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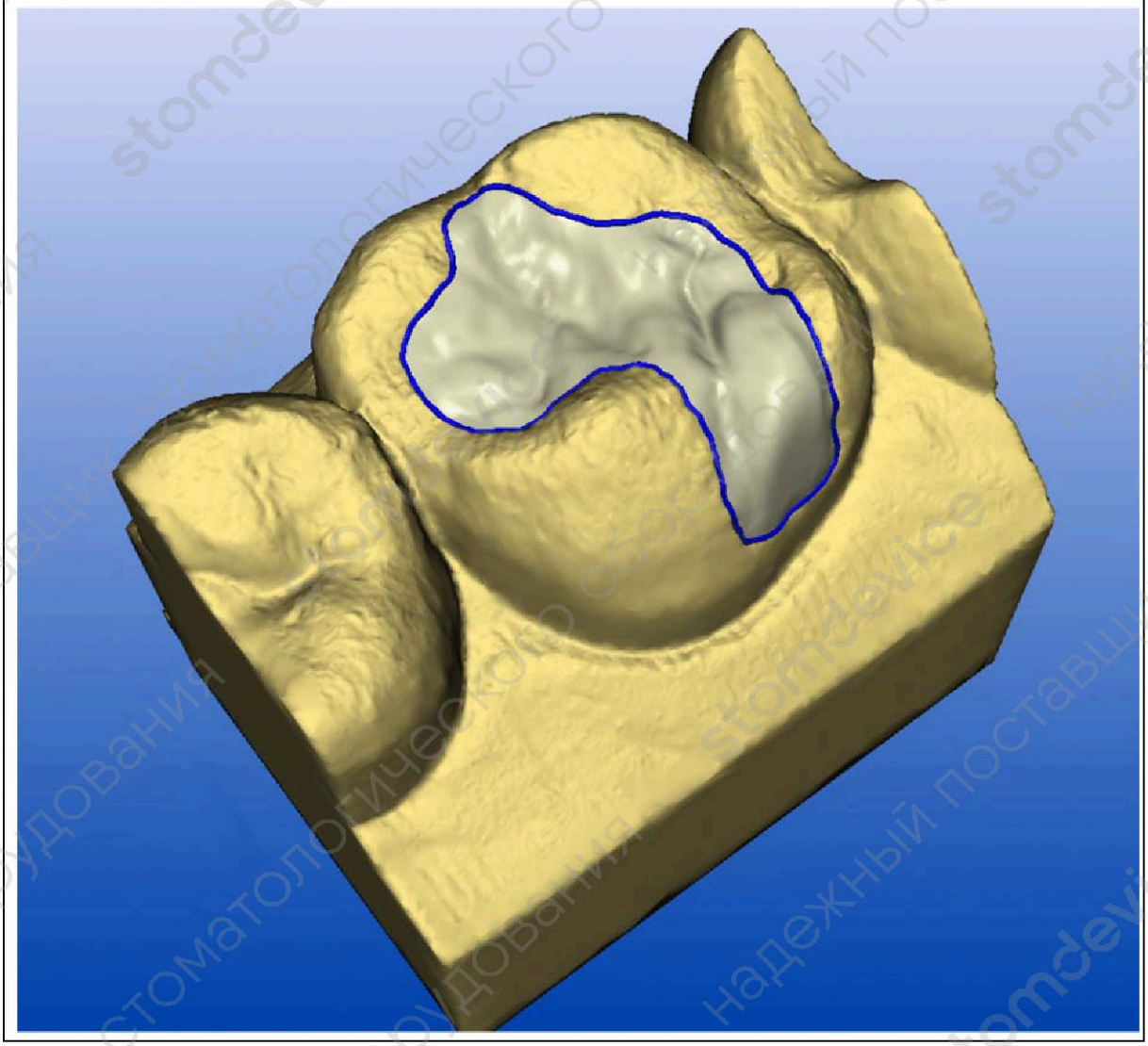
sirona
The Dental Company

# CEREC 3D

Operator's Manual
Software version 3.8X

**English**

This product is covered by the following US patent: 7796811



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# 1 Introduction

## 1.1 Dear Customer,

Thank you for purchasing your CEREC 3D software from Sirona.

In connection with CEREC 3 / CEREC MC XL, this software enables you to produce dental restorations, e.g. from ceramic material with a natural appearance (**CE**ramic **REC**onstruction).

Improper use and handling can create hazards and cause damage. Therefore, please read and carefully follow this manual and the relevant operating instructions. always keep them within easy reach.

In order to master the system safely, you should train on the exercise model using the described examples.

To prevent personal injury or material damage it is important to observe all safety information.

To safeguard your warranty claims, please complete the attached **Installation Report / Warranty Passport** when the system is handed over and send it to the indicated fax number.

Your
CEREC 3D Team

## 1.2 Copyright and trademark

**Copyright**

© Sirona Dental Systems GmbH 2010. All rights reserved.

The information contained in this manual may be changed without notice.

The software and all related documentation are protected by copyright. You must therefore handle it in the same way as any other protected material.

Anyone who copies this software or this manual to magnetic tape, floppy disk or any other medium for any purpose other than his own personal use without the written permission of Sirona Dental Systems will be liable to prosecution.

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Microsoft® and Windows 7® are registered trademarks.

Windows™ is a trademark of Microsoft Corporation.

Windows Vista™ is a trademark of Microsoft Corporation.

All other trademarks are the property of their respective holders.

**Components of other manufacturers**

This software contains components produced by the following manufacturers:

Zlib:
© 1995-2002 Jean-loup Gailly, Mark Adler and Greg Roelofs

PaintLib:
© 1996-2000 Ulrich von Zadow

LibTiff:
© 1988-1997 Sam Leffler

© 1991-1997 Silicon Graphics, Inc.

LeadTools:
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## 1.3 General

In order to effectively address the needs of new and experienced CEREC users, the software has been split into two parts - CEREC 3D mode and *"Master Mode"*.

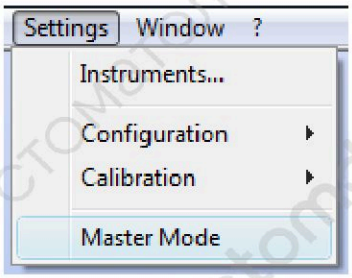
### 1.3.1 CEREC 3D software

The CEREC 3D software has been optimized for easy and efficient design of inlays, onlays and crowns with the aid of the *"Biogeneric"* design technique with or without antagonist.

Changeover to the *"Master Mode"* is advisable only for users who have mastered all the basic procedures of the CEREC 3D method.

A description of these functions can be found under "User interface of the CEREC 3D software" [→ 21].

### 1.3.2 Master Mode option




You can select the *"Master Mode"* by selecting the menu option *"Settings"* / *"Master Mode"*. This displays all functions of the software.

A description of these functions can be found under "User interface in Master Mode".

## 1.4 General information

**CAUTION**

**Be sure to observe all warnings!**

Please observe the warning and safety information provided to prevent personal injury and material damage. Any such information is highlighted by a signal word, i.e. WARNING, CAUTION or NOTE.

Please read this document completely and follow the instructions exactly. You should always keep it within reach.

Original language of the present document: German.



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## 1.4.1 Structure of the documents

### Structure of the documents

The symbols and character formats used in the present manual have the following meaning:

**WARNING**

Identifies warnings where a medium risk of injury to persons exists if they are not observed.

**CAUTION**

Identifies safety information where the following hazards exist if they are not observed: Slight risk of injury to persons, risk of property damage or damage to the product.

**NOTICE**

**Assistance**

Identifies additional information, hints and tips.

| | |
|---|---|
| ✓ Prerequisite<br>➢ Action<br>or<br>➢ **1.**, **2.**, …<br>↳ Result | Requests you to do something. |
| See chapter "Structure of the documents [ → 14]" | Identifies a reference to another text passage. |
| • List | Identifies a list. |
| "*Text between quotation marks*" | Identifies commands, menu items or quotations. |



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#### 1.4.1.1 Conventions

| Example | Meaning |
|---|---|
| Clicking | Pressing once and releasing the left mouse button or the left trackball button on the acquisition unit (or foot switch). |
| Double-clicking | Pressing twice quickly in succession and releasing the left mouse button or the left trackball button on the acquisition unit (or foot switch). |
| Moving the mouse in one direction | On the acquisition unit: Moving the trackball in the corresponding direction. |
| Seizing a point | Pressing the left mouse button (left trackball button on the acquisition unit) and keeping it pressed. |
| For impressions acquired with 3D camera: Actuate foot switch | The same function as: Pressing the left trackball button on the acquisition unit or the left mouse button. |
| *"Ctrl+N"* | On the keyboard: Press the **Ctrl** and **N** keys simultaneously. |

#### 1.4.1.2 Formats of the manual

The Operator's Manual is available on the supplied program DVD in html format. This format is screen-oriented and is well suited for finding terms, e.g. in the index or table of contents.

You can call up this manual via the online help function.

The Operator's Manual is available on the supplied program DVD in pdf format.

This format is page-oriented and is well suited for printing out the desired pages.



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# 2 General safety information

## Only use original software

Only use original software or software which has been released by Sirona. To produce restorations, manipulated and non-released software components must not be used.

Software and software components must not be installed using incorrect data.

Please also ensure that each installed component has been granted approval in its country. Contact your dealer for more information.

## Restoration to be checked by trained personnel

Each restoration which is performed with this software must be checked for suitability by a trained person (e.g. dental technician or dentist).

## For the USA only

**CAUTION:** Federal Law (USA) restricts sale of this device to or on the order of a physician, dentist, or licensed practitioner.



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# 3 Software

## 3.1 CEREC Biogeneric

CEREC Biogeneric is the first method which is able to reconstruct lifelike occlusal surfaces. On the basis of the features of a patient's single intact tooth, the program extrapolates the naturally created morphology of other teeth. The biogeneric occlusal design functions for all single tooth restorations and fully anatomic bridges.

Currently, all occlusal design approaches are based on dental libraries and databases containing data records of various standard teeth. Conventional CAD/CAM programs retrieve a matching tooth from the archive, and then generate a design proposal for the given clinical situation. The user then manually edits and adapts this proposal. The biogeneric occlusal design is to replace the “dental database” design procedure applied in previous CEREC software versions. It will now be possible to create crowns, inlays, onlays, veneers, and anatomically sized bridges in a fully automated manner. The reconstruction can be based on any intact patient tooth from the same type, i.e. posterior tooth or anterior tooth. The often time-consuming process of manually adjusting the tooth to the clinical situation is now virtually a thing of the past. Moreover, due to the standardized and largely automated routines, the new software is easy to get to grips with and use.

## 3.2 Installing the software

**NOTICE**

**Installation only with administrator rights**

You must have administrator rights on the PC on which you want to install the software!

**Installation procedure**

✓ The PC is powered up and all programs are terminated.

1. Insert the DVD in the CD/DVD drive.
   ↳ The setup program starts automatically.
2. If this is not the case, run the *"Setup.exe"* file in the root directory of the DVD.
3. Select the language of the installation and click the button marked *"OK"*.
   ↳ The installation wizard opens.
4. Click the *"Next"* button.
   ↳ The license agreement is shown.
5. Accept the license agreement with the *"Yes"* button.
   ↳ The program continues the installation routine.

**Selecting the standard installation**

1. Click the button marked *"Standard Installation"*.

**NOTICE**

**Installing DirectX**

If DirectX is not yet installed on your computer, it will be installed now. Accept the license agreement and decide whether the computer is to be restarted now or later.



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2. To complete the installation, you can register to receive current information on software updates and/or have the *"ReadMe"* file displayed. This file contains the latest information on the software.
   Select or deselect the corresponding checkbox.
3. Click the button marked *"Finish"*.
4. Decide whether the computer should be restarted now or later and click the button marked *"Finish"*.

**Information about this software version**

You can load a restoration made with an earlier software version with this version as well. However, once this restoration has been saved with the current software version, it can no longer be loaded with the earlier software version. The restoration can be saved according to the following procedures:

- By selecting *"Restoration"* / *"Save"*.
- By selecting *"Restoration"* / *"Save as..."*.
- Automatically, by confirming the image catalog with the *"Next"* icon.
- Automatically, by pressing the *"Mill"* icon.
- Automatically, during virtual seating (*"Design"* / *"Quadrant..."*.)

## 3.3 Downloading the software to the milling unit

**⚠ CAUTION**

**Transferring the milling program**

Following installation of the new software, the new milling program must be transferred to the milling unit.

### CEREC 3 milling unit

✓ The new software is installed on the PC.

➢ Transfer the new milling program to the milling unit as described in the Operating Instructions for the milling unit.

### CEREC MC XL

The new milling program is automatically transferred to the milling unit.

## 3.4 Uninstalling the software

✓ The program is closed.

1. Click *"Start"* / *"Programs"* / *"CEREC 3D"* / *"Deinstallation"* to uninstall the software.
   ↳ During the uninstall procedure, you will be asked whether you want to delete the patient data or the entries in the registration database (e.g. the calibration data).
2. According to how you decide, click the button marked *"Yes"* or *"No"*.

↳ The software is uninstalled.



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# 3.5 Copy protection (softguard dongle)

## 3.5.1 Introduction

Whether a given restoration may be milled depends on the softguard dongle-connected and the identifier of the milling unit used.

## 3.5.2 Softguard dongle

**Softguard dongle**

The following softguard dongles are available:

- CEREC 3D (for inlays, onlays, crowns and veneers)
- AK x[1] (only in conjunction with the inLab 3D software).

AK = Activation Key

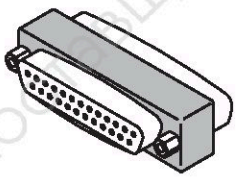
The **AK x** softguard dongles have a counter that deducts one unit for each milling operation:

**Overview of debiting**

| Restoration | Debit from AK x |
|---|---|
| Inlay, onlay, occlusal inlay | 1 unit per restoration |
| Crown | 1 unit per restoration |
| Veneer | 1 unit per restoration |
| Crown framework | 1 unit per restoration |
| Wax-up, Bridge correlation | 1 unit per milling operation |
| Bridge framework, anatomical bridge | 1 unit per bridge element<br>1 unit per bridge abutment |
| Abutment | 1 unit per restoration |

## 3.5.3 Connecting the softguard dongle

### AKx



✓ The PC must have a parallel port.

1. Connect the softguard dongle to the parallel port of the PC.
2. You may then connect further softguard dongles or e.g. a printer to this softguard dongle.

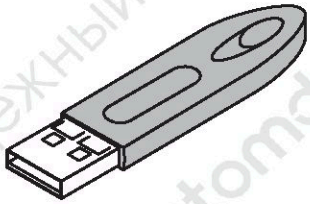
1. x = Remaining number of units (that can be milled with this activation key)



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### AK Unlimited inLab 3D or AKx USB softguard dongles

✓ The PC must have a free USB port.

➢ Connect the **AK Unlimited inLab 3D** or **AKx** USB softguard dongle to the USB port of the PC.

### 3.5.4 Without softguard dongles

All restorations can be scanned, designed and saved without a softguard dongle. You need a softguard dongle for milling.

## 3.6 Starting the software

✓ The CEREC 3D software is installed. The CEREC 3D button is located on the desktop.

➢ Start the CEREC 3D software by double-clicking the CEREC 3D button.

or

➢ Click *"Start" | "Programs" | "CEREC 3D" | "CEREC 3D"*.



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# 4 User interface of the CEREC 3D software

## 4.1 Tool bar of the CEREC 3D software

### Description of the icons

You can show or hide the tool bar via the *"Window"* / *"Tool bar"* menu item.

Inactive functions appear dimmed.




- Create a new restoration




- Scan/acquire prepared tooth (preparation)




- Scan/acquire antagonist/registration




- One design step forward (Next)




- One design step backward (Undo)




- Starting the milling process

You can drag the tool bar with the mouse and drop it anywhere on the screen. It can be docked at the left, right, top or bottom edge of the screen, as is usual with Windows programs. Via *"Window"* / *"Reset"* (*"Ctrl+R"*) it can be restored to the position it had on delivery (left edge of screen).



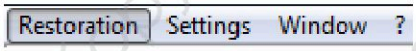
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## 4.2 Menu bar of the CEREC 3D software

The menu bar at the top of the window allows you to select further program functions which cannot be accessed via the tool bars.




The following menus are available in the CEREC 3D mode:

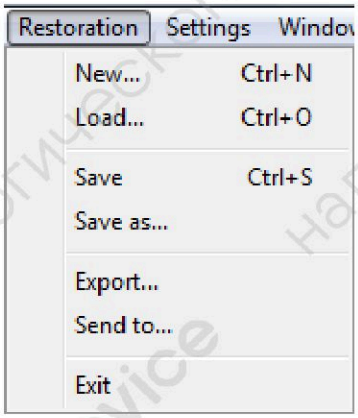
- *"Restoration"*
- *"Settings"*
- *"Window"*
- *"?"*

**NOTICE**

**Alternatives to the menu bar**

Some menu functions can also be activated using the shortcut keys specified in the menu item or the corresponding icons on the tool bar.

### 4.2.1 Restoration menu in the CEREC 3D mode

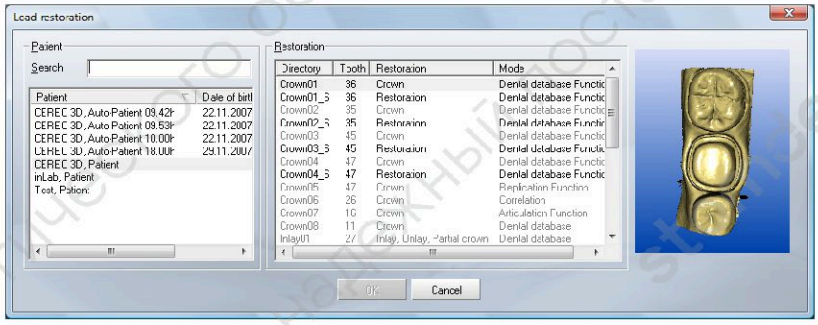



*Restoration menu in the CEREC 3D mode*



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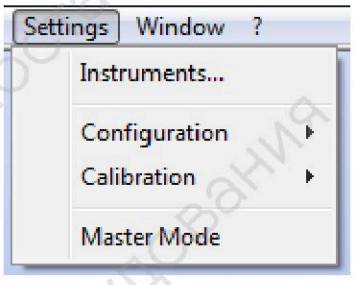



*Loading a restoration in the CEREC 3D mode*

In the dialog box *"Load restoration"* all restorations are displayed in the CEREC 3D mode. However, optical impressions taken in the Master mode are dimmed and can **not** be loaded.

A detailed description of the individual menu items can be found under "Restoration menu".

## 4.2.2 Settings menu in the CEREC 3D mode




With the *"Settings"* menu, you can adapt and change the following menu items:

- *"Instruments"*
- *"Configuration"*
- *"Calibration"*
- *"Master Mode"*

### Instruments

This menu item allows you to change worn/defective milling instruments. Also refer to the chapter "Changing burrs" in the Operating Instructions of the milling unit.



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## Configuration

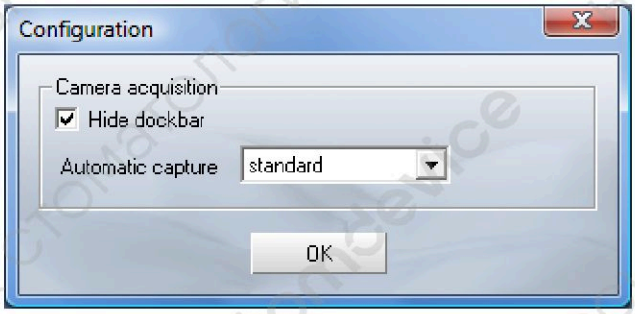
Under this menu item, you can check and modify the factory-set configurations.

- *"Devices..."*
- *"Options"*

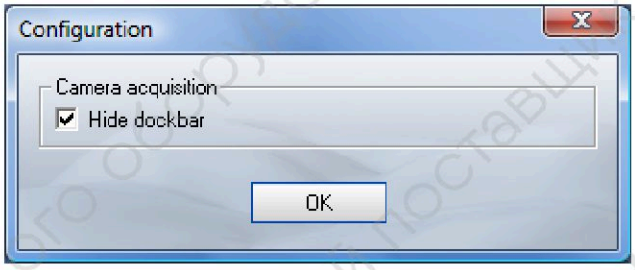
All connected milling units can be displayed and configured under the menu item *"Settings"|"Configuration"|"Devices..."*.

Via the menu item *"Settings"|"Configuration"|"Options"* you can set the following:

- Show/hide docking bar
- *"Automatic capture"* (with CEREC Bluecam only)




With CEREC Bluecam




With CEREC 3 camera

The docking bar is hidden in the 3D preview. If you move the mouse pointer to the lower part of the respective image field, the docking bar dynamically appears.

If you place a check mark in front of *"Hide dockbar"*, the docking bar will be displayed permanently.




For impressions acquired with the CEREC Bluecam, you can use the *"Automatic capture"* option to set the sensitivity to shaking of the automatic acquisition technique. The setting options are available:

- *"very strict"*
- *"strict"*
- *"standard"*
- *"tolerant"*
- *"very tolerant"*

## Calibration

Via the *"Calibration"* menu item you can...

- calibrate the *"3D camera"*,

  (see the chapter "Calibrating the Bluecam/3D camera" in the Operating Instructions for the acquisition unit).



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**NOTICE**

**Calibrating the Bluecam/3D camera**

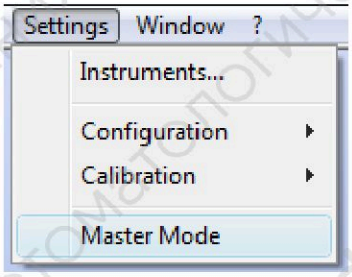
In order to calibrate the Bluecam/3D camera, the *"Bluecam calibration set"*/ *"3D calibration set"* is required.

The *"Bluecam calibration set"*/ *"3D calibration set"* must **not** be powdered.

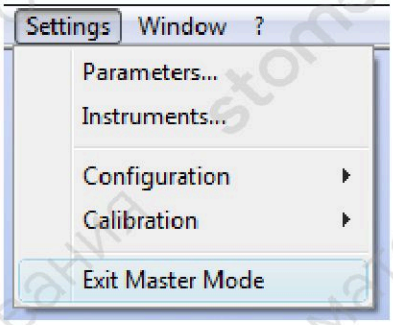
- calibrate the *"Milling unit"*,

  (see chapter on “Calibrating the milling unit” in the operating instructions for the milling unit).

### Master Mode



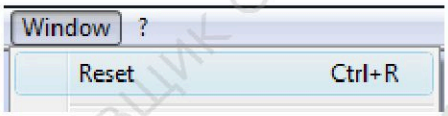

If you select *"Settings"*/ *"Master Mode"* from the menu, all software functions are shown.




If you select the *"Settings"* / *"Exit Master Mode"* menu item, the unit is reset to its delivery status (CEREC 3D Mode).

A detailed description of the individual menu items can be found under "Settings menu".

## 4.2.3 Window menu in the CEREC 3D mode




You can restore the default setting for the display of the windows/tool bar on the screen:

*"Window"* / *"Reset"* or *"Ctrl+R"*

## 4.2.4 "?" menu in the CEREC 3D mode






If the menu item *"Text prompts"* the next work step is described in a balloon in the status bar.

A detailed description of the individual menu items can be found under ""?" menu".



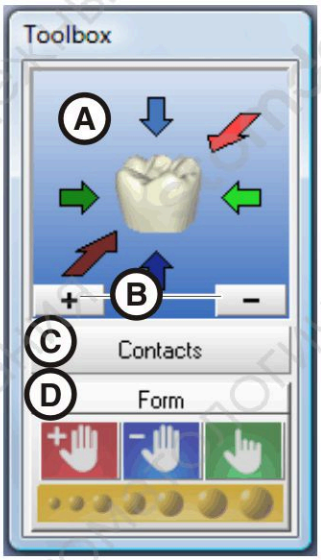
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# 4.3 Toolbox window

## 4.3.1 Introduction




You can drag the window with the mouse by grabbing its title bar and drop it at any position on the screen. Via *"Window"* / *"Reset"* (*"Ctrl+R"*) it can be restored to the position it had on delivery (right edge of screen).

- A: Standard views

  For a detailed description, see "Standard views" [→ 30].
- B: Zoom tool

  For a detailed description, see "Zoom tool" [→ 30].
- C: Showing/hiding contact surfaces (*"Contacts"*)

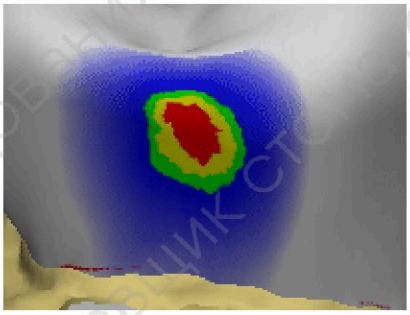
  For a detailed description, see "Showing/hiding contact surfaces" [→ 26].
- D: Form tool (*"Form"*)

  For a detailed description, see "Form tool" [→ 39].

## 4.3.2 Showing/hiding contact surfaces




By clicking the button marked *"Contacts"* you can show/hide the contact surfaces to the neighboring teeth and to the antagonist. The neighboring teeth are then hidden or shown.



When the contact surfaces are shown, a color scheme with the following meaning appears:

- **blue**: Clearance 0-1 mm
  Smaller surface – larger clearance
- **green**: Penetration 0-50 µm
- **yellow**: Penetration 50-100 µm
- **red**: Penetration >100µm

With the *"Form"* tool, you can design the contact surfaces according to your wishes.

# 4.4 Note: 3D Preview

In the 3D mode, the 3D Preview displays only the *"Preparation"* and *"antagonist"* image fields. There is no image field for occlusal impressions.



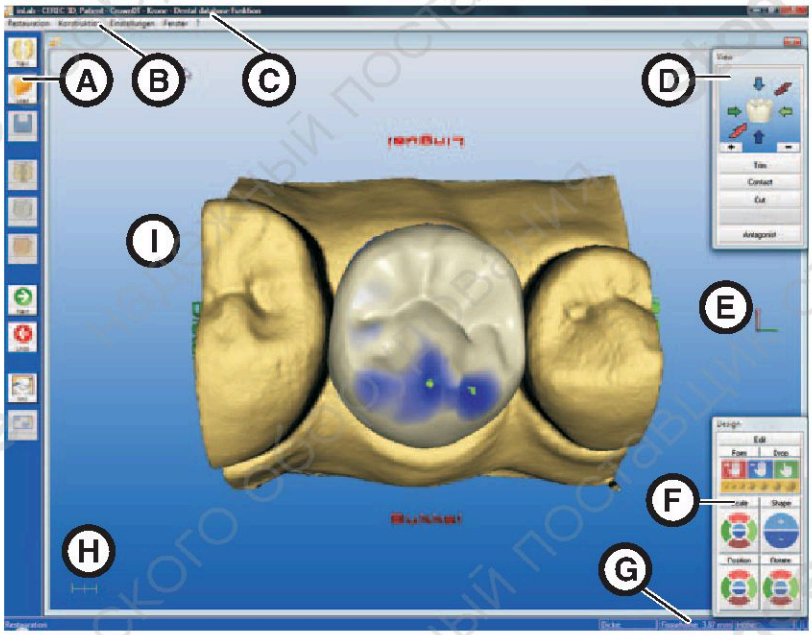
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# 5 User interface in Master Mode

## 5.1 Description of the user interface




*Main menu*

CEREC 3D features a menu-controlled user interface enabling you to scan preparations and then design and mill the required restorations.

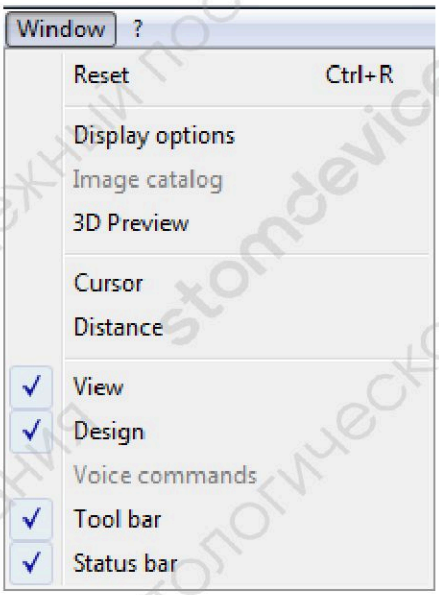
Screen displays guide you through the design process and give you a continuous overview of which program step is currently being performed.

The main menu consists of:

- **A**: Tool bar
- **B**: Menu bar
- **C**: Program window title,
- **D**: View window
- **E**: Coordinate system
- **F**: Design window
- **G**: Status bar
- **H**: Scale (1 mm)
- **I**: Design window (3D viewer)



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You can show or hide the following windows/bars:

- *"View"*
- *"Design"*
- *"Tool bar"*
- *"Status bar"*

## 5.2 Tool bar

You can show or hide the tool bar via the *"Window"* / *"Tool bar"* menu item.

Unavailable functions are grayed out (e.g. Occlusion in the example below).

### Description of the buttons




- Create a new restoration




- Load restoration



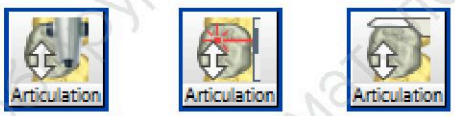

- Save restoration




- Scan/acquire prepared tooth (preparation)




- Scan/acquire unprepared tooth (occlusion)




- Scan/acquire dynamic occlusion impression (articulation)



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- Acquire a buccal optical impression










- Scan/acquire antagonist/registration




- One design step forward (Next)




- One design step backward (Undo)




- Starting the milling process




- Send restoration to infiniDent

You can drag the tool bar with the mouse and drop it anywhere on the screen. It can be docked at the left, right, top or bottom edge of the screen, as is usual with Windows programs. Via *"Window"* | *"Reset"* (*"Ctrl+R"*) it can be restored to the position it had on delivery (left edge of screen).

## 5.3 View window

### 5.3.1 Introduction

You can display or hide this window via the menu item *"Window"* | *"View"*.

Inactive windows appear dimmed.

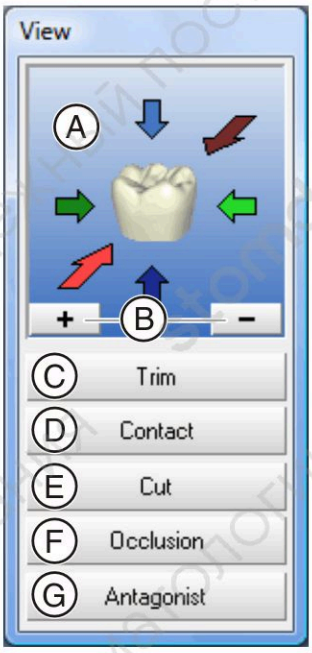
You can drag the window with the mouse by grabbing its title bar and drop it at any position on the screen. Via *"Window"* | *"Reset"* (*"Ctrl+R"*) it can be restored to the position it had on delivery (right edge of screen).



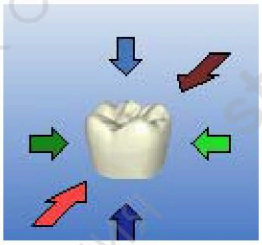
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- A: Standard views
- B: Zoom tool
- C: Showing/hiding the neighboring teeth (Trim)
- D: Showing/hiding the contact to the neighboring tooth (Contact)
- E: Cut tool
- F: Showing/hiding the occlusion/articulation/gingival mask
- G: Show/hide antagonist



## 5.3.2 Standard views

The objects in the Design window can be displayed in six predefined views by clicking the corresponding arrows:

- *"Mesial"*
- *"Distal"*
- *"Buccal"* / *"Labial"*
- *"Lingual"*
- *"Cervical"*
- *"Occlusal"* / *"Incisal"*

When you point to one of these arrows with the mouse cursor, the direction of the view is indicated.

When you click the arrow, the object is turned into this view.

There are two ways to display the *"Mesial"*, *"Distal"*, *"Buccal"* / *"Labial"* and *"Lingual"* views:

| Single-click | Double-click |
|---|---|
| Oblique top view | 90° view |

If you have changed the display of the objects with the zoom tool, you can reset this change by clicking on the tooth in the View window.




## 5.3.3 Zoom tool

The objects displayed in the Design window can be zoomed in and out as follows:

- step by step, by repeatedly clicking the **"+"** sign (zoom in) or the **"-"** sign (zoom out)
- continuously, by pressing and holding down the **"+"** sign (zoom in) or the **"-"** sign (zoom out)



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- by pressing the center mouse button and moving the mouse:
  - forward, you zoom the 3D view in
  - back, you zoom the 3D view out
- by simultaneously pressing the left mouse button and the Shift key and moving the mouse:
  - forward, you zoom the 3D view in
  - back, you zoom the 3D view out

### 5.3.4 Showing/hiding the neighboring teeth




You can hide the neighboring teeth by clicking the *"Trim"* button.

For the case that parts of the neighboring teeth are disturbing during input of the preparation margin, trimming off the disturbing parts is possible. For this purpose, you can hide parts of the image after image acquisition (see "Trimming the preparation [→ 105]").

You can redisplay the neighboring teeth by clicking the *"Trim"* button again.

**NOTICE**

**Showing and hiding with the Trim button**

If the preparation was not trimmed, you can use the *"Trim"* button to show and hide the entire preparation, e.g. for editing the proximal surface of the restoration.

### 5.3.5 Showing/hiding the contact to the neighboring tooth (Contact)




You can show or hide the contact surface to the neighboring tooth by clicking the *"Contact"* button.




You can click on the *"Contact"* button to open the *"Contact Options"* dialog box.[1] .

You can have the appropriate proximal contact defined automatically by clicking the corresponding button.

**NOTICE**

**Hiding the neighboring teeth**

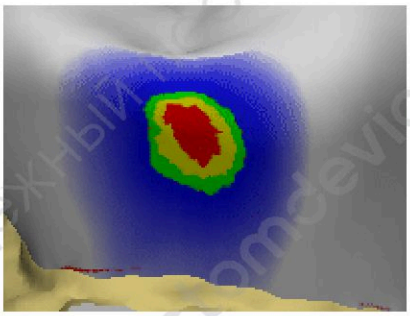
For better assessment of the contact surface you can hide the neighboring teeth with the *"Trim"* button.

If you click the *"Contact"* button, a color scheme with the following meaning appears on the contact surfaces:

1. This option can only be used for posterior tooth crowns (not for anterior tooth crowns, veneer, etc.).



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- **blue**: Clearance 0-1 mm
  Smaller surface – larger clearance
- **green**: Penetration 0-50 µm
- **yellow**: Penetration 50-100 µm
- **red**: Penetration >100µm

You can use the design tools *"Scale"*, *"Shape"*, *"Form"*, and *"Drop"* to design the contact surfaces according to your wishes.

## 5.3.6 Cut tool



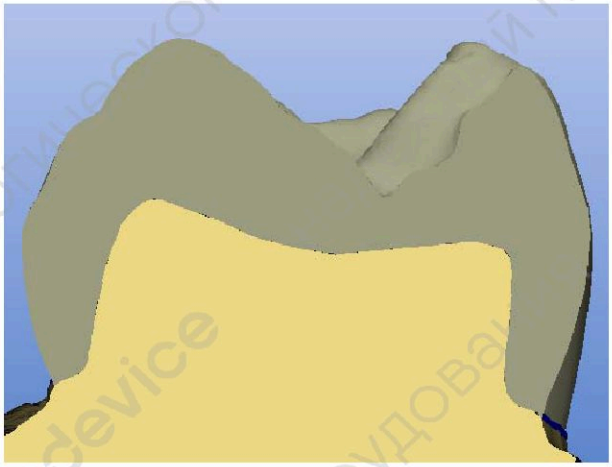

To open the *"Cut"* window, choose *"Cut"* or *"Ctrl+C"*.




You can place a cut plane through the restoration and preparation by clicking the *"Cut"* tool. The cut plane lies parallel to the screen plane. The cut plane can be moved parallel in two ways:

- step by step, by repeatedly clicking the "+" or "-" Cut semicircles
- continuously, by keeping a semicircle pressed.

For bridges, the cut surface is displayed in the status bar.



*Cut plane*




To exit the *"Cut"* tool, click the highlighted *"Cut"* bar.

Close the *"Cut"* window by clicking **x** (Close) or the *"Cut"* button.

## 5.3.7 Showing/hiding the occlusion/articulation

### Occlusion




If an image field of the occlusion exists, you can show or hide it with the help of this button.

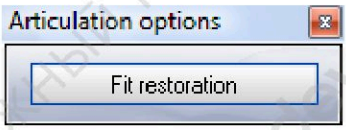
### Articulation




This function can be used only for the following:

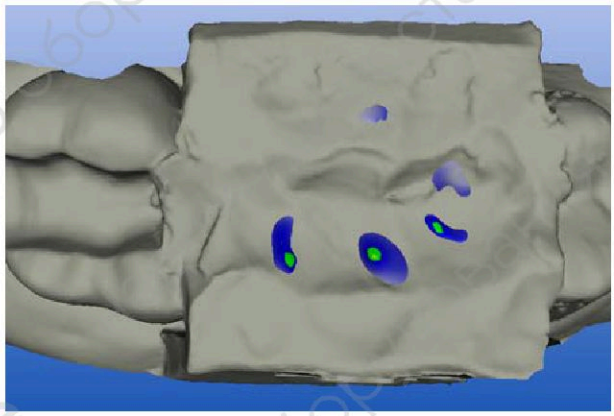
- *"Restoration"*: *"Crown"*
- *"Design technique"*: *"Articulation"*


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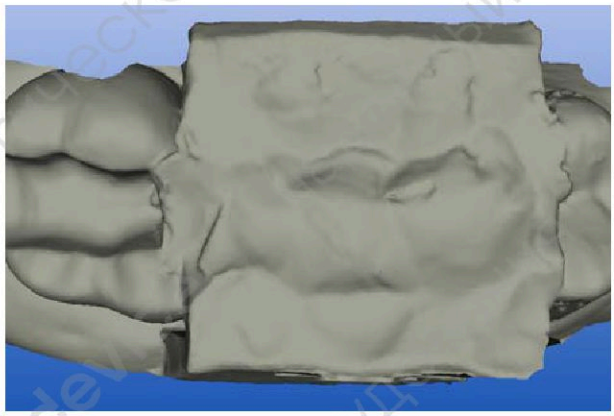

If a dynamic occlusion impression (**FGP**, **F**unctionally **G**enerated **P**ath) exists, it can be shown or hidden with the help of this button.

