

Planmeca Onyx™ & Romexis® CAD/CAM

User's manual



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.

Planmeca 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 Onyx digital impression scanner is intended for dental offices or laboratories. The scanner can be used as part of Planmeca PULSE, a complete optical impression system for CAD/CAM of dental restorations in different digital workflows in Romexis or exported to a third party.

The scanner fulfils the requirements of Medical Device Regulation (EU) 2017/745, Class I and RoHS, REACH and WEEE.

BASIC UDI-DI (Global Model Number) for Planmeca Onyx:
6430035420265V

NOTE

Planmeca Onyx is not intended for any indication beyond dentistry.

This manual is valid for Romexis software revision 6.5.2 or later.

NOTE

The Romexis CAD/CAM module is available under licence.

NOTE

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

1.1 Intended use

The Planmeca Onyx optical impression system is used to record the topographical characteristics of the dentition and/or full arch and preparation areas (including features such as implant scan locator fixtures, braces, brackets, etc.). In addition, it can record the topographical characteristics of the oral anatomy (such as soft tissue, gingivae and palate).

The three-dimensional model generated from the scan may be further used for study models, and for the design and manufacturing of dental restorations including implant supported prostheses and full and partial frameworks, and can be used to design and manufacture physical models of the teeth.

It may be used in conjunction with production of orthodontic appliances, retainer and accessories.

For information on the intended use of the Romexis software, see the Romexis user's manual.

1.1.1 Contraindications

The scanner is not intended for use with indications other than those specifically mentioned.

The scanner is not intended to provide direct diagnosis or to replace the decision of the dentist, with regard to clinical acceptability of the manufactured restoration.

1.1.2 Clinical benefits

The use of the optical impression system:

- reduces the need for traditional impression materials
- facilitates treatment planning
- facilitates perfection of design
- facilitates accuracy of the final restoration.

1.1.3 Patient target group

The optical impression system is suitable for any patient whose general health is acceptable for dental treatment.

1.1.4 Intended users

The optical impression system is intended for dentists, dental assistants, dental lab technicians, and other dental professionals that have received training on the system.

1.1.5 Intended use environment

The optical impression system is intended to be used in indoor environments only, such as dental offices, dental laboratories, and dental schools.

1.1.6 Side effects

No side effects have been identified for the scanner.

1.2 Software and hardware upgrades

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

2 Associated documentation

- Romexis 6 user's manual
- Romexis 6 technical manual
- Planmeca PlanMill 35 user's manual
- Planmeca PlanMill 30 S user's manual

For information on the Romexis software and its delivery, see sections *Associated documentation* and *About Romexis* in the Romexis user's manual.

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 the manufacturer for replacement labels.

NOTE

The labels may have changed since this manual was published.

NOTE

Label examples are not shown in their actual size.



Type BF applied part for specified dental instruments (Standard IEC 60417).



General warning (Standard ISO 7010).



Dangerous Voltage ISO 3864-B.3.6.



Alternating current (Standard IEC 60417).



Direct current.



Class 2 LED product (Standard IEC62471)/Class II electrical product.



OFF Power IEC 60417-5008.



ON Power IEC 60417-5007.



Standby IEC 60417-5010.



Consult electronic instructions for use (Standard ISO 15223-1).



General mandatory action.



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



Fulfills the requirements of Medical Device Regulation (EU) 2017/745.



ETL Listed.



Thai Industrial Standards Institute.



Japan Electrical Safety Mark.



Regulatory Compliance Mark.



Medical Device (Standard ISO 15223-1).



Catalogue number (Standard ISO 15223-1).



Lot number (Standard ISO 15223-1).



Serial number (Standard ISO 15223-1).



Manufacturer (Standard ISO 15223-1).



Date of manufacture (Standard ISO 15223-1).



Date of manufacture (Standard ISO 15223-1).



Fragile; handle with care (Standard ISO 15223-1).



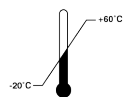
Keep dry (Standard ISO 15223-1).



Humidity limitation (Standard ISO 15223-1).



Operating temperature limits (Standard ISO 15223-1).



Storage temperature limits (Standard ISO 15223-1).



Autoclavable at temperature specified.



Disposable item. Do not reuse (Standard ISO 15223-1).



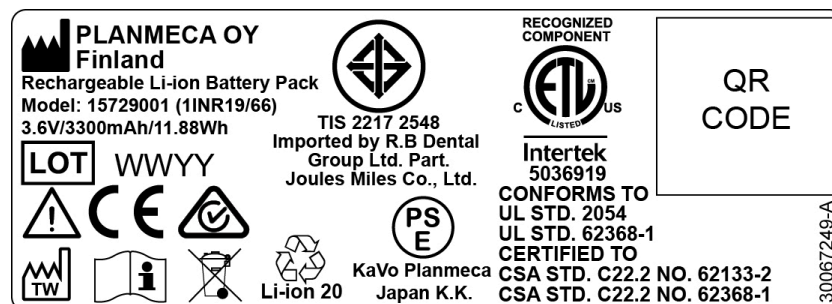
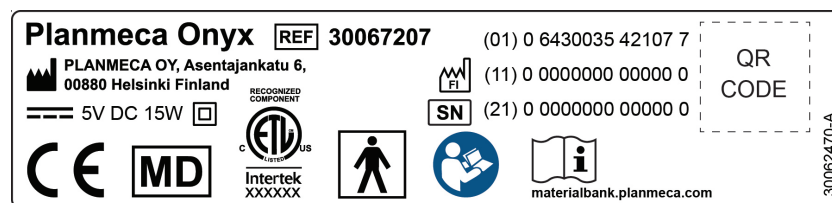
Separate collection for electrical and electronic equipment according to Directive 2012/19/EU (WEEE).



General symbol for recovery/recyclable (Standard ISO 7000).

3.1 Product identification labels

The product identification labels affixed to the scanner and its battery contain product identification and safety information. Read carefully all product labelling.



4

Safety precautions

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

Ensure your scanner is properly maintained through periodic maintenance. If you suspect equipment malfunction or failure, discontinue using the scanner and contact technical support immediately. Do not attempt to make any repairs on the scanner.

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 stare at the operating lamp. It can harm your eyes.

**WARNING**

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

**WARNING**

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

**WARNING**

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

**WARNING**

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

**WARNING**

Do not install or operate the scanner in an environment where an explosion hazard exists, for example in a high oxygen area.

**WARNING**

Do not attach any equipment or devices to the scanner unless their use has been specifically authorised by the manufacturer.



WARNING

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



WARNING

To prevent electrical shock and eye damage by LED 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 scanner is designed to be used with the tip connected to the scanner. The connector pins on the scanner are energised when the tip is removed. To ensure safety of the user and patient, do not touch the pins when the tip is removed without disconnecting the scanner from power supply.



WARNING

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. The wireless components in the scanner may be interfered with by other equipment, even if the other equipment is fully compliant with CISPR emission requirements.



CAUTION

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



CAUTION

Portable and mobile Radio Frequency (RF) 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 140.

**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 scanner to conditions outside the operating conditions, see section "Technical specifications" on page 144. Clean the scanner according to the instructions in section "Cleaning / preventive maintenance" on page 140.

**CAUTION**

Ensure your scanner is properly maintained, see section "Cleaning / preventive maintenance" on page 140.

**CAUTION**

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

**CAUTION**

If you suspect equipment malfunction or failure, discontinue using the scanner and contact technical support immediately. Do not attempt to make any repairs on the scanner.

**CAUTION**

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

**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. The surface of the applied part (scanning tip) may reach a temperature of 43 °C during normal operation. This is necessary to prevent fogging of the mirror and is safe for patient contact.

**CAUTION**

Comply with all applicable regulations when disposing of waste materials from the scanner. To avoid cross-contamination, dispose of all potential biohazard waste materials in accordance with local procedures and guidelines.



CAUTION

Inspect the battery housing for cracks or damage before any use. If you find cracks or damage, see section "Disposal" on page 155.



CAUTION

There is a risk of fire and burns. Do not open, crush or incinerate the battery. Do not expose the battery to temperatures above 60 °C/140 °F. Follow the instructions in this manual.



CAUTION

Do not store the scanner cable in the battery charger.

NOTE

Remove the battery from the scanner at the end of the day or if the scanner will not be used for a long period.

NOTE

Exposure to Electrostatic Discharge (ESD) may cause the scanner to capture an unintended snapshot and shut down. To recover normal operation, restart the scanner.

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.

4.2 Cybersecurity

Cybersecurity is the practice of defending computers, servers, mobile devices, electronic systems, networks, and data from malicious attacks.

The following are things you can do to minimise security threats.

Username/password

For ease of use, your system has an automatic Windows login. To provide more safety, it is recommended that you disable the automatic Windows login and add a password to the screensaver. Passwords should be strong and changed every few months.

You do not need to set up a different account for each user unless that is your preference.

Physical security

For ease of use, your system has an automatic Windows login. If you do not use a username and password, it is important to secure the laptop physically to ensure system safety.

- Laptop should be kept in a secure environment away from public access.
- Unauthorised people should not have access to the system.

Wireless networks

The system should only be connected to password protected networks. Open (unlocked) networks can make your system vulnerable.

4.2.1 System default settings - no user action required

The following items are set up to protect your system by default and should not be disabled or changed unless requested by customer support. This list is being provided for your information and does not require any action by the user.

- Windows firewall must be enabled and running with security levels blocking all requests for incoming connections. Exceptions can be allowed for predetermined, trusted applications.

NOTE

Customer support will connect with your system when needed, but the initiation of this link will start on the user's end and with their permission. They will walk you through the process if/when it is needed.

- Windows firewall must be enabled, running, and kept up to date to allow detection and handling of malware threats.
- Automatic security update installation is enabled.
- If you want to encrypt your data, you can use TPM 2.0 (Trusted Platform Module) with Windows Bit Locker encryption. This is built into Windows and is recommended for laptops which are portable and vulnerable to theft.

5 Getting started

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

- Start Romexis (see section "Starting Romexis" on page 19).
- Activate your Romexis licence.
- Log in to Romexis.

NOTE

For detailed instructions see the Romexis user's manual.

5.1 CAD/CAM system recommendations

	Romexis client	Romexis server
Computer	Laptop PC or desktop PC	-
Processor	Intel i7, 13th generation or better	Minimum: Intel Core i3 (6th generation or later) or equivalent
RAM	32 GB	8 GB
Hard disk	512 GB SSD	2 x 1 TB (RAID1 mirroring) recommended
Graphics card	NVIDIA RTX 3500 Ada 12 GB or better	Any
Cable interface	USB C	-
Display	Full HD resolution	-
Supported operating system Only 64-bit operating systems supported	Windows 11 Pro	• Windows Server 2022 • Windows 11 Pro • macOS 13 • macOS 14

5.2 Starting Romexis

About this task

NOTE

Ensure your Windows Display Scale is set to 100 % before starting 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 Romexis icon on your desktop or on the Windows menu.



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.

5.3 Searching and managing patients and images

For detailed descriptions see the following sections in the Romexis user's manual:

- *Patients module*
- *Searching patients*

6 Scanner setup

This section describes how to prepare the scanners for scanning.

6.1 Components

In addition to the Planmeca Onyx scanner with the Protective tip, the delivery includes:

- Scanner tip x 3
 - Standard tip x 2
 - SlimLine tip
- Scanner battery x 3
- Battery charger
- Scanner cable
- Standalone holder
- Color balancer
- Tip cleaning instructions.

6.2 Connecting battery

Steps

1. Inspect the battery for cracks or damage.
If you find cracks or damage, see section "Disposal" on page 155.
2. Position the battery so that the black sides of the battery and the scanner are on the same side.



3. Insert the battery into the scanner.

**NOTE**

The battery may only be installed into the charger in one direction.

4. To switch on the scanner, press the middle button until the LED at the back of the scanner goes on.

6.3 Plugging scanner into laptop

About this task**NOTE**

Keep the scanner connected to the cable at all times while using the wired configuration.

The cable is necessary for the wired configuration of the scanner and for adding new scanners to the White List of trusted wireless scanners.

Steps

1. Insert the scanner cable in the back of the scanner body.



2. Insert the USB-C end of the scanner cable into to USB-C port of the computer.



6.4 Scanner tips

Tip sizes

- Standard tip x 2

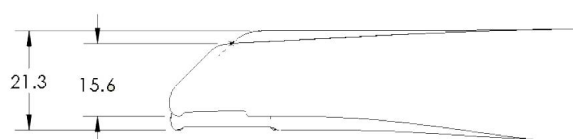


- SlimLine tip x 1 (optional)

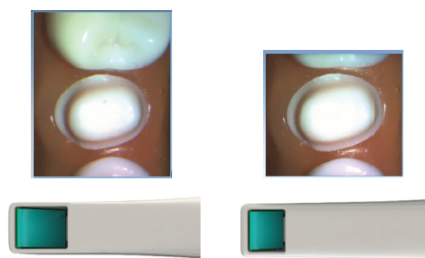


The SlimLine logo is on the tip and the S displays on screen when in use.

