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Temporarisation

Provisional Restorations

Dr. Matsubara

Temporarisation

Synonyms

- Provisional restoration/prosthesis
- Interim restoration/prosthesis
- Temporary restoration/prosthesis

Temporarisation

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Temporary prosthesis

A fixed or removable dental prosthesis, designed to enhance aesthetics, stabilize and give function for a limited period of time, after which it is to be replaced by a definitive dental prosthesis.

Assist determination of the therapeutic effectiveness of a specific treatment plan or the form and function of the definitive prosthesis

Glossary of Prosthodontic Terms; 9th ed 2005

Temporary Prosthesis

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Objectives of Provisional Restorations

- Biological
- Mechanical
- Aesthetic
- Part of adjunctive therapy
  - Endodontic treatment
  - Periodontal treatment
- Communication with dental laboratory

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Biological Requirements

- Prevent sensitivity
- Maintain pulp vitality
- Maintain periodontal health
- Resolve gingival inflammation
- Prevents caries (prolonged application)

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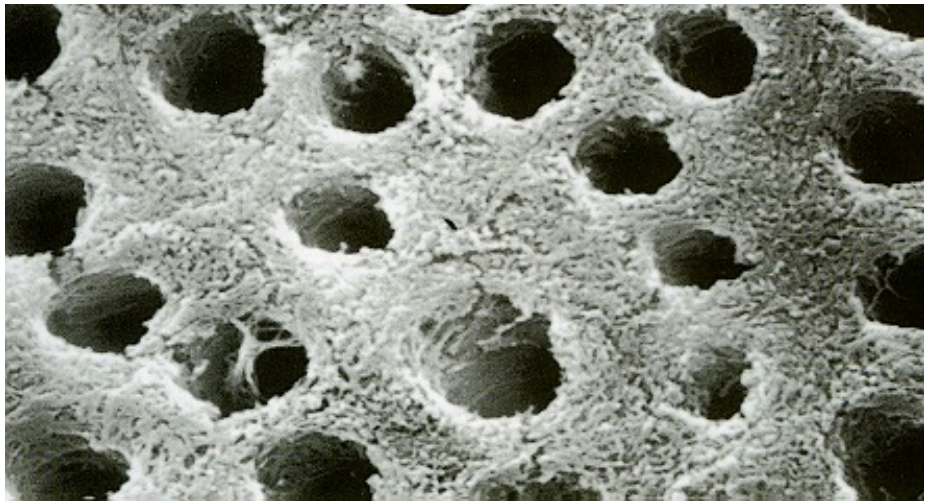
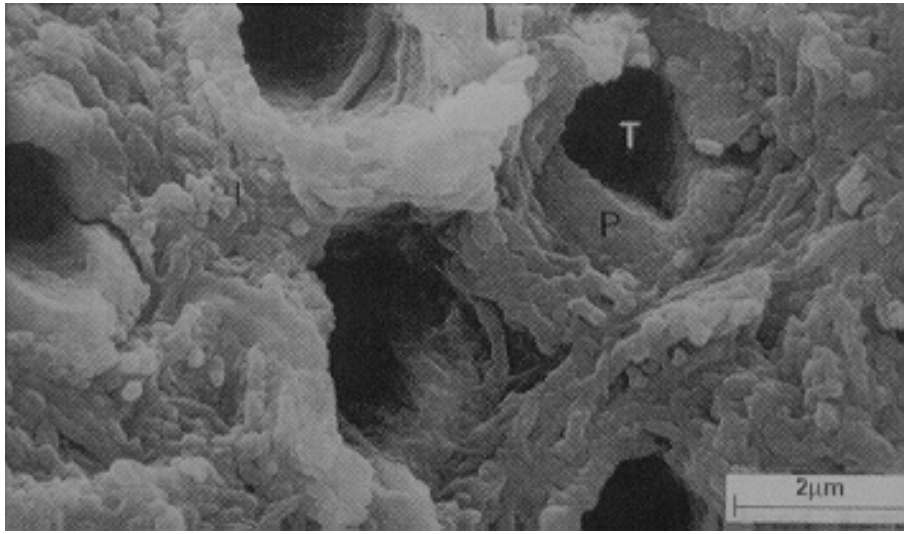
Biological Requirements

Dentine tubules



Pulp Protection

- Provisional restoration must seal and insulate the prepared tooth from oral environment
  - Thermal, bacterial and chemical irritants
- Inevitable pulp trauma can become irreversible if adequate provisional restoration cannot be made



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Biological Requirements

Pulp Protection

- Used to assess questionable pulpal vitality before completing definitive restorations
- Ideal when dealing with teeth with “cracked cusps”
- Good anchorage for rubber dam clamps

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Biological Requirements

Maintain Periodontal Health

- Provisional restoration must facilitate plaque control by:
  - Good marginal fit
  - Proper contour
  - Smooth surface
- Provisional restoration can be used to promote healing of soft tissues and allows resolution of gingival inflammation
- If the existing restoration preclude proper plaque control, then a well made provisional restoration could help to restore gingival health

