

A New Design for Anterior Fixed Partial Denture, Combining Facial Porcelain and Lingual Metal; PTU Type II

A. Pahlevan ¹

¹ Assistant Professor, , Department of Operative Dentistry, Faculty of Dentistry, Tehran University of Medical Sciences, Tehran, Iran

✉ Corresponding author:
A. Pahlevan, Department of Operative Dentistry, Faculty of Dentistry, Tehran University of Medical Sciences, Keshavarz Bulv., Gods St., Post Code: 14147, Tehran, Iran.
ayoubpahlevan@yahoo.com

Received: 17 December 2004
Accepted: 6 June 2005

Abstract:

A new design for replacing a missing anterior tooth is described. In this article, a lingually fixed partial denture, its advantages, disadvantages, indication and contraindications have been explained. The ability of this design to replace a single missing central or lateral incisor is discussed.

Key Words: Anterior bridge; Porcelain bridge; New esthetic bridge

Journal of Dentistry, Tehran University of Medical Sciences, Tehran, Iran (2005; Vol: 2, No.3)

INTRODUCTION

The advent of the acid-etched resin bonded retainers has been one of the most significant events in prosthodontics. Rochette [1] first described a perforated retainer as a periodontal splint. Howe and Denehy [2] adapted this method, using frameworks without retention holes. Later Livaditis and Thompson [3] reported electrolytic etching of non precious alloy in the area of the retainer to provide micromechanical retention. This system is now in wide use replacing both anterior and posterior missing teeth. In spite of the vast popularity of this technique and advocating many methods to improve retentions, recently a growing number of dentists have reported that the restoration is not as effective as previously believed. The failure generally occurs at the metal-resin interface.

In this article a new approach to replacing missing anterior incisors has been described to overcome problems associated with resin-bonded retained fixed-partial dentures.

Indications of this lingually fixed partial denture (LFPD) are:

- Replacement of missing central or lateral incisors where the enamel on the abutment teeth is sound and esthetically acceptable.
- When implants are restricted.
- When there is enough over jet.
- When esthetics is the main purpose.

Contraindications of LFPD:

- When the abutment teeth need a form and/or color correction.
- Short abutment teeth.
- Edge to edge occlusion.
- Inadequate over jet.
- When function is the main concern.

MATERIALS AND METHODS

Patient Selection:

This type of conservative fixed-partial denture is used to replace a single missing anterior tooth, where the abutment teeth have a beautiful and sound enamel tissue (Fig.1). The most favorable occlusal relationship is where little or no centric contact is present. If the overjet is not enough, a minimal preparation of the lingual enamel of the abutment teeth is mandatory.



Fig. 1: A: Missing upper central incisor and B: Missing lower incisor

Tooth Preparation:

Tooth preparation is restricted to the lingual surface and consists of class III or Hollow ground shape cavities on the lingual proximal surfaces of the abutment teeth from a lingual direction. These cavities should be facing each other on the abutment teeth. If the over-jet is inadequate, minimal preparation of the lingual enamel surface of the abutment teeth should be performed using a pear shape diamond bur. Care should be taken to avoid exposure of the dentin.

Impression:

An accurate impression material such as additional silicon material is recommended.

Laboratory Procedure:

The metal framework is fabricated through the two Hollow ground depressions with the bridge pontic (NON precious, therma bond VNP™). The framework is tried in the mouth and the fitness is examined (Fig 2). It is then sent to the laboratory and the porcelain laminates along with the porcelain pontic are fabricated.

The final visit consists of checking the finished restoration for proper fitness and

color. The patient is allowed to view the bridge in place with a drop of water prior to cementation (Fig 3).

Cementation:

Cementation involves the routine enamel dentin bonding procedure on the enamel and dentin on the lingual surfaces of the abutments. The abutment teeth are polished, rinsed and dried. The matrix strips are placed adjacent to the abutment teeth to prevent etching of the adjacent teeth. The enamel dentin bonding is used to bond the LFPD to the abutment teeth. The coupling agent is applied to the internal surface of the laminate according to the manufacturer's instructions. The lingual surface of the abutments are etched and rinsed and dried. Enamel-dentin bonding is applied on the etched lingual surface according to the manufacturer's instructions. The laminates are filled with the dual cured cement, the LFPD is seated and the resin is cured using visible light cure.

The margins are trimmed by using micro fine diamonds and diamond polishing paste. The occlusion must be checked in centric and lateral protrusive movements.



Fig. 2: A lingual framework; Labial view of metal frame work (A, C) and B represent the lingual view



Fig. 3: Final restoration, labial view of bridges.

Cementation:

Cementation involves the routine enamel dentin bonding procedure on the enamel and dentin on the lingual surfaces of the abutments. The abutment teeth are polished, rinsed and dried. The matrix strips are placed adjacent to the abutment teeth to prevent etching of the adjacent teeth. The enamel dentin bonding is used to bond the LFPD to the abutment teeth. The coupling agent is applied to the internal surface of the laminate according to the manufacturer's instructions. The lingual surface of the abutments are etched and rinsed and dried. Enamel-dentin bonding is applied on the etched lingual surface according to the manufacturer's instructions. The laminates are filled with the dual cured cement, the LFPD is seated and the resin is cured using visible light cure.

