Compromised First Permanent Molars – deciding what to do when it's broken down

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Aims & Objectives

Aim:

To increase knowledge and understanding of treatment options for compromised first permanent molars

Aims & Objectives

Points aiming to cover

- Brief overview of clinical presentation and aetiology of cFPM
- Options for clinical management
- Success and prognosis of treatment options
- Update on new guidelines e.g., RCS guidelines for extraction of FPMs

Plan

Overview

- Aetiology
- Problems with cFPM
- What to do? Restore or extract?

Compromised First Permanent Molars (cFPM)

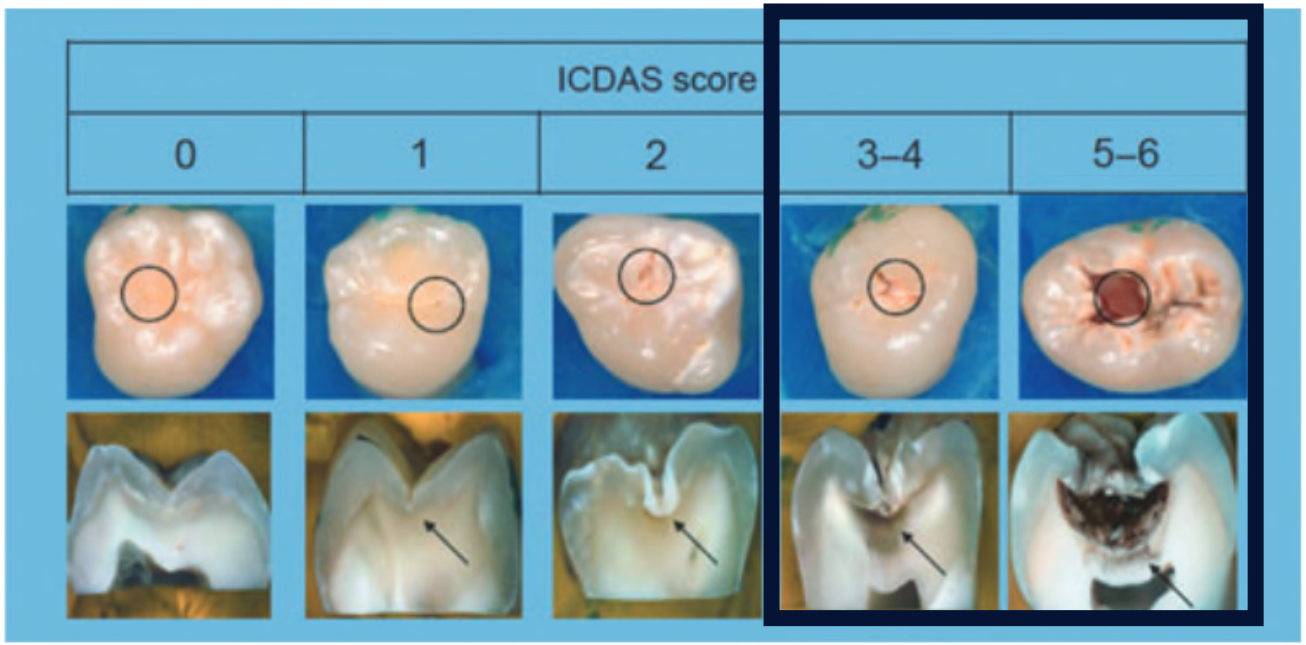
- Defective molar
- Restorable
- Uncertain long-term prognosis

What is the long-term prognosis of the FPM?

Uncertain

Aetiology

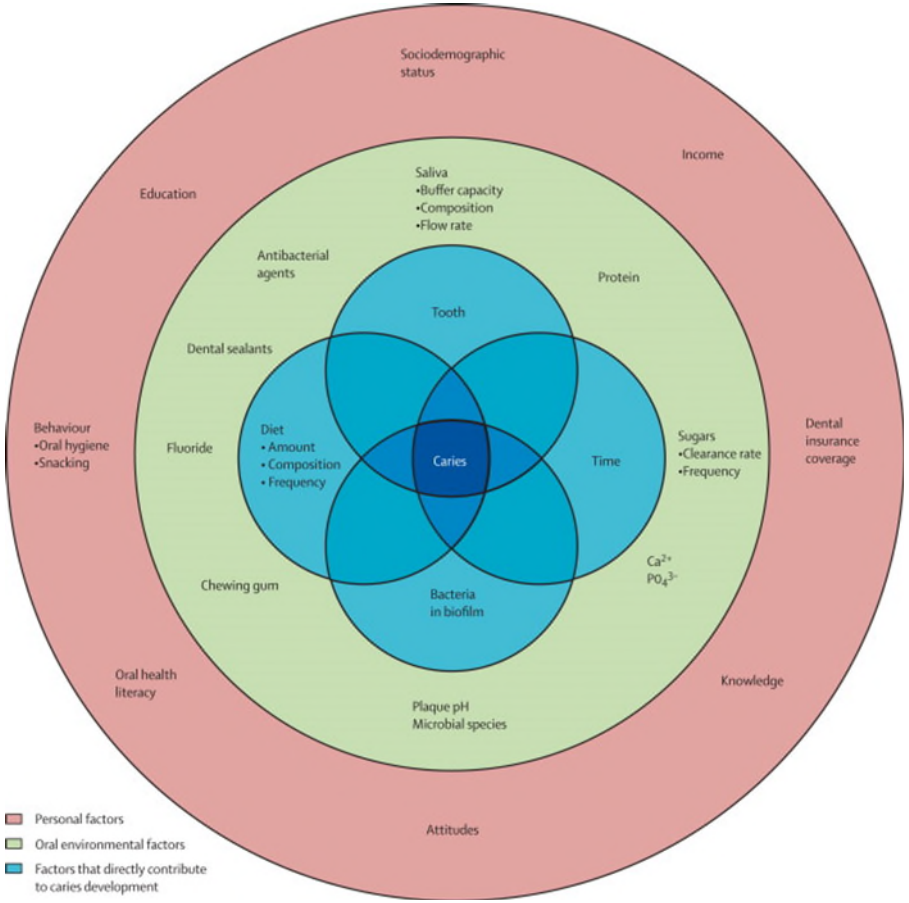
Caries



(Pitts et al., 2013)

Aetiology

Caries



(Ismail et al., 2007)

Aetiology

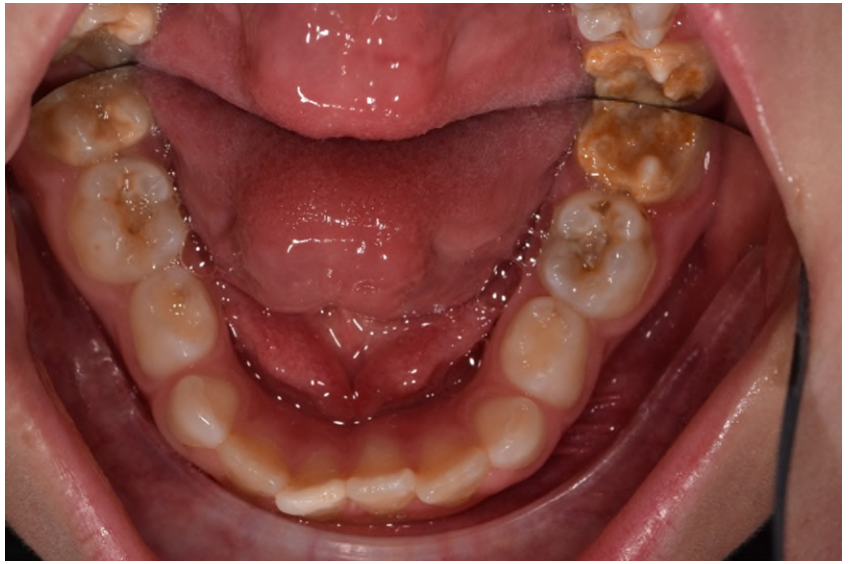
Molar-Incisor-Hypomineralisation (MIH): Qualitative defect of 1-4 first permanent molars with or without the maxillary and mandibular permanent incisors

(Weerheijm et al., 2003)

Aetiology

Molar-Incisor-Hypomineralisation (MIH):

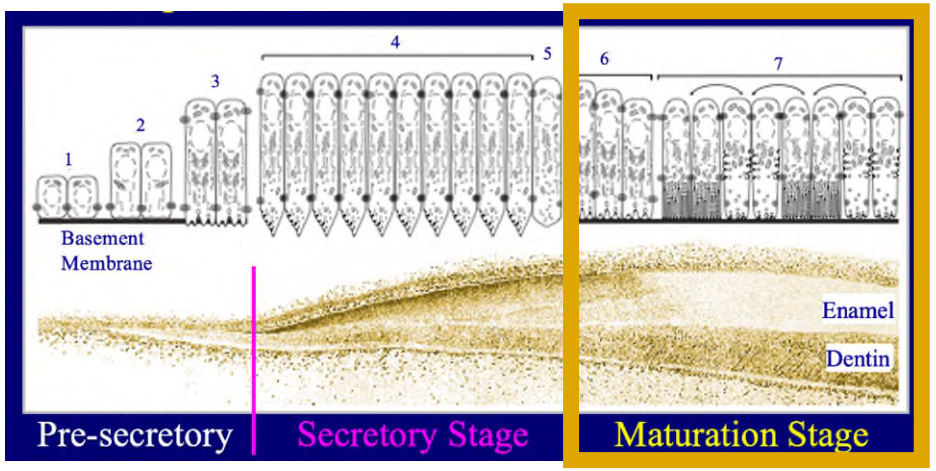
Hypoplastic Molars?



Aetiology

Hypomineralisation:

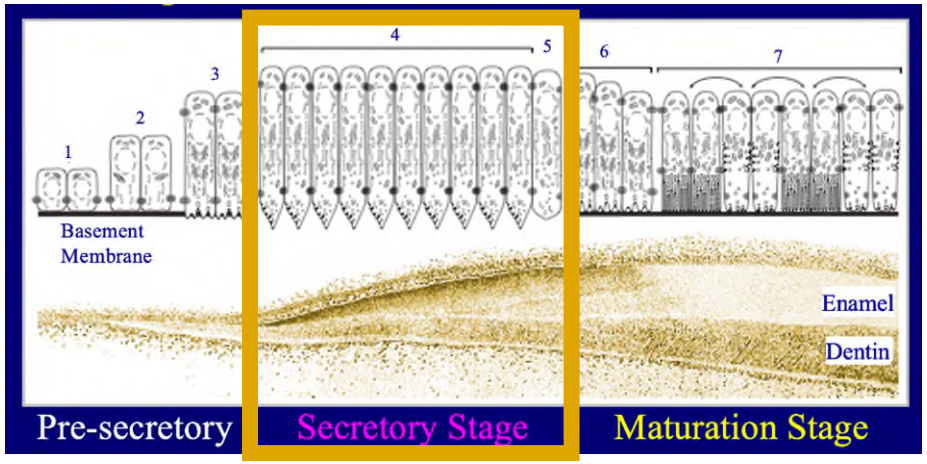
Qualitative defect - normal amount of enamel but poorly mineralised



Aetiology

Hypoplasia:

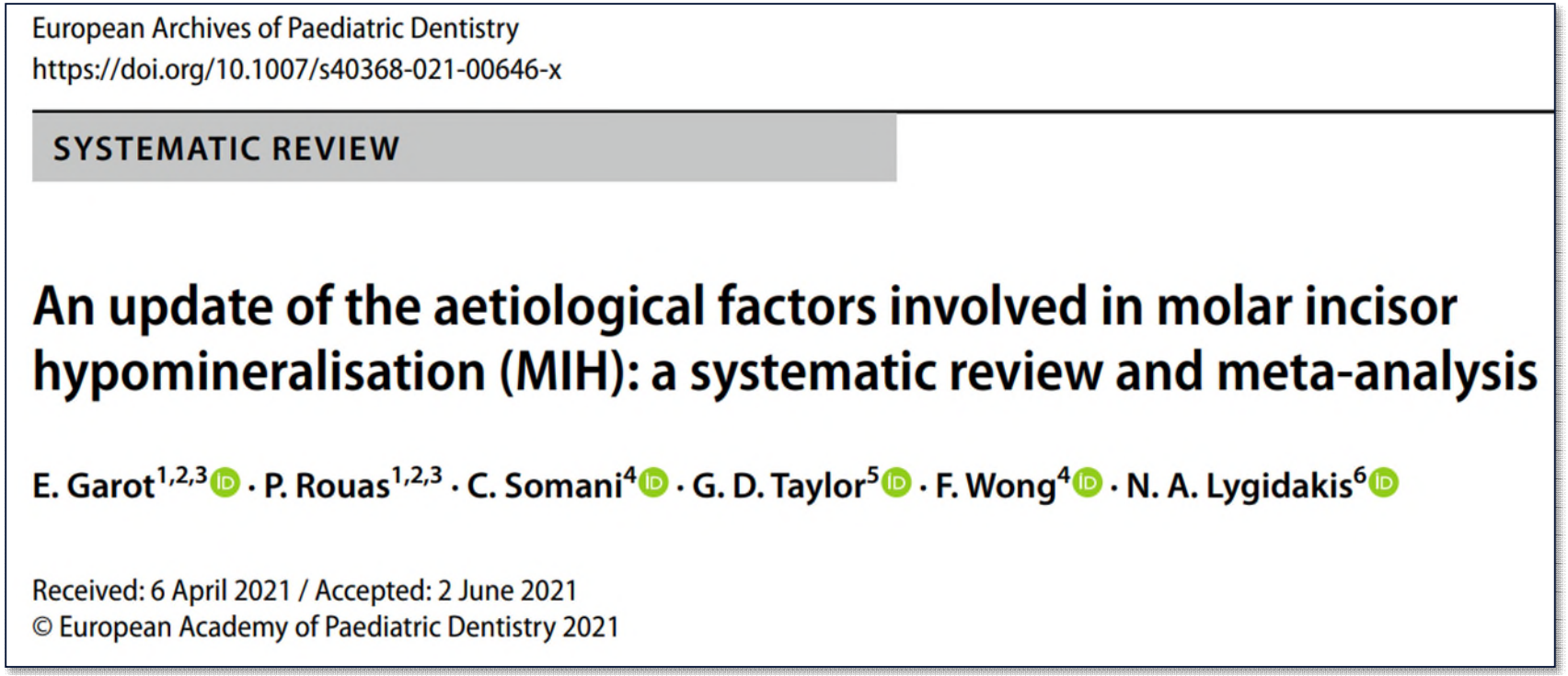
Quantitative defect - insufficient amount of enamel and occasionally poorly mineralised



Aetiology

Hypoplasia:

Aetiology



European Archives of Paediatric Dentistry
https://doi.org/10.1007/s40368-021-00646-x

SYSTEMATIC REVIEW

An update of the aetiological factors involved in molar incisor hypomineralisation (MIH): a systematic review and meta-analysis

E. Garot[1,2,3] · P. Rouas[1,2,3] · C. Somani[4] · G. D. Taylor[5] · F. Wong[4] · N. A. Lygidakis[6]

Received: 6 April 2021 / Accepted: 2 June 2021

Aetiology

Newcastle Upon Tyne Hospitals NHS Foundation Trust

Child Dental Health Medical History Record

Date completed: _____

Patient ID sticker

Medical History Questions	Answer		Details
In good general health	Yes	No	
Under the care of a GP or hospital (including recent hospital admissions)	Yes	No	
Other serious illnesses or injuries	Yes	No	
Previous GA (including family) Any complications?	Yes	No	
Heart problems	Yes	No	
Breathing problems (Sleep Apnoea?)	Yes	No	
Diabetes, thyroid problems, or other hormone conditions	Yes	No	
Liver disease/jaundice	Yes	No	
Kidney problems	Yes	No	
Digestive/bowel problems (Reflux?)	Yes	No	
Epilepsy, faints, or CNS disorders	Yes	No	
Muscle, bone, or joint problems	Yes	No	
Chemotherapy or radiotherapy (If yes, please provide further information)	Yes	No	
Steroid treatment (currently or within past 2 years)	Yes	No	
Bleeding problems/Blood disorders/previous transfusion	Yes	No	
Skin Disorders	Yes	No	
Eye/Ear Conditions	Yes	No	
Allergies	Yes	No	
Behavioural concerns or assistance at school	Yes	No	
Have you tested positive for COVID-19? (If yes, please provide further information)			

Any medications: **Further Information (see overleaf if required):**

Sensitivity

Discretion

Aetiology

Post-eruptive breakdown:

Loss of enamel of a tooth, after tooth eruption, that has hypomineralisation and/or hypoplasia

Attrition, erosion and caries can accelerate an already compromised surface

Aetiology

Post-eruptive breakdown:

(Ghanim, 2017)

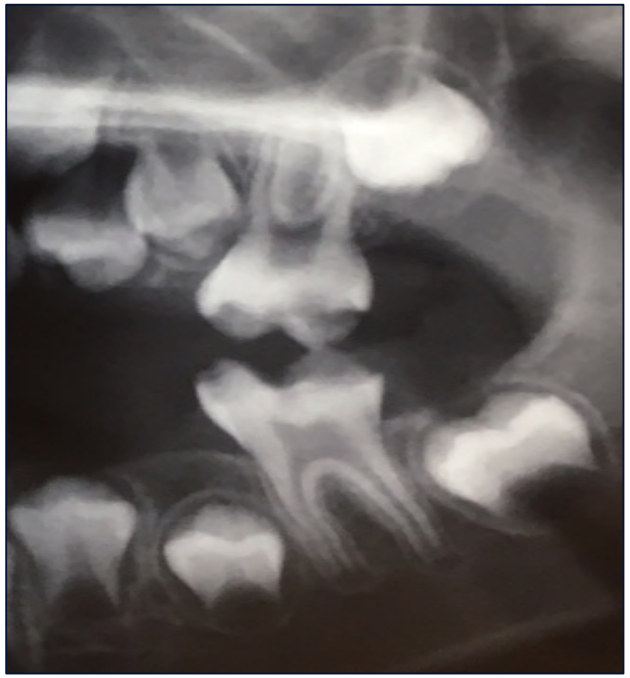
Aetiology

Post-eruptive breakdown:

Aetiology

Post-eruptive breakdown:

2015



2017

Plan

Overview

- Aetiology
- Problems with cFPM
- What to do? Restore or extract?

