

Delaware State Dental Society
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Functional Considerations in Esthetic Dentistry

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PATIENT INTERVIEW

- 1. What can we do for you today? _____
- 2. Are you having any discomfort now? _____
- 3. Is there anything about the appearance of your teeth that you would like to change? _____
- 4. What types of dental procedures have you had done in the past 5 years? _____

RADIOGRAPHIC EXAMINATION

- 1. General appearance on radiograph: _____
- 2. Missing teeth _____
- 3. Prevalence of fillings: FEW MODERATE MANY _____
- 4. Any overhanging margins? _____
- 5. Any periapical infections? _____
- 6. Any cavities obvious on x-ray? _____
- 7. Any bone loss? _____
- 8. Any widened periodontal ligament? _____
- 9. Any unerupted teeth? _____

CLINICAL EXAMINATION

- 1. Jaw relationship? _____
- 2. History of joint noise? _____
- 3. History of joint pain? _____
- 4. Headaches or neck pain? _____
- 5. Appearance of soft tissue/ oral cancer exam _____
- 6. Any premature interference or mobile teeth? _____
- 7. Any gum pocket formation? _____
- 8. Adequate attached gingiva? _____
- 9. Any malpositioned teeth? _____
- 10. Any sign of tooth wear? _____
- 11. Any teeth likely to fracture? _____
- 12. Any generalized recession? _____
- 13. Any erosion? _____
- 14. Any unmanageable bacterial traps? _____
- 15. Tooth by tooth analysis: _____

1. Determine joint health, rule-out active pathology, and judge the ability to withstand long-term muscular forces.
2. Utilize Bimanual Guidance, Leaf Gauge, or Anterior Bite Plane to load test.
3. Achieve accurate diagnostic casts and pinpoint occlusal records.
4. If a repeatable joint position or accurate recording cannot be established initially, utilize other therapies to achieve an accurate starting position prior to treatment.

TMJ-RESTORATIVE PROTOCOL

Muscle Symptoms	Joint Symptoms	Load Test	Splint Therapy
Yes	Yes	Positive	Yes
Yes	Yes	Negative	Yes
Yes	No	Positive	Yes
Yes	No	Negative	Maybe
No	No	Positive	Maybe
No	No	Negative	No

Muscle Symptoms	Joint Symptoms	Load Test	Restorative
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Yes	Yes	Positive	No
Yes	Yes	Negative	Yes
Yes	No	Positive	No
Yes	No	Negative	Yes
No	No	Positive	No
No	No	Negative	Yes

Posterior Stop After Prep	Anterior guidance in IP	TMJ Symptoms	Restore in IP
Yes	Yes	No	Yes
Yes	Yes	Yes	Maybe
Yes	No	No	Maybe
Yes	No	Yes	No
No	No	No	No
No	No	Yes	No

DEVELOP ANTERIOR SEGMENT
Phonetic Evaluation

Sound

View

Clinical Relevance

“E”	Frontal	Observe the distance from upper to lower lip. If incisors fall below 50%, they generally can be lengthened. If 70%, can generally not be lengthened.
“F”	Profile	Observe interaction between incisal edges and lower lip. Evaluate length and position.
“S”	Profile	Observe interaction between upper and lower incisal edges. Evaluate length and position.
“Th”	Profile	Observe clarity and crispness of sound. Evaluates lingual contour.

Esthetic Guidelines

1. Central incisor length \geq 10mm
2. Central incisor width \geq 7.5mm
3. Incisal plane=Horizon
4. Gingival line=Horizon
5. Central incisor: Central incisor width \leq 3mm
6. Central incisor: Central incisor length \leq 1.5mm
7. Midline embrasure: Vertical
8. Midline teeth: Midline face=N/A
9. Tooth: Tooth width \cong Golden Proportion
10. Upper lip during smile: Gingival margins \leq 4mm

Laboratory Esthetic Evaluation and Diagnostic Waxing

Armamentarium: Dividers, red and blue pencil, Bunsen burner, presentation wax,

PKT waxing instruments #1 and #2, Hollenback and cleoid-discoid carvers, Bard Parker lab knife, Boley gauge, Denar ruler, and Panadent platform with golden proportion guides

1. Remove upper cast from articulator.
2. Establish ideal lower incisor shape.
3. Analyze and correct lower occlusal plane with Broaderick Analyzer
4. Replace upper cast and correct posterior occlusion (additive or subtractive).
5. Establish parallel upper incisal plane with Dento-Facial Analyzer.
6. Attempt to correct midline if possible.
7. Scribe gingival margins with blue pencil.
8. Measure and establish absolute symmetry at the central incisors.
9. Use golden proportion guides for placement of laterals.

