Challenging The American Board of Operative Dentistry Certification (ABOD) was one of the most humbling, challenging and gratifying experiences of my dental career. To say that it is an honor to join the elite names on that list would be a serious underatement. Organized dentistry is priceless to the success of our profession and challenging board examinations allows us to peer-review top clinicians in their respective fields. I can still recall entering the oral examination room with the 3 elite examiners around the table thinking, "what have I gotten myself into." Thankfully, I was equipped with the knowledge (peer-reviewed publications) and confidence needed to defend my clinical decision making and dental material selections. The peer-reviewed process of both research publication and board certification keeps our cherished field of dentistry on the cutting edge of technology and patient care. It is my hope that more dentists would seek these peer-reviewed challenges to continue the legacy of organized dentistry that we hold so dear.

The board certification includes a full day written examination, a three day clinical examination, and an oral case defense of two separate cases. I want to share the oral case defense presentations with our readers to help them better understand the clinical process involved and the utilization of various direct and indirect restorative materials. The following excerpt is directly from the American Board of Operative Dentistry, Inc. certification program at the time the oral examination was challenged. The URL for the current version is hyperlinked below.


EXAMINATION INSTRUCTIONS AND PROCEDURAL GUIDE FOR THE CERTIFICATION PROCESS

The oral examination is based on cases presented to the board. The questions will be related to the cases and such supporting information as deemed reasonable by the examiners. The total amount of cases presented must be a minimum of two but there may be as many as four as long as all the requirements are met (see subtitle "Cases"). It is my recommendation that candidates provide comprehensive care by meeting the examination requirements with as few total cases as possible (two). It is advantageous to screen 2 patients that meet all 24 direct and indirect requirements as described in "general requirement" section of this case presentation. However, one or two additional cases may be necessary to accommodate all 24 total restorations required (12 direct and 12 indirect). The candidate should be familiar with the current textbooks and refereed journals, as related to operative dentistry and supporting disciplines. I have included the textbooks and peer-reviewed journal article used for this defense in (Table 1) (current at time of defense). The examination will be conducted and evaluated by a minimum of two (2) examiners although three (3) are usually in attendance, all of whom have reviewed the cases and accompanying documentation. The oral examination will be recorded for future reference and the recording becomes the property of the American Board of Operative Dentistry, Inc. The completed case documentation will be returned immediately to the candidate on completion of the examination but should be retained by the candidate for future reference. The oral examination may be scheduled during the three day clinical examination in such a manner so as not to interfere with the clinical examination. The oral examination may be taken at another site and time other than during the clinical examination at the convenience of the candidate and based on the demand. However, in all cases, the oral examination must be successfully completed during the board eligible time window. The oral examination will not exceed one hour in length.

GENERAL REQUIREMENTS

All submitted cases must conform to the following general requirements:

1. Only one of the submitted cases may have had the diagnosis and treatment initiated during any formal residency, advanced education, or postgraduate program ever...
Table 1: Literature Used for Case Defense (Literature was current at time of defense).

| Resin Composite | Textbooks: | • Craig’s Restorative Dental Materials, 10e |

| Dentin Bonding | Textbooks: | • Craig’s Restorative Dental Materials, 10e |

| Dental Amalgam | Textbooks: | • Craig’s Restorative Dental Materials, 10e |

| Direct Gold Foil | Textbooks: | • Craig’s Restorative Dental Materials, 10e |

| Glass Ionomer Cements | Textbooks: | • Craig’s Restorative Dental Materials, 10e |

| Indirect Pressed Leucite Ceramics Inlays/Onlays | Textbooks: | • Craig’s Restorative Dental Materials, 10e |

| Dual-Cure Resin Cement | Textbooks: | • Craig’s Restorative Dental Materials, 10e |
enrolled in by the candidate.

2. All restorative work must have been performed by the candidate individually and independently as the operator. Supporting laboratory work may be performed by a technician.

