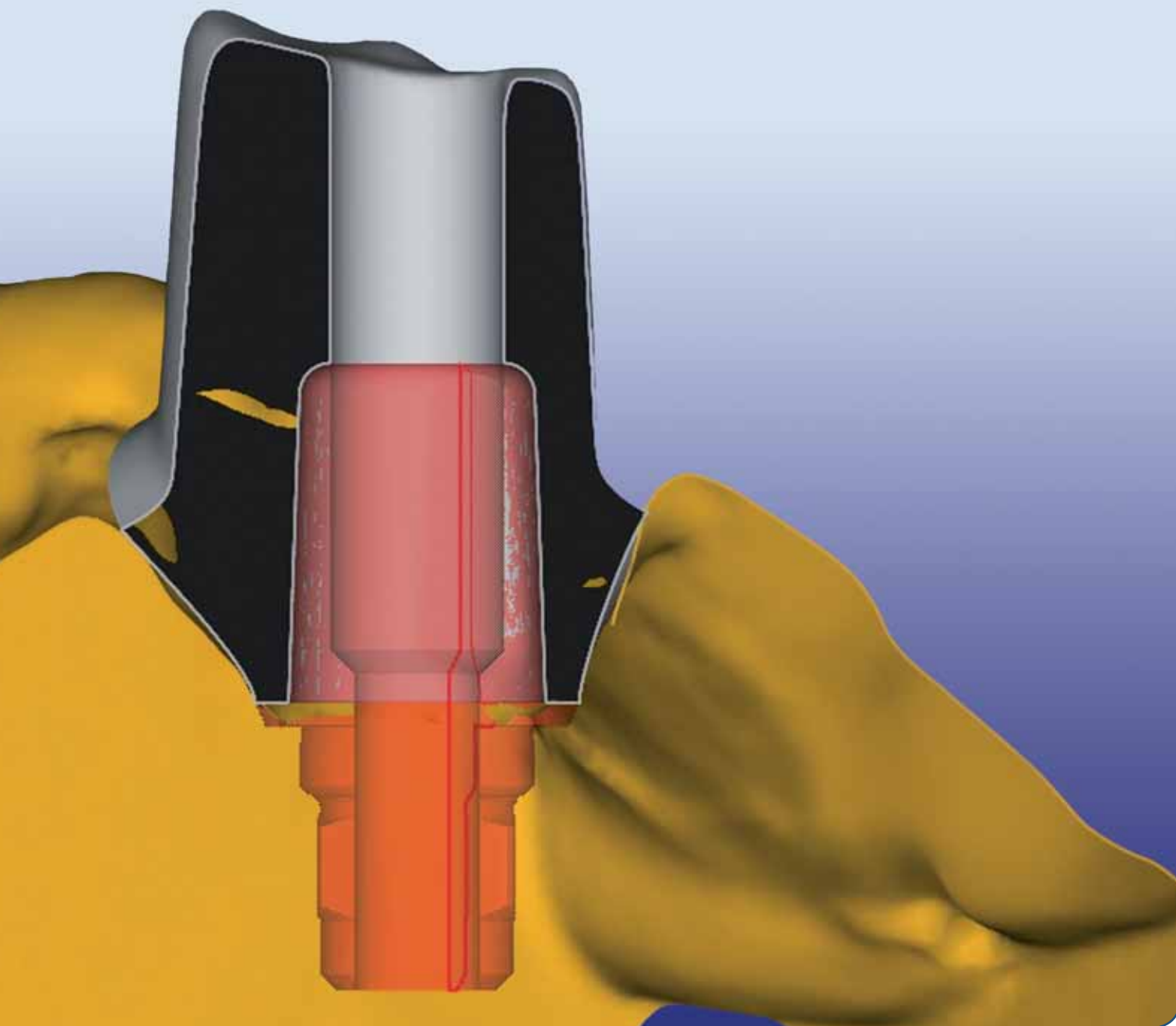


# CAD/CAM



## Cercon art<sup>®</sup> Custom Abutments

Product Description and Instructions for Use

Cercon<sup>®</sup> art Custom Abutments in connection with  
Cercon<sup>®</sup> smart ceramics and Compartis<sup>®</sup> integrated systems

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# 1 Purpose

## 1.1 Indication for use

- Cercon art is a hardware and software system developed for the virtual design of dental crowns and bridges as well as abutments in the dental laboratory.
- Cercon art is the CAD module for the Cercon smart ceramics zirconia all-ceramic system. With the current software version, Cercon art can be used to produce frameworks for crowns and bridges as well as abutments.
- Frameworks produced with Cercon art und Cercon brain/ Cercon brain expert or by the Compartis network production service must be checked for correct fit on the master cast before delivery to the patient.
- Improper repairs or interventions may compromise the integrated safety and protective functions (including electromagnetic protection) of Cercon art and may cause personal injury or damage the system.
- Hardware components must be repaired using original replacement parts only. This is the only way to ensure the stated performance and required operating safety. We recommend entering into a maintenance agreement that includes inspections to the Cercon art units.

## 1.2 Contraindications

- Cercon art is not suitable for any applications other than those described in the Cercon art, Cercon base/ Cercon base disk and Cercon brain/ Cercon brain expert Instructions for Use.

## 1.3 Warnings

- Applicable local laws and regulations related to work with display screen equipment must be followed when using with Cercon art.
- Cercon art units are electrical devices with electrical connectors essential to their function. These electrical connectors must conform to all applicable local laws and regulations. They must not be modified by the operator.
- **Repairs and interventions must be performed by DeguDent-authorized service technicians only. Interventions by non-authorized personnel will invalidate the warranty.**
- **Keep the transport packaging materials. The person or entity responsible for the operation of the unit is also responsible for the proper return of the Cercon art unit, should this become necessary. Return the system only in the original packaging materials, which should be retained for the purpose. DeguDent will not be responsible for any injury or damage caused by improper packaging (i.e., not the original packaging materials).**
- Modifications of system components may constitute a direct safety hazard and are therefore prohibited. In addition to the direct safety hazard, indirect hazards may occur, including errors in the dental restorations produced with Cercon art.
- Avoid strong magnetic fields in the vicinity of the system, which might interfere with the proper communication between the various components of the unit.
- Cercon art is delivered ready to use with different mains voltages, complete with mains cable, depending on the intended country of use.
- Before connecting the components, please compare the listed voltages, frequencies and fuse ratings on the rating plates with those of the existing power supply.
- Do not operate the system in a moist environment.

- Do not operate the system outdoors for any protracted period.
- Do not operate the system in an explosive atmosphere.
- When installing the unit, ensure adequate cooling by providing sufficient clearance on all sides.
- The system will be electrically safe only when connected to a properly executed installation, including protective earth.
- If you require a longer power cord to connect the system to mains, make sure that the ratings of the cables used and the electrical outlets are compatible with those of the system. In case of doubt please contact a licensed electrician.
- Disconnect the system from mains if not in use for a protracted period. To do so, unplug the mains cables.
- Hazardous fumes or gases may be generated in case of fire.
- Do not attempt to extinguish fire with water. Use a non-residue carbon dioxide extinguisher.

## 1.4 Precautions

- The safety instructions preceding the Instructions for Use include cautions and warnings for safe operation of the system components.
- Make sure to observe the safety instructions in the Instructions for Use of the various Cercon art units and the pertinent supplementary documentation.
- Before operating the Cercon art unit for the first time, please read these Instructions for Use carefully. They contain important information concerning system safety,

use and maintenance. This will protect you can prevent damage to the system.

- Retain these Instructions for Use and make them available to all users of the system.
- In addition to this chapter, make sure to read to separate Instructions for Use for the PC and monitor components.
- This chapter contains all information required for the safe operation of Cercon art.
- Permanent operation of the units is permissible in well-ventilated dry rooms only.
- Follow the EU Directive on the Minimum Health and Safety Requirements for Work with Display Screen Equipment (89/270/EEC).
- Downloading software updates or transmitting data for processing outside the laboratory requires access to the public telephone network or to a local area network (LAN) with Internet access.

## 1.5 Manufacturer

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Cercon art is the CAD module for the Cercon smart ceramics zirconia all-ceramic system. This module adds another method for fabricating abutments to our proven zirconia all-ceramic system.

For this purpose, individual die data are acquired using the Cercon brain laser or the separate Cercon eye scanner. Data from saw-cut models with bridge preparations can only be acquired using Cercon eye. The Cercon art software designs the crown or bridge framework and controls the Cercon brain/Cercon brain expert unit that takes care of the milling. Alternatively, the CAD data can be transmitted to the Compartis network production service for off-site fabrication.

Abutment situations are acquired using the Cercon eye scanner. The Cercon art software is used to design the one- or two-piece abutment. One- and two-part abutments can be fabricated by the Compartis production centre; two-part abutments only can also be fabricated using Cercon brain expert.

The Cercon art components comply with the requirements of EC Directive 73/23/EEC (Low-Voltage Directive). The Cercon art components comply with the requirements of EC Directive 89/336/EEC (EMC Directive). A voltage selector is located on the back panel of the Cercon art PC where the correct voltage range (100–127 V or 200–240 V) must be selected prior to installing the unit. In case of doubt, please consult a licensed electrician.

Before connecting and using Cercon art, please read these Instructions for Use carefully. The Instructions for Use and its complements (see below) are applicable to all product components of the Cercon art CAD module. The Instructions for Use and other documentation pertaining to the PC, monitor, USB storage device and PC switch complement the present Instructions for Use and are to be considered an integral part of these Instructions.

### Target group

**Cercon eye/Cercon art must only be used for the fabrication of dental components of medical products (dental crown or bridge restorations) when operated and supervised by qualified dental laboratory personnel.**

This documentation is intended to be read and followed by the person responsible for the operation and any other operators or users of the Cercon brain expert, Cercon eye or Cercon art units.

## 3 Preparatory steps

### 3.1 Laboratory steps

#### 3.1.1 Model preparation

The first step consists of fabricating the stone casts of the implant situation. We recommend pouring the dental arch in a light-coloured dental stone, e.g. white, pastel yellow, pastel blue, pastel green, light brown, brown, light grey or grey, since these are the best colours for the Cercon eye scanner to recognize and process. To be able to check the fit of the finished abutment on the cast, it is recommended to use a gingival mask made of a flexible material. The materials offered by Dentona (dento-mask 21) or Dreve (GumQuick implant) are characterized by excellent scannability in the Cercon eye scanner. Other materials for gingival masks must be rendered scannable by applying Cercon eye scan spray.



#### 3.1.2 Model preparation

As when scanning crowns and bridges, the cast must be segmented first, so that each gingival element with lab analogue is separate and stands by itself. Where multiple implants are located adjacent to each other, as can be the case when an entire quadrant is restored, the individual gingival elements may remain unsegmented for as long as they are not separated by a residual tooth or preparation.



#### 3.1.3 Scanning aid

To assist in acquiring the position of the implant during the scanning process, a specific scanning aid is available for each implant system. The scanning aid can also double as a modelling aid for the wax-up. The illustration shows the scanning aid for the ANKYLOS®/C system.



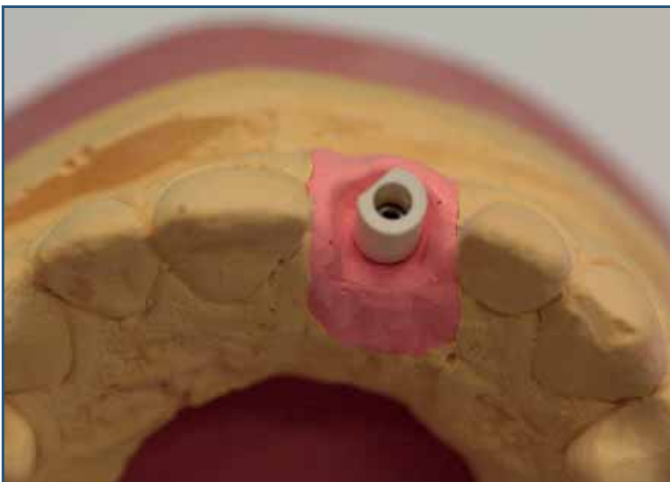
## 3 Preparatory steps

### 3.1.4 Scanning aid



The scanning aid for the XiVE® system helps determine not only the position of the implant during the scanning process but also the position of the index.

### 3.1.5 Scanning aid



Insert the scanning aid for the ANKYLOS®/C system into the lab analogue and secure it by hand-tightening the enclosed screw.

Never modify the shape of the scanning aid in any way.

### 3.1.6 Scanning aid



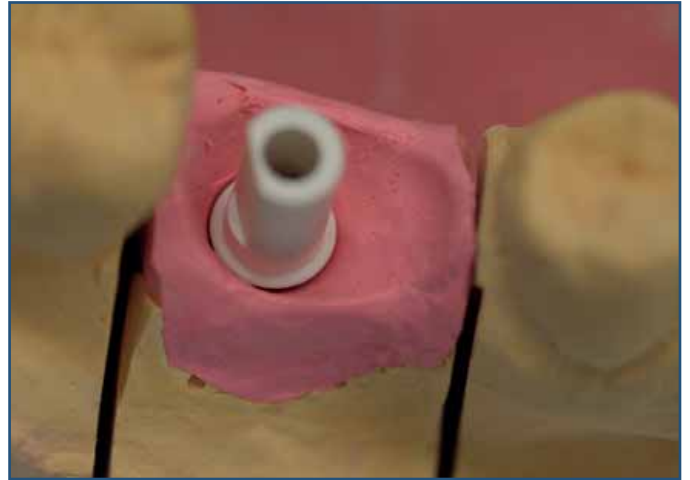
When inserting the scanning aid for the XiVE® system, make sure that it fits the index of the lab analogue perfectly. If this is the case, hand-tighten the enclosed screw to secure the scanning aid.

Never modify the shape of the scanning aid in any way.

## 3 Preparatory steps

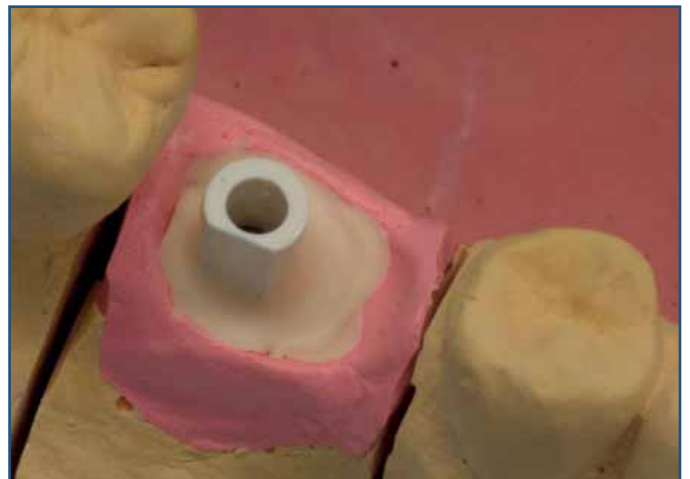
### 3.1.7 Scanning aid

If – as in this illustration – the scanning aid is improperly positioned, this will result in an incorrect position of the implant after scanning, with the result that the custom abutment will not fit.



### 3.1.8 Wax-up

If the scanning aid is used in its auxiliary function as a modelling aid, you can customize it by trimming. First fill the sulcus area with wax, then complete the tooth shape. You should perform the wax-up directly on the articulator because this will let you consult the antagonist bite when designing the Custom Abutment.



### 3.1.9 Wax-up

The wax-up should be as simple as possible but still include the necessary information related to the counterbite and the contacts with the adjacent teeth. Growth/incremental lines, Carabelli's cusps or similar may adversely affect the outcome for the Custom Abutment. In addition, make sure that the diameter of the bore for the screw canal does not exceed the diameter of the screwdriver shaft.



## 3 Preparatory steps

### 3.1.10 Positioning the cast



Position the cast within the scan holder such that the scanning area fits below the scanning template.

### 3.1.11 Positioning the cast



The pivoting arm with the three reference marks is aligned with the abutment situation. To acquire the emergence profile with the Cercon eye scanner in the best possible way, it is a good idea to tilt the cast slightly buccally for posterior abutments or slightly vestibularly for anterior abutments. This allows the gingival aspect to be captured more exactly by the scanning cameras.