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



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



6.4.1

Attaching/removing scanner tip

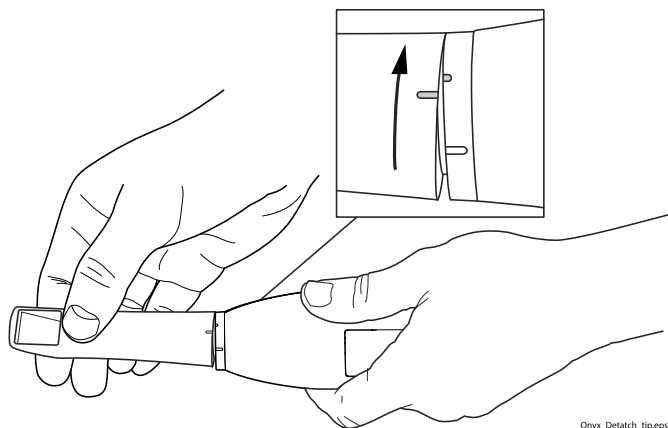
**WARNING**

The scanner is designed to be used with the tip connected to the scanner. The connector pins on the scanner are energised 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.

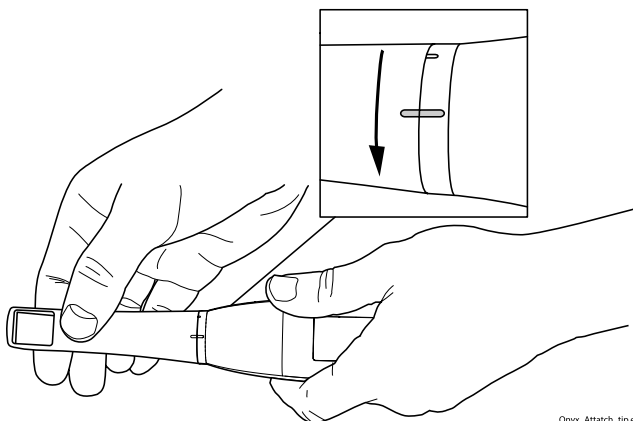
When the scanner is not in use, place the non-functional protective scanner tip on the scanner (delivered with the scanner).

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



Onyx_Detatch_tip.eps

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



Onyx_Attatch_tips.eps

TIP

The tip can be removed and disinfected while the next tip is being used. For cleaning instructions, see section "Cleaning scanner base and other surfaces after every patient" on page 143.

6.5 Setting up wireless scanner

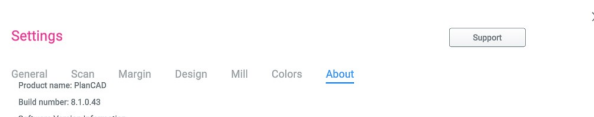
About this task

NOTE

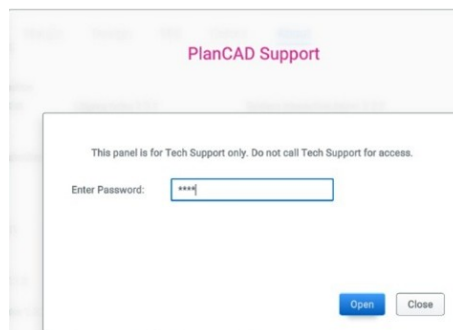
The following procedure is an example. Contact your IT department for configuring wireless scanning.

Steps

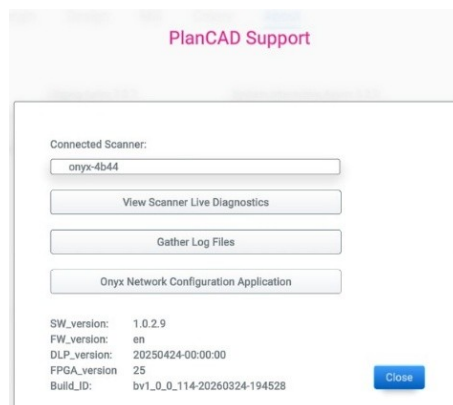
1. Connect your computer to the network that will be used for wireless scanning.
2. Connect the scanner with its cable to the scanning computer.
3. Open Romexis and select a patient.
4. Go to the CAD/CAM module and select the Scan tab.
5. Go to **Settings > About > Support**.



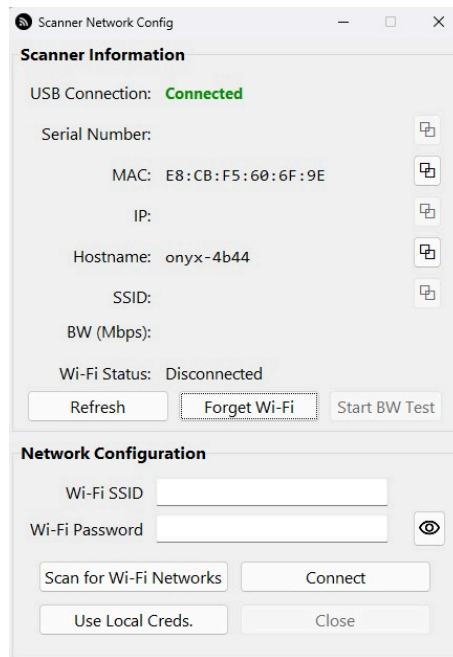
6. Give the password.



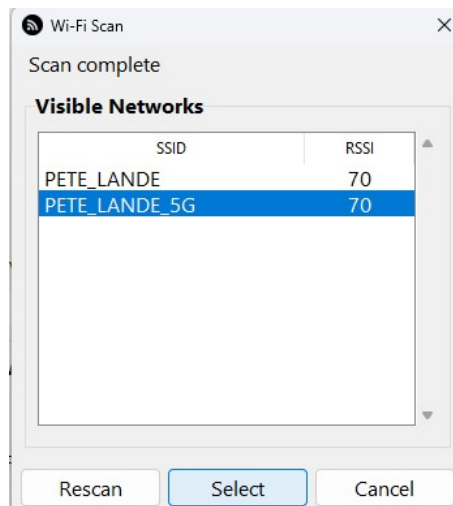
7. Verify that the connected scanner name is the same as the scanner serial number and click the Onyx Network Configuration Application button.



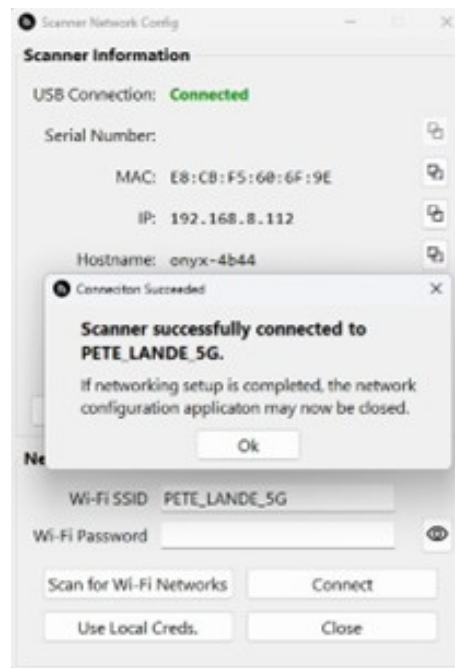
8. Click the Scan for Wi-Fi Networks button.



9. Choose your Wi-Fi network from the list and click **Select**.



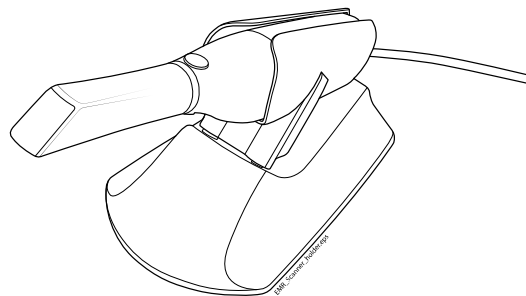
10. Type the password to the Wi-Fi Password field and click **Connect**.



11. Click the Close button to exit the Scanner Network Config window.

6.6 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**

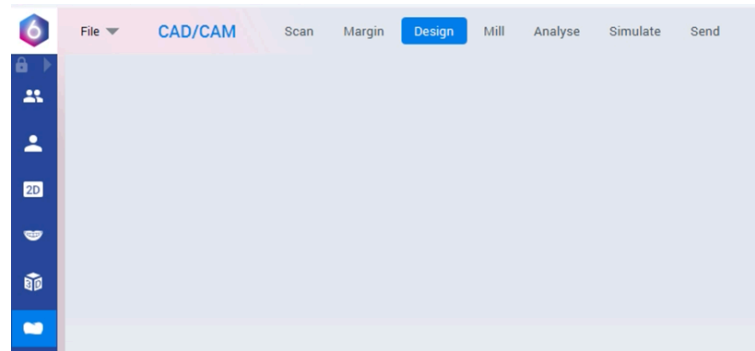
Do not unplug the scanner cable while scanning.

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 Romexis CAD/CAM module overview

The Romexis CAD/CAM module consists of individual tabs: Scan, Margin, Design, Mill, Analyse, Simulate, and Send.



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

The purchase licence version determines which tabs are available and active.



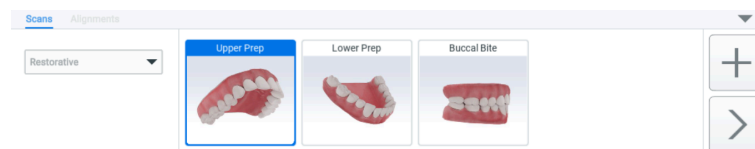
To access the preference settings, click the Settings icon on any tab page.



To access tool and workflow instructions, click the Wizard button on any tab page.



Click the arrow icon to expand the toolsets on the right-hand side or View Panel at the bottom. Toolsets contain all application tools for the current tab. The View Panel contains scans, alignments, or screenshots for the current tab.



8.1 Creating and opening case

See your Romexis user's manual for information about adding and editing patient files.

8.1.1 Starting new CAD/CAM case

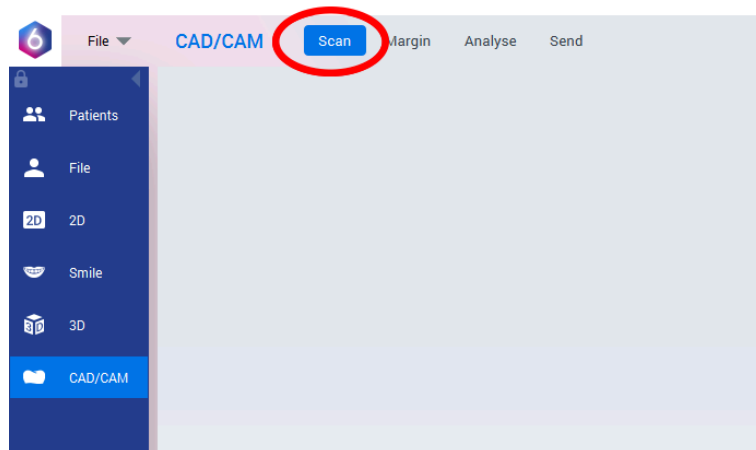
About this task

To begin scanning:

Steps

1. Do one of the following:
 - Add a new patient.
 - Click on a patient to highlight it and click **Select Patient**.
2. Click the CAD/CAM module.

- Click the Scan button.



See section "Scanning" on page 40 for more information.

8.1.2 Opening existing CAD/CAM case

About this task

You can continue an existing scan as follows.

Steps

- Highlight a patient and click **Select Patient**.
- Double-click **CAD/CAM Case** to open it.
The case opens on the Analyse tab.
- To continue scanning, click the Scan tab.

NOTE

You can continue scanning only if the scan has originally been scanned with that workstation.

8.2 Moving/viewing 3D models

Use the mouse to zoom in or out, move, and rotate the model.

8.2.1 Rotating model

About this task

Follow these steps to rotate a model.

Steps

- Click and hold down the right mouse button.



- Drag the mouse horizontally, vertically, or diagonally to rotate the image.

Drag in small increments for more control.

3. To stop rotating, release the mouse button.

Repeat as needed.

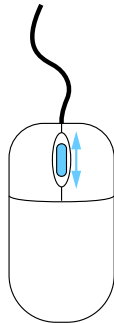
8.2.2 Changing model size

About this task

Use the scroll wheel on the mouse to zoom in and out on the model.

Steps

1. Position the cursor on your model.
 - To zoom in on the model: rotate the mouse wheel downward, toward your wrist.
 - To zoom out of the model: rotate the mouse wheel upward, away from your wrist.



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



8.3 Settings

8.3.1 Settings screen



Access the Settings screen using the Settings button on each tab. The Settings tabs contain options to modify the software's default behaviour of the software.

Use the Restore Factory Defaults button to revert a single Settings tab to default behaviour or Restore All Factory Defaults to revert all Settings tabs to default behaviour.

