Molaren-Inzisiven-Hypomineralisation | Dr. Rainer F. Prugmaier | Leibnitz (za-prugmaier.at)

Molar-Incisor Hypomineralisation (MIH)

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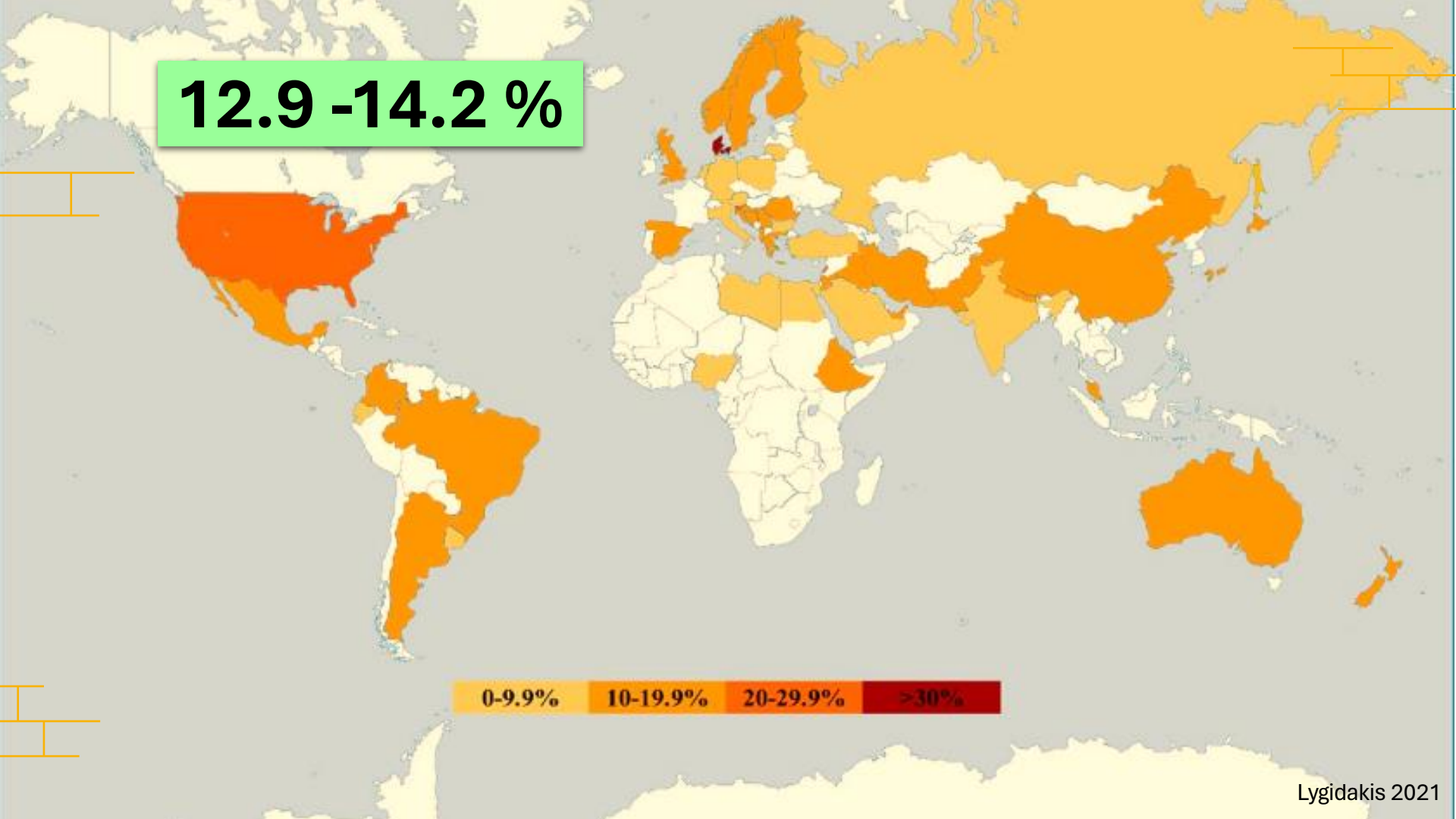

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European Archives of Paediatric Dentistry (2022) 23:3–21
https://doi.org/10.1007/s40368-021-00668-5

INVITED REVIEW

Best clinical practice guidance for clinicians dealing with children presenting with molar-incisor-hypomineralisation (MIH): an updated European Academy of Paediatric Dentistry policy document

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Received: 12 September 2021 / Accepted: 22 September 2021 / Published online: 20 October 2021

