



Aesthetic Rehabilitation of The Smile Zone –A Case Report

KEYWORDS

Diastema, Aesthetics, Ceramic laminate, All ceramic crowns, Fibre reinforced composite

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ABSTRACT Restoration of appropriate esthetics and function in anterior region is of paramount importance to the patient. Discoloration, proclined anteriors and diastema can make the patient emotionally depressed and socially less active. A 25 year old female patient presented with acute pain, discoloration and spacing in the upper anterior teeth region. Appropriate investigations led us to the diagnosis of incomplete root canal obturation with phoenix abscess in relation to 12,11 and 21. The persistent pace of innovation and development in restorative materials offers clinicians a whole plethora of esthetic materials and techniques. This case report deals with the endodontic and restorative management of the anterior teeth, providing an excellent esthetic result

Introduction

Special importance is given to re restore aesthetics and function in the smile zone of a patient. It is a known fact that an individual turns psychologically depressed and socially inactive if his/hers smile is dissatisfactory with discoloration, proclination or spacing between the teeth. Multiple options are available to treat problems arising in the zone of high esthetic sensitivity. Every treatment modality offers some advantages and disadvantages. Porcelain veneers are considered much more conservative in terms of requirement for preparation, they provide satisfactory and long-lasting esthetic results [1, 2, 3]. However, if the teeth are already compromised by the presence of discoloration, fracture or endodontic treatment, placement of a crown is the more prudent choice [4,5]. This case report deals with the rehabilitation of a compromised smile with spacing, discoloration and failed root canal treatment of anterior teeth.

Case report:

A 25 year old female patient reported to the Department of Conservative dentistry and Endodontics with a chief complaint of acute pain in the upper anterior teeth region since three days. The patient was also unhappy with the discoloration and gaps in her upper front teeth and restrained herself from smiling due to self-consciousness. The dental history revealed that she had a trauma 6yrs back and her teeth were fractured. The patient also elicited the history of root canal treatment of upper front teeth from private practitioner a month back.

Clinical examination revealed, Ellis Class II fracture in relation to tooth # 12,11 and 21; Discoloration in tooth # 11 and 21 and diastemas in relation to 12, 11,21,22,31 and 41. Moreover there was also an anterior open bite. The teeth # 12, 11 and 21 were tender to percussion and to palpation. (Figure 1)



Figure 1: Pre operative view of upper and lower anteriors

Intraoral periapical radiograph showed insufficiently obturated root canals along with periapical changes with respect to 12, 11 and 21. (Figure 2)

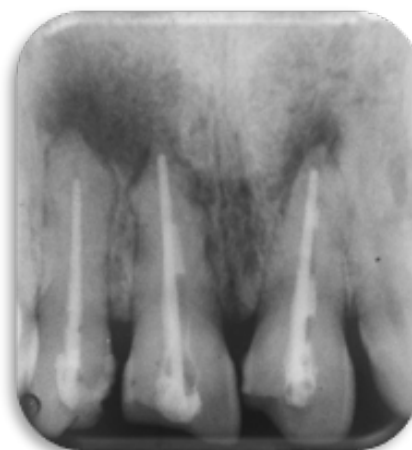


Figure 2:Pre-operative Intra oral periapical radiograph

Thus, a diagnosis of incomplete root canal treatment with phoenix abscess in relation to 12, 11, 21 was made. Depending on the above findings a treatment plan was drawn.

- Re-RCT in relation to 12, 11 and 21 followed by all ceramic crowns.
- Ceramic Laminate in 22
- Fiber reinforced composite fixed partial denture (FRC FPD) using composite as a pontic in relation to 41 and 31

On the first appointment, under rubber dam isolation the access cavities of 12, 11 and 21 were reentered using a diamond point (Horico Dental, Berlin, Germany). Coronal gutta percha was softened with a hot plugger (Mani Inc., Tochigi, Japan) and engaged with the help of H-files (Mani Inc., Tochigi, Japan). Entire contents of the obturating material were removed and confirmed radiographically. Canals were irrigated with saline to flush the gutta percha and sealer remnants. Canals were dried using paper points and calcium hydroxide based intracanal medicament was placed inside the canal by using a lentulo spiral. The cavity was then temporarily restored with Cavit G (ESPE dental, Seefeld, Germany).

Patient was recalled after seven days for follow up. Patient was totally asymptomatic on the recall visit. Canals were reentered and working length of 12, 11 and 21 was determined using an apex locator (Root ZX II, J Morita, USA) and was confirmed radiographically.