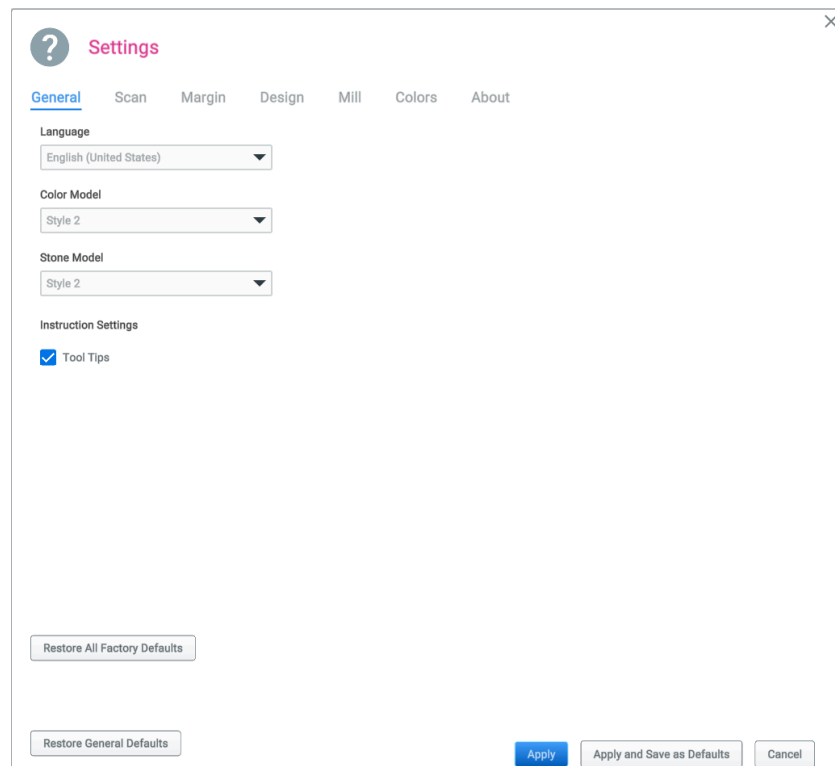
Click the Apply to Case button to save the changes for the currently open case or click the Apply to Default button to use these settings in current and future cases.

Click the Cancel button to exit without saving.

NOTE

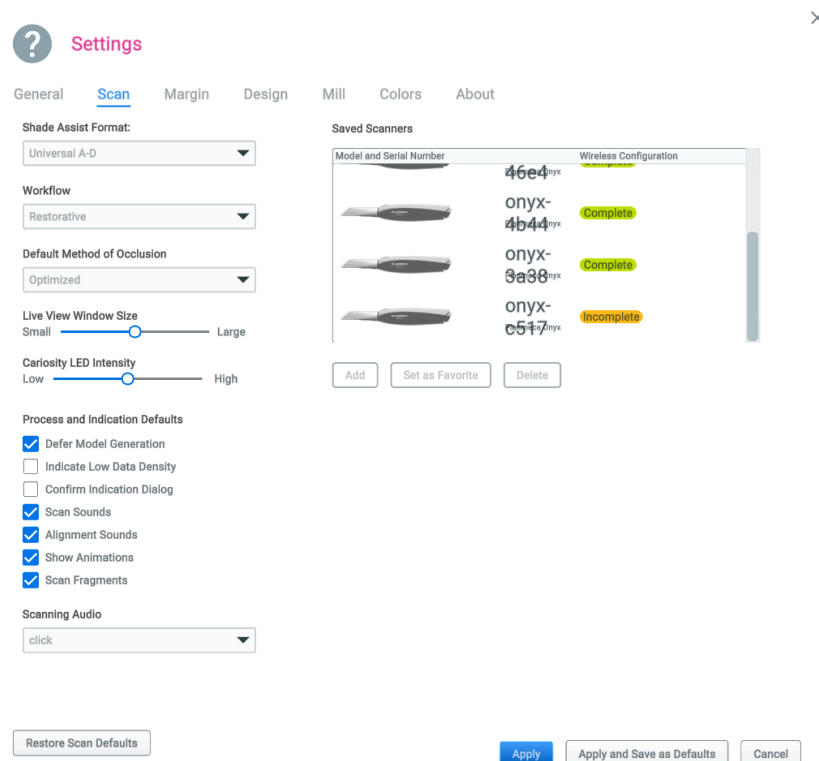
Clicking the Apply to Default or Restore Factory Defaults buttons will not affect individual cases that were previously customised.

8.3.2 General settings



- Click **Restore General Defaults** to revert the current tab to the original settings.
- Click **Restore All Factory Defaults** to revert everything on all tabs to the original settings.
- Select the language from the Language drop-down list.
- Select the color model from the Color Model drop-down list: Style 1, Style 2, Style 3 or Style 4.
- Select the stone model from the Stone Model drop-down list: Style 1, Style 2, Style 3 or Style 4.
- Uncheck the Tool Tips box to disable tool tips for experienced users.

8.3.3 Scan settings



- Select the shade assist format from the Shade Assist Format drop-down list including Universal A-D and CIELab.
- Select a workflow from the Workflow drop-down list for the current case or as a new default workflow.
- Select Optimized or Standard method of occlusion from the Default Method of Occlusion drop-down list.
- Use the Live View Window Size slider to adjust the size of the window showing the scanner's current position while scanning.
See section "Scanning live view" on page 50 for more information.
- The Defer Model Generation box is checked by default.
 - When checked, Model Generation occurs after being manually initiated or after Buccal scan layer alignment.
 - When unchecked, Model Generation occurs when you switch scan layers.
- The Indicate Low Data Density box is unchecked by default.
When checked, the low data density color overlay is displayed by default after model generation.
See Low Data Density in section "Evaluating data density" on page 59 for more information.
- The Scan Sounds box is checked by default.
When checked, you will receive audible feedback while scanning.
- The Alignment Sounds box is checked by default.
When checked, you will receive audible feedback when an alignment occurs while scanning.
- The Show Animations box is checked by default.

When checked, scanning animations for empty scan layers will be shown.

- The Scan Fragments box is checked by default.

Data islands are shown as thumbnails beside the live view.

- When the Scan Sounds box is checked, you can select a specific audible feedback from the Scanning Audio drop-down list.

The volume of this feedback can be adjusted with the laptop's volume control.

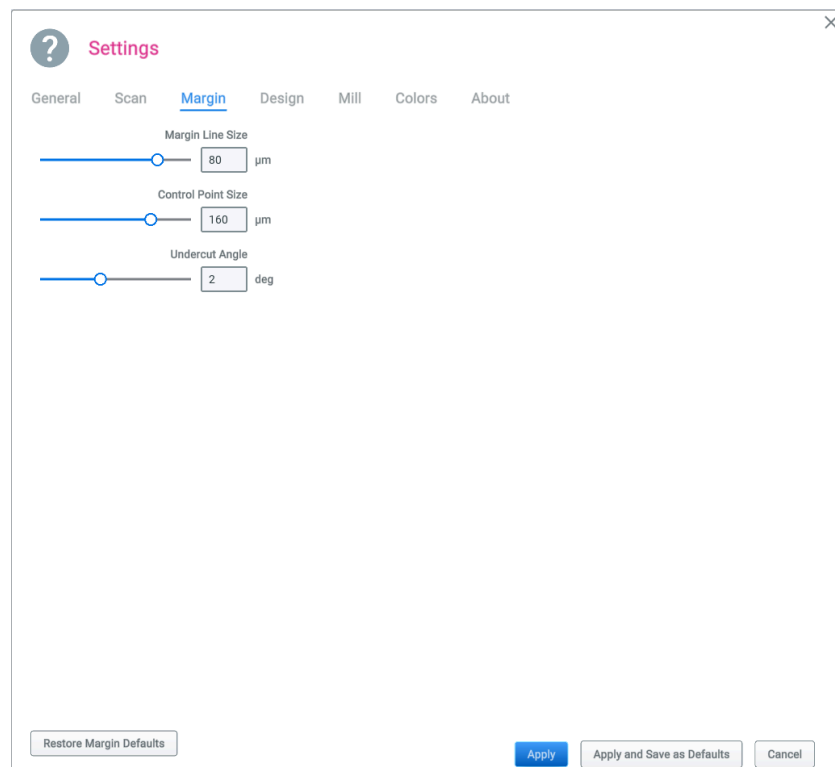
To add custom **.wav**, **.mp3**, or **.ogg** files to the drop-down list, go to C:\Program Files\PlanCAD\bin\Windows_App\PlanCAD_Data\StreamingAssets\CustomMusic.

- Click Restore Scan Defaults to revert the current Settings tab to default behaviour.
- To be able to scan wireless, your scanner needs to be added to the Saved Scanners list and set up with correct network information.

If your added scanner shows up as *Incomplete*, follow the steps in section "Setting up wireless scanner" on page 25.

The scanner added as Favorite will be the first one to show up on the Connected Devices list.

8.3.4 Margin settings

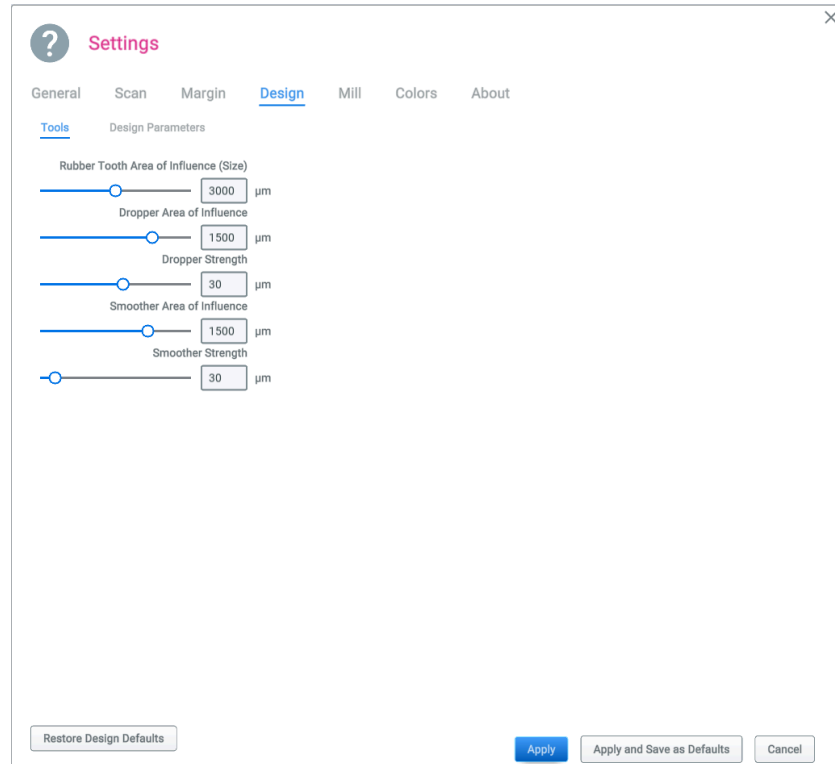


- **Margin Line Size** determines the thickness of the displayed line. Click on the field to change the value.
- **Control Point Size** determines the size of the dots on the margin line. Click on the field to change the value.
- **Undercut Angle** adjusts the sensitivity of the visual indication for undercuts.

8.3.5 Design settings

On the Design tab you can make adjustments to tools and design parameters.

Tools



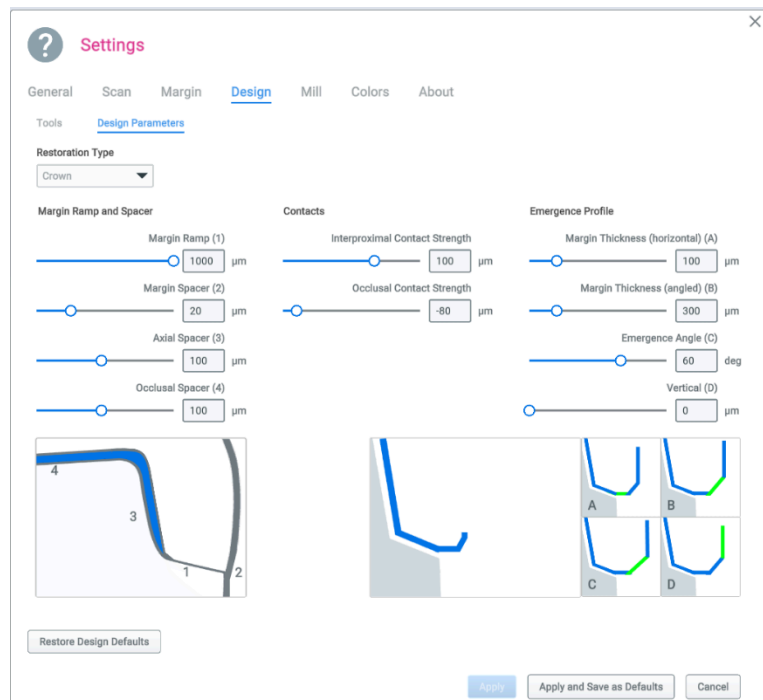
Change the Tools values to tune the performance of the toolset including:

- Rubber Tooth Area of Influence (Size)
- Dropper Area of Influence
- Dropper Strength
- Smoother Area of Influence
- Smoother Strength.

