

Aesthetic and Functional Rehabilitation of Anterior Teeth Using the In-Ceram Zirconia System: A Case Report

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ABSTRACT

Considering the need to improve dentogingival aesthetics, the scientific community has been improving surgical techniques and dental restorative materials, providing aesthetics, self-esteem, and quality of life to the patients. The present paper aimed to describe a clinical case of oral rehabilitation of anterior teeth using the In-Ceram Zirconia system. The patient was a 47-year-old, Caucasian female who sought dental care because she was not satisfied with her facial appearance and improper functioning. The treatment started with correction of the dentogingival asymmetry. Later, temporary crowns were cemented and finally, definitive porcelain metal-free crowns (In-Ceram zirconia system) were fixed. After the multidisciplinary execution of the procedures, positive results were noticed in the aesthetic, functional and psychosocial conditions of the patient. It may be noted that the integration between periodontal and prosthetic treatment is essential in clinical cases. It is also concluded that, when used properly, the In-Ceram Zirconia system allows achieving satisfactory results.

Keywords: Ceramics, Crowns, Metal-free prosthesis

CASE REPORT

A 47-year-old, Caucasian female sought dental care because she was not satisfied with her dental aesthetics which also caused problems in her interpersonal relationships.

After the physical examination and periapical radiographs, compromised aesthetics and cervical maladaptation were observed in #12, #21, and #22, the latter being represented by a prosthesis on a cemented implant [Table/Fig-1a,b]. The treatment thus selected was the fabrication of six metal-free crowns using the In-Ceram Zirconia system. Gaps were also observed in the cervical edges of the anterior teeth. Thus gingivectomy was performed prior to the rehabilitation treatment. The gingivectomy was performed in a single session, correcting the unequal gingival levels present between the right upper canine and the upper left canine. Removal of bone tissue was not necessary and corrective gingivectomy was performed with gingivoplasty in the anterior region [Table/Fig-1c].

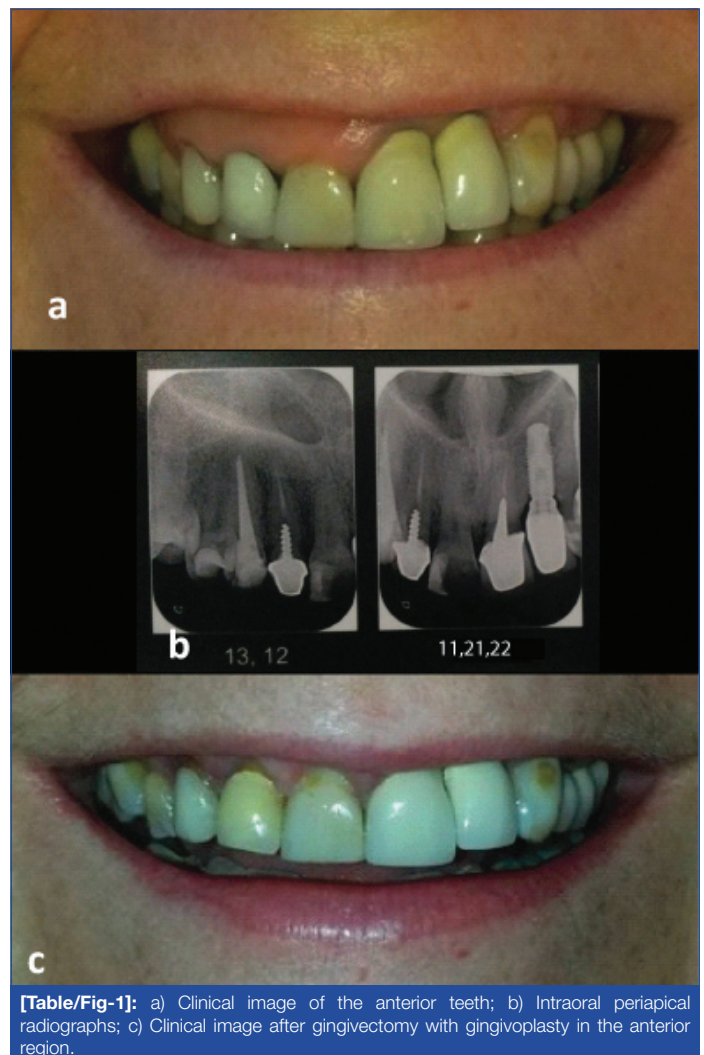
Three weeks after performing the periodontal procedures, the prostheses were removed from teeth #12, #21, #22 and #11, #13, and #23 were prepared for full crown. At the same time, a molten metal core matrix was formed in #13. Temporary crowns were fabricated and cemented over the prepared anterior teeth [Table/Fig-2a,b]. After moulding by the double mixing of addition silicone (Virtual™, Ivoclar Vivadent, Liechtenstein), the zirconia copings were produced [Table/Fig-2c,d].

After verifying the correct cervical adaptation of the zirconia copings, the maxillomandibular relation was established with acrylic resin of low polymerization contraction (Duralay™, Reliance Dental Ltd., Alsip IL, USA). and subsequent transfer moulding with addition silicone was done [Table/Fig-2e].

After covering the zirconia copings with feldspathic ceramics (Vita VM3™, Bad Säckingen, Germany), the metal-free crowns were cemented with dual resin cement (Enforce™, Dentsply, São Paulo, SP, Brazil). [Table/Fig-3] shows the comparison between initial and final clinical images of the patient.