10. Use canines and first premolars to add and subtract space needed elsewhere.
11. Evaluate gingival levels. Central incisors must be at least 10mm.
12. Rationalize with desired occlusal scheme and refine anterior guidance.

Development of Posterior Occlusal Plane

1. Remove upper cast and set pin to "0"
2. Add wax arbitrarily to lower posteriors
3. Set compass to 4in radius
4. Establish anterior survey point (cusp tip of idealized lower canine)
5. Scribe an arc onto the flag
6. Establish the posterior survey point (ideal second molar cusp, condylar axis point)
7. Scribe a line onto the flag
8. Place the compass at the intersection of lines and scribe a line onto the wax
9. Wax anatomic posterior teeth using scribed wax guidelines for Curves of Spee and Wilson
10. Replace upper cast and adjust upper occlusal surfaces to allow for anterior contact
11. Set pin at this point
12. Wax upper lingual cusps to occlude into each central fossa of the lower posterior teeth
13. Wax upper buccal cusps for esthetics
14. "Clear" the lingual inclines of the buccal cusps to allow for immediate posterior disclusion
15. Refine anatomic contours

Instruments and Materials

Digital X-Ray	Dexis	Provision Dental Systems Dexis Digital X-ray 1000 Northfield Court
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		Suite 150 Roswell, GA 30076 888-88DEXIS www.dexray.com
Facial Measurement	Trubyte Tooth Indicator	Densply-Trubyte York, PA 800-877-0020 www.trubyte.densply.com
Occlusal Measurement	Range of Motion Scale	Great Lakes Prosthodontics Tonawanda, N.Y. 800-828-7626 800-324-4434(NY) www.greatlakesortho.com
Occlusal Evaluation	T-Scan	Tekscan, Inc. 307 West First Street. South Boston, MA TekScan.com
Impression Material	Jeltrate-Plus	Dentsply-Caulk Milford, DE 800-534-2855 www.caulk.densply.com
Alginate Mixer	Alginator II	Great Lakes Prosthodontics
Facebow	Kois Dento-facial Analyzer	Panadent Corporation Grand Terrace, California 909-783-1841 www.panadent.com
Facebow Registration	Bite-Tab	Panadent Corporation
Occlusal Registration	Delar Wax (D-Style)	Delar Corp.
Cast Stone	Silky-Rock White	Whip Mix Corporation Louisville, Ky. www.whipmix.com
Mounting Stone	Kerr Sno-White #2	Kerr Manufacturing Co. Orange, California 1-800-KERR-123 www.kerrlab.com
Articulator	Panadent PCH	Panadent Corporation
Diagnostic Wax	Presentation Wax	Great Lakes Prosthodontics
Occlusal Plane Analyzer	Broaderick Analyzer	Panadent Corporation
Waxing Instruments	PKT 1,2,4 Cd 3/6,#7 wax spatula, Bard- Parker lab knife Fillastre Carver for Analyzer (Panadent)	Hu-Friedy Mfg. Co., Inc. Chicago, IL 800-HU-FRIEDY www.hufriedy.com
Articulating Paper-Lab	Surgident Full Arch	Heraeus Kulzer South Bend, IN www.kulzer.com
Articulating Paper-Oral	Bausch 40µ	Bausch Articulating Papers Nashua, NH www.bauschdental.com

Retraction Cord	Raycord #9 and #10	Pascal Co.
C+B Impression	Impregum Penta	3M-ESPE
Matrix Material Single	Matrix Buttons	Advantage Dental Products
Matrix Material Multiple	Genie Putty	Sultan Chemists
Composite Matrix	Memosil	Heraus Kulzer
Matrix-guided composite	Filtek Supreme Ultra	3M-ESPE
Provisional Resin	Protemp Plus	3M-ESPE
Burs	Thomas R. McDonald DMD Preparation Kit Provisional Kit	Komet USA www.kometusa.com

Provisional Restorations

Provisional restorations provide many valuable functions in restorative dentistry. They can be used to diagnostically establish vertical dimension of occlusion, tooth contour, tooth position, incisal edge position, incisal guidance, phonetics, and esthetics. More directly, they provide sealing of the prepared tooth structure for pulpal protection. Maintenance of tooth position and enhancement of gingival health are also advantages of well-constructed provisional restorations.

