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Fixed Partial Prosthesis

Classification and clinical rationale

Acknowledgements to Dr Matsubara

Learning outcomes

- Understand and discuss the advantages and disadvantages of different types of FPD
- Discuss the differences between the types of bridges
- Discuss tooth preparation for bonded bridges
- Discuss fibre-reinforced bonded bridges
- Discuss the concept of Shortened dental arch
- Discuss the clinical rationale of prosthetic treatment using FPD: factors that affect the prognosis of the treatment

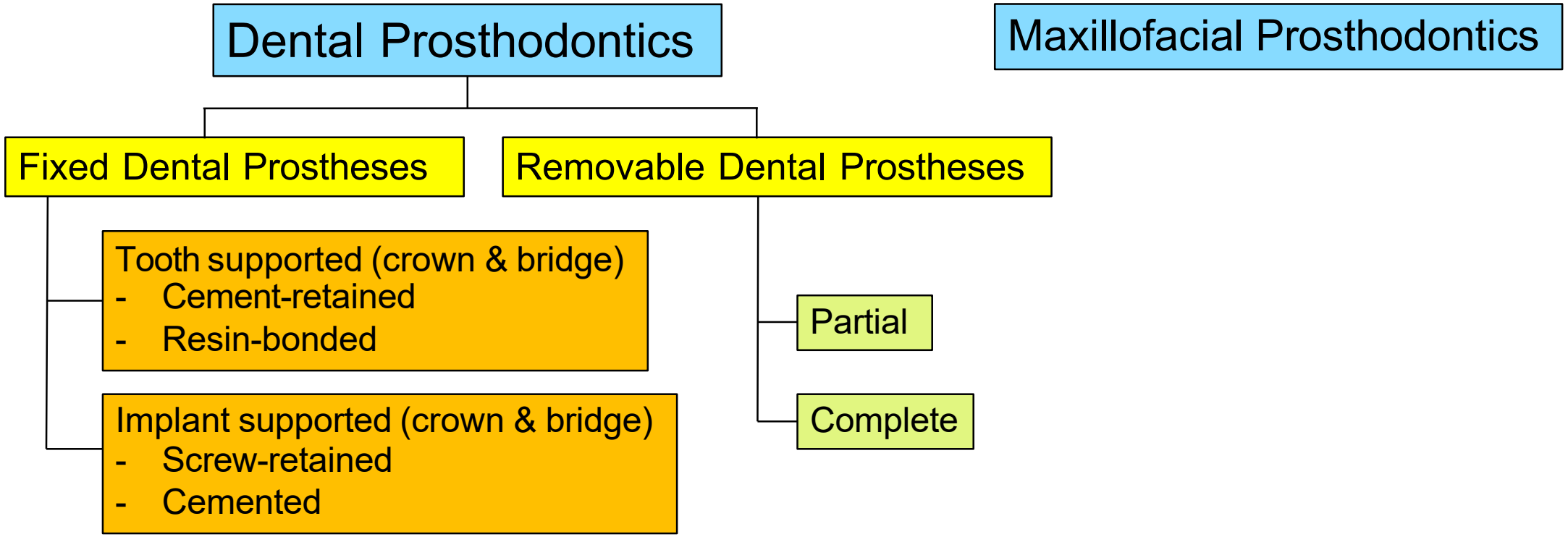
Reading:

Practical advice for successful clinical treatment with resin-bonded bridges

Stephanie King,[1] Banoo Sood[1] and Martin P. Ashley*[2]

Classification

PROSTHODONTICS



Classification

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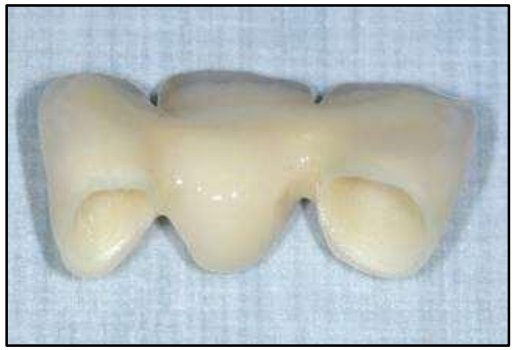
Material

- Acrylic, composite (temporary bridge)
- Cast metal: gold alloy
- Metal-ceramic (PFM)
- Resin-Veneered
- All ceramic (e.g. zirconia)



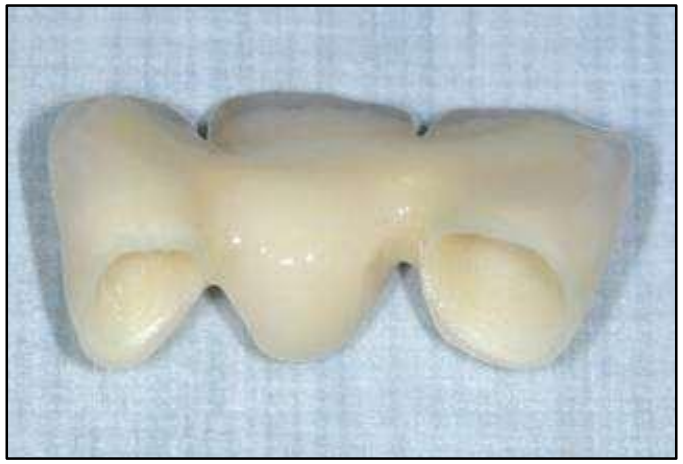
Classification

Cement-Retained FPD

Metal-ceramic

- Cemented with conventional luting material (GIC, RMGIC, Zinc phosphate)

All ceramic



- Cemented with conventional luting material
- Bonded with resin cement

Classification

Resin-bonded FPD

Early bonded FPD

Extracted natural teeth
Acrylic teeth
(temporary restoration)

70s - Rochette bridge

Etched cast

Maryland Bridge

Classification

Resin-bonded FPD

Traditional approach

ADVANTAGES

- Minimal removal of tooth structure (wing thickness 0.8mm)
- Supragingival preparation, easy impression making
- Interim restoration not usually required

Classification

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Resin-bonded FPD

Traditional approach

ADVANTAGES

- Minimal removal of tooth structure
- Supragingival preparation, easy impression making
- Interim restoration not usually required

DISADVANTAGES

- Reduced restoration longevity
- Space correction is limited
- Good alignment of abutment teeth is required
- Esthetics is compromised on anterior

Classification

Resin-bonded FPD

Traditional approach

INDICATIONS

- Short edentulous space (one tooth)
- Healthy/Unrestored abutments (enamel surface)
- Significant clinical crown length
- Temporary restoration - space maintenance
- Open bite

Classification

Resin-bonded FPD

Traditional approach

INDICATIONS

- Short edentulous space (one tooth)
- Healthy/Unrestored abutments (enamel surface)
- Significant clinical crown length
- Temporary restoration - space maintenance
- Open bite

CONTRAINDICATIONS

- Damaged abutments
- Large edentulous area
- Unfavorable angulation and rotation of abutments
- Parafunctional habits or heavy occlusal forces
- Deep bite
- Mobile teeth
- Alloy allergy

Classification

Resin-bonded FPD

Traditional approach

Design and construction:

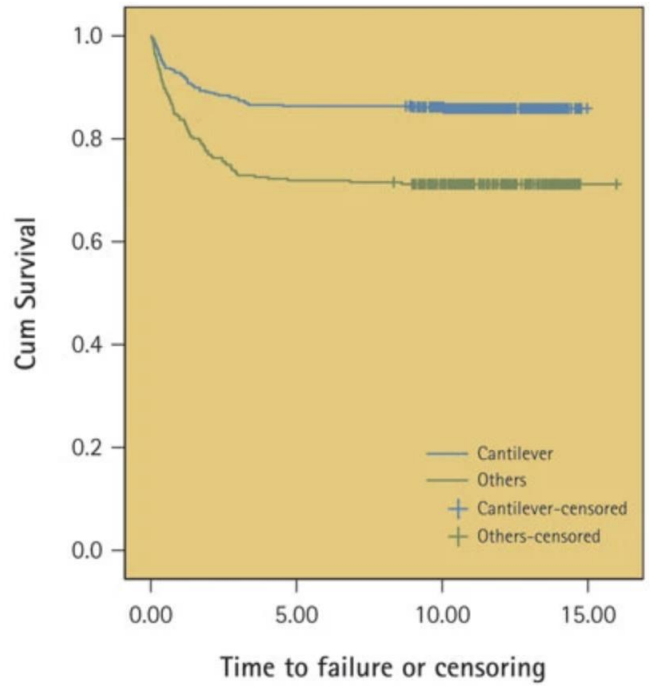
- Cantilevered design (anterior)

Research | Published: 10 April 2015

Survival characteristics of 771 resin-retained bridges provided at a UK dental teaching hospital

P. A. King, L. V. Foster, R. J. Yates, R. G. Newcombe & M. J. Garrett

Figure 3

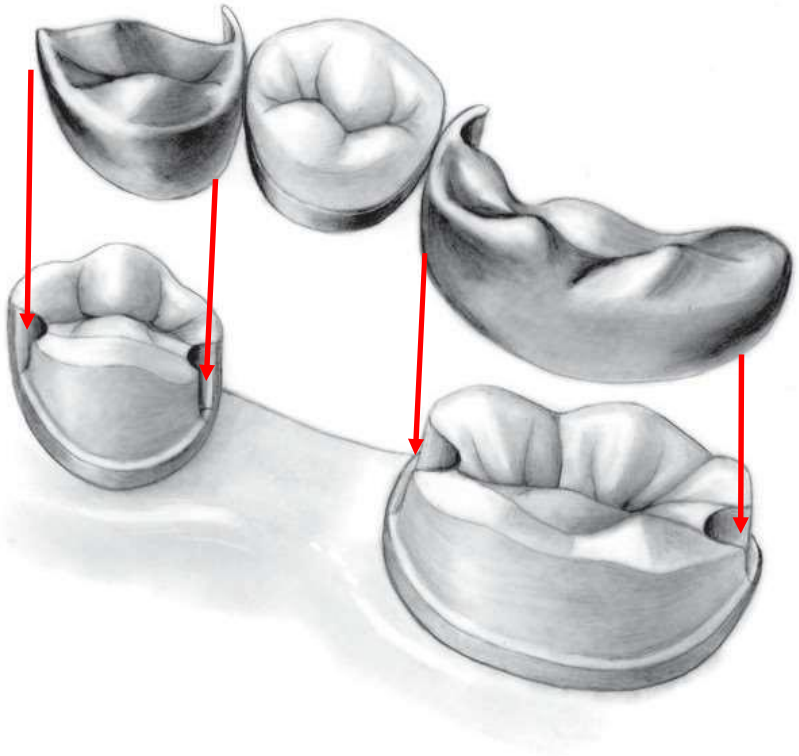


survival curves for 476 cantilever bridges and a group comprising 292 fixed-fixed and