3. All documentation required by the Board must be submitted as outlined below.

4. It is preferred that each case submitted have had at least a six month post-treatment follow-up. Exemptions to this requirement may be petitioned in writing to the Chair of the Examination and Certification Committee.

**CASE REQUIREMENTS**

The cases submitted to the Board shall meet certain requirements. At least two cases must be submitted although up to four may be submitted by the candidate as needed to demonstrate the desired level of proficiency. Successful completion of this examination requires that you successfully defend your clinical decisions making and choose of final restorative dental materials. From the below guidelines and reading between the lines, the board is encouraging only two total cases. The following requirements for each case shall apply:

1. Each case should be primarily single tooth restorations; although, each case may include fixed and removable prosthesis involving natural teeth and/or implant fixtures.

2. Each case should restore at least 12 teeth not including pontics and artificial replacement thereof.

3. One case should be restored primarily with gold castings of any design and esthetic restorations involving occlusion.

4. One case should be primarily amalgam restorations and minor esthetic restorations.

5. Included in either case should be an appropriate demonstration of the use of direct compacted gold as a restoration.

There are specific guidelines set by the board to judge your operator ability and knowledge of current dental materials and their physical properties (mechanical, thermal, electrical, color and optical properties). Of specific importance is the understanding of retention and resistance forms of all direct and indirect restorative materials in enamel and dentin (preparation design; adhesive bonding; ionic bonding, etc.). Understanding physical property nomenclature and fracture characteristics of all restorative dental materials is extremely important as well.

With these concepts in mind, I would like to present the two cases used for my ABOD oral case defense.

**DIRECT RESTORATIVE CASE**

**Medical history**

Patient denies medical history of cardiovascular, neurologic, neuromuscular, respiratory, endocrine, hepatic, or renal problems. Patient denies family history of cancer. Patient is a ½ pack per day cigarette smoker in the process of trying to quit. Patient drinks a lot of coffee and tea throughout the day. Otherwise, patient is in good general health.

**Dental history**

Patient has a history of anterior composite restorations, of which all are failing. Several generalized cavitated carious lesions on occlusal and smooth surfaces. CC: “The fillings are turning dark in the front and my lower right tooth is hurting all the time” (Figure 1).

Patient exhibits severe extrinsic and intrinsic staining from excessive smoking in conjunction with excessive coffee and tea consumption.

**Caries/ fissures needing attention:**

#2:OF Caries
#3:OF Caries
#4:OF Dark Fissure
#5:OF Dark Fissure
#7:OF Composite resin failing
#8:OF Caries
#9:OF Caries
#10:OF Mesial and Facial Caries/OF composite failing
#11:OF Mesial and Facial Caries
#12:OF Dark Fissure
#14:OF-OF Caries
#15:OF Caries

![Figure 1 Charting.](image-url)
Clinique Mentale

Central alignment. Patient needs orthodontic consultation if desired.

Tipped lingual constricting the space needed for proper anterior occlusion. The mandibular molars and premolars from the occlusal view are constricted as much as possible (Figure 2).

The idea is to share the load as much as possible between the working or laterotrusive side, but no contacts on the non-working or mediotrusive side. The patient exhibits CR independent from CO (no contacts in CR). Patient has Angle Class I first molar relationship. There is no posterior crossbite; however the molars and premolars on the mandible are tipped towards the lingual. Additionally, the anterior overjet was 3mm and overbite was 8mm with mandibular anterior crowding.

Excursive Movements: The patient exhibits a unilateral balanced occlusion both right and left excursive movements. No need to alter cuspal or marginal ridge heights from existing conditions.

Protrusive Movement: With 3mm of overjet and 8mm overbite, the anterior teeth disocclude the posterior teeth in protrusive movements without posterior interferences. No need to alter cuspal or marginal ridge heights from existing conditions.

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Tooth #13: MO resin composite (placed 1 month ago).

Tooth #29: DO Amalgam (placed 1 year ago).