Problems - cFPM

Impacts of pain / sensitivity on the day-to-day life of a child

Avoidance of certain foods

Not brushing teeth properly

Days off school with pain

Repeated antibiotics if infection

(Taylor et al., 2018)

Problems - cFPM

MIH likely to cause a negative impact on OHRQoL in children

(Jälevik et al., 2022)

Problems - cFPM

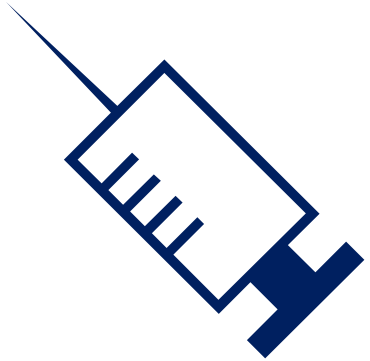
Chronic low-grade sub-clinical pulpal inflammation:

- Increased sensitivity
- Difficult to anaesthetise

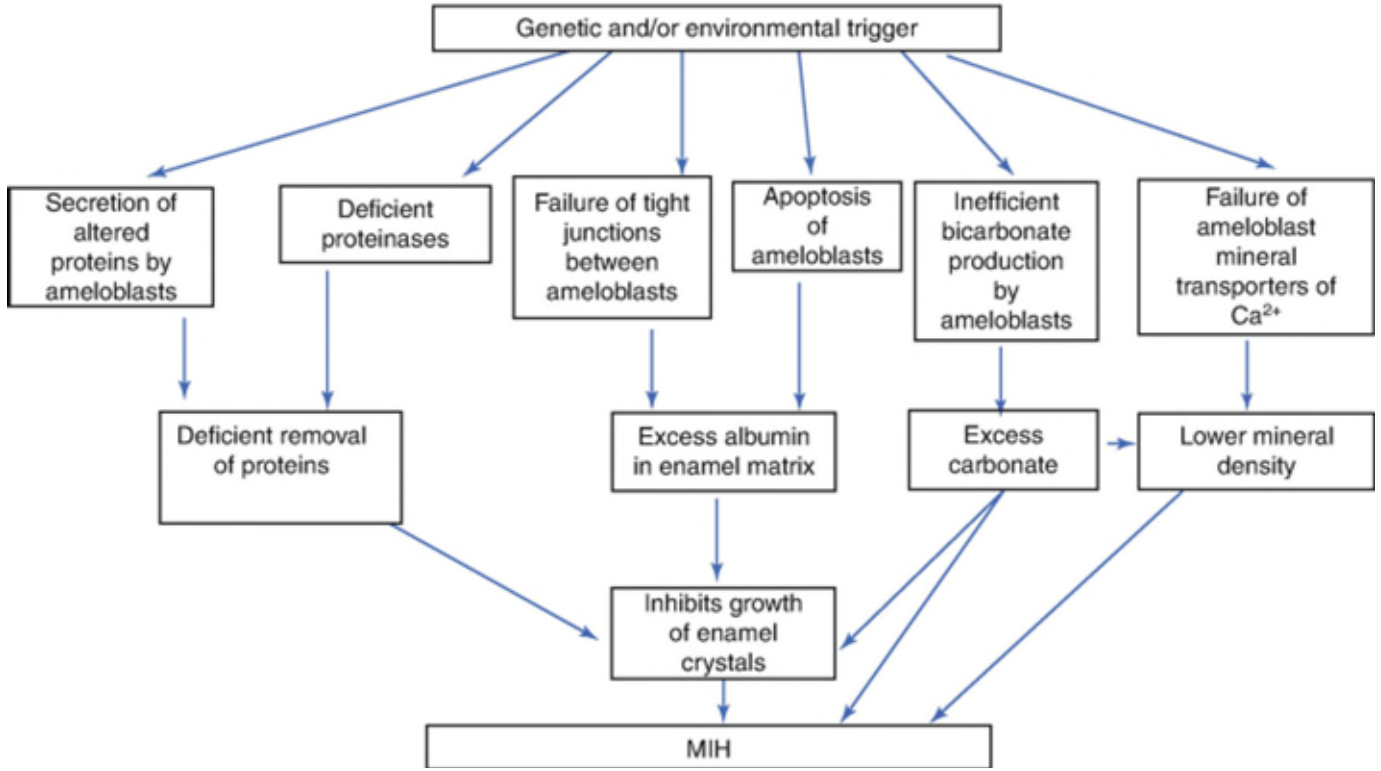
(Jälevik, 2002; Rodd et al., 2007)

Hypersensitive pulp will excite with less stimulation than normally necessary

Supplementary Articaine (not as IDB) + time = successful anaesthetic



Problems - cFPM



(Manton et al., 2020)

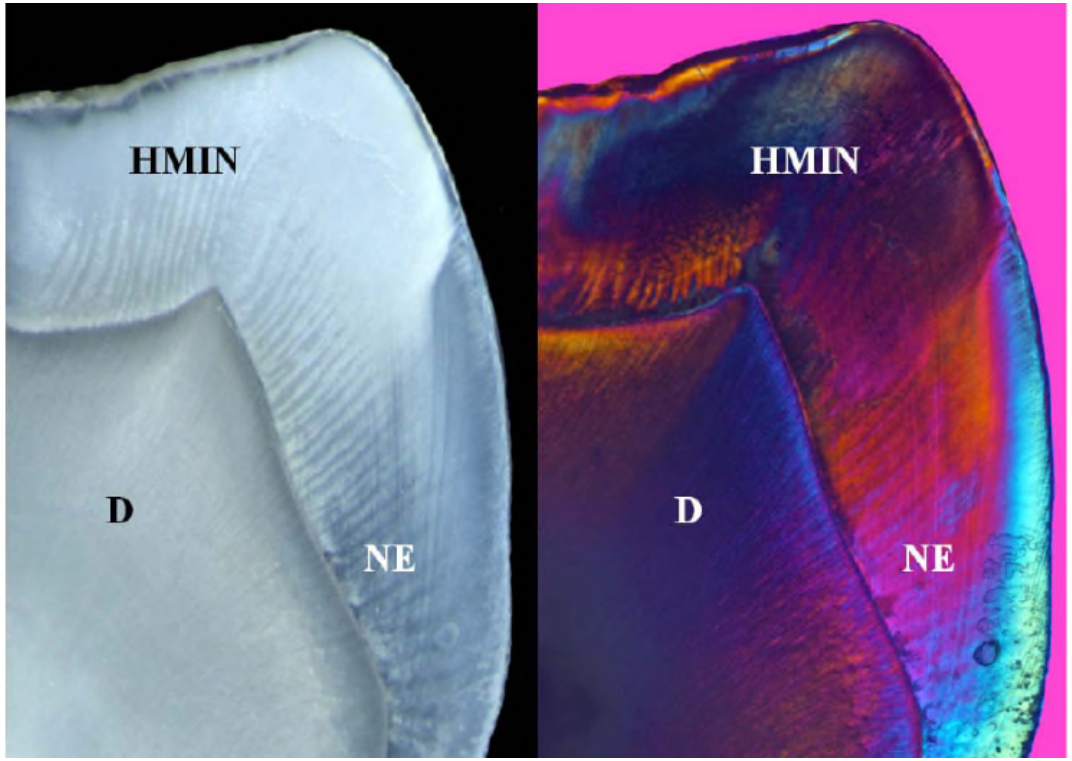
Problems - cFPM

Hypomineralisation in MIH begins at the amelodentinal junction (ADJ) and not at the surface of the enamel

- Mild (inner)
- Severe (full thickness)

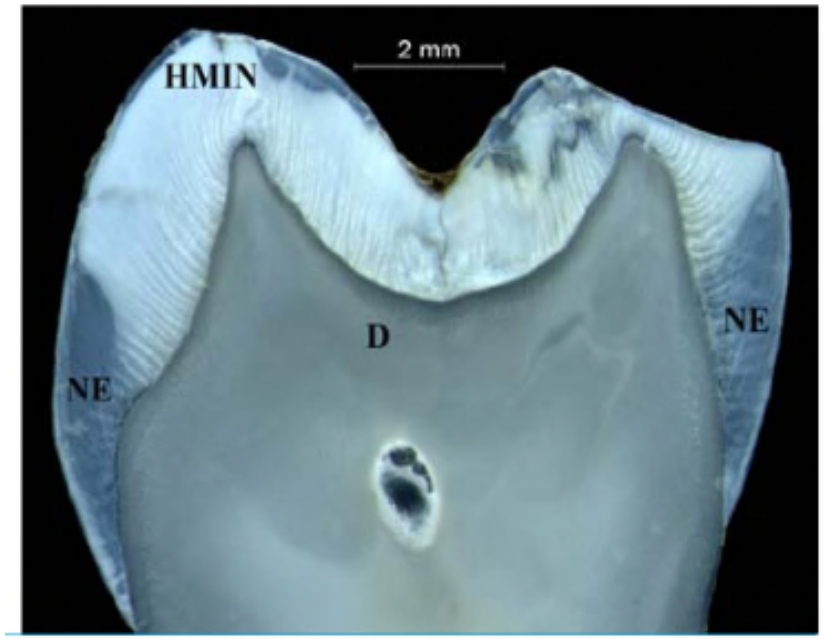
(Mahoney et al., 2014)

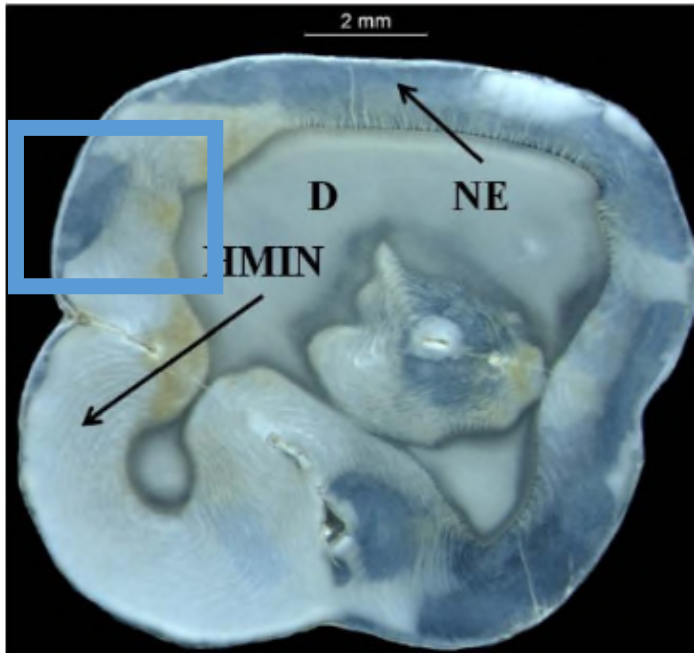
Problems - cFPM



(Fagrell et al., 2013)

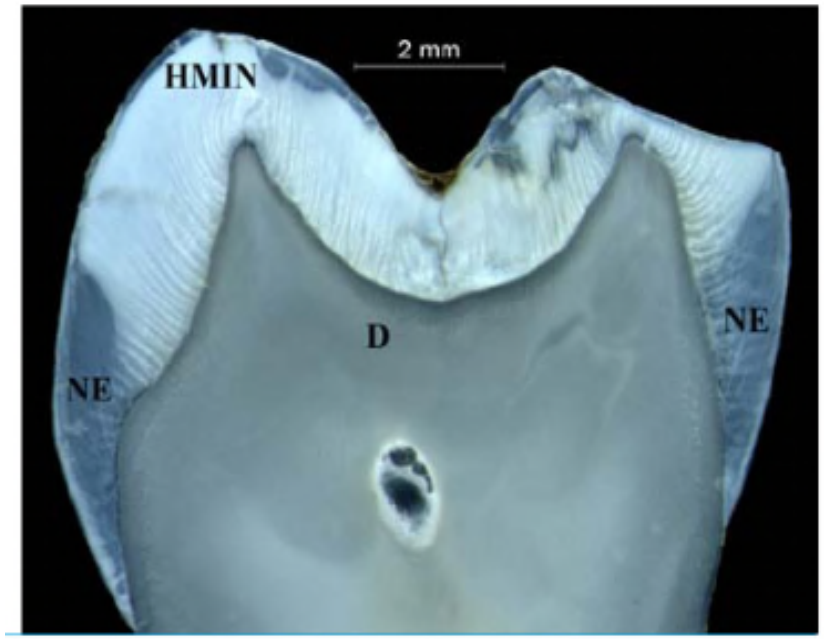
Problems - cFPM

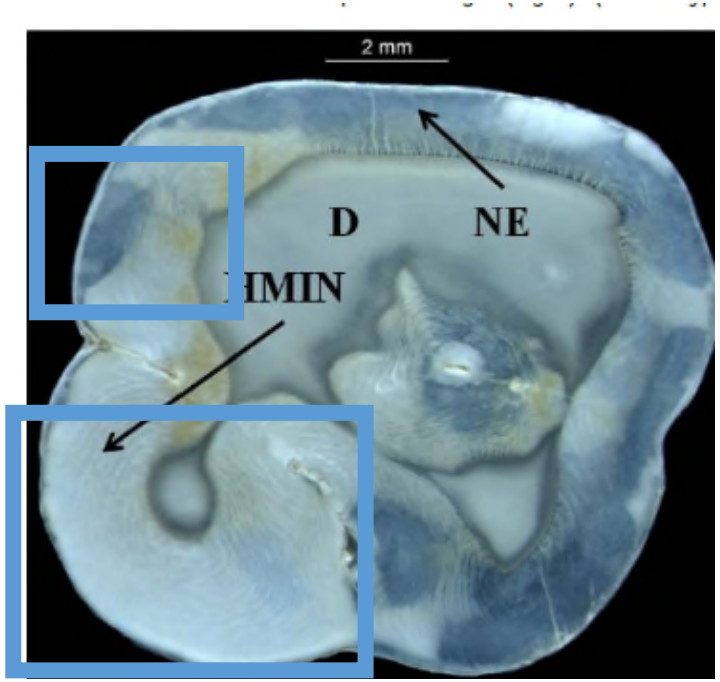




(Fagrell et al., 2013)

Problems - cFPM





(Fagrell et al., 2013)

Problems - cFPM

Compared to sound enamel:

- 20% less mineral
- Reduced hardness/modulus of elasticity
- Increased protein content (three-fold to 15-fold)

Defect	Mean	df	95% Confidence Interval	
			Lower Bound	Upper Bound
Normal	278.21	10.24	255.22	301.20
White/cream	86.11	7.87	62.16	85.41
Yellow/brown	81.64	9.43	62.28	100.99
Hypoplasia – missing enamel	31.03	19.63	-2.91	64.98
PEB	41.60	11.66	16.49	66.71

(Farah et al., 2010)

(Noor et al., 2014)

Problems - cFPM

Compared to normal enamel, MIH-affected enamel has:

- Reduction in the mineral quantity and quality
  - **Finish margins on sound enamel**
- Reduced hardness and modulus of elasticity
  - **Use materials that can flex better e.g., Composite**
- Increased porosity
  - **Extended etching time allows deeper penetrations**
- Higher protein content
  - **Deproteinise teeth prior to restoration e.g., NaOCl**

(Elheneway et al., 2017; Manton et al., 2020)

Problems - cFPM

Increased susceptibility of caries due to the structural defect and subsequent post-eruptive breakdown

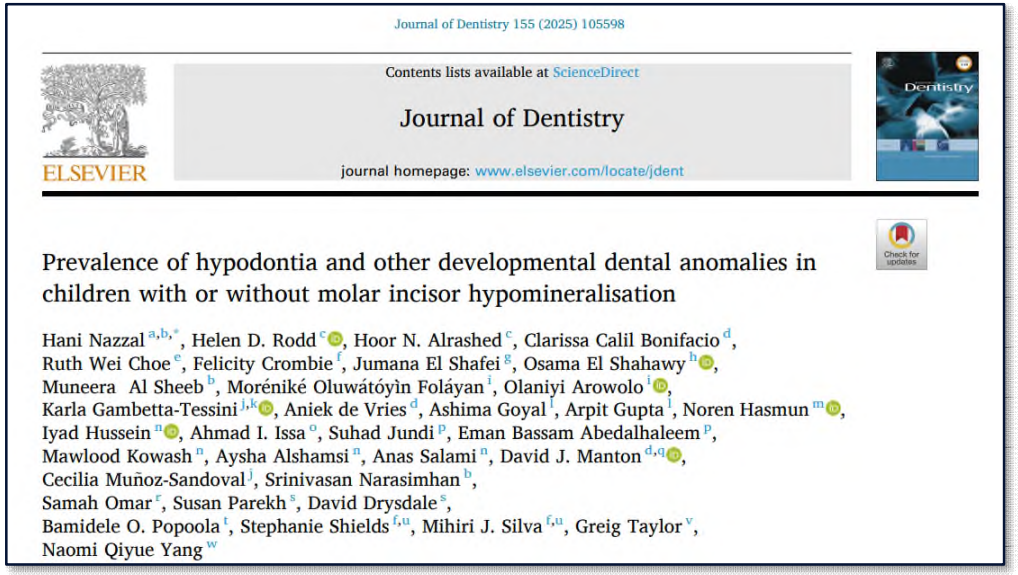
The micro-niche environment is ideal for biofilm development and initiation of caries

(Americano et al, 2016; Mazur et al., 2023)

Problems in cFPM

Those with MIH:

- hypodontia (p = 0.047)
- dens invaginatus (p = 0.004)
- dens evaginatus (p < 0.001)
- microdont lateral incisors (p = 0.01)



Journal of Dentistry 155 (2025) 105598

Contents lists available at ScienceDirect

Journal of Dentistry

journal homepage: www.elsevier.com/locate/jdent

Prevalence of hypodontia and other developmental dental anomalies in children with or without molar incisor hypomineralisation

Hani Nazzal [a,b,*], Helen D. Rodd [c], Hoor N. Alrashed [c], Clarissa Calil Bonifacio [d], Ruth Wei Choe [e], Felicity Crombie [f], Jumana El Shafei [g], Osama El Shahawy [h], Muneera Al Sheeb [b], Morénikẹ́ Oluwátóyìn Foláyan [i], Olaniyi Arowolo [i], Karla Gambetta-Tessini [j,k], Aniek de Vries [d], Ashima Goyal [l], Arpit Gupta [l], Noren Hasmun [m], Iyad Hussein [n], Ahmad I. Issa [o], Suhad Jundi [p], Eman Bassam Abedalhaleem [p], Mawlood Kowash [n], Aysha Alshamsi [n], Anas Salami [n], David J. Manton [d,q], Cecilia Muñoz-Sandoval [j], Srinivasan Narasimhan [b], Samah Omar [r], Susan Parekh [s], David Drysdale [s], Bamidele O. Popoola [t], Stephanie Shields [f,u], Mihiri J. Silva [f,u], Greig Taylor [v], Naomi Qiyue Yang [w]

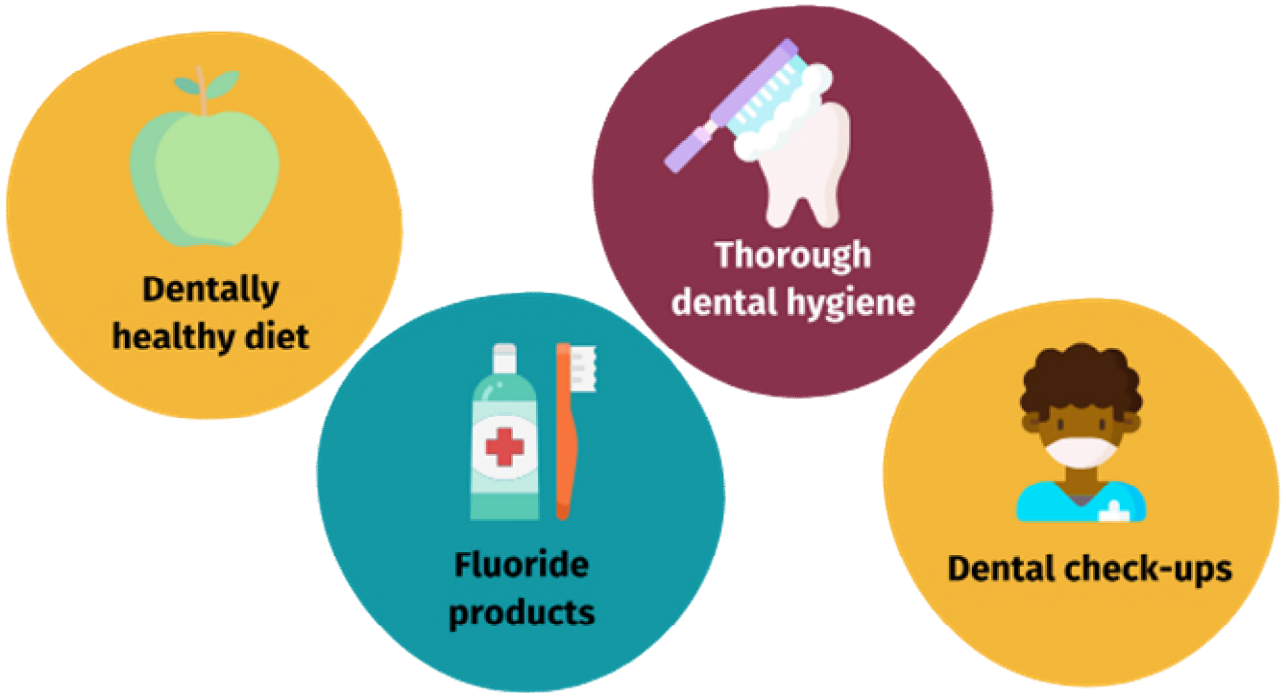
Hypodontia were **1.49 times** higher in children with MIH compared to those without MIH, adjusted for age, sex & geography

Plan

Overview

- Aetiology
- Problems with cFPM
- What to do? Restore or extract?