ges

Resin-bonded FPD

Metal-ceramic

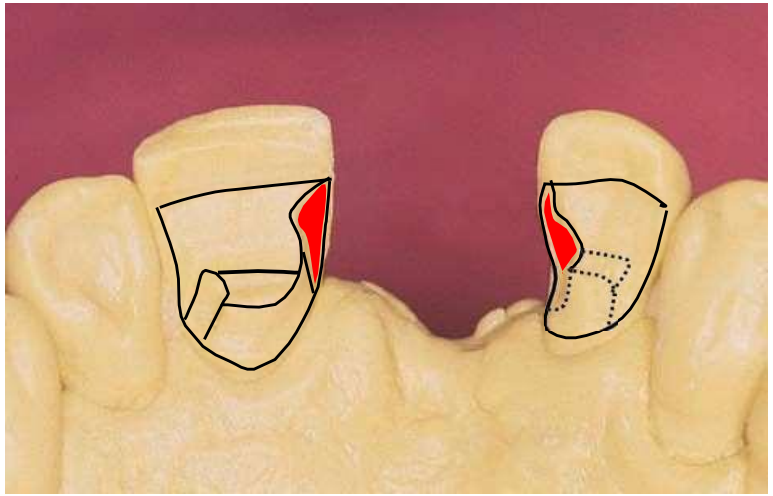


Single path of Insertion

Stability

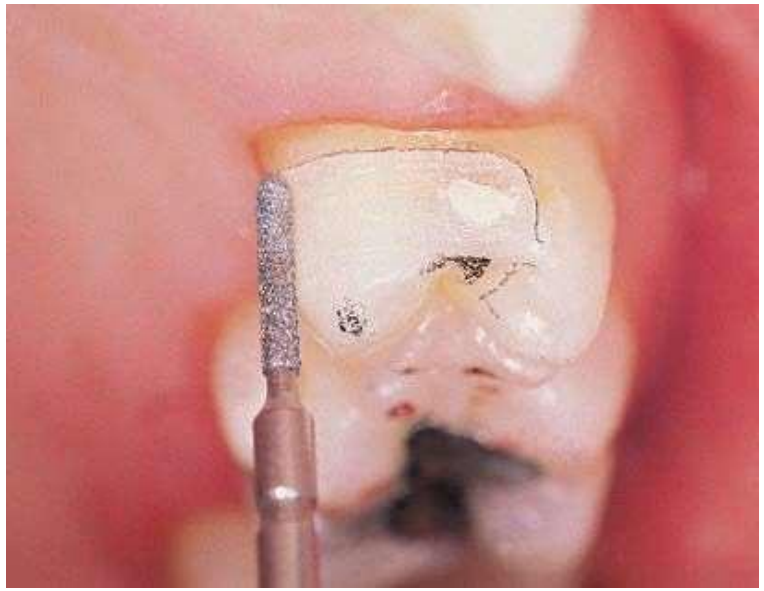
&

Retention



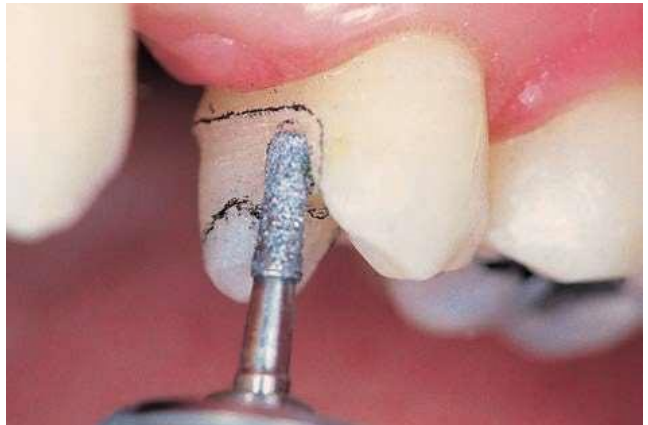
Resin-bonded FPD

Metal-ceramic



Guide planes: maximum surface area of enamel contact, POI, Resistance against horizontal movement

Axial grooves
Resistance against horizontal movement



Rest seat
Resistance against vertical occlusal forces

Resin-bonded FPD

Metal-ceramic

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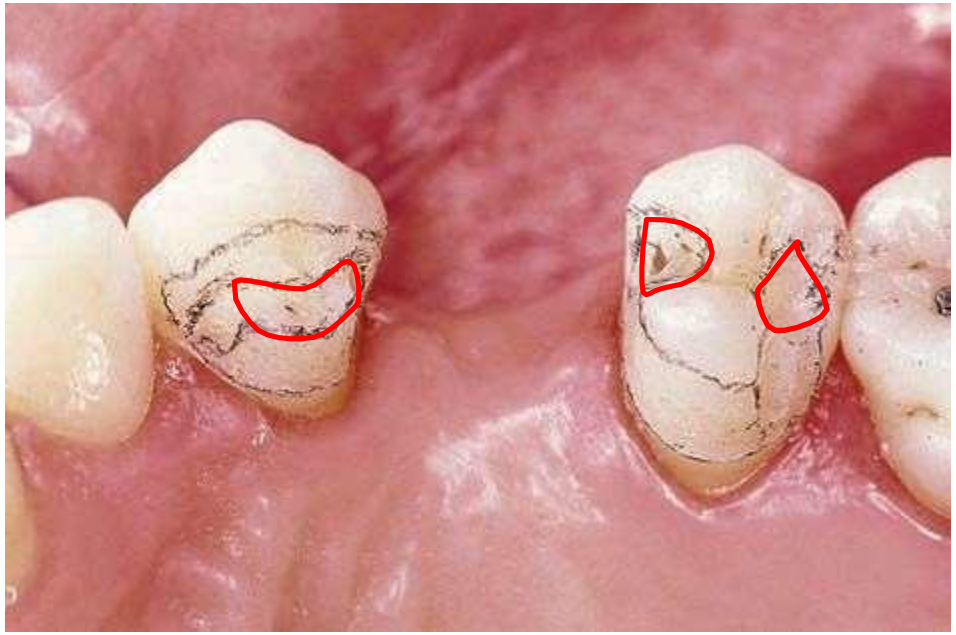

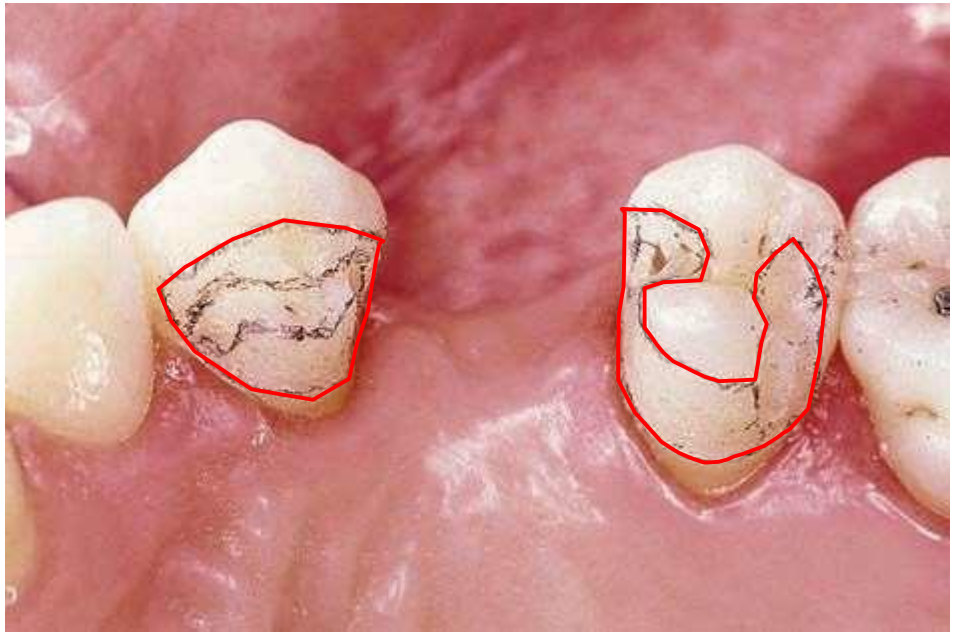

Resin-bonded FPD

Metal-ceramic

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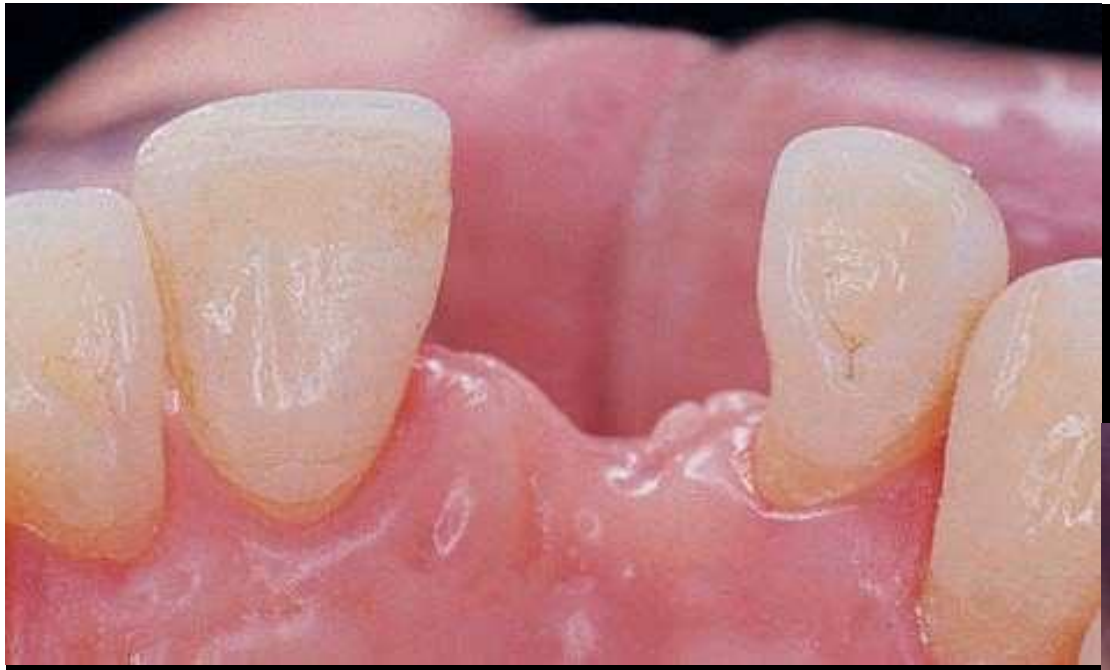