For information about the scanning process itself, please consult the Cercon art software Instructions for Use.

## 4 Preparation for one-piece Custom Abutments –

### Creating a case

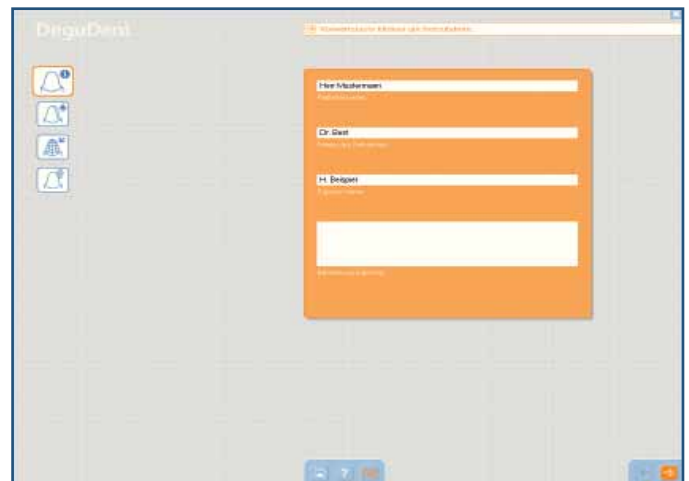
#### 4.1 Creating a new case

To create a case, i.e. a new file, click the corresponding icon.



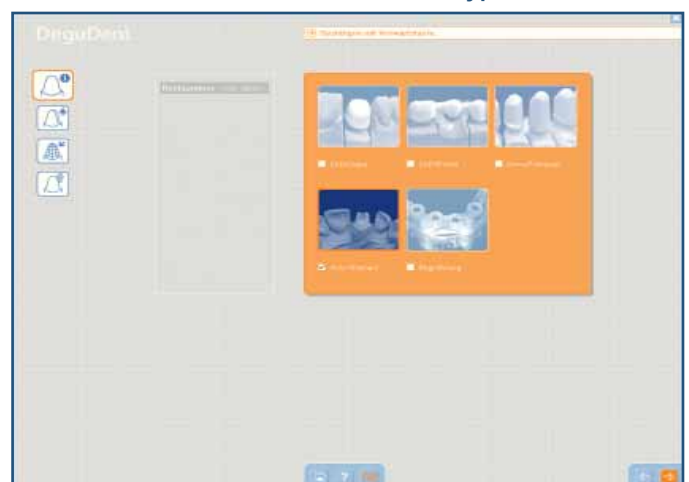
As the first step of the preparatory phase, the program requires you to enter the name of the patient, dentist and operator to identify the case uniquely and to meet the quality assurance requirements. Additional information about the case may be entered in the text field at the bottom.

#### 4.2 Text input



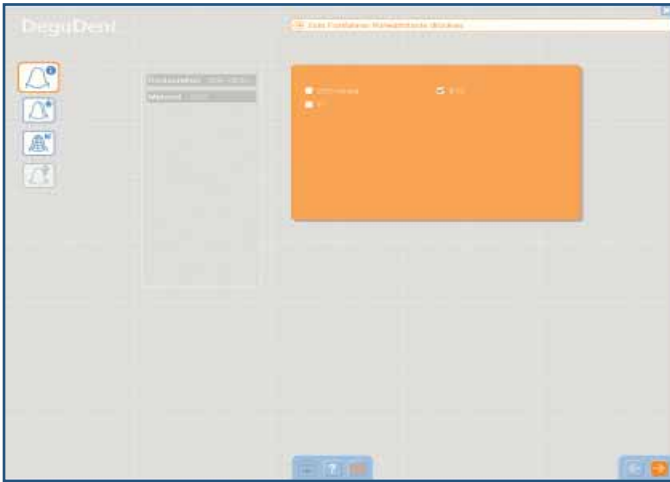
Define the restoration type to be created.

#### 4.3 Type of restoration



## 4 Preparation for one-piece Custom Abutments

### 4.4 Selecting the material



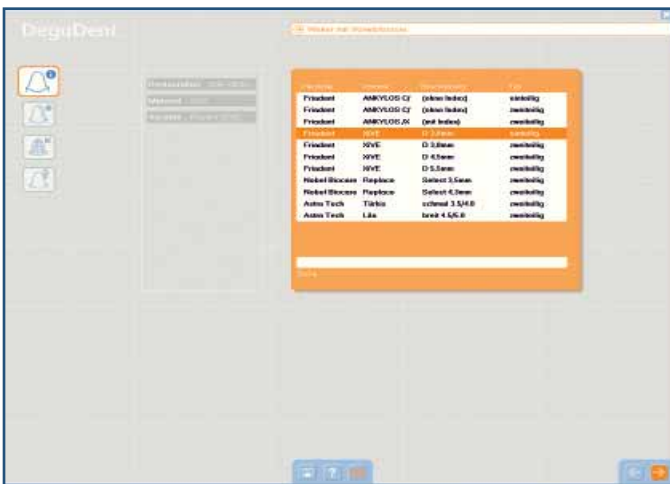
If you select the Custom Abutment icon, you will be taken to the material selection. Select the material for your coping or framework.

**Note:**

One-piece zirconia abutments have been approved only for the anterior region (teeth 13 to 23 and 43 to 33).

Two-piece Custom Abutments cannot be fabricated if titanium (Ti) is selected as a material.

### 4.5 Selecting the implant system (XiVE®)



In this step you can define for which implant system and platform the Custom Abutment is to be designed; in our example this will be the XiVE® 3.8 by Friudent.

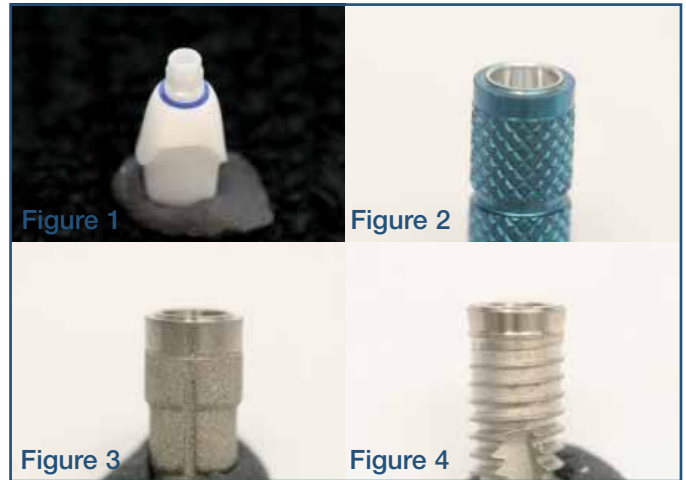
## 4 Preparation for one-piece Custom Abutments

### 4.6 Note on the Frialit/XiVE® implant system

For the Frialit and XiVE systems, Hermetics sealing rings used to be employed for diameters of 4.5 mm or above (Fig.1) to achieve a tight bacterial seal between the implant and the abutment. These sealing rings have since been discontinued by Friadent. Unfortunately, the corresponding lab analogues (Fig. 2) as well as the Frialit implants (Fig. 3) still feature an elevation in the shoulder region to accommodate those sealing rings, for implants with diameters of 4.5 and 5.5 mm; the XiVE implants (Fig. 4) do not. Restorations designed on the basis of Friadent lab analogues with diameters of 4.5 and 5.5 mm and the resulting custom Cercon art abutment would be 0.2 mm lower in the mouth than on the articulator if a XiVE implant was used. For this reason, only the 3.8 mm diameter platform has been approved and is available for the XiVE implant system in the Cercon art Abutment chapter.

Fabricating a Custom Abutment based on a Frialit implant is not possible owing to the elevation designed to accommodate the Hermetics sealing rings.

For information about product availability, please consult DENTSPLY Friadent.



In this step you can select the healing abutment used by the treatment provider.

#### Note:

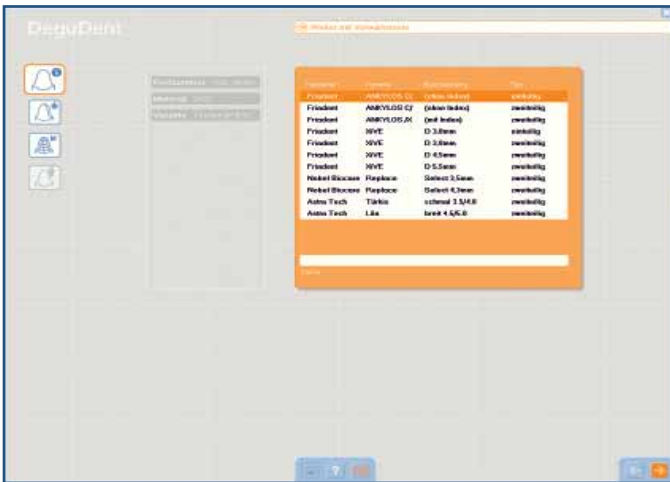
If no information is available regarding the healing abutment used or if the emergence profile was customized, the default healing abutment suggested by the software can be used instead.

### 4.7 Selecting the healing abutment (XiVE®)



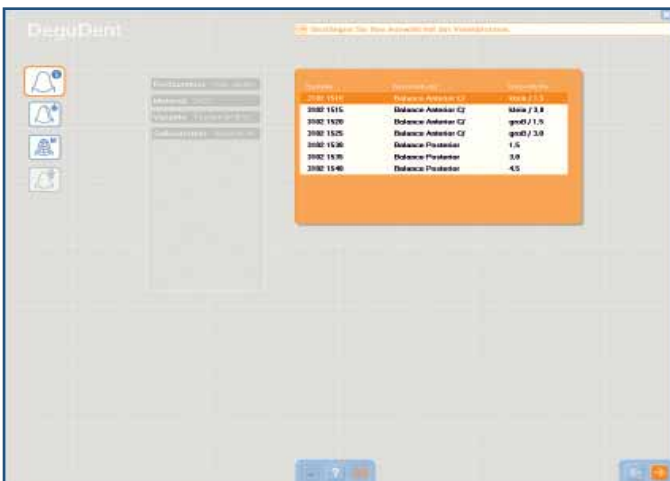
## 4 Preparation for one-piece Custom Abutments

### 4.8 Selecting the implant system



In this step you can define for which implant system and platform the Custom Abutment is to be designed; in this example this will be the ANKYLOS C/ system by Friadent.

### 4.9 Selecting the healing abutment

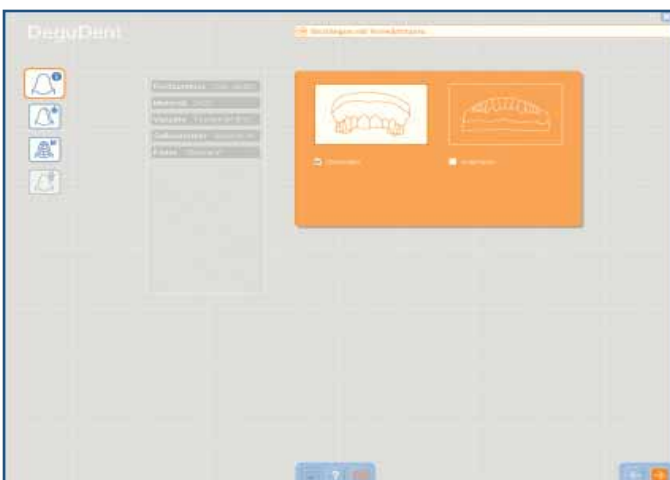


In this step you can select the healing abutment used by the treatment provider.

#### Note:

If no information is available regarding the healing abutment used or if the emergence profile was customized, the appropriate healing abutment must be determined based on the scanned cast.

### 4.10 Selecting the jaw



In this step you can select the jaw for which the abutment is to be designed.

## 4 Preparation for one-piece Custom Abutments

This step lets you define the tooth position for which the abutment is to be designed. The adjacent teeth can be additionally selected as well. Click the delete button if you need to start over.

### 4.11 Selecting the abutment position



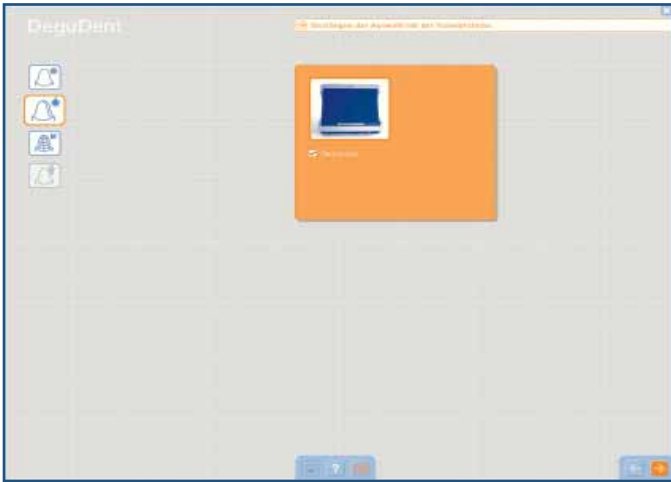
One-piece Custom Abutments must be produced at the Compartis® production centre. For this reason, a message window will be displayed when the continue button is clicked. Clicking the accept button lets you continue with the design process. Clicking “Cancel” returns you to the selection screen for the abutment position.

### 4.12 Selecting the abutment position



# 5 Scanning

## 5.1 Selecting the scanner



Only the Cercon eye scanner is available for scanning a cast for the fabrication of Custom Abutments.

## 5.2 Preparing for the scan (Cercon eye)



If the scan selected is the Cercon eye, on-screen instructions will explain the steps to be performed on the scanner: Turn on the scanner.

Clamp the cast in place on the scanning platform. Align it roughly according to its path of insertion and according to its height, using the scanning template for assistance. Follow the instructions in the chapters detailing the laboratory steps.

Click the View button at the lower edge of the window to change the display from info to video mode. Remove all elements that are not needed from the base of the cast. In the present example, only the gingival element with the analogue on the cast will remain. Place the scanning platform on the scanning plate of the Cercon eye scanner.

## 5.3 Aligning the first element



Position the scanning platform on the scanning plate so the crosshairs are positioned in the middle of the sulcular area. In some cases, this will be the middle of the lab analogue. All three reference marks must be completely visible within the video image frame.

In some situations, a magnified preview image may facilitate the exact positioning of the object to be scanned below the crosshead.

**Magnified preview** To get the magnified preview, simply check the corresponding checkbox below the preview image.

**Magnified preview** Note that the regular preview image will return after the following scan to ensure that the reference markers are located inside the preview image.

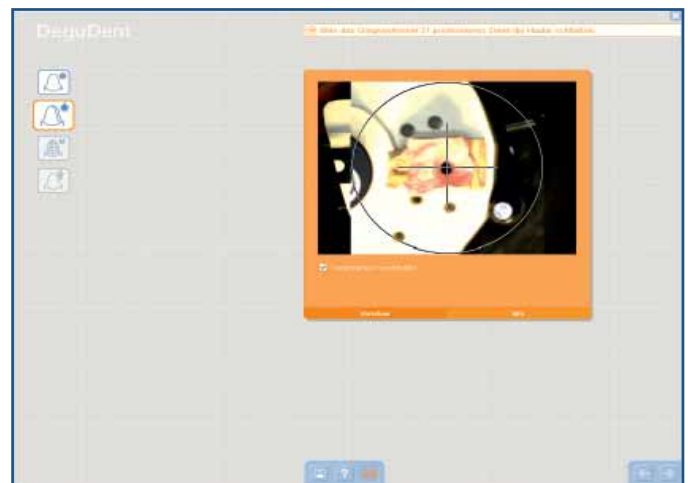
To initiate the scanning process, close the lid until it locks into place.

Close the lid to start the scanning process. The upper progress bar will show the scanning progress for the current element. The lower progress bar will show the total scanning progress for all elements.

Once the scanning process has been completed, place the scanning aid in the gingival element. No particular alignment is required.

Position the scanning platform on the scanning plate so that the crosshairs are positioned in the middle of the scanning aid. All three reference marks must be completely visible within the video image frame.

