

PLANMECA



Planmeca FIT[®] CAD/CAM system

Planmeca Emerald[™] S & Planmeca Emerald[™] & Planmeca PlanCAD[®] Easy[™]

user's manual

10033946

The manufacturer, assembler and importer are responsible for the safety, reliability and performance of the unit only if:

- installation, calibration, modification and repairs are carried out by qualified authorised personnel
- electrical installations are carried out according to the appropriate requirements such as IEC 60364
- equipment is used according to the operating instructions.

Planmecca pursues a policy of continual product development. Although every effort is made to produce up-to-date product documentation this publication should not be regarded as an infallible guide to current specifications. We reserve the right to make changes without prior notice.

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1 Introduction

The Planmeca FIT system is a complete optical impression system for CAD/CAM of dental restorations intended for dental offices or laboratories. The system comprises a digital impression scanner (Planmeca Emerald S or Planmeca Emerald) Planmeca PlanCAD Easy software module and Planmeca PlanMill 40 S and 30 S milling units.

The scanner takes digital impressions which can be used in different digital workflows in Planmeca Romexis or exported to a third party.

NOTE

The Planmeca PlanMill 40 S and 30 S milling units have separate user's manuals.

NOTE

The Planmeca impression system is not indicated for orthopaedics or any indication beyond dentistry.

This manual is valid for Planmeca Romexis software revision 6 or later.

NOTE

The Planmeca PlanCAD Easy is available under license.

NOTE

Some of the screenshots may have been taken in earlier software versions and may not exactly match your screen.

NOTE

FOR US USERS: Federal law restricts the scanner to sale by or on the order of a health care professional.

NOTE

Throughout the manual, important notes and items of interest are formatted like this example.

1.1 Indications for use

The Planmeca FIT system is an optical impression system for computer-aided design and manufacturing of dental restorations. It is used for recording topographical characteristics of teeth, dental impressions, or stone models by digital methods for use in computer aided design and manufacturing of dental restorative prosthetic devices.

Contraindications

The system is not indicated for orthopaedics or any indication beyond dentistry.

1.2 Software and hardware upgrades

System software and hardware upgrades are initiated through Planmeca only. No software or hardware should be added to or deleted from the Planmeca systems without prior approval of Planmeca. Doing so may result in damage to the system and will void the product warranty.

2 Associated documentation

- Planmeca Romexis 6 User's Manual (publication number 30025109)
- Planmeca PlanMill 40 S User's manual (publication number 30003011)
- Planmeca PlanMill 30 S User's manual (publication number 30016888)

3 Symbols on product labels

The following symbols are used on various labels on the system.

Affixed to the system are product identification labels that contain identification and safety information. The following images show each safety and warning label and describe where on the apparatus each can be found. Be certain to read all product labelling.

NOTE

If any of the labels are missing or illegible, please contact Planmeca After Sales for replacement labels.

NOTE

The labels may have changed since this manual was published.

NOTE

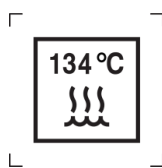
Label examples are not shown in their actual size.



Alternating current (Standard IEC 60417)



Refer to instruction manual/booklet (Standard ISO 7010).



Autoclavable at temperature specified.



Fulfils the requirements of (EU) 2017/745.

Class 2 electrical product



Catalogue number (Standard ISO 7000)



Dangerous Voltage ISO 3864-B.3.6



Date of manufacture (Standard ISO 7000).



Direct current



Disposable item. Do not reuse. (Standard ISO 7000).



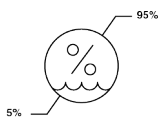
Fragile



General mandatory action



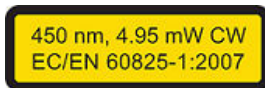
General warning (Standard ISO 7010).



Humidity limitation



Keep away from rain.



Laser information



Laser warning



Lot number



Manufacturer (Standard ISO 7000).



Medical Device



OFF Power IEC 60417-5008.



ON Power IEC 60417-5007.

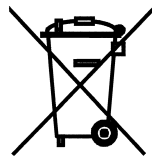
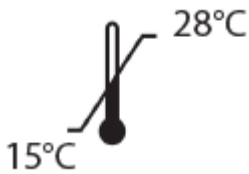


On/Off Power IEC 60417-5010.



Operating Instructions ISO 7000-1641.

Operating temperature limits



Separate collection for electrical and electronic equipment according to Directive 2002/96/EC (WEEE).

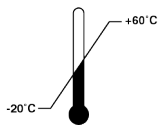


Serial number (Standard ISO 7000)



Standby IEC 60417-5010

Storage temperature limits



Type B applied part (Standard IEC 60417).



UL Laboratory Equipment Listing

4 Safety precautions

The user must read and comply with all safety, warning, and instructional labels on the Planmeca products.

Ensure your Planmeca products are properly maintained through periodic maintenance. If you suspect equipment malfunction or failure, discontinue using the products and contact Planmeca Technical Support immediately. Do not attempt to make any repairs on Planmeca products.

Warning denotes something that can cause personal injury to the patient or the user.

Caution denotes something that can cause damage to the equipment.



WARNING

Failure to adhere to all safety warnings may result in personal injury, equipment damage, or data loss.



WARNING

Do not use the Planmeca products for any purpose other than its intended and labelled use.



WARNING

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.



WARNING

When connecting the Planmeca components, use only the cables supplied with the products. Failure to do so may result in increased electromagnetic emissions or reduced immunity to external electromagnetic emissions.



WARNING

Do not make any unauthorized repairs or modifications to the system software or hardware. This includes installing unauthorized software on the host computer system or altering or bypassing any safety switches or mechanisms. Changes or modifications not expressly approved by Planmeca could void the user's authority to operate the equipment.



WARNING

Do not install or operate the Planmeca products in an environment where an explosion hazard exists, e.g., high oxygen area.



WARNING

Do not attach any equipment or devices to the Planmeca products unless their use has been specifically authorized by Planmeca.

**WARNING**

The wireless components in the Planmeca products may be interfered with by other equipment, even if the other equipment is fully compliant with CISPR (International Special Committee on Radio Interference) emission requirements.

**WARNING**

When possible, electrical equipment should not be used when adjacent to other electrical equipment. If adjacent use is necessary, the equipment should be observed to verify normal operation in the configuration in which it will be used.

CAUTION

Comply with all applicable regulations when disposing of waste materials from the Planmeca products.

**WARNING**

The Planmeca scanner is a high precision Class 2 laser scanning instrument. Always store the scanner in its holder when not in use. To prevent damage or misalignment, do not drop or strike the scanner. Follow all stated precautions when using the scanner.

**WARNING**

To prevent electrical shock and eye damage by laser radiation, do not open any sealed covers or connectors with user restricted access.

**WARNING**

In case of emergency unplug the scanner from the computer port and/or unplug the computer power cord from the wall or from the computer.

**WARNING**

The Planmeca scanner is designed to be used with the tip connected to the scanner. The connector pins on the scanner are energized when the tip is removed. To ensure safety of the user and patient, do not touch the pins when the tip is removed.

CAUTION

Medical electrical equipment requires special precautions regarding EMC (Electromagnetic Compatibility). The Planmeca products must be installed and placed into service according to the EMC information provided in the documentation that accompanies the Planmeca products.

CAUTION

Portable and mobile RF (Radio Frequency) communications equipment can affect medical electrical equipment.

CAUTION

After using the scanner on a patient, clean the scanner according to the cleaning instructions found in section "Cleaning / preventive maintenance" on page 148.

CAUTION

Do not hold the scanner in a way that will cover the cooling vents.

CAUTION

Do not immerse the scanner base in liquid or expose the Planmeca products to conditions outside the operating conditions, see section "Planmeca Emerald and Emerald S scanners specification" on page 153. Clean the scanner according to the instructions in section "Cleaning / preventive maintenance" on page 148.

CAUTION

Do not stack the tips near or on any other metal instruments.

CAUTION

Ensure your Planmeca products are properly maintained, see section "Cleaning / preventive maintenance" on page 148.

CAUTION

If you suspect equipment malfunction or failure, discontinue using the Planmeca products and contact Planmeca Technical Support immediately. Do not attempt to make any repairs on the products.

CAUTION

Read and comply with all safety, warning, and instructional labels on the Planmeca products.

CAUTION

If the scanner has been operational for an extended period of time, the surface may become warm to the touch. If the temperature becomes too warm to the touch within a minute of use, turn it off and allow it to cool.

4.1 Reporting serious incidents

Serious incidents that have occurred in relation to the device must be reported to the manufacturer and the local competent authority.

5 Getting started

To start using the Planmeca Romexis and the CAD/CAM module you need to:

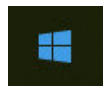
- Start Planmeca Romexis (see section "Starting Planmeca Romexis" on page 9).
- Activate your Planmeca Romexis license.
- Log in to Planmeca Romexis

NOTE

For detailed instructions see [Planmeca Romexis 6 User's manual](#).

5.1 Starting Planmeca Romexis

Steps



1. Press the power button to start the laptop.
2. On your keyboard, press the **Windows** key to make the standard desktop appear if desired.
3. Once the desktop is visible, double-click the Planmeca Romexis icon on your desktop or on the Windows menu.



Romexis
App

The following message may appear from Windows: Do you want to allow the following program to make changes to this computer?

4. Click **Yes**.

This is a normal safety feature in Windows.

Results

The software opens to the Home screen.

What to do next

NOTE

To save electricity remember to turn off the system while not using the scanner.

5.2 Managing cases in Planmeca Romexis

5.2.1 Searching and managing patients and images

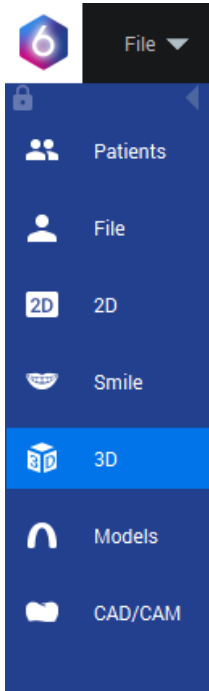
For detailed descriptions see Planmeca Romexis 6 User's manual sections:

- "Patients module"
- "Searching patients"
- "DICOM Query/Retrieve (optional)"

5.2.2 DICOM storage (optional)

With DICOM Full license images can be sent to a remote DICOM application, i.e. DICOM image archive PACS. DICOM Storage needs to be configured in the *Admin* module before the DICOM storage can be used, see section "Imaging - DICOM" in the Planmeca Romexis 6 Technical manual (30024964).

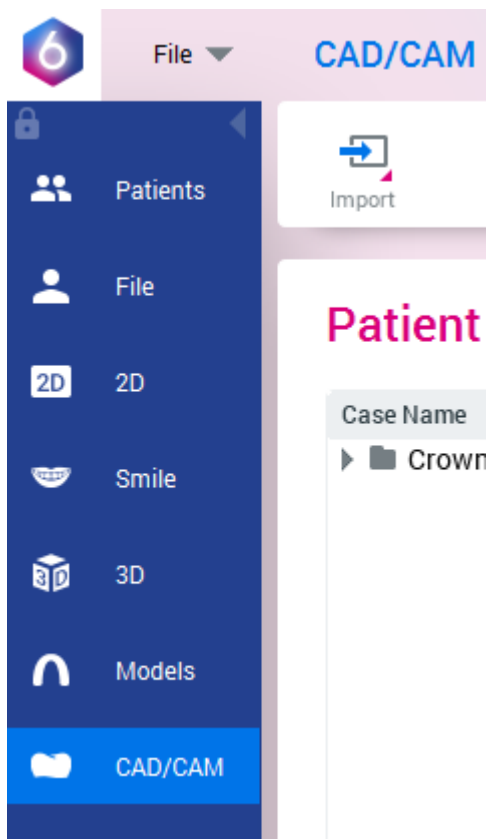
5.2.3 Viewing and opening cases in Planmeca Romexis 3D module



All scans and designed restorations will automatically appear in the 3D module volumes list.

To view and open scans and cases in Planmeca Romexis see section "Viewing CAD/CAM case in 3D module" in Planmeca Romexis 6 User's manual.

5.2.4 Working with cases in Planmeca Romexis CAD/CAM module



Planmeca Romexis CAD/CAM module is intended for working with digital impressions and restorations.

The digital impressions can be used for designing restorations in the software. The digital impressions and designed restorations can then be paired with CBCT volume in *Implants* module for implant simulation.

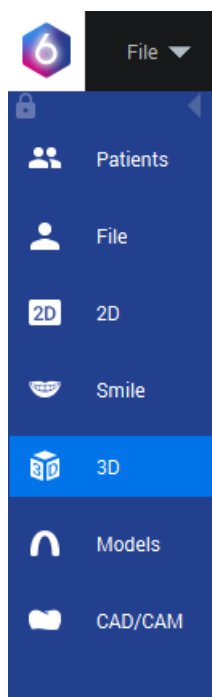
All data are automatically stored into Planmeca Romexis database and organized into cases to be exported to another system or sent to a certified laboratory for design and milling using Planmeca Romexis Cloud service (see section “Cloud export” in Planmeca Romexis 6 User’s manual).

5.2.5 Working with cases in Planmeca Romexis Model Analyser module

For detailed instructions see Planmeca Romexis 6 user’s manual.

5.2.6 Combining model to 3D volume

A model can be combined to a 3D volume in Planmeca Romexis 3D module.



Opening 3D volume

See Planmeca Romexis 6 User's manual section "Opening images".

Importing intraoral scans to 3D volumes

See Planmeca Romexis 6 User's manual section "Importing 3D models".

6 Scanner setup

This section describes how to prepare the scanners for scanning.

Components

The scanner comes with the following components:

Planmeca Emerald S scanner

- Scanner tip x 3
- Scanner cable
- Standalone holder
- Colour balancer
- Cover boot x 4 (in different colours)

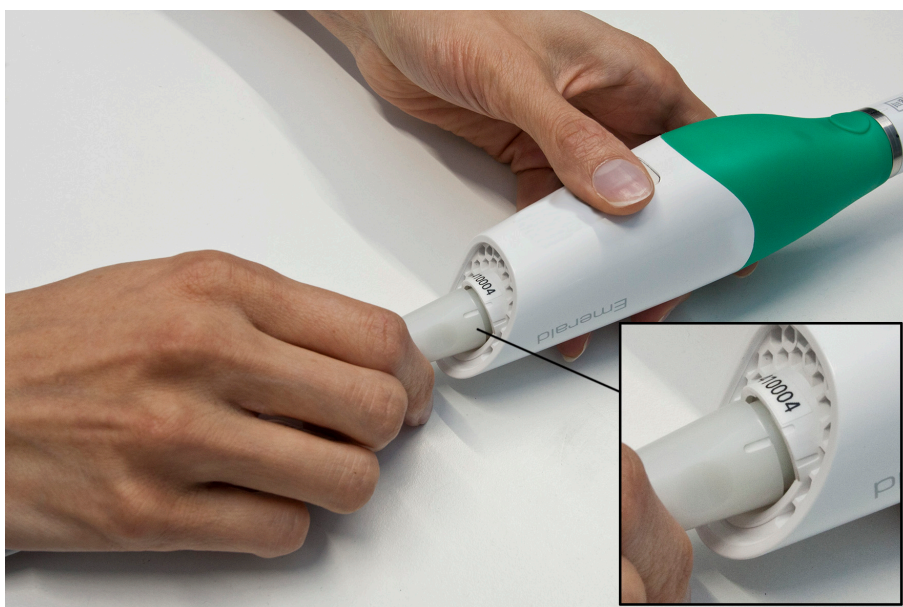
Planmeca Emerald scanner

- Scanner tip x 3
- Scanner cable
- Standalone holder
- Colour balancer

6.1 Connecting scanner cable

Steps

1. Align the notch on the cable with the small notch on the back of the scanner.



2. Push the cable in and turn clockwise until the notch on the cable is aligned with the larger notch.



NOTE

Keep the scanner connected to the cable at all times. Remove the cable from the scanner only when directed by customer support or when replacing the cable.

6.2 Plugging scanner into laptop

About this task

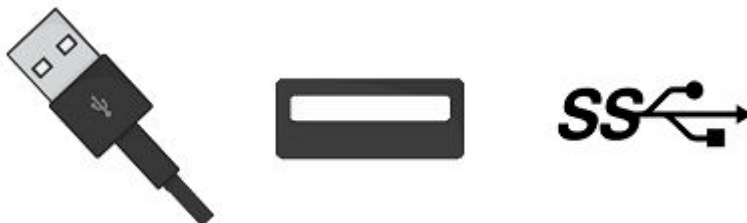
NOTE

Keep the scanner connected to the cable at all times. Remove the cable from the scanner only when directed by customer support or when replacing the cable.

Steps

1. Insert the USB-C cable into a USB 3 port on the laptop.

All the ports on Planmeca laptop are USB 3. If you are not using a laptop provided by Planmeca, refer to your laptop's user's manual to find the USB 3 port.



NOTE

Extension cables and USB hubs are not recommended. Use only cables provided by Planmeca.

What to do next

When the scanner is not in use disconnect the cable from the laptop by grabbing on the connector.

CAUTION

Do not pull on the cable itself to disconnect. Bending or twisting the cable may impact system usability.

You do not need to detach the USB device from Windows.

6.3 Scanner tips

Tip sizes

- Standard tip x 2



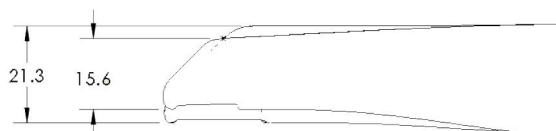
- SlimLine tip x 1 (optional)



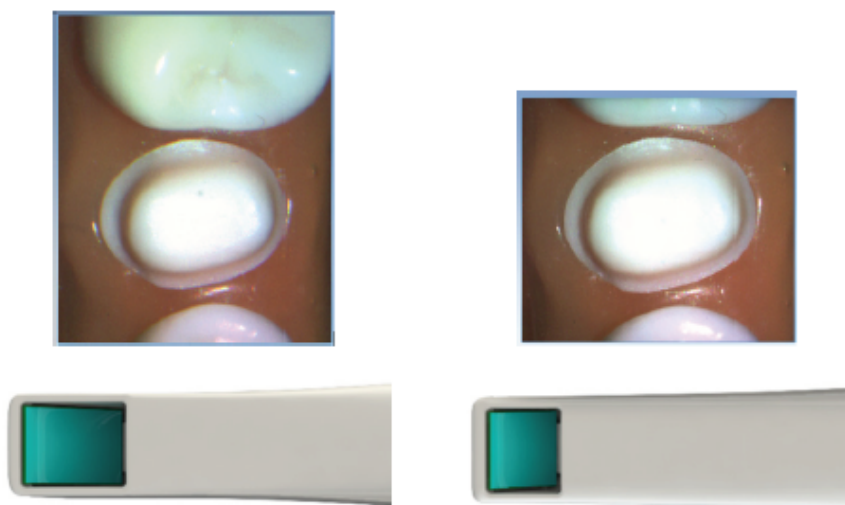
The SlimLine logo is on the tip and the S displays on screen when in use.



The SlimLine tip is 5.7mm thinner than the standard scanner tip.



With the SlimLine tip the field of view is 30% smaller compared to the standard tip.



- Cariosity tip x 1 (optional)

6.3.1 Attaching / removing scanner tip

The scanner comes with removable tips.



WARNING

The scanner is designed to be used with the tip connected to the scanner. The connector pins on the scanner are energized when the tip is removed. To ensure safety of the user and patient, do not touch the pins when the tip is removed.

The scanner comes with a removable tip.

When the scanner is not in use, place the non-functional protective scanner tip on the scanner (delivered with the scanner).

To detach the tip turn it towards the smaller notch on the scanner.



To reattach the tip, place it on the scanner and turn it towards the larger notch on the tip until it locks in place.



TIP

The tip can be removed and disinfected while the next tip is being used. For cleaning instructions, see section "Cleaning scanner tips" on page 148.

6.4 Scanner holder

The scanner comes with a standalone holder.



7 Relocating laptop and/or scanner

The laptop can be unplugged and moved as needed. The software does not need to be shut down.

CAUTION

Do not unplug the scanner cable while scanning.

NOTE

Do not use the scanner when the battery is low. If the computer has to shut down before the model is generated, you will lose your scans. Make sure the laptop is plugged in during scanning to keep the scanning from slowing down.

8 Planmeca PlanCAD Easy overview

The Planmeca PlanCAD Easy software consists of individual tabs used to design the restoration: *Setup, Scan, Margin, Plan, Design, and Mill*.

The tabs are dynamic: the choices you make on each tab affect the options available on the current and related tabs.

In typical restoration the tabs are used from left to right. Moving backwards in the process (e.g., modifying the settings in the *Margin* tab after completing the design in the *Design* tab) can cause settings and designs to be discarded. The system warns you when your actions will cause design data to be discarded.

Some system configurations will restrict the use and access of individual tabs.

For communicating with associates or Planmeca you may wish to save an image of the screen.



To take and save a screen shot:

On your keyboard, press the **Windows** and **Print Screen** (or Prt Scr) keys.

The computer takes a screen shot and saves it in the folder *Libraries > Pictures > Screenshots*.

The screen shots are automatically numbered. You can rename them if desired.

If you are using a third party laptop, please refer to that computer's user manual on how to take and retrieve screenshots.

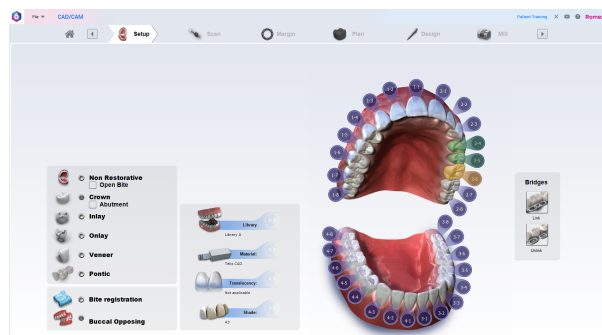
9 Setting up restoration

Before you begin

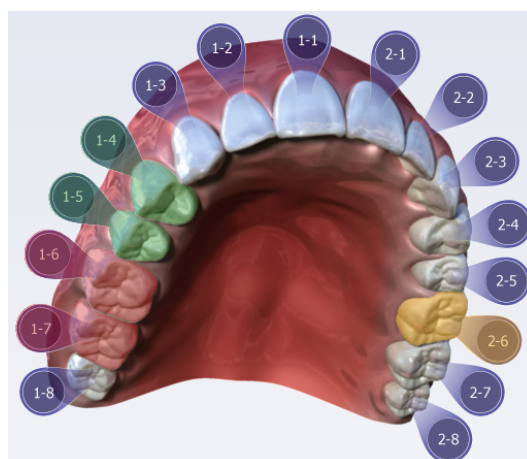
Before scanning, you need to select:

- Type of restoration
 - Non restorative
 - or
 - Teeth with indications (crown (with or without abutment), inlay, onlay, veneer or pontic)
- Open bite scanning option if needed
- Occlusal scanning method (bite registration or buccal/opposing)
- Tooth library
- Restoration material
- Translucency
- Shade

If you open an existing restoration, many of these settings may already be selected.

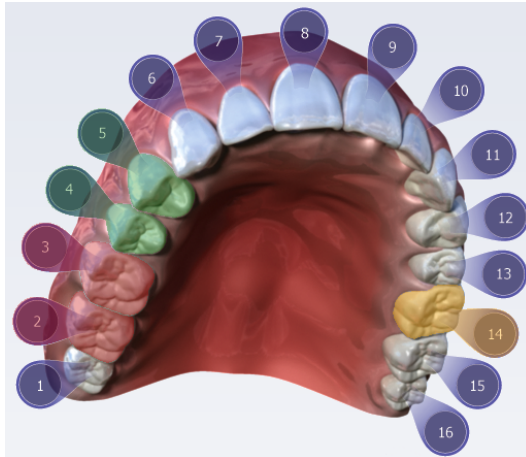


- You can select between:
FDI (ISO) two-digit FDI World Dental Notation



and

- Universal Numbering System adopted by the ADA (American Dental Association).



The numbering system can be set in Planmeca Romexis Configuration application, for more information see Planmeca Romexis 6 Technical manual (publication number 30024964).

About this task

Follow these steps to set up restoration.

Steps

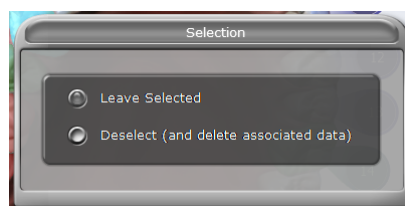
1. Start the setup by selecting the restoration site by clicking on the tooth/teeth on the anatomical model.

The currently selected tooth shows in orange. Any other teeth that are part of the restoration show in green.

If no teeth have been selected, the anatomical model is closed until you approach it with the mouse cursor.

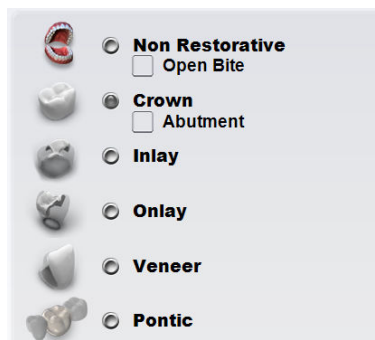
For bridges, select the abutments and the pontic(s). You can do up to 16 restorations on the same arch at one time.

- If you accidentally select a wrong tooth right-click the tooth and select **Deselect**, then select the correct restoration site.

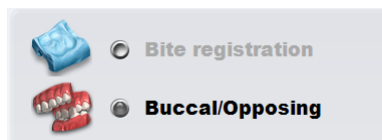


- If no teeth have been selected the jaws of the anatomical model will close. To enable selection, place the cursor over the model.
2. Select the type of restoration by clicking on the appropriate restoration type.

Select *Open bite* option if needed. The option is used for scanning for dental appliances that require a gap between the upper and lower jaw, such as night guards.



3. Select the **Buccal/Opposing** scan type.



NOTE

The majority of Planmeca Romexis Cloud recipients will require Buccal/Opposing cases. Bite registration cases can only be sent to recipients using Planmeca PlanCAD Easy.

4. Select tooth library.



For permanent teeth you can use libraries A (A = adult) and for primary teeth library C (C = child).

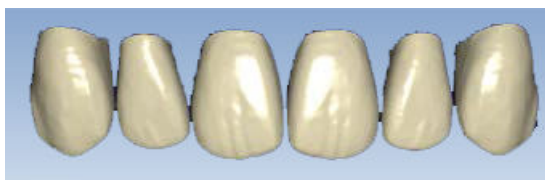
NOTE

You can change the tooth library on the *Design* tab. The system offers block size options on the *Mill* tab. The material can be changed on the *Mill* tab settings.

The facial pictures below show the anterior library options grouped by type.

Round-Round

Teeth 1-2 (7) through 2-2 (10) are Anterior A1.



Teeth 1-3 (6) and 2-3 (11) are from Library A.



Square-Round

Teeth 1-2 (7) through 2-2 (10) are Anterior A2.



Teeth 1-3 (6) and 2-3 (11) are from Library A.



Square-Round

All teeth are Library C.

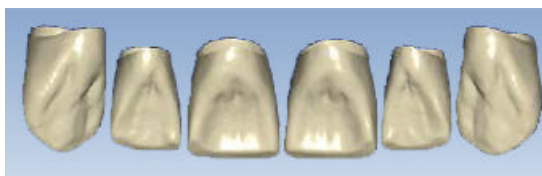


Square-Square

Teeth 1-2 (7) through 2-2 (10) are Anterior A2.



Teeth 1-3 (6) and 2-3 (11) are from Library A.

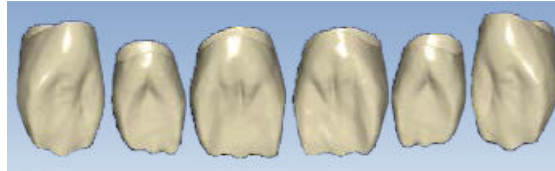


Cutback A4

For further processing in dental laboratories.



The lingual pictures show the anterior library options grouped by type.



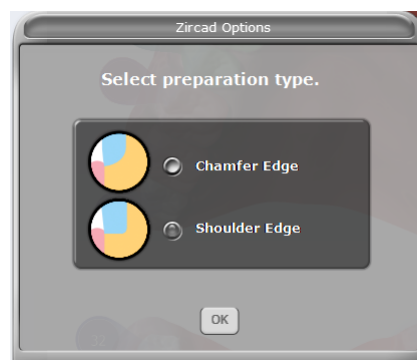
5. Select material.



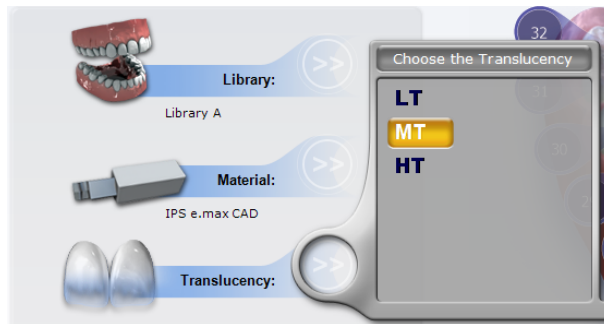
If you select IPS e.max ZirCAD for crown material, you also need to select the preparation type, either Chamfer Edge or Shoulder Edge (default):

As instructed in the pop-up, a chamfered restoration may require manual polish on the milled margin (pre-firing) to prevent overhanging to the margin.

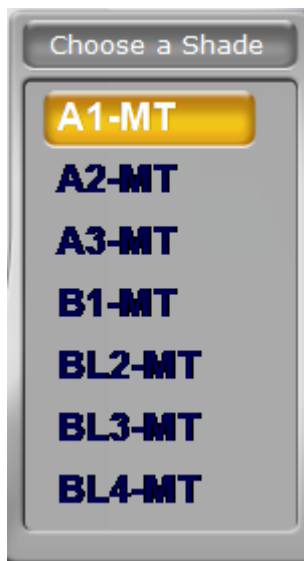
Select **OK** to proceed or cancel to change your selection. For how this material selection affects the milling unit screen, see section "Milling IPS e.max ZirCAD" in section "Sending restoration to milling unit" on page 145 and the Planmeca PlanMill 30/40 S User's manual for information on how this material selection affects milling.



6. Select translucency (if applicable for the selected material).
You can choose from low (LT), medium (MT) or high (HT) translucency.



7. Select shade for the restoration.

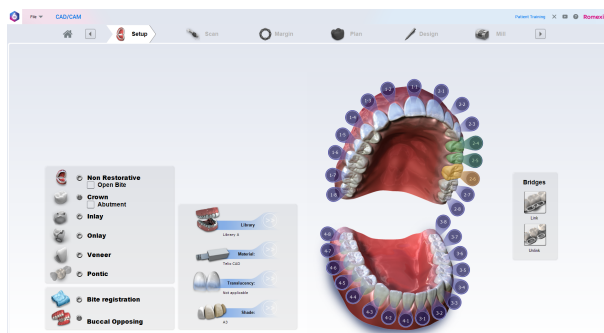


The shade is shown in the milling unit instructions along with the material and block size.

8. If setting up a bridge, select all the teeth you want to use for the bridge by clicking on the tooth numbers.
9. Select the correct restoration type (crown or pontic).
10. Link the restoration as a bridge by clicking the **Link** button and then clicking on the first and the last tooth of the bridge.

NOTE

When exporting 3Shape bridge cases, do NOT link the bridge in the *Setup* tab. Tag the teeth and the pontic separately. Bridges will not be imported into 3Shape, but you can be link them after import.



What to do next

Proceed to scanning by clicking the **Scan** tab button.

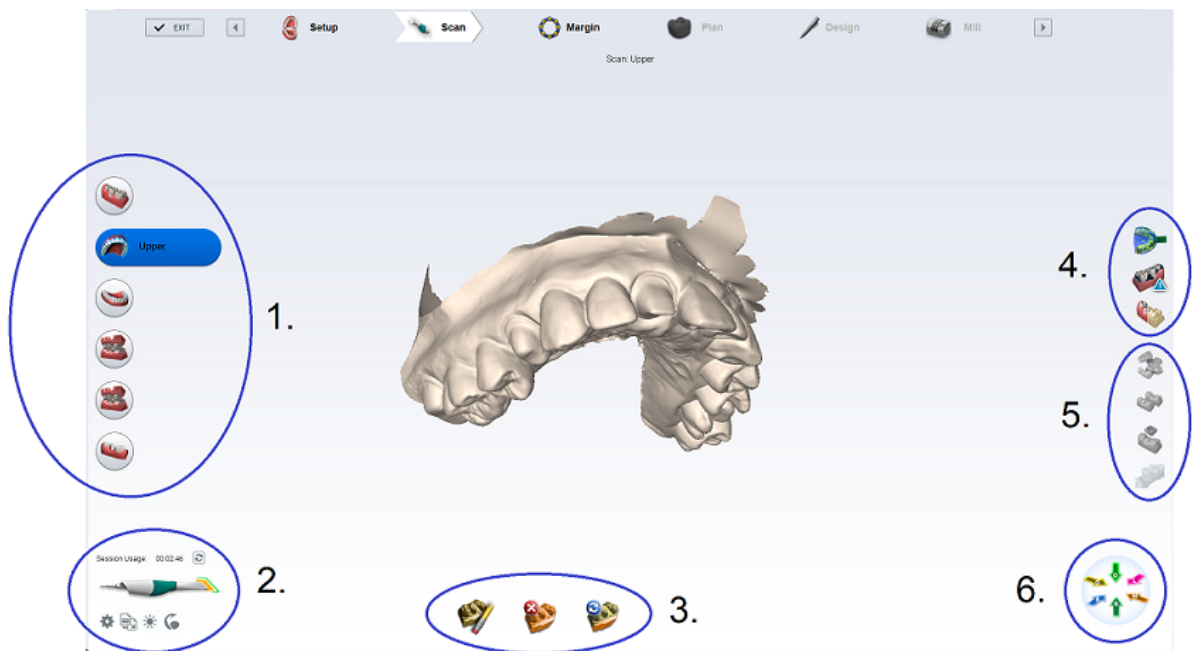
10 Scan tab overview

The *Scan* tab contains the following tools and indicators:

1. Scan type selection tools.

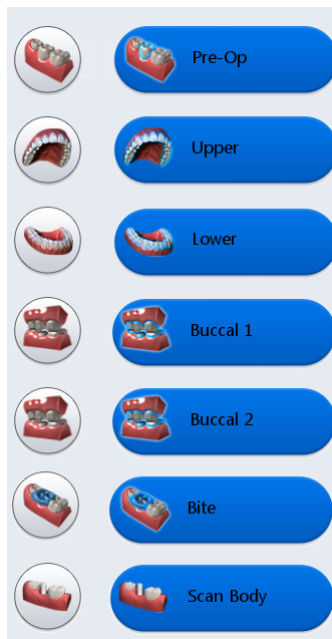
The scan types are pre-op, upper, lower, buccal, buccal 2, bite and scan body.

2. Scanner indicators
3. Model editing tools
4. View editing tools
5. Alignment tools
6. View mode selection tools



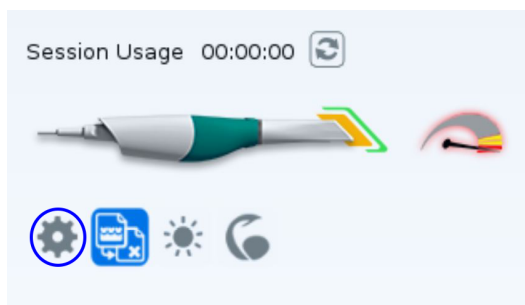
10.1 Scan type selection buttons

Select the desired scan type by clicking these buttons.

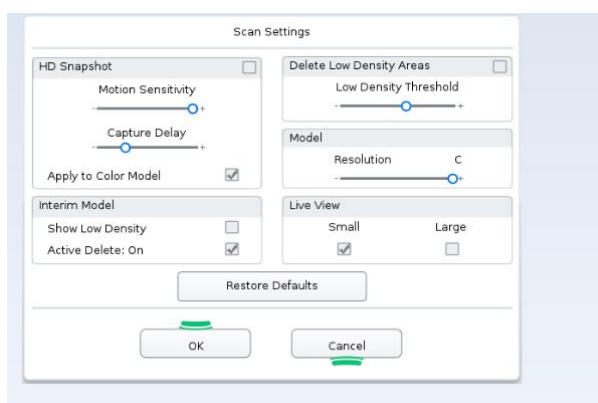


10.2 Adjusting scan settings

Open the scan settings dialog by clicking this button.



