Understanding Digital Dentistry

Guided Surgery Referral Protocols

www.cdental.com

Guided Implant Surgery Strengths

Accurate, safe and predictable surgery
Shorter surgical time
Faster healing time with flapless surgery
Smaller incisions with less bleeding and pain
Immediate loading can be done

The Benefits of Outsourcing to Us

We're specialists in image capture & processing
Local & convenient hours for patients
Maximize chair time for your dental practice
Fast & efficient service
Excellent quality images, surveys & reports
Online case planning

Fields of View

We offer focus, small and large view CBCT scans with a simple and affordable pricing structure.

Focus View

6 x 6 cm | 1-3 Teeth

Implants | 3rd Molars | Endodontics | Impactions

The Focused View reduces the dimension of the scan, providing high resolution images for diagnosis in all pathologies where it is necessary to identify small details at high definition. Survey includes 1-3 adjacent teeth and in some cases 4-5 depending on each patient's size and anatomy. **Focused field of view cannot be used for guided surgery**.

Small View

8 x 8 cm or 12 x 8 cm | One or Both Arches

Implants | Oral Surgery | Guided Surgery | Periodontics

Only a Small View produces both the quality and the quantity of details necessary to accurately diagnose the maxilla and mandible for implant assessment, trauma impactions and lesions. **Can be used for guided surgery with 3D intraoral iTero scan.**

Large View

12 x 15 cm or 15 x 15 cm | Both Arches

Airway/OSA | Orthodontics | Oral Surgery | Impactions | TMJ | Orthognathic Surgery

The Large View includes the frontal sinus to below the hyoid bone. This view has slightly lower resolution than the Hi-Res Small scan. **Can be used for guided surgery with 3D intraoral iTero scan.**

To learn more about our paperless NNT and OnDemand3D 3D software surveys, visit www.cdental.com.

Table of Contents

Case Examples

Introduction to CBCT & iTero Digital Models System

Cone Beam CT | NewTom VGi

- Vertical patient positioning
- Medical grade tube head
- Rotating anode
- .3mm focal spot
- Flat panel
- Scan time: 18 seconds
- X-Ray time: 2.3 seconds to 5.2 seconds
- Safe Beam™ technology *(reduces radiation based on patient size)*

As the leading 3D CBCT on the market, NewTom is setting the industry standard for patient experience and safety, image quality and 3D case diagnosis.

3D Intraoral Models | iTero Element Scanner

- Faster, more detailed digital models
- Zero radiation exposure
- Less mess, more accuracy
- 3D high quality imaging for better case planning
- 6,000 frames per second
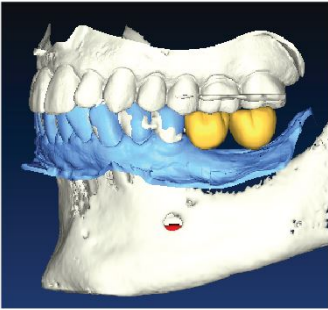- No more goop, gagging or discomfort for patients

iTero scans utilize 15-micron surface-tooth recognition software to create a highly accurate digital model of the patient's anatomical tooth structure.

Choose the right implant software for your 3D case planning.

In order to best utilize CBCT and realize the benefits it has to offer to your practice, choose the right software. C-Dental recommends either In2Guide by Cybermed or Simplant by Materialise.

Scanning Options for Surgical Guide Fabrication

Option 1 **CBCT and Intraoral Scan of Patient** *See Page 5*	Option 2 **CBCT and Denture Dual Scan** *See Page 15*
1. CBCT and iTero scan of patient 2. Software conversion and merge of data 3. Virtual wax-up (see below) 4. Virtual case plan 5. Surgical guide printed using digital model	1. Mark denture and fabricate bite support 2. CBCT of denture 3. CBCT of patient wearing supported denture 4. Virtual case plan 5. Surgical guide printed using denture scan

Option 3
CBCT of Patient & Intraoral Scan of Models
See Page 21

4

Intraoral Scan & CBCT of Patient

Prerequisites for Imaging

At least 4 teeth on arch(es) of interest with posterior occlusion

4+ teeth with **removable provisional** and posterior occlusion

4+ teeth with **partial** and posterior occlusion

4+ teeth with **fixed restoration** with posterior occlusion

4+ teeth with posterior occlusion and **immediate extraction** site

4+ teeth with **hard model** wax-up

Why 3 anatomical landmarks?

