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## CAD/CAM technology for zirconia based ceramics frameworks achieving

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### Introduction

Restorations produced with computer assistance are increasingly being adopted in dental technology. They require basic knowledge in this field, but the access to new, an increase in quality and reproducibility, an improvement in precision, as well as an increase in efficiency are some of the reasons to make efforts.

### Objectives

The aim of the study was to evaluate the effectiveness of the technological procedures in achieving zirconia based ceramics frameworks using Cercon CAD/CAM system.

### Material and Methods

Data capture from models were made using an 3D laser scanner Cercon Eye with a precision down to the  $\mu\text{m}$  range (Fig. 1, 2). The scanner is an integrated part of the CAD/CAM system and operates only in combination with the dedicated soft Cercon art 2.2. It calculates the magnification factor and controls the conversion in the milling program. The virtual 3D dental restorations were designed on the computer screen following the specific steps. The CAD software transforms the virtual model into specific set of commands which drive the CAM unit. CAM complete oversized restorations were created by subtraction from presintered soft prefabricated zirconium oxide blocks (Fig. 3, 4), processed and finally these were sintered and reduced to the original size (Fig. 5, 6, 7).



Fig. 1: Cast prepared for scanning



Fig. 2: Scanning of a die

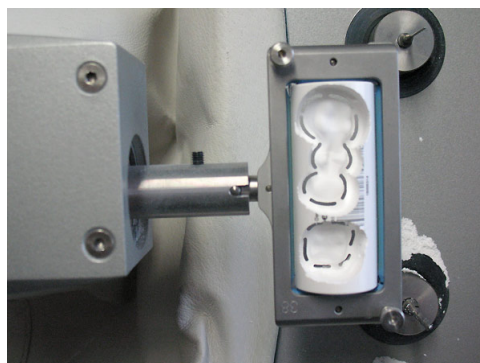


Fig. 3: Scanning of the presintered soft prefabricated zirconium oxide block



Fig. 4: Oversized milled restoration

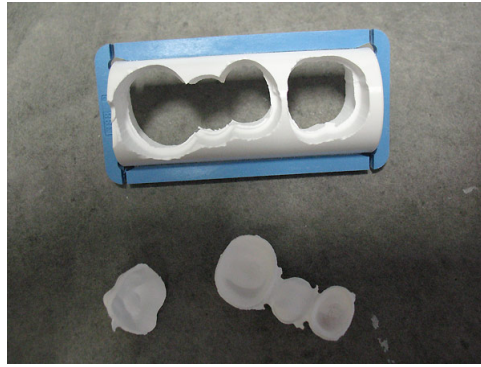


Fig. 5: Sandblasting of the restoration



Fig. 6: Oversized restoration

Fig. 7: Final sintered restoration

## Results

Using Cercon system a wide variety of frameworks from zirconia based ceramics can be fabricated. They require subsequent veneering using other methods to achieve adequate aesthetics.

## Conclusions

Handling with Cercon CAD/CAM system is easy for the practitioner. It is important that the user can modify the automatically designed restorations and individualize them to each clinical case.

## Acknowledgements

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## Literature

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*This Poster was submitted by Assist. Prof. Dr. Sorin Porojan.*

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# CAD/CAM technology for zirconia based ceramics frameworks achieving

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**Introduction:** Restorations produced with computer assistance are increasingly being adopted in dental technology. They require basic knowledge in this field, but the access to new, an increase in quality and reproducibility, an improvement in precision, as well as an increase in efficiency are some of the reasons to make efforts. The use of high strength structural materials like zirconia based ceramics for restoration frameworks which can be shaped only by CAD/CAM systems increased in the last years.

**Objective:** The aim of the study was to evaluate the effectiveness of the technological procedures in achieving zirconia based ceramics frameworks using Cercon CAD/CAM system (Degudent, Hanau, Germany)



Fig. 1. Wax-up prepared for scanning.



Fig. 2. Scanning of the wax up.



Fig. 3. Cast prepared for scanning.



Fig. 4. Scanning of a die.



Fig. 5. Scanning of the pre-sintered soft prefabricated zirconium oxide block.

**Material and method:** There are two possibilities for producing frameworks: one is the classical method where the wax-up (Fig. 1) is scanned with Cercon brain scanner (Fig. 2) and the other is the virtual design. In the last case data captures from models were made using a 3D laser scanner Cercon Eye, with a precision down to the  $\mu\text{m}$  range (Fig. 3, 4). The scanner is an integrated part of the CAD/CAM system and operates only in combination with the dedicated soft Cercon art 2.2. It calculates the magnification factor and controls the conversion in the milling program. The virtual 3D dental restorations were designed on the computer screen following the specific steps. The CAD software transforms the virtual model into specific set of commands which drive the CAM unit. CAM complete oversized restorations were created by subtraction from pre-sintered soft prefabricated zirconium oxide blocks (Fig. 5, 6, 7), processed and finally these were sintered and reduced to the original size (Fig. 8, 9, 10).



Fig. 6. Oversized milled restorations.



Fig. 7. Oversized milled restorations compared to the wax up.



Fig. 8. Oversized restorations.



Fig. 9. Final sintered restorations.



Fig. 10. Sandblasting of the restorations.

**Conclusions:** Handling with Cercon CAD/CAM system is easy for the practitioner. It is important that the user can modify the automatically designed restorations and individualize them to each clinical case.

**Results:** Using Cercon system a wide variety of frameworks from zirconia based ceramics can be fabricated. They require subsequent veneering using other methods to achieve adequate aesthetics.

**References:**

1. Hornfischer K.D., Burgen PA. Restorations of the upper dental arch using Lava all-ceramic crown and bridge work. *Br Dent J.* Jun 23, 2004; 117: 731-5, 2007.
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