In the scan settings dialog, you can view and adjust the following settings.



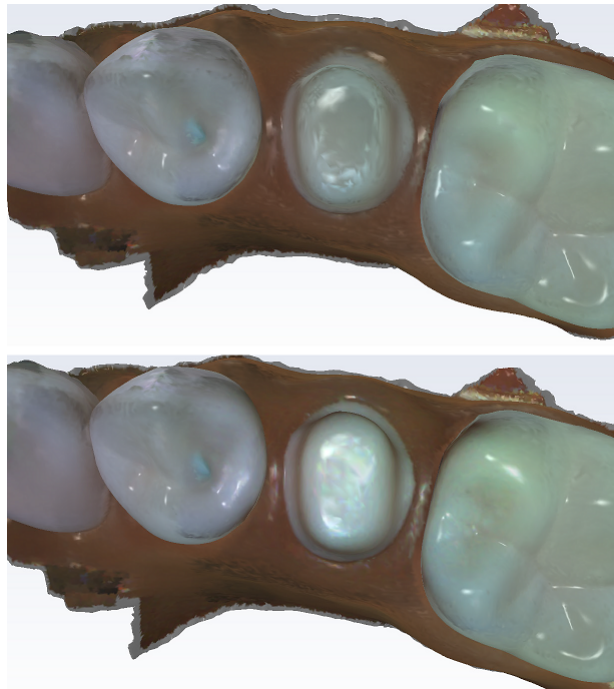
HD snapshot

When enabled, snapshots can be taken while hovering on the image.

Take a snapshot by hovering over an area, pressing briefly the lower button of the scanner or holding it down until you hear a shutter sound.

The snapshots are saved to the directory.

On the lower image the snapshot is applied to color model.



Motion Sensitivity

Drag the slider to adjust how sensitive this function is to movement of the camera.

Capture delay

Drag the slider to adjust how long you must stay still to take a snapshot.

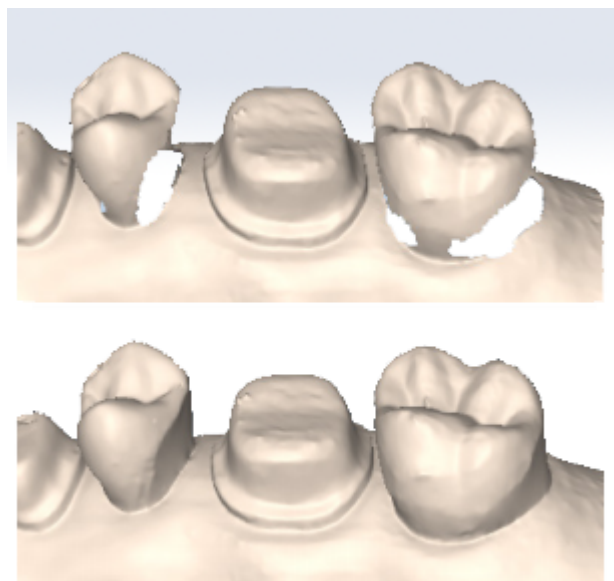
Apply to Color Model

When enabled, an HD image is added onto the color view of the model.

Delete Low Density Areas

Enable this option to remove low data. When enabled you can adjust the automatic fill of low density data in the generated model by dragging the *Low Density Threshold* slider to increase or decrease the level of data shown on the model.

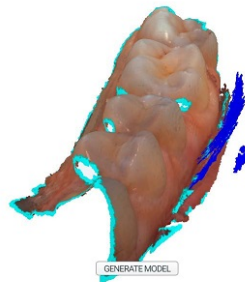
On the upper image the low density areas are removed.



Interim model

Show low density

Before the model is generated, the areas with insufficient data are highlighted in light blue.



Model

Resolution

To sharpen the details of the model, move the *Resolution* slider in the Scan Settings to the right from A to C.



Live settings

The Live View window can be set to Small or Large.

Restore Defaults

To restore the default settings, click this button.

10.3 Scanner indicators

Usage time

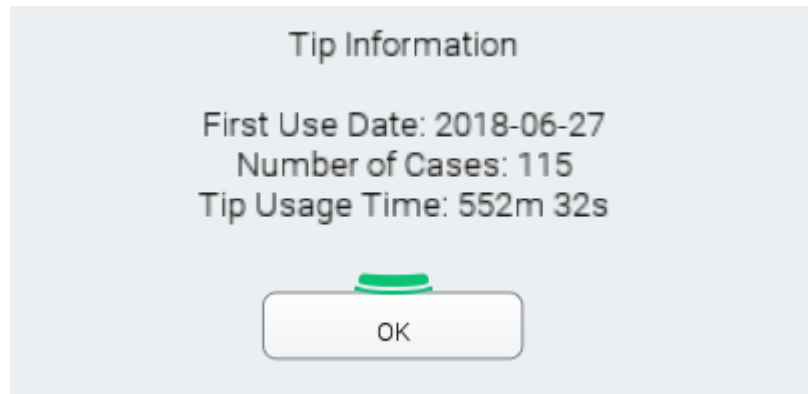
The session usage counter shows the usage time for the ongoing scanning session.



To reset the counter to zero, click the **Reset** button.

Tip usage

To check the total usage of the scanner when not scanning but while the scanner is in active state, click on the tip.

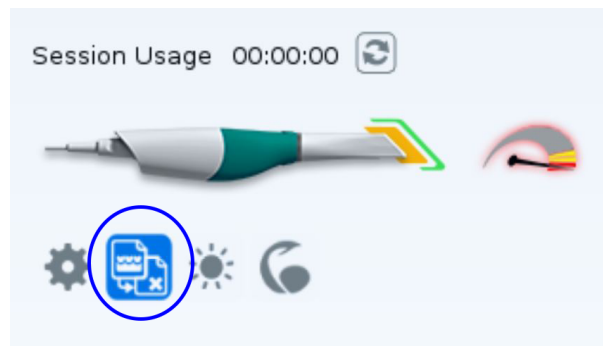


Settings

For detailed description see section "Adjusting scan settings" on page 29.

Active delete

Active delete is the default setting. If needed you can deactivate it by pressing and holding down the lower button of the scanner or by clicking this button.



For more information see section "Active delete" on page 54.

Scanner status

The current status of the scanner is indicated in the software with the following symbols.

The scanner is disconnected.



The scanner tip is disconnected.



The scanner is in heating stage 1.



The scanner is in heating stage 2.



The scanner is ready for scanning or scanning is ongoing.



Scan Model mode



The Scan Model scanning mode can be used for scanning of bright surfaces in mouth and on models to improve the scanning result. In the Scan Model mode the scanner light is dimmed. Use the Scan Model scanning for example for gold restorations, bright white stone models, etc.

To activate the Scan Model mode, click the **Scan Model mode** button.

Calibrate colour

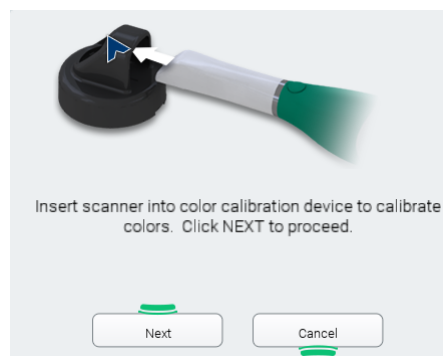


This is an optional step to optimize the colour represented on screen. This does not affect the stone model, nor the amount of data collected by the scanner.

To optimize the colour while in the scanning screen, click the colour symbol.

A new screen appears.

Before clicking **Next**, insert the scanner with sterilized colour tip into the device as illustrated.



Another screen appears with the results.

If contamination occurs, clean with a germicide wipe. Do not autoclave.

Store the colour balancer in a plastic bag or keep a dust cover on it.

10.4 Model editing tools

Eraser tool



Use this tool to remove unnecessary data like extra teeth, tongue, cheek, etc. of the scanned model. The tool can also be used to erase a misalignment or a part of the model that you wish to rescan without starting over.

The Erase icon is available after the model is generated. The model will be automatically cleaned up during the model generation i.e. erasing is not always necessary.

Delete all data



Use this tool to delete all 3D data in the current model.

Restore data



Use this tool to restore all data erased after scanning.

10.5 View editing tools

Impression model view



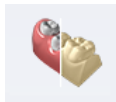
Click this button to change between the impression model view and normal view.

Data density view



This view mode represents the density of data captured during scan.

Color view



NOTE
For intraoral cases only.

This mode renders actual scan images for a clear view of margins, dentition and tissue.

Click this button to toggle between color view and stone view.

NOTE
You can zoom and rotate the model while creating or editing the margin.

10.6 Alignment indicator



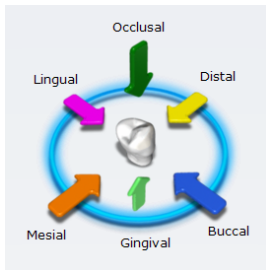
The buccal and opposing teeth will be automatically aligned. The successful alignment is indicated with the green point on the top right corner of the alignment button.



In case the alignment is not successful (indicated with red point in the top right corner of the alignment icon) see section "Aligning models" on page 47.

10.7 View mode selection tools

Select from the following view modes by clicking the arrows:



- Occlusal
- Lingual
- Mesial
- Gingival
- Buccal
- Distal

11 Moving/viewing 3D models

The model can be zoomed in and out as well as moved and rotated using the mouse.

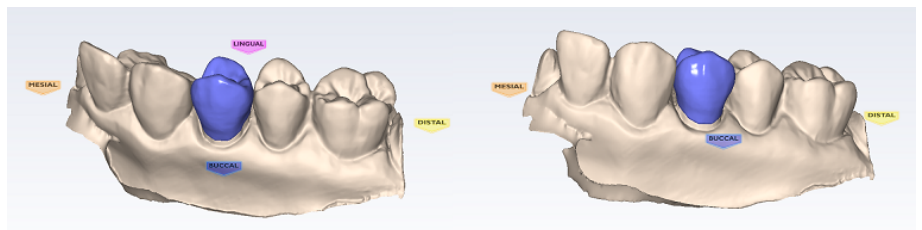
11.1 Rotating model

About this task

Follow these steps to rotate a model.

Steps

1. To rotate, click and hold down the right mouse button.
 2. To stop rotating release the mouse button.
- Repeat as needed.



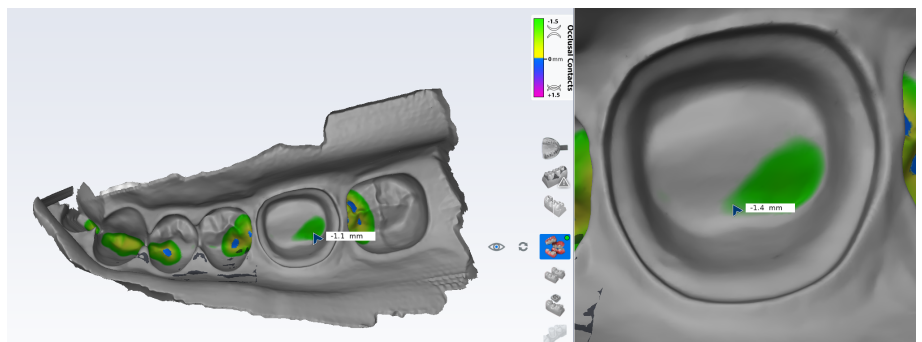
11.2 Zooming model

About this task

Follow these instructions to zoom.

Steps

1. Position the pointer on your model.
 - To zoom in the model, scroll the mouse wheel away from your wrist.
 - To zoom out the model, scroll the mouse wheel towards your wrist.



11.3 Moving model

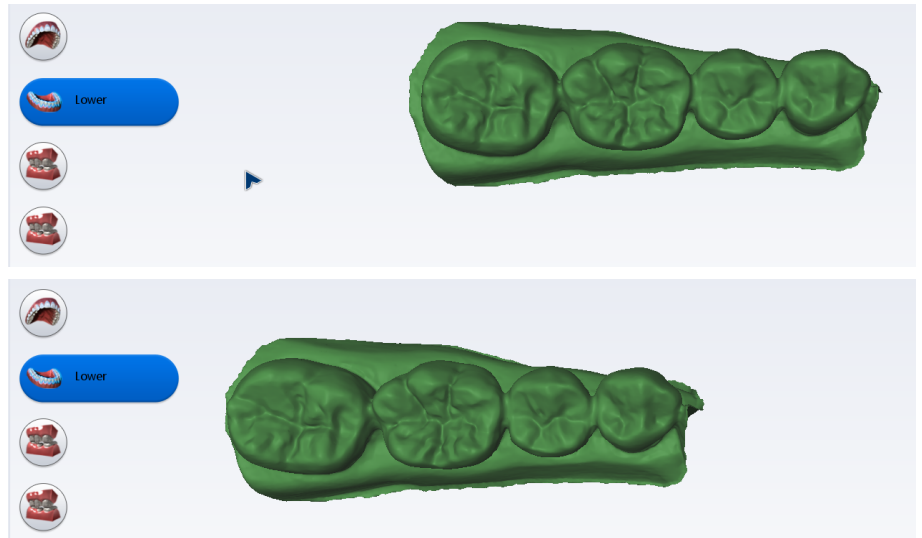
About this task

The model can be moved on the screen without being rotated. Follow these steps to move model.

Steps

1. Position the pointer on the model.

2. Press and hold down the mouse wheel.
3. Drag the model to the desired location and release the mouse wheel.



12 Scanning

NOTE

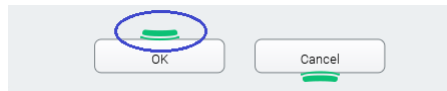
This section does not apply to cases that are imported from another scanning system.

12.1 Button and motion controls

12.1.1 Top button

Use the **top** button to:

- Activate scanner
- Deactivate scanner
- Activate a button when this icon is displayed.
- With *Planmeca Emerald S*, you can rotate and zoom the scanned model on the screen by moving the scanner while pressing and holding down the top button.



12.1.2 Bottom button

Use the **bottom** button to:

- Switch scanning types
- Turn ON/OFF the active delete functionality while scanning (Live View is open). For more information on active deleting see section "Active delete" on page 54.
- Activate a button when this icon is displayed.



12.1.3 Top and bottom buttons pressed simultaneously

About this task

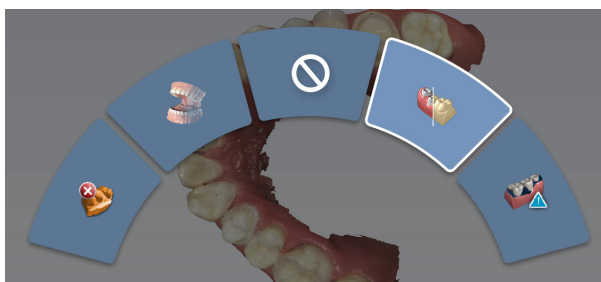
You can use the **top and bottom buttons simultaneously** to:

- Delete model
- Generate model
- Select color view
- Select Data density

Steps

1. Hold down both buttons simultaneously.
A menu appears on the screen.

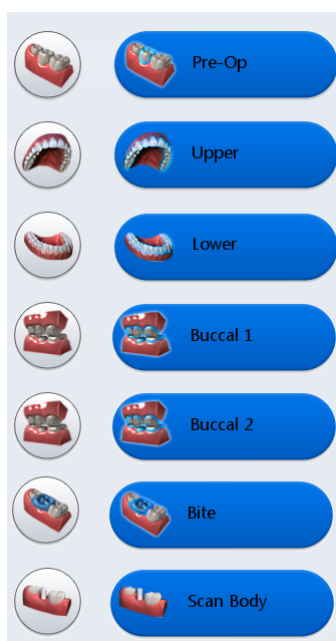
2. Point the scanner towards the screen and rotate the scanner clockwise or counterclockwise to select a desired action.



3. When the desired action is highlighted release the buttons.

12.2 Selecting scan type

Start the scanning by clicking the desired scan type tab:



- **Pre-op** - For using the patient's existing dentition or a wax-up as the pre-op model for creating the restoration.
- **Upper jaw**
- **Lower jaw**
- **Buccal** - For scanning the buccal view of the jaws in occlusion.
- **Bite** - For defining the occlusal anatomy of a bite registration. This button is active when bite registration is selected.
- **Scan Body** - For scanning the scan body on a dental implant.

TIP

You can move between the scan type tabs by pressing the bottom button of the scanner. The scanned model will be generated automatically when moving to the next tab.

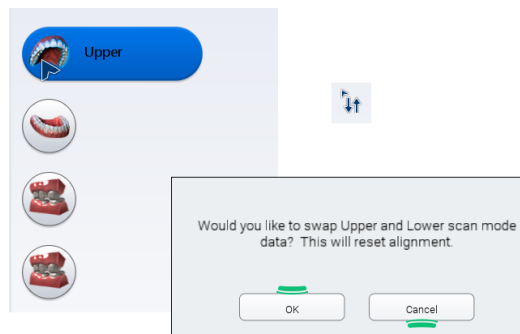
12.2.1 Swapping scan type

About this task

If you accidentally scanned a model after selecting a wrong scan type, the model can be changed to the correct type afterwards as follows.

Steps

1. Right-click and hold the mouse cursor on top of the scan type icon – up and down arrows will replace the standard cursor image.
2. Drag the cursor on to the icon of the desired scan type and release the mouse button.
3. Complete the swap by clicking **OK** in the following window.



Results

Alignment is reset.

12.3 Positioning scanner

Rest the tip of the scanner gently on the teeth during scanning to get the correct focal depth for the scans.



12.4 General scanning instructions

About this task

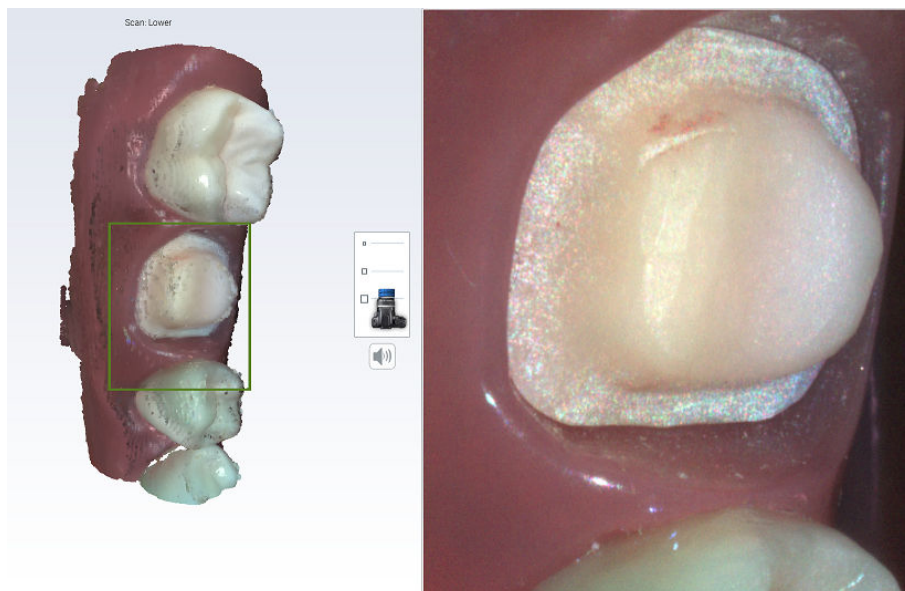
Follow these instructions when scanning.

Steps

1. Shield the site from strong extraneous light sources (dental lights, sunlight, etc.).
2. Place the scanner so that the camera is centred over the occlusal surface of the teeth.

3. Activate the laser by clicking the start button on the scanner.
4. Scan with smooth movements.
5. Rotate the scanner to almost 90° from the occlusal surface when scanning buccal and lingual data.

Watch the model building on the left to see what information has been captured and where you need to move the scanner.



The first scan is the most important one as it determines the default orientation.

NOTE

Make sure the first scan is taken parallel to the occlusal surface. If the first scan is not optimal, delete it and rescan.

In the preparation scans you should see:

- 100% of the preparation and interproximal contact areas
- 90% of the adjacent teeth
- Good buccal and lingual data, at least 2-3 mm buccal gingiva.

NOTE

If you accidentally scan undesired areas (e.g. tongue, cheeks) you can use the active filtering, see section "Active delete" on page 54 for more information.

6. Continue scanning until the model is fully formed.
7. Turn off the scanner by clicking the button on the scanner again.
A raw data model is displayed.
8. Create a 3D model by clicking **Generate Model** or by pressing the **M** key on your keyboard.

GENERATE MODEL

NOTE

If you exit PlanCAD Easy software without generating the model, the scans may be lost.



9. Evaluate the model for low data by clicking **Data density view** (for more information, see section "View editing tools" on page 34) and rescan if needed.



If necessary remove the extra material from the scan by using the Eraser tool, for more information see section "Removing unnecessary data with eraser tool" on page 53.

10. Select the next scan type tab and repeat the steps from the beginning for the antagonist.

See section "Scanning buccal bite" on page 45 for more information.

Note that the occlusion can be evaluated and designed using:

- Bite registration
- Buccal bite and antagonist
- Pre-op (a wax-up of existing anatomy before preparation)

Results

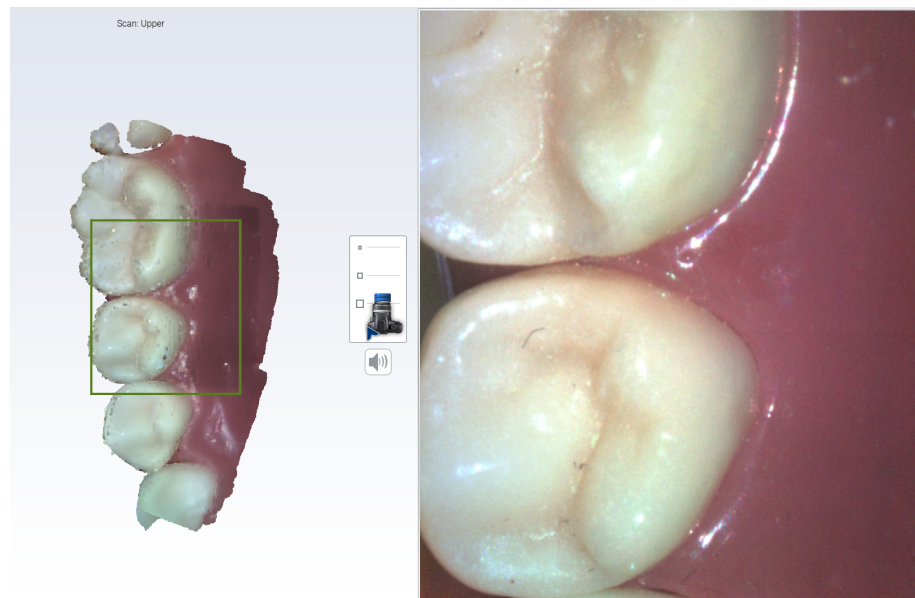
The image is automatically saved to Planmeca Romexis.

What to do next

To exit the software, click this button on the top left corner of the window.



12.4.1 Scanning with live view



The system displays a model based upon the scan data. The live view appears on the right and the model builds on the left. Watch the model building on the left to see what information has been captured and where you need to move the scanner. The building model rotates to match the live view.

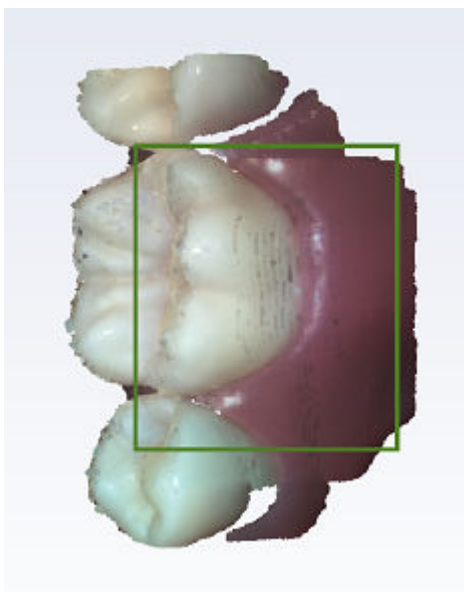
To indicate that the system is capturing data, an audio tone is played. If you have moved too far and the system needs data overlap, the audio feedback is stopped.

To mute or adjust the level of the audio feedback, adjust your computer's volume.

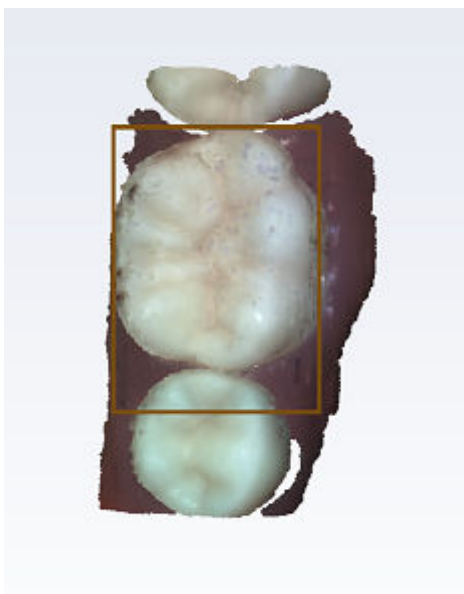
12.4.1.1 Checking scanning distance

The distance between the scanner and the surface being scanned is indicated with a coloured box on the building model. The colour of the outline changes based on how close or far the scanner is from the surface ranging from green (close) to orange and red (far).

- **Green** - close to the tip. The green colour indicates ideal focal distance. It means the scanning distance is correct and that the scanning is successful.



- **Yellow/Orange** - middle of the reading range.
- **Red** - end of the reading range (far away from tip).



NOTE

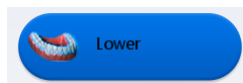
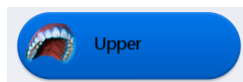
Any colour shown means the scanner is capturing data. The colours only correspond to the focal distance.

12.5 Scanning antagonist**About this task**

The opposing teeth are scanned to acquire bite information for the proposal. Follow these steps to proceed.

Steps

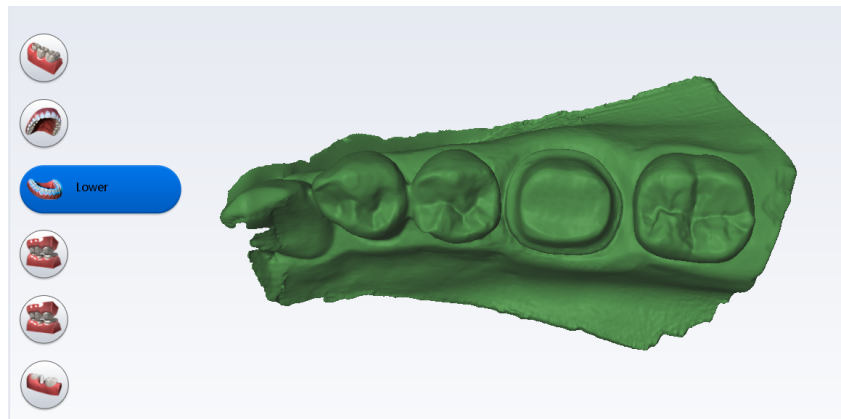
1. Select the antagonist by clicking **Upper** or **Lower**.



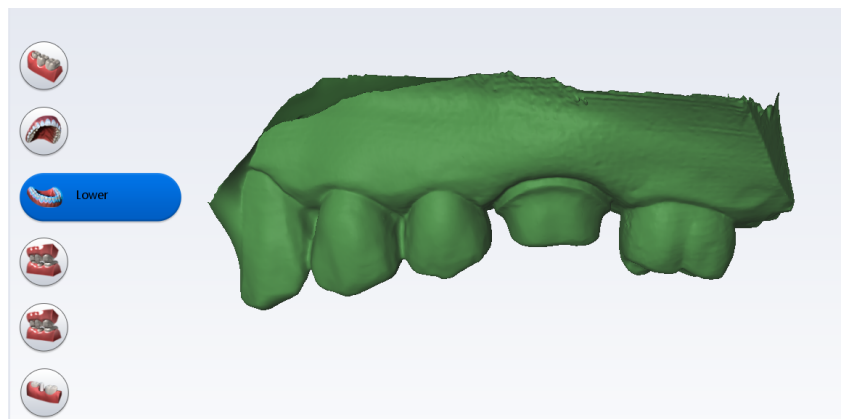
2. Starting with an occlusal view, scan the occlusal surfaces of the opposing dentition.
Ensure there is good cusp tip data on both the lingual and buccal sides.
3. Roll to the buccal and scan the buccal side of the opposing dentition.
Include gingival data, do not stop halfway down the tooth.

You should see:

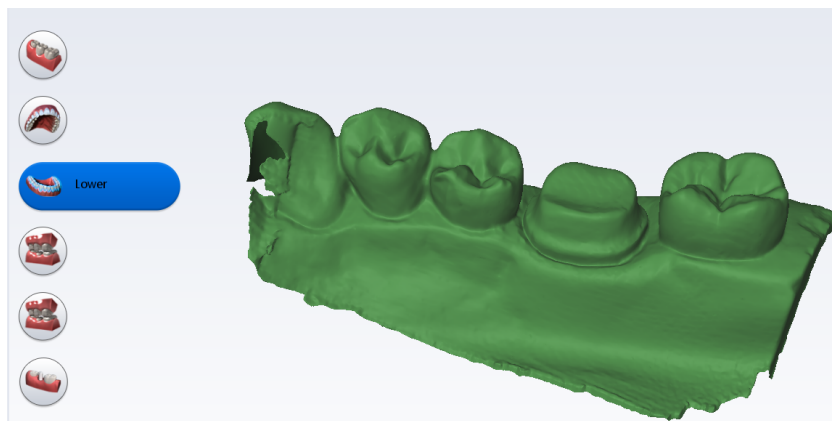
- Good occlusal data



- Good buccal data



- Good lingual cusps



Lingual axial data is not needed.

4. Erase extra data from the opposing model.

12.6 Scanning buccal bite

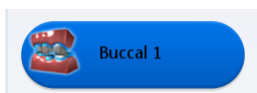
About this task

The buccal bite is scanned to align the upper and lower models. While scanning the buccal, the upper and lower model will automatically appear in the model build view.

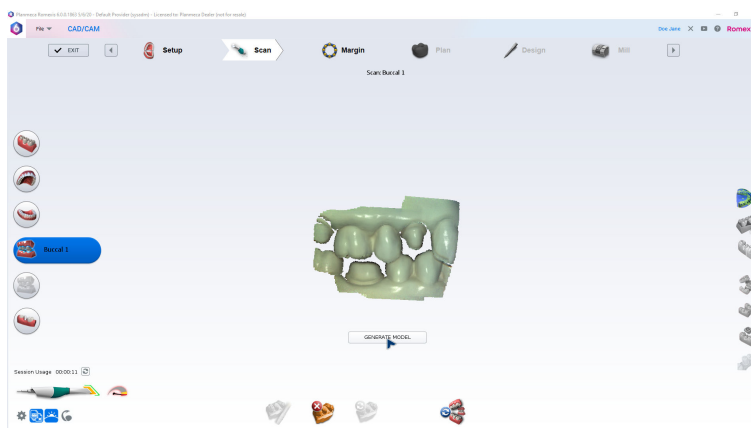
Follow these steps to proceed.

Steps

1. Click the **Buccal 1** button.



2. Have the patient bite down firmly and tell them not to move while you are scanning.
If they shift during scanning, the alignment may be incorrect.
3. Place the scanner at a 90° angle to the teeth.
4. Scan on one arch until the model for that arch appears, then move to the opposing arch and repeat.



5. Click the **Generate Model** button.

OR

Press the **M** key on your keyboard.

If the alignment fails (the buccal alignment icon is red), see section "Aligning buccal data" on page 49 on how to manually align the data.

6. If desired, click **Refine Bite** (unavailable if the models are not aligned).



12.6.1 Scanning bilateral buccal bite

About this task

Full mouth cases may require additional refinement and bite scans. To scan a second bite the *Buccal 2* scan type can be used and if needed refined after scanning.

Steps

1. Scan Buccal 1.
2. Verify bite alignment and refine if needed.
3. If necessary, scan Buccal 2.
4. Verify bite alignment and refine if needed.

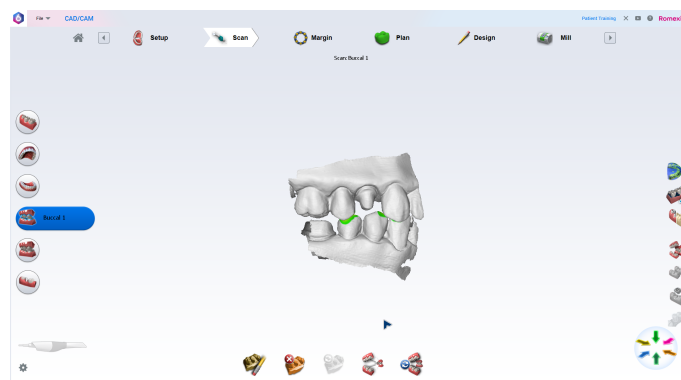
12.6.2 Buccal refinement

About this task

Buccal refinement is done to generate a new refinement based on 3-point cusp alignment.

Steps

1. Click on **Buccal Refinement** button.



- To cancel the refinement and return to the original alignment, re-click on **Buccal Refinement**.

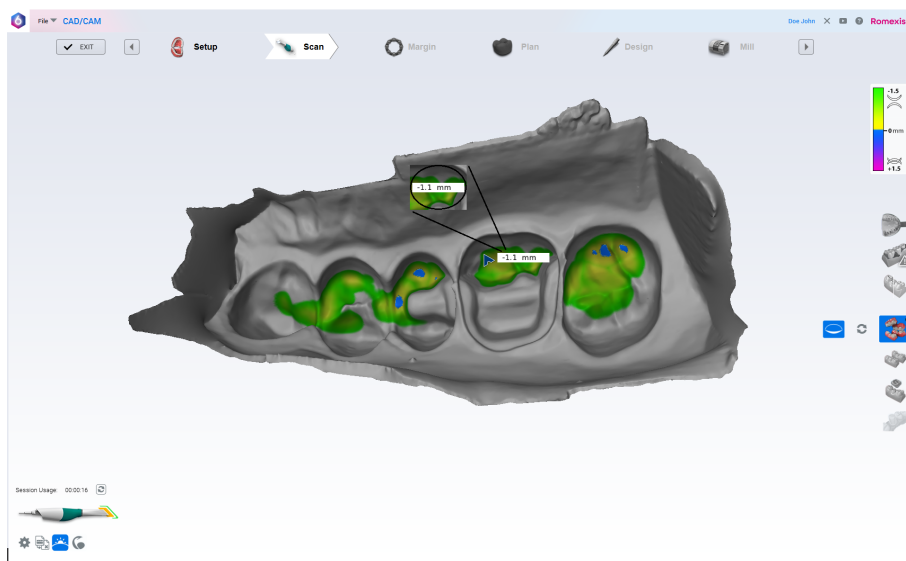
NOTE

If you regenerate the model after refinement has been applied, it will revert to the original alignment and may need to be refined again.

