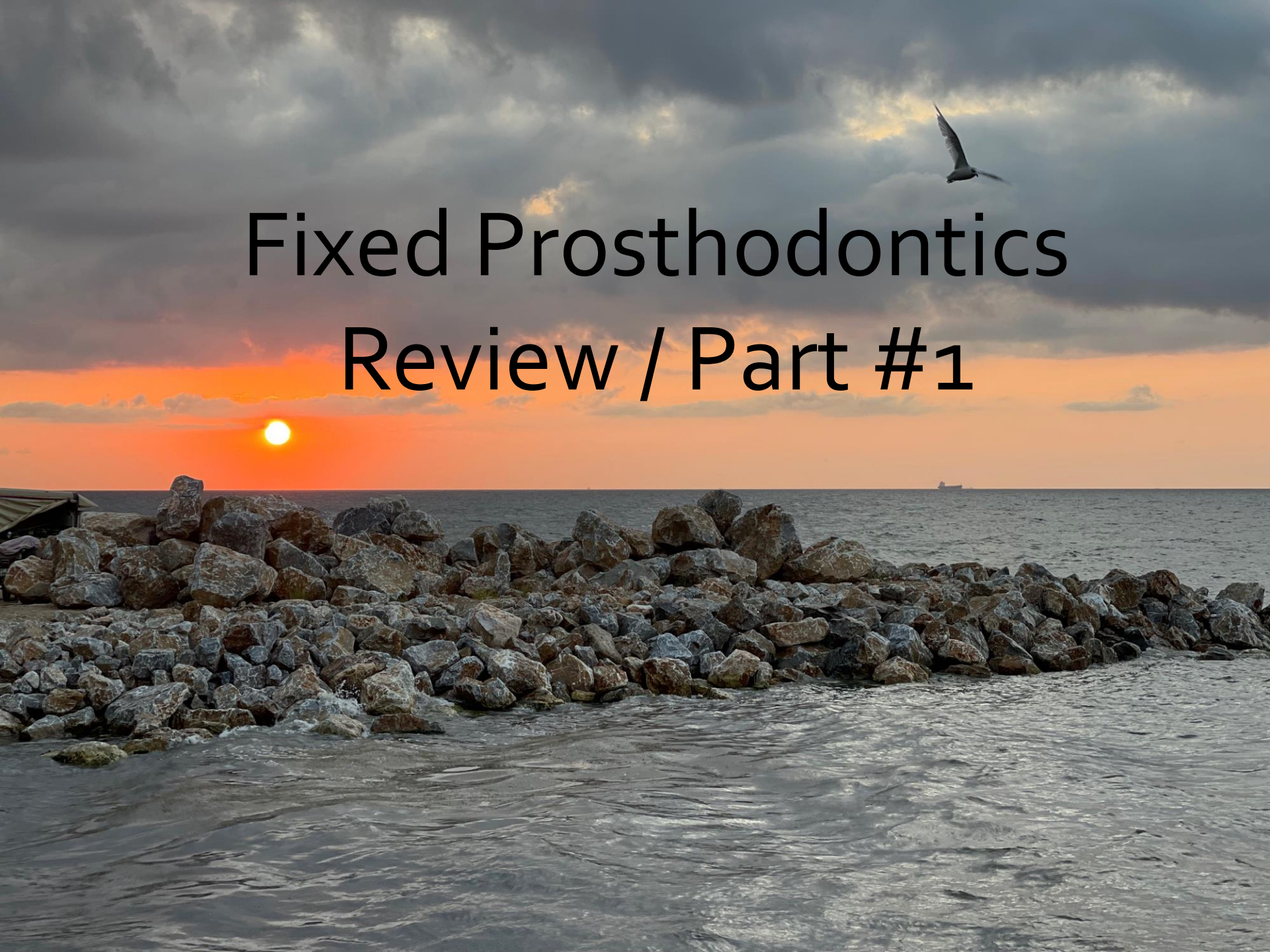
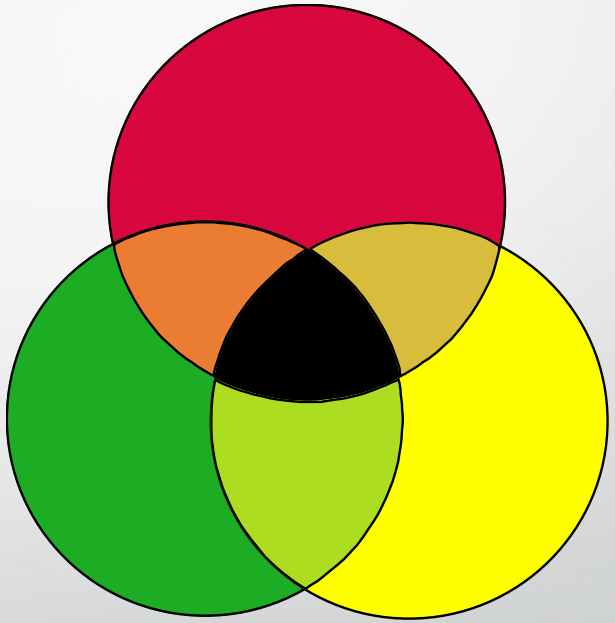


Fixed Prosthodontics Review / Part #1

Principles of tooth preparation

- Biologic
  - Oral tissue health
- Mechanical
  - Integrity and durability of restoration
- Esthetic
  - Appearance of the patient



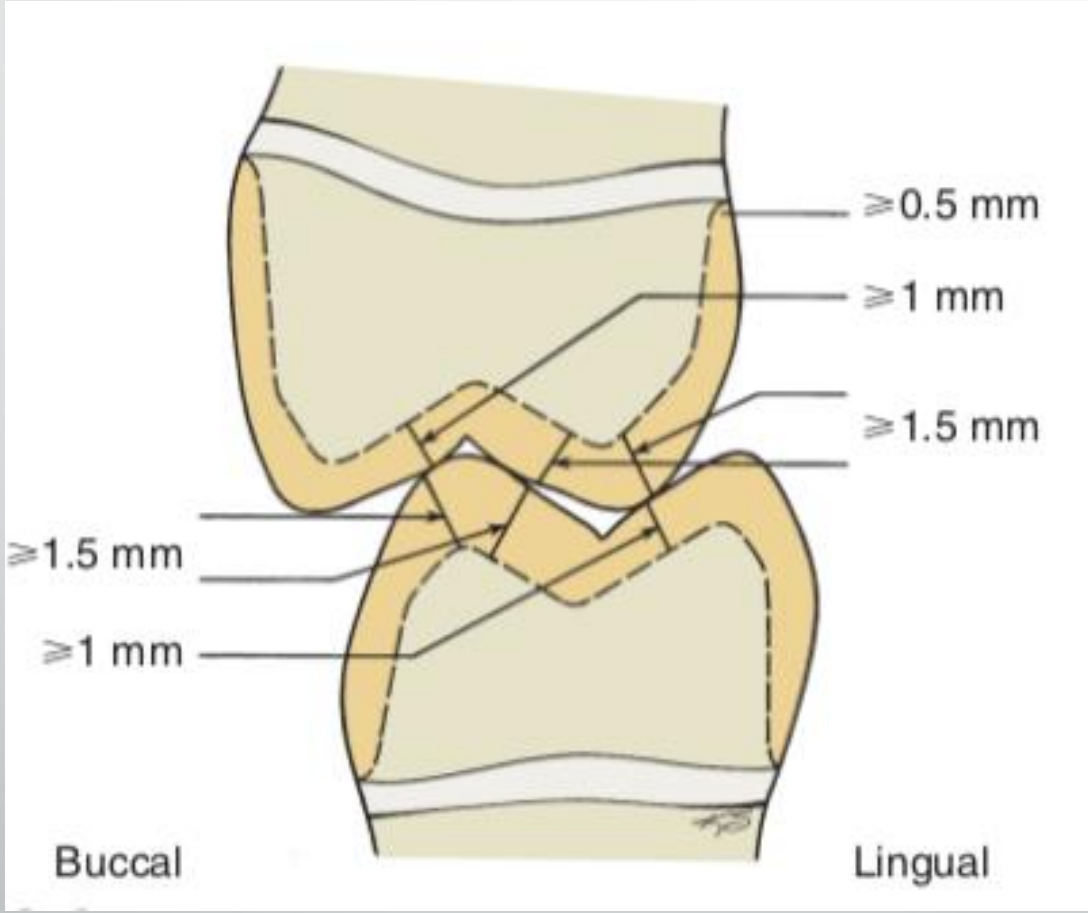
 A balance of:

- unnecessary destruction of tooth structure
- preservation of the remaining tooth structure

