Regressive Alterations of Teeth

1. Attrition, Abrasion, Erosion
2. Abfractions
3. Dentinal Sclerosis
4. Dead tracts
5. Secondary dentine
6. Pulp atrophy
7. Pulp calcifications
8. Resorption of teeth
9. Hypercementosis
10. Cementicles

ATTRITION

Definition:
Attrition (L. attritum for “rubbing against another surface”) is the loss of tooth structure due to tooth to tooth contact during occlusion and mastication.

- **Physiologic** – result of normal ageing; Accelerated by factors such as premature contacts, habits
- **Pathologic** – bruxism, poor-quality or absent enamel as in environmental enamel hypoplasia, dentinogenesis imperfecta

Features:
- Can occur in both deciduous & permanent dentitions
- Most frequently incisal and occlusal surfaces involved
- Seen as large, smooth, shiny wear facets
- Matching wear on occluding surfaces
- Shiny facets on amalgam contacts
- Enamel and dentin wear at the same rate
- Possible fracture of cusps or restorations
- Interproximal wear also present – shortening of arch length
- Dentine sensitivity & Pulp exposure uncommon because of slow progress – reparative dentine formation
- Radiographically:
  - Flat occlusal plane
  - Pulp chamber, canal size \( \swarrow \) ed
  - Hypercementosis

Influencing factors:
- Age
- Salivation (quantity / quality)
- State of the dentition, occlusion
- Diet
- Parafunction (bruxism, clenching of teeth)

Consequences:
- Loss of vertical dimension (without compensatory eruption)
- Pulpal trauma
- Hypercementosis/\( \uparrow \) periodontal bone trabeculation
- If there is exposure of dentine \( \rightarrow \) sensitivity
- Faster mineral loss in dentine than in enamel \( \rightarrow \) pitting \( \rightarrow \) Food retention
- Enamel fracture \( \rightarrow \) cheek / tongue biting, irritation

Treatment: **Management of severe attrition:**
- Lost structure replaced with crowns or onlays
  - They restore the size of the shortened and flattened teeth
- The bite and chewing relationship (occlusion) between the upper and lower teeth will be restored
- Any sensitivity to hot and cold is eliminated by covering the previously exposed dentine
- Aesthetics of the teeth, mouth and face improved dramatically
- Use of an occlusal splint & prosthetic rehabilitation

**BRUXISM**
- Involuntary grinding and clenching of teeth.
- It can take place during waking hours, but occurs more commonly while people are asleep.

**Causes of Bruxism**
- Stress and anxiety
- abnormal positioning of jaws and of teeth

**Management:** Use of
- Nightguard
- Acrylic bite plate

**ABRASION**

**Definition:**
Abrasion (L. *abrasum* for “scrape off”) is pathologic wear of dental tissues or restorations due to mechanical action of an external agent.

(“The term demastication is used for tooth wear accelerated by chewing an abrasive substance between opposing teeth i.e., abrasion + attrition.”)

**Causes:**
- Horizontal brushing stroke + abrasive tooth paste + heavy pressure
- Pencils, tooth picks, pipe stems, bobby pins
- Chewing tobacco, biting nails, dental floss injury

**Features:**
- Smooth buccal surfaces that have lost their developmental patterns
- Wedge-shaped defects with well-defined margins, in cervical region
- “V” shaped notches on incisal edges if bobby pins, pipes are used
- Lesions are more wide than deep
- Premolars and cusps are commonly affected
- Atypical defects on the incisal edge in special cases
- Lesions worse in an acidic oral environment
- Radiographically: Well-defined semilunar defects at the cervical region; Sclerosed pulp chambers

**Consequences:**
- Sensitivity
- Weakening of the tooth

**Treatment:**
- Cause should be identified
- Habits should be modified (oral hygiene, diet)
- Topical Fluoride applications, especially if the oral cavity is acidic (active)
- Restoration of lesions, if necessary

**EROSION**

**Definition:**
Erosion (L. *erosum* for “corrode”) is defined as progressive *non-bacterial* loss of tooth structure due to chemical agents (Acids / Chelators) or electrochemical action. Some prefer the term “corrosion” as it is caused by chemical corrodents.