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Aetiology of MIH

- **Multi-factorial model**
  - Environmental-gene interactions
  - Systemic medical factors
    - Perinatal hypoxia
    - Pre-maturity caesarean section
  - Infant/childhood illnesses

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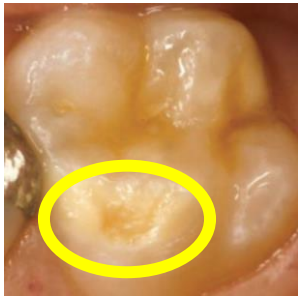
Clinical presentation

“ Demarcated opacities of different color ”

Large opacities and discolored at distal marginal ridge



White opacities w/ post eruptive enamel break down

Demarcated yellow opacities

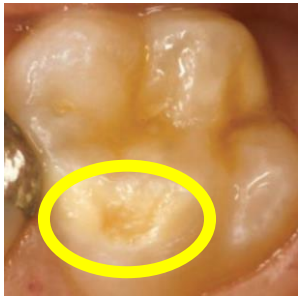
Yellow/brown opacities w/ enamel break down

Weerheijm 2003

Clinical presentation

“ Demarcated opacities of different color ”

Large opacities and discolored at distal marginal ridge



White opacities w/ post eruptive enamel break down

Demarcated yellow opacities

Yellow/brown opacities w/ enamel break down

Weerheijm 2003

Clinical presentation

Sensitive to air, cold and warmth

Rapid caries progression

Due to fragile enamel

Clinical presentation

Weerheijm 2003

EAPD

Diagnostic Criteria

- Tooth involved
- Demarcated opacities
- Post-eruptive enamel breakdown
- Sensitivity
- Atypical restorations
- Extraction of molar due to MIH

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EAPD Diagnostic Criteria

- **At least one** of all four permanent first molar (PFM) with enamel hypomineralisation
- Defect may be seen at the 2nd primary molars, premolars, 2nd permanent molars and the tips of canines

☑ **Tooth involved**

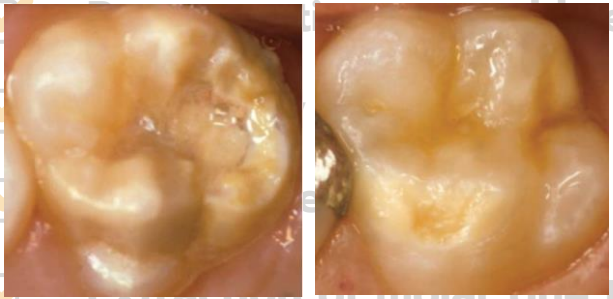
EAPD Diagnostic Criteria

- Clearly demarcated opacities
- Variability in color, size and shape
- White, creamy or yellow to brownish color

- Only defect greater than 1 mm should be considered

Tooth involved

Demarcated opacities



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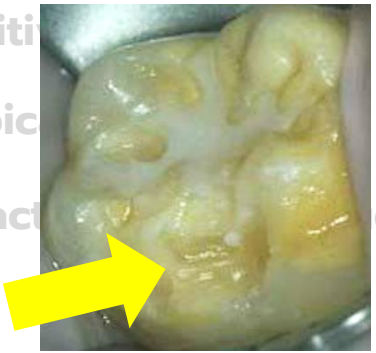
EAPD Diagnostic Criteria

- Enamel breakdown after tooth eruption, due to masticatory forces
- The loss usually associated with pre-existing demarcated opacity

- Tooth involved
- Demarcated opacities
- **Post-eruptive enamel breakdown**
- Sensiti
- Atypic
- Extract e to MIH



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EAPD Diagnostic Criteria

- Ranging from mild response to external stimuli - spontaneous hypersensitivity
- MIH molar may be difficult to anesthetize

- Tooth involved
- Demarcated opacities
- Post-eruptive enamel breakdown
- **Sensitivity**
- Atypical restorations
- Extraction of molar due to MIH

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EAPD Diagnostic Criteria

- Recommended extend the margin of restorations to buccal/palatal smooth surface

- Tooth involved
- Demarcated opacities
- Post-eruptive enamel breakdown
- Sensitivity
- **Atypical restorations**
- Extraction of molar due to MIH

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EAPD Diagnostic Criteria

- Relevant notes in the records
- Demarcated opacities or atypical restorations on the other first molars
- Typical demarcated opacities in the incisors

- ☑ Tooth involved
- ☑ Demarcated opacities
- ☑ Post-eruptive enamel breakdown
- ☑ Sensitivity
- ☑ Atypical restorations
- ☑ **Extraction of molar due to MIH**

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Severity level according to “ EAPD criteria ”

