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Effect of Prosthetic Rehabilitation of Anterior Upper Teeth with CAD/CAM All-Ceramic Crowns

A Case Report

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Authors:

Assist. Prof. Dr. Srdjan Postic,
University of Belgrade, Faculty of Stomatology, Clinic of Dental Prosthetic, Belgrade, Serbia
Prof. Dr. Jerzy Krupinski,
University of Cracow, Department of Conservative Dentistry, Cracow, Poland
Mileva Simonovic, BSc, Ljubomir Jolovic, DDS,
Wisil-M, Belgrade, Serbia
Assist. Prof. Dr. Maciej Zarow,
Jagiellonian University, Institute of Stomatology of Collegium Medicum, Cracow, Poland

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Introduction

All-ceramic CAD/CAM crowns should improve aesthetic and occlusion of many patients, as well as of a patients of advanced age-premature old patients, and middle-old patients 1-18. Particular preparation set of burs should be used in tooth preparation, especially when finalizing cervical margin surfaces and finishing-line 19, 20. Digital scanning of prepared teeth - digital impressing tray, or precise silicone impressions could be used when reproducing prepared tooth surfaces.²¹

Objectives

The aim of the study was to present success of rehabilitation of anterior teeth of the patient by all-ceramic CAD/CAM crowns.

Material and Methods

Case report

Upper incisors 11, 12 and 21 of the patient (69 yrs.) were prepared (Jota Preparationsset, Nr 1450, Switzerland). (Fig. 1, Fig. 2, Fig. 3) A full-arch closed impression of abutments was made using light body silicone (Oranwash L, Zhermack) in custom tray. (Fig. 4) A bite registration has been done in her mouth. Master cast was poured (Galigranitstone, Galenika a.d., Serbia). Optical impression In-Eos (Sirona Dental Systems) of each abutment in relation to the neighboring dentition was provided. (Fig. 5, Fig. 6)



Fig. 1: Preparation-set of Burs



Fig. 2: Tooth Preparation



Fig. 3: Retraction Cords in Position

Fig. 4: Silicone Impression (Oranwash L, Zhermack) in Custom Tray, After Impressing in Her Mouth

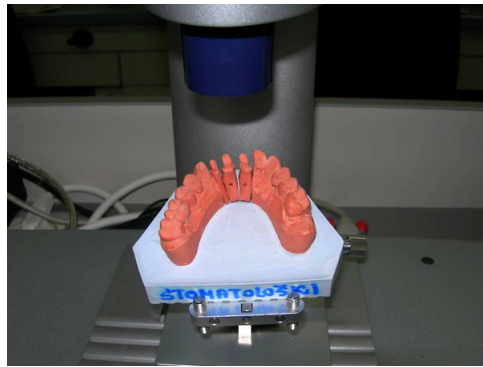


Fig. 5: Positioning of Master Cast and Dies in In-Eos, Prior to Scanning

Fig. 6: Scanning in In-Eos

Dental Database mode in PC was chosen to facilitate design. Each core (coping) has been previewed on - screen from proximal locations, as well as apically. (Fig. 7-Fig.20)

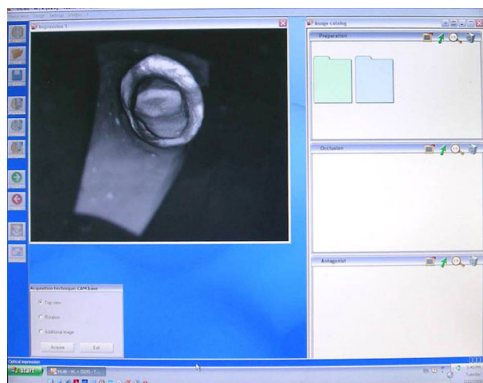
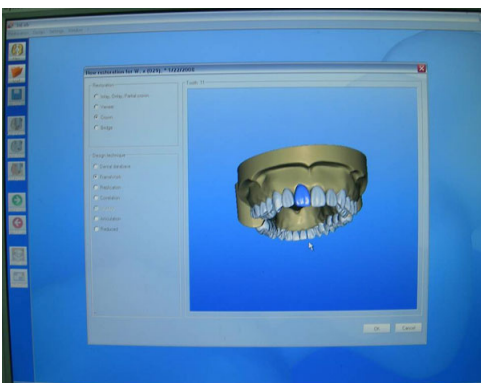