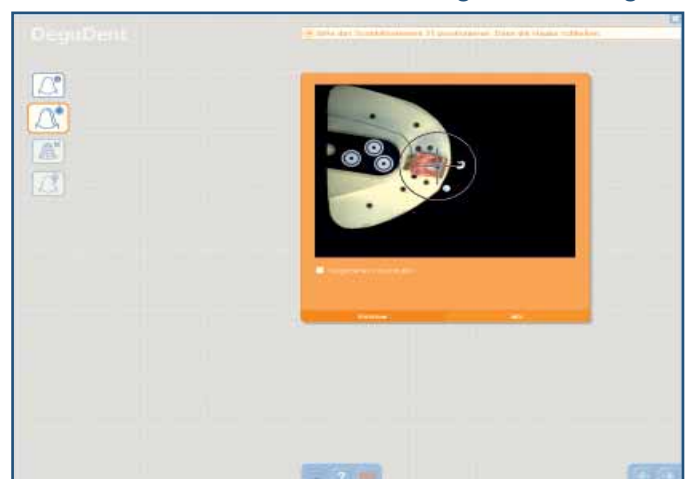
## 5.4 Magnified preview



## 5.5 Scanning progress

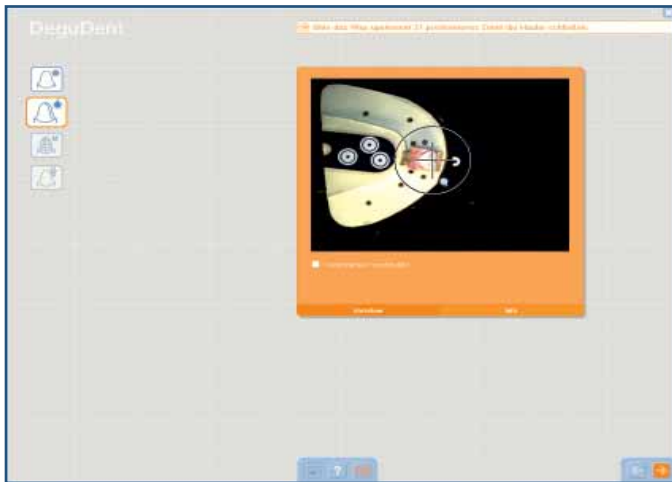


## 5.6 Scanning the scanning aid



## 5 Scanning

### 5.7 Scanning the wax-up

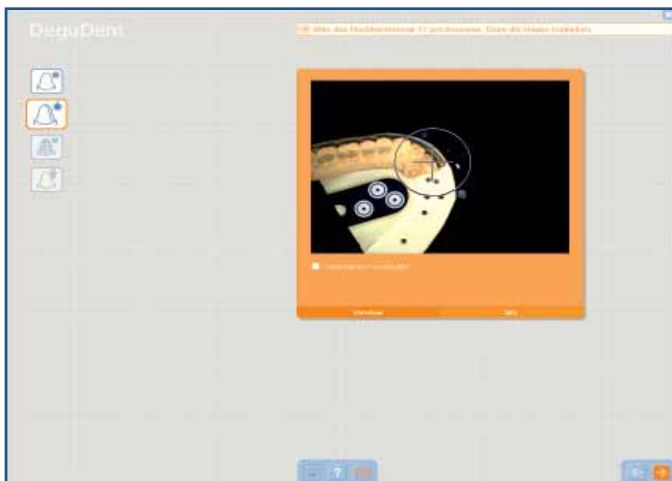


Once the scanning process is completed, remove scanning aid from the gingival element and put the wax-up in place.

Position the scanning platform on the scanning plate so the crosshairs are positioned in the middle of the occlusal surface in the case of posterior teeth or at the centre of the incisal edge in the case of anterior teeth.

All three reference marks must be completely visible within the video image frame.

### 5.8 Scanning the adjacent teeth



Scan the adjacent teeth (here: 11 and 22) in the same way as the wax-up. Proceed in the same manner as for the posterior and anterior teeth: centre the crosshairs and start the scanning process.

Here, too, all three reference marks must be completely visible within the video image frame.

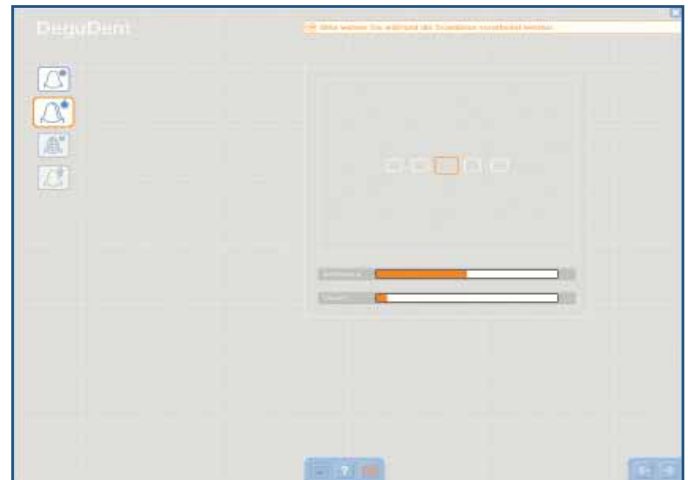
### 5.9 Scanning the wax-up individually (wax-up single scan)



Once the adjacent teeth have been scanned, scan the wax-up individually. Secure the wax-up to a lab analogue and place it in the scan holder base. Align the wax-up roughly according to its path of insertion and also according to the correct height, using the scanning template for assistance. Follow the instructions in the chapters detailing the laboratory steps.

## 5.10 Referencing

Next, the scan data for the gingiva, the scanning aid, the adjacent teeth and the individual wax-up are will be referenced, i.e. the six point clouds will be perfectly aligned.








## 5.11 Scan data display

When the calculations have been completed, Cercon art will display the resulting point cloud. This point cloud should display a roughly even distribution in the sulcus area of the future abutment, in the area of the scanning aid, in the area of the wax-up and in the area of the adjacent teeth.



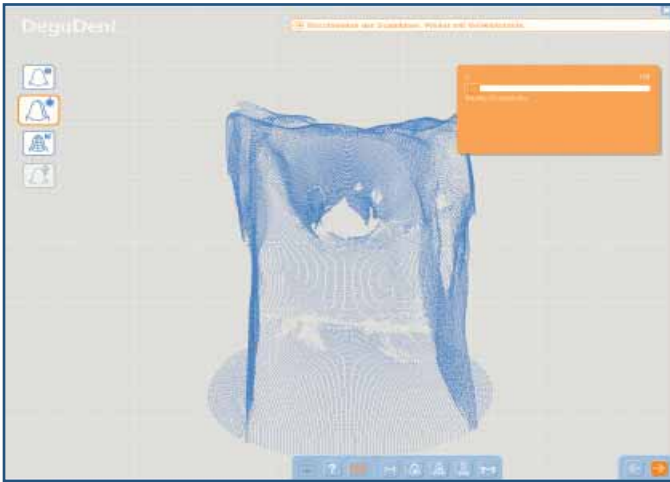
Five buttons are available to control the display and to check the scan data.

-  Show/hide the gingiva scan data.
-  Show/hide the wax-up single scan data.
-  Show/hide the wax-up scan data.
-  Show/hide the scanning aid scan data.
-  Show/hide the adjacent teeth scan data.



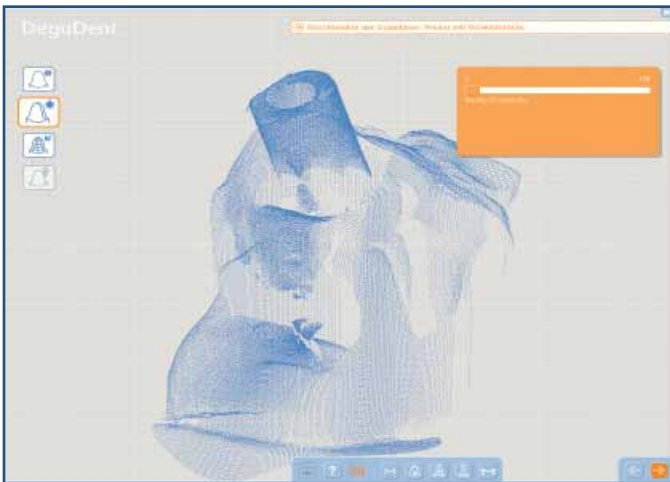
## 5 Scanning

### 5.12 Checking the scan data



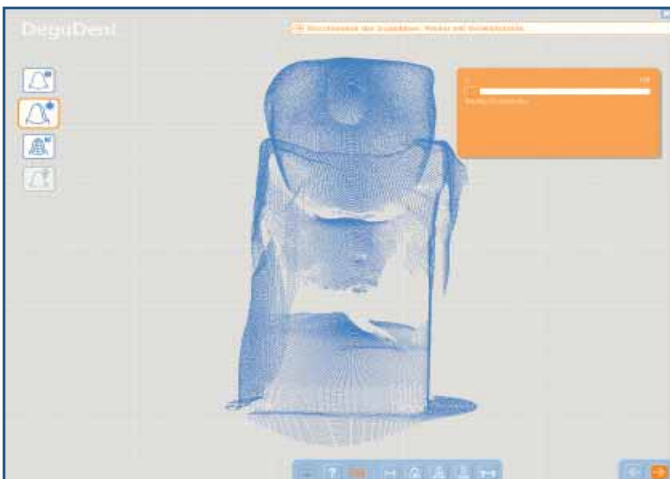
Use the display buttons to hide the data for all the scanned elements until only the point cloud of the gingiva data is visible. Check to see whether the area where the emergence profile will be contains a sufficient number of scan points.

### 5.13 Checking the scan data



Use the display buttons to hide the data for all the scanned elements until only the point cloud for the scanning aid data is visible. Check to see whether the area of the scanning aid that emerges from the gingiva contains a sufficient number of scan points.

### 5.14 Checking the scan data



Use the display buttons to hide the data for all the scanned elements until only the point cloud for the wax-up scan data is visible. Check to see whether the area of the wax-up that emerges from the gingiva contains a sufficient number of scan points.

Use the display buttons to display not only the wax-up scan data point cloud, but also the adjacent teeth scan data point cloud. Check to see whether the area of the adjacent teeth contains a sufficient number of scan points.

### 5.15 Checking the scan data



Use the display buttons to hide the data for all the scanned elements until only the point cloud for the wax-up single scan data is visible. Check to see whether the wax-up area contains a sufficient number of scan points.

### 5.16 Checking the scan data



If you discover problems with one or more of the point clouds, such as “holes”, you have the option to repeat the scan for the affected element.

**This presupposes that the cast has not been moved or in any way modified on the scanning platform.**



To rescan, simply go back one step using the arrow buttons.

A menu will open where you select the objects to be rescanned by clicking on them.

### 5.17 Multi-scan



## 5 Scanning

### 5.18 Multi-scan



Realign the elements below the crosshairs as previously described and rescan them.

**Note:**

This presupposes that the cast has not been moved or in any way modified on the scanning platform.

### 5.19 Multi-scan



The data for the rescanned object will be inserted automatically into the overall scan data for the rest of the elements.

**Note:**

The multi-scan option will be available for as long as the case has not been closed. If the case has been saved and closed, the multi-scan option will no longer be available.

To reduce the amount of data to be processed and to obtain a well-defined margin, the scan data can be cropped, starting at the basal aspect.

To do so, use the slide control to define the height of the base.

Make sure that there is sufficient distance to the deepest point of the gingival element so that the sulcus region for the Custom Abutment is not encroached on.

When done, click the forward arrow to conclude the SCAN section.

## 6 One-piece Custom Abutments

When moving from the SCAN section to the CAD section of the software, the scan points of the abutment case scanned with Cercon art are calculated completely, and the surface is calculated are displayed. Begin the abutment design process by aligning the tooth axes.

### Note:

If at least one adjacent tooth is scanned for an abutment case, no adjustments or only minor adjustments to the dental axes will usually be required. If the case is scanned without adjacent teeth, adjustment of the tooth axes is inevitable.

To assist in aligning the tooth axes, these are displayed in three different colours:

Blue = buccal/labial

Green = mesial


Red = occlusal/incisal

The tools for aligning take the shape of the slide control and a toggle button for selecting the active axes.



Toggle button for selecting a tooth axis.

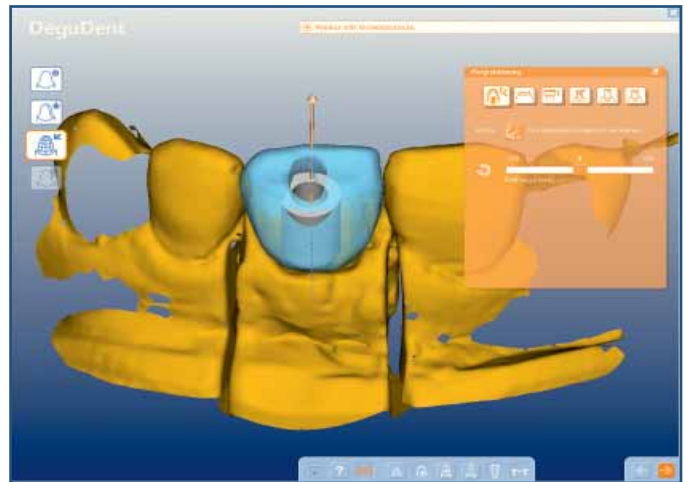


For a better view of the axes, use the  display button to hide the scanning aid library component.

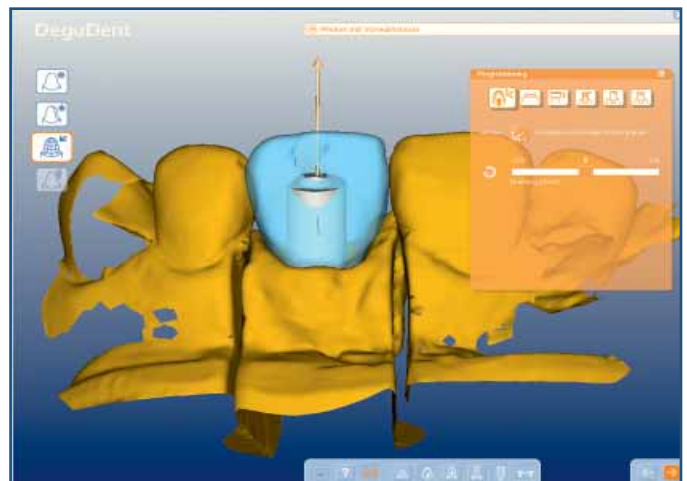
At the beginning of the alignment process, the occlusal/incisal axis will be active. The active axis is indicated by an arrow, while the inactive axes are indicated by a dotted line. The inactive axes are rotated around the currently active axis. A slide control is available for rotating. The range of rotation is between  $-180^\circ$  and  $+180^\circ$ , meaning that a complete  $360^\circ$  turn is possible.

To get a better idea of the positions of the inactive axes, it will be necessary to watch the arrow for the active axis. Use the Cercon move to arrange the situation appropriately.