The margins are trimmed by using micro fine diamonds and diamond polishing paste. The occlusion must be checked in centric and lateral protrusive movements

DISCUSSION

Acid-etched resins bonded fixed prosthodontics have been used in dentistry for over 20 years. These techniques preclude the need for extensive preparation of the abutment teeth. The advantages such as esthetics, simplicity, cost, conservation of the tooth tissue and laboratory-time have made this method popular in a wide range, for replacing missing anterior teeth in several countries

around the world.

In spite of the advantages, there are some problems associated with this technique including debonding and grayish discoloration of the tooth due to light transillumination (Illumination or elucidation) throughout the tooth. Various methods including macro-mechanical and micro-mechanical retention as well as chemical etching have been designed to bond the metal to the enamel surface [4-6]. Despite all efforts to increase the bond strength between metal and resin, this type of bonding still remains a problem and there is always a chance for failure in metal resin bonding.

The bond strength of composite resins to porcelain has been found to be greater than that of composite to metal. The bond strength of porcelain with intermediate bonding agents and composite has been shown to be up to 30 MP [7,8].

In this method, the retainers are porcelain, which could make a strong bond with the resin composite. The joints of the bridge, which are subjected to forces, have been reinforced with the metal bar. The method is quite simple and overcomes the problem of metal shining through. The appearance of the bridge particularly in the lower jaw is quite satisfactory.

Strong bonding has the advantage of reducing the susceptibility to recurrent caries, which could be seen more often with etched-cast bridges. Also, due to higher thickness and

surface roughness, and lower esthetics, the newly introduced reinforced fiber composites (RFC) can not compete with porcelain bridges [9]. The indications of this technique are the same as those of metal cast etched bridges.

The present method offers an alternative to etched cast metal bridges which provides excellent cosmetic and stronger bonding.

In brief, advantages of LFPD are:

- No or little tooth preparation.
- Preservation of tooth structure.
- Simplicity of technique.
- No grayish discoloration due to metal effect.
- Stronger bond between porcelain and resin as compared to the bond between metal and resin.
- Beautiful appearance from the labial and lingual views.
- Good biocompatibility with gingival tissues.

Disadvantage(s) of LFPD are difficult fabrication, placement, and expenses as compared to Maryland type bridge.

REFERENCES

1. Rochette AL. Attachment of a splint to enamel of lower anterior teeth. *J Prosthet Dent* 1973;30:418-23.
2. Howe DF, Denehy GE. Anterior fixed partial dentures utilizing the acid-etch technique and a cast metal framework. *J Prosthet Dent* 1977; 37: 28-31.
3. Livaditis GJ, Thompson VP. Etched castings: An improved retentive mechanism for resin-bonded retainers. *J Prosthet Dent* 1982; 47: 52-58.
4. Hudgins JL, Moon PC and Knap FJ. Particle-roughened resin-bonded retainers. *J Prosthet Dent* 1985; 53: 471-476.
5. Shen G, Forbes J and Boettcher R. Resin-bonded bridge bond strength using a cast mesh technique [Abstract]. #464 *J Dent Res*. 1983; 63: 221.
6. Tanka T, Nagata K, Takeyama M, Atsuta M, Nakabayashi N, Masuhara E. 4-META opaque resin-- a new resin strongly adhesive to nickel chromium alloy. *J Dent Res* 1981; 60: 1697-1706.
7. Beck DA, Janus CE and Douglas HB: Shear bond strength of composite resin porcelain repair materials bonded to metal and porcelain. *J Prosthet Dent* 1990;64:529-533.
8. Appeldoorn RE, Wilwerding TM, Barkmeier WW. Bond strength of composite resin to porcelain with newer generation porcelain repair systems. *J Prosthet Dent*. 1993; 70: 6-11.
9. Jia W, Yang z, Prased A Polymer based conquest sculpture crown and bridge composite material properties according to ISO and ADA standards/specifications Wallingford. CT: Jeneric/Pentnon, 1997:1-10

طرح جدید پروتز فیکس قدامی با ترکیبی از پرسن در سطح فاسیال و فلز در لینگوال: نوع II PTU

۱. پهلوان^۱

^۱ نویسنده مسؤول؛ استادیار گروه آموزشی ترمیمی، دانشکده دندانپزشکی، دانشگاه علوم پزشکی تهران، تهران، ایران

چکیده

در این گزارش، طرح جدیدی جهت جایگزینی یک دندان قدامی از دست رفته ارائه شده است. این طرح، یک پروتز پارسیل ثابت لینگوالی است و در این مقاله مزایا، معایب، موارد مصرف و منع مصرف آن شرح داده شده است. توانایی این طرح در جایگزینی یک تک دندان قدامی سانتترال یا لترال نیز مورد بحث قرار گرفته است.

واژه‌های کلیدی: Bridge قدامی؛ Bridge پرسن؛ پروتز پارسیل ثابت

مجله دندانپزشکی دانشگاه علوم پزشکی و خدمات بهداشتی، درمانی تهران (دوره ۲، شماره ۳، سال ۱۳۸۴)