Caries in the primary dentition

Restorative treatment
Caries treatment:

• Pre-cavitation lesion → prevention

• Cavity formation → restoration and prevention
Early childhood caries
(formerly baby bottle/nursing bottle caries)

• The presence of one or more decayed (non-cavitated or cavitated lesions), missing teeth (due to caries), or filled tooth surfaces in any primary tooth in a child 72 of months age or younger.

• In children younger than 3 years of age, any sign of smooth-surface caries is indicative of severe early childhood caries (S-ECC). From ages 3 through 5, one or more cavitated, missing teeth (due to caries), or filled smooth surfaces in primary maxillary anterior teeth, or decayed, missing, or filled score of ≥4 (age 3), ≥5 (age 4), or ≥6 (age 5) surfaces constitutes S-ECC.
Aetiology of nursing bottle caries

• Long periods of exposure to cariogenic substrate. The teat is held next to the palatal surfaces of the upper anterior teeth for up to 8 hours.

• Low salivary flow rate at night, and reduced buffering
Nursing bottle caries

• Prevalence 2.5-15 %
• Rampant caries starts at the neonatal line, affects mostly maxillary anterior teeth
• Lesions appear later on posterior teeth. Canines are affected less than first molars because of later eruption
• Mandibular anterior teeth are unaffected because of salivary flow and position of tongue
• Bottle is often used as a pacifier to get infant to sleep
• The bottle can contain any liquid with fermentable carbohydrate
• This pattern of caries may also occur with prolonged at-will breast feeding
Management of ECC

• Cessation of habit
• Fluoride application
• Build-ups of restorable teeth (GIC, composite resin – strip crowns, SSCs)
• Pulpal involvement → endodontic treatment
• Extractions if required (loss of upper anterior teeth will not result in space loss if the canines have erupted)
• Treatment under general anaesthesia is often required for small children
Restorative materials

• Amalgam
• Glass-ionomers
  • Glass-ionomer cements (GICs)
  • Resin-modified glass-ionomers (RMGI)
  • Polyacid-modified composite resins (PMCR, compomers)
• Composite resins
• Stainless-steel crowns
The choice of restorative material depends on:

- Cavity shape and size
- The age of the child and the tooth
- Caries risk
- Cooperation of the child
- Special requirements
Rubber dam isolation

• Quickdam
• clamp, floss, wooden wedge or „Wedjet”
• „through” or slit (split) dam technique
Amalgam

Advantages:
• Simple
• Quick
• Cheap
• Technique insensitive
• Durable

Disadvantages:
• Not adhesive
• Requires mechanical retention in cavity
  • Environmental and occupational hazards
  • Public concerns
Influences of primary tooth morphology
Tooth preparation

• Mesiobuccal pulp horns of primary first molars extend higher occlusally → in case of caries media preventive pulpotomy required
• Prominent mesiobuccal cervical bulges (cingulum) → reduced depth of proximal box
• Narrow occlusal table → altered occlusal preparation
Class I

Outline form:
✓ Conservative
✓ Include all carious area & retentive fissure
✓ Cavosurface margin: out of the stress area, no bevel
✓ Rounded line angle

Depth:
✓ ideally: 0.5 mm in dentin
✓ deep cavity: liner, base
Common errors in class I

• Deep cavity
• Remaining caries
• Undermining the marginal ridge
• Undercarving /overcarving
Class II restoration

Proximal Box:

• Broader at the cervical portion than the occlusal portion
• Open the contact with the adjacent tooth (buccal, lingual, gingival)
• Flat gingival seat with no bevel (1mm)
• Remove undermining enamel

Axial wall: 0.5 mm into dentin
  follow the outer proximal contour

Axiopulpal line angle: rounded
Matrix application

- Tofflemire
- Auto matrix systems
- Sectional matrices
- T-band
Polishing of amalgam

• 24 hours later!!!
Indications of stainless-steel crowns:

- Grossly broken-down teeth (3 or more carious surfaces)
- Primary molars after pulp therapy
- Hypoplastic primary or permanent teeth
- High caries frequency
Stainless-steel crowns

Advantages:
• Very durable
• Protect and support remaining tooth structure

Disadvantages:
• Extensive tooth preparation
• Patient cooperation required
Composite resins

Advantages:
• Adhesive
• Aesthetic
• Reasonable wear properties
• Command set

Disadvantages:
• Technique sensitive
• Good isolation required (rubber dam)
• Problem of secondary caries diagnosis
• Expensive
Indications of composites in the primary dentition:

• Restoration of anterior teeth (nursing bottle caries or trauma)
  • Composite resin strip crown
  • Incisal edge replacement
• Class I and II cavities in children with good cooperation (isolation) and low caries rate
Composite resin crown
Glass-ionomer cements

Advantages:
• Adhesive
• Aesthetic (?)
• Fluoride leaching

Disadvantages:
• Long setting time
• Brittle
• Susceptible to erosion and wear
• Radiolucent
Indications of glass ionomer cements in the primary dentition:

• Class III, V and small Class I cavities, where aesthetics is secondary
• Semi-permanent restoration of Class II lesions (1-2 years)
• High caries risk
• ART (Atraumatic Restorative Treatment)
Condensable glass ionomer cements

- High powder : liquid ratio, viscous, self-curing materials
- Better physical properties, reduced sensitivity to water
- Products: Fuji IX (GC), Ketac Molar (Espe), Chemflex (Dentsply)
Resin-modified glass-ionomer cements (RMGI)

• Dual-cure materials (acid-base reaction, light-induced free radical polymerisation): Fuji II LC (GC), Photac Fil Quick (Espe)

• Triple-cure materials (acid-base reaction, light-induced and self-induced free radical polymerisation): Vitremer (3M)
Resin-modified glass-ionomer cements

Advantages:
• Adhesive
• Aesthetic
• Command set
• Fluoride release
• Simple to handle (?)

Disadvantages:
• Some are radiolucent
• Unknown durability
• Water absorption
Indications of RMGIs in the primary dentition:

• Class III, V and I cavities
• Class II restorations for not more than 2 or 3 years
• High caries risk
Polyacid-modified composite resins (compomers)

**Advantages:**
- Adhesive
- Aesthetic
- Command set
- Simple to handle
- Radiopacity

**Disadvantages:**
- Unknown durability
- Water absorption
Indication of compomers in the primary dentition:

• **Class I-V cavities**, but
  • In grossly broken-down primary molars stainless-steel crowns,
  • In case of nursing bottle caries composite strip crowns are preferred