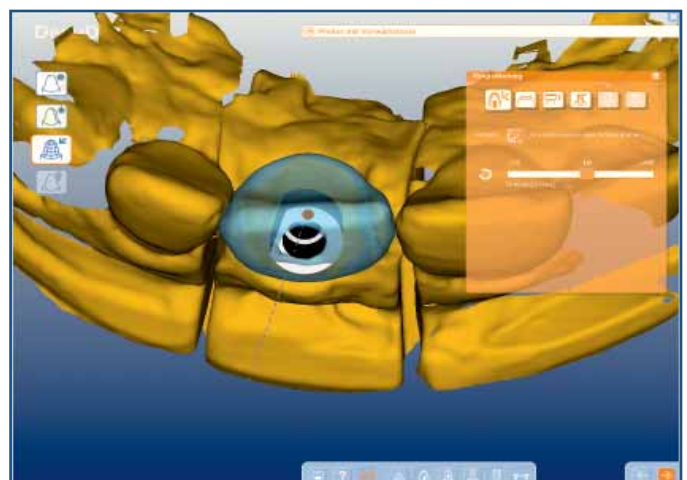
### 6.1 Viewing the calculated surfaces



### 6.2 Aligning the tooth axes

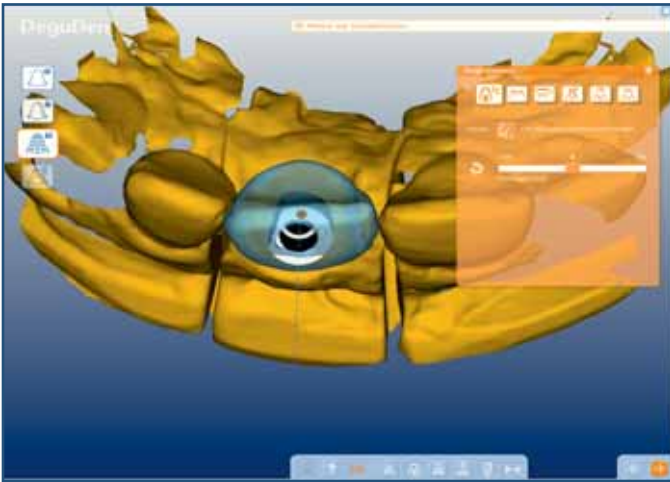


### 6.3 Aligning the tooth axes



## 6 One-piece Custom Abutments


### 6.4 Aligning the tooth axes




Use the slide control to align the two inactive axes such that blue points in a vestibular direction and green points in a mesial direction.

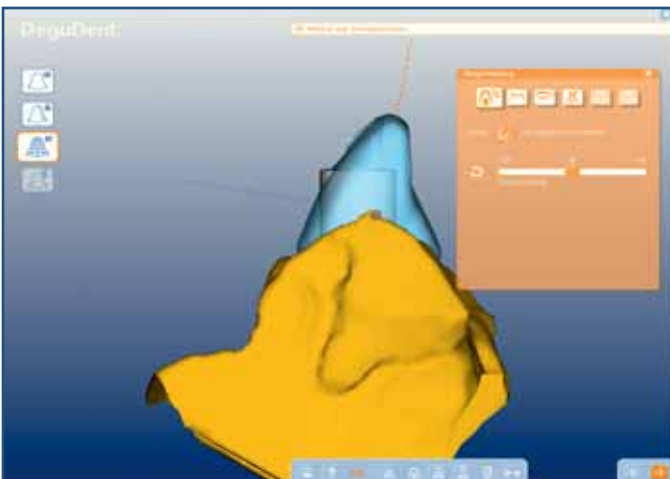
### 6.5 Aligning the tooth axes



Correct the occlusal/incisal axis in a vestibular/oral direction. To do so, first use the  toggle button to select the active axis.


Now the mesial axis will be active, indicated by an arrow. To get a better view of the mesial axis, use the  button to hide the adjacent teeth.

### 6.6 Aligning the tooth axes



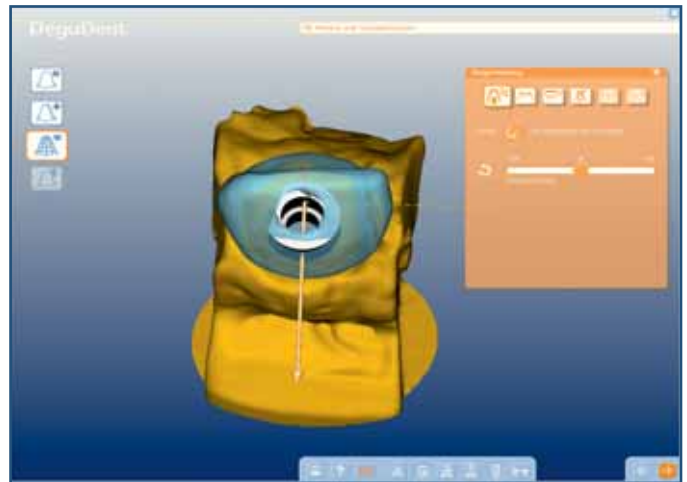
Use the Cercon move to rotate the situation such that your view is of the tip of the mesial proximal surface of the scanned wax-up. Use the slide control to rotate the red inactive axis such that it points in an occlusal/incisal direction.

## 6 One-piece Custom Abutments

Correct the occlusal/incisal axis in a mesial/distal direction. To do so, again use the  toggle button to select the active axis.

Now the vestibular axis will be active, indicated by an arrow.

### 6.7 Aligning the tooth axes

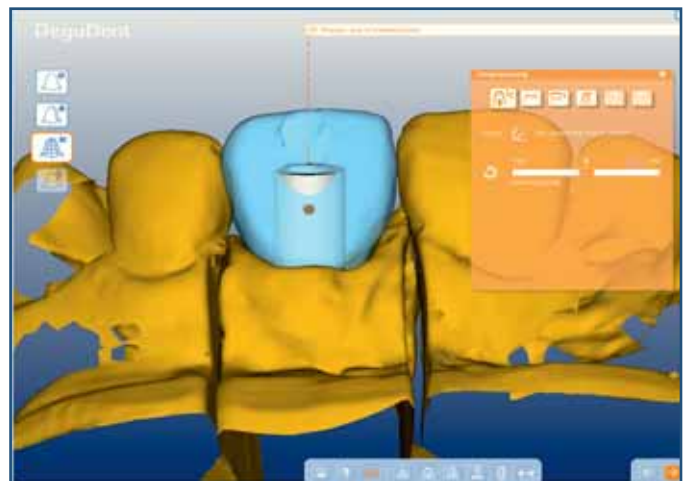


Use the Cercon move to rotate the situation such that your view is of the tip of the vestibular axis. Use the slide control to rotate the red inactive axis such that it corresponds to the vertical axis of the wax-up.

Use the  display button to redisplay the adjacent teeth for better orientation.

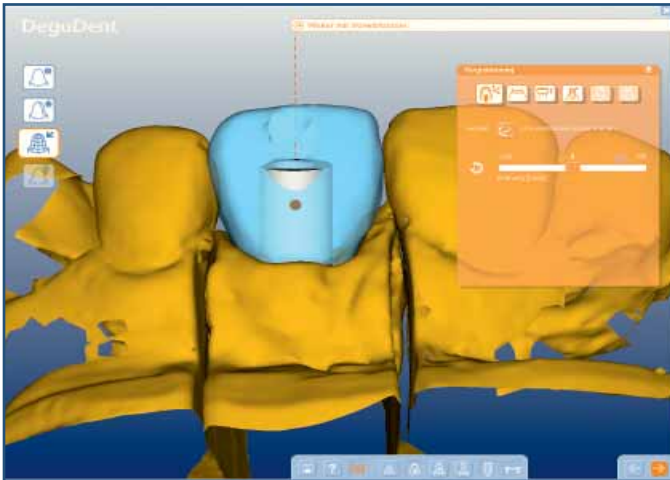
This concludes the alignment of the tooth axes.




### 6.8 Aligning the tooth axes



## 6 One-piece Custom Abutments

### 6.9 Checking the registration



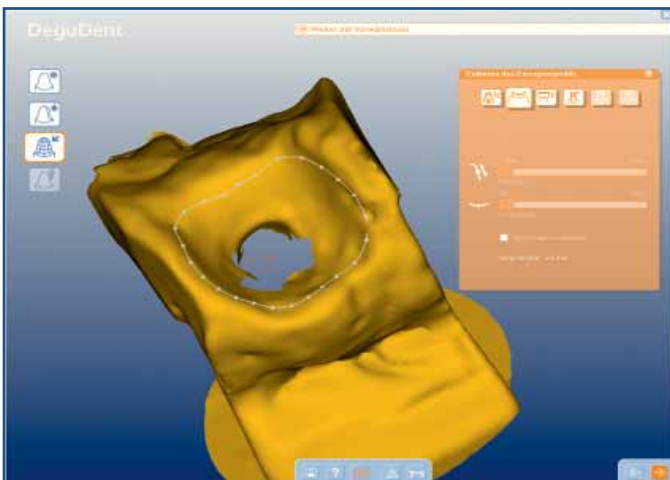
Use the  display button to hide the wax-up and the  and  display buttons to show the scanned and library data for the scanning aid.

Both the scanned and the library data should coincide, as seen in the illustration. When done, click the forward arrow to proceed to editing the emergence profile line.

#### **Note:**

If the scanned data for the scanning aid do not agree with its library data, this means that the registration has failed. You will have to abort the abutment design process, because the position of the implant connection geometry does not agree with the position on the cast or with the intraoral position. In this event, the case will have to be completely rescanned.

### 6.10 Editing the emergence profile line



You will be given an initial suggestion for an emergence profile. On the finished abutment, this light response to the preparation margin of the subsequent restoration.

#### **Note:**

In addition to the emergence profile line, the sulcus line will be visible as a grey dotted line. When editing the emergence profile line, make sure that (1) it does not cross the sulcus line and (2) its diameter is smaller than that of the sulcus line. If one of these requirements is not met, Cercon art cannot design an abutment. Read more in Chapter 11.11 Abutment calculation error.

## 6 One-piece Custom Abutments

### 6.11 Editing the emergence profile line



You have the option to modify the emergence profile line manually. To move a single point, select it by clicking it with the left mouse button and dragging it to the desired location. Alternatively, you may move the point using the “Position” slide control.



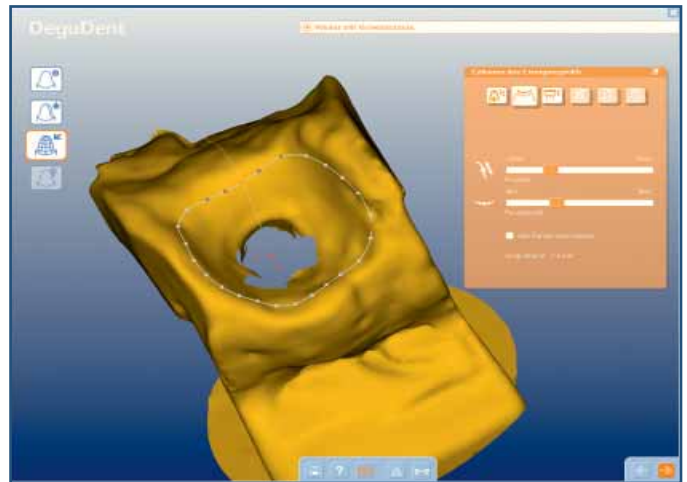
To move a large a second rather than a single point, increase the number of points by moving the corresponding slide control.



Move all points

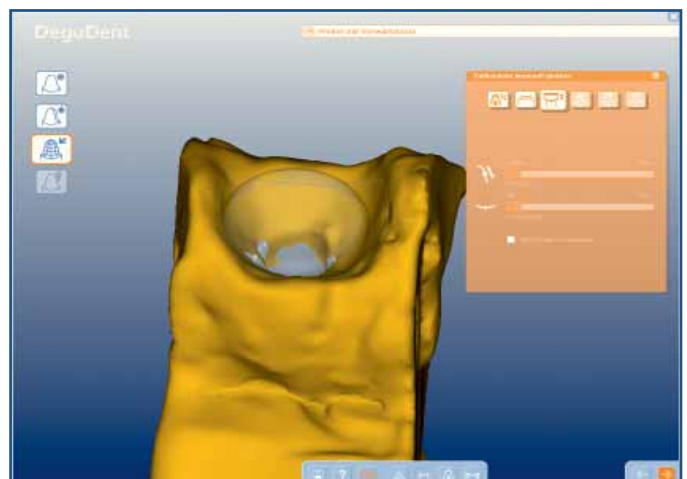
To move all points, check the corresponding checkbox.

Click the forward arrow to conclude editing the emergence profile line.



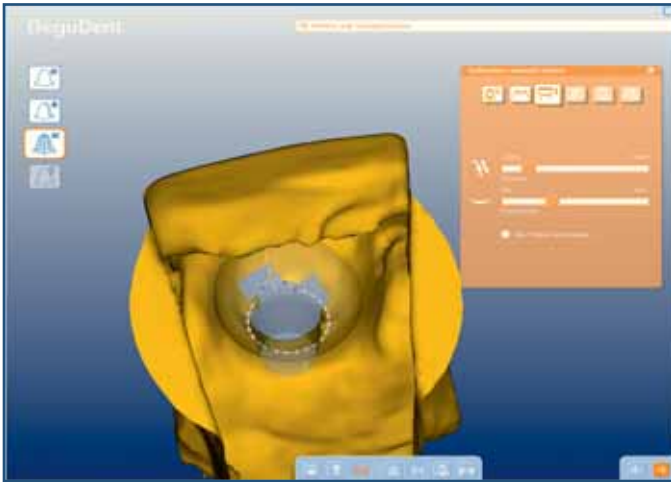
### 6.12 Editing the sulcus line

In this step you will see the healing abutment selected at the beginning of the design process. You have the option to modify the sulcus line manually.



## 6 One-piece Custom Abutments

### 6.13 Editing the sulcus line



Use Cercon move to rotate the gingival element so you view the sulcus line from below. The tools for editing the sulcus line are the same as those for editing the emergence profile line.

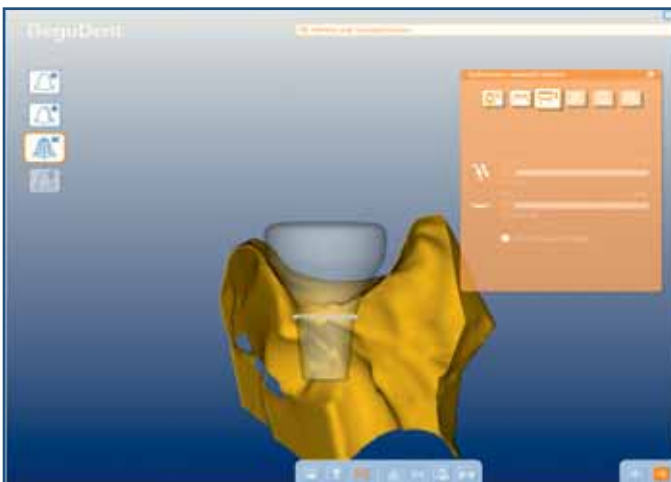
Any missing scan data in the sulcular region can be substituted for by data from the healing abutment by relocating the sulcus line.


Click the forward arrow to conclude editing the sulcus line.

#### **Note:**

In addition to the sulcus line, the emergence profile line will be visible as a grey dotted line. When editing the sulcus line, make sure that (1) it does not cross the emergence profile line and (2) its diameter is not greater than that of the emergence profile line. If one of these requirements is not met, Cercon art cannot design an abutment. Read more in Chapter 11.11 Abutment calculation error.

### 6.14 Editing the sulcus line



Use the  display button to view a section of the healing abutment. In this view you can check the fifth of the healing abutment and the positions of the emergence profile and sulcus lines.

#### **Note:**

When editing the sulcus line, make sure that (1) it does not cross the emergence profile line and (2) its diameter is not greater than that of the emergence profile line. If one of these requirements is not met, Cercon art cannot design an abutment.

Read more in Chapter 11.11 Abutment calculation error.

## 6 One-piece Custom Abutments

The abutment settings section is divided into three areas, each with its own range of settings.

These are:



Reduction parameter settings



Subgingival and margin settings



Angulation settings

The supragingival part of the Custom Abutment is calculated from the emergence profile line in a reduction-type procedure based on the wax-up. Starting from the wax-up, the bulk is cut back to accommodate the veneer thickness and the coping thickness of the future restoration. The tools available for this purpose are four slide controls, two each for the veneer and the coping. Use the slide controls to define the space to be provided for your future restoration.