What to do? Restore or extract?



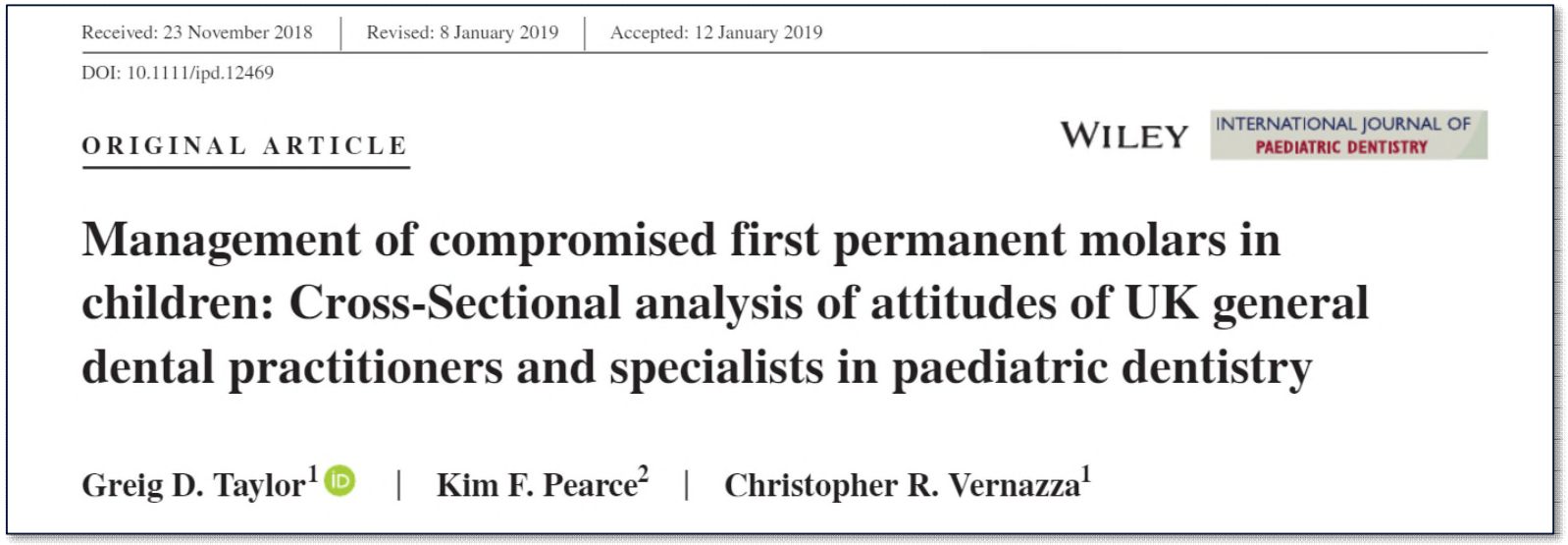
What to do? Restore or extract?

My treatment ‘philosophies’ for cFPM molars:

- **Early coverage to**
  - Reduce sensitivity
  - Prevent caries
  - Minimise future structural tissue loss
  - Maintain occlusal contact

- **Consider long-term:**
  - Extract or restore
  - Preferences & values!! (not just service pressures!)

What to do? Restore or extract?



Received: 23 November 2018 | Revised: 8 January 2019 | Accepted: 12 January 2019

DOI: 10.1111/ipd.12469

ORIGINAL ARTICLE

WILEY INTERNATIONAL JOURNAL OF PAEDIATRIC DENTISTRY

Management of compromised first permanent molars in children: Cross-Sectional analysis of attitudes of UK general dental practitioners and specialists in paediatric dentistry

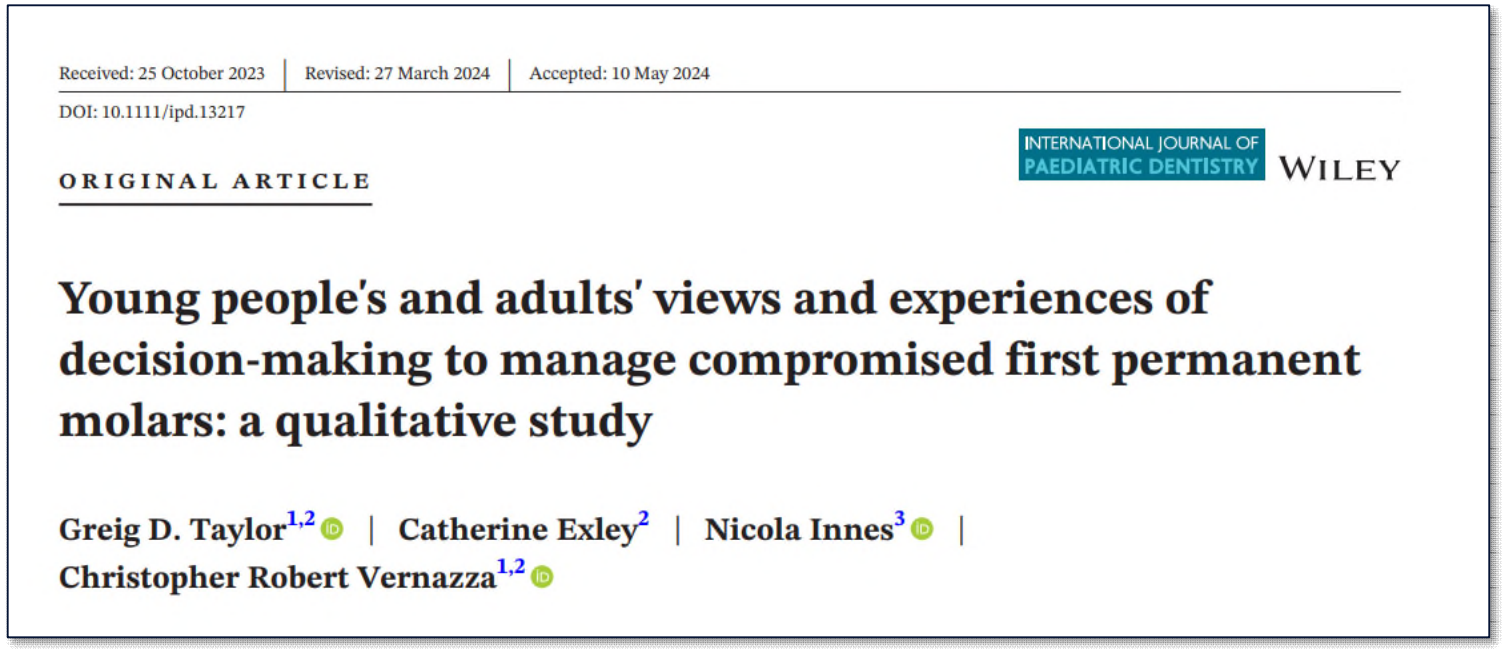
Greig D. Taylor[1] | Kim F. Pearce[2] | Christopher R. Vernazza[1]

What to do? Restore or extract?

	General Dental Practitioners	Specialists in Paediatric Dentistry
Fill (9-year old)	71%	45%
Extract (9-year old)	29%	49%

(Taylor et al., 2019)

What to do? Restore or extract?



Received: 25 October 2023 | Revised: 27 March 2024 | Accepted: 10 May 2024

DOI: 10.1111/ipd.13217

INTERNATIONAL JOURNAL OF PAEDIATRIC DENTISTRY WILEY

ORIGINAL ARTICLE

Young people's and adults' views and experiences of decision-making to manage compromised first permanent molars: a qualitative study

Greig D. Taylor[1,2] | Catherine Exley[2] | Nicola Innes[3] | Christopher Robert Vernazza[1,2]

What to do? Restore or extract?

Influencing Factors	Life-long considerations	Shared Decision Making
• Acquired vs Developmental • External • Personal • Physical • Procedural • Professional	• Preference for retention • Recurrent pain leads to extraction	• Provision of Information • Retaining Autonomy • Trust Professional Opinion

FUNDED BY
NIHR | National Institute for Health Research

DECIDE
EXTRACTION VS FILLING FOR ADULT TEETH IN CHILDREN

What to do? Restore or extract?

Influencing Factors

- Acquired vs Developmental

"I'd not be as worried because I hadn't caused it, but this would make me want to try and save it, as I was born with it…"
(*12-year-old, female, no treatment*)

"…it doesn't really matter whether I caused this, or [if] I was born with it, if the hole is too big I'd have it extracted."
(*13-year-old, male, extract only*)

"…if it did not develop and was going to form in a different way then it is not really worth trying to salvage the tooth with that. I would say get rid of it" (*15-year-old, female, no treatment*)

What to do? Restore or extract?

Shared Decision Making

"…what happens with my teeth is my choice, but how often I get to make that choice I am not sure" (*14-year-old, male, no treatment*)

"I think it's important to have information and like they should have like a pros and cons list, basically, [ok] of what would happen and what could happen erm in the future." (*12-year-old, female, fill/extract*)

"I agreed with erm the extractions and the braces…I felt like I had a choice in the matter, rather than my parents…" (*16-year-old, male, fill/extract*)

What to do? Restore or extract?

Influencing Factors	Uncertainty around specialist input	Decision making
• 'Societal norms' • Generational • Personal thresholds for retention	• Complexity • Abnormal child • Approval needed by GDP to see 'Expert'	• Involvement of child • 'Parental' Responsibility • 'Abstract' vs. 'Reality' • Discourse between child and themselves

What to do? Restore or extract?

Decision making

"I would definitely endeavour to make sure that my child has a more active role in that decision-making process."
(37-year-old, female, fill/extract)

"I would try and explain to them what was going on…but ultimately my decision would be, you know, i-, in, in partnership with the sort of dentist and my children…"
(*53-year-old, female, fill*)

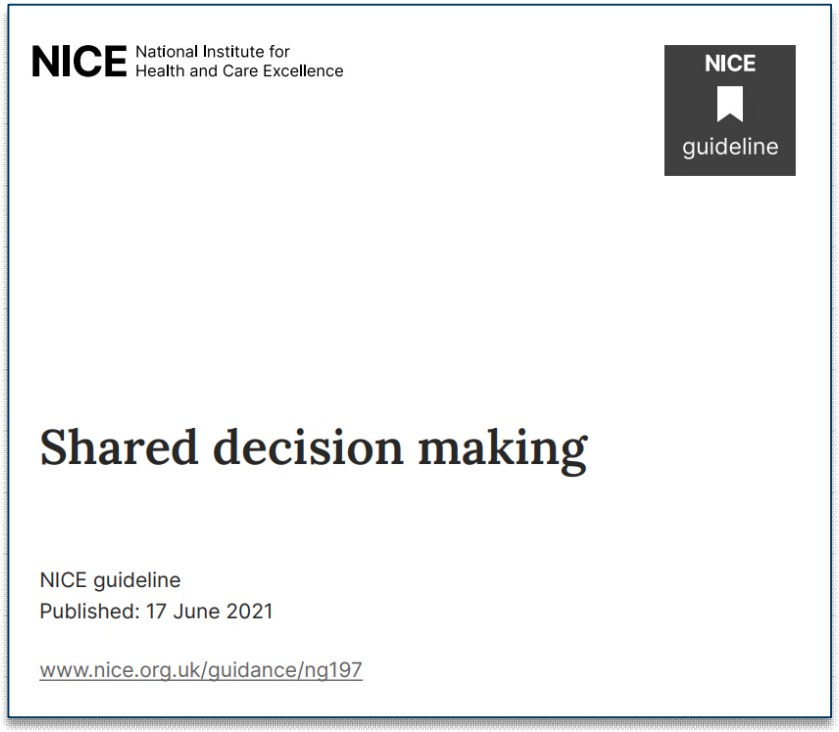
What to do? Restore or extract?

Shared decision-making - who should decide?

- Any decision should be jointly made between the patient, parent and healthcare professional.
- Parents and/or guardians still have a role to play in shared decision-making and need to empower a young person.
- Professionals need to actively encourage adults to allow children to express their opinions and preferences for decisions rather than dictating what they think they would want.

What to do? Restore or extract?

Shared decision-making - who should decide?

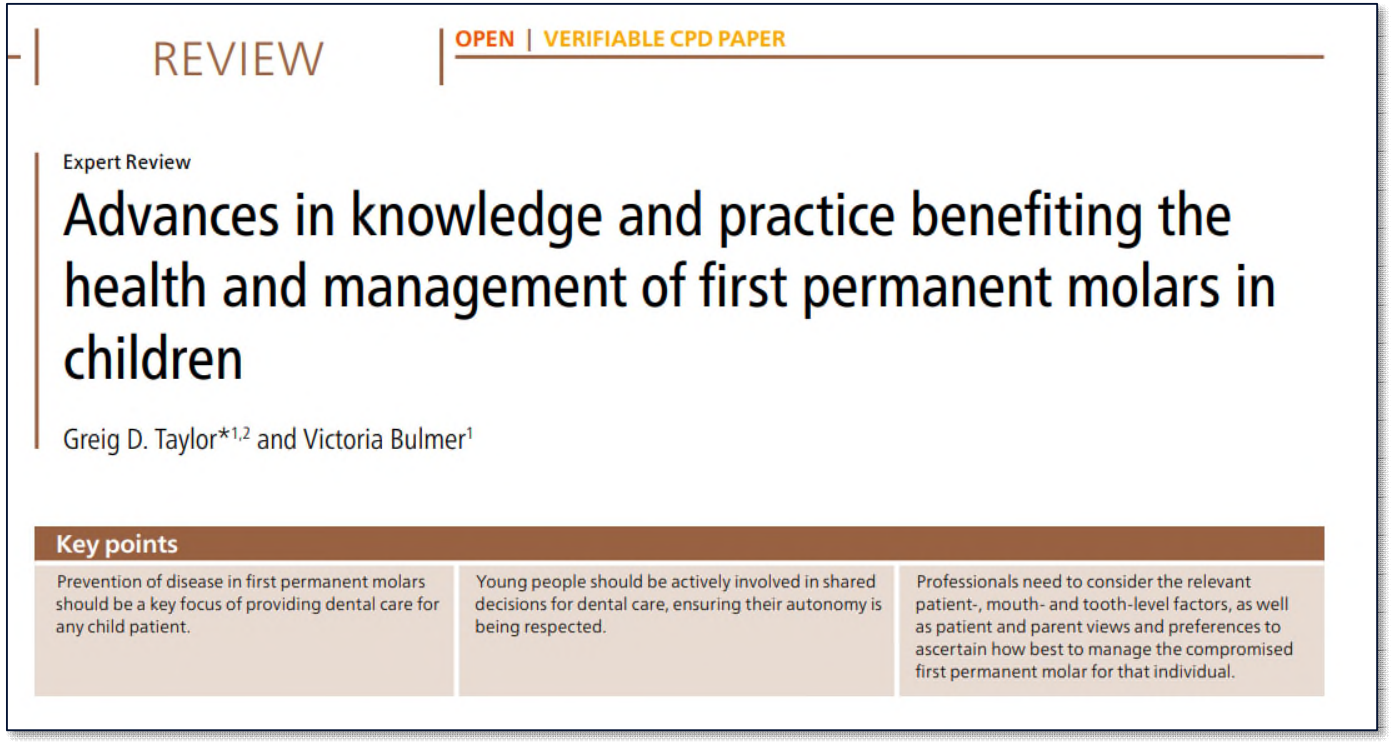


What to do? Restore or extract?

- Defective molar
- Restorable
- Uncertain long-term prognosis

…deciding what to do when it's broken down?

What to do? Restore or extract?



REVIEW

OPEN | VERIFIABLE CPD PAPER

Expert Review

Advances in knowledge and practice benefiting the health and management of first permanent molars in children

Greig D. Taylor*[1,2] and Victoria Bulmer[1]

Key points

Prevention of disease in first permanent molars should be a key focus of providing dental care for any child patient.

Young people should be actively involved in shared decisions for dental care, ensuring their autonomy is being respected.

Professionals need to consider the relevant patient-, mouth- and tooth-level factors, as well as patient and parent views and preferences to ascertain how best to manage the compromised first permanent molar for that individual.

What to do? Restore or extract?