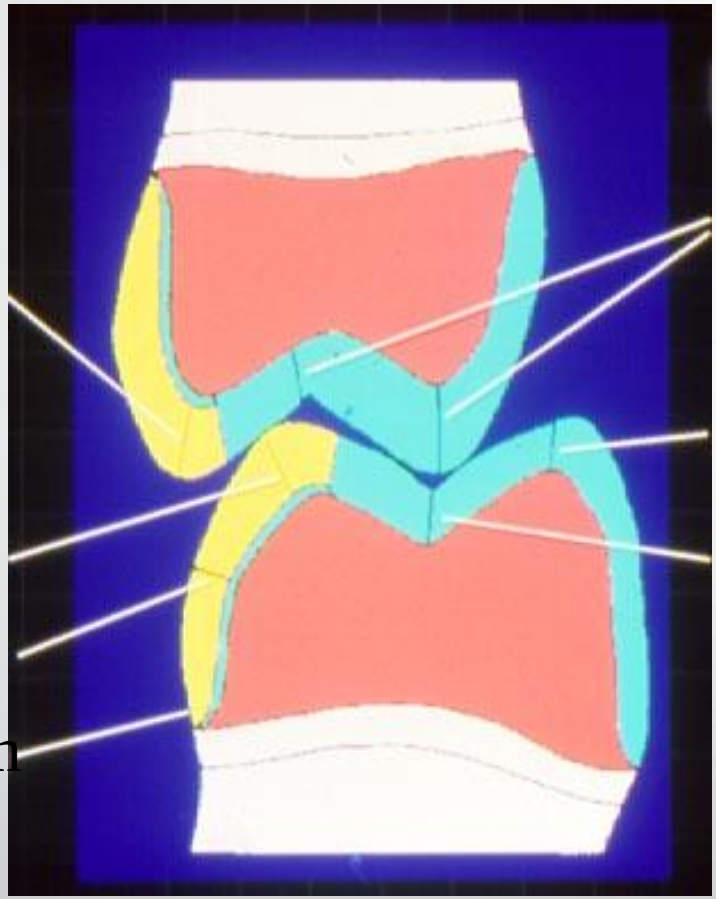
 versus

- mechanical restoration
- esthetic requirements

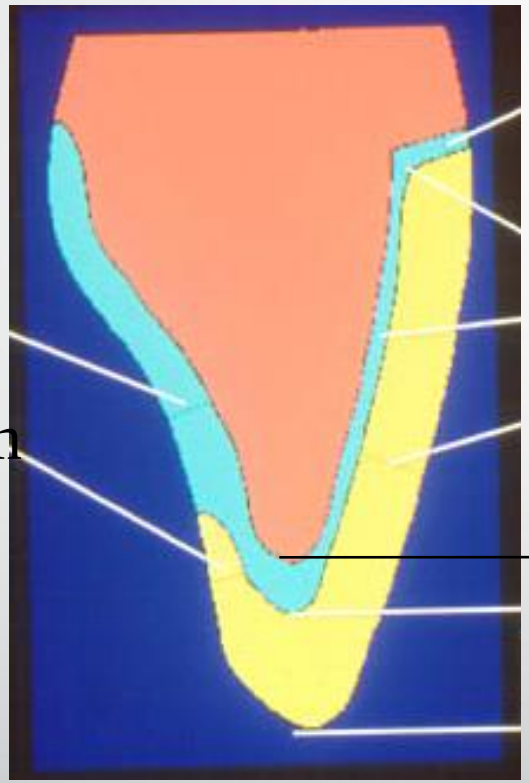
Full Cast Crown Restoration



Ceramo-metal Restoration



Anterior Ceramo-metal Restoration



Determine metal vs. porcelain contact

1.0 mm

1.3-1.5 mm

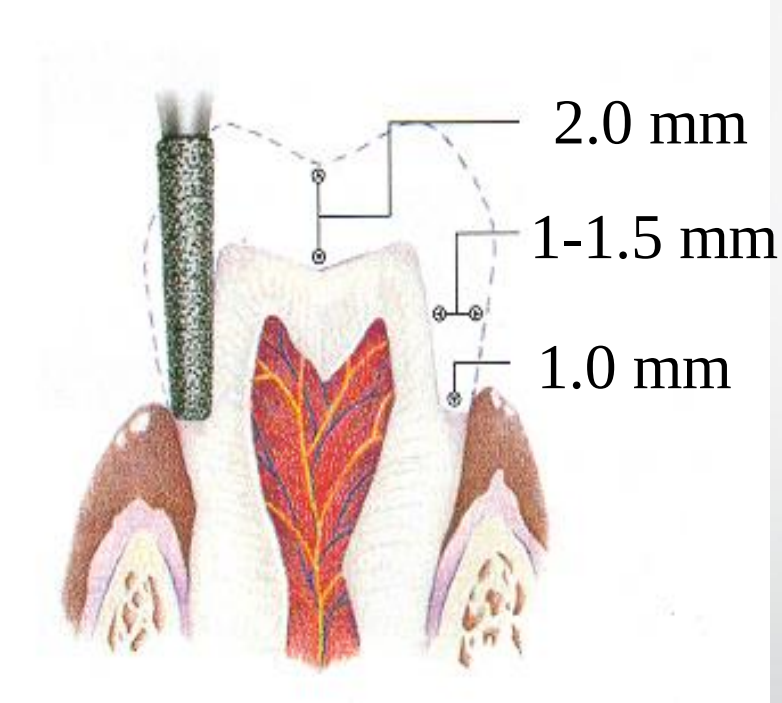
Chamfer form, 1.0 mm

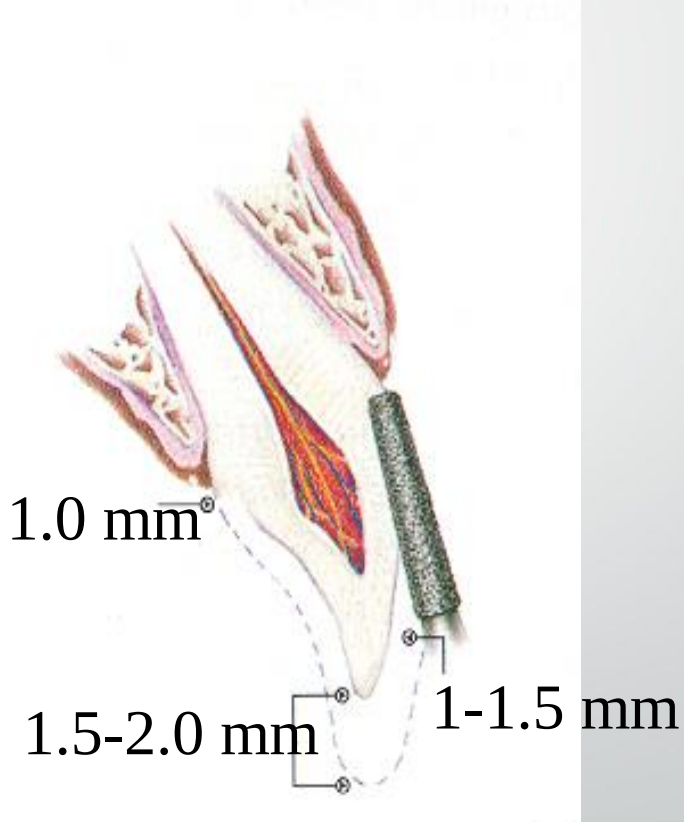
1.5 mm for metal and porcelain

Overall 2.0 mm incisal clearance

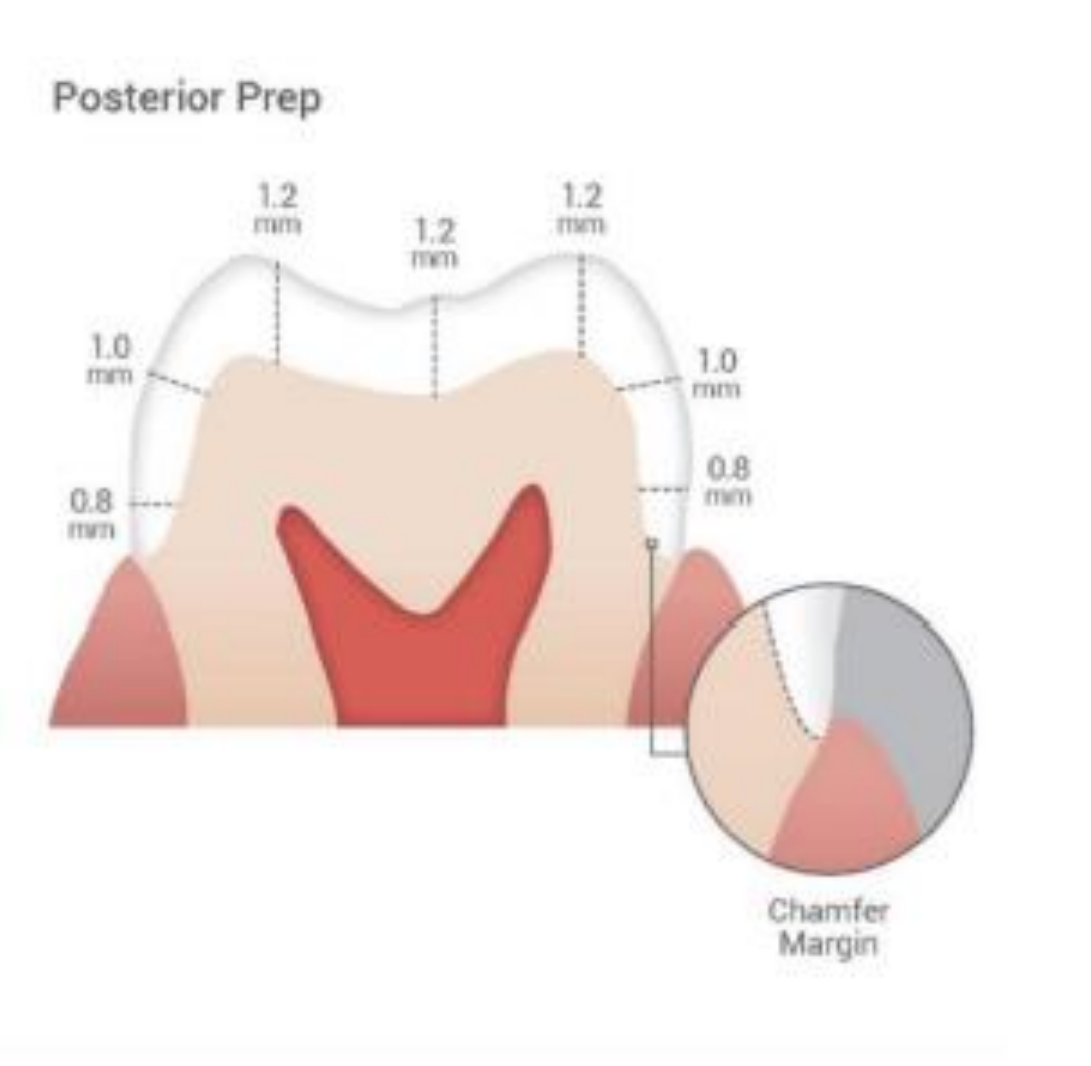
1.5 mm for porcelain

All Ceramic Restorations

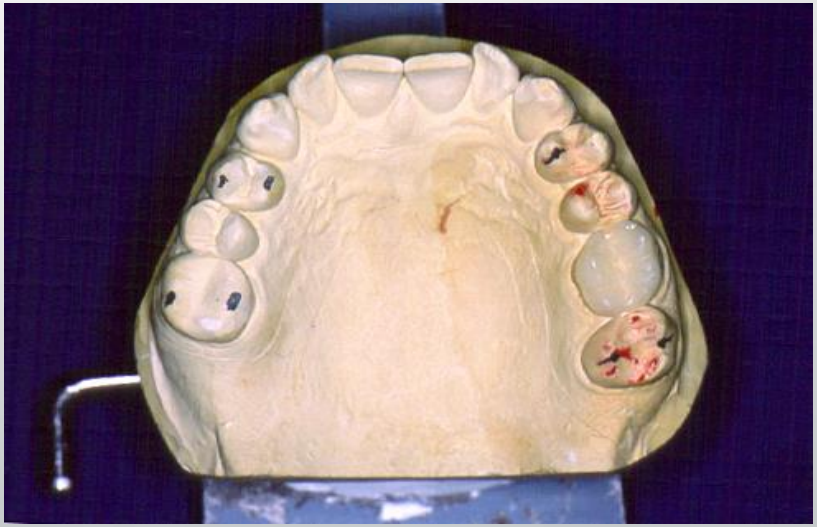




Monolithic zirconia



- Diagnostic information:
  1. Diagnostic impressions and diagnostic mounting
  2. Diagnostic wax-up
  3. Diagnostic prep



Preparation Sequence

1. Occlusal/Incisal reduction
   - functional bevel
2. Axial reduction
   - buccal-lingual, mesial-distal
   - second plane reduction
   - smooth transition areas
3. Finish line design and placement
4. Secondary retention
   - evaluate and do only if necessary

Occlusal Clearance