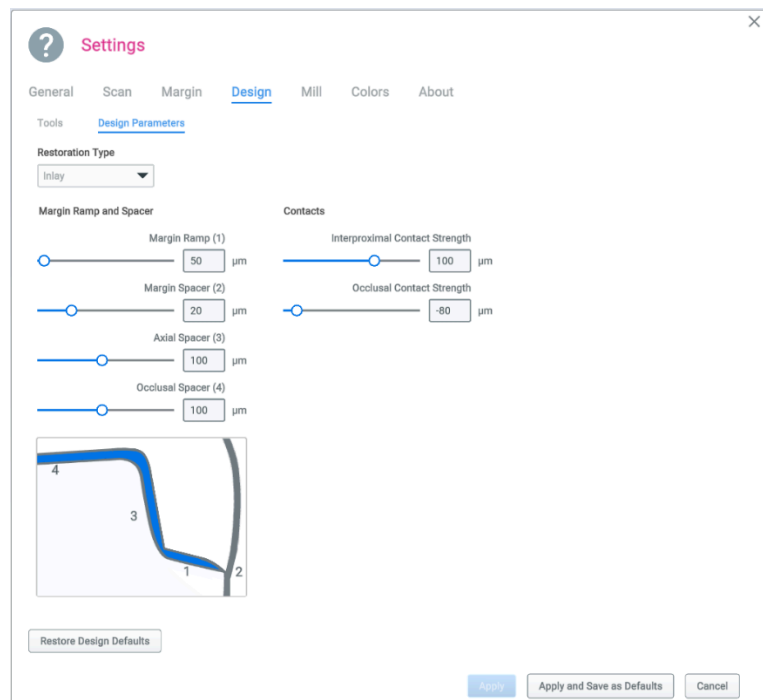
Design Parameters

- Select the restoration type from the Restoration Type drop-down list:

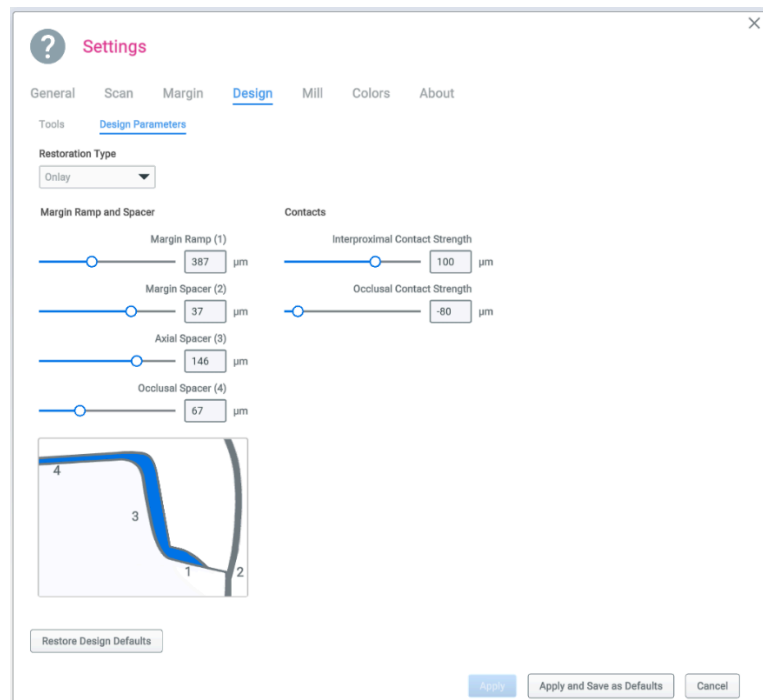
▪ Crown



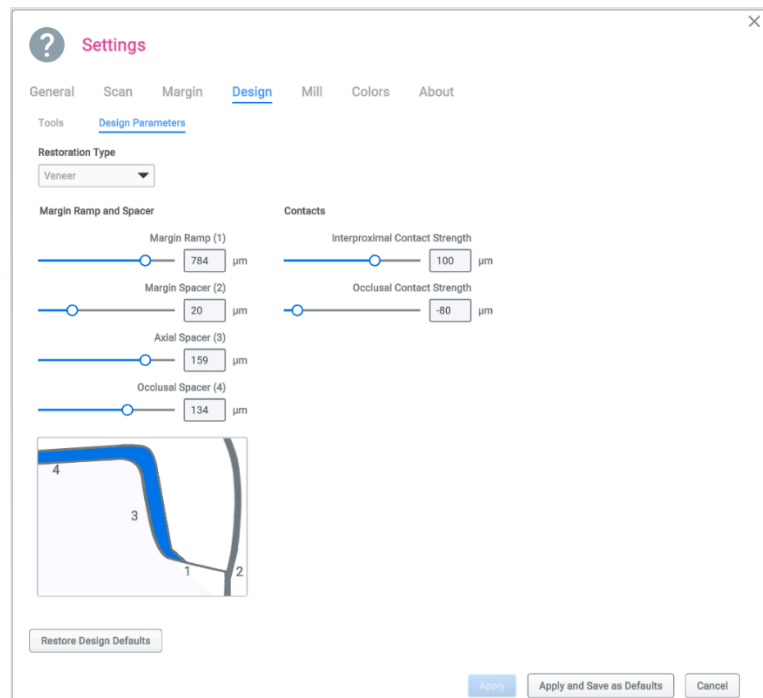
▪ Inlay



▪ Onlay

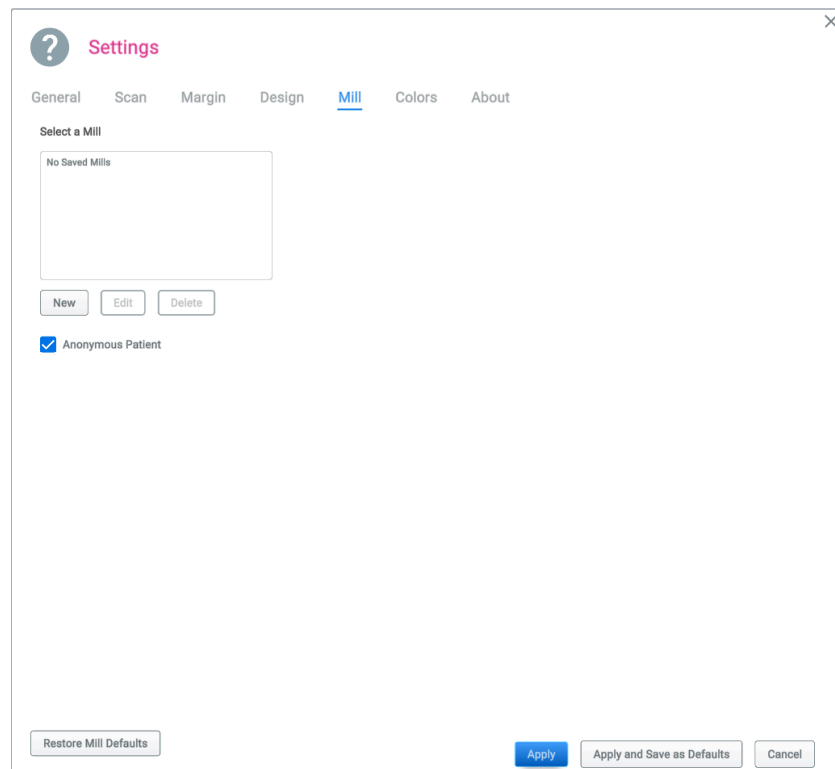


▪ Veneer



- Adjust the Margin Ramp and Spacer values for restoration types crown, inlay, onlay and veneer.
- Adjust the Contact values for restoration types.
- Adjust the Emergence Profile value for restoration type crown.

8.3.6 Mill settings



To create a new mill setup, click the New button.

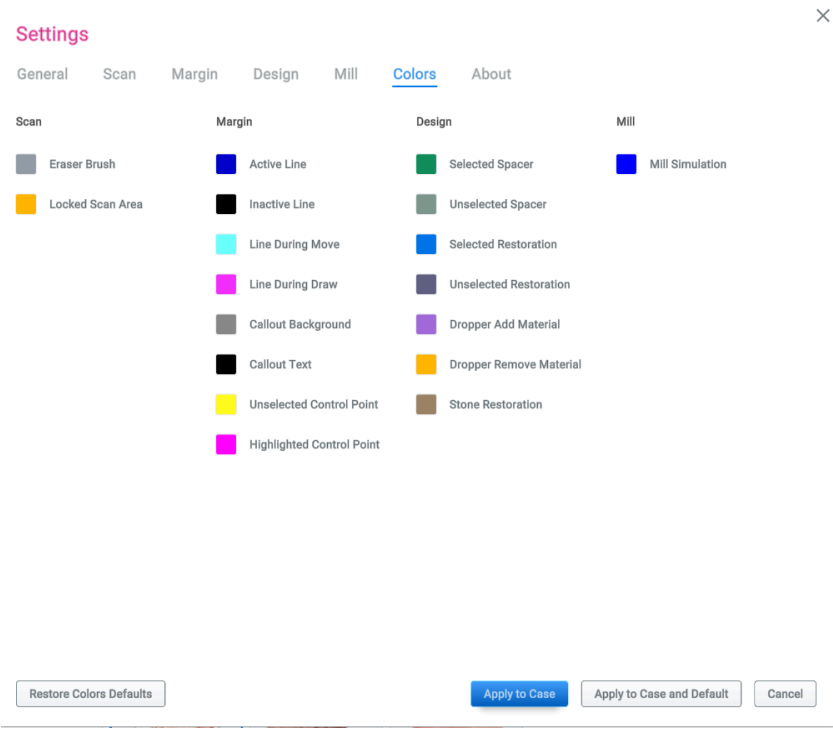
- Enter a name and IP address of the mill.
- Select the mill type from the drop-down list.
- Select the favourite mill.

To delete a mill setup, click the Delete button.

If you want to send the restoration to the mill with the patient name, uncheck the Anonymous Patient option. The Anonymous Patient option is checked by default for GDPR reasons.

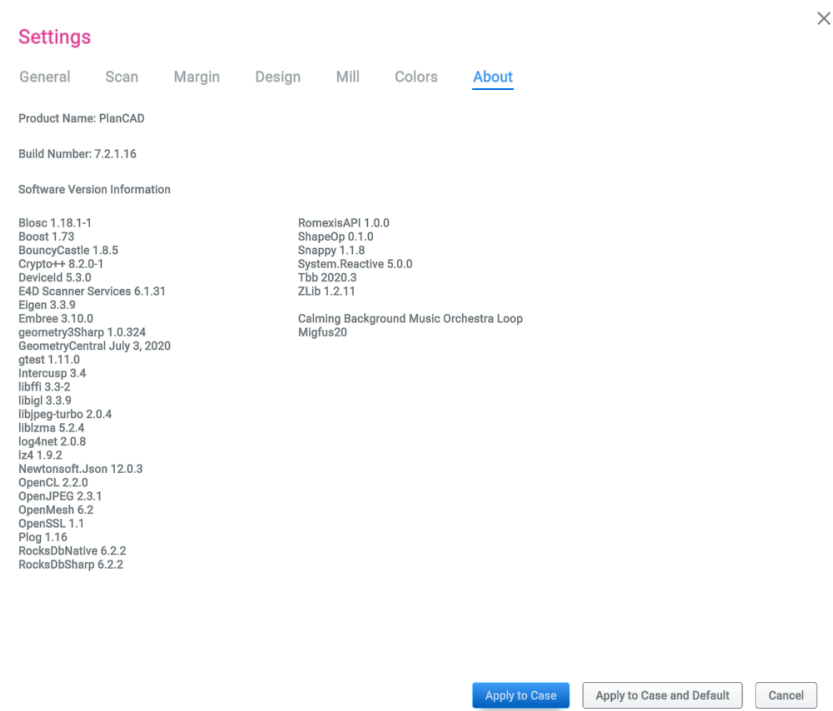
8.3.7 Color settings

You can change the colours of the settings on the Scan, Margin, Design and Mill tabs.



8.3.8 About settings

The About tab displays information about the software version.



9 Scanning

To prevent damage or misalignment, do not drop or strike the scanner. Follow all stated precautions when using the scanner.

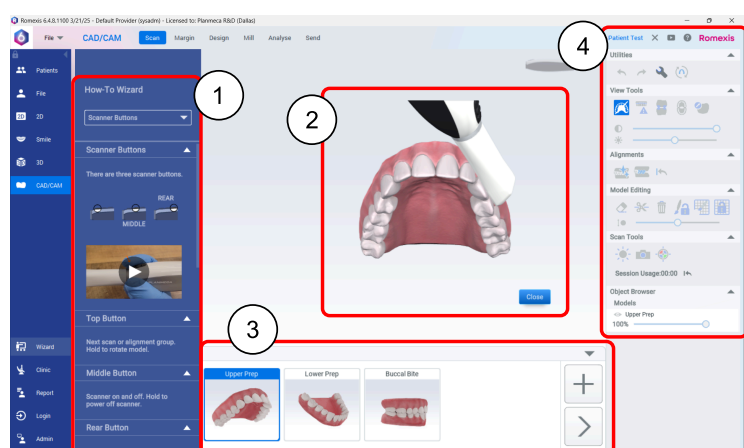
The scanner captures the restoration site with a LED system and delivers live images to the monitor. As you capture images, the system creates a 3D model, revealing any areas that need further scanning.

Ensure the power cord is being used on the laptop while scanning. If the scanner cable is not properly connected, the program tells you how to connect the cable properly.

When you navigate to the *Scan* tab, a check is run to determine if the laptop is running on battery power. If the laptop runs on battery power, the program advises you to connect the laptop to a power source to increase the scanner performance. If you ignore the message, the battery icon keeps flashing.

The program warns you when there is less than 20 GB of disc space.

Scan tab layout



1 How-To Wizard

By default, the workflow wizard is hidden. Click the Wizard button to reveal/hide the How-To Wizard window. Use the drop-down list at the top to select the desired wizard.

2 Model animation

An animation of a suggested scan pattern appears when you select an empty scanning layer. This can be turned off in Settings. Start scanning or click the Close button to end the animation.

3 Scan layers, alignment groups and screenshots

4 Scanning tools

9.1 Scanner status

Icons at the top of the screen indicate the status of the scanner.



The scanner is disconnected.

Wired scanner

The scanner has a wired connection with no tip.



The scanner has a wired connection with a tip in heating stage 1.



The scanner has a wired connection with a tip in heating stage 2.