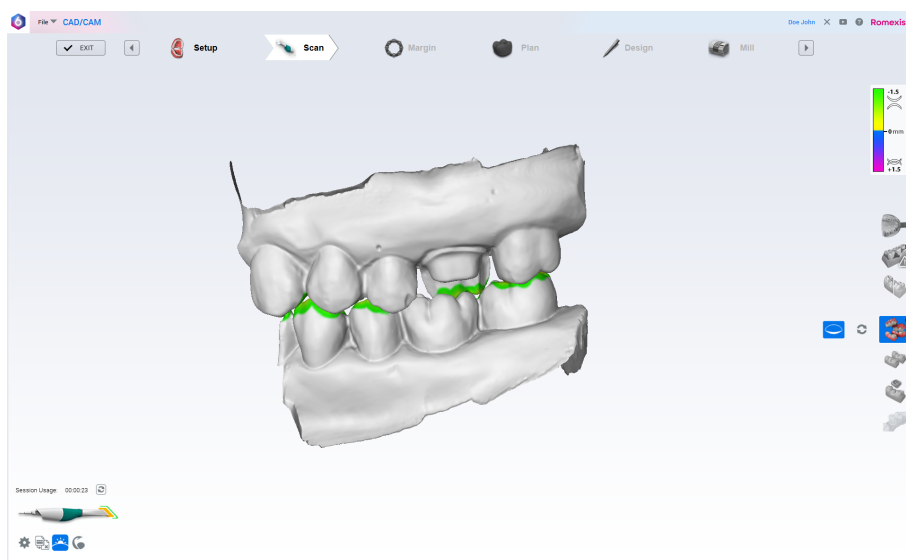
12.7 Prep clearance and contact strength

While the bite alignment tool is active, rotate the model to view the prep.

To display a distance indicator (in mm) move the mouse cursor around the model.



The *Occlusal Contacts* legend displayed with the bite alignment tool indicates the strength of the bite or the distance to the opposing dentition assisting in defining bite intensity and clearance.



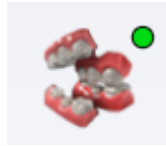
12.8 Aligning models

The alignment icons are on the right side of the screen.

The system attempts to automatically align the models as they are generated.

There is a different icon for each alignment type:

Buccal bite



Pre-op



Bite registration



Scan body



A green dot next to the alignment icon indicates the scans are aligned.



A red dot next to the alignment icon indicates the scans are not aligned.



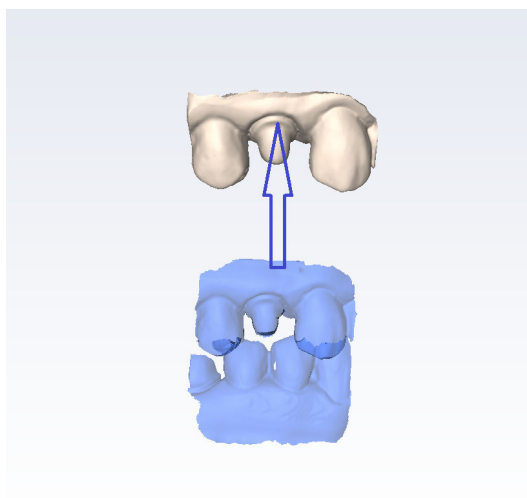
To view the alignment, click the alignment icon.



To reset the alignment and manually align the models, click **Reset**.

If there is extra data that might be interfering with the scans (tongue, cheek, etc.), try trimming the extra data before manually aligning.

To align the models, drag and drop the buccal bite, pre-op, bite registration or scan body over the prep model.

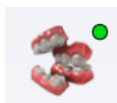


The models snap into place or return to their original positions.

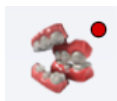
To access the menu options at the top or to return to scanning, deactivate the selected **Alignment** icon. You cannot proceed if the **Alignment** icon is active (blue).

12.8.1 Aligning buccal data

About this task



The buccal bite should automatically align. When the alignment is successful the spot in the top right corner of the **Align Buccal** button is green.



If the alignment is not acceptable the spot in the top right corner of **Align Buccal** button is red. In this case you can manually realign the data.

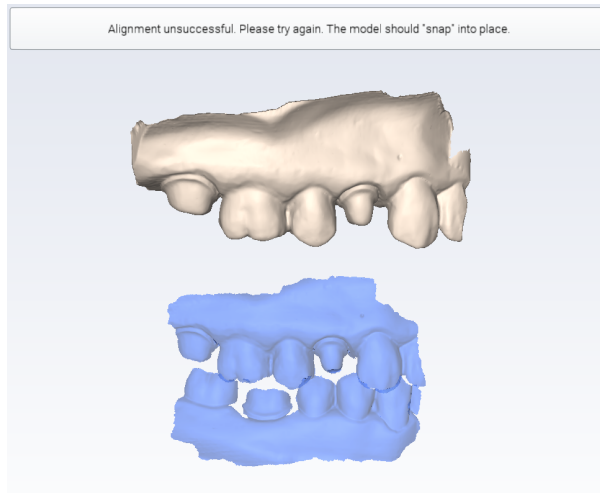
To designate the position of the three models (preparation, opposing, and buccal bite) in relation to each other proceed as follows.

Steps

1. Click **Align Buccal**.

The preparation and buccal bite model appear.

- If the preparation is an upper tooth, the preparation model appears at the top of the screen.
- If the preparation is a lower tooth, the preparation model appears at the bottom of the screen.



2. Look for a distinctive feature on both models.

3. Click directly on a distinctive feature in the buccal bite and drag the model until the pointer is directly over the same distinctive feature on the preparation model.

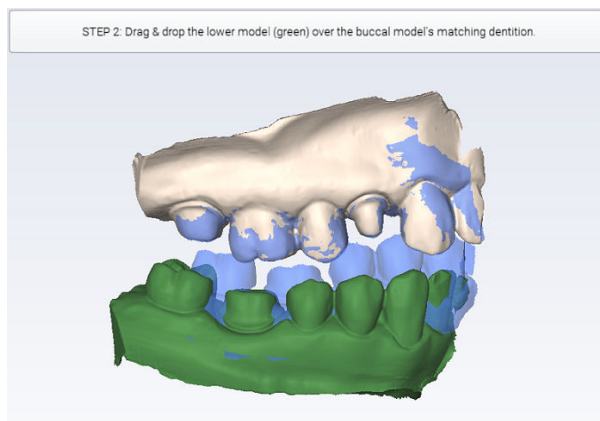
Click directly on a distinctive feature in the buccal bite and drag the model until the pointer is directly over the same distinctive feature on the preparation model.

As you drag the buccal bite model down, it will disappear behind the preparation model. It is important to know the point that you grabbed and drag it to the same point on the preparation model.

Distinctive features can include a cusp tip, groove, unique gingiva, etc.

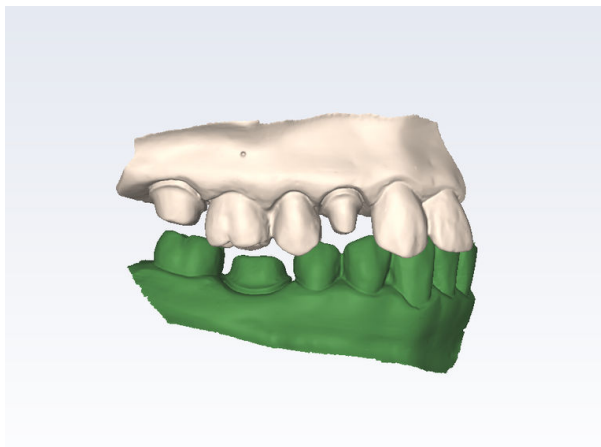
Do NOT click on smooth/round parts of the model or the model base.

The buccal bite model snaps into place and the opposing model appears.



- Click directly on a distinctive feature in the opposing model and drag the model until the mouse is directly over the same distinctive feature on the buccal bite model.

The opposing model snaps into place. Your alignment should resemble the following.



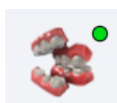
What to do next

If the system is unable to align the drag and drop points that you selected, the models will go back to their original positions. Try again.



If you are not satisfied with the alignment, click **Reset** to start over.

If a model has become tilted, it may be difficult to align. Click **Reset** to start over.



To deactivate the model and return to the scan options click **Align Buccal**.

12.9 Evaluating model

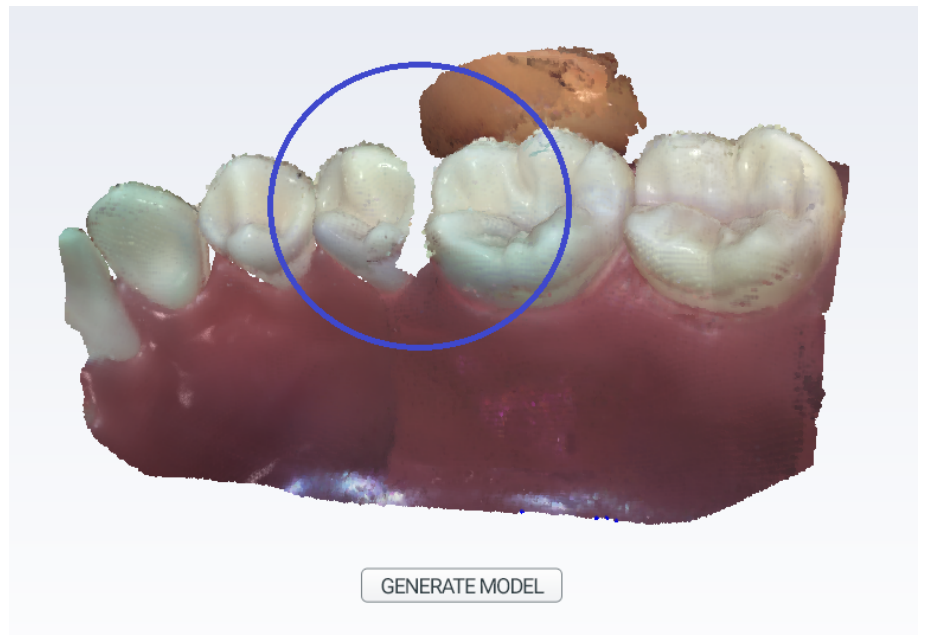
About this task

Follow these instructions to evaluate model.

Steps

- Rotate the model to look for low data areas in key areas: the preparation, interproximal contacts, etc.

In the example below, there is missing data on the interproximal area and extraneous data from a finger accidentally being scanned.



2. Fill in missing data where needed.

12.9.1 Checking model for missing data

About this task

Follow these instructions to check the model for missing data.

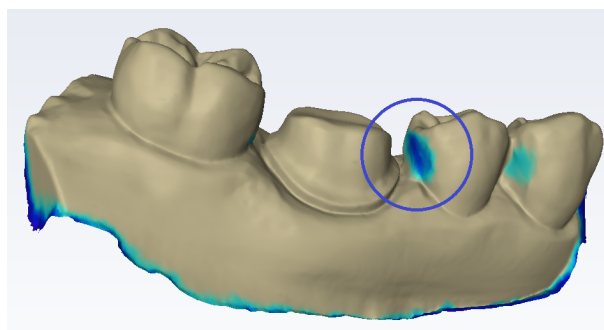
Steps



1. Click **Data density view**.

The model refreshes with dark blue areas indicating the least data.

2. Rotate the model to analyse it.



3. Check if the key areas are missing data:
 - Look for coloured areas on the prepared tooth, especially on the margin.
 - The adjacent teeth should have good data on the interproximal contact area, occlusal surfaces, and of the lingual and buccal contours.
4. Rescan the areas needed.



What to do next

To return to the normal view click **Data density view** again.

12.10 Removing unnecessary data with eraser tool

The **Erase** icon is available after the model is generated. The model will be automatically cleaned up during the model generation i.e. erasing is not always necessary.

The eraser tool can be used to remove unnecessary data like extra teeth, tongue, cheek, etc. It can also be used to erase an area that needs to be rescanned. If you spot a problem (i.e. the margin is partially hidden by cord or tissue), you can erase that area, correct the problem intraorally, then rescan just that area. You do not have to start over.

NOTE

Be sure to erase and rescan ALL modified areas.

The eraser can also be used in the pre-op, bite registration and scan body time saver tools.

Click the **Eraser tool** to deactivate it and regenerate the model.

NOTE

Keep some of the buccal or lingual data when erasing. If you disconnect the two halves of the model, half of the model will disappear. It is also recommended that you not delete multiple teeth in a row. Large gaps in the model is not recommended.



12.11 Active delete



Active delete removes unwanted data that is scanned inadvertently. The active delete tool is automatically activated and recommended to use while scanning. It can be deactivated if needed by clicking this button or depressing and releasing the bottom button of the scanner while it is active.



In some cases, rotate the scanner in different angles while scanning to remove unwanted data. Always verify data density after using this feature.

12.12 Global alignment

Global Alignment reprocesses scans to correct misalignments where possible and improves overall model trueness and precision during model generation. Misaligned area should be scanned from multiple angles and the system replaces and realigns the data.

Model building while scanning may slow down slightly due to how the data is added to the model.

12.13 Scanning pre-op

About this task

Use Pre-op scan when you want to scan a pre-operative tooth or a wax-up. Pre-op scans can be used in combination with the Library tooth or can be used as a template, like a bite registration.

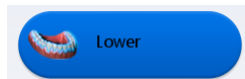
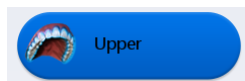
Steps

1. On the *Scan* tab, click **Pre-op**.

Scan the pre-operative tooth or wax-up with the same scanning techniques used for the prepared anterior or posterior tooth.



2. Prepare the tooth.
3. On the *Scan* tab, select the jaw (upper or lower) with the preparation.

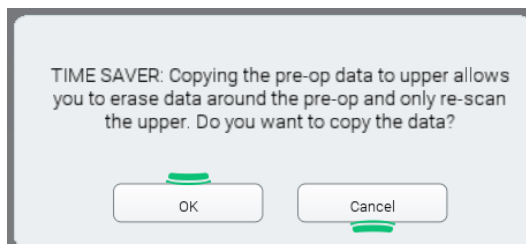


A Time Saver message appears. This message only appears when the pre-op is scanned first. Select Time Saver to duplicate the pre-op model and to use the same data for the preparation model.

NOTE

Time Saver cannot be used in conjunction with Impression Mode.

- Click **OK** to use the Time Saver.



If you do not wish to use the Time Saver option, the preparation and adjacent teeth can be scanned on their own. The following instructions assume the use of the Time Saver option.

A copy of the pre-op model is created in the preparation model colour.



- Click the **Eraser Tool**.
- Erase the tooth that has been prepared and the marginal ridges of the adjacent teeth.
- To deactivate the Eraser Tool, re-click it.
- Activate the scanner and begin the scans with the occlusal of one of the adjacent teeth.
Once you have established where you are, you can begin scanning the preparation.
- Scan the entire preparation and any of the adjacent tooth data that was removed.
- Click **Generate Model** or press **M** on the keyboard.

GENERATE MODEL

12.14 Scanning multiple restorations

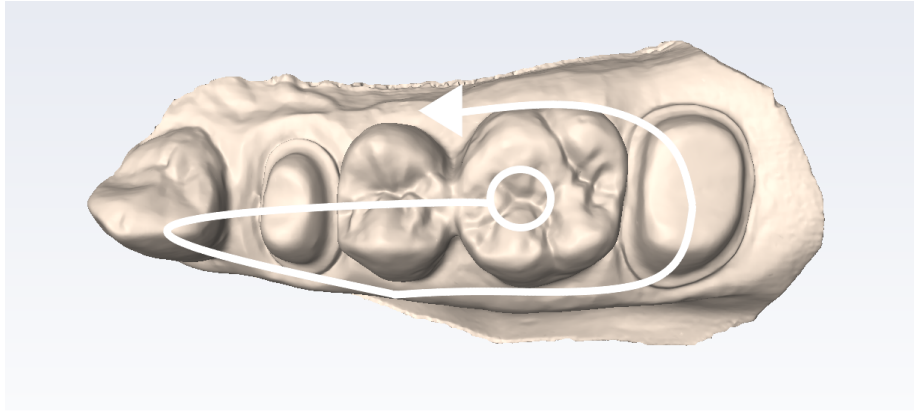
About this task

In scanning multiple restorations, the basic scanning technique is expanded to encompass the extra preparation(s).

Steps

- Select the tooth number for the first preparation and then select a preparation type, material, and shade.
- Repeat for each prepared tooth.
The selections made for the previously selected tooth are used as default values.
- Click the *Scan* tab.

An example of multiple restoration scanning is shown below.



The basic scanning pattern is expanded to encompass the extra preparations and any teeth in between.

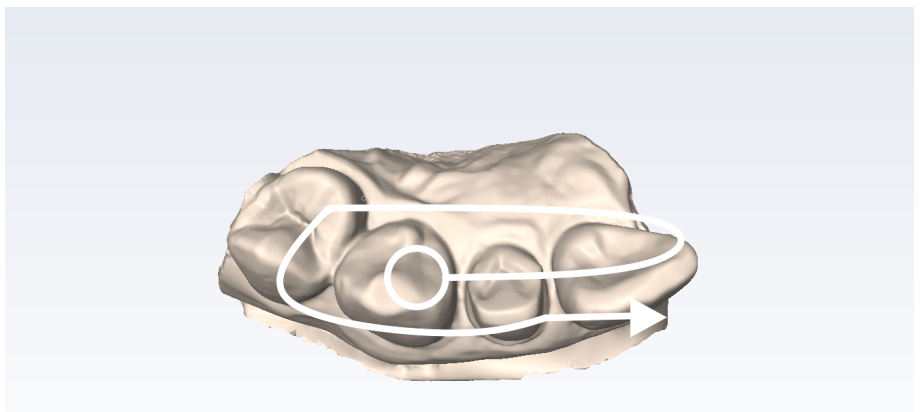
12.15 Scanning single anterior

About this task

The scanning pattern for anteriors is similar to the posteriors although the anterior teeth are often very similar to each other. To lower the chances of misalignment, follow the suggested scanning steps. The scanning method is the same for all anteriors.

Steps

1. Start the scan on the occlusal of the preparation and then proceed to mesial proximal.
2. Rotate to the lingual and scan the teeth.
3. Rotate across the distal proximal to reach the facial side.
4. Scan the facial side.



When scanning intraorally, it might be more comfortable to have the scanner tip pointing towards the mesial instead of the distal. In this case, the surface indicators on the model will be incorrect until the Orientation is changed.

Alternative scanning pattern

You might use a “saddle” pattern: rolling back and forth over the straight and long anterior teeth. This pattern can help avoid misalignments when scanning very similar teeth.

12.16 Scanning multiple anteriors

When scanning multiple anteriors and crossing the midline, start the scanning with the highest tooth number (Universal) or higher quadrant (ISO) to get the correct orientation.

In intraoral scanning it is sometimes more comfortable to scan with the scanner tip pointing towards the mesial instead of the distal. There are a couple of options for dealing with this situation:

- Take the first scan with the scanner pointing in the correct direction. Turn the scanner around to a more comfortable position and retake the first scan.

Watch the model as it applies the second scan and ensure the scan is placed correctly. This will not work if there is insufficient data for the system to recognize the two scans as the same position. If the second scan aligns correctly, continue scanning in the normal pattern.

When crossing the mid-line, lingual scans are recommended for more data and fewer flat surfaces. After you turn the scanner around, pay attention to where the system places the next scan. Repeating a previous scan can help the system recognize that the scanner has been turned around. If the scan is placed in the wrong area, there may not be enough data on your model to turn the scanner around and more scans will be required.

- Take the first scan of the higher tooth number with the scanner pointing towards the mesial or start with a lower tooth number. In this case, the surface indicators will be incorrect until you reach the *Margin* tab. On the *Margin* tab, turn the model around when setting the Orientation.

12.17 Non-restorative scanning

For diagnostic cases, orthodontic aligners, or when sending a restorative case (without drawing margins) to a laboratory, select *Non Restorative* as the restoration type on the *Setup* screen and click **Scan** to proceed.

Non-restorative scanning differs from restorative scanning in several ways:

- Setup screen information is not entered.
- No margins are drawn. If you are scanning a large restorative case and sending it to a lab, ensure the margins are visible without the need for the Retract tool.
- Buccal scanning - double buccal is enabled. Scan the molars on each side to get accurate alignment, for more information see section "Scanning buccal bite" on page 45.

Use the method on the following pages when using full arch scans for the fabrication of appliances. Follow the scanning protocol to ensure adequate model.

You can also scan in *Models* module. See Romexis 6 User's manual for more information.

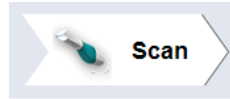
12.17.1 Selecting initial scanning position

About this task

Follow these instructions when selecting initial scanning position.

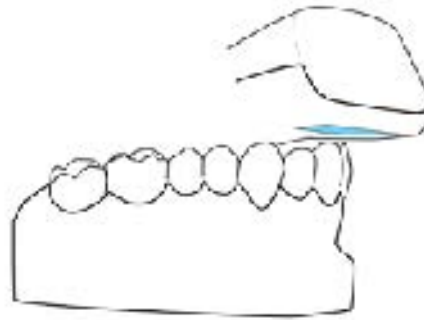
Steps

1. Go straight to the *Scan* tab (no setup is needed).

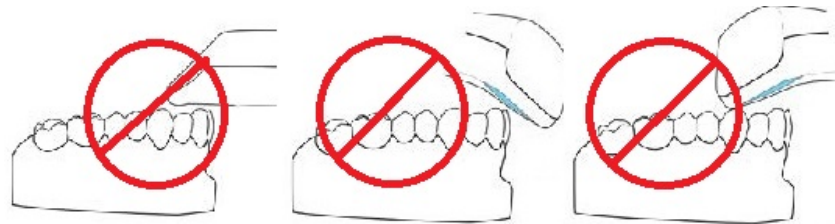


2. Start by positioning the scanner towards the distal surface of the patient's left teeth.

Check that the scanner is straight over the incisal as illustrated.



The scanner is incorrectly positioned if positioned straight from facial side, tilted towards facial or lingual side.



NOTE

To eliminate interference of soft tissue, retraction devices are highly recommended.

12.17.2 Recommendation for full arch scanning with Planmeca Emerald and Emerald S

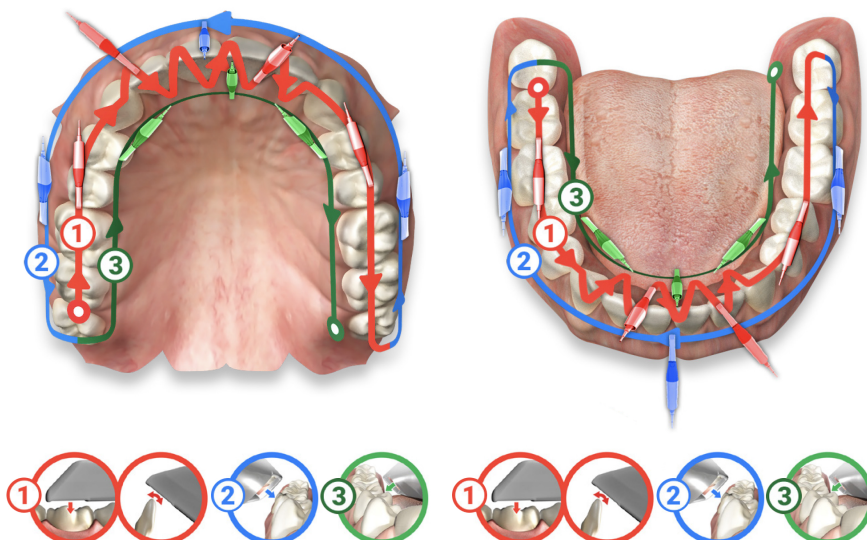
About this task

Follow these steps to perform full arch scanning.

Steps

1. Start on the distal surface of one side and scan the occlusal of the entire arch.
On the anteriors, rotate back and forth from the lingual and facial surfaces.
2. Scan all of the buccal surface.
3. Scan all of the lingual surface.
4. Evaluate the model and rescan areas with low data, if necessary.

- To aid automatic alignment, start the scans on the opposing molars and continue to the buccal scan in the same quadrant.



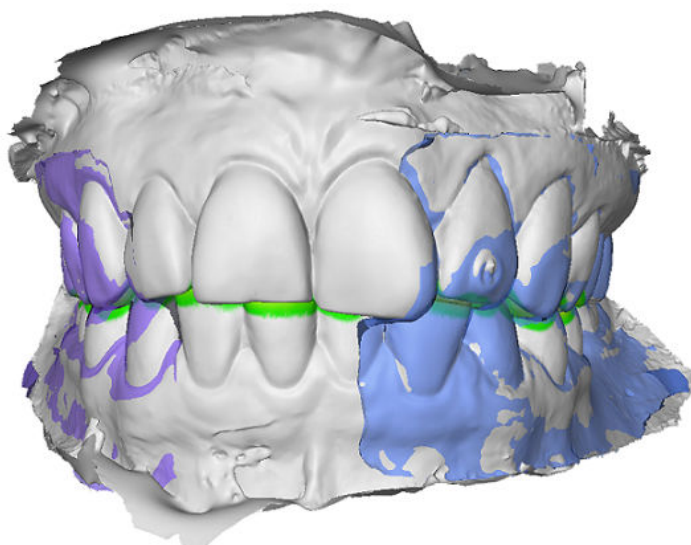
12.17.3 Buccal scan

About this task

Follow these instructions to perform buccal scan.

Steps

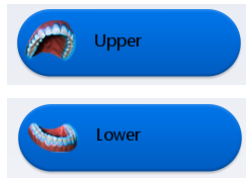
- Start the buccal scan over the gingival tissue of the maxillary arch.
- Capture the maxillary teeth until the maxillary arch appears.
- Start to capture the mandibular arch until the mandibular arch appears.
If the models do not appear, stop scanning and manually align the models with the bite alignment tool.
- Verify the bite and use the Refine Alignment tool if needed.
If additional alignment is needed, continue to Buccal 2.
- If needed repeat the refinement on Buccal 2.



12.18 Scanning scan body

About this task

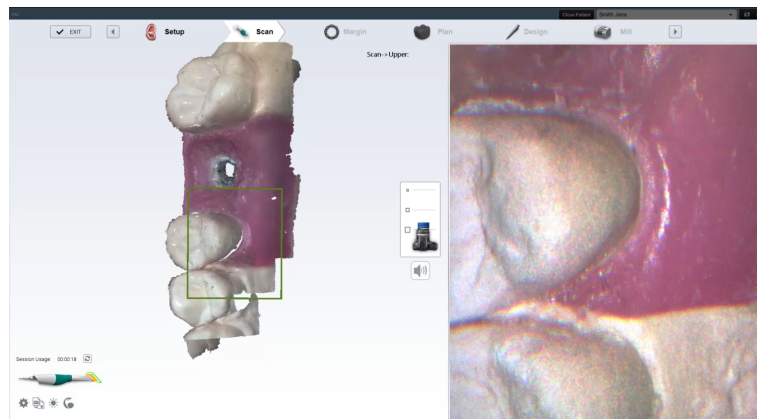
After having defined the restoration site to be scanned in the *Setup* screen, the software automatically shows the correct jaw (upper or lower to be scanned).



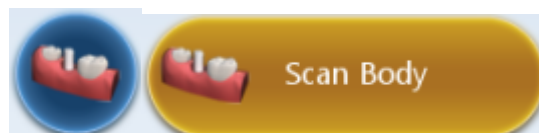
Steps

1. Start scanning the occlusal surface of the jaw in which the implant is placed.

Scan buccal and lingual surfaces. Make sure you have properly scanned the approximal contacts and the emergence profile.

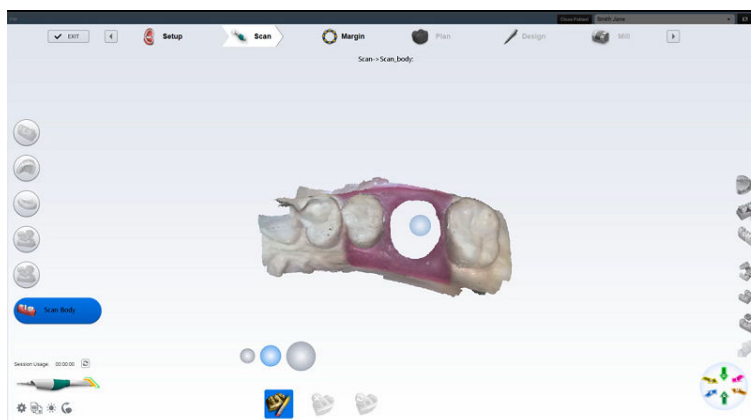


2. Evaluate the model and make adjustments as needed.
3. Select **Scan Body** scan type.



After you click the **Scan body** button you can select whether to use the time saver option or scan the whole area again with the scan body.

In the following instructions the time saver is used. Before starting to scan the scan body erase the area around the implant.



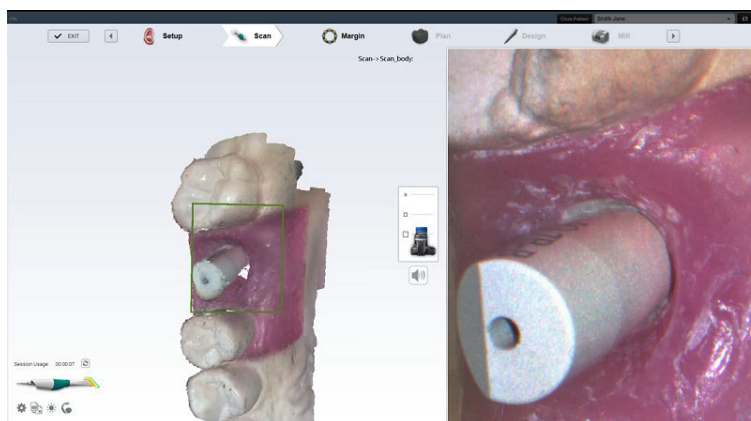
4. Insert the scan body.
5. Start the scanning at the gingival in order to capture enough data.

If you start scanning from the occlusal on a scan body, not enough data is captured which makes it difficult to create a good model. Scan the scan body from as close as possible but do not put it inside the tip. Do **not** use Active Delete.

When possible, include teeth and tissue in the scans.



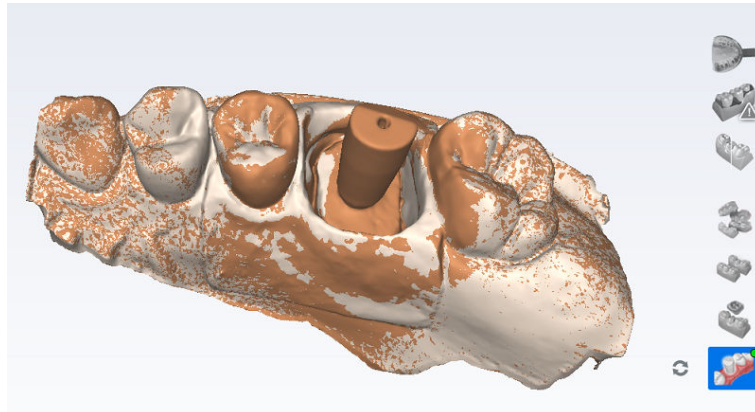
Scan up the side, over the top of the scan body, and back down until you reach the gingival again.





If not automatically aligned, click the **Align Scan Body** button to manually align the scans.

The alignment is successful when both scanned models show clearly in the alignment.



What to do next

Scan the antagonist and buccal bite as usual.

12.19 Bite registration scanning

A bite registration can be used to optimize occlusion for proper alignment with the opposing tooth. Scan the preparation, ensuring there is enough detail of the adjacent dentition and/or gingival tissue in your preparation scans to align the bite registration scans. After scanning the preparation, prepare the bite registration.

12.19.1 Preparing bite registrations

About this task

Follow the steps below as you prepare bite registrations.

Steps

1. Place the bite registration material so that it completely covers the preparation surface.

Make sure that:

- The bite registration material *does NOT cover the adjacent teeth*. If it does, trim to the interproximal after the material sets.
- There is *sufficient data of the adjacent teeth* in the scans of the preparation and the bite registration in order for the two models to align.
- There are *no gaps* between the bite registration material and the adjacent teeth.

2. Ask the patient bite down firmly for the impression.

If the bite needs to be trimmed to expose more of the adjacent teeth, trim it in the mouth. Note that if you remove and replace it, the bite registration material may not seat properly.



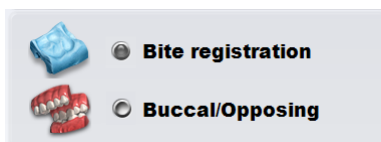
12.19.2 Scanning preparation model

About this task

Follow these steps to scan preparation model.

Steps

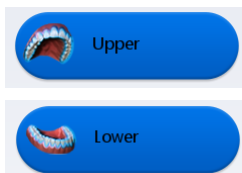
1. On the *Setup* screen, select **Bite registration**.



The *Upper* or *Lower* is automatically selected based on the selected tooth number.

2. On the *Scan* tab, select the jaw (upper or lower) with the preparation and scan it.

Make sure you scan the entire occlusal surface.



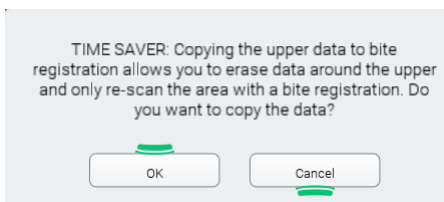
3. Click **Bite**.



A Time Saver message appears when the preparation is scanned first. The time saver option allows you to duplicate the preparation model and to use the same data for the bite registration model.

If you do not wish to use the Time Saver, the bite registration and adjacent teeth can be scanned on their own.

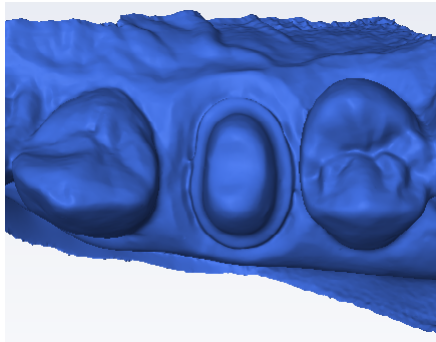
To use time saver, click **OK**.



NOTE

Time Saver cannot be used with Impression Mode.

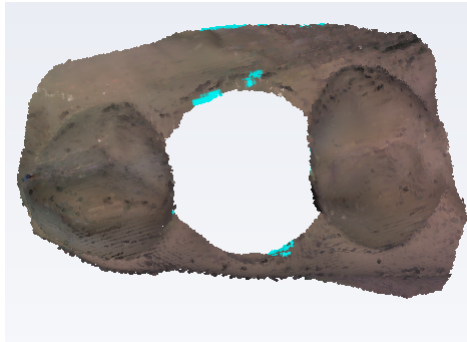
A copy of the preparation model is created in the bite registration model colour.



4. Click the eraser tool.



5. Erase the preparation and the marginal ridges of the adjacent teeth.



6. Deactivate the eraser tool by clicking on it.



7. Activate the scanner and start scanning the occlusal surface of one of the adjacent teeth.
8. Once you have established where you are, start scanning the bite registration data.
9. Scan the occlusal surface of the bite registration material and any removed data of the adjacent tooth which was not included in the bite registration.

12.19.3 Defining occlusion areas for bite registration

About this task

Follow these steps to define occlusion areas for bite registration.

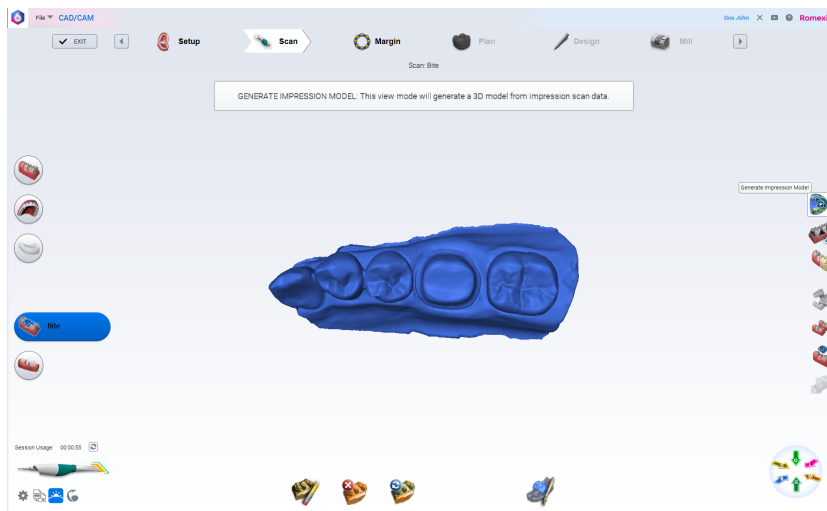
Steps



1. Click **Bite Selection** at the bottom of the screen.

This icon only appears on the *Bite* screen.

2. Click and drag the tools to highlight the areas of the opposing dentition that would come into contact with the restoration.



