Conservative Bridge With Natural Tooth Pontic: A Case Report

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Abstract

AIMS AND OBJECTIVES
A conservative solution for an esthetic challenge provided in a single visit and a chair side procedure to improve a smile.

CASE DESCRIPTION
Conservative solutions for the restoration of a single edentulous space in the anterior maxilla present an esthetic challenge to the clinician. A 24-year-old female patient whose left upper central tooth was planned to be extracted was referred to our department for a conservative, rapid, and economic treatment. After radiographic and clinical examinations, it was decided that the tooth which was to be extracted should be used for the restoration of its own extracted area. The extracted tooth was splinted using Ribbond fiber (Ribbond Inc., Seattle WA) to adjacent teeth with the aid of the surface modifications on extracted tooth and adjacent teeth .

CONCLUSION
The conservative bridge with natural tooth pontic satisfied the patient with a good mechanical behavior, and long-term durability.

KEYWORDS: conservative, natural tooth pontic

Introduction

Injury to anterior teeth is a psychologically traumatic experience for most patients. Although an anterior tooth has mechanical functionality, it is the compromised facial esthetics associated with traumatic tooth loss or luxation injuries that becomes the patient's primary concern. Restoration of the esthetics by immediate repositioning of luxated tooth with simultaneous functional stabilization attains utmost importance in such situations.

When a single tooth is lost from the anterior region, the patient expects immediate and esthetically pleasing restoration of the edentulous space[1]. The various prosthodontic treatment options for a single missing tooth includes conventional fixed partial dentures, a removable partial denture, and a single-tooth implant, all of which require multiple visits to achieve a desirable result. Alternatively, replacing a missing tooth in a single visit can be made possible by utilizing adhesive techniques with resin composites and glass fibers in the form of fibre reinforced conservative bridge using natural tooth pontic[2].

Fibre reinforced conservative bridge with natural tooth pontic is a simple , economical and quick method to improve the esthetics and to fulfill functional and psychological requirements of patients presenting with avulsed, subluxated or extruded anterior tooth due to trauma.

CASE REPORT

A 24 year old female patient working as a beautician came to the Department of Conservative Dentistry and Endodontics with chief complaint of extruded and mobile maxillary left central incisor.

Past dental history revealed trauma at the age of 10 years with avulsion and replantation of 21.Clinically, the patient presented with extrusion, grade II mobility and slight discolouration of the affected tooth 21[Figure 1 & 2].IOPA radiograph revealed poor bone support and associated root resorption with thin dentinal walls in relation to 21[figure 3].Tooth 22 was tender on percussion and showed delayed response on electric pulp testing

Because of poor prognosis it was decided to extract 21 and root canal treatment was planned for 22.Replacement options for the resulting edentulous space were discussed with the patient.Because of time constraints and patient's psychological expectations, it was planned to use the crown of same extracted tooth as a replacement prosthesis.The patient was duly informed about possible limitations and outcome of the procedure.

PREOPERATIVE ANALYSIS

Length of the natural tooth pontic needed was determined on a study cast of patient using the incisal edge of adjacent central incisor and location of gingival margin as reference points. This length was recorded.

PROCEDURE

Root canal treatment of 22 was initiated first.After biomechanical preparation the root canal was obturated with protaper gutta percha points and AH Plus sealer.The acess cavity was left unrestored intentionally.Extraction of 21 was performed under local anaesthesia with all aseptic measures and avoiding any traumatic tear of the marginal gingiva and interdental papilla [Fig 4a]. Pressure on the extracted site was applied with moist gauze for 30 minutes for hemostasis and clot formation.The extracted tooth was cleaned of debris using scalers (fig 4a and 4b).

The length recorded earlier was marked on the extracted tooth measuring from incisal to cervical direction.Root amputation was done along the marked line using straight fissure diamond points(fig 5).

Following pulp removal, the coronal portion of pulp chamber was cleaned with 3% NaOCl from the site of root amputation. The pulp chamber was sealed at the site of amputation with a micro-filled hybrid composite(fig6a)(FILTEC Z 250,3M ESPE) and formed into a ovate pontic shape using composite resin.(fig6b)

Multiple retentive points were made on palatal aspect of pontic to aid in micromechanical retention. [Fig 7] . Prepared pontic was tried in the edentulous space for proper positioning and tightness of proximal contacts.Pontic was adjusted mesially and distally for achieving passive contacts. [Fig 8]