If you click the *"Articulation"* button, the 3D model of the dynamic occlusion impression is displayed and an additional dialog box is opened with the *"Fit Restoration"* button.



*Interfering_contact_FGP*

If you click the *"Fit Restoration"* button, all of the interfering contacts of the restoration which "protrude out of" the FGP will be virtually milled so that they disappear.



*Interfering contacts milled*

### 5.3.8 Show/hide antagonist




By clicking the button marked *"Antagonist"* you can show/hide the Antagonist window.



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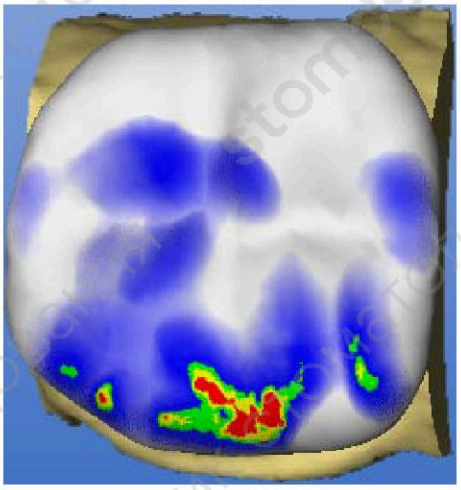



*Antagonist window*

In this window, under *"View Options"* you can activate or deactivate the following:

- *"Interocclusal Clearance"*
- *"Antagonist"*
- *"Antagonist surface"*

### 5.3.8.1 Interocclusal clearance



When *"Interocclusal Clearance"* is activated, a color scheme with the following meaning of the colors appears on the restoration:

- **blue**: Clearance 0-1 mm

  Smaller surface – larger clearance
- **green**: Penetration 0-50 µm
- **yellow**: Penetration 50-100 µm
- **red**: Penetration >100µm

You may use the *"Scale"*, *"Shape"*, *"Form"* or *"Drop"* design tools to adapt the distance.

### 5.3.8.2 Antagonist

If *"Antagonist"* is activated, the optical impression of the centric bite registration appears above the restoration.



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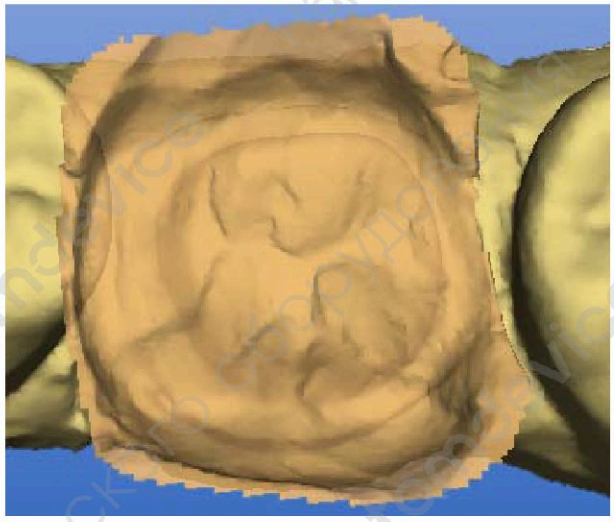

*Antagonist displayed*

By clicking the buttons next to *"Elevate Antagonist"* you can elevate or lower the registration. You obtain a better view onto the occlusal surface by elevating the antagonist.

You can view the restoration from all directions and adapt it with the *"Design"* tools.

### 5.3.8.3 Antagonist surface

If *"Antagonist surface"* is activated, the occlusal surface of the antagonist/registration appears above the restoration.



*Antagonist surface displayed*

By clicking the buttons next to *"Elevate Antagonist"* you can elevate or lower the registration. You obtain a better view onto the occlusal surface by elevating the antagonist.

You can view the restoration from all directions and adapt it with the *"Design"* tools.



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### 5.3.8.4 Tools subgroup




*Antagonist window*

With the *"Manual Trim"* button in the *"Antagonist"* dialog box you can also hide image regions at a later point in time.

For posterior tooth crowns with antagonist (design technique *"Biogeneric"* or *"Biogeneric reference"*), the *"Settling"*, *"Cusp settling"* and *"Virtual grinding"* buttons all have the same function as in the automatic crown suggestion (see "Options" in the "Settings" Chapter). You can use these functions if you have changed the suggested crown with the *"Design"* tools and would like to redefine the occlusal contacts.

For inlays/onlays in the design technique *"Biogeneric"* with antagonist, you can automatically set the occlusal contacts with these buttons. Automatic adaptations to the antagonist are performed for the inlay/only initial suggestion.

#### Settling button

With this button, the restoration is adapted to the antagonist so that the resulting contact situation is as stable as possible. The contacts should have as little penetration volume as possible. The morphology of the occlusal surface is not changed.

#### Cusp settling button

If the restoration features a cusp tip, the *"Cusp settling"* button is automatically enabled. This button triggers automatic adaptation of the individual cusps of the restoration to the antagonist. The cusps are adapted to the antagonist so that the resulting contact situation is as stable as possible. The morphology of the occlusal surface is changed.

#### Virtual grinding button

This button can be used to virtually grind the existing occlusal contacts. This function removes the red contacts down to a size that you have defined in the parameter dialog under *"Occlusal contact strength"*.

When designing inlays/onlays and crowns which are not automatically adapted, we recommend that you initially adapt the restoration to the present situation with the *"Design"* tools. Then you can finalize the contact situation with the following buttons in this order:

1. *"Settling"*
2. *"Cusp settling"*
3. *"Virtual grinding"*



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**NOTICE**

**Undoing the last adaptation step**

For crowns and inlays, you can undo the last adaptation step (*"Manual Trim"*, *"Settling"*, *"Cusp settling"*, and *"Virtual grinding"*) with the red arrow as long as the corresponding button is still pressed.

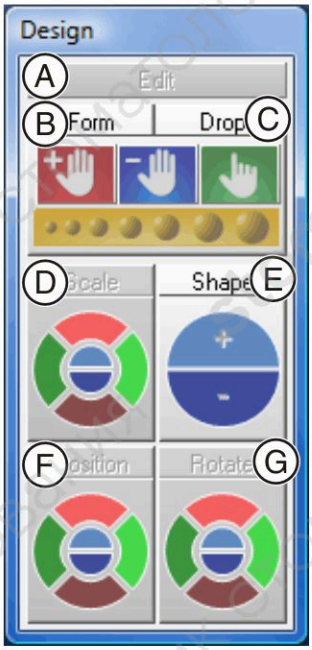
## 5.4 Design window

You can display or hide this window via the menu item *"Window"* / *"Design"*.

Unavailable functions appear dimmed, e.g. *"Position"*.

You can drag the window with the mouse by grabbing its title bar and drop it at any position on the screen.

When you select *"Window"* / *"Reset"*, the window returns to its default position (right screen margin).




The following *"Design"* tools are described in this section:

- **A**: Editing tool (Edit)
- **B**: Form tool
- **C**: Wax drop (Drop)
- **D**: Scaling tool (Scale)
- **E**: Shaping tool (Shape)
- **F**: Positioning tool (Position)
- **G**: Rotation tool (Rotate)

### 5.4.1 Editing tool (Edit)



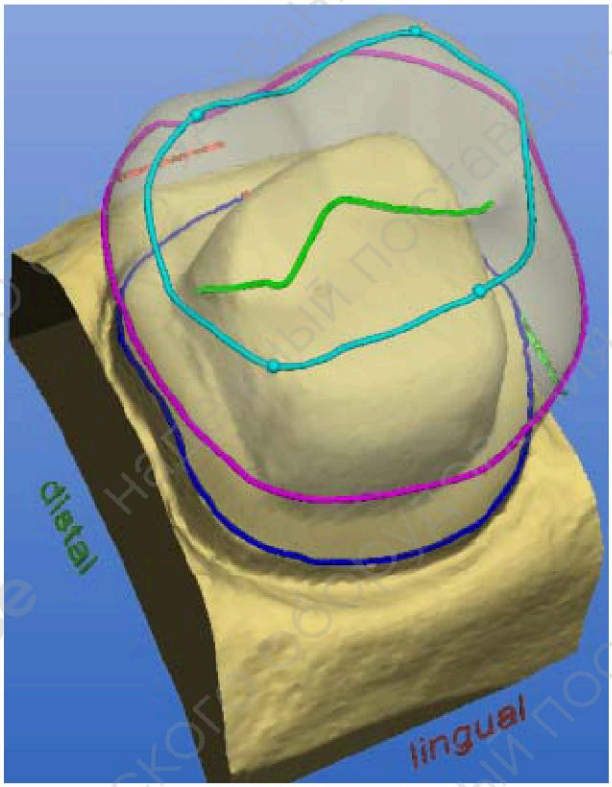

Click the *"Edit"* to activate/deactivate the Editing function.



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*Editing function*

The editing function can be applied to all the design lines. The design lines are displayed automatically and have different color coding.

### Colors of design lines

| Design line | Color |
|---|---|
| Preparation margin, base line, gingival line | blue |
| Proximal contact line | pink |
| Marginal ridge, labiolingual line | turquoise |
| Fissure, cutting edge or copying line | Green |

Editing is effective only in the viewing plane.

#### 5.4.1.1 Editing a construction line

1. Click the *"Edit"* button.
2. Double-click a construction line to set the first point of the correction line.
3. Click to set further points of the correction line.

**NOTICE**

**Deleting clicks**

You can also undo the last click by right-clicking.



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4. Setting the end point of the correction line:
   **Closed line** (e.g. crown equator)
   Double-click the construction line
   **Open line** (e.g. fissure line)
   Double click at the desired new end point of the line.

**NOTICE**

**Undoing changes**

You can undo the last change made in the line profile by clicking the *"Undo"* icon.

**NOTICE**

**Changing the connection to the preparation margin**

If you want to change the connection to the preparation margin (red dot), grab the red dot with the left mouse button and move it along the preparation margin.

### 5.4.2 Form tool (Form)

Form

By clicking the *"Form"* button, you can activate or deactivate the *"Form"* tool.


Apply material


Remove material


Blend material

You can use this function to

- apply material
- remove material
- blend material

Clicking on the symbol activates the corresponding mode.

**NOTICE**

**Alternative**

Using the space bar on the keyboard, you can change functions in the following order:

Apply > Remove > Blend > Apply ...

#### 5.4.2.1 Changing the size of the layer to be applied

When you start this tool, the diameter of the layer to be applied is 1.35mm.



*Slider*

The slider allows you to modify the size of the layer to be applied.



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**NOTICE**

**Alternative**

You can also modify the layer size (orange-colored area) by right-clicking the restoration:

**Increase layer size** – push mouse forward while holding down the right mouse button.

**Decrease layer size** – drag mouse backward while holding down the right mouse button.

The next layers will be applied using this size. This size remains active until you change the size again or deactivate the Form tool.

The ratio between material thickness and radius of the applied layer is 1:70.

### 5.4.3 Wax drop (Drop)




By clicking the *"Drop"* button, you can activate or deactivate the wax drop function.



Apply material



Remove material



Blend material

You can use this function to

- apply material
- remove material
- blend material

Clicking on the symbol activates the corresponding mode.

**NOTICE**

**Alternative**

Using the space bar on the keyboard, you can change functions in the following order:

Apply > Remove > Blend > Apply ...

#### 5.4.3.1 Modifying the wax drop size

When you start this tool, the diameter of the drops is 1.08mm.



*Slider*

The slider allows you to modify the size of the drops.



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**NOTICE**

**Alternative**

If you click on the restoration with the right mouse button, you can modify the size of the wax drops:

**Increase size of wax drops** – push mouse forward while holding down the right mouse button.

**Decrease size of wax drops** – drag mouse backward while holding down the right mouse button.

The next drops can be applied using this size. This size remains active until you change the size again or deactivate the *"Form"* tool.

The ratio between material thickness and radius of the drops is 1:70.

### 5.4.3.2 Applying material

Application can be performed in two ways:



- Drop by drop, by clicking the desired point of the restoration
- Apply a row of drops in material color by holding down the left mouse button and moving the cursor. The density of the drops is controlled by the speed with which you move the cursor.

### 5.4.3.3 Removing material

Removal can be performed in two ways:



- Drop by drop, by clicking the desired point of the restoration
- Remove a row of orange colored drops by holding down the left mouse button and moving the cursor. The density of the drops is controlled by the speed with which you move the cursor.

### 5.4.3.4 Blending material



The cursor assumes the shape of a hand and can then be used to blend or smoothen the surface locally; to do so, press and hold down the left mouse button.

## 5.4.4 Scaling tool (Scale)



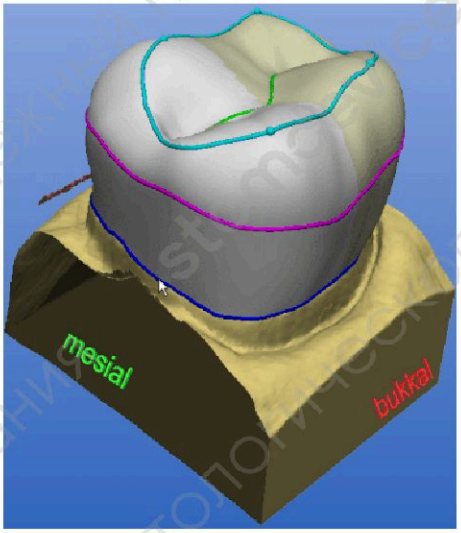

By clicking the *"Scale"* tool, you can activate the scaling function. This function enables you to scale a selected region.

First select the region to be scaled by clicking one of the lines.



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## Selecting the scaling region




| Region to be selected | Click ... |
|---|---|
| **Restoration half...**<br>lingual/buccal/**mesial**/distal | **Preparation margin...**<br>lingual/buccal/**mesial**/distal |
| Region between the preparation margin and marginal ridge ...<br>lingual/buccal/mesial/distal | Proximal contact line...<br>lingual/buccal/mesial/distal |
| Region above the proximal contact line...<br>lingual/buccal/mesial/distal | Marginal ridge...<br>lingual/buccal/mesial/distal |
| Occlusal region | Fissure line |
| Cusp | Turquoise-colored ball on the marginal ridge |

**NOTICE**

**For crowns and inlays:**

When selecting the preparation margin, proximal contact line and marginal ridge, you can extend the selection by the second half of the selected region by pressing the space bar.

If you then press space bar once again, the original region is selected again.

**NOTICE**

**For bridges**

You can double-click to select an element of a bridge.

The entire bridge element is selected. To select only half an element, press the space bar.

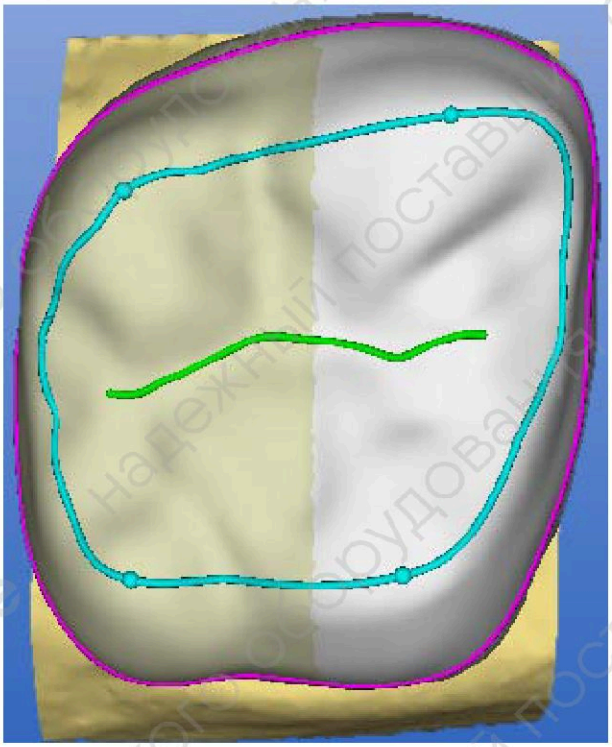



Once you have selected a region, you can modify it as follows:

- step by step, by repeatedly clicking a segment of the circle (e.g. buccal)
- continuously, by keeping a segment of the circle (e.g. buccal) pressed.



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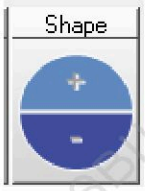


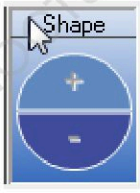
*Scaling the selected region*




To exit the scaling tool, click the highlighted bar *"Scale"*.

### 5.4.5 Shaping tool (Shape)




You can smoothen surfaces and apply or remove material with the *"Shape"* tool:

- along an open line or
- inside a closed area

To exit the *"Shape"* tool, click the highlighted button marked *"Shape"*.

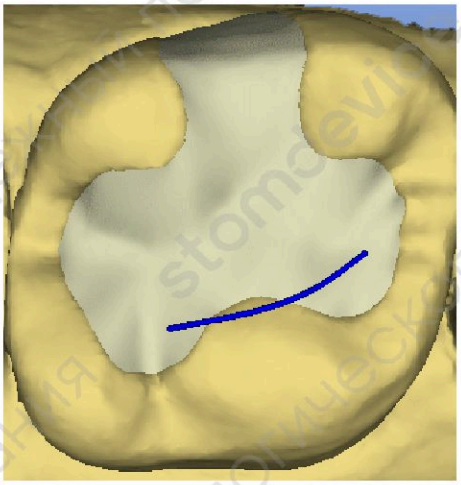


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### 5.4.5.1 Applying material along an open line



1. Start to draw a line by double-clicking the restoration.
2. Draw the line along which you want to apply or remove material by clikking.

**NOTICE**

**Starting point and end point**

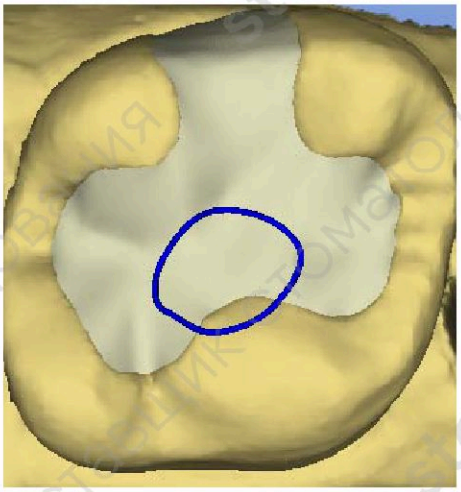
Individual points may lie on the residual tooth, but the starting and end point must be on the restoration.

3. Set the line end by double-clicking.




4. You can raise (+) or lower (-) the line:
**step by step**, by repeatedly clicking the "+" or "-" *"Shape"* semicircle or
**continuously**, by keeping the "+" or "-" semicircle pressed.

### 5.4.5.2 Applying material inside a closed area



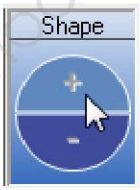
1. Start to draw a line by double-clicking the restoration.
2. Draw the area inside which you want to apply or remove material by clikking.

**NOTICE**

**Starting point and end point**

Individual points may lie on the residual tooth, but the starting and end point must be on the restoration.

3. Set the line end by double-clicking the starting point.

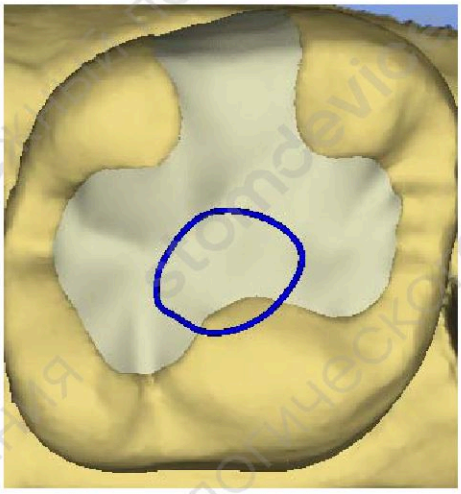



4. The region inside the area is activated, you can apply (+) or remove (-) material:
**step by step** by clicking the "+" or "-" *"Shape"* semicircle or
**continuously**, by keeping the "+" or "-" semicircle pressed.



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### 5.4.5.3 Smoothing an area



You can also smoothen a previously defined area with the *"Shape"* tool.

1. Start to draw a line by double-clicking the restoration.
2. Draw the area inside which you want to smoothen the surface by clicking.

**NOTICE**

**Starting point and end point**

Individual points may lie on the residual tooth, but the starting and end point must be on the restoration.

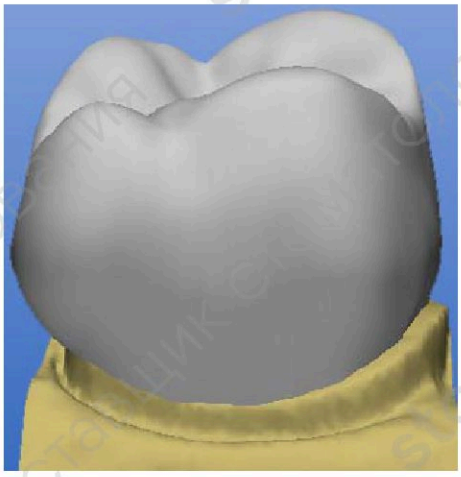
3. Set the line end by double-clicking the starting point.
4. Activate the smoothing function by pressing the spacebar.

↳ The surface inside the area is smoothed.

## 5.4.6 Positioning tool (Position)




By clicking the *"Position"* tool, you can activate the positioning function.



With this function you can move the entire restoration (or the selected element) in the following directions:

- mesio-distal
- bucco-lingual
- occlusal-cervical




The restoration can be positioned in two ways:

- step by step, by repeatedly clicking a segment of the circle
- continuously, by keeping a circle segment pressed.

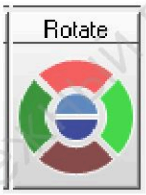



To exit the positioning tool, click the highlighted button marked *"Position"*. When you exit the positioning tool, the connection to the preparation margin (base line) is restored.

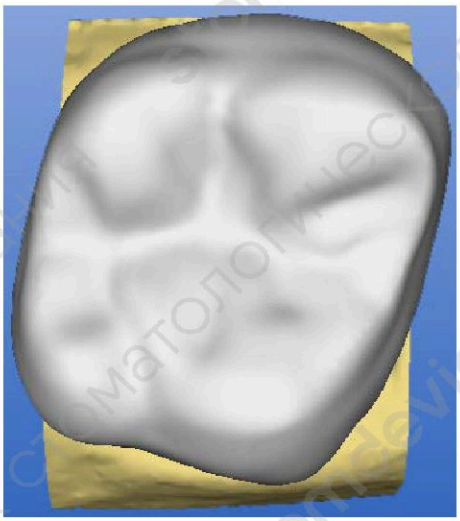


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## 5.4.7 Rotation tool (Rotate)

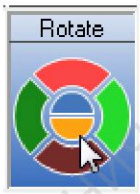



By clicking the *"Rotate"* tool, you can activate the rotation function.



With this function you can rotate the entire restoration (or the selected element) about the following axes:

- mesio-distal
- bucco-lingual
- occlusal-cervical




The restoration can be rotated in two ways:

- step by step, by repeatedly clicking a segment of the circle
- continuously, by keeping a circle segment pressed.




To exit the rotation tool, click the highlighted Rotate button.

When you exit the rotation tool, the connection to the preparation margin (base line) is restored.

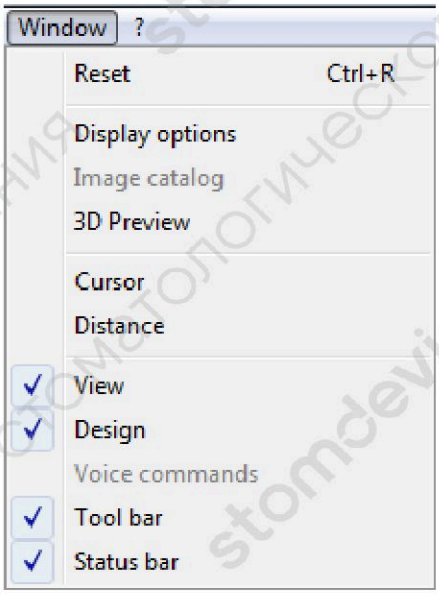


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## 5.5 Status bar




*Status bar*




**NOTICE**

**Showing/hiding the status bar**

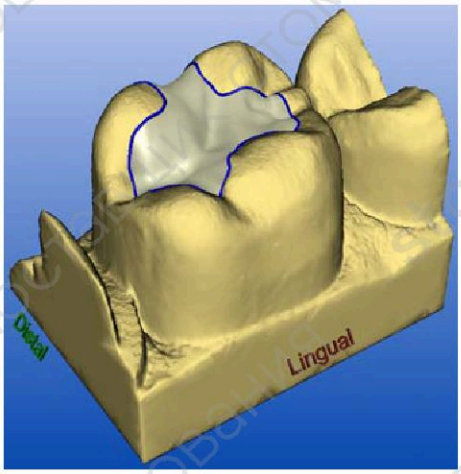
The status bar can be shown or hidden via the *"Window"*\ *"Status bar"* menu item.

The status bar provides current information about:

- A: the steps to be performed,
- B: the current activity of the milling unit,
- C: with restoration and preparation displayed, the ceramic thickness at the mouse cursor position. The field is colored red if the position of the mouse cursor exceeds the material thickness.
- D: the minimum fissure height
- E: the height of the preparation / occlusion at the mouse cursor position

## 5.6 Design window

### 5.6.1 Design window (3D viewer)




CEREC 3D contains a main window (3D viewer) for visualizing and designing a restoration in 3D.

The 3D viewer opens after all image fields have been acquired. The time up to display of the viewer depends upon the number of image fields and the number of single optical impressions.

You can do the following in the Design window:

- view the image fields of the preparation, of the occlusion and of the antagonists as well as the restoration, either individually or in any combination,
- determine a new insertion axis,
- hide an image region by entering an open line mesially and distally,
- enter the preparation margin,
- immediately see the effects caused by applying a tool (e.g. editing, scaling ...)
- view the restoration in the milling simulation before machining,
- rotate the objects arbitrarily. To do so, press and hold down the left mouse button and move the mouse in the desired direction.
- For better orientation, the direction is indicated (e.g. mesial, lingual, etc.).



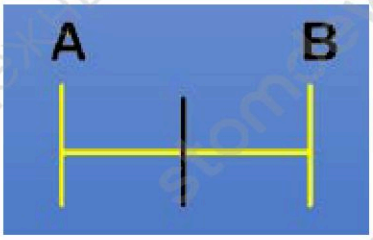
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The objects are displayed centered. You can change the position of the objects with the right mouse button pressed.

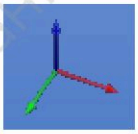
### 5.6.2 Scale




The scale is displayed in the bottom left corner of the 3D viewer. The distance between **A** and **B** corresponds to 1 mm.

If the display of the object is zoomed in or out, then the display of the scale changes correspondingly.

### 5.6.3 Coordinate system

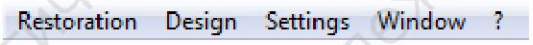


The coordinate system shows you how the object is oriented on the screen. The three arrows point in the following directions:

- red: buccal
- green: mesial
- blue: occlusal

## 5.7 Menu bar

The menu bar at the top of the window allows you to select further program functions which cannot be accessed via the tool bars.




The following menus are available:

- *"Restoration"*
- *"Design"*
- *"Settings"*
- *"Window"*
- *"?"*

**NOTICE**

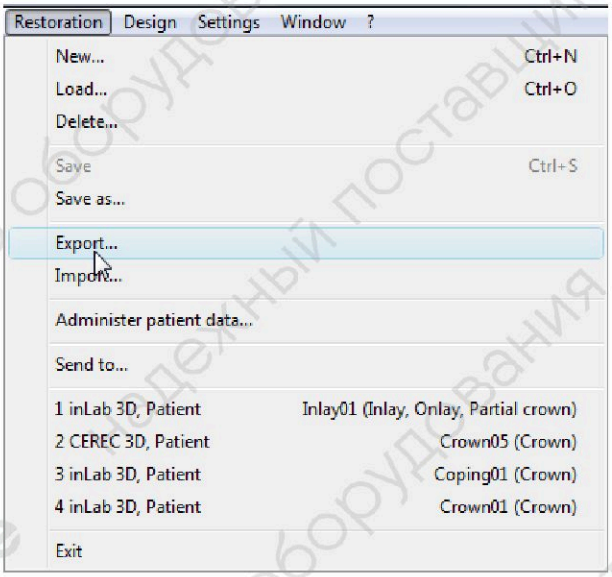
**Alternatives to the menu bar**

Some menu functions can also be activated using the shortcut keys specified in the menu item or the corresponding icons on the tool bar.



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### 5.7.1 Restoration menu




*Restoration menu*

Via the menu you can...




- open a window for a new restoration
  *"Restoration"|"New..."* or *"Ctrl+N"*




- load an existing restoration
  *"Restoration"|"Load..."* or *"Ctrl+O"*
- delete a restoration
  *"Restoration"|"Delete..."*




- save a restoration
  *"Restoration"|"Save"*... or *"Ctrl+S"*
- save a restoration under another name or assign it to another patient
  *"Restoration"|"Save as..."*
- export a restoration
  *"Restoration"|"Export..."*
- import a restoration
  *"Restoration"|"Import..."*
- administer patient data
  *"Restoration"|"Administer patient data..."*.
- send restoration data by e-mail
  *"Restoration"|"Send to..."*
- open a previous restoration or
- quit the application with


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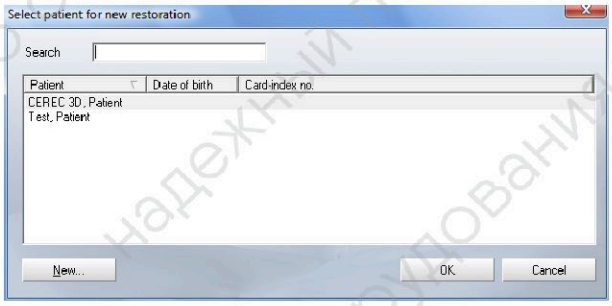
*"Restoration"|"Exit"*

### 5.7.1.1 Creating a restoration

#### Selecting an existing patient




1. Select *"Restoration"|"New..."* or click the *"New"* icon.
   ↳ The following dialog box appears *"Select patient for new restoration"*.



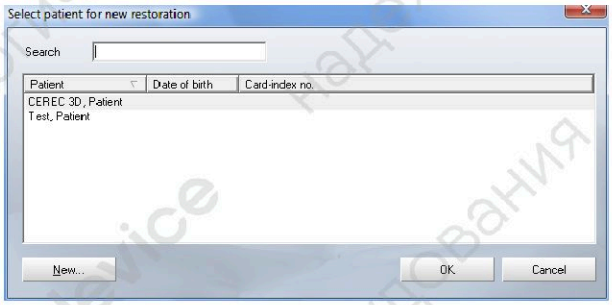

*Selecting a patient for a new restoration*

2. Select a patient and click the button marked *"OK"*.
   ↳ The New dialog appears.

#### Creating a new patient

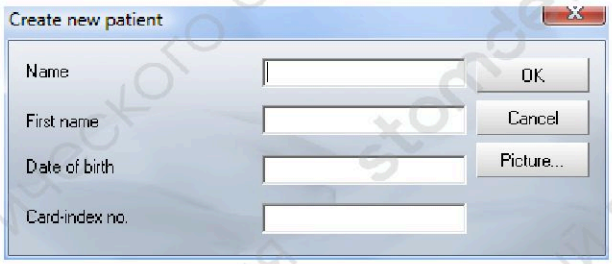



1. Select *"Restoration"|"New..."* or click the *"New"* icon.
   ↳ The following dialog box appears *"Select patient for new restoration"*.




*Selecting a patient for a new restoration*

2. Click the *"New"* button.
   ↳ A dialog box then appears.




*Creating a new patient*

3. Enter *"Name"*, *"First name"*, *"Date of birth"* and/or a *"Card-index no."*.


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**NOTICE**

**Inserting an image**

Using the *"Image"* button, you can assign an image (photo) to each patient.

4. Click the *"OK"* button.
   ↳ The New dialog appears.

In the data structure, a patient is uniquely identified by one of the following two entries:

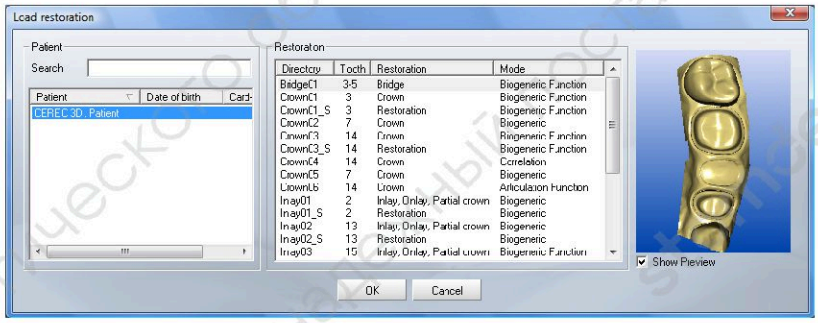
- *"Name"*, *"First name"*, *"Date of birth"*

or

- *"Card-index no."*.

If the database connection is used, the last name, the *"Name"*, *"First name"*, *"Date of birth"* must be entered; input of the *"Card-index no."* is optional.

### 5.7.1.2 Loading a restoration




*Load restoration*

➢ Select *"Restoration"*|*"Load..."*.
↳ The *"Load restoration"* dialog box opens.

To display the preview, a check mark must be placed in front of *"Show Preview"*.

The preview shows either the preparation impression or the 3D model of the preparation, provided it has already been reconstructed.

In the *"Load restoration"* dialog box, all restorations are displayed and can also be loaded in Master mode. If a CEREC 3D mode restoration is loaded in the Master mode, the program automatically changes to the CEREC 3D mode.

**NOTICE**

**Rotating a 3D preview**

The 3D preview can be rotated with the mouse and viewed from all sides (control the same as for rotating the model in the 3D viewer).



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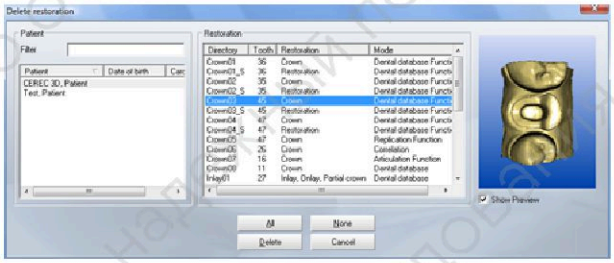


**NOTICE**

**Bridge frameworks/implants**

This software does not allow the loading and importing of bridge frameworks and implant mesostructures.

### 5.7.1.3 Deleting a restoration



*Deleting a restoration*

1. Select *"Restoration"|"Delete..."*.
   ↳ The *"Delete restoration"* dialog box opens.
2. Select the restoration you would like to delete.
3. Click the *"Delete"* button.
   ↳ You will be asked if the restoration should be deleted.
4. Confirm by clicking the *"Yes"* button.

↳ The restoration will then be deleted.

To display the preview, a check mark must be placed in front of *"Show Preview"*.

The preview shows either the preparation impression or the 3D model of the preparation, provided it has already been reconstructed.

**NOTICE**

**Rotating a 3D preview**

The 3D preview can be rotated with the mouse and viewed from all sides (control the same as for rotating the model in the 3D viewer).

### 5.7.1.4 Exporting a restoration or scan data

If a restoration is open, it can be saved in compressed form at any location.

✓ You have opened a restoration.

1. Select *"Restoration"|"Export..."*.
   ↳ A standard Windows file dialog box opens.
2. Select the target folder to which you want to export the restoration.
3. Assign any name to the restoration.
4. Click the *"Save"* button.

↳ The restoration is exported.

The restoration can be saved under any name, but the file type used must be "*.cdt" or "*.idt". If you want to export a restoration for use in GALILEOS Implant, you can create files with the file type *.ssi from the milling preview. An OpenSI dongle is a prerequisite for this.



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A special data format, "*.idt", is used to send data to infiniDent. Since this file format is distinctly smaller, it speeds up file transfer.

### 5.7.1.5 Importing a restoration or scan data

✓ An existing restoration is located on your acquisition unit.

1. Select *"Restoration"|"Import..."*.
   ↳ A standard Windows file dialog box opens in which a file search of all PC drives (hard disks, floppy disks and CDs) can be performed to find compressed CEREC restorations.
2. Select the folder where the restoration is located.
3. Select the restoration file.

**NOTICE**

**File types**

If the selected file ("*.cdt", "*.sdt", "*idt." or "*.dat") is a CEREC restoration, it will open. If not, it will not open, and an error message will be displayed. Depending on the attached OPEN xy Softguard (e.g. OPEN 3Shape, format *.3si), importing to other special formats is also enabled.

4. Click the *"Open"* button
   ↳ A dialog box opens.
5. Assign a name to the restoration.
6. Click the *"OK"* button.

↳ The restoration is then imported and opened.

**NOTICE**

**Rotating a 3D preview**

The 3D preview can be rotated with the mouse and viewed from all sides (control the same as for rotating the model in the 3D viewer).

Under the preview window the tooth number, the restoration type and the design technique of the selected restoration file are shown.

The thumbnail view additionally shows a preview of the preparation impression in the folder list.

**NOTICE**

**Bridge frameworks and implants**

This software does not allow the loading, importing and editing of bridge frameworks and implants.

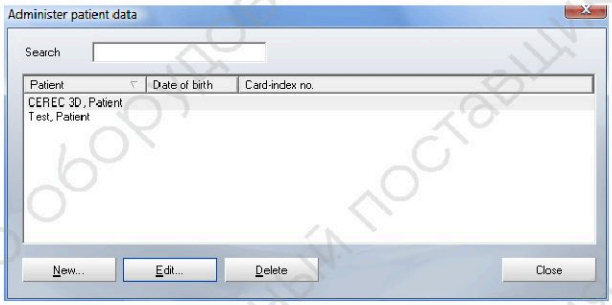


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#### 5.7.1.6 Administering patient data




*Managing CEREC patient data*

➢ Select *"Restoration"|"Administer patient data..."*.

↳ The *"Administer patient data..."* dialog box opens.

The *"Administer patient data..."* dialog box primarily contains a list of all patients.

It shows the patient's first name, last name, date of birth and card index number.