CLINICAL DIAGNOSIS

TMJ: evaluation of the TMJ revealed no discomfort by the patient in all movements. Maximum opening was approximately 45mm with no clicking or popping of the disc. There was no significant deviation of the mandible during condylar rotation in the fossa or translation down the articular eminence.

In maximum intercuspation (MI), the complete intercuspation of the opposing teeth independent of condylar position, revealed the patient has an Angle Class I first molar relationship. There is no posterior cuspitate; however the molars and premolars on the mandible are tipped towards the lingual. Additionally, the anterior overjet was 3mm and overbite was 8mm with mandibular anterior crowding.

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Patient wants the failing (dark) anterior composite restorations replaced and the extrinsic staining and caries removed from his teeth. Patient is realistic to the expected outcome for his treatment. It was explained to patient that some of the staining may not be removed.

Esthetic concerns: Patient wanted the failing (dark) anterior composite restorations replaced and the extrinsic staining and caries removed from his teeth. Patient is realistic to the expected outcome for his treatment. It was explained to patient that some of the staining may not be removed.

Soft tissue: Soft tissue examination revealed no obvious gross oral pathological conditions except the generalized gingival inflammation. Additionally, digital palpation of the muscles of mastication did not elicit an uncomfortable response from the patient.

PRE OPERATIVE RADIOGRAPHIC INTERPRETATION

Osseous evaluation

Maxilla: From the pre-operative FMX, there is no evidence to suggest an early generalized periodontitis. The sinus architecture is normal with no visible sinus pathology.

Mandible: From the pre-operative FMX, there is no evidence to suggest an early generalized periodontitis. Impacted 3rd molar extractions.
DO amalgam #29 placed 1 year ago. Asymptomatic; no need to replace at this time (Figure 4)

- #2: Amalgam OF SSC Amalgam
- #3: Amalgam O-OL SSC Amalgam
- #4: PRR O Kerr .4 Flowable Resin Vita A3
- #5: PRR O Kerr .4 Flowable Resin Vita A3
- #7: Resin Composite MFL Kerr .4 Resin Vita A2/A3
- #8: Resin Composite MFL Kerr .4 Resin Vita A2/A3
- #9: Resin Composite MFL Kerr .4 Resin Vita A2/A3
- #10: Resin Composite MFDLI Kerr .4 Resin Vita A2/A3
- #11: Glass Ionomer MF (Class V) Photac-fil RMGI Vita A3
- #12: Glass Ionomer MF (Class V) Photac-fil RMGI Vita A3
- #14: Amalgam OFL SSC Amalgam
- #15: Amalgam OF SSC Amalgam
- #18: Amalgam O SSC Amalgam
- #19: Amalgam Olf SSC Amalgam Direct Gold O-O Gold Foil
- #20: PRR O Kerr Flowable Resin Vita A3
- #21: PRR O Kerr Flowable Resin Vita A3
- #30: Amalgam MO SSC Amalgam (Vitrebond RMGI base)
- #31: Amalgam O SSC Amalgam
- #17: Extraction
- #32: Extraction

RESTORATIVE MATERIAL SELECTION

Direct composite resin

Point 4™: Point 4 (Kerr Dental) was chosen as a light-cured, resin-based. Composite dental restorative that contains approximately 77% by weight (59% by volume) inorganic filler with an average particle size of 0.4 microns. Point 4 aimed to bridge the gap between microfill and hybrid composite materials. A specific grinding process combined with rheological modifiers allow Point 4 to polish to a very high, long-lasting luster similar to microfills, while providing strength equivalent to the microhybrids.

Point 4™ Flowable: Point 4 Flowable (Kerr Dental) was chosen as a low-viscosity, flowable light-cured, resin-based composite with ultra-small particle filler that is 70% loaded. This results in an esthetic material that wears uniformly, retains its esthetics and performs well over time.

