



Aesthetic enhancement with all-ceramic prostheses: A series of case report

Kanesha Abrol^{1*}; Samarth Kumar Agarwal²; Romil Singhal³; Akanksha Singh⁴

Department of Prosthodontics and Crown & Bridge, Kothiwal Dental College and research Centre, India

*Corresponding Author(s): Kanesha Abrol

Department of Prosthodontics and Crown & Bridge, Kothiwal Dental College and research Centre, India
Email: drkaneshaabrol92@gmail.com

Abstract

Oral rehabilitation using all-ceramic systems is widely popular among both dental practitioners as well as patients, considering its ability to simulate the optical properties of teeth in relation to color, surface texture and translucency. Advancement of ceramic systems, allow the fabrication of prosthesis with reliable esthetic and successful outcomes. Zirconia ceramic system are an excellent alternative to fixed prostheses with metal infrastructure. This case report series describes the esthetic enhancement by replacing missing anterior teeth with zirconia- based all- ceramic prosthesis.

Received: Feb 28, 2020

Accepted: Apr 03, 2020

Published Online: Apr 07, 2020

Journal: Annals of Dentistry and Oral Health

Publisher: MedDocs Publishers LLC

Online edition: <http://meddocsonline.org/>

Copyright: © Abrol K (2020). *This Article is distributed under the terms of Creative Commons Attribution 4.0 International License*

Keywords: All-ceramic restoration; Esthetics; Zirconia.

Introduction

Rehabilitation of teeth in esthetic zone becomes a major challenge to prosthodontists. Metal-ceramic restorations have been extensively used as a restoration of choice. But due to problems such as the grayish discoloration at the margins of the restorations, chipping of the porcelain, allergy to the metal and difficulty in shade matching, all-ceramic systems has become popular alternative [1,2]. Some of the all ceramic materials include alumina, lithium disilicate and zirconia. Zirconia has flexural strength of approximately 900-1100 MPa⁴ and resists fracture during function or parafunction, at both anterior and

posterior sites. The selection of proper materials and techniques which makes it possible to reach an optimal esthetic result should be carried out in order to get prosthesis as close as the natural dentition. In addition, the dental professional and dental lab technician must work together closely to achieve the patient's expectation, as the esthetic outcomes are of utmost importance [3,4].

This case report series describes prosthodontic rehabilitation of patients with missing anterior teeth using all-ceramic restoration.

Cite this article: Abrol K, Agarwal SK, Singhal R, Singh A. Aesthetic enhancement with all-ceramic prostheses: A series of case report. Ann Dent Oral Health. 2020; 3(1): 1014.



Case reports

Case 1

A 23-year old female patient reported to the Department of Prosthodontics with the chief complaint of poor appearance due to loss of upper front teeth. Patient gave history of road traffic accident 6 months back and extraction was done for the same due to mobility in the upper anterior teeth. Intra oral examination disclosed a Kennedy's class 4 partial edentulous situation with respect to 11, 12, 21 and 22. (Figure 1a).



Figure 1a: Intra-oral frontal view

After radiographic and mounted diagnostic cast evaluation, two basic treatment options were presented to the patient in the order of preference, fixed or removable prosthesis. As the patient had higher demands for esthetics, so the treatment option with implants was explained but due to financial constraints she asked for an alternative. Thus the treatment plan was to replace the missing anteriors with zirconia fixed dental prostheses.

Clinical procedure

Diagnostic impressions of maxillary and mandibular arches were made with irreversible hydrocolloid (Zelgan, Dentsply) and poured in dental stone. The facebow transfer was performed. Lateral and protrusive records were made, followed by articulation in semi-adjustable articulator. The wax up was done to visualise the final outcome. Vital tooth preparation was done under local anesthesia for all ceramic restorations with respect to 13 and 23 (Figure 1b). The equigingival shoulder finish line was prepared for 13 and 23. The overall reduction of 2 mm and incisally, 1.5–2 mm clearance was made so as to provide esthetic prosthesis. Gingival retraction was done with the retraction cord.



Figure 1b: Intra-oral frontal view

Definitive impression for maxillary arch was made in light body addition silicone elastomeric impression material (Aqua-sil, Dentsply) using double mix technique. The stock metal tray was loaded with putty impression material, and impression was made with retraction cord in place. The light body impression material (Aqua-sil), was manipulated as per the manufacturer's instruction. Impression was loaded with light body impression material. Retraction cord was removed and light body impression material was syringed on the margins of the prepared tooth and the impression was made. Shade selection was done with the 3D Master shade guide (VITA). The provisional fixed partial denture was fabricated from self-cure tooth colored acrylic resin (DPI) which was cemented in place using a temporary cement (Temp-ting, GC). Final prosthesis was fabricated in Zirconia with respect to maxillary anteriors. The zirconia based all ceramic bridge was then cemented with resin based luting cement (Rel-yX 100, 3M ESPE) (Figure 1c). Patient was very happy and satisfied with the final outcome (Figure 1d).



Figure 1c: Frontal view after cementation



Figure 1d: Pre-operative photograph



Figure 1e: Post-operative photograph

Case 2

A 29-year-old male patient reported to the department of prosthodontics with a chief complaint of poor aesthetics due to display of metal from the existing metal ceramic prostheses fabricated 3 years back by a local dentist. Intraoral examinations revealed 3 unit metal ceramic bridge with mild gingivitis in the interproximal and embrasure areas with gray pigmentation at the free gingiva of the teeth in respect to 11 and 22 (Figure 2a). Radiographic examination showed endodontic treatment irt 11 and 22.



Figure 2a: Post-operative photograph

The patient requested to replace the existing maxillary metal ceramic anterior bridge with a more naturally appearing smile to improve the facial appearance.