A minimum of 3 teeth or prepped teeth per arch are needed to create an accurate digital impression. These teeth also act as anatomical landmarks for merging the STL file to the CBCT. Radiolucent provisional, pontic-teeth, and bridges won't show up in the CBCT and can't be used to merge the STL file.

Why posterior occlusion?

Posterior occlusion establishes vertical height and allows a virtual ceramist to accurately design a virtual wax-up. This virtual wax-up is designed on the STL file and merged to the CBCT for implant planning.

What if the patient does not qualify?

If the patient does not meet any of the prerequisites listed, above see **Scanning Option 2** - Radiographic Guide Dual Scan (page 7).

What if the patient has one qualifying arch and one non-qualifying arch?

For the qualifying arch, use Option 1. For the the non-qualifying arch, use Option 2.

Referral Guides

Missing Teeth with Posterior Teeth in Occlusion
Understanding Digital Dentistry

One or two arches can be iTero scanned for ordering virtual wax-up services. Wax-ups are placed in edentulous areas as requested on the referral slip. Doctors can perform implant placement using 3D imaging when the patient meets the specifications for an accurate merge of a CBCT and iTero 3D intraoral scan.

Specifications for an accurate wax-up & merge:

1. At least 4 teeth on the same arch

2. Premolar and molar on the same side that each have an opposing tooth

3. Ideal Occlusion

Without these specifications, an iTero scan will not work due to lack of virtual articulator and therefore vertical height will not be established.

Referral Slip Protocol

1. Choose *Small 12x8cm CBCT* and select arch of interest

2. Choose *Implant Survey*

3. Indicate planning program

4. Choose virtual design option - *Virtual Wax-Up - CBCT + iTero*

5. Indicate area(s) of interest & wax-up tooth numbers

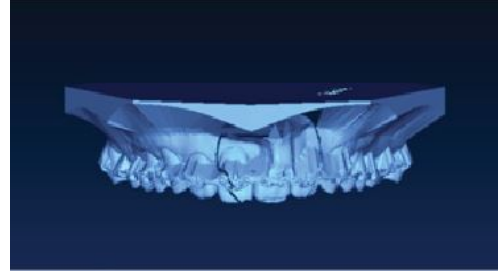6. Check *Authorize Virtual Wax-Up* Order box

Workflow

1

Imaging Center Workflow

CBCT and iTero scan are performed on patient. iTero file is sent to Cybermed OnDemand3D.

2

Cybermed Workflow

Digital models and virtual wax-up are created by OnDemand3D and sent back to imaging center.

3

Imaging Center Workflow

iTero derived wax-up is merged with CBCT by technician. Case files and accurate merge are organized and sent to doctor.

4

Doctor's Workflow

Doctor plans implant surgery based on virtual wax-up and CBCT merge.

5

Surgical guide is fabricated and surgery is performed.

Patients with a removable provisional can be scanned with and without the appliance to save cost and use the provisional as a virtual crown.

Specifications for an accurate merge:

1. At least 4 teeth on the same arch
2. Premolar and molar on the same side that each have an opposing tooth
3. Ideal Occlusion

Preparing the Provisional

1. Remove cement
2. Verify that provisional does not rock or shift when in place
3. Verify occlusion

Patient must be able to remove and replace provisional themselves. If patient cannot replace provisional themselves, they can return to the doctor to replace the provisional and return to the imaging center for the iTero scan.

Virtual Design Considerations

1. Does the provisional have the proper labial contours?
2. Does it meet your aesthetic expectations?

If your patient's restoration does not meet these expectations please remove it and indicate on the referral that you prefer a virtual wax-up. See page 9.

Referral Slip Protocol

1. Choose CBCT scan dimension and resolution
2. Choose *Implant Survey*
3. Indicate planning program
4. Choose virtual design option - *iTero Scan with Temporary*
5. Indicate area(s) of interest
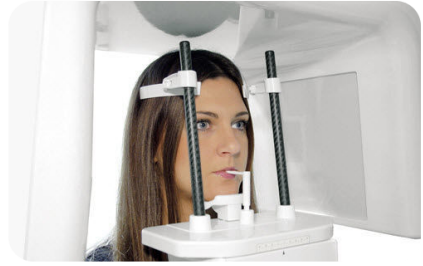6. Indicate 'No Virtual Wax-Up'

Workflow

1

Doctor's Workflow

Remove cement from provisional. Send patient to the imaging center with removed provisional for the scan.