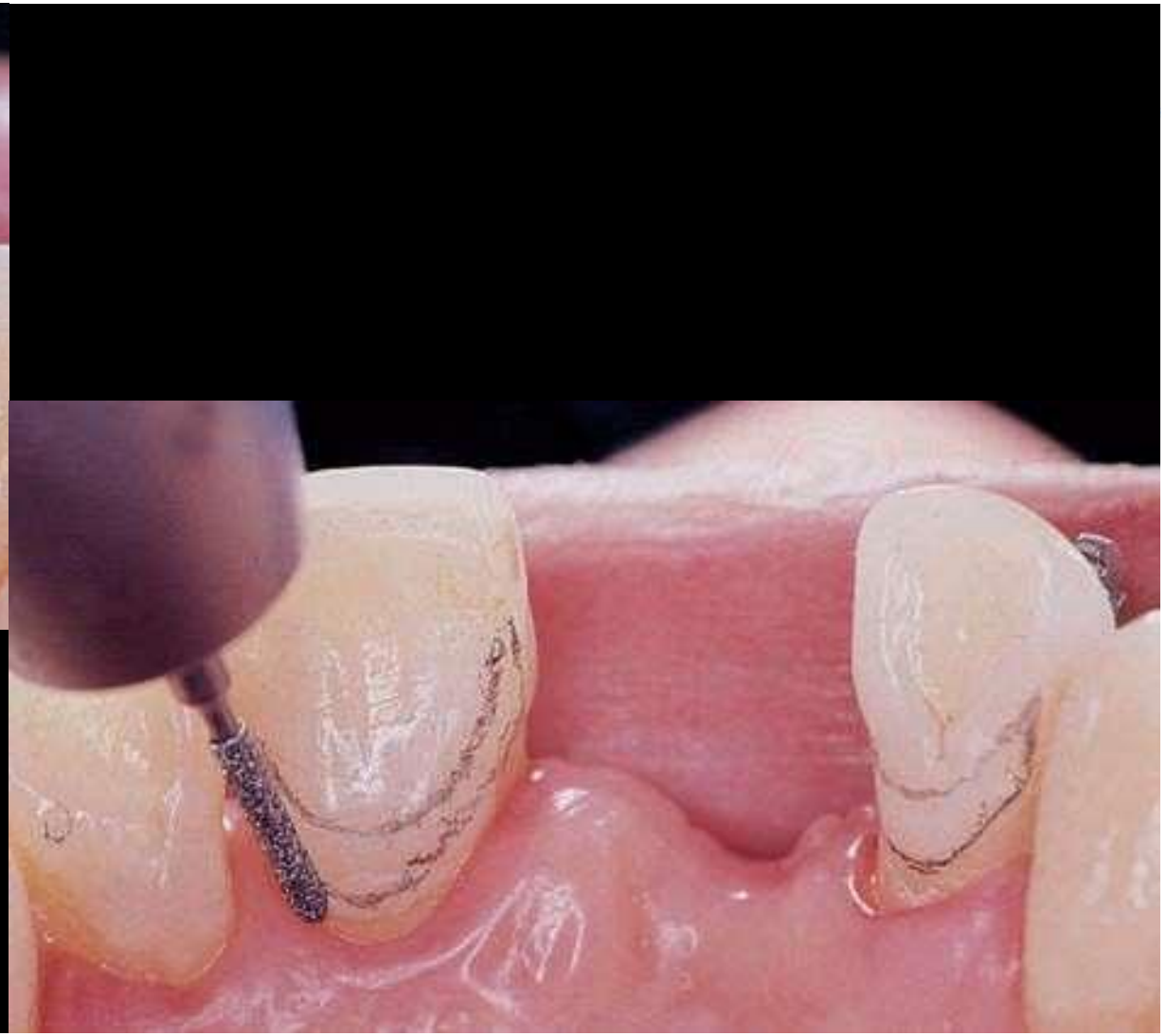

Resin-bonded FPD

Metal-ceramic

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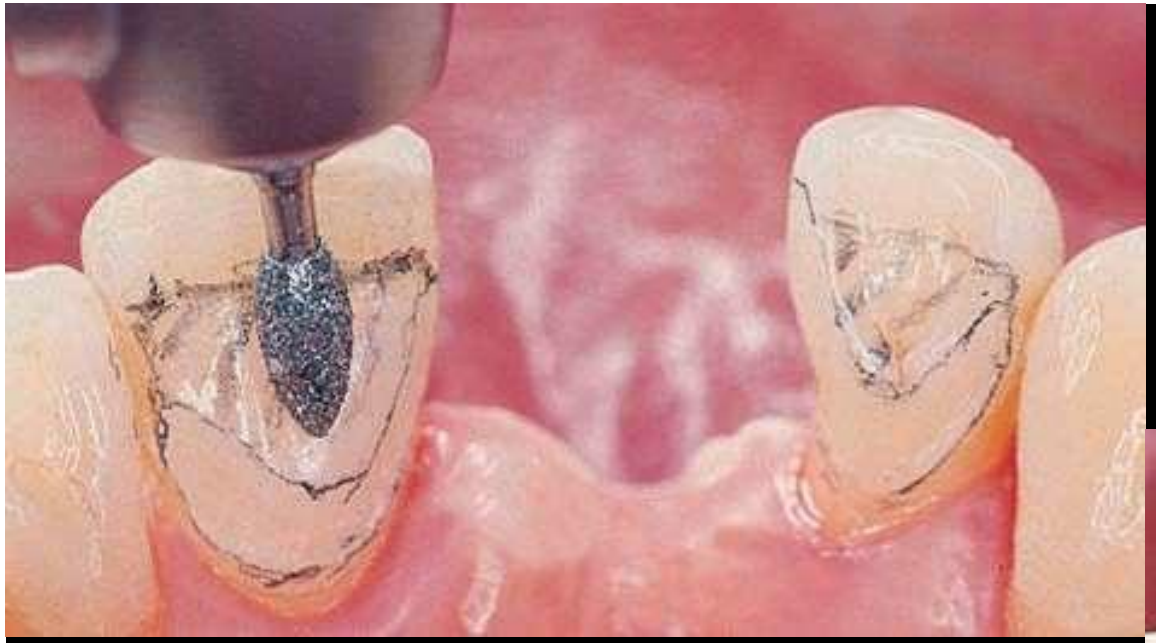