You can sort the entries by clicking the column header.

With the help of the *"Search"* text box, you can make the list more clear and concise by entering a last name, first name or initial letter.

Example
If you enter the letter "c" in the *"Search"* text box, a list of all patients whose last name, first name or card index number contains the letter "c" is displayed.

##### 5.7.1.6.1 Creating a new patient

If the database connection is used, the *"Name"*, *"First name"*, *"Date of birth"* must be specified; specification of the *"Card-index no."* is optional.

1. Click the button marked *"New"*.
   ↳ A dialog box is displayed.
2. Enter the patient's *"Name"*, *"First name"*, *"Date of birth"* and *"Card-index no."*.

**NOTICE**

**Inserting an image**

Using the *"Image"* button, you can assign an image (a photo) to each patient.

3. Click the button marked *"OK"*.

↳ The patient is saved in the patient list.

In the data structure, a patient is uniquely identified by one of the following two entries:

- *"Name"*, *"First name"* and *"Date of birth"*

or

- *"Card-index no."*.



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#### 5.7.1.6.2 Deleting patient data

The patient administration also enables you to delete a patient.

**NOTICE**

**Assigned restorations**

If any CEREC or video images are still assigned to a patient, a warning allowing you to cancel the delete operation will appear.

If you confirm the delete process, these images will also be deleted.

Patients to whom X-ray images are assigned cannot be deleted.

1. Click the button marked *"Delete"*.
   ↳ A dialog box is displayed.
2. Click the button marked *"OK"*.
   ↳ The patient data are deleted from the patient list.

Patients registered in the database via the SLIDA interface (see "SLIDA interface" [→ 169]) can be deleted, but not edited. The reason for this is that their administration is performed entirely outside of the CEREC 3D application; i.e., the database contains copies of the patient data, but no originals.

If a new restoration is selected (via the tool bar or the Restoration menu) a dialog box very similar to the one for patient administration appears (see "Creating a new restoration" [→ 50]). It is not possible to edit and/or delete patient data.

### 5.7.1.7 Sending a restoration

If an Internet e-mail connection is configured on your PC, you can send data via e-mail.

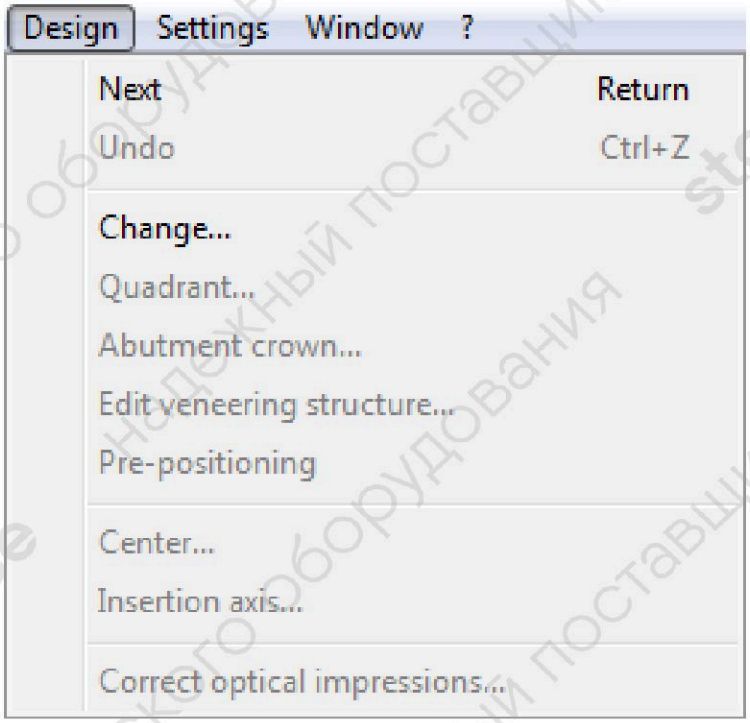


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## 5.7.2 Design menu




A tooth restoration must be designed in an exactly defined sequence.

Using the *"Design"* menu, you can...




- continue to the next design step
  *"Design"|"Next"* or *"Return"*




- return to the previous design step
  *"Design"|"Undo"* or *"Ctrl+Z"*
- change the restoration type, design technique and/or tooth of the opened restoration
  *"Design"|"Change"*
- instruct the program to perform virtual seating and the opening of a second program, (for quadrant restoration)
  *"Design"|"Quadrant..."*
- manually execute the adjustment to adjacent teeth and antagonists using the pre-positioning tool
  *"Design"|"Pre-positioning"*
- redefine the center
  *"Design"|"Centre..."*
- redefine the *"Insertion axis..."*.
- Correct optical impressions...

### 5.7.2.1 Change

With the menu item *"Change"*, you can edit the restoration type, the design technique and/or the tooth of the opened restoration.



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### 5.7.2.2 Quadrant

**NOTICE**

**Quadrant restoration**

During a quadrant restoration, the software will not let you switch to a tooth from the opposite jaw.

When you switch to a tooth in the opposite quadrant of the same jaw, the model is automatically rotated by 180° to ensure correct direction designations.

With the menu item *"Quadrant..."* the virtual seating and opening of a second program is essentially performed automatically.

After this menu item is selected, the New dialog box for selecting the tooth, the restoration type and the design technique opens. The patient is accepted. This is followed by the virtual seating and start of a second CEREC 3D program.

In the program running in the foreground, the old restoration is in its original state and could be milled, for example.

The program with the virtually seated restoration is loaded in the background. It can be reached e.g. via the task bar or the task selection keys (**Alt+Tab**). In this program the dialog for centering (*"Centre..."*) is open.

**NOTICE**

**Setting the insertion axis**

Remember to set the insertion axis correctly after drawing in the preparation margin (*"Design"|"Insertion axis..."*).

See also the example under "Quadrant restoration (in the Master mode only)" [→ 159].

### 5.7.2.3 Pre-positioning tool

This tool is available to you directly following automatic calculation of the initial suggestion of a fully anatomic crown or bridge restoration in the case of the following design procedure:

- *"Biogeneric"*,
- *"Biogeneric reference"*,

Once this tool has been activated, the automatic adjustments to the adjacent teeth and the antagonists are reverted. You can now manually adjust the restoration using the tools of the *"Design"* window.

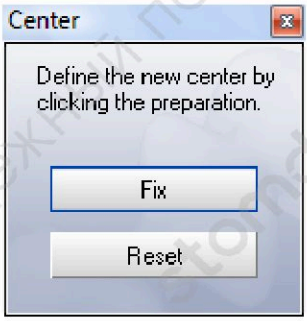


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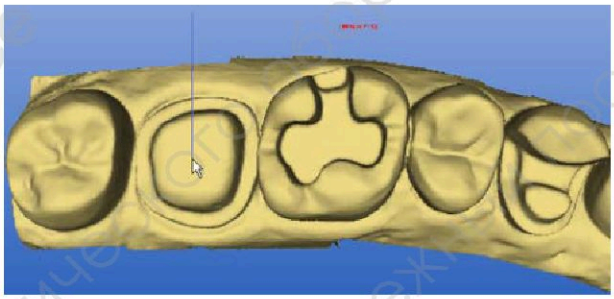
### 5.7.2.4 Centering




With the menu item *"Centre..."* You can open the *"Centre"* window. In this window you can define the preparation you want to further work with as center. This function is especially helpful in quadrant restoration.

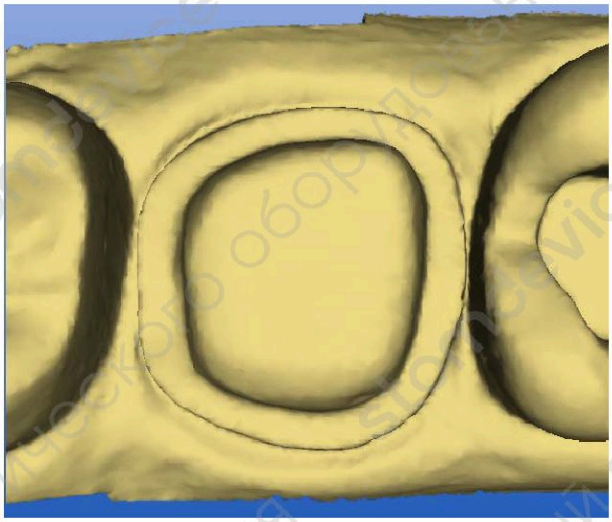
#### Defining the center

1. Select *"Design"* / *"Centre..."*.
   ↳ The *"Centre"* window opens.
2. Click the center of the preparation to be edited.



*Defining a new center*

3. Click the button marked *"Fix"*.
   ↳ The preparation appears in the center of the viewer and the *"Centre"* window closes



*Defining a new center*

If you want to define another preparation as center:

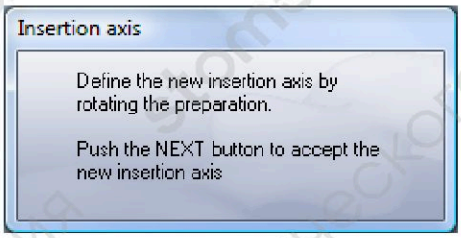
1. Select *"Design"* / *"Centre..."*.
2. Click the button marked *"Reset"*.



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3. Click the center of the preparation to be edited.
4. Click the button marked *"Fix"*.
   ↳ The preparation appears in the center of the viewer and the *"Centre"* window closes

#### 5.7.2.5 Insertion axis

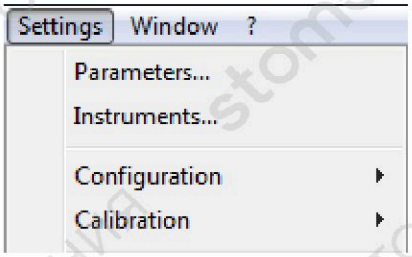



With the help of this function you can redefine the orientation of the preparation (mesial - distal, buccal - lingual) as well as the milling direction (see "Redefining the insertion axis" [→ 109]) .

#### 5.7.2.6 Correcting an optical impression

With the help of this function, you can remove artifacts and cut away disturbing marginal information, e.g. on optical impressions from the image fields of the antagonists or of the occlusion (see "Deleting and correcting image regions in image fields" [→ 112]).

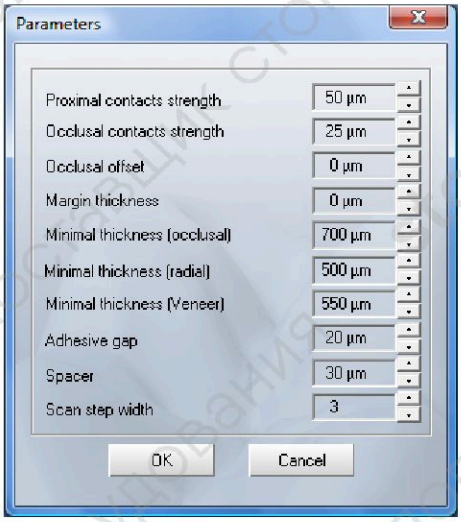
### 5.7.3 Settings menu




With the *"Settings"* menu, you can adapt and change the following menu items:

- *"Parameters..."*
- *"Instruments"*
- *"Configuration"*
- *"Calibration"*

#### 5.7.3.1 Parameters




A restoration requires some settings with regard to the milling/design process.

You can make the settings for all parameters via the *"Settings"*|*"Parameters..."* menu item.

The edited parameter values are saved with the restoration. If a restoration is loaded, the corresponding parameters are automatically loaded along with it and used.

**NOTICE**

**Factory settings**

The unit was set up optimally during final testing at the factory.

You can check the following parameters and modify them, if necessary

- *"Proximal contacts strength"*
- *"Occlusal contact strength"*
- *"Occlusal offset"*
- *"Margin thickness"*
- *"Minimal thickness (occlusal)"*


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- *"Minimal thickness (radial)"*
- *"Minimal thickness (Veneer)"*
- *"Adhesive gap"*
- *"Spacer"*
- *"Scan step width"*

#### 5.7.3.1.1 Proximal contacts strength

The CEREC 3D software automatically determines the proximal contact thickness.

**NOTICE**

**No contact to the neighboring tooth**

If the neighboring tooth is located at a distance of more than 1mm (e.g. neighboring tooth prepared), no contact is made.

The setting of the parameter *"Proximal contacts strength"* affects crown, inlay and onlay restorations.

If you find that the contacts proposed by the software are generally too strong or too weak, you can change them via the menu *"Settings"*| *"Parameters..."* according to your requirements.

If you set a higher number in the *"Proximal contacts strength"* text box, correspondingly more material will be applied to the contact points.

The thickness of the contact points can be adjusted in increments of 25µm between -200µm and 200µm.

**NOTICE**

**Change only after recalculation**

This setting acts only on line suggestions. A change to this setting becomes effective only after recalculation of the suggestion.

**NOTICE**

**Inadequate suggestions for contact points**

The proximal contact points are determined by the software by analyzing your measured data. Poor quality of the acquisition data can lead to inadequate suggestions regarding the contact points.

The setting of the parameter *"Proximal contacts strength"* has no influence on the design of crown and bridge frameworks.

#### 5.7.3.1.2 Occlusal contacts strength

With this parameter you can set the contact thickness to be produced in connection with *"Virtual grinding"*.

The thickness of the contact points can be adjusted in increments of 25µm between -200µm and 200µm.

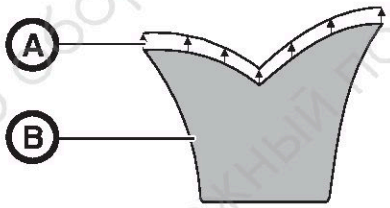


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#### 5.7.3.1.3 Occlusal offset

If you find that all of your restorations have too little or too much material in the occlusal direction, you can compensate for this with this parameter.

The occlusal offset can be adjusted in increments of 25µm between -500µm and 500µm.




*Increasing the occlusal offset (exaggerated representation)*

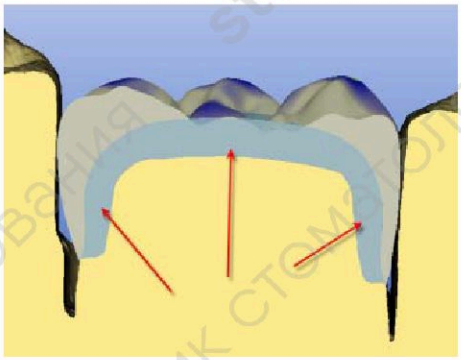
| | |
|---|---|
| A | z offset |
| B | Restoration |

**NOTICE**

**Visible only on milling**

This setting affects the restoration only on milling. The effect is not visible in the milling preview.

#### 5.7.3.1.4 Minimum thickness



With these parameters you can set the desired minimum material thickness. This is also already visible during the design phase if the *"Minimal thickness"* checkbox is selected under *"Window" I "Display options"*.

The parameters *"Minimal thickness (occlusal)"* and *"Minimal thickness (radial)"* influence the minimum wall thickness geometry **for veneers, inlays, onlays and crowns only**. Different values can be set for the occlusal and radial perspectives.



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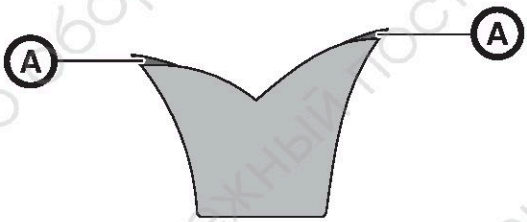
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#### 5.7.3.1.5 Margin thickness

Prior to milling of inlays, the margin of the restoration is thickened by the set thickness.

The *"Margin thickness"* can be adjusted in increments of 25 µm from 0 µm to 200 µm.

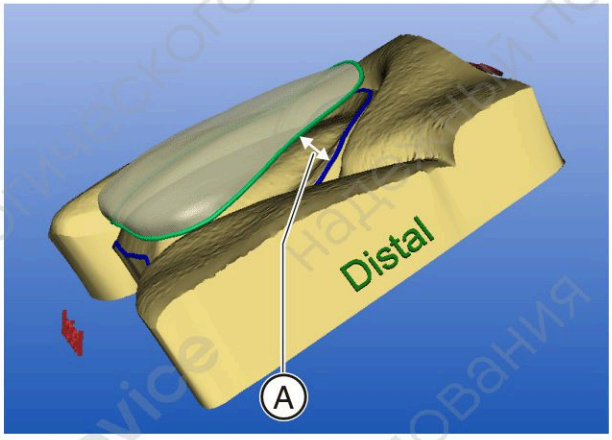



*Margin thickness A (exaggerated representation)*

#### 5.7.3.1.6 Veneer thickness

This parameter allows you to set the initial veneer thickness (**A**) for veneer restorations using the following design techniques:

- *"Biogeneric"*
- *"Biogeneric reference"*




*Veneer thickness*

The *"Minimal thickness (Veneer)"* can be adjusted in increments of 100 µm from 0 µm to 2000 µm.

In the case of a minimum thickness below 500µm, these are referred to as thin veneers. In this case, "e.max CAD" is available as material.

#### 5.7.3.1.7 Adhesive gap

If you find that all of your inlay restorations turn out to be too large, you can compensate for this by modifying the adhesive gap.

If you set a larger number in the *"Adhesive gap"* text box, the adhesive gap will be enlarged correspondingly. The size of the adhesive gap can be varied in increments of 10 µm from 0 µm to 150 µm.

**NOTICE**

This setting affects the calculation of the restoration.



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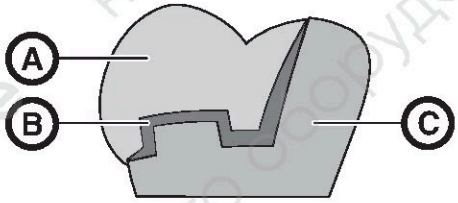


Recommended setting:

| | |
|---|---|
| 3D camera, powdered surfaces | 0 µm<br>(condition on delivery) |
| 3D camera, CAM base model without powder | 50 µm |
| Scanner, CAM base model with powder | 50 µm |
| Scanner, CAM base model without powder | 80 µm |

5.7.3.1.8 **Spacer**

The program enables you to consciously create space for the adhesive bonding of the crown or inlay using the Spacer spin box.




*Spacer (exaggerated representation)*

| | |
|---|---|
| A | Restoration |
| B | Spacer |
| C | Residual tooth |

If you increase the value, more space will be created. The setting can be adjusted in increments of 10µm between -100µm and 100µm.

**NOTICE**

This setting affects the calculation of the restoration.

Recommended setting:

| | |
|---|---|
| When using powder | 0 µm<br>(condition on delivery) |
| Plaster model without powder (inlay, crown) | 30 µm |

5.7.3.1.9 **Scan step width**

### Only with integrated scanner

If using the scanner (optional) to acquire the optical impression, you can set the resolution with *"Scan step width"*.

You can select a resolution of between 3 and 5. Setting the scan step width lower increases the scan time as well as the accuracy of the optical impression data record.



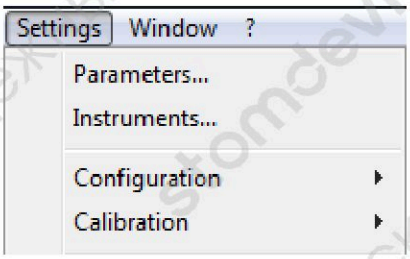
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### 5.7.3.2 Instruments

See also the chapter on "Changing burrs" in the Operating Instructions for the milling unit.

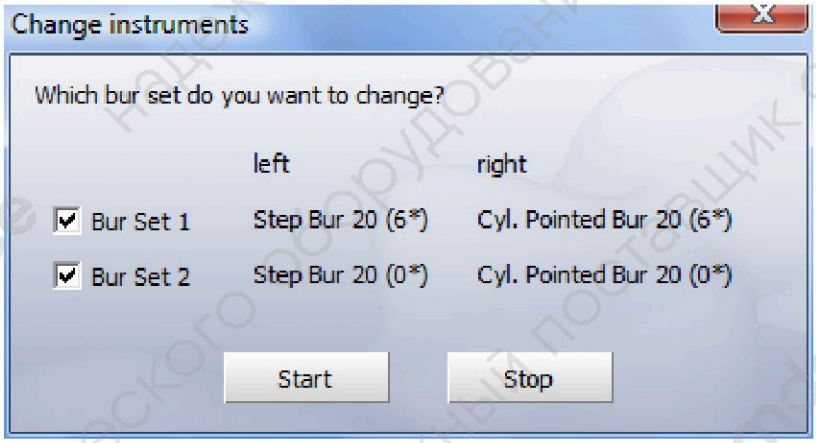



1. Select the *"Settings"* / *"Instruments"* menu item.

**NOTICE**

**Multiple milling units connected**

If several milling units are connected, a dialog box will appear from which you must select the desired milling unit and confirm with *"OK"*.



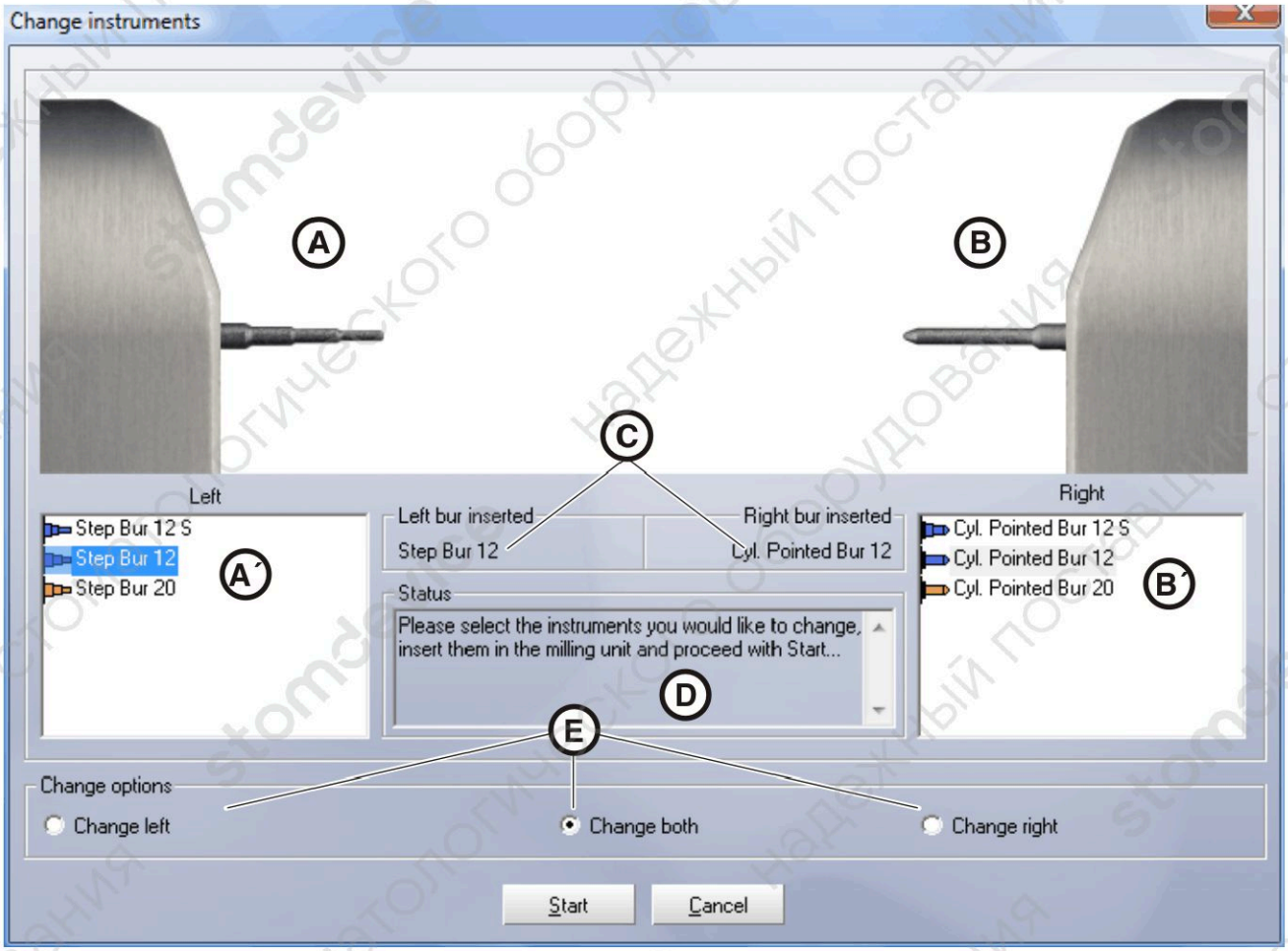

*Selecting a milling set*

2. If the (optional) bur set 2 is integrated in CEREC MC XL, a dialog is opened which allows you to select the bur set in which you want to change a milling instrument.
   ↳ The motors run to the position for changing the milling instruments. The *"Change instruments"* dialog box opens.
3. Select the milling instrument(s) you would like to change to and click *"Start"*.



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## Description of the dialog *"Change instruments"*




*Change instruments*

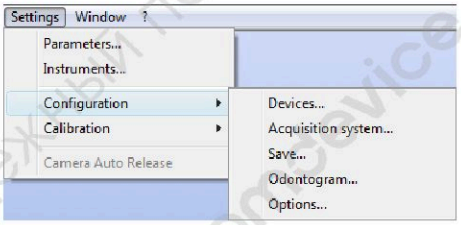
- **A, B** – The milling instruments selected in lists **A', B'** are displayed here.
- **A', B'** – You can select the milling instruments you would like to insert here.
  The milling instrument last inserted is preselected.
- **C** – The milling instruments last used are displayed here. This display remains unchanged even if you click other milling instruments under **A', B'**.
- **D** – The calls to action you must implement next are displayed here.
- **E** – You can select whether only the left, only the right or both milling instruments are to be replaced here.
- *"Start"* – Changes the milling instrument.
- *"Cancel"* – Operation is canceled


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### 5.7.3.3 Configuration




Under this menu item, you can check and modify the factory-set configurations.

- *"Devices..."*
- *"Acquisition system"*
- *"Save"*
- *"Odontogram"*
- *"Options"*

#### 5.7.3.3.1 Devices




*Configuring CEREC devices*

Via the menu item *"Settings"*\ *"Configuration"*\ *"Devices..."* all connected devices (milling units/inEos) can be displayed and configured. Several milling units and one inEos can be managed.

A green check mark next to a device denotes its active availability, e.g. this milling unit can be selected for milling.

A red cross indicates that this device cannot be selected, e.g. this milling unit is currently performing a milling operation or its calibration data are invalid.

A yellow exclamation mark indicates that the current milling program must be loaded into the milling unit (see Operating Instructions for the milling unit).

##### 5.7.3.3.1.1 Refresh status

You can use the *"Refresh status"* button to refresh the status display, e.g. check whether a milling unit has in the meantime finished milling.

##### 5.7.3.3.1.2 Add automatically

The function *"Add automatically"* detects any and all devices (milling units/inEos) connected to the PC. If a new device is detected, a dialog box for entering the name of the detected device automatically appears.



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#### 5.7.3.3.1.3 Add manually

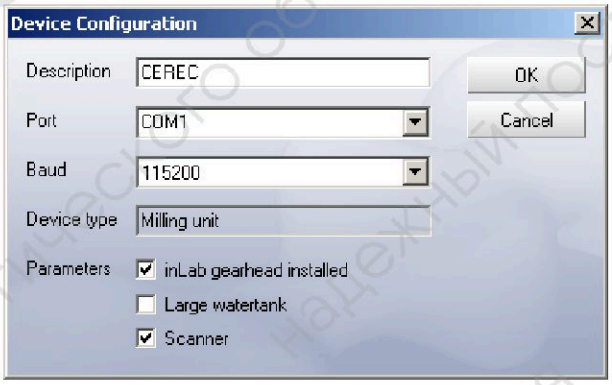
Units which cannot be operated at the maximum speed of 115,200 baud must be entered manually. This normally proves necessary only when longer cable connections or certain radio modules (e.g. Futaba, 19,200 baud) are used. Using the *"Add manually"* button, you can add these devices and enter the following information in the dialog box which then appears:

- Description
- Interface
- Baud (transmission speed)

#### 5.7.3.3.1.4 Remove

A connected device can be removed by clicking the *"Remove"* button in the main configuration dialog. The calibration data are not deleted in this case. If the device is added again, the corresponding calibration data will be reloaded and used.

#### 5.7.3.3.1.5 Configuration (CEREC 3)




*CEREC device configuration*

Via the *"Configure"* button, you can subsequently edit the name and connection settings and configure various parameters.

- *"inLab gearhead installed"*
- *"Large watertank"*
- *"Scanner"*

##### 5.7.3.3.1.5.1 Scanner




For a CEREC 3 milling unit with an integrated scanner, a check mark must be placed in the checkbox front of *"Scanner"*.

**Retrofitting (CEREC 3)**

If the scanner (optional, order no. 58 33 707) is retrofitted, your service engineer must place a check mark in the box in front of *"Scanner"*.



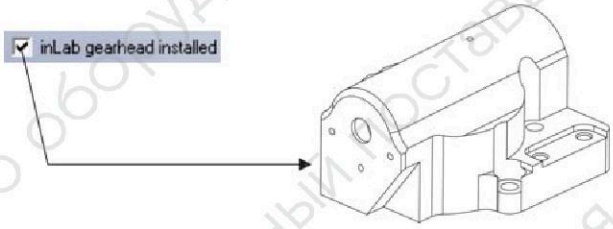
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#### 5.7.3.3.1.5.2 inLab gearhead

If the gearhead looks like the one shown in the figure, a check mark must be set in the box in front of *"inLab gearhead installed"*.

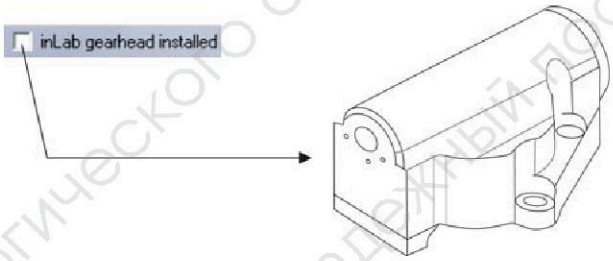



*With inLab gearhead (check mark set)*

**Retrofit**

If the inLab gearhead (optional) is retrofitted in the milling unit, your service engineer must set a check mark in the box in front of *"inLab gearhead installed"*.

If the inLab gearhead looks like the one shown in the figure, check the box in front of *"inLab gearhead installed"*to make sure that **no** check mark is set.




*With inLab gearhead (check mark NOT set)*

#### 5.7.3.3.1.5.3 Large water tank




If the 25-liter canister (option, Order No. 60 56 217) is connected and the check mark has been placed, you will not be reminded to change the water until a later point in time.

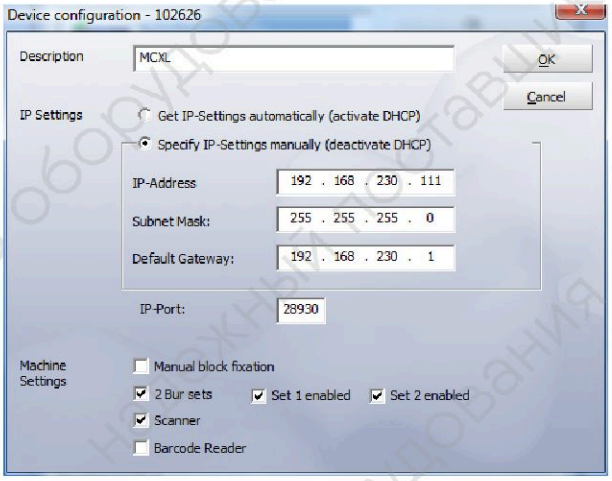
**Retrofit**

If the 25-liter canister is retrofitted, your service engineer must place a check mark in the box in front of *"Large watertank"*.



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#### 5.7.3.3.1.6 Configuration (CEREC MC XL)




*Configuring devices (CEREC MC XL)*

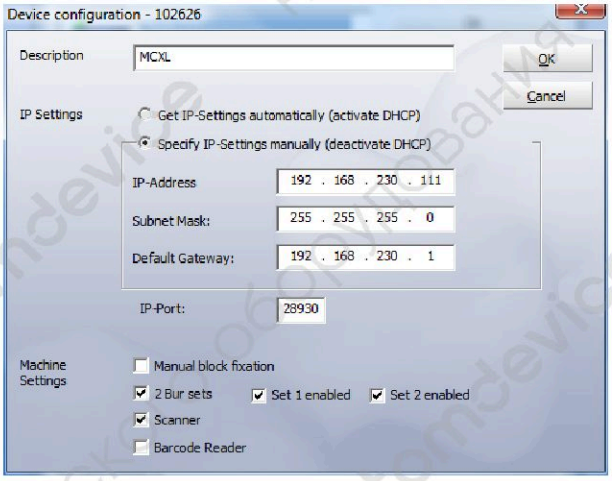
The various settings can be subsequently changed via the *"Configure"* button.

### Manual block fixing

When using the manual block clamp, the check mark must be set in front of *"Manual Block Fixation"*.

### Deactivating a bur set (only for milling units with 4 motors)

It may sometimes prove necessary to deactivate a bur set, e.g. as long as it is not possible to replace a defective milling instrument or in case a milling motor is defective or cannot be calibrated.




In all of these cases, you can deactivate sets 1 and 2 separately in the *"Device Configuration"* dialog box. A deactivated set will simply be ignored during milling, calibration etc.



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**NOTICE**

**Risk of collision**

The restoration may become damaged if longer milling instruments are present in the deactivated bur set than in the active set.

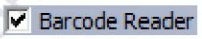
➢ Ensure that milling instruments installed in the deactivated bur set are no longer than those in the active set.

### Scanner



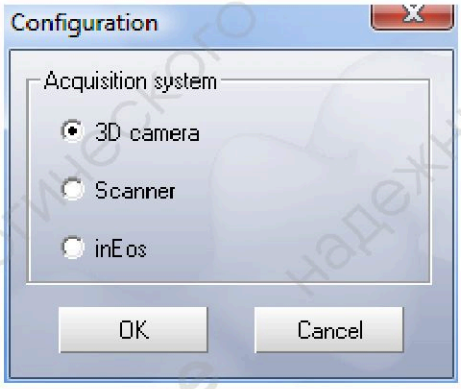

When using the internal scanner, the check mark must be set in front of *"Scanner"*.

### Barcode reader




When a barcode reader is used, the corresponding checkbox must be activated. This ensures that the barcode reader is always used to read a barcode, even if the scanner is also active. In this case the scan function can still be used.

#### 5.7.3.3.2 Acquisition system

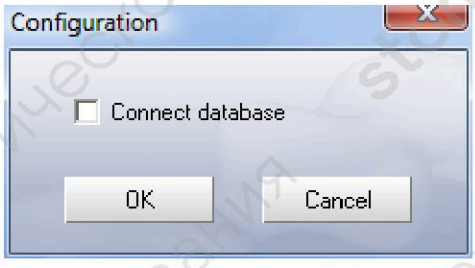



*Acquisition system configuration*

Via the menu item *"Settings"* I *"Configuration"* I *"Acquisition system"* you can select the following:

- *"3D camera"*
- *"Scanner"*
- *"inEos"*

#### 5.7.3.3.3 Save




*Saving the configuration*

Via the *"Settings"* I *"Configuration"* I *"Save"* menu item you can:



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- *"Connect database"*

  An existing SIRONA database is used for patient data and images.

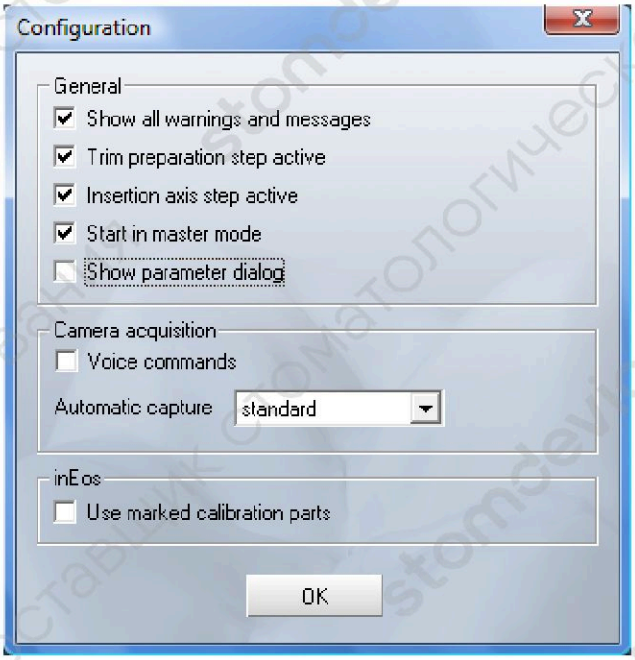
#### 5.7.3.3.4 Odontogram



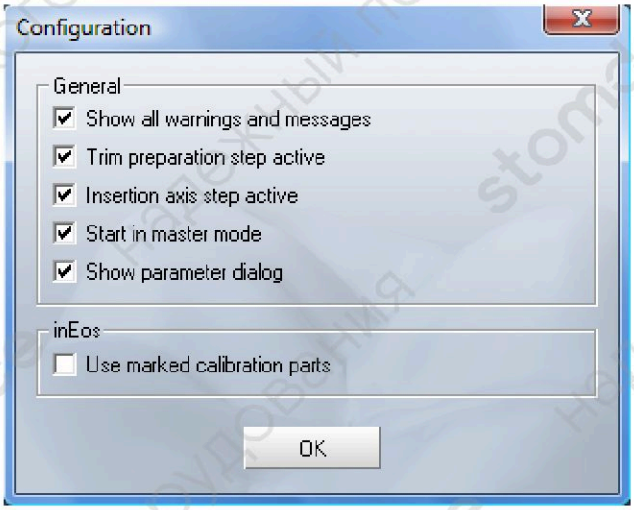

*Odontogram configuration*

Via the menu item *"Settings"|"Configuration"|"Odontogram"* you can select either the US or the international odontogram.

#### 5.7.3.3.5 Options




With CEREC Bluecam




With CEREC 3 camera

The *"Options"* configuration dialog box offers several groups of functions which can be selected and deselected:

- General
- Camera acquisition (with CEREC Bluecam only)
- inEos



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### General

In the *"General"* group, you can select or deselect the following options:

- *"Show all warnings and messages"*
- *"Trim preparation step active"*
- *"Insertion axis step activ"*
- *"Start in Master mode"*
- *"Show parameter dialog"*

### Camera acquisition

In the *"Camera acquisition"* group, you can set the following option for exposures taken with the CEREC Bluecam:

- *"Automatic capture"*

### inEos

In the inEos group, you can select or deselect the following options:

- *"Use marked calibration parts"*

#### 5.7.3.3.5.1 Show all warnings and messages




If you have hidden individual warnings (checkmark in front of *"Do not display this warning again."*), they can be displayed again by placing a checkmark in front of *"Show all warnings and messages"*.

