

An Harmonic Smile Resulted from the Use of Ceramic Prosthesis with Zirconia Structure: A Case Report

Rudys Rodolfo de Jesus Tavarez¹, Leticia Machado Gonçalves¹, Ana Paula Dias², Anna Claudia Pereira Dias², Adriana Santos Malheiros³, Alice Carvalho Silva⁴, Matheus Coelho Bandeca¹

Contributors:

¹Professor, Post Graduation Program in Dentistry, Department of Restorative Dentistry, School of Dentistry, São Luis, MA, Brazil; ²Student of Master Program in Dentistry, Department of Restorative Dentistry, São Luís, Maranhão, Brazil; ³Professor in Dentistry, Department of Prosthodontics, School of Dentistry, São Luis, MA, Brazil, ⁴Post Graduate Program in Dentistry, Department of Restorative Dentistry, Federal University of Maranhão – UFMA, São Luís, Maranhão, Brazil.

Correspondence:

Dr. Tavarez RR. Post Graduate Program in Dentistry, – UniCEUMA, Rua Josué Montello, 01, Renascença II. Zip Code: 65075-120. São Luís, Maranhão, Brazil. Phone: +55-9832144172. Email: rudysd@uol.com.br

How to cite the article:

Tavarez RR, Gonçalves LM, Dias AP, Dias AC, Malheiros AS, Silva AC, Bandeca MC. An harmonic smile resulted from the use of ceramic prosthesis with zirconia structure: A case report. J Int Oral Health 2014;6(3):90-2.

Abstract:

The rehabilitation of patients requiring an esthetic smile demands a multidisciplinary approach. This clinical report describes a treatment plan for recovery aesthetics' smile of anterior teeth using ceramic prosthesis with zirconia structure. Initially, a review of aesthetic parameters, diagnostic waxing, mock-up and provisional restorations was performed. A contextual assessment of aesthetic, proportion and shape of teeth was done to recreate a natural looking for teeth in consonance with the smile line. Subsequently, based on these parameters, fixed prostheses of the upper anterior teeth using ceramic restorations with zirconia infrastructures were performed. The use of ceramic restorations with zirconia structures associated with a careful treatment plan allows the professional to integrate esthetic and function for satisfactory clinical results.

Key Words: Esthetic, fixed partial dentures, smile, zirconia

Introduction

Smile and face in harmony are fundamental in facial esthetics from increasing the self-esteem and well-being of the individual.¹ Esthetics of smile is based on a proper position of the lips, gingival tissue condition, color, shape, and teeth position.²⁻⁵ Thus, an integrated assessment of each component should be performed when the prosthetic rehabilitation become necessary.^{3,4}

Rehabilitation of maxillary anterior teeth requires professional comprehension of the natural dentition aspects and a

careful rehabilitation plan. This plan includes a clinical and radiographic examination, study models with diagnostic waxing, and multidisciplinary approach cooperation with the aesthetic rehabilitation.⁶⁻⁹

The selection of adequate materials and techniques that makes possible to reach an optimal esthetic result should be carried out in order to get restorations as close to the natural dentition. Advances in restorative dentistry and development of ceramic systems with biomechanical properties combined with mimetic requirement, allow the fabrication of restorations with aesthetic and long-lasting results.

Zirconia ceramic system allows high resistant fixed prostheses.¹⁰ With excellent cosmetic results. Longitudinal clinical studies using this system in anterior and posterior teeth show encouraging results for the future, becoming an alternative to fixed prostheses with metal infrastructure.¹¹⁻¹⁴

This case report presented an anterior metal ceramic's fixed prosthesis with changes in size, proportion, shape, color, and texture that prejudiced the smile's harmony. Thus, it was presented a treatment sequence using fixed prosthesis with zirconia structure.

Case Report

The case we present here is about a 35-year-old female patient who consulted a private dental clinic complaining for an anterior esthetic rehabilitation (Figure 1). The clinical examination included the biological aspects (probing, bleeding on probing) and esthetic parameters (shape, color, and change the smile). The patient presented a metal ceramic fixed prosthesis in teeth 11, 21 and 22, which presented cervical root exposure causing displeased esthetic effect (Figure 2). Two different treatment options were discussed. The first one proposed the installation of osseointegrated implant for the lost left lateral incisor (22), ceramic crowns in central incisors (11 and 21) and ceramic veneer in the right lateral incisor (12). As a second treatment option, it was proposed to install ceramic fixed prostheses with three elements from 11 to 22, being the last one (22) as cantilever, and the right lateral incisor a ceramic veneer. Considering financial aspects, the patient opted for the second choice.