- Evaluate the existing occlusal clearance prior to starting the preparation.
- Dependent upon the restorative material used.
- Re-evaluate prior to final impression.

occlusal reduction

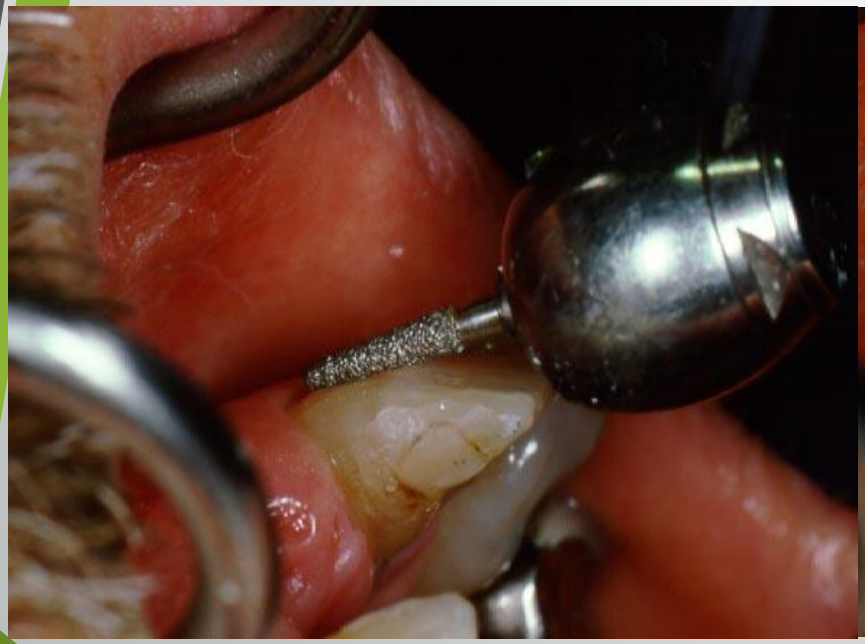
1. Initial occlusal table reduction using depth grooves
2. Functional bevel placement
3. Occlusal clearance evaluation

Anterior Tooth Preparation
Incisal reduction

Axial reduction

1. Buccal and lingual walls prepared
2. Establishment of R & R form
3. Path of draw
4. Proximal walls

2-plane facial reduction

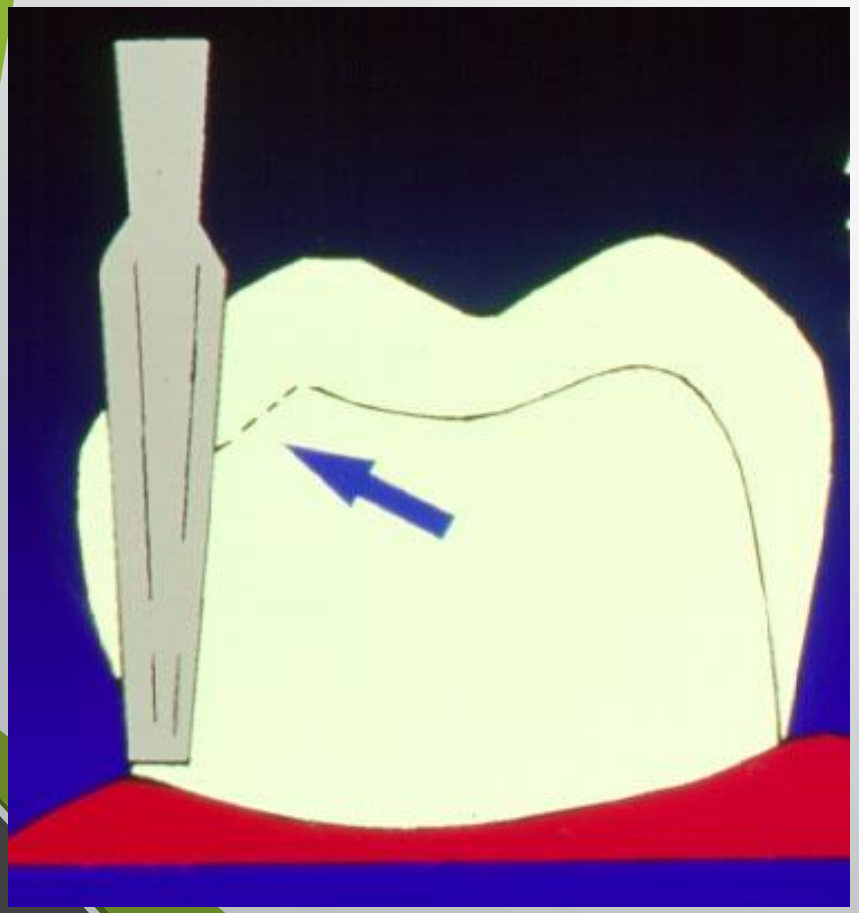


Anterior Tooth Preparation
Facial finish line

Anterior Tooth Preparation

Metal versus porcelain
Occlusal contact location

Surveyed crowns
Removable partial denture abutment



The RPD is designed before the preparation is started.

Prepare abutment for crown.

Modify preparation to accommodate RPD.

Crown margins and cervical abrasion, what to do?

Crown margins and cervical abrasion, what to do?

Evaluation of R&R

- When retention and resistance form is insufficient, decide and implement the most appropriate way to improve it.