The following controls are available:



Coping thickness in mm



Occlusal/incisal veneer thickness in mm



Oral veneer thickness in mm

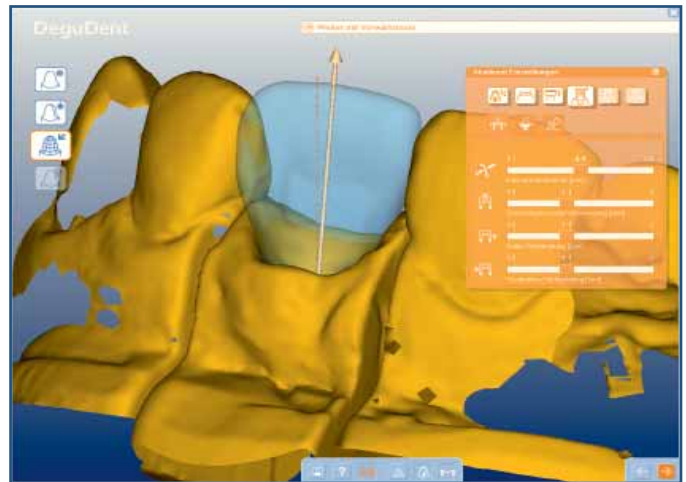


Vestibular veneer thickness in mm

### Note:

There will be no visualization of these selections.

### 6.15 Reduction parameters settings



### 6.16 Abutment settings



## 6 One-piece Custom Abutments

### 6.17 Subgingival and margin settings



Left-click the symbol for the subgingival and margin settings. The following slide controls and checkboxes are available for designing the subgingival aspects and for modifying the abutment margin parameters:



Shoulder length

Use the slide control to define the minimum cervical dimension in mm, similar to a shoulder preparation.



Emergence profile widening

Use the slide control to extend the diameter of the selected emergence profile in the horizontal direction. The unit of measurement is the millimetre (mm).

Smooth subgingival aspect

Check this checkbox to smooth the subgingival aspect of the abutment, starting at the emergence profile line. The emergence profile scan data are only partially included in the calculation.

Convex subgingival aspect

Check this checkbox to give the subgingival aspect of the abutment a convex shape. The emergence profile scan data will not be included in the calculation.

#### **Note:**

If none of the checkboxes is checked, the subgingival aspect of the Custom Abutment will be designed based on the scan data.

There will be no visualization of these settings.

## 6 One-piece Custom Abutments

### 6.18 Angulation settings

To control the abutment angle, left-click the angulation setting icon.

In this situation, an arrow symbolizes the abutment axis and, hence, the abutment angle. The dotted line indicates the axis of the screw-access canal/abutment. Two slide controls are available to control the abutment angle.



Angulation slide control, degrees

The maximum available angulation depends on the height of the gingiva and the selected material.



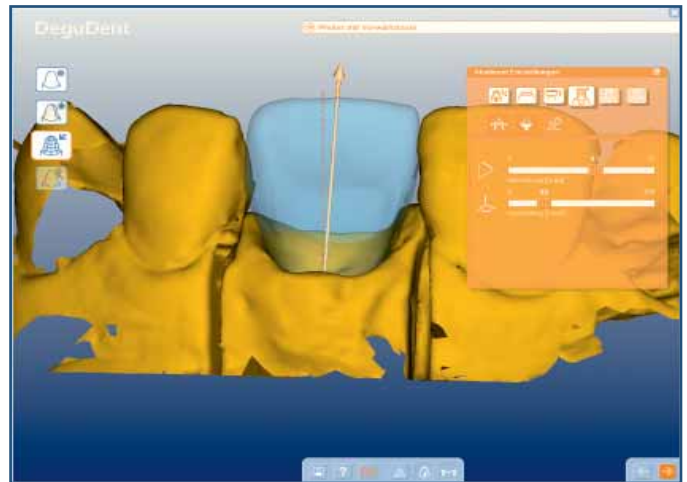
Angulation alignment slide control

The slide control lets you rotate the previous angulation around the screw-access canal axis to align the angulation in the vestibular, oral, mesial and distal directions. A rotation up to 360° is possible.

#### Note:

The angulation selected may influence the path of insertion of the future restoration.

Click the Forward arrow to proceed to the abutment preview and surface modification section.



#### Anterior: ANKYLOS, ZrO<sub>2</sub> and titanium

Height of gingival contour	Angulation
≤ 3.0	15
> 3.0	0

#### Posterior: ANKYLOS, titanium

Height of gingival contour	Angulation
0.75	37.5
1	35
1.5	30
2	25
2.5	20
3	15
3.5	15
4	15
4.5	15
5	0

#### Anterior: XiVE, ZrO<sub>2</sub>

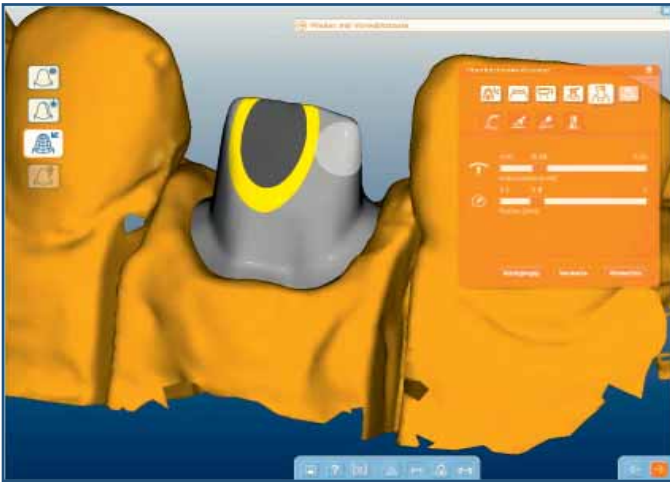
Height of gingival contour	Angulation
≤ 3.0	15
> 3.0	0

#### Anterior and posterior: XiVE, titanium

Height of gingival contour	Angulation
≤ 5.0	15
> 5.0	0

## 6 One-piece Custom Abutments

### 6.19 Surface modification



In this surface modification step, the proposed abutment is shown as defined by the previously selected parameters. The future screw-access canal is shown in grey. The yellow ring around the screw-access canal indicates the minimum thickness of the wall surrounding the canal.





### 6.20 Surface modification



The manipulation window contains the following tools and controls for abutment customization:



Adding/Smoothing/Removing/Rotating

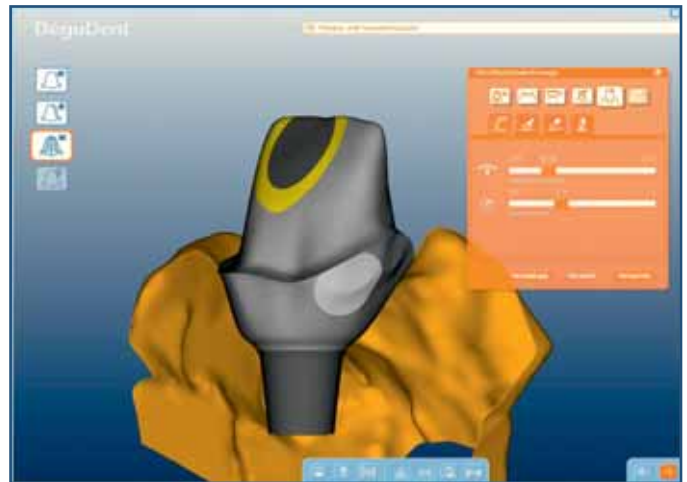
-  Build-up height
-  Reduction depth
-  Degree of smoothing
-  Degree of rotation

The rotation to let you rotate the supragingival aspect of the abutment 5° to the left or right. The subgingival aspect of the abutment will not be rotated.


## 6 One-piece Custom Abutments

### 6.21 Surface modification

The surface modification tools can be used both for the subgingival part and for the supragingival part of the two-piece Custom Abutment. When working on the supragingival part, it is recommended to use the appropriate display buttons to hide the interfering aspect of the model or to select the section view.



### 6.22 Viewing the Custom Abutment

This final step displays the finished abutment design. Use the  display button to view a section. Here you can check the position of the emergence profile line and the subgingival aspect of the abutment, as well as the minimum volume that insures that the minimum wall thickness requirements around the screw canal are met.



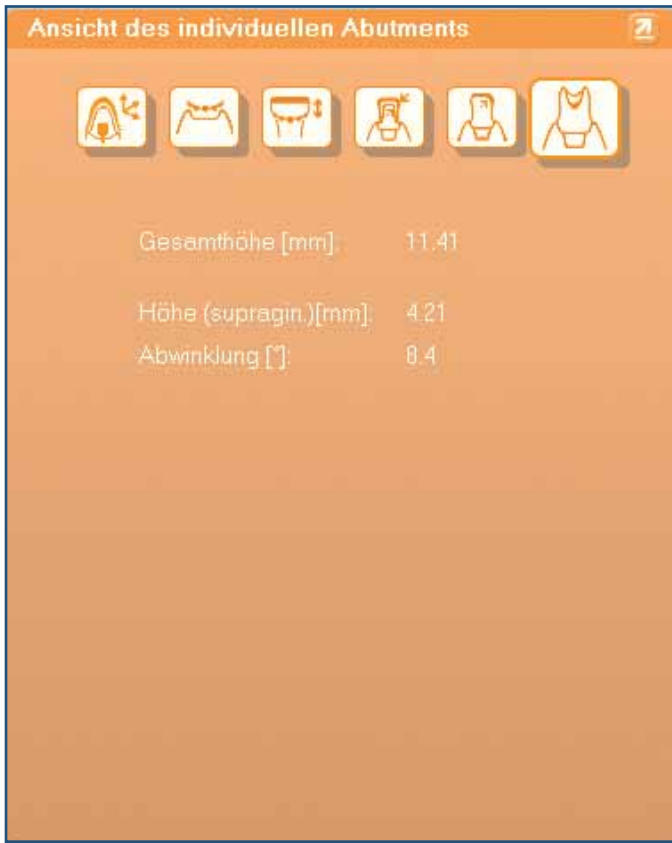
### 6.23 Viewing the Custom Abutment

The display buttons lets you hide the adjacent teeth and the gingival element, exposing the entire abutment including the connection geometry.



## 6 One-piece Custom Abutments

### 6.24 Viewing the Custom Abutment



The info screen displays information about the total height, from the lowest part of the connection geometry to the highest point of the abutment, the height of the supragingival aspect and the angulation of the abutment. Click the forward arrow to leave the CAD section and to enter the CAM section, where you can select the fabrication option as usual.

**Note:**

One-piece Custom Abutments can be produced at the Compartis® production centre.

## 7 Preparation for two-piece Custom Abutments –

### Creating a new case

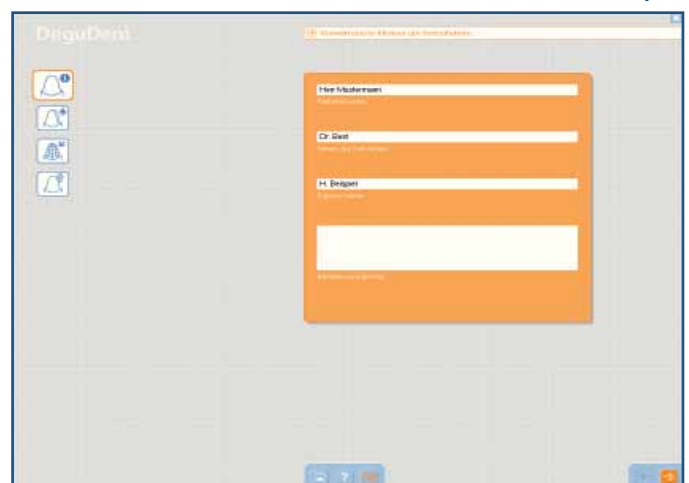
#### 7.1 Creating a new case

To create a new case, i.e. a new file, click the corresponding icon.



As the first step of the preparatory phase, the program requires you to enter the name of the patient, dentist and operator to identify the case uniquely and to meet the quality assurance requirements. Additional information about the case may be entered in the text field at the bottom.

#### 7.2 Text input



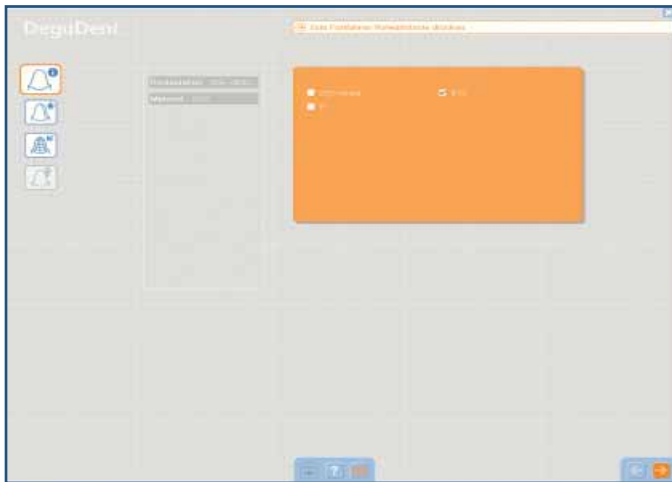
Define the restoration type to be created. Starting with version number 3.1, available options include CAD coping, CAD bridge, Conical/telescope, Custom abutment and Registration.

#### 7.3 Type of restoration



## 7 Preparation for two-piece Custom Abutments

### 7.4 Selecting the material

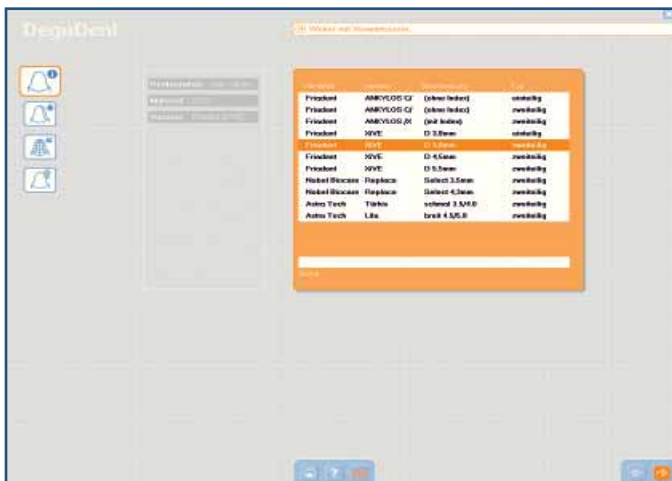


If you select the Custom Abutment icon, you will be taken to the material selection. Select the material for your coping or framework.

**Note:**

Two-piece Custom Abutments cannot be fabricated if titanium (Ti) is selected as a material.

### 7.5 Selecting the implant system (XiVE)

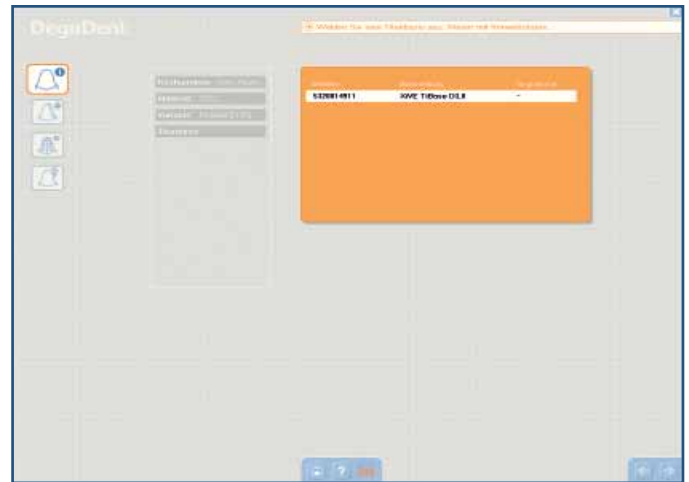


Define for which implant system the Custom Abutment is to be designed and whether it should be a one-piece or two-piece abutment; in our example this will be the XiVE D3.8 two-piece system by Friadent.

