

Individualizing A Smile Makeover: A Clinical Report

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ABSTRACT

Background: For a smile to be considered esthetically attractive there must be a harmonious balance between shade, shape and texture. With the objective of correcting a lack of esthetic harmony in the smile such as with diastemas and missing anterior teeth, implants with zirconia abutments and ceramic restorations have frequently been used. This article describes a case in which a maxillary central incisor is replaced with an implant and restored with a customized zirconia abutment and crown. In addition, the remaining maxillary incisors were restored with feldspathic porcelain veneers and diastemas between the mandibular anterior teeth were restored with full coverage ceramic crowns to yield a highly esthetic result.

Keywords: Zirconia abutment, veneers, diastema, full coverage crowns.

INTRODUCTION

Advances in technology and biomaterials have dramatically expanded the possibilities for esthetic optimization in prosthetic dentistry. Esthetic replacement of a maxillary central incisor using a dental implant can be a challenging task. The hard and soft tissues must be managed in a way that minimizes the risk of tissue loss, while preserving and/or regenerating full interdental papillae. Advances in dental materials and development of computer aided design/computer assisted manufacture current trends in both anterior and posterior implant prosthetic treatment are gravitating towards individualised/ customized abutment fabrication using titanium, zirconia or hybrid ceramic materials to build abutments reflecting the natural contour of the patient's gingival as well as providing supportive prosthetic restorations for interdental papilla.

The patient's esthetic expectations may be met with a zirconia abutment, which eliminates the metal collar reflection allowing light transmission through the peri-implant tissues and are especially suited for areas with thin gingival tissues¹. These zirconia

abutments and crowns can be synergistically combined with other ceramic materials.

In addition to the color of the abutment, the pink esthetic that is attained by shaping the gingival with the restoration form plays an important role in the success of the implant prosthesis^{2,3}. Generally, provisional restorations are used to contour the gingival according to the emergence profile and to improve the psychology and confidence of the patient by immediately replacing the missing teeth with a fixed prosthesis^{4,5}.

This article describes a case in which a dental implant is placed to replace a maxillary central incisor, and a customized zirconia abutment and crown are used in conjunction with feldspathic porcelain veneers to restore the four maxillary incisors, following gingival manipulation with provisional restorations to improve the emergence profile. In addition, space management and closure of diastemas between the mandibular teeth is managed by fabricating all-ceramic Emax crowns with gingival porcelain to mask the recession.

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CASE REPORT

A 24 year old woman with missing maxillary central incisor came to the department of prosthodontics of Dr. D.Y. patil school of dentistry for prosthetic treatment. The tooth was lost due to a motorbike crash 6 month ago and not replaced then on. After discussing the findings and treatment plan options with the patient, the patient elected to replace the maxillary right central incisor with an implant-supported crown. The remaining maxillary incisors would be treated with feldspathic porcelain veneers. In the mandibular arch, the diastemas were proposed to be managed with full coverage porcelain crowns.



Fig 1: Frontal view of the maxillary anterior teeth showing missing 11.



Fig 2: Frontal view of the mandibular anterior teeth showing diastemas.



Fig 3: Intra oral examination showing missing 11 and diastemas between 31,32,41 and 42.



Fig 4: Preoperative smile.



Fig 5: Angle verification radiograph.



Fig 6: immediate temporisation following implant placement.



Fig 7: Post operative smile after immediate temporization.



Fig 8: Healing abutment placed for a week to achieve emergence profile.



Fig 9: Preparation of laminate veneers.



Fig 10: Preparation of lower anterior teeth for full coverage crowns.



Fig 11: Customised Zirconia abutment fabricated.



Fig 12: Emax laminates and implant crown.



Fig 13: Post operative occlusal view.



Fig 14: Post operative smile.

Profound local anesthesia was achieved using 2% lidocaine with 1:100,000 epinephrine. Incisions were made using a #15 scalpel blade in the gingival sulcus around the maxillary central incisor. Using the surgical implant drills, an implant osteotomy was prepared. Following this osteotomy the buccal plate of bone was found to be intact. A verification Radiograph was taken to verify the angulation. A 3*10 biodenta implant was placed 2mm below the ridge crest and sutured.

Polymethyl methacrylate was loaded into a silicone matrix that duplicated an initial diagnostic wax-up, and the matrix was seated over the area of the missing central incisor. Once the material was set, the provisional restoration was trimmed and polished. The remaining incisors were spot etched and bonded.

After 3 months, the implant site was found to be healing well. The gingiva had natural and esthetic contours. The interdental papillae were full and showed no signs of shrinkage. The healing abutment was placed for a week and the gingival cuff was found to be healthy and free of inflammation.

The remaining maxillary incisors were prepared for porcelain veneers. Enamel reduction of about 0.4 mm was done, and margins were placed at the gingival crest. This limited reduction would allow the resulting shade to be a combination of the tooth preparation and the shade chosen for the restorations, also making sure the teeth are designed in accordance with the golden proportion. Retraction cord was packed and a closed tray impression was made for the maxillary arch. Conversely, the mandibular anterior teeth were prepared and a final impression was made. A custom abutment was made using a prefabricated straight zirconia abutment modified with veneering porcelain to provide optimal margin placement, retention, resistance, support, and emergence contours. The feldspathic veneers and the cervical margins of the zirconia crown were etched with hydrofluoric acid, silanated, and the restorations were adhesively cemented with a resin cement.

DISCUSSION

Simulation of colour and shape of natural teeth and soft tissue contour termed as “pink and white esthetics” are the key factors for the success of prosthetic management in the esthetic zone. Several treatment plans were available to this patient. Most notably, the maxillary right central incisor could have been replaced using a fixed partial denture using the adjacent incisors as abutments. This patient, however, specifically requested replacement of the maxillary right central incisor using a dental implant and single crown. Because of the highly esthetic nature of this area, proper management of this site was critical.

Recent advances in ceramic restorations and abutments have greatly transformed esthetic dentistry. Porcelain veneers are frequently the restoration of choice when the goal is to modify tooth form, position and/or colour. They can restore appropriate rigidity to the crown and have the benefit preserving sound tooth structure over full coverage restorations⁶. Ceramic abutments have the advantage over metallic ones of avoiding the possibility of gingival discoloration as a result of abutment material show-through and can improve translucency and illumination of the peri-implant soft tissues^{7,8}. Zirconia is of particular interest to the dental profession because of its high toughness and

strength⁹ which has made it the material of choice for ceramic abutments¹⁰.

Zirconia abutments are showing promising results both in vitro and in vivo. Laboratory studies comparing their behavior to titanium abutments report that both types should be able to withstand functional forces in a similar manner¹¹ and have sufficient fracture resistance for anterior and posterior regions¹². Clinical studies have shown no failures or screw loosening between 1 year and up to a 44-month observation period¹³. The particular zirconia abutment used in this case has no metal collar, which allows customization with veneering porcelain to enhance the emergence profile, support, and retention of the restoration¹⁴.

CONCLUSION

Restoration of single implant in the esthetic zone may be challenging in terms of mimicking the natural tooth colour and gingival contour. This clinical report presents a viable prosthetic treatment approach that combined a modified zirconia abutment and a CAD-CAM laminate veneer to obtain emergence profile, preventing over contouring of the restoration and improving retention of the cemented restoration as well as full coverage crowns to correct diastemas between the mandibular teeth.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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