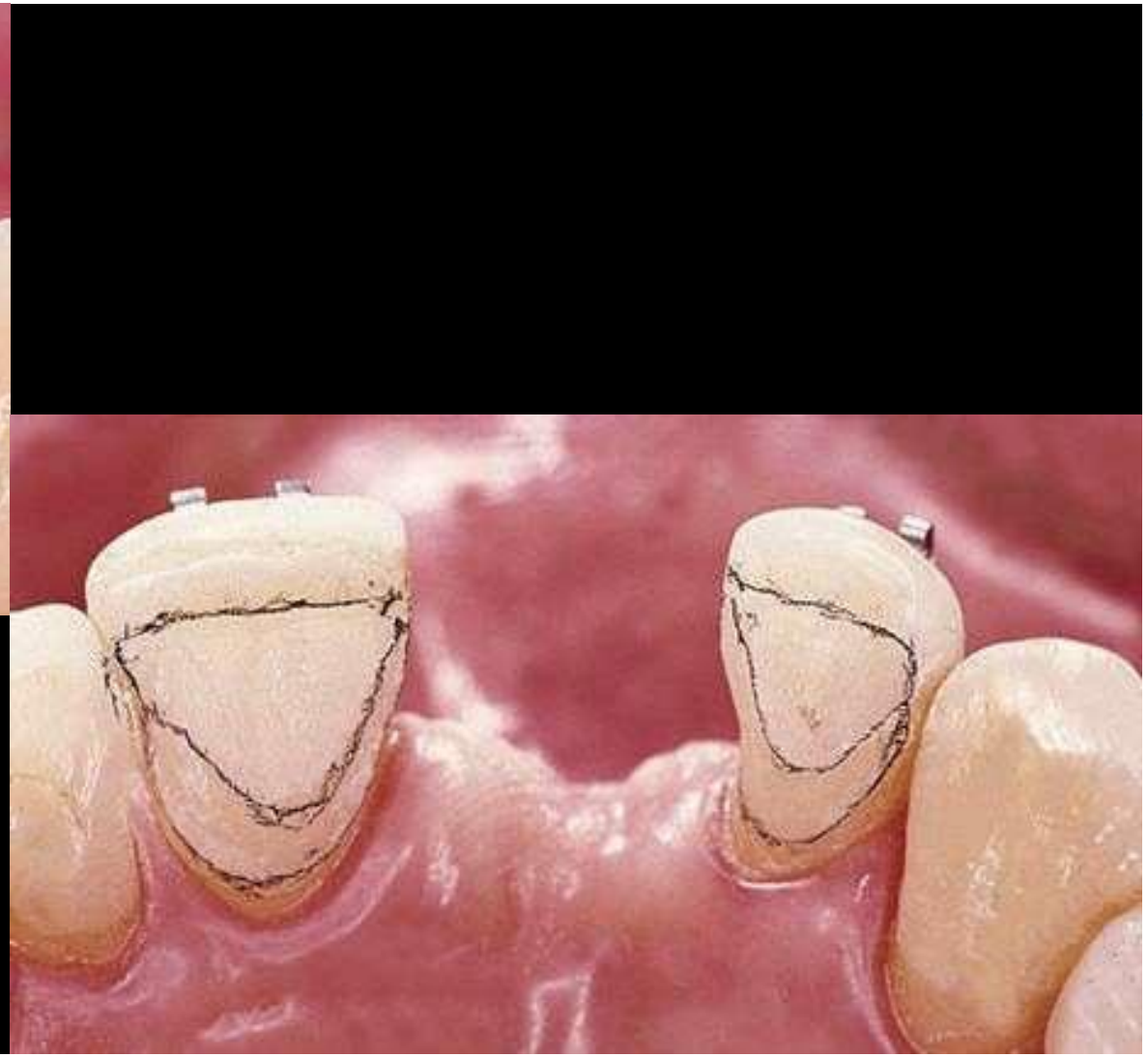

Resin-bonded FPD

Metal-ceramic

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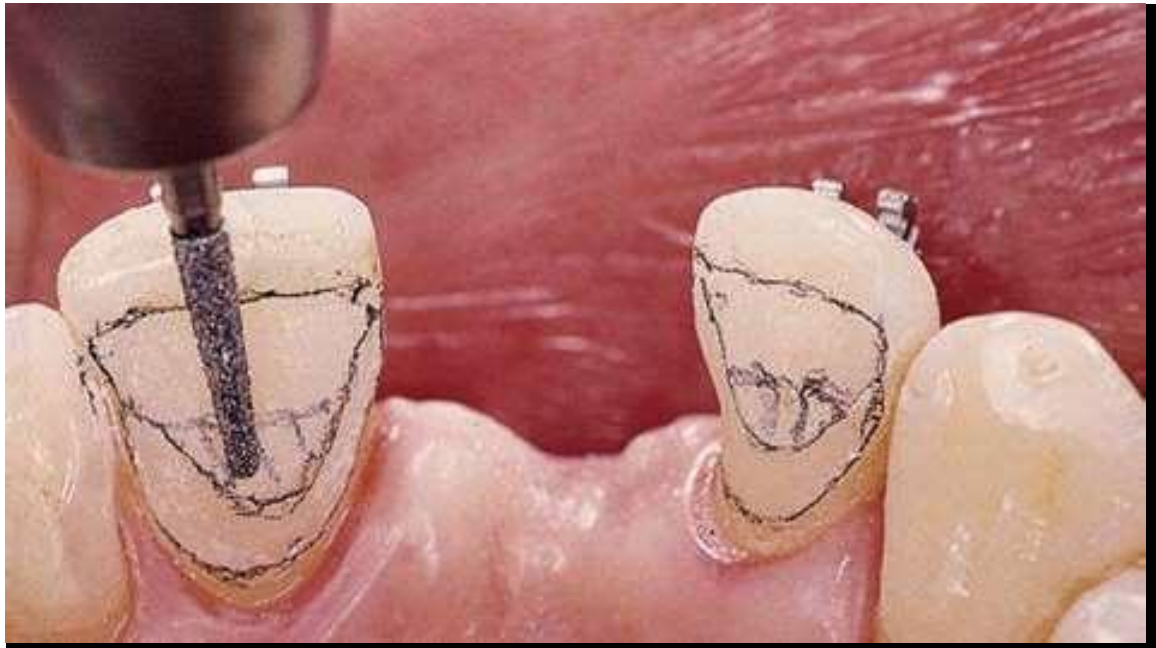
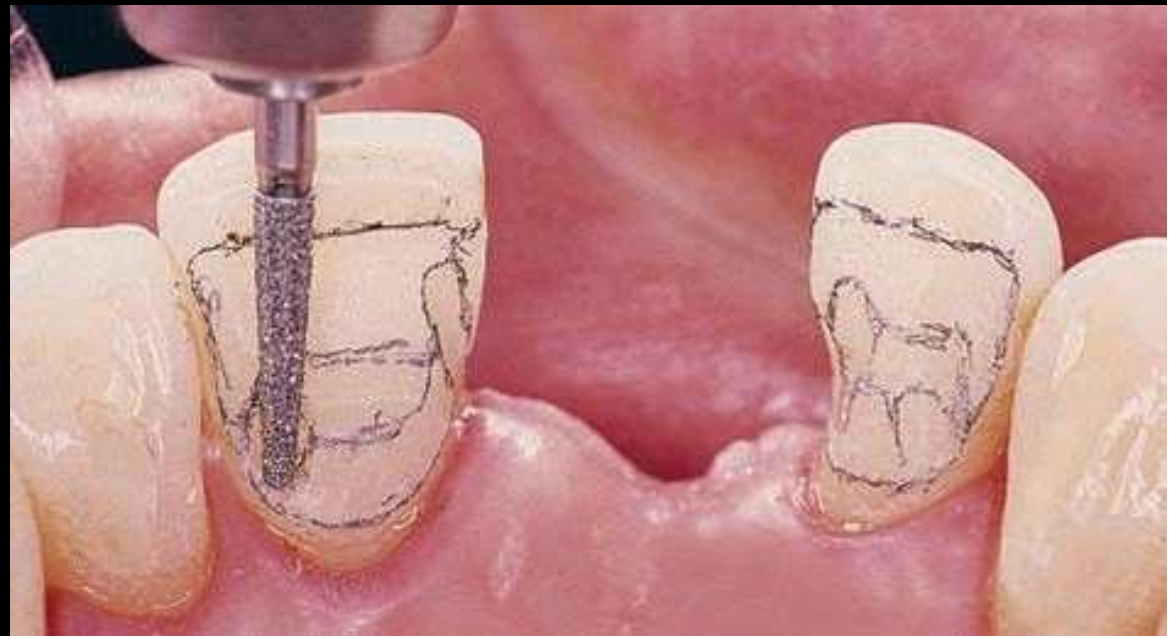
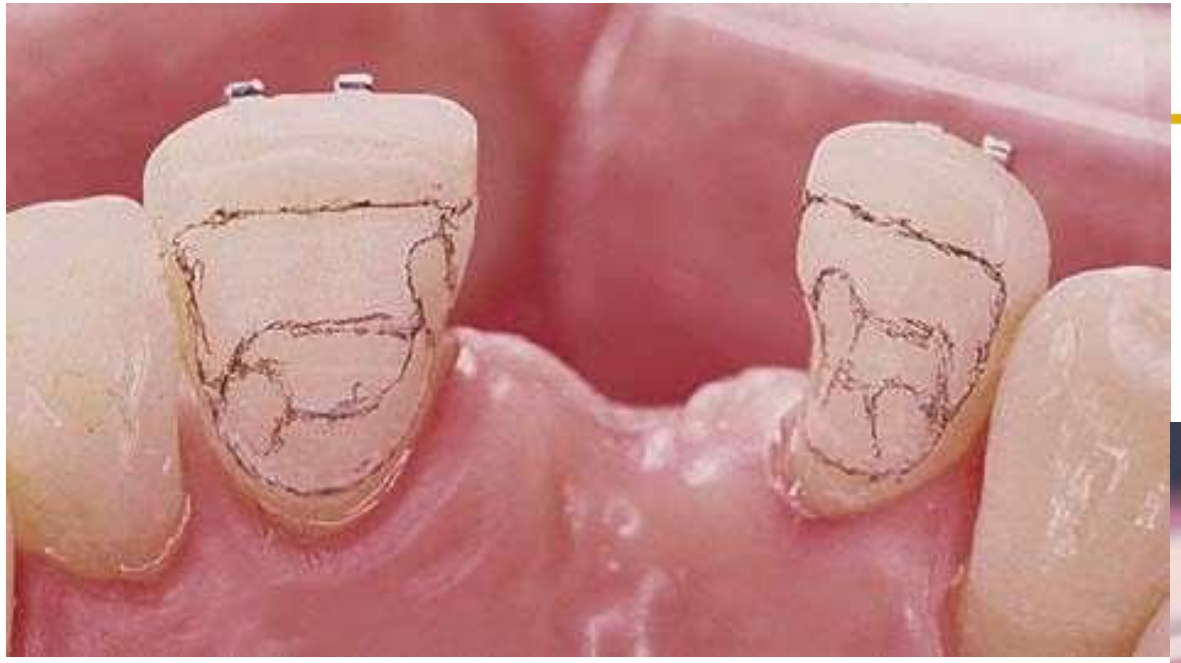




Resin-bonded FPD

Metal-ceramic



Resin-bonded FPD

All ceramic

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Resin-bonded FPD

All ceramic

Resin-bonded FPD

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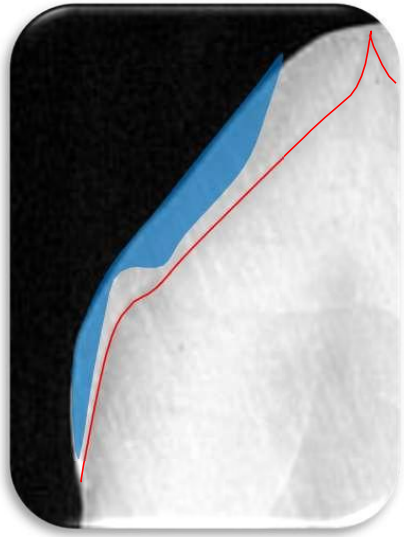
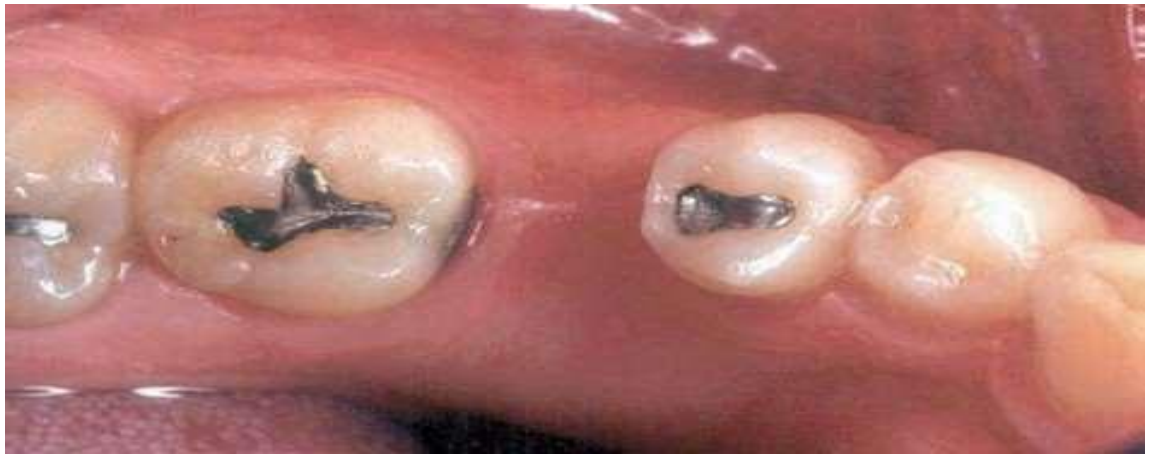
PRINCIPLES OF TOOTH PREPARATION

- Intra-enamel preparation
- Supragingival margins
- Maximize surface area for retainers
- Bracing of abutments
- Single path of insertion
- Clearance for retainers
- Rest seats



Resin-bonded FPD

All ceramic

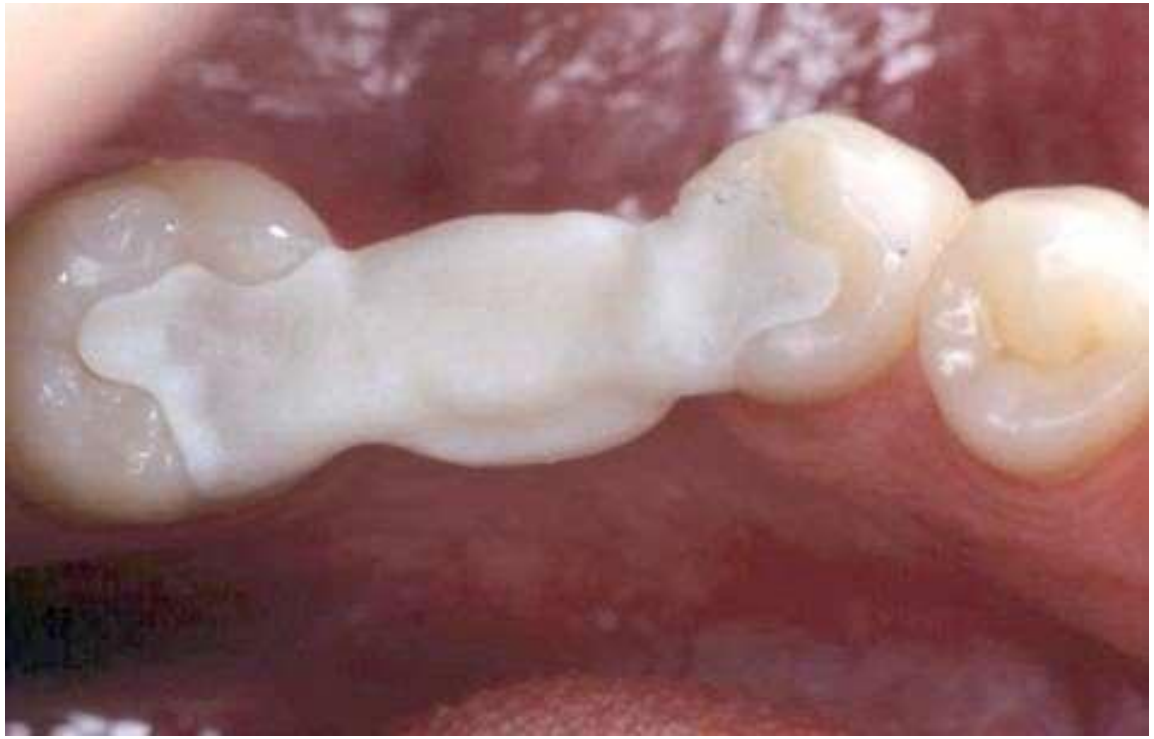


Retainers:
Inlay
Onlay

Pegoraro et al 2013

Resin-bonded FPD

All ceramic



Pegoraro et al 2013

Resin-bonded FPD

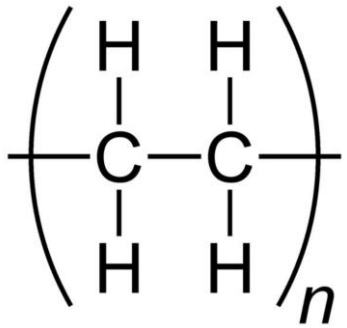
All ceramic

Pegoraro et al 2013

Resin-bonded FPD

Fiber-reinforced

Fiber-reinforced bonded bridge: natural or acrylic tooth

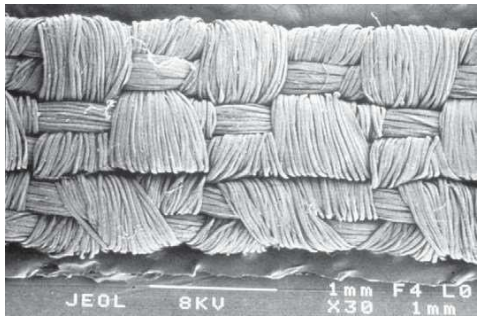


Ribbond®

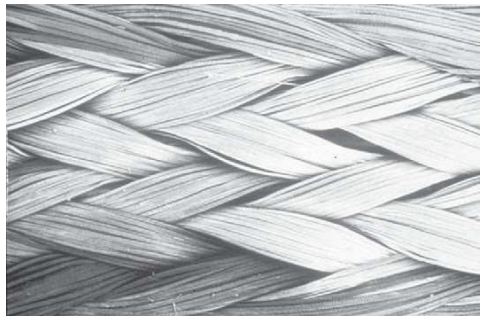
Leno weave

Types of fibers:

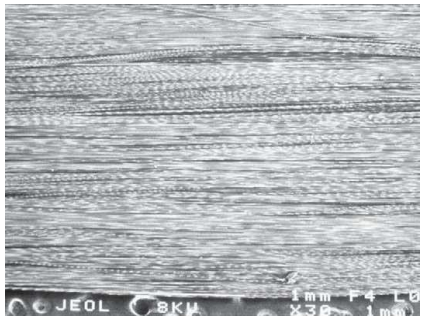
- Glass
- Polyethylene
- Kevlar



Woven



Braided



Unidirectional

Resin-bonded FPD

Fiber-reinforced

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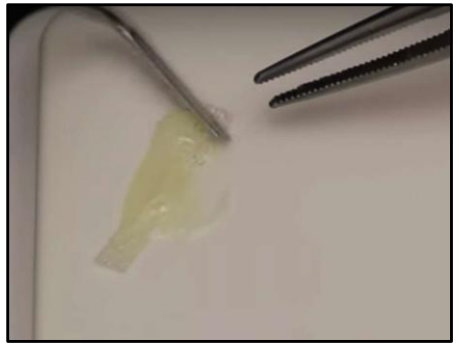
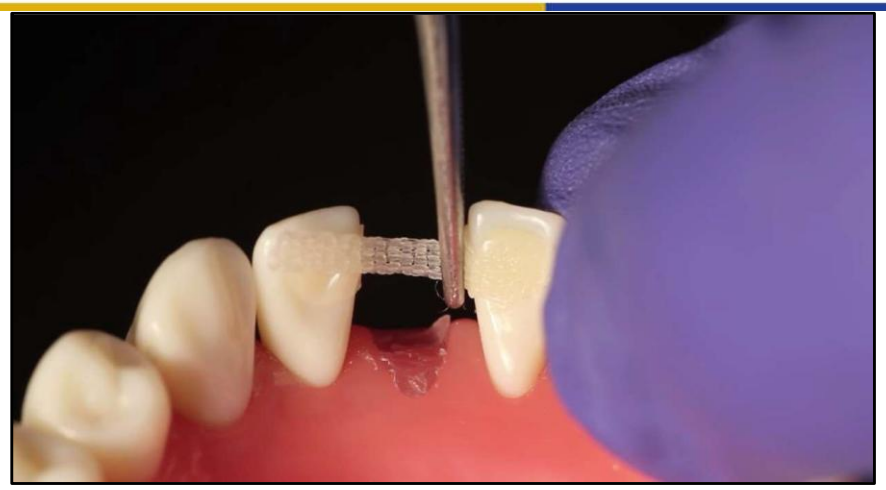
Fiber-reinforced bonded bridge





Resin-bonded FPD

Fiber-reinforced

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Fiber-reinforced bonded bridge

Resin-bonded FPD

Fiber-reinforced

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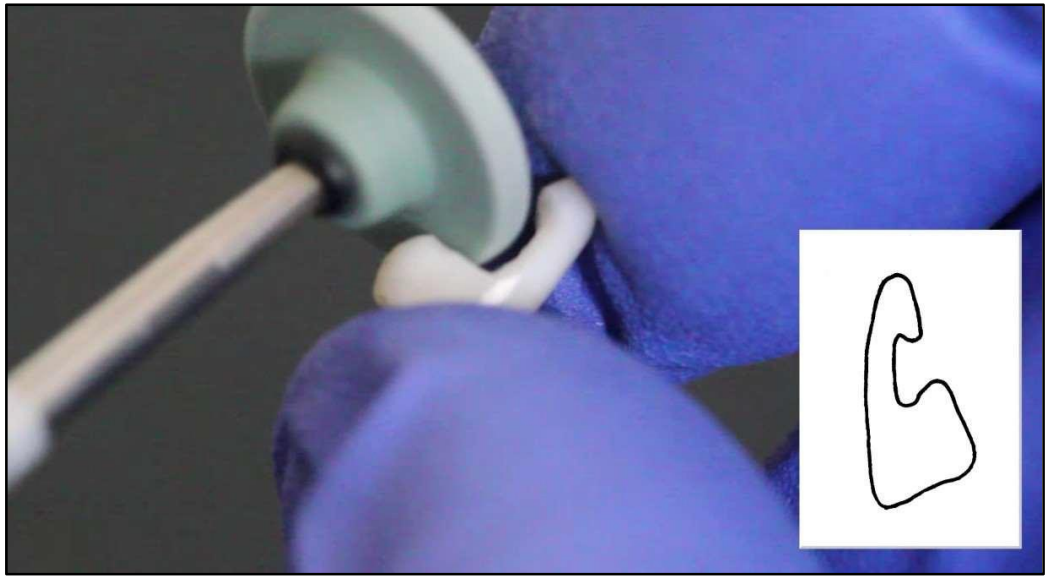
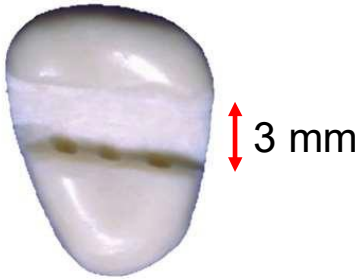
Fiber-reinforced bonded bridge





Resin-bonded FPD

Fiber-reinforced

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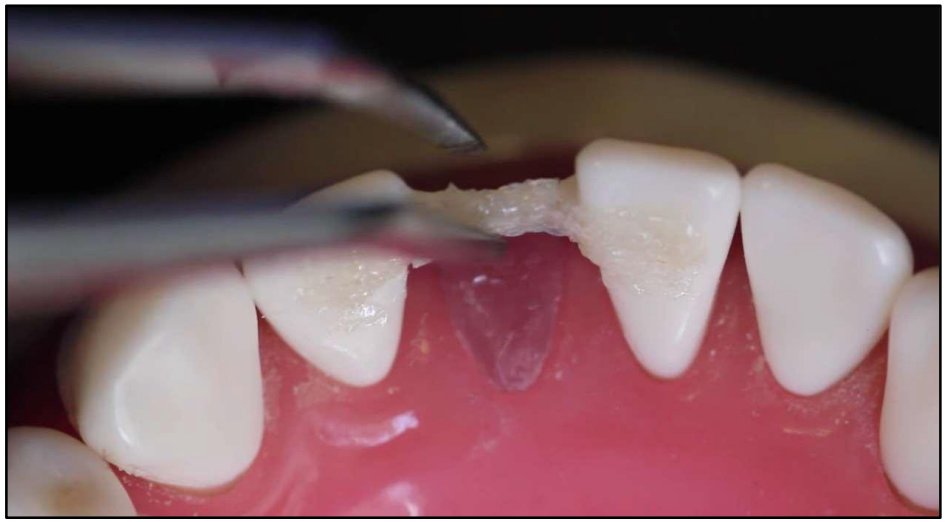
Fiber-reinforced bonded bridge



Resin-bonded FPD

Fiber-reinforced

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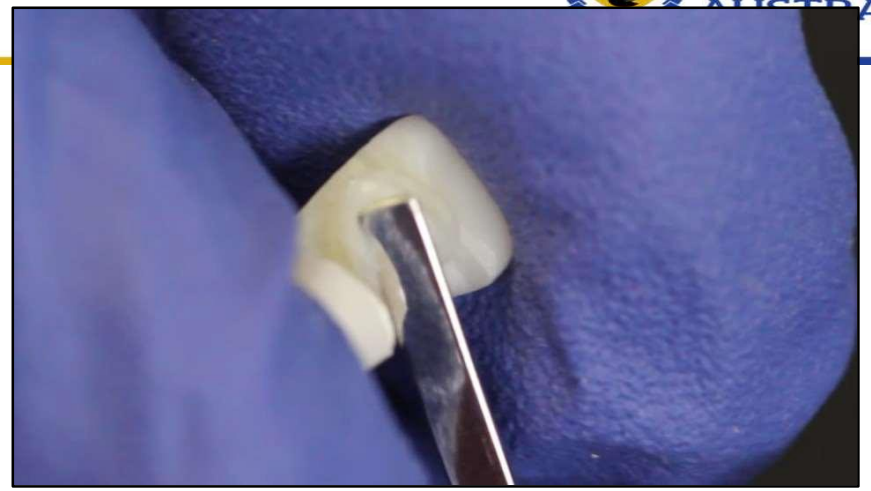
Fiber-reinforced bonded bridge



Implant Supported Bridge

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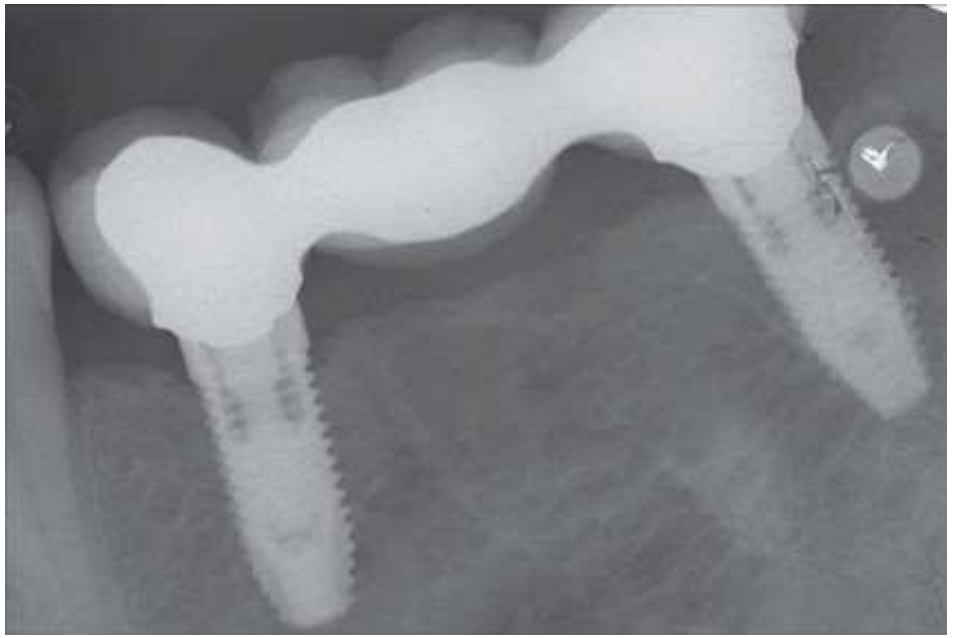

