PHYSICAL AND CHEMICAL INJURIES OF THE ORAL CAVITY

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INTRODUCTION

- Physical injuries - iatrogenic, self-inflicted, traumatic, or occupational.
- The most important iatrogenic cause - repair of tooth affected by dental caries or other developmental defects and restoration of missing tooth.
- Iatrogenic - includes X radiation and laser radiation.
- Self-induced or factitious injuries - overzealous oral hygiene practices, caused by psychotic or neurotic condition, or habitual.

- Traumatic causes - fall, fight, road traffic accidents, and sports injuries.
- Chemical injuries - caused by environmental elements such as toxic levels of chemicals in the water, air, or consumables, the restorative and endodontic materials used in the routine dental practice.

INJURIES OF TEETH ASSOCIATED WITH TOOTH PREPARATION

- Tooth preparation - done by rotary instruments such as tungsten carbide burs and diamond burs.
- Lasers and air abrasion are also used alternatively.
- Pulpal responses depend on the heat generated by friction, cutting of odontoblastic processes and drying of dentinal tubules, thickness of remaining dentin, vibration, removal of minerals and exposure of the organic matrix of dentin, and formation of smear layer.

REACTION TO ROTARY INSTRUMENTATION

- Stainless steel burs revolving at low speed were used in the past for cavity and crown preparation.
- As the hardness of the enamel is high, these burs could not abrade instead they cut or chip away the tooth material.
- Also a considerable amount of pressure is applied during the procedure, which results in excessive heat production and evaporation of the contents of the dentinal tubules.
- High speed rotary instrumentation with tungsten carbide and diamond burs has replaced the steel burs in recent years.
- Nevertheless stainless steel burs are used in procedures involving bone

- Three general reactions to cavity preparation are noted:

(1) the production of tertiary dentin

(2) changes in the odontoblasts associated with injured tubules

(3) general changes in the pulp.

In mild reactions –

- odontoblasts become distorted and reduced in number.
- Small vacuoles may appear between them, probably lymph exudate.
- Capillaries in the damaged area may become prominent.
- The bulk of the pulp tissue away from the cut tubules may exhibit little or no reaction.

In more serious injuries-

- greater infiltration of the injured locus by polymorphonuclear leukocytes,
- gradually become replaced by lymphocytes.
- probably associated with the sudden exposure of large numbers of open dentinal tubules to oral fluids and bacteria.

EFFECT OF ULTRASONIC TECHNIQUE

- advocated because it involves less heat, noise, and vibration in contrast to rotary instruments.
- there are no remarkable differences in the reaction of the dental pulp to the preparation of cavities by the steel bur, the diamond stone or the ultrasonic instrument.
- This emphasizes that only the dentinal injury itself is important, not how this injury is produced.

LASERS

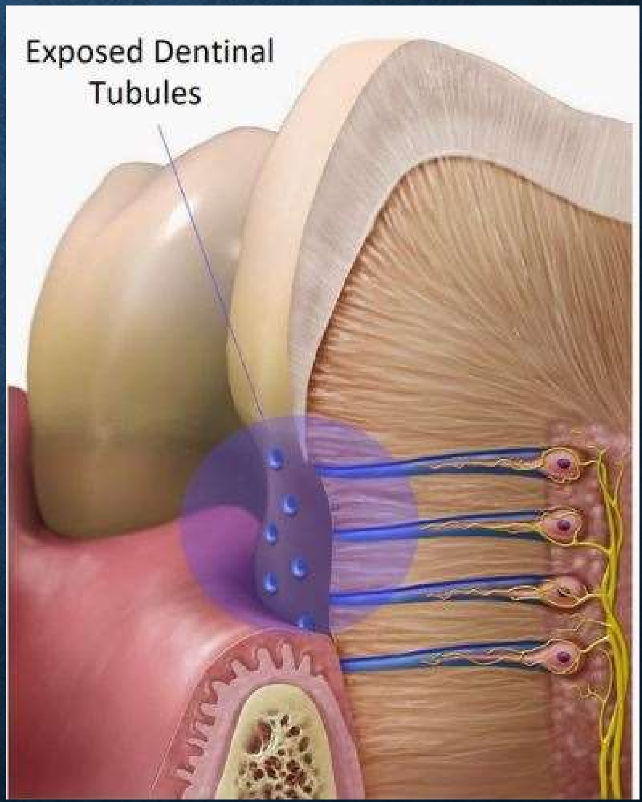
- Light Amplification by Stimulated Emission of Radiation
- Lasers are used in dental practice as an alternative to acid etching, to vaporize the carious tissue, to vaporize the organic tissues in the root canal in endodontic procedures, cavity preparation, restoration removal, treatment of dentinal sensitivity, caries prevention and bleaching.
- The main problem with laser cutting of hard dental tissues is the generation of heat and forbidden tactile control.

Effects on Pulp

- severe pathologic changes, including hemorrhagic necrosis with acute and chronic inflammatory cell infiltration.
- The odontoblastic layer also underwent coagulation necrosis, although the severity of the response varied with the amount of radiation.

EFFECT OF RESTORATIVE MATERIALS

- The dentinal tubules, containing odontoblastic processes which have been freshly cut, form a series of passage ways leading directly to the pulp through which a fluid or soluble material may reach the pulp tissue.
- If this material is irritating, it may lead to serious injury.