#### 5.7.3.3.5.2 Preparation trim step active




If a check mark is set in front of *"Trim preparation step active"*, you can remove image regions before entering the preparation margin (see "Trimming the preparation [→ 105]").

If a check mark is not set in front of *"Trim preparation step active"*, this step will be skipped and you can continue with trimming the antagonist (if present) or with entering the preparation margin.

#### 5.7.3.3.5.3 Insertion axis step active




If this option is activated, you will be prompted to set the insertion axis after drawing in the preparation margin.

#### 5.7.3.3.5.4 Start in Master Mode




If this box is checked, the next start of CEREC 3D will be executed in *"Master Mode"*.

#### 5.7.3.3.5.5 Display parameter dialog box

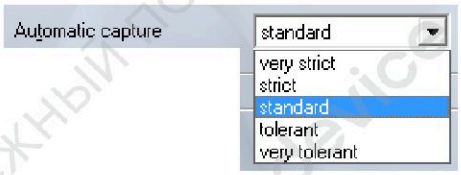



When this option is activated, each time a restoration is performed, the parameter dialog box will be displayed in order to check the settings.



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5.7.3.3.5.6




### Automatic acquisition (with CEREC Bluecam only)

For impressions acquired with the CEREC Bluecam, you can use the *"Automatic capture"* option to set the sensitivity to shaking of the automatic acquisition technique. The setting options are available:

- *"very strict"*
- *"strict"*
- *"standard"*
- *"tolerant"*
- *"very tolerant"*

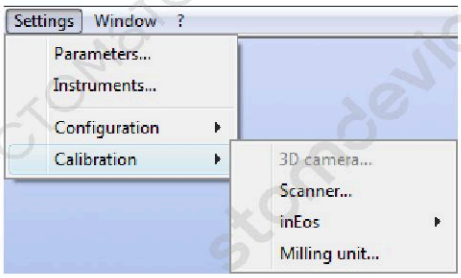
5.7.3.3.5.7




### Use marked calibration parts

Tick this option if you use a blue-marked calibration part **B** and a blue-marked calibration cylinder. After this, perform a complete inEos calibration (see inEos Operating Instructions).

5.7.3.4




## Calibration

Under the menu option *"Calibration"* you can...

- calibrate the *"3D camera"*,

  3D camera must be selected as the acquisition system (see chapter on "Calibrating the Bluecam/3D camera" in the Operating Instructions for the acquisition unit).

**NOTICE**

**Calibrating the Bluecam/3D camera**

For calibration of the Bluecam/3D camera, you will require the *"Bluecam calibration set"*/ *"3D calibration set"*.

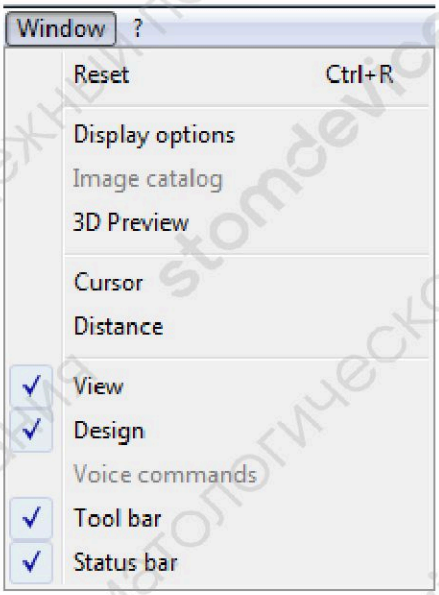
The *"Bluecam calibration set"*/ *"3D calibration set"* must **not be powdered**.

- calibrate the *"Scanner"* (see chapter on "Calibrating the scanner" in the Operating Instructions for the milling unit).
- calibrate the *"inEos"* device (see chapter on "Calibrating" in the inEos Blue Operating Instructions).
- calibrate the *"Milling unit"* (see chapter on "Calibrating the milling unit" in the Operating Instructions for the milling unit).



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### 5.7.4 Window menu




Using the menu *"Window"*, you can change the arrangement of the various viewing windows on the screen and refresh the screen display.

You can restore the default setting for the display of the windows/tool bar on the screen:

*"Window"* I *"Reset"* or *"Ctrl+R"*

The following views and windows are available for assessment and editing purposes:

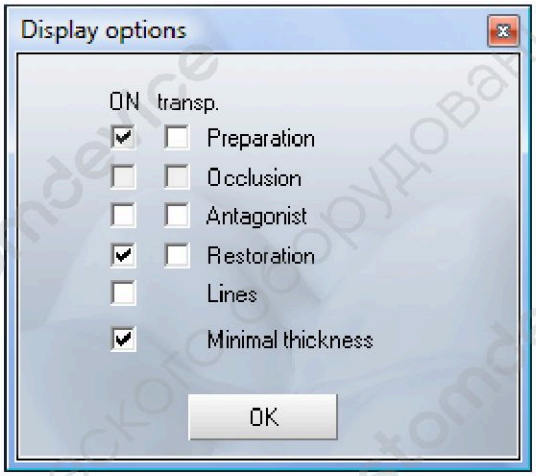
- *"Display options"*
- *"Image catalog"*
- *"3D Preview"*
- *"Cursor"*
- *"Distance"*
- *"View"*
- *"Design"*
- *"Tool bar"*
- *"Status bar"*

**NOTICE**

**Displayed windows**

Displayed windows/bars are identified by a check mark in front of the menu item.

#### 5.7.4.1 Display options



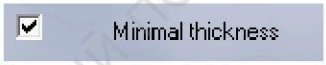

In the *"Display options"* window, the current state of the 3D display is shown and can be adjusted individually.

- Check mark next to *"ON"* - object visible
- Check mark next to *"transp."* - object is displayed transparently

If a box is shown in gray, this option is not available in this state (design technique, design step, image material).


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#### 5.7.4.1.1 Minimum thickness




If this option is checked, a minimum thickness geometry which is set in the parameter dialog box is displayed (see Minimum thickness [ → 61]).

### 5.7.4.2 Image catalog




Using the function *"Window"\|"Image catalog"* you can show or hide the *"Image catalog"*.

You can manage the image fields of the preparation, of the occlusion and of the antagonists in the *"Image catalog"* window (see "Image catalog [ → 90]").

### 5.7.4.3 3D Preview

You can show or hide the 3D preview via *"Window"\|"3D Preview"*.

You can manage the image fields of the preparation, of the occlusion/articulation and of the antagonists 3-dimensionally in the *"3D Preview"* window (see "3D Preview" [ → 94]).

This function is only available for scanning with the Bluecam/3D camera.

The 3D preview can only be used for scans with inEos Blue.

### 5.7.4.4 Cursor



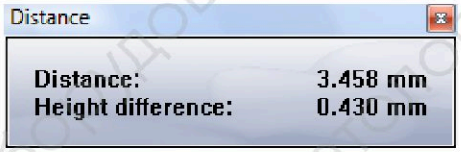

In the *"Cursor"* window, the current position of the cursor (arrow tip) in the active window is displayed as an absolute value. The zero point of the absolute cursor position is located in the distal and the lingual (or buccal) direction from the model.

The first line shows the x, y value at the cursor position.

The second line shows the height value at the cursor position.

You can drag the *"Cursor"* window with the mouse by grabbing its title bar and drop it at any position on the screen.

### 5.7.4.5 Distance




If you select the function *"Window"\|"Distance"*, the *"Distance"* window is displayed.

✓ The *"Distance"* window opens.

1. Left-click to set the desired starting point of the distance to be measured.
2. Move the mouse to the desired end point.
3. Left-click to set the end point.



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### Changing the position of the blue line:

1. Drag the red pin at the end of the blue line with the left mouse button pressed.
2. Release it anywhere you want.

The first line shows the 3-dimensional distance between the starting and end points of the blue line.

The second line shows the height difference between the starting and end points of the blue line.

You can drag the Distance window with the mouse by grabbing its title bar and drop it at any position on the screen.

## 5.7.5 "?" menu




With the *"?"* menu, you can

- start the Help function (online help)

  *"?"|"Help"* or function key *"F1"*

- display information about the active restoration

  *"?"|"Info Options..."*

- display information about the connected softguard dongle (activation key)

  *"?"|"Softguard info..."*

- call up information about the current program version

  *"?"|"Info on CEREC..."*

### 5.7.5.1 Help (online help)

The online help function gives you instructions on the steps to be performed.

To start help, call up the menu item *"?"|"Help"* or *"F1"*.

A dialog box appears that contains a variety of help topics you can select and have displayed.

### 5.7.5.2 Info Options

In the *"Options"* window you receive information about the active restoration.

### 5.7.5.3 Softguard info

The *"Softguard"* window contains information about the connected Softguard dongle (activation key).

**NOTICE**

**Multiple milling units connected**

If several milling units are connected, a dialog box will appear from which you must select the desired milling unit and confirm with *"OK"*.



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**NOTICE**

**Milling unit not switched on**

If the milling unit is not switched on/connected or the current software has not been downloaded to the milling unit, the following message appears *"Milling unit not ready"*. The milling unit name entered in the *"Description"* field during the login appears as the "milling unit".

| | | |
|---|---|---|
| **Identifier 0** | = | CEREC 3 milling unit / *Scan* (serial no. < 5000) |
| **Identifier 1** | = | inLab milling unit (serial no. >/= 5000) |
| **Identifier 2** | = | CEREC 3 milling unit / *Scan* (serial no. >/= 5000) |
| **Identifier ??** | = | no milling unit detected (check the connection to the milling unit and the communication settings) |
| **Identifier 32** | = | CEREC MC XL |
| **Identifier 48** | = | inLab MC XL |

### 5.7.5.4 Info on the program

The *"Info on CEREC..."* window contains information about the current program version.

If you have installed an internet access, you can access our internet website directly by clicking the *"Homepage"* link.



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# 6 Optical impression

A *"Optical impression"* can be captured either with the CEREC Bluecam, CEREC 3D camera or with the scanner.

Image acquisition with inEos/inEos Blue is described in the respective Operating Instructions.

## 6.1 Optical impressions with the CEREC Bluecam

### 6.1.1 Acquisition control

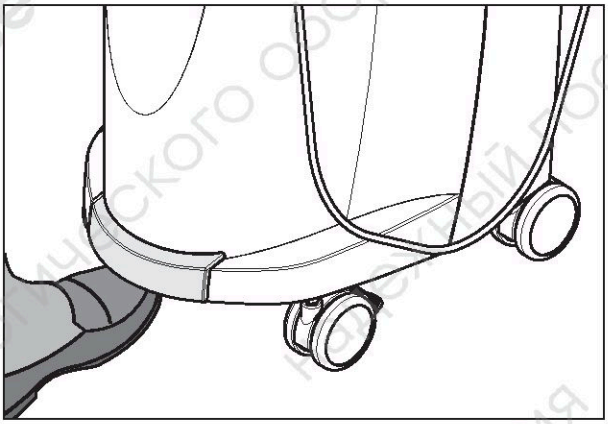
The acquisition control of the Bluecam functions as follows:

#### Manual acquisition control

✓ A window is opened for a new restoration.




1. Position the cursor on the acquisition icon (e.g. *"Acquire preparation"*).



2. Press the **foot control upward** and **keep it pressed**.
   ↳ A live video image appears with a green cross.
3. Release the foot control.
   ↳ The optical impression is automatically transferred to the 3D preview (e.g. the Preparation image field).
4. Additional optical impressions can be captured by repeating steps 1 to 3.
5. By positioning the cursor on another acquisition icon (e.g. *"Acquire occlusion"* or *"Acquire antagonist"*) and repeating steps 2-4, additional optical impressions can be captured in the occlusion or antagonist model




6. To exit the acquisition mode, click the icon marked *"Next"*.



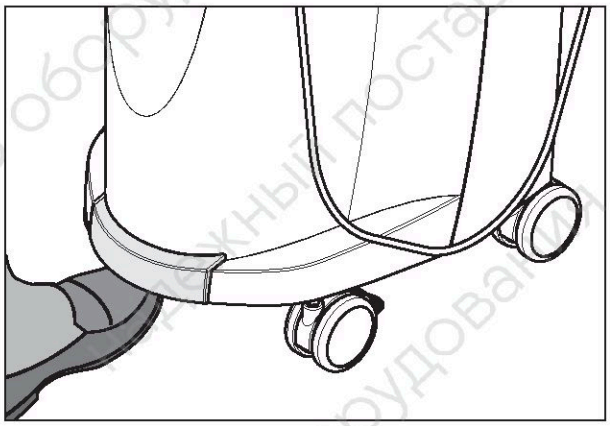
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### Automatic acquisition control

✓ A window is opened for a new restoration.




1. Position the cursor on the acquisition icon (e.g. *"Acquire preparation"*).



2. Press the foot control upward **briefly**.
   ↳ As soon as a sharp optical impression can be captured, images are automatically generated and transferred to the 3D preview.
3. Press the foot control upward **briefly**.
   ↳ The optical impression is completed.
4. By positioning the cursor on another acquisition icon (e.g. *"Acquire occlusion"* or *"Acquire antagonist"*) and repeating steps 2-3, additional optical impressions can be captured in the occlusion or antagonist model
5. To exit the acquisition mode, click the icon marked *"Next"*.




### Changing from automatic to manual acquisition control

If you press the **foot control upward** and **keep it pressed** during an automatic exposure, this changes the program back to manual acquisition control.

## 6.1.2 Single optical impression

### Reference optical impression

As a rule, a single optical impression is sufficient for single tooth restorations. It must be taken in the occlusal direction (insertion axis) and is called reference optical impression.




As soon as you have selected a tooth and a design technique, the *"Acquire preparation"* icon is activated in the tool bar. The cursor then jumps to this icon.


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**CAUTION**

**Handling the 3D camera**

For intra-oral recordings, always use the camera support.

The 3D camera is a high-precision optoelectronic instrument which requires careful handling. Incorrect handling (impacts, dropping) leads to failure of the 3D camera.

Do not support the camera head (prism) on a tooth.

## Camera support

Using the camera support helps ensure that the scans are not blurred. The camera support prevents damage to the prism and contact with the prepared tooth.

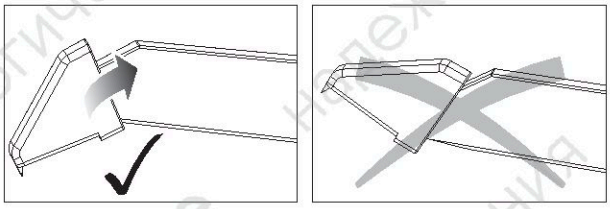
**CAUTION**

**Using the camera support**

Clean the camera support by wiping or spraying it with disinfectant prior to use. Designed for one-time use only.

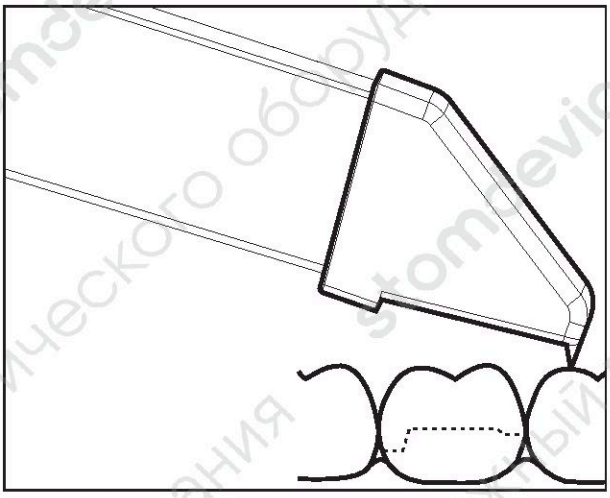
## Preparing an optical impression

1. Push the camera support onto the camera as illustrated.



*Pushing on the camera support*

2. Position the camera over the powdered preparation.



*Supporting the 3D camera*



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3. Support the camera with the front part of the camera support on a tooth so that you can hold it quietly during the acquisition phase.

**NOTICE**

**Powder on the surface of the prism**

If the prism touches powdered surfaces, then powder usually remains on the prism surface and generates dark spots in the image.

The powder can be wiped off from the prism with a soft cloth.

### Taking the scan

➢ Take the scan as described under "Acquisition control" [→ 78].

### Concluding the optical impression

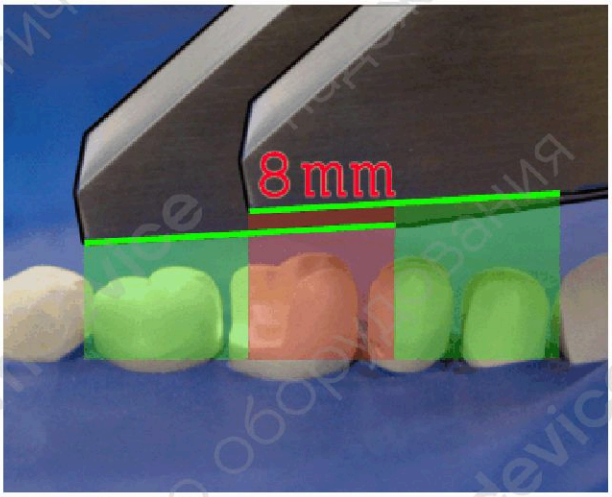



➢ To exit the acquisition mode, click the icon marked *"Next"*.

## 6.1.3 Supplementary optical impressions

### Acquiring the neighboring teeth as well

If the neighboring teeth are to be completely imaged as well, then the image field can be extended by further optical impressions of these teeth. The overlap area of two neighboring optical impressions should be approx. 8mm.




*Overlap area 8mm*

✓ You have taken the reference optical impressions as described in the chapter "Single optical impression" under "Preparing the optical impression" and "Capturing the optical impression".

**NOTICE**

**Insertion axis**

The reference optical impression determines the original insertion axis, which can be modified later, if required.

1. Click briefly to include the reference optical impression.



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2. Repeat the steps described in the section "Capturing the optical impression" of the chapter "Single optical impression" for the mesial neighbor.
3. Click briefly to include the mesial neighbor.
4. Repeat the steps described in the section "Capturing the optical impression" of the chapter "Single optical impression" for the distal neighbor.
5. Click briefly to include the distal neighbor.
6. To exit the acquisition process, click the icon marked *"Next"*.




### 6.1.4 Angled optical impressions

**NOTICE**

**Insertion axis**

The reference optical impression determines the original insertion axis which can be modified later if required (see "Redefining the insertion axis" [→ 109]).

#### Additional angled optical impressions

Additional angled optical impressions are possible for the preparation. They can be used to acquire impressions of regions that are concealed in the reference optical impression, or to acquire steep walls in more favorable angles.

**⚠ CAUTION**

**Proximal undercuts**

Proximal undercuts may make it impossible to seat an inlay.

The maximum permissible tilt angle for capturing an additional optical impression of the same area is 20°.

### 6.1.5 Supplementary and angled optical impressions

**NOTICE**

**Insertion axis**

The reference optical impression determines the original insertion axis which can be modified later if required (see "Redefining the insertion axis" [→ 109]).

#### Supplementary optical impressions and additional angled optical impressions

Apart from the reference optical impression, additional supplementary optical impressions and additional angled optical impressions are possible.



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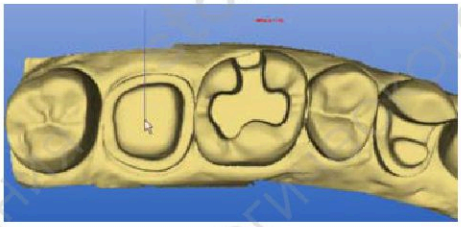


### 6.1.6 Optical impressions for quadrant restoration

**NOTICE**

**Insertion axis**

The reference optical impression determines the original insertion axis which can be modified later if required (see "Redefining the insertion axis" [→ 109]).



For quadrant restoration it is recommended to acquire the prepared teeth as well as an unprepared neighboring tooth in each case. It can be covered by capturing several supplementary optical impressions.

### 6.1.7 Acquiring end teeth

#### End tooth at the distal margin

When end teeth are restored, the end tooth should lie at the distal margin of the image field.

### 6.1.8 Acquiring the antagonist

#### Acquire antagonists directly

Powder the antagonist and acquire it directly. You can record the two acquisitions together with a buccal acquisition (see "Image field of the buccal image [→ 90]").

#### Alternative: Acquiring the centric bite registration

The interocclusal relation between the prepared tooth and the antagonist in the opposite jaw is recorded with the bite registration.



*Centric bite registration*

1. Place the impression compound on the preparation.
2. Ask the patient to bite down on the impression compound (without functional movement).



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3. Once the impression compound has hardened, trim it so that the proximal surfaces can be seen from the mesial and distal aspect.
4. Acquire the antagonist.




**NOTICE**

**Image field of the antagonists**

The image field of the antagonists must agree with the image field of the preparation in the mesial and distal region.

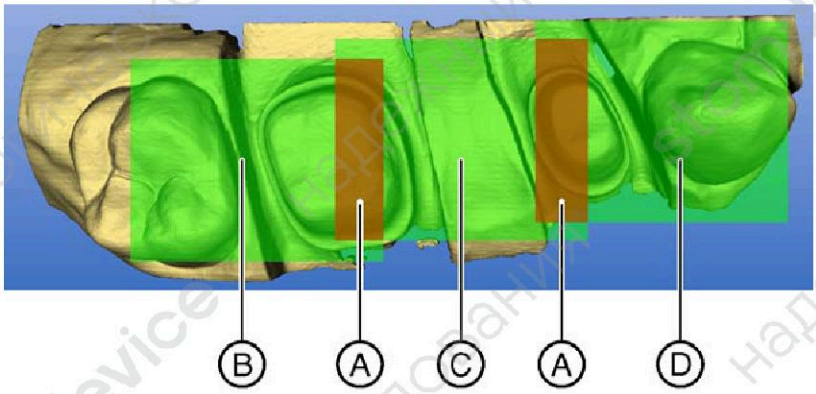
5. Remove disturbing marginal information via *"Design" | "Correct optical impressions..."* (see "Correcting the orientation of bridges").
6. To exit the acquisition process, click the icon marked *"Next"*.




## 6.1.9 Veneer images

With software V3.80 or higher, the exposure in the anterior tooth region does not differ from other exposures. Continue acquiring the preparation from the occlusal/incisal direction.

## 6.1.10 Acquiring bridge preparations




| | | | |
|---|---|---|---|
| A | Overlap area | C | 2. optical impression |
| B | 1. optical impression | D | 3. optical impression |

To produce bridge frameworks of up to 3 elements, you can acquire the tooth situation with the CEREC Bluecam. Make sure there is always dental substance visible in the overlap area of the acquisitions (areas **A**). Start by taking the 1st scan on the distal end. Then guide the camera over the preparation in the mesial direction.

The design of bridge frameworks is described by means of an example under "Designing a bridge framework".

## 6.1.11 Take casting

### Prepare casting

✓ In certain circumstances, the casting must be cut free somewhat, so that the definition of the image of the CEREC Bluecam is sufficient.



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➢ Apply a matte finishing to the areas to be acquired to prevent reflections. For this purpose, use CEREC Optispray.

### Take casting

1. Click the *"Preparation"* icon to start the acquisition.
2. Move the cursor to the left edge of the image catalog *"Preparation"*.
3. Click on the "Change view" icon.
4. Start the acquisition procedure.
5. In the 3D preview, the model is displayed on both sides. The model preview is displayed in yellow, whereas the preview of the casting itself is shown in green.
6. Following acquisition of the required area, click on the *"Next"* icon to have the model reconstructed.

It is possible to combine casting acquisitions and intraoral acquisitions, while upper and lower jaws can be correlated by means of an intraoral buccal acquisition.

## 6.2 Optical impressions with the scanner

**(Only with integrated scanner)**

### 6.2.1 General information

**NOTICE**

**Supplementary and angled optical impressions**

Supplementary and angled optical impressions are not possible with the scanner.

It is not possible to acquire abutment positions with scanbody using the scanner.

Preparation of the scan model is described in the Operating Instructions for the milling unit.

The model is scanned from several directions. Several single images appear in the image catalogimage catalog after scanning.

Reference optical impressions cannot be changed with a double-click.

Based on the selected restoration type, the software decides which scanning technique will be used.

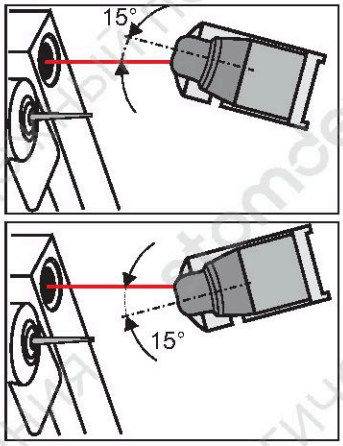


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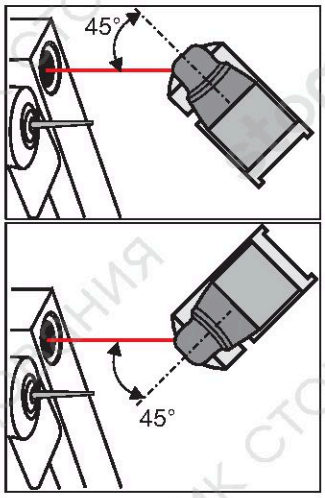
### 6.2.2 15° scanning technique




This scanning technique is used for inlay and crown preparations. Two scans are performed:

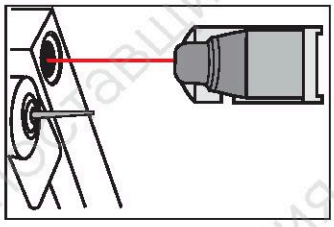
- one from an angle of 15°
- one from an angle of -15°

### 6.2.3 45° scanning technique




This scanning technique is used for veneers as well as crown and bridge preparations that are fastened to a model holder for bridge framework. Three scans are performed:

- one from an angle of +45°
- one from an angle of -45°



- one from an angle of 0° (occlusal view)

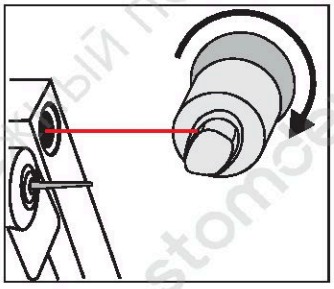


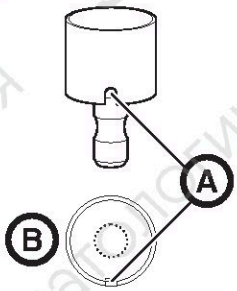
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### 6.2.4 Crown framework scanning technique





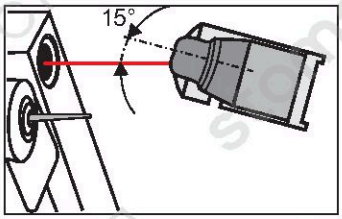

This scanning technique is used for crown preparations that are fastened to a model holder for bridge framework. One scan is performed.

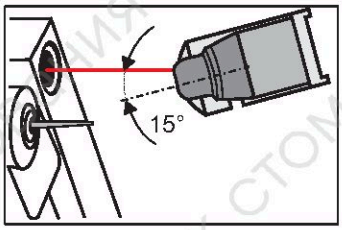
**NOTICE**

**Display of assignment**

If you insert the model in the model holder so that **B** lies mesially to the left of groove **A**, the mesial/distal assignment will be displayed correctly in the software.

### 6.2.5 15° scanning technique for quadrant restoration




**NOTICE**

**Inlay for a quadrant restoration**

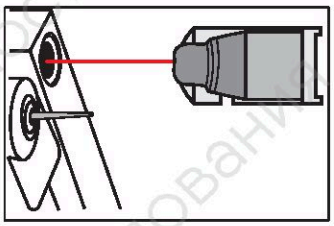
If an inlay is also to be supplied in connection with a quadrant restoration, first select Inlay as the restoration type in the New dialog box and begin with this restoration. The quadrant model is then scanned from the 15° direction of view:

– one scan: + 15°

– one scan: -15°

### 6.2.6 Scanning antagonists

With this scanning technique, one scan is performed from the occlusal view (0°).



**CAUTION**

**Position of model must not be changed**

Make sure that the position of the model is not changed between the scan of the antagonists and the scan of the preparation.

**NOTICE**

**Image regions**

These two image fields do not have to have any corresponding image regions (neighboring teeth).



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*Preparation model with bite registration*

1. Place preparation model A into the milling unit with bite registration B mounted on top. The registration may cover the model over its entire length.



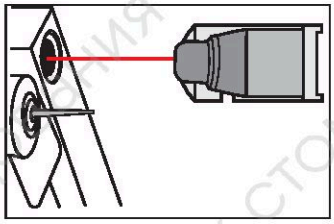

2. Have model A scanned using attached bite registration B as the antagonist.
3. Then remove registration B from model A without removing the model from the milling unit.




4. Have the model scanned as the preparation.

## 6.2.7 Scanning an occlusion

With this scanning technique, one scan is performed from the occlusal view (0°).



The image field of the occlusion must agree with the image field of the preparation in the mesial and distal region (see also "General information on the optical impression").

1. Insert the occlusion model in the milling unit.



2. Have the occlusion scanned.
3. Then remove the model from the milling unit.
4. Insert the preparation model in the milling unit.




5. Have the model scanned as the preparation.



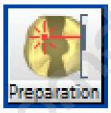
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## 6.3 Image fields

An image field can consist of one or more optical impressions.

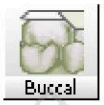
We distinguish between the following image field types:








- Image field of the preparation




- Image field of the buccal image








- Image field of the occlusion








- Image field of the antagonists








- Image field of the articulation

**NOTICE**

**Waiting times**

If a large number of optical impressions is used (>50), longer waiting times may result during reconstruction of the 3D model. The files become very large.

Generally, the following applies: As many optical impressions as necessary, but as few as possible.

### 6.3.1 Image field of the preparation

Optical impressions can be made of the prepared tooth/teeth in the image field of the preparation.

Angled optical impressions are expedient here as well.

### 6.3.2 Image field of the occlusion

In the image field of the occlusion, optical impressions of a previously existing or of a waxed-up occlusion are possible.

The image field of the occlusion must agree with the image field of the preparation in the mesial and distal region.

Even if you are not using the design technique *"Correlation"*, an occlusal exposure can be performed here as a design aid. This optical impression can be displayed as a reference image during the design process.



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In the *"Biogeneric reference"* design technique, the exposures of the replicate must lie within the image field of the occlusion.

### 6.3.3 Image field of the buccal image

These impressions are possible only if you have selected the following in the New dialog box: *"Bite registration technique"* > *"Buccal scan"*.

An exposure in which 50% of the image contains the upper jaw and 50% of the image contains the lower jaw is usually sufficient in most cases. In order for the registration to succeed, it is important to ensure that the relevant image information for the preparation and the antagonist show sufficient a buccal proportion.

### 6.3.4 Image field of the antagonists

In the image field of the antagonists, scans of a centric bite registration or the opposite jaw are possible.

The image field of the antagonists must agree with the image field of the preparation in the mesial and distal region.

### 6.3.5 Image field of the articulation

Optical impressions of a dynamic occlusion impression (FGP technique) are possible in the image field of the articulation. These impressions are possible only if you have selected the following in the New dialog box:

- *"Restoration"*: *"Crown"*
- *"Design technique"*: *"Articulation"*

## 6.4 Image catalog

### 6.4.1 General information

**NOTICE**

The image catalog can be used only with scanner or inEos optical impressions.

If you are working with inEos Blue or CEREC AC, proceed to chapter "3D Preview [→ 94]".

In the *"Optical impression"*[1] processing stage you can perform the following actions:

- Assign an image group to the active region (see "Active region")
- Define another image as reference optical impression (see "Redefining a reference optical impression" [→ 92])
- Assign an image to another image field (see "Changing the assignment" [→ 93])
- Move images between the active and the passive area
- Delete images (see "Deleting images" [→ 93])

1. Displayed on the status bar at the bottom left.



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**NOTICE**

**Undoing work steps**

If the restoration is in an advanced processing status, you can click the *"Undo"* icon repeatedly until you return to the *"Optical impression"* processing status. When doing so you must delete the restoration (if present).

**⚠ CAUTION**

**Optical impressions with the scanner**

You cannot redefine the reference optical impression for optical impressions which have been acquired with the (optional) scanner.

### 6.4.2 Opening the image catalog

The image catalog opens automatically when it is necessary or possible to take an image.

To open the image catalog manually, select *"Window"\|"Image catalog"*.

### 6.4.3 Design of the image catalog




*Image catalog*

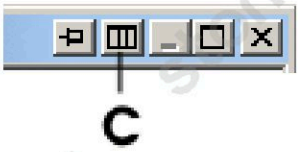


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All three image fields are displayed simultaneously in the image catalog. When you double-click the title bar of an image field, this image field is maximized. The other two image fields remain visible as well.

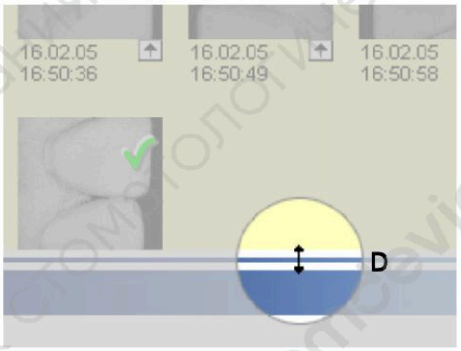
There are two areas within each image field:

- an active area **A**
- a passive area **B**




Button **C** is used to switch between horizontal and vertical image catalog division (and vice versa).

If there are multiple images, the panes of the relevant image region automatically increase in size.




You can adjust the relevant image region manually by placing the cursor in area **D**, pressing and holding the left mouse button, and moving the cursor forward or to the rear.




You can fix the optimal position with button **E**. In the fixed state the size of the current image field does not increase with an increasing number of impressions.



Images which are located in the active region and can be attached to other images are marked with a green check mark.



Images which cannot be attached to each other are marked with a red cross.




Successfully reconstructed models are marked with a green check mark within an image region.




With this icon you can set the zoom factor of the display in the image catalog.

Each image is displayed in the image catalog as a thumbnail (preview).

You can choose a preview format in steps ranging from 1:10 to 1:2.

The first optical impression of the image field is called reference optical impression and is surrounded by a red frame. It must be taken in the occlusal direction (insertion axis).

### 6.4.4 Redefining the reference optical impression

To define another image as the reference optical impression, double-click the desired image.



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### 6.4.5 Active region (only with integrated scanner)

Each time you click another scanning icon, an existing image group[1] is pushed out of the active region (not deleted). The last image group scanned is located in the active region. You can press and hold down the left mouse button to drag an image group located outside of the active region back inside the active region.

**CAUTION**

**Confirming the image catalog with Next**

An image group may be located in the active region only if you confirm the image catalog with the *"Next"* icon.

### 6.4.6 Zooming in

When you point to an image with the mouse cursor, the image is displayed in its original size.

### 6.4.7 Changing the assignment

**NOTICE**

**inEos**

Only rotational images and detail images can be moved between the image fields. They always land in the passive area.

1. Holding down the left mouse button, drag the image you want to move to the “other” image field.
2. Release the mouse button.
   ↳ The image is now assigned to "another" image field.
3. In order to activate the image after this, drag the scan onto the icon marked *"New group"*.



### 6.4.8 Within an image field (inEos)

**NOTICE**

**Moving images**

Only rotational images and detail images can be moved between the active and passive area and the recycle bin within an image field.

### 6.4.9 Deleting images



You can drag an unusable scan onto this button to discontinue using it.

1. Holding down the left mouse button, drag the image you want to delete to the recycle bin icon.
2. Release the mouse button.

↳ The image is deleted.

1. All of the images generated by a single scanning operation. They all have the same time stamp.



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### 6.4.10 Opening the recycle bin



1. Click the recycle bin.
   ↳ The recycle bin opens and displays all of the scans it contains.
2. Move the desired scan back to the passive area if necessary.

### 6.4.11 "Puzzle" dialog box for top view image (inEos)

1. Double-click a top-view scan
2. Drag the scans to the right location manually if necessary.

Place scan in correct location, see Operating Instructions for inEos.

The “Puzzle” dialog box has a separate recycle bin.

### 6.4.12 Rotational image (inEos)

When you double-click a rotational image, the display changes between overview image and single optical impression..

### 6.4.13 Displaying the height image

Right-click the thumbnail image in the image catalog. The height image is displayed. To close the height image, right-click the height image once again.

### 6.4.14 Closing the image catalog




The image catalog closes automatically when you click the *"Next"* icon and it is possible to reconstruct a 3D model from all active images.

To open the image catalog manually, select *"Window"*/*"Image catalog"* from the menu.

## 6.5 3D Preview

### 6.5.1 General information

The 3D preview can only be used with camera scans taken with CEREC AC or for displaying scans generated using inEos Blue. If you are working with an inEos or with the scanner, go to chapter "Image catalog“.

In the default setting, the data are displayed from the occlusal direction in the 3D preview. You can freely select the viewing direction of the 3D model in the 3D preview window with the mouse (left-click, hold button pressed and move mouse).

### 6.5.2 Opening the 3D Preview

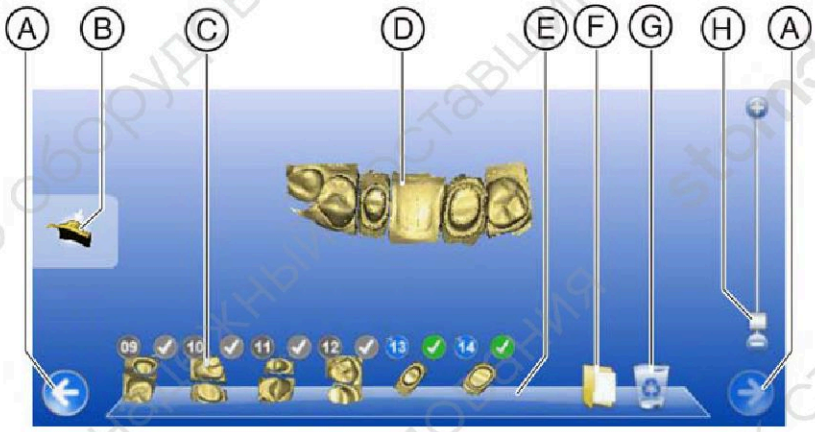
The 3D preview opens automatically when it is necessary or possible to acquire an optical impression.