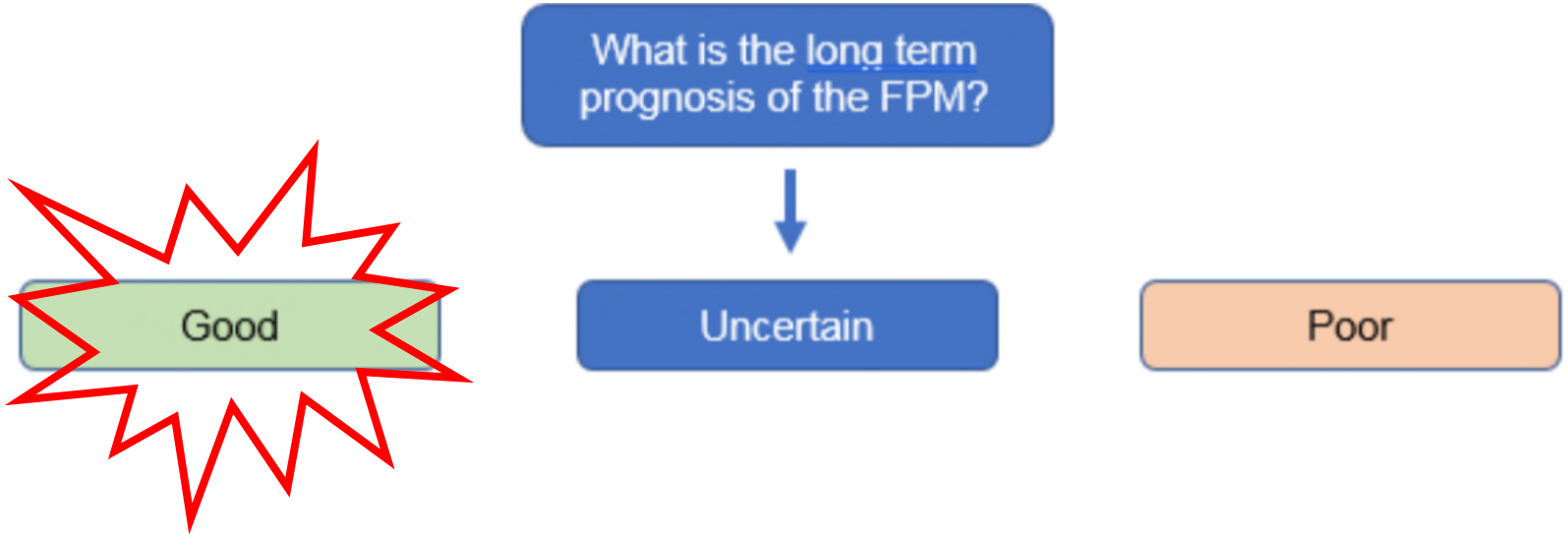
Table 1 Factors to be considered when treatment planning cFPMs

Patient level	Mouth level	Tooth level
Patient preferences	Number of affected cFPMs	Size and location of defect
Relevant medical history	Overall dental health	Number of surfaces involved
Age and level of co-operation	Dental developmental eg bifurcation of second permanent molars	Presence/absence of post-eruptive breakdown in hypomineralised tooth
Presence/absence of symptoms	Orthodontic need, such as presence/absence crowding, hypodontia etc	Pulpal involvement
Current access to general dental services	Presence of third permanent molars	History of dental abscess/facial cellulitis
Access to specialist care (paediatric dental/orthodontic)		

(Taylor & Bulmer 2025)

What to do? Restore or extract?

What is the prognosis?



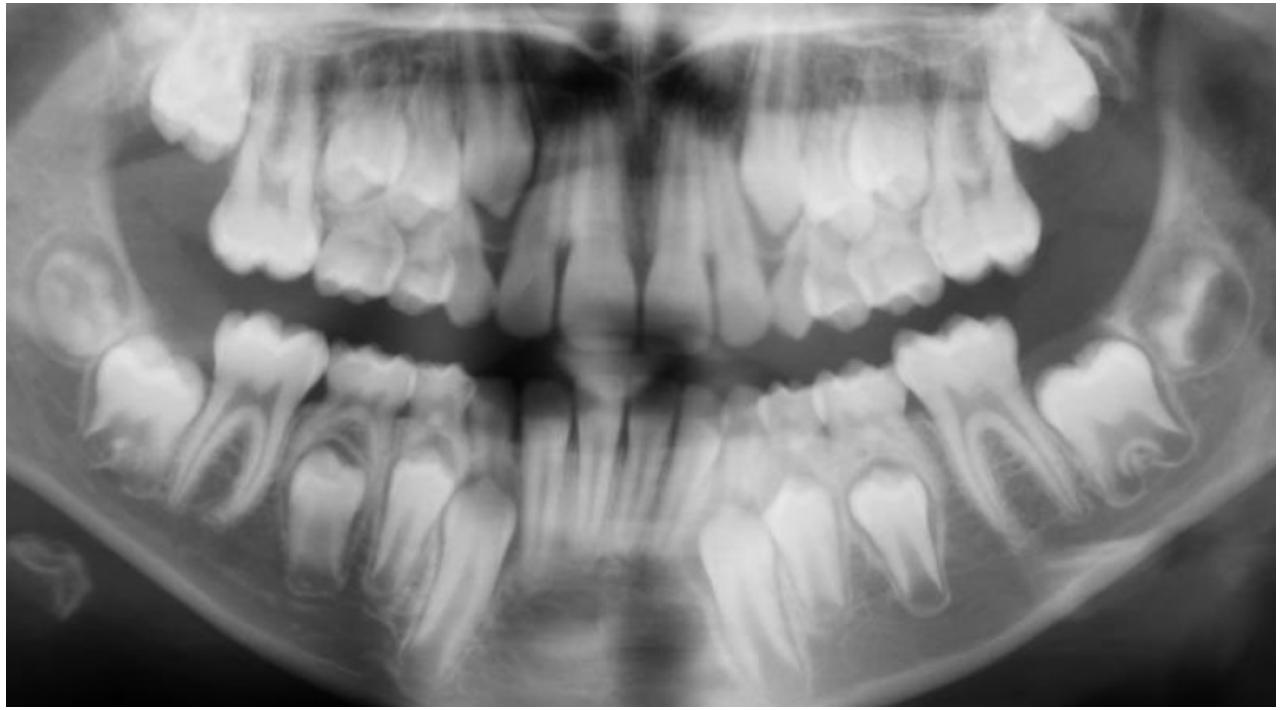
Keep it unless its removal has a specific benefit to occlusal guidance

What to do? Restore or extract?

What is the prognosis?

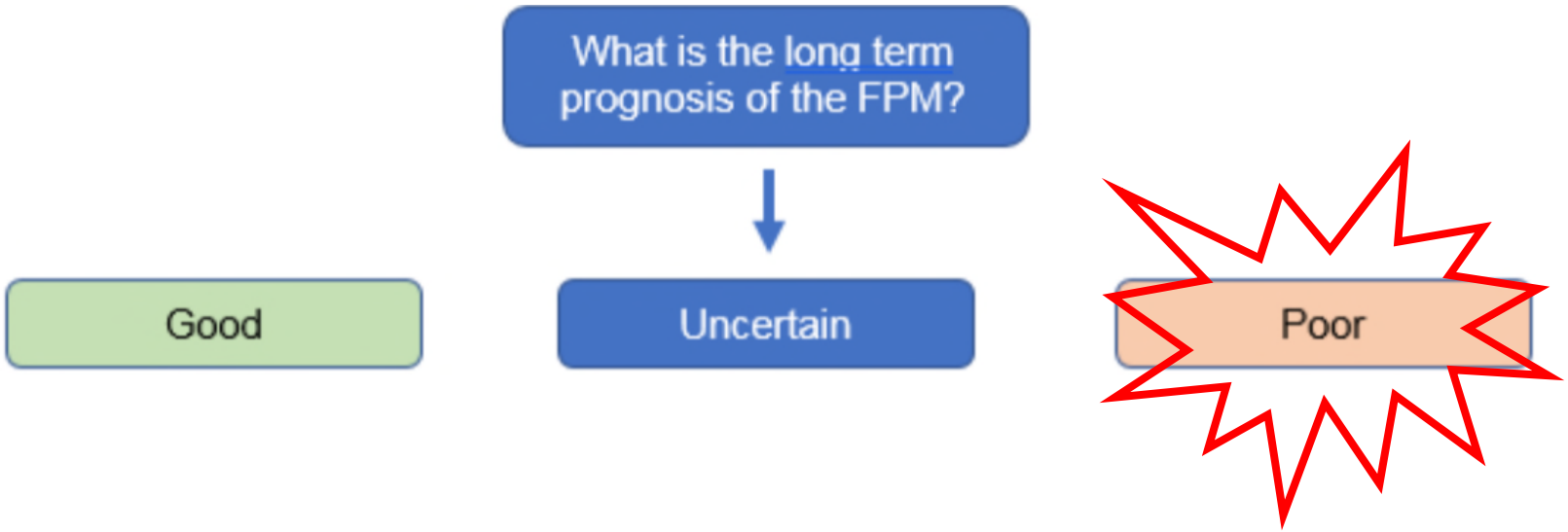
What to do? Restore or extract?

What is the prognosis?



What to do? Restore or extract?

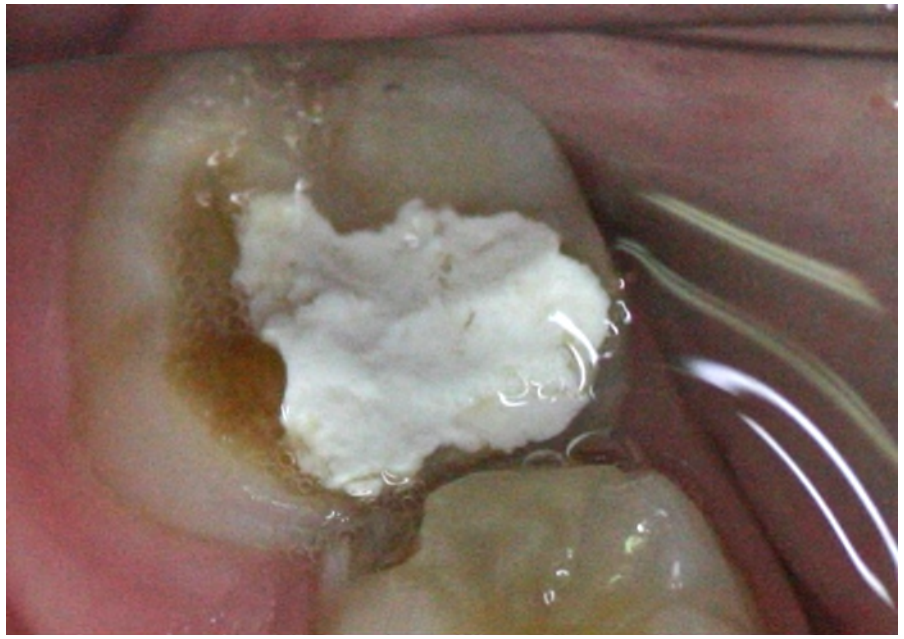
What is the prognosis?



Extraction is the only option

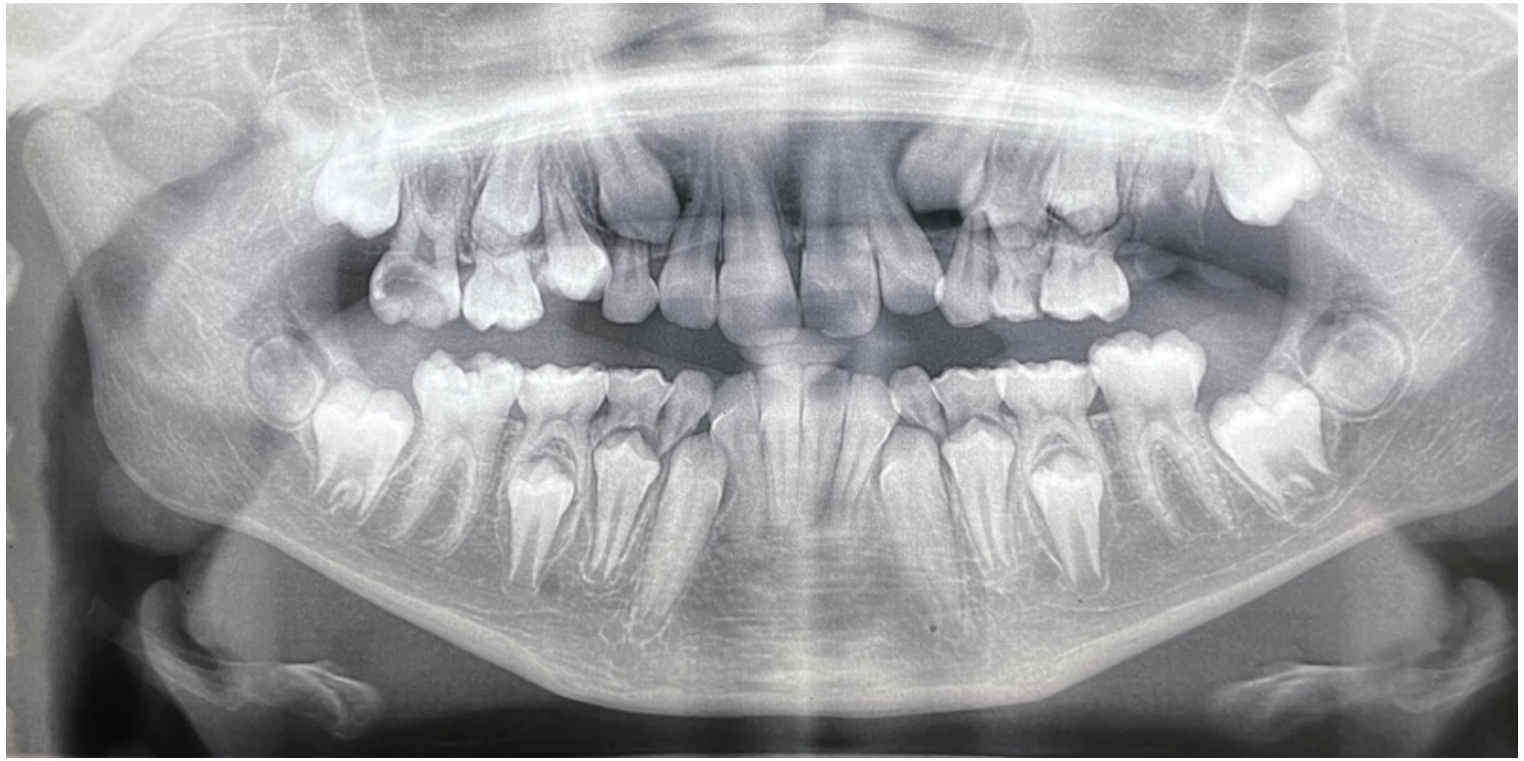
What to do? Restore or extract?

What is the prognosis?



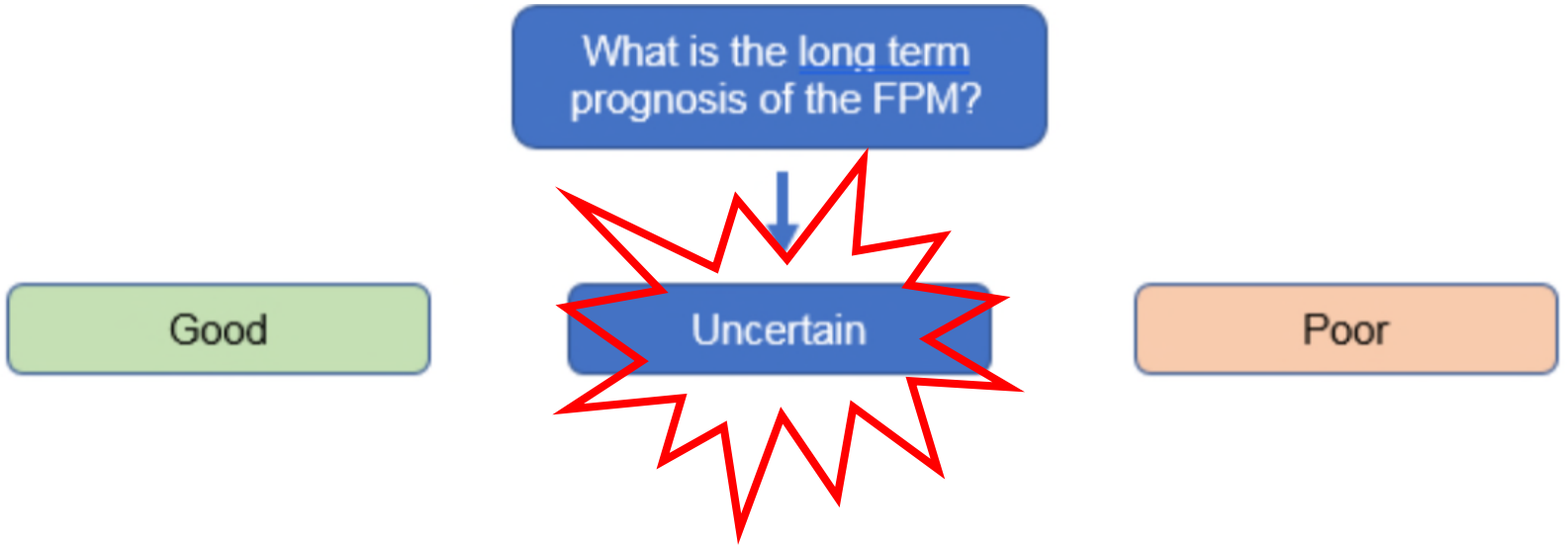
What to do? Restore or extract?

What is the prognosis?



What to do? Restore or extract?

What is the prognosis?



Restore or Extract

Shared-Decision making considering all relevant factors and risks/benefits of each option

What to do? Restore or extract?

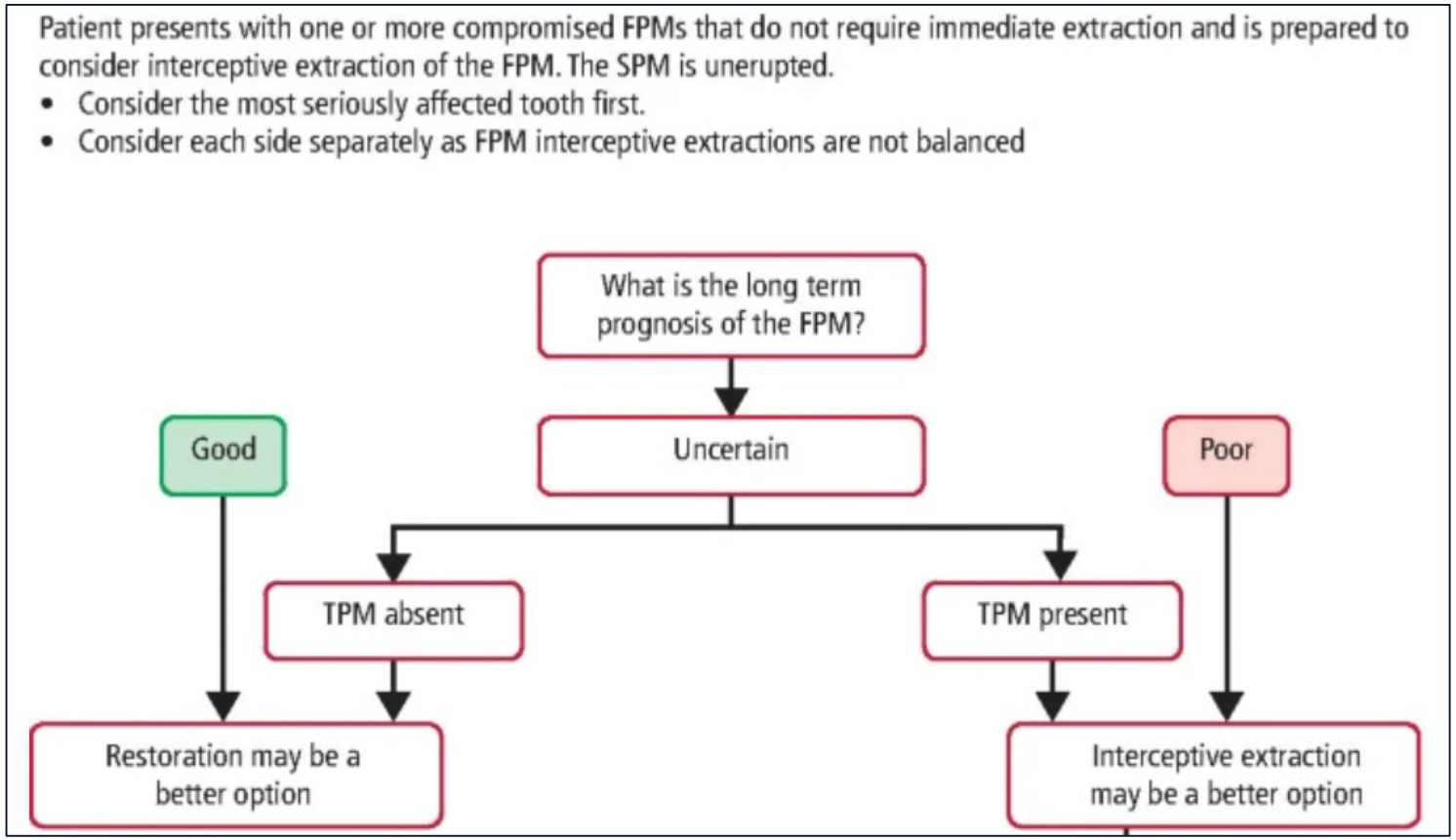
What to do? Restore or extract?

