Preparation techniques in conservative dentistry

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Caries

In early stages: prevention (secondary)
• Incipient caries

Therapy:
restoration ➔ cavity preparation, filling

REVERSIBLE

IRREVERSIBLE
Cavity preparation

• Removal of tooth structure for healing purposes

• Possibilities:
  • Manual (hand) instruments
  • Rotary instruments (gold standard)
  • Oscillating instruments
  • Laser
  • Air abrasion
  • Chemo-mechanical (ICON)
Predilection spots (areas)

- Predilection spots are retention areas
  - these areas are not self-cleaning (debris)

- Fissures
- Pits
- Approximal surfaces (under the contact point)
- Smooth surfaces between the aquator of the tooth and the gingiva
Classification of cavities

• Based on the **predilection spots** of caries on the **anatomical crown** (until the CEJ)
  • Class I-V

• Later extra classes were added
  • Class VI: not predilection area (for example: top of the cusp)
  • Root surface caries: not on the anatomical crown)
Class I

Pits and fissure cavities
Class II

Cavities on the proximal surface of posterior (premolar and molar) teeth (MO, OD, MOD)
Class III

Cavities on the proximal surface of anterior teeth, incisal edge is intact
Class IV

Cavities on the proximal surfaces of anterior teeth that involves the incisal edge
Class V

Cavities on the gingival third of the anatomical crown (bucal/oral) → smooth surface caries
Class VI

Cavities on the incisal edge of anterior teeth, or on the occlusal cusp of posterior teeth → not predilection spot
Root surface caries

Caries develops on the root surface (cementum)
Nomenclature of cavity preparation

• **Surface**: unprepared part
• **Wall**: prepared part → named after the surface
• **Line angle**: junction of two walls → named after the walls
• **Point angle**: junction of three walls: → named after the walls
• **Cavosurface angle** or **cavosurface margin**: junction of wall and surface
General rules of cavity preparation

• Black: **EXTENSION FOR PREVENTION** → aim was to prevent the secunder caries
  • the border of the cavity should be extended to areas that are normally self-cleaning, or cleansable, therefore healthy tooth structure can be removed
• During the years the rules were modified many times → principles nowadays:
  • Healthy tooth structure should be preserved
  • All fracturable enamel should be removed
  • All caries/faults should be involved
  • Good polishable position
  • The outline of the filling should be shortened
Preparation techniques

• **Conventional** form:
  • For **amalgam**, inlay/onlay, root surface caries
  • **Macroteethension**
  • Box-like cavity
  • Special enamel margin
  • Secondary retention are used very often
Preparation techniques

• **BEVELED CONVENTIONAL** form:
  • Old amalgam filling is changed to composite
  • Macro- and microretention
  • Box form, but enamel margins are beveled for higher microretention

• **MODIFIED** form (ADHESIVE or MINIMAL-INVASIV):
  • No special form
  • Only decayed tooth structure will be removed
  • cavosurface margin will be beveled
  • Composite $\rightarrow$ Microretention
Phases of cavity preparation

- Primary phase
  - opening of the cavity
  - outline form, initial depth: prepared together, high speed, watercooling, diamond burs
  - primary resistance form:
    - Preparation resists displacement or removal of the restoration from tipping or lifting forces
    - Retention is influenced by the contact between the restorative material and tooth
      - mechanical contact: macromechanical: amalgam micromechanical: composite
      - chemical: rare, glassionomer
      - electrical: weak
  - primary retention form ~ convinience form:
    - Both the tooth and restoration can withstand without fracture the masticatory forces
    - Primay retention and resistance form are prepared together
    - Principles: box shape, flat floor, slightly rounded line angles, thickness of restorative material, walls: parallel, divergent or convergent
Phases of cavity preparation

• Secondary phase:
  • removal of infected dentin and old filling:
    • infected dentin always has to be removed
    • old restoration should be removed, if:
      • negatively affect the new one
      • compromise in retention
      • caries is under the filling
      • the pulp was symptomatic preoperatively
      • the periphery of remaining filling is not intact
  • pulp protection
  • secondary resistance and retention form
  • finishing the prepared walls:
    • aim of finishing is to create the best marginal seal between the the restorative material and tooth; smooth marginal junction; provide maximum strength of both the tooth and filling near the margin
  • cleaning, inspecting
Thank you for your attention!