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A TECHNIQUE TO CONDITION SOFT TISSUE AROUND FIXED RESTORATION PONTIC IN THE ESTHETIC ZONE: MODIFIED OVATE PONTICS

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Abstract:

Restoring a missing tooth in the esthetic zone poses a challenging situation to the clinician. Amongst the various pontic designs proposed in literature, the most acceptable pontic design is the ovate and modified ovate design, that can be used both in immediate and delayed extraction sites. Before the final restoration is fabricated, adequate planning and laboratory communication is required so as to modify the provisional restoration and contour the soft tissue. The present case report provides a technique to condition the soft tissue around the pontic to provide an esthetically acceptable outcome.

Key-words: sub pontic soft tissue, esthetic restoration, ovate pontics, soft tissue conditioning, contour, emergence profile, esthetics

INTRODUCTION:

One of the most challenging job for a restorative dentist is to rehabilitate the missing tooth in the esthetic zone. The pontic design must fulfil both functional and esthetic replacement of the missing tooth.^{1,2} Irrespective of being a conventional or implant retained FPD, the pontic design must be esthetically acceptable, enable adequate oral hygiene, should avoid tissue irritation and be able to mimic the emergence of a natural tooth.^{3,4,5} It should support the surrounding soft tissue and interproximal papillae to produce an illusion of emergence profile of a natural tooth.

In 1926, Brill designed and advocated the use of porcelain root extension pontics into extraction sockets to achieve optimal esthetics and hygiene maintenance. Subsequently in 1933, Dewey and Zugsmith advocated the use of Brill's pontic design for post-extraction sites.⁶ In 1980 Abrams designed the all convex ovate pontic design in post extraction sockets, to condition the soft tissue and by guiding papilla growth and stabilization.⁷ Most often the patient presents with a healed socket which has soft and hard tissue deficiency occurring post extraction. The ovate pontic contacted a larger area of the underlying soft tissue and applied light pressure on the ridge tissue, as compared with the ridge lap or modified ridge lap pontic, which were in passive contact with tissue without application of pressure.¹

Liu improvised the design of ovate pontic by making it less convex with decreased labiolingual thickness to more accurately duplicate emergence profile.⁸ This was called the modified ovate pontic design.

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CASE REPORT:

A 35-year-old female reported to the Department of Prosthodontics, with a missing maxillary left central incisor. The patient gave a history of trauma to the maxillary teeth during her childhood which led to the subsequent loss.

The patient had high lip line and the smaller occluso-gingival dimension of all anterior teeth led to a highly pronounced gummy smile. She also had internal stains in all her teeth akin to fluorosis [Figure 1]. The overall gingival health was good and the mucosa in the edentulous space was thick and keratinized. Subsequent radiographs revealed no underlying pathology. Study cast analysis revealed that the mesio-distal width of the edentulous space of the pontic site was almost double of the incisal-gingival height present. The adjacent right central incisor and left lateral incisor also revealed a major discrepancy in proportion of their length as compared to the width. The patient wanted a non-surgical esthetically acceptable solution for the missing tooth simultaneous with improvement in color and appearance of her anterior teeth.

The treatment plan designed was to rehabilitate the missing tooth with a three-unit bridge with an ovate pontic. Individual crowns for teeth 12, 13, 14, 15,24,25 in order to improve the color (fluorosis stains), the length to width ratio and proportion



Fig 1: Preop



Fig 2: After crown preparation



Fig 3: Cast analysis : buccolingual dimension



Fig 4: Cast analysis : mesiodistal dimension



Fig 5: Cast



Fig 6: Provisionals



Fig 7: Provisionals cemented



Fig 8: Tissue conditioning done by provisionals



Fig 9: Cast analysis and conditioning done second time

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of all the anterior teeth. It was estimated that a gradual conditioning of the soft tissue will require a set of provisional with modified ovate pontic design; so as to stimulate the growth of papilla around the pontic and achieve desired esthetic result.

Teeth preparation was done following all the biomechanical principles and impression was made using addition silicone impression material in a stock tray. A working cast was obtained subsequently and cast analysis was done.[Figure 2,3,4]. On the working cast, a shallow depression of up to 2mm was created in the edentulous space to allow fabrication of an ovate tissue surface for the pontic and subsequently temporary crowns were fabricated in auto-polymerizing tooth colored acrylic [Figure 5,6]. The intaglio surface of the temporary ovate pontic was polished to a smooth gloss. The depression that was created did not coincide with the dimensions of the final restoration;

the goal was to slowly push and shape the mucosa in increments so that better and predictable results are achieved. Temporary crowns were luted using eugenol free temporary cement [Figure 7]. This approach allowed sufficient adaptation and healing of the pressurized mucosa, leading to stimulation of the papilla and decreasing the risk of the mucosa getting receded. The patient was given oral hygiene instructions and was recalled the next day for evaluation of tissues around the pontic site which was found to be healthy.