What if they are of ‘uncertain’ prognosis?

These are the difficult cases

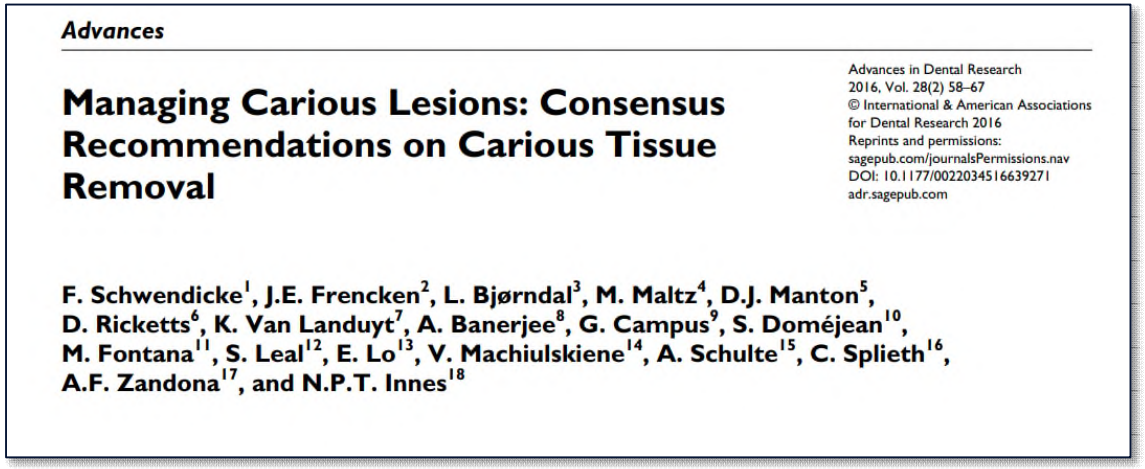
Restoration for life *vs* extraction with risk of unwanted space

What to do? Restore or extract?



(Ashley & Noar 2019)

What to do? Restore or extract?



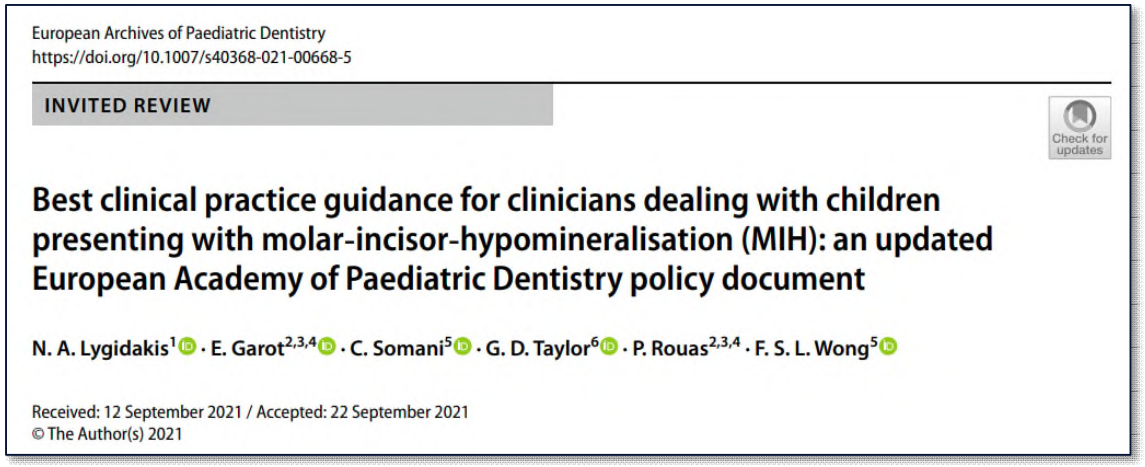
Advances

Managing Carious Lesions: Consensus Recommendations on Carious Tissue Removal

Advances in Dental Research
2016, Vol. 28(2) 58–67

DOI: 10.1177/0022034516639271
adr.sagepub.com

F. Schwendicke[1], J.E. Frencken[2], L. Bjørndal[3], M. Maltz[4], D.J. Manton[5], D. Ricketts[6], K. Van Landuyt[7], A. Banerjee[8], G. Campus[9], S. Doméjean[10], M. Fontana[11], S. Leal[12], E. Lo[13], V. Machiulskiene[14], A. Schulte[15], C. Splieth[16], A.F. Zandona[17], and N.P.T. Innes[18]



European Archives of Paediatric Dentistry
https://doi.org/10.1007/s40368-021-00668-5

INVITED REVIEW

Check for updates

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

N. A. Lygidakis[1] · E. Garot[2,3,4] · C. Somani[5] · G. D. Taylor[6] · P. Rouas[2,3,4] · F. S. L. Wong[5]

Received: 12 September 2021 / Accepted: 22 September 2021

What to do? Restore or extract?

Preventive counselling*

Desensitising*

SDF*

Fissure sealants*

Glass Ionomer Cement

Resin Infiltration*

Direct restorations

PFMC

Indirect restoration

Endodontic considerations

Orthodontic considerations

Extractions

* Not really options for cavitated molar

Silver Diamine Fluoride

Doesn’t restore structure; reduces carious activity

Support delayed treatment?

Silver Diamine Fluoride

Good evidence-based for caries (mostly primary dentition)

Very few studies in MIH

Management of Molar Incisor Hypomineralization with Silver Diamine Fluoride.
Clinical Trials Registry
NCT03862014

- Split-mouth parallel RCT
- SDF only vs SDF & Atraumatic Resin Restoration

Resin Infiltration

Infiltration fills the lesion and refracts the light in a similar manner to natural tooth tissue

Hypothetical, could it reduce risk of post-eruptive breakdown?

Journal of Dentistry 105 (2021) 103570

Contents lists available at ScienceDirect

Journal of Dentistry

journal homepage: www.elsevier.com/locate/jdent

ELSEVIER

Structural integrity of MIH-affected teeth after treatment with fluoride varnish or resin infiltration: An 18-Month randomized clinical trial

Vinícius Krieger Costa Nogueira [a,*], Igor Paulino Mendes Soares [b], Camila Maria Bullio Fragelli [a], Talita Boldieri [a], David John Manton [c,d], Diego Girotto Bussaneli [a], Rita de Cássia Loiola Cordeiro [a]

Resin Infiltration

At 6 months

- Increased risk of failure of 3.1 (OR) FV and 3.0 (OR) FV+etch compared to resin infiltration

At 18 months

- Frequency of failure was 17.9% for FV, 17.3% for FV+etch, and 6.10% for RI

(Noguiera et al., 2021)

Restoration

Why restore?

Mild/moderately affected

Good cooperation

Hypodontia (including no TPM)

Advances in bonding & minimal-interventive dentistry

Patient/Parent choice?

Restore - Direct Restorations

Aims of restorative management:

Reduce carious activity by aiding plaque control to disrupt biofilm

Protect the pulp-dentine complex and arrest the lesion by sealing it

Restore the function, form, and aesthetics of the tooth

(Schwendicke et al., 2016)

Restore - Direct Restorations

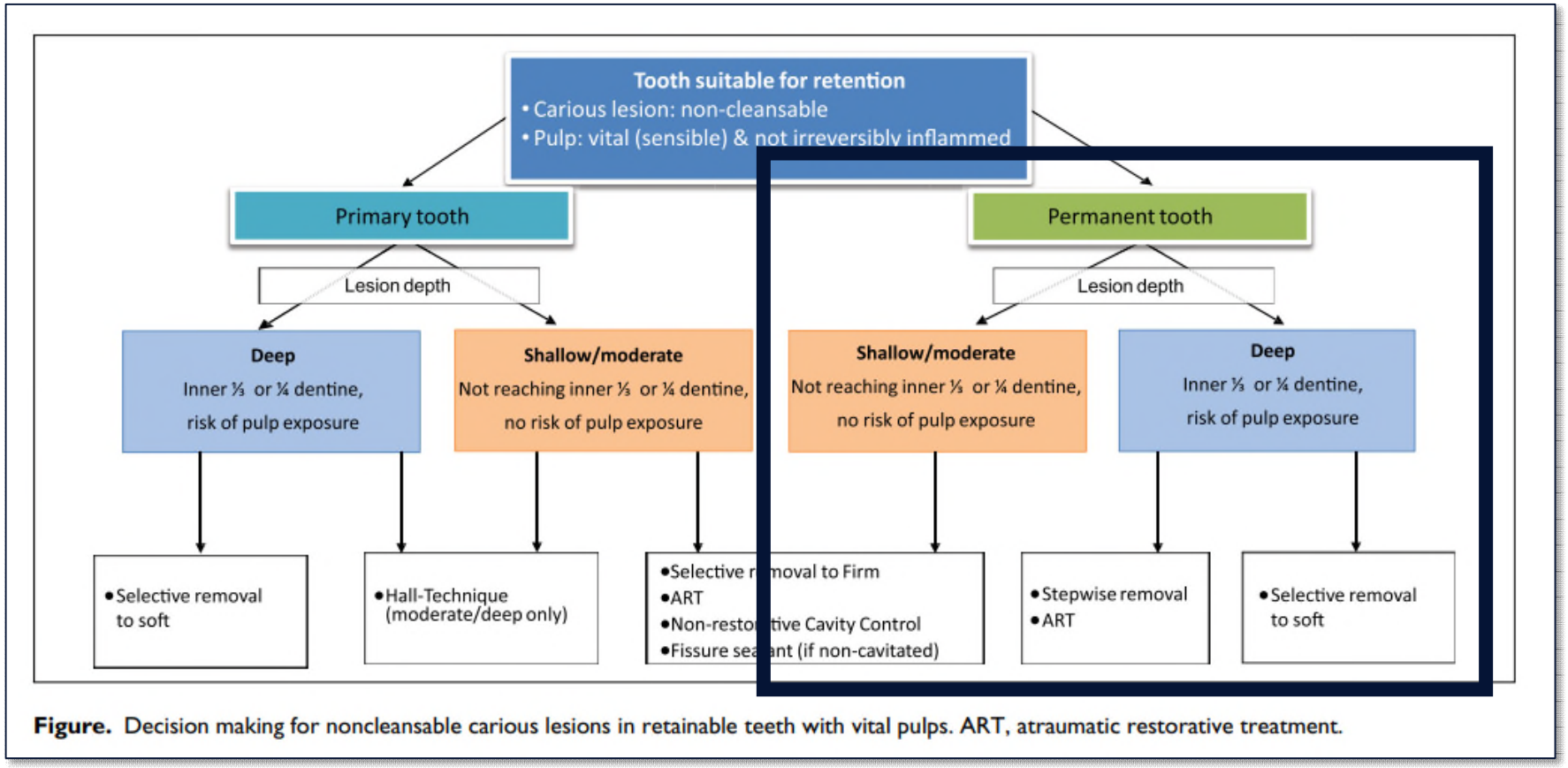


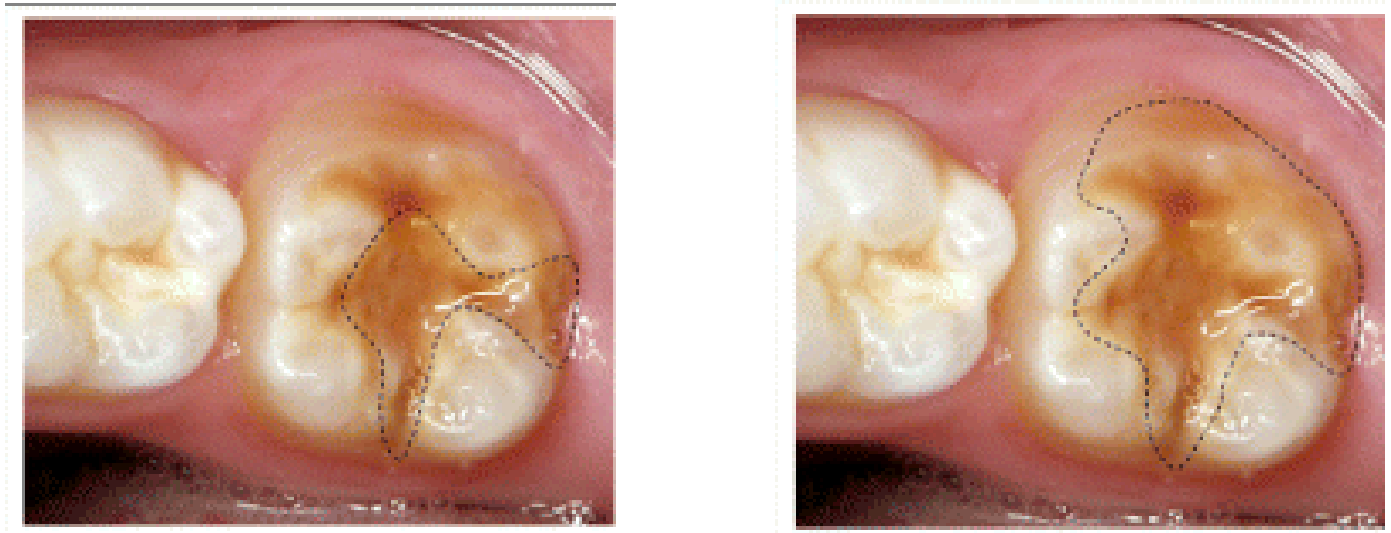
Figure. Decision making for noncleansable carious lesions in retainable teeth with vital pulps. ART, atraumatic restorative treatment.

(Schwendicke et al., 2016)

Restore - Direct Restorations

Circumferential or complete removal in MIH

Most importantly – sound enamel margins!



(Kopperud et al., 2016)

Restore - Direct Restorations

Amalgam – not permitted in children

Glass Ionomer Cement – not a definitive restoration

Composite good success

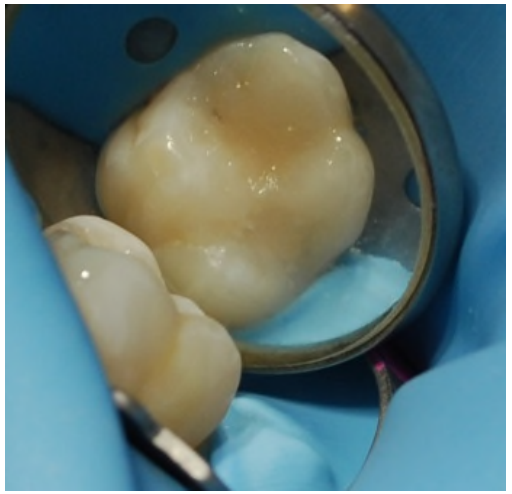
Margins on sound enamel

Rubber dam isolation

?Sodium Hypochlorite

Expect failure

Regular monitoring



(Lygidakis et al., 2022; Schwendicke at al., 2016)

Restore - Direct Restorations

Restore - Direct Restorations

Restore - Direct Restorations

Restore - Direct Restorations

281 immature molars:

- Age 6-8
- ICDAS 5-6 carious lesions
- Severe MIH
- Incomplete root formation

Selective caries removal tissue removal

Under LA and rubber dam

Sodium Hypochlorite rinse

Restored with GIC

GIC replaced at 6 months with Composite

(Gaton-Hernandez et al., 2019)

Restore - Direct Restorations

Single operator/assessor – no intra-rater reliability

Cooperative Children – generalisability?