Provisional restorations may be fabricated directly in the mouth or in the laboratory on stone casts. Diagnostic desires, complexity, and provisional time determine the technique used for fabrication. The following is a clinical guide for fabrication of customized provisional restorations.

Clinical Guide

Direct Technique

INDICATIONS: One and two teeth crowns, inlays, onlays, and short bridges.

MATERIALS: Matrix Button®, mineral oil, bis-acryl provisional material, burs, flour pumice, lathe with rag wheel, articulating ribbon, provisional cement.

ADVANTAGES: Quick, simple technique. Minimal preparation prior to patient appointment. Can be used when fractured teeth are present.

PROCEDURE: 1. Heat Matrix Button® hot tap water, fold and knead to create a ball.

2. Form (by hand) over the tooth or teeth to be prepared or over a stone cast of the teeth to be prepared. Ignore fractured cusps or missing restorations. Make sure to include adjacent teeth. If the matrix is formed on a model, place it into the mouth prior to tooth preparation to confirm fit and practice path of insertion.

3. Trim/scoop out areas that are fractured and gingival neck around the tooth with a hot wax spatula.
4. If necessary, trim the matrix with wax scissors 3 mm. below the gingival margins.
5. After tooth preparation and retraction cord placement, lubricate the preparation **and the matrix** with mineral oil on a cotton pellet.
6. Mix provisional material and place a small amount on the patient napkin.
7. Fill the appropriate tooth area of the matrix.
8. Place matrix onto the quadrant of the prepared teeth, place a cotton roll over the matrix and instruct the patient to close lightly.
9. Test the piece of material on the patient napkin. Use this piece as an indicator of setting time (usually approximately 30 seconds).
10. Remove the matrix from the teeth.
11. In most cases the provisional will come out in the matrix.
12. Set aside in a cup of chemical disinfectant/water.
13. Mark proximal contacts with a red wax pencil. Trim margins with a large acrylic carbide bur. Relieve the occlusal surfaces 0.5 mm. With the same bur. Relieve internal line angles with a #6 or #8 round bur.
14. Polish with flour pumice on a rag wheel.
15. Return to operatory in the same disinfectant cup.

Hybrid Technique

INDICATIONS: Multiple Individual crowns and short bridges, usually within one sextant.

MATERIALS: Diagnostic cast and/or wax-up, silicone putty, mineral oil, bis-acryl provisional material, burs, flour pumice, lathe with rag wheel, articulating ribbon, provisional cement.

ADVANTAGES: Efficient chairside technique for multiple units. Can be used for anterior esthetic cases.

PROCEDURE:

1. Form silicone material (by hand) over the tooth or teeth to be prepared. Make sure to include adjacent teeth. After the matrix is formed on a model, place it into the mouth prior to tooth preparation to confirm fit and practice path of insertion.
2. Trim/scoop out the sulcus area inside the matrix with a bard parker knife.
3. Trim the extension of the matrix 1½ teeth beyond the teeth to be prepared and 3 mm. below the gingival margins.

4. After tooth preparation, lubricate the preparation with mineral oil on a cotton pellet. Do not lubricate the silicone matrix.
5. Mix provisional material and place a small amount on the patient napkin.
6. Fill the appropriate tooth area of the matrix.
7. Inject provisional material into the proximal spaces of the prepared teeth.
8. Place matrix onto the quadrant of the prepared teeth. Hold in place firmly.
9. Test the piece of material on the patient napkin. Use this piece as an indicator of setting time (usually approximately 30 seconds).
10. Remove the matrix from the mouth.
11. In most cases the provisional will come out in the matrix.
12. Set aside in a cup of alcohol.
13. Follow trimming steps below.
14. Polish with flour pumice on a rag wheel.
15. Return to operatory in the same disinfectant cup.