Minimum height
Based on tooth width

- Premolars
  - with 10-20° convergence
  - minimum 3 mm occlusocervical height
- Molars
  - with 10-20° convergence
  - minimum 4 mm occlusocervical height

The Effect of Convergence Angle on Retention and Resistance Form

Dodge WW, et al; *Quin Inter* 1985;16:191-194

- Evaluated the effect of varying the convergence angle on the retention and resistance in complete veneer crown preparations
- Stainless steel dies prepared at 10, 16 and 22° taper
  - 10 mm diameter
  - 3.5 mm occlusal gingival height
- Castings were cemented with zinc phosphate
- 50 KN load cell tensile force until failure

The Effect of Convergence Angle on Retention and Resistance Form

Dodge WW, et al; *Quin Inter* 1985;16:191-194

- Conclusions:
  - Resistance form is more sensitive to changes in convergence angle
  - 16 degrees of occlusal convergence provides adequate resistance and retention form

Relationship between Taper and Resistance of Cemented Crowns to Dynamic Loading

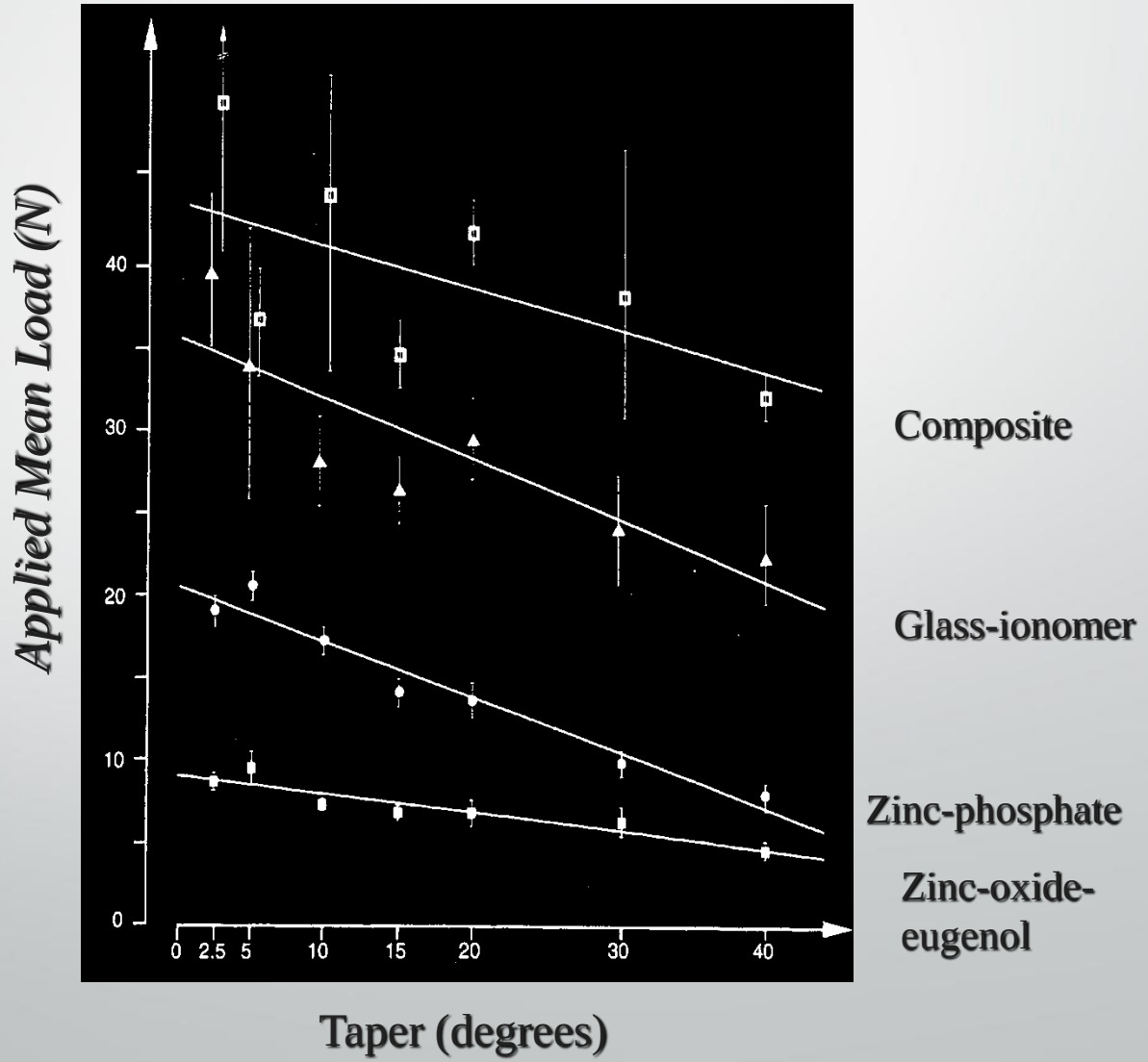
- This study looked at the relationship of convergence (2.5, 5, 10, 15, 20, 30, and 40 degree taper) and resistance form of cemented crowns with dynamic loading.
- Cements included: resin composite, glass-ionomer, zinc phosphate, and zinc oxide eugenol.
- The specimens were subjected to repeated tension-compression stress cycles.

Wiskott HW, et al; *Int J Prosthodont* 9:117-130

Relationship between Taper and Resistance of Cemented Crowns to Dynamic Loading

- Conclusions:
  - The abutment taper and resistance to dynamic loading is approximately linear.
  - The most resistant cement was resin composite cement, followed by glass ionomer, zinc phosphate, and zinc oxide eugenol.

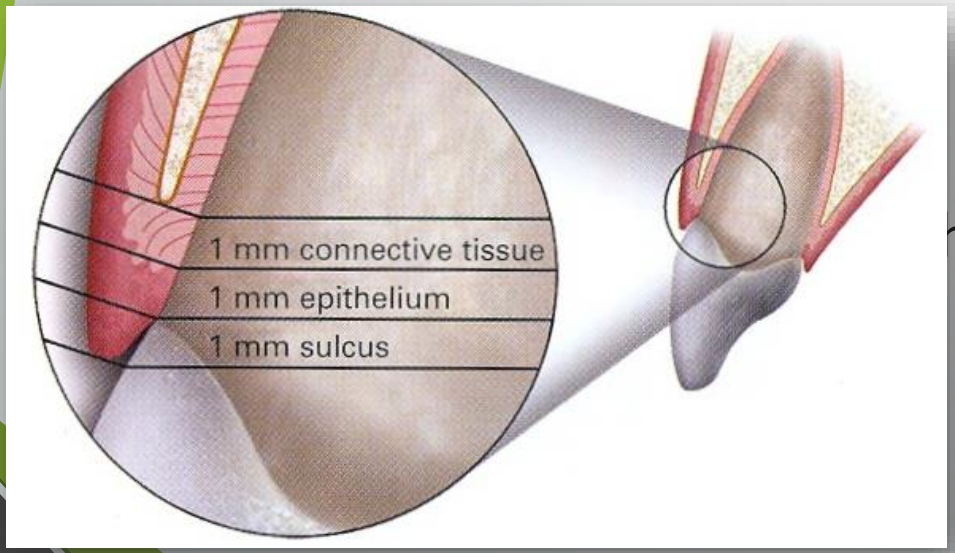
Wiskott HW, et al; *Int J Prosthodont* 9:117-130

