CAD CAM AND DENTISTRY
FROM A-Z

CDAA/CADAT ANNUAL CONFERENCE 2019

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DISCLOSURES

I do not have any financial affiliations or sponsorships for my presentations in this conference.
Presentation Outline

• What is CAD CAM
• Its Introduction into Dentistry
• CADCAM Dentistry- The Process of Scanning, Designing and Manufacturing
• Utilization of CAD CAM in the Dental Office and in the Dental Laboratory
• Comparison of CAD CAM Processes to the Traditional Analog Restorative Techniques
• Materials used in CAD CAM Dentistry
What is CAD CAM?

Computer Aided Design and Computer Aided Manufacturing

It is essentially an integration of a software to help design a certain concept, prototype or product and a program which converts that electronic image into a numeric controlled programming language which generates instructions to the machine which makes it. The manufacturing process could be subtractive (Milling) or additive (Printing).
CAD CAM Process
Introduction of CAD CAM in Dentistry

Some of the early innovation in CAD CAM dentistry started happening in the 1980s both in the Dental Laboratory and in the Dental Office.
# The Pioneers in CAD CAM Dentistry

| Dr. Duret was the first to introduce CAD CAM to dentistry in 1971. He used an optical scanner to image the prepared tooth and then design and mill the restoration | Dr Moermann was the first to introduce chairside fabrication of dental restorations using CAD CAM in the early 80s. He is the person behind the most popular CAD CAM system in Dentistry today - CEREC | Dr. Andersson developed the Procera system used mainly to fabricate framework copings with CAD CAM in lab settings |
CAD CAM WORKFLOW

- Scanning - Data Acquisition
- Designing - Modelling
- Manufacturing - Milling
Optical Scanning- Digital Impressions

The Principle of Optical scanning is that a source of laser or structured light is emitted on to the teeth and the surrounding tissues and the data points of the various surfaces are captured by the sensors in the device and the software converts it into a 3D model.
Designing- Planning on Digital Models

• Proprietary 3D rendering software prepares a digital restoration on the created digital model based on the input of information by the dental or laboratory professional
Manufacturing - Milling

- The process by which the selected dental restoration is milled out of a prefabricated block of Dental material to be used for the restoration.
Digital Workflow vs Analog Workflow

Digital Process - The New World

- Dental Office
  - Tooth Preparation
  - Try In, Seat and Cement the Restoration

- Dental Office
  - Intra Oral Scan
  - and software creates a digital Model

- Electronic Transmission of Data

- Dental Lab
  - Design, Mill and Characterize and Process the Restoration

- Ship to Dental Office

Analog Process - Traditional

- Dental Office
  - Tooth Preparation
  - Try In, Seat and Cement the Restoration

- Dental Office
  - Impression with Alginate/ PVS and Make a Model

- Send to Lab

- Dental Lab
  - Waxup, Casting, Ceramic Structure characterization and Crystallization

- Dental Office
  - Design, Mill and Characterize and Process the Restoration

- Dental Office
  - Try In, Seat and Cement the Restoration

- 2nd Visit

- Tooth Preparation
Traditional PFM Crown Fabrication in the Dental Lab

- Waxup and Casting of Substructure
- Porcelain Layering
- Finishing
CAD CAM Workflow in the Dental Office - One Visit Dentistry

- Preparation of the tooth to be restored
- Isolation
- Imaging with Intra Oral Scanner
- Designing the Restoration in the Chairside Software
- Milling the restoration
- Characterization and Crystallization/ Sintering of the Restoration
- Bonding/Cementing of the Restoration
CAD CAM Workflow from Dental Office to Dental Laboratory – Two visit Dentistry

• Preparation of the tooth being restored
• Isolation
• Imaging with the Intra Oral Scanner and Temporization
• Online Transmission of the Scanned Data to a Dental Lab
• Lab Designs, Mills, Characterization, Crystallization, Sintering of the Restoration
• Shipped to Dental Office
• Restoration Bonded / Cemented in the Dental Office-2nd visit
All Ceramic Restoration in the Dental Lab

Monolithic Ceramic Restoration
- Mill Restoration
- Stain and Glaze
- Polish

Layered Ceramic Restoration
- Mill Restoration
- Cutback
- Layer Ceramic
- Fire
- Stain and Glaze
- Polish

Translucent Zirconia Restoration
- Mill in Green Stage
- Infiltration Colors
- Sinter
- Polish
- Stain and Glaze
Tooth Preparation Guidelines
Isolation
Dental Impressions
Digital Impressions - Chairside Scanning
Dental Models
Digital Models
In Office Designing
Types of Burs used for Milling

- Diamonds - Grinding
- Carbides - Milling
In Office Milling- Ceramics
In Office Milling - Zirconia
Staining & Glazing on Ceramics
In Office Infiltration - Zirconia
Firing of Ceramics and Zirconia
## Materials I use in my Office

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<tr>
<th>Glass Ceramics</th>
<th>Lithium Based</th>
<th>Zirconia</th>
<th>Composite Resins</th>
<th>PMMA</th>
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<td>Regular Opaque-Cerec Zirconia</td>
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Chairside CADCAM - Possibilities

- Restorative Dentistry
- Implantology
- Orthodontics

CAD CAM
Restorative Dentistry

- Crowns
- Bridges
- Veneers
- Inlays/Onlays
Implantology

FOUR STEPS — ONE EASY SOLUTION.

Integrated implantology gives you the safest solution for implanting. The four-step program now gives you the opportunity to get started with implantology and achieve a perfect result — safely and efficiently — in just three sessions.

1. SCAN
Optical impressions and 3D X-ray data form the perfect basis.

2. PLAN
Plan the implant and make a surgical guide.

3. PLACE
Place the implant in the patient’s mouth.

4. RESTORE
Produce the individual abutment and crown.
Orthodontics