2

Imaging Center Workflow

CBCT scan of patient without the provisional is performed.

3

Imaging Center Workflow

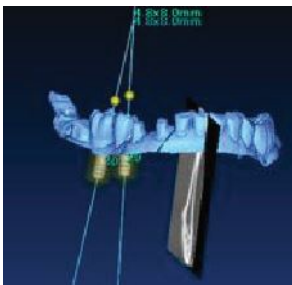iTero scan with and without provisional is performed.

4

Cybermed Workflow

Wax-up of patient and prosthesis based on scan with provisional is constructed.
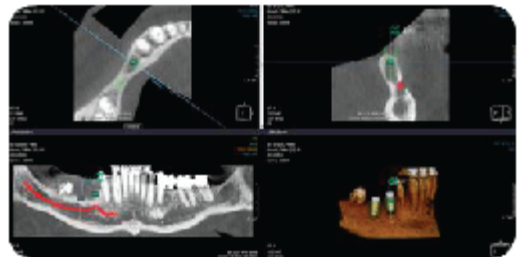
5

Imaging Center Workflow cont.

C-Dental merges virtual wax-up and CBCT scan and sends to doctor.

6

Doctor's Workflow

Verification of Implant Placement
Online case planning assistance.

7

Doctor's/Cybermed Workflow

Surgical guide is fabricated and surgery is performed.

Immediate Extraction & Immediate Implant Placement
Understanding Digital Dentistry

When planning for an immediate extraction and implant placement, the same specifications for an accurate merge apply. Please review the following considerations regarding image capture and treatment planning that might affect your referral and treatment sequence.

Specifications for an accurate merge:

1. At least 4 teeth on the same arch

2. Premolar and molar on the same side that each have an opposing tooth

3. Ideal Occlusion

Without these specifications, an iTero scan will not work due to lack of virtual articulator and therefore vertical height will not be established.

The imaging center can perform an immediate merge of the iTero and CBCT scans if the tooth being extracted represents the final prosthesis. If not representative, a virtual wax-up by Cybermed is required.

Fractured tooth that represents position of final prosthesis.

Considerations for Intraoral Scan of Extraction Site

Tooth should have the proper position, labial contours, aesthetics, and occlusion.

Referral Slip Protocol

1. Choose CBCT scan dimension and resolution

2. Choose *Implant Survey*

3. Indicate planning program

4. Choose virtual design option - *No Wax-Up - Immediate Extraction*

5. Indicate area(s) of interest

If tooth not representative of final prosthesis: Indicate wax-up tooth number and check box that authorizes virtual wax-up order.
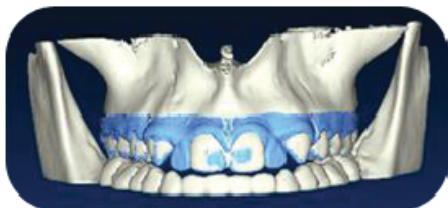

Workflow

1

Imaging Center Workflow
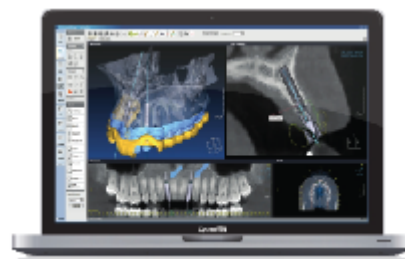CBCT and iTero scan performed on patient.

2

Imaging Center Workflow

iTero derived wax-up immediately merged with CBCT.
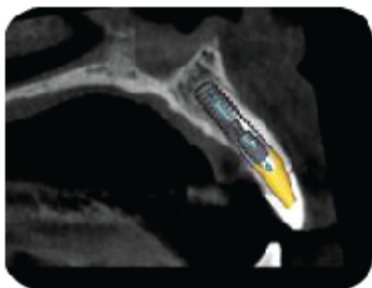
3

Doctor's Workflow
Online treatment planning assistance.