## 7 Preparation for two-piece Custom Abutments

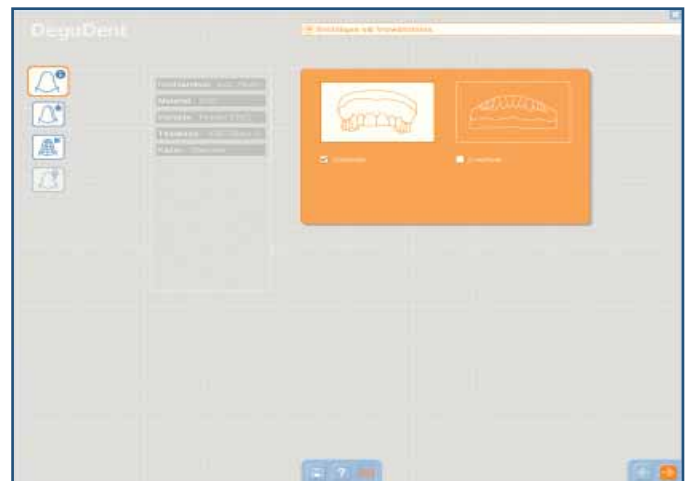
Select the appropriate titanium base.

### 7.6 Selecting the titanium base (XiVE)



Select the jaw for which the Custom Abutment is to be designed.

### 7.7 Selecting the jaw



Define the tooth position for which the abutment is to be designed. The adjacent teeth can be additionally selected as well. Click the delete button if you need to start over.

### 7.8 Selecting the abutment position

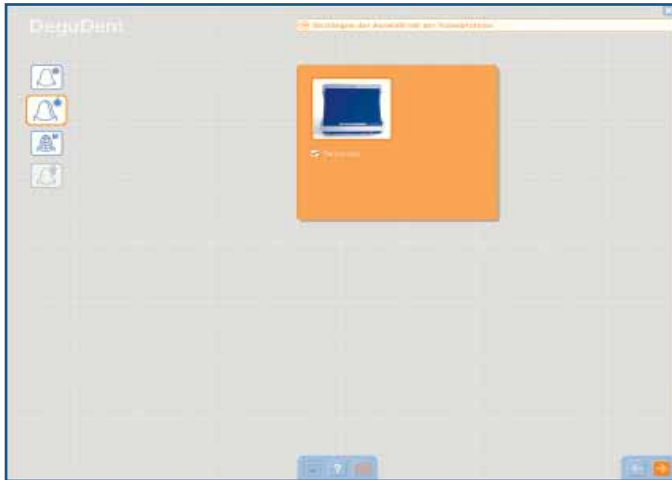


#### **Note:**

Two-piece Custom Abutments can be produced using Cercon brain expert or ordered from the Compartis® production centre.

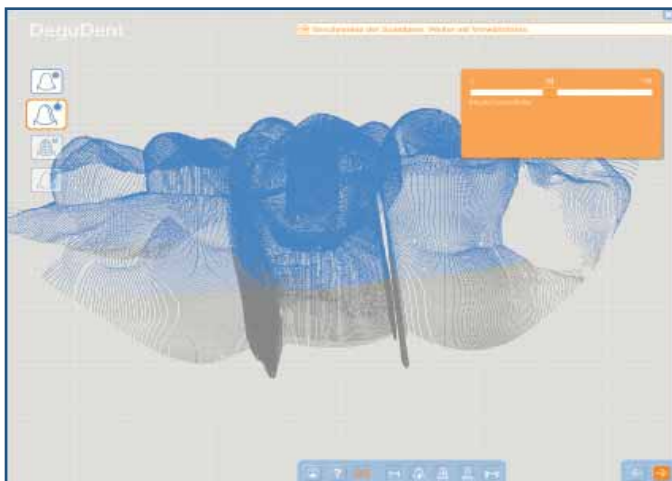
## 8 Scanning

### 8.1 Selecting the scanner



Only the Cercon eye scanner is available for scanning a cast for the fabrication of Custom Abutments. The scanning procedure is the same as for a single-piece Custom Abutment. See also Chapter 5 of the Cercon art Custom Abutments Instructions for Use.

### 8.2 Scan data display



When the calculations have been completed, Cercon art will display the resulting point cloud. This point cloud should display a roughly even distribution in the sulcus area of the future abutment, in the area of the scanning aid, in the area of the wax-up and in the area of the adjacent teeth.

Five buttons are available to control the display and to check the scan data.

For detailed information about the function of the display buttons please consult Chapter 5.11 of the Cercon art Custom Abutments Instructions for Use.

## 9 Designing abutments with Cercon art

When moving from the SCAN section to the CAD section of the software, the scan points of the abutment case scanned with Cercon art are calculated completely, and the surface is calculated and displayed. Begin the abutment design process by aligning the tooth axes.

### Note:

If at least one adjacent tooth is scanned for an abutment case, no adjustments or only minor adjustments to the dental axes will usually be required. If the case is scanned without adjacent teeth, adjustment of the tooth axes is inevitable.

To assist in aligning the tooth axes, these are displayed in three different colours:

Blue = buccal/labial

Green = mesial

Red = occlusal/incisal

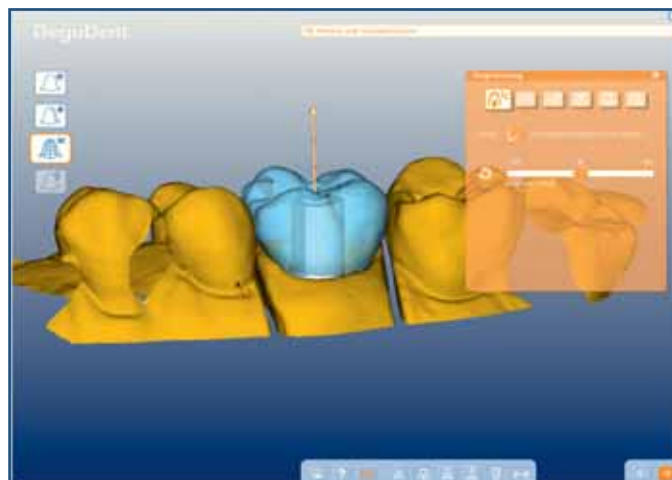
The tools for aligning take the shape of the slide control and a toggle button for selecting the active axes.



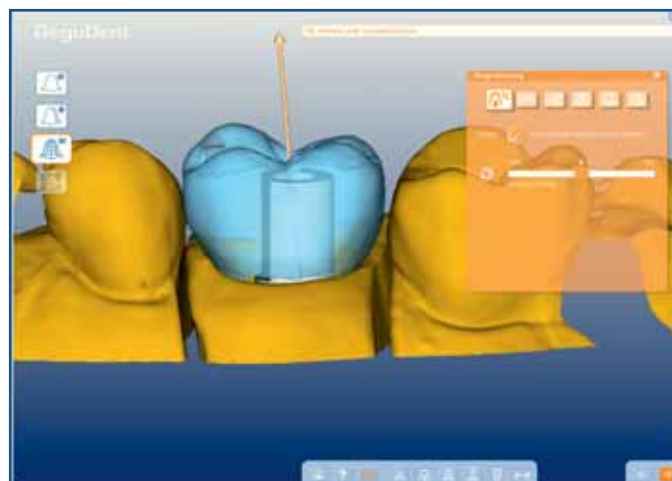
Toggle button for selecting a dental axis. For a better view of the axes, use the  display button to hide the scanning aid library component.

The procedure for aligning the tooth axes is described in Chapter 6.2 of the Cercon art Custom Abutments Instructions for Use.

### 9.1 Viewing the calculated surfaces

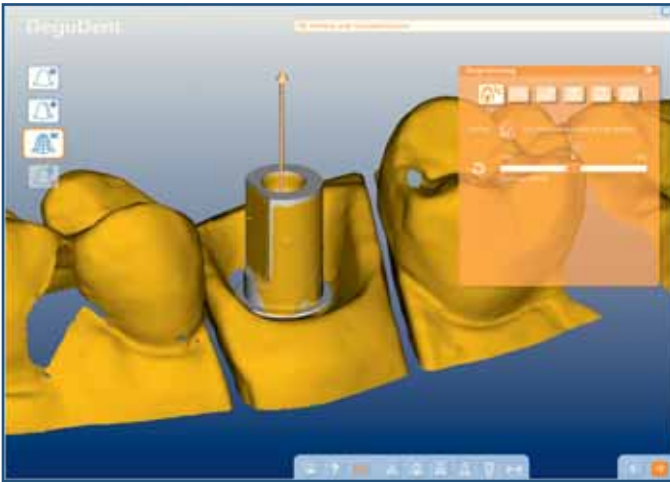





### 9.2 Aligning the tooth axes



## 9 Designing abutments with Cercon art

### 9.3 Checking the registration



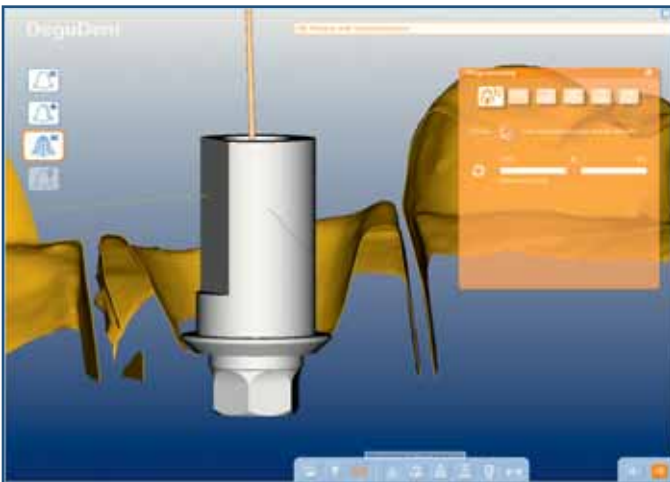
Use the  display button to hide the wax-up and the  and  display buttons to show the scanned and library data for the scanning aid.


Both the scanned and the library data should coincide, as seen in the illustration.

#### **Note:**

If the scanned data for the scanning aid do not agree with its library data, this means that the registration has failed. You will have to abort the abutment design process, because the position of the implant connection geometry does not agree with the position on the cast or with the intraoral position. In this event, the case will have to be completely rescanned.

### 9.4 Checking the registration



Use the  display button to perform a section through the situation. This section also offers an opportunity to verify the emergence profile line. In addition, it allows you to check the distances from the scanning aid and the custom build-up.

Click the Forward arrow to proceed to editing the emergence profile line.

You will be given an initial suggestion for an emergence profile. On the finished abutment, this light response to the preparation margin of the subsequent restoration.

You will also be shown the current gingival height, as it will be influenced by editing the emergence profile line. The procedure for editing the emergence profile line is found in Chapter 6.10 of the Cercon art Custom Abutments Instructions for Use.

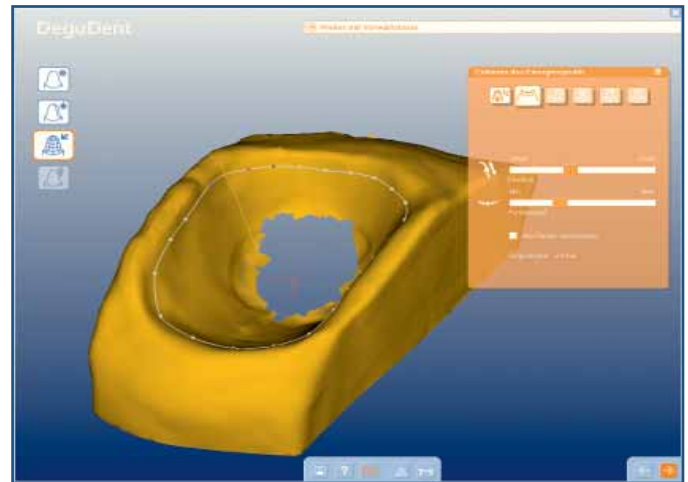
### Note:

In addition to the emergence profile curve, the preparation margin of the titanium base will be visible as a grey dotted line. When editing the emergence profile line, make sure that (1) it does not cross the preparation margin and (2) its diameter is smaller than that of the preparation margin. If one of these requirements is not met, Cercon art cannot design a mesostructure. Read more in Chapter 11.11 Abutment calculation error.

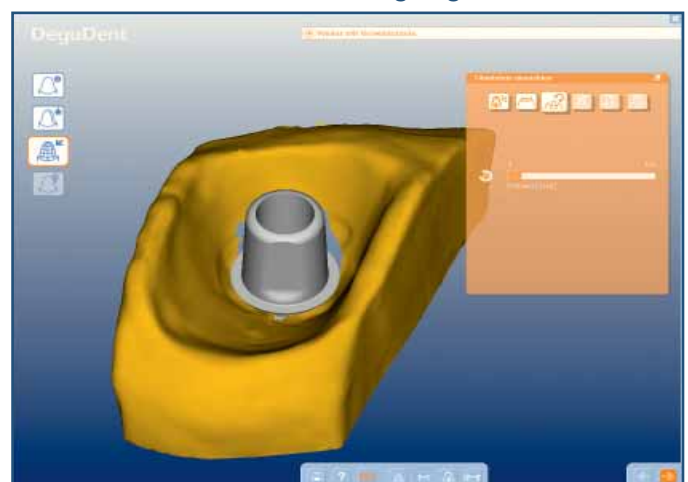
Close the lid to start the scanning process. The upper progress bar will show the scanning progress for the current element. The lower progress bar will show the total scanning progress for all elements.

You may use the slide control to align the titanium base such that the anti-rotation surfaces are located in the most favourable position for subsequent restoration. Depending on how the respective implant system is indexed, up to six different positions may be available (XIVE). Ankylos C/ titanium base abutments may be rotated freely (360°).

### 9.5 Editing the emergence profile curve

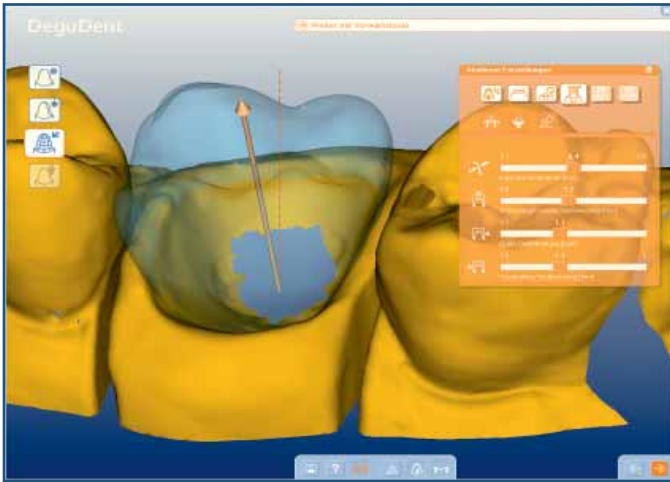


### 9.6 Aligning the titanium base



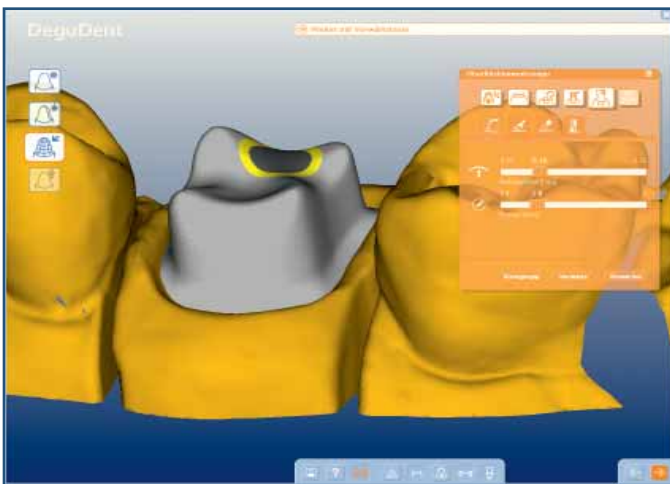
## 9 Designing abutments with Cercon art

### 9.7 Reduction parameters settings



These settings are identical with those for a single-piece Custom Abutment. See also Chapter 6.15 of these Instructions for Use.

### 9.8 Surface modification



In this surface modification step, the proposed abutment is shown as defined by the previously selected parameters. The future screw-access canal is shown in grey. The yellow ring around the screw-access canal indicates the minimum thickness of the wall surrounding the canal.