After 1 week, the temporary crowns were retrieved from the patient's mouth and a healthy ovate depression was observed at the pontic site [Figure 8]. The same working cast was further modified by deeping the ovate depression by approximately 1 -1.5mm [Figure 9]. The temporaries were seated on the cast, and the tissue surface of the ovate pontic was relined with auto-polymerizing tooth colored acrylic and was well-polished. The temporary



cemented again

- Fig 10; Provisionals modified and Fig 11: Tissue conditioned to final dimension
- Fig 12: Tissue conditioned to final dimension



Fig 13: Fully conditioned healthy and stable tissue after 3 weeks



Fig 16: Final impression



Fig 14: Fully conditioned healthy and stable tissue after 3 weeks



Fig 17: Final prosthesis cemented



Fig 15: Gingival retraction



Fig 18: Lingual view of the final prosthesis

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crowns were checked and cemented [Figure 10]. A 24 hours follow-up was done. After 1 week the procedure was repeated and temporary ovate pontic was again relined, but, now to its final dimensions [Figure 11,12]. A 24 hours follow-up was done again.

After 3 weeks, the temporary crowns were removed. The fully conditioned and completely shaped ovate pontic site was inspected. It appeared to be healthy and normal, thereafter, decision was made to make the final impression [Figure 13,14].

A modified impression technique was used, to accurately register the modified pontic site. Prior to impression making, the existing temporary crowns were duplicated in tooth colored auto-polymerizing acrylic resin. The old temporaries were placed on the prepared teeth and were picked in a putty impression following which, the temporaries were removed from the impression. The pontic was detached from the rest of the temporary prosthesis and was reseated in the putty impression. The putty impression, with the temporary pontic in place, was relined with light body impression material and the impression was made [Figure 15,16]. The new set of duplicated provisionals were cemented.

Master casts were prepared, face bow transfer was done with subsequent articulation in a semi-adjustable articulator. The final prosthesis fabricated was a porcelain fused metal fixed partial denture comprising of individual crowns for 12, 13, 14, 15, and 23, 24, 25 and a three-unit bridge for 11, 21, and 22. At the stage of bisque trial;occlusal adjustments were done and patient's opinion was obtained. After glazing the final prosthesis was luted and excess cement was removed using floss [Figure 17,18]. The patient was educated about hygiene maintenance. Follow up was done after 1 month,6 months and a year.

DISCUSSION:

In the early twentieth century, bridges had porcelain

root pontics extending into extraction sockets or surgically prepared sites. This technique was associated with poor oral hygiene, inflammation, mucosal swelling and infections; therefore, it consequently fell out of favour.

Stein's work confirmed that mucosal contact and pressure should be avoided. Thereafter, the modified ridge lap pontic became the design of choice. However, once the importance of plaque control in maintaining mucosal health was understood, clinicians began to revisit and modify pontic designs.⁸

The ovate pontic has an all convex design making it conducive for oral hygiene without compromising esthetics. The intaglio surface of an ovate pontic is convex, smooth, highly polished and maintains a slight passive contact with the underlying mucosa.

The temporary bridge fabricated was used to apply controlled pressure on the ridge area to develop the desired contours of the pontic site without any overt signs of inflammation.

Jaques had described a non-invasive tissue sculpting technique which allowed for fabrication of a pontic with adequate emergence profile and pseudo interdental papilla.⁹

The technique used here differs from that developed by Jaques in the way that, preparation of the pontic site was done on the working cast after close calculations of the dimensions, the relining of the pontic's tissue surface was done on the working cast as opposed to Jaques's technique which was a chairside procedure.

However, a minimum 3 to 5 mm of soft tissue thickness is required to achieve optimum results so as to compress the tissue without surgical intervention.¹⁰ The controlled pressure applied by provisional restoration can be verified by ensuring, that the blanching of soft tissue subsides within 5 to 10 minutes.¹¹

The modified impression technique allowed

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the accurate transfer of the soft tissue contours. Similar techniques were described by Winston W. L. Cheeand Terry E. Donovan.^{12.13} This impression technique also prevented the tissue rebound that can happen once the provisional restoration is removed and can create a pontic space that is shallower than the intended dimensions.²

The main advantages of this technique were to contour and replicate the interdental papilla almost similar to that of natural teeth. Time allowed for healing helps to verify esthetics and phonetics. Daily hygiene practices provide continuous moderate pressure against the apex of the pontic and abutment connectors ensuring optimal tissue health.

However, the procedure is time consuming and involves multiple appointments. Attention to tissue healing and existing provisional restoration is necessary for an acceptable marginal fit. Maintenance of oral hygiene by patient plays critical role in success of the procedure

CONCLUSION:

The ovate pontic is an approach for esthetically demanding anterior bridgework. An ovate pontic design has an increased amount of mucosal contact and applies light pressure to the underlying mucosa in an attempt to improve esthetics.⁷ This pontic design addresses the issue of emergence profile esthetics, but its use must be combined with effective oral hygiene procedures to obtain a successful esthetically acceptable outcome.

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