3. Click **Bite Selection** tool again to deactivate it.

What to do next

NOTE

If you made a mistake and need to start over, click **Reset**.



12.20 Scanning impressions

About this task

Follow these steps to scan impressions.

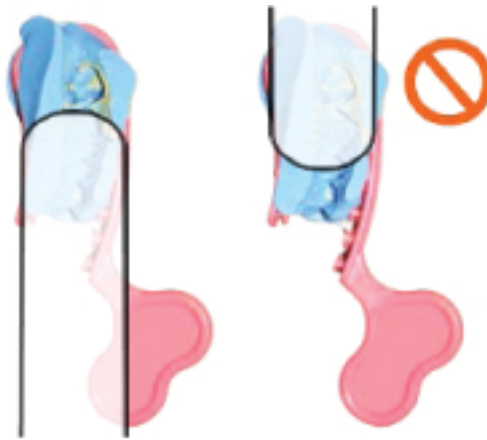
NOTE

Any impression material can be used. The system does not require a particular colour or type of material.



Steps

1. Remove the excess impression material so that the scanner can get closer for scanning.



NOTE

The Buccal / Opposing scan option cannot be used with impression scanning. Use the impressions to create an articulated model.

2. Ensure the tip of the scanner is pointing towards the distal so that the orientation of the model will be correct.

Due to the nature of impressions, the normal positioning of the scanner may not be able to capture all of the walls of the impression. You can also tilt the scanner up or down to achieve the necessary point of view.

For positioning see also section "Positioning scanner" on page 40 .

NOTE

Be careful not to squeeze or otherwise distort the impression while scanning.

3. Select **Upper** or **Lower** if not already selected.

NOTE

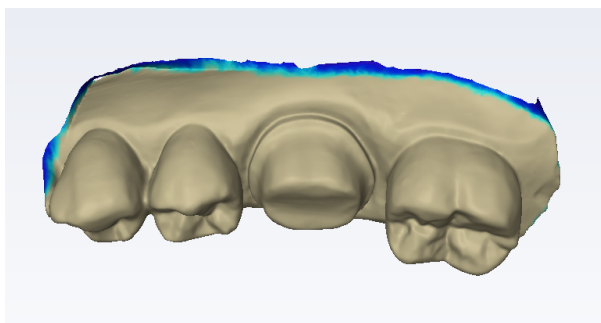
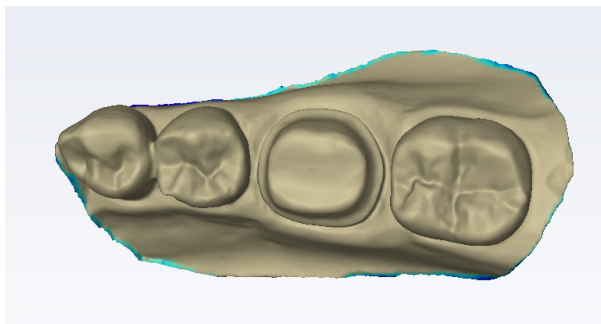
Do NOT select Scan Bite Registration, which resembles an impression.

4. Use the same scan pattern as for intraoral or model scan.

NOTE

From the occlusal view, the impression can give the optical illusion of looking like a regular model.

5. Rotate the model to see all of the impression.
Be sure to check the contact areas on the proximal teeth.

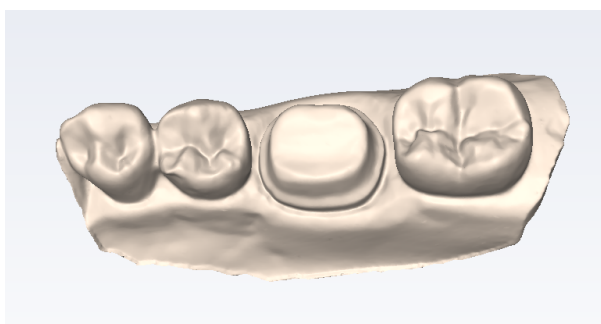


You can use the **Data Density View** to be sure there is enough data.

6. If there are areas that need additional scans, such as the mesial interproximal area, take extra scans.
7. Click **Data Density View** to deactivate it.
8. Click **Impression Mode**.



The model is inverted into normal view. All other tabs will use the inverted model of the impression for creating the proposal.



9. Click the **Margin Tool** button and continue with the normal procedure for drawing the margin and designing the proposal.

12.21 Shade assistant

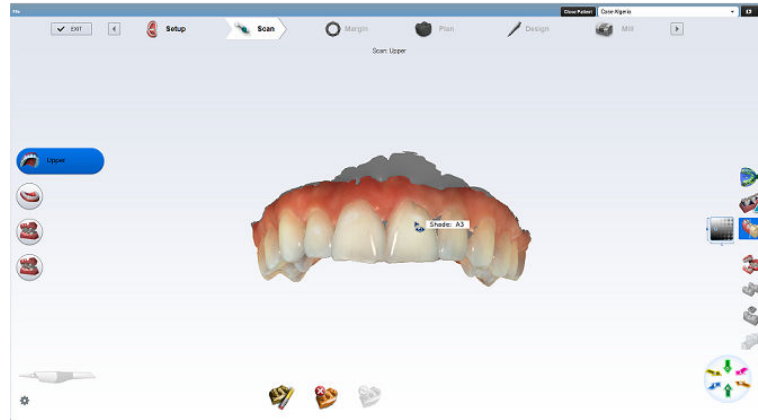
NOTE

The **Shade Assistant** feature only works with the **Planmeca Emerald S** scanner and only with intraoral cases.



To view the scanned model in colours, click the Color View icon on the right side of the screen.

Hover the mouse over the model to view the tooth shade.



13 Orientating models

Orientation is the selected model position for Autogenesis to propose the new restoration. Autogenesis in turn uses this set position as a starting point for cusp height and marginal ridges based on the adjacent teeth.

The first scan determines the initial positioning of the model.

Orientation affects two major aspects:

- **Design** - Orientation plays a large part in Autogenesis and determining that the anatomy aligns with the adjacent teeth.
- **Milling** - The path of insertion determines the Orientation needed for milling. For a restoration to mill out properly, the margin and axial walls must be visible from the occlusal view.

In most cases, these two factors can be accomplished with one Orientation and will only need minor adjustment. There are situations when greater adjustments to Orientation are required.

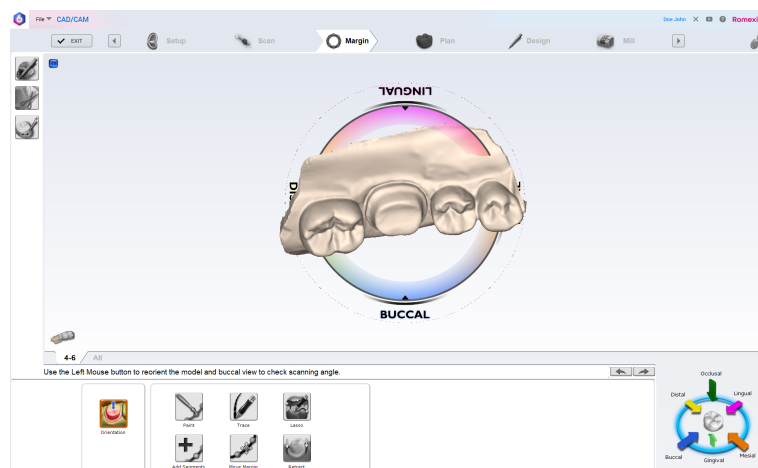
13.1 Orientation in intraoral scanning

- Tooth position and size of the patient's mouth can sometimes make it difficult to get a perfectly positioned first scan.
- Depending on an anterior tooth's placement and whether you are right or left handed, it may be necessary to point the scanner in the wrong direction. If the tip of the scanner is pointing towards the mesial instead of the distal, then the surface indicators on the model will be incorrect until the Orientation is changed, see section "Rotating model" on page 75.

Starting the orientation

When the *Margin* tab is selected, Orientation is automatically activated. The model displays with the Orientation Circle.

When Orientation is active, use the left mouse button to rotate the model to the exact desired position.



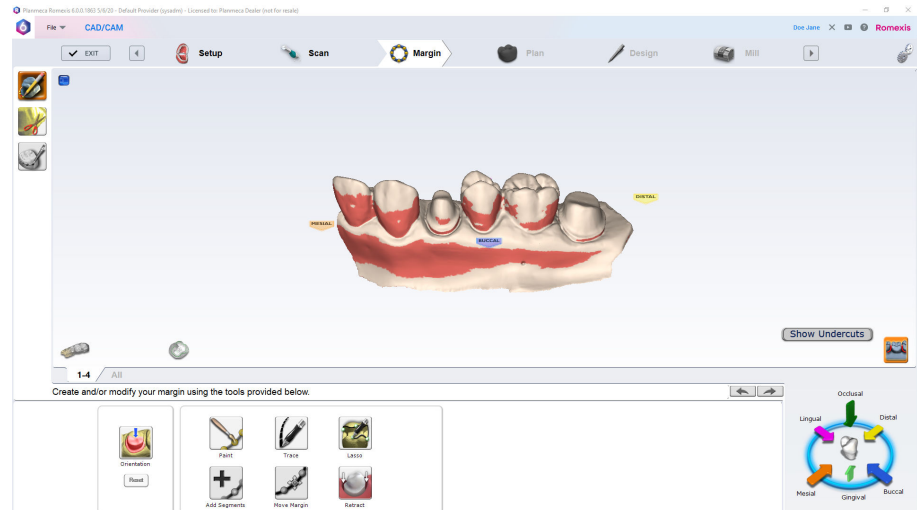
13.2 Viewing model

In Orientation, the model displays with a circular graphic labelling the mesial, distal, buccal, and lingual surfaces. Zoom out to see the buccal and lingual labels, if desired.

The model should also be evaluated from the sides. Click the arrows in View Controls to view the desired surface.



Click **Show Undercuts** to view any undercut areas on the model. This is based on the Orientation and is for visual reference only. It does not affect milling.



13.3 Moving central point

About this task

The central point of the orientation circle is the middle of the screen, which may or may not be the location of your preparation. If the central point is not on your preparation, it can be a little confusing when rotating the model.

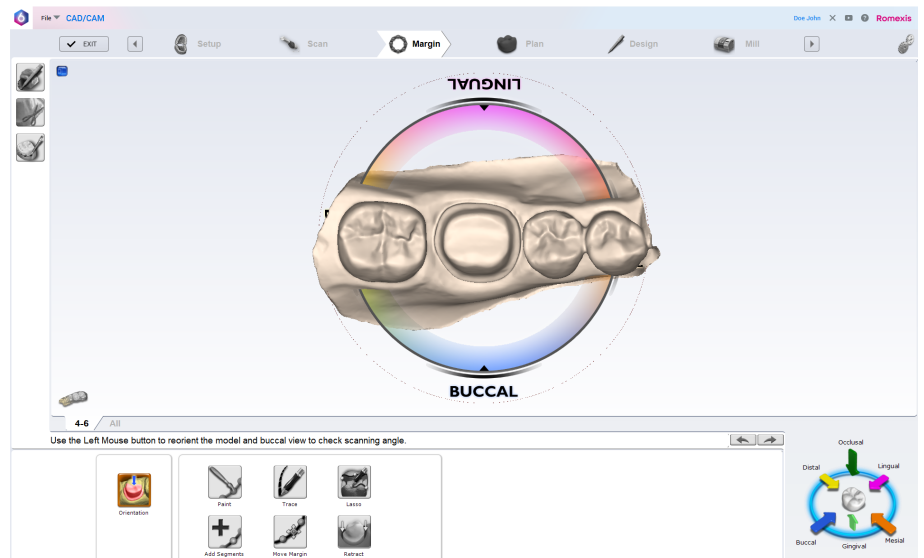
It is not necessary to centre the model on the preparation, but it can be helpful if you are new to rotating a 3D model or if you have multiple preparations.

Follow these instructions to move the model so that your preparation is centred.

Steps

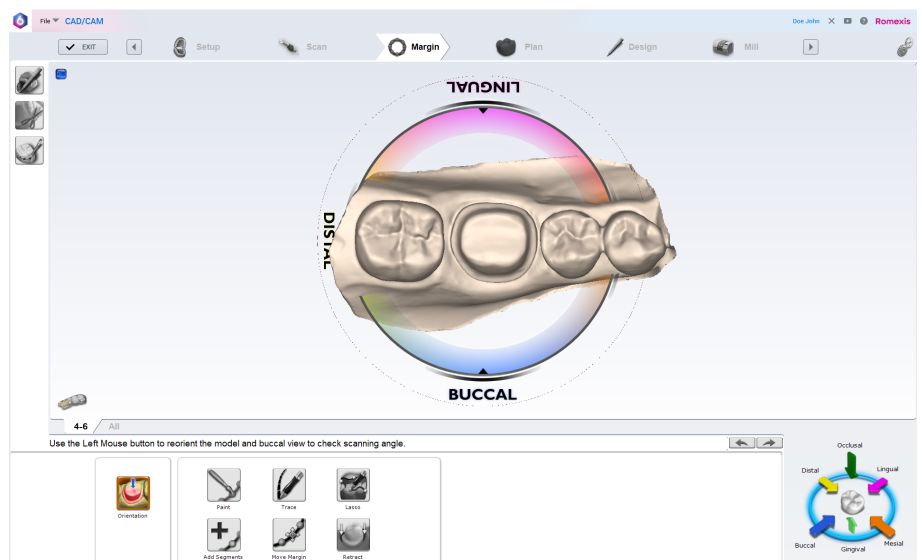
1. Hold down the mouse scroll wheel and move the model.

The circle graphic moves with the model, but you can see the model moving in relation to the tabs at the top of the screen.



Results

When the scroll wheel is released, the circle graphic refreshes and moves to the centre.



What to do next

Repeat as necessary.

13.4 Orientating single restorations

If the scanner was not parallel to the preparation on the first scan, the model will be tilted.

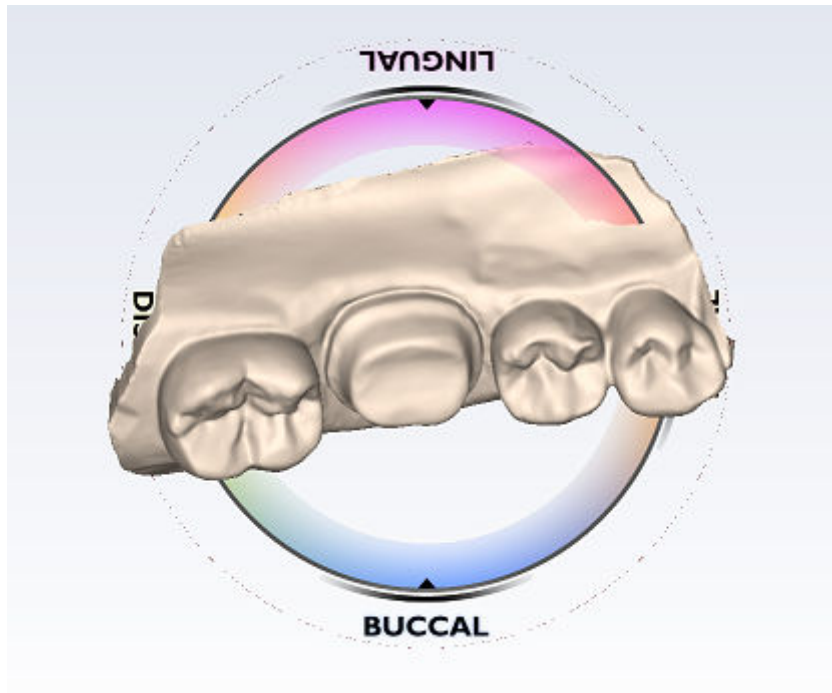
13.4.1 Occlusal view

About this task

In this example, the model is tilted to both the buccal and mesial sides. The occlusal view is good for buccal/lingual adjustments.

Steps

1. Position your mouse near the **Buccal** label on the circle graphic.
2. Hold down the left mouse button and move the mouse straight up.



3. Rotate the model until it has a good buccal/lingual alignment.
You should be able to see the occlusal tables clearly and the same amount of data on the buccal and lingual sides of the adjacent teeth. The central grooves need not be aligned.

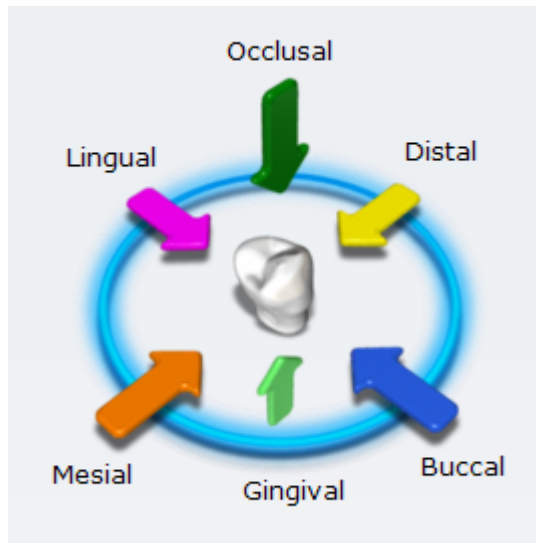
13.4.2 Distal view

About this task

The distal or mesial view is good for mesial/distal and occlusal/gingival adjustments.

Steps

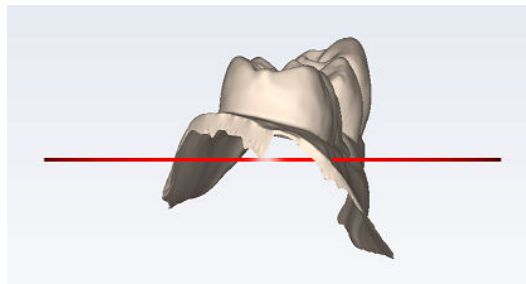
1. Click the **Distal** arrow in View Controls.



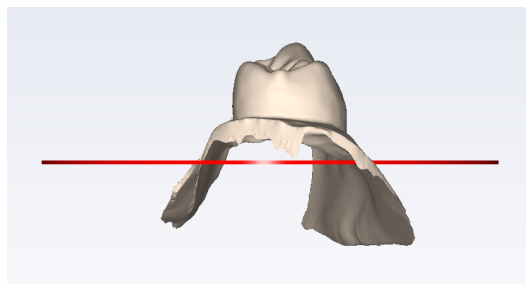
The distal view is sometimes obscured by high distal data. Tilt the model up or down to see the cusps of the adjacent teeth.

2. Evaluate the cusp heights of the adjacent teeth.
Align your cusps and axial walls according to the Curve of Spee.

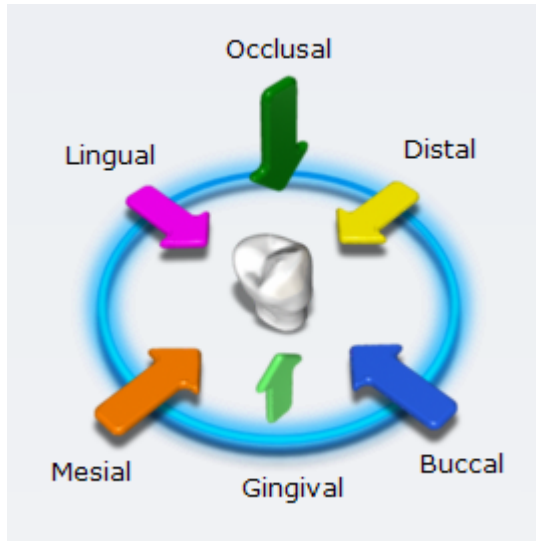
Cusps before alignment



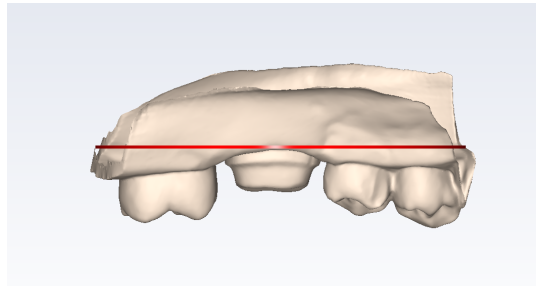
After - proximal cusp tips and axial walls are aligned



- Click **Buccal** or **Lingual** to view from the side.

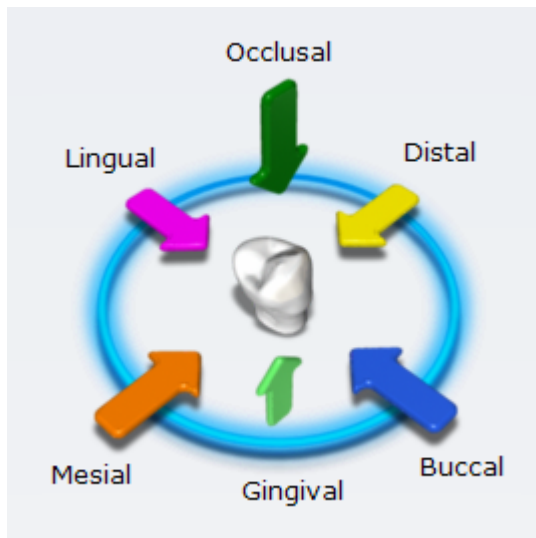


Use the red line as a guide to evaluate the marginal ridge alignment of the adjacent teeth. In this example, the alignment is good.



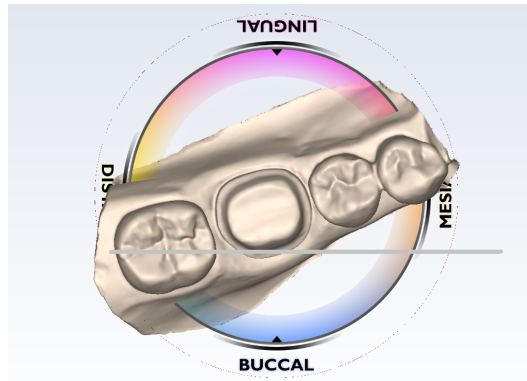
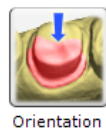
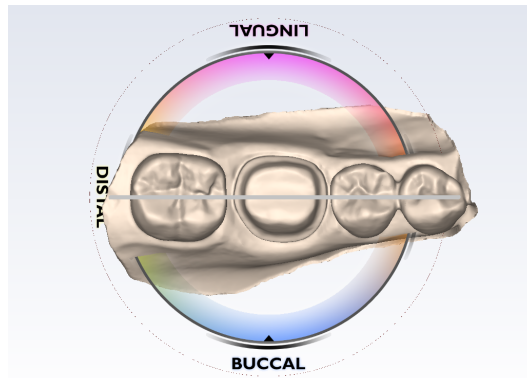
If necessary, you can return to the Occlusal or Distal view to make adjustments. You do not want to adjust the orientation from the buccal or lingual point of view because it is easy to accidentally change the mesial/distal alignment at the same time.

- Click **Occlusal**.



- From the occlusal, ensure the model is straight across from mesial to distal.

You can imagine a straight line going from the mesial to the distal;

INCORRECT:**CORRECT:**

Orientation

6. When satisfied, re-click **Orientation** to save changes.

What to do next

Orientation can be reactivated and altered at any time. If Autogenesis has already been applied, be sure to go to the Tooth Libraries screen and reapply the library tooth for the new orientation.

13.5 Resetting orientation

Orientation



Reset

The Orientation can be reset at any time. If there are multiple restorations, the Reset will only affect the tooth of the currently selected tab.

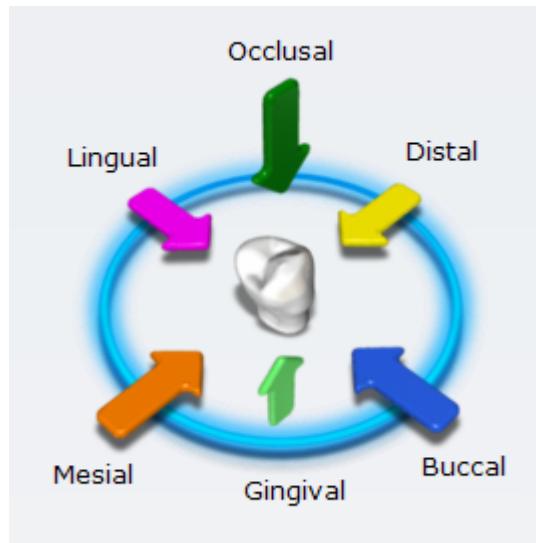
To move the model into position based on the first scan, click **Reset**.

13.6 Rotating model**About this task**

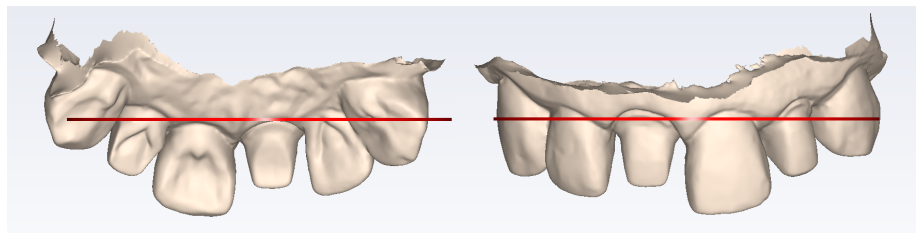
If the scanner is not pointing towards the distal on the first scan, the surface indicators will be backwards. This is easily fixed with Orientation.

Steps

1. Click the **Facial** arrow.



2. Click and drag the model in sideways motion multiple times to turn the model around.



What to do next

Continue with the normal Orientation workflow.

13.7 Orientating multiple restorations

About this task

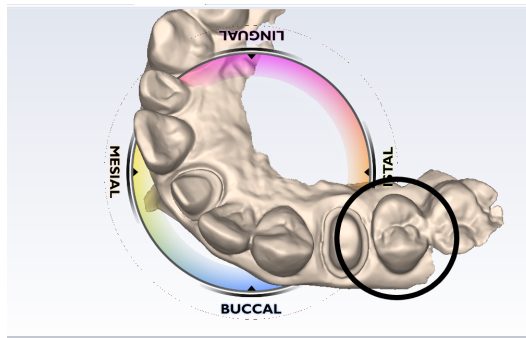
The system displays the model with the lingual side facing the top of the screen.

The default orientation is based on the first scan (circled in blue).

A different orientation is assigned to each restoration. The curve of spee affects the orientation of each restoration.

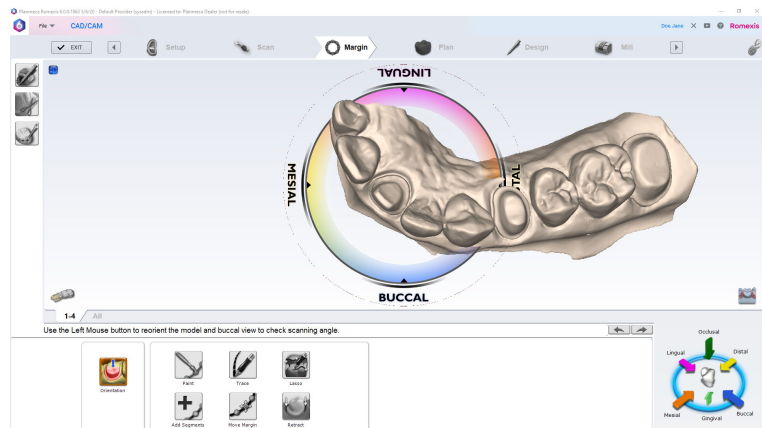
The tooth number tabs are in the same left-to-right order as the teeth on the model.

The model rotates around the central point of the orientation circle. The model can be moved so that an individual preparation is at the centre of the circle. This is an optional step which can make it easier to alter the orientation for each restoration.



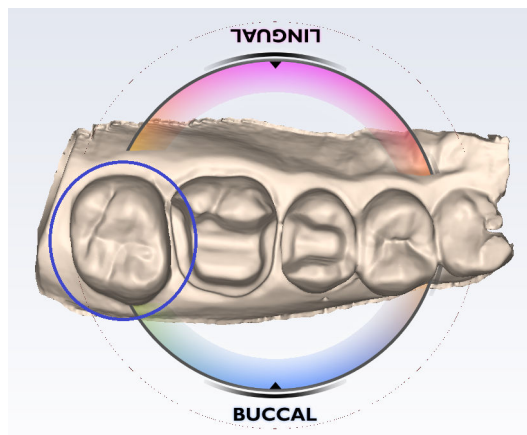
Steps

1. To re-orientate the restoration, click and hold down the scroll wheel.
2. Drag the model until the first tooth is centred in the middle of the screen. The circle moves with the model, but you can see the model moving in relation to the tabs at the top of the screen.



When the scroll wheel is released, the circle graphic refreshes and moves to the centre.

Repeat as necessary.



3. To get the correct orientation for the first tooth, rotate the model.

- When satisfied, click **Orientation** to accept.



Orientation

NOTE

If you cannot use the distal or mesial view to make the adjustments due to the length of the model or the misalignment of the teeth, make all of the adjustments from the occlusal view.

- Click the tab for the next tooth.

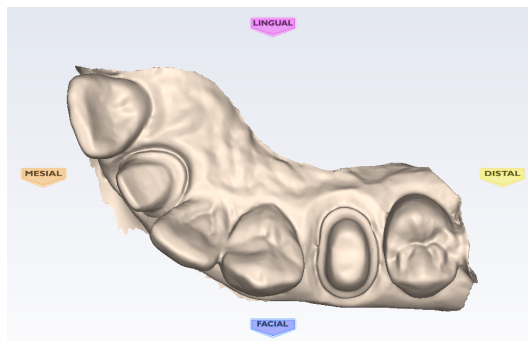
The model reorients back to the original orientation. If you click back on the previous tab, the model will shift to the path for that tooth.

- While on the second tab, click **Orientation** to designate the orientation for the second preparation.

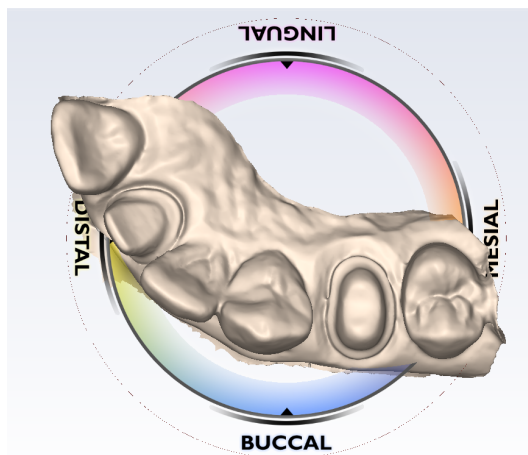


Orientation

- Drag the model so that the second preparation is centred.



- Rotate the model to the correct orientation.



9. Click **Orientation** to accept.

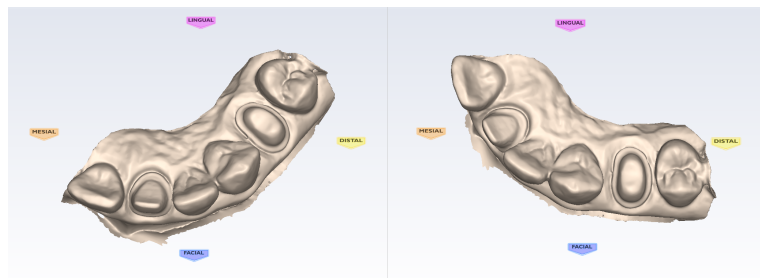


Orientation

Clicking on each tooth's tab moves the model to that tooth's orientation.

NOTE

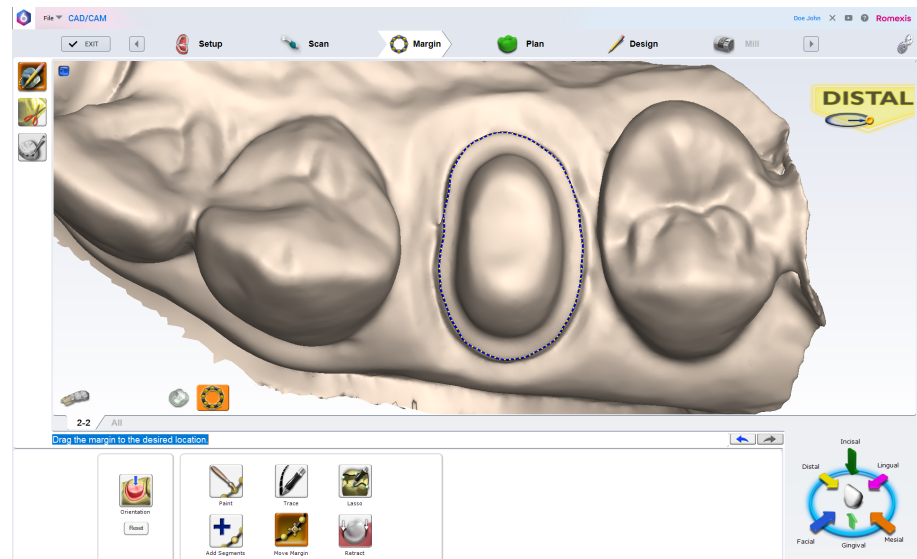
The model is centred on the original central point regardless of the tooth you have selected.



14 Defining margin

The *Margin* tab contains quick and easy-to-use tools for creating and modifying the margin.

There are three tool groups on the *Margin* tab.



- Margin tools



- Selection area tools



- Pre-op editing tools



Additionally, there are a set of tools affecting the view on the *Margin* tab which will be called here as Margin view tools.

14.1 Using margin aid tools

View Color Preparation

NOTE

For intraoral cases only.

Use View Color Preparation to toggle between color view and stone view.



Show Features



Use the **Show Features** tool to highlight high contour areas in green for finding the margin edge on supragingival preps, inlays, and onlays.

Toggle margin



Click **Toggle Margin** to show or hide the margin and to verify the margin has been correctly drawn.

14.2 Drawing and adjusting margin

You can use the following tools to draw and adjust the margin:

- **Paint** - Create the margin using a broad brush stroke.
- **Trace** - Draw the margin by clicking along the edge.
- **Lasso** - Draw the margin by marking several points along the edge

After the margin is created, it can be edited using one or both of the following:

- **Add segments** - Replace existing segments of the margin.
- **Move margin** - Adjust the outline of the existing margin.
- **Retract** - Remove part of the model outside of the drawn margin.



Paint



Trace



Lasso



Add Segments



Move Margin



Retract

14.2.1 Painting

About this task

The **Paint** tool is recommended for drawing supragingival margins. Follow these instructions to proceed.

Steps

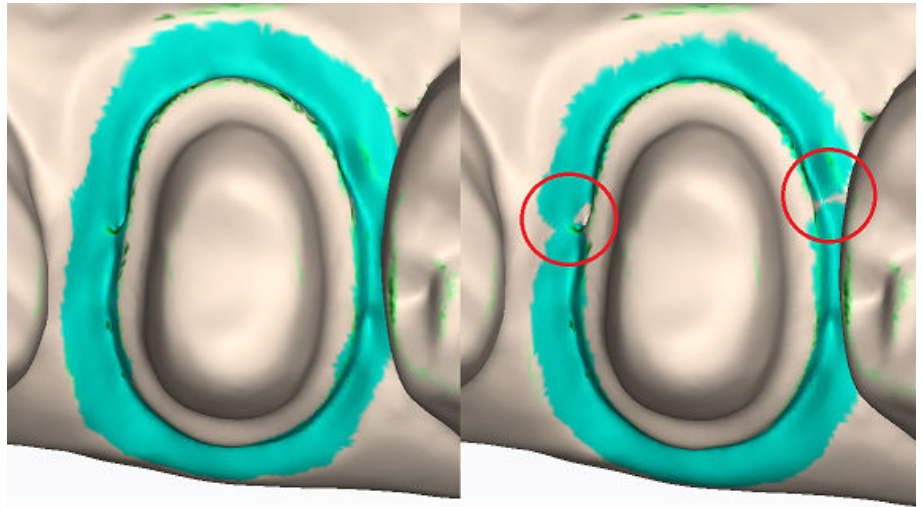


Paint

1. Click the **Paint** button.

2. Draw the outer margin edge by pressing and holding down the left mouse button while dragging the mouse around the scanned preparation.

The margin doesn't have to be perfect, but gaps must be avoided.