The scanner with a wired connection is ready for scanning, or scanning is ongoing.

Wireless scanner

The scanner has a wireless connection with no tip.



The scanner has a wireless connection with a tip in heating stage 1.



The scanner has a wireless connection with a tip in heating stage 2.

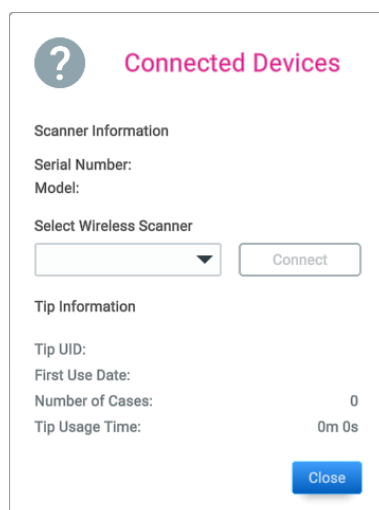


The scanner with a wireless connection is ready for scanning, or scanning is ongoing.

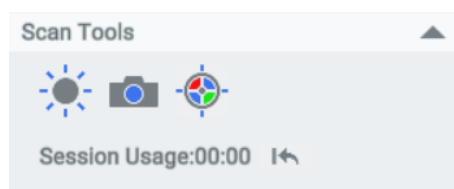
9.2**Connected devices**

Clicking on the scanner graphic shows Connected Devices.

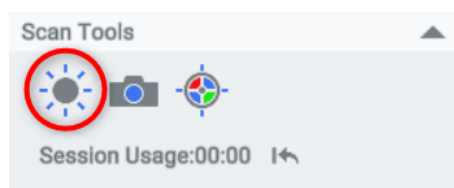
You can select a previously added wireless scanner from the drop-down list to connect to.



9.3 Scan tools



9.3.1 Mouth Model Mode



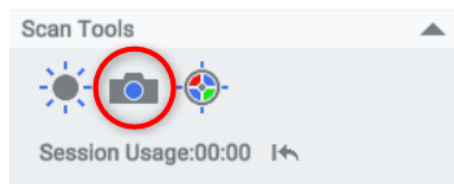
Click the Mouth Model Mode icon to switch to a dimmer setting when needed for models or anytime the live view is too bright.

9.3.2 Intraoral Mode

Activate Intraoral Mode to use the scanner as an intraoral camera without adding information to the current model/scan layer.

When active, the icon is blue and the *Intraoral Camera Mode* message is displayed at the top of the screen while scanning.

Click the front button while scanning to save a snapshot. See section "Saving live view image" on page 53 for more information.



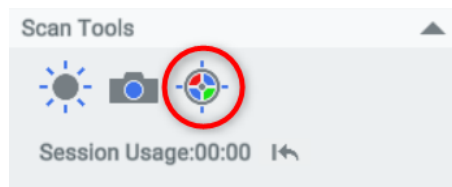
9.3.3 Color balancing

About this task

Balance the color weekly or as needed. This is an optional step to optimise the color represented on screen. This does not affect the stone model nor the amount of data collected by the scanner.

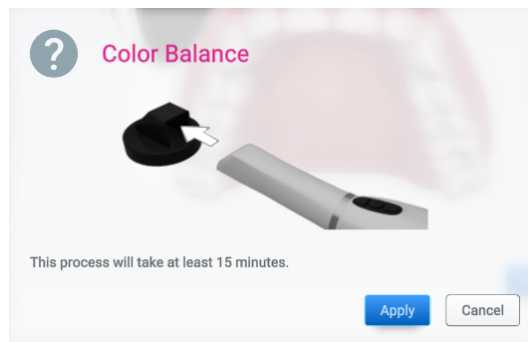
NOTE

The scanner must be cold before starting the color balancing process. The process takes approximately 1 minute.



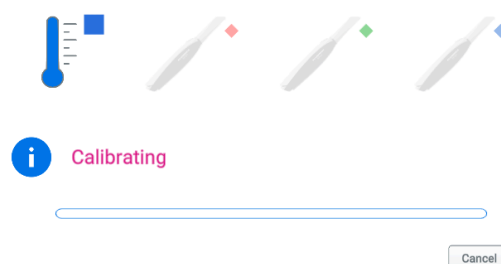
Steps

1. While in the scanning screen, click the Color Balance symbol to optimise the color.



This icon is only available when a Standard tip is connected.

2. Insert the scanner with a sterilised tip into the color balancer as shown.
3. Click **Next**.



Results

Another screen appears with the results.

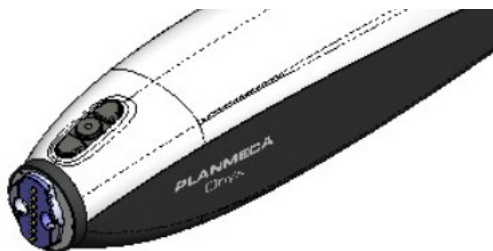
What to do next

If there is a problem, try again. If problems continue, contact Customer Support.

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

Store the color balancer protected from dust.

9.4 Button and motion controls



9.4.1 Front button

While not scanning:

- Quick press the button to:
 - Scroll to the next scan layer
 - Scroll to the next alignment group
 - Scroll to the next option when Scanner Driven Menu is active.
- Hold the button down to toggle Occlusal Contacts on/off.

While scanning with Standard or Slim tip, quick press the button to take a snapshot.

9.4.2 Middle button

While not scanning:

- Quick press the button to:
 - Activate the scanner
 - Activate the confirm button when the confirmation or notification dialogue is active



- Select the current option when Scanner Driven Menu is active.
- Hold the button down to open or close Scanner Driven Menu.

While scanning with Standard or Slim tip, quick press the button to deactivate the scanner.

When the scanner has been powered off, press the middle button until the LED at the back of the scanner goes on.

9.4.3 Back button

While not scanning:

- Quick press the button to
 - Toggle between Scans and Alignments tabs

- Activate the cancel button when the confirmation or notification dialogue is active.

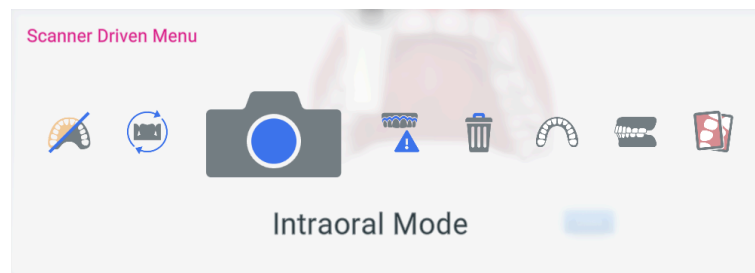


- Hold the button down to rotate the model of the current scan layer.

9.4.4 Scanner Driven Menu

You can hold the middle button down to activate Scanner Driven Menu and select the following options:

- Color Mode
- Generate Model
- Intraoral Mode
- Data Density
- Delete Model
- Scans
- Alignments
- Snapshots



Color/Stone Model Mode



Select to toggle between color and stone views of the model. See section "Color Mode" on page 58 for more information.

Generate Model



Select to initiate model generation. See section "Model generation" on page 55 for more information.

Intraoral Mode



Select to toggle Intraoral Mode on and off. See section "Intraoral Mode" on page 42 for more information.

Low Data Density



Select to toggle Data Density on and off. See section "Evaluating data density" on page 59 for more information.

Delete Model

Select to delete all data from the current scan layer.

Scans

Select to switch to the Scans tab.

Alignments

Select to switch to the Alignments tab. At least one alignment must exist in the case.

Snapshots

Select to switch to the Snapshots tab. At least one snapshot must exist in the case.

9.4.4.1 Using Scanner Driven Menu

Steps

1. Hold the middle button down on the Scans tab.
A menu appears.
2. Press the front and back buttons to scroll between the options that appear.
3. Press the middle button to select a menu item.
Hold down the middle button to exit the menu without making a selection.

9.5 Positioning scanner

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



9.6 Performing basic scanning steps

About this task

Follow these instructions when scanning.

Steps

1. Add a new patient or select an existing patient.
2. Click **CAD/CAM** on the left menu.
3. Click **Scan** at the top of the screen.

A Model Animation appears showing a recommended scan pattern. This can be turned off in Settings. See section "Scan settings" on page 33 for more information. You do not have to follow the suggested pattern. Click **Close** on the animation or start scanning to close the animation.

4. Optionally, click the Wizard button to show/hide the Workflow Wizard.

5. Click **Choose a Workflow** to select a set of scan layers.

See section "Workflows" on page 47 for more information.

6. Shield the site from strong extraneous light sources (dental lights, sunlight, etc.).

7. Click the middle button on the scanner to activate scanning.

The Live View displays the scanning view with live feedback. The system assumes that the first scan is taken from the occlusal and the model is orientated accordingly.

8. Scan until the desired area is fully formed.

9. Click the middle button on the scanner to deactivate scanning.

10. Evaluate the model.

Scan more if needed. See section "Evaluating scan" on page 54 for more information.

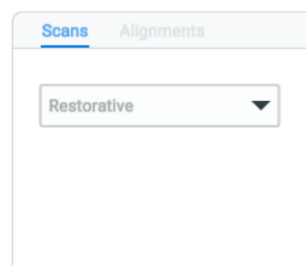
11. Click the bottom scanner button or use the mouse to select the next scan type.

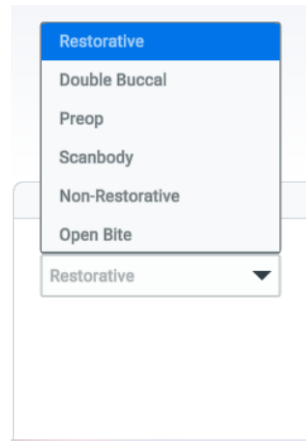
12. Repeat the steps above.

9.7 Workflows

Click the workflow dropdown list to select an initial set of scan layers. The scan layers can be customised afterwards as desired. Each scan layer represents a type of scan you plan to take.

The workflow dropdown list cannot be changed or accessed while any scanned data exists in the case, though the layers themselves may be added, removed, or changed individually.





- Restorative - Upper Prep, Lower Prep, Buccal Bite
- Double Buccal - Upper Prep, Lower Prep, Buccal Bite, Buccal Bite 2
- Preop - Upper or Lower Preop, Upper Prep, Lower Prep, Buccal Bite
- Scanbody - Upper or Lower Scanbody, Upper Prep, Lower Prep, Buccal Bite
- Non-Restorative - Upper, Lower, Buccal Bite
- Open Bite - Upper, Lower, Open Bite

9.7.1 Editing scan layers

About this task

Scan layers represent each scan you have taken or plan to take. These help you organise and label your scans.

To access the context menu:

Steps

1. Right-click the desired scan layer.
A popup menu appears.
2. Click the desired selection.
 - Add to Alignment Group – See section "Scanning alignment groups" on page 49 for more information.
 - Import Group
 - Duplicate Scan Layer
 - Rename or Edit Scan Layer
 - Import Model
 - Delete Scan Layer
3. To add additional scan layers:
 - 3.a. Click the + icon to add a layer.
 - 3.b. Select **Scan Type** from the popup list.

Upper options	Lower options	Buccal options
Upper Prep	Lower Prep	Buccal Bite
Upper Preop	Lower Preop	Open Bite
Upper ScanBody	Lower ScanBody	
Upper Waxup	Lower Waxup	

3.c. Enter the desired name for the scan layer.

To rename or edit scan layers:

- I. Right-click the desired scan layer.
A popup menu appears.
- II. Change the name and scan type as desired.

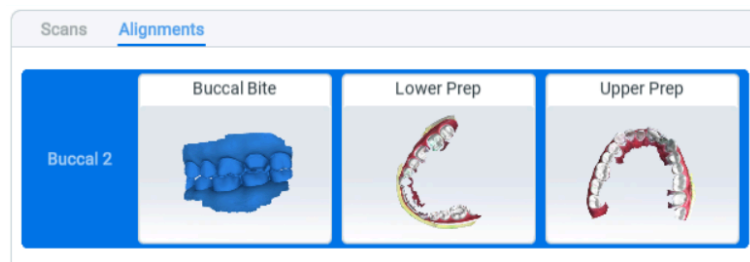
NOTE

Changing an aligned buccal layer to another type will void all associated alignments.

9.8 Scanning alignment groups

Scan alignment groups are created when scanning is completed on a buccal layer containing data or scan layers are aligned.

The thumbnails of buccal layers and aligned models are displayed in associated groups.



A new alignment group can be manually created by dragging and dropping one scan layer on top of another. The software will attempt to align it automatically. A manual alignment window appears if automatic alignment is unsuccessful.

A scan layer may be added to an existing alignment group by right-clicking a scan layer and selecting **Add to Alignment Group**.

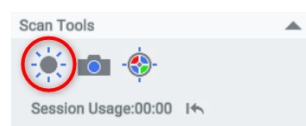
NOTE

You cannot click or open Alignments if no groups have been created yet.

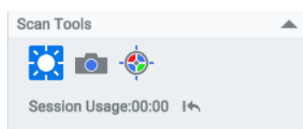
9.9 Model scanning

The scanner's default setting is for intraoral scanning. Click the sun icon under Scan Tools to toggle between the Default setting and a dimmer Model setting.