Composite bonding agent

OptiBond® Solo Plus™: OptiBond Solo Plus (Kerr Dental) was chosen as a one-dose, ethanol-based traditional etch and rinse adhesive. It is 15% filled with the same 0.4 micron filler found in the Kerr Point 4 composite. According to published literature, it provides the highest level of protection against microleakage, while sustaining high bond strengths to a variety of surfaces. The filler not only reinforces the hybrid zone but also penetrates the dentin tubules, creating a true “structured bond” not found in unfilled or even “nano” filled adhesive systems.

Dental amalgam

Tytin®: (Kerr Dental) was chosen as a dental amalgam alloy with a high silver content (low copper) and 100% spherical particle formula. According to published literature, spherical dental amalgam has delivered excellent clinical performance for decades. It is extremely smooth, easy to place and carve, and accepts immediate polishing (3 minutes) in Class I restorations. Tytin capsules are self-activating with no special activation device is required. (59% Ag, 13% Cu, 28% Sn, 42.5% Hg). High early compressive strength allows occlusal adjustment without amalgam fracture.

Direct gold foil

E-Z Gold: (Lloyd Baum) was chosen as a direct gold application for class I restorations. Direct gold or gold foil, is the oldest dental restorative material and continues to be used by many dentists today. Although not in general use due to many factors, it is the only dental material that if carefully placed and finished can approximate the cavosurface margin with zero marginal gap and last longer than any other dental material.

Direct glass ionomer

Photac fil restorative: (3M™ ESPE™) Resin modified glass ionomers are glass ionomer cements that contain a small quantity of a polymerizable resin component. These materials have most of the advantages of glass ionomer materials with the added advantage of water insolubility while setting and the ability to light cure some brands to reduce the likelihood of cement and marginal washout during placement. The ability to light cure the excess material makes for reduced chair time as well. They chemically bond to the calcium component of the dental structure allowing bonding to enamel, dentin and cementum. This was advantageous on teeth numbers 11-12 cervically because the
caries extended below the CEJ onto cementum where resin adhesive would not perform as well.

In this capacity they leach fluoride into the tooth throughout their service life thus reducing the likelihood of recurrent decay.

**Vitrebond liner:** (3M™ ESPE™) was selected as a base under amalgam restoration #30. They lack the ability to resist occlusal wear, but their major virtue is that they shrink very little while setting and thus reduce post operative sensitivity while reducing compressive stresses on the tooth. The physical barrier will assist in thermal conduction through the amalgam to the thin remaining dentin covering the pulpal tissue. The operator must be cognizant of the low compressive strength while condensing the amalgam to ensure that the material does not fracture.

Post Operative Radiograph Series are displayed in the **Figure 5**.

**TREATMENT PLAN SEQUENCE**

1. HIPPA forms completed. FMX radiographic series taken by dental hygienist.
2. #13 MO resin restored 2 weeks previous.
3. Patient transferred to Dr. Michael Metz for restorative treatment planning and pain LR.
4. Addressed emergency #30 E&E.
5. Restored #31-O while under anesthesia. Reinforced oral hygiene.
6. Pre-op pictures and impressions. Face bow transfer.
9. Rx: Prevident 5000+ X 5 refills
10. Scale and polish X 4 quadrants over 2 appointments due to heavy extrinsic staining. Verified hard tissue charting after extrinsic stain removal. Occlusal evaluation. Delivered ultra-sonic toothbrush and direction. 5% sodium fluoride varnish application.
11. Restored 2-3-4-5. 5% sodium fluoride varnish application.
12. Restored 18-19-20-21. 5% sodium fluoride varnish application.
13. Restored 7-8-9-10-11-12. 5% sodium fluoride varnish application.
15. Post-op pictures, impressions, and FMX.
17. Referred to orthodontics for consultation.

**INDIRECT RESTORATIVE CASE**

**Medical history**

Patient denies medical history of cardiovascular, neurological, neuromuscular, respiratory, endocrine, hepatic, or renal problems. Patient denies family history of cancer. Patient reports only seasonal allergies. Patient is in good general health and participates in daily exercise activity.