Paint

3. Click the **Paint** button again.

Results

The system automatically draws the margin.

What to do next

To delete the margin and start over, click **Paint**, **Trace**, or **Lasso** button.



Paint



Trace



Lasso

14.2.2 Tracing

About this task

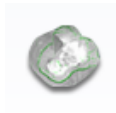
The **Trace** tool can be used on any margin, but it is especially recommended for equigingival and subgingival margins.

Steps

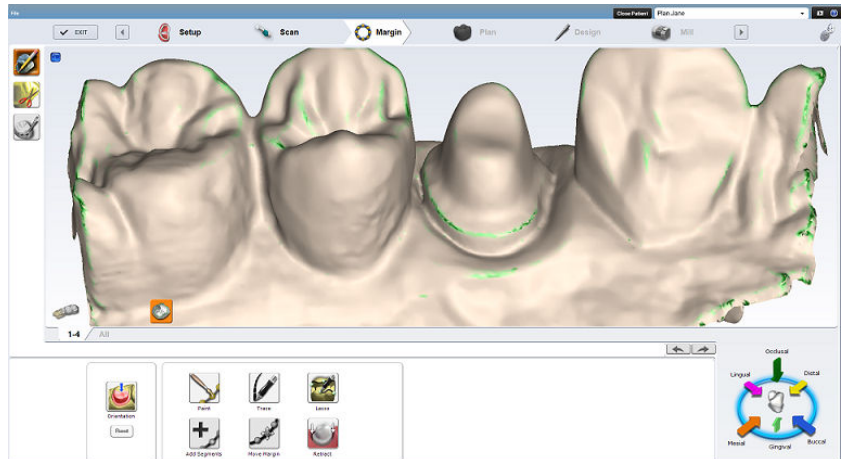


Trace

1. Click the **Trace** button.



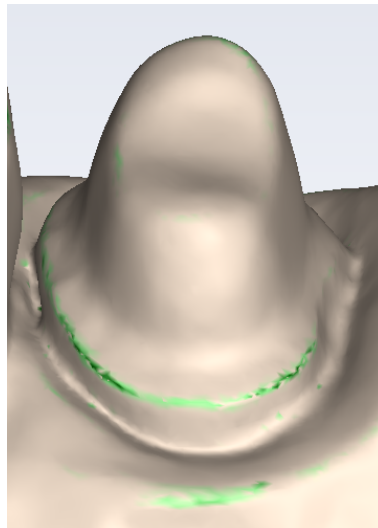
2. To highlight the high contour areas in green, click **Show features**.
3. Zoom in and rotate the model until there is a good view of the margin.
4. Position the **Trace** tool in the middle of the green high contour indication on the margin.



NOTE

Show Features is recommended as an aid in finding the edge of the margin, it is not necessary for using the Trace tool. Draw the margin in the middle of the green high contour indication.

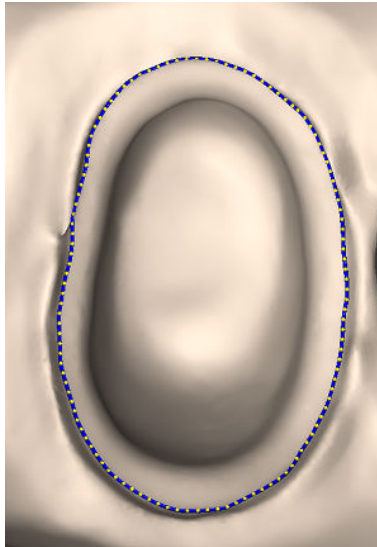
5. Click on the margin.
A dot appears as the starting point.
6. Draw the margin in the middle of the green high contour indication.



When clicking along the margin in small increments the system creates straight lines between each click.

For drawing a continuous line (by holding down the left mouse button), you need a steady drawing hand and it is not recommended for beginners. To stop drawing, release the mouse button at any time.

You can switch between clicking and continuous drawing as desired.



7. Finish the margin by clicking on the starting point.

Results

The system automatically changes the trace line into a margin line.

What to do next

To delete the margin and start over, click the **Trace**, or **Lasso** button.



Trace



Lasso

14.2.3 Lassoing

About this task

The Lasso tool is recommended for partial restorations and supragingival margins with a sharp edge. Follow these instructions to use the Lasso tool.

Steps



Lasso

1. Click the **Lasso** button.

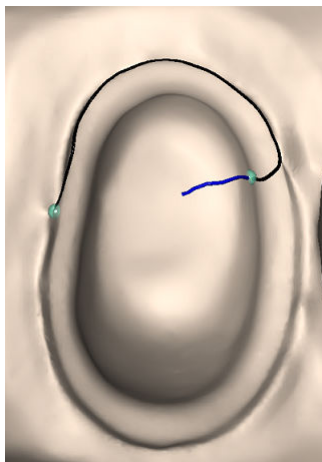
2. Click along the margin at large intervals.

The system creates a line along the edge between each click.

NOTE

If Lasso is having trouble finding the margin, you can change the Color Margin Mode to Texture Only.

The starting point and the most recent point clicked appear as blue dots.



3. Accept the previewed segment by clicking on the model.
4. Finish the margin by clicking the blue starting dot.

What to do next

If you need to delete the margin and start over, click the **Trace** or **Lasso** button.



Trace

Lasso

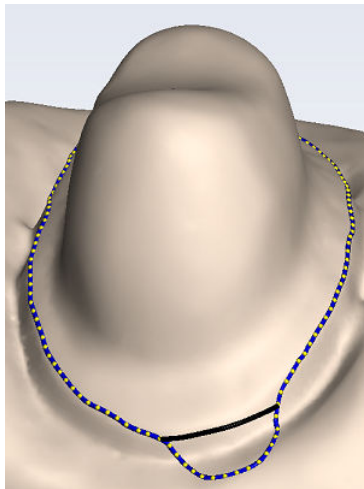
14.2.4 Adding segments**About this task**

Use the **Add Segments** tool to redraw a portion of the margin.

Steps

Add Segments

1. Click the **Add Segments** button.
2. Click on a section of the margin line that is acceptable.
3. Add new points by clicking across the gap on the line.
A line is traced where you click. To create a curve, use multiple clicks.



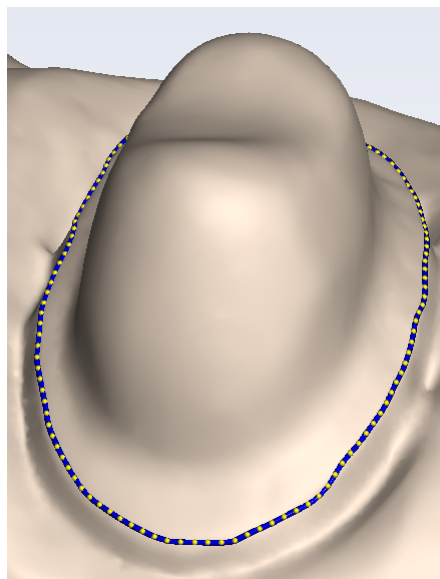
4. Click **Add Segments**.



Add Segments

Results

The system redraws the margin and removes the unacceptable section.



What to do next

Repeat as needed.

14.2.5 Moving margin

About this task

Use the Move Margin tool to drag and drop a section of the margin into a new position.

Steps



Move Margin

1. Click the **Move Margin** button.
2. Click and hold down the mouse button on the margin line.

NOTE

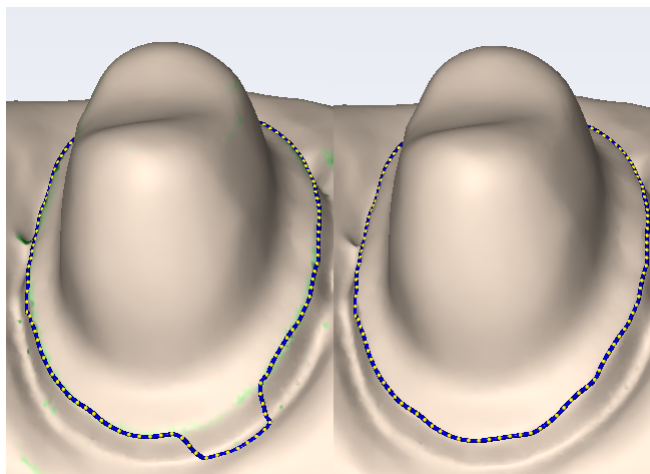
You can change the tool's area of influence by dragging the yellow button to increase or decrease the size of the ellipse.



3. Drag the margin onto the margin shelf and release the mouse button.

Results

The system automatically redraws the margin in the new location.



What to do next

Repeat as needed.

14.2.6 Retracting

About this task

The Retract tool can be used on STL export cases with a subgingival or equigingival margin. As the margin line does not convert to STL format the 3D model is ditched.

NOTE

Color View is not converted to STL format and cannot be used as a visual aid.

Without retraction, the margin may be difficult for your recipient to see.



Before starting the retraction, the margin has to be drawn and edited. Follow these instructions to proceed.

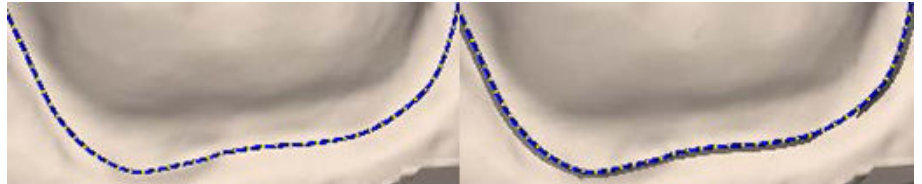
Steps



1. Click **Retract**.

The system virtually removes part of the model outside of the drawn margin.

On the left is an example of margin without ditching and on the right of margin with ditching.



NOTE

Any changes to the margin will require the ditching to be redone. If you are creating a multiple restoration case, finish all of the margin edits before retracting.

What to do next



To view the ditched area without the margin, click **Toggle Margin**. This is similar to what your STL recipient will see.

To show/hide the virtual ditching, click **Toggle Retraction**.



14.3 Defining margin for multiple restoration cases

About this task

On multiple restoration cases, the tooth number is assigned to each preparation when the margin is drawn. Follow these instructions to define margin for multiple restoration cases.

2-6 / All

Steps

1. Click the desired tooth number tab.
2. Draw and edit the margin for the selected tooth number.
3. Select the next tooth number.

4. Draw and edit the margin for the selected tooth number.

The tooth number is designated for each preparation by drawing the margins.

If the wrong tooth number is selected when a margin is drawn, the margin must be marked again on the correct tooth tab.

NOTE

On how to draw pontic margins see section "Drawing pontic margins" on page 89.

14.3.1 Drawing pontic margins

About this task

Follow these instructions to draw a margin for each tooth in the bridge.

Steps

1. Click the tooth number tab for each abutment and draw the margin on the selected tooth.

An edentulous space does not technically have a margin. The margin is drawn to aid the design process.

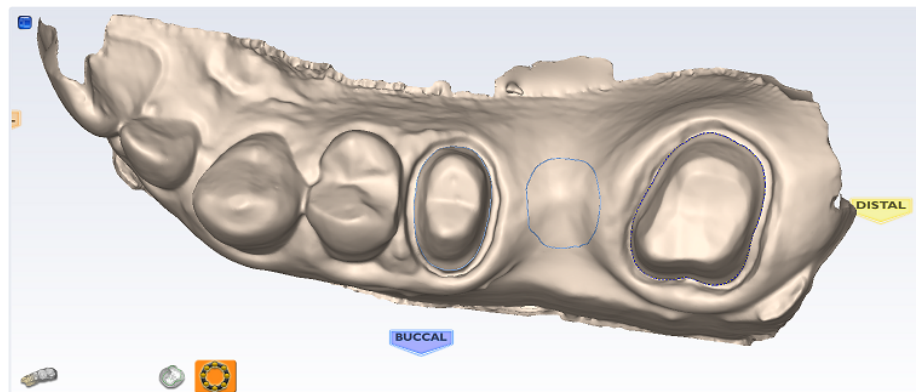
2. Click **Trace** and designate the position and extension of the base of the pontic on the gingival tissue to fit the appropriate contour.



Trace

NOTE

Do not go too far down the curve of the gingival tissue or you may not be able to fit the bridge in the block.



14.4 Using Color margin mode

About this task

NOTE

For intraoral cases only.

Color Margin Mode determines which view the system uses to create the margin curve when using the **Lasso** tool.

Follow these instructions to proceed.

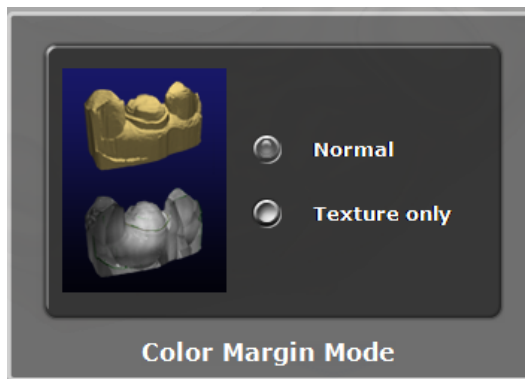
Steps

1. Click **Settings** button.

2. Click **Color Margin Mode** button.

The default setting, *Normal*, means that the system uses both the stone and color view to determine where the Lasso line should appear.

To indicate that the system should ignore the stone model and focus on the differences in the color view, select *Texture only*. If View Color Preparation is deactivated, this setting returns to *Normal* mode.



3. Click **Save** to save the changes or **Cancel** to exit without saving.

14.5 Defining selection region

About this task

When the margin is drawn on an inlay or onlay, the message *Please define a selection region...* appears. If you do not want this reminder to appear in the future, select **Do not show this message again**.

Steps

1. Click **Selection area** button.

The *Selection Area* window opens, and the selection area tool options appear at the bottom of the screen.

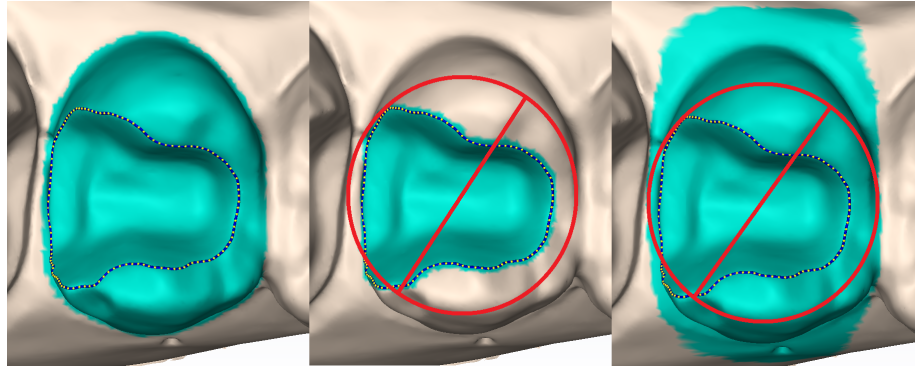


Add to Selection

2. Click **Add to Selection**.

3. Click and drag a circle around the entire tooth.

After you let go, an area is highlighted. Do not go too far beyond or short of the natural tooth or the proposal will be distorted. This process is recommended for inlays, onlays, and window veneers for upper teeth.



4. When you are satisfied with the selection area, click **Margin Tool** to edit the margin.

14.5.1 Removing area from selection

About this task

Follow these instructions to remove area from selection.

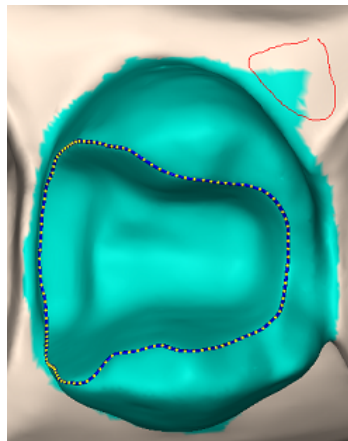
Steps



Remove from Selection

1. Click **Remove from Selection**.

2. Click and drag to select areas you want to remove.



3. Repeat as needed.
4. When finished, click **Margin Tool**.





5. Click **Hide Model** to view your trim region.

NOTE

Hide Model is only available on the *Margin* tab when a **Selection Area** tool has been designated.

What to do next



Reset Selection

To remove the Selection Area and start over, click **Reset**.

14.6 Pre-op editing

About this task

NOTE

For designing systems only.

The pre-op editing tool is used to designate the area of the pre-op scan that will be combined with the library tooth. If the pre-op scans are being used as a template only, this step is not necessary.

Steps



1. Click **PreOp Editing**.
2. To designate the pre-op's library surface, use the tools at the bottom of the screen.

These act the same way as the margin tools.

14.6.1 Tracing

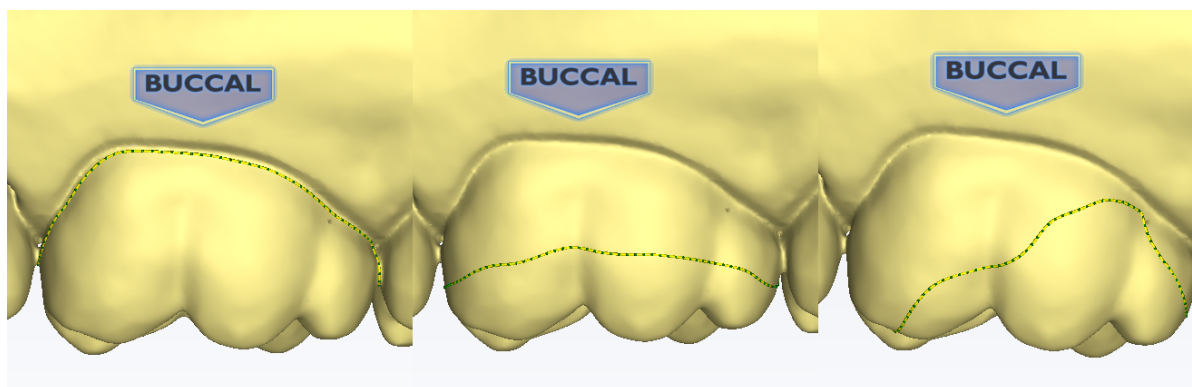
About this task

Follow these instructions to trace the pre-op.

Steps

1. Click **Trace**.
2. Click or drag the mouse around the edges of the pre-op to designate the area that you want to combine with the library tooth.

Be sure to only designate areas with good data.



On the left: Down to near the gingival tissue

In the middle: Occlusal cap only

On the right: Partial tooth - often used when original anatomy is chipped

3. Finish the pre-op area by clicking on the blue dot.
The trace line changes to a margin line.

14.6.2 Moving curve

About this task

Follow these instructions when moving curve on the pre-op area line.

Steps



Move Margin

1. Click **Move Curve**.
2. Drag the curve into the desired position.
3. Release the mouse button to view the new occlusal area line.

14.6.3 Adding segments

About this task

Follow these instructions when adding segments on the pre-op area line.

Steps



Add Segments

1. Click **Add Segments**.
2. Click on the section of the line that is well aligned.
3. Add new node points by clicking across the gap on the line.
A black line traces where you click. Use multiple clicks to create a curve.
4. Finish by re-clicking **Add Segments**.



Add Segments

Results

The system redraws the pre-op area line and removes the bad section.

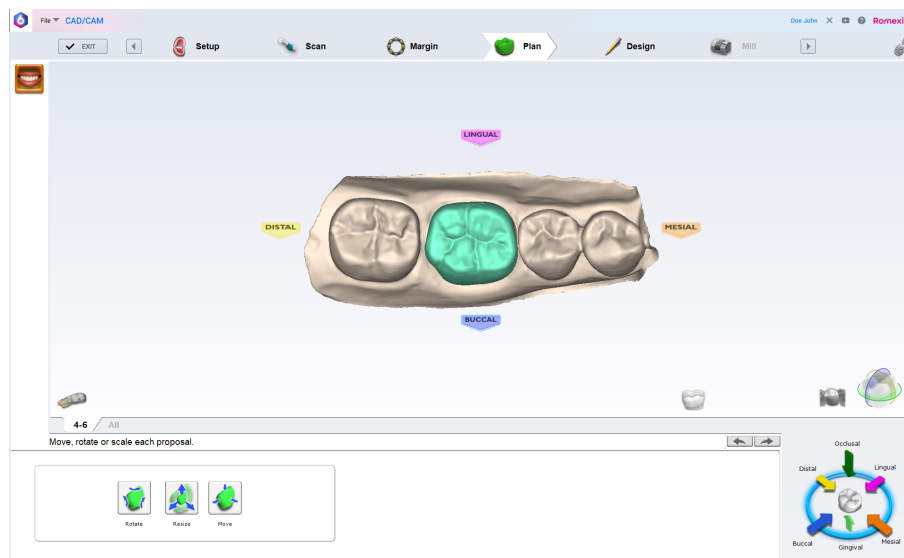
What to do next

Repeat as needed.

15 Using Plan tab

About this task

The *Plan* tab is used to size and position the proposal to aid autogenesis. Preview of the library teeth displays on the model. The bright green tooth is the active selection.



NOTE

This step does not replace the Orientation function. If a preview tooth is drastically out of alignment, return to the margin screen and adjust the orientation.

Follow these steps when using the Plan tab.

Steps

1. Click a tooth tab number to select it.
2. Select **Rotate**, **Resize**, or **Move**.



Rotate



Resize



Move

3. Right-click and drag the proposal to perform the desired action.

The following keyboard shortcuts can also be used for adjusting the size of the proposal:

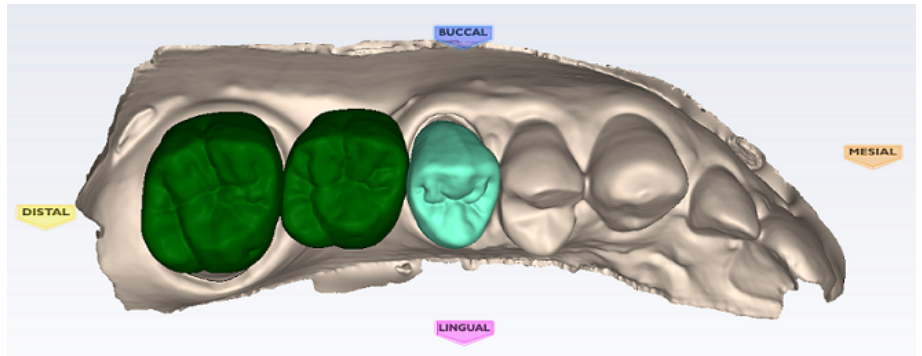
- **Shift** for mesial/distal adjustment
- **Ctrl** for lingual/buccal adjustment
- **Alt** for occlusal/gingival adjustment

Hold down the shortcut key while dragging with the mouse.

NOTE

To avoid distorting the anatomy, use these shortcuts carefully.

- To view the opposing information, click the **View Bite Registration** icon.
- Adjust the preview tooth as needed for all proposals.



Autogenesis uses the adjusted preview tooth's size and position as the new starting point for the proposal design.

What to do next

Proceed to the *Design* tab.

15.1 Adjusting restoration on model

15.1.1 Rotating

Steps



Rotate

- Click on the **Rotate** button.
- Rotate the restoration to appropriate position by dragging.

15.1.2 Resizing

Steps



Resize

- Click on the **Resize** button.
- Drag the restoration to appropriate size.

15.1.3 Moving

Steps



Move

- Click on the **Move** button.
- Drag the restoration into the right place.

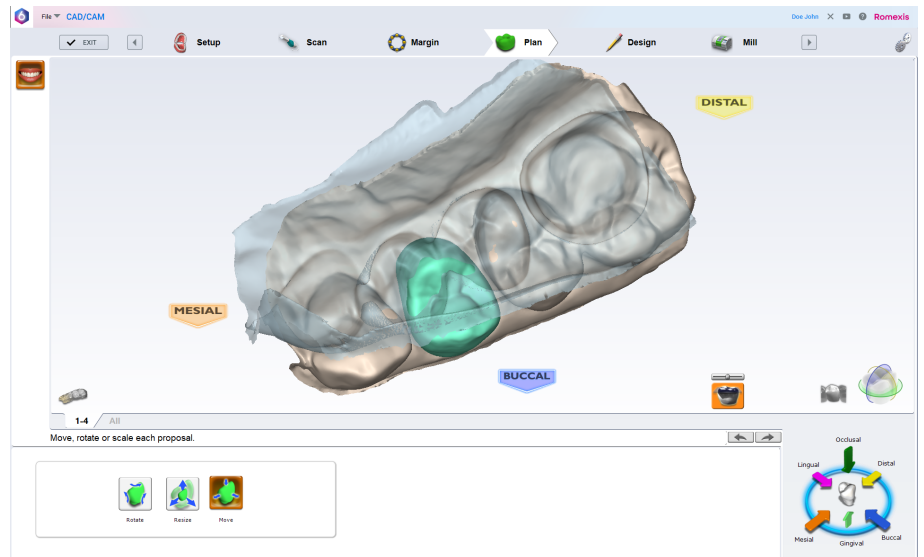
15.2 Checking bite

Steps



1. Click twice on the bite registration tool.

The bite registration shows in translucent.



2. Check the bite.
If the bite is too heavy in some areas and the proposal too high in some areas use the **Move** tool to lower it.

16 Customizing restoration design

NOTE

The availability of the Design option depends on your license.

After you have scanned the preparation and defined the margin, the *Design* tab provides tools to customize the proposal.

The tools on the left menu, each of which provides additional options in the box below the restoration:



Tooth Libraries



Spacer Tool



Incremental Change Tools



Freeform Change Tools



Contact Refinement

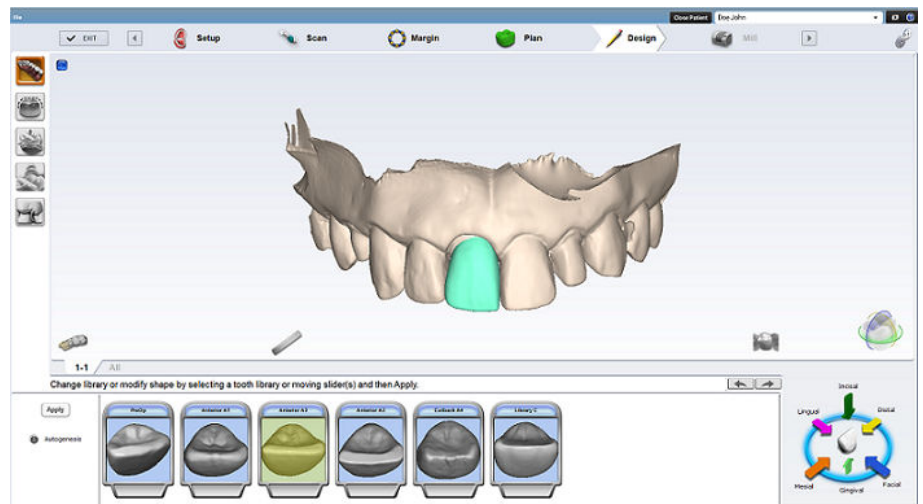


Abutments

16.1 Tooth libraries

The *Tooth Libraries* view opens by default in the *Design* tab where you can change the library selected earlier in the *Setup* tab. This may be useful for finding a better match with the actual anatomy. You can also resize/move the preview tooth, change the anatomy levels, and/or deactivate Autogenesis for this restoration.

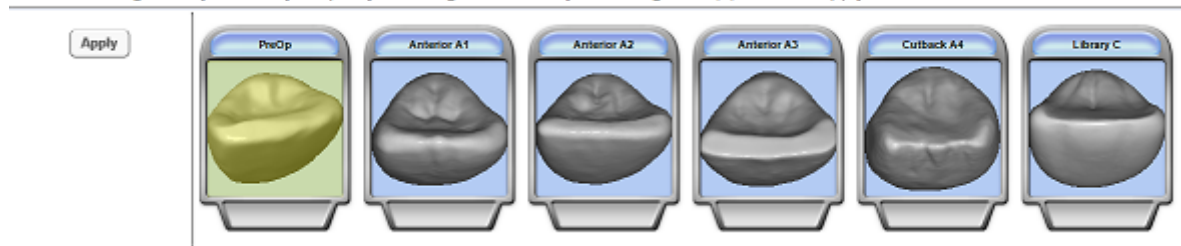
The library thumbnails appear in the *Options* box below the restoration. A green preview tooth is displayed. The selected library is highlighted in yellow.



Selecting library

If desired, click another library to view the preview tooth. Select the library with the closest anatomy.

Change library or modify shape by selecting a tooth library or moving slider(s) and then Apply.



16.1.1 Resizing and moving library tooth

The preview tooth can be resized to aid in *Autogenesis*.

To resize the preview tooth, hold down the **Alt** key and use the up or down arrows. It should be close in size to the adjacent teeth.

The preview tooth can be moved to aid in *Autogenesis*.

Click and drag the tooth into closer alignment with the adjacent teeth.

16.1.2 Anatomy levels

The anatomy levels enable you to deactivate Autogenesis and/or select different anatomy details for this proposal. Most restorations will use the default settings.

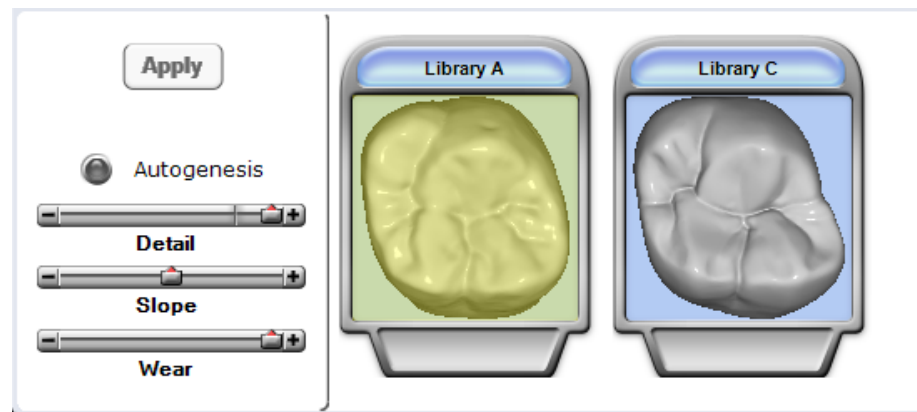
NOTE

The red line on the Detail slider represents the maximum amount of detail that can be milled into a restoration.

If desired, use the sliders to change the amount of Detail, Slope, and/or Wear.

To deactivate Autogenesis, clear Autogenesis.

To apply changes click **Apply**.



16.1.3 Pre-op as library tooth

About this task

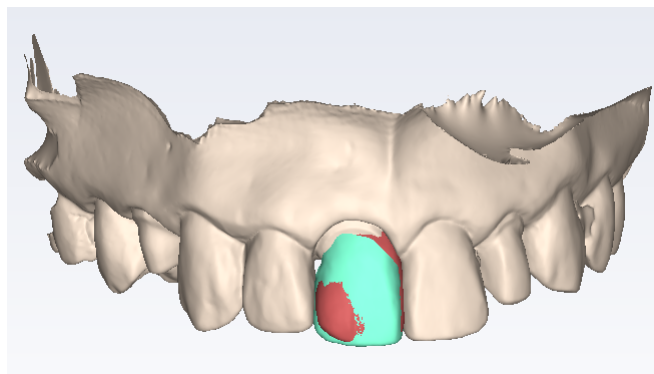
When Pre-op is selected as the Library tooth, Autogenesis combines the pre-op selection with the Library A tooth. Use the following steps to move or resize the library A tooth to modify the proposal, if desired.

Steps

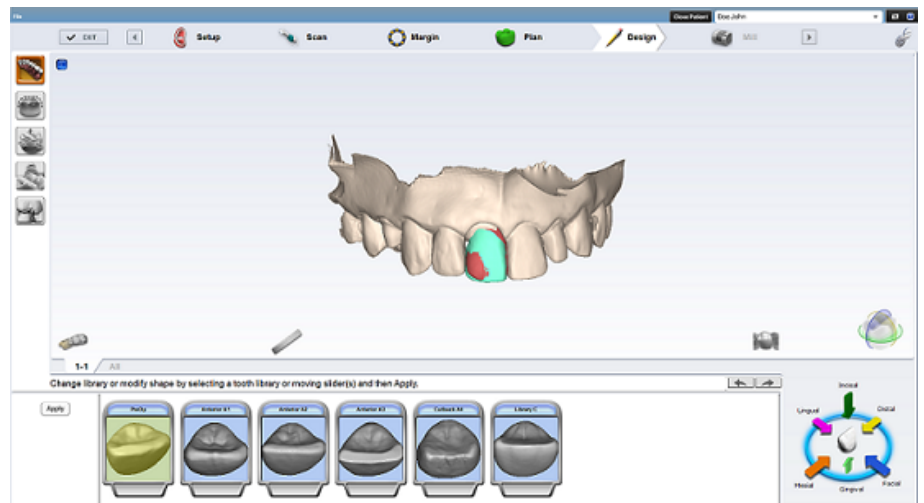


1. Click **Tooth Libraries**.

The Pre-op selection preview displays as green and the Library A tooth as dark red.



2. Move and/or resize the library tooth for a closer match to the pre-op selection.



3. Click **Apply**.
4. Repeat as needed.

16.2 Spacer tool

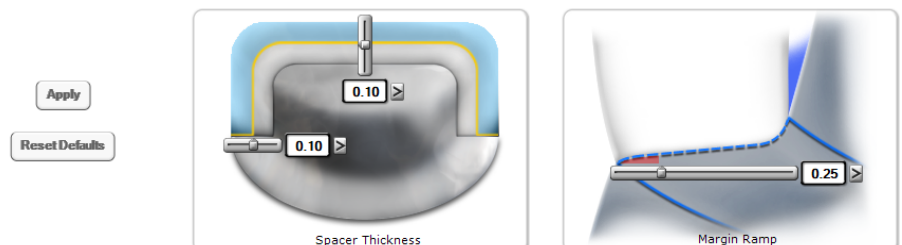
Use the Spacer tool to override the default spacer thickness and margin ramp values.

Spacer thickness is the space between the restoration and the preparation.

You can adjust the settings separately for axial and occlusal walls.

Margin ramp is the contact zone for the margin.

Use the sliders or pop-up menus to change the values.

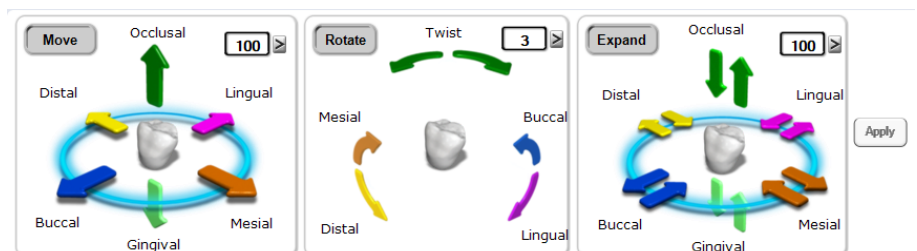


16.3 Incremental change tools

Use the Incremental Change Tool options to move, rotate, or expand the restoration's occlusal table while leaving the margin intact.

Click **Incremental Change Tools** button on the left most menu.

The Incremental Change options appear.



The recommended order (1. Rotate, 2. Move, 3. Expand) is instructed in the following sections.

NOTE

The images on rotating, moving, and expanding the restoration use exaggerated examples to help illustrate how the tools work. These examples do not represent realistic restorations.