Default setting – sun icon represents brighter LED setting for intraoral use

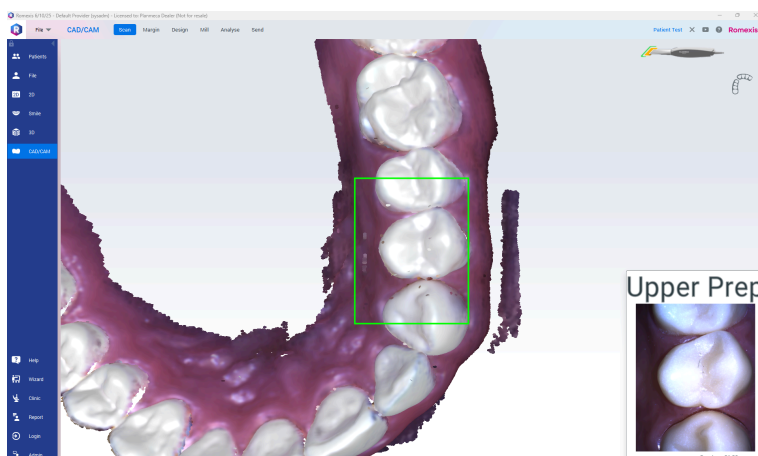


Model setting – activated sun icon represents the dimmer LED setting for external or model use



9.10 Scanning live view

The software displays a representation of raw data acquired. The live view appears on the right and the data scanned into the scan layer appears on the left with the Scanning Indicator box. Compare the data captured with where you need to move the scanner.



Audible feedback plays to indicate the software is acquiring data. The software stops audible feedback if you lose data acquisition. The feedback is music by default.

To change the audible feedback, go to `C:\Program Files\PlanCAD\bin\Windows_App\PlanCAD_Data\StreamingAssets\CustomMusic`.

Paste the desired music file (.wav, .mp3, or .ogg) into this folder. If multiple files are in this folder, the software will pick one at random.

Mute or adjust the volume on your laptop to change the volume of the audible feedback.

The Scanning Indicator box shows the current focus area and the outline color changes according to the scanning status. The color changes from green (scanning) to red (not scanning). When the scanning indicator turns red, the system is unable to stitch the current data seen in the live view to the model and the audible feedback stops. Move the scanner back slightly to a previously captured area to reestablish the scanner's location and continue scanning.

Previously acquired data rotates to match the live view.

Press the middle button on the scanner to stop scanning.

9.10.1 Adjusting live view window size

About this task

The live view window can be set to a range of sizes per case or as a default. The live view window can also be manually adjusted during scanning.

To change the live view window size for the current case in Settings:

Steps

1. Click the Settings icon.
2. Adjust the live view window size slider to the desired setting.
3. Click **Apply**.

The size is saved and used in all scanning within the current case.

9.10.2

Changing live view window size manually**About this task**

To manually change the live view window size while scanning:

Steps

1. Use the mouse to drag the top left corner of the live view window.
2. Adjust the live view window size to the desired setting.

The size is saved and used in all scanning within the current case.

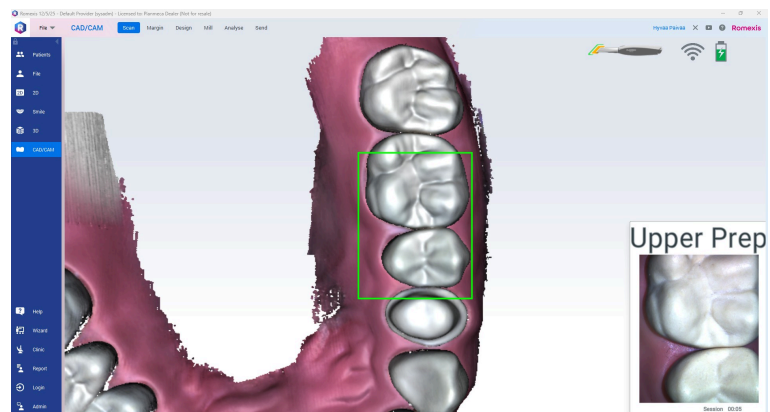
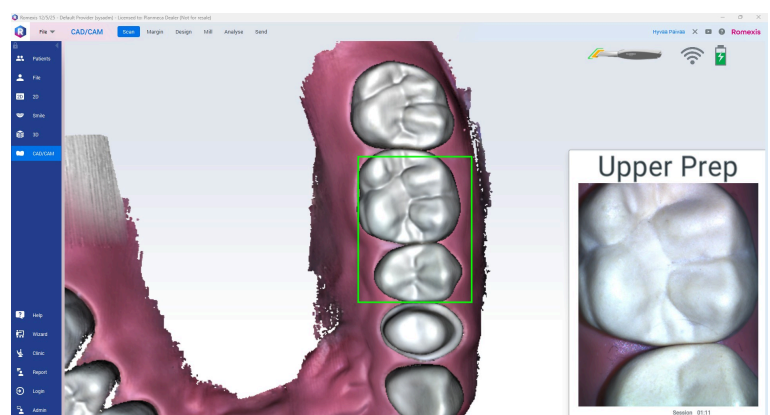
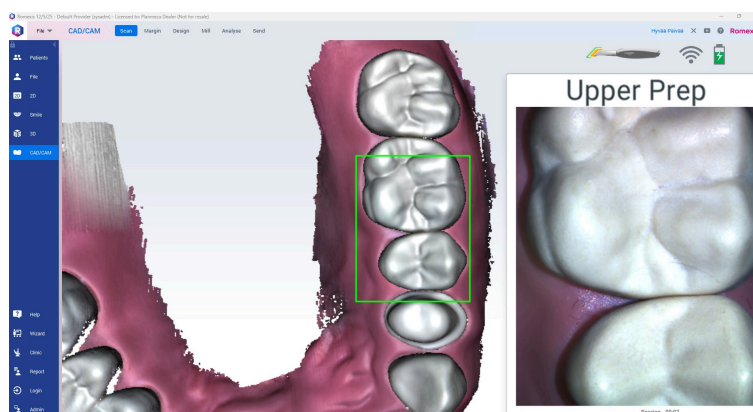
Figure 1. Small**Figure 2. Medium**

Figure 3. Large

9.10.3 Changing live view window size default

About this task

To change the live view window size default:

Steps

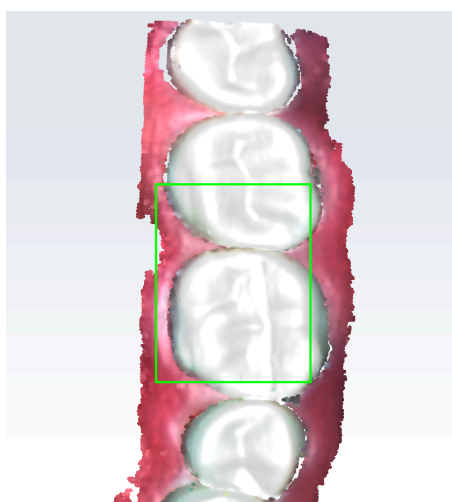
1. Click the Settings icon.
2. Adjust the live view window size slider to the desired setting.
3. Click **Apply to Default**.

The size is saved and used in all scanning within the current case and following cases.

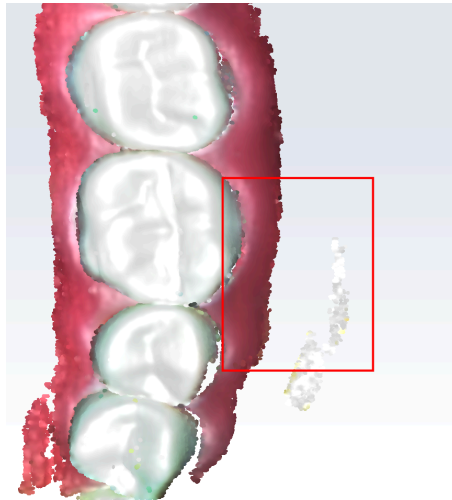
9.10.4 Scanning reticle

The status of data acquisition by the scanner is indicated with a colored reticle in the main window while scanning. The color of the reticle changes when the scanner starts or stops acquiring data.

- Green: Acquiring data

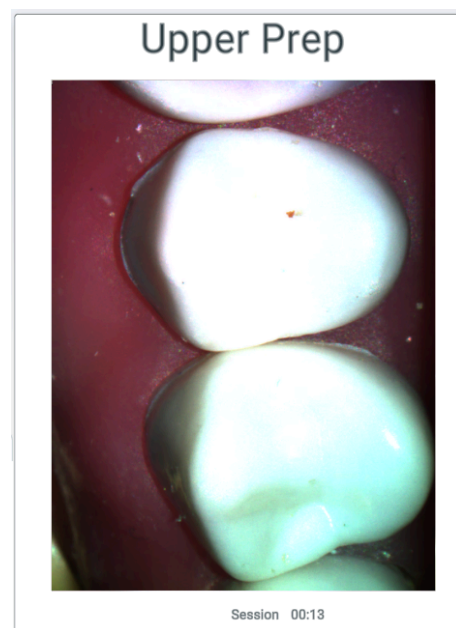


- Red: Not acquiring data

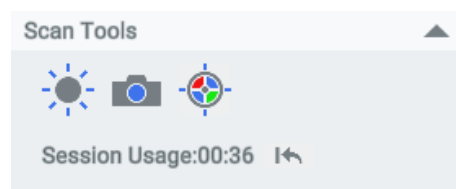


9.10.5 Session usage

A session timer is displayed below the live view in the live view window. The session duration is tracked while the scanner is activated.



The session usage timer under Scan Tools displays the cumulative scan time for the case.



9.11 Saving live view image

About this task

To take a snapshot of anatomy visible in the live view window:

Steps

1. Press the front button while scanning.
The screen will dim, and a camera shutter sound will provide audible feedback.
The snapshot will be saved in the patient's directory as a **.png** image.
2. Navigate to the Snapshots tab in the software, Patient Data in the File module, or under Photo in the 2D module to access the snapshots.

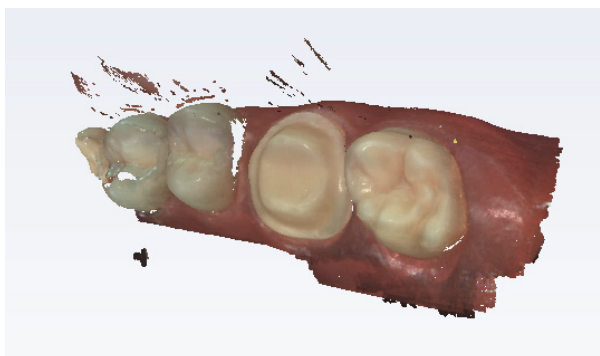
9.12 Evaluating scan

About this task

To evaluate the scan:

Steps

1. Rotate the model to look for low data areas in key locations such as preparations and interproximal contacts.



2. Fill in any required missing data by activating the scanner.

- Distal tip

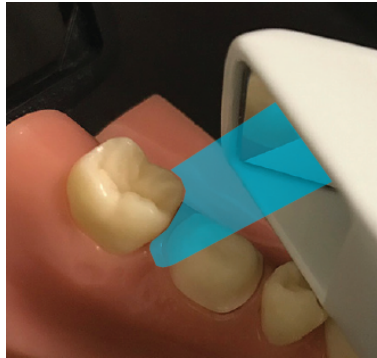
Rest the end of the scanner tip on the distal neighbour; rock the scanner to point the blue LED into the mesial interproximal area.



- Mesial tip

Rest the neck of the scanner tip on the mesial neighbour, rock the scanner to point the blue LED into the distal interproximal area.

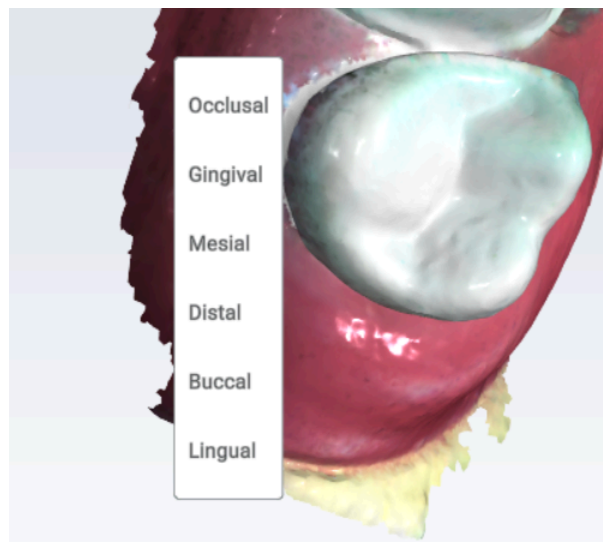
The scanner can be turned to a 90-degree angle if the position in the mouth allows it.



3. Fill in the missing data where needed.

9.13 View controls

Right-click in the Scan screen to use the View Controls menu and change the camera angle for the model. Select which angle you want to view the model from by clicking on the pop-up menu. You can then rotate the model as usual for another angle.



9.14 Model generation

Models can be generated when switching between each layer or all at once after buccals are aligned. Check the Defer Model Generation option under the Scan tab of Settings to change between the two options.

When model generation is deferred, you can switch between scan layers without waiting for each model to generate. Model generation is deferred by default.

You can generate models at any time by clicking the Generate Model(s) button or by pressing the M key on the keyboard.

Ungenerated models will be processed when you exit the software or exit the Scan screen.

During model generation, extraneous data is removed, and low-density areas are filled in.