To open the 3D preview manually, select *"Window"* / *"3D Preview"*.



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### 6.5.3 Design of the 3D Preview




*Design of the 3D Preview*

| | | | |
|---|---|---|---|
| A | Scroll arrow | E | Docking bar |
| B | Change view | F | Passive folder |
| C | Thumbnails | G | Recycle bin |
| D | 3D overall view,<br>active region | H | Zoom function,<br>appears only if the mouse pointer is moved to the right margin of the window. |

In the 3D preview, scans are displayed in the following three image fields:

- Preparation
- Occlusion/articulation/buccal (if present)
- Antagonist (if present)

The design inside the image field is identical.



If images are located in the active region and can be attached to other images, the thumbnails are marked with a green check mark.



Thumbnails which cannot be attached to each other are marked with a red X.

The window with the 3D preview and the panes of the individual image fields in the 3D preview can be minimized, maximized, and restored to their default size. You can click the following icons at the top right edge of the window:



- Minimize



- Maximize



- Restore



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### 6.5.4 Symbol for reference optical impression



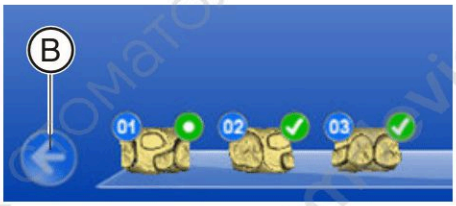

The reference optical impression is marked by a green circle with a white dot.

To select another image as the reference optical impression, double-click the desired thumbnail. As you can see, the green circle with the white dot is adapted accordingly.

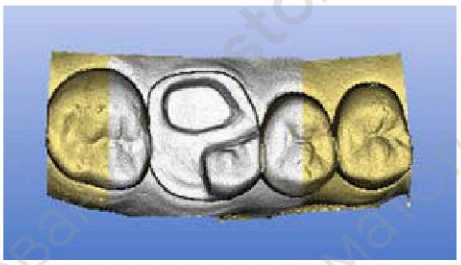
### 6.5.5 Numbering of optical impressions




Each thumbnail has a white number in a blue circle (based on the acquisition date). All optical impressions/thumbnails in each image field are numbered consecutively according to this principle.




Depending on the current size of the window, the scrolling arrows **(B)** located to the left and right of the docking bar may be activated for scrolling in case of multiple thumbnails.



If you move the mouse pointer over the thumbnail, this causes the corresponding part to be highlighted in the 3D overall display. This part is displayed white.

### 6.5.6 Passive folder




You also have the option of dragging optical impressions which may be used at a later time from the docking bar to the passive folder **(A)** and saving them there. The optical impressions in this folder are saved, and not deleted.

If you click the folder icon, the folder is opened and its contents, including all of the optical impressions it contains, are displayed. You can then drag the optical impressions from the folder to the active region of the 3D Preview. The optical impression is recorrelated in the process.

### 6.5.7 Copying/moving optical impressions

If you drag an optical impression or a thumbnail from one image field to another, a small context menu opens after you release the mouse button. In this menu, you can select whether the optical impression should be copied or moved.

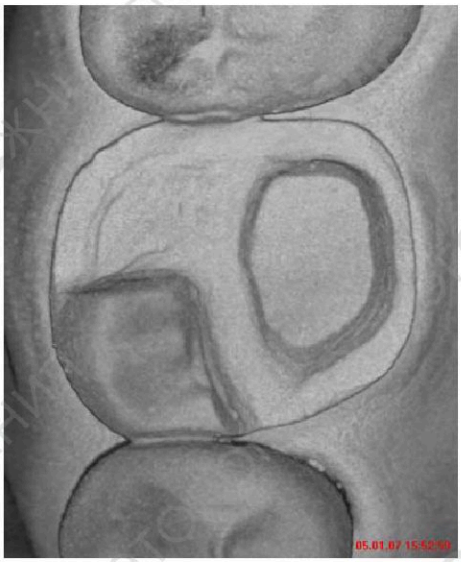


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### 6.5.8 Displaying the date/time in the intensity image



If you move the mouse pointer over a thumbnail in the docking bar and keep it there for at least 2 seconds, the intensity image appears to the left along with the date and time of acquisition in red lettering.

### 6.5.9 Displaying the height image



If you move the mouse pointer over a thumbnail in the docking bar and right-click it, the height image appears to the left. To close the height image, right-click the thumbnail once again.



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### 6.5.10 Zoom function in the 3D Preview




If you move the mouse pointer into the right region of the respective image field, a slider appears which can be used to change the size of the thumbnails.

### 6.5.11 Deleting images



You can drag an unusable scan onto this button to discontinue using it.

1. Holding down the left mouse button, drag the thumbnail you want to delete to the recycle bin icon.
2. Release the mouse button.

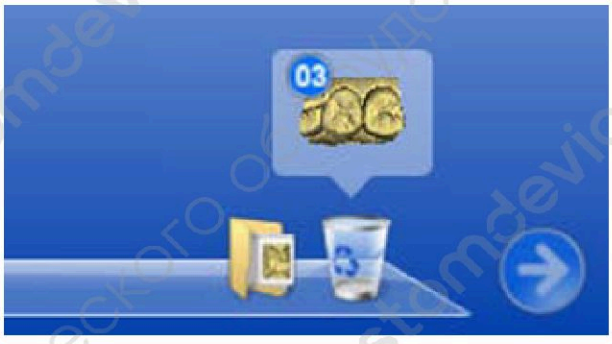
↳ The image is deleted.

If you would like to use a deleted image once again, left-click the recycle bin icon again (see also "Opening the recycle bin [ → 98]").

Images that have been moved to the recycle bin will be automatically deleted as soon as you click the *"Next"* button after producing the optical impression.

**Tip**: Alternatively, you can move the mouse pointer onto the scan icon (e.g. *"Preparation"*). You can then right-click to delete the last scan.

### 6.5.12 Opening the recycle bin




*Open recycle bin*

If you click the recycle bin icon, the recycle bin is opened and its contents, including all of the optical impressions it contains, are displayed. You can then drag the optical impressions from the folder to the active region of the 3D Preview. The optical impression is recorrelated in the process.



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## 6.5.13 Closing the 3D Preview

### Closing the 3D Preview



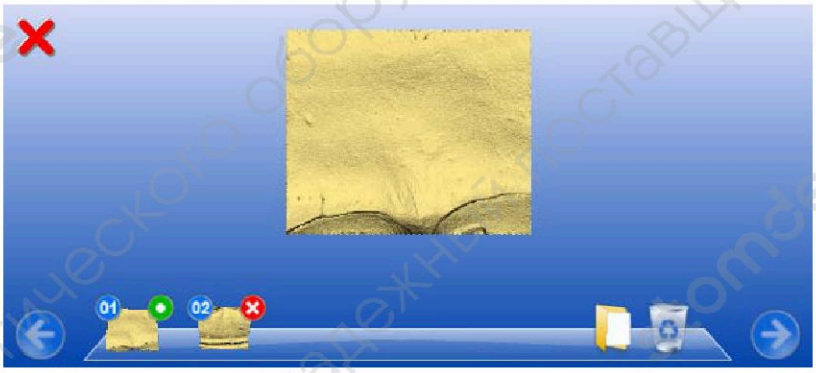

The *"3D Preview"* automatically closes when you click the *"Next"* icon and it is possible to reconstruct a 3D model from all active images.

You can close the *"3D Preview"* manually via the menu *"Window"*|*"3D Preview"*.

## 6.5.14 Discarding initial, unsuitable optical impressions

If the first optical impressions are unsuitable, e.g. because cotton pellets or a cofferdam were/was scanned, they will automatically be discarded later on once a suitable pair of images has been found.

It is thus possible to continue working quickly even when unsuitable images are scanned at the beginning of automatic acquisition. The following example explains this relationship.




*1. and 2nd optical impression*

1. optical impression:

- Cofferdam,
- unsuitable,
- green dot,
- forms the model

2. optical impression:

- cellulose roll,
- unsuitable,
- cannot be registered,
- red cross



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*3. optical impression*

3. optical impression:

- Tooth 17,
- OK,
- cannot be registered,
- red cross.




*4. optical impression*

4. optical impression:

- Tooth 16,
- OK,
- matches 3rd optical impression

The first two optical impressions are sorted out (red cross), the 3rd optical impression is used as a reference image. The 3rd and 4th optical impression form the model.

## 6.6 Model calculation

| NOTICE |
| --- |
| This chapter is only relevant if exposures were acquired using an inEos Blue or the CEREC AC. |

Once you have acquired the optical impressions for the preparation, the buccal image and the antagonist, the system is ready to calculate the 3D model.

To do this, click the button marked *"Next"*.

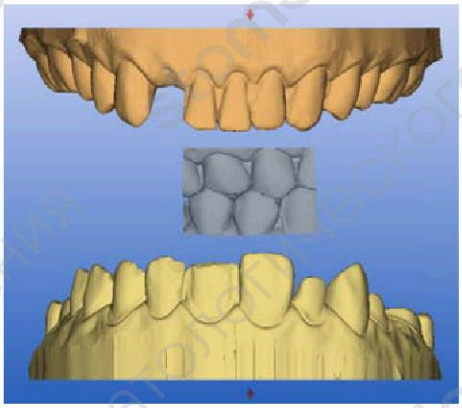


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## 6.6.1 Manual Correlation

In this step, you see the models of the preparation, the antagonist and the buccal image. The buccal image is placed in the center between the preparation and the antagonist.

### Rotating the preparation and the antagonist



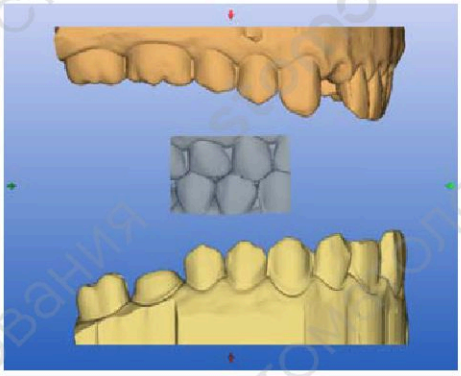
➢ Click in the blue area with the left mouse button and hold the button down.
  ↳ The preparation and the antagonist can be rotated about the vertical axis simultaneously.

➢ Click on the preparation or the antagonist with the left mouse button and hold the button down.
  ↳ The arches can be rotated individually.

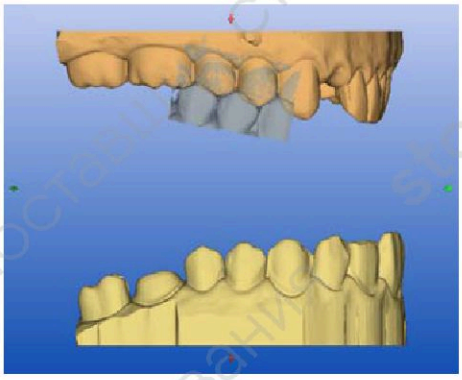
**NOTICE**

The prepared jaw is always displayed at the bottom, even if the preparations are located in the upper jaw.

### Registering the buccal image on the preparation and the antagonist



1. Rotate both models so that you can see the overlap area of the buccal image and of the preparation and the antagonist. See "Rotating the preparation and the antagonist" [→ 101].
2. Now drag the buccal image to the corresponding area of the antagonist with the mouse and let go of the mouse button (drag&drop).
   ↳ The buccal image automatically registers itself on the preparation. If the registration was successful, this will be indicated by a "leopard pattern". If the registration was not successful, the model will start shaking and the buccal image will jump back to its original position. In this case, you must repeat the drag&drop procedure in order to find a better correlation surface.



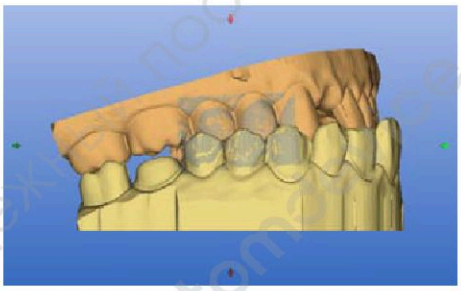
3. Now click on the buccal image once again and drag it onto the appropriate surface of the preparation (drag&drop).
   ↳ If the registration was successful, this will be indicated by a "leopard pattern". If the registration was not successful, the model will start shaking and the buccal image will jump back to its original position. In this case, you must repeat the drag&drop procedure in order to find a better correlation surface.



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It is irrelevant whether you drag the buccal image onto the preparation or onto the antagonist first.

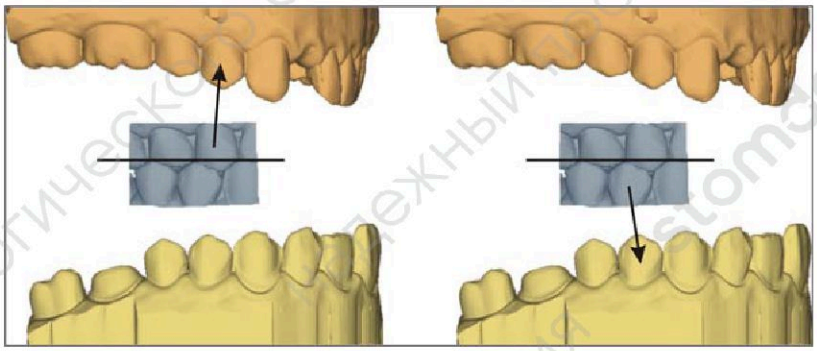
## Rotating the buccal image

In some cases, the buccal image may be displayed upside down in relation to the preparation and the antagonist. Proceed as follows in such cases:

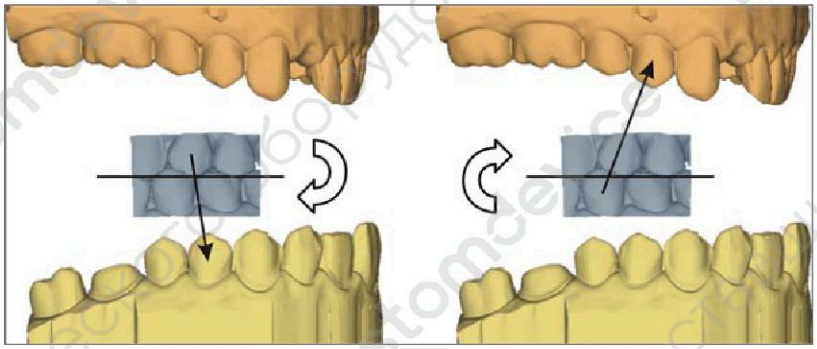
➢ Click on the upper area of the buccal image and drag it onto the lower model.

↳ The buccal image will automatically flip, and you can then register it on the jaw via the drag&drop technique.

This works in the same way vice versa, i.e. if you click on the lower area of the buccal image and then drag it onto the upper model.



The buccal image is then displayed right side up. Registration is possible without rotation.

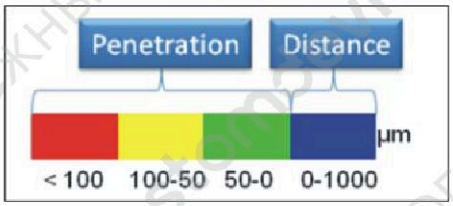


The buccal image is then displayed upside down. When you begin the registration, the software detects this and automatically flips the image right side up.



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## 6.6.2 Occlusal contact points




You can use the *"Toggle Contacts"* button to check the occlusal contact points of the jaws.

The same color scheme is used as when displaying the contacts to the neighboring teeth or to the antagonist.

- blue: Clearance 0-1 mm
- green: Penetration 0-50 µm
- yellow: Penetration 50-100 µm
- red: Penetration >100µm



Using the *"Settling"* function, the models can be rearticulated manually.

**NOTICE**

Only execute *"Settling"* if the model spans all 4 quadrants and you have ensured that all support points are contained in the model.



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### 6.6.3 Checking the model

In the *"Check model(s)"* step, you can check the calculated model.

1. For checking purposes, show the buccal acquisition and the antagonist adjacent to one another.
2. Decide whether you would like to mark the preparation borders yourself.

**NOTICE**

**Not marking the preparation borders yourself**

If you do not wish to mark any preparation borders yourself, you can forward the model to your laboratory.

➢ Click the *"Connect"* button.

↳ You will be connected to the CEREC Connect Portal. Skip the rest of this chapter.

### 6.6.4 General information

You can enter the preparation margin in the viewer in the 3-dimensional (3D) representation of the preparation.

**NOTICE**

**No movement during the drawing process**

Since the last "drawing click" can be undone by clicking with the right mouse button, it is not possible to move the 3D model while drawing (since this is done by pressing and holding down the right mouse button).

During the entry of the preparation margin, you can rotate the 3D display of the preparation.

The preparation margin must always form a closed line.

You can edit the preparation margin after entering the last line.

#### Entering the preparation margin for bridges

1. After entering the preparation margin on the first abutment, click the icon marked *"Next"*.
2. Continue this procedure until you have drawn in the preparation margin on all of the abutment teeth.

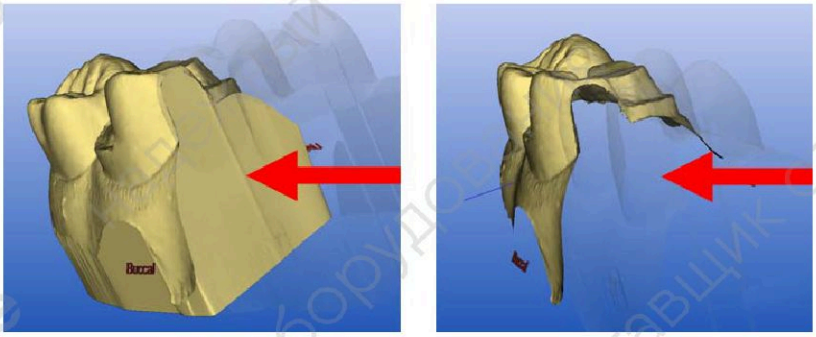


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# 7 Design

## 7.1 Trimming the preparation

After the 3D model of the preparation is displayed in the viewer and before you enter the preparation margin, you can hide image regions of the preparation, e.g. the mesial and distal neighbors.

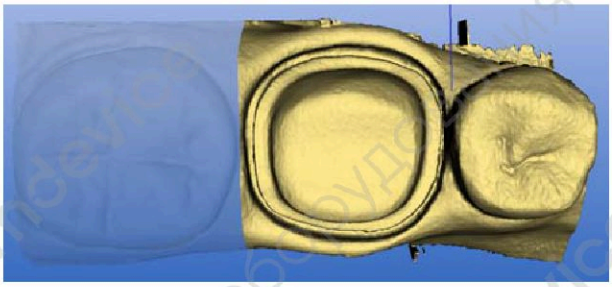


If the 3D model is trimmed in this design step, both the side surfaces and the bottom are then displayed complete (illustration on the left). With the *"Ctrl+B"* shortcut, the model can be displayed without the side surfaces and without the bottom (illustration on the right). If you wish, you can now view and edit the preparation margin in the cervical view.

### Hiding image regions

Trim

1. Rotate the model to a perspective in which you can see all areas that you want to trim. The model cannot be rotated while you are drawing the line.
2. Double click in any location to set the start point of the trim line.



*Distal neighbor hidden*

3. Click to set further points of the line, e.g. in the interdental space.
4. Double click in any position to end the line. Ensure that the closing end of the line does not cut any areas of the model that you want to keep.
   ↳ The smaller image region to the side of the line is hidden.

**NOTICE**

**Switching the image region**

If it is the wrong image region, you can switch to the other image region by double-clicking the hidden region.

5. To exit this mode, click the icon marked *"Next"*.



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By clicking the *"Trim"* button, you can simultaneously show or hide all image regions.

**NOTICE**

**Showing and hiding the preparation**

If the preparation was not trimmed, you can use the *"Trim"* button to show and hide the entire preparation, e.g. for editing the proximal surface of the restoration.

## 7.2 Trimming the antagonist

This design step can be used in the following, if an optical impression of the antagonist exists.

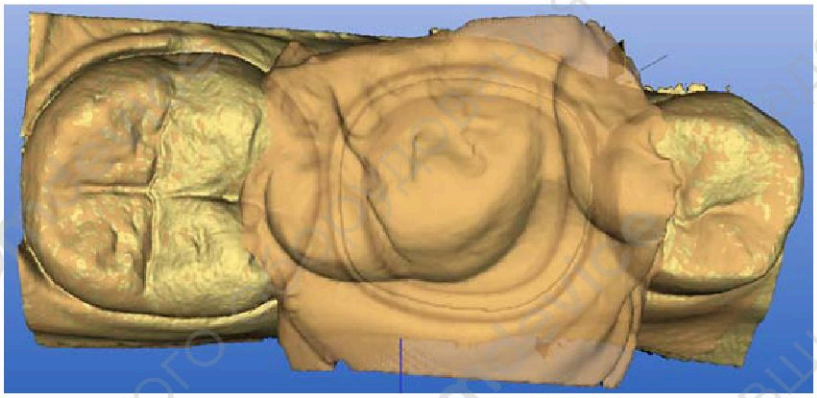
| *"Restoration"* | *"Design technique"* |
|---|---|
| *"Crown"* | • *"Biogeneric"*<br>• *"Biogeneric reference"*<br>• *"Articulation"* |
| *"Inlay, Onlay, Partial crown"* | • *"Biogeneric"* |

After you have trimmed the preparation, you can hide the image regions of the antagonist.

Correct trimming of the antagonist is very important for improvement of the settling results.

This new design step will automatically be skipped if no optical impression has been scanned.

### Hiding image regions



*Antagonist transparent*

In this design step, the antagonist is displayed slightly transparent and the preparation is simultaneously displayed. This makes it easier for you to recognize where it makes the most sense to trim the antagonist.

Draw a closed line (e.g. around the impression of the antagonist/registration):

1. Set the starting point with a double-click.
2. Click to set further points.
3. Set the line end by double-clicking.

The area outside the line is hidden.



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It is important to remove any regions which should not touch the occlusion of the new restoration.






With the *"Manual Trim"* button in the *"Antagonist"* dialog box you can also hide image regions at a later point in time.

## 7.3 Entering the preparation margin

### 7.3.1 General information

**NOTICE**

**Changing the insertion axis and image regions**

**After** entering the preparation margin, you can redefine the insertion axis or delete and correct image regions as required (see Redefining the insertion axis [→ 111] and Deleting and correcting image regions in image fields [→ 112]).

You can enter the preparation margin in the viewer in the 3-dimensional (3D) representation of the preparation.



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**NOTICE**

**Moving not possible during the drawing process**

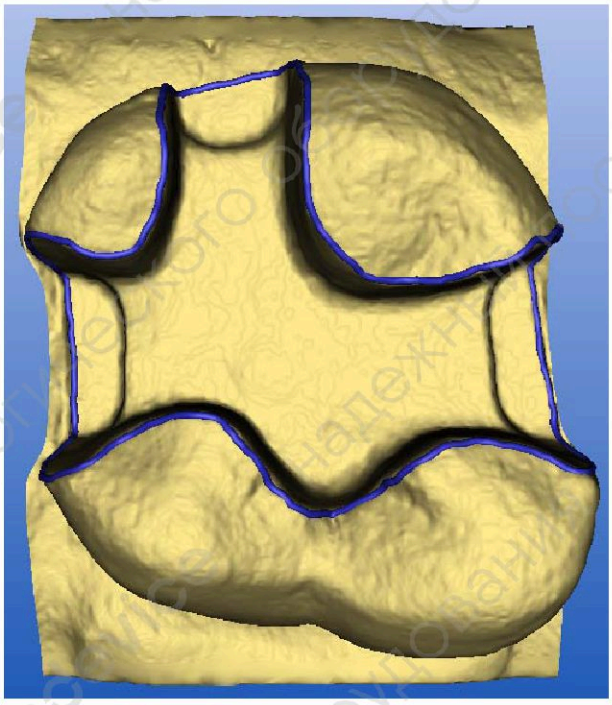
Since the last "drawing click" can be undone by clicking with the right mouse button, it is not possible to move the 3D model while drawing (since this is done by pressing and holding down the right mouse button).

During the entry of the preparation margin, you can rotate the 3D display of the preparation.

The preparation margin must always form a closed line.

You can edit the preparation margin after entering the last line.

## 7.3.2 Entering the preparation margin



*Entering the preparation margin*

1. Start the entry by double-clicking anywhere on the preparation margin.
2. Move the cursor along the preparation margin.

**NOTICE**

**Automatic edge detection**

To support the automatic edge detection, click anywhere near the margin on the raised side. There is an automatic correction when the next point is set.

3. Continue this procedure until you are back at the starting point.
4. Conclude the entry by double-clicking the starting point.



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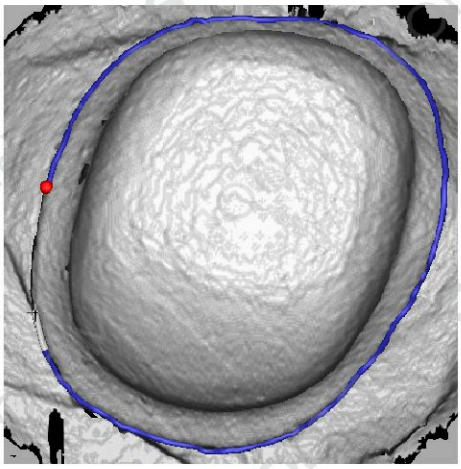
### 7.3.3 Entering a preparation margin with unclear edges

If you press the **space bar** while entering the preparation margin, the system switches to the interpolating method (spline function) and you can set individual points by clicking.

**NOTICE**

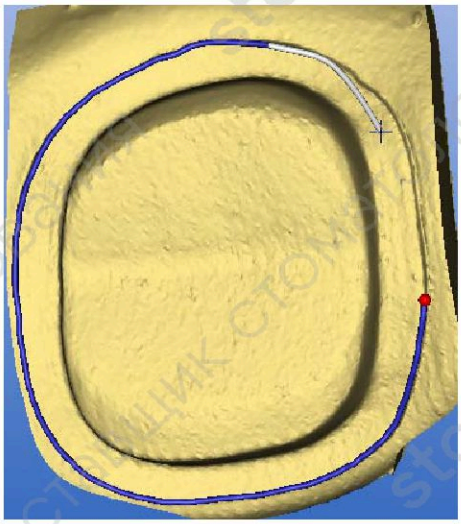
**Setting points close together**

Set the points exactly on the edge and close to one another.



If the optical impressions have been made with the CEREC 3D camera or with inEos*, the switch is made to intensity image.

*In the case of inEos optical impressions which contain a rotational scan, or in case of optical impressions made with the scanner, the system does not switch over to intensity image.



In the case of optical impressions made with the CEREC Bluecam, the normal model continues to appear. If you wish to see the intensity image in unclear situations, press the space key once again. When the space key is pressed for the third time, the system switches to the edge detection method again.

## 7.4 Redefining the insertion axis

If you have activated the *"Insertion axis step activ"* option under *"Settings"* / *"Configuration"* / *"Options"*, the *"Insertion axis"* tool is automatically activated at the following time.

- While the preparation margin can be edited,
- Before the restoration is suggested.



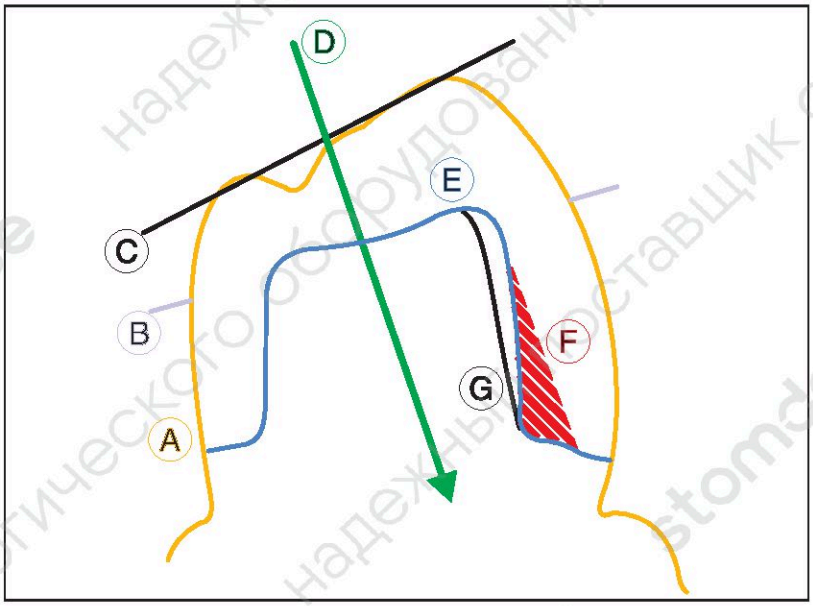
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### 7.4.1 Preparing the right insertion axis

CEREC Biogeneric obtains the information it requires from the occlusal surface and the proximal contact line of adjacent teeth. During the acquisition procedure, all the essential information is recorded based upon the insertion axis specified by the user: The software stipulates that both levels must be positioned vertically to the insertion axis. If indentations are created by positioning the insertion axis vertically to the occlusal surface in the preparatory steps, you must change the direction of the insertion axis. Deviations of the acquired surface from the actual occlusion have a negative effect upon the quantity of data available for the biogeneric algorithm. This has the potential to affect the quality of the proposal.




| | | | |
|---|---|---|---|
| A | Tooth contour | E | Preparation |
| B | Proximal contact line | F | Undercut |
| C | Occlusal surface | G | Alternative buccal preparation line |
| D | Insertion axis | | |

(A) displays the original contour of the tooth to be restored.

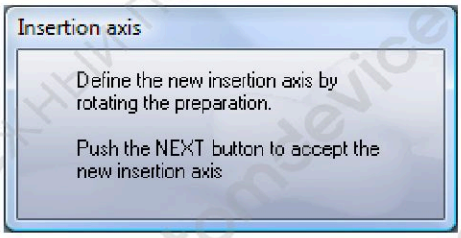
The optimum alignment for the insertion axis (D), in order to provide information for the biogeneric algorithm, is vertically to the proximal contact line (B) and occlusal surface (C).

Should this optimum axis not be positioned for the preparation (E), indentations may occur. (G) shows an alternative buccal preparation line which would optimize the angle of insertion and enable optimum results from CEREC Biogeneric.



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## 7.4.2 Redefining the insertion axis




The *"Insertion axis step activ"* option is activated.

1. Once you have entered the preparation margin, click the *"Next"* icon.
   ↳ The *"Insertion axis"* window opens.
   Regions within a preparation margin that show an undercut from the viewing direction are marked yellow.
2. Change the position of the preparation such that all yellow markings disappear. If this is not possible, (e.g. in the case of diverging stumps) make sure that all preparation margins are completely visible from the viewing direction and yellow-marked undercuts are as far away as possible from the preparation margin.
3. In order to achieve and optimum result with Biogenerics, change the position of the preparation so that the insertion axis is aligned as vertically as possible to the occlusal surface.
4. Then rotate the preparation model so that the model is correctly labeled by the axis designations (mesial<->distal and lingual<->buccal). To do this, rotate the preparation in the occlusal view by grasping the right or left edge of the screen with the mouse pointer and then moving the pointer along the edge of the screen.

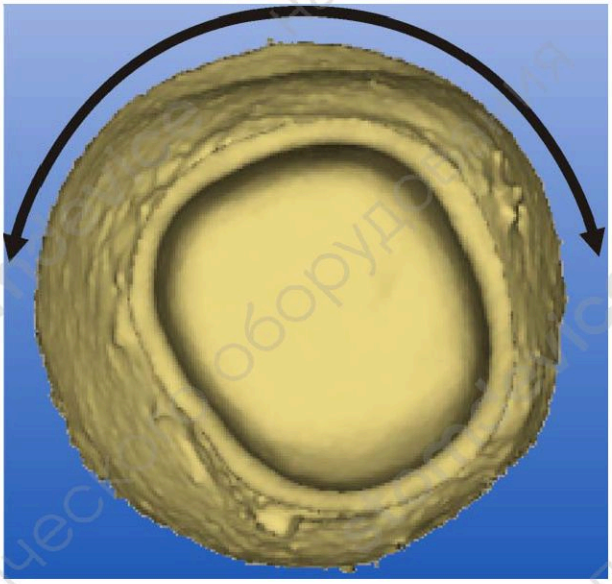
**NOTICE**

**Bridge frameworks**

In the case of bridge frameworks, "lingual<->buccal" must be labeled correctly at least.




5. Click the *"Next"* button.
   ↳ The reference coordinate system for all further design steps is changed.



*Rotation without effect*

**NOTICE**

**Rotation while scanning a crown framework model holder**

If performed while scanning a crown framework with the model holder, a rotation about the occluso-cervical axis has no effect.

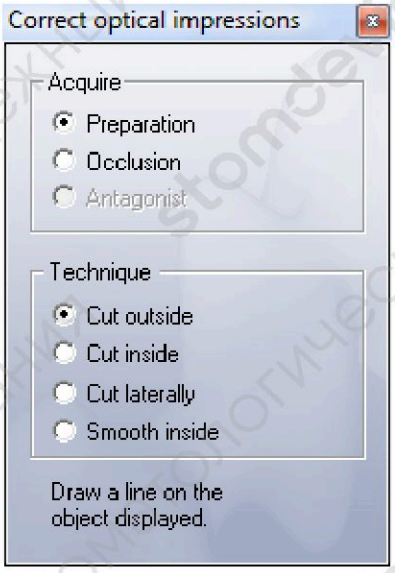


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## 7.5 Deleting and correcting image regions in image fields



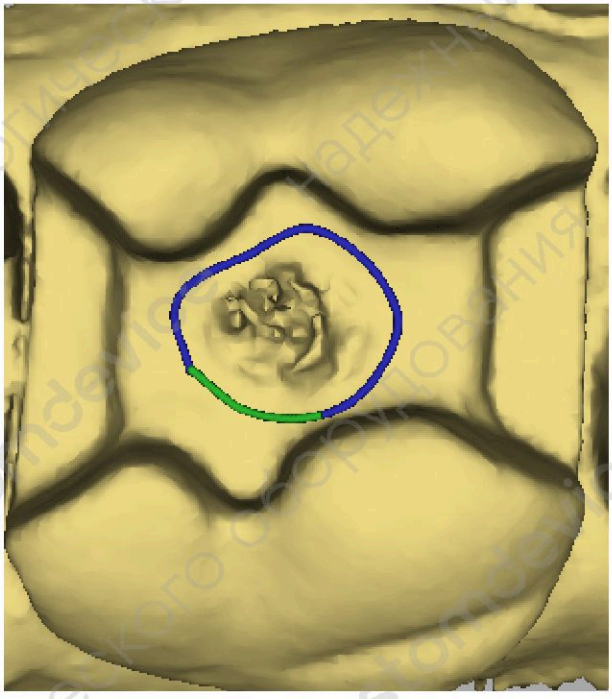

**Before** you enter the preparation margin, you can delete and correct image regions in all image fields (preparation, occlusion, antagonist).

1. Select *"Design"|"Correct optical impressions..."*.
   ↳ The *"Correct optical impressions..."* window opens.
2. Select the image field type (*"Acquire"*) and *"Technique"*.

Under Technique you can decide:

- whether you want to cut outside or inside a closed line,
- cut to the side of an open line or
- smooth inside a closed line.

### 7.5.1 Example 1: Removing a powder spot



*Drawing a closed line*

1. To correct a powder spot on a level surface, select the corresponding image field type under *"Acquire"*.
2. Click on *"Technique"* under *"Smooth inside"*.
3. Draw a closed line.

↳ The surface is smoothed.

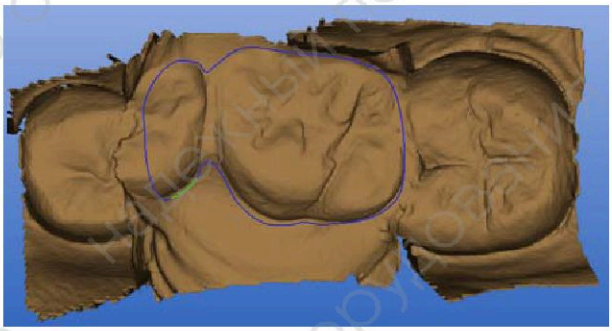


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### Drawing a closed line

1. Set the starting point with a double-click.
2. Click to set further points.
3. Set the line end by double-clicking.

## 7.5.2 Example 2: Deleting disturbing image regions



*Drawing a closed line*

1. To remove disturbing regions of the bite registration in the image field of the antagonist, select the *"Antagonist"* image field type under *"Acquire"*.
2. Click on *"Technique"* under *"Cut outside"*.
3. Draw a closed line (e.g. around the impression of the antagonist/registration).

↳ The area outside the line is deleted.

### Drawing a closed line

1. Set the starting point with a double-click.
2. Click to set further points.
3. Set the line end by double-clicking.



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# 8 Milling

## 8.1 Milling preview




After having finished the design of the restoration, you can activate the milling preview by clicking on the *"Next"* icon.

The restoration is shown in the viewer exactly as it will be machined by the milling unit.

You can also use the *"Form"*, *"Drop"*, and *"Shape"* free forming tools in the milling preview.




If you click the *"Undo"* icon inside a tool once, this causes all of the changes made with this tool to be reversed.

If you click the *"Undo"* icon a second time, you quit the milling preview and return to the design mode.