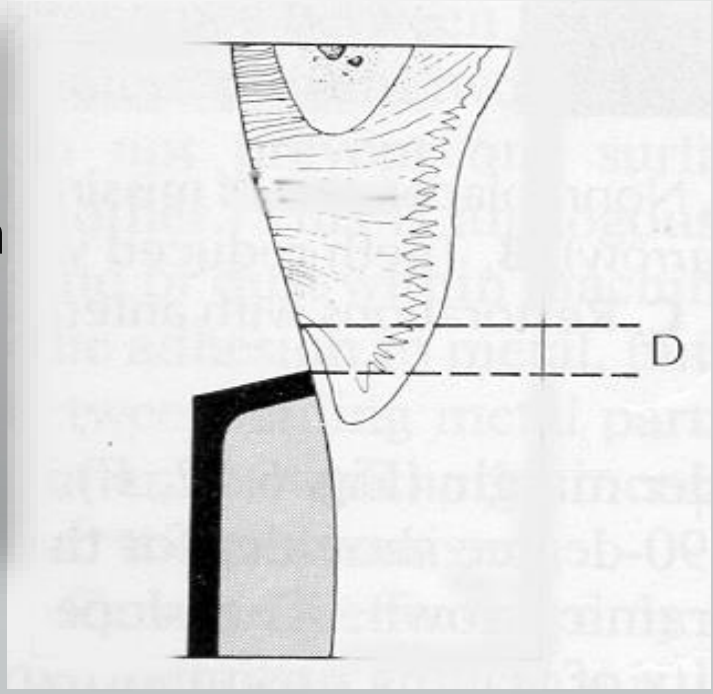


Options for Increasing Retention & Resistance

1. Increase tooth height with restorative material
2. Increase tooth height by dropping finish line subgingival

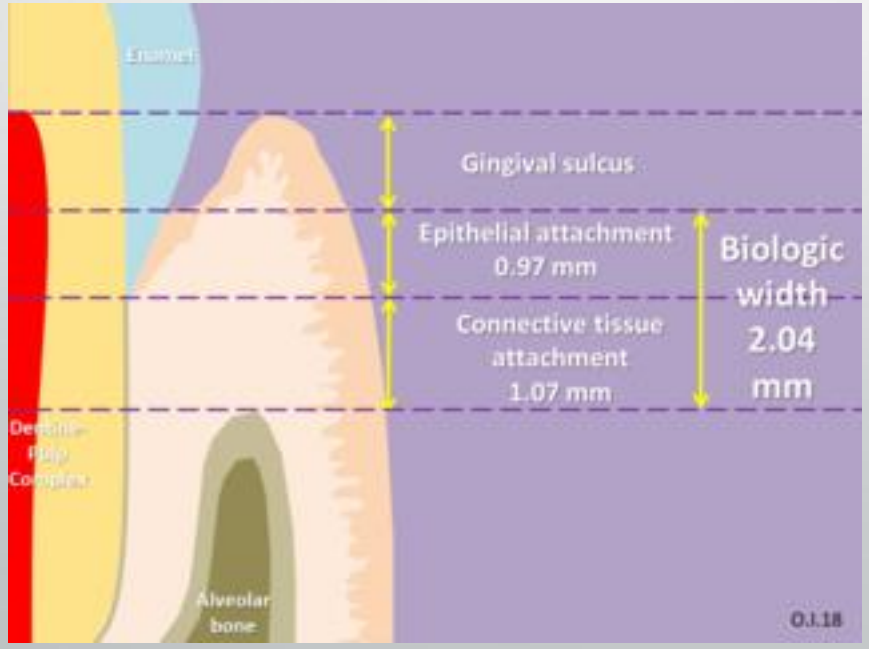
Limitation of subgingival finish line

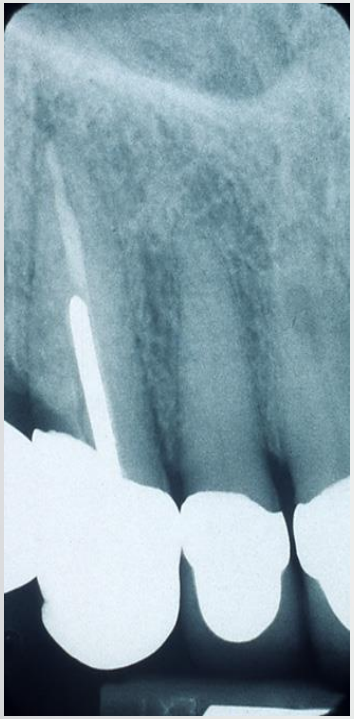


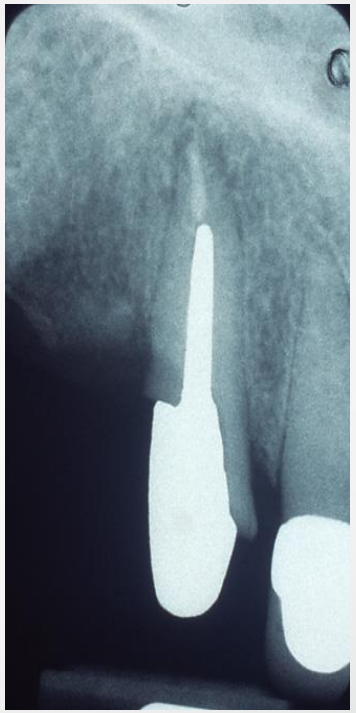


Biologic width

- Restorative margin must respect biologic width
- CT attachment + Junctional Epithelium ~ 2.04 mm
- Variation tooth to tooth / surface to surface







3. Increase tooth height with crown lengthening

4. Secondary Retention

- Proximal grooves or boxes placed in healthy tooth structure.
- Used to enhance the overall retention and resistance of the preparation.

Definition

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

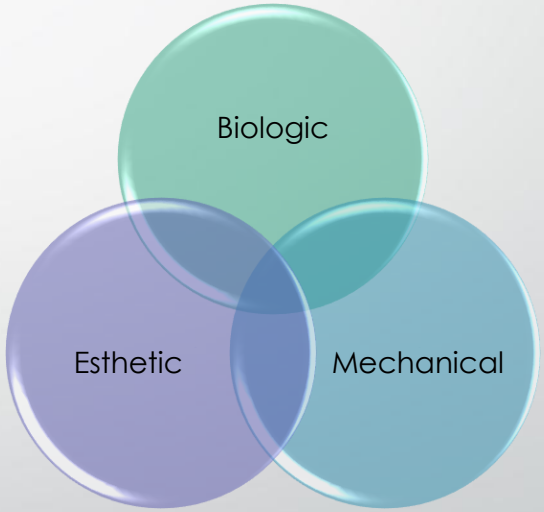
interim prosthesis \ĭn'ter-ĭ prŏs-the'sĭs\: a fixed or removable dental prosthesis, or maxillofacial prosthesis, designed to enhance esthetics, stabilization, and/or function for a limited period of time, after which it is to be replaced by a definitive dental or maxillofacial prosthesis; often such prostheses are used to assist in determination of the therapeutic effectiveness of a specific treatment plan or the form and function of the planned for definitive prosthesis; syn, PROVISIONAL PROSTHESIS, PROVISIONAL RESTORATION

Glossary of Prosthodontic Terms, 9th Edition 2017

Requirements

Same as for definitive restorations, except for longevity and sophistication of color

- Protect the prepared teeth
- Maintain periodontal health
- Maintain occlusal stability and tooth position
- Restore function
- Restore esthetics

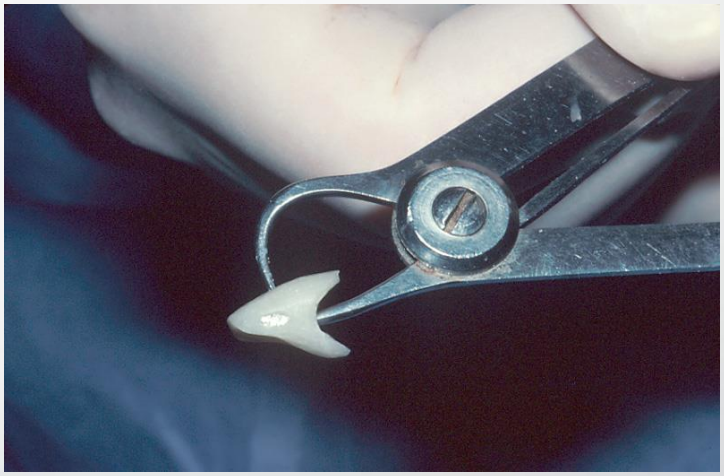


Interim Restorations

Require

- Planning
- An understanding of the requirements and objectives of the procedure
- Appropriate time management

Interim restoration as a diagnostic tool



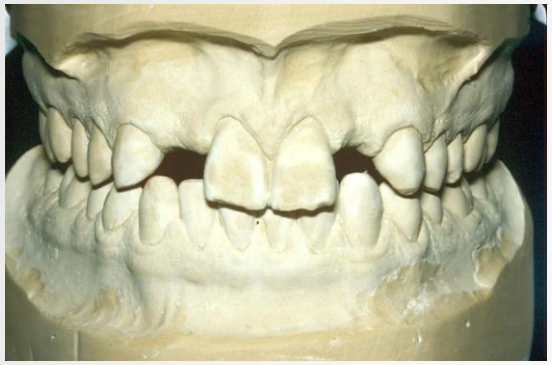
Measure the thickness of interim to confirm adequate reduction

Interim restoration as a diagnostic tool

To determine if the planned restoration will satisfy the functional, esthetic and phonetic requirements of the patient

Scenario 1

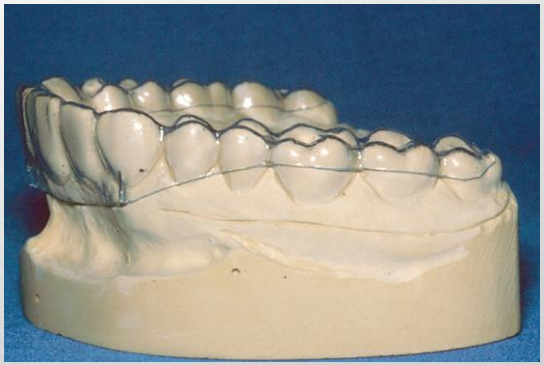
Interim restoration as a diagnostic tool