Fig. 7: Virtual Tooth Selecting

Fig. 8: Choosing of Occlusal (Incisal) View of the Die

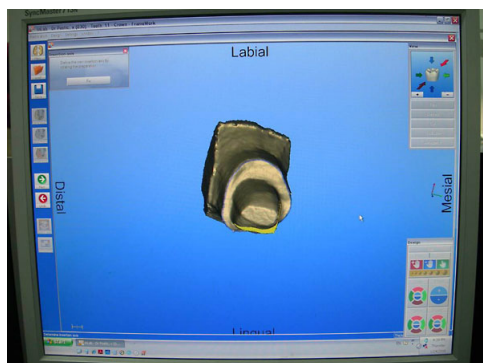
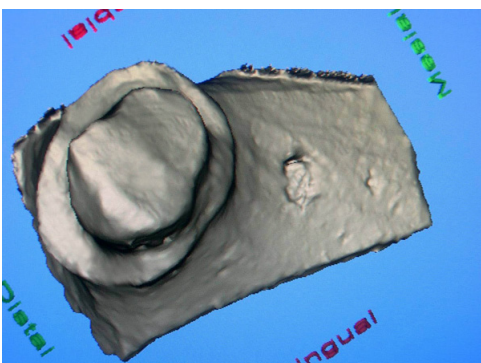


Fig. 9: Macro Mode for Checking the Prepared Tooth's Surfaces

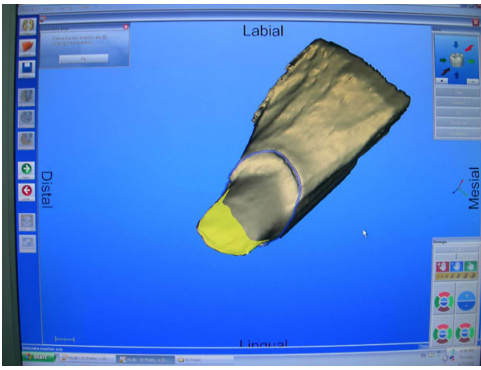


Fig. 10: Digital Appearance of Prepared Tooth Surfaces (Occlusal Aspect)