**CAUTION**

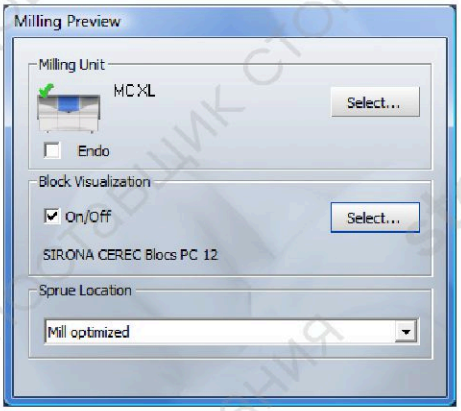
**Changes**

The changes you have made in the milling preview mode using the *"Form"*, *"Drop"*, and *"Shape"* tools are then lost.

you can select and change the following:

- Selecting the milling unit
- Block visualization
- Change of sprue location
- *"Sinter Support"*

### 8.1.1 Milling unit selection



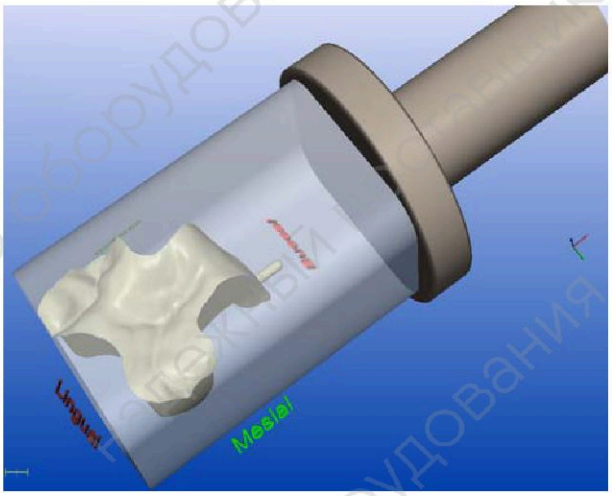

you can set the following:

- Select the milling unit with which you would like to mill the restoration (*"Select"* button):
  - MC XL
  - CEREC 3
  - inLab
- The program automatically displays the milling preview according to the milling instruments you have selected for the respective milling unit.
- The Endo mode is automatically activated for crowns in the anterior tooth region and for veneers.
- You can activate the Endo mode for any type of restoration (*"Endo"* check box).
- When using an MC XL milling unit with 4 motors, you can select the bur set for which the floor simulation is to be reconstructed and displayed.



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## 8.1.2 Block visualization




You can have all of the blocks displayed in the preview.

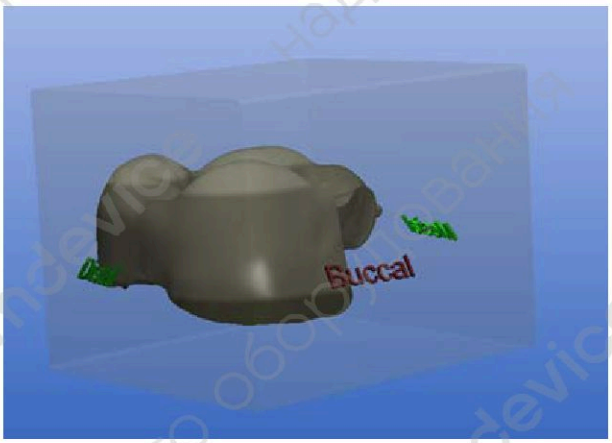
you can set the following:

- *"Block Visualization"* option on/off.
- Search for the block you want to mill (*"Select"* button).

In addition, you also can select whether or not you would like to have the block holder displayed.




If you deactivate *"Show block holder"*, the restoration in the block is displayed without the block holder.




## 8.1.3 Change of sprue location

*"Mill Optimized"* is set as the sprue location by default. You can also select another sprue location from the pull-down menu.

The following sprue locations are offered for the specified restoration types by default.


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| Restoration type | *"Mill Optimized"* | Other possibility |
|---|---|---|
| Inlay/Onlay/Partial Crown | If an extension is available, this applies for the extension.<br>Otherwise the prioritization is as follows: Lingual, buccal, distal, mesial | Mesial, distal, buccal, lingual |
| Crown | Lingual | Mesial, distal, buccal, lingual |
| Veneer | Distal (1st or 3rd quadrant),<br>Mesial (2nd or 4th quadrant) | Mesial, distal, cervical, incisal |

### 8.1.4 Positioning the restoration in a multicolored block

You can move the restoration in all spatial directions within the block using the *"Position"* tool until the restoration reaches one of the block limits. The limits are signaled by a beep and a red block. If the restoration is milled on an MC XL milling unit, you can rotate the restoration along the block holder axis by using the red buttons on the *"Rotate"* tool. Tip: If you wish to rotate a front tooth along the mesial-distal axis, for example, before doing so select *"Mesial"* or *"Distal"* as the sprue location in the *"Milling preview"* dialog.

When you click the *"Mill"* icon, the restoration will be milled in this position from the block. In the case of restorations milled on an inLab milling unit, contortion is not taken into account. The restoration is milled in its initial alignment.

#### RealLife ™ blocks

Anterior teeth are positioned as an initial suggestion so that the curvature of the labial surface corresponds as closely as possible to the curvature of the dentine core. The position of the restoration can be further adjusted by moving and rotating.

For RealLife ™ blocks, the same positioning options are available as for simple layered blocks. In addition, the restoration can be rotated around the tooth axis using the blue surfaces of the *"Rotate"* tool.

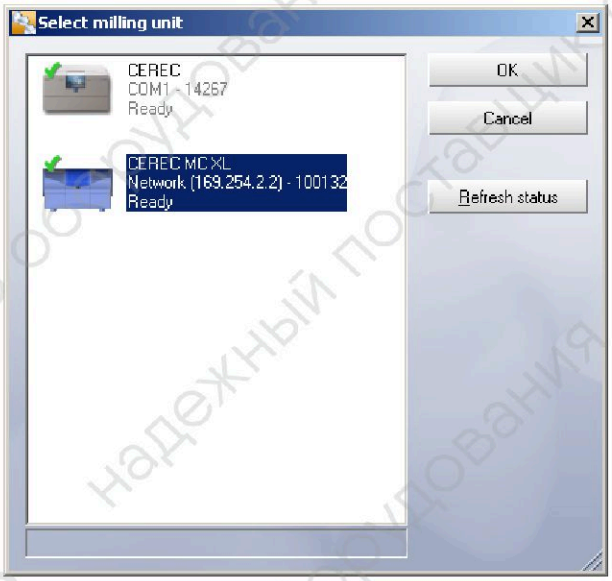
Use the *"Form"*, *"Drop"* and *"Shape"* tools before you determine the position of the restoration in the block. As soon as you switch off the block display, all setting for alignment in the block are lost. You should therefore ensure that the block display remains activated when you start the milling process using the *"Mill"* icon. The position of the sprue location can no longer be freely chosen and lies proximally/labially, depending on the rotation of the restoration.

## 8.2 Starting the milling process

Once you have completed the design and assessed the restoration in the milling preview, you can mill the restoration.



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*Selecting the milling unit*

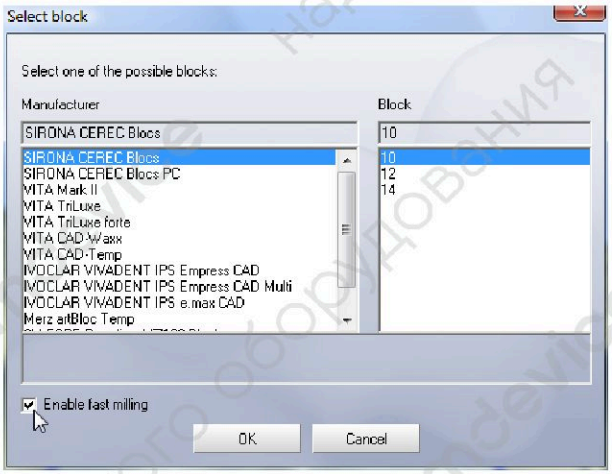
**NOTICE**

**Selecting the milling unit**

If several milling units are connected, a dialog box will appear when the *"Mill"* icon is clicked, where you must select the desired milling unit and confirm with *"OK"*.




➢ Click the *"Mill"* icon.




**NOTICE**

**Selecting a block**

When you choose a block which is too small, a warning message is displayed.

1. Select a block and confirm with *"OK"*.
2. Wait until the spindle/workpiece axis has reached the zero position.



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**CAUTION**

**Milling chamber door**

The milling chamber door must be closed.

3. Open the milling chamber door.

**WARNING**

**Risk of injury on milling instruments!**

If you put your hand in the milling chamber, you could injure it on the milling instruments.

Be careful not to brush against the milling instruments with your hand.

4. Insert a ceramic block of the required size and color in the spindle/workpiece axis (also see Operating Instructions of the milling unit).

**CAUTION**

**Error message during touch process!**

Always insert the ceramic block that you selected in the *"Select block"* dialog box. Otherwise an error message will be displayed during the touch process.

5. Close the milling chamber door and start the milling process (click *"Start"* ).

**CAUTION**

**Do not activate the sleep mode**

The sleep mode of the PC must not be activated during the milling process.

The instruments are measured automatically and milling starts.

The remaining processing time is displayed continuously.

The number of milled restorations is shown so that the service life of the milling instruments still available can be estimated.

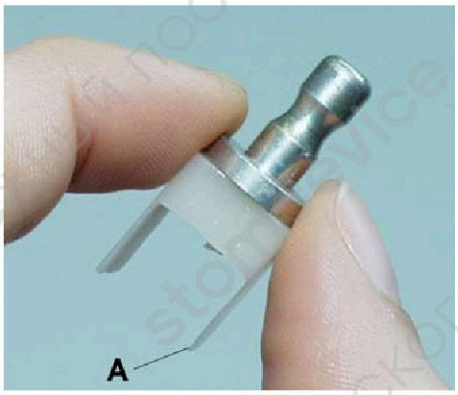
**CAUTION**

**Canceling the milling process**

You can cancel the milling process at any time by pressing the *"Stop"* button.



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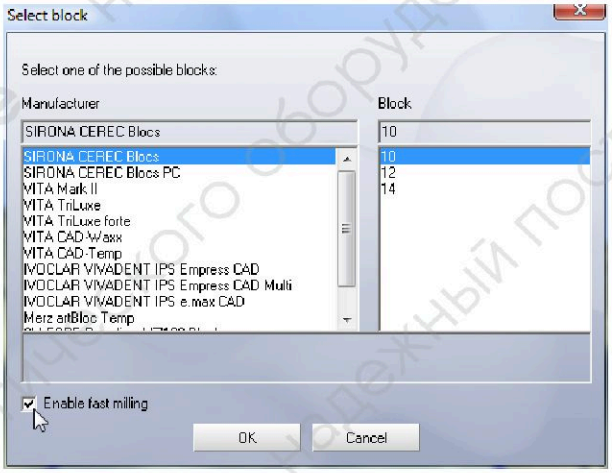

**WARNING**

**Risk of injury on the remainder of the ceramic block!**

The remaining portion of the ceramic block may have sharp edges (e.g. **A**) that could injury you if it is not removed carefully.

Always grasp the remainder of the ceramic block by its metal holder.

## 8.3 Fast grinding




*Block selection*

**CAUTION**

**Loss of quality!**

Fast grinding may have a negative influence on the quality of the restoration!

If desired, the grinding process can be accelerated for some materials. To do this, simply set a check mark in the corresponding checkbox of the block selection dialog box.

This mode is faster, however the surface of the milled restoration is slightly rougher.



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# 9 Managing/archiving data

## 9.1 Saving regularly

To create an archive of all finished restorations you should save regularly.

Under *"Settings"|"Configuration"|"Save"*, you can activate or deactivate the *"Connect database"* option (see "Save" in the "Configuration" chapter [→ 70]).

## 9.2 Connect database

If a SIRONA database is installed in your system, it can be used for data archiving and patient management after selecting this option. Once the database has been connected, all patients stored in the database are known to the application. You must enter new patient names in the database. Restorations must also be saved and loaded using the database.

If the database connection is used, all CEREC restorations will be saved to the *"CEREC"* subfolder in the Pdata folder of the database. This folder is usually located on a server which can be accessed from all PCs connected to the network.

CEREC images are assigned the image code **VC** in the SIRONA database.

## 9.3 Database import

After the database connection is activated, all locally saved patients and restorations are transferred (imported) to the SIRONA database. A message indicating the successful database import is then displayed.

Patients (and their restorations) cannot be imported to the SIRONA database if they are identified only by a card index number in the local data structure. A message informs the user about this situation during database import.

## 9.4 Database export

When the database connection is deactivated, a dialog box appears in which you can select whether the restorations stored in the database are to be copied (exported) to the local data structure.

The patient information will in any case be transferred by creating a patient folder in the data structure for each patient in the database. During database export, you are informed of its progress.

A message indicating the successful database export is then displayed.

## 9.5 Restoration files

In the *"Programs"|"CEREC"|"Data"* directory (if you have installed the program under *"Programs"|"CEREC"*), you will find a subfolder for and named after each patient. Each patient folder contains one or more tooth folders in which the individual restoration files are stored.

If the database connection is used, the *"PDATA"* folder (created during installation of the SIRONA database) contains a folder named *"CEREC"*. Since a unique patient number is assigned to each patient in the database, no patient names are used here under *"CEREC"*; instead, consecutively numbered folders (e.g. “P_000001”) are listed. The tooth folders and restoration files can be found below them.



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## 9.6 Consistency check

If the database connection is active, a consistency check will be performed when the CEREC 3D application is started. The database will be searched for images from earlier CEREC 3D versions. Any such old images found will be updated. The user is informed of the progress.

If the list of restorations for a specific patient is displayed for loading or deletion, corrupt restoration files will automatically be recognized and suggested for deletion.

This mechanism always remains active, regardless of whether a database is connected or not.



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# 10 Restoration types and design techniques

## 10.1 Selecting a suitable design procedure

### Biogeneric (inlay, veneer, crown, bridge)

Select this design technique to generate a fully anatomical suggestion that is calculated from the neighboring teeth using the patented "Biogeneric" procedure.

Also refer to the information provided under "Biogeneric [→ 125]".

### Biogeneric reference (inlay, veneer, crown, bridge)

Select this design technique to generate a fully anatomical suggestion that is calculated from any tooth using the patented "Biogeneric" procedure.

Also refer to the information provided under "Biogeneric reference (only in Master Mode) [→ 158]".

### Correlation (inlay, veneer, crown, bridge)

Select this design technique to transfer parts of an existing occlusal surface to the restoration and enhance the rest using the patented Biogeneric procedure.

Also refer to the information provided under "Correlation (in Master Mode only) [→ 147]".

### Articulation

Use this design technique if you want to consider information from a dynamic bite register.

Also refer to the information provided under "Design example of articulation (in Master Mode only) [→ 142]".

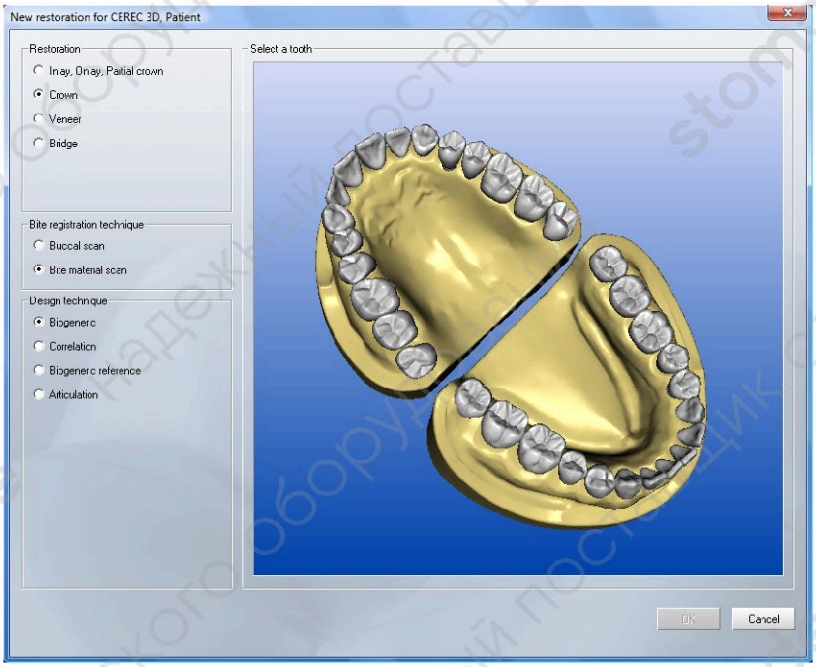


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## 10.2 Overview of the restoration types and design techniques




*New Screen*

In the New dialog box, you can select the following and confirm with *"OK"*:

- *"Restoration"*
  - *"Inlay, Onlay, Partial crown"*
  - *"Crown"*
  - *"Veneer"*
  - *"Bridge"*

**NOTICE**

**Preparation margin too high**

If the preparation margin of the crown (partial) is so high that it cuts the proximal contact line of the crown suggestion, the system will automatically switch from crown to inlay.

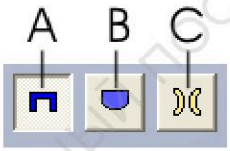
- *"Design technique"*
  - *"Biogeneric"*
  - *"Correlation"*
  - *"Biogeneric reference"*
  - *"Articulation"*



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- Element
  - A: Crown,
    shown in dark blue in the odontogram
  - B: Pontic,
    shown in light blue in the odontogram
  - C: Partially edentulous (missing),
    shown in brown in the odontogram

Selectable teeth are shown in white and non-selectable (inactive) teeth are shown in yellow in the odontogram.

If you select *"Bridge"* as the restoration, the *"Element"* button group is visible. You can mark an element (e.g. **A**: crown) and then select a tooth here. To mark another element, just click the corresponding button (e.g. **B**: pontic).



*Bridge elements selected*

You can deactivate a selected tooth by clicking this tooth with the right mouse button.

The *"OK"* button is enabled if:

- a single, consecutive row of buttons is pressed in the odontogram,

  and

- at least one of the teeth in the row is marked as a crown.



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# 10.3 Biogeneric

## 10.3.1 Introduction

In the *"Biogeneric"* / *"Individual"* design technique, the neighboring teeth are analyzed and the restoration suggestion is calculated on this basis. The more information that is available, the more successful the calculation. A full image of at least one neighboring tooth should therefore be taken from the occlusal/incisal direction. For anterior and corner teeth, an image of the labial surface should also be taken.

For premolars or molars, the calculation is mainly based on the distal neighbor, for anterior teeth the mesial neighbor is used.

**NOTICE**

If larger regions of the neighboring teeth already have restorations or are prepared, this calculation is severely restricted. In this case, a suggestion is still generated, but this corresponds to an average tooth that is not perfectly adapted to the remaining teeth. If no suitable neighbor is available, a preferred tooth shape must be selected (*"adult"*, *"youth"*, *"lepto"*, *"athlet"*, *"pykno"* or *"asia"*) or the *"Biogeneric reference"* design technique should be used.

## 10.3.2 Design example of MOD inlay with lingual extension for tooth 27

MOD = **M**esio-**o**ccluso-**d**istal

### 10.3.2.1 Creating a new restoration

✓ You have selected a patient from the database or created a new patient.

1. Select the following options in the New dialog box.
2. Click *"OK"*.










| Range | Value |
|---|---|
| Tooth | 27 |
| In Master mode you additionally select: | |
| *"Restoration"* | *"Inlay, Onlay, Partial crown"* |
| *"Design technique"* | *"Biogeneric"* |

### 10.3.2.2 Acquiring the preparation

1. After you have made and dried the preparation, powder the working field.
2. Accept the preparation (see "Optical impression").
3. With the CEREC 3D software, multiple impressions can be acquired from slightly displaced perspectives.
   ↳ The CEREC 3D software combines all of the individual impressions to form a single whole impression so that all regions of the preparation are acquired. The first impression is displayed with a red frame to show that it is the reference impression.



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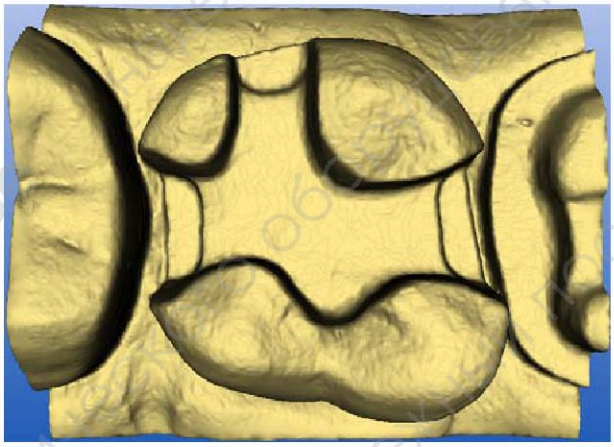
**CAUTION**

**Fitting the restoration**

If regions with slight undercuts are also displayed, the milling unit will then machine the preparation so accurately that the restoration may get stuck slightly while it is being fit.

✓ All of the required optical impressions are available.
➢ Click the button *"Next"*.

### 10.3.2.3 Displaying the 3D representation

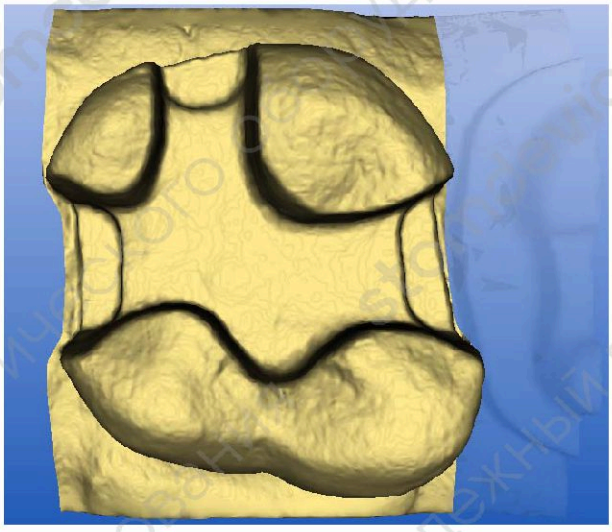


*3D display*

You can rotate the preparation as required by pressing and holding down the left mouse button and moving the mouse in the desired direction.

You can also use the cursor arrows in the *"View"* window to view the preparation from the desired direction (see "Standard views" [→ 30]).

### 10.3.2.4 Hiding image regions



*Drawing the trimming line*



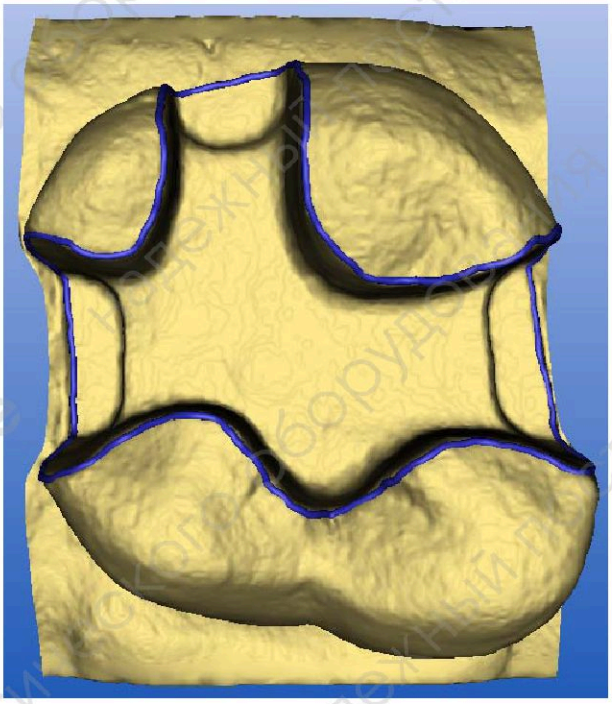
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1. Cut the distal and mesial neighbors away by entering an open line for each of them (see "Trimming the preparation [➞ 105]").
2. Click the *"Next"* button.

### 10.3.2.5 Entering the preparation margin



*Entering and checking the preparation margin*

1. Enter the preparation margin (see "Entering the preparation margin" [➞ 108]) and check it by rotating the preparation.

**NOTICE**

**Directly editing the preparation margin**

The preparation margin can be edited immediately after it is entered (see Editing tool (Edit)).

2. Click the *"Next"* button.
   ↳ A menu appears in which you can select the type of tooth shape.
3. Select *"Individual"* for the biogeneric calculation using the neighboring teeth.
   or
   ➢ If no suitable neighboring teeth are available, select a preferred tooth shape: *"adult"*, *"youth"*, *"lepto"*, *"athlet"*, *"pykno"* or *"asia"*.
4. Confirm your choice by clicking the *"OK"* button.

↳ The restoration is calculated and then displayed.

### 10.3.2.6 Editing the restoration

1. Assess the restoration from all directions.
2. Hide the neighboring teeth by clicking the *"Trim"* button.

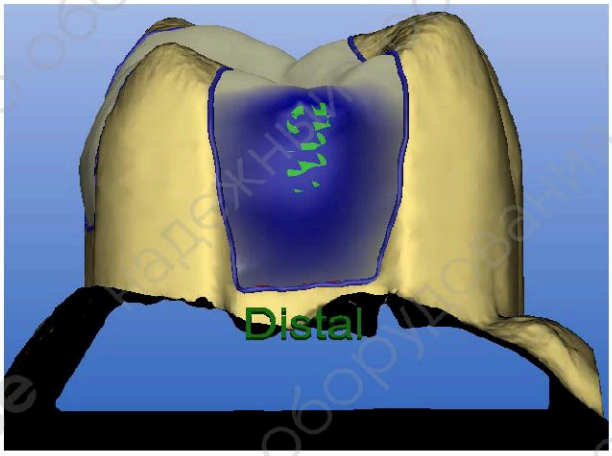


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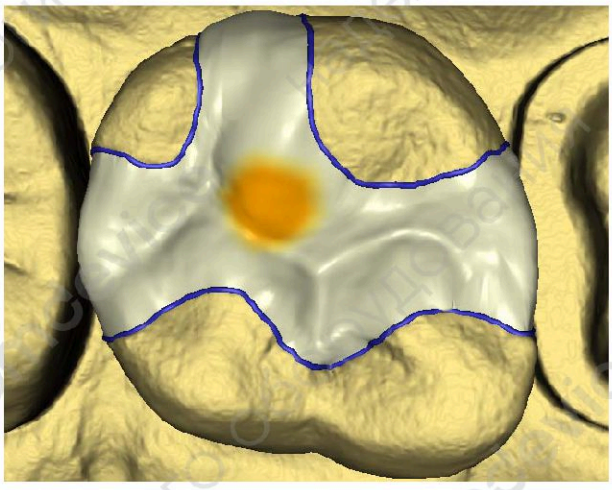
3. If required, click the button marked *"Edit"*. You can change all construction lines as required (see "Editing tool (Edit)").
4. Activate the contact surfaces by clicking the *"Contact"* button (see "Showing/hiding the contact to the neighboring tooth (Contact)" [→ 31]).
5. As required adapt the contact surfaces using the *"Form"* tool (see "Form tool (Form)" [→ 39]).




*Changing the contact surfaces*

6. After the design is finished, click the icon marked *"Next"*.

Using the *"Form"* tool, you can apply and smooth additional material. Parts of the occlusal surface, the proximal surfaces, or the marginal situations can thus be changed as required.

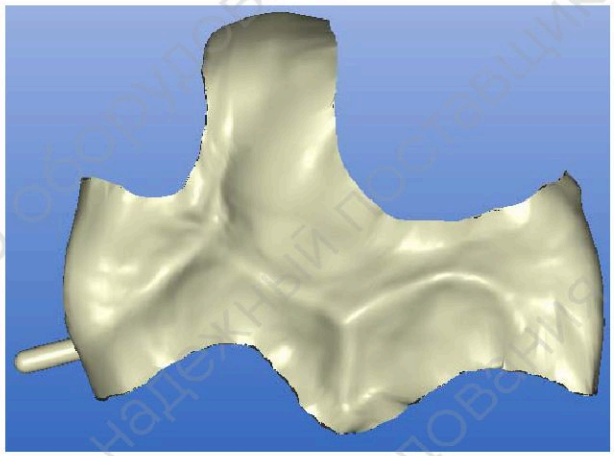


*Applying and smoothing material*



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#### 10.3.2.7 Examining the milling preview



*Milling preview*

The finished restoration is displayed in the milling preview (see ".Milling preview [→ 114]").

1. Inspect the restoration.
2. Select the desired milling mode.
3. Set the sprue location on a flat, convexly curved side.

#### 10.3.2.8 Milling




1. If you are satisfied with the restoration, click the *"Mill"* icon (see "Mill" [→ 114]).
2. Start the milling process (see also Operating Instructions of the milling unit).

### 10.3.3 Design example for MOD inlay with antagonist image on tooth 16

MOD = **M**esio-**o**ccluso-**d**istal

#### 10.3.3.1 Creating a new restoration

✓ You have selected a patient from the database or created a new patient.

1. Select the following options in the New dialog box.
2. Click *"OK"*.










| Range | Value |
|---|---|
| Tooth | 16 |
| In Master mode you additionally select: | |
| *"Restoration"* | *"Inlay, Onlay, Partial crown"* |
| *"Design technique"* | *"Biogeneric"* |



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### 10.3.3.2 Acquiring the preparation

1. After you have made and dried the preparation, powder the working field.
2. Accept the preparation (see "Optical impression").
3. With the CEREC 3D software, multiple impressions can be acquired from slightly displaced perspectives.
   ↳ The CEREC 3D software combines all of the individual impressions to form a single whole impression so that all regions of the preparation are acquired. The first impression is displayed with a red frame to show that it is the reference impression.

**⚠ CAUTION**

**Fitting the restoration**

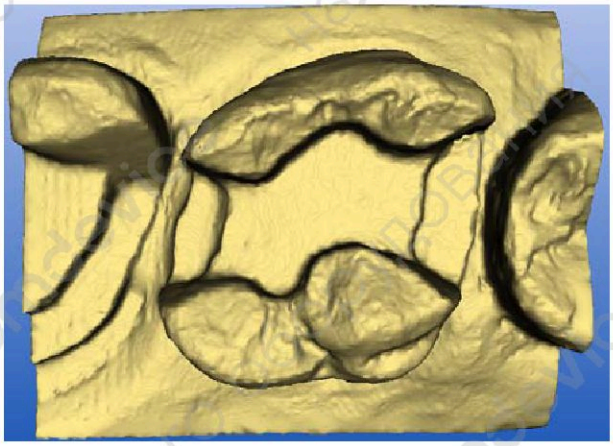
If regions with slight undercuts are also displayed, the milling unit will then machine the preparation so accurately that the restoration may get stuck slightly while it is being fit.

✓ All of the required optical impressions are available.
➢ Click the button *"Next"*.

### 10.3.3.3 Acquiring the antagonist

1. Acquire one or more impressions of the antagonist/bite registration.
2. If all of the required optical impressions are available, click the icon marked *"Next"*.

### 10.3.3.4 Displaying the 3D representation



*3D display*

You can rotate the preparation as required by pressing and holding down the left mouse button and moving the mouse in the desired direction.

You can also use the cursor arrows in the *"View"* window to view the preparation from the desired direction (see "Standard views" [→ 30]).

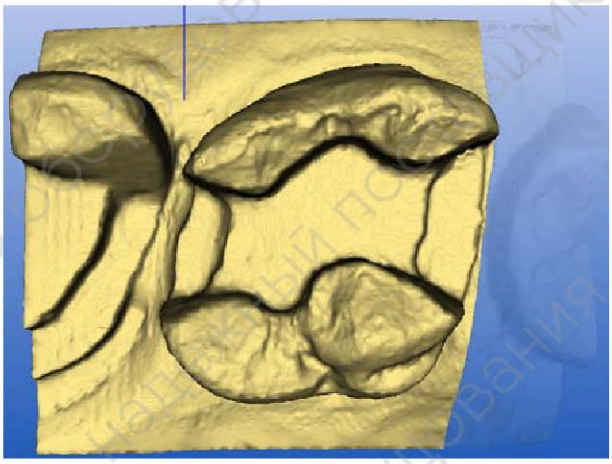


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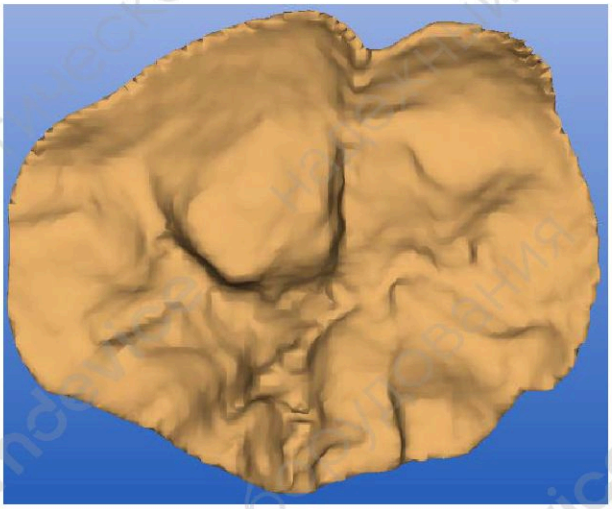
### 10.3.3.5 Hiding image regions



*Drawing the trimming line*

1. Cut the distal and mesial neighbors away by entering an open line for each of them (see "Trimming the preparation [→ 105]").
2. Click the *"Next"* button.

### 10.3.3.6 Trimming the antagonist



*Trimming the antagonist*

1. Trim the antagonist (see "Trimming the antagonist" [→ 106]).
2. Click the button *"Next"*.

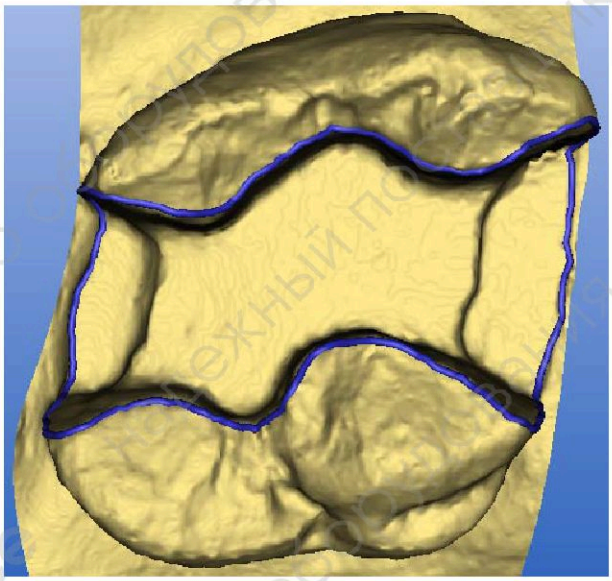


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### 10.3.3.7 Entering the preparation margin



*Entering and checking the preparation margin*

1. Enter the preparation margin (see "Entering the preparation margin" [→ 108]) and check it by rotating the preparation.

**NOTICE**

**Directly editing the preparation margin**

The preparation margin can be edited immediately after it is entered (see Editing tool (Edit)).

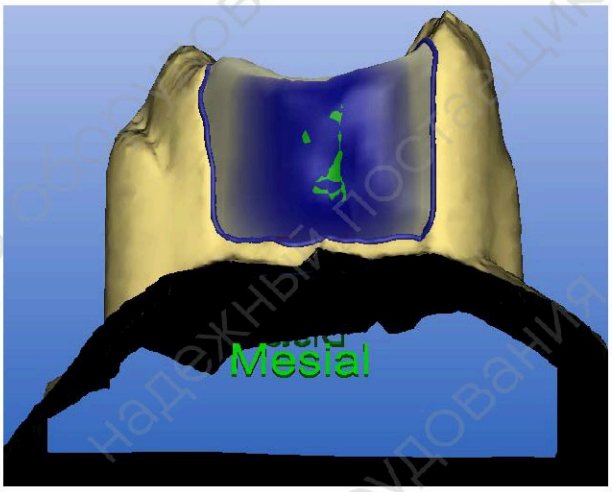
2. Click the *"Next"* button.
   ↳ A menu appears in which you can select the type of tooth shape.
3. Select *"Individual"* for the biogeneric calculation using the neighboring teeth.
   or
   ➢ If no suitable neighboring teeth are available, select a preferred tooth shape: *"adult"*, *"youth"*, *"lepto"*, *"athlet"*, *"pykno"* or *"asia"*.
4. Confirm your choice by clicking the *"OK"* button.

↳ The restoration is calculated and then displayed.



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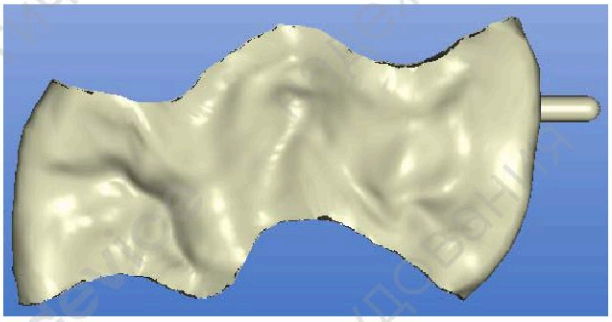
### 10.3.3.8 Making a proximal contact




*Changing the contact surfaces*

1. Activate the contact surfaces by clicking the *"Contact"* button (see "Showing/hiding the contact to the neighboring tooth (Contact)" [→ 31]).
2. If red penetration areas are present, they can be eliminated using the *"Design"* tools (see "Design window" [→ 37]).
3. After the design is finished, click the icon marked *"Next"*.

### 10.3.3.9 Examining the milling preview



*Milling preview*

The finished restoration is displayed in the milling preview (see ".Milling preview [→ 114]").

1. Inspect the restoration.
2. Select the desired milling mode.
3. Set the sprue location on a flat, convexly curved side.

### 10.3.3.10 Milling




1. If you are satisfied with the restoration, click the *"Mill"* icon (see "Mill" [→ 114]).
2. Start the milling process (see also Operating Instructions of the milling unit).


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## 10.3.4 Design example of partial crown with antagonist image for tooth 17

### 10.3.4.1 Creating a new restoration

✓ You have selected a patient from the database or created a new patient.

1. Select the following options in the New dialog box.
2. Click *"OK"*.










| Range | Value |
|---|---|
| Tooth | 17 |
| In Master mode you additionally select: | |
| *"Restoration"* | *"Inlay, Onlay, Partial crown"* |
| *"Design technique"* | *"Biogeneric"* |

### 10.3.4.2 Acquiring the preparation

1. After you have made and dried the preparation, powder the working field.
2. Accept the preparation (see "Optical impression").
3. With the CEREC 3D software, multiple impressions can be acquired from slightly displaced perspectives.
   ↳ The CEREC 3D software combines all of the individual impressions to form a single whole impression so that all regions of the preparation are acquired. The first impression is displayed with a red frame to show that it is the reference impression.

**⚠ CAUTION**

**Fitting the restoration**

If regions with slight undercuts are also displayed, the milling unit will then machine the preparation so accurately that the restoration may get stuck slightly while it is being fit.

✓ All of the required optical impressions are available.

➢ Click the button *"Next"*.