After examining the patient and data collecting, the treatment plan was discussed with the patient. The treatment sequence involved removal of the faulty prostheses irt 11, 21 and 22, followed by modification of tooth preparation irt 11 and 22 and definitive restoration in the form of all ceramic crowns. The patient consented to the treatment option while rejecting the metal ceramic crowns.

Clinical procedure

Diagnostic impressions of the maxillary and mandibular arch were made with irreversible hydrocolloid (Zelgan, Dentsply) and poured in dental stone (Kalstone, Kalabhai Karson Pvt Ltd, Mumbai, India). The removal of the metal ceramic bridge retainers was started with sectioning of the existing retainers on teeth # 11, 22 from buccal to lingual using coarse diamond burs (Meisinger, Germany) as recommended by Rosenstiel et al, 2006 (Figure 2b). The sectioning was done without local anesthesia.



Figure 2b: Intra oral frontal view after removal of faulty prostheses

After removal of the faulty bridge, modification of the preparations of the abutments to receive all ceramic retainers were done with the extension of margins just below the free marginal gingiva. Gingival retraction was done using retraction cord around the abutments. (Figure 2c&d).



Figure 2c: Palatal view of the modified preparations irt 11 and 22



Figure 2d: Frontal view of the modified tooth tooth preparations.

The final impression was made in elastomeric impression material with double mix technique. The stock metal tray was loaded with putty impression material, and impression was made with retraction cord in place. Impression was loaded with light body impression material. Retraction cord was removed and light body impression material was syringed on the margins of the prepared tooth and the impression was made. Shade selection was done with the 3D Master shade guide (VITA). The provisional restoration was relined with the tooth colored acrylic resin and was cemented with non-eugenol temporary cement (Temp-ting, GC). Final prosthesis was fabricated in lithium disilicate and then cemented with resin based luting cement (RelayX 100, 3M ESPE) (Figure 2e). The patient was satisfied with the esthetics and facial appearance. (Figure 2 f&g).



Figure 2e: Definitive all ceramic crowns cemented irt 11, 21 & 22



Figure 2f: Definitive all ceramic crowns cemented irt 11, 21 & 22



Figure 2g: Post-operative photograph

Discussion

Rehabilitation of anterior teeth is difficult and even more challenging in the esthetic zone. It requires proper planning regarding the analysis of all esthetic parameters. Knowledge about the principles of esthetics and how to apply them in oral rehabilitation is crucial for successful therapy. The current esthetic pattern requires materials to have a clinical performance closer to the natural tooth. Thus, metal-free ceramic prosthe-

sis replacing the metal ceramic fixed prosthesis have become a biomechanical and esthetically viable option in view of biologic, physical, and esthetic properties. Since its identification by the German chemist Klaproth, zirconia based all ceramic restorations have found place in both single crowns and short span anterior fixed partial dentures. Zirconia or yttrium oxide partially stabilized zirconia (3Y TZP) is a crystalline dioxide of zirconium. Zirconia-based dental ceramics are stronger than conventional glass-ceramic restorations and have excellent mechanical strength properties.⁵⁻⁶ However, a zirconia core is opaque and lacks translucency. For this reason, IPS e.max Ceram was used over the zirconia copings to improve the esthetic appearance. This system consists of a nanofluorapatite glass ceramic distinguished from all previous ceramic systems by specific features, such as improved translucency and unique opalescent shades that are achieved with the help of opacifiers and ion coloring, while also providing high strength. The use of such all ceramic systems has become increasingly common in the clinical practice, to come across patients who are in search of cosmetic procedures since the presence of an aesthetically pleasing smile directly affects the individual's social life. Therefore, it is extremely important that the professional is able to meet the demand of function and aesthetics as desired by the patient. And hence, all ceramic restoration was planned in these cases to overcome the drawbacks of the metal ceramic restoration.

Conclusion

Successful anterior restorations can be achieved when using a detailed treatment plan and when considering the esthetic and functional parameters. The use of a conservative technique to condition soft tissues is attractive to the patient, and metal-free crowns improve the dental arrangement and shade matching, providing a pleasant smile for the patient.

References

1. Dudhekar AU, Nimonkar SV, Belkhode VM, Borle A, Bhola R. Enhancing the esthetics with all ceramic prosthesis. *J Datta Meghe. Inst Med Sci Univ.* 2018; 13: 155-157.
2. De Andrade OS, Hirata R, Celestrino M, Seto M, Siqueira S, et al. Ultimate ceramic veneer: A laboratory-guided preparation technique for minimally invasive laminate veneers *Journal of the California Dental Association* 2012; 40: 489-494.
3. Radz GM. Minimum thickness anterior porcelain restorations *Dental Clinics of North America.* 2011; 55: 353-370.
4. Miranda ME. Esthetic Challenges in Rehabilitating the Anterior Maxilla: A Case Report *Operative Dentistry.* 2016; 41: 2-7.
5. Vichi A, Louca C, Corciolani G, Ferrari M. Color related to ceramic and zirconia restorations: A review *Dental Materials.* 2011; 27: 97-108.
6. Walia S, Thomas PM, Sandhu H, Santos GC. Restoring esthetics with metal-free ceramics: A case report *Journal of the Canadian Dental Association.* 2009; 75: 353-355.
7. Shetty SK. Esthetic rehabilitation of anterior missing teeth with ridge defect using zirconia fixed prosthesis-A case report 2019; 8: 24-32.
8. Censi R, Vavassori V, Borgonovo AE, Re D. Esthetic rehabilitation of a severely compromised anterior area: Combined periodontal and restorative approach. *Case Rep Dent.* 2014.