Trimming Procedure

1. Mark proximal contacts and margins with a wax pencil.
2. Hold restoration with incisal/occlusal surfaces down.
3. Trim outside accessible margins with large acrylic trimming diamond.
4. Trim proximal embrasures with diamond disc. Use both sides of the disc to avoid turning the restoration as much as possible.
5. Blend line angles, relieve occlusal surfaces, and relieve internal surfaces. Use second cast as a trimming/fitting die.
6. Smooth gingival embrasures with pyramid diamond. Leave teeth splinted if possible.
7. Polish with flour pumice on a lathe/rag wheel

Cementation Procedure

1. Seat crown and adjust occlusion.
2. Re-polish.
3. Isolate tooth and dry.
4. Apply two coats of cavity varnish or dentin sealant to the tooth.
5. Cement with Durelon®.
6. Remove excess cement at rubber stage.

Note: In critically esthetic areas, the opaque white shade of Durelon® may show through a thin section of acrylic. In most cases, cavity varnish and glass ionomer or clear resin cement may be used as a substitute

Provisionals for Bonded Restorations

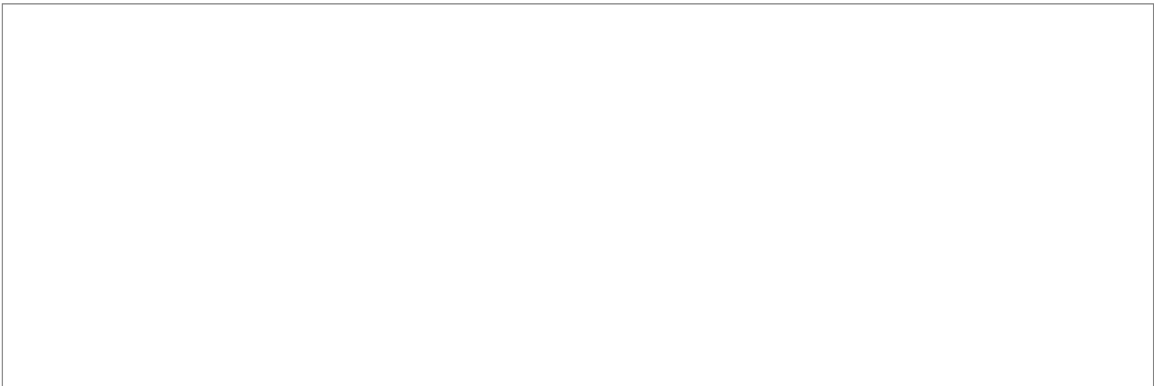
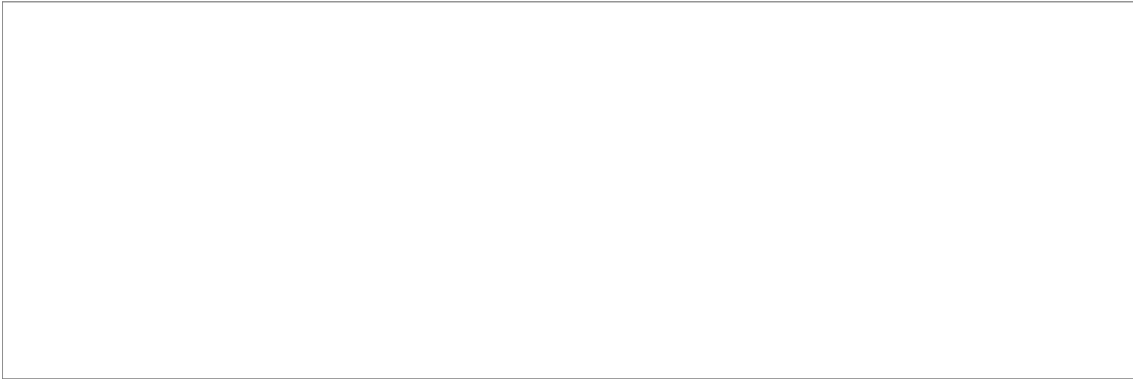
Direct fabrication-Indirect trimming	Direct fabrication-Direct trimming	Direct light-cured fabrication-Direct trimming
Silicone matrix of wax-up, trimmed, and tried into the mouth	Silicone matrix of wax-up, trimmed, and tried into the mouth	Clear silicone matrix of wax-up, trimmed, and tried into the mouth. Cut away the gingival aspect of teeth to be restored, leaving incisal ½
Lubricate teeth with mineral oil	Spot etch each tooth	Spot etch each tooth
Load matrix with bis-acryl and seat firmly into mouth	Apply enamel bonding agent	Apply enamel bonding agent
Allow for initial set and remove	Load matrix with bis-acryl	Load matrix with light-cured composite and seat firmly
Trim and polish	Allow for complete set	Cure through the matrix
Spot etch and bond with resin cement or cement alone	Remove matrix, trim, and polish with composite finishing instruments	Remove matrix, add gingival composite directly. Finish and polish.