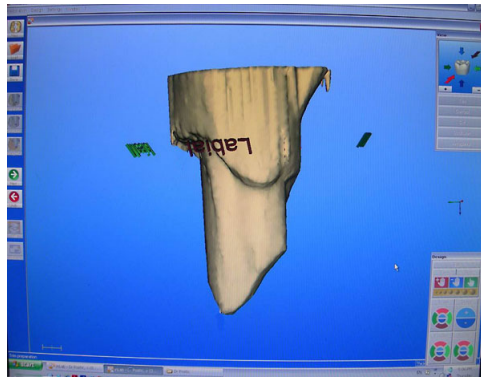


Fig. 11: Vestibular-Buccal Aspect

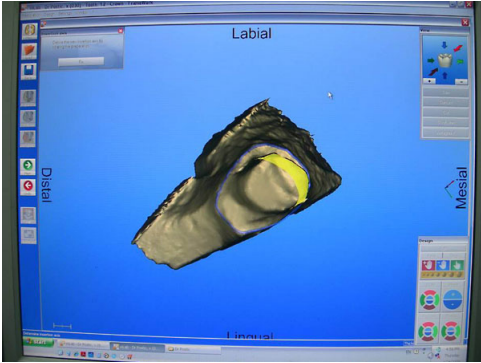


Fig. 12: Proximal Aspect

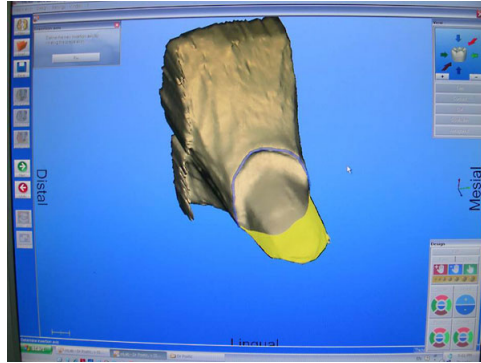


Fig. 13: Oral Aspect Mode



Fig. 14: Relationships of Prepared Tooth Surfaces with Finishing Line-Bold-Mark

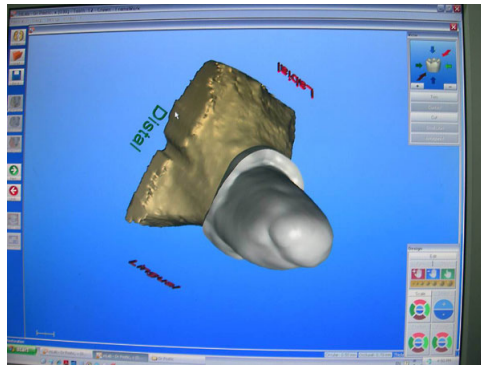


Fig. 15: Selection of the Model Material

Fig. 16: Digital Preview of Core

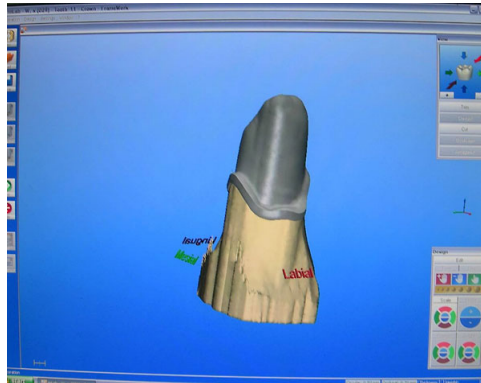
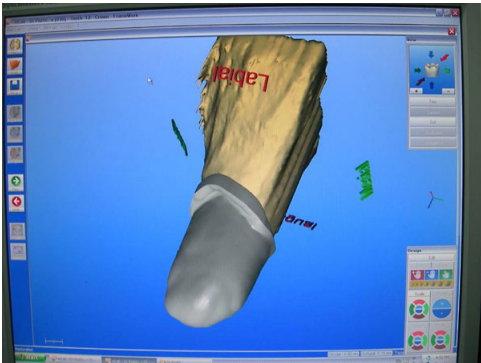


Fig. 17: A Preview of Labial Surface of Core

Fig. 18: Digital Previewing of Axial Surfaces of Core

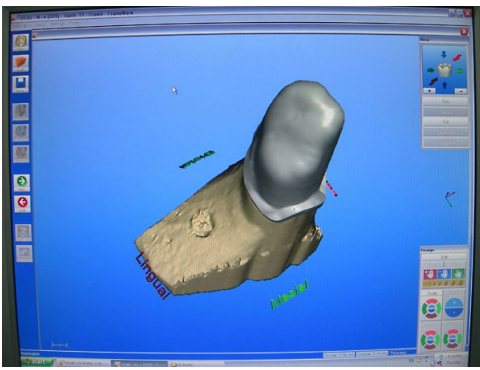


Fig. 19: Digital Preview of Oral Surface of Core

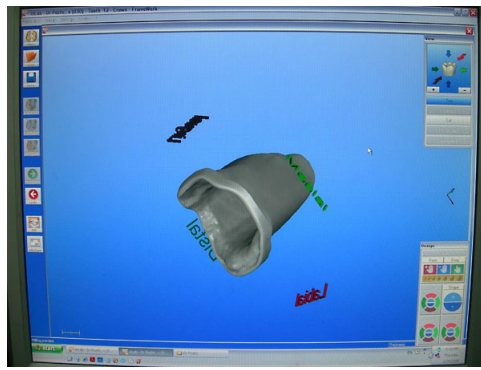


Fig. 20: Digital Form and Outlook of Core

CAD / CAM technology allowed the 3-D crown design to help compensate for aesthetic and occlusion. In- Ceram alumina (VITA , Europe) blocks were used for aesthetic properties. (Fig. 21, Fig. 22) Veneering porcelain (VITA VM 9) was added. The restorations were strained and glazed with Vita Akzent kit to add natural characterization in the Vita Vacumat oven. (Fig. 30. Fig. 33) The dentin of prepared incisors was treated with 3% hydrogen (Fig. 34) and the Interface porcelain adhesive system (Apex Dental Materials). Crowns were cemented using transparent Multilink - Sprint resin (Ivoclar , Vivadent) (Fig. 31, Fig. 32, Fig. 36, Fig. 37, Fig. 38)