Implant Supported Bridge

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CLINICAL RATIONALE

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CLINICAL RATIONALE

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Consequences of tooth loss

- Loss of masticatory efficiency – affect systemic health
- Loss of quality, width and height of bone
- Loss of soft tissue volume
- Aesthetics is compromised
- Phonetic is compromised (dental consonants)
- Occlusal instability

CLINICAL RATIONALE

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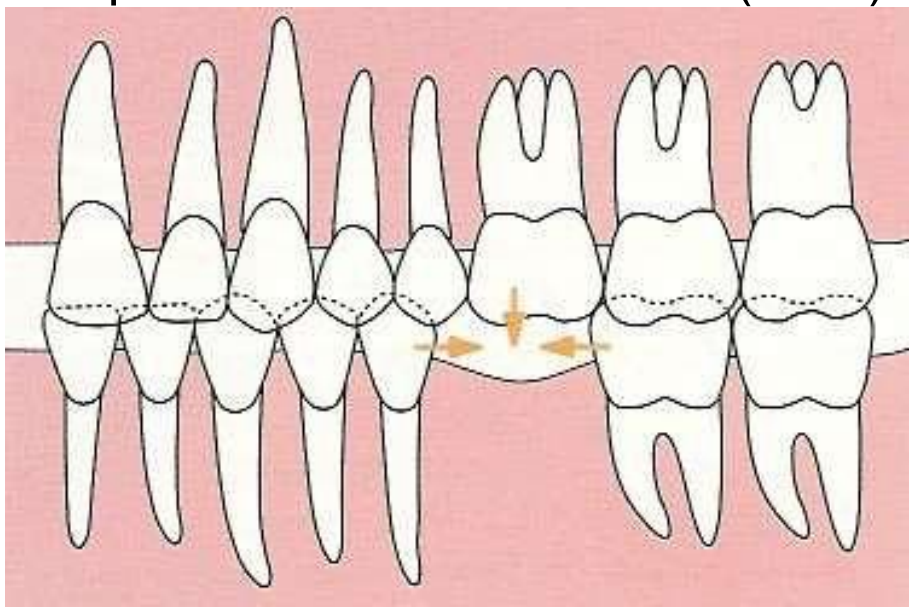
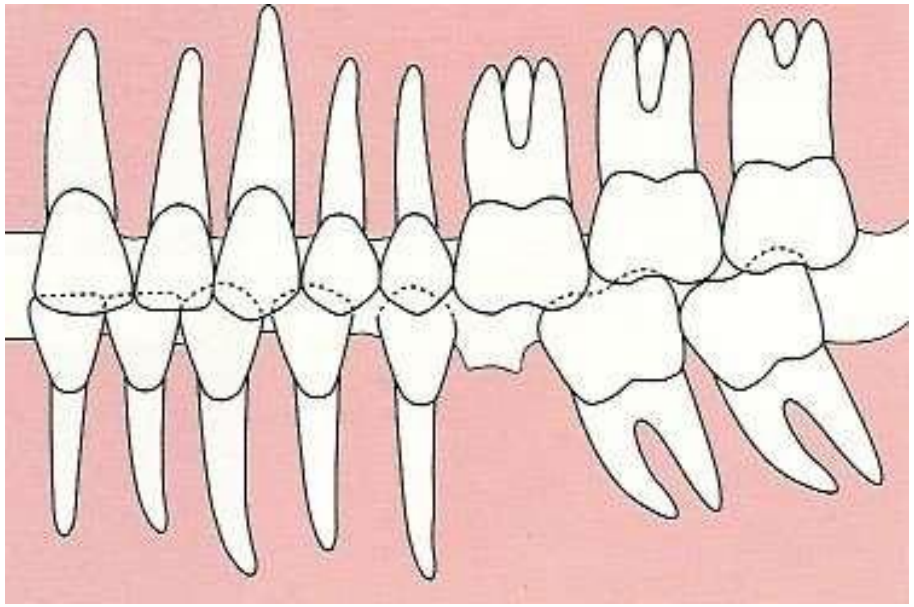
Consequences of tooth loss

- Occlusal changes: Interferences, unbalanced muscle contraction, temporomandibular disorders (TMD)



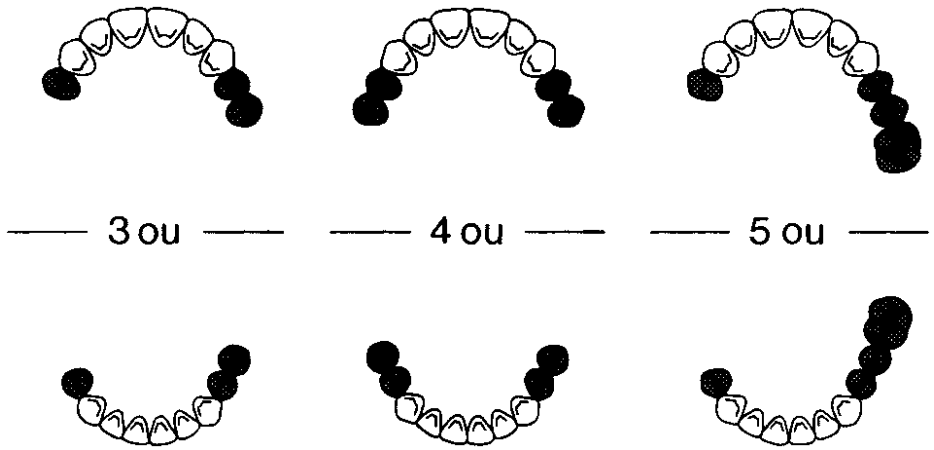


CLINICAL RATIONALE

Consequences of tooth loss

- Occlusal changes: Interferences, unbalanced muscle contraction, temporomandibular disorders (TMD)

Shortened dental arch concept



Witter et al. 1999

CLINICAL RATIONALE

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Rationale for Intervention:

- Is there a need for improved aesthetics?
- Does the patient need to improve masticatory function ?
- Is there a need for improved occlusal stability?

Need vs Demand

CLINICAL RATIONALE

Rationale for Intervention:

Aesthetics:

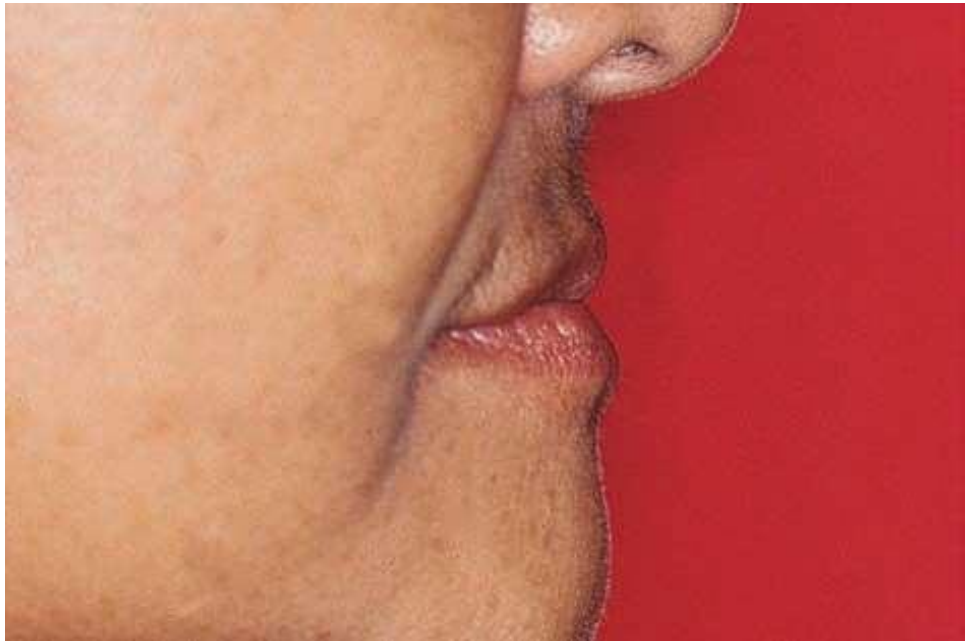
- What the patient wants
- What the patient needs
- What the patient can get

What is the patient's expectation?
Can it be achieved?
What is technically possible?

CLINICAL RATIONALE

- Aesthetics

Lip support, high smile line



CLINICAL RATIONALE

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Clinical Rationale of Tooth Supported Bridgework

NEVER OVERLOAD ABUTMENT TEETH!

- Direction of Occlusal forces:

1) Mandibular stability
2) Axial occlusal load
3) During lateral excursions: no interference in the working side
4) During lateral excursions: disocclusion in the non-working side
5) During protrusion: disocclusion of posterior teeth

- Intensity of Occlusal Forces:

- Parafuntional habits
- Age, Gender

Clinical Rationale of Tooth Supported Bridgework

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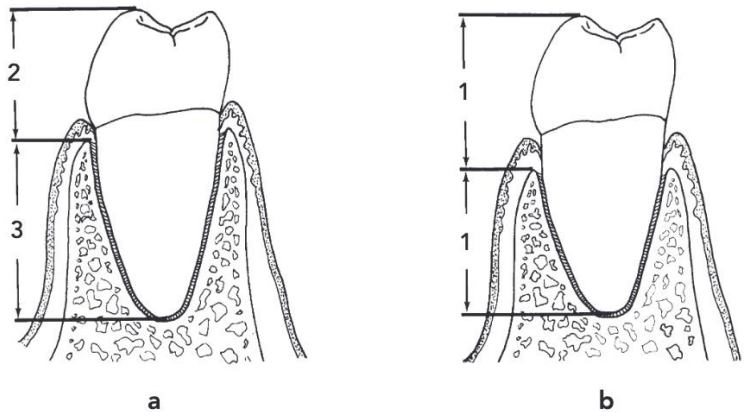
Assessing potential abutment teeth:

- Crown/Root Ratio
- Root configuration
- Periodontal Ligament Area

Ante's Law: "Root surface area of the abutment teeth has to equal or surpass that of the teeth being replaced with pontics"



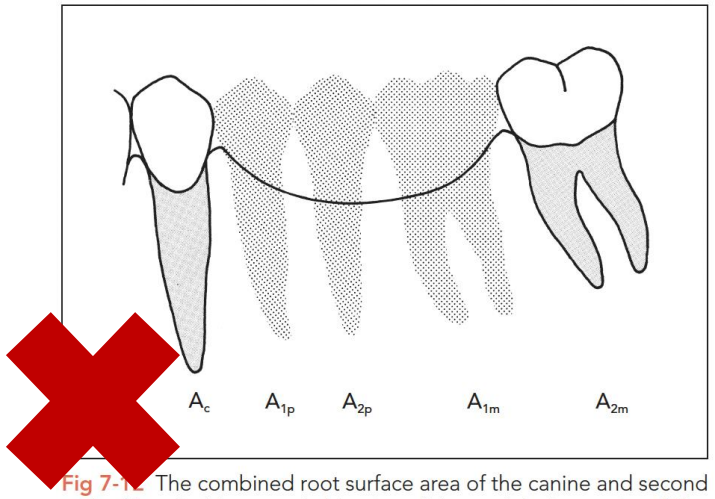


Fig 7-12 The combined root surface area of the canine and second molar ($A_c + A_{2m}$) is exceeded by that of the teeth being replaced ($A_{1p} + A_{2p} + A_{1m}$). A fixed partial denture would be a poor choice in this situation.

