



RESEARCH ARTICLE

MODIFIED OVATE PONTIC –AN ESTHETIC UNRAVELLING FOR ANTERIOR TOOTH REPLACEMENT

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ABSTRACT

The pontic design in anterior edentulous region is primarily influenced by aesthetic and phonetic factors and secondarily by residual soft tissue contour. One of the most challenging issues in dental treatment plan is to preserve interproximal tissue after the loss of tooth, which is detrimental in terms of esthetic outcome. A valuable solution is ovate pontic which creates the illusion of the tooth growing out of the gingiva and thereby, provides with best aesthetic result adjuvant to creation and maintenance of interdental papilla, ease of cleansibility with beneficence for elimination of 'black triangle' spaces.

INTRODUCTION

The loss of anterior tooth is severe emotional trauma to patient and if the replacement does not simulate the natural tooth the impact on psychology is multifold. Mere replacement of tooth does not serve the purpose of high aesthetic outcome with added challenge to preserve the interproximal soft tissue in ridge defects involving considerable hard and soft tissue loss. (Edelhoff *et al.*, 2002) Pontic is the *raison d'être* of a fixed partial denture. An ovate design is most esthetically pleasant carrying convex tissue surface that resides in the residual depression or hollow so that the tooth appears to be literally emerging out from gingiva. Dewey and Zugsmith coined the term ovate pontic in 1933 (Dewey and Zugsmith, 1933). Its design was developed by Abrams in 1980 (Abrams, 1980). Primarily indicated when economic condition is low, or edentulous site is not healthy enough to warrant an implant placement. However, a modification to former design was developed that involves moving the height of contour at the tissue surface from the centre of the base to a more labial position, this does not require much of faciolingual thickness to create an emergence profile, compared to ovate design it is easier to clean owing to less convex design.

It aids in effective air seal, and minimizes the black triangles between the teeth with little or no ridge augmentation required (Robert, 2004). It is important to preserve the socket shape and the architecture of the gingival tissue in order to preserve the tissue height for post-restoration aesthetics (Dylina, 1985). This case report attempts to describe a situation with traumatic avulsion of anterior tooth that was restored by pretreatment socket preservation of recipient site and modification in pontic design.

Clinical report

A 24 year old female patient in her third trimester of pregnancy reported to the department of prosthodontics with a request for fixation of her traumatically avulsed front tooth (21). (Fig 1 & Fig.2) History revealed that traumatic avulsion took place 24 hours prior to her reporting. Clinical examination revealed a socket with stabilised blood clot in association with missing left central incisor. It was approximately 6mm in dimension. Pulp vitality test for right central incisor and left lateral incisor presented that the teeth were vital. Since avulsed left central incisor had dried completely, its replantation was negated. Patient was explained about all possible treatment modalities.

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Fig. 1. Avulsed Left central incisor



Fig. 2. Socket with saturated blood clot

With patient's informed consent a fixed partial denture with a root extension in the socket for preservation of gingival architecture was planned.

Procedure

- Maxillary and mandibular diagnostic impressions were made with irreversible hydrocolloid (*Alginate-Marieflex, Septodont*), a temporary prosthesis with labial and lingual flange along with a root like extension into the socket replacing missing incisor (Fig.3) was fabricated in autopolymerising acrylic resin. (DPI Cold cure Acrylic Repair Material: Mumbai) so as to preserve the socket until end of pregnancy.
- Post pregnancy, 11 and 22 were selected as abutments and were prepared with shoulder margin to receive a full veneer porcelain fused to metal bridge.
- For enhancement of architecture, soft tissue contouring using electrocautery was opted to simulate the free gingival marginal contour at the edentulous site similar to that associated with 11. (Fig.4)
- In the same appointment, a provisional fixed partial denture was fabricated in tooth coloured autopolymerising resin. (DPI Cold cure Acrylic Repair Material: Mumbai)

