

Resin Bonded Retainers-Maryland Bridge: An Overview with Case Report

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Introduction

The most recent imaginative approach in fixed partial dentures is the composite resin bonded metal retainer. The success of this technique depends upon the ability to etch specific high modulus, non-precious alloys. After etching, the metal framework can be bonded to enamel with composite resin. A thin, inconspicuous three unit FPD can then be placed after the limited tooth reduction¹. Through the evolutionary stages of different metals and framework preparation for composite bonding by electrolytic, chemical, and air-abrasive procedures and the improvements in bonding composites, the bridge has been in clinical use for approximately 9 to 10 years².

The attachment is composed of three strategic areas:

- Etched enamel surface
- Bonding resin
- Etched metal surface

Rochette suggested the perforated prosthesis for immobilizing periodontally compromised teeth using the acid etch technique and composite resin.³

Key terms

Acid Etch Restoration, Sealant, Composite Resin Restoration.

Indication

1. Retainers of FPD for abutments with sufficient enamel to etch for retention.
2. Splinting of periodontally compromised teeth.
3. Stabilizing dentitions after orthodontics.

4. Medically compromised, indigent and adolescent patients.
5. Prolong placement of interim prosthesis to augment surgical procedures i.e. craniofacial anomalies.

Contraindications

1. Patient with acknowledged sensitivity to base metal alloys.
2. When the facial esthetics of abutments require improvement.
3. Insufficient occlusal clearance to provide 2 to 3 mm vertical retention. E.g. abraded teeth.
4. Inadequate enamel surfaces to bond. e.g. caries, existing restorations
5. Incisors with extremely thin facio-lingual dimensions.
6. Exceptionally demanding esthetics for adults.

Advantages

1. Noninvasive to dentin with lingual and proximal tooth preparation including occlusal.
2. Conservative with undeniable patient appeal.
3. Tissue tolerant because of supragingival margins without pulpal irritation.
4. Unaltered casts without removable dies.
5. Reduced cost and less chair time.

Disadvantages

1. Education is needed about concepts of micro retention.
2. Demanding techniques and tooth preparation with discerning diagnosis.
3. There is heavy dependence on the lab for the competent treatment of cast metals and

- selective waxing to avert over contouring.
4. Plaque accumulation is prohibitive because design is outside the dimension of natural tooth, and bulky contours are intolerable for specific patients.
5. Patient expectations of esthetics are high, but routine results are fair to good.
6. Usually restricted to one tooth replacement.
7. "Graying out" of teeth that are thin labiolingually at the incisal surfaces.

Standard fundamental preparation technique¹

The success rate is impressive for Maryland Bridge that has the prescribed resistance and retention in the form of.

- Nearly parallel opposing walls i.e. 6 degree taper.
- A specific path of insertion.
- Sufficient occlusal clearance.
- Maximum coverage of virgin enamel.
- Vertical stops.

Fundamental consideration of the anterior Maryland Bridge

- Sufficient lingual surface clearance 0.6 to 0.8 mm of occlusion (1 mm is optimal)
- Development of a cingulum rest
- Creation of an incisogingival proximal surface. Path of insertion with an identifiable supragingival finish line about 1 mm from crest of tissue.
- Additional 0.2 mm to accommodate protrusive excursions of the mandible
- Proximal-facial extension for retention without a metal display

- Possible rotational path of insertion with one proximal surface slightly undercut.

Case report

A male patient, aged 35 years came to department of prosthodontics with chief complaint of missing upper left lateral incisor(22).

Patient gave a history of loss of tooth due to trauma 1 year back. On examination it was revealed that the entire tooth was missing with an edentulous area with no space loss.

An Orthopantomogram(OPG) was taken and the radiograph revealed complete root formation of the adjacent teeth (21&23).(Fig. 1) After considering the patients wish and the clinical situation, the option of removable partial denture, full coverage fixed partial denture and implant were eliminated and it was decided to replace it with a Maryland bridge.