**Dental history**

Patient has a history of amalgam and direct composite restorations placed in Turkey approximately 8 years ago. Patient supplied no family dental history information. Patient denies family history of cancer. CC: “The fillings I have are old and they need to be replaced. I want to replace them all with white fillings.”

**Charting**

**Caries/ marginal discrepancies (Figure 6):**

- #2: Mesial pit and DF DL amalgam margins
- #3: Transverse ridge between MO OL amalgam and MF amalgam
- #4: MF DL amalgam margins
- #5: DF ML composite margins
- #12: Occlusal gap at composite-amalgam interface
- #13: DF amalgam margin
- #14: Transverse ridge between MO OL amalgams/ class V lingual caries
- #15: Mesial pit and DF and DL amalgam margins
- #18: DL amalgam margins undermining DL cusps/ class V facial/lingual caries
- #19: Mesial pit/ DL amalgam margins undermining DL cusps
- #31: DL amalgam margins undermining DL cusps/ class V facial/lingual caries
Existing Restorations Not Replaced (Figure 7):

- #6: DL Composite Resin
- #14: Lingual class V Glass ionomer
- #18: Buccal class V Glass ionomer
- #20: O sealant/ PRR
- #21: O sealant/ PRR
- #28: O sealant/ PRR
- #29: O sealant/ PRR
- #30: NSRCT/ parapost + core/ PFM crown (endodontic referral)
- #31: Buccal class V Glass ionomer

**DIAGNOSIS**

**Occlusion TMJ**

Evaluation of the TMJ revealed no discomfort by the patient in all movements. Maximum opening was approximately 42mm with no clicking or popping of the disc. There was no significant deviation of the mandible during condylar rotation in the fossa or translation down the articular eminence (Figure 8).

In maximum intercuspation (MI), the complete intercuspation of the opposing teeth independent of condylar position, revealed the patient has an Angle Class I first molar relationship. There is no posterior crossbite. Additionally, the anterior overjet was 1mm and overbite was 4mm. Also, #10 and #23 exhibit an end to end relationship.

**Protrusive movement**

With 1mm of overjet and 4mm overbite, the anterior teeth disocclude the posterior teeth in protrusive movements without posterior interferences. No need to alter cuspal or marginal ridge heights from existing conditions.

**Excursive movements**

The patient exhibits a unilateral balanced occlusion both right and left excursive movements without the cuspids. Meaning there is contact between as many teeth as possible on the working or laterotrusive side, but no contacts on the non-working or mediotrusive side. The idea is to share the load as much as possible.

Patient exhibits CR independent from CO (no contacts in CR). The patients maxillary and mandibular arched from the occlusal view are in an ovoid shape allowing adequate space and no anterior crowding.

Patient has no evidence of bruxism or aggressive parafunctional habits.

**Periodontal risk:** Patient has generalized gingivitis with localized areas of gingival edema and erythemia. Suspect resolution of gingivitis with proper oral hygiene home care. Discussed purchasing a rotary or ultra-sonic toothbrush to help with plaque and stain removal.

Caries Risk: Patient is classified in a moderate caries risk category. Dietary evaluation performed to determine caries etiology. Patient reported a positive history of Starbucks’ daily caramel coffees in the morning and afternoon with table sugar X 4 years. Informed patient of caries risk status and recommended for the patient to use sugar substitutes. Patient otherwise has a non-contributory dietary caries influence. Saliva-check™ (GC America) determined that the patient exhibited normal stimulated and unstimulated salivary flow, pH, buffering, and consistency. Dentocult SM™ and Dentocult LB™ (Orion Diagnostica) revealed < 10,000 colony forming units. This is considered below normal levels of cariogenic bacteria. Modifying the sugar drink together with effective plaque removal will decrease both future caries and periodontal disease risk. Patient informed.

**MISSING TEETH**

3rd molars secondary to reported pericoronitis #17 at age 18.