The root canals were then cleaned and shaped using NiTi hand protaper files (Dentsply Maillefer; Switzerland) with the crown down technique. Apical enlargement in all canals were done with F3 protaper files. 5.25% sodium hypochlorite (Medilise Chemicals, Kannur, Kerala), 17% EDTA (Merck, Darmstadt, Germany) and 0.9% saline (Claris Ostuka Limited, Ahmedabad, India) were used for irrigation of root canals. Then after drying the canals with paper point, intracanal medicament with calcium hydroxide was placed inside the canal and the access cavity was temporarily sealed with Cavit. In the next visit, master cone radiograph was taken and then the canals were obturated with F3 ProTaper gutta-percha cones (Dentsply, Maillefer, USA) using AH Plus (Dentsply, Konstanz, Germany) as a root canal sealer. (Figure 3)

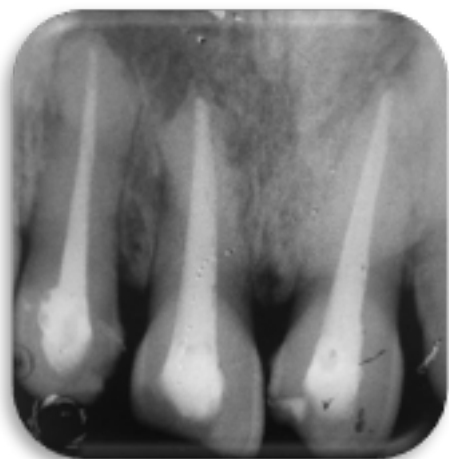


Figure 3: Post-operative intraoral periapical radiograph showing obturation in 12, 11 and 21.

The access cavities were then restored using composite resin (Filtek Z350 XT, 3M ESPE, USA) and patient was recalled after 2 weeks. For the midline diastema in the lower arch a fibre reinforced composite fixed partial denture was planned. Proximal slots were prepared on 31 and 41 only in enamel. After etching (Scotch bond 3M ESP, USA) and bonding procedures (Adper Singlebond 2, 3M ESPE, USA) super splint (Hager Werken, Duisburg, Germany) of length 10-mm was adapted on the lingual and proximal surfaces of 31 and 41 using flowable composite resin (Filtek™ Z350 XT flowable restorative, 3M ESPE, USA) and light-cured for 20 s with light emitting diode (LED) light curing unit (Bluephase, Ivoclar, Vivadent, USA). (Figure 4)



Figure 4: showing FRC FPD placed on the lingual surface of 41 and 31

Free hand composite build up was done to mimic a mandibular central incisor (pontic) which was then adapted to the splint with the help of flowable composite and light cured for 20 s. Later, after finishing and polishing an appealing result was obtained with which both clinician and the patient were extremely satisfied. (Figure 5)



Figure 5 showing FRC FPD w.r.t to 41 and 31

Later, tooth preparation was done in 12, 11 & 21 for a full-ceramic crown with shoulder margin. Then in tooth # 22 a very conservative preparation such that chamfer margin labially and interproximally, and a butt fit margin palatoincisally was done to receive ceramic laminate. To duplicate maximum details gingival retraction with respect to 12, 11, 21 and 22 was done with # 000 braided cord (Ultradent Ultrapack cord, USA).

An impression was made with double mix single step impression technique with polyvinyl siloxane impression material (Reprosil, Dentsply Caulk, USA). Temporization was done with Luxatemp 4 ((DMG, America) and cemented with provicol (VOCO, Germany) temporary luting cement. The fabricated crowns and laminate were tried on patient and inspected for marginal fit. Prior to cementation, ceramic was etched with a porcelain etchant (Angelus 10% Hydrofluoric acid) for 20 seconds, washed with water and

air dried. Then a silane coupling agent (Monobond N, Ivoclar Vivadent, USA) was applied to the crown surface for 60 seconds and lightly blow-dried.

At the same time, self-etch adhesive (Multilink N primer, Ivoclar Vivadent, USA) was applied over the tooth surface. Next, the crowns and the laminates were cemented into place using a self-cure resin cement (Multilink N, Ivoclar Vivadent, USA). Later, light curing with LED (Bluephase, Ivoclar, Vivadent, USA) curing light was completed for 40 seconds. The post-operative view of the cemented restorations is illustrated in Figure 6



Figure 6: All ceramic crowns in 12, 11, 21 & ceramic laminate in 22

Discussion

Procedural errors and reinfection are one of the reasons for endodontic failure [6,7,8]. Assuming that persistent intraradicular infection is the most common cause of failure in this present case, it is advisable retreating failed teeth prior to surgery. Appropriate measures including strict asepsis, complete chemomechanical preparation using antimicrobial irrigants, intracanal medication, adequate root canal filling, and proper coronal sealing are essential to maximize the success of retreatment. The permanent coronal restoration should also be placed as early as possible to prevent coronal leakage.