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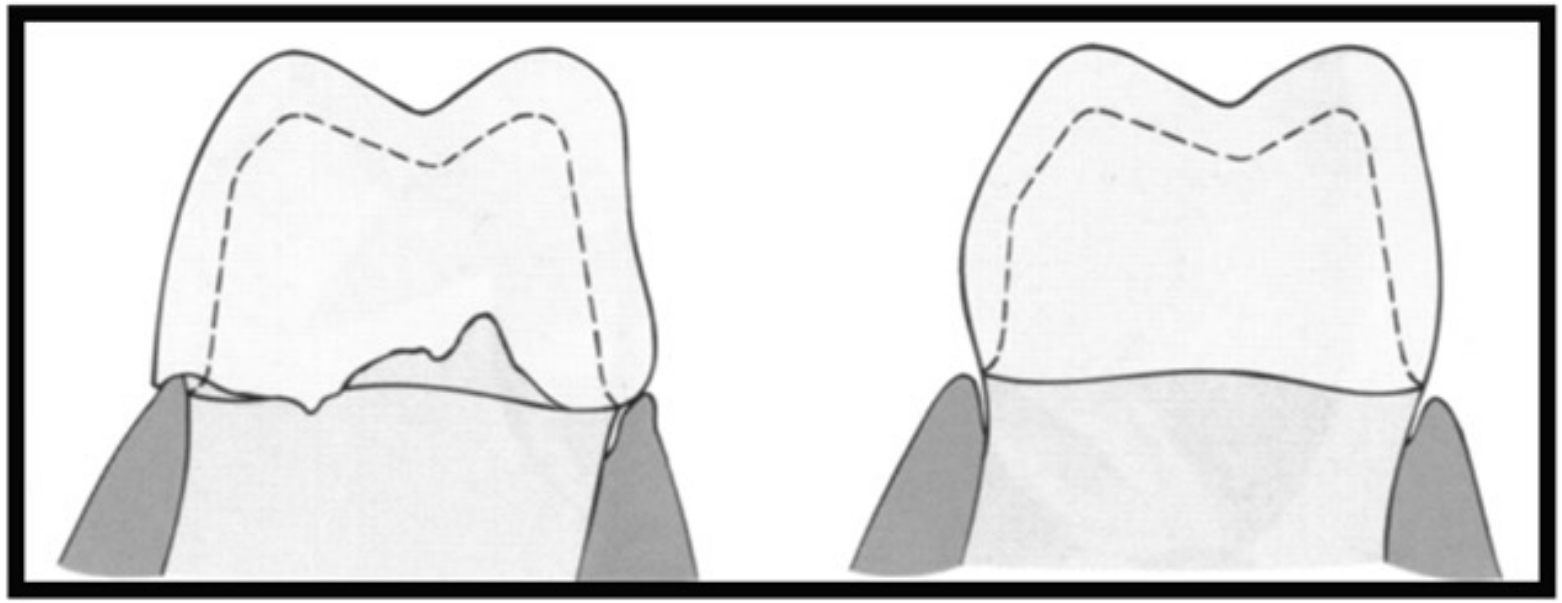
Biological Requirements

Maintain Periodontal Health



Open margins
Overhangs
Overcontoured

Sealed margin
Smooth margin
Well-contoured

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Provisional restoration

- periodontal tissues to stay or become healthy.

GRACIS et al. 2001

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Biological Requirements

Maintain Periodontal Health

►Possible implications on

- Adequate tissue management and definitive impressions
- Possible recession and aesthetic dissatisfaction

►Monitor healing after crown lengthening surgery

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Mechanical Requirements

- Maintain tooth position (occlusal stability)
- Protection against fracture
- Resist functional load
- Resist removal forces (retention and resistance)

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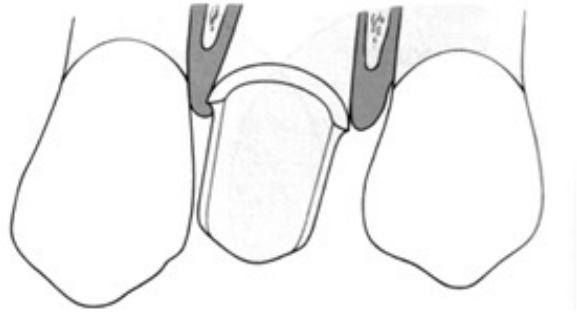
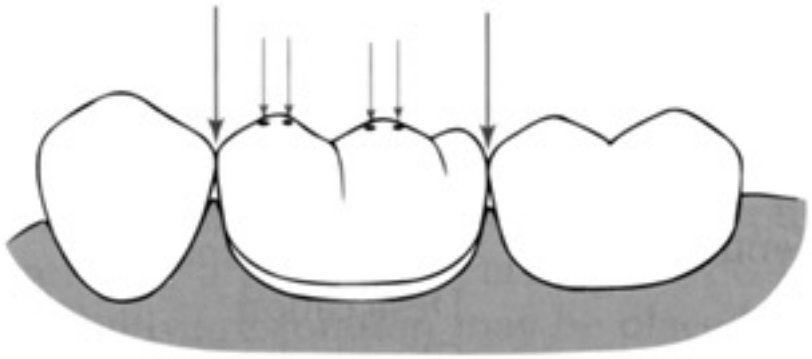
Mechanical Requirements



Occlusal stability

➢ Preserve intra-arch relationship:

- Provisional restoration should establish and maintain proper contacts with adjacent teeth
- Prevents movement or drifting
- Significant implication on bridge fit