A Class III cavity with palatal extention was prepared mesially on 11 to aid in retention and stabilization with Ribbond(Ribbond Inc., Seattle WA).[Fig 9].The required length of Ribbond fibre (Ribbond Inc., Seattle WA) was measured using dental floss between the adjacent teeth 11 and 22.Two pieces of adjusted length of Ribbond fibre (Ribbond Inc., Seattle WA) were cut and soaked in dentin bonding agent and kept away from light.[Fig 10]

The access cavity on 22 and conservative class III cavity on 11 along with the pontic tooth 21 were etched with 37% phosphoric acid (Scotchbond Etchant_; 3M ESPE, St. Paul, MN, USA) on the palatal and proximal surfaces.[Fig 11a &11 b].The teeth surfaces were rinsed with water and air-dried after etching. The bonding agent (Adper_ Single Bond 2; 3M ESPE) was applied and light-cured according to the manufacturer's instructions using a light-emitting device (Mini LED; Satelec Acteon Group, Merignac, France). With the help of sticky wax natural tooth pontic was carried into the desired position and stabilized using Ribbond (Ribbond Inc., Seattle WA) and passive contacts.A thin layer of flowable composite resin was applied to the palatal surface of the pontic and the adjacent teeth.The Ribbond fibre (Ribbond Inc., Seattle WA) was pressed into the resin with the aid of a composite hand instrument to ensure its close adaptation on to the pontic and adjacent tooth surfaces.The assembly was light-cured from palatal and labial directions.Excess bulk of resin was removed from palatal and embrasure areas and esthetic contouring & polishing of the restoration done. [Fig 12]

The final steps included adjustment of occlusion and esthetic contouring and polishing of the conservative bridge. The patient was informed about the importance of proper hygiene and was followed up periodically [Figure 13a]. 12 months follow up showed an intact and fuctional conservative bridge and patient was satisfied ,except for the discoloured pontic(figure 13b).In office power bleaching was planned for patient and all the limitations associated with bleaching procedure were explained to patient.In office power bleaching using pola office(SDI,BrunsdonSt,Bayswater,Victoria,3153,Australia) was carried out on 21(fig 14).Patient was completely satisfied with the result of bleaching procedure and was happy with the new and more estheticaly pleasing smile at 2 year follow up. (fig 15)

DISCUSSION

This case report describes a simple, economical and quick method to improve the esthetics of patients having extruded anterior tooth undergoing resorption with poor prognosis due to trauma. Single-tooth

Figure 1 Preoperative View

Figure 2 Preoperative View

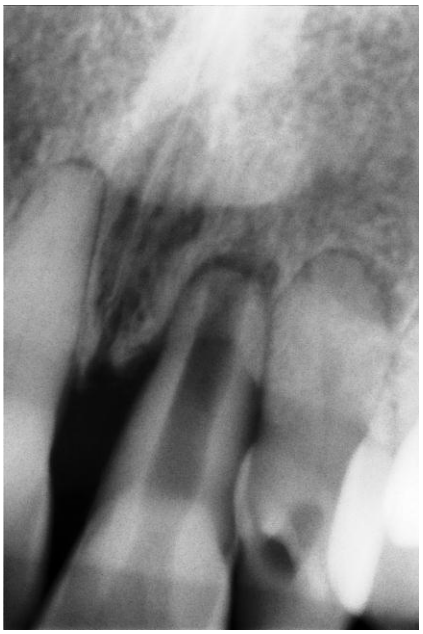

Figure 3 IOPA showing extruded 21 with poor bone support

Figure 4a photograph of extracted tooth 21

Figure 4b photograph after extraction of 21

Figure 5 coronal part after root amputation showing pulp chamber

Figure 6a sealed pulp chamber with a micro-filled hybrid composite

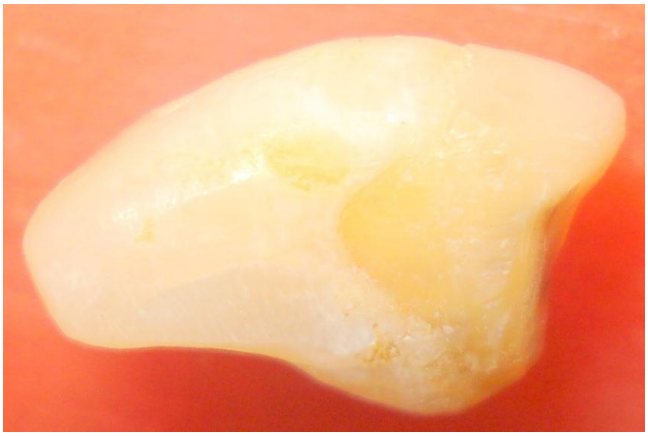

Figure 6b photograph showing ovate pontic shape

Figure 7 multiple retentive points on palatal aspect

Figure 8 photograph showing verification of size and positioning of pontic

Figure 9 photograph showing Class III cavity with palatal extention on 11 and unrestored acess cavity on 22

