Fissure sealing 2

Preventive dentistry

4th year
Etiological factors of dental caries

- Plaque microorganisms
- Substrate
- Time
- Susceptible tooth surface

No caries

Caries
Criteria for selecting teeth for sealant placement

- A sealant is indicated if a deep occlusal fissure, fossa or lingual pit present.
- In case of enamel and/or dentin developmental diseases.
- Freshly erupted, hypomatured teeth (relative indication).

![Favourable fissure types:](image1)

![Unfavourable fissure types:](image2)
Criteria for selecting teeth for sealant placement II.

A sealant is contraindicated if

• Patient behavior does not permit use of adequate dry–field techniques throughout the procedure
• An open occlusal carious lesion exists
• Caries exist on other surfaces of the same tooth
• A large occlusal restoration is already present
Criteria for selecting teeth for sealant placement III.

A sealant is probably indicated if

- Fully erupted fossa
- An intact occlusal surface
- An incipient lesion
Patient selection

- **Children with special needs.** (fissure sealing of all occlusal surfaces of permanent teeth should be considered for those who are medically compromised, physically or mentally disabled, or having learning difficulties)
- **Children with extensive caries in their primary teeth** should have all permanent molars sealed as soon as possible after their eruption.
- **Children with caries–free primary dentitions** do not need to have first permanent molars sealed routinely.
Optimal timing of fissure sealing

- In the primary dentition:
  - Between the age of 3 to 4

- In the permanent dentition
  - 6-7 years → first molars
  - 11-13 years → second molars, premolars

The optimal sealing time is within 6 months after the eruption of the tooth. When the tooth is in contact with the antagonist, the risk of the occlusal caries is lowered.
Fissure sealing methods

• Non-invasive fissure sealing
• Invasive fissure sealing (fissurotomy)
• Preventive restoration
Non-invasive fissure sealing

• Fissure sealing without hard tissue removal
• Surface treatment options
  – **Mechanical cleaning** (non-fluoride polishing pastes, rubber cup or nylon brush)
  – **Air abrasion** (Prophy jet)
  – **Laser** (Er:YAG)

Air abrasion is the best method to improve the retention of the sealing material
The steps of fissure sealing

- **Cleaning** the surfaces (with fluoride free polishing paste)
- **Drying** (the teeth must be dry because the sealants are hydrophobic) and **isolation** with cotton rolls or rubber dam
- **Etching** with 30-50 percent phosphoric acid for 30-60 sec.
- **Washing, re-isolation, and drying** (critical steps, contamination with saliva must be avoided)
- (Etched enamel not covered with sealant will remineralize within 24 h.)
- **Application of the sealant**
- **Polymerization**
- **Checking** the retention and the occlusion
Invasive fissure sealing

Fissurotomy (ameloplasty)

- In case of doubtful caries diagnosis, **minimal enamel removal** is required to open the fissure and evaluate the health of the underlying tissues.

- For invasive fissure sealing, the ideal choice is the filled sealing material!!!

- Flow composites can be used for sealing, but only with bonding!!!

- During the application of the flow composites, we have to be careful to avoid air bubbles.
Preventive resin restoration

• In case of small dentin lesions
• Prepare and clean only the lesion, and fill with adhesive material (GIC, compomer, composite), then seal the fissures AND the surface of the filling
Main groups of sealants

**Bis –GMA resins** (bisphenol A-glycidyl methylacrylate) -1960
Buonocore

*Filled* (contain microscopic glass beads, quartz particles and other fillers used in composite resins)

*Unfilled*

**Glass ionomer cements**

- Fluoride release → cariostatic effect
  Fluorid uptake increases the enamel resistance to caries.
- Poor retention
  (temporary sealing for partially erupted teeth, where isolation from saliva is difficult)

*Self–curing* (auto-polymerizing) → cheaper

*Light-curing* → simple, quick

↓

equal in retention
Sealing materials

• **Composite resins**
  – Fissurit, Fissurit F, Fissurit FX (Voco)
  – Helioseal, F, Clear, Croma (Ivoclar Vivadent)
  – UltraSeal XTplus (Ultradent)
  – Clinpro Sealant (3M ESPE)
  – EcuSeal (DMG)
  – Conseal, Conseal F (SDI)
  – Grandio Seal (Voco)
  – Admira Seal (Voco)

• **Compomer**
  – Dyract Seal (Dentsply)

• **RMGI**
  – Ionosit Seal (DMG)
  – Fuji II LC Improved (GC)
  – Vitremer (3M ESPE)

• **Glass-ionomers**
  – Fuji VII or Triage (GC)
  – condensable GICs
    • Fuji IX GP (GC)
    • Ketac Molar (3M ESPE)
    • Ionofil Molar (Voco)
Resin sealants

- **Filled** (30-60 w% anorganic filler)
  - Fissurit FX
  - Helioseal F
  - UltraSeal XT
- **Unfilled** (under 10 w% filler)
  - Fissurit F
  - Helioseal Clear
  - Clinpro Sealant
  - Conseal F

- Fluoride containing
- Clear, opaque or tinted
- Colour changing during the setting
How to chose the sealing material?

We have to evaluate:

- Caries risk
- Fissure morphology
- Possibilities of isolation
- The eruption phase
- The possibilities of the follow-up
Criteria for selecting sealant material

<table>
<thead>
<tr>
<th>Type of fissure</th>
<th>Caries risk</th>
<th>Treatment</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>No or low</td>
<td>PMTC + F varnish</td>
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<tr>
<td></td>
<td>High or very high</td>
<td>PMTC + fissure sealant (glass-ionomer)</td>
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PMTC: Professional Mechanical Tooth Cleaning
How to achieve optimal retention?

- Deep, irregular pits and fissures → correct tooth selection
- Clean surfaces → mechanical cleaning (Prophy Jet)
- Maximal microretention → acid etching
- Dry surfaces → isolation (saliva ejector + cotton rolls or rubberdam)
Increasing the surface area

- **Adhesive forces** (sealants do not bond directly to the teeth)
- **Tooth conditioners** (etchants)
  - 37% phosphoric acid (resins)
  - 10% polyacrylic acid (GICs)
The fissure sealing of partially erupted molars can be done with GIC sealing materials (less sensitive to moisture, easy handling properties, quick, fluoride releasing). After the complete eruption we have to re-evaluate the caries risk and if necessary to re-seal the tooth surface with resin sealing material.