Galileos-Cerec Integration for Guided Implant Surgery

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Galileos-Cerec Integration for Guided Implant Surgery

Circa 1993

Cad/Cam Scanner/Milling Chamber

Milling Chamber

Excessive powdering of preparation
Galileos-Cerec Integration for Guided Implant Surgery

Circa 1993

Monitor screen view of scan

Virtual view of restoration
In 1993 there was a steeper leaning curve due to limitations of the software and milling capabilities.
Galileos-Cerec Integration for Guided Implant Surgery
Combining 3D Conebeam / CT Scan and Cerec Technology

- Fiduciary Markers
- Known Radiographic Marker Scan
- Cerec Virtual Crown
- Virtual Crown, Implant and Soft Tissue Superimposed on CT Scan
Galileos-Cerec Integration for Guided Implant Surgery

Digital Intraoral Scan

Intraoral Camera

Omnicam Intraoral Camera

CEREC Acquisition Unit

Roll Camera from Occlusal to Buccal then Lingual
Galileos-Cerec Integration for Guided Implant Surgery

• CEREC - Sirona
SICAT Surgical Guides - Overview - Workflow

Radiographic Imaging

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Galileos-Cerec Integration for Guided Implant Surgery

Radiographic Imaging

Radiographic Templates

Off-Site Lab Fabricated

- Classic Guide- **PROS:** Very accurate implant guide, Multiple complex implant placement
  **CONS:** Involves shipping to lab for fabrication (longer turn around), Cost

- OPTIGUIDE- **PROS:** Very accurate implant guide, Send case via email (cuts turnaround time)
  **Cons:** Requires Intraoral scanner, Cost

Chairside Fabricated

- CEREC Guide- **Pros:** Can fabricate in 20 minutes, inexpensive guide
  **Cons:** Utilized for 3-4 implants
Scan Patient with Guide in place
Digitally Plan Case
Conventional Diagnostic Model Required
Guide Completed and shipped in 3 weeks
Ship to SICAT LAB
1. Optical Scan (Optiguide) Instead of Conventional Diagnostic Cast
2. Radiographic Template with Bite Material
3. Scan Patient with Guide in place
4. Digitally Plan Case
5. Email Digital Scan and Plan to SICAT LAB
6. Guide Completed and shipped in 1 week
The Anatomy of a Classic Guide

1) Radiographic Bite Template
2) Radiopaque Acrylic Tooth Form
3) Thermoplast Arch Form
The Anatomy of a Classic Guide

- Radiographic Template
- Radiopaque Bite Material
- Radiographic Template
- Radiopaque Duplicate Denture
CBCT Scan with Radiographic Template in place
DENTAL OFFICE PARKING ONLY

ALL OTHERS WILL BE PAINFULLY EXTRACTED
SICAT Surgical Guides - Overview - Workflow

Digital Planning of Surgical Guide

Fractured Lateral Incisor

Omnicam Intraoral Scan
Design Virtual Crown at Lateral Incisor Site

Define Gingival Margin

Proposal of Virtual Crown
SICAT Surgical Guides - Overview - Workflow

Merging of CBCT Scan and the Intraoral Scan

- Intraoral Scan superimposed
- Digital Implant placement
- Radiographic Markers
- Cerec Virtual Crown
SICAT Surgical Guides - Overview - Workflow

Implant Planning Prosthetic and Surgically Driven

Reference Body with Radiographic Markers

Digital Implant Placement

Cerec Scan of gingiva and virtual crown

Radiographic Marker

Digital Implant Placement

Cerec Scan of gingiva and virtual crown
SICAT Surgical Guides - Overview - Workflow

Implant Planning Prosthetic and Surgically Driven

- Cerec Scan of gingiva and virtual crown
- Digital Implant Placement
- File Emailed to SICAT LAB
- Guide shipped to Clinic
- Titanium Access for Implant keys
Chairside Surgical Guides

CEREC Guide

Reference Body

Thermoplast
The Guide can be fabricated chairside with inexpensive materials and used to place implants for one to four missing teeth.

- Reference Body
- Thermoplastic Material
- Implant Specific Drill Sleeve
- Cerec Milled Drill Body

Package of two reference bodies and two drill bodies..... $80.

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Reference Body:

Radiopaque Markers

Medium is most commonly used size.