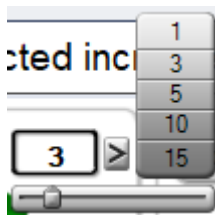
16.3.1 Rotate

About this task

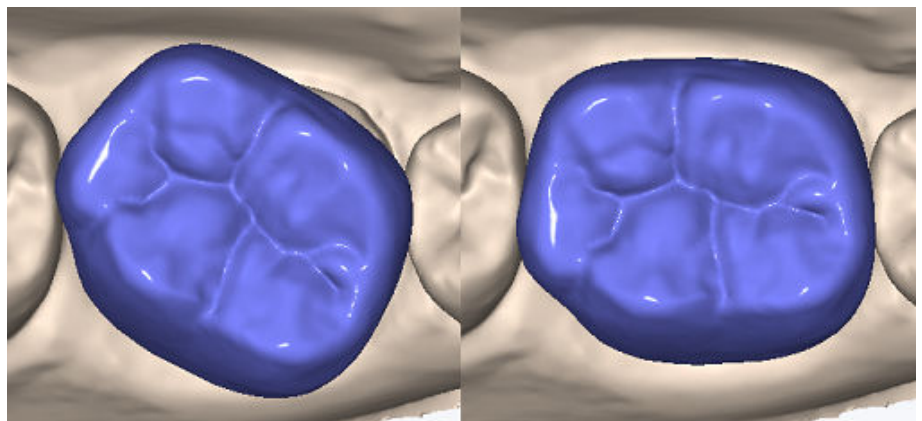
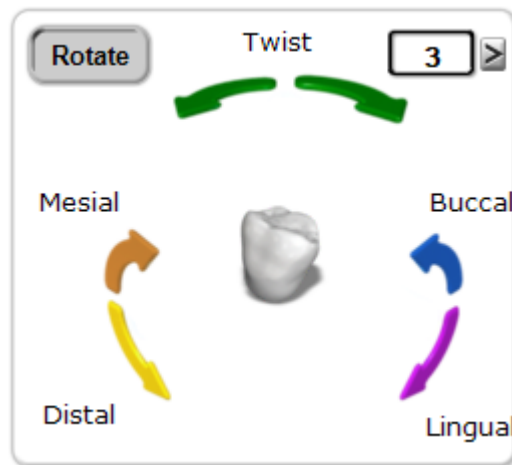
The *Rotate* controls use a numerical rotation angle field in conjunction with three pairs of rotation arrows to rotate the occlusal table about a selected axis.

Steps

1. Set the rotation angle in degrees by selecting a value from the pop-up list or by using the slider.



2. Click the desired rotational direction arrow to rotate the occlusal table the specified number of degrees in the desired direction.



16.3.2 Move

About this task

The Move controls are for overall movement and use a numerical distance field in conjunction with six directional arrows to move the occlusal table.

Steps

1. Use the number field or pop-up list to set the movement distance in microns.
2. Click the desired directional arrow to move the occlusal table the specified distance and desired direction.

16.3.3 Expand

About this task

The Expand controls are for fine movement and use a numerical field in conjunction with six pairs of arrows to scale the cervical cap in a given direction. This is different from Move and Rotate controls that move the cervical cap as a unit.

Steps

1. Set the expansion in microns by using the number field or the pop-up list.
2. Click the desired directional arrow to expand or contract the restoration the specified amount in the desired direction.

16.4 Freeform change tools



These tools can be used to modify the restoration in an unrestricted manner rather than the defined increments of the Incremental Change tools.

NOTE

To adjust the area of influence of a tool, drag the yellow button.



16.4.1 Rubber tooth

About this task

Use the Rubber Tooth tool to change the form of the restoration by pushing or pulling inward or outward on the restoration.

Steps



Rubber Tooth

1. Click the **Rubber Tooth** button.
2. Click and hold down the left mouse button on the part of the restoration that you want to change.
The area to be affected turns pink.

3. While holding down the left mouse button, drag the cursor in the direction that you want the restoration to move.

Small moves are recommended. Rotate and zoom as needed to view the changes.

What to do next

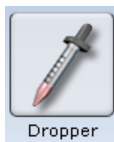
If you need to cancel changes, click **Undo**.

16.4.2 Dropper

About this task

The Dropper tool adds/removes virtual beads of material to/from the restoration, analogous to placing beads of liquid wax on a cast model. The vertical axis of Area of Influence determines whether the material is being added (positive number) or removed (negative number).

Steps



1. Click the **Dropper** tool.

2. Ensure Material Thickness is activated.

This is the best way to see the effect of the dropper. To speed up the process, leave Material Thickness deactivated.

3. Position the pointer where you would like to add/remove beads of material to the restoration.
4. Click and release the mouse button.

Rotate and zoom as needed to view the changes. Click and hold while dragging to make a line of material.

What to do next

Repeat, as necessary.

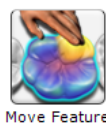
If you need to discard the changes, click **Undo**.

16.4.3 Move feature

About this task

Use the Move Feature tool to modify a cusp, marginal ridge, or the occlusal table.

Steps



1. Click the **Move Feature** tool.

Each anatomical feature is now represented by a different colour.

2. Click the desired feature to activate it.

The selected feature is highlighted.

3. Do one of the following.
Click and drag the feature to the desired position.
OR
Use the Control arrows to move the selected feature.
Small moves are recommended.
4. Rotate and zoom as needed to view the changes.

What to do next

If you need to discard changes, click **Undo**.

16.4.4 Smooth surface

About this task

Use the Smooth Surface tool to make an area of the proposal's surface more uniform.

Steps



Smooth Surface

1. Click the **Smooth Surface** tool.
2. Click on the desired area to smooth it.

Small, gradual changes are recommended. Rotate and zoom as needed to view the changes. Click and hold while dragging the mouse to make continuous changes.

What to do next

If you need to discard changes, click **Undo**.

16.4.5 Move margin

About this task

The Move Margin tool allows you to make minor margin adjustments without losing the design work.

Steps



Move Margin

1. Click the **Move Margin** tool.

The restoration becomes translucent.
2. Position the pointer on the margin line.
3. Click and hold down the mouse button.
4. Drag the margin into the new position and release the mouse button.
The system automatically redraws the margin in the new location.
5. Re-click the **Move Margin** tool to see the solid restoration view.

16.4.6 Defining anatomical features

About this task

Define Feature is used to add anatomical features to the restoration. Multiple features can be drawn and moved simultaneously.

Steps



Define Feature

1. Click the **Define Feature** button and trace the feature on the restoration proposal.

2. Use the arrow controls to move the feature line(s) in the desired direction.

Alternatively, you can use the Rubber Tooth to pull or push the feature to the desired position or shape.



16.4.7 Painting designated area

About this task

Use this tool to designate an area of the proposal that you want to move, often a contact area.

Steps



Paint Feature

1. Click **Paint** icon and paint the desired area of the proposal.

- Use the arrow controls to move the highlighted area in the desired direction.



Rubber Tooth

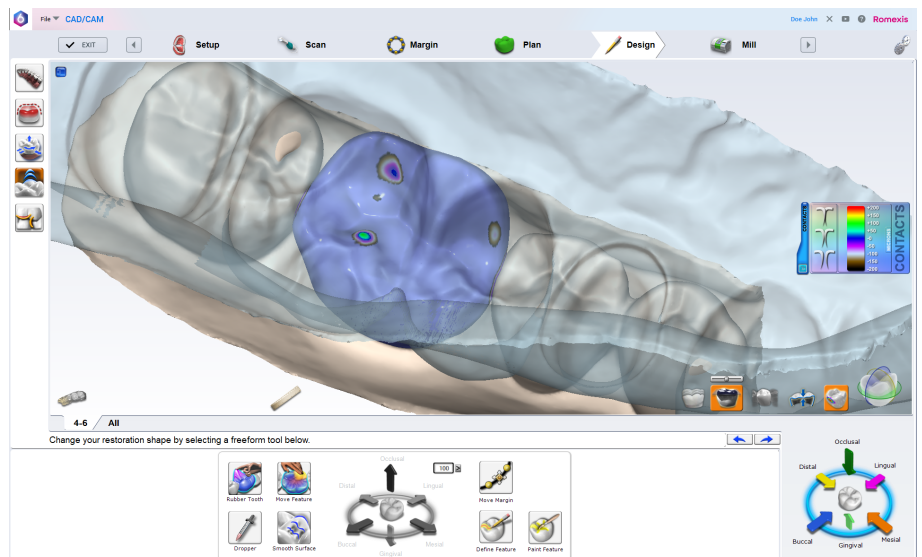
As an alternative, use the **Rubber Tooth** icon to pull or push the feature to the desired position or shape.

16.5 Refining contacts

About this task

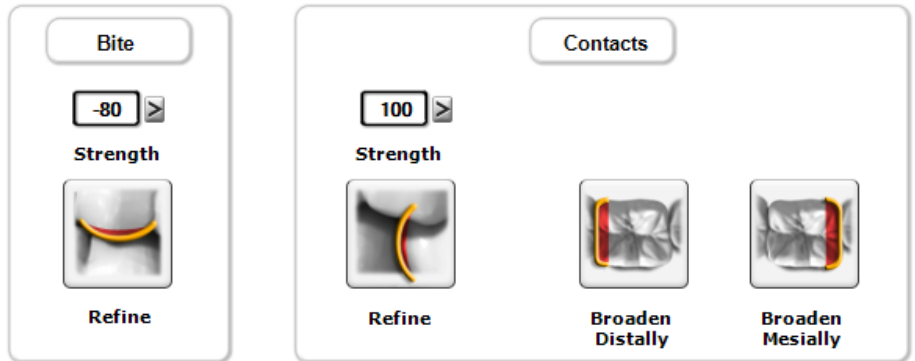
With refinement tools you can set the strength of the occlusal and/or interproximal contacts.

By broadening the interproximal contacts, you can also make the proposal more square.



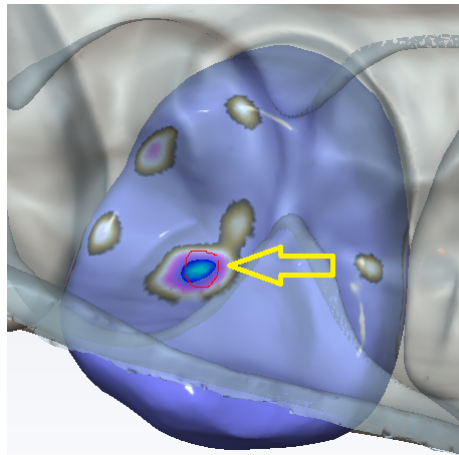
Steps

1. Select the desired strength for the bite and/or contacts.



To adjust the selected strength, you can:

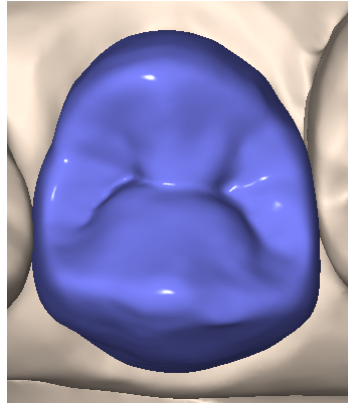
- automatically change the occlusal table or the interproximal contacts by clicking **Refine**,
- circle the desired area,



- adjust the proposal by selecting Occlusal view and then clicking **Broaden Distally** and/or **Broaden Mesially**.

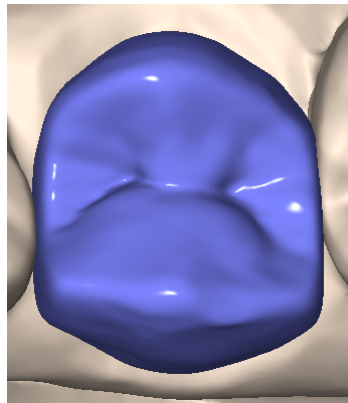


Broadening is suited e.g. for posterior crowns. The proposal is adjusted in set increments. It is not connected to the selected strength.



NOTE

Be careful not to overuse the broadening buttons to avoid making the proposal too square.



What to do next

To undo the changes, click **Undo**.

By reapplying the library tooth *all* design changes will be lost.

16.6 Viewing options

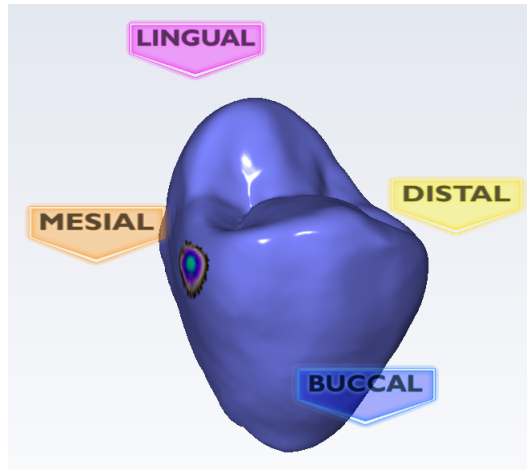
The *Design* tab contains additional viewing options to aid in optimizing the design that appear below and to the right of the restoration. These functions can be used with most of the tools listed above.

16.6.1 Hide model



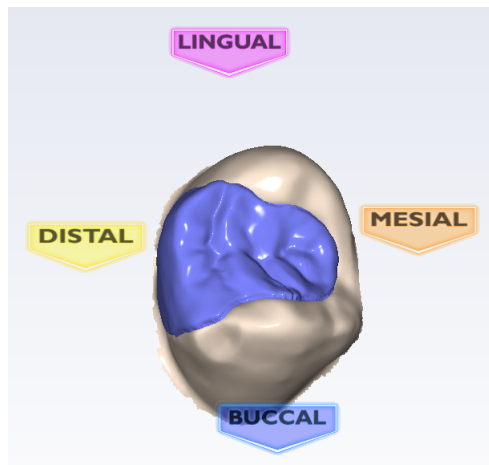
To show/hide the adjacent teeth click this button.

Hiding of the model is especially helpful when adjusting the contact areas.



When Hide Model is activated on partial restorations, the area that remains visible is the area designated as the selection area.

When rotating, depending on the designated selection area, you *may* see holes. These are usually not a deterrent to the design process. If desired, return to the *Margin* tab and edit the Selection Area.

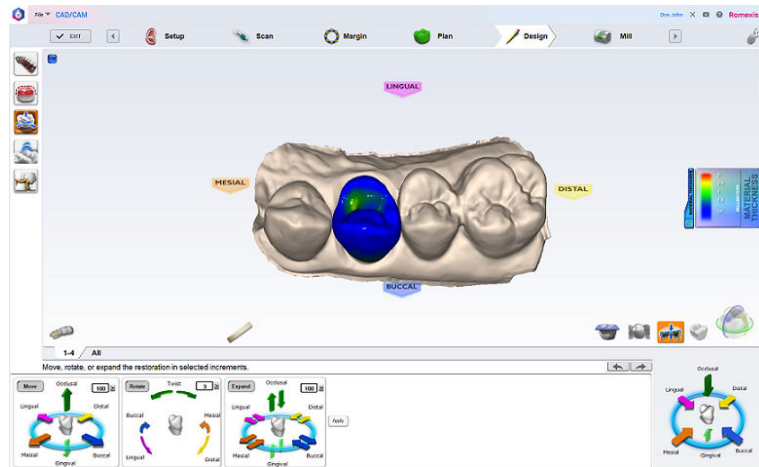


16.6.2 Material thickness

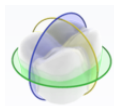
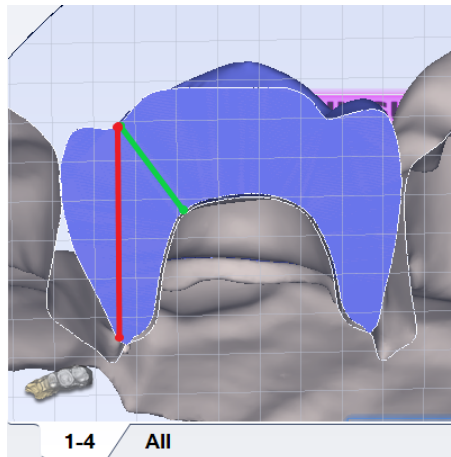


To show/hide the material thickness indicators in the *Design* tab click **Material Thickness**.

When Material Thickness mode is active, the system colours the proposal based upon material thickness at each point on the restoration and displays a legend to indicate the thickness associated with each colour.



The thickness shown represents the shortest distance to the preparation (green line) and not necessarily the vertical thickness at that point (red line).



To calculate the thickness of other areas, use **Slice Plane** and the measuring grid.

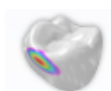


To view the material thickness measurement displayed in the information bar click the **Measure** button and click anywhere on the proposal.

NOTE

Measure does not have to be used with Material Thickness.

16.6.3 View contacts



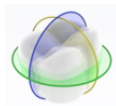
To show / hide the strength of contact between the restoration model and adjacent dentition click **View Contacts**.

To hide the adjacent dentition from view, select **Hide Model**.



When View Contacts is active, the system colours the proposal based upon contact strength at each point on the restoration and displays a legend to indicate the measurement associated with each colour.

16.6.4 Slice plane

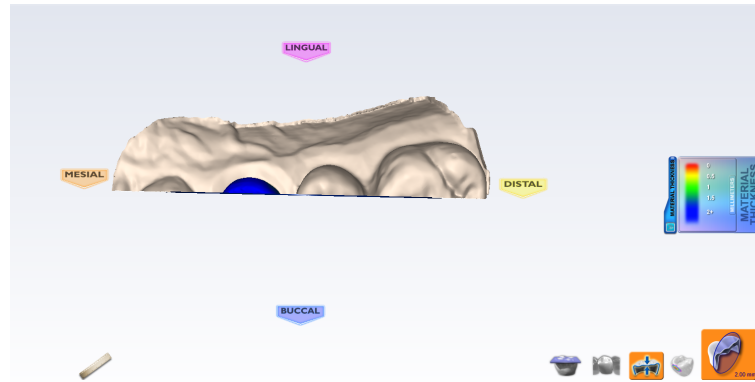


Using slice plane tool, you can view the restoration along various cross sections.

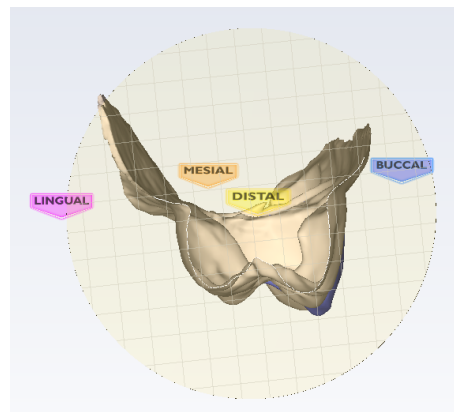
This is especially helpful in optimizing material thickness and contacts.

Each time you click Slice Plane, a different cross section is shown.

If needed, click and drag the slice plane line into the desired position. The thin dotted white line represents the slice plane's original location.



To view the cross section, rotate the image.



To view the measurement represented by the grid lines, click the **Slice Plane** button.

Zoom in to decrease and zoom out to increase the measurement

16.6.5 View bite registration, opposing model, or pre-op

About this task

If a bite registration, opposing model, or pre-op was scanned, it can be viewed anytime during design.

Steps



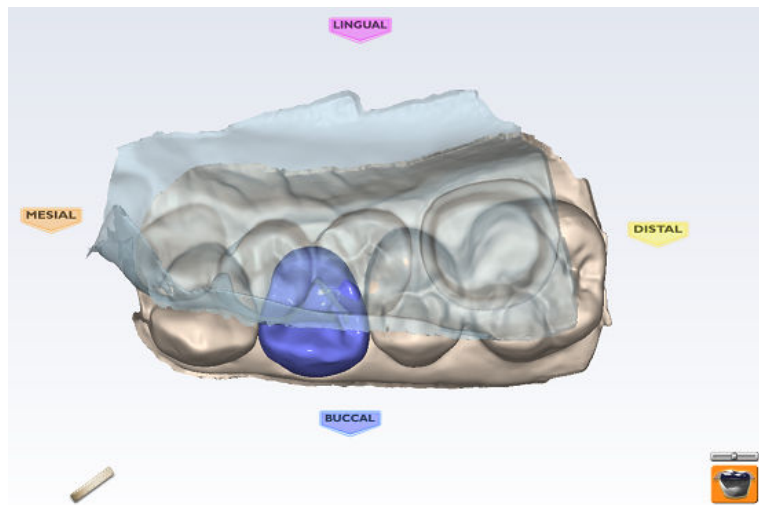
1. Click **View Pre-op**.

OR

Click **View Bite Registration** to view the opposing model.



The pre-op (yellow) or bite registration/opposing model (blue) template appears on top of the restoration.



To make the template translucent, click **View Pre-op** or **View Bite Registration** again.

To adjust the transparency of the template, use the slider.



2. Click again to remove the template from view.

16.7 Designing abutments



Click the **Abutments** button.

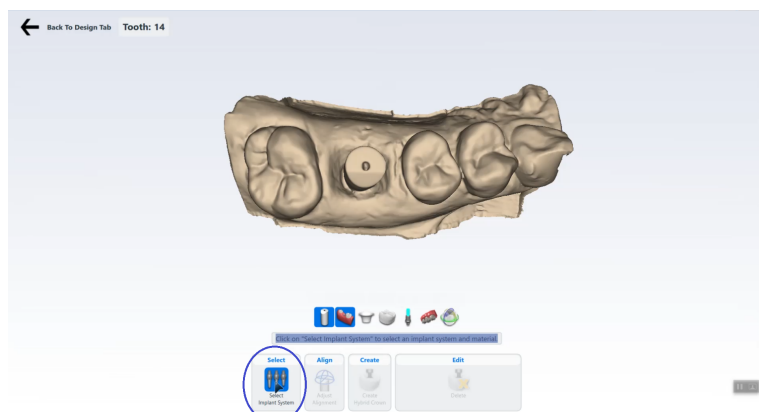
16.7.1 Selecting implant system and block

About this task

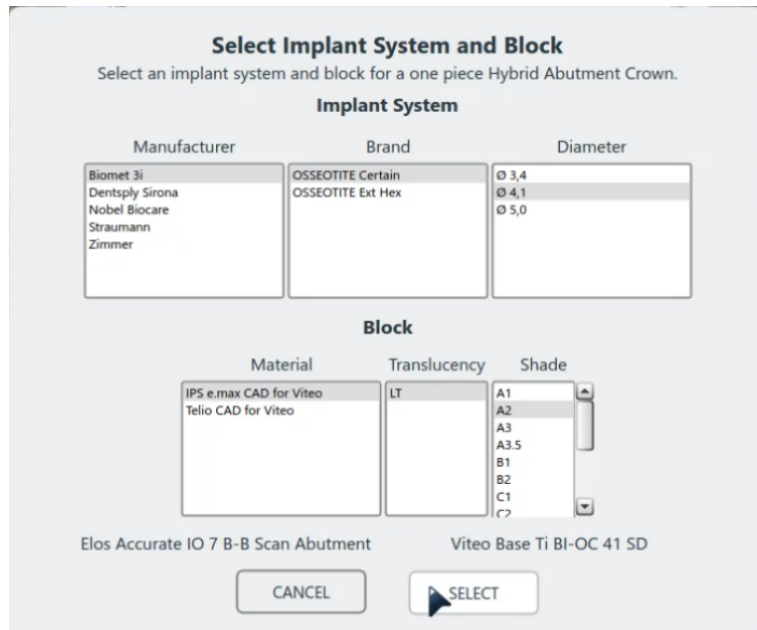
Follow these steps when selecting implant system and block.

Steps

1. In the opening window click the **Select Implant System** button.



2. Select the following:
 - For the implant system, select the manufacturer, brand and diameter.
 - For the block, select material, translucency and shade.



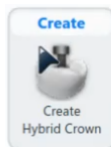
3. Confirm your selections by clicking **Select**.

16.7.2 Creating hybrid crown

About this task

Follow these steps to create a hybrid crown.

Steps

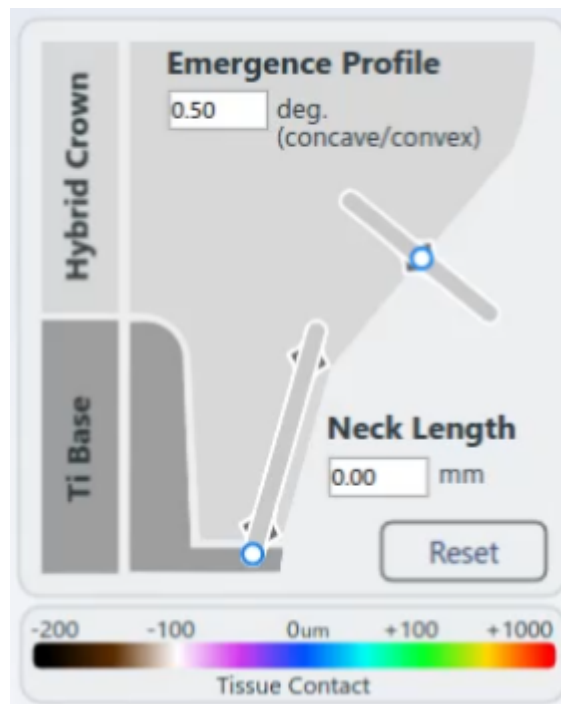


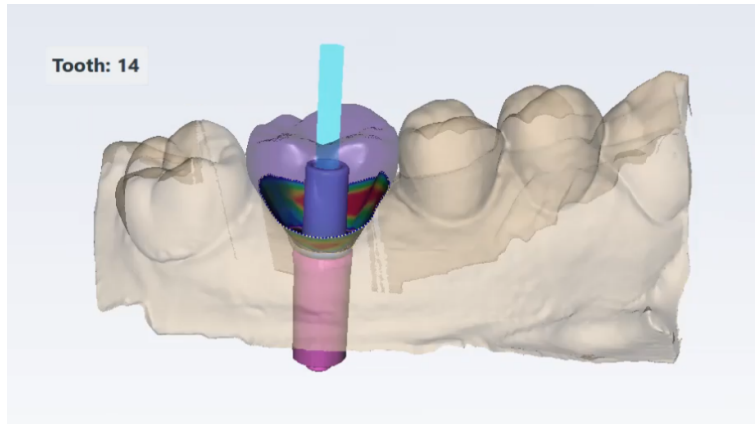
1. Click the **Create Hybrid Crown** button.

The hybrid crown appears on the model.



2. To adjust the emergence profile and neck length, use the sliders. The colour scale indicates tissue contact.





16.8 Design tab settings

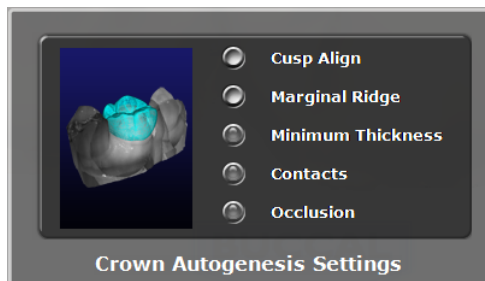
16.8.1 Autogenesis settings

About this task

Follow these instructions for selecting autogenesis settings.

Steps

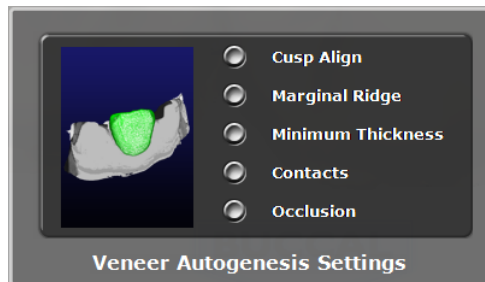
1. Click **Settings** to select which features Autogenesis uses, to enter the default bite and contact strengths, and to use Margin Boost.
Each type of restoration has the option of different settings.
2. Select the appropriate settings for each restoration type.
For crowns all options are selected by default.



For inlays and onlays *Contacts* and *Occlusion* are selected

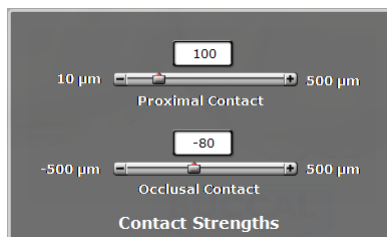


For veneers all options are deselected.



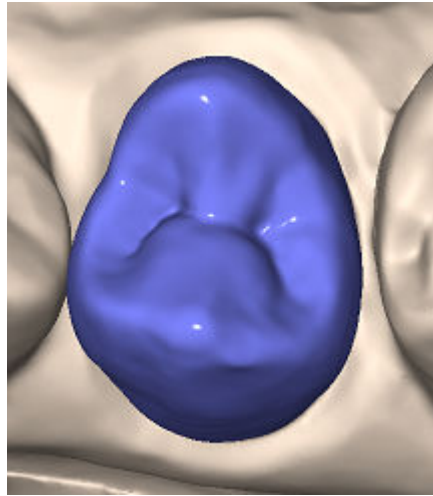
16.8.2 Contact strengths

Contact Strengths designates the default strength of the Proximal Contact and Occlusal Contact in Autogenesis and Contact Refinement.



NOTE

Autogenesis may not create an interproximal contact if the proposal makes contact with gingival tissue, as illustrated in the example below. In that case create the contact manually.

**16.8.3 Margin boost settings**

Use Margin boost settings to increase the thickness of the proposal around the margin. Margin Boost is OFF by default.

You can designate the default margin boost for each restoration type.

The controls are similar to the Dropper tool. The Area of Influence (blue bubble) affects the width and thickness of material added. The width is represented by the horizontal arrow, 2.000 in the example. The thickness of material is represented by the vertical arrow, 0.150 in the example. The vertical slider on the right is the height of the material added. This is generally kept towards the bottom, near the margin.



The effects of this tool are most easily seen on pre-op cases where there is a gap between the margin and the clone template, however this tool can be used on all cases to ensure sufficient material thickness and avoid chipping during milling.

Make any desired changes to the Margin Boost. In Tooth Libraries, click **Apply** to regenerate the proposal with the new settings. The settings are saved for the next proposal.

NOTE

Margin Boost is recommended over the use of Margin Thickness.

16.9 Designing multiples

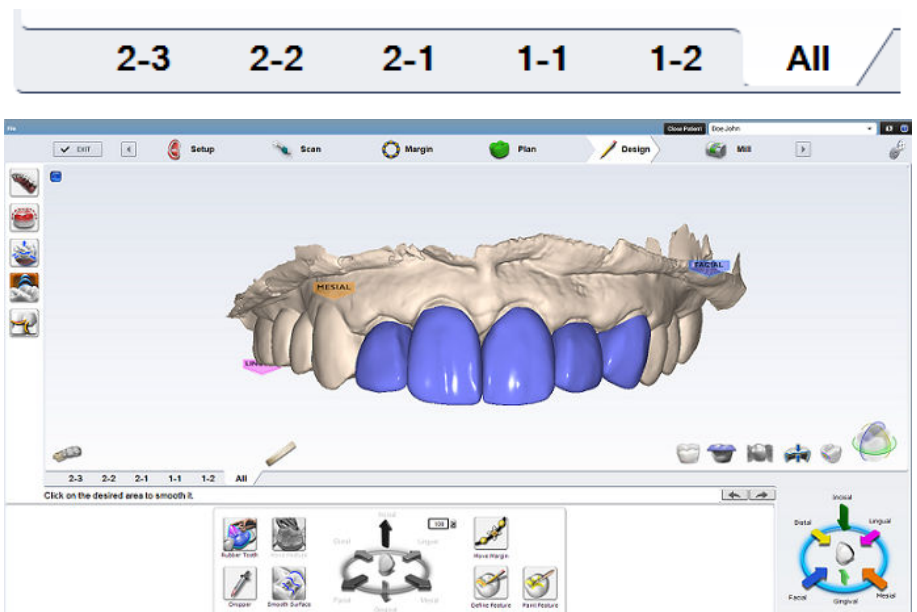
About this task

Follow these instructions when designing cases with multiple proposals.

Steps

1. Click the desired tooth number tab to designate which tooth is being designed.

The *All* tab enables certain design tools to manipulate every proposal at the same time or activates all proposals at the same time to enable individual manipulation without switching tooth tabs.



2. Select tools.

To adjust all proposals at the same time, use Incremental Change Tools:

- Move
- Rotate
- Expand

To adjust individual proposals without switching tabs use Freeform Change Tools:

- Rubber tooth
- Dropper
- Smooth surface

NOTE

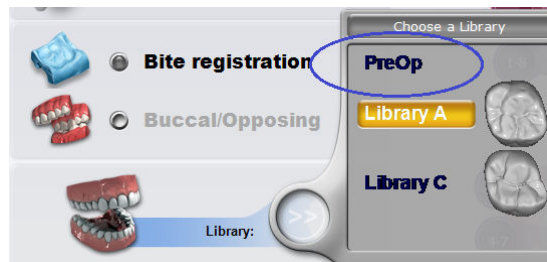
When using the Incremental Change tools, the margins do not adjust to the new position until Apply is clicked or another tool is selected.

16.10 Mirroring contralateral dentition**About this task**

With contralateral tooth copy option an existing contralateral dentition can be copied and mirrored onto preparation.

Steps

1. Start mirroring in the *Setup* tab by selecting **PreOp** Library.



2. In the *Scan* tab select the **Pre-op** scan type.



3. Scan the prep and the desired contra-lateral dentition.
4. Copy the pre-op model as the prep model using the time saver option.
5. Scan the opposing and buccal views.
6. Orientate models (see section "Orientating models" on page 69) and define the margin (see section "Defining margin" on page 80).
7. Select pre-op editing tool and designate the anatomy of the contra-lateral dentition to copy.

8. Check the *Contralateral* check-box.



9. Continue to the *Plan* tab and adjust the position of the contra-lateral shell to match the placement and alignment of the preparation.
10. Continue to the *Design* tab.
The contra-lateral pre-op anatomy is mirrored as a normal pre-op restoration.

16.11 Mirroring contralateral restoration design

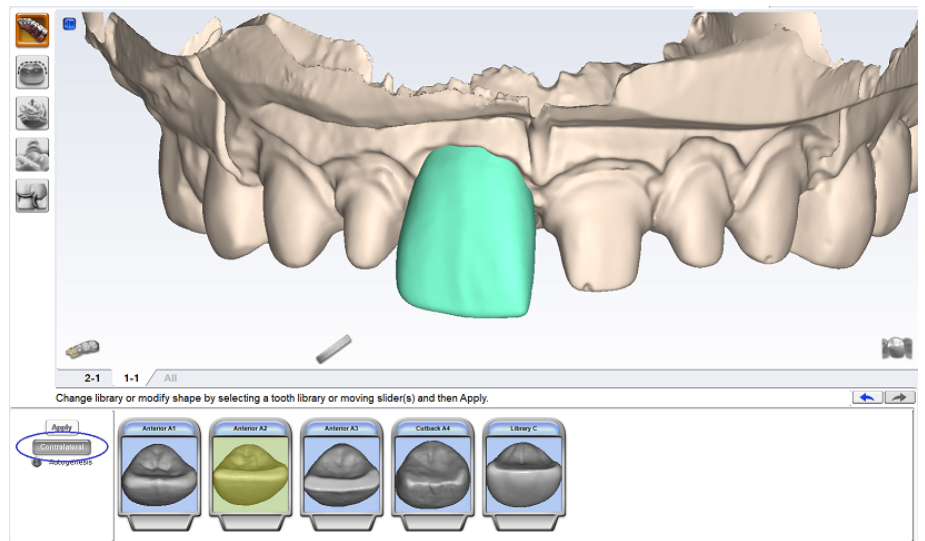
About this task

Follow these instructions to mirror contralateral restoration design.

Steps

1. Scan, orientate and draw margins for both preparations (see sections "Scanning" on page 38, "Orientating models" on page 69 and "Defining margin" on page 80).
2. Plan and design the first restoration proposal.
3. Click the second tooth tab.

4. On the tooth libraries click the **Contralateral** button.



What to do next

Continue the design normally.

NOTE

Any changes on the Plan tab for the second tooth is ignored when a design is being copied. The position of the contralateral design is based on the orientation of both preparations. Check the orientation of both teeth.

17 Creating bridges

A bridge is made up of two or more restorations that are connected.

Bridge cases are unique in that they are designed as individual teeth and milled as one unit.

This chapter assumes familiarity with multiple restoration cases and other intermediate to advanced topics. Refer to other chapters for more information.

17.1 Preparing teeth for bridges

Before you begin

Ensure the preparations for the abutment teeth are not angled in different directions. If one is pointed towards the lingual and the other towards the buccal, there may be problems with path of insertion and over-milling.

About this task

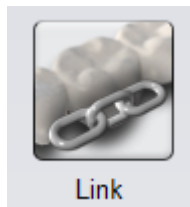
Follow these steps for designating bridge.

NOTE

Cantilever and Maryland bridges are not supported.