Severity level	Signs and symptoms
Mild	Demarcated enamel opacities without enamel breakdown Induced sensitivity to external stimuli e.g., air/water but not brushing Mild aesthetic concerns on discolouration of the incisors
Severe	Demarcated enamel opacities with breakdown and caries Spontaneous and persistent hypersensitivity affecting function e.g., brushing, mastication Strong aesthetic concerns that may have socio-psychological impact

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Severity level according to “ EAPD criteria ”

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Treatment Approaches

For MIH teeth

01 Posterior teeth

02 Anterior teeth

03 Hypersensitivity and remineralisation

01 Posterior teeth

Table 6 Factors to be considered for appropriate treatment planning for posterior teeth

At patient level	At oral level	At tooth level
Age of patient	Number of affected teeth	Size of defect
Medical history	DMFT	Location of defect
Ability to cooperate	Developmental stage	Number of surfaces involved
Presence/absence of symptoms	Occlusion	Presence/absence of post-eruptive breakdown
Access to general dental care	Presence/absence of crowding	Presence/absence of atypical or typical carious lesions and extent
Access to specialist care (paediatric dental/orthodontic)	Presence of third permanent molars	Pulpal involvement
	Hypodontia	History of dental abscess/facial cellulitis
	Need for future orthodontic treatment	

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01 Posterior teeth

Preventive approach

- Oral hygiene instruction (fluoride at least 1000 ppm)
- Dietary advice
- Topical fluoride varnish
  - Recall interval every 3-6 months
- Resin-based fissure sealants
  - With adhesive to increase retention rate

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01 Posterior teeth

Atraumatic restorations

- Glass ionomer cement (GIC)
  - Lack of co-operation
  - Unable to moisture control
  - Interim restoration

https://www.septodontcorp.com/biodentine-atraumatic-restorative-treatment-procedure

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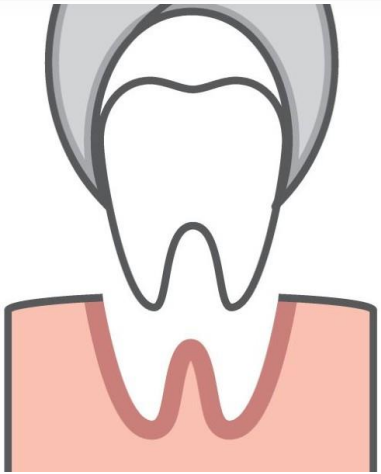
01 Posterior teeth

- [x] Severe case

Demarcated enamel opacities with breakdown and caries
Spontaneous and persistent hypersensitivity affecting function e.g., brushing, mastication
Strong aesthetic concerns that may have socio-psychological impact

"Restore"



"Extract"

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01 Posterior teeth

Severe case

- Composite resin
- Preformed metal crowns (PMC)
- Laboratory manufactured indirect restorations
- Pulp therapy
  - Partial/coronal pulpotomy

“Restore”

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01 Posterior teeth

Severe case

- **Composite resin**
  - Rubber dam isolation
  - Cavity design
    - Removal of all hypomineralised enamel
  - Adhesion
    - Pre-treatment with 5% sodium hypochlorite
    - Self-etch or total etch

https://www.teeth.org.au/rubber-dam

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01 Posterior teeth

Severe case

- **Preformed metal crowns (PMC)**
  - Tooth with hypersensitivity or enamel breakdown

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01 Posterior teeth

Severe case

- **Laboratory manufactured indirect restorations**
  - Multiple surfaces or cusps involved
  - 3 categories
    - Metal alloys
    - Indirect composite
    - Ceramic restoration
  - Rubber dam isolation
  - Removal of all hypomineralised enamel
  - Cautions: tooth structure -> wider pulp chambers, higher pulpal horns

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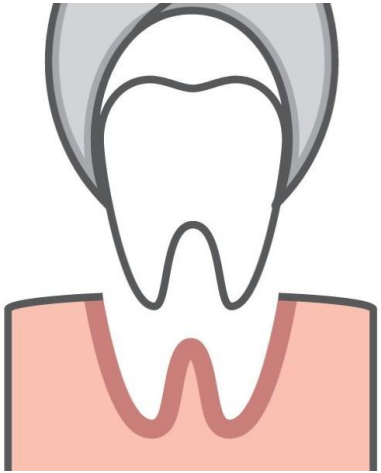
01 Posterior teeth

Severe case

- **Scheduled extraction**
  - Teeth with
    - significant breakdown
    - Pulpal involvement
    - Dental abscess/facial cellulitis
  - Ideal time: 8-10 years
    - 3 studies: spontaneous space closure



“Extract”

