occasionally referred to as the (gummy smile).

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

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 qualitative assessment of periodontal tissue health includes tissue color, texture, contours, edema and sulcular exudates are noted. The presence of specific local factors such as plaque, calculus and their relationship to tissue inflammation should be noted. During examination of periodontium, the dentist must estimate the location of margins for future restorations and their potential to impinging on the biologic width.

3- EVALUATION OF OCCLUSION AND OCCLUSAL WEAR

The occlusion can have significant effects on the restorative treatment plan. The following factors should be evaluated during occlusal examination:

- 1 .Occlusal interferences between the occlusion of centric relation and that of maximum intercuspation.
- 2 .The number and position of occlusal contacts as well as the stress placed on the occlusal contacts.
- 3 .The amount and pattern of attrition of teeth and restorations resulting from occlusal function.

4-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 and restoration.

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

4 .EVALUATION OF RADIOGRAPH

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

- Pervious 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, peri apical radiolucency's within the bone of the tooth. The dentist must interpret abnormal radiographic finding with caution. For example when the clinician evaluates radiolucency's that appear to represent carious tooth structure but may in fact represent non pathologic 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 and 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:

The sequence of treatment should consider the following:

1. Severity of disease (i.e. the most symptomatic tooth and the tooth with deepest caries is restored).
2. Esthetic need.
3. time consumption