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Restorative dentistry

Patient evaluation, diagnosis, and treatment planning

The success of operative treatment depends on a comprehensive evaluation of the patient's reasons for seeking care and an assessment of the patient's systematic conditions so that an appropriate plan of treatment can be offered to the patient.

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 done. Disinfection of dental chair unit, wear mask, protective eyeglass, gloves and gown is now a standard requirement for dental procedures.

Patient Assessment:

- **Chief complaint:**

Before initiating any treatment, the patient's chief complaint (the problems that initiated the patient's visit) should be obtained. It is the first information that records, the patient should be encouraged to discuss all aspects of the current problems, including onset, duration, symptoms, and related factors. This information is expressed by the patient's own words. By this discussion, the dentist accomplishes two important goals:

1. Give the dentist an imagination about the possible diagnosis, and selecting appropriate treatment options.
2. The patient feels that his problem have been recognized & the doctor-patient relationship begins positively.

- **Medical History**:

The purpose of medical history is to discover whether patient has any general or local condition that might alter, complicate or contraindicate the normal course of treatment. 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. Systemic diseases & cardiac abnormalities problems, or joint replacements that may demand prophylactic antibiotic coverage or need for medical referral or consultation before initiating dental care.

❖ **Dental History**:

A brief history of past dental experience can provide useful information about patient's tolerance for dental treatment. Questions about previous fractured or lost restorations, trauma, infection, sensitivity & pain can give information that will alter the possible treatment & guide the dentist to clinical & radiographic examination thus might help avoid future complications.

❖ **Clinical Examination**

It includes both extraoral and intraoral examination.

Extraoral examination: It begins as soon as patient enters in the clinic and patient should be observed for unusual gait and habits. Which may suggest underlying systemic disease, drug or alcohol abuse. In addition, patient should be looked for any facial asymmetry or any localized swelling, signs of trauma if present.

Intraoral examination: It involves an examination of the dentition, periodontium, & occlusion.

1. **Evaluation of the dentition:** The examination of the dentition should be conducted in a dry field, with adequate lighting, using a mirror & explorer.

✓ 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 patient can be given instructions for good oral hygiene.

✓ Detection of caries lesions:

- ***Pit & 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 non destructive method. Pit & fissure lesions appear as a gray or gray-yellow opaque area that show through the enamel. Fiberoptic

transillumination may be helpful in visualizing pit & fissure lesion. Varieties of new technologies are being evaluated for detection of caries lesions like air abrasion & laser.

- ***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 wile 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.

Various types of pulp tests performed are:

a. **Cold test**: The application of cold is a valuable method of vitality testing. After isolating the tooth a cotton pellet saturated with ethyl chloride tooth (Ethyl chloride evaporates so rapidly that it absorbs heat and thus, cools the tooth) is placed on the tooth to determine vitality, or by using a piece of ice made by freezing water inside a sterilized anesthetic cartridge.

b. **Heat test:** exposed surface of tooth to hot object and note the patient response. If higher temperature is needed to elicit a response, like heated gutta percha, hot burnisher, etc. can be used.

c. **Electric Pulp Test:** The pulp tester is an instrument which uses the gradations of electrical current to excite a response from the pulpal tissue. A positive response indicates the vitality of pulp. No response indicates non-vital pulp or pulpal necrosis.

d. **Cavity test:** This method should be used only when all other test methods are inconclusive in results. Here, a test cavity is made with high speed round burs with appropriate air and water coolant. The patient is not anesthetized while performing this test. Patient is asked to respond if any painful sensation occurs during drilling. The sensitivity or the pain felt by the patient indicates pulp vitality. Here, the procedure is terminated by restoring the prepared cavity. If no pain is felt, cavity preparation may be continued until the pulp chamber is reached and later on endodontic therapy may be carried out.

e. **Palpation** 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.

f. **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 tissue 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.