Tooth preparation for both 21 and 23 was done following the standard technique. Lingual preparation ended 1mm from the incisal edge and a chamfer finish line was prepared 1 mm supragingivally (Fig. 2)

An impression was made in elastomeric impression material (Aquasil - Dentsply regular set) by one step technique(Fig. 3) and sent to the laboratory.

After the metal try-in, shade selection was done using a shade guide (Fig. 4). The bisque trial of the prosthesis was done and then esthetics, mastication and speech were evaluated. After glazing, the final prosthesis was ready for cementation.

After proper isolation Maryland Bridge was cemented with resin cement (3 M ESPE-RELYX self-adhesive resin cement) (Fig. 5).

Failures of Resin Bonded Prosthesis

1. Inappropriate patient selection:
 - Alignment of teeth results in a poor path of insertion.
 - Insufficient vertical length of abutment teeth.
 - Inadequate virginal enamel for bonding.
 - History of metal sensitivity.
 - Thin labiolingual dimensions of abutments.
2. Incomplete tooth preparation:
 - Insufficient proximal and lingual surface reduction.
 - Incomplete or less than 180 degree extension of “wraparounds”.
 - Lack of accommodation to mandibular excursion i.e. protrusive
3. Bonding:
 - Contamination
 - Prolonged mixing
 - Inappropriate luting agent

Summary and Conclusion

The literature is replete with research on the micro retentive, noninvasive techniques

associated with the adhesive bridge⁴.

The reality is:

- Patient selection should be a discriminating procedure.
- Tooth preparation is arduous because of its intricate, demanding design and vision is impaired by white-on-white surfaces.
- Bonding is regimented procedure with a predetermined, coordinated effort between dentist and assistant.
- Laboratory implementation requires informed, diligent technicians.
- Patient education as to the intent and limitations of the conservative procedure is necessary.

The adhesive FPD is promising, imaginative treatment to augment traditional Fixed Prosthodontics.

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Legends

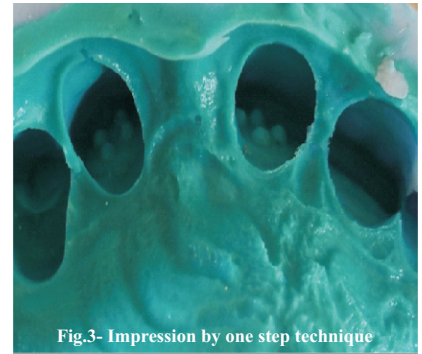


Fig.3- Impression by one step technique



Fig.4- Metal try-in

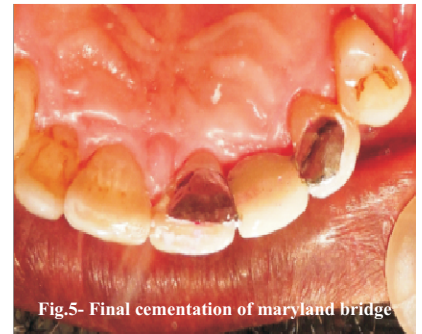


Fig.5- Final cementation of maryland bridge

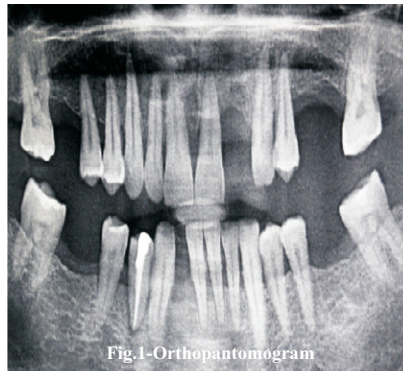


Fig.1-Orthopantomogram

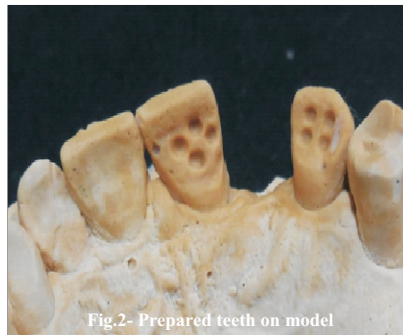


Fig.2- Prepared teeth on model