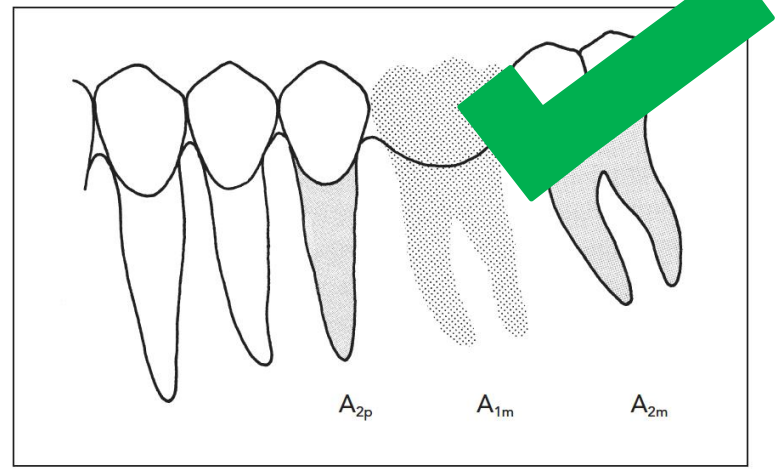
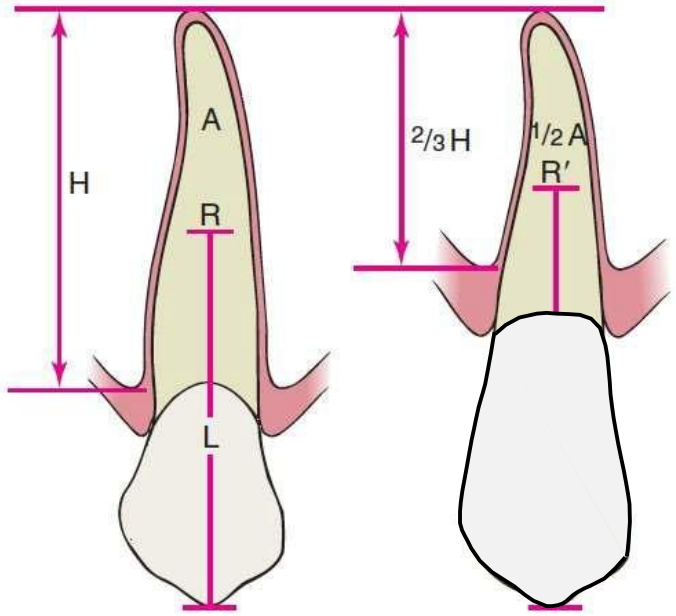


Fig 7-10 The combined root surface area of the second premolar and the second molar ($A_{2p} + A_{2m}$) is greater than that of the first molar being replaced (A_{1m}).

Clinical Rationale of Tooth Supported Bridgework

- Crown-to-root ratio

Minimum 1:1



Shillingburg 1997

Clinical Rationale of Tooth Supported Bridgework

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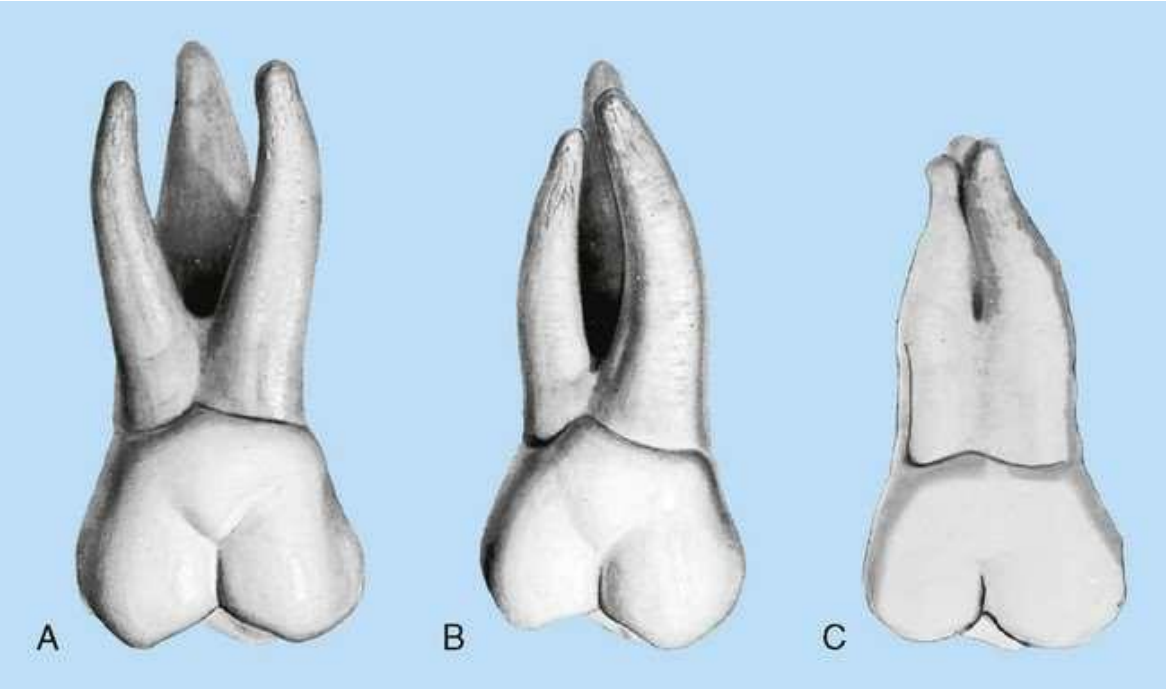
- Root shape and angulation



Clinical Rationale of Tooth Supported Bridgework

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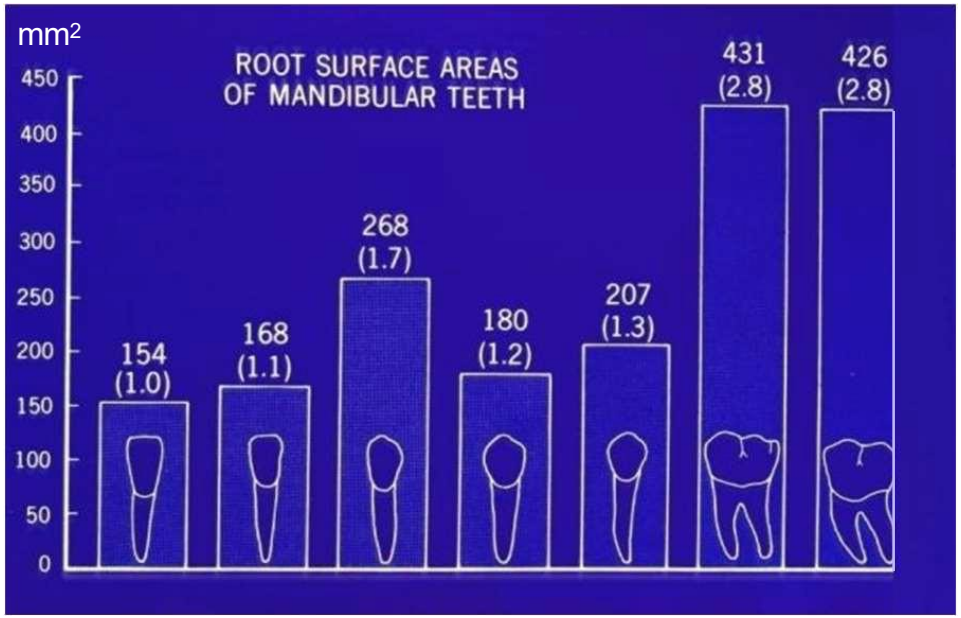
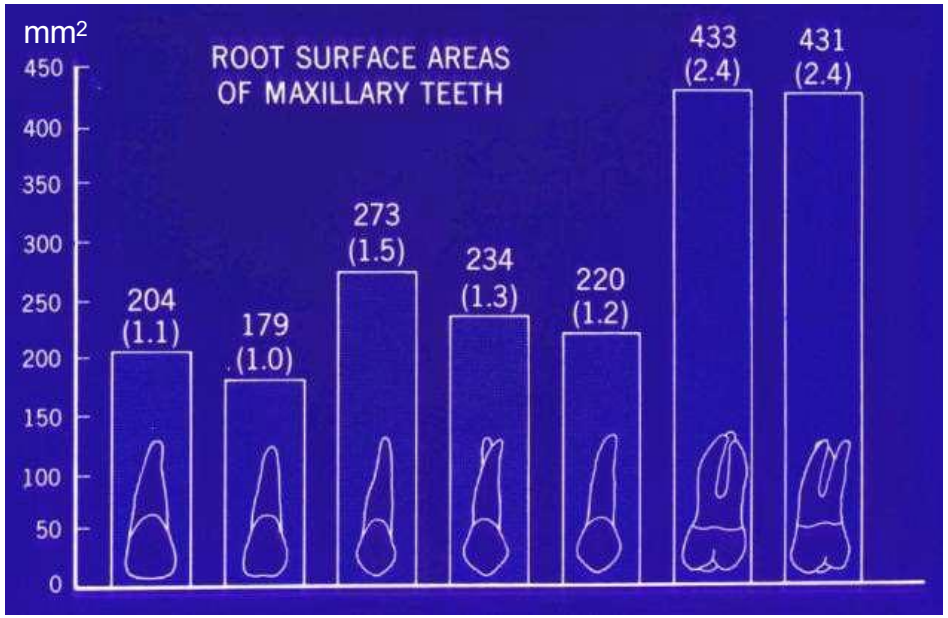
- Root surface area





JEPSEN A. Root surface measurement and a method for x-ray determination of root surface area. Acta Odontol Scand. 1963.