Months	Number of failure per time period	Failure rate	Survival rate
2 months	1	0.071%	99.929%
6 months	3	0.338%	99.662%
12 months	5	0.929%	99.071%
18 months	0	0.929%	99.071%
24 months	0	0.929%	99.071%

(Gaton-Hernandez et al., 2019)

Restore - Direct Restorations

With thanks to Miss. Rachel Goldsmith (StR in Paediatric Dentistry)

Restore - PFMC

Treatment of choice for severely affected MIH

Act as a temporary (until extraction) or/ until mature to have cast restoration

Age/Cooperation consideration

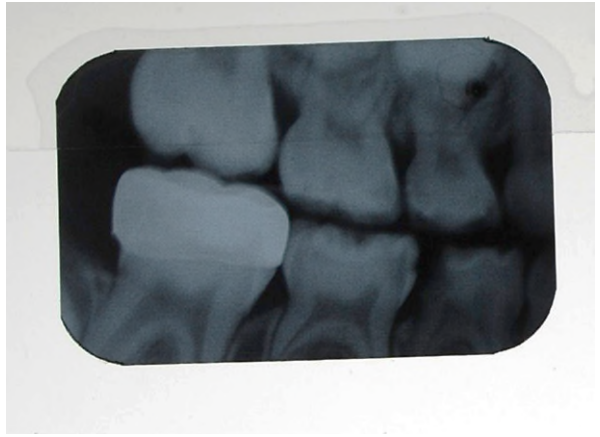
Restore structure/occlusion

Restore – PFMC (Conventional Prep)

Minimal occlusal & interproximal reduction

Local Anaesthetic

Hall technique



Restore - Indirect Restorations

Minimal tooth reduction

Sound enamel margins

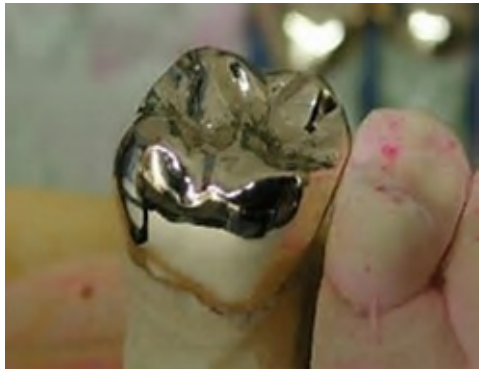
Inlay, onlay, ¾ crown or full coverage

Cuspal Coverage

Bond under rubber dam

Material options

- Nickel-Chrome
- Gold (Ideal, but v expensive)
- Indirect composite



Restore - Indirect Restorations

98.2 % (n=56) Cast Gold Copings were still functioning after a mean observation period of 38.6 months

(Gaardmand, 2013)

At 36 months, (n=42):

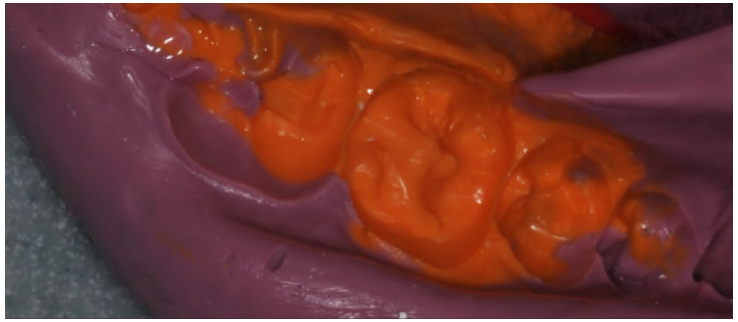
- Clinical Success - 90% (Co.Cr) vs. 85.7% (Indirect resin)
- Survival rates – 85% (Co.Cr) vs. 100% (Indirect resin)

(Dhareula, 2019)

Restore - Indirect Restorations

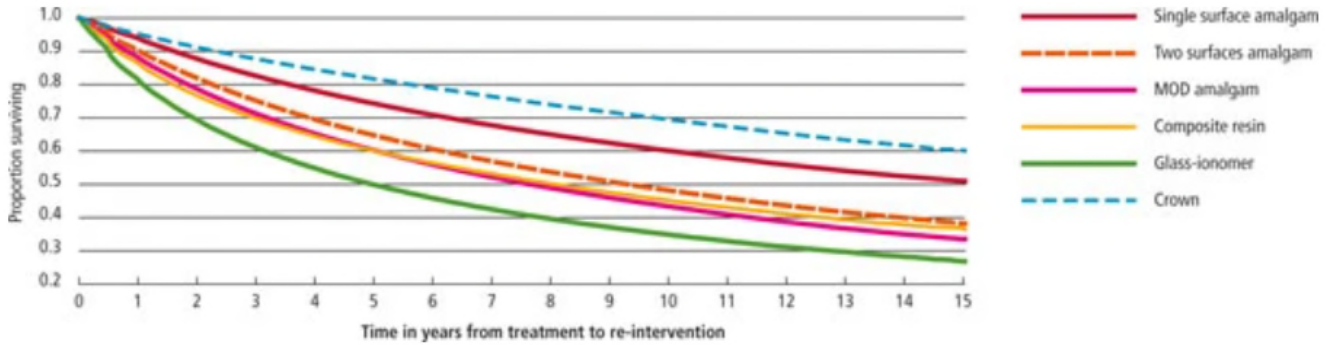
With thanks to Miss. Rachel Goldsmith (StR in Paediatric Dentistry)

Restore - Indirect Restorations



Restore – failure rates in carious cFPM

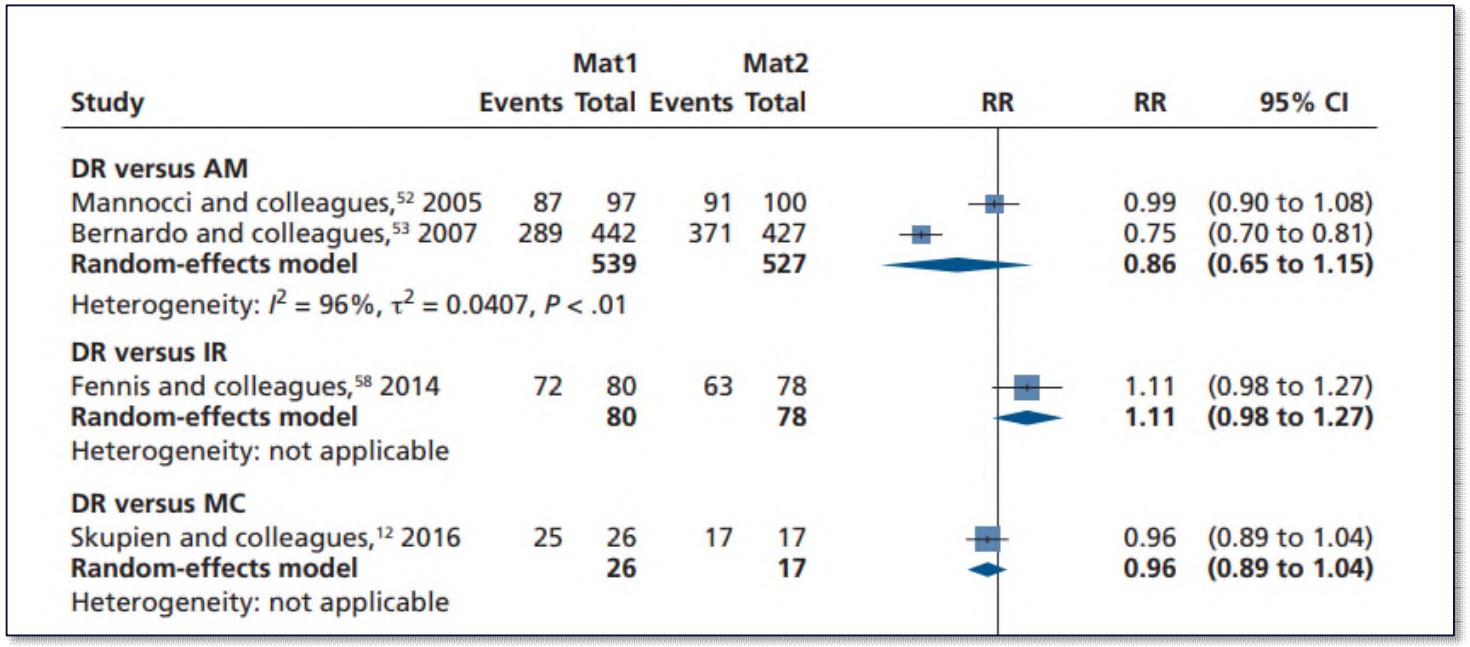
Figure 3



Time to re-intervention of restorations in molar teeth, with regard to the most commonly placed restorations

(Burke & Lucarotti 2018)

Restore – failure rates in carious cFPM



Study	Mat1 Events	Mat1 Total	Mat2 Events	Mat2 Total	RR	RR	95% CI
DR versus AM							
Mannocci and colleagues,[52] 2005	87	97	91	100		0.99	(0.90 to 1.08)
Bernardo and colleagues,[53] 2007	289	442	371	427		0.75	(0.70 to 0.81)
Random-effects model		**539**		**527**		**0.86**	**(0.65 to 1.15)**
Heterogeneity: $I^2 = 96\%$, $\tau^2 = 0.0407$, $P < .01$							
DR versus IR							
Fennis and colleagues,[58] 2014	72	80	63	78		1.11	(0.98 to 1.27)
Random-effects model		**80**		**78**		**1.11**	**(0.98 to 1.27)**
Heterogeneity: not applicable							
DR versus MC							
Skupien and colleagues,[12] 2016	25	26	17	17		0.96	(0.89 to 1.04)
Random-effects model		**26**		**17**		**0.96**	**(0.89 to 1.04)**
Heterogeneity: not applicable							

(Vetromilla et al., 2020)

Restore – failure rates in MIH-affected cFPM

Restorative Approach	Mean (SD) Annual Failure Rate
Fissure Sealants	12% (6%)
Glass Ionomer Restorations	12% (2%)
Composite Restorations	4% (3%)
Preformed Metal Crowns	1.3% (2.1%)
Indirect Restorations	1% (3%)

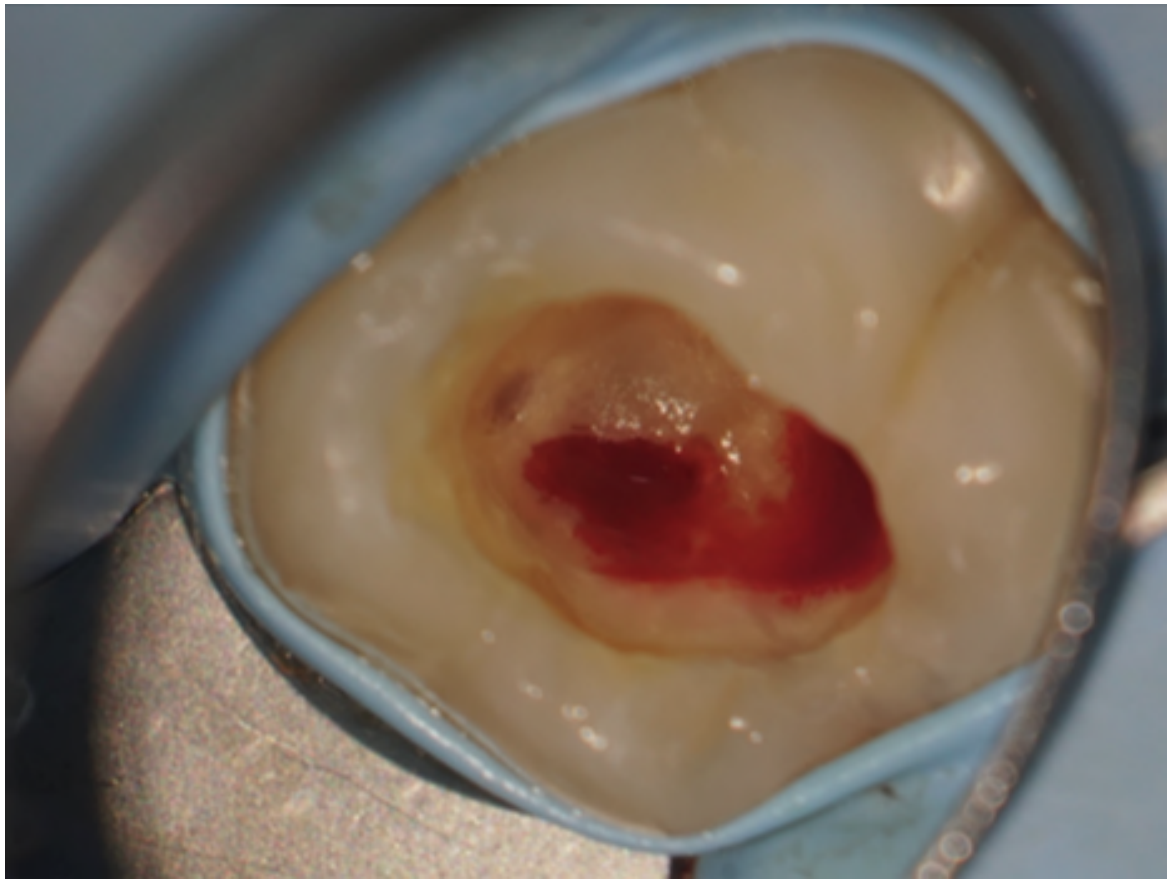
Use with caution for MIH as this review included all 'hypomineralised' teeth and severity of defect wasn't controlled for

(Elhennawy et al., 2016)

Vital Pulp Therapies

Part of exposed vital pulp is removed, usually as a means of preserving the vitality and function of the remaining part

(European Endodontic Society, 2019)



Vital Pulp Therapies

Partial pulpotomy

Removal of a small portion of coronal pulp tissue after exposure

Application of a biomaterial directly onto the remaining pulp

Definitive restoration

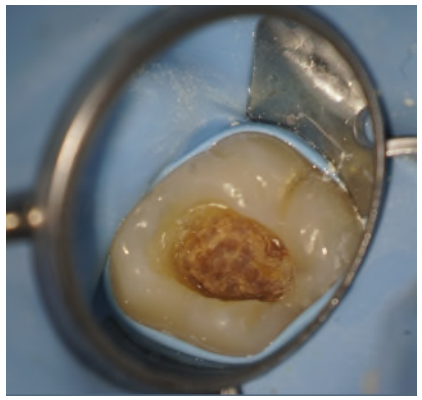
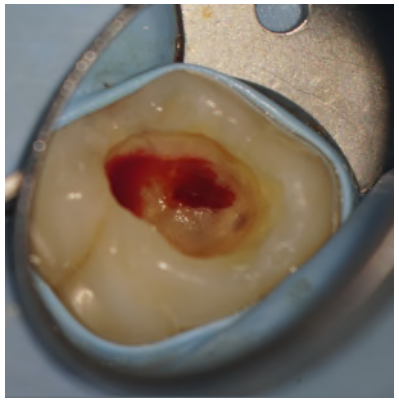
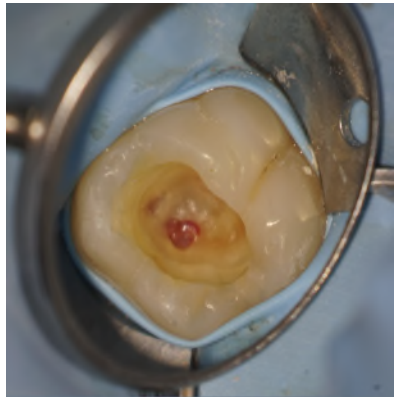
Full (coronal) pulpotomy

Complete removal of the coronal pulp

Application of a biomaterial directly onto the pulp tissue at the level of the root canal orifice(s)

Definitive restoration

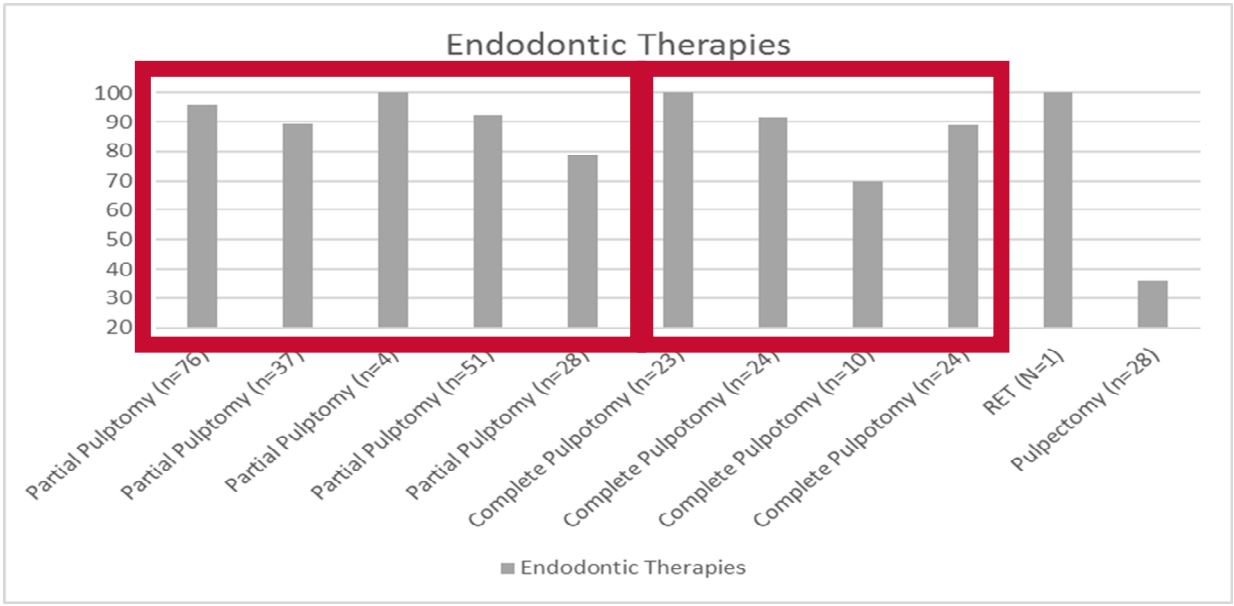
Vital Pulp Therapies

With thanks to Mr David Edwards (PhD Student/StR in Endodontics)

Vital Pulp Therapies – success <16-year-olds?

91.3%



90.5%

Material choice (MTA vs. $Ca(OH)_2$) and maturity of apex were not significant variables for success

(Taylor et al., 2020)

Vital Pulp Therapies – success <16-year-olds?

Extraction

Why extract?

Symptomatic

Unrestorable

Severely affected

Orthodontic considerations

Lack of cooperation

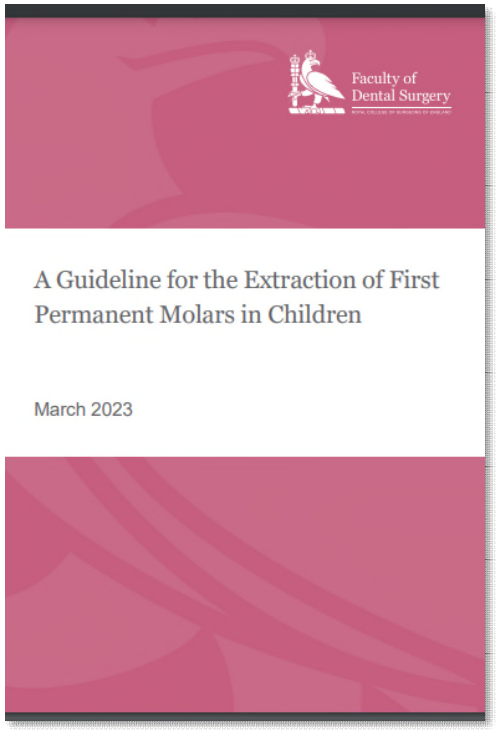
Patient/Parent choice?