Mounted diagnostic casts

Diagnostic wax-up duplicated in stone

Diagnostic wax-up of proposed restorations



Vacuum formed matrix on duplicated cast

Abutment teeth prepared

Tooth reduction verified

Fabrication of Interim restoration

Right and Left working side of Interim FDPs

Interim restoration as a diagnostic tool

Before

After

Scenario 2

Interim restoration as a diagnostic tool

Existing veneers removed; #5-12 prepared for PFM crowns

Interim restorations

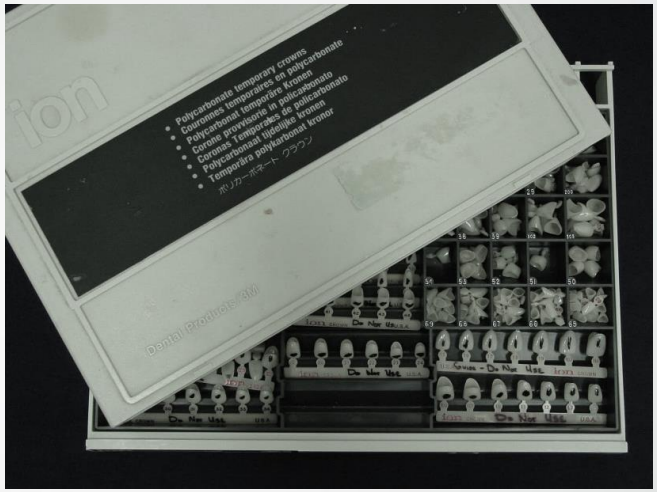
Before

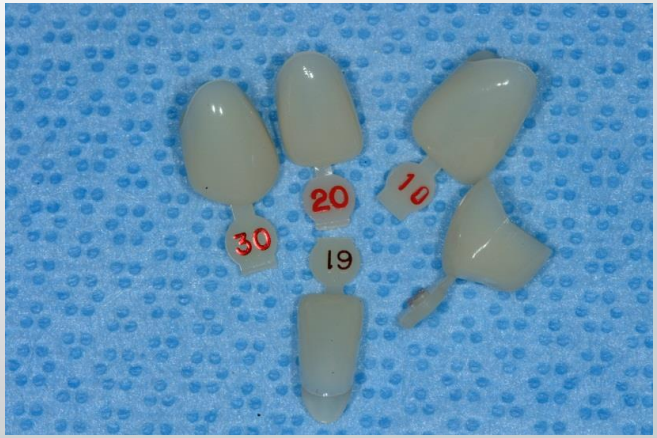
After


Interim restoration
Prefabricated crown forms
Custom molded crown or FDPs form

Prefabricated crown forms

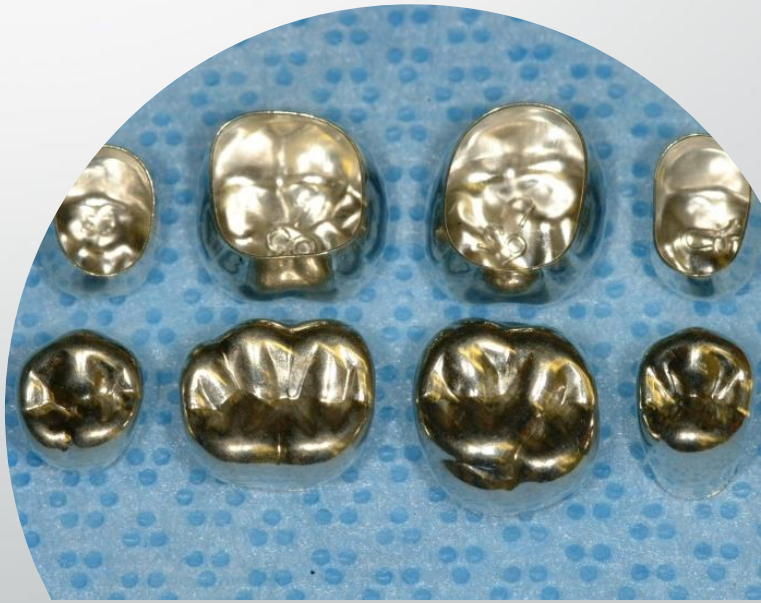
- Polycarbonate
- Cellulose-acetate
- Aluminum (shell or anatomic)
- Tin-silver (anatomic)
- Nickel-chromium
- Stainless steel





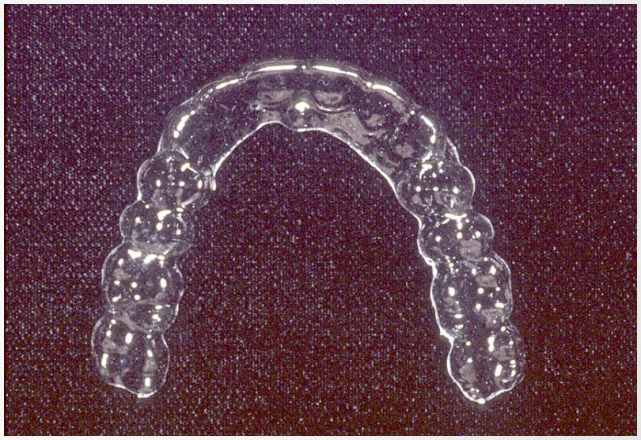
Prefabricated crown forms

- Polycarbonate
- Cellulose-acetate
- Aluminum (shell or anatomic)
- Tin-silver (anatomic)
- Nickel-chromium
- Stainless steel



Custom molded crown or bridge forms

- Vacuum formed molds
- Silicone molds
- Alginate molds



Interim restoration

Prefabricated crown forms

- First-visit emergency when crown is missing
- Limited to single units
- Must be lined with autopolymerizing resin
- Considerable amount of modification (internal relief, axial recontouring, occlusal adjustment) may be required ☹

Custom molded crown or FDPs form

- Accurate reseating of external surface from is easier
- Less time consuming
- May be used for multiple units

Currently Available Materials

Acrylics

- Polymethyl Methacrylates
- Poly-R' Methacrylates
  - (R' = ethyl, vinyl, isobutyl)

Bis-Acryl Composites

- Chemically-Activated
- Visible Light-Activated
- Dual-Activated

Acrylics

Advantages	Disadvantages
Low cost	Significant amount of heat given off by exothermic reaction ☹
Poor to good wear resistance	High degree of shrinkage (about 8%) ☹
Good esthetics	Strong, objectionable odor
High polishability	Must be mixed
Poor to good color stability	Radiolucent
Easy to repair	
Short working time	

Bis-Acryl Composites

Advantages	Disadvantages
Less shrinkage than acrylics Minimal heat generated during setting Relatively high strength Minimal odor Excellent esthetics Most products use automix delivery Can be repaired or characterized using resin composite Easy to trim Good color stability Radiopaque	Greater cost than acrylics Some do not have a rubbery stage (snap set) Viscosity cannot be altered Sticky surface layer present after polymerization May be more brittle than acrylics ☹ Can be harder to repair in some areas

Techniques of Fabrication of Interim Fixed Restoration

- Direct
- Indirect
- Indirect-Direct
- Digital

Direct technique

- Reduce laboratory time
- Accuracy of marginal fit

- Potential for pulpal and/or gingival irritation
- Risk of allergic reaction or sensitization
- Patient discomfort

Polymethyl methacrylate allergy

Allergic reactions on pontic area and upper lip from interim FDPs #7-10

Indirect technique

- Predictable results
- Least risk to patient's health

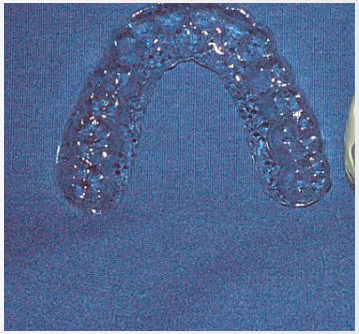
Indirect-Direct technique

Patient is missing #8 and #9. Tx plan for 4-unit FDPs #7-10

Indirect component

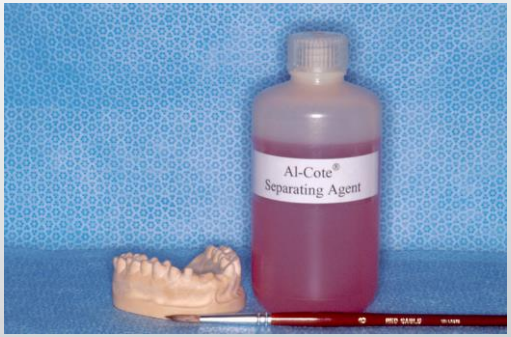
Diagnostic wax-up of the proposed restoration

Duplicated cast of diagnostic wax-up



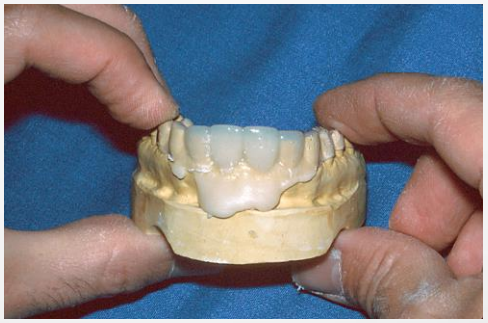
Vacuum formed matrix made from duplicated cas

Abutments on original diagnostic casts are prepared conservatively



Apply Al-Cote/Vaseline on teeth and gingiva of cast

Fill matrix with resin



Seat matrix over prepared teeth when resin loses its gloss

Secure matrix with rubber band

Place assembly in pressure pot at 20 psi

Separate matrix from cast and release cured resin from matrix

Trim gross excess with scissors

Completed shell Interim on cast ***(end product of indirect component)***. Note thin shell at #7 and 10, which will be filled by a direct lining procedure

Direct component

Prepare abutment teeth in usual manner

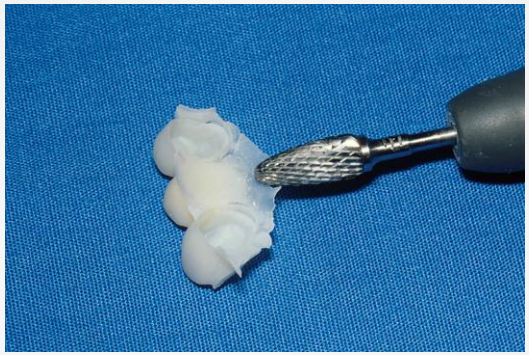
Verify adequate tooth reduction with vacuum formed matrix

Try-in the shell Interim on the prepared teeth

Fill shell with resin, and after it loses its surface sheen, seat the restoration

Finishing the Interim Restoration

Carbide bur, sandpaper disk, mandrels, and polishers



Remove gross resin excess with carbide burs (margins must be avoided)