DISCUSSION

Damaged teeth may result in aesthetic deficit and may be replaced with prosthetic treatments that increase masticatory efficiency,



[Table/Fig-1]: a) Clinical image of the anterior teeth; b) Intraoral periapical radiographs; c) Clinical image after gingivectomy with gingivoplasty in the anterior region.

maintain the health and integrity of the remaining alveolar ridge, and elevate the psychological state of patients due to the aesthetic improvement [1,2].



[Table/Fig-2]: a) Metal-ceramic prostheses removed from teeth #12, #21 and #22 and metal core cemented on #13; b) Temporary full crowns cemented; c) Zirconia copings on die-cut model; d) Trial of zirconia copings; e) Transfer moulding.



[Table/Fig-3]: a) Pre-treatment and b) post-treatment clinical image of the patient.

In order to achieve optimal aesthetic results, certain standards established by dental science define what is harmonious. However, these clinical criteria are questionable, considering aesthetics is a subjective idea [3]. Patient expectations and the understanding of therapeutic options in dentistry should be considered before initiating any type of rehabilitation plan. The patient of the case in question sought assistance for being unhappy with previous rehabilitation treatments. Hence, when the treatment plans were presented, the patient opted for the fabrication of metal-free crowns, using the In-ceram Zirconia system.

An attractive smile presents a correlation between the shapes and colours of teeth, as well as a proper lip-gingival ratio. Thus, analysing the amount of teeth and gingival tissue exposure is of utmost importance for smile aesthetics [3]. With the association of periodontal surgical procedures, numerous degrees of anterior aesthetic complaints can be solved before the restorative procedure. [3-5]. In the case presented, gingivectomy allowed correcting the gingival contour to obtain more parabolic and harmonious gingival levels.

Ayyildiz E et al., reported that a harmonious smile has been considered an indicator of facial attractiveness and beauty since the beginning of humanity, affecting social interaction and interpersonal success [6]. Such statements corroborate the present case.

Considering the initial dentogingival condition of the patient which was unsatisfactory, the patient reported problems in her personal and professional life.

Dental ceramics represent a great part of aesthetic rehabilitative treatments. They are reliable materials and provide satisfactory clinical results, as they reproduce the characteristics of natural teeth [1,7,8]. Metal-ceramic crowns have been used for more than 50 years [1], but they are known for few disadvantages in certain cases. The evolution of research on the development of ceramics presented a new option, in which the metal infrastructure was eliminated, producing crowns that were more precise and resistant to fracture and these were better known as metal-free prostheses [6,9].

Presented for the first time in 1998 by the Frenchman Sadoun, In-ceram zirconia system is considered a very reliable restorative method, despite presenting clinical limitations, such as low fracture resistance, difficulty in obtaining a vitreous surface after the necessary adjustments, little conservative preparation, difficult to make repairs and high cost [8,10]. As advantages, this system has a high fracture toughness, high flexural strength, combines excellent biocompatibility, low biofilm accumulation and low thermal conductivity [11].

Metal-free systems are greatly recommended. Facets in single restorations as well as large crowns and bridges may be used. According to Cenci SN et al., zirconia-reinforced ceramics have clinical indications for both anterior and posterior teeth [12].

The correct indication of the various ceramics available for indirect restorations to achieve long-term efficacy should be observed; analysing each case along with the properties and limitations of the material [13]. In the present case, a significant improvement of aesthetics and function was observed when replacing the metal-ceramic crowns with metal-free crowns. It should also be noted that, even if teeth #13, #21 and #22 have metal trunnions, it did not harm aesthetics, because the In-Ceram Zirconia system presents considerable opacity, which masks the presence of underlying metal.

With regard to the functional aspects, fixed prostheses with zirconia infrastructure have survival rates similar to those with metal infrastructure and therefore are an excellent substitute [13]. Improving zirconia ceramics guarantees flexural strength and high tenacity, but it limits the optical properties of translucency, so this ceramics ends up being used as a core to be covered with glass-ceramics [12,14]. In the present case, the system selected for producing the copings was the In-ceram Zirconia with feldspathic aesthetic ceramic coating.

Zavanelli AC et al., affirm that the development of all-ceramic systems following metal-ceramics restorations allowed simulation of natural dentition due to favourable function and aesthetics [15]. So, In-Ceram is an alternative when esthetics is primordial. The same authors state that In-Ceram is indicated in anterior and posterior teeth even when there is color change or metallic core visibility. However, the system is counter-indicated when patient presents bruxism or inadequate space for occlusal adjustment (1.5 mm in occlusal surface and 1.2 mm in axial walls).

The index patient did not present with bruxism and the interincisal space was considered satisfactory. Thus, in view of functional aspects, In-Ceram zirconia system was chosen. It is worth noting that, even without the presence of bruxism habit, it was decided to make an occlusal plate after the rehabilitation treatment, in order to protect metal-free crowns. Finally, it also emphasize that the rehabilitation improved the masticatory function, phonetics, aesthetics and biopsychosocial function that the stomatognathic system performs.

CONCLUSION

The objectives outlined in the planning of the present case were achieved, especially regarding the periodontics-prosthesis

integration. A comprehensive treatment plan combined with the correct selection of restorative material is critical for clinical success. The satisfaction of the patient was achieved, providing greater self-esteem, confidence, motivation and function. The In-Ceram Zirconia system is highly effective in meeting the aesthetic and functional needs of the cases which is also seen in this case.

ETHICAL ASPECTS

This work is in accordance with the ethical standards of the committee responsible for human research. The patient signed a free informed consent form prior to the treatment.

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