4

Doctor's Workflow
In2Guide implant placement over extraction site.

5

Doctor's/Cybermed Workflow

Surgical guide is fabricated and surgery is performed.

All On 4 or 6 Implants
Understanding Digital Dentistry

All on 4 or 6 extractions and immediate placements.

1. Imaging Protocol: CBCT and Intraoral Digital Scan

A CBCT and 3D intraoral digital scan is performed on the patient.

C-Dental imaging technicians must be informed if the case will be an All on 4 or 6 implant survey.

The patient's iTero scan requires that the patient be imaged well above or below the apex of the teeth for guide fixation purposes.

2. Existing Occlusion
Patient <u>cannot</u> have Class 3 mobility.

3. Scans Merged, In2Guide Treatment Planning & Guide Ordering

4. Fabrication of Anchor Guide
If possible, a tooth will be left intact to help establish vertical height for the fabrication of the anchor guide.

5. Implant Placement Through Surgical Guide

Referral Slip Protocol

1. Choose CBCT scan dimension and resolution

2. Choose *Implant Survey*

3. Indicate planning program

4. Choose virtual design option - *No Wax-Up - Immediate Extraction*

5. Indicate area(s) of interest

6. Indicate 'No Virtual Wax-Up' and if *all on 4 or 6* in <u>special instructions</u>

Workflow

1
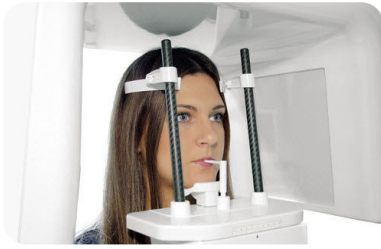
Imaging Center Workflow

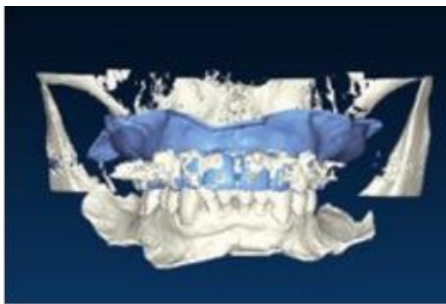CBCT and iTero scan performed on patient.

2

Imaging Center / Doctor Workflow

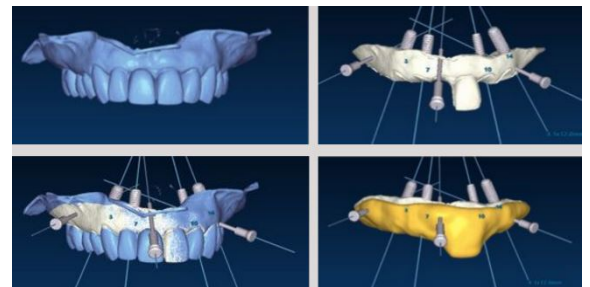Existing occlusion - no Class 3 mobility established.

3

Imaging Center / Doctor / Cybermed Workflow

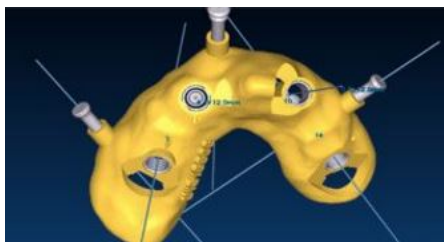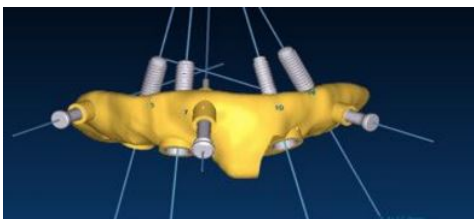Scans are merged, treatment planning completed and guide is ordered.

4

Doctor's Workflow

Fabrication of anchor guide.

5

Doctor's Workflow

Surgical guide is fabricated and surgery is performed.