Extract - considerations

Optimal spontaneous space closure – extract at 8.5-10.0 years:

- Dental Development
- Orthodontic considerations

Royal College of Surgeons
FACULTY OF DENTAL SURGERY

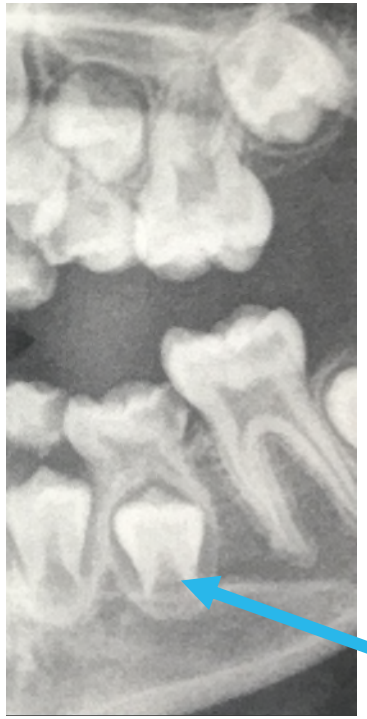


Extraction - considerations

Presence of 3rd molar

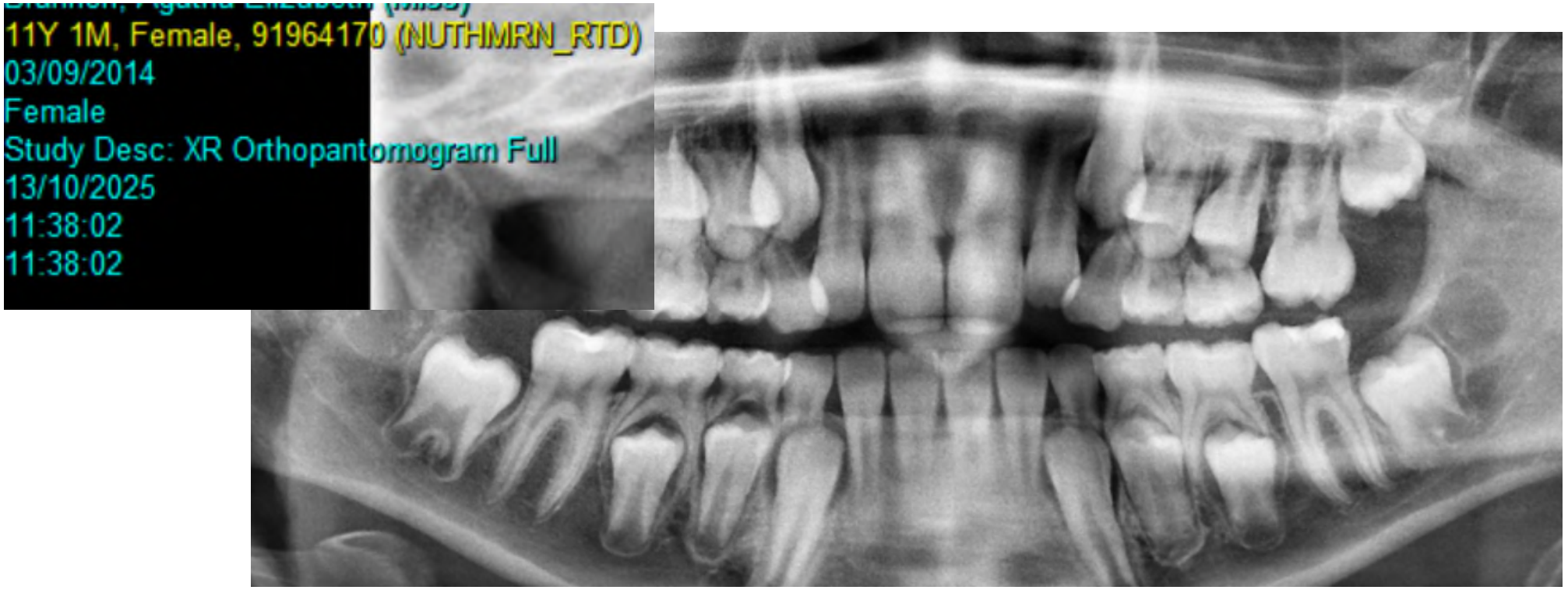
Bifurcation calcifying

Mesially angulated 2nd permanent molar



Disto-angular 2nd premolar
Sitting in the furcation

Extract - considerations



Extract - considerations

Optimal spontaneous space closure – extract at 8.5-10.0 years:

- Dental Development
- Orthodontic considerations

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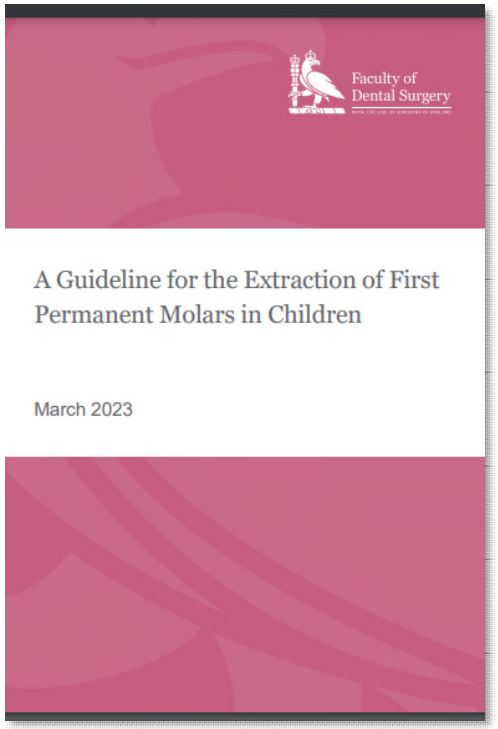
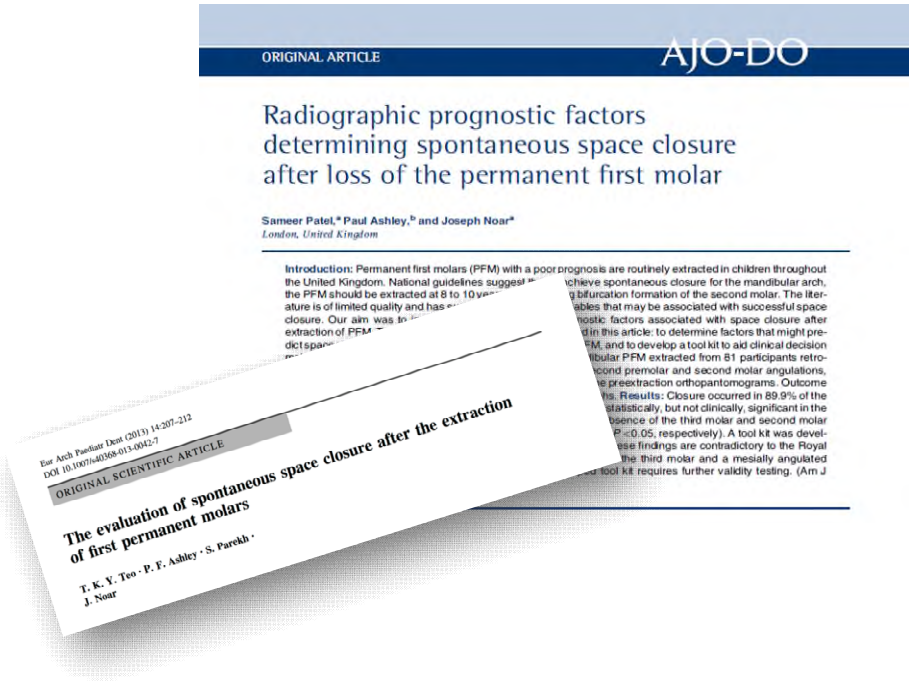
Developmental age vs. Chronological age



Extraction - considerations


ORIGINAL ARTICLE AJO-DO

Radiographic prognostic factors determining spontaneous space closure after loss of the permanent first molar

Sameer Patel,* Paul Ashley,[b] and Joseph Noar*
London, United Kingdom

Eur Arch Paediatr Dent (2013) 14:207–212
DOI 10.1007/s40368-013-0042-7

ORIGINAL SCIENTIFIC ARTICLE

The evaluation of spontaneous space closure after the extraction of first permanent molars

T. K. Y. Teo · P. F. Ashley · S. Parekh · J. Noar

Probability of Achieving Space Closure (%)				
		Angulation of Second Molar		
		Mesial	Upright	Distal
Third Molar	Present	89.4	56.5	28.7
	Absent	63.7	21.3	7.8

Extract – ‘Ideal time’

EASTMAN
DENTAL HOSPITAL
EDUCATION CENTRE

Extraction – ideal timing 'evidence'

Maxilla:

- Perfect spontaneous closure in **72%** based on 38 FPM
  - 8 – 10.5 years, 80%
  - 10.5 – 11.5 years 55%
  - > 11.5 years, 56%

Mandible:

- Perfect spontaneous closure in **48%** based on 489 FPM
  - <8 year, 34%
  - 8 – 10.5 years, 50%
  - 10.5 – 11.5 years 59%
  - > 11.5 years, 44%

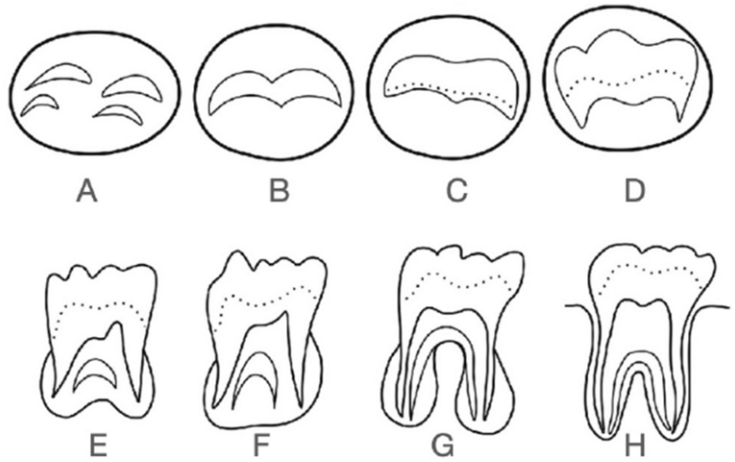
(Eichenberger et al., 2015)

Extraction – ideal timing ‘evidence’

Spontaneous space closure was higher in the maxilla than the mandible

(OR = 7.77; 95% CI = 4.99–12.11; P < 0.001).

For both maxillary/mandibular second molars, **Demirjian category E** was associated with increased space closure odds than earlier/later stages (P < 0.05).



(Hamza et al., 2024)

Extraction – ideal timing ‘evidence’

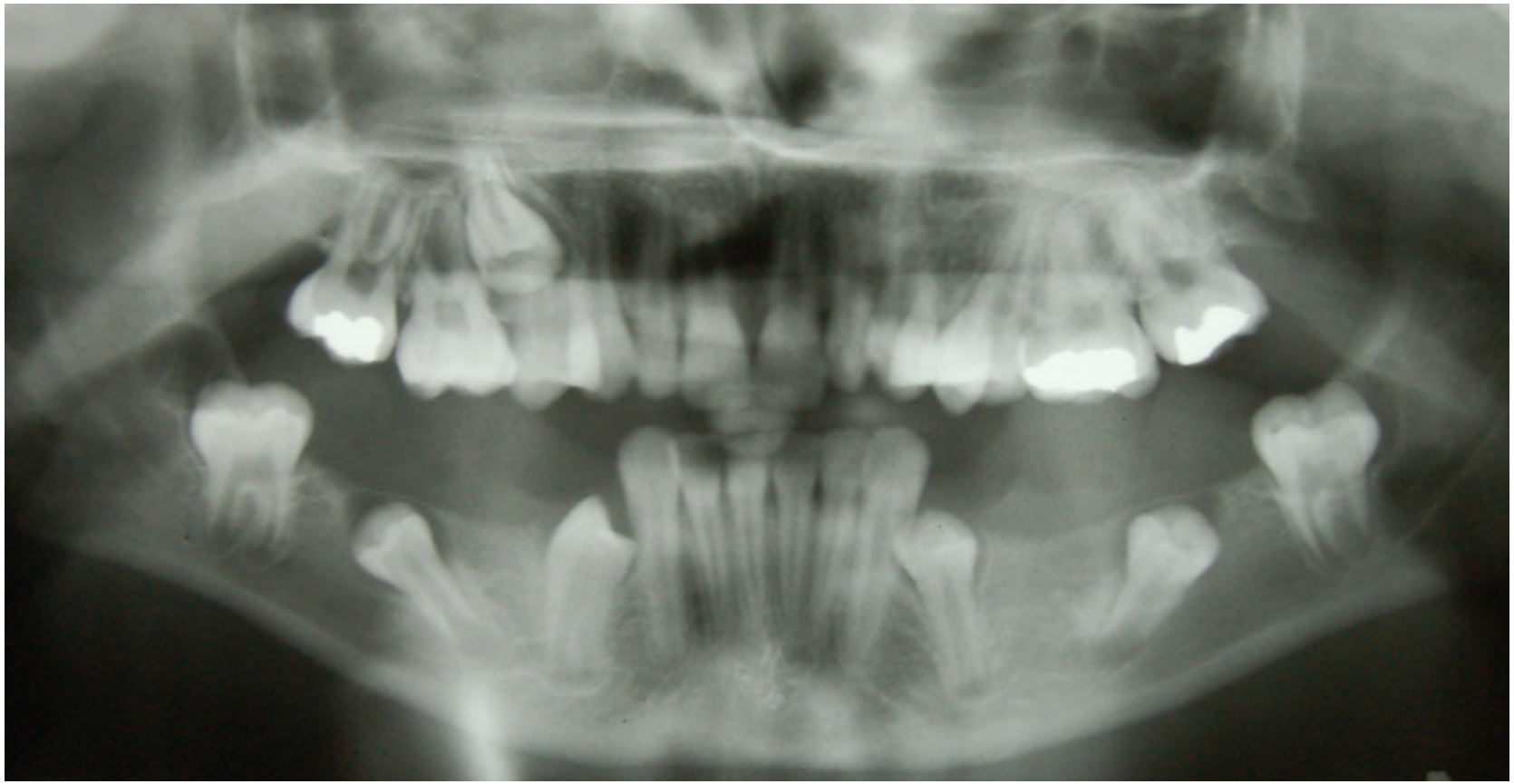
Spontaneous space closure in the mandible was seen more often for patients ages 8–10 years (compared with older patients (OR = 3.32; 95% CI = 1.73–6.36; P < 0.001)

If there was evidence of a third permanent molars

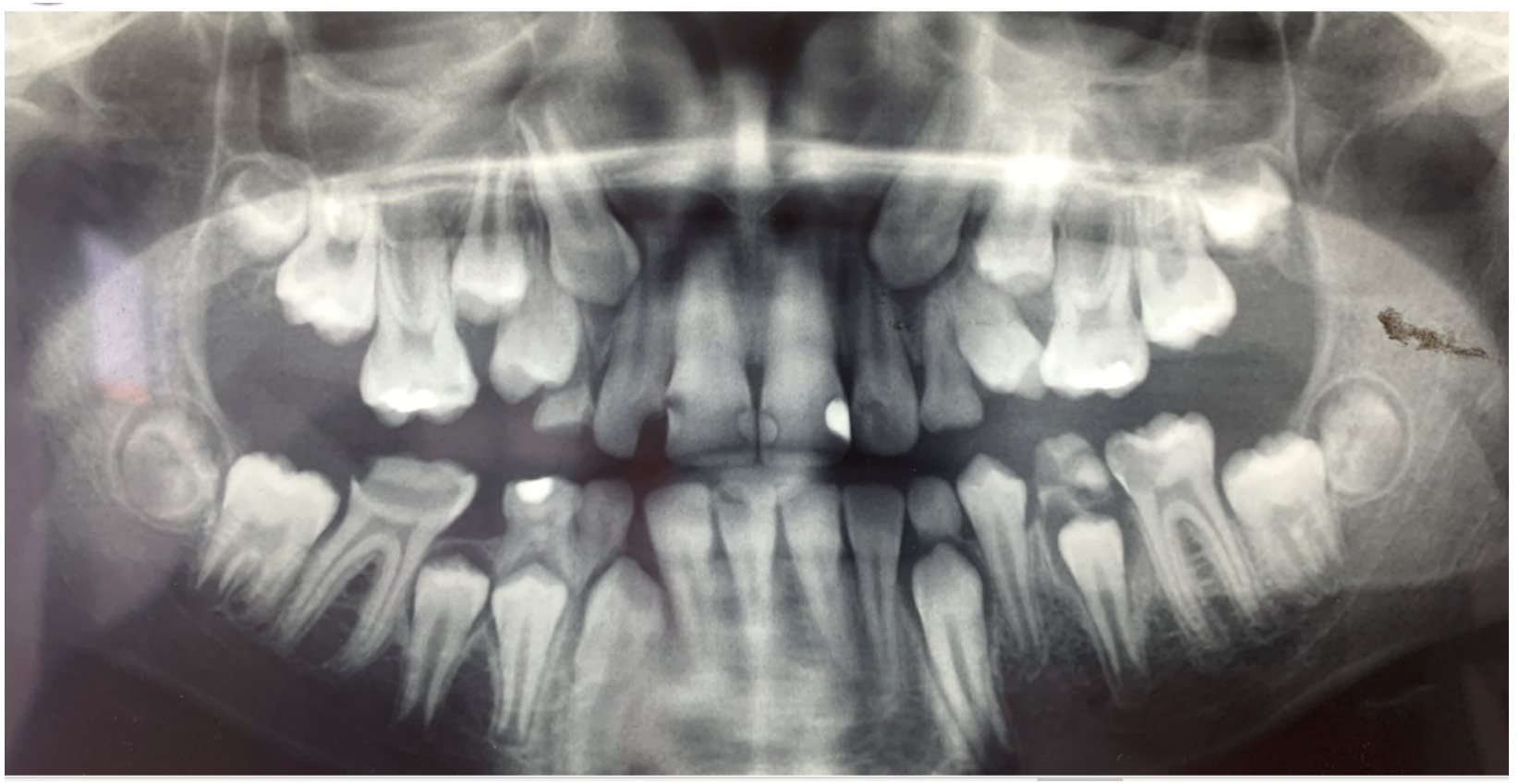
(OR = 2.28; 95% CI = 1.67–3.09; P = 0.003).

(Hamza et al., 2024)