Figure 10 photograph showing premeasured ribbond fibre soaked in dentin bonding

Figure 11a photograph showing etching of pontic and adjacent teeth

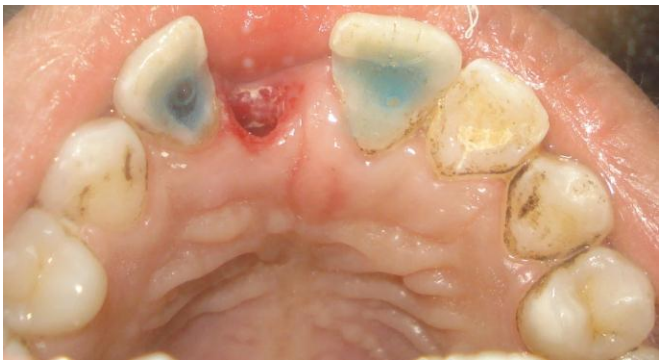

Figure 11b photograph showing etching of pontic and adjacent teeth

Figure 12 photograph showing close adaptation of fibre on to the pontic and adjacent tooth surfaces

Figure 13a postoperative view

Figure 13b After 12 months follow up

Figure 14 after In office bleaching

Figure 15 After 2 years of follow up

replacement options include conventional fixed partial dentures, a removable partial denture and a single-tooth implant.A resin-bonded fixed partial denture allows for more conservative tooth preparation[3]. Dental implants in the esthetic zone are well documented in the literature, and numerous controlled clinical trials have documented satisfactory overall implant survival and success rates[4].Such restorations are sometimes complicated by the cost of the restoration, patient's fear of the surgical procedure, and anatomical limitations. The development of adhesive systems has provided other treatment options with minimally invasive preparations and is often simpler[5,6].Replacement of a single tooth with natural tooth pontic and using ribbond was preferred in the current case to immediately restore the esthetics of patient because this chair side technique does not require laboratory procedures[7]. The use of the extracted tooth, aided by the impressive bond strength of dental adhesive materials,provides an option to treat patients with less invasive tooth preparation, favorable esthetics, and a natural feeling.

The key to Ribbond's success (and what distinguishes Ribbond(Ribbond Inc., Seattle WA) from the other fiber reinforcements) is its patented leno weave designed with a lock-stitch feature that effectively transfers forces throughout the weave without stress transfer back into the resin, Ribbond's weave also provides excellent manageability characteristics.

Having virtually no memory, Ribbond(Ribbond Inc., Seattle WA) adapts to the contours of the teeth and dental arch.In addition, unlike loosely braided or bundles of unidirectional fibers, Ribbond does not spread or fall apart when manipulated.

According to a clinical 5-year follow-up pilot study, glass-FRC fixed partial dentures exhibited an overall survival rate of 75% and functional survival rate of 93%[8]. Previous attempts at chairside tooth replacement involved using various types of pontics, such as the extracted tooth[9], porcelain denture teeth[10], and resin composites[10,11]acrylic denture teeth (with or without lingual wire reinforcement) [12].In this case, patient's own tooth was used as a pontic which was extracted due to extrusion and apical resorption associated with alveolar bone loss.

Bonding of the pontic to adjacent teeth is important for the success of conservative bridges. The predominant location of debonding with resin-bonded fixed partial dentures is between the luting cement and the framework of the denture[13] .Good adhesion could be managed by adding more fibre to the present fibre frame. The fracture resistance of a three-unit provisional fixed partial denture was found to be increased by adding glass-fibre reinforcement[14].In present case, for better adhesion the access cavity on 22 was intentionally left unrestored initialy and a conservative class3 cavity with palatal extension was prepared on mesial surface of 11 for obtaining bonding areas. Furthermore, for maximum strength, two Ribbond fibres(Ribbond Inc., Seattle WA) were adapted onto the retentive points made on pontic and prepared cavities on 22 and 11.

In conclusion, this report describes a simple, economical, rapid and conservative chairside technique for restoring a single anterior tooth using the patient's own extracted tooth and ribbond fibre. This chair side technique does not require laboratory procedures. Patient gets immediate benefit by repositioning the extracted tooth. The conservative bridges with natural tooth pontic can make patient happier and more confident.

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