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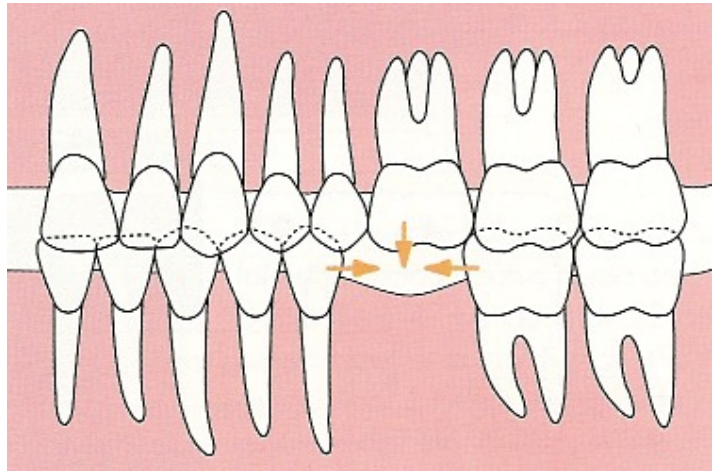
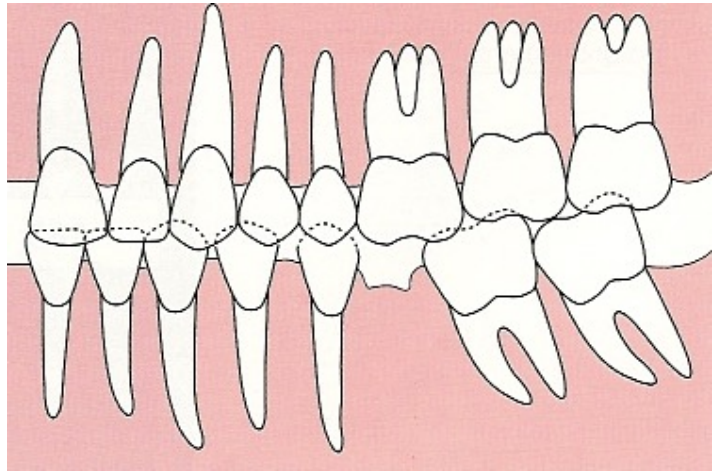
Mechanical Requirements

Occlusal stability

➢ Preserve inter-arch relationship:

- Establish and maintain proper contacts with the opposing dentition
- Prevents extrusion
- Observes the effects of occlusion before the definitive restoration





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Mechanical Requirements

Protection Against Fracture

- Protection of weakened tooth structure after preparation
- Protection of core restoration
- Protection of preparation features
- Even small fracture will increase chair side time and, in extensive cases, might require remake

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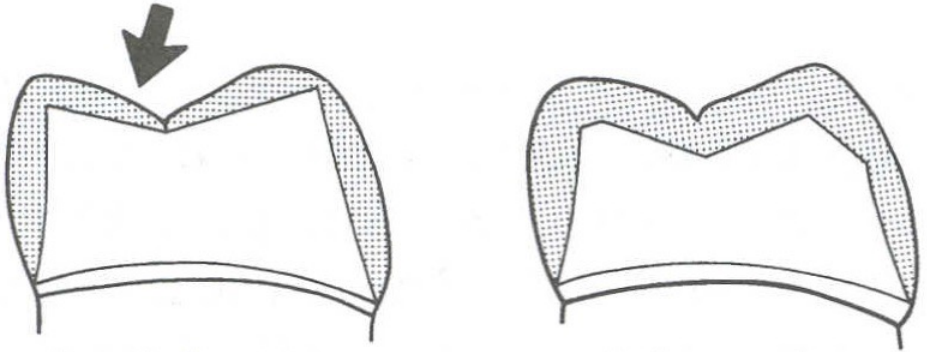
Mechanical Requirements

Resist Functional Load



- Provisional restoration should be strong enough to resist functional load:

- Preparation reduction
- Provisional restoration adjustment
- Material selection

- Should preserve intercuspal contacts to maintain tooth position
- Occlusal interferences must be removed

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Mechanical Requirements

Resist Removal Forces

- Retention and resistance forms of the preparation
- Fit of provisional restoration
- Cementation material

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Aesthetic Requirements

- Colour compatibility
- Translucency
- Colour stability

Depends on:

- Material
- Morphology

- Choose material that is close to final shade
- Choose material carefully if long term provisional restoration is required

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Aesthetic Requirements

► After major alterations

- Clinician and patient can assess tooth form, gingival contours, shade requirements and effects on phonetics prior to final definitive restorations
- Once approved, an impression of the provisional restorations allows the technician to build new crowns to the same shape
- Alteration of the palatal surfaces or the incisal tips of the upper anterior teeth can cause problems in forming ‘S’, ‘F’, ‘V’ & ‘Th’ sounds

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Aesthetic Requirements

Good communication with dental laboratory

Initial

Temporarisation

Final

Donovan and Cho; 2001

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MATERIALS

Selection depends on:

- Anticipated load
- Prosthesis design
- Span length
- Duration of provisional restoration

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MATERIALS

- Polymethyl Methacrylate (PMMA)
- Polyethy Methacrylate (PEMA)
- Bisacryl Composite Resin
- Light-Cured Composite Resin

Metal Reinforcement with base metal alloy

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MATERIALS

Ideal Properties

- Adequate strength
- Abrasion resistance
- Biocompatible
- Non-irritant
- Dimensional stability
- Ease of contouring and polishing
- Good appearance
- Convenient handling
  - Working time
  - Setting time
  - Application
  - Easily modifiable

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MATERIALS

PMMA

Advantages

- High strength
- Colour stability
- Can be characterized
- Easily smoothed and polished
- Easily repaired
- Low cost

Disadvantages

- Highly exothermic: can be traumatic to the pulp
- Significant polymerization shrinkage
- Monomer release
- Unpleasant odour

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MATERIALS

PMMA

Examples: Jet, Polyvicron

Indications

- Should not be used directly in the mouth
- Laboratory construction (indirect method)
- Shell construction in the laboratory then can be relined by PEMA intraorally (indirect-direct method)
- Suitable for long-span provisional restoration