An unpleasing smile always hinders one's personality and lowers the confidence level. Tooth discoloration and presence of diastema compromises an acceptable aesthetic smile. Rehabilitating the anterior aesthetics becomes a big challenge to the dentists because of cosmetic concerns and high expectation of the patient. A careful diagnosis of the causal element is important in determining the appropriate treatment plan. Several etiological factors have been proposed as the cause of diastema, including periodontal attachment loss, pressure from the inflamed tissue, occlusal factors such as trauma from occlusion, oral habits (such as bruxism, mouth breathing, tongue thrusting, sucking habits, pipe smoking, and playing of wind instruments) and abnormal labial frenum attachment [9]. The cause of diastema in the present case may be due to tongue thrusting.

In the present case, polyethylene fibre reinforced composite fixed partial dentures could be a functional and esthetic alternative for the correction of mandibular midline diastema. FRC FPDs have many advantages including bondability, reparability, ease of fabrication and relative longevity. This is considered a noninvasive or minimally invasive procedure with very little or no tooth reduction. It is more comfortable than a removable appliance, non-irritating, and hygienic [10]. The patient's natural tooth, an acrylic tooth, or composite resin can be used as a pontic. Composite was used in the present case because it assures a higher degree of bond strength to FRC [11].

A lot of other treatment options like direct composite restorations, ceramic laminates and all ceramic crowns have been proposed to close the space between the teeth. Although, ceramic restorations are more expensive than composite restorations, they provide superior esthetics, resistance to wear and abrasion, good durability, biocompatibility, and color stability [12,13,14,15]. All ceramic crowns were placed for tooth # 12, 11 & 21 because the teeth were root canal treated and ceramic laminates for tooth # 22 with a conservative preparation since it was a vital tooth. These ceramic restorations improved esthetic problems and the patient's satisfaction by closing the diastema.

Conclusion

Today as choices are plenty, dentists are always in a dilemma during selection of material and technique to restore a deficient tooth structure. However the choice should always give priority to conservation of tooth structure which will also provide good success rate and predictable esthetics.

References

1. Chen YW, Raigrodski AJ. A conservative approach for treating young adult patients with porcelain laminate veneers. *J Esthet Restor Dent* 2008; 20:223-236.
2. Peumans M, Van Meerbeek B, Lambrechts P, Vanherle G. Porcelain veneers. A review of the literature. *J Dent* 2000; 28:163-177.
3. McLean JW. The science and art of dental ceramics. *Oper Dent* 1991; 16(4):149-156.
4. H.T. Schillingburg, S. Hobo, D.W. Lowell, R. Jacobi, S.E. Brackett. *Fundamentals of fixed prosthodontics*. (3rd ed.) Quintessence 1997 p. 433, 455-483.
5. Dietschi D, Duc O, Krejci I, Sadan A. Biomechanical considerations for the restoration of endodontically treated teeth: a systematic review of the literature—part 1. Composition and micro- and macrostructure alterations. *Quintessence Int* 2007; 38(9):733-743.
6. Lin LM, Skribner JE, Gaengler P. Factors associated with endodontic treatment failures. *J Endod* 1992; 18(12):625-627.
7. Lin LM, Pascon EA, Skribner J, Gaengler P, Langeland K. Clinical, radiographic, and histopathological study of endodontic treatment failures. *Oral Surg Oral Med Oral Pathol* 1991; 71(5):603-611.
8. Nair PNR, Sjogren U, Krey G, Sundqvist G. Therapy resistant foreign body giant cell granuloma at the periapex of a root-filled human tooth. *J Endod* 1990; 16: 589-95
9. Rao R, Vishwanath BT. Esthetic enhancement with diastema closure—a case report. *Indian J Dent* 2011; 2:184-186.
10. Butterworth C, Ellakwa AE, Shortall A. Fiber-reinforced composites in restorative dentistry. *Dent Update* 2003; 30:300-306.
11. S Garoushi, PK Vallittu, LVJ Lassila. Fiber-reinforced Composite for Chair-side Replacement of Anterior Teeth: A Case Report. *Libyan J Med* 2008; 3(4): 195-196.
12. J.R. Kelly, I. Nishimura, S.D. Campbell. Ceramics in dentistry: historical roots and current perspectives. *J Prosthet Dent* 1996; 75(1):18-32.
13. Della BA, Kelly JR. The clinical success of all-ceramic restorations. *J Am Dent Assoc* 2008; 139(Suppl):8-13.
14. Donovan TE. Factors essential for successful all-ceramic restorations. *J Am Dent Assoc* 2008; 139(Suppl):14-18.
15. Jorge andré cardoso, Paulo júlio almeida, Alex fischer, Somano luang phaxay. Clinical Decisions for Anterior Restorations: The Concept of Restorative Volume. *J Esthet Restor Dent* 2012; 24(6):367-383.