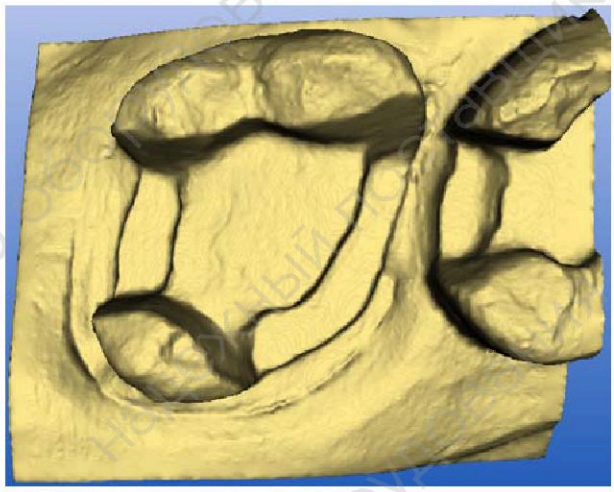
### 10.3.4.3 Acquiring the antagonist

1. Acquire one or more impressions of the antagonist/bite registration.
2. If all of the required optical impressions are available, click the icon marked *"Next"*.



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### 10.3.4.4 Displaying the 3D representation

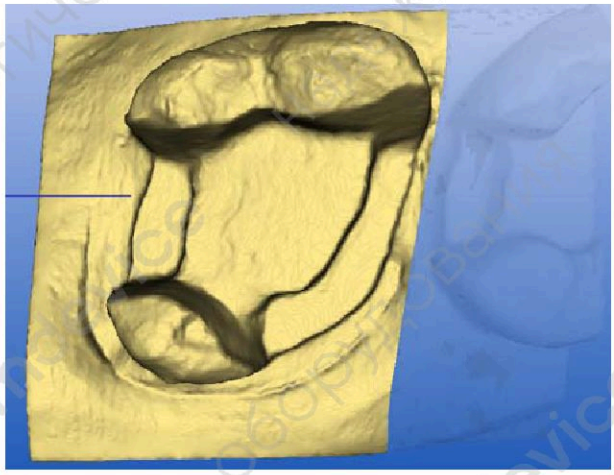


*3D display*

You can rotate the preparation as required by pressing and holding down the left mouse button and moving the mouse in the desired direction.

You can also use the cursor arrows in the *"View"* window to view the preparation from the desired direction (see "Standard views" [→ 30]).

### 10.3.4.5 Hiding image regions



*Drawing the trimming line*

1. Cut away the mesial neighbor by entering an open line (see ".Trimming the preparation [→ 105]").
2. Click the *"Next"* button.

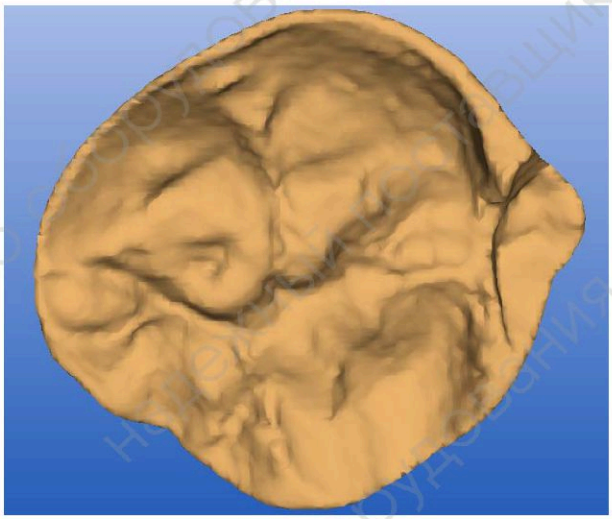


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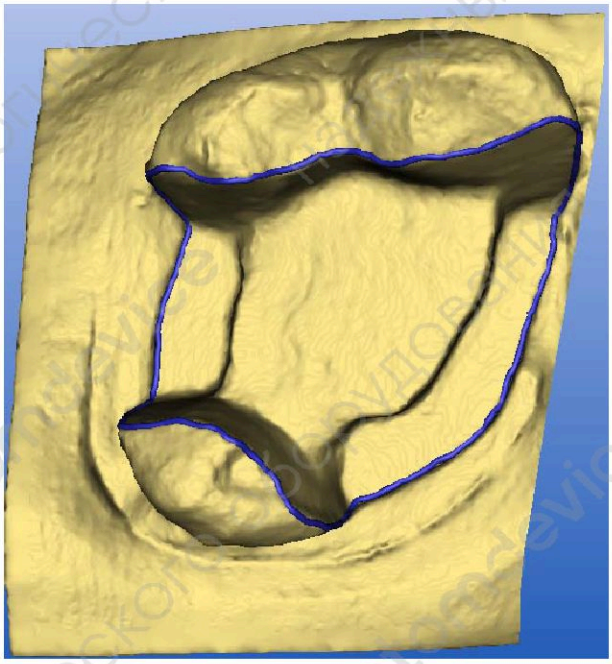
### 10.3.4.6 Trimming the antagonist



*Trimming the antagonist*

1. Trim the antagonist (see "Trimming the antagonist" [→ 106]).
2. Click the button *"Next"*.

### 10.3.4.7 Entering the preparation margin



*Entering and checking the preparation margin*

1. Enter the preparation margin (see "Entering the preparation margin" [→ 108]) and check it by rotating the preparation.



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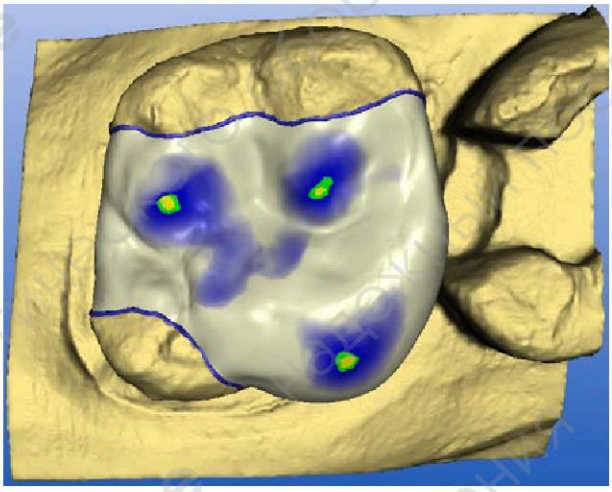
**NOTICE**

**Directly editing the preparation margin**

The preparation margin can be edited immediately after it is entered (see Editing tool (Edit)).

2. Click the *"Next"* button.
   ↳ A menu appears in which you can select the type of tooth shape.
3. Select *"Individual"* for the biogeneric calculation using the neighboring teeth.
   or
   ➢ If no suitable neighboring teeth are available, select a preferred tooth shape: *"adult"*, *"youth"*, *"lepto"*, *"athlet"*, *"pykno"* or *"asia"*.
4. Confirm your choice by clicking the *"OK"* button.

↳ The restoration is calculated and then displayed.



*Restoration*

### Penetration areas

1. If red penetration areas are present, they can be eliminated using the *"Design"* tools.
2. After the design is finished, click the *"Next"* icon.

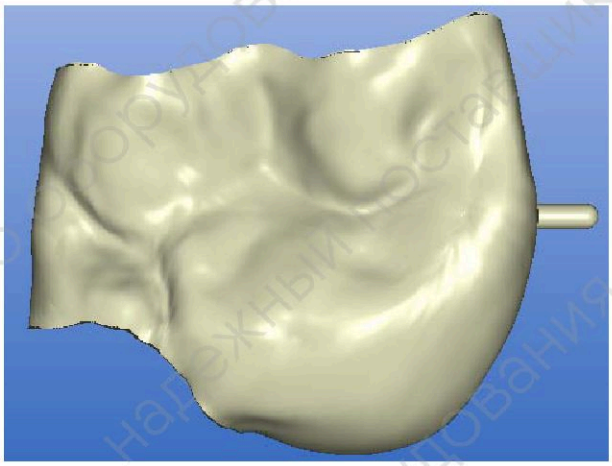


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#### 10.3.4.8 Examining the milling preview



*Milling simulation*

The finished restoration is displayed in the milling preview (see ".Milling preview [ → 114]").

1. Inspect the restoration.
2. Select the desired milling mode.
3. Set the sprue location on a flat, convexly curved side.

#### 10.3.4.9 Milling




1. If you are satisfied with the restoration, click the *"Mill"* icon (see "Mill" [ → 114]).
2. Start the milling process (see also Operating Instructions of the milling unit).

### 10.3.5 Design example of crown with antagonist image for tooth 47

#### 10.3.5.1 Creating a new restoration

✓ You have selected a patient from the database or created a new patient.

1. Select the following options in the New dialog box.
2. Click *"OK"*.










| Range | Value |
|---|---|
| Tooth | 47 |
| In Master mode you additionally select: | |
| *"Restoration"* | *"Crown"* |
| *"Design technique"* | *"Biogeneric"* |



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### 10.3.5.2 Acquiring the preparation

1. After you have made and dried the preparation, powder the working field.
2. Accept the preparation (see "Optical impression").
3. With the CEREC 3D software, multiple impressions can be acquired from slightly displaced perspectives.
   ↳ The CEREC 3D software combines all of the individual impressions to form a single whole impression so that all regions of the preparation are acquired. The first impression is displayed with a red frame to show that it is the reference impression.

**⚠ CAUTION**

**Fitting the restoration**

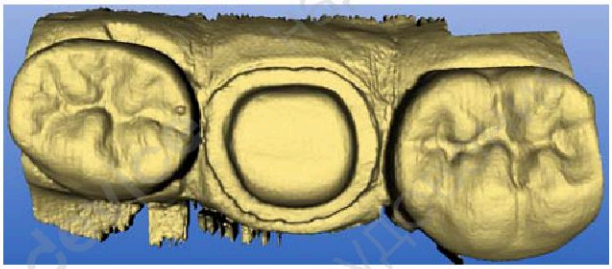
If regions with slight undercuts are also displayed, the milling unit will then machine the preparation so accurately that the restoration may get stuck slightly while it is being fit.

✓ All of the required optical impressions are available.
➢ Click the button *"Next"*.

### 10.3.5.3 Acquiring the antagonist

1. Acquire one or more impressions of the antagonist/bite registration.
2. If all of the required optical impressions are available, click the icon marked *"Next"*.

### 10.3.5.4 Displaying the 3D representation



*3D display*

You can rotate the preparation as required by pressing and holding down the left mouse button and moving the mouse in the desired direction.

You can also use the cursor arrows in the *"View"* window to view the preparation from the desired direction (see "Standard views" [→ 30]).

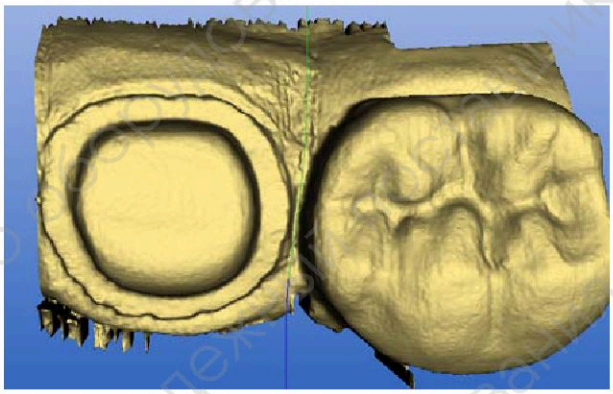


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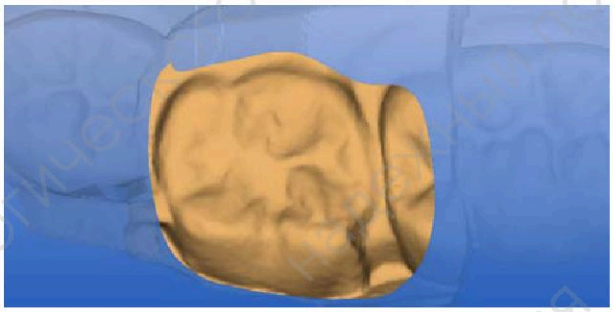
### 10.3.5.5 Hiding image regions



*Drawing the trimming line*

1. Cut the distal and mesial neighbors away by entering an open line for each of them (see "Trimming the preparation [→ 105]").
2. Click the *"Next"* button.

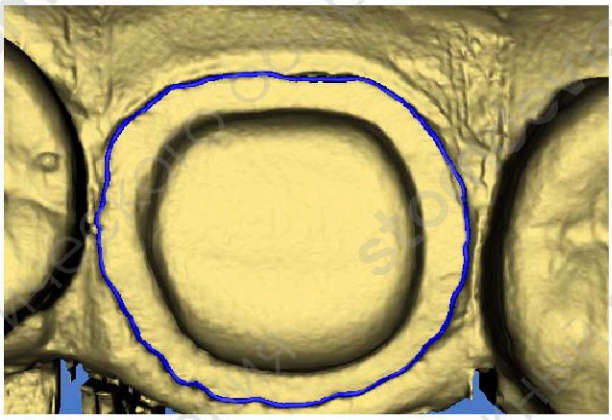
### 10.3.5.6 Trimming the antagonist



*Trimming the antagonist*

1. Trim the antagonist (see "Trimming the antagonist" [→ 106]).
2. Click the button *"Next"*.

### 10.3.5.7 Entering the preparation margin



*Preparation margin*



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1. Enter the preparation margin (see "Entering the preparation margin" [→ 108]) and check it by rotating the preparation.

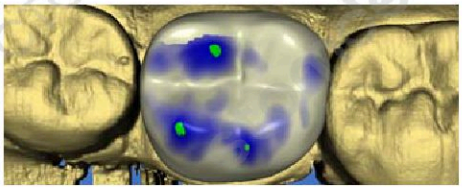
**NOTICE**

**Directly editing the preparation margin**

The preparation margin can be edited immediately after it is entered (see Editing tool (Edit)).

2. Click the *"Next"* button.
   ↳ A menu appears in which you can select the type of tooth shape.
3. Select *"Individual"* for the biogeneric calculation using the neighboring teeth.
   or
   ➢ If no suitable neighboring teeth are available, select a preferred tooth shape: *"adult"*, *"youth"*, *"lepto"*, *"athlet"*, *"pykno"* or *"asia"*.
4. Confirm your choice by clicking the *"OK"* button.
   ↳ The restoration is calculated and then displayed.

### 10.3.5.8 Performing the design



✓ A biogeneric suggestion is calculated automatically. This process can take several minutes, depending on the hardware configuration.

1. You can use the *"Position"* and *"Rotate"* tools to align the restoration as required.
2. Using the *"Design"* tools *"Scale"*, *"Edit"*, *"Shape"*, *"Form"*, and *"Drop"*, you can modify the restoration until it fits perfectly into the overall environment.
3. You can use the *"Antagonist"* button to display the *"Antagonist"* window (see "Show/hide antagonist [→ 33]") and with the aid of the *"Design"* tools, you can adapt the occlusal surface to the antagonist.
4. After the design is finished, click on the *"Next"* button.



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### 10.3.5.9 Examining the milling preview



*Milling simulation*

The finished restoration is displayed in the milling preview (see ".Milling preview [→ 114]").

1. Inspect the restoration.
2. Select the desired milling mode.
3. Set the sprue location on a flat, convexly curved side.

### 10.3.5.10 Milling




1. If you are satisfied with the restoration, click the *"Mill"* icon (see "Mill" [→ 114]).
2. Start the milling process (see also Operating Instructions of the milling unit).

## 10.3.6 Design example of articulation (in Master Mode only)

### 10.3.6.1 Creating a new restoration

✓ You have selected a patient from the database or created a new patient.

1. Select the following options in the New dialog box.
2. Click *"OK"*.










| Range | Value |
|---|---|
| *"Restoration"* | *"Crown"* |
| *"Design technique"* | *"Articulation"* |
| Tooth | ?? |


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### 10.3.6.2 Acquiring the preparation




➢ Acquire the preparation (see "Optical impression").

### 10.3.6.3 Acquiring the antagonist




➢ Acquire the antagonist (static impression).

### 10.3.6.4 Acquiring the dynamic occlusion impression



1. Acquire the dynamic occlusion impression (**FGP**, **F**unctionally **G**enerated **P**ath).
2. If all of the required optical impressions are available, click the icon marked *"Next"*.

↳ The 3D representation of the preparation is reconstructed and then displayed in the 3D viewer.

### 10.3.6.5 Hiding image regions

1. Cut the distal and mesial neighbors away by entering an open line for each of them (see "Trimming the preparation [→ 105]").
2. Click the *"Next"* button.

### 10.3.6.6 Trimming the antagonist

1. Cut away the regions which do not belong to the occlusion of the opposite tooth.
2. Click the button *"Next"*.

### 10.3.6.7 Entering the preparation margin

1. Enter the preparation margin (see "Entering the preparation margin" [→ 108]) and check it by rotating the preparation.

**NOTICE**

**Directly editing the preparation margin**

The preparation margin can be edited immediately after it is entered (see Editing tool (Edit)).

2. Click the *"Next"* button.

↳ A menu appears in which you can select the type of tooth shape.

3. Select *"Individual"* for the biogeneric calculation using the neighboring teeth.

or

➢ If no suitable neighboring teeth are available, select a preferred tooth shape: *"adult"*, *"youth"*, *"lepto"*, *"athlet"*, *"pykno"* or *"asia"*.

4. Confirm your choice by clicking the *"OK"* button.

↳ The restoration is calculated and then displayed.



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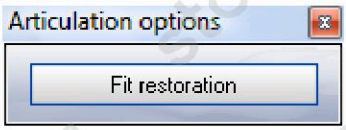


### 10.3.6.8 Performing the design

✓ A biogeneric suggestion is calculated automatically. This process can take several minutes, depending on the hardware configuration.

1. You can now modify the crown with all of the available tools (*"Scale"*, *"Edit"*, *"Shape"*, *"Form"*, *"Drop"*, …) and adapt it to the statics.
2. If you click the *"Articulation"* button, the 3D model of the dynamic occlusion impression is displayed and an additional dialog box is opened with the *"Fit Restoration"* button.




3. If you click the *"Fit Restoration"* button, all of the interfering contacts of the restoration which "protrude out of" the FGP will be ground virtually so that they disappear.
4. After the design is finished, click on the *"Next"* button.

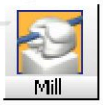
### 10.3.6.9 Examining the milling preview

The finished restoration is displayed in the milling preview (see ".Milling preview [➝ 114]").

1. Inspect the restoration.
2. Select the desired milling mode.
3. Set the sprue location on a flat, convexly curved side.

### 10.3.6.10 Milling

1. If you are satisfied with the restoration, click the *"Mill"* icon (see "Mill" [➝ 114]).




2. Start the milling process (see also Operating Instructions of the milling unit).

## 10.3.7 Provisional bridges (in the Master Mode only)

### 10.3.7.1 Creating a new restoration

✓ You have selected a patient from the database or created a new patient.

1. Select the following options in the New dialog box.
2. Click *"OK"*.










| Range | Value |
|---|---|
| *"Restoration"* | *"Bridge"* |
| *"Design technique"* | *"Biogeneric"* or *"Biogeneric reference"* |
| Element | |

### 10.3.7.2 Acquiring optical impressions

➢ Acquire the desired optical impressions of the preparation and the antagonist (if present).

### 10.3.7.3 Trimming the preparation

Trim the preparation (if desired).

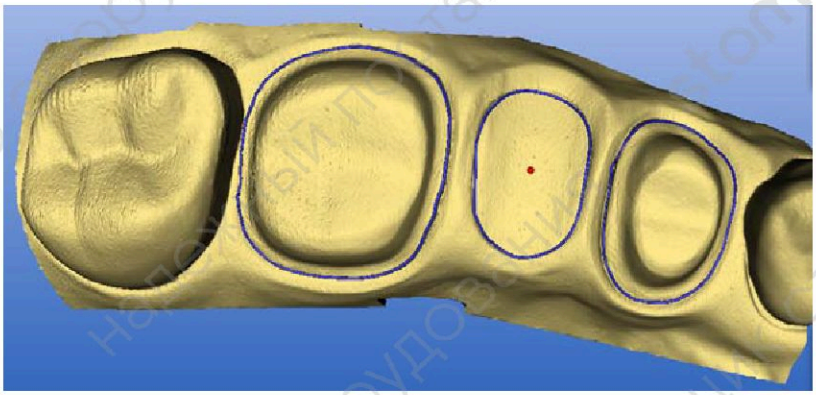


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### 10.3.7.4 Trimming the antagonist

Trim the antagonist (if present).

### 10.3.7.5 Entering the preparation margin and base lines

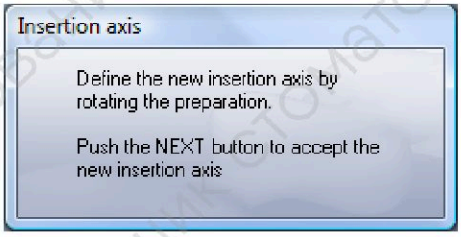


1. Enter the preparation margin of the first crown, starting distally.
2. Enter the base line of the pontic.
3. Enter the preparation margin of the second crown.

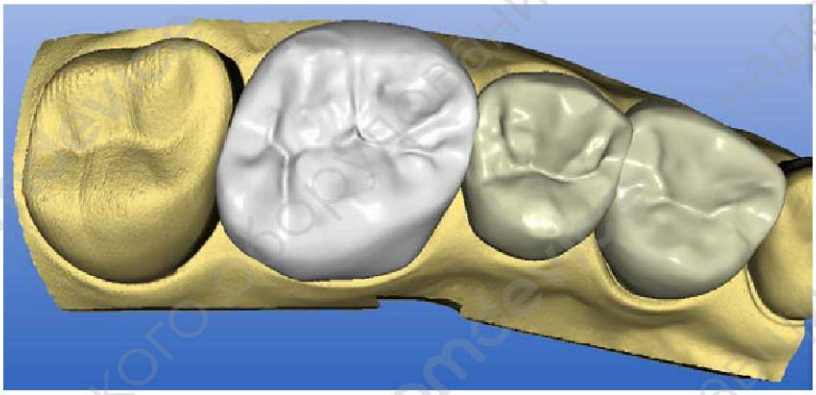
Once the last line has been entered, it is possible to edit all lines. Furthermore, a red dot appears in each base line. This dot can be randomly displaced on the model and defines the buccolingual position of the subsequent initial suggestion for the pontic.

With base lines for a "shifted heart shape", this red dot should thus be shifted slightly in a lingual direction.

### 10.3.7.6 Designing a bridge




You can correct the insertion axis if necessary.



Now each bridge element will be suggested individually starting from the distal side.

**NOTICE**

**Set up elements first**

It is generally advantageous to first set up all elements coarsely in size and position and then make the finishing touches only after all elements have been set up.



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All of the tools required to modify the suggestion are already available to you. If you have scanned an antagonist, the occlusion can also be adapted automatically (as for a single anatomical crown).

The design of the crown does not yet have to be definite at this time; it can be corrected at any time until shortly before the milling preview. For this purpose, a double-click on an unselected crown is sufficient to enable its subsequent adaptation.

An additional element of the bridge appears each time you click the green *"Next"* arrow.

### 10.3.7.7 Examining the milling preview

As soon as you are satisfied with the design of the bridge, you can click the green *"Next"* arrow to change to the milling preview, where you will find the free forming *"Form"*, *"Drop"* and *"Shape"* tools you need to add the finishing touches.

**CAUTION**

**No connectors between crowns**

The user himself is responsible for the coherence of the bridge! Do NOT place any connectors between the crowns!

When using the *"Cut"* tool, the cut surface is displayed in the status bar. This allows you to verify the thickness of the connection surfaces.

You can visualize the bridge in the block in the milling preview.

### 10.3.7.8 Milling

The following materials are available for bridge restorations:

- VITA CAD-Temp monoColor CT-40
- VITA CAD-Temp monoColor CT-55
- VITA CAD-Temp multiColor CTM-40
- Merz artBloc Temp 40 mm
- Ivoclar Telio CAD

Heed the following recommendations for machining these materials.

#### CEREC MC XL milling unit

| Milling instruments | Material | Milling speed |
|---|---|---|
| Step Bur 12 S and<br>Cyl. Pointed Bur 12 S | VITA CAD-Temp monoColor CT-40 | Fast grinding |
| Step Bur 12 S and<br>Cyl. Pointed Bur 12 S | VITA CAD-Temp monoColor CT-55 | Fast grinding |
| Step Bur 12 S and<br>Cyl. Pointed Bur 12 S | Merz artBloc Temp | Fast grinding |
| Step Bur 20 and<br>Cyl. Pointed Bur 20 | VITA CAD-Temp multiColor CTM-40 | Normal grinding |



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CEREC 3 milling unit

| Milling instruments | Material | Milling speed |
|---|---|---|
| Cone Bur 14 and Cylinder Pointed Bur | VITA CAD-Temp monoColor CT-40 | Normal grinding |
| Cone Bur 14 and Cylinder Pointed Bur | VITA CAD-Temp multiColor CTM-40 | Normal grinding |
| Cone Bur 14 and Cylinder Pointed Bur | Merz artBloc Temp | Normal grinding |

## 10.4 Correlation (in Master Mode only)

### 10.4.1 General information

#### Optical impressions of the preparation and occlusion

- The teeth to be restored should be located in **the center of the image** in the mesio-distal and in the bucco-lingual direction.
- The following also applies to impressions comprising several images: The preparation and occlusion impressions should cover an almost **equally large area**.
- Acquire only as many images per impression as are absolutely necessary. The precision of the overall impression will be improved only if all additional impressions are optimally sharp (i.e. in particular free of motion blurring). Poorly defined additional impressions impair the quality of the overall impression and may endanger a subsequent correlation.
- Avoid complete or partial obstruction of the distal or mesial neighbor by using a cofferdam or other objects.
- The patient's tongue and any cotton wool rolls should be kept away if possible.
- Terminal situations are always distally terminal. The image of the tooth to be restored (prepared tooth) must never be acquired so that it lies on the mesial image border. Part of the neighboring tooth is always to be expected at the mesial end.

#### Entering the preparation margin for Inlay, Onlay, Partial crown

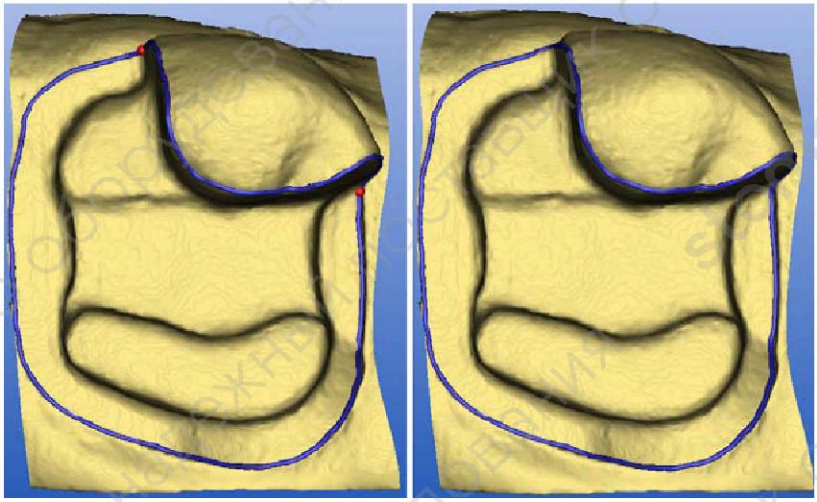
If for *"Inlay, Onlay, Partial crown"* in the design technique *"Correlation"* (**and only in this design technique!**), while drawing in the preparation margin, you set segment limits[1] and if needed then change this, this will be taken into account by the software (figure left).

If you set no segment limits, then (as previously in version 3.0x) the software automatically detects the segment limits (figure right).

1. Red balls for the transition from the bottom to the marginal area (double-click).



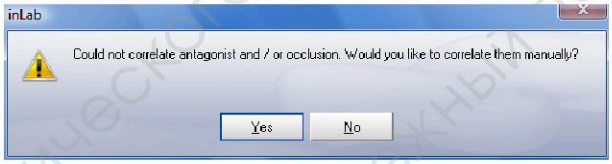
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*Entering the preparation margin*

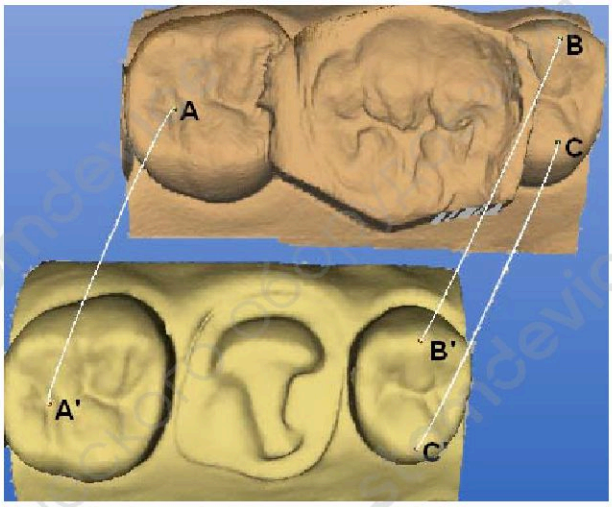
### 10.4.2 Manual Correlation

If the models of the preparation, the occlusion and the antagonist cannot be correlated, the following message appears.




*Manual Correlation*

If you want to perform manual correlation, click the Yes button.




Then mark at least 3 points on both models which are correlated (A – A', B – B', C – C').

These points should form as large a triangle as possible (ABC or A'B'C').



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**NOTICE**

**Unambiguous point pairs**

Additional points will not improve the result! The software can best calibrate the models with three unambiguous pairs of points.

1. Double-click a prominent location (e.g. **A**) in a model to set a colored point.
2. Then double-click the corresponding location on the other model (e.g. **A'**).

**NOTICE**

**Moving points**

The colored points can be moved via drag and drop.

3. Set reference points B – B' and C – C' as described under items **1 – 2**.
4. Click the button *"Next"*.

## 10.4.3 Design example for tooth 16 with extensive fissure caries and proximal caries on both sides

### 10.4.3.1 Creating a new restoration

✓ You have selected a patient from the database or created a new patient.

1. In the *"New"* dialog, select the information stated below.
2. Click *"OK"*.

| Range | Value |
|---|---|
| *"Restoration"* | *"Inlay, Onlay, Partial crown"* |
| *"Design technique"* | *"Correlation"* |
| Tooth | 16 |

### 10.4.3.2 Acquiring the occlusion

**NOTICE**

**Observe instructions**

The occlusion of the tooth to be restored must be located in the center of the image during the acquisition. Observe the instructions under "General information on the optical impression".

In this example, an only slightly impaired occlusal surface was provisionally reconstructed and the contact situation was also checked.

An ideal "occlusal impression" is thus obtained for the subsequent correlation.

1. Move the arrow cursor to the icon marked *"Acquire occlusion"*.
2. Remove the 3D camera from its holder and position it above the powdered working field.
3. Acquire the occlusion.



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### 10.4.3.3 Acquiring the preparation

#### Preparation

1. Perform the preparation and powdering.
2. Powder the working field.

#### Procedure

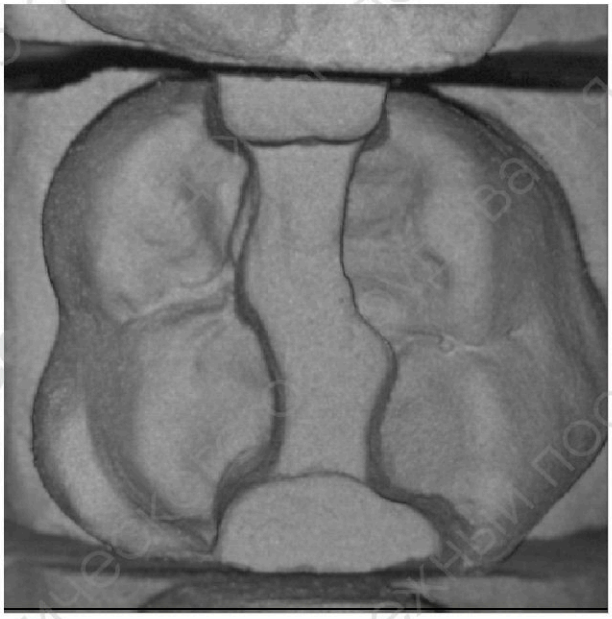


*Image field of the preparation*

1. Acquire the preparation (see "Optical impression").

**NOTICE**

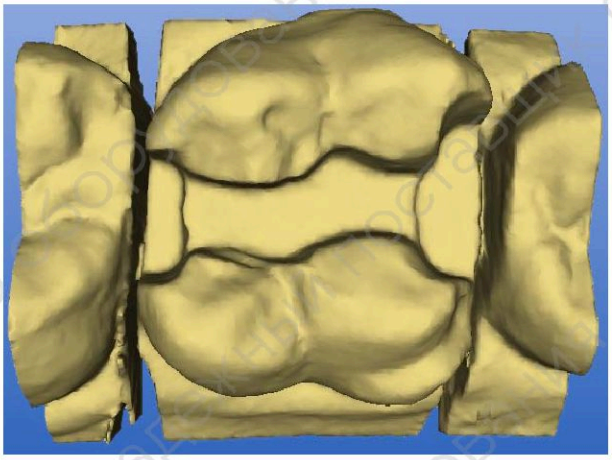
**Observe instructions**

The prepared tooth must be located in the center of the image during the acquisition. Observe the instructions under "General information on the optical impression" [→ 147].

2. If all of the required optical impressions are available, click the icon marked *"Next"*.

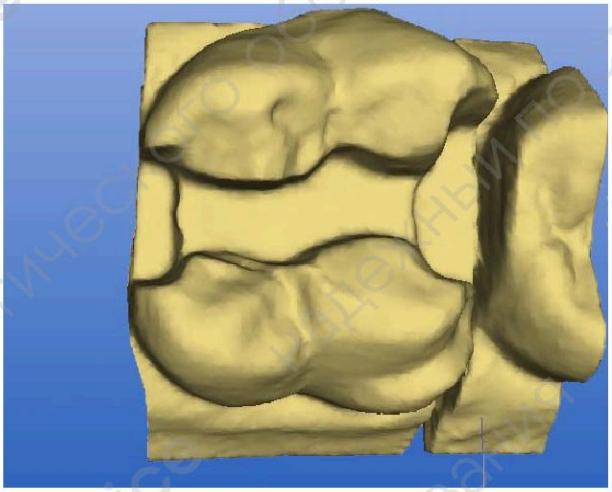


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*3D display*

### 10.4.3.4 Hiding image regions



*Drawing the trimming line*

1. Cut the distal and mesial neighbors away by entering an open line for each of them (see "Trimming the preparation [→ 105]").
2. Click the *"Next"* button.

### 10.4.3.5 Entering the preparation margin

1. Enter the preparation margin (see "Entering the preparation margin" [→ 108]) and check it by rotating the preparation.

**NOTICE**

**Directly editing the preparation margin**

The preparation margin can be edited immediately after having been entered.

2. Click the button *"Next"*.

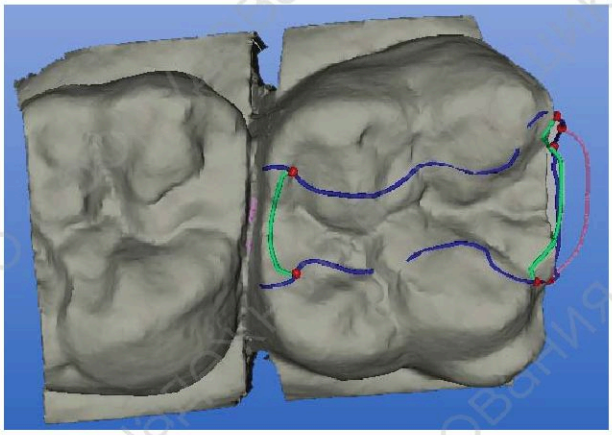


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### 10.4.3.6 Adapting the copying line

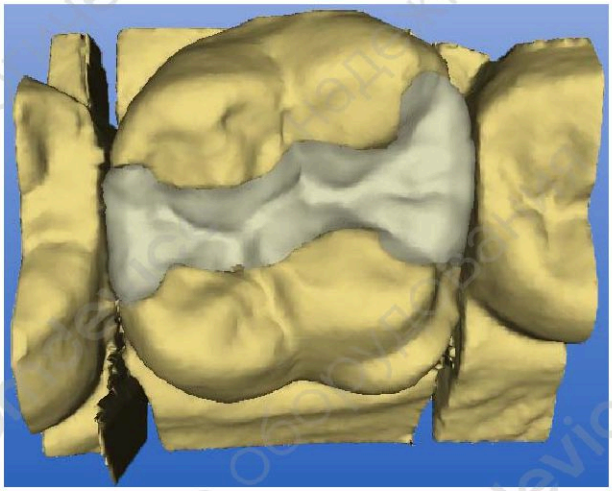


*Suggested copying line*

✓ The program suggests a copying line (green line). The end points are marked by red dots.

1. Move the red end points along the preparation margin, if necessary.
2. If required, adapt the copying line using the *"Design"* tool *"Edit"* (see "Editing a design line" [→ 38]).
3. After adapting the copying line, click the icon *"Next"*.

↳ The restoration is calculated and then displayed. All areas outside of the copying line are generated by Biogenerics.



*Restoration*

### 10.4.3.7 Editing the restoration

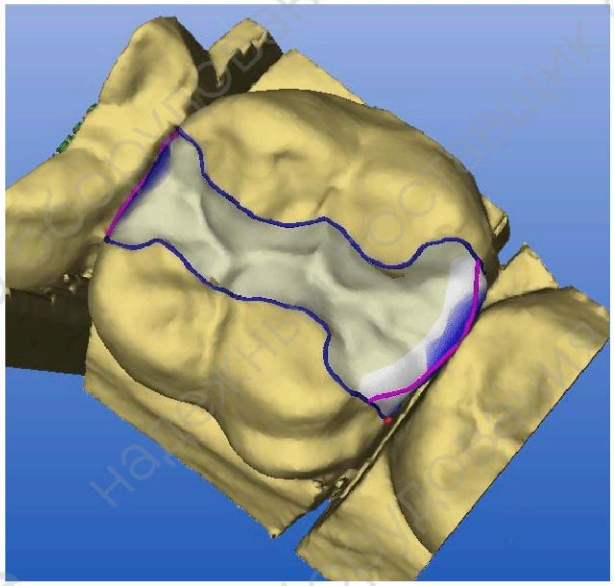
1. Assess the restoration from all directions.
2. Hide the neighboring teeth by clicking the *"Trim"* button.
3. Activate the contact surfaces by clicking the *"Contact"* button (see "Showing/hiding the contact to the neighboring tooth (Contact)" [→ 31]).
4. As required adapt the contact surfaces using the *"Design"* tools.