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MATERIALS

PEMA

Advantages

- Less exothermic reaction than PMMA

(but higher than Bisacryl composite)

- Moderate strength
- Can be smoothed and polished
- Can be characterized
- Easily repaired
- Low cost

Disadvantages

- Weaker than PMMA
- Discoloration
- Unpleasant odour
- Susceptible for polymerization shrinkage

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MATERIALS

PEMA

Indications

- Single crowns (direct method)
- Short span bridge
- Short term provisional restoration (2-3 weeks)
- Relining pre-formed or laboratory made shell

Examples: Trim, Snap

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MATERIALS

Bisacryl Composite Resin

Advantages

- Low exotherm
- Minimal polymerization shrinkage
- Ease of application (Cartridge system)
- Can be smoothed and polished
- Can be characterized

Disadvantages

- Brittle
- Difficult to repair
- Does not bond to polycarbonate crown
- High cost

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MATERIALS

Bisacryl Composite Resin

Indications

- Single crowns (direct method)
- Ideal for intraoral application with matrix or template
- Short span bridge

Examples: Protemp (3M), Luxatemp (DMG), Structor (Voco), Integrity (Dentisply)

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MATERIALS

Light-Cured Composite Resin

Advantages

- Controlled setting (light-cured)
- Highly aesthetic
- Can be characterized
- Easily polished and smoothed

Disadvantages

- Brittle
- Transparent template is necessary or freehand application
- Can be time consuming
- High cost

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MATERIALS
Light-Cured Composite Resin

Indications

- Single unit restoration (direct method)
- Inlays, onlays and veneers
- Repairing open margins of Bisacryl composite crowns
- For laboratory application (indirect method)
- Overlaying metal reinforcement

Example: Symphony (Flowable composites)

Bohnenkamp et al. 2004

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FABRICATION TECHNIQUES

- Direct (chairside)
  - Preformed
  - Custom
- Indirect (laboratory)
- Indirect-Direct (laboratory and chairside)

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FABRICATION TECHNIQUES

Direct: Preformed

- Based on preformed mould (not a complete restoration)
- Must be relined with an acrylic material
- Used for single unit restoration

- Available moulds:
  - Polycarbonate
  - Cellulose acetate
  - Aluminum
  - Tin-silver
  - Nickel-chromium

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FABRICATION TECHNIQUES

Direct: Preformed

Polycarbonate crowns

- Part of the provisional restoration
- Bond to PEMA
- Colour stable. Only one shade

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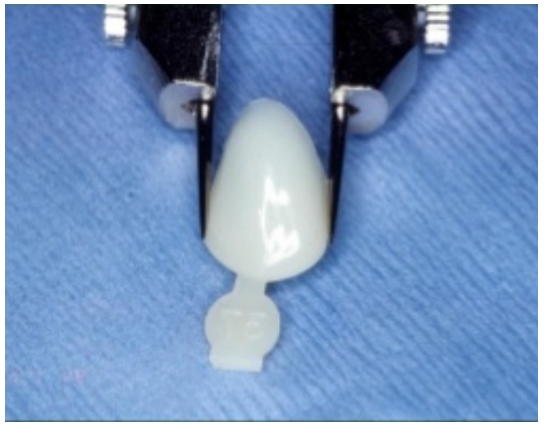
FABRICATION TECHNIQUES

Polycarbonate crowns

Direct: Preformed

1) Select the correct crown
   - Morphology
   - Mesiodistal width
2) Adjust the height accordingly until passively fitting
   - Green stone
   - Soflex discs



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FABRICATION TECHNIQUES

Polycarbonate crowns

Direct: Preformed

3) Lubricate the prepared tooth with thin petroleum coat

- Protection from monomer
- Avoid bonding of the acrylic to the tooth

4) Mix PEMA

5) When the mixed PEMA loses its gloss, place it in the shell

6) Fit the crown on the prepared tooth and align it adequately

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FABRICATION TECHNIQUES

Polycarbonate crowns

Direct: Preformed

7) Immediately eliminate marginal excess material before the rubbery stage

8) After the rubbery stage (about 2 minutes) remove and reseat the crown

- Facilitate removal
- Minimize thermal irritation

9) After full setting (5 minutes), the excessive material can be adjusted

10) Adjust the occlusion

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FABRICATION TECHNIQUES

Direct: Preformed

Acetate strip crowns

- Determine the tooth morphology
- Does not bond to acrylic
- Should be removed after setting

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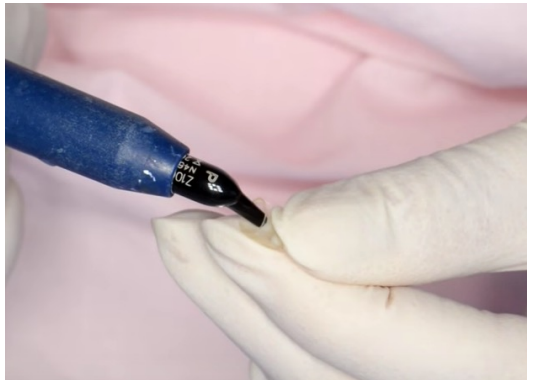
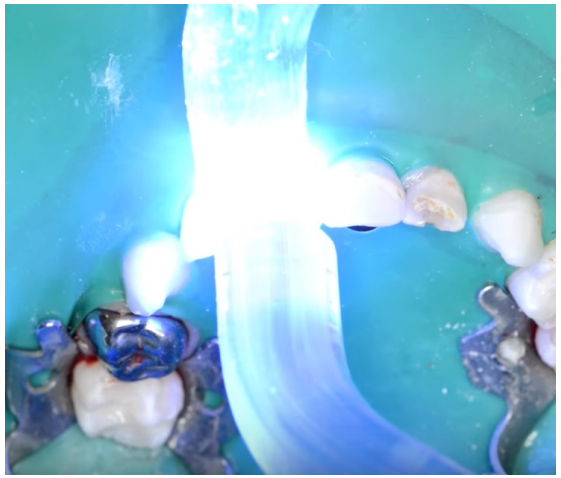
FABRICATION TECHNIQUES