Clinical Rationale of Tooth Supported Bridgework

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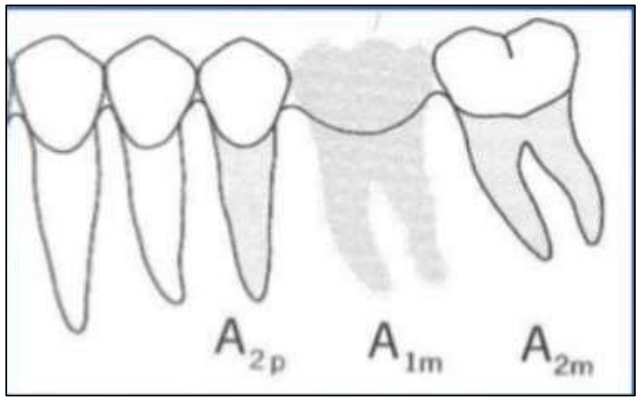
- Length of edentulous area

Ante's Law

The total root surface area (periodontal membrane) of the abutment teeth for a FPD must be equal to or greater than the root surface area of the teeth being replaces (Irvin Ante, 1926)



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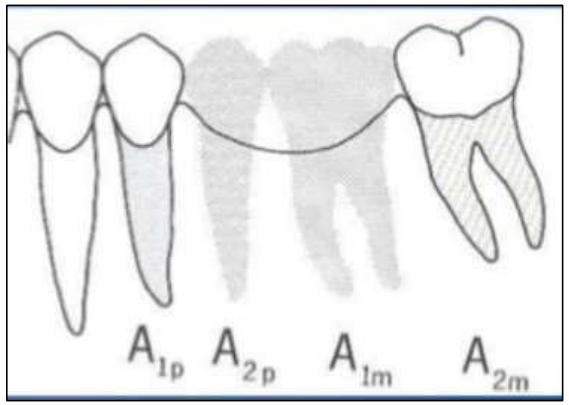

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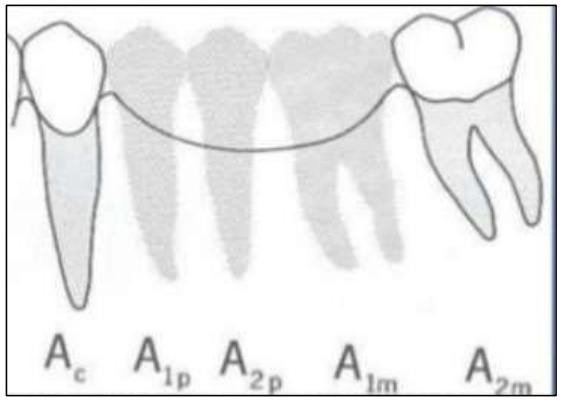
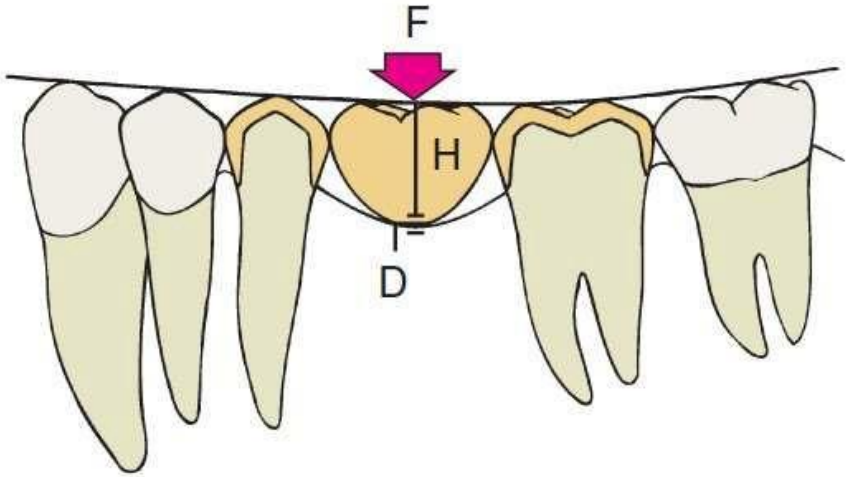
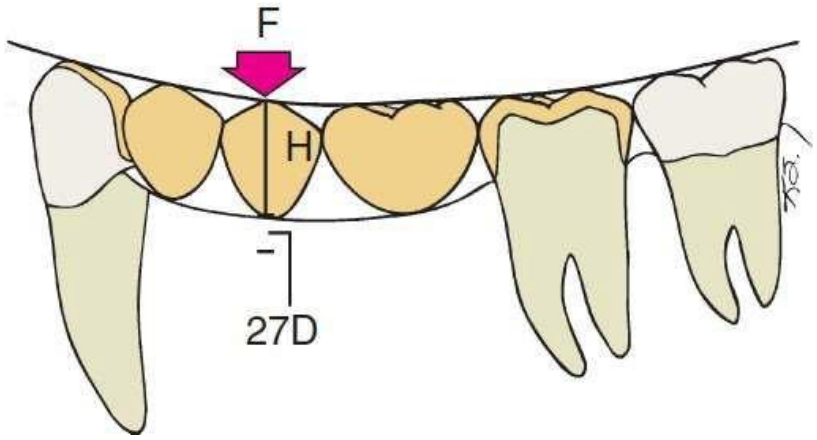


3

Clinical Rationale of Tooth Supported Bridgework

- Length of edentulous area





- Fracture of a porcelain veneer
- Breakage of a connector
- Loosening of a retainer
- Unfavorable soft tissue response
- Fracture of abutment

Clinical Rationale of Tooth Supported Bridgework

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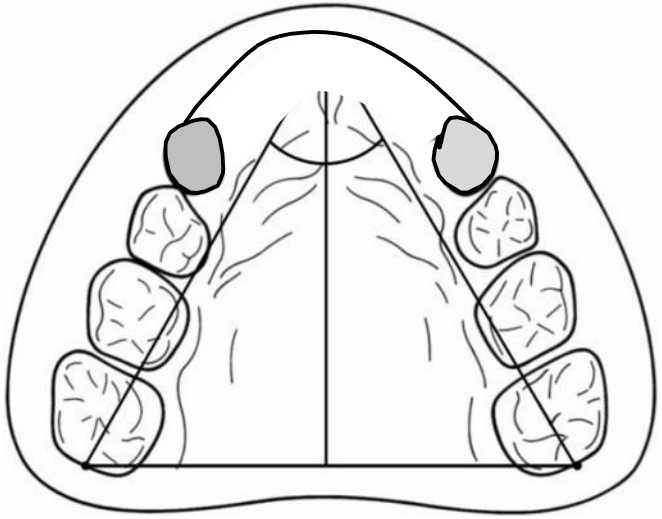
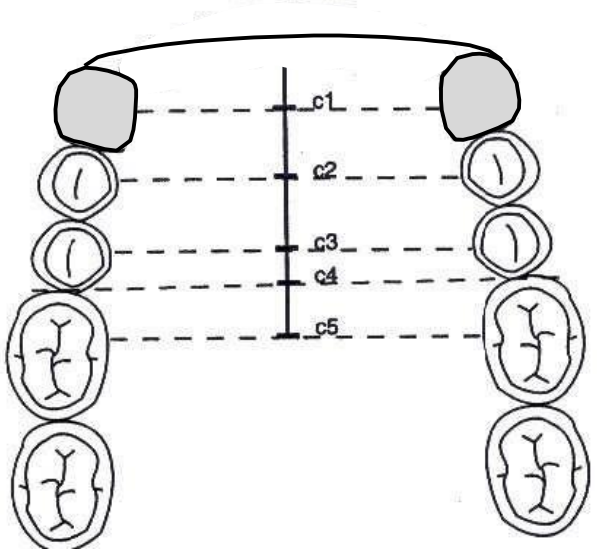
- Dental arch shape





- Opposing arch

Clinical Rationale of Tooth Supported Bridgework

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- Dental arch shape

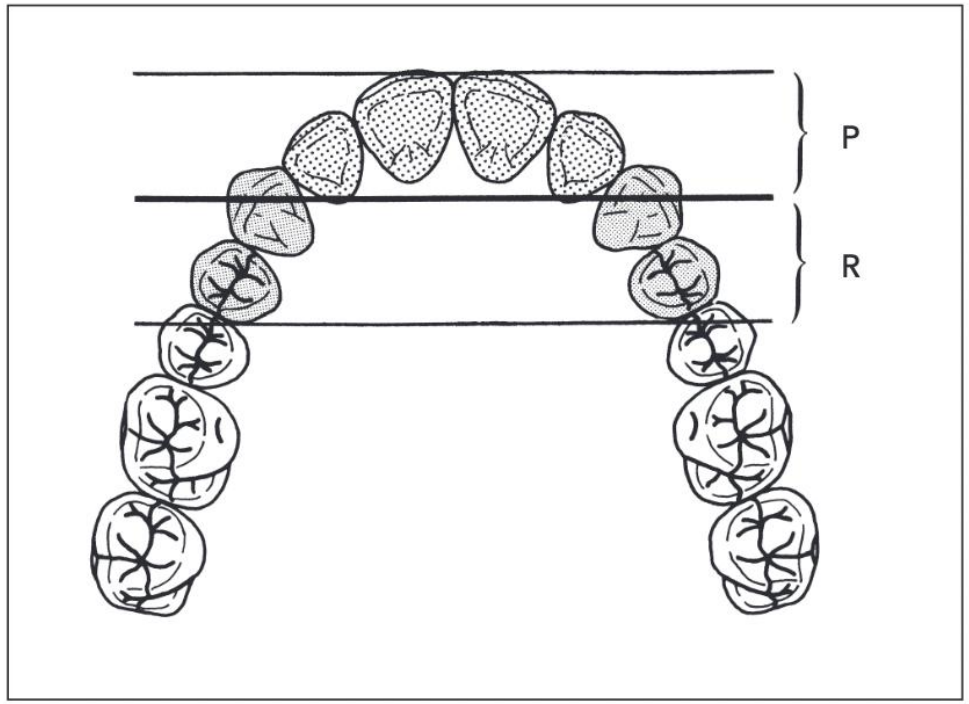

Fig 7-20 Secondary retention (R) must extend a distance from the primary interabutment axis equal to the distance that the pontic lever arm (P) extends in the opposite direction.

Fundamentals of Fixed Prosthodontics

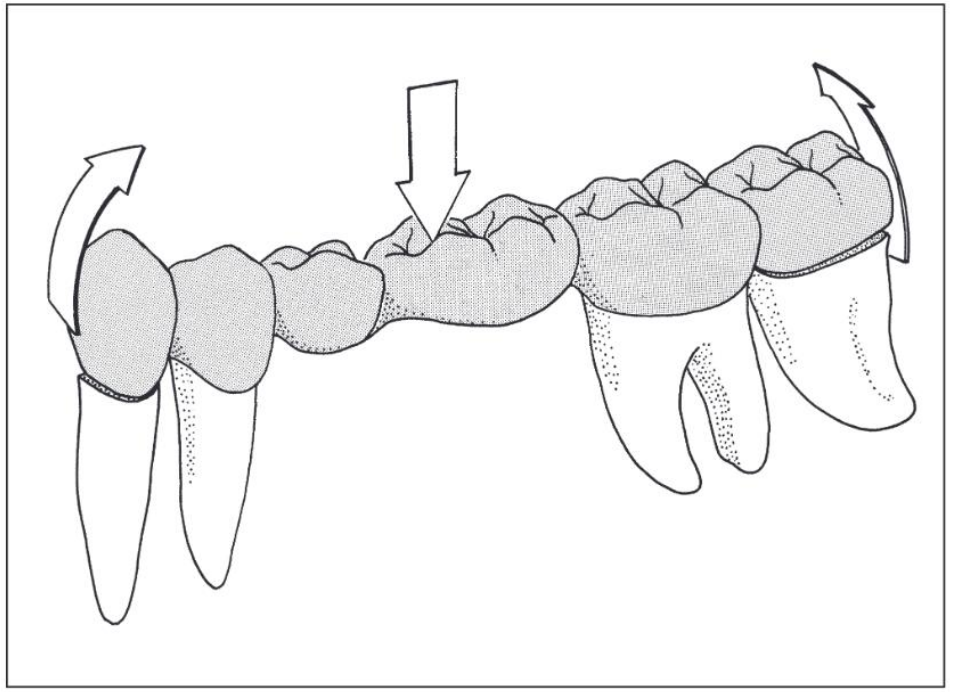

Fig 7-19 The retainers on secondary abutments will be placed in tension when the pontics flex, with the primary abutments acting as fulcrums.

Clinical Rationale of Tooth Supported Bridgework

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- Direction of Occlusal forces
- Intensity of Occlusal Forces
- Assess root surface area
- Length of edentulous area
- Root shape and angulation
- Crown-to-root ratio
- Dental arch shape
- Opposing arch

Thanks for listening!