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*Extending contact surfaces*

If the contact proves insufficient, you can extend the entire proximal surface with *"Scale"* tool (see "Scaling tool (Scale)").




If the contact is too strong, you can correct it with the *"Form"* tool (see "Form tool (Form)" [→ 39]).

➢ After the design is finished, click the icon marked *"Next"*.



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#### 10.4.3.8 Examining the milling preview



*Milling simulation*

The finished restoration is displayed in the milling preview (see ".Milling preview [➙ 114]").

1. Inspect the restoration.
2. Select the desired milling mode.
3. Set the sprue location on a flat, convexly curved side.

#### 10.4.3.9 Milling




1. If you are satisfied with the restoration, click the *"Mill"* icon (see "Mill" [➙ 114]).
2. Start the milling process (see also Operating Instructions of the milling unit).

### 10.4.4 Design example of crown for tooth 26

#### 10.4.4.1 Creating a new restoration

✓ You have selected a patient from the database or created a new patient.

1. In the *"New"* dialog, select the information stated below.
2. Click *"OK"*.

| Range | Value |
|---|---|
| *"Restoration"* | *"Crown"* |
| *"Design technique"* | *"Correlation"* |
| Tooth | 26 |

#### 10.4.4.2 Acquiring the occlusion

**NOTICE**

**Observe instructions**

The occlusion of the tooth to be restored must be located in the center of the image during the acquisition. Observe the instructions under "General information on the optical impression".



1. Reconstruct the occlusal surface provisionally and check the contact situation.
2. Move the arrow cursor to the icon marked *"Acquire occlusion"*.



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3. Remove the 3D camera from its holder and position it above the powdered working field.
4. Acquire the occlusion.

### 10.4.4.3 Acquiring the preparation



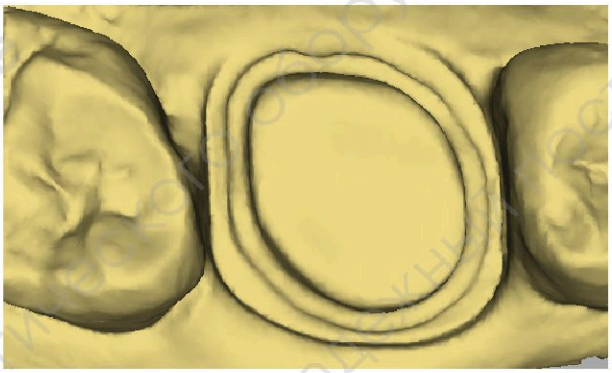

1. Acquire the preparation (see "Optical impression").

**NOTICE**

**Observe instructions**

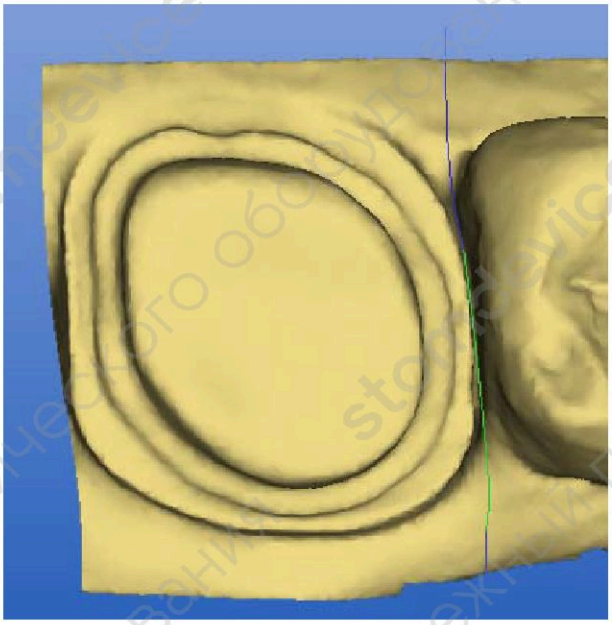
The prepared tooth must be located in the center of the image during the acquisition. Observe the instructions under "General information on the optical impression" [→ 147].

2. If all of the required optical impressions are available, click the icon marked *"Next"*.



*3D display*

### 10.4.4.4 Hiding image regions



*Drawing the trimming line*



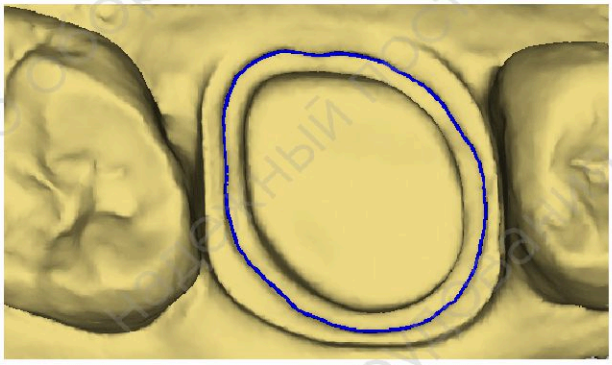
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1. Cut the distal and mesial neighbors away by entering an open line for each of them (see "Trimming the preparation [→ 105]").
2. Click the *"Next"* button.

### 10.4.4.5 Entering the preparation margin



*Entering and checking the preparation margin*

1. Enter the preparation margin (see "Entering the preparation margin" [→ 108]) and check it by rotating the preparation.

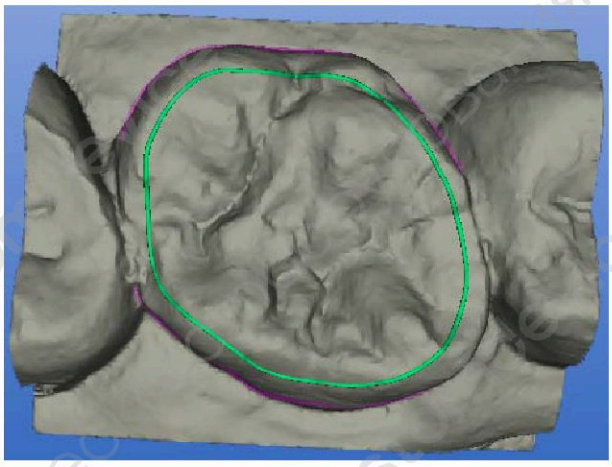
**NOTICE**

**Directly editing the preparation margin**

The preparation margin can be edited immediately after having been entered.

2. Click the button *"Next"*.

### 10.4.4.6 Accepting a copying line



*Suggested copying line*

The program suggests a copying line (green line) for your acceptance.



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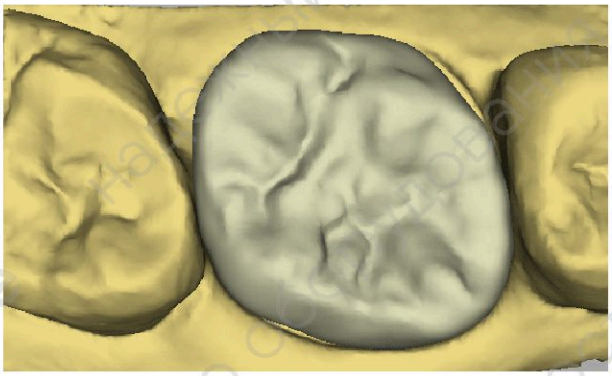


**NOTICE**

The copying line can be extended to the start of the gingiva if necessary. All areas outside of the copying line are generated by Biogenerics. This is especially useful e.g. for cusp fractures. In this case, the fracture position is excluded from the copying line and enhanced by the software.

➢ Click the *"Next"* button.

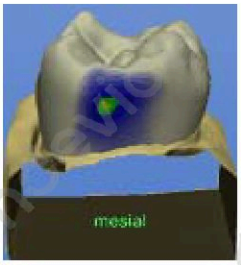
↳ The restoration is calculated and then displayed.



*Restoration*

### 10.4.4.7 Editing the restoration

1. Assess the restoration from all directions.
2. Hide the neighboring teeth by clicking the *"Trim"* button.
3. Activate the contact surfaces by clicking the *"Contact"* button (see "Showing/hiding the contact to the neighboring tooth (Contact)" [→ 31]).
4. As required adapt the contact surfaces using the *"Design"* tools.







If the contact proves insufficient, you can extend the entire proximal surface with *"Scale"* tool (see "Scaling tool (Scale)").

If the contact is too strong, you can correct it with the *"Form"* tool (see "Form tool (Form)" [→ 39]).

➢ After the design is finished, click the icon marked *"Next"*.



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#### 10.4.4.8 Examining the milling preview



*Milling simulation*

The finished restoration is displayed in the milling preview (see ".Milling preview [➙ 114]").

1. Inspect the restoration.
2. Select the desired milling mode.
3. Set the sprue location on a flat, convexly curved side.

#### 10.4.4.9 Milling




1. If you are satisfied with the restoration, click the *"Mill"* icon (see "Mill" [➙ 114]).
2. Start the milling process (see also Operating Instructions of the milling unit).

## 10.5 Biogeneric reference (only in Master Mode)

Select this design procedure if you wish to make a fully anatomic proposal, which is reconstructed from one of the reference teeth specified by yourself by means of the patented biogeneric procedure. This reference tooth must be acquired on a separate basis in the *"Occlusion"* image field.

This technique can be used for inlays, onlays, partial crowns, crowns, and bridges.

✓ You have selected a patient from the database or created a new patient.

1. In the New dialog box, select *"Biogeneric reference"* as the design procedure. The bite registration technology *"Buccal scan"* is not available to you.
2. As usual, take acquisitions of the preparation.
3. Take an optical impression of a reference tooth in the *"Occlusion"* image field. The tooth is to be fully acquired from the occlusal direction.



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4. Following the reconstruction of the model, you have the option to trim the model as well as to determine the preparation line and insertion axis.
5. You are subsequently prompted to enter the tooth position of the tooth that you wish to use as the reference. Confirm your selection in the tooth model by clicking the *"OK"* button.
6. If you selected the contralateral tooth as the reference, you can choose between creating the restoration by mirroring the contralateral tooth or by means of biogeneric reconstruction.
7. The acquisition of the reference tooth is subsequently displayed in gray. Double-click on the center of the occlusal surface, in the case of anterior teeth click on the center of the incisal edge.
   ↳ A biogeneric suggestion is now reconstructed.
8. You then have the option of adjusting and milling the suggestion with standard tools.

# 10.6 Quadrant restoration (in Master Mode only)

## 10.6.1 Design example for teeth 14 to 17

### 10.6.1.1 Preparing, drying and powdering



*Powdering the working field*

After you have made and dried the preparation, powder the working field.

### 10.6.1.2 Acquiring tooth 16

✓ You have selected a patient from the database or created a new patient.

1. Select the following options in the New dialog box.

**NOTICE**

**Start with an inlay if necessary**

If an inlay is also to be provided, then start with this restoration.

2. Click *"OK"*.

↳ The arrow cursor jumps automatically to the button marked *"Acquire preparation"*.

| Range | Value |
|---|---|
| *"Restoration"* | *"Inlay, Onlay, Partial crown"* |
| *"Design technique"* | *"Biogeneric"* |
| Tooth | 16 |

➢ Acquire an optical impression of the central cavity for tooth 16.



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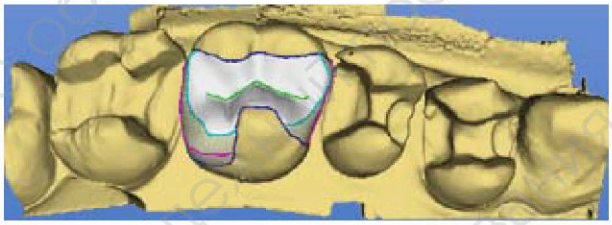
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### 10.6.1.3 Acquiring supplementary optical impressions

1. Acquire optical impressions of the mesial neighbors (tooth 15 and then tooth 14).
2. Acquire an optical impression of the distal neighbor (tooth 17).

### 10.6.1.4 Tooth 16: Creating the restoration



*Restoration of tooth 16*

1. Define tooth 16 as the center (see "Centering" under "Design" [→ 58]).
2. Create a restoration.
3. Save the restoration.
4. Select *"Design"|"Quadrant..."* (see "Quadrant" under "Design" [→ 57]).
   ↳ The New dialog box opens. The patient is accepted.
5. In the New dialog box, you can select the following and confirm *"OK"*.
   ↳ The virtual seating and the start of a second CEREC 3D program then occur.
   In the program running in the foreground, the old restoration is in its original state.

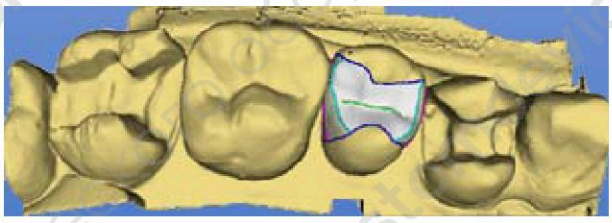
**⚠ CAUTION**

**Limitations**

Following virtual seating you may **no longer** perform the following: use the *"Undo"* button to return to the *"Optical impression"* work step, remove or add images or change the reference image!

6. Mill the restoration.

### 10.6.1.5 Tooth 15: Creating the restoration



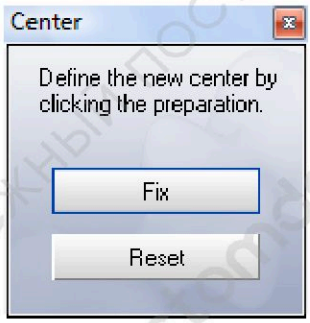
*Tooth 16 seated virtually, restoration of tooth 15*

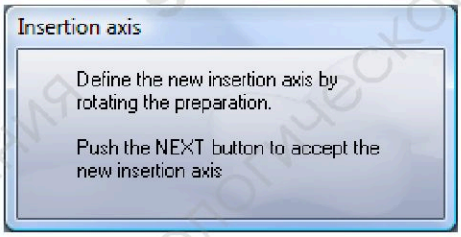
The program with the virtually seated restoration is loaded in the background. You can bring the program to the foreground via the task bar or by pressing the task selection keys (**Alt+Tab**).

The finished design (tooth 16) appears as the tooth in the new display.



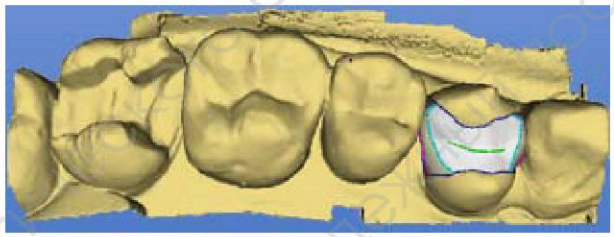
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1. Click the preparation to be edited (tooth 15).
2. Click the button marked *"Fix"*.
3. Trim the model.
4. Click the button *"Next"*.
5. Draw the preparation margin.
6. Select the menu item *"Design"|"Insertion axis"*.
7. Define the insertion axis for tooth 15 (see "Redefining the insertion axis" [→ 109]).
8. Click the button *"Next"*.
9. Create a restoration (see the design examples in the preceding sections).
10. Save the restoration.
11. Select *"Design"|"Quadrant..."* (see "Quadrant" under "Design" [→ 57]).
    - This is followed by the virtual seating and the start of another CEREC 3D program.
12. Mill the restoration.

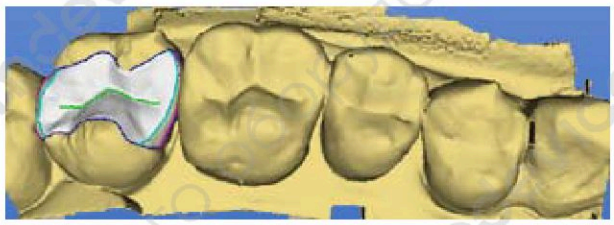
### 10.6.1.6 Tooth 14: Creating the restoration



*Tooth 16 and 15 seated virtually, restoration of tooth 14*

1. Create the restoration for tooth 14 analogously to tooth 16 and 15.
2. Save the restoration.
3. Mill the restoration.

### 10.6.1.7 Tooth 17: Creating the restoration



*Tooth 16, 15 and 14 seated virtually, restoration of tooth 17*

1. Create the restoration for tooth 17 analogously to tooth 16 and 15.
2. Save the restoration.
3. Mill the restoration.


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### 10.6.1.8 All restorations



*Inlays inserted with adhesive bonding and milled*

1. Polish the proximal surfaces.
2. Insert the inlays with adhesive bonding.
3. Carry out the milling and polishing.



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# 11 Adhesive bonding of restorations

## Preparation

Before seating the restoration, grind off the sprue remaining from the milling process.



*Removing the sprue*

## Bonding according to the general rules of adhesive dentistry

The restorations can be bonded in accordance with the general rules of adhesive dentistry.

Please observe the instructions of the respective bonding material manufacturers.



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# 12 Messages

Three different types of messages can be distinguished.

- Information
- Warnings
- Error messages

## 12.1 Information

### Description



These messages prompt you to perform a specific operation or inform you that a specific action is not possible at the moment.

### Example

Two examples of this are the messages that a milling instrument should be replaced or that the milling unit is busy.

## 12.2 Warnings

### Description



This type of message is also used to remind you of important user actions or to warn you about problems.

## 12.3 Error messages

### Description



An error message means that an action could not be executed. The program and the data are usually restored to the state in which they were prior to the action.

### Different variations

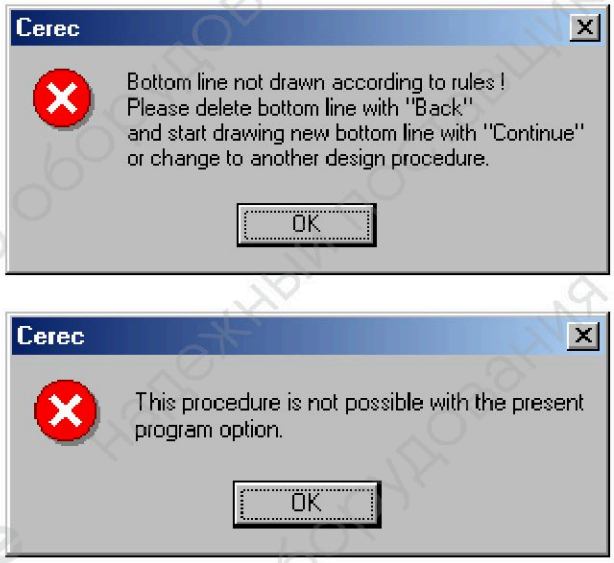
The individual error messages may vary. The following variations exist:

- Self-explanatory error messages
- Other types of errors (two-stage errors)
  - Errors in connection with determining or managing construction lines
  - Errors in the reconstruction of the restoration
  - System errors
  - Memory allocation errors



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### 12.3.1 Self-explanatory error messages




*Self-explanatory error message*

This type of error message is used whenever the cause of the error is unambiguous. You will be given detailed information on required action whenever possible.

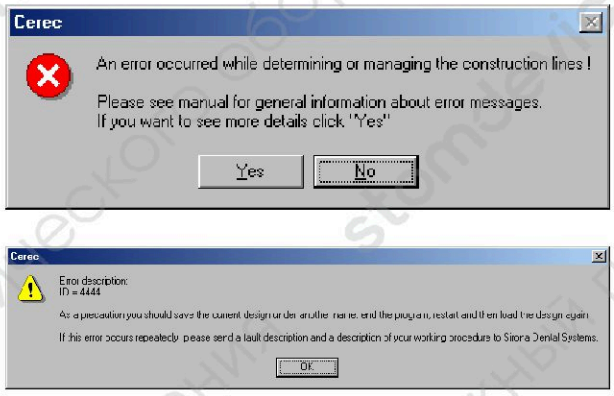
### 12.3.2 Two-stage errors

Other error messages are displayed in two stages. The basic error is displayed first.

You then have the possibility of having further details displayed. If error messages of this type appear repeatedly during a design process, you should forward the design in question to Sirona Dental Systems along with a description of the procedure you have followed.

With the exception of memory allocation errors, you can usually acknowledge the error message and continue working after an error has occurred.

### 12.3.3 Errors in connection with determining or managing construction lines




*Two-stage errors*


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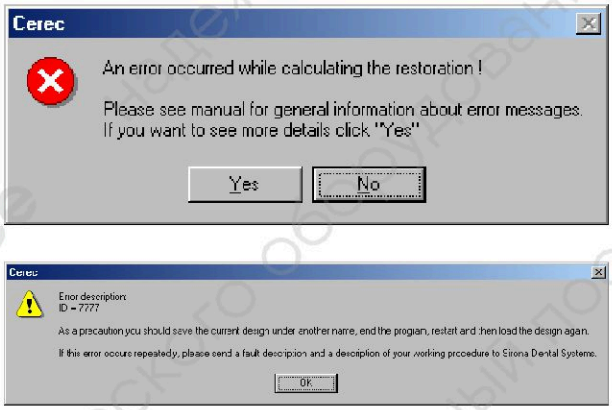
This type of error typically occurs whenever the construction lines are unsuitable. It may, however, also be caused by a program error.

When you click Yes, a dialog box with further details and hints opens.

The error description, i.e. the ID, is used by the hotline or development team to analyze and eliminate the problem.

In most cases, you can continue to work with the restoration data after acknowledging the error. However, just to make sure, you can create a copy and work with this copy. In this way, you can always recur to the original optical impression in case further problems occur.

### 12.3.4 Errors in the reconstruction of the restoration



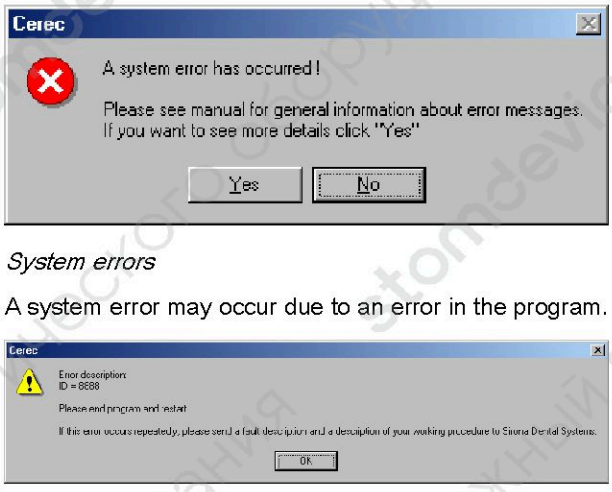

*Errors in the reconstruction of the restoration*

This error may occur if the restoration is to be milled. In this case, the restoration to be milled cannot be calculated with the available construction lines.

As before, you can usually continue to work with the restoration data after acknowledging this error message. For reasons of safety, you may of course work on a copy.

Check and correct all construction lines, if necessary.

### 12.3.5 System errors

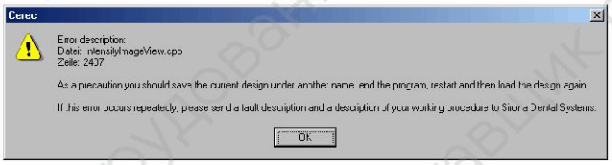



*System errors*

A system error may occur due to an error in the program.



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*Detailed information*

Two different types of detailed information can then follow.

Despite these error messages, you can continue to work with the existing design data, but for reasons of safety, you should always use a copy for doing so.

## 12.3.6 Memory allocation errors







*Memory allocation errors*

The occurrence of a memory allocation error means that the program or operating system is in a critical state.

1. Exit the program.
2. Save any available design data under another name.
3. If this error occurs again, terminate all running programs and restart the operating system.



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# 13 Link to Practice Administration

**NOTICE**

**Entering the patient data**

If there is an interface to a practice administration program, the patient data should be entered in the practice administration program and edited as required.

## 13.1 Parameter interface

### 13.1.1 Patient data as parameter list

Some practice administration programs can be configured so that they can pass on patient data as a parameter list.

### 13.1.2 Parameter interface: CerPI.exe

With this parameter interface, you can conveniently perform the following:

- Generate new patients in the data structure
  - With database connection
  - Without database connection
- Preselect existing patients in the following dialog boxes
  - *"Load restoration"*
  - *"Delete restoration"*
  - *"Select patient for new restoration"*

### 13.1.3 Generating or preselecting patients

Launch the **CerPI.exe** program by entering the following data:

- **CerPI.exe**
- Minus sign (**-**)
- **Card index number;**
- **First name;**
- **Last name;**
- **Date of birth;**

The **date of birth** must be entered in the format specified in the Windows Regional Settings: in the format **DD.MM.YYYY** (e.g.: 27.03.1964) or **MM/DD/YYYY** (e.g.: 03/27/1964).

**⚠ CAUTION**

**Entering the data**

Following the **card index number, first name, last name, date of birth, you MUST** always enter a semicolon (;).

#### Example

CerPI.exe -0815;first name;last name;15.11.2000;



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### Result

**Database connection**

| With database connection | Without database connection |
|---|---|
| The patient is registered in the SIRONA database. | The patient is generated in the local data structure. |

## 13.2 SLIDA interface

**NOTICE**

The SLIDA interface is only available for devices with a 32-bit operating system (e.g. not for inEos Blue users).

### Only with database connection

If the database connection is used, it is possible to send patient data to CEREC via the SLIDA interface.

### Modifying patient data via the SLIDA interface

You can create new patients, change patient data and activate patients. The mail slot for the SLIDA interface is set up during the installation of the database.

### No editing of patient data in CEREC

Patients registered in the SIRONA database via the SLIDA interface can be deleted in the CEREC 3D application, but not edited. The reason for this is that the SIRONA database contains only copies and no originals.



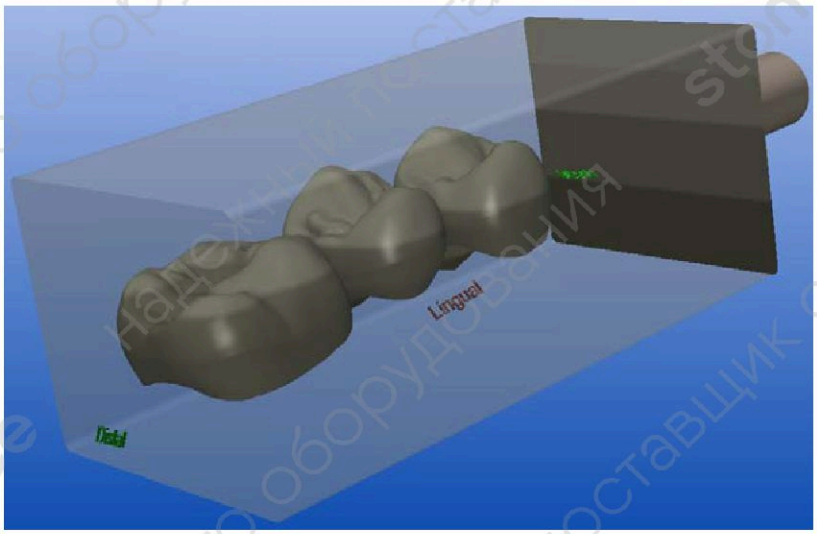
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# 14 Tips and Tricks

## 14.1 VITA CAD-Temp multiColor




For a restoration *"Bridge"* in the design procedure, *"Biogeneric"* the `VITA CAD-Temp multiColor` block can be used. The following milling units are required for this:

- *"Step Bur 20"*
- *"Cyl. Pointed Bur 20"*

## 14.2 Screenshot / TIF image

The SIROCAM application is perfectly suitable for exporting TIF images of preparations or forwarding them to a graphics program for further processing.

### Generating a screenshot

Since TIF images of preparations do not show any constructions lines, it may be necessary to generate a screenshot:

**NOTICE**

**Print key on acquisition unit**

Instead of the **Print** key, press the following keys simultaneously on a CEREC acquisition unit.




✓ The desired contents are visible on the screen.

1. Press the key marked *"Print"*.
2. Open a graphics program of your choice (e.g. Paint).
3. In this program, select *"Edit"* / *"Paste"*.



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## 14.3 Importing CEREC Connect files into the CEREC 3D software

**NOTICE**

**CEREC Connect software**

Files can only be imported from the CEREC Connect software into the CEREC 3D software if you have confirmed the validity of the 3D model.

✓ The CEREC Connect software is started.

✓ The validity of the 3D model is confirmed.

1. Save the restoration in the CEREC Connect software by selecting *"Restoration"* / *"Save as..."*.
2. Close the CEREC Connect software by selecting *"Restoration"* / *"Exit"*.
3. Start the CEREC 3D software.
4. Load the restoration, which was saved previously in the CEREC Connect software, by selecting *"Restoration"* / *"Load..."*.
5. Once the restoration has been loaded, select *"Design"* / *"Change..."*.
6. Select a patient or create a new one.
7. Select the restoration type (*"Restoration"*), *"Design technique"* and tooth number in the next dialog box.
8. Confirm with *"OK"*.
9. Proceed by selecting *"Restoration"* / *"Save as..."*.
10. Enter a new name and click *"OK"* to confirm.
11. You can now proceed with the design process as normal.

## 14.4 Technical notes

### 14.4.1 No optical impressions can be taken while a DVD film is being played back

No optical impressions can be acquired (3D camera or SIROCAM) during playback of a DVD film. The DVD software player must be deactivated before taking a new optical impression.

If an acquisition is initiated during playback of a DVD, graphic errors will result. In this case, exit both the CEREC 3D (or SIROCAM) application and the DVD software player and restart the CEREC 3D (or SIROCAM) application.

### 14.4.2 Softguard dongle

A device (printer, external drive) connected additionally to the softguard donglesoftguard dongle can impair its function.

1. Remove the connection to this device.
2. Check to see whether the parallel port is set to EPP in the BIOS setup of the PC. Use the manual for the motherboard as a reference.

The acquisition unit has been correctly adjusted at the factory!



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### 14.4.3 Problems during communication with the milling unit

If no communication can be established with the milling unit, check the port and baud rate settings under *"Settings"| "Configuration"| "Devices..."| "Configure"*.

Under unfavorable radio conditions, problems can arise in the communication with the milling unit. Switch the radio module of the milling unit off (pull out the plug) and then back on and try again.

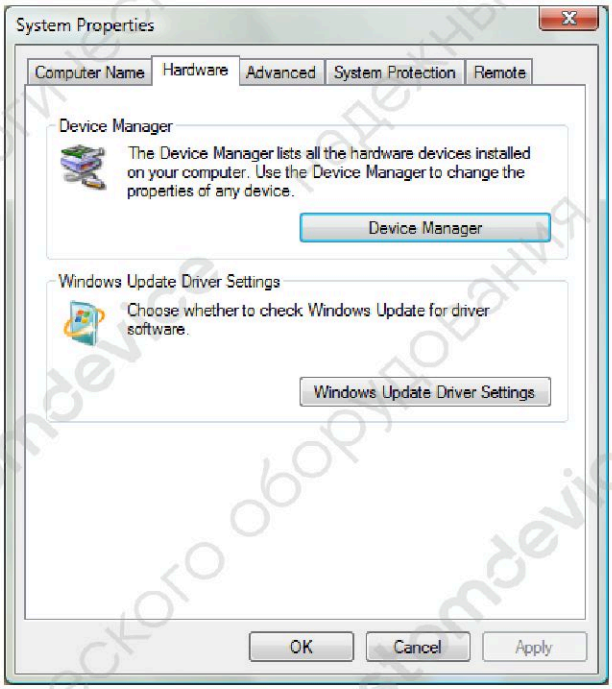
#### 14.4.3.1 Examples with CEREC 3 acquisition unit connected

| | | |
|---|---|---|
| Cable connection | Port=COM2 | Baud rate=115200 |
| Cable connection, long | Port=COM2 | Baud rate=19200 |
| EU radio link | Port=COM1 | Baud rate=115200 |
| U.S. radio link (Höft&Wessel) | Port=COM1 | Baud rate=115200 |
| U.S. radio link (Futuba) | Port=COM1 | Baud rate=19200 |
| Japan radio link (Futuba) | Port=COM1 | Baud rate=19200 |

#### 14.4.3.2 For PC/notebook

Check the *"Communications Port"* (interface).

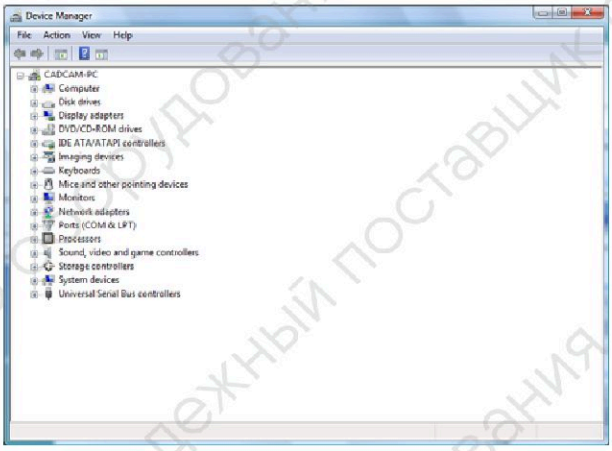
1. Select *"Start"| "Settings"| "Control panel"*.




*System Properties*

2. Double-click *"System"*.
3. In *"System Properties"*, select the *"Hardware"* tab and click on *"Device Manager"*.


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*Device Manager*

4. Double-click *"Ports (COM and LPT)"*. Here you can see which *"Communications Port"* is available (e.g. COM1, COM2).
5. Set the port displayed here via the menu option *"Settings"| "Configuration"| "Devices..."| "Configure"* (see "Devices" under "Configuration").

### 14.4.4 No sleep mode during the milling process

**CAUTION**

**Milling process**

The sleep mode of the PC must not be activated during the milling process.

### 14.4.5 Changing the font size

If the text is not completely visible in a dialog, in the window *"Display Properties"| "Large Fonts"* must be set. By right-clicking the background, in the window *"Display Properties"| "Appearance"| "Font Size"* you can set to *"Normal"* .

### 14.4.6 Screen saver

Display errors can occur when the screen saver opens. If this is the case, deactivate the screen saver.

### 14.4.7 Task Manager

Display errors can occur when you open the Task Manager (Ctrl+Alt+Del). If this is the case, exit and restart the CEREC 3D program.

### 14.4.8 Correlation quality

You can check the correlation quality by displaying the occlusal impression (*"Window"| "Display options"*). The preparation area and occlusion area are displayed as a "spotty" pattern in overlapping image regions.


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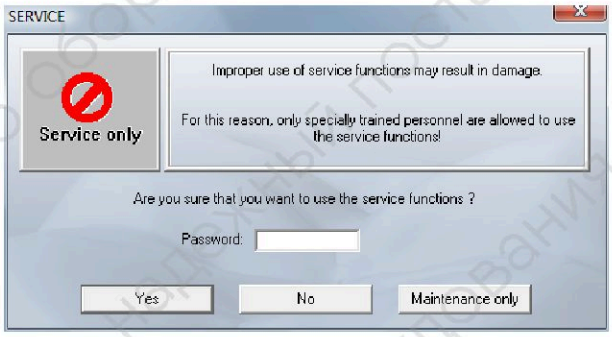
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## 14.5 Service program

✓ The CEREC 3D program is installed.

➢ Start the service program in the CEREC program group by clicking *"Start"| "Programs"| "CEREC"| "Service"*.




*Service dialog*

**CAUTION**

**Service functions**

The service functions are exclusively for use by authorized CEREC service engineers.

This program area can be accessed only by authorized technical personnel with a service password.

- With the Yes button, you confirm the service password.
- Use the *"No"* button to quit the service program.
- Using the *"Maintenance only"* button, you can also perform a water change of the milling unit **without** having to enter a service password (also see the Operating Instructions for the milling unit).

## 14.6 Frequently Asked Questions

### 14.6.1 Database connection

The tooth number specified by the CEREC entries (code "VC") is not converted in S(V)IDEXIS when the U.S. odontogram is used.

### 14.6.2 Minimizing the program

The CEREC 3D program cannot be minimized during the milling process.

### 14.6.3 Blurred optical impressions

Motion blurring in optical impressions (preparation or occlusion) can be recognized by their wavy appearance. Bright or dark spots in the height image (preparation or occlusion) are also indications of motion blurring.

Blurred optical impressions may produce bad milling results (holes in the restoration). The 3D camera must be held steadily until you hear an audible "click" sound.



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### 14.6.4 Additional software on the CEREC 3D DVD

- The freeware program “Zoomer” is installed in the CEREC program group along with the CEREC 3D software. This program features a magnifier function as a drawing aid. After right-clicking the zoom window, you can make various settings.
- The “Misc/CSA” folder includes a program with which you can participate in the CEREC Documentation Project of the “German Society of Computerized Dentistry” (DGCZ) and the “International Society of Computerized Dentistry” (ISCD).

  For more information, please contact AG Keramik at:

  Arbeitsgemeinschaft für Keramik in der Zahnheilkunde e.V.

  Office:

  Postfach 100117

  76255 Ettlingen

  E-mail: info@ag-keramik.de

  Internet: http://www.ag-keramik.de



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# Glossary

### 3D Preview

After you trigger the optical impression, the measurement data are displayed 3-dimensionally.

### 3D viewer

Main window

### Angled optical impressions

Additional optical impressions of the same area with a maximum permissible tilt angle of 20°.

### Edit

Tool (button) for activating/deactivating the editing function which can be used to modify design lines.

### Image catalog

Window for managing the image fields (preparation, occlusion and antagonist)

### Image field

One or more optical impressions of the preparation, of the occlusion or of the antagonist impression.

### Insertion axis

The direction of view of the camera / scanner (occlusal aspect) must agree with the insertion axis of the restoration.

### Intensity image

Window for more accurately drawing the cervical segments of the preparation margin in epigingival areas. You can activate the intensity image with the spacebar while entering the preparation margin.

### Occlusal optical impression

Optical impression of an existing or waxed-up occlusion.

### Reference optical impression

First optical impression that determines the original insertion axis.

### Single optical impression

A single optical impression that must be taken in the occlusal direction (insertion axis).

### Softguard dongle

Plug that is connected to the parallel port or the USB port of the PC and enables different milling options.

### Supplementary optical impressions

Several optical impressions that also image the mesial and distal neighbors.



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### Tool bar

Symbols (“icons”) which can be used to access important program functions.

### Trim

Tool (button) which can be used to hide/show previously defined regions.



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