Direct: Preformed



Acetate strip crowns

- Determine the tooth morphology
- Does not bond to acrylic
- Should be removed after setting



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FABRICATION TECHNIQUES

Direct: Preformed

Metal crowns

- Molar and premolar
- Easily adjustable
  - Occlusal surface
  - Contact area
- Part of the provisional restoration
- Bond to PEMA

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FABRICATION TECHNIQUES

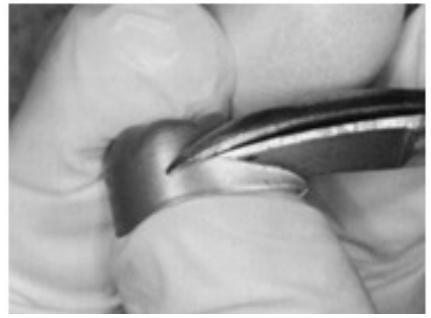
Metal crowns

Direct: Preformed

Select the correct crown
- Morphology
- Mesiodistal width

Adjust the mesiodistal width as necessary
- Plier

Adjust the height accordingly until passively fitting
- Scissor
- Stone
- Pliers



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FABRICATION TECHNIQUES

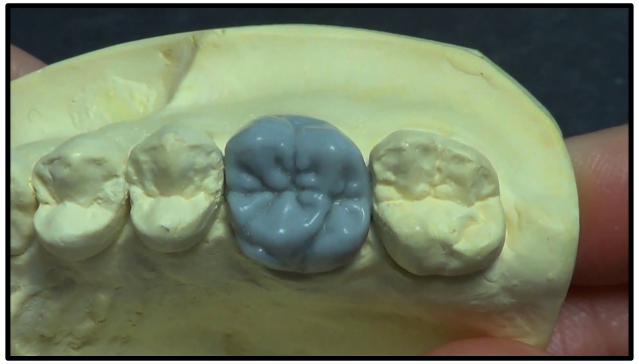
Direct: Custom

- Requires a mould
- Can be:

Silicone

Clear thermoplastic material

- Can be used with any provisional material



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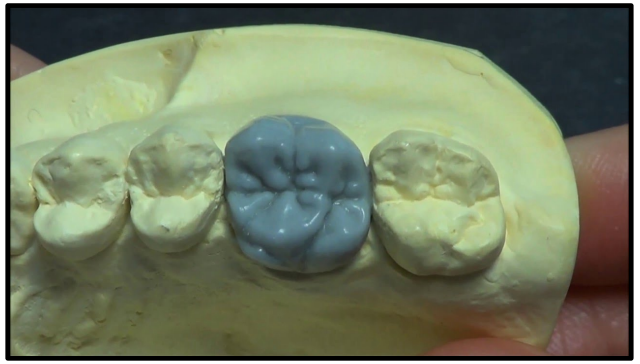
FABRICATION TECHNIQUES

Direct: Custom

- Construct the mould with one of the following techniques:
  - Intraorally (silicone)
  - Extraorally: on diagnostic cast or wax-up

(silicone, thermoplastic template)



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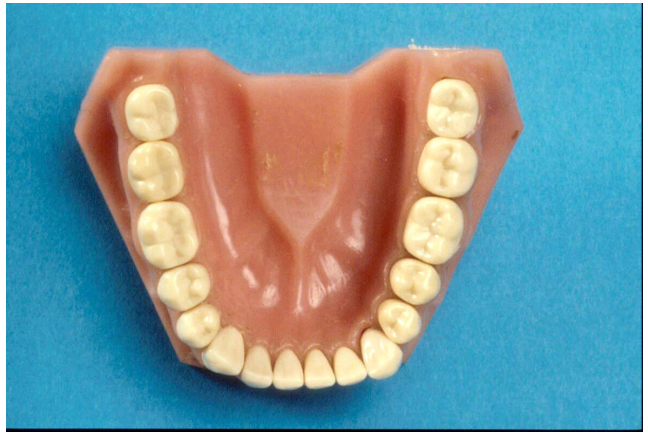
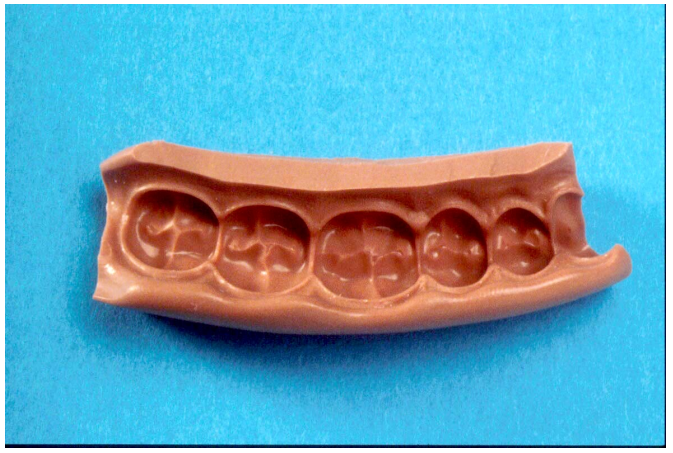
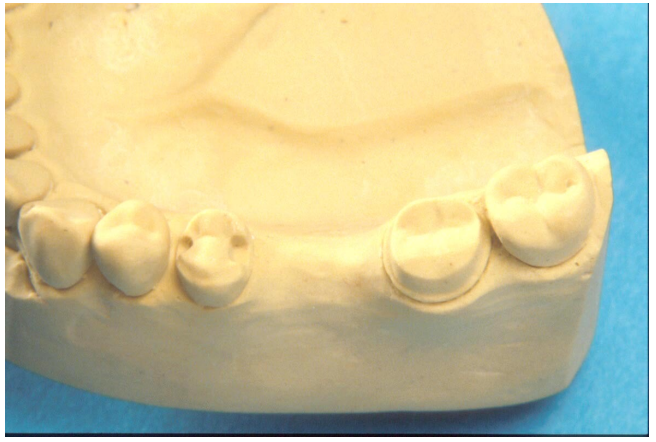
FABRICATION TECHNIQUES