Study cast models and diagnostic wax-up were executed (Figure 3). Mock-up was built to simulate and evaluate the

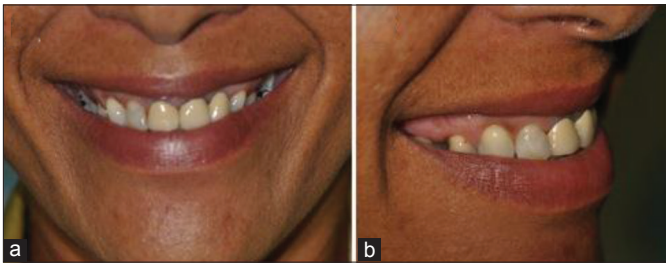


Figure 1: (a and b) Initial view of the smile.



Figure 2: (a and b) Intraoral clinical aspect of metal ceramic fixed prostheses.

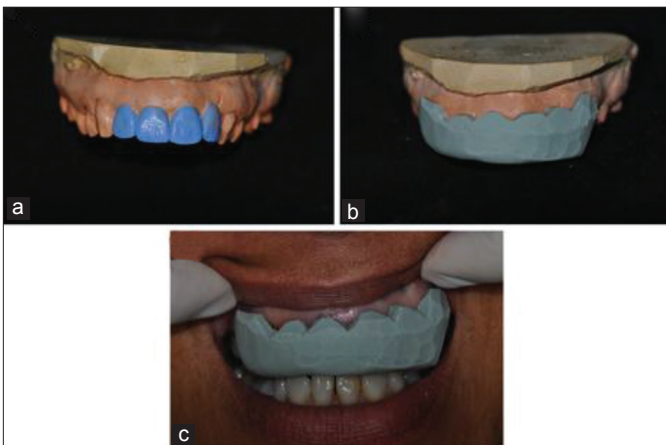


Figure 3: (a-c) Study models, diagnostic wax-up and wall of silicone for realization of mock-up.



Figure 4: (a and b) Intraoral clinical view of mock-up.

esthetic parameters (Figure 4). Subsequently, provisional restorations were performed. After determining the size, proportions and shape of teeth, dental preparations and impression procedures were performed to obtain the zirconia's structure (Figure 5). This structure has been adjusted and reassembled together with the facet casting of the element 12. Application of ceramic, final adjusts and resinous cementation was performed (Figures 6 and 7).



Figure 5: (a-c) Dental preparations and structure in zirconia.

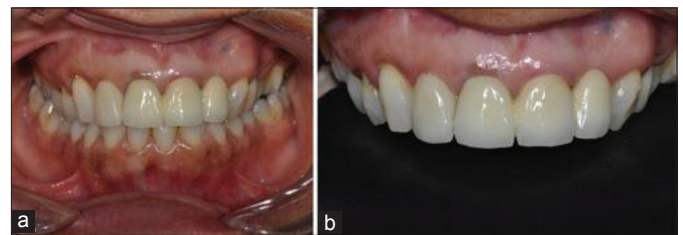


Figure 6: (a and b) Intraoral final aspect of the ceramic fixed prostheses 11-22 and ceramic veneer 12.

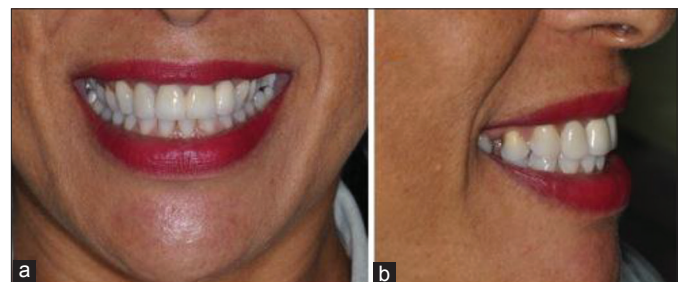


Figure 7: (a and b) Final harmonic smile result.

Discussion

Rehabilitation plan involving anterior teeth requires careful regarding, especially concerning the analysis of all esthetic parameters. Knowledge about the principles esthetics of a natural smile and how to apply them in oral rehabilitation is crucial for successful therapy. The contrast between form, color and texture of the teeth in harmony with gums and lips to create an esthetic composition should be the major goal of prosthetic rehabilitation.

Keeping interdental papilla and gingival health as a frame to the teeth is an important aesthetic aspect to be considered during diagnosis and treatment.¹⁵ Changes in gingival contour and color, as the marginal height or the presence of black spaces between the incisors, related to the absence of interdental papilla may endanger the esthetics and harmony of smiling.¹⁶ Absence of a papilla can also result in phonetic problems and food impaction.