The manipulation window contains the following tools and controls for abutment customization:



Adding/Smoothing/Removing/Rotating



Build-up height



Reduction depth



Degree of smoothing



Degree of rotation

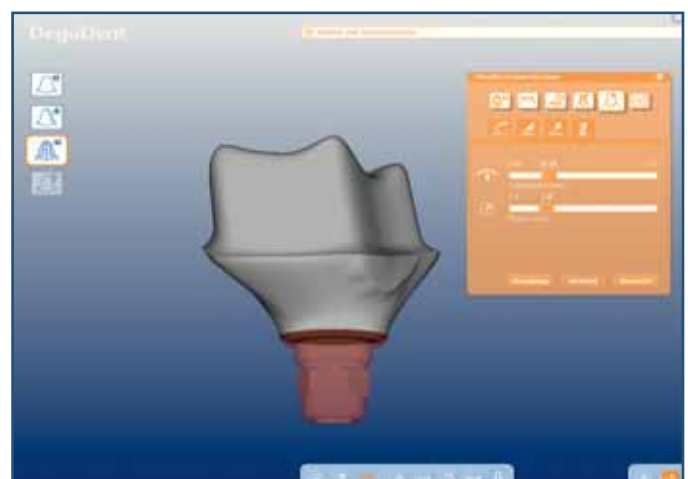
The rotation to let you rotate the supragingival aspect of the abutment 5° to the left or right. The subgingival aspect of the abutment will not be rotated.

## 9.9 Surface modification



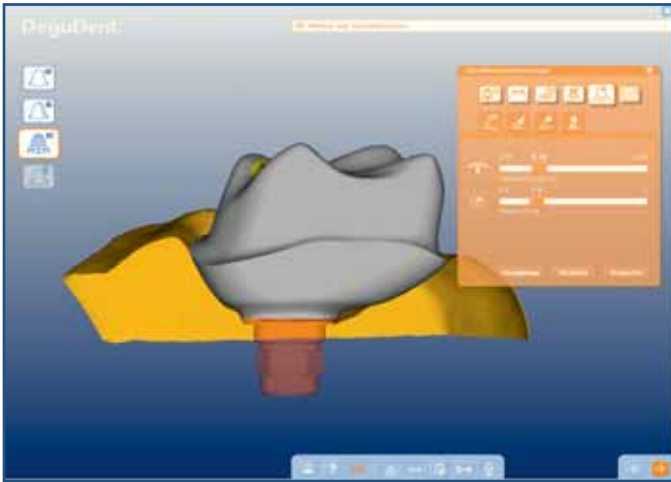
## 9.10 Surface modification


The surface modification tools can be used both for the supragingival part and for the subgingival part of the two-piece Custom Abutment. When working on the supragingival part, it is recommended to use the appropriate display buttons to hide the model aspect.



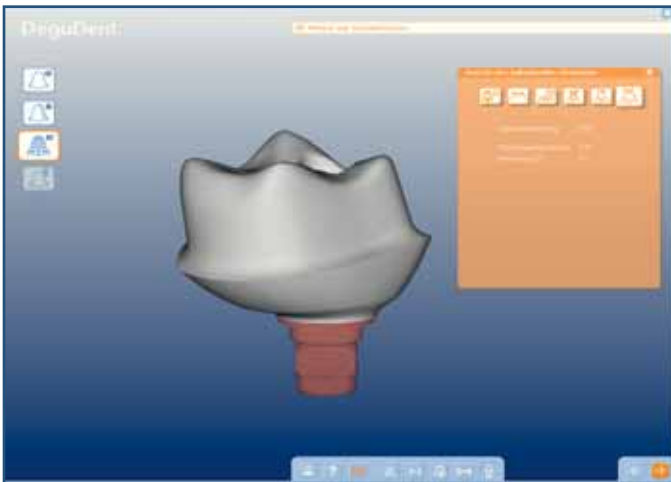
## 9 Designing abutments with Cercon art

### 9.11 Surface modification



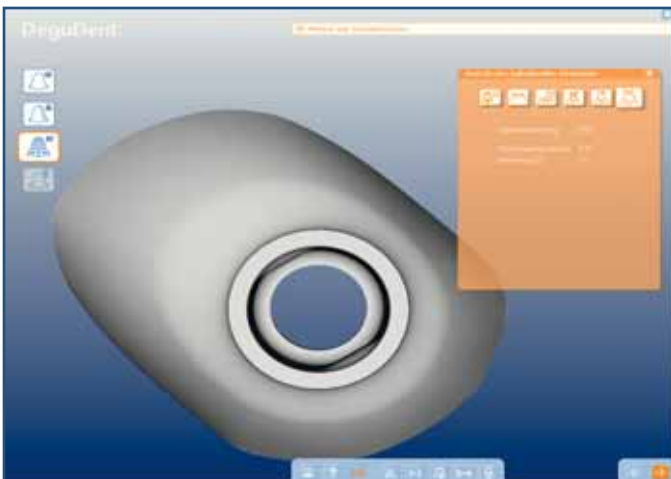
Use the  display button to perform a section through the situation. Use the  display button to show the titanium base. Turning the Cercon move thumbscrew lets you move through the situation along the plane of the section.


### 9.12 Viewing the two-piece Custom Abutment



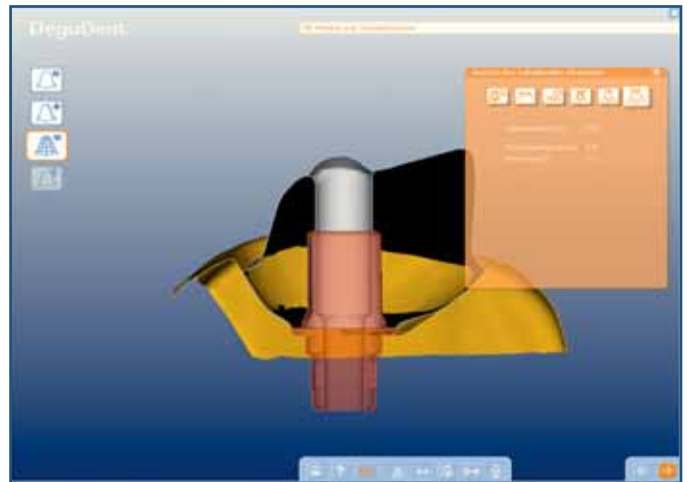
This final step displays the finished abutment design. The display buttons lets you hide the adjacent teeth and the gingival element, exposing the entire abutment including the titanium base.

### 9.13 Viewing the two-piece Custom Abutment




Hiding the titanium base using the  display button exposes the internal geometry of the two-piece Custom Abutment.

### 9.14 Viewing the two-piece Custom Abutment



### 9.15 Viewing the two-piece Custom Abutment



In this section plane, use the  display button to show the location and direction of the screw access canal to check the wall thickness around the Custom Abutment and the distance of the two-piece Custom Abutment from the emergence profile.

The info screen displays information about the total height, from the lowest part of the connection geometry to the highest point of the two-piece Custom Abutment, the height of the supragingival aspect and the angulation of the two-piece Custom Abutment. Click the forward arrow to leave the CAD section and to enter the CAM section, where you can select the fabrication option as usual.

**Note:**

Two-piece Custom Abutments can be produced using Cercon brain expert or ordered from the Compartis® production centre.

# 10 Cementing

## Step 1: Securing the titanium base in place



Place the titanium base in the laboratory analogue and tighten to prevent contamination of the implant connector when cementing the mesostructure

## Step 5: Joining



Join the zirconia abutment to the titanium base by bringing it into its final position, making sure to watch out for the correct position of the anti-rotation device

## Step 2: Sandblasting the titanium base



Sandblast the titanium base and the inside of the Custom Abutment using 50- $\mu$ m white aluminium oxide at no more than 2 bar. Use a steam cleaner to remove sandblasting particles from the Custom Abutment.

## Step 6: Removing residual cement and polymerizing



Remove gross cementing agent excess. Stabilize the zirconia abutment until the cement has completely set, especially when removing excess. Follow the manufacturer's instructions when curing cement and removing excess.

## Step 3: Protecting the screw access canal



Seal the screw access canal with wax.

## Step 7: Finishing



Remove remaining excess cementing agents using rotary instruments

## Step 4a: Applying cement



Apply the cementing agent as per its manufacturer's instructions, placing it on the pre-conditioned contact surface ...

## Step 8: Finished Custom Abutment



Zirconia mesostructure cemented to a titanium base

## Step 4b: Applying cement



... and/or on the internal surface of the zirconia abutment

We recommend dual-curing composite cementing agents such as SmartCem2 (DENTSPLY) or Panavia F2.0 (Kuraray).

Last updated: 7 June 2010

To ensure an adequate wall thickness around the screw-access canal, a minimum volume has been pre-defined. With highly angled abutments, there is a risk that this minimum volume is not provided. The consequence would be that the head of the screw protrudes from the abutment.

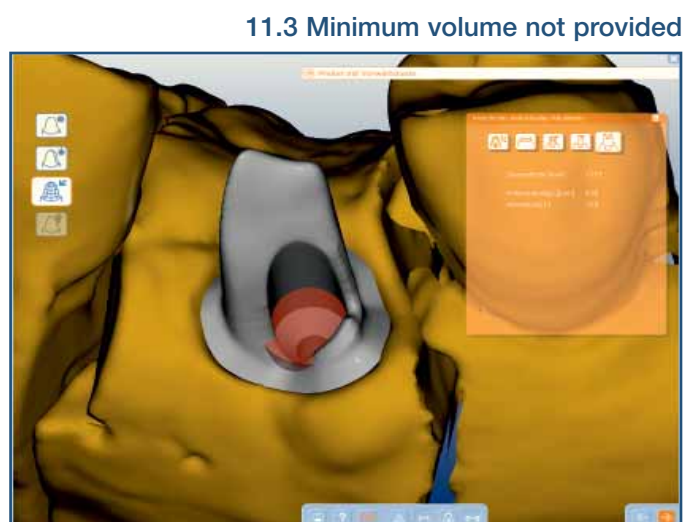
If the minimum volume is not respected, it is displayed in red in the area of the screw-access canal in the abutment preview window. You can use the surface tool to add material in the critical area until the minimum volume requirement is once again met. Once this is done, you can conclude the design phase as usual.



Use the surface tool to add material in the critical area until the minimum volume requirement is met.

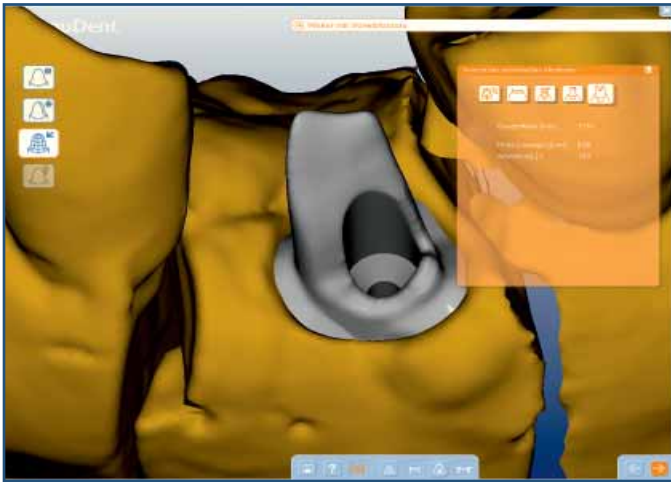


Sometimes even a correction with the surface tool cannot prevent a situation where the minimum volume required is not provided as the screw access canal is designed. Here, too, the minimum volume around the screw access canal will be shown in red. If this is the case, return to the surface tool and correct the problem at the affected site.



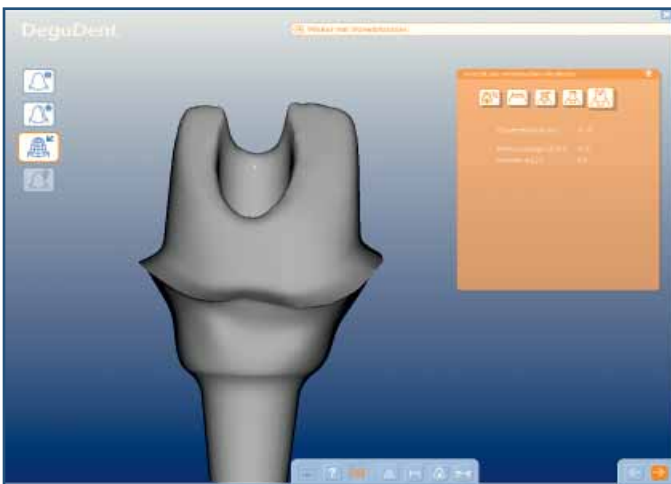
# 11 Troubleshooting

## 11.4 Minimum volume not provided



The corrected abutment.

## 11.5 Sharp edges



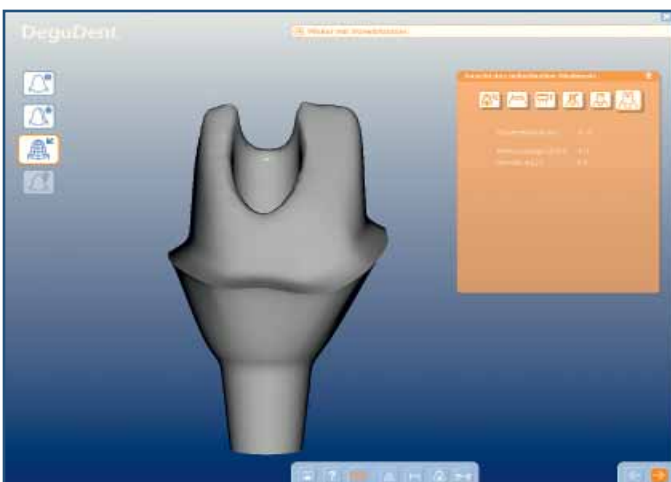
If the subgingival aspect of the Custom Abutment is designed based on the scan data, sharp edges may result in the area of the preparation margin, depending on the situation.

In the zirconia Custom Abutment production process, the sharp edges would result in chipping or crack formation in this area. To counteract this effect, check the following checkbox:

Smooth subgingival aspect

Check this checkbox to smooth the subgingival aspect of the abutment, starting at the emergence profile line.

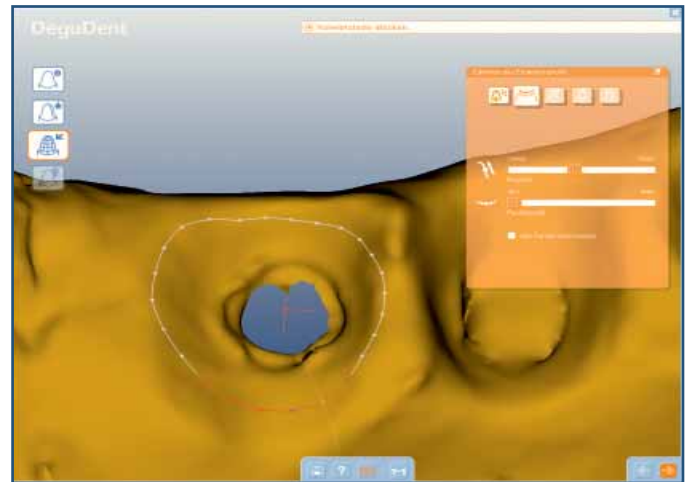
## 11.6 Sharp edges



Corrected abutment without sharp edges.

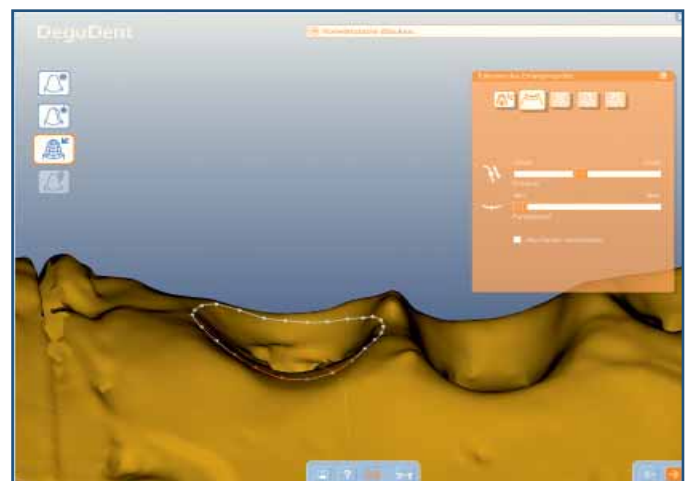
## 11.7 Points on the emergence profile line are shown in red

If individual points on the emergence profile line are shown in red, this means that they are outside below the zero level of the abutment situation. The zero level indicates the transition between the connector geometry and the custom parts of the abutment.



