

# Incorporating modified ovate pontic design for anterior tooth replacement: A report of two cases

## Clinical Report

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### ABSTRACT

Pontic is the raison d'être of a fixed partial denture. The design of the prosthetic tooth will be dictated by aesthetics, function, ease of cleaning, maintenance of healthy tissue on the edentulous ridge and patient comfort. Proper design is more important for hygiene and good tissue health than the choice of material. An ovate pontic has been recommended to fulfill both aesthetic and functional requirements. The convex design of this pontic was intended to form a concave soft tissue outline in the site of the alveolar ridge mucosa. Clinically healthy conditions can be established at pontic sites if appropriate plaque control is performed. As the ovate pontic suffers from certain disadvantages, the modified ovate pontic design was developed to circumvent the problems encountered with the ovate pontic. A report of two cases will be presented where the modified ovate pontic design was employed for replacing upper anterior teeth.

**KEY WORDS:** Aesthetic restoration, modified ovate pontic, ovate pontic, ridge preservation

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### INTRODUCTION

Pontic design is important and should be determined prior to fixed partial denture construction. Four basic types of pontics have been used over the years: sanitary (hygienic), ridge lap (full ridge lap, total ridge lap), modified ridge lap, and ovate. The sanitary pontic is nonaesthetic and not for use in the cosmetic zone. Total ridge lap pontic has reasonably good aesthetics, but concave tissue surface acts as a food trap and is contributory to tissue inflammation. Modified ridge lap promotes easier cleansing than total ridge lap, but there is not enough air seal for speech. Saliva may be forced through this space during speech and food gets trapped at lingual triangle open area. The ovate pontic was developed by Abrams<sup>[1]</sup> in 1980. Instead of a concave shape at the tissue surface, it was created with a convex shape to overcome the disadvantage of the ridge lap or modified ridge lap pontics. It is indicated for anterior and posterior teeth. It combines excellent aesthetics with emergence profile. The

pontic is easier to clean than the modified ridge lap pontic. However, the height of contour of the convex surface was designed close to the center of the base, and sometimes floss cannot pass through the center of pontic, especially in thin scalloped periodontium, in which there is a longer distance from the top of the papilla to the labial gingival margin. The convex nature of the ovate pontic was created to develop the correct emergence profile. However, in contrast to the requirements for pontics, which suggest the importance of pressure-free contact over a small area, the ovate pontic comes into contact with a larger area of the underlying soft tissue and applies very light pressure. Its major disadvantage is that it requires a sufficient faciolingual width and apicocoronal thickness to house the ovate pontic within the edentulous ridge. The modified ovate pontic design was developed and described by Liu<sup>[2]</sup> in 2003. It meets all the requirements that one desires in a pontic, where as the other types of pontics may not.

The modification of the ovate pontic involves moving

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the height of contour at the tissue surface from the center of the base to a more labial position. It does not require as much faciolingual soft tissue thickness to create an emergence profile. It is much easier to clean compared with the ovate pontic owing to the less convex design. Its major advantage over the ovate type is that often there is little or no need for surgical augmentation of the ridge. The height of contour at the tissue surface of the pontic is 1 to 1.5 mm apical and palatal to the labial gingival margin. Dental floss can be used to push the labial gingival margin away and cleanse the tissue surface without any difficulty, in contrast with other pontic types. The labial gingival margin rebounds after the dental floss is removed. The tissue surface of the modified pontic is less convex than that of the ovate pontic. It is indicated in anterior and posterior teeth, with high smile line [Table 1].

Of all the available ridge-management techniques<sup>[2]</sup> to aesthetically enhance restorations, the 'immediate pontic technique' suggested by Spear<sup>[3]</sup> maintains the interdental papilla following anterior tooth removal. The provisional fixed dental prosthesis is modified to prevent the socket from collapsing and to imitate the natural emergence profile. It can be employed when the dentist is presented with the opportunity of restoring a hopeless tooth in the cosmetic zone.

The cases presented employ the immediate modified ovate pontic design as a technique for ridge management.

## CASE REPORTS

### Case 1

- A middle aged male patient came to the Department of Prosthodontics with the chief complaint of mobile upper right central incisor. He had a history of road traffic accident six years back, when the upper central incisor was subluxated and splinted to the adjacent teeth followed by root canal treatment and an acrylic jacket crown [Figure 1]. Radiograph revealed external resorption and insufficient bone support. Pulp vitality test revealed that

abutment teeth 12 and 21 were vital. Thorough oral prophylaxis and hygiene instructions were given.

- Alginate impressions (Tropicalgin, Zhermack Spa, Badia, Polosine (Ro) Italy) were made.
- Arbitrary tooth preparation was done on the obtained cast.
- Ovate pontic site was defined after removing 11 on the cast [Figures 2 and 3].
- Provisional acrylic fixed dental prosthesis (FDP) (Crown material, DPI heat cure acrylic, DPI dental products, India) with modified ovate pontic was prepared with the help of a putty external surface form.
- Tooth preparation was done on the abutment teeth followed by atraumatic extraction of 11.
- Provisional FDP was cemented with temporary luting cement (Zinc oxide eugenol, DPI products, India) after necessary adjustment [Figure 4].
- Patient was dismissed after thorough oral hygiene instructions.
- Recall visits were planned on the next day, after one week, and one month later
- After one and a half months, healing of the site was found to be satisfactory [Figure 5].
- Modifications were done to the abutment teeth and final impressions made with Addition silicone (Reprosil light and heavy body, Dentsply Caulk, Milford, USA) taking care to record the ovate pontic site using overt pontic circumferential index as described by Dylina.<sup>[4]</sup>
- Master casts was poured in die stone (Kalrock, Kalabhai karson Pvt Ltd, India) and pattern fabrication, investing, and casting was done with a base metal alloy (Wiron 99).
- Metal try in [Figure 6] and shade selection was done followed by porcelain application (VMK 95 Metall Keramik, vita Zahnfabrik, Bad sackingen, Germany).
- Definitive prosthesis was cemented with provisional cement for one month followed by permanent cementation with type I glass ionomer cement (Fuji 1, GC, USA) [Figures 7-9].
- Oral hygiene instructions were reinforced at each clinical visit.