Scanning Option 2
Understanding Digital Dentistry

Dual Scan CBCT | Radiographic Guide

Prerequisites for Imaging

No posterior occlusion   Less than 4 teeth on arch of interest

Fabricating Your Denture

Materials

Acrylic denture without metal or radiopaque material
Radiopaque marker placed by imaging center
Radiolucent bite support (blu mousse or white vanilla)

Directions

- Hard-lined
- Well fitting
- Ideal occlusion
- No metal
- 6 radiographic markers (our imaging technicians will place these)
- 3 per side - all lingual - varying horizontal heights
- Tooth position and size should represent the final prosthesis
- The denture should represent the desired final prosthesis and establish proper vertical height

Fabricating Your Bite Support

Materials

Radiolucent material (blu mousse or white vanilla)

Directions

- Build up bite support to cover the occlusal surface of all posterior molars and bicuspids as well as anterior teeth.
- The bite support should be thick enough that the patient cannot bite through it.
- The bite support should be one piece.

Purpose

- The bite support ensures that the denture is seated properly against the soft tissue during the CBCT scan.
- Rocking or space between the soft tissue and the radiographic denture will result in an inaccurate case plan.
- The same bite support will be used to fixate the surgical guide during surgery.

Partially Edentulous | Scanning with scanning markers
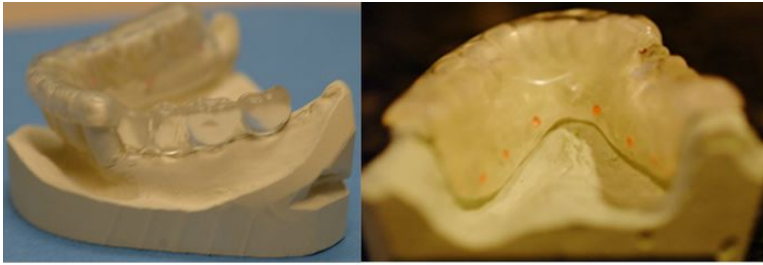
Fully Edentulous | Duplicate denture with radiographic guides

Combination Scenarios & Other Situations

One Arch Dual Scan | Partially or Fully Edentulous + One Arch CBCT & iTero

Scanning Option 3

Hard Model Scan with Edentulous Area

Partially Edentulous
Understanding Digital Dentistry

The following steps must be complete by the doctor before the patient is seen in one of our imaging centers. NOTE: Dual scans can be used for most patients. C-Dental recommends the dual scan for patients with 3 teeth or less.

1. Take preferred Polyvinyl siloxane (PVS) impression, or if necessary, alginate impression with a plaster model poured immediately.

- No drag
- No pull
- No bubbles
- Cover pallette
- Deep into vestibule
- Cover retromolar pad

2. Prepare Plaster Models

- Must accurately reproduce the buccal and lingual margins
- Vestibule must be clear and understated

3. Fabricate Radiographic Guide

The accuracy of this guide is very important, as it is the basis for fabricating the surgical guide.

- Use clear orthodontic acrylic
- Tooth position and size should represent the final prosthesis
- The crowns should be distinctively represented on the facial/buccal and occlusal aspects of guide
- Guide should cover occlusal surface of full arch
- Guide should extend over the gums on lingual/palatal side

**4. Drill 6 gutta percha filled markers (GPM)**

- Use #2 round bur to 1 mm depth
- All lingual
- On varying horizontal planes
- On flange, below gingival plane on the mandible - above on maxilla
- Fill holes flush with gutta percha
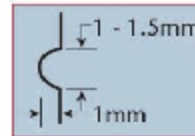
5. Fabricate bite support for use during CBCT scan

- Ensure no overlap of incisal or posterior occlusion
- Use stiff, radiolucent bite support material
- Cover complete arch
- If teeth are missing in opposing arch, fill edentulous space with index material to make contact with alveolar ridge

6. Send patient with radiographic guide and bite support to imaging center.
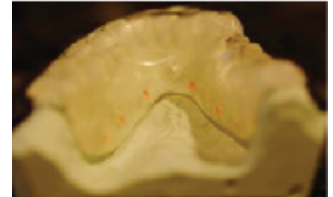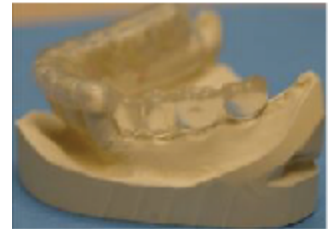
Referral Slip Protocol

1. Choose CBCT scan dimension and resolution
2. Choose *Implant Survey*
3. Indicate planning program
4. Choose virtual design option - *Dual Scan - Marked Denture or Radiographic Guide*
5. Indicate area(s) of interest

Workflow

1

Doctor's Workflow

CBCT performed on patient wearing radiographic guide utilizing bite support.