Fig. 21: Milling Machine Sirona



Fig. 22: Ceramic Block in Milling Apparatus

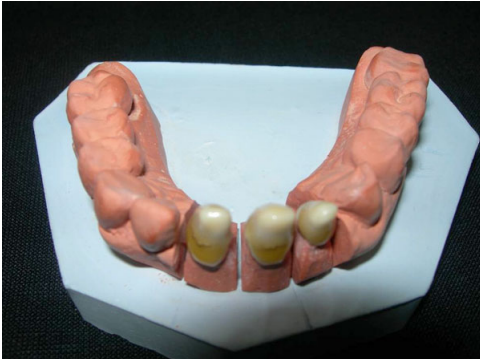


Fig. 23: Infiltration Glass on Core's Surfaces

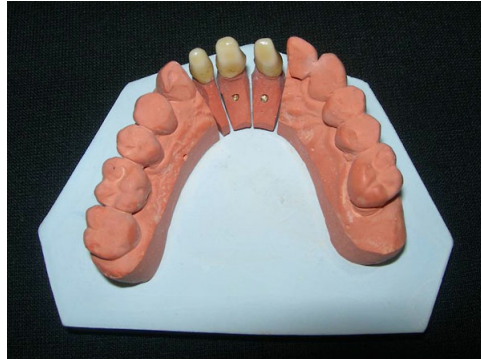


Fig. 24: Infiltration Glass on Cores-Lingual Surfaces

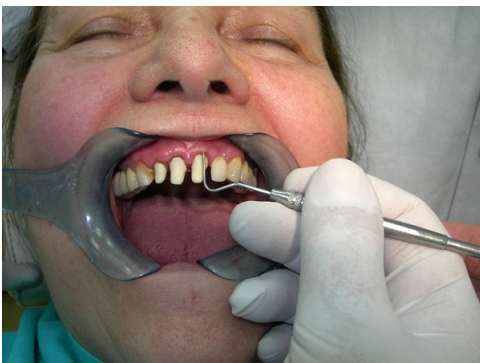


Fig. 25: Cores-Copings in the Mouth of the Patient



Fig. 26: Probing and Inspection of Core's Position in Her Mouth

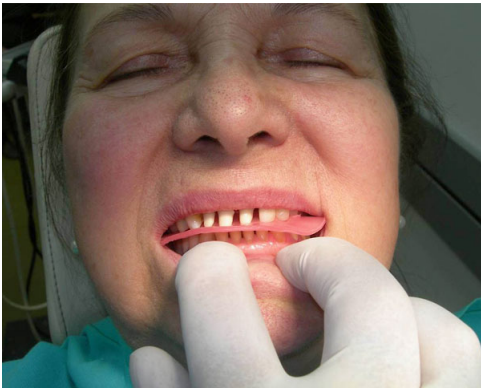


Fig. 27: Bite Check Using Wax



Fig. 28: Master Casts Prior to Positioning in the Articulator

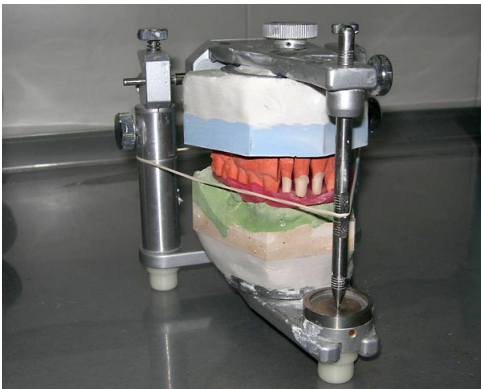


Fig. 29: Cores and Casts Positioned in Articulator and Position Respecting Occlusal Plane

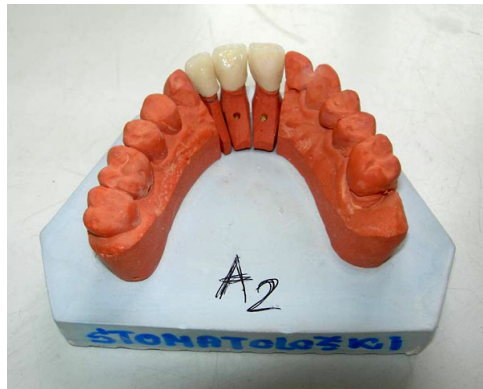


Fig. 30: All Ceramic Crowns Positioned on Cast After Glazing



Fig. 31: Probing and Checking On Marginal Fitting



Fig. 32: Checking Position of Crowns in the Mouth and Assessing of Forms, Shapes and Aesthetic Appearance Prior to Glazing

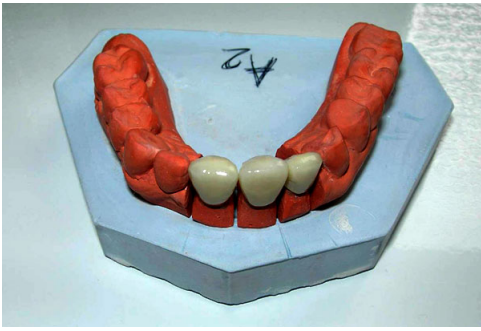


Fig. 33: Fabricated and Glazed All Ceramic Crowns Positioned on Cast-Akzent Kit Colors Added