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Treatment Approaches

For MIH teeth

01 Posterior teeth

02 Anterior teeth

03 Hypersensitivity and remineralisation

02 Anterior teeth

At patient level	At oral level	At tooth level
Age of patient	Number of opacities	Colour of opacity
Medical history	DMFT	Size of opacity
Ability to cooperate	Developmental stage	Depth of opacity
Psychological impact of dental appearance on patient (e.g. bullying at school)		Presence/absence of sensitivity
Access to specialist dental care		Presence/absence of post-eruptive breakdown

- Rubber dam isolation
- Photography before and after treatment in order to explanation of the limitation of treatment

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02 Anterior teeth

Microabrasion

- 18% hydrochloric acid or 37% phosphoric acid
- Follow by Casein phosphopeptide-amorphous calcium phosphate (CPP-ACP)
- Not suitable for deeper opacities

https://www.scottarmsdentalpractice.com/microabrasion-dr-emma-franks/

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02 Anterior teeth

Resin infiltration

- 15-20% hydrochloric acid etchant
- Ethanol and TEGDMA monomer infiltrant
- Suitable for all type of opacities

https://www.smiles-for-kids.com/blog/9kdl4dn3lmehtgadzktgf2n2ch4tm6

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02 Anterior teeth

Etch-bleach-seal technique

- Bleached with 5% sodium hypochlorite for 20 minutes
- Follow by 37% phosphoric acid etchant
- Apply clear resin sealant
- Questionable effectiveness in MIH

External bleaching

- Used in adolescents to camouflage white opacities by increasing the overall whiteness of the teeth
- Hydrogen peroxide (up to 6%)
- Carbamide peroxide (10% or 16%)
- Side effect
  - Gingival irritation
  - Sensitivity

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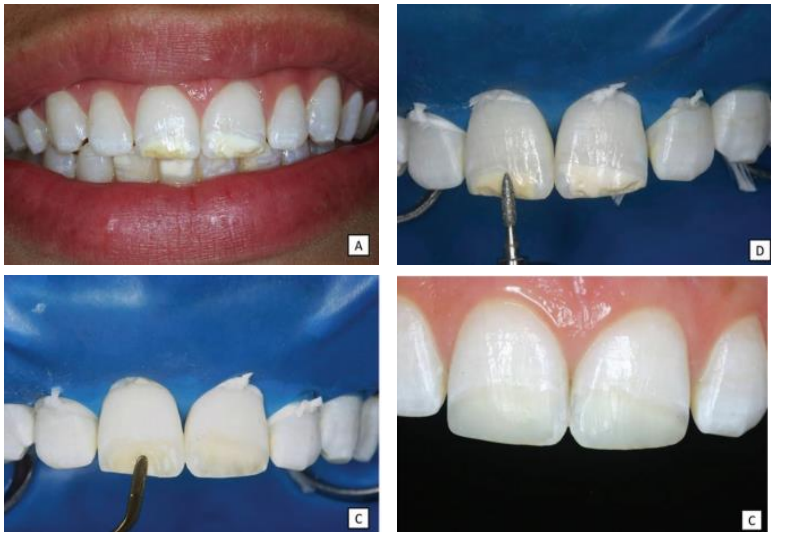
02 Anterior teeth

Composite restorations

- Removal of opacities enamel or breakdown enamel
- Replacement with resin composite



https://www.scielo.br/j/rgo/a/4zW3wHX3xTgfMbsYk4S34VP/?format=pdf

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Treatment Approaches

For MIH teeth

01 Posterior teeth

02 Anterior teeth

03 **Hypersensitivity and remineralisation**

03 Management of hypersensitivity and remineralisation

- casein phosphopeptide-amorphous calcium phosphate (CPP-ACP)
- casein phosphopeptide-amorphous calcium fluoride phosphate(CPP-ACFP)
- 5-6% Fluoride varnish with/without tricalcium phosphate
- 8% Arginine and calcium carbonate paste
- Ozone or low-level laser therapy

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Clinical practice guidance for treatment approach for MIH teeth

SIGNS/SYMPTOMS	Mild defect → Severe defect				
Post-eruptive breakdown/Caries					
No of breakdown surfaces					
Sensitivity					
DMFT					
Reversible Pulpitis	—	—	—	+	+
Irreversible Pulpitis	—	—	—	—	+
Abscess/Cellulitis	—	—	—	—	+
Dental Age (yrs)	6-16	6-9	7-16	7-16	8-10*
THERAPEUTIC APPROACH	**F/CPP-ACFP/ Sealants**	**Glass Ionomer**	**Composite Resin**	**Preformed metal crown**	**Extraction**

*preferable chronological period for spontaneous space closure.
— indicates absence and + indicates presence of the sign/symptom