<table>
<thead>
<tr>
<th>Size</th>
<th>Color</th>
<th>Width at most narrow</th>
<th>Max Drill Ø</th>
<th>Mes/dis position correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>Orange</td>
<td>6 mm</td>
<td>3.5 mm</td>
<td>≤ 1.5 mm</td>
</tr>
<tr>
<td>M</td>
<td>White</td>
<td>7.3 mm</td>
<td>4.3 mm</td>
<td>≤ 2 mm</td>
</tr>
<tr>
<td>L</td>
<td>Grey</td>
<td>11 mm</td>
<td>6 mm</td>
<td>≤ 4 mm</td>
</tr>
</tbody>
</table>

Concave tissue surface

Center reference body in edentulous space.
Combining 3D Conebeam / CT Scan and Cerec Technology

Thermoplastic material

Reference Body

Diagnostic Cast
Thermoplastic material softens and turns clear in 120° water.

Adapt material to edentulous space and adjacent teeth. Center reference body in space and press to place, making contact with ridge. Adapt material to sides of reference body.

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Material adapted to adjacent teeth.

Reference body in contact with tissue of ridge.

Material adapted to sides of reference body.

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Scan with Cerec guide and reference body in place intraorally
Radiopaque fiduciary markers embedded in Reference Body will be used by Sidexis software for orientation.
Software allows for viewing in three dimensions.
Locate and highlight the Mandibular nerve:
Implant selection using software library of multiple implant companies:
Implant Positioning:

Outline of Reference Body

Center implant position within outline of reference body to insure accurate fabrication of drill body.
Implant Positioning:

Guidelines: 1. Implant positioned in sound bone.
2. Avoid nerve by at least 2 mm.
3. Minimum of 2mm bone thickness on buccal and lingual.
Design and Export Of Virtual Crown

Omnicam

Draw Gingival Margin

Virtual Crown Design
Design and Export Of Virtual Crown

Export Design as .CDT File
Load .CDT File onto CBCT Software
Import Virtual Crown to CBCT Software
Exporting Surgical Plan to Omnicam

Which type of surgical guide would you like to order/use?

Order at SICAT:

**CLASSICGUIDE**
- Radiographic template
- Stone model

**OPTIGUIDE**
- Registered optical impression
- Stone model

Export plan for third-party processing:
- Registered reference bodies
- Sleeve positions D2

Select the type of surgical guide you would like to order/use by pressing the corresponding button.
Exporting Surgical Plan to Omnicam

Is this the correct plan?

Patient: Unknown - Howells, Manwyyn E. *0/10/1944

Anonymize patient data

Plan "Plan 1", implants:

<table>
<thead>
<tr>
<th>Position</th>
<th>Ø [mm]</th>
<th>Length [mm]</th>
<th>Manufacturer</th>
<th>Implant line</th>
<th>Reference body</th>
<th>Sleeve position D2 [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>30</td>
<td>4.73.9</td>
<td>Zimmer Dental</td>
<td>TSF MTX</td>
<td>M</td>
<td>22.0</td>
</tr>
</tbody>
</table>

Please make sure that the reference bodies are exactly aligned with the x-ray data. All CAD/CAM objects will be included in the export.

Where do you want to export the plan to?

E:\2013-10-31 12-50 Howells Manwyyn E. 1944-05-10.cmg.dcr

Export plan for third-party processing:

1. Please check that all implants you intend to export are included in the list with the correct reference body types and sleeve positions.
2. If you need to anonymize the patient data, please tick the corresponding check box.
3. Select where you want to export the plan to.
4. Press "Export".
Sidexis software directs Cerec machine to produce milled drill body.
Milled Drill Bodies:

Implant Drill Guide Channel

Orientation Projection

Vertical Stop

Tissue Surface
Drill body produced in Cerec milling chamber.

Projection

Orientation Notch

Reference body removed.

Drill body snapped into Cerec Guide.
Tissue punch used with drill sleeve to enter tissue while protecting the milled drill body.
Drill sleeves are specific to implant manufacturer and size.

Sleeves fit into drill body on stent and guide drill bits to pre-determined angle and depth.
Tissue punch technique provides:
1. Atraumatic entry into implant site.

Initial trephine drill guided to full depth
Drill sleeves and drill bits of progressively larger sizes are used until implant can be placed at correct angle and pre-determined depth.

Multi-purpose fixture mount holds implant while its driven into bone.
Multi-purpose fixture mount.
Careful planning ...........

........leads to ideal implant positioning.
Guided implant surgery produces excellent results.