2

Imaging Center Workflow

CBCT performed on radiographic guide alone.
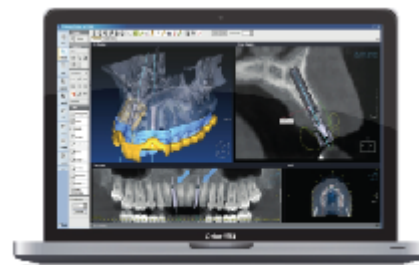
3

Imaging Center Workflow

Radiographic guide merged with CBCT.

4

Doctor's Workflow

Online treatment planning assistance.

5

Doctor's/Cybermed Workflow

Surgical guide is fabricated and surgery is performed.

Fully Edentulous | Dual Scan
Understanding Digital Dentistry

The following steps must be complete by the doctor before the patient is seen in one of our imaging centers.

1. Ideal Denture Fabricated

- Teeth of proper size, shape and length
- Established occlusion
- No metal components
- No radio-opaque components
- 2.5 - 3mm thickness
- Buccal flanges with height for fixation pins
- Hard reline only - no soft reline
- Excellent fit to soft tissue and patient cast

2. Fabricate Bite Support

- Stiff radiolucent material (blu mousse or white vanilla)
- Cover complete arch
- Must complete occlusal surface of denture teeth

Purpose: Bite support ensures complete contact of intaglio surface to soft tissue palette.

Take a PVS impression of intaglio of denture to validate fabrication or surgical guide.

3. Radiographic Markers & Patient Imaging

Radiographic markers facilitate the merge of the scanned denture to the CBCT scan. Our imaging technicians will place the adhesive radiographic markers on the denture.

The imaging technicians will choose the scan resolution and dimension based on the patient's anatomy. The patient must bring the bite support and denture to the imaging center.

    1. CBCT scan performed on patient wearing denture with bite support in place.

    2. CBCT scan performed on denture alone with radiographic markers.

4. Scans Merged, In2Guide Treatment Planning & Guide Ordering

5. Validation

Following this protocol ensure that the anchor guide and surgical guide have been identically fabricated to patient's denture. By using the PVS impression from the denture and placing it into the intaglio of the anchor guide or surgical guide ensures proper fabrication of those guides.

The bite support is used to seat the anchor and surgical guide at the time of surgery.

Bite support will be returned to the restorative dentist after imaging is completed.

PVS impression of denture intaglio.

Use 1mm drill pins to fixate the surgical guide while patient bites.

Same PVS denture impression should fit to anchor guide and surgical guide.

Workflow

Referral Slip Protocol

1. Choose CBCT scan dimension and resolution
2. Choose *Implant Survey*
3. Indicate planning program
4. Choose virtual design option - *Dual Scan - Marked Denture or Radiographic Guide*
5. Indicate area(s) of interest

1

Doctor's Workflow

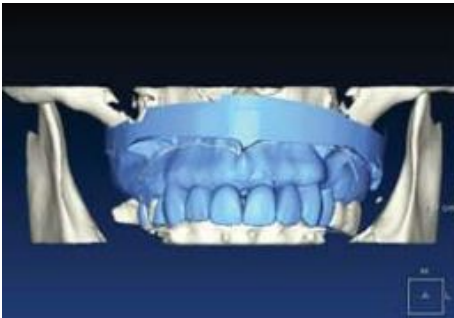Ideal denture and bite support are fabricated and sent to the imaging center with the patient.

2

Imaging Center Workflow

CBCT performed on patient wearing denture utilizing bite support and CBCT scan performed on denture alone with radiographic markers.
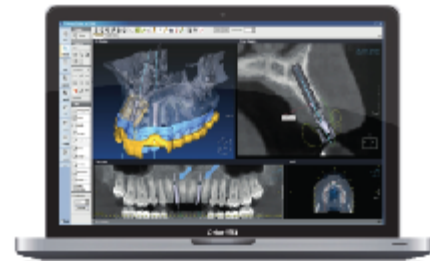

3

Imaging Center Workflow

Scans are merged in implant software.