**Esthetic concerns**

MF line angles of 4-5-12-13 all show when the patient smiles. Patient had esthetic concerns originally and did not want to see silver or gold period. After thorough consultation of porcelain advantages and disadvantages with the patient, it was agreed to use gold inlays and onlays on the posterior molars and pressed porcelain on the maxillary premolars and #19.
Soft tissue

Soft tissue examination revealed no obvious gross oral pathological conditions except the generalized gingival inflammation. Additionally, digital palpation of the muscles of mastication did not elicit an uncomfortable response from the patient.

PRE OPERATIVE RADIOGRAPHIC INTERPRETATION

Osseous evaluation

Maxilla: From the pre-operative FMX, there is no osseous pathology noted. The sinus architecture is normal with no visible sinus pathology. The height of alveolar bone is normal with no signs of periodontal destruction.

Mandible: From the pre-operative FMX, there is osseous PARL noted around the apices of #30 mesial and distal roots. Patient reports history of NSRCT secondary to advanced caries and draining fistula. NSRCT/ parapost + amalgam core/ PFM crown X 2 years ago. No pre or post endo radiographs for healing comparison. Asymptomatic X 2 years following endo. Endo referral recommended 12 month follow-up to assess healing of periapical bone and symptomology. Recommended apicoectomy if any treatment needed. The height of alveolar bone is normal with no signs of periodontal destruction except for a slight vertical defect mesial #31.

Dental evaluation (Figure 9, Figure 10, Figure 11)

|----------|----------------|-------------------|----------------|-------------------------------|------------------------|----------------------------------|----------------|----------------|----------------|----------------|

**Final restorative treatment**

| #2: | Gold Inlay-DO | JB Type II Gold |
| #3: | Gold Inlay- MOL | JB Type II Gold |
| #4: | Porcelain Inlay- MOD | OPC Ceramic Vita A2*** |
| #5: | Porcelain Inlay- MOD | OPC Ceramic Vita A2*** |
| #12: | Porcelain Inlay- MOD | OPC Ceramic Vita A2 |
| #13: | Porcelain Inlay- MOD | OPC Ceramic Vita A2 |
| #14: | Gold Inlay- MOL | JB Type II Gold |
| #15: | Gold Inlay-DO | JB Type II Gold |
| #18: | Gold Onlay- MODL | JB Type II Gold |
| #19: | Porcelain Onlay- MODL | OPC Ceramic Vita A2 |

**Direct restorations placed**

| #4: | Gingival Floor/ Axial Wall | Photac Fill (RMGI) |
| #5: | Gingival Floor/ Axial Wall | Photac Fill (RMGI) |

***The final distal gingival margins on 4-5 OPC porcelain inlays were finished on resin modified glass ionomer due to lack of adequate enamel for bonding

Referral:PARL apices #30. NS Endo/ parapost with core/ PFM crown. Asymptomatic.

RESTORATIVE MATERIAL SELECTION

Indirect ceramic inlays/onlays

Optimal pressable ceramic®: OPC (Pentron Laboratory Technologies) features smaller and more evenly distributed leucite crystals that favorably impact the strength and reliability of the restorations. A Vita A2 shade was selected with light opacity to allow the underlying resin cement to dictate the final clinical shade. Because the core and powders are made of similar color coordinated ceramic materials there is considerably more control over the translucency levels throughout the restoration. That esthetic control coupled with high flexural and compressive...
strength make OPC materials a good choice for posterior inlays and onlays. Pressed porcelain opposing enamel has improved significantly in terms of two body wear in excursive mandibular movements.

**Ceramic adhesive bonding:** leucite reinforced glass ceramic restorations remain, at base, fortified glass bodies. This means that the internal surfaces can be acid etched using hydrofluoric acid. Thus they can be luted directly to the teeth using standard bonding procedures. The crystalline inclusions in these glasses act to reduce the tendency for microcracks to form on the internal surfaces of these restorations, and the bonding technique turns the tooth structure itself into a sort of unbreakable core. This further reduces the likelihood that any relatively minor cracks that may be present on the internal surface of the ceramic body will actually cause a catastrophic fracture.