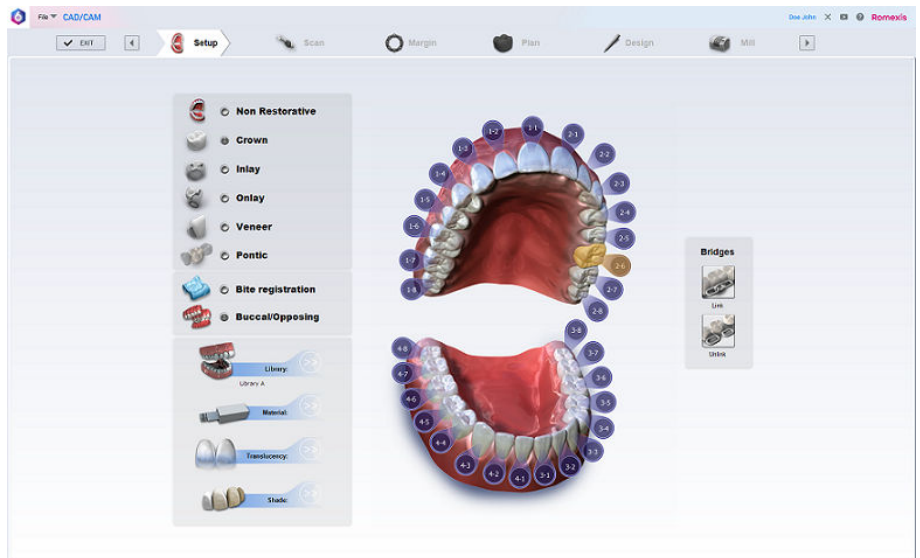
Steps

1. On the *Setup* tab select each tooth that is part of the bridge - the abutment(s) and the pontic(s).
2. Select the restoration type for each tooth.
3. Click the **Link** button.



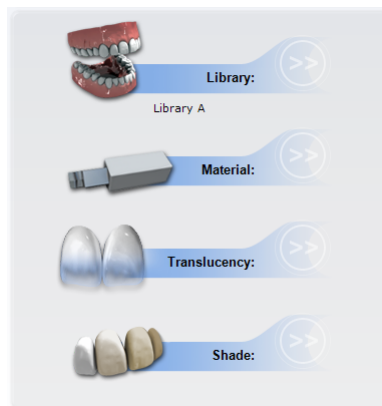
The cursor changes to a chain symbol.

4. Click the mesial and distal teeth of the bridge.
After each end of the bridge is selected, the teeth turn purple.
The teeth are now designated as a bridge.



5. Select the first tooth in the bridge and designate the Library, Material, and Shade.

The material and shade are duplicated on the other teeth in the bridge when you click on them.



6. Select the remaining teeth in the bridge and designate the Library. Library must be chosen for each restoration before you can continue to the *Scan* tab.

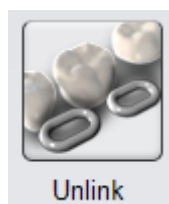
NOTE

If Library, Material and Shade are chosen before linking the bridge the software will replace the Material and Shade of the remaining restorations with that of the highest tooth number after the link.

What to do next

To create multiple bridges on the same arch, repeat the steps above.

To relink the bridge, click the **Unlink** button and then click on any of the teeth in the bridge.



17.2 Scanning and orientating bridges

About this task

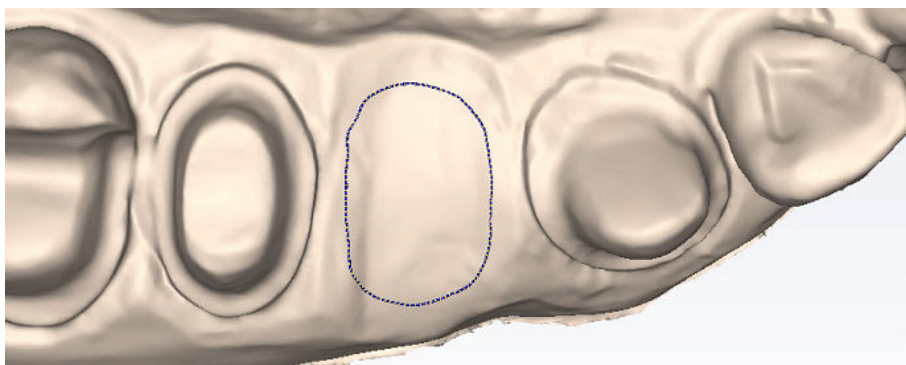
The scanning procedure for a bridge is the same as that for a multiple restorations case.

Steps

1. Start by scanning the prepped teeth, the edentulous area, and the two unprepped neighbours or more unprepped neighbours to aid in design.

NOTE

Scanning more teeth on anterior bridges will aid in smile design.



2. Set the orientation for each tooth tab.
Good alignment will aid Autogenesis with the design.

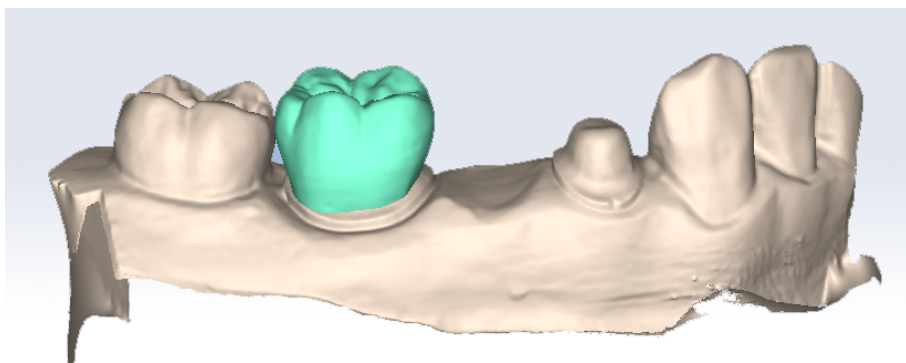
17.3 Designing bridges

About this task

With any multiples case, it is generally best to start the Autogenesis process on a tooth with an existing neighbour. In a bridge case, that means starting with the abutments.

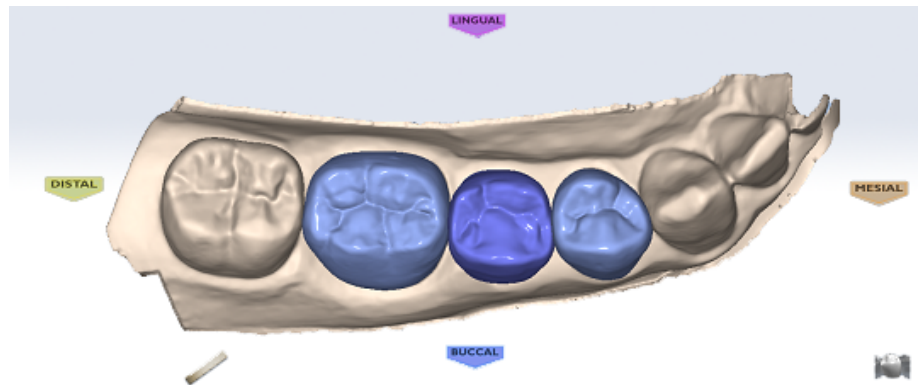
Steps

1. Rotate to evaluate the position of the preview library tooth.

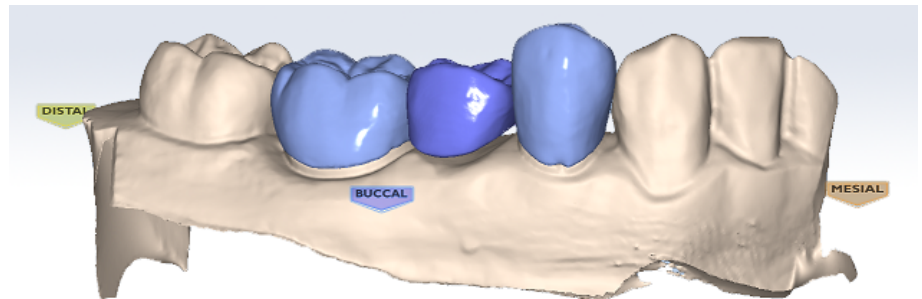


2. Resize (Alt + arrows) and move (drag and drop) as needed.
3. Click **Apply**.
4. Repeat these steps for the other abutment.

- Repeat these steps for the pontic(s).



When you rotate the model, you will notice that the pontics have a solid base and are raised above the gumline (0.75 mm). The gingival aspect of the pontic follows the contours of the edentulous tissue and can be adjusted utilizing the design tools.



- Follow the normal design workflow with interproximal contacts being the only difference.
- Adjust the interproximal contacts that touch unprepared teeth to the same contact strength that you normally use.
The contacts of the bridge teeth will be fused together to form the bridge, so the actual contact strength is not a concern, but the contact should be heavy enough to ensure a proper connection.
- When you are satisfied with your designs, click the *Mill* tab.

17.4 Evaluating connectors

About this task

It is important to evaluate the connections on the bridge and look for possible hangups.

The sprue will be on the mesial or distal side of the bridge.

Steps



- Click **View Model** to hide the model.



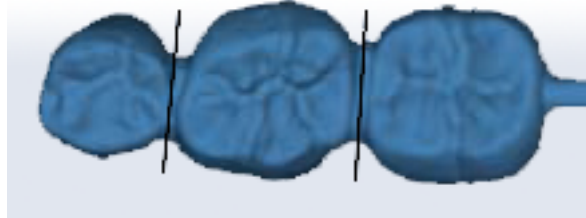
- Click **Sim** to start the simulation.

When the simulation is run, the connections between the teeth are displayed.

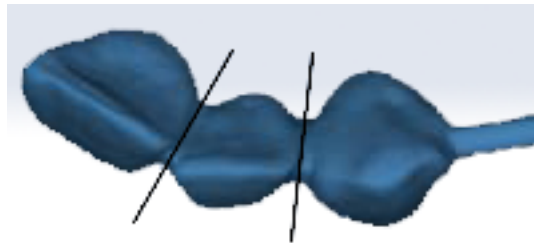


- Click **Slice Plane** twice.

The slice width is automatically measured. If the slice is thinner than the material guidelines, the slice displays as red. It is important to slice the simulation through the **thinnest** part of the connector lines.



Posterior cases tend to have wider contacts with smaller embrasures and are unlikely to be thin. Anterior cases have smaller contacts and larger embrasures.



Any thin area should be evaluated.

- Move the Slice Plane to a connector.

If the Slice Plane needs to be rotated to slice through the thinnest part, hold down the Ctrl key while moving the mouse to rotate.

- Rotate the model to view the slice.

If the slice is red, adjust the embrasures and/or contacts and try the simulation again. Note that when the model is hidden, the **Slice Plane** button displays the mm² area.



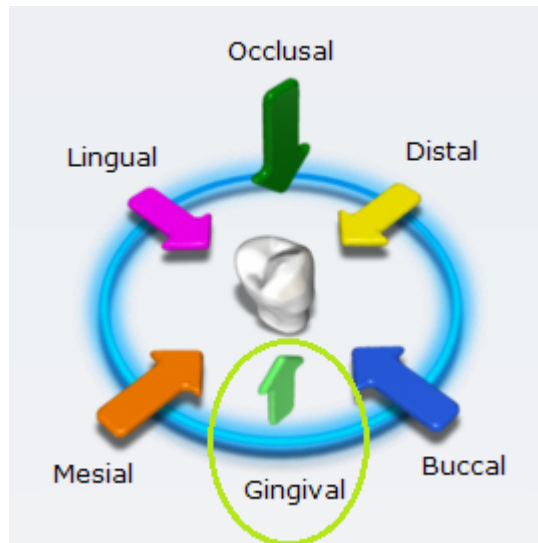
The minimum required thickness for:

- Telio CAD I = 12 mm²
- IPS e.max = 16 mm²



- Activate the model by clicking the **View Model** button.

7. Click the gingival view control arrow to view the model from underneath.



17.5 Spacer tool settings on bridges

The default Spacer Tool settings are different on bridges to account for the larger Path of Insertion.

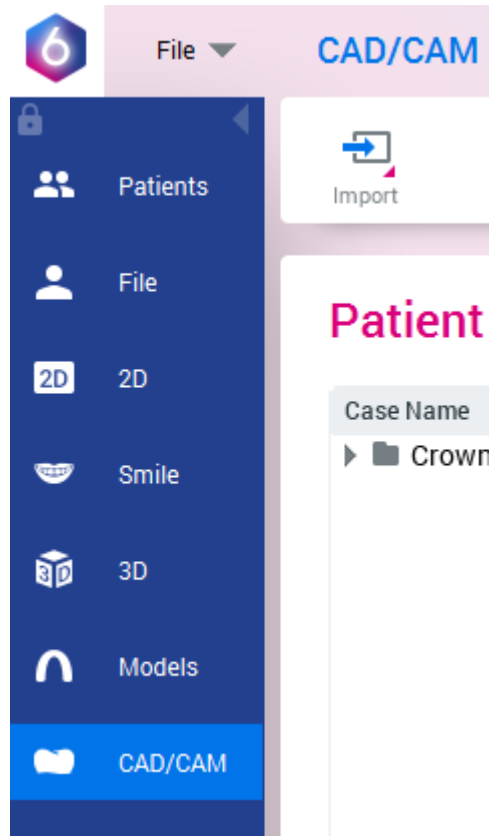
The normal maximum for the spacer is 0.20 mm. On bridge cases, the spacer defaults to 0.20 mm and can be increased to 0.30 mm.

A larger default margin ramp of 1 mm is used to aid in stability.

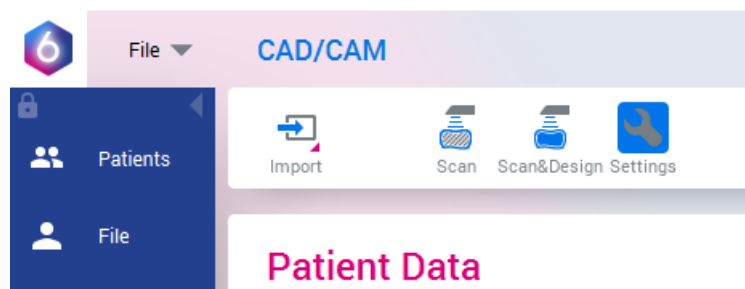
18 Functions in Planmeca Romexis

18.1 Adjusting CAD/CAM settings

To access Planmeca Romexis CAD/CAM module, click the **CAD/CAM** module button.



Click **Settings**.



You can scroll to left and right between the settings categories by placing the mouse cursor over the arrow. To select the settings you would like to modify, click on the category button.



To restore factory default settings click **Restore Factory Defaults**.

To save the new settings click **Save** or to exit without saving click **Cancel**.

Version

Displays the version of the software.

Reset warnings

You can select the option *Do not show these messages again*. If a new operator is using the system, you may want to reactivate these warnings.

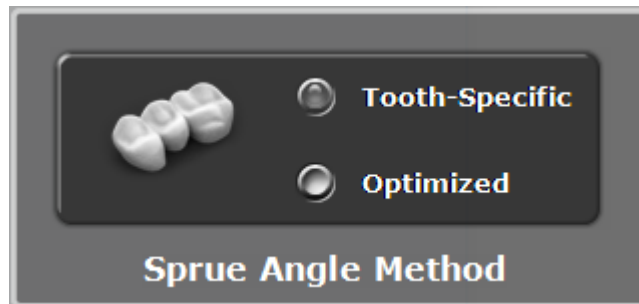


Sprue angle method

(For mill systems)

When the default setting *Tooth Specific* is selected the sprue is in the most commonly recommended position for the selected type of restoration.

When selecting *Optimized* the placement is based on the fastest milling time. In all cases, the sprue can be manually moved on the *Mill* tab.



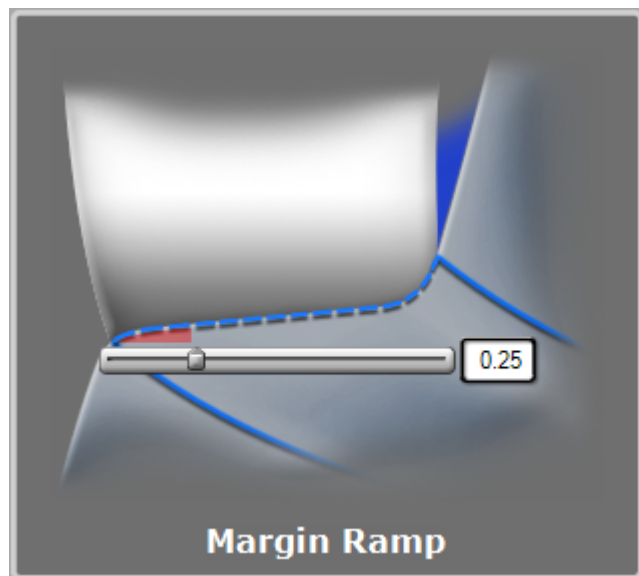
Margin ramp

(For design systems) Default: 0.25

Default setting for the margin ramp incline. Use the slider or type a number in the box to change the setting.

Increasing the margin ramp decreases the space between the restoration and preparation at the shoulder.

Decreasing the margin ramp increases this space.

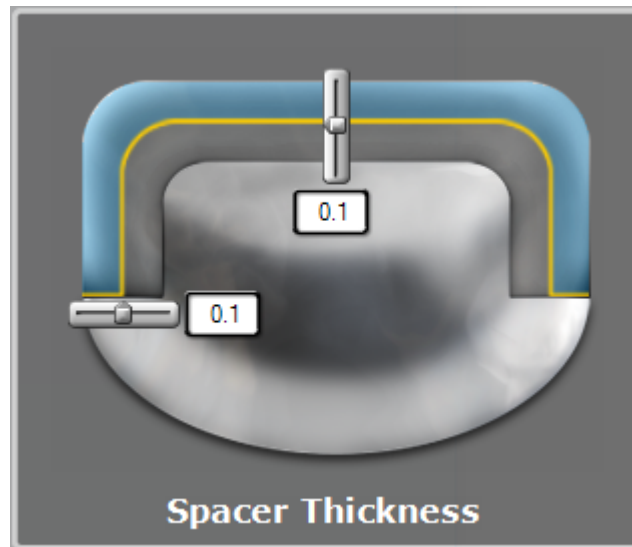


Spacer thickness

(For design systems)

The default setting for the space between the preparation and the restoration:

- Top: 0.1
- Sides: 0.1

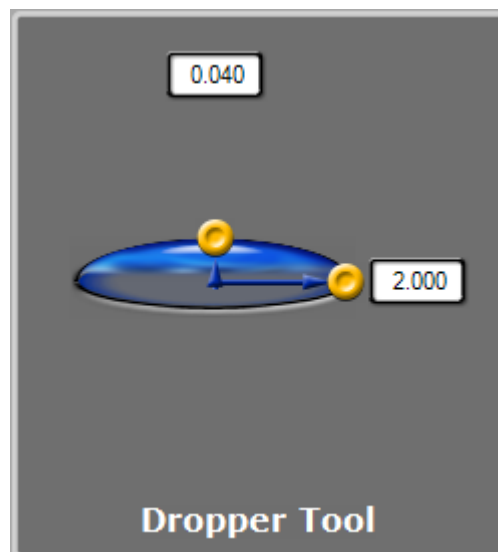


Dropper tool

(For design systems)

Default setting for the dropper tool has an amount/thickness of material and how much surface area it covers.

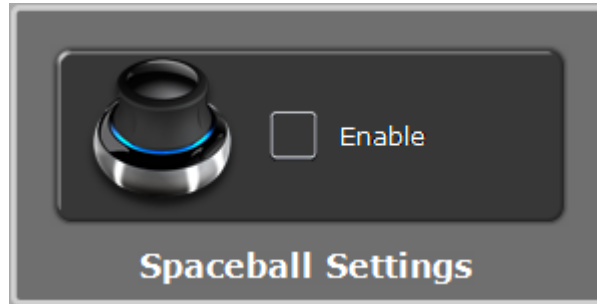
- Thickness 0.040
- Width 2.000



Spaceball settings

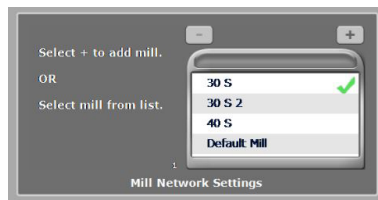
(Optional)

Select to activate the Spaceball option.

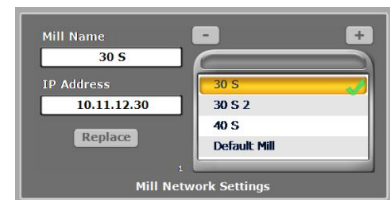


Mill network settings

Use Mill Network Settings to enable or disable the Mill Status on the laptop.



List of mills



Mill selected

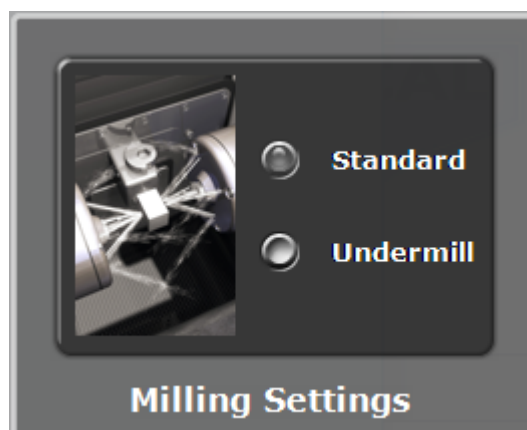
Milling settings

In Milling Settings, you can select *Standard* (overmill) or *Undermill* setting.

This setting only affect proposal with a sharp interior, like an anterior incision edge. If the interior of the proposal is smaller at the tip than the tools in the mill, the standard setting is for the mill to remove extra material at the tip.

This may lead to a crown that is too thin at the top. You may round the preparation or select Undermill. If Undermill is selected, the mill will not remove all of the interior but only as much as the tool's size will allow.

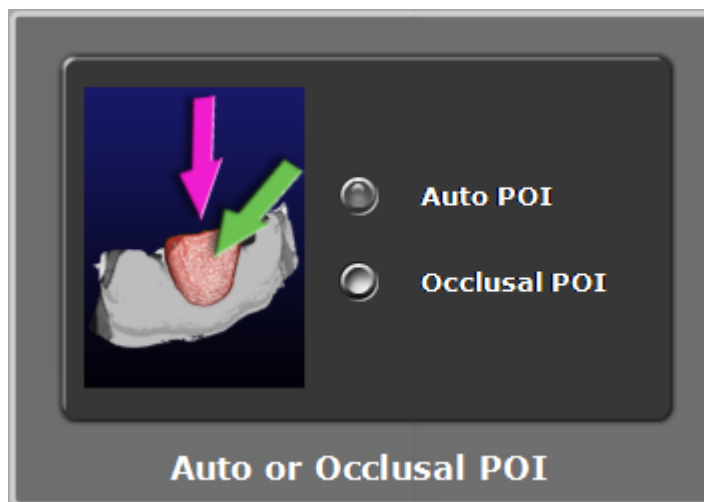
Remove the remainder manually.



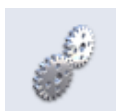
Auto or occlusal POI

(For milling unit systems)

This setting should be modified only at the request of customer support. Auto POI (Orientation) finds the best possible milling path to avoid undercuts and this eliminates the need to go back (on veneer and multiple cases especially) and reset POI for the mill. Occlusal POI uses the Orientation to set the tool path.



Tab related settings



The settings related to the tasks performed in the current tab can be accessed by clicking the **Settings** button on the top right corner of the window.

To select the settings of a specific category, click on the button.

These screens contain preference settings that modify the default behaviour of the software. The settings are based on each screen. Use the arrows to scroll right or left. Click a category to select it. Selected categories display in the bottom of the screen.

18.2 Importing and exporting scans and cases

For detailed instructions see Planmeca Romexis 6 User's manual sections "Importing 3D models" and "3D model export".

To send scans and restorations to iOS see Planmeca Romexis 6 User's manual section "Mobile applications".

18.3 Sending and receiving cases via Planmeca Romexis Cloud

Planmeca Romexis Cloud is a subscription-based service that is integrated into Planmeca Romexis and can be used to transfer images and documents between Planmeca Romexis users. All transfers are encrypted and always appointed from user to user (both using Planmeca Online account), i.e. users cannot see each other's cases.

To start using the Planmeca Romexis Cloud service for sending and receiving cases you will need a user account. On how to set up an account see section "Setting Planmeca Romexis Cloud user account" in the Planmeca Romexis 6 Technical manual.

For detailed information on Planmeca Romexis Cloud user requirements and on how to download and upload cases see Planmeca Romexis 6 User's manual.

18.4 PlanCAD Easy language selection

About this task

The following task instructs how to select interface language for PlanCAD Easy software.

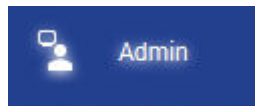
Steps

1. Open Planmeca Romexis.

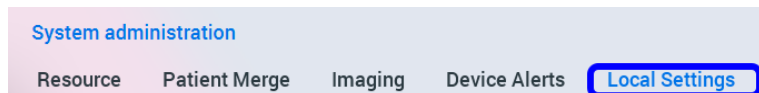


Romexis
App

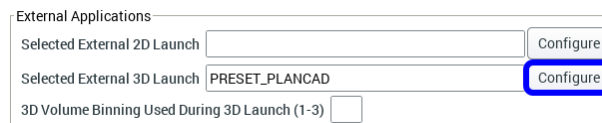
2. Select **Admin** module.



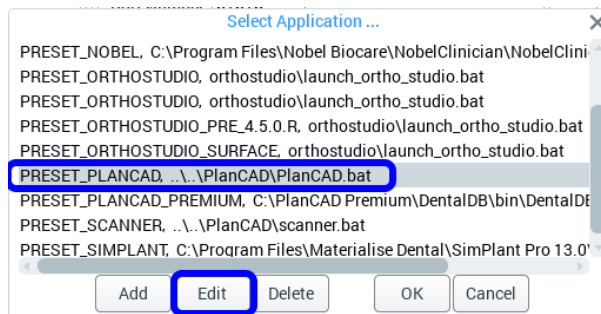
3. Select *Local Settings* tab.



4. Find *Selected External 3D launch* and click **Configure**.

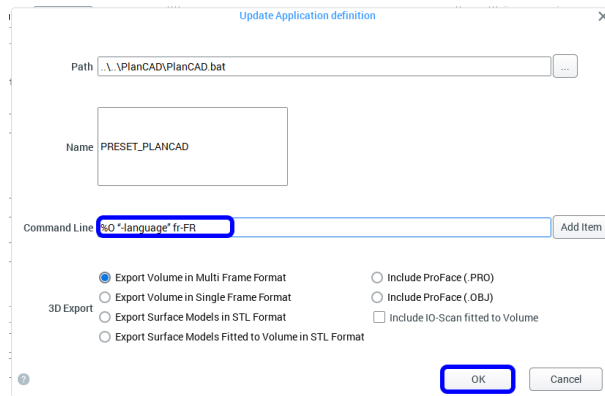


5. Find and select “PRESET_PLANCAD”, and click edit.



6. Add the desired language to the command line:

- Chinese: “-language” zh-HAN
- Japanese: “-language” ja-JP
- Spanish: “-language” es-ES
- French: “-language” fr-FR
- German: “-language” de-DE



7. Click **OK** and save the changes in Romexis admin module.
The language is changed after restarting the Romexis software.

19 Preparing restoration for milling

The final restoration setup is done on the *Mill* tab.

On the *Mill* tab you can:

- select a block
- choose a location for the sprue
- position for the restoration in a multi-block
- view mill simulation
- send the design data to the milling unit

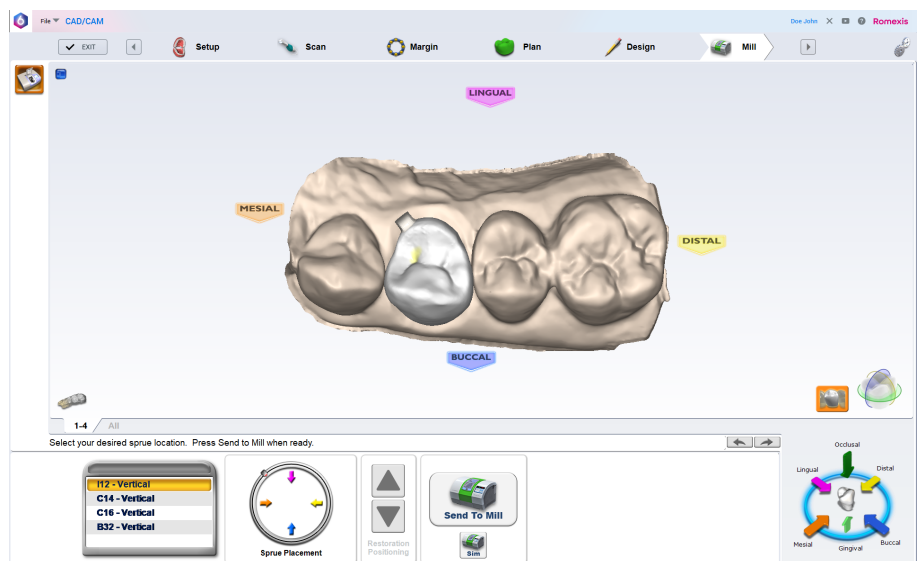
Before starting the milling process at the milling unit:

- load the block,
- ensure the milling tools are in place and
- verify the fluid is at the correct level.

NOTE

Before proceeding to milling setup check that there are no yellow or red shading on the restoration. The shading indicates that the material in those areas is thin and adjustment is recommended. Return to the *Design* tab to make changes to material thickness.

To view or hide the preparation and proximals, click the **View Model** button.



19.1 Using milling settings



To change any of the settings listed below, click the **Settings** button on the *Mill* tab.

Network settings

This should only be changed by a customer service representative. Incorrect network settings will make the Planmeca PlanCAD Easy unable to communicate with the job server and milling unit.

If you have multiple mills on your network, you can set them up here.

- To add a new milling unit to the network, click the plus (+) sign on the top right corner and enter the name and IP address of the milling unit.
- To edit one of the milling units, click the name on the list and edit the details on the left.
- To remove a milling unit, click the name on the list and then click the minus (-) sign on the top left.



Material / shade settings

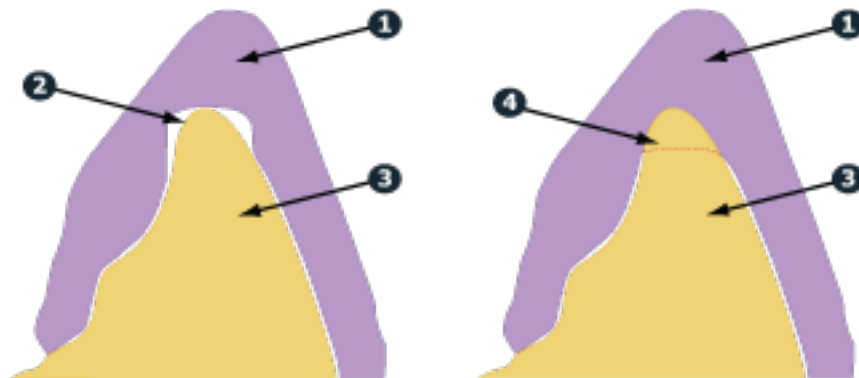
The material and shade for the current restoration can be changed here.

Margin thickness settings

Select the minimum material thickness along the margin. The recommended margin thickness is 70 to 100 microns to reduce margin chipping or potential short margins.

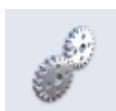
Milling settings

Milling Settings only affect proposals with a sharp interior angle, like an anterior incisal edge. If the interior of the proposal is smaller at the tip than the tools in the mill, the Standard setting removes extra material at the tip. This may lead to a crown that is too thin at the top. The options are to round the preparation or to select Undermill. If Undermill is selected, then the mill will go as far as the tool's size will allow and the remainder must be removed manually.



1. Proposal
2. Preparations
3. Standard
4. Undermill

Simulation settings



Click **Settings** on the *Mill* tab to view/edit the Simulation Settings.

The default selection is Speed. This will give you a faster simulation. Select Quality for a more accurate simulation but be aware that it will take longer to process. Note that when the software is restarted, it will return to the default Speed setting.



NOTE

Mill time is displayed in the information when Quality simulations are processed.

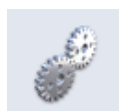
19.2 Selecting block size

About this task

Available block sizes are listed in the Blocks section. A default size is selected and shows in yellow. To change size:

Steps

1. Click on another size.



If the restoration will not fit into any of the block sizes available for the selected material, click **Settings** to select a different material.

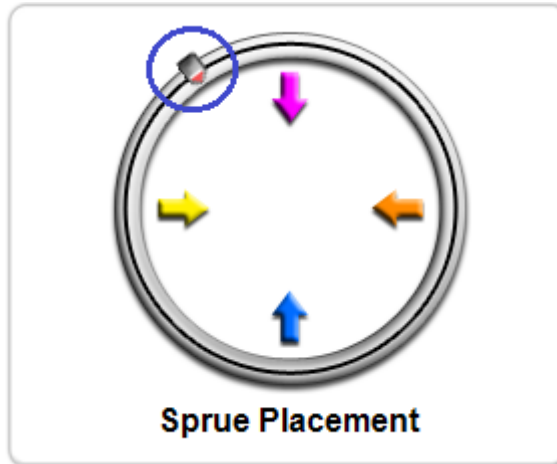
19.3 Sprue placement

About this task

The default setting for the sprue can be changed, see section "Adjusting CAD/CAM settings" on page 129. Follow these instructions to change the location of the sprue on the restoration.

Steps

1. Move the placement indicator along the circle that represents the exterior of the restoration or click one of the arrows.



The recommended locations are:

- Anteriors/posteriors: midway between lingual and the mesial or distal
- Inlays and Onlays: largest proximal box

NOTE

The sprue connects the restoration and the mandrel.

19.3.1 Ensuring sprue is not positioned on groove

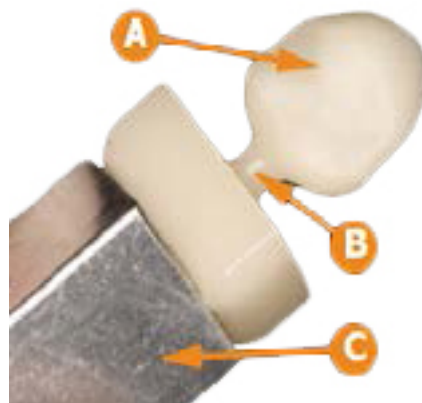
About this task

Follow these instructions to ensure that the sprue is not positioned on a groove.

Steps

1. Rotate and inspect the restoration.
2. Move the sprue towards a flatter area of the restoration.

This is usually near the interproximal but should not be put on the contact area unless it is necessary.



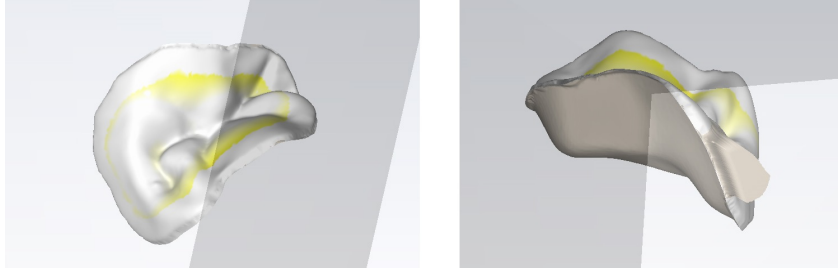
A Restoration

B Sprue

C Mandrel

3. Carefully position the sprue on inlay and onlay restorations.

Ensure the sprue is not attached to an upper surface unless it is an occlusal only inlay. If the sprue appears to be missing, it is on an interior surface. Try moving the sprue to a new position. Do not mill a partial sprue if another position with full sprue is available. The orientation affects the position of the sprue.



No sprue visible - it is on the interior surface. Change the position of the sprue.

Partial sprue - Change position to allow a full sprue when possible.

4. Deactivate View Model to ensure the sprue is properly placed.

19.3.2 Occlusal only inlays

Since occlusal only inlays have no external proximal walls, sprue position can become an issue. There are two options. The sprue can be placed on the internal aspects, but this will result in manual adjustment of the internal fit, which can affect the integrity of the restoration.