9.15 Model editing tools

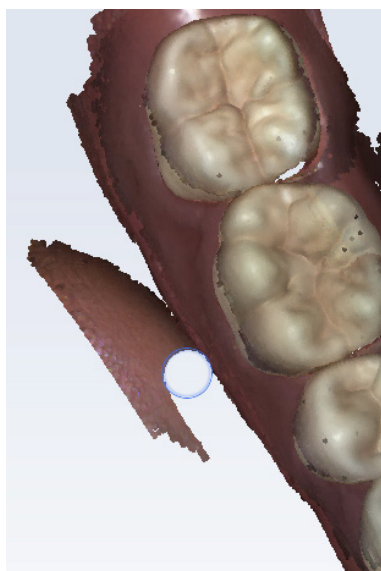
9.15.1 Erase Data tool



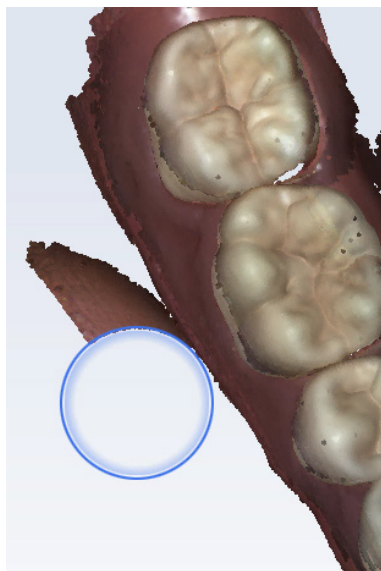
Use the Erase Data tool to remove portions of the scanned data. This allows the removal of unneeded data like extra teeth, tongue, cheek, etc.

Adjust the size of the erase circle using the slider and zoom in or out on the model to affect the proportion of the model within the erase circle.

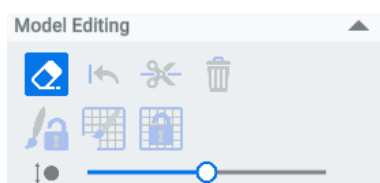
Erase circle - small



Erase circle - large



Erase icon with slider



Click the Erase Data tool to deactivate it.

TIP

It is not recommended that you delete multiple teeth in a row. Large gaps in the model is not recommended.

9.15.2 Using Trim Model tool

About this task

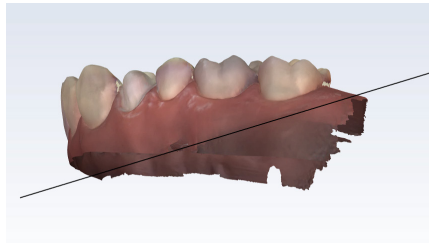
The Trim Model tool can be used to remove sections of the model using a straight cutting line instead of manually erasing.

Steps

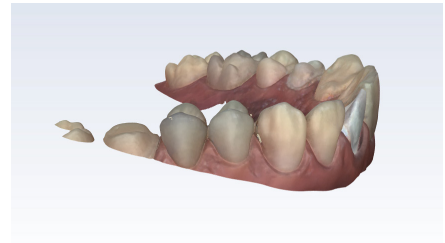
1. Ensure the scanned data is at an even angle before using the Trim Model tool.

If you trim the model while it is angled sharply, you could accidentally trim away desired data on the other side of a full arch case.

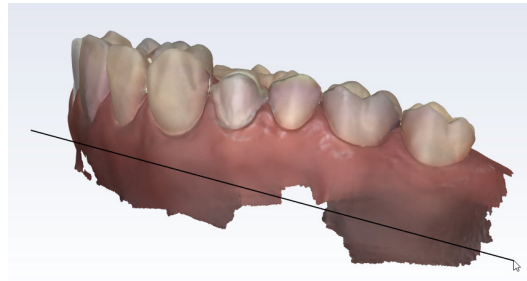
Wrong - line drawn on angled model



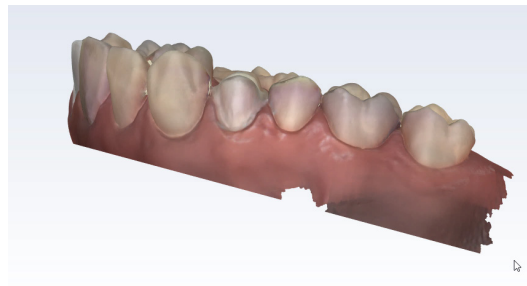
Good data removed on the other side of the arch



2. Click and drag to draw the Trim Model line.



The application removes the data from the side of the line with the least data.

**NOTE**

Use the Trim Model tool before adding scan layers to an alignment group. If the Trim Model tool is used on a scan layer, that scan layer will be removed from all alignment groups.

9.15.3 Lock Scan Area tool

Use the Lock Scan Area tool to protect areas from being changed by additional scanning when the existing anatomy must be maintained.



Lock Scan Area

Paint an area with the Lock Scan Area tool to prevent an area from getting erased or scanned.



Unlock Scan Area

Paint an area previously locked with the Lock Scan Area tool to remove area from being locked.



Clear Locked Scan Areas

Use the Clear Locked Scan Areas tool to clear all locked areas at once.

9.16 Color Mode

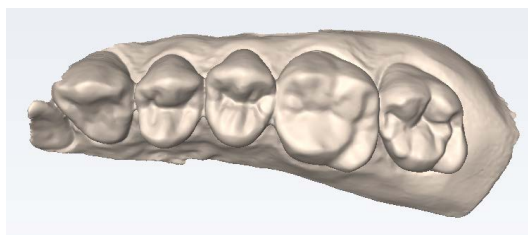
Toggle the Color Mode icon to switch the colors of scanned data between Color Mode and Stone Mode. Color Mode represents the colors of scanned anatomy, while Stone Mode displays the scanned anatomy in one color like poured stone. The default color setting is Color Mode.

Use the upper slider in the toolset to adjust brightness. Use the lower slider to adjust contrast.

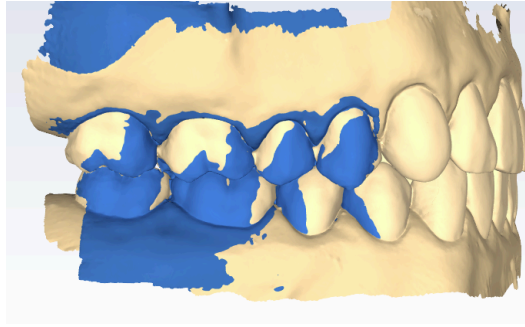
Color Model View



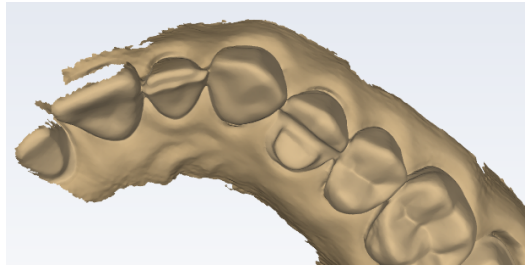
Stone Model - Upper



Stone Model - Upper and Lower beige, Buccal blue



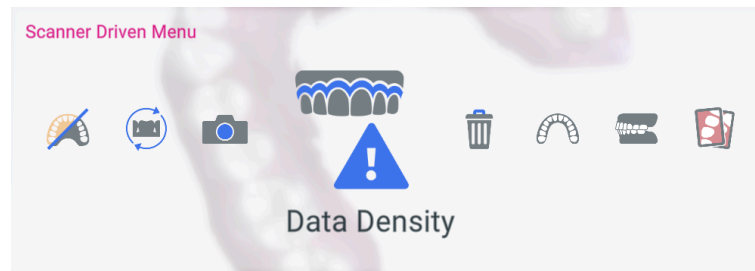
Stone Model - Waxup



9.17 Evaluating data density

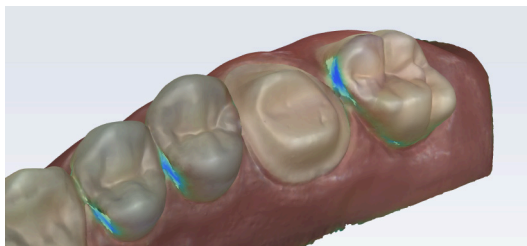
About this task

Follow these instructions to evaluate the model for low data.

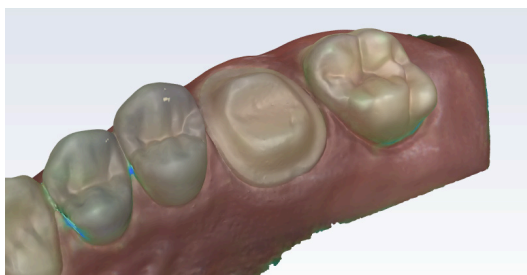


Steps

1. Click the Data Density icon.
The model refreshes with the dark blue and purple areas indicating the least data.
2. Rotate the model to analyse data density.
Dark areas on your restoration site and interproximal contact areas should be rescanned.
3. Check if the key areas are missing data.
 - Look for low density areas on the prepared tooth, especially on the margin anatomy.
 - The teeth adjacent to the margin should have good data on the interproximal contact area, occlusal surfaces, and of the lingual and buccal contours.
 - Data below the height of contour is not as crucial on the adjacent teeth.

Colour model with Data Density activated

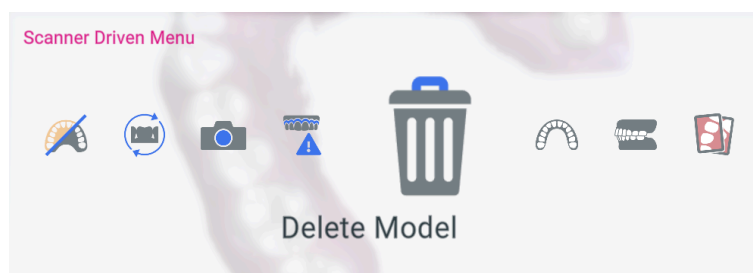
4. If necessary areas still lack data density, rescan the area.



9.18 Deleting model

Steps

1. Click the Delete Model button to delete all data from a scan layer.



All associated margins, restorations and alignments will be deleted.

The scanning animation will be displayed.

9.19 Scanning upper and lower jaw

Steps

1. Start on the occlusal.
2. Scan the facial.
3. Scan the lingual.
4. Fill in buccal data to aid in alignment.
5. Fill in areas of low data density focusing on the margin, occlusion and interproximal contacts (for restoration scans).

9.20 Scanning buccal bite

About this task

The buccal bite is scanned to align the upper and lower models. While scanning the buccal the system attempts to automatically align the upper

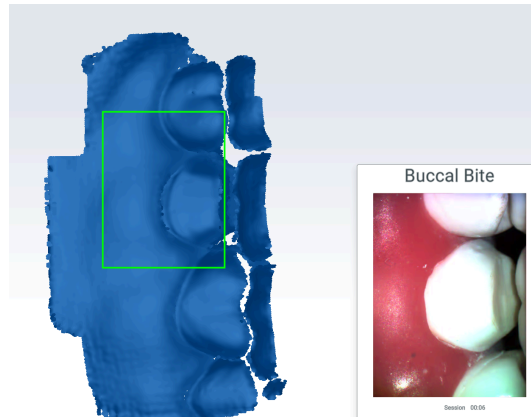
and lower scan layers. The upper and lower scan layers will automatically appear in the main view as they are aligned. Ensure the models to be aligned with the buccal have enough gingival data to aid in alignment.

NOTE

This scanning pattern is displayed in the buccal scanning animations.

Steps

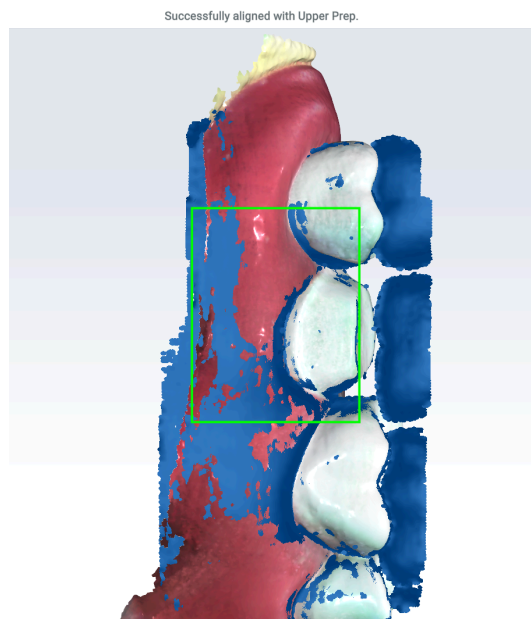
1. Click the Buccal Bite scan layer.
2. Press the articulated model down firmly or have the patient bite down firmly and tell them not to move while you are scanning.
If they shift during scanning, the alignment may be incorrect.
3. Start scanning at a perpendicular or 90° angle to the teeth.
 - 3.a. Focus scanning on one arch/gumline until the scan layer for that arch appears and visually aligns (with a notification noise if the setting is enabled), then go to the opposing arch and repeat.



- 3.b. Scan the sides of the teeth captured in the upper and lower scan layers.

