

Case Report

Aesthetic management of discoloured anterior teeth with zirconia: A case report

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ABSTRACT

Introduction: The aim of this paper is to present a case with a discoloured anterior teeth with spacing and functional application of zirconia based crowns for a smile make over.

Case presentation: A 24 year old male patient reported to department of prosthodontics with a discoloration and spacing in upper front teeth region and desired for an esthetic smile with white teeth. After complete examination zirconia based crowns have been considered as a valid management option to solve aesthetic and functional problems in the upper aesthetic zone.

Discussion: Smile rejuvenation can positively impact a patient's self-esteem and emotional health through an improved appearance. This era of development and technology led to creation of different biomaterials. zirconia- based ceramic crowns offer a good esthetic result with minimum tooth preparation combining strength and could be considered as a treatment option in selected clinical cases.

INTRODUCTION

Tooth discolorations are associated with many clinical and esthetical challenges. They can have an impact on a person's self-image and self-confidence in today's society. The options and advances in esthetic dentistry to mask tooth discoloration and rehabilitation of an unaesthetic smile are increasing day by day. Decision making is the fundamental aspect of clinical dentistry. For many years, the most predictable and durable aesthetic restoration of discoloured anterior teeth has been achieved with bleaching procedures. This approach is not effective for all forms of discoloration and result aren't permanent. Other procedure have been advocated e.g. metal ceramic full crowns, ceramic veneers, zirconia based system. Zirconia - based ceramic crowns offer a good esthetic result with minimum tooth preparation combining strength and could be considered as a

treatment option in selected clinical cases³. Additional advantages are the esthetic characteristics, the biocompatibility and durability. They also show increased abrasion resistance, color and contour stability, appropriate translucency and excellent tissue response due to minimal plaque accumulation.

CASE REPORT

A 24-year healthy male patient presented for restoring his upper front teeth at the Department of prosthodontics, Crown & Bridge, Aesthetic Dentistry and Implantology. He complained about discoloration and spacing in upper front teeth region and desired for an esthetic smile with white teeth.

Complete history of the patient along with preoperative photographs was taken. The patient's medical and family history was noncontributory. Intra oral examination

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showed that patient had moderate dental fluorosis and spacing between upper anterior teeth.

Following a detailed clinical examination and careful evaluation of the objective parameters of the patient's age, profession, smile, esthetic and functional demands and to boost his confidence towards life, it was found that zirconia crowns were best suited for this condition in maxillary anterior teeth from canine to canine.

PROCEDURE

Prior to beginning of teeth preparation, the shade selection was done using vita shade guide. The axial reduction of approximately 1.2 to 1.5 mm and incisal reduction of 1.5 to 2.0 mm was carried out^{1,2}. All the line angles were rounded off. A circumferential chamfer finish line was prepared for all the teeth from canine to canine.

Impression procedures were carried out with addition silicon and then sent to the laboratory. Provisional crowns were fabricated using tooth coloured auto polymerizing acrylic resin and cemented with eugenol free temporary cement to the patient. Final restoration was cemented in place with glass ionomer cement.

DISCUSSION

The zirconia based restoration was considered ideal in this case as the patient's desire for quick treatment and closure of spacing between front teeth.

Bleaching procedure was prohibited as it required more sessions. The effect of bleaching on natural tooth is not permanent and is somewhat unpredictable to speculate the colour change. Seepage of bleaching agent into the surrounding periodontal tissues can lead to gingival irritation or severe damage⁶.

Zirconia full crown was selected over labial veneers because of their clinical longevity and survival rate, this

is in agreement with Shillburg¹ et al 1997 and those concluded that full crown restoration is the most type of preparation with long services calculated by years. Also the most common esthetic problem associated with porcelain veneer is the impact of the luting cement on the final shade of the veneer⁴.

According to Heffernan et al., Zirconia as compared to other all ceramic systems has the better opaque effect⁷.

With zirconia, crowns offer intense strength and durability and could last a lifetime. zirconia is naturally compatible to body chemistry. Minimally invasive as require less removal of your enamel, more natural tooth structure remains intact. Also less wear on antagonists⁸.

The latest in dental crowns, the e-Max brand is made from lithium disilicate ceramic — a strong, specially harvested material known for its strength and aesthetic qualities⁹. E-max is more translucent than Zirconia. The translucency of E-max crowns allows in more light. This creates a more lifelike crown that requires no stain. However, for a dark tooth underneath, this characteristic makes Zirconia the better choice¹⁰. But Multiple-unit lithium disilicate restorations are not advised. The 360-400MPa flexural strength of lithium disilicate is relatively weak compared to the 1,000MPa flexural strength of zirconia-based restorations¹¹.

Also Zirconia materials are so strong, they can be made thin- more conservative in the preparation, saving more of patient's' original tooth structure. Zirconia may be as thin as ½ mm; the minimum thickness of e.max Lithium Disilicate materials is 1.5 mm to 2 mm. but E-max crowns can fracture at the time of try-in or during adjustment of the occlusion. The most common reason for the ceramic to fracture is inadequate material thickness¹².

E. max Lithium Disilicate materials need to be etched and bonded to place, while Zirconia can be conventionally cemented, making the process easier.



Fig 1: Pre-op Picture



Fig 2: Pre-op Picture



Fig 3: Final prosthesis (zirconia crowns)



Fig 4: Final prosthesis

CONCLUSION

Zirconia-based tooth-supported crowns showed promising clinical results restoring anterior teeth. CAD/CAM technology in the manufacture of Zirconia has become a reality in dental practice that demonstrates important physical and mechanical properties of high strength, adequate fracture toughness, biocompatibility and esthetics outcome.

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