Table 1: Characteristics of ovate and modified ovate pontics designs

Characteristic	Ovate, Abrams <sup>[1]</sup> (1980)	Modified ovate, Liu <sup>[2]</sup> (2003)
Indication	Anterior and posterior teeth, high smile line	Anterior and posterior teeth, high smile line
Contraindication	A thin, knife edge ridge	-
Esthetic concern	Excellent esthetics and emergence profile	Excellent esthetics and emergence profile
Tissue surface of pontic	Convex	Convex
Hygiene	Easier than modified ridge lap; sometimes floss cannot pass in center of pontic	Easiest to floss and maintain hygiene
Disadvantages	Ridge augmentation surgery needed if ridge collapsed	May leave shadow in apical area of tooth-gingival margin in Class I ridge defect and high smile line
Advantages	Creates illusion of free gingival margin and papilla Minimizes "black triangles"	Creates illusion of free gingival margin and papilla Minimizes "black triangles" Requires less ridge augmentation surgery than ovate pontic



**Figure 1:** Preoperative case 1



**Figure 2:** Diagnostic cast



**Figure 3:** Ovate pontic site preparation on diagnostic cast



**Figure 4:** Provisional fixed dental prosthesis



**Figure 5:** Modified ovate pontic site



**Figure 6:** Metal try in



**Figure 7:** Definitive prosthesis



**Figure 8:** Definitive prosthesis partially seated



Figure 9: Postoperative view



Figure 10: Case 2 preoperative



Figure 11: Preoperative radiograph



Figure 12: Provisional fixed dental prosthesis case 2



Figure 13: Healed modified ovate pontic site



Figure 14: Definitive prosthesis



Figure 15: Post operative view

#### Case 2

A middle aged male patient reported to the department when he accidentally fractured his root canal treated upper right central incisor [Figure 10]. Radiograph revealed insufficient obturation and the fractured tooth was tender on percussion with insufficient remaining crown structure [Figure 11]. Immediate interim fixed dental prosthesis was planned following extraction of fractured 11 as adjacent teeth required restorations.

- Diagnostic wax up of the fractured tooth was done and a putty external surface form (Reprosil, Dentsply Caulk, Milford, USA) was fabricated which was later used for interim FDP fabrication.

- Tooth preparation was done followed by atraumatic extraction of fractured tooth 11.
- Provisional FDP incorporating the modified ovate pontic design was cemented with temporary luting agent [Figure 12].
- Patient was dismissed after thorough oral hygiene instructions.
- Definitive prosthesis was fabricated as described for Case 1 [Figures 13-15].

## DISCUSSION

Socket-preservation techniques should be performed at the time of extraction to create the tissue recess from which the ovate pontic form will emerge. For a pre-existing residual ridge, soft tissue surgical augmentation is typically required. In either case, meticulous attention to the contour of the pontic of the provisional restoration is essential when conditioning and shaping the residual ridge.

Pontics of fixed partial dentures have to fulfill esthetic, functional, and hygienic requirements. For years, controversy has existed regarding the pontic surface abutting the tissue. With the use of the ridge lap pontic, alveolar ridge deficiencies were accommodated, but oral hygiene was difficult because of the concave pontic design. The sanitary pontic and the modified ridge lap pontic were developed to avoid or minimize any contact between the pontic and edentulous ridge mucosa, but they did not satisfy the esthetic requirements. The ovate pontic was developed to fulfill esthetic and functional requirements. Its convex pontic design was intended to fabricate a concave soft tissue outline in the edentulous ridge mucosa. However, at times floss cannot pass through the center of pontic, especially in anterior teeth area, where the distance from the top of papilla to the labial gingival margin is longer than in posterior teeth area. The cemento-enamel junction is more curved in anterior teeth, and there is more convexity as compared with posterior teeth

area. The modified ovate pontic was developed to circumvent this problem. This pontic is less convex and often requires little or no ridge augmentation. Some investigators<sup>[5]</sup> have reported that soft tissue-contacting pontics have been associated with clinical signs of inflammation such as swelling, edema, and histologic changes. Oral hygiene was not the main concern of these investigators; their primary concerns were the composition and surface texture of the pontic material, the design of the pontic, and the degree of pressure placed on the edentulous ridge mucosa by the pontic.

Zitzmann and colleagues' study on premolars and molars noted that an edentulous space with an ovate pontic supported by adequate oral hygiene was not associated with overt clinical signs of inflammation.<sup>[6]</sup> Histologically, the ovate pontic design was associated with a thinner keratin layer and with changes in the composition of the connective tissue component subjacent to the epithelium.

Silness and colleagues<sup>[7]</sup> reported that clinically healthy conditions can be established at pontic sites if appropriate plaque control with dental floss and/or super floss is performed.

The modified ovate pontic has less soft tissue-contacting surface and less curvature than the ovate pontic. This modified pontic fulfills not only the esthetic and functional demands but also the hygienic requirements. It is much easier to clean than the ovate pontic.

The modified ovate pontic design and its proposed advantages over ovate pontic design have been outlined. Two cases where immediate ridge management technique utilizing interim fixed dental prosthesis using modified ovate pontic, followed by definitive prosthesis have been described.

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