Furthermore, to achieve optimal aesthetic result is necessary to follow a treatment protocol, including photographs, radiographs, diagnostic waxing and studying models. Thus, an accurate diagnosis of the case must be realized, starting by a simulation of treatment with a multidisciplinary approach. Likewise, accurate clinical procedures as the correct dental preparation, temporary restorations relined and adjusted aesthetically, serve as prototypes for the final ceramic prostheses and become helpful guidance for the technical professional.

The current esthetic pattern requires from materials a clinical performance closer to the natural tooth. Thus, metal-free ceramic restorations replacing the metal ceramic fixed prosthesis become a biomechanical and esthetically viable option.¹⁷ The use of ceramic restorations with zirconia infrastructures associates the biocompatibility and high resistance with the ease of obtaining esthetic. This good performance is due decrease the darkening of the root and allow better light transmission, which is especially important in anterior teeth.^{18,19}

Conclusion

The use of ceramic restorations with zirconia structures associated with a careful treatment plan allows the professional to integrate aesthetic and function for satisfactory clinical results.

References

1. Tole N, Lajnert V, Kovacevic Pavicic D, Spalj S. Gender, age, and psychosocial context of the perception of facial esthetics. *J Esthet Restor Dent* 2014;26:119-30.
2. Musskopf ML, Rocha JM, Rösing CK. Perception of smile esthetics varies between patients and dental professionals when recession defects are present. *Braz Dent J* 2013;24(4):385-90.
3. 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;2014:658790.
4. Pithon MM, Santos AM, Viana de Andrade AC, Santos EM, Couto FS, da Silva Coqueiro R. Perception of the esthetic impact of gingival smile on laypersons, dental professionals, and dental students. *Oral Surg Oral Med Oral Pathol Oral Radiol* 2013;115(4):448-54.
5. Sharma PK, Sharma P. Dental smile esthetics: The assessment and creation of the ideal smile. *Semin Orthod* 2012;18:193-201.
6. Pinho T, Neves M, Alves C. Multidisciplinary management including periodontics, orthodontics, implants, and prosthetics for an adult. *Am J Orthod Dentofacial Orthop* 2012;142:235-45.
7. Dundar M, Gungor MA, Cal E. Multidisciplinary approach to restoring anterior maxillary partial edentulous area using an IPS Empress 2 fixed partial denture: A clinical report. *J Prosthet Dent* 2003;89(4):327-30.
8. Dunn DB. The use of a zirconia custom implant-supported fixed partial denture prosthesis to treat implant failure in the anterior maxilla: A clinical report. *J Prosthet Dent* 2008;100(6):415-21.
9. Haralur SB, Al-Faifi AH. Use of CAD/CAM in esthetic restoration of badly decayed tooth. *Case Rep Dent* 2012;2012:608232.
10. Bahat Z, Mahmood DJ, Vult von Steyern P. Fracture strength of three-unit fixed partial denture cores (Y-TZP) with different connector dimension and design. *Swed Dent J* 2009;33(3):149-59.
11. Molin MK, Karlsson SL. Five-year clinical prospective evaluation of zirconia-based Denzir 3-unit FPDs. *Int J Prosthodont* 2008;21:223-7.
12. Christensen RP, Ploeger BJ. A clinical comparison of zirconia, metal and alumina fixed-prosthesis frameworks veneered with layered or pressed ceramic: A three-year report. *J Am Dent Assoc* 2010;141:1317-29.
13. Raigrodski AJ, Hillstead MB, Meng GK, Chung KH. Survival and complications of zirconia-based fixed dental prostheses: A systematic review. *J Prosthet Dent* 2012;107(3):170-7.
14. Lyssova V, Estafan D, Cunnigham RP. A multidisciplinary esthetic approach to single-tooth replacement and diastema closure. *Gen Dent* 2008;56:282-5.
15. Stappert CF, Tarnow DP, Tan JH, Chu SJ. Proximal contact areas of the maxillary anterior dentition. *Int J Periodontics Restorative Dent* 2010;30(5):471-7.
16. Hochman MN, Chu SJ, Tarnow DP. Maxillary anterior papilla display during smiling: A clinical study of the interdental smile line. *Int J Periodontics Restorative Dent* 2012;32:375-83.
17. Silva NR, Bonfante E, Rafferty BT, Zavanelli RA, Martins LL, Rekow ED, et al. Conventional and modified veneered zirconia vs. metaloceramic: Fatigue and finite element analysis. *J Prosthodont* 2012;21:433-9.
18. Nogueira AD, Della Bona A. The effect of a coupling medium on color and translucency of CAD-CAM ceramics. *J Dent* 2013;41 Suppl 3:e18-23.
19. Ishikawa-Nagai S, Yoshida A, Sakai M, Kristiansen J, Da Silva JD. Clinical evaluation of perceptibility of color differences between natural teeth and all-ceramic crowns. *J Dent* 2009;37 Suppl1:e57-63.