Fig. 34: Tooth Inspecting Prior Cementing and Usage of 3% of Hydrogen Solution



Fig. 35: Usage of Multilink - Sprint Resin in This Situation for the Purpose of Cementing



Fig. 36: All-Ceramic Crown Cementing with the Aid of Light Transmission



Fig. 37: Final Check for Crown Position Prior Cementing



Fig. 38: Cementing with Light

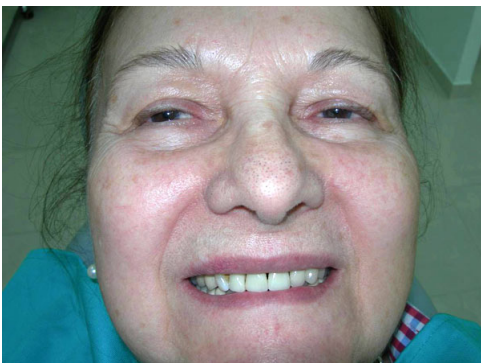


Fig. 39: Aesthetic and functionality of All-Ceramic Crowns at Recall 3 Years After Cementation

Results

The marginal and external fit of the crowns was excellent at the baseline, in the 1st year, the 2nd year, as well as in the 3rd year recalls. (Fig. 31, Fig. 32, Fig. 39)

Conclusions

Discussion

Tooth preparation for 3-D all-ceramic crown designing stipulates ideal preparation of marginal surface of prepared tooth with equal circumferential width of smooth cervical margin of preparation, as well as ultimately recognized exact finishing line. The tooth, prepared this way, and the cervical margin of this preparation could be merely recognized in computer analysis of preparation and designing for CAD/CAM and all-ceramics 1,7,19, 20. However, many facts and situations in dental clinical practice showed that for a number of adult patients, as well as for a patients of population of old should not be possible to prepare the tooth this way, because the width of cervical margin could not be with equal width ideally, considering its relationships to adjacent tissues and not-prepared surfaces. Just for these cases, if preparation has been recognized in computer program, software analysis and simulation, zirconia cores should be applied. Firmness and hardness of zirconia material could compensate for high stress concentration to areas of all-ceramic crown which could be more prone to fractures 2,4,8,10.

Conclusions

Accuracy, aesthetic and short-time fabrication of CAD/CAM generated all-ceramic crowns is satisfactory in dental prosthetic rehabilitation of patients of advanced age.

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Abbreviations

CAD = Computer-aided Design

CAD/CAM = Computer-aided Design/Computer-aided Manufacturing

This Poster was submitted by Assist. Prof. Dr. Srdjan Postic.

Correspondence address:

Assist. Prof. Dr. Srdjan Postic

University of Belgrade

Faculty of Stomatology, Clinic of Dental Prosthetic

Ranekova 4

11000 Belgrade, Serbia



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EFFECT OF PROSTHETIC REHABILITATION OF ANTERIOR UPPER TEETH WITH CAD/CAM ALL-CERAMIC CROWNS - A CASE REPORT -

Authors: Prasad K D, Srinivasulu M, D, Zeeva M, S, Jafarizadeh L, S, J
Faculty of Dental Prosthetics, The University of Sindh, Jamshoro, Pakistan
25, N. H. S. Road, Jamshoro, Pakistan
3772044



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Introduction: All-ceramic CAD/CAM crowns should improve esthetic and occlusion of patients of advanced age.
The AIM of the study was to present successful rehabilitation of anterior teeth of the patient by all-ceramic CAD/CAM crowns.

Methods: A 60-year-old patient presented with a severe maxillary anterior tooth loss. The patient was treated with all-ceramic CAD/CAM crowns. The patient was followed up for 3 years. The results were excellent. The patient was satisfied with the appearance and function of the crowns. The patient was followed up for 3 years. The results were excellent. The patient was satisfied with the appearance and function of the crowns.

Results: The marginal and external fit of the crowns was excellent at the baseline, in the 1st year, the 2nd year as well as in the 3rd year recall.



Conclusion: Accuracy, esthetic and short-time fabrication of CAD/CAM generated all-ceramic crowns is satisfactory in dental-prosthetic rehabilitation of patients of advanced age.