Direct: Custom







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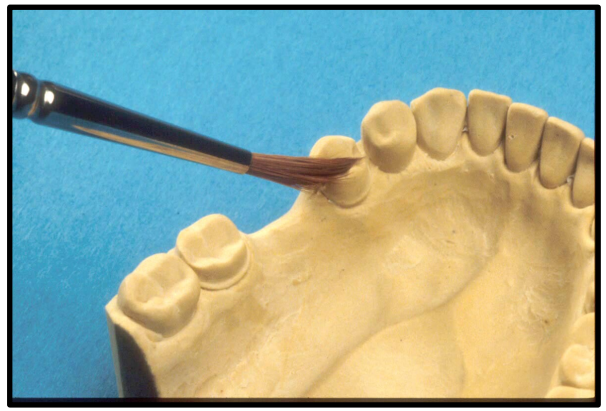
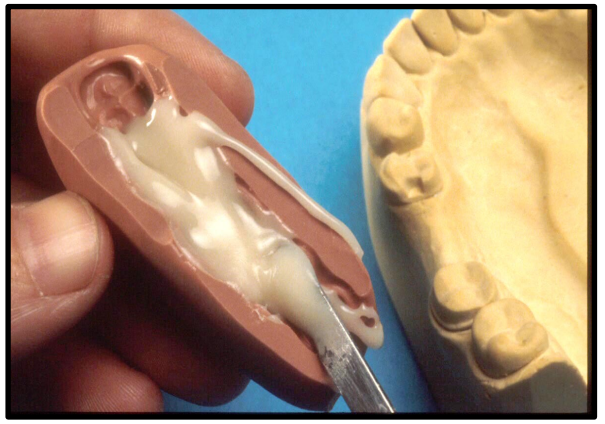
FABRICATION TECHNIQUES

