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CASE REPORT

ANTERIOR FOUR UNIT ZIRCONIA RESTORATION: AN INTERDISCIPLINARY APPROACH

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ABSTRACT

The awareness of aesthetics is increasing along with the patients expectations. Metal Ceramic restorations had been widely used past many decades in dentistry. Due to the advantages of all ceramic materials the use of these restorations is preferred. Restoring anterior aesthetics with Fixed Dental Prosthesis (FDP) considers facial , dental and gingival aesthetics. To achieve these, interdiciplinary approach is a good option of choice.

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INTRODUCTION

The demand of all ceramic restorations has been increasing in today's generation as aesthetics being the prime concern. The use of all ceramic restorations is due to its recent advances and its obvious advantages over metal ceramic restorations (Griggs, 2007). In an anterior fixed dental prosthesis (FDP) all ceramic restorations provide excellent results due to the shade resemblance with adjacent teeth along with patient satisfaction.Zirconia (zirconium dioxide, ZrO_2), also called as "ceramic steel", has optimum properties for dental use: superior toughness, strength, and fatigue resistance, in addition to excellent wear properties and biocompatibility with excellent translucency (Luthardt *et al*., 2002). Studies have shown 93% survival rates over 5 years for zirconia and 89% survival rates over 5 years for all ceramic FDP's (Schwass *et al*., 2013). Aesthetics involves matching the facial aesthetics with the dental aesthetics and similarly dental aesthetics with the gingival aesthetics. Facial aesthetics includes facial analysis, facial type, facial symmetry and smile analysis.

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Dental aesthetics includes dental midline, tooth dimension, tooth inclination. Gingival aesthetics includes gingival symmetry, gingival zenith, gingival health and harmony (Julie *et al*., 2002; Mohan Bhuvaneswaran, 2010; Chu *et al*., 2009). In order to achieve this, an interdisciplinary approach is necessary (Spear *et al*., 2006). This article describes an interdisciplinary approach to achieve optimal aesthetics for a four unit anterior zirconia restoration.

Case History: A 23 yr old female patient reported with chief complaint of missing teeth and wanted replacement for the same. Past dental history revealed extraction 8 years back. On examination the missing tooth was 21 and the pontic space was compromised due to the drifting with 11, 12 and 22, the dental midline was not coinciding with the facial midline, 12 and 22 were distolabially rotated (Figure 1) and the frenum attachment was high. Electric pulp testing was done with 11, 12 and 22 which revealed 11was non vital and 12 and 22 were vital teeth. The patient was suggested for an orthodontic treatment followed by prosthetic rehabilitation. Patient was not willing for orthodontic treatment because of the time duration involved so other treatment option was planned and explained to the patient. The treatment plan was an interdisciplinary approach which included extraction with 11, osteoplasty in 21 region,

Figure 1. Intraoral image showing drifting of teeth and compromised pontic space

Figure 2. Mock up done to show the final outcome of prosthesis to patient

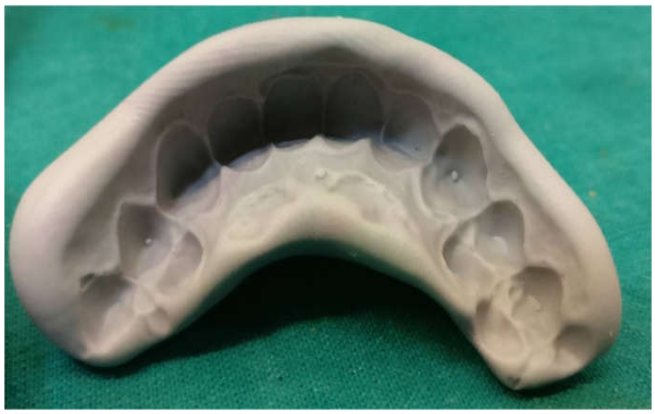

Figure 3. Putty index made over mock up to fabricate provisional restoration

Figure 4. Provisional restoration fabricated

periodontal grafting surgery, frenectomy and root canal with 12 and 22 followed by prosthesis. A diagnostic mock up was made and patient's approval was taken (Figure 2).

- Diagnostic impression was made with maxillary and mandibular arches using elastomeric impression material (3M ESPE Putty). Cast was poured using type III gypsum product (Kalabhai Kalstone Dental Stone), on the obtained cast 11 was removed, tooth preparation was done with 12 and 22 a diagnostic wax up was made to show the final outcome. A putty index was obtained (Figure 3) from the mock up which would help in fabrication of provisional restoration (DPI tooth moulding acrylic) (Figure 4).
- Intentional Root canal treatment was done with 12 and 22 (figure5). Atraumatic extraction was done with 11(Figure 6) and periodontal grafting surgery (Figure 7) was done along with osteoplasty in 21 region and frenectomy was done (Figure 8).
- The provisional restoration was then adjusted intraorally and cemented using non eugenol cement (Prevest DenPro Ora Temp C and B) (Figure 9,10). Patient was recalled after 10 days for suture removal, the provisional restoration was relined with soft liner and the patient was called every 15 days for relining for one and half month (GC Soft Liner).
- On satisfactory wound healing, the final tooth preparation was done. Shade selection was done in daylight and elastomeric impression was made with maxillary and mandibular arches (3M ESPE Putty) to fabricate definitive prosthesis.
- Bisque trial was done to check for the marginal fit of the crowns and shade verification of the prosthesis along with aesthetic outcome. The definitive prosthesis was obtained (Figure 11) and luted in patients mouth using resin modified Glass Ionomer Cement (3M Rely X) (Figure 12,13).