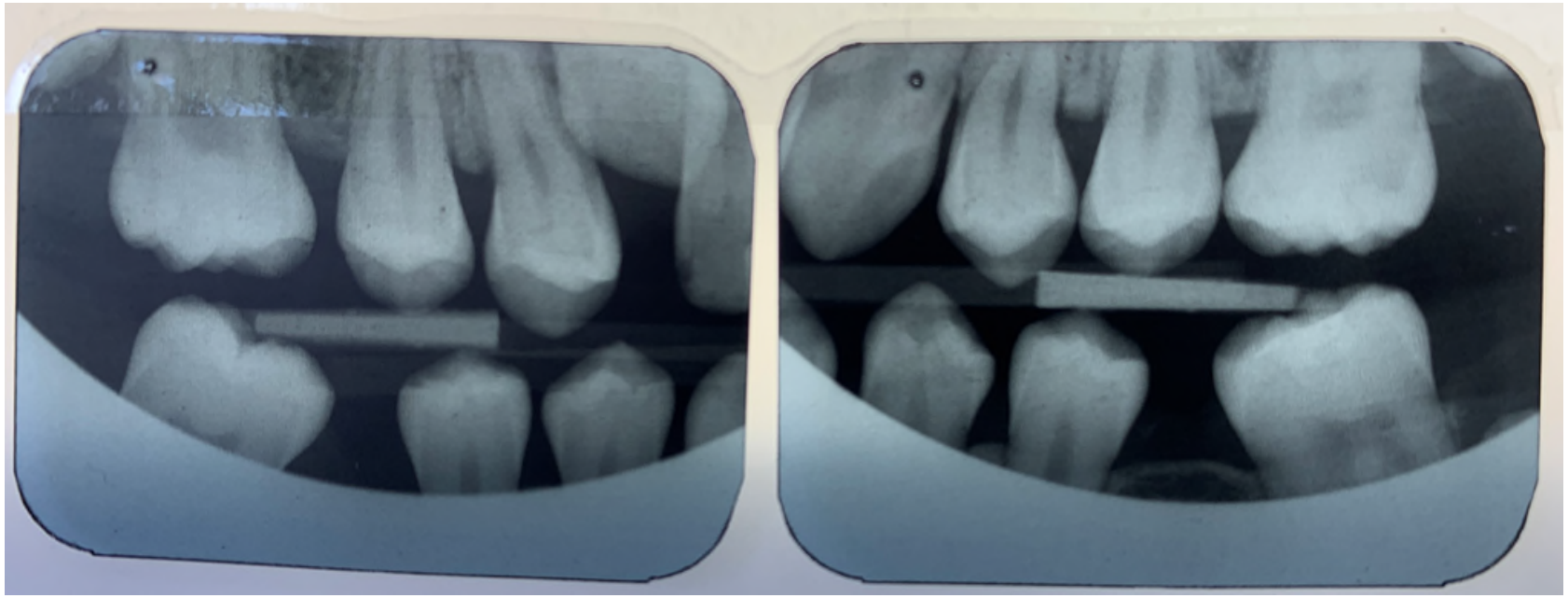
Extraction – too early



Extraction – too late

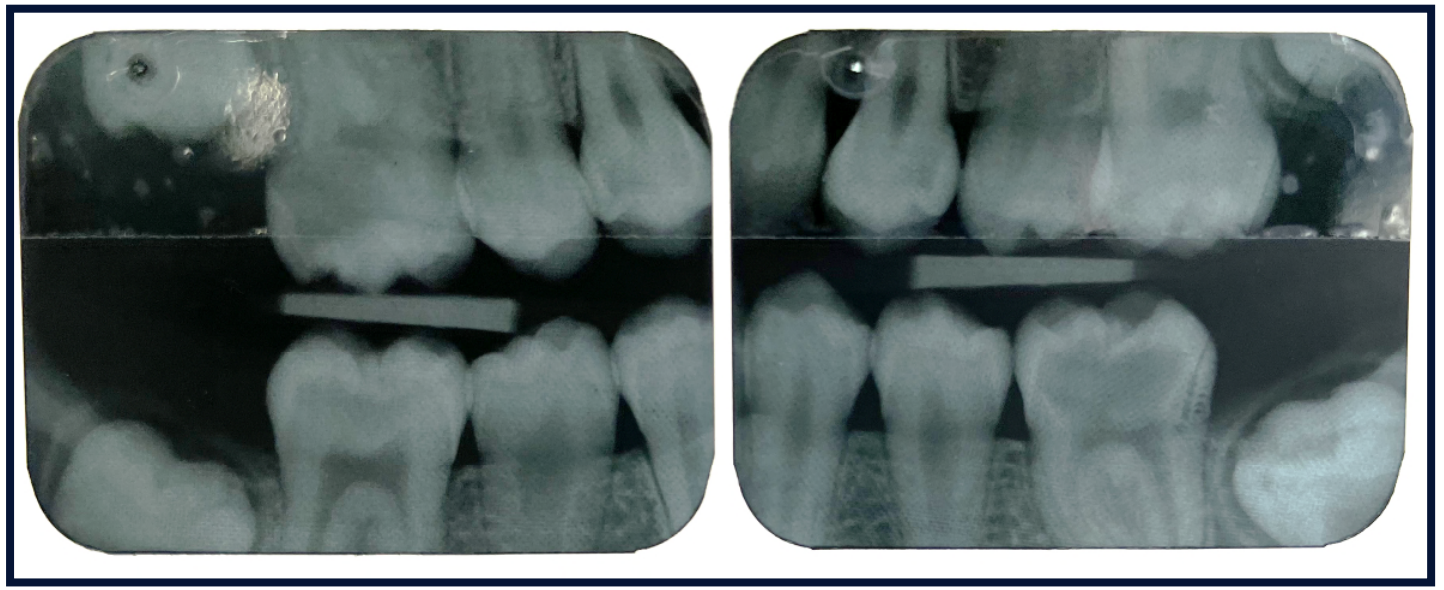


Extraction – too late?



Extraction – ‘Perfect’ Alignment

Unrestorable 6’s removed 9.5 years old



Extraction – ‘Perfect’ Alignment

All four ‘perfectly’ aligned 7’s are now unrestorable at 14 years old

Compensating Extractions

Extract a lower molar ‘do not routinely’ compensate the upper, unless:

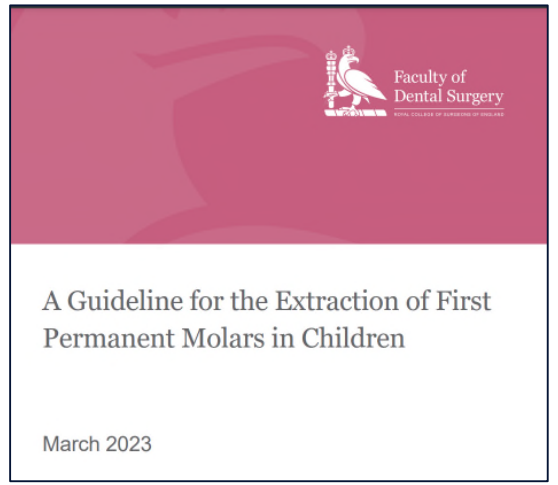
clear occlusal requirement

likelihood of being unopposed for a ‘significant’ period

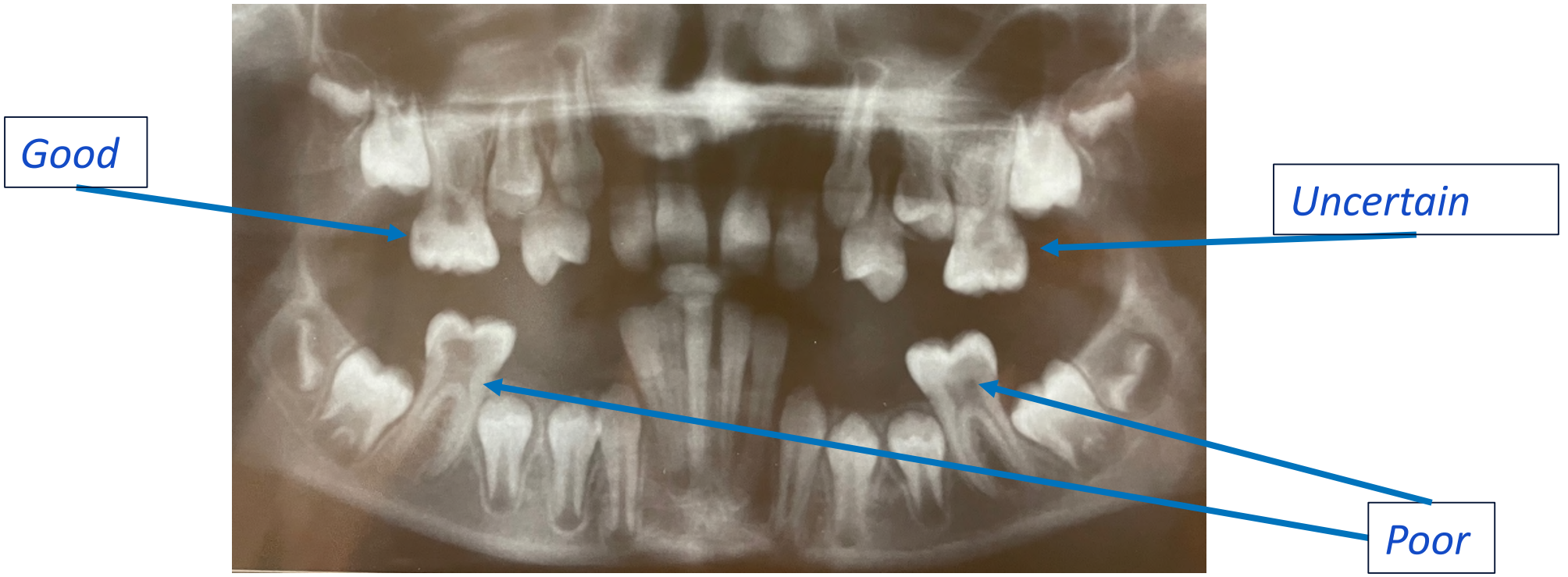
Extract an upper molar do not compensate the lower

Careful consideration if GA

If compensating, justify why!



What to do? Restore or extract?



A multidisciplinary approach is sometimes needed

Timing? Benefit to orthodontic treatment

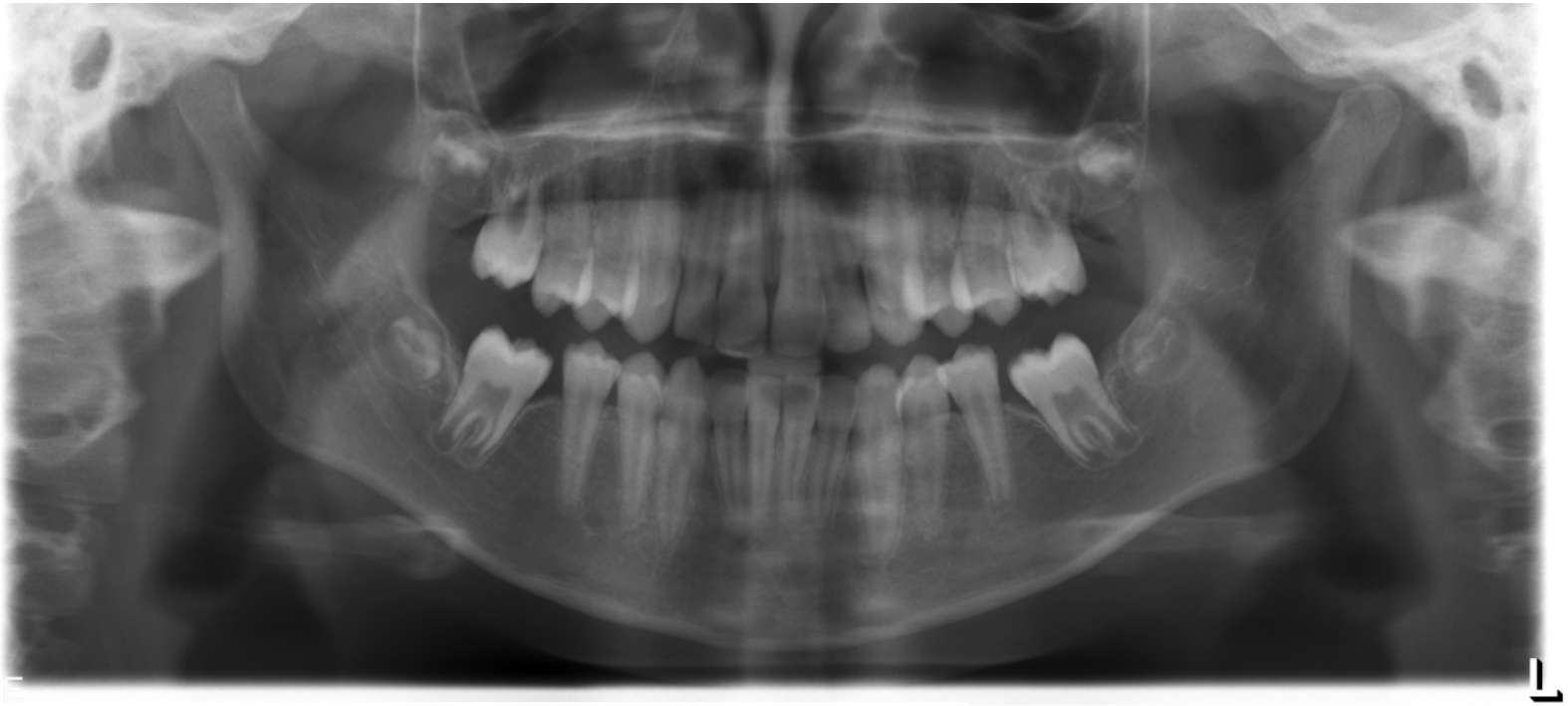
,

Extraction – Case Example

T0: 2016, at the time of extraction.

With thanks to Dr Adnan Hajdarevic, University of Gothenburg

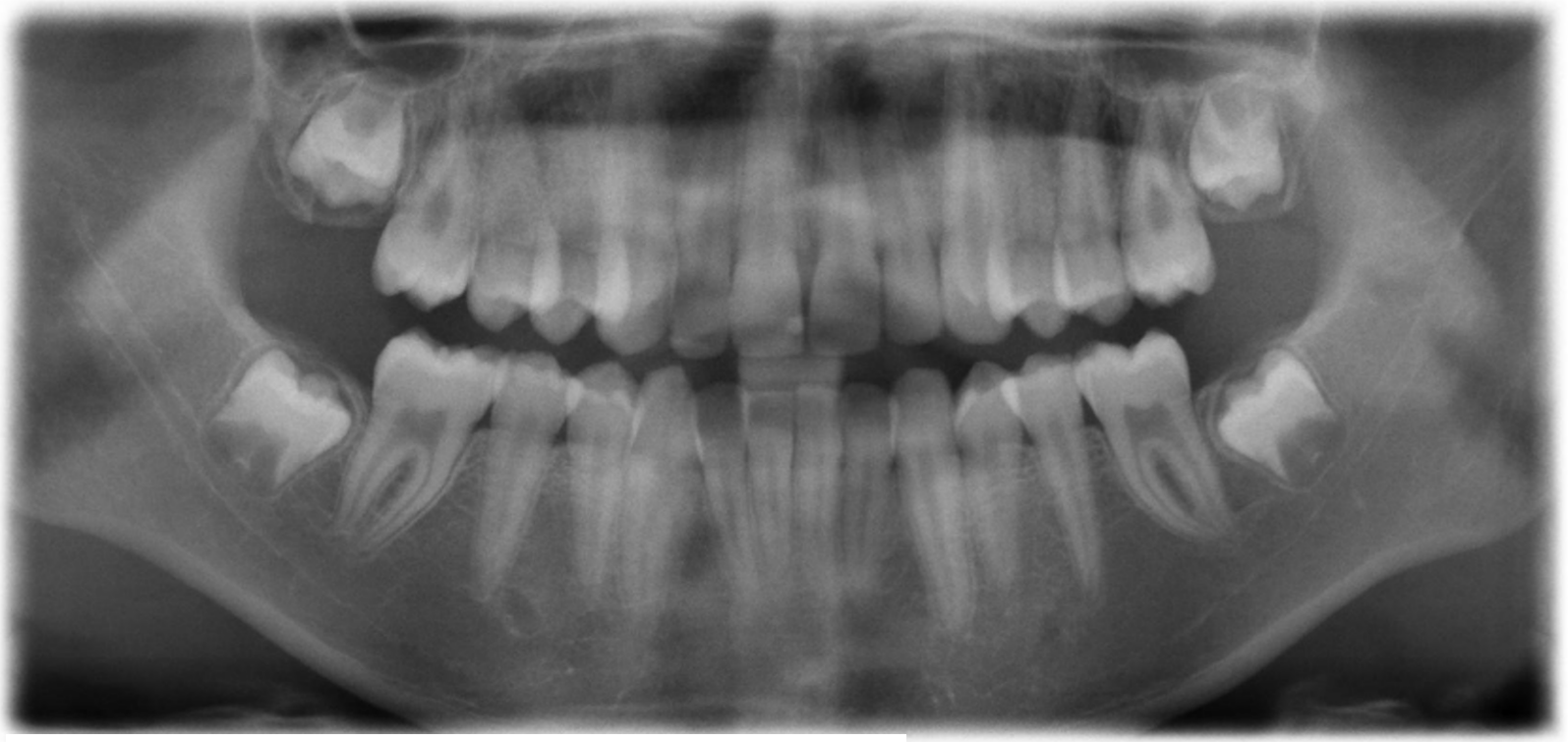
Extraction – Case Example



T1: 2020, when the patient was 11 years old.

With thanks to Dr Adnan Hajdarevic, University of Gothenburg

Extraction – Case Example



T2: 2024, when the patient is 15 years old.

With thanks to Dr Adnan Hajdarevic, University of Gothenburg

Extraction – Case Example

With thanks to Dr Adnan Hajdarevic, University of Gothenburg

Extraction – orthodontic consideratoin

(Elhussein & Jamal, 2020)

Extraction – orthodontic

(Elhussein & Jamal, 2020)

Extraction – orthodontic

(a)

(b)

(Elhussein & Jamal, 2020)

What to do? Restore or extract?

Why restore?

Mild/moderately affected

Good cooperation

Hypodontia (including no TPM)

Advances in bonding & minimal-interventive dentistry

Why extract?

Symptomatic

Unrestorable

Severely affected

Orthodontic considerations

Lack of cooperation (need for GA?)

What to do? Restore or extract?

If uncertain prognosis, need to consider all factors to help support decision:

Restorability (or prognosis)

Patient cooperation

Underlying orthodontic need

Patient preferences/values

Research Reports: Clinical

Public Valuations of Managing Compromised Molars: A Discrete Choice Experiment

Journal of Dental Research
2025, Vol. 104(1) 22–28

DOI: 10.1177/00220345241285154
journals.sagepub.com/home/jdr

G.D. Taylor[1,2], D. Boyers[3], C. Exley[2], N. Innes[4], L. Vale[2,5], and C.R. Vernazza[1,2]

Public Valuation of managing cFPM

Compared to filling

-ve = less preferred
+ve = more preferred

Conditional (fixed effects) logistic regression				Number of obs.	14,064	
(Iteration 4) Log likelihood = -2811.4599				LR chi2(12)	4677.67	
				Prob > chi2	0.0000	
				Pseudo R2	0.4541	
Choice	**Coefficient**	**Std. err.**	**z**	**P>z**	**95% conf. interval**	
ASC	4.273386	0.134738	31.72	0.000	4.009305	4.537467
Filling (reference)						
Full gap	-1.435166	0.085225	-16.84	0.000	-1.602203	-1.268129
Partial gap	-0.767303	0.080712	-9.51	0.000	-0.925494	-0.609111
No tooth gap	-0.022228	0.07928	-0.28	0.779	-0.177613	0.133158
Ortho gap	0.008178	0.087393	0.09	0.925	-0.163108	0.179465
False tooth gap	-1.054161	0.07295	-14.45	0.000	-1.197141	-0.911182
General Dental Practitioner (reference)						
Enhanced GDP	-0.165737	0.054858	-3.02	0.003	-0.273255	-0.058218
Specialist	0.074416	0.050971	1.46	0.144	-0.025486	0.174317
Dentist makes decision (reference)						
Shared	0.13918	0.053398	2.61	0.009	0.034522	0.243839
Patient	0.107982	0.053885	2	0.045	0.00237	0.213594
Tx Avoid (cont.)	-0.003038	0.001673	-1.82	0.069	-0.006317	0.000241
Cost	-0.0008432	0.0000395	-21.36	0.000	-0.000921	-0.000766

Young people's valuation of managing cFPM

Choice	OR (95%CI)	P-value
ASC	135.14 (66.02- 276.63)	0.001
Treatment (Reference Case): Filling		
Full gap left	0.11 (0.08 – 0.17)	0.001
Partial gap left	0.31 (0.22 – 0.43)	0.001
No gap	1.40 (0.98 – 1.99)	0.063
Closed with false tooth	0.37 (0.24 – 0.45)	0.001
Orthodontic closure	0.61 (0.46 – 0.81)	0.001
Provider of Dental Care (Reference Case): General Dental Practitioner		
Dentist with Specialist Interest	0.87 (0.70 – 1.07)	0.192
Specialist	0.91 (0.83 – 1.04)	0.119
Decision Maker (Reference Case): Dentist making decision alone		
Shared decision between patient, parent and dentist	0.89 (0.72 – 1.09)	0.259
Patient making decision alone	0.91 (0.75 – 1.12)	0.393
Number of future Visits*		
	0.99 (0.98 – 1.00)	0.103

Table 4: Regression analyses (*- continuous variable so no reference case)

Summary – managing cFPM in children

Prevention key!!

cFPM impact children

Evidence-base for treatment decisions is still limited but improving

Consider patient preferences/values when discussing treatment options

Shared decision-making and, if appropriate, MDT approaches!

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Thanks for listening

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From Newcastle. For the world.