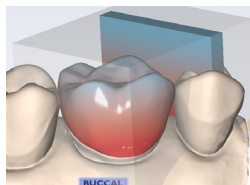
The recommended method is to use the dropper tool or rubber tooth tool to “pull up” an area of the occlusal surface and create a raised area on which a sprue can be attached. Manual adjustment of the occlusal surface will be required after milling, but internal fit will not be compromised.

19.4 Positioning restoration



When using a multiblock, the Restoration Positioning arrows are enabled. Use the arrows to move the restoration up or down within the block to achieve the desired translucency / shading.

Note that if the restoration is near the top or bottom of the block, extra milling time will be required for removing the extra material.



19.5 Simulating milled restoration

About this task

The simulation mode portrays the milled restoration. It takes about 10 seconds to generate and is recommended before milling to check the

internal fit. If a hang-up is seen, you can increase the spacer or make any other necessary design changes.

Steps

1. On the *Mill* tab, click **Sim** (located under Send to Mill).
2. Select the desired setting:
 - *Standard* is recommended for full coverage restorations.
 - *Detailed* is recommended for partial coverage restorations.

CAUTION

Detailed mode is not recommended for e.max c14 blocks and may result in broken tools.



Recommended milling modes according to block size, material and restoration type

Block size / material	Crown	Bridges	Inlay	Onlay	Veneer
I-12	Detailed	Standard	Detailed		
C-14	Standard		N/A		
C-16	Standard				
IPS e.max ZirCAD	Detailed	Detailed	N/A		

(*) Zirconia requires long burs

3. Click **OK**.

Results

The simulation is created in a few seconds.

19.5.1 Simulating and milling IPS e.max ZirCAD

About this task

When milling IPS e.max ZirCAD perform a Sim to ensure inner surfaces are cleared out.

For bridges, ensure the connectors are above minimum area requirements for strength.

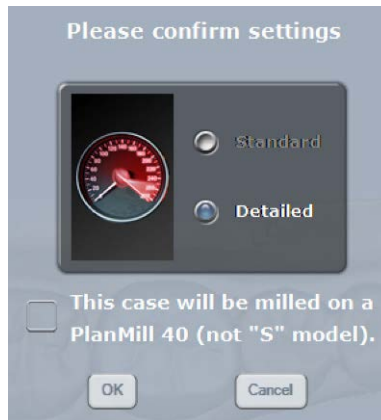
Steps

1. When simulating IPS e.max ZirCAD material always select the **Detailed** simulation option.

If you are simulating with Planmeca PlanMill 40 milling unit, check the *This case will be milled on a PlanMill 40 (not "S" model)* check-box.

If you do not know the model of the milling unit, please contact your Planmeca representative.

2. Click **OK** to continue.



19.6 Checking simulation

About this task

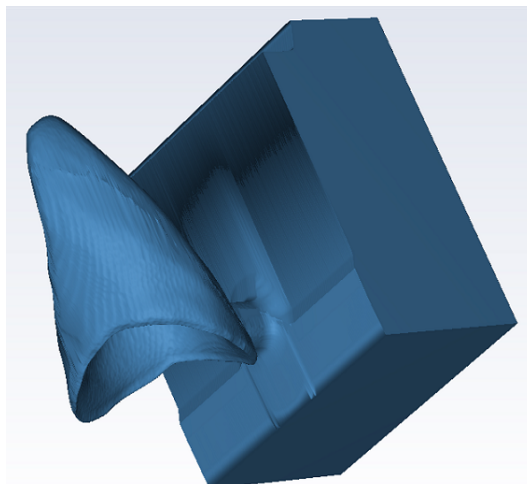
Simulation should be checked for:

- **Hangups**

Hangups are areas where the tools cannot completely remove the material for the interior of the proposal.

- **Overmilling**

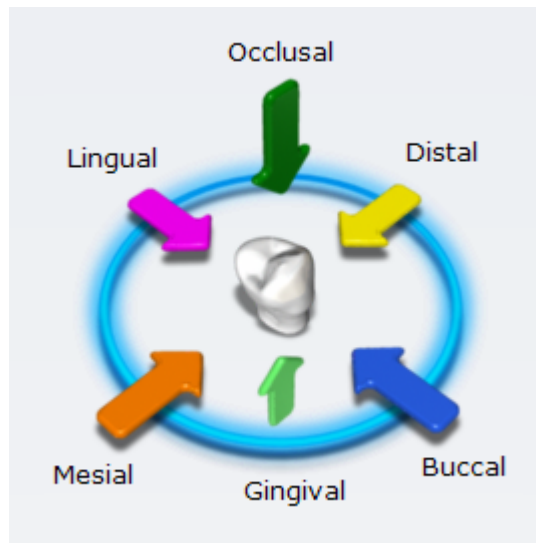
Overmilling is caused by areas of the preparation that are smaller than the tools. The tools must "overmill" and remove extra material so that there is no hangup. Is the overmilling drastic enough to cause a loss in retention?



Steps



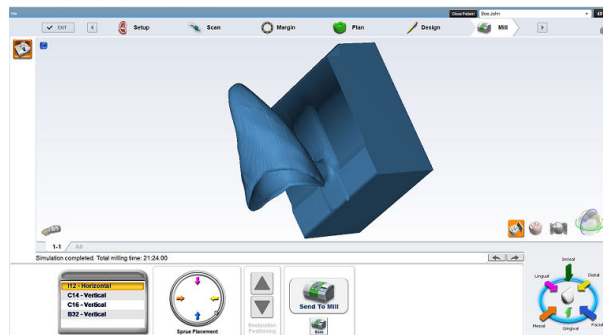
1. To view the interior aspect of the proposal, click **Hide/View Model** and then click the **Gingival** arrow.



The simulation will show swirl marks in areas where the milling tools have to overcompensate for small upper areas.

Swirl marks indicate overmilling. The rest of the proposal's interior is relatively smooth.

Sharp areas of the preparation that are smaller than the milling tools can result in overmilling.



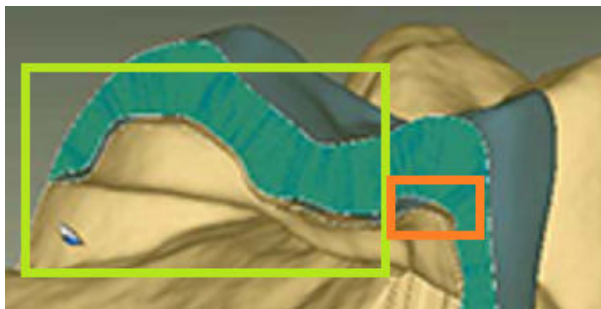
2. Click **Hide/View Model** to activate the model again.
3. Click **Slice Placement** once or twice to get the desired slice direction.
4. Drag the slice to the approximate area of the overmilling.
5. Rotate and zoom to evaluate.

NOTE

A maximum zoom of 1 mm is recommended.

Example A:

In this example, the majority of the spacer follows the contours of the preparation (highlighted in green). There is a section of extra spacer where the tools had to overcompensate for the sharpness of the preparation (highlighted in orange).

**Example B:**

In this example, there is large overmilling (orange), minor overmilling (yellow) with only a slight increase in the spacer, and on a different slice of the same proposal, there is an overlap which would cause a hangup (red).



If you mill a problematic proposal, you may have too much spacer and loss of retention or you may have hangups and have to adjust the restoration (and mill another block) or adjust the preparation.



When running a quality simulation, the mill time is displayed in the information bar, see simulation settings in section "Using milling settings" on page 137.



19.7 Sending restoration to milling unit

About this task

Follow these instructions when sending restoration to milling unit.

Steps

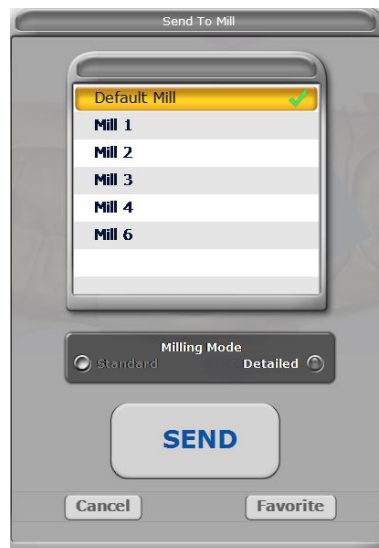
1. When satisfied with the restoration and milling unit setup click the **Send to Mill** button.



2. If you have multiple milling units, select the desired unit from the list. See milling unit's user's manual for how to create/edit this list. Use the **Favorite** button to designate the highlighted mill as the default. The favourite mill is always at the top of the list.
3. Confirm the desired setting.
 - *Standard* is recommended for full coverage restorations.
 - *Detailed* is recommended for partial coverage restorations.

NOTE

It is not recommended to use the Detailed mode with e.max c14 blocks as it may break the milling tools.



Milling IPS e.max ZirCAD

With IPS e.max ZirCAD *Detailed milling* is the only available option.

When milling, the following reminder appears: *Perform a Sim to ensure inner surfaces are cleared out. For bridges, ensure connectors are above minimum area requirements for strength. Click OK to continue.*

If you are using a Planmeca PlanMill 40 milling unit (not the “S” model), check the *This case will be missed on a PlanMill 40* box before clicking **Send to Mill**.

20 Cleaning / preventive maintenance

20.1 Cleaning scanner tips

NOTE

For intraoral scanning systems only.



The following instructions are for the removable tip of the scanner, not for the entire scanner. See instructions below for cleaning the base of the scanner.



WARNING

Do NOT autoclave tips with no temperature symbol.



WARNING

Do NOT place in ultrasonic cleaner.



WARNING

The scanning tips have been manufactured and tested for specific disinfection protocols. Operational, maintenance and replacement instructions should be followed for the product to perform as designed. Cleaning the scanner tip incorrectly may result in incomplete disinfection and/or permanent damage to the tip.



WARNING

Do NOT pouch with other instruments.



WARNING

Do NOT stack the tips near or on any other metal instruments.



WARNING

Excessive cycle times and excessively long sterilization cycles may prematurely reduce the life and function of the tip.

CAUTION

To prevent scratches, avoid brushing the mirror.

CAUTION

Autoclave baskets are not indicated for this cleaning procedure.

20.1.1 Tip infection control procedure for Planmeca Emerald and Planmeca Emerald S

20.1.1.1 Cleaning after every patient

About this task

CAUTION

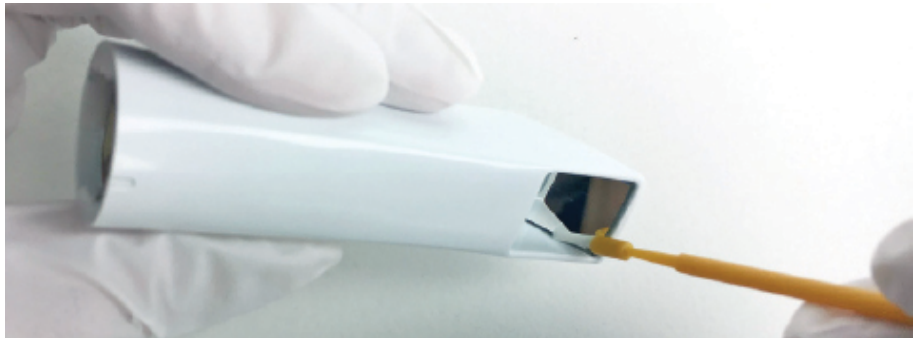
It is of utmost importance to clean the scanner tip after every patient to ensure proper infection control.

Steps

1. Remove the scanner tip from the scanner.
2. Using a soft bristled brush, such as a soft toothbrush, rinse and brush the external surface of the tip under warm running water (3 - 3.5L/min at 30° - 35°C [86° - 95°F]) for a minimum of 15 seconds, with emphasis on the tip alignment indicator.
3. Rinse and brush around the edge and surrounding crevices of the mirror under running water for a minimum of 30 seconds.

To avoid scratching the mirror, be careful that only the bristles touch its surface.

The example picture is shown without running water for visibility purposes. Use the bristles of the small brush on all crevice edges of the mirror (e.g. Pinn-Point Brush shown).



4. After brushing, rinse the mirror and surrounding crevice under running water for additional 15 seconds.
5. Wipe the mirror with an optical lens wipe.
 - If there is any visible debris remaining after performing the cleaning steps above repeat the process.
 - If there is any debris that cannot be removed or visible deterioration such as cracks or discoloration, the tip should be disposed of and replaced.
6. Place each scanner tip individually into an autoclave pouch.
7. Place one to three pouches per tray or cassette.

DO NOT stack tips on or around other metal instruments.
8. Select the *Wrapped*, *Wrapped Instruments*, or *Pouch* autoclave cycle with a minimum sterilization temperature of 132° C (269° F).
 - For Pre-Vac autoclaves minimum sterilization time is 3 minutes.
 - For Gravity autoclaves minimum sterilization time is 10 minutes.

For any autoclave, use a minimum dry time of 10 minutes. Autoclave sterilization cycle times exceeding 10 minutes could be considered excessive and may damage the tip.

What to do next

After cycle completion, store for later use.

20.1.1.2 Manufacturer's specifications, additional information, and cautions

Prior to scanning, visually confirm the scanning mirror and scanner connection surfaces are clean and dry.

To clean either surface, use an optical cloth with a small amount of alcohol to gently remove residue.

Ensure each surface is dry before connecting it to the scanner. Autoclave cycle times, parameters, and names differ among manufacturers and autoclave types. Refer to your manufacturer's manual for sterilizing wrapped instruments. Autoclave sterilization cycle times exceeding 10 minutes could be considered excessive and may damage the tip. To verify that minimum cycle parameters are met, see the User's manual of the autoclave manufacturer. For more information, call customer support.

CAUTION

DO NOT use chemical sterilant.

CAUTION

DO NOT place in ultrasonic cleaner.

CAUTION

DO NOT pouch with other instruments.

CAUTION

DO NOT stack tips on or around other metal instruments. Excessive cycle times may prematurely reduce the life and function of the tip.

20.2 Cleaning scanner base

About this task

NOTE

For intraoral scanning systems only.

NOTE

Before and after each use, clean all areas of the scanner.



WARNING

Before and after each use, follow these instructions to disinfect the scanner. Do not substitute any other cleaning solution or procedure. Never use any paint thinner, solvents, or harsh chemicals.



NOTE

Use only a non-woven sponge or pre-moistened germicidal cloths that have been saturated with a hospital grade disinfectant when cleaning the scanner.

Steps

1. Using a clean, non-woven sponge that has been saturated with a hospital-grade, TB-rated germicide or pre-moistened germicidal cloths, apply the germicide to the entire surface of the scanner base, scanner holder, mouse, mouse-pad, and any other surfaces that you touch that were not covered by a disposable barrier.

Do not spray the germicide directly on the items and do not submerge the scanner or mouse in the germicide.

2. Follow the germicide manufacturer's instructions.

20.2.1 Planmeca Emerald

About this task

The rubber sleeve of the scanner should be removed once a month for cleaning.

Follow these instructions when cleaning the rubber sleeve.

Steps

1. Start on the bottom of the sleeve and flip/roll it upwards.



2. Continue rolling to the top of the scanner until you can pull it off.



3. Clean the cover and base with germicide as instructed in section "Cleaning scanner base" on page 150 above.
4. Ensure the cover is right-side-out and slide it back onto the scanner.





21 Technical specifications

21.1 Planmeca Emerald and Emerald S scanners specification



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<https://www.planmeca.com/>



Electrical Ratings	5 Vdc 7,5 W 1,5 A (4 A if external supply)
Storage and transportation conditions	-20°C to 60°C (-4°F to 140°F)
Operating conditions	15 °C to 28 °C (59 °F to 82 °F) 5% - 95% non-condensing relative humidity
Maximum altitude	2,000 m (6,562 ft)
Dimensions	Scanner with tip 41 x 45 x 249 mm (1.6 x 1.8 x 9.8 in.)
	Scanner without tip 40,5 x 45 x 165 mm (1.6 x 1.8 x 6.5 in.)
	Scanner tip 24.6 x 24.6 x 88.6 mm (0.96 x 0.96 x 3.5 in.)
	Scanner holder 119 mm x 186 mm x 114 mm (4.7 x 7.3 x 4.5 in.)
Approximate weight	Scanner with tip and cable <i>Planmeca Emerald S:</i> 339 g (11.97 oz) <i>Planmeca Emerald:</i> 338 g (11.94 oz)
	Scanner base <i>Planmeca Emerald S:</i> 213 g (7.51 oz) <i>Planmeca Emerald:</i> 212 g (7.48 oz)
	Scanner tip - 17 g (0.60 oz)
	Scanner cable - 109 g (3.86 oz)
Applied parts	The scanning tip is the only applied part.
Patents	(EU) EP1579171; EP2076870 (Australia) 2004273957; 2003300135 (Canada) 2538162; 2511828 (Japan) 4913597; 5189287 (US) 7573583; 7342668; 7978892; 8532355
Cables	When connecting components, ensure you use only the cables provided with the system.

21.1.1 Applicable standards

Product safety



ANSI/AAMI ES60601
IEC 60601-1, 3rd Edition

EMC

IEC 60601-1-2
US FCC CFR 47, Part 15B

Laser product safety

IEC 60825-1, 2nd Edition

Packaging and environmental

ISTA Class 2A

Bio-compatibility

ISO 10993

European standards

93/42/EEC Medical Device Directive
EN 60601-1:2006 Safety of Medical Electrical equipment
EN 60601-1-2 Electromagnetic Compatibility
EN 60825-1 Safety of Laser Products
EN ISO 14971:2012 Risk Management
EN ISO 13485 Quality Management Systems
EN ISO 10993: Biological Evaluation of Medical Devices

Canadian standards

CAN/CSA C22.2 No. 60601
SOR-98-282 Canada Medical Device Regulations
ICES-001 ISM Radio Frequency Generators

US Food and Drug Administration

US FDA CFR 21 Part 1040.10 Laser Products
US FDA Laser Notice 50
CFR 21, Part 820
FDA Class II Special Controls for Computer Assisted Design and Manufacturing of Dental Restorations

International standards

ISO 14971:2007
ISO 13485:2003

21.1.2 Approvals (all systems)

North America

Product Safety Mark (NRTL) - UL C/US

International

CB Scheme Product Safety Test Certificate (UL) CB Scheme EMC Test Certificate (INTERTEK) CE Mark (TUV)

Quality System Certifications



ISO 13485 Registered Firm

Complies with FDA performance standards for laser products, except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This ISM device complies with Canadian ICES-001. (Cet appareil ISM est conforme à la norme NMB-001 du Canada.)



WARNING

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

21.1.3 Optical specifications

CAUTION

Using controls, making adjustments, or performing procedures in a manner other than is specified in this documentation may result in hazardous radiation exposure.

Laser class ^a	Class 2
Output	6.2 mW
Wavelength range	400 - 700 nm
Beam divergence	10 degrees

^{a)} Laser product classified to standard IEC/EN 60825- 1:2007-03 Ed. 2.0

The scanner's laser projection system utilizes a divergent beam powered by a non-accessible laser source with a maximum power output of 200 mW. The scanner incorporates design features that prevent exposure to any hazardous levels of laser radiation in normal operation modes and in any reasonable fault conditions.

21.1.4 External components and connectors



When connecting external components to the system, attach only devices that have an appropriate NRTL mark for compliance with IEC 60601-1 or IEC 60950.

Connectors for attaching external devices conduct low voltages. Avoid touching the connector pins.

21.1.5 UL listing



UL Medical Equipment Listing

MEDICAL - GENERAL MEDICAL EQUIPMENT AS TO ELECTRICAL SHOCK, FIRE AND MECHANICAL HAZARDS ONLY IN ACCORDANCE WITH ANSI/AAMI ES60601-1 (2005)

CAN/CSA C22.2 No. 60601-1:2008

EN 60601-1 (2006)

IEC 60601-1-2

IEC 60825-1

30SD

21.2 Planmeca CAD/CAM chairside computer specification

To ensure the correct functionality of the CAD/CAM chairside equipment, Planmeca recommends laptop models whose specifications you find by opening the QR Code below.

Planmeca dealer purchases, configures and delivers fully functional computer with Planmeca Romexis CAD/CAM software installed. All specifications are subject to change without notice.



22 EMC information

Guidance and manufacturer's declaration – electromagnetic emission

The scanner is intended for use in the electromagnetic environment specified below. The customer or the user of the scanner should assure that it is used in such an environment.

Emission test	Compliance	Electromagnetic environment - guidance
RF emissions CISPR 11	Group 1	The Planmeca Emerald scanner uses RF energy only for its internal function. Therefore its RF emissions are very low and not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	The Planmeca Emerald scanner is suitable for use in all establishments, other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonics emission IEC 61000-3-2	Not applicable	
Voltage fluctuations / flicker emissions IEC 61000-3-3	Not applicable	

Guidance and manufacturer's declaration – electromagnetic immunity

The scanner is intended for use in the electromagnetic environment specified below. The customer or the user of the scanner should assure that it is used in such an environment.


Planmeca Emerald / Emerald S

Immunity test	IEC 60601 Test level	Compliance level	Electromagnetic environment -guidance
Electrostatic discharge (ESD) IEC 61000-4-2	Planmeca Emerald: +/- 6 kV Contact +/- 8 kV Air Planmeca Emerald S: +/- 8 kV Contact +/- 15 kV Air	Planmeca Emerald: +/- 8 kV Contact +/- 15 kV Air Planmeca Emerald S: +/- 8 kV Contact +/- 15 kV Air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient / burst IEC 61000-4-4	+/- 2kV for power supply lines +/- 1kV for input/ output lines	Not applicable	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	+/- 1 kV differential mode 2 kV common mode	Not applicable	Mains power quality should be that of a typical commercial or hospital environment.

Planmeca Emerald / Emerald S

Immunity test	IEC 60601 Test level	Compliance level	Electromagnetic environment -guidance
Voltage dips, short interruptions and variations on power supply input lines IEC 61000-4-11	0% UT; 0.5 cycle at 0°, 45°, 90°, 135°, 180°, 225°, 270°, and 315° 0% UT; 1 cycle 70% UT; 25 cycles Single phase: at 0° 0% UT; 250 cycle	Not applicable	Main power quality should be that of a typical commercial or hospital environment. If the user of the BSVD-1000 system requires continued operation during power mains interruptions, it is recommended that the scanner be powered from an uninterruptible power supply (UPS) or a battery.
Power frequency (50/60Hz) Magnetic field IEC 61000-4-8	30 A/m	30 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
Note:UT is the A.C. mains voltage prior to application of the test level.			
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz 6 V m) in ISM bands between 0.15 MHz and 80 MHz	Not applicable	Portable and mobile RF communications equipment should be used no closer to any part of the Planmeca Emerald scanner, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.

Planmeca Emerald / Emerald S

Immunity test	IEC 60601 Test level	Compliance level	Electromagnetic environment -guidance
Radiated RF IEC 61000-4-3	3 V/m 80.0 MHz to 2.5 GHz	3 V/m Proximity fields met the minimum requirement of section 8.10 of IEC 60601-1-2	<p>Recommended separation distance</p> $d = 1.2\sqrt{P}$ $d = 1.2\sqrt{P} \text{ 80 MHz to 800 MHz}$ $d = 2.3\sqrt{P} \text{ 800 MHz to 2.5. GHz}$ <p>where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m).</p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey should be less than the compliance level in each frequency range.</p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> 
Note 1) At 80 MHz and 800 MHz, the higher frequency range applies.			
Note 2) These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			
<p>a. Field strengths from fixed transmitters, such as base stations for radio (cellular/ cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the EUT is used exceeds the applicable RF compliance level above, the EUT should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the EUT.</p> <p>b. Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3V / m.</p>			
<p>Recommended Separation Distances Between Portable and Mobile RF Communications Equipment and the Planmeca Emerald scanner.</p>			

Planmeca Emerald / Emerald S

Immunity test	IEC 60601 Test level	Compliance level	Electromagnetic environment -guidance
<p>CAUTION Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the scanner, including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result.</p>			
<p>The Planmeca Emerald scanner is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The user of the Planmeca Emerald scanner can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the Planmeca Emerald scanner as recommended below, according to the maximum output power of the communications equipment.</p>			
Rated maximum output power (W) of transmitter	Separation distance (m) according to frequency of transmitter		
	150 kHz to 80 MHz $d = 1.2 \sqrt{P}$	80 MHz to 800 MHz $d = 1.2 \sqrt{P}$	800 MHz to 2.5 GHz $d = 1.2 \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.33
10	3.8	3.8	7.3
100	12	12	23
<p>For transmitters rated at a maximum output power not listed above, the recommended separation distance (d) in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.</p> <p>Note 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.</p> <p>Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.</p>			

23 FAQ

- Which USB port do I plug my scanner in?
- How do I know if my scanner is connected?
- How do I prevent my scanner from overheating even though I'm not scanning?
- Why is my image fogging while scanning intraorally?
- My scanner is plugged in but does not show as connected. Several scenarios presented below.
- The colour seems off on my scanner.
- My scanner seems to have slowed down.
- My scanner connection keeps dropping.
- Why does the tip flash on and off when connected?
- A strange spider web/chicken wire graphic appears when I try to scan.
- I'm having trouble scanning Scan Bodies.
- I'm having trouble saving cases
- Didn't find your question/answer?

Which USB port do I plug my scanner in?

Always make sure it's plugged into the USB 3.0 port labelled as such.



How do I know if my scanner is connected?

Icons in the lower-left corner of the screen indicate the status of the scanner.

- Disconnected



- Tip Disconnected



- Heating - Stage 1



- Heating - Stage 2



- Ready



How do I prevent my scanner from overheating even though I'm not scanning?

Unplug the scanner when you are not scanning. The controls for the heating & cooling are only activated when the software is in the scan page.

Why is my image fogging while scanning intraorally?

It is always advisable to let the tip heat for approx. 30-45 seconds until you see the orange & green status indicators on the front of the tip image.



Ready

My scanner is plugged in but does not show as connected

Several scenarios presented below.

- Are you plugged into a hub or extension cable? Plug the scanner directly into the laptop. Extension cables and USB hubs are not recommended.
- Desktop PC users: Are you plugged into a front USB port? We don't recommend the front USB ports as they don't receive the full power that the rear ports receive.
- Verify that the correct driver is installed:
 1. Use the Windows Search to open Device Manager.
 2. Does Westbridge appear in Other Devices?
 - If yes, the correct driver is not installed.
 - If no, then you do not need to update the driver.
 3. If the driver needs to be installed, contact your local dealer.

The colour seems off on my scanner

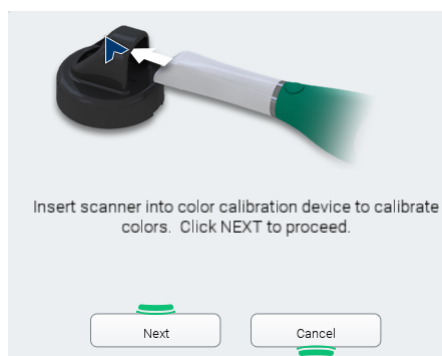
Colour Balancing should be done monthly or as needed. This is an optional step to optimize the colour represented on screen. This does not affect the stone model nor the amount of data collected by the scanner.

1. While in the scanning screen, click the colour symbol to optimize the colour.



A new screen appears.

2. Insert the scanner with sterilized colour tip into the device as shown then click **Next**.

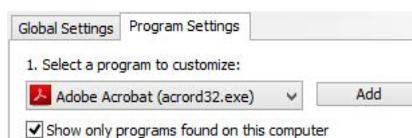


Another screen appears with the results.

- If there is a problem, try again.
 - If problems continue, contact Customer Support.
 - If contamination occurs, clean with a germicide wipe. Do not autoclave.
3. Store the Colour Balancer in a plastic bag or keep a dust cover on it.

My scanner seems to have slowed down

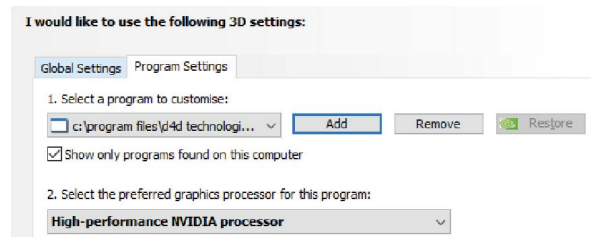
- Is your laptop plugged in?
Ensure the AC power adapter for the laptop is plugged in and that the laptop shows charging and not running on battery. The laptop should always be plugged in during scanning.
- Is the laptop connected to an external monitor?
Disconnect the external monitor, it is using up too much of the graphics card resources during scanning.
- Check your graphic card settings. Ensure the Nvidia Graphics card settings match the following:
 1. Right-click on the Desktop and select NViDIA Control Panel.
 2. On the left, ensure the PhysX option under 3D Settings is selected.
 3. Under Select a PhysX processor, use the drop-down list to set it to the current Nvidia option (ex. GeForce GTX).
 4. Click **Apply** to save your changes. If you did not change the drop-down item, the Apply button will not be present.
 5. Click Manage 3D Settings on the left.
 6. Click the *Program Settings* tab on the right.
 7. Click the **Add** button.



8. Click **Browse**.
9. Navigate to *C:\Program Files\D4D Technologies LLC\DesignCenter\scanner* and select **Sapphire.exe**.
10. Click **Open**.
11. Click **Apply** to save your changes.

If the graphic drivers are updated, the system will return to the default settings and these steps may need to be repeated. After selecting Sapphire, the window returns to the program settings.

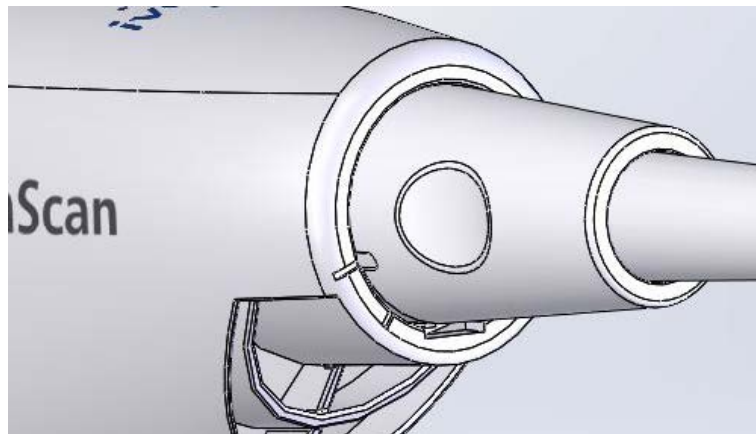
- Under step 2, use the drop-down menu to select the NVIDIA processor.



- Click the *Global Settings* tab.
- Ensure the NVIDIA processor is the Preferred graphics processor.
- Click **Apply** to save changes.

My scanner connection keeps dropping.

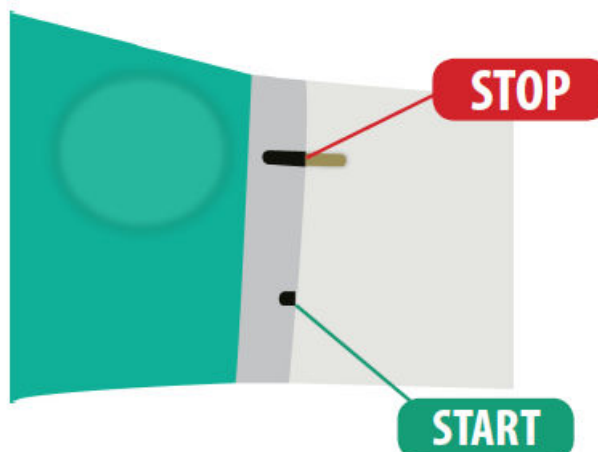
Check that the cable is inserted into the scanner correctly. Make sure it is locked in place and cannot be pulled out without releasing the lock. Also ensure it is fully inserted into the USB port.



Why does the tip flash on and off when connected?

Disconnected Ready

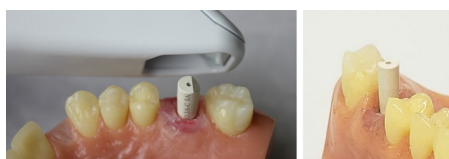
1. Check to see if the tip and scanner marking points are fully lined up.



2. Make sure the contacts on the rear of the tip are clean and dry.
3. Reseat the tip and test.
4. In addition, try another tip and see if it connects okay.

A strange spider web/chicken wire graphic appears when I try to scan

This occurs if the scanner has not initialized correctly. Unplug the scanner and plug back in.



I'm having trouble scanning Scan Bodies

- Try to get as close as possible to the scan body, but do not put it inside of the tip.
- Do not use Active Delete
- Use the larger tip size because of the bigger field of view to aid in alignment

Scan pattern:

1. Start the scanning at the gingival in order to capture enough data. When possible, include teeth and tissue in the scans.
2. Scan up the side, over the top of the scan body, and back down until you reach the gingival again.
3. Scan the rest of the model with the normal scan pattern. If you start scanning from the occlusal on a scan body, you will not capture enough data and it is difficult to create a good model.

Start scanning from the gingival in order to start with good data.

Having trouble saving cases

It is highly recommended by Planmeca that any computers connected to a Romexis Server be hard-wired. This will ensure reliability, faster saving and

a more robust infrastructure. If wireless networks are used it can lead to data loss, slow saving, or even data corruption.

24 Troubleshooting / repair

Problem	Probable cause	Corrective action
No power	Power cable unplugged.	Verify the power cable is plugged to live AC outlet.
	Outer power supply switch turned off.	Set power supply rocker switch at rear of the unit to "ON" position.
	Inner power supply switch turned off.	Set power supply rocker switch at rear of the unit to "ON" position.
Failing to send restoration.		Contact customer support. (See job server troubleshooting).
Login screen appears	Screensaver login turned on.	Go to properties, then screen saver and turn it OFF.
Fan making loud noises	Out of balance.	Replace fan. (Call customer support)
Software application freezing	Low memory.	Re-start application or the system.
Mouse not responding	Low batteries or loose mouse dongle.	Replace batteries. Ensure mouse dongle is plugged into the USB port.
Laser flickering	IOD Cable not grounded properly.	Call customer support.
Skyball not responding	USB cable not plugged in. 3D Connexion settings are incorrect.	Plug USB in. Open the 3D Connexion program and check the settings.
On the <i>Mill</i> tab, the Multiblocks appear to be embedded in the block.	This is a visual issue only. Simulation and actual milling are correct.	None required.
Scanning is slow.	Model sharpness is used.	Try a lower setting or try scanning the majority of the information in a low setting and then erase and capture the problem area in a higher sharpness setting. Higher settings use extra filtering.
Colouring issue on the model.	HD snapshot may accidentally be used at the same time as active delete (or any other time that you are hovering).	Deactivate the Apply to Color Model.
Spider web graphic appears when trying to scan.	Scanner has not initialised correctly.	Unplug the scanner and plug back in.

NOTE

The scanner does not contain any interchangeable or detachable parts specified replaceable by service personnel.

24.1 System warnings

Hardware compatibility warning

Not all hardware is compatible with the scanning software. You will get an error message if you attempt to use the scanner with an incompatible laptop.

Windows update warning

Dialog box appears if a windows update is being installed in the background. Scanning is not recommended during Windows updates.

Low disk space warning

Dialog box appears if the amount of available disk space is below the recommended amount. If this happens, the user should back up their files and delete unnecessary files to increase space.

25 Disposal

CAUTION

Comply with all applicable regulations when disposing of waste materials from the Planmeca products.



In order to reduce the environmental load over the product's entire life cycle, Planmeca's products are designed to be as safe as possible to manufacture, use and dispose of.

Parts which can be recycled should always be taken to the appropriate processing centres, after hazardous waste has been removed. Disposal of obsolete device is the responsibility of the possessor.

All parts and components containing hazardous materials, such as oil and heavy metals, must be disposed of in accordance with local and national waste legislation and instructions issued by the environmental authorities. The risks involved and the necessary precautions must be taken into account when handling waste products. For more detailed information consult your Planmeca representative.

Batteries must be disposed of following the requirements of Directive 2006/66/EEC and in accordance with waste legislation and instruction issued by the environmental authorities.

This product must NOT be disposed of with other waste. It is the user's responsibility to dispose of their waste electrical and electronic equipment by handing it over to an approved reprocessor, or by returning it to Planmeca for reprocessing. For more information about where you can send your waste equipment for recycling, please contact your local city office or Planmeca.

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