Zirconia Screw Retained Hybrid Implant Crown

.........excellent results
Digital Implant Impressioning
Hybrid Custom Abutments

Orientation Notch

Orientation Recess

Ti-Base

Scan Body

Digital Implant Impressioning
Digital Implant Impressioning

Hybrid Custom Abutment

- Provides precise implant location transfer
- Prefabricated rotation locks in zirconium block and on Ti-Base
- Metal to metal screw connection
Digital Implant Impressioning

Hybrid Custom Abutments

Zirconia Blocks

Orientation Recess

Screw Access Hole

Magnified View of Intaglio Surface of Milled Zirconia Crown
Digital Implant Impressioning

Hybrid Screw Retained Custom Abutment Crown

Custom Healing Abutment

Gingival Emergence at Implant Fixture Level

Custom Healing Abutment removed
Digital Implant Impressioning

Hybrid Screw Retained Custom Abutment Crown

Ti-Base* inserted at fixture level

Scan Body* inserted over Ti-Base

*Ti-Base is the fixture level connection to the implant body

*Scan Body is the orientation marker for the software
Abutment Crown crystalized and glazed cemented onto Ti-Base.

After cementation need to polish gingival 1/3.

Occlusal View
Digital Implant Impressioning

Hybrid Screw Retained Custom Abutment Crown

Zirconia Hybrid Custom Screw Retained Implant Crown

Natural Emergence Profile
Digital Implant Impressioning

Hybrid Custom Abutments

Healing Abutment

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Digital Implant Impressioning

Hybrid Custom Abutments
Digital Implant Impressioning

Scan of the TiBase

Scan of the Scan Body
Digital Implant Impressioning

Scan of Opposing Arch

Scan of Bite Record
Digital Implant Impressioning

Outline Emergence of Abutment

View without Scan Body
Digital Implant Impressioning

Digital View of Crown Proposal

Digital View of Crown Proposal Without Gingival Mask
Digital Implant Impressioning

TiBase

Interproximal Contact Strength

Custom Abutment Crown
Digital Implant Impressioning

Split Custom Abutment from Crown

Crown

Custom Abutment

Milling Preview of Custom Abutment
Digital Implant Impressioning

Milling Preview of Crown
Digital Implant Impressioning

Custom Abutment

Crown

TiBase
Milled Zirconia Abutment

Cemented Crown

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Utilizing CBCT Scan for MDI Implant Placement

Edentulous Mandibular Arch
Acrylic duplicate of Mandibular Denture

Gutta Percha placed as radiographic markers for proposed implant placement in drilled channels
Utilizing CBCT Scan for MDI Implant Placement

Tin Foil used to accent incisal edges

Radiographic Markers
Tin Foil used to accent incisal edges

Gutta Percha placed as radiographic markers for proposed implant placement in drilled channels

Lateral View of Mandible
Tin Foil used to accent incisal edges

Gutta Percha placed as radiographic markers for proposed implant placement in drilled channels

Occlusal View of Mandible
Cross Sectional view isolating the mental foramen

Tin Foil used to accent incisal edges

First Radiographic Marker 6mm anterior to mental nerve
Prepared Sites for implants

Implant Twist Drill guided by access holes

Prepared Sites for implants
Relief Cut Into Intaglio of Existing Denture for O-ring Housings
Shim Material placed over Implants for block out purposes

O-Ring Housings placed
Silicone Pressure Paste utilized for confirming fit of O-ring Housings

Shim Material

Acrylic Resin Pick-Up of O-Ring Housings
Intaglio of Denture Refined with Acrylic Resin
Dental Material List

Intra-Oral Scanner
- Omnicam - Sirona

CBCT Scanner
- Galileos - Sirona

Radiographic Bite Plate
- Galileos - Sirona www.scicat.com

Cerec Optiguide
- Patterson Dental - Hydro plastic Material (TAK)
- Reference Body (Sirona)
- CEREC Guide Block (Sirona)

Implant Drill Sleeve
- Sirona – www.sironausa.com

Implant System
- Zimmer Dental
- MDI

CEREC Guide Kit
Dental Material List

- Ti-Base Kit
  *Patterson Dental – includes Ti-Base and Scan Body*

- Zirconia
  *Patterson Dental – Sirona Incoris*

- Lithium Disilicate Porcelain
  *Patterson Dental – Ivoclar Emax*

- Maximized Adhesive Dentistry
  *Patterson Dental – Danville Micro etcher*
  *Monobond Plus Silane (Ivoclar)*
  *All-in-One Unidose bonding agent (Kerr)*
  *NX3 Dual Cure Resin Cement (Kerr)*
  *Sirona – www.sironausa.com*

- Implant Drill Sleeve

- Implant System
  *Zimmer Dental*
  *MDI 3M*