Direct: Custom



Lubricate the prepared

Acrylic PEMA
Bisacryl

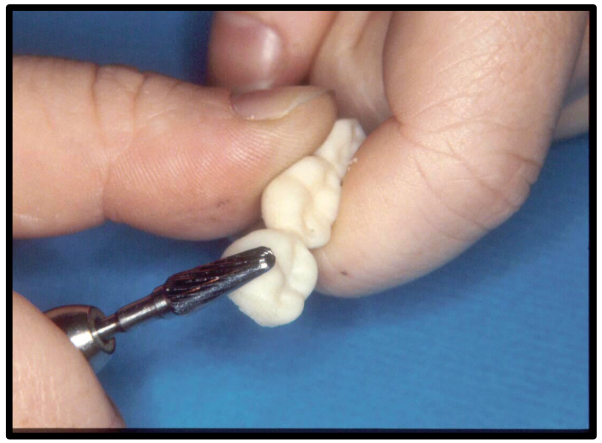


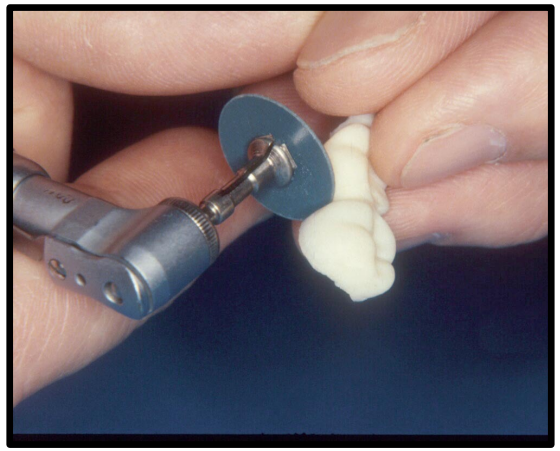
Apply the material to the mould

Seat the mould

FABRICATION TECHNIQUES

Direct: Custom





Trim the excess

Polishing

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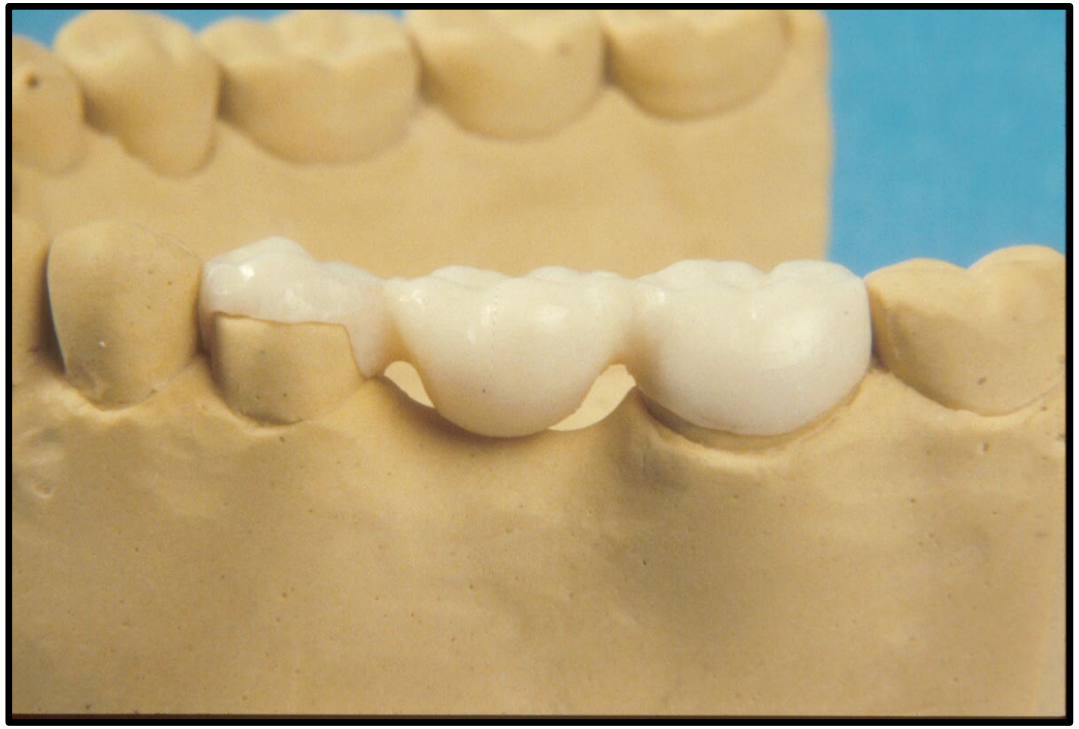
FABRICATION TECHNIQUES

Direct: Custom



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FABRICATION TECHNIQUES

Direct: Custom

Advantages

- Easy to apply
- Applied in the same visit
- Incorporates wax-up modifications
- Cheapest

Disadvantages

- Inferior mechanical properties
- Optimal fit is compromised
- More overall clinical time

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FABRICATION TECHNIQUES

Indirect

- Impression of the prepared teeth
  - Elastomeric
- Laboratory construction of the provisional restoration
  - With the aid of template
  - In pressure pot

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FABRICATION TECHNIQUES

Indirect

Advantages

- Superior mechanical properties
- Better fit
- Better finish and polish
- Less clinical time
- Incorporates wax-up modifications
- Possibility of metal reinforcement

Disadvantages

- Time consuming (additional clinical appointment)
- Additional cost
- More suitable for extensive restorations

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FABRICATION TECHNIQUES

Indirect

Metal reinforced provisional restorations

- Long term temporary restorations
- Extensive areas

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FABRICATION TECHNIQUES

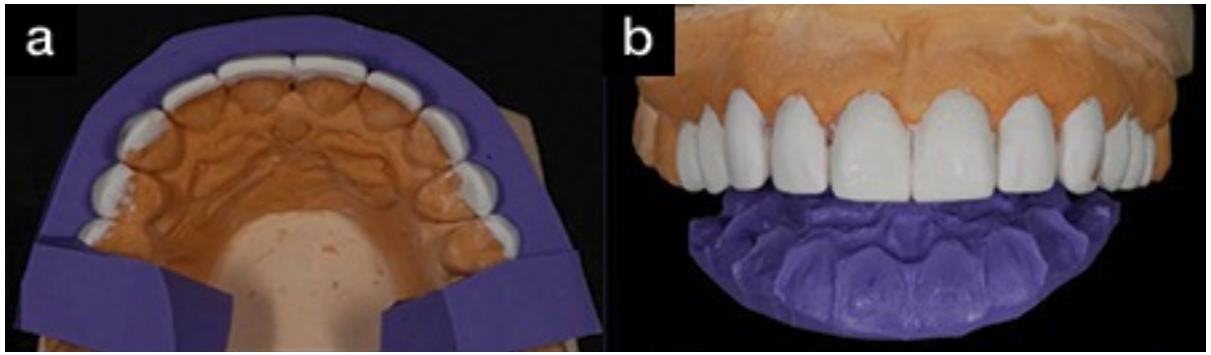
Indirect - Direct

Indirect

- Stone model is conservatively prepared in the laboratory
  - Supragingival margins
- Provisional restoration is constructed in the laboratory with the aid of template

Direct

- Provisional restoration is tried in the mouth and adjusted accordingly
- Relined with suitable material



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FABRICATION TECHNIQUES

Indirect - Direct

Advantages

- Superior mechanical properties
- Better finish and polish
- Incorporates wax-up modifications

Disadvantages

- Additional laboratory cost
- More time consuming than indirect technique
- Suitable for bridge provisional restoration