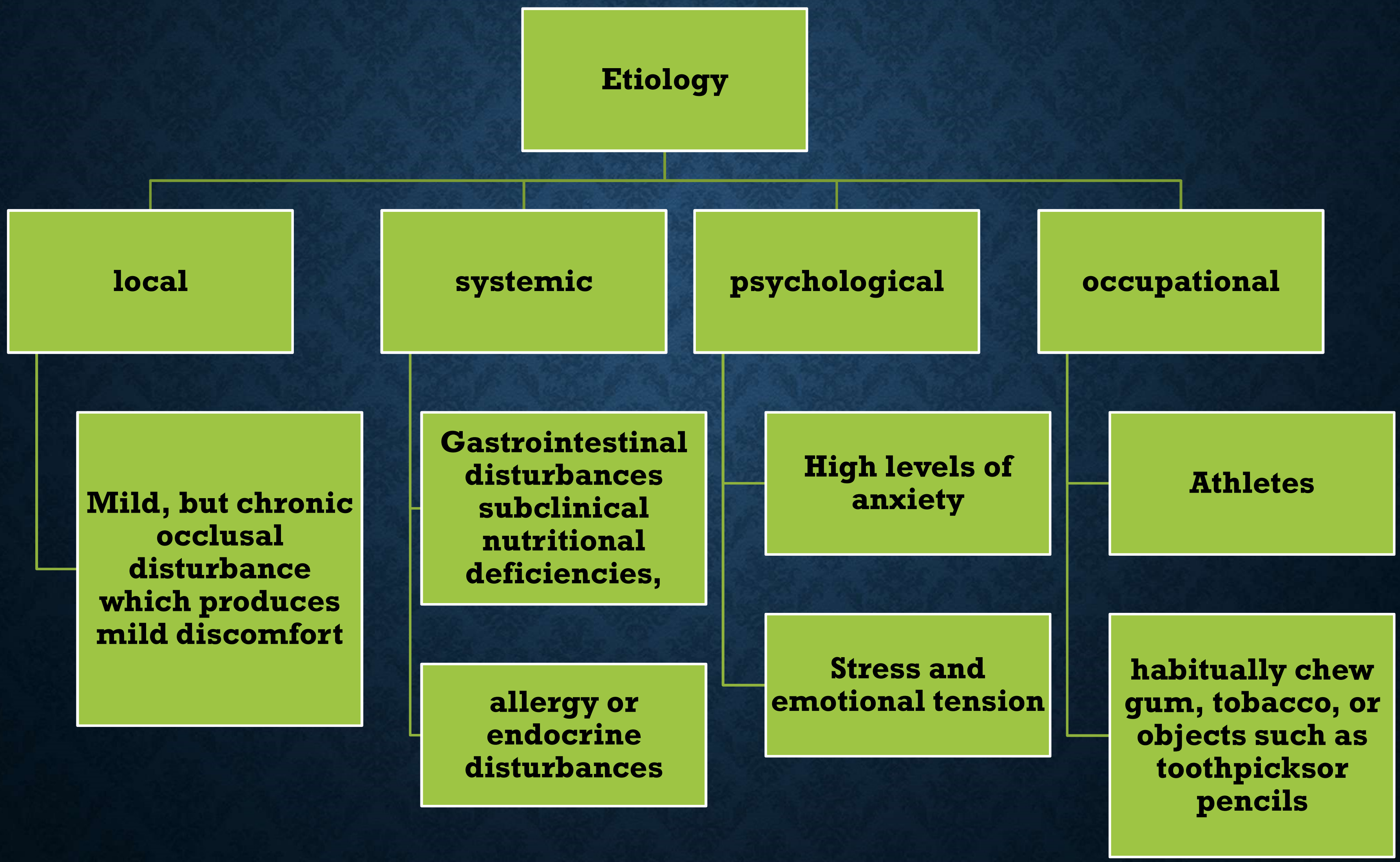


- Remaining dentin thickness-
- If the cavity depth is shallow, with 2.0 mm or more of primary dentin remaining between the floor of the cavity preparation and the dental pulp, dentin probably provides its own insulation against traumatic, thermal or restorative material irritation.
- However, if the remaining thickness of primary dentin is less than 2.0 mm, it is necessary that a cement base be utilized.

PHYSICAL INJURIES OF THE TEETH

BRUXISM: ('NIGHT-GRINDING', BRUXOMANIA)

- Bruxism is the habitual grinding or clenching of the teeth, either during sleep or as an unconscious habit during waking hours.
- This term is generally applied both to the clenching habit, during which pressure is exerted on the teeth and periodontium by the actual grinding or clamping of the teeth, and also to the repeated tapping of the teeth.
- Bruxism is one of the most common sleep disorders.
- The incidence of bruxism has been variously reported as between 5 and 20%.


Etiology
local
systemic
psychological
occupational
Mild, but chronic occlusal disturbance which produces mild discomfort
Gastrointestinal disturbances subclinical nutritional deficiencies,
allergy or endocrine disturbances
High levels of anxiety
Stress and emotional tension
Athletes
habitually chew gum, tobacco, or objects such as toothpicksor pencils

CLINICAL FEATURES

- Six major types:

(1) effects on the dentition,

(2) effects on the periodontium,

(3) effects on the masticatory muscles

(4) effects on the temporomandibular joint

(5) head pain

(6) psychologic and behavioral effects.

- severe wearing or attrition of the teeth may occur, not only occlusal wear, but also interproximal wear which produces sensitivity
- loss of integrity of the periodontal structures, resulting in loosening or drifting of teeth or even gingival recession with alveolar bone loss
- Hypertrophy of the masticatory muscles, particularly the masseter muscle
- bruxism may give rise to facial pain and headache

TREATMENT AND PROGNOSIS

- nervous factor must be corrected if the disease is to be cured
- Removable splints to be worn at night
- Botulinum toxin (Botox) has been very successful in treating the grinding and clenching of bruxism. Botox when injected into the masseter muscle, weakens the muscle enough to stop the grinding and clenching