- Modified pontic having a root like extension of 4 to 5 mm (Fig.5) was fabricated, the provisional denture was luted over the prepared abutments using temporary cement (TempBondNE; Kerr, USA).
- After 3 to 4 weeks, healing and soft tissue profile of pontic site was assessed. Final impression was made using double mix (putty wash), single stage technique with polyvinyl siloxane impression material. (Aquasil, Denstplytm India).
- Dies were prepared from final impression poured in Type IV dental stone (Kalrock, Kalabhai karson Pvt Ltd, India),
- Wax pattern for copings in inlay wax was then invested and casted in cobalt chromium alloy (Wiron 99 BEGO, USA).
- Metal try-in of copings was followed by ceramic build-up. (Fig.6)
- The dimensions of root extension casted in metal for modified pontic was 3 mm in length apicocoronally, 2mm buccolingually and 1.5mm mesiodistally so as to provide room for ceramic build-up.
- Definitive prosthesis with respect to 11, 21, 22 was cemented with type I glass ionomer cement (Fuji 1, GC, USA). (Fig.7)
- Patient was dismissed after thorough oral hygiene instructions. Recall visits were planned on the next day, after one week, and one month later respectively.
- After three months, healing of the site was found to be satisfactory. Oral hygiene instructions were reinforced at each clinical visit.



Fig. 3. Provisional Removable partial denture



Fig. 4. Scalloped Contour of Pontic site



Fig.5. Provisional Fixed partial denture



Fig.6 Metal Try-in



Fig.7. Final Prosthesis

DISCUSSION

Local defects of the alveolar ridge often complicate conventional restorative measures. In this case report the patient was informed and advised about various other replacement options that included implant placement, and conventional fixed partial denture. Since the patient desired for economical treatment, implant therapy was ruled out. Moreover, a conventional fixed partial denture would have resulted in loss of gingival architecture along with prolonged waiting for complete healing of socket.

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. Five basic types of pontics have been used over the years: sanitary (hygienic), ridge lap (full ridge lap, total ridge lap), modified ridge lap, ovate and conical. 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. Ovate pontic was developed to fulfill esthetic and functional requirements.

Moreover, loss or shrinkage of interdental papillae due to recession of underlying interdental bone predispose to empty spaces that lie between the tip of recessed papilla and interdental contact point, these spaces popularly known as black triangles. They are predominantly associated with teeth having triangular shape particularly maxillary and mandibular incisors. In the above case, a provisional restoration not only replaced the missing tooth but also maintained the profile of interdental papilla to prevent its future recession leading to black triangles. 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. The term modified pontic was coined by Liu in 2003. 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. It is indicated in anterior and posterior teeth, with high smile line, since the pontic is less convex and often requires little or no ridge augmentation. Some investigators have reported that soft tissue contacting pontics have been associated with clinical signs of inflammation such as swelling, edema, redness along with histologic changes. (Valderhaug, 1980) 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 exerted on the edentulous ridge mucosa by the pontic. (Stein, 1966) 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. (Zitzmann *et al.*, 2002) Silness and colleagues reported that clinically healthy conditions can be established at pontic sites if appropriate plaque control with dental floss and/or super floss is performed. (Silness *et al.*, 1982) The modified ovate pontic has less soft tissue contacting surface and less curvature than the ovate pontic. (Tolboe *et al.*, 1988; Johnson and Leary,

1992) This design not only fulfills the esthetic and functional demands but also is amendable to easy cleaning.

Conclusion

The final restoration was functionally sound, easy on hygiene maintenance, acceptable in form as it appeared to be emerging out of the gingiva with possible elimination of black triangles in anterior zone. All of this was possible because an adequate ridge contour was maintained at all the times by socket preservation and soft tissues contouring by electro cautery to support a modified pontic. Moreover, root extension in definitive prosthesis will maintain the gingival contour at cervical third of prosthesis particularly indicated in high smile line cases

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