## 11.8 Points on the emergence profile line are shown in red

The reason is that the height of the gingiva is insufficient, resulting in a flat gingiva and then undercut region.

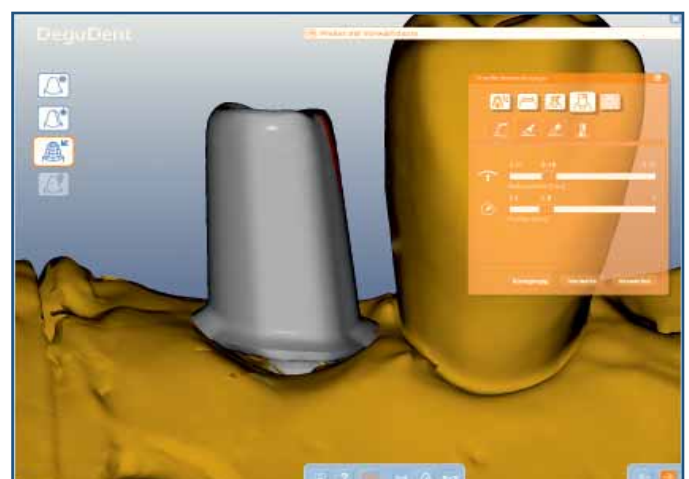


## 11.9 Points on the emergence profile line are shown in red

For technical reasons, one-piece abutments with circular undercuts cannot be produced. Points located below the zero level are automatically raised by this software until the resulting abutment can be produced. In this area, there will be a crevice between the gingiva and the circular aspect of the abutment.

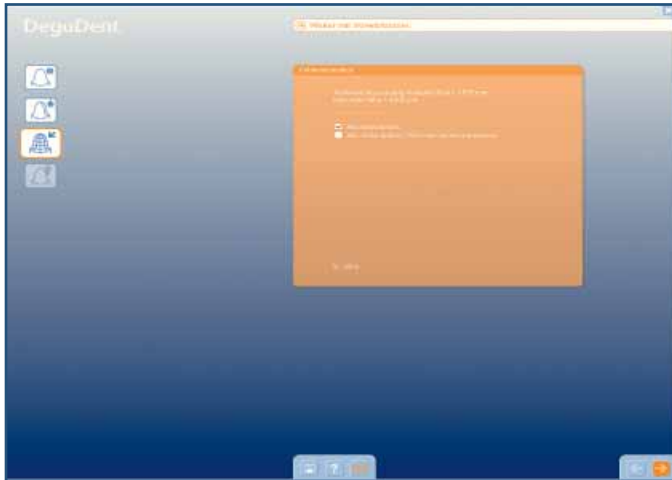
**Note:**

We recommend resorting to a two-piece abutment in these cases.



# 11 Troubleshooting

## 11.10 Insufficient abutment height



Custom abutments require a minimum supragingival abutment height of 4.00 mm. If this minimum abutment height requirement is not met, long-term cementing success cannot be ensured. In this case, therefore, an error message will be shown on the screen indicating the current height and the required minimum height along with a four-digit area code.

You can check one of two check buses to continue with the abutment design process:

### Modify abutment

If you check this check was, you can click the forward arrow to return to the abutment settings screen.

To increase the height of the abutment, you may either reduce the occlusal reduction parameter or relocate the highest points of the emergence profile line to the depth of the emergence profile, which was also result in increasing abutment height.

### Modify minimum height 3.659 mm and recalculate

Checking this checkbox accepts the current height and designs the abutment as is. By doing so, the operator assumes complete responsibility for this step.

## 11.11 Abutment calculation error

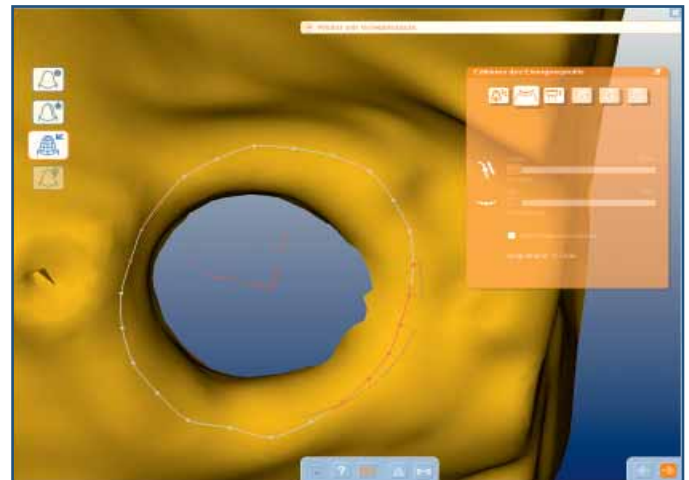


This error message may appear if, during editing, the emergence profile line crosses the sulcus line or its diameter is smaller than that of the sulcus line.

## 11.12 Abutment calculation error

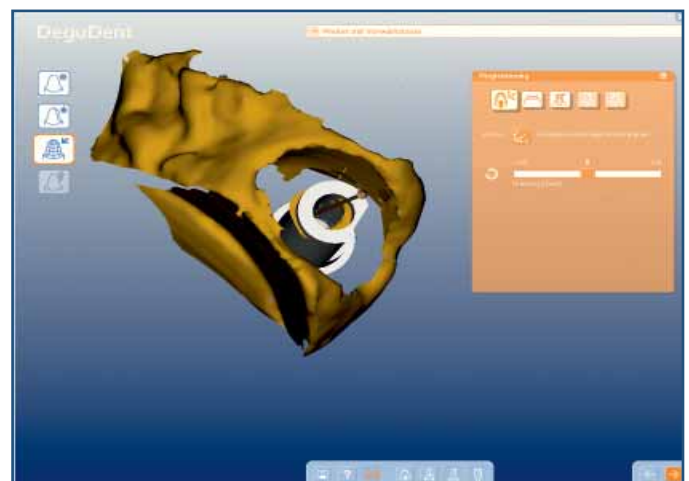
Here you can see that the emergence profile line crosses the dotted sulcus line. This may happen, e.g., when designing a ANKYLOS C titanium abutment using the healing abutment Balance Posterior GH 0.75 (REF 3102 1528). In this case, the emergence profile line will have a smaller diameter than the sulcus line.

The problem can be avoided by enlarging the emergence profile line or by selecting a healing abutment of the next larger size (Balance Posterior GH 1,5, REF 3102 1530) or a Balance Anterior healing abutment (REF 3102 1510).



## 11.13 Registration failed

The scanned data for the scanning aid do not agree with its library data, meaning that the registration has failed. You will have to abort the abutment design process, because the calculated position of the implant connection geometry does not agree with the position on the cast or with the intraoral position.

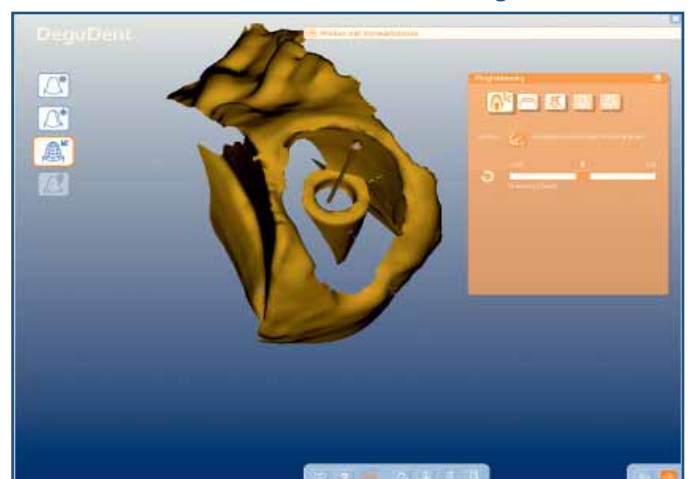


## 11.14 Registration failed

The reason for this is insufficient scan data for the scanning aid. The scanning aid can be rescanned without the gingival mask by returning to the point cloud display. A menu will open where you select the objects to be rescanned by clicking on them.

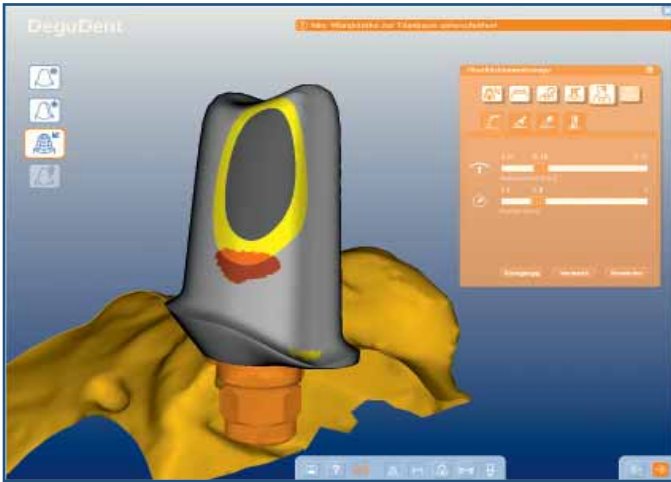
**This presupposes that the cast has not been moved or in any way modified on the scanning platform.**

Once this step has been successfully completed, the design process can be continued.



# 11 Troubleshooting

## 11.15 Infringing on the titanium base



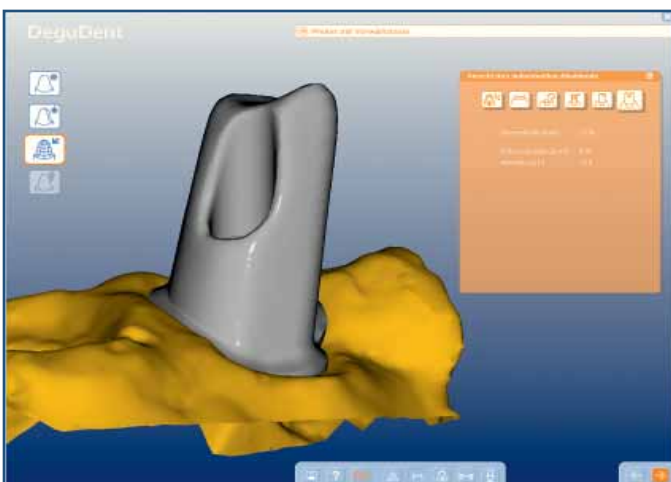
To ensure a sufficient wall thickness around the titanium base, the amount of material around the base is automatically checked. With highly angled abutments, there is a risk that the titanium base is infringed on. The consequence would be for the titanium base to protrude from the abutment.

If the titanium base is infringed on, the area where the wall thickness of the mesostructure is too low it is displayed in red in the abutment preview window. Use the surface tool to add material in the critical area until the titanium base is no longer visible. Once this is done, you can conclude the design phase as usual.

**Note:**

Infringements on the titanium base may occur both in the supragingival and in the subgingival aspect of the two-piece abutment.

## 11.16 Infringing on the titanium base

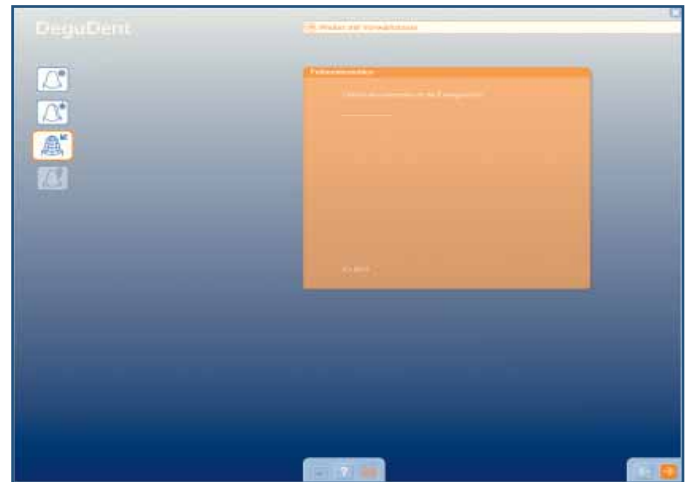


The corrected abutment.

### 11.17 Error matching the emergence profile line

This error message may appear the scanner does not find sufficient scan points when scanning the wax up. In this case, the software is unable to adapt the wax up to the previously edited emergence profile line.

One possible remedy is rescanning the wax up after spraying it with scan spray.



# 11 Troubleshooting

## 11.18 Error messages

Error ID	Cercon art error message	Possible causes	Remedy
ID0001	Error occurred during calculation. Please check settings and scan data.	General calculation error.	Individual case analysis required. Please call the technical hotline.
ID0002	Minimum wall thickness not provided. Check the wall thickness throughout the veneers.	Wax-up dimensions too small for the required reduction.	If appropriate, enlarge wax-up or correct reduction parameters.
ID0003	Error occurred during calculation. Please check settings and scan data.	1. Wax-up dimensions too small for the required reduction. 2. No individual wax-up was scanned (optional) and the wax-up is not suitable for use as an individual wax-up in the current case.	1. If appropriate, enlarge wax-up or correct reduction parameters. 2. Rescan wax-up as individual wax-up or rescan case using the single scan option.
ID0004	Abutment is too low.	Abutment does not have the prescribed minimum height of 4.00 mm.	Correct the reduction parameters for the occlusal veneer or reposition the highest points of the emergence profile line into the sulcus.
ID0005	Error occurred during calculation. Please check settings and scan data.	Supragingival aspect does not have the prescribed minimum area of 50 mm <sup>2</sup> .	Correct the reduction parameters for the occlusal veneer or reposition the highest points of the emergence profile line into the sulcus.
ID0006	Illegal abutment design. Check wall thickness of the veneer and angulation.	Calculation error.	Individual case analysis required. Please call the technical hotline.
ID0007	Emergence profile line below sulcus line. Modify emergence profile line or sulcus line.	The emergence profile line is positioned below sulcus line.	Design case as two-part abutment.

## 11.18 Error messages

Error ID	Cercon art error message	Possible causes	Remedy
ID0008	Error occurred during calculation. Please check settings and scan data.	<ol style="list-style-type: none"> <li>1. "Smooth subgingival aspect" checkbox was checked in a case where the emergence profile line and the sulcus line run closely together.</li> <li>2. Too few scan points below the emergence profile line, making adaptation to the scan data impossible.</li> </ol>	<ol style="list-style-type: none"> <li>1. Uncheck "Smooth subgingival aspect" checkbox; modify emergence profile line or sulcus line. Activate section view to check result.</li> <li>2. Check "Smooth subgingival aspect" checkbox.</li> </ol>
ID0009	Subgingival aspect too small. Check the emergence profile line.	Calculation error.	Individual case analysis required. Please call the technical hotline.
ID0010	Error occurred during calculation. Please check settings and scan data.	Calculation error.	Individual case analysis required. Please call the technical hotline.
ID0012	Error occurred during calculation. Please check settings and scan data.	Calculation error.	Individual case analysis required. Please call the technical hotline.
ID0013	The emergence profile line is located partially inside the sulcus. Try recalculating after subgingival smoothing.	Emergence profile line crosses sulcus line.	Relocate sulcus line toward implant connector or relocate emergence profile line subgingivally.
ID0014	Error adapting the wax-up to the emergence profile line.	Too few scan points found on the wax-up.	Rescan wax-up, using scanning spray if necessary.
ID0015	Error generating the screw access canal.	Calculation error.	Individual case analysis required. Please call the technical hotline.
ID0016	Error calculating the emergence profile line.	Incomplete emergence profile scan data.	Repeat gingival scan, using scanning spray if necessary.
ID0017	Subgingival aspect cannot be given a convex shape.	Emergence profile line is below the zero point while "Smooth subgingival aspect" checkbox is checked.	Uncheck "Smooth subgingival aspect" checkbox or design case as two-part abutment.

# Fascination Prosthetics

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