**Causes**
- “Extrinsic” (external)
  - Food and drinks
REGRESSIVE ALTERATIONS OF TEETH

- Medicines
- Swimming pool water
- Industrial (acidic- vapour, dust)

“Intrinsic” (Internal)
- Gastroesophageal reflux disease (GERD) or heartburn
- Anorexia and Bulimia
- Hiatus Hernia
- Consumption of alcohol
- Morning sickness in early pregnancy
- Chronic indigestion
- Salivary gland hypofunction

Erosion from dental exposure to gastric secretions is called perimolysis.

Features:
- Sites not commonly protected by saliva usually affected
- Broad concavities within smooth surface enamel
  - Facial & palatal surfaces of max anteriors
  - Facial & occlusal surfaces of mand posterials
- Cupping of occlusal surfaces, (incisal grooving) with central depression of dentin surrounded by elevated enamel – cusp tips, incisal edges
- Shallow, spoon-shaped depressions cervically
- Increased incisal translucency
- Wear on non-occluding surfaces
- "Raised" clean, non-tarnished amalgam restorations
- Absence of perikymata
- Preservation of enamel "cuff" in gingival crevice is common
- Hypersensitivity
- Pulp exposure in deciduous teeth

Types of Erosion:

Grade 1: Early lesion
- Loss of enamel structures
- Dull surface appearance (active)
- Can be smooth / shiny – chronic
- Minimal loss of enamel (only just measurable)

Grade 2: Erosion in enamel
- Obvious loss of enamel
- Dentine not exposed

Grade 3: Erosion in dentine
- Dentine involved
- Less than ⅓ del of the tooth surface with exposed dentine

Grade 4: Erosion in dentine
- 1/3 - 2/3 of tooth surface has exposed dentine

Grade 5: Severe lesion
- More than 2/3 of the tooth surface has exposed dentine and/or the pulp is exposed

Consequences:
- Sensitivity
- Weakening of the teeth
- Reduced lifetime for some restorations (GIC and ceramic)

Prevention and Treatment
- Acid exposure should be reduced – avoid overuse of wine should be avoided, carbonated beverages, fruit juices
- Ability of oral cavity to resist acids should be improved
- Tooth should be brushed, with low-abrasive toothpaste, only once a day
- Consumption of buffering substances like milk, cheese
• Proper Hydration
• Chewing gum?
• Dentine sensitivity can be decreased with use varnishes, mouthwashes, or toothpastes with SrCl/SnF ± iontophoresis
• Dietary analysis – change in unfavourable dietary habits
• Psychological / medical factors
• Fluoride application – daily
• Restorative therapy

**ABFRACTION**

**Definition:**
Abfraction (L. ab for “away” and fractio for “breaking”) is the microstructural loss of tooth substance in areas of stress concentration. This is due to tensile and compressive occlusal stresses that create repeated tooth flexure with failure of enamel and dentine at a location away from the point of loading.

- McCoy (1982) postulated that tooth flexure from tensile stresses led to cervical tooth breakdown and Class V amalgam restoration failure.
- Eakle (1984) later hypothesized that the primary etiologic factor in wedge-shaped cervical erosion is tensile stress from mastication and malocclusion.
- Grippo (1991) gave the term “abfraction”

**Features:**
- Affects buccal/labial cervical areas of teeth
- Deep, narrow V-shaped notch
- Commonly affects single teeth with excursive interferences or eccentric occlusal loads

**Consequences:**
- Sensitivity
- Weakening of the tooth
- Reduced lifetime of restorations (GIC, ceramics)
- Possible TMJ dysfunction
- Tooth fracture and wear
- Residual endodontic / periodontic lesions

**Treatment:**
- Modify diet
- Fluoride
- Occlusal splint
- Consider restoring lesions - Glass ionomer – as it allows material to flex with the tooth.