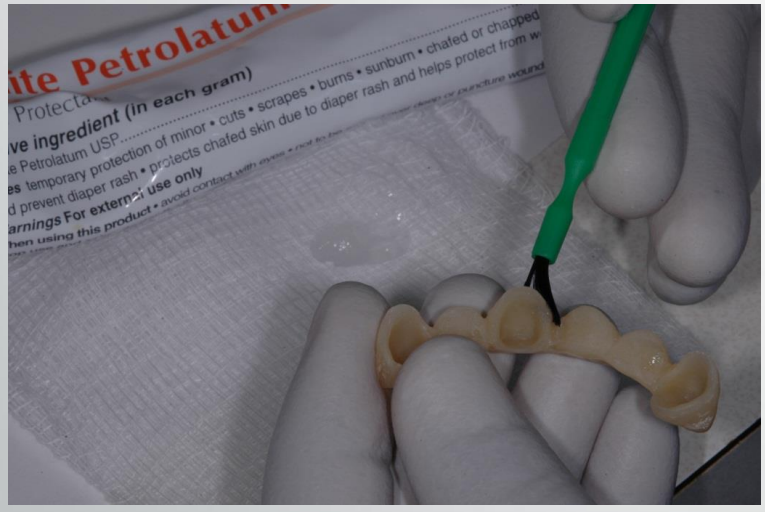
Adjust axial contours and fine trim margins with sandpaper disk

Smooth surface of restoration with polishers

Finish restoration with wet pumice and dry polishing with polishing compound

Completed Interim restoration

Cementing the interim restoration



Place petroleum jelly on the external surface

Isolate with cotton rolls, dry prepared teeth

Cementing the interim restoration

Line the internal surface of the interim using the tip of the syringe

Firmly seat Interim and allow the cement to set

Remove excess cement with explorer after material has set

Floss through contacts with knotted floss; Give OHI

Relining the interim restoration

- When the interim initially doesn't fit

- When the tooth preparation has been refined or changed

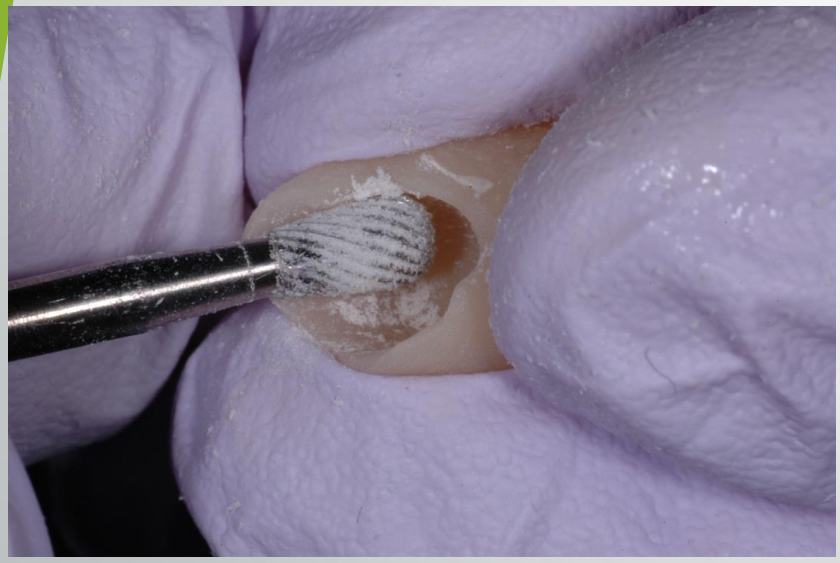
Scenario 5

Relining the Interim Restoration

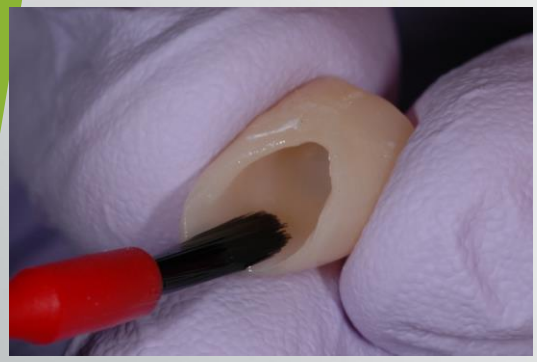
Relining the interim restoration

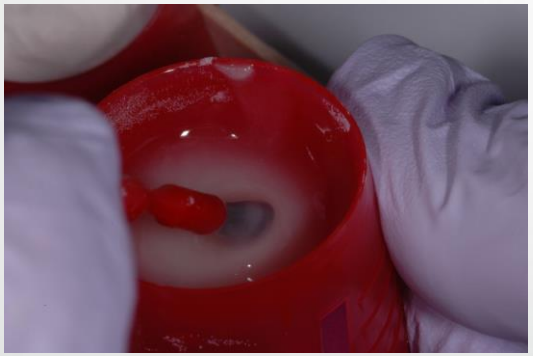
Relining the interim restoration

Relining the interim restoration

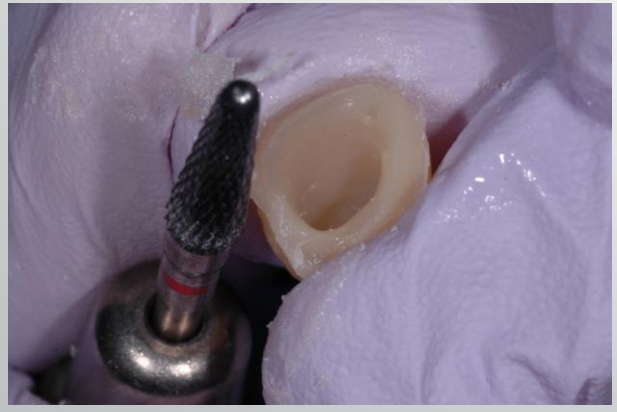


Relining the interim restoration





Relining the interim restoration



Relining the interim restoration

Scenario 6

Interim restoration for Endodontically Treated Teeth

Interim Restorations for Endodontically Treated Teeth

Preoperative view of tooth #8

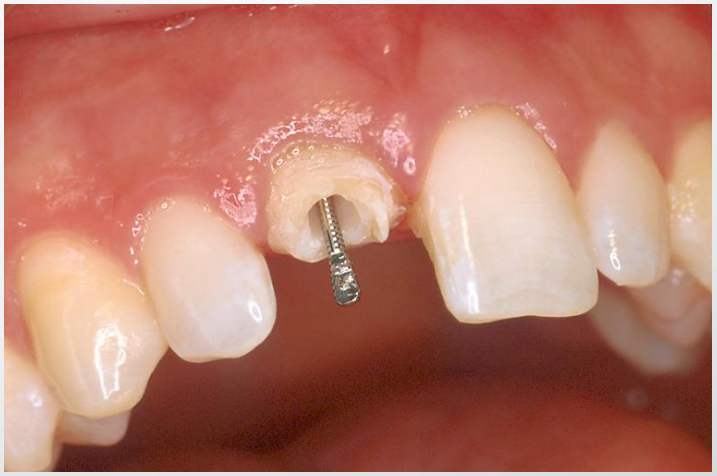
Interim Restorations for Endodontically Treated Teeth

Polycarbonate crown selected with the appropriate M-D width

Cervical portion of crown adjusted to desired length and gingival curvature

Interim Restorations for Endodontically Treated Teeth

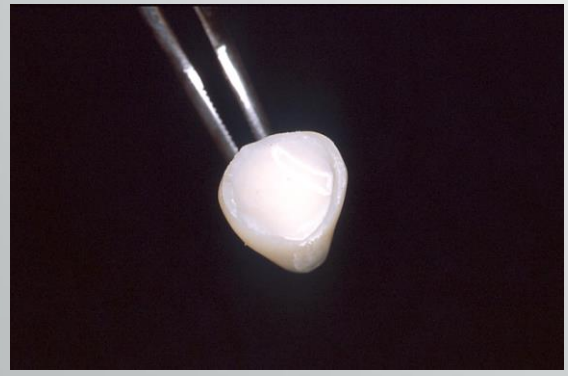
Crown length adjusted to match adjacent tooth #9. Note curvature of cervical portion.



Prefabricated post placed in canal
Bead brush acrylic around the **coronal portion**

Interim Restorations for Endodontically Treated Teeth

Excess resin immediately removed before material sets



Polycarbonate crown filled with resin

When resin loses its shine, seat Interim over tooth

Interim Restorations for Endodontically Treated Teeth

Relined Interim showing margins

Completed Interim restoration

Scenario 7

Digital Interim Fixed Restoration

Digital Interim Fixed Restorations

- Digital workflow

Digital Interim Fixed Restorations

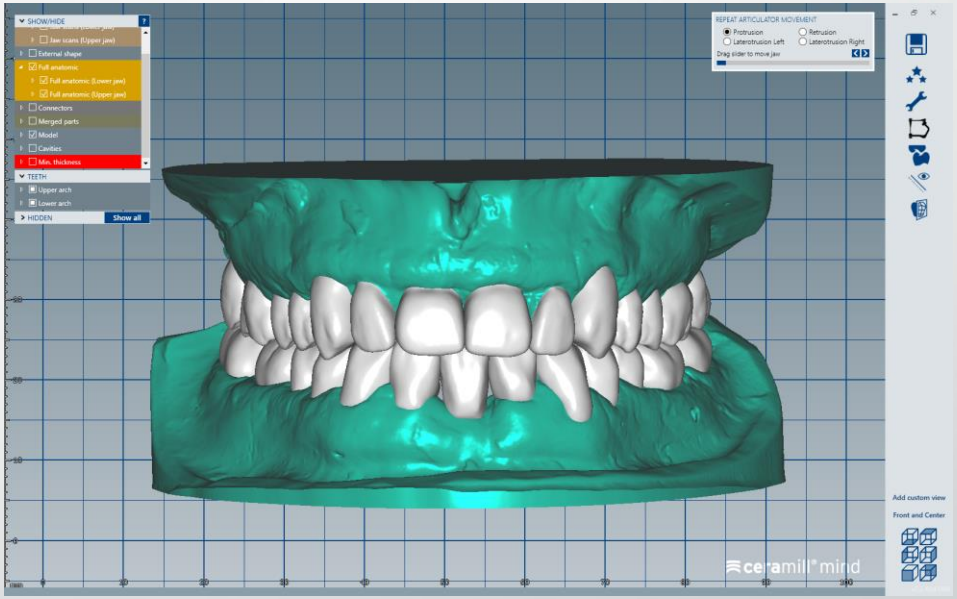
- Reduce the patient's exposure to chemicals
- Multiple units
- One color or layered colors
- Sufficient in mechanical properties, wear resistance, color stability, bonding ability
- Long-term interim restorations
- Data files can be used to mill the definitive restoration