Figure 5. Intentional root canal treatment done with 12 and 22 followed by tooth preparation

Figure 6. Atraumatic extraction done with 11

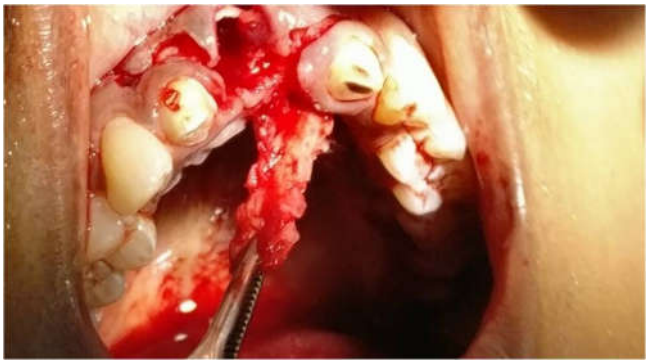

Figure 7. Subepithelial connective tissue grafting done

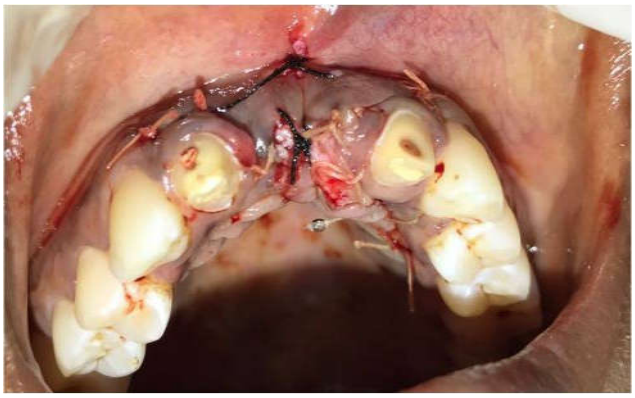

Figure 8.Frenectomy done and sutures placed

Figure 9. Provisional restoration cemented in patients mouth

Figure 10. Image showing the previous condition and after provisional restoration

Figure 11. Definitive prosthesis using gingival porcelain with 11

Figure 12. Intraoral view of cemented Definitive prosthesis

Figure 13. Definitive Prosthesis cemented in patient's mouth

DISCUSSION

In this case the patient had an accidental fracture with 21, got extraction done and not replaced it for a long period of time. Due to this the pontic space was compromised and there was drifting of teeth causing distolabial rotation with 12 and 22, and midline shift (Greenstein *et al*., 2008; Chasens, 1979). The facial midline was not coinciding with the dental midline. A complete orthodontic treatment to correct the midline and regain the pontic space followed by prosthetic rehabilitation was suggested, but due to the time duration involved the patient was not willing for the treatment. The treatment plan was to extract 11 to match the midline in prosthesis .If a 3 unit restoration had planned the pontic would had been compromised causing aesthetic failure. An implant could had planned for 11 and 21 but due to less mesiodistal space the proportions of centrals would had been same as that of laterals. So it was decided to fabricate a 4 unit restoration. Zirconia prosthesis was finalized over lithium disilicate, as zirconia would be advantageous [(10)]. Since 12 and 22 were rotated and it needed more of mesial and labial tooth preparation to achieve optimal aesthetics, intentional root canal was planned. The Provisional restoration was made by tooth preparation on the cast considering desired proportions.

Over the diagnostic cast 11 was removed and 21 region was scraped on the basis of bone mapping carried out in patient's mouth and the adjacent teeth for gingival symmetry. This guided to achieve the required osteoplasty. Post extraction, subepithelial connective tissue grafting was done to develop gingival symmetry with relation to other teeth (Langer, 1980). The provisional restorations was then relined with soft liner and adjusted in patients mouth periodically to obtain required gingival architecture. Proceeding without extraction and intentional root canal treatment would had compromised the dental aesthetics and if no osteoplasty and grafting had done that would affect the gingival aesthetics. The use of gingival porcelain was not considered before because of grafting procedure but there was a need to use minimal gingival porcelain with 11 to attain the gingival symmetry (Naik, 2015). An interdisciplinary approach helps for the best rehabilitation in an aesthetic zone.

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