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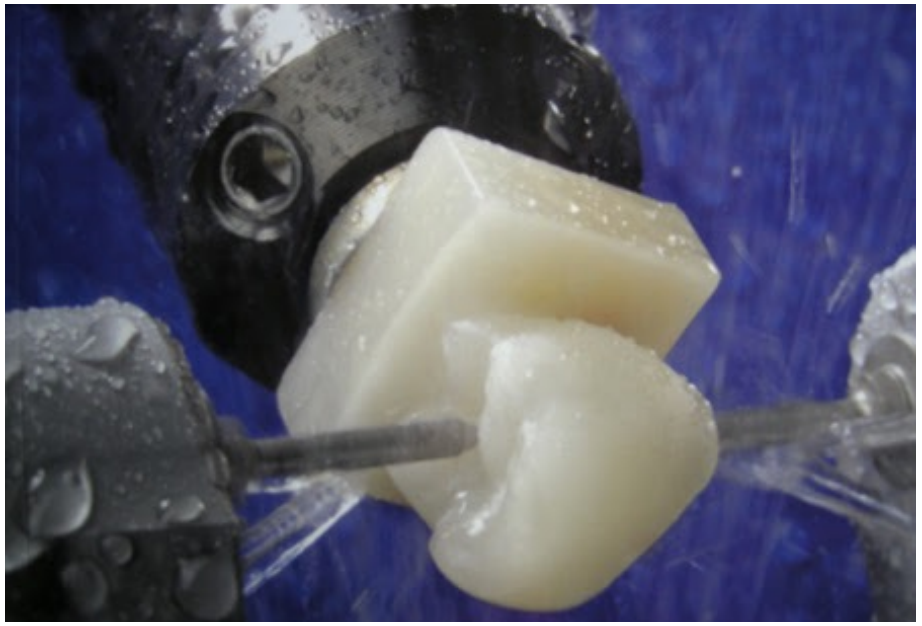
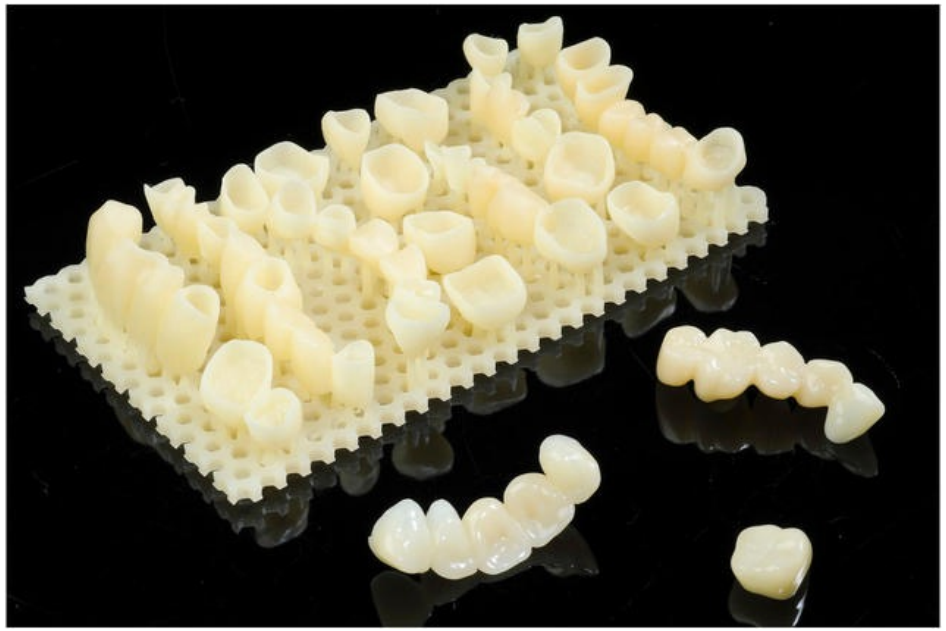
FABRICATION TECHNIQUES

Indirect - Direct

CAD-CAM



Milled temporary crown



3D printed temporary crown

Temporary Prosthesis

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TEMPORARY CEMENTS

Objectives

- Provide adequate seal
- Retain provisional restoration
- Minimal solubility
- Adequate handling and mixing
- Adequate working and setting time
- Cleansable
- Compatible
  - Pulp and gingiva
  - Tooth structure, core restoration and provisional restoration material
- Allows for restoration removal

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TEMPORARY CEMENTS

Examples

►Zinc-oxide eugenol cement (Tempbond)

►Eugenol free cement

►Polycarboxylate cement (harder cement)

►Tempbond clear (Aesthetic option)

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TEMPORARY CEMENTS

- Zinc-oxide eugenol is the most commonly used cement
- Strength can be minimised by the addition of petroleum gel
- High strength cements should be avoided since restoration removal can damage either the restoration or prepared tooth.

Indications:

- Lack of retention in tooth preparation
- Long span or long-term use of provisional restoration
- Parafunctional activities

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TEMPORARY CEMENTS

- Free eugenol acts as a plasticiser of methacrylate resin
- Possible effects on:
  - Resin provisional restoration, composite core
  - Bond strength of resin cements
- Some studies have shown that eugenol-containing temporary cements can reduce bond strength of resin cements, but there are other in vitro studies showing no difference

Al Wazzan et al 2005; Chiluke et al 2017

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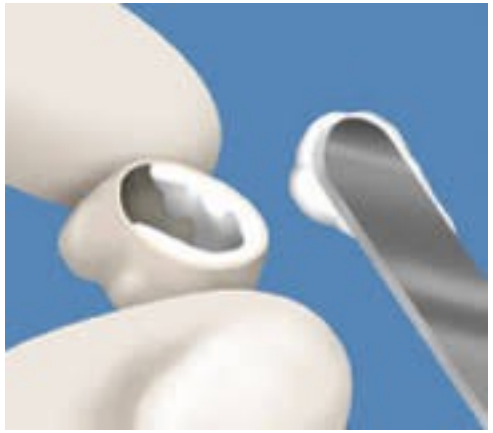
TEMPORARY CEMENTS

1) Mix the base and activator
2) Apply a small quantity just short to the margin
3) Seat the crown and hold tightly (or ask patient to bite over a cotton roll)
4) Remove the excess with an explorer and dental floss
5) Make sure no cement is left in the gingival sulcus
6) Occlusion should be checked and adjusted after cementation




Thank you