Digital Interim Fixed Restorations

- Indications

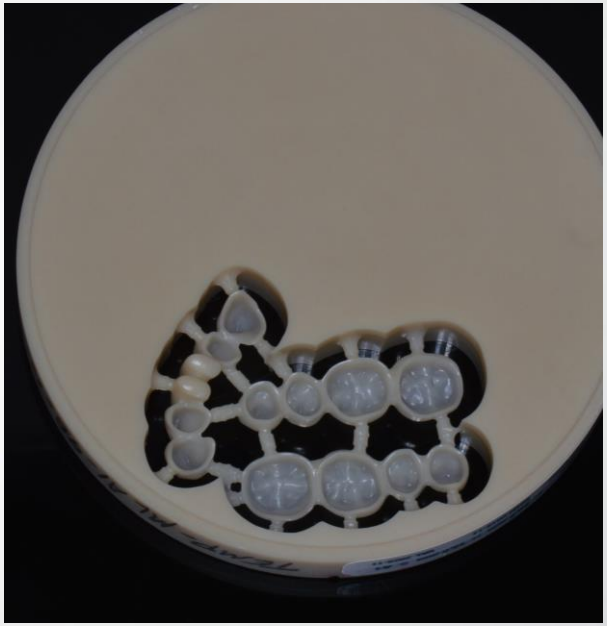
- ☑ Multiple units
- ☑ Full mouth rehabilitation
- ☑ Long-term interim fixed restorations

Preoperative



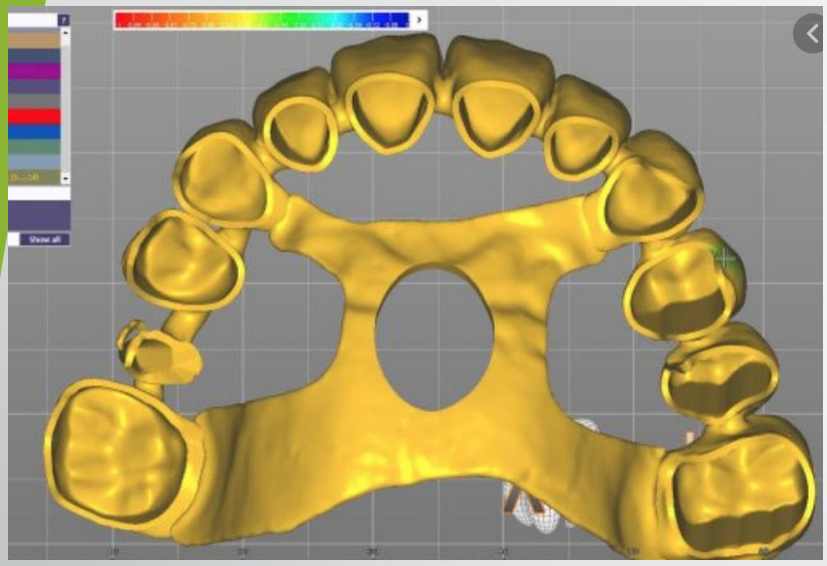
Digital diagnostic waxing

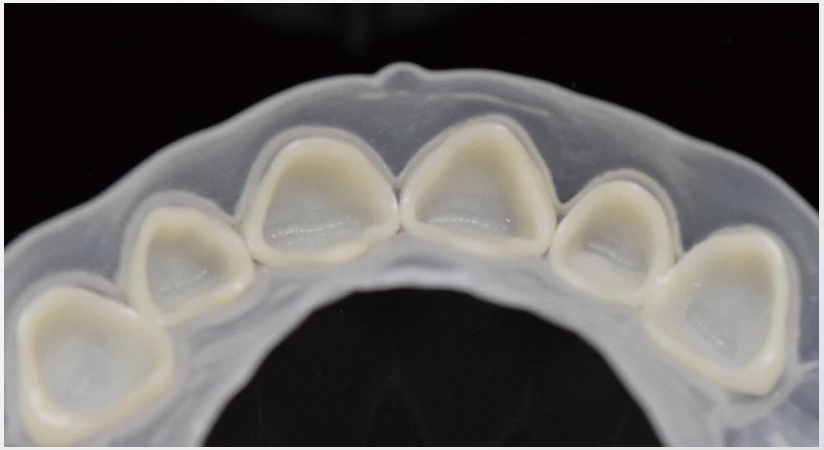
photos courtesy of Dr.Abuhammoud



Milled interim restoration

photos courtesy of Dr.Abuhammoud





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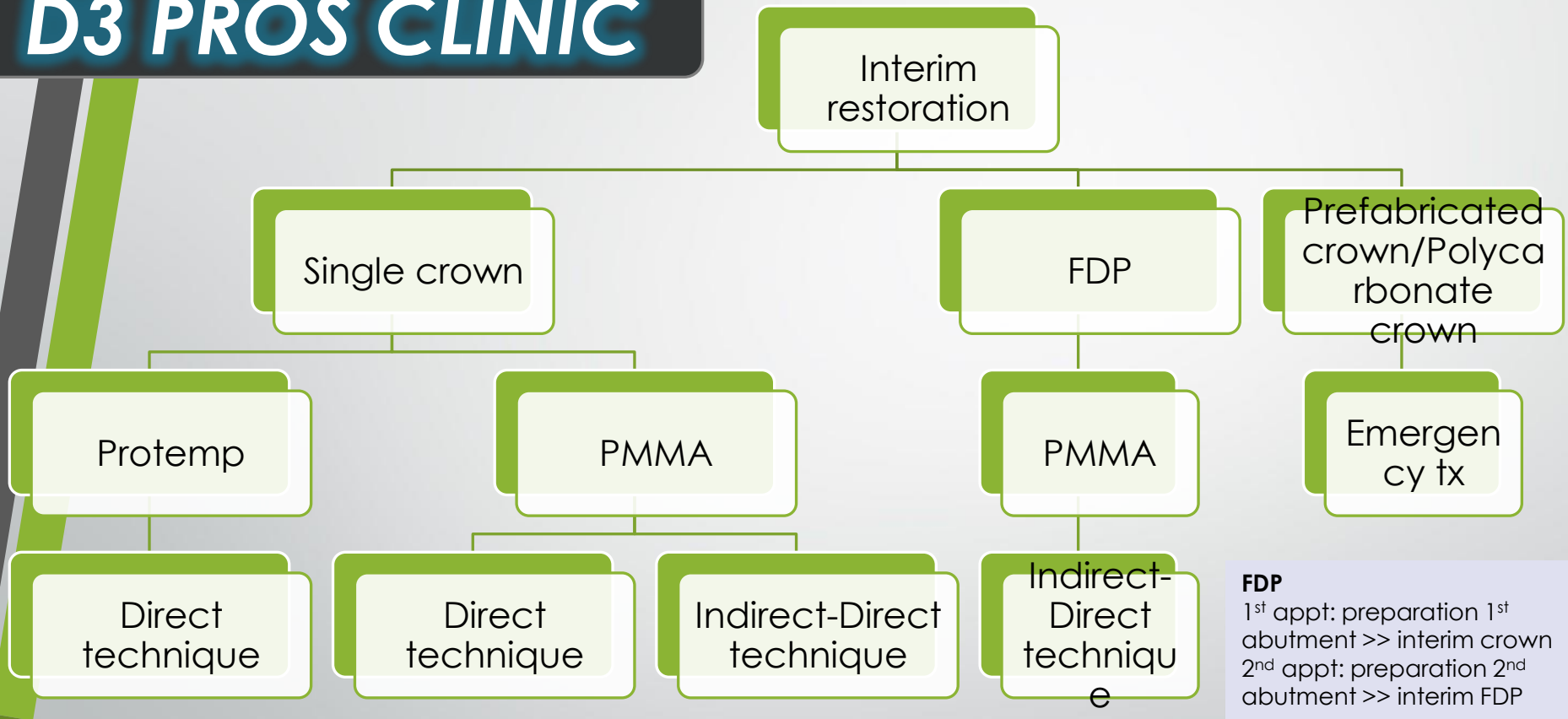
D3 PROS CLINIC



FDP
1st appt: preparation 1st abutment >> interim crown
2nd appt: preparation 2nd abutment >> interim FDP