“Thinning” the area over the bonded spot and flexing the composite with a sickle scaler at the margins will easily remove bonded provisionals.

Trouble Shooting

Problem	Diagnosis	Solution
Bubble, hole, or crack in acrylic	Thin matrix, inadequate reduction, trapped air	Roughen area, apply bonding agent, add composite
Restoration will not seat in the mouth	Internal bubble, distortion or undercut preparation	Relieve acrylic aggressively on all internal surface
Lack of occlusion	Improper wax-up or mounting, over-seating of matrix	Add composite directly in the mouth
Open margin, short margin, open contact	Inadequate impression or over trimming	Add composite on model or in mouth
Occlusal surfaces and embrasures shifted	Matrix “frameshift”	Remake
Bubbles in model	Thick mix of stone	If not margins, fabricate and relieve
Esthetic discrepancy	Patient desires	Add composite/reshape

Bonded Composite Reconstruction



Provisional Materials

Cast stone	Silky Rock-White	Whip-Mix Corp. P.O. Box 17183 Louisville, KY 40217
Quick set stone	Kerr Sno-White #2	Kerr Manufacturing Co. 1-800-KERR-123
Quick set stone	Earth Stone	Tak Systems Densply Raintree Essix www.essix.com
Thermo-plastic matrix	Matrix Buttons	Advantage Dental Products Lake Orion, MI 48361 1-800-338-6319
Cast Lubricant	Separating Fluid	Ivoclar-Vivadent Inc. 1-800-5DENTAL ivoclarvivadent.com
Laboratory Putty	Sil-Tek	Ivoclar-Vivadent
Laboratory Putty	3M Express Bite Registration	3MESPE
Laboratory Putty	Genie	Sultan Chemists
Provisional Resin	Pro-Temp Plus (bis-acryl)	3M/ESPE St. Paul, MN 55144-1000
Provisional Resin	Systemp (bis-acryl)	Ivoclar-Vivadent
Provisional Resin	Luxatemp (bis-acryl)	Zenith/Foremost

		1-800-622-6383
Provisional Resin	Versa-Temp (bis-acryl) TempArt (methyl-methacrylate)	Sultan Chemists 85 West Forest Englewood, NJ 07631 800-637-8582
Prefabricated Resin Crown	Protemp Crown	3M/ESPE St. Paul, MN 55144-1000
Provisional Resin Intra-coronal	Systemp Inlay-Onlay	Ivoclar-Vivadent
Characterizing Resin	Tetric Color	Ivoclar-Vivadent
Cement Separator	Handi Liner II Cavity varnish Copalite	Mizzy Inc. Cherry Hill, NJ 1-800-333-3131 www.keystoneind.com
Provisional Cement	Systemp Link	Ivoclar-Vivadent
Provisional Cement	Temp Advantage	GC America
Provisional Cement	Durelon	3M-ESPE
Contouring burs	H79EF.HP.040 Tapered carbide 6924.180 Diamond Disc H79GE.HP.070 Tapered carbide H1.HP.023 Round carbide H251ACR.060 Tapered carbide Thomas R. McDonald DMD Provisional System Kit	Komet USA www.komet-usa.com