✓ Evaluation of existing restorations: It can be done by visual examination, tactile and using radiographs. On clinical evaluation of restorations, the following conditions may be observed:

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.

Proximal overhangs: The amalgam–tooth junction is evaluated by moving the explorer back and forth across it. If the explorer stops at the junction and then moves outwardly onto the amalgam, an overhang is present. Overhangs also can be confirmed by the catching or tearing of dental floss. Such an overhang can result in inflammation of adjacent soft tissue. An overhang should be corrected, and this often indicates the need for restoration replacement.

Recurrent caries: at the marginal area of the restoration is detected visually, tactilely, or radiographically and is an indication for repair or replacement.

Improper occlusal contacts: Premature occlusal contacts can be seen detected by occlusal marking paper. Occlusal contacts of restoration that creating primary occlusal trauma and should be altered or replaced to resolve the problem. Restorations that are in significant infra- occlusal may permit the super eruption of opposing teeth & should be considered for replacement.

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

- Discolored areas or “amalgam blues” are often seen through the enamel in teeth that have amalgam restorations.
- Discoloration or poor shade match in tooth colored restoration.
- Poor contour in tooth-colored restoration.

- Poor periodontal tissue response in anterior restoration.

✓ Evaluation of tooth wear, integrity, & fractures:

Cracked-tooth syndrome: is a common result of incomplete tooth fracture. Patients suffering cracked tooth syndrome often experience cold sensitivity & sharp pain 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, and pulp tests are typically non-diagnostic.

The two most useful tests are:

a. Transillumination**:** when a tooth with a crack is Transilluminated from either the facial or the lingual direction, light transmission is interrupted at the point of the crack. So the portion of the tooth on the side away from the light appearing quite dark.
b. 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 & 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.

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) & education of the patients.

Abrasion: the loss of tooth substance induced by mechanical wear other than that of mastication. Abrasion results in wedge-shaped indentations with a smooth, shiny surface.

Generalized attrition Abrasion from tooth brush

Erosion: It can be defined as a loss of tooth substance by a chemical process that does not involve known bacterial action. The eroded area appears smooth, hard and polished.

Abfraction: microfractures which appear in the enamel and possibly the dentine caused by flexion of the cervical area of the tooth under heavy loads.

2. Evaluation of the periodontium:

From a restorative dentistry perspective, the periodontium must be evaluated for two reasons:

- To determine the effect of t the periodontal health of the teeth on the restorative treatment plan.
- To determine the effect of that planned or existing restorations on the health of the periodontium.

The most consistent clinical indicator of periodontal inflammation is bleeding on probing. Any bleeding by gentle probing should be noted.

Mobility of a tooth should also be tested, by placing a finger or blunt end of the instrument on either side of the crown and pushing it and assessing any movement with other finger.

During examination of periodontium, the dentist must estimate the location of margins for future restorations & their potential to impinging on the biologic width (the area approximately 2mm in the apicocoronal dimension, occupied by the junctional epithelium & the connective tissue attachment).

3. Evaluation of occlusion:

The occlusal examination should be considered for restorative treatment plan. The interarch space available for placement of needed restoration and the number & position of occlusal contacts as well as the stress placed on the occlusal contacts should be assessed

Evaluation of radiograph: Radiograph is one of the most important tools in making a diagnosis. Without radiograph, case selection, diagnosis and treatment would be impossible as it helps in examination of oral structure that would otherwise be unseen by naked eye.

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, periapical radiolucency of the tooth.

Evaluation of diagnostic casts:

The dentist can gain valuable information through an evaluation of diagnostic casts. The dentist can see areas that are visually inaccessible during the clinical examination. Facets & marginal openings that may be difficulty see intraorally are readily visible on the diagnostic casts. In addition, cases involving -multiple missing teeth need the evaluation of casts mounted on a semi-adjustable articulator. This enable dentist to assess the occlusal relationship & to plan restorative treatment.

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