4

Doctor's Workflow

Treatment planning is completed and guide is ordered.

5

Doctor's/Cybermed Workflow

Validate the identical fabrication of the anchor guide and surgical guide.

Traditional impressions can be scanned by the iTero intraoral scanner when the patient specifications for an intraoral iTero scan are not met.

Specifications for an accurate merge:

1. At least 4 or more teeth in entire mouth

2. Polyvinyl siloxane (PVS) impressions or alginate if necessary

   ***Plaster model must be poured immediately with alginate impression**

3. Diagnostic wax-up fabricated

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1. Impression Specifications
- No drag
- No bubbles
- Deep into vestibule
- No pull
- Cover palette
- Cover retromolar pad

2. Diagnostic Wax-Up & Plaster Model - *OPTIONAL*
- Once plaster model is poured, the diagnostic wax-up can be fabricated by the doctor
- This wax-up must represent the final prosthesis (shape/size of teeth
- The upper/lower impressions must be articulated with mounted hinge

Articulator establishes vertical height in mouth, proper teeth positioning and how prosthetic teeth will interdigitate

3. Diagnostic Wax-Up & Plaster Model Sent to C-Dental for iTero Scan

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Referral Slip Protocol
1. Choose CBCT scan dimension and resolution
2. Choose *Implant Survey*
3. Indicate planning program
4. Choose virtual design option - *iTero scan of models and merge to CBCT*
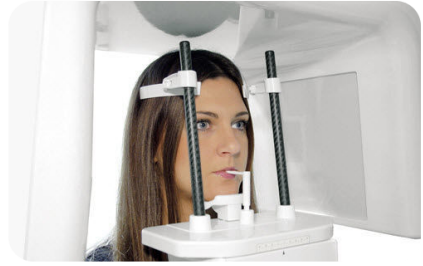5. Indicate area(s) of interest

Workflow

1

Doctor's Workflow

Diagnostic wax-up & plaster model sent to C-Dental for iTero scan.

2

Imaging Center Workflow

CBCT taken of patient without anything in the mouth.

3

Imaging Center Workflow

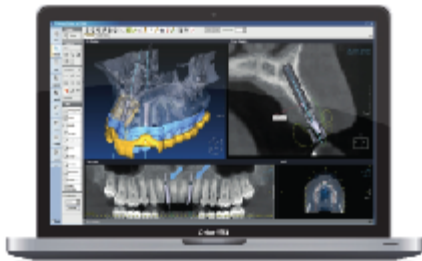Model complete with diagnostic wax-up or prosthesis is scanned with iTero.

4

Imaging Center Workflow

CBCT and STL file merged into 3D treatment planning software and sent to doctor.

5

Doctor's Workflow

Online treatment planning assistance.

6

Doctor's / Cybermed Workflow

Surgical guide is fabricated and surgery is performed.

San Francisco - Downtown
450 Sutter Street, Suite 1542
San Francisco, CA 94108
(415) 421-1389

San Francisco - West Portal
362 West Portal Avenue
San Francisco, CA 94127
(415) 753-8701

San Rafael
1050 Northgate Drive, Suite 445
San Rafael, CA 94903
(415) 472-1323

San Mateo
424 N. San Mateo Drive, Suite 100
San Mateo, CA 94401
(650) 685-8097

Menlo Park
695 Oak Grove Avenue, Suite 330
Menlo Park, CA 94025
(650) 323-0204

Pleasanton
1475 Cedarwood Lane, Suite D
Pleasanton, CA 94566
(925) 846-9291

Walnut Creek
1900 Olympic Blvd., Suite 201
Walnut Creek, CA 94596
(925) 935-0500

Mountain View
505 South Drive, Suite 7
Mountain View, CA 94040
(650) 965-1320

San Jose
5150 Graves Ave., Suite 10A
San Jose, CA 95129
(408) 446-9729

Mobile CBCT Services

C-Dental's mobile imaging center can travel to most locations and is handicap accessible. We often travel to patient's homes, places of work, and dental offices. The mobile unit is equipped with a NewTom CBCT and iTero 3D Intraoral machine.

(925) 935-0500 East & North Bay
(408) 446-9729 South Bay & Peninsula