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Clinical practice guidance for treatment approach for MIH teeth

Severity	Clinical examination	Problems	Therapeutic approach
Severe ↑ Mild	Opacities + Loss of enamel structure	Risk of tooth fracture + Aesthetic concerns	Localised macro-abrasion/micro-abrasion + Resin infiltration + Composite restoration
	Opacities on the incisal edge	Aesthetic concerns ± Risk of tooth fracture	Localised macro-abrasion/micro-abrasion + Resin infiltration + Composite restoration
	Brown/yellow opacities	Aesthetic concerns	Localised macro-abrasion/micro-abrasion + Resin infiltration + Composite restoration
	White/creamy opacities	Aesthetic concerns	Regional whitening +/- Micro-abrasion +/- Resin infiltration OR don't do anything

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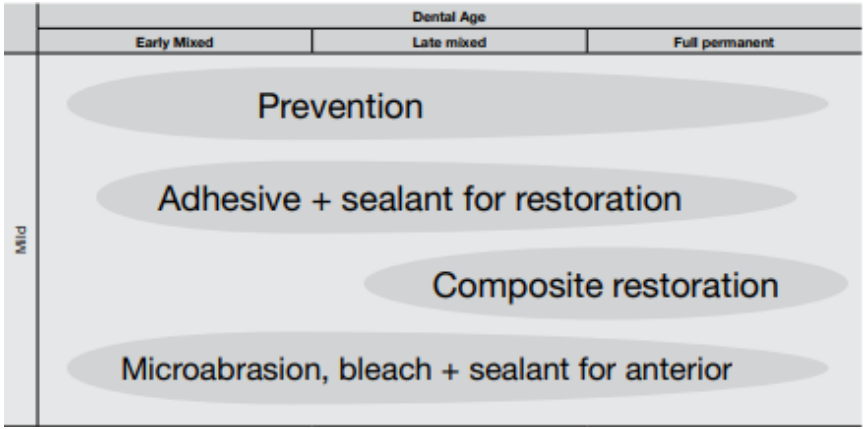
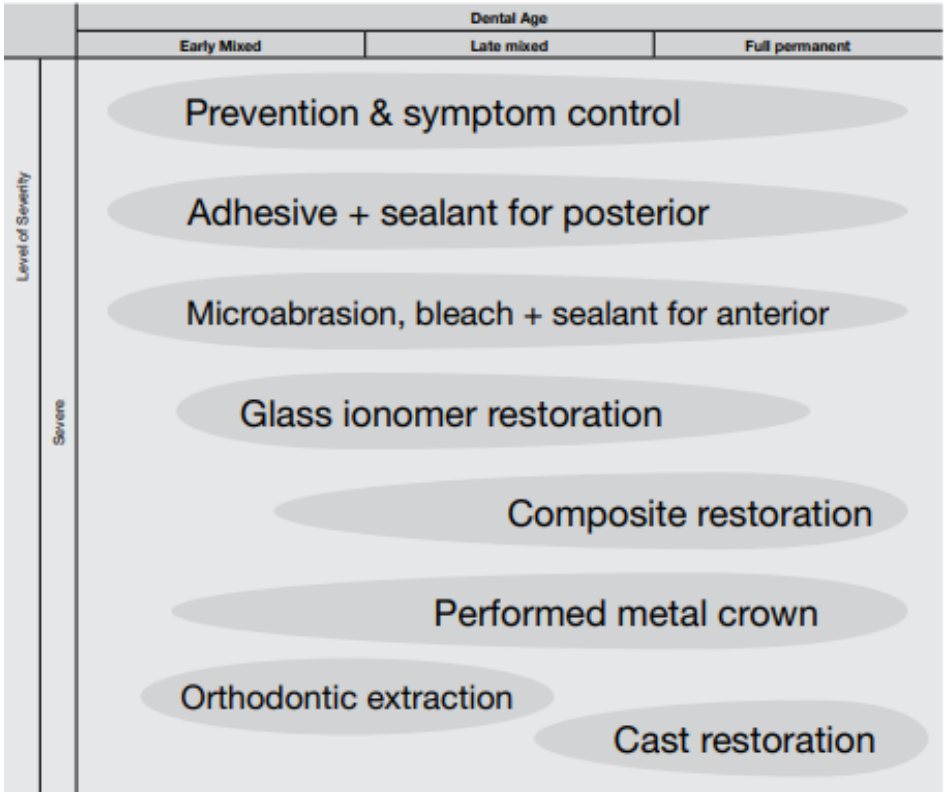
Treatment Approaches





Jälevik B 2010

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Thank You