**Mechanical bonding:** The inside of the restorations are sandblasted with 50 micron silica particles to roughen the porcelain and to increase the surface area for bonding. Then a solution of 9.6% hydrofluoric acid gel is applied to the sandblasted area. The hydrofluoric acid dissolves the surface of the glass in uneven patterns creating even tinier microscopic mountain ranges over the surface of the sandblasted hills and valleys.

**Chemical bonding:** Chemical adhesion of the resin to the etched porcelain is done by the application of silane to the prepared porcelain surface.

**CERAMIC LUTING AGENT**

**Mirage vision 2 resin adhesive**

(Myron International, Inc.) Vita A2 dual-cured low viscosity resin adhesive was used for all inlays and onlays for maximum wear on margins. The ceramic restorations were fabricated with light opacity to allow the resin adhesive to opaque the underlying dentin color. Dentin primer included prevent sensitivity and stop marginal leakage and unfilled resin to access asperities. Silane included for chemical bond of resin to the etched porcelain interface.

**Indirect gold inlays/onlays**

**JB casting alloy:** (Jensen Dental) classic Type II crown and bridge alloy for the clinician who knows the value of a soft, burnishable gold. It was designed for multi-surface inlay and onlay restorations. Because JB is a softer alloy, it is kind to opposing dentition in two and three body wear and burnsishes quickly and easily so margins can be tightly sealed. Plus, because of its high gold content, JB offers a luminous yellow color as a precious metal alloy (Gold 75%, Palladium 3%, Silver 15%).

**GOLD CEMENTATION AGENT**

**Ketac cem**

(3M™ ESPE™) glass ionomer cement was used and has become the standard material used to cement metal alloy castings and porcelain fused to metal crowns. They reduce post operative sensitivity and reduce the likelihood of cement washout. They chemically bond to both the metal and the tooth structure. They are also easy to use and simple to mix, unlike zinc phosphate cement which was the industry standard up until the introduction of these cements.

**Direct glass ionomer**

**Photac fil restorative:** (3M™ ESPE™) Resin modified glass ionomers are glass ionomer cements that contain a small quantity of a polymerizable resin component. These materials have most of the advantages of glass ionomer materials with the added advantage of water insolubility while setting and the ability to light cure some brands to reduce the likelihood of cement and marginal washout during placement. The ability to light cure the excess material makes for reduced chair time as well. They chemically bond to the calcium component of the dental structure allowing bonding to enamel, dentin and cementum. This was advantageous on teeth numbers 4-5 distal gingival margins because the caries extended below the CEJ onto cementum where resin adhesive would not perform as well. In this capacity they leach fluoride into the tooth throughout their service life thus reducing the likelihood of recurrent decay and provide a stable margin for resin adhesive bonding of the porcelain inlays.

**Post operative radiographic series** (Figure 12):

**TREATMENT PLAN SEQUENCE**

1. HIPPA Forms completed. Pre-op pictures, impressions, and FM radiographic series.


3. Scale and polish X 4 quads. OHI. Face bow transfer and occlusal analysis.

Rxc: Prevident 5000+ X 5 refills. 4. Mount pre-op models in MI on class III semi-adjustable articulator with face bow transfer.

5. Fabricate custom impression maxillary and mandibular trays to initiate treatment.


7. Evaluate and cement gold onlay #18 and bond ceramic onlay #19.

8. Remove old amalgams, composites, and caries from 12-13-


12. Remove existing restorations 4-5. Restored distal boxes of 4-5 due to lack of adequate enamel and undercuts from previous restorations. Impress 2-3 with custom trays. Bite registration.

13. Evaluate and bond porcelain inlays 4-5.


15. Hard and soft tissue charting.

16. Face bow transfer and reevaluation of occlusion.

17. Mount post-op models on class III semi-adjustable articulator with face bow transfer.


**Endodontic referral determined that since #31 was asymptomatic and healing was WNL, there is no need to retreat the Endo at this time. Re-evaluation X one year.