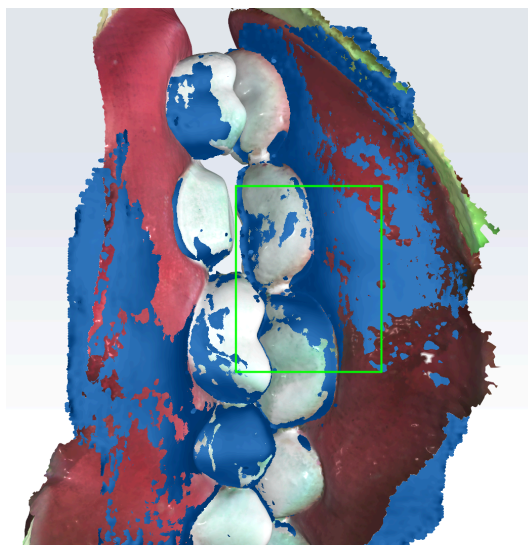
Ensure some gingival data is captured.

The first arch will attempt to automatically align, notifying the user with a banner at the top of the screen (with a notification noise if the setting is enabled) when successful.



3.c. Move the scanner to scan the other arch.

The second arch will attempt to automatically align, notifying the user with a banner at the top of the screen (with a notification noise if the setting is enabled) when successful.



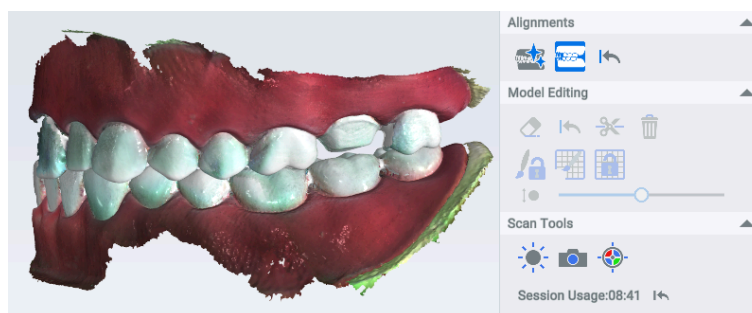
When scanning stops on a buccal in a single buccal workflow, model generation will commence and aligned layers will appear in an Alignment Group.

NOTE

If the scan layers do not automatically align, scan the desired teeth and manually align them. See section "Performing manual alignment" on page 67 for more information.

4. For difficult bite alignment cases, click **Standard Alignment**.

This is an alternate way of calculating an optimum alignment.



5. Click the icons to view both alignment options and leave the option you prefer active.

The active icon determines the exported alignment.

NOTE

The default bite alignment method can be selected from the Default Method of Occlusion drop-down list. See section "Scan settings" on page 33.

9.20.1 Scanning double buccal bite

About this task

If you intend to scan a full arch, select the double buccal workflow from the available workflow options or add an additional buccal scan layer for an alignment between both buccal scan layers.

Steps

1. Scan the upper and lower arches.
2. Scan the first buccal bite and align upper and lower arches.
3. Scan the second buccal bite from the opposite buccal and align upper and lower arches.
4. After model generation, verify the alignment.

NOTE

If a non-double buccal workflow was selected, model generation will automatically begin after the first buccal scan layer is scanned. If a double buccal workflow was selected, model generation will automatically begin after the second buccal scan layer is scanned.

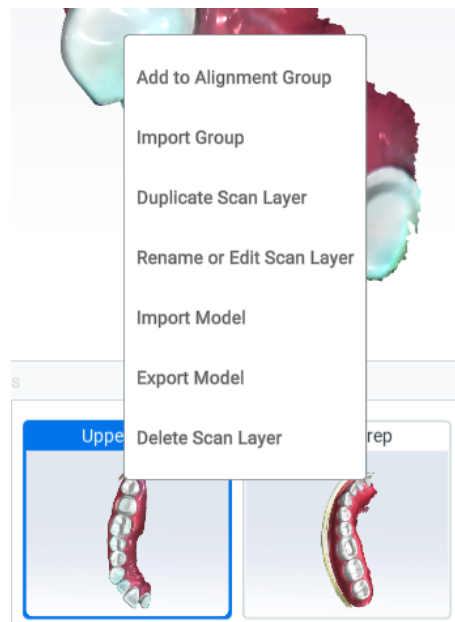
9.21 Renaming or editing layer

About this task

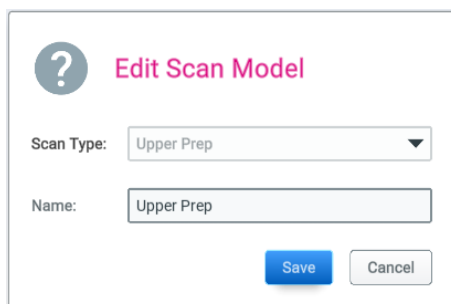
A scan layer can be edited to change the name and/or scan type. This can be helpful if you accidentally scan something under the wrong label.

Steps

1. Right-click the scan layer you want to edit.



2. Click **Rename/Edit Scan Layer**.



3. Change the scan type and/or the layer's name.
4. Click **Save** to keep your changes or click **Cancel** to exit without saving.

9.22 Using Shade Assist

About this task



Color Mode must be active for the Shade Assist icon to be available. Shade assist can be used for intraoral cases only.

Steps

1. Click the Shade Assist tool to activate Shade Assist mode.
2. Hover over dentition to see a shade popup.



3. Click on the desired area to make an annotation showing the color.
4. Right-click an annotation to remove it.
5. Repeat as desired.

NOTE

Annotations are not saved or exported.

9.23 Evaluating occlusal contact strength

About this task

The Occlusal Contact heat map can be used to evaluate the alignment and preparation clearance.

Steps

1. Click on an aligned group.
See section "Model alignment groups" on page 65 for more information.



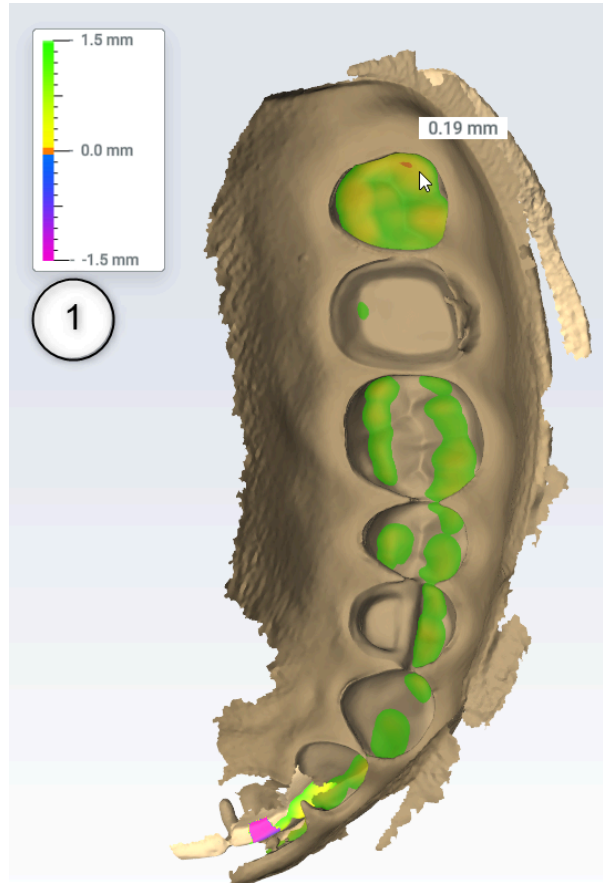
2. Click **Occlusal Contact** under View Tools.

A heat map legend displays and the occlusal contacts are highlighted.

3. Rotate the model to view the occlusal.

4. Use the legend to evaluate the colors and/or hover the mouse cursor over an area to see the contact strength.

Hover on areas of the preparation to see the amount of clearance to the opposing tooth.



- 1 Use the occlusal contacts legend to assist in bite intensity and clearance.

9.24 Model alignment groups

Alignment groups are used to align models. You can create and export multiple groups if needed. If two or more models are aligned during scanning, a group is automatically created with the aligned models. When doing manual alignment, a new Alignment Group will automatically be created unless the manual alignment is part of Add to Alignment Group. After the new alignment group is created, any Add to Alignment Group action on that scan layer will inherit the previous manual alignment.

NOTE

If you continue scanning on an already generated scan, this scan will be removed from aligned layers. When you align the model again, the scan is added to aligned layers.

9.24.1 Creating new alignment group

Steps

1. Scan a buccal scan layer to automatically align or drag one scan layer onto another.

If dragging one scan layer onto another does not automatically align scan layers, a manual alignment screen appears. See section "Performing manual alignment" on page 67 for more information.

9.24.2 Buccalless bite alignment

About this task

You can create an alignment group without scanning the buccal.

Steps

1. Scan the Upper.
2. Scan the Lower.
3. Drag the upper layer onto the lower layer to create a new group.

Results

The system creates an alignment group based on occlusal contacts.

What to do next

If you are dissatisfied with the alignment, you can scan the buccal bite to create a new alignment group.

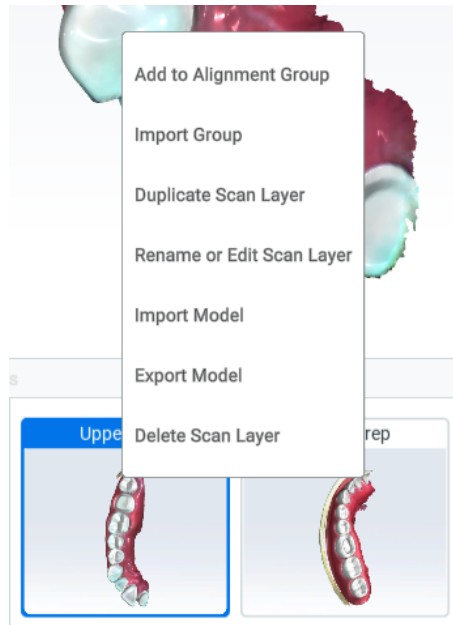
9.24.3 Adding to alignment group

About this task

If one or more models aligned during scanning, an alignment group is created. You may add unaligned models to existing groups or previously aligned models to additional groups.

Steps

1. On the Scans tab, right-click the desired scan layer and select **Add to Alignment Group**.



The available alignment groups are shown.

2. Click the desired alignment group.

The software will attempt to align the new scan layer to the group, using a pre-existing alignment first if it exists. If unsuccessful, such as when an upper arch aligns to a buccal, but the lower arch does not, you must manually align the scan layer. See section "Performing manual alignment" on page 67 for more information.

9.24.4 Performing manual alignment

About this task

If automatic alignment is unsuccessful, then manual alignment is necessary.

Steps

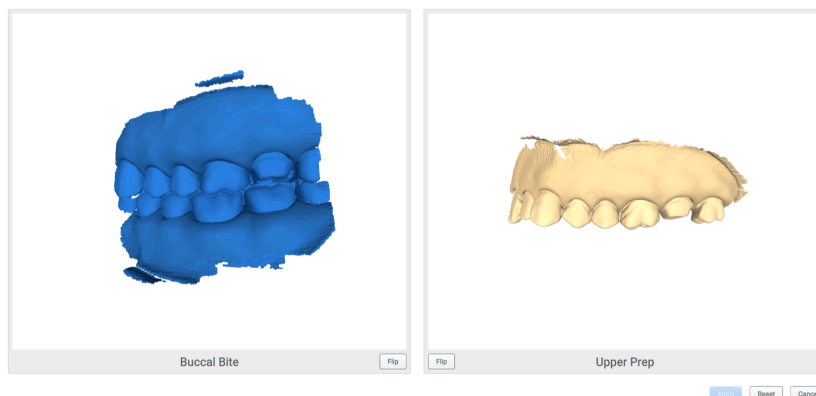
1. Go to **Manual Alignment**.

If the software fails to automatically align when you drag one layer over another, then it may ask you to manually align the layers.

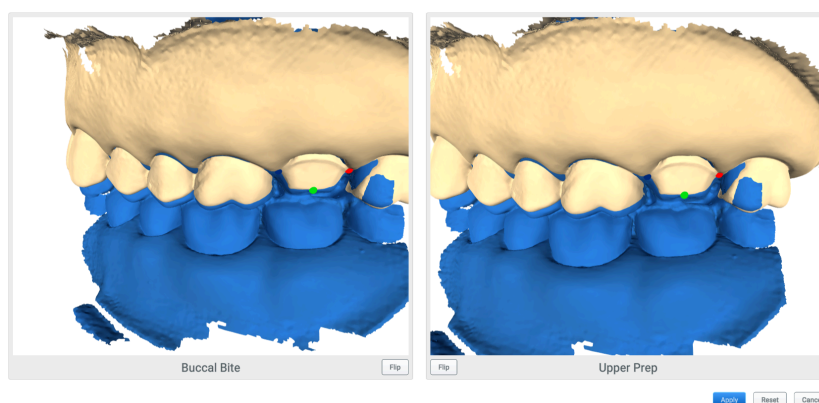


Click **Reset Alignment** to force manual alignment for an existing group. This is not available for buccalless alignments between upper and lower scan layers.

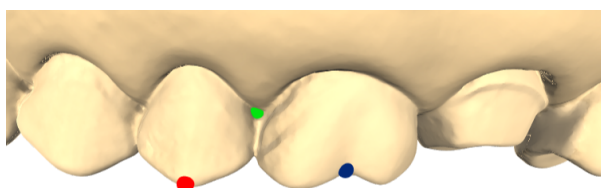
A split screen appears with each model to be aligned in a separate window on each half of the screen.



2. If needed, rotate or flip the models so that matching anatomy appears on each screen.
3. Set reference points.
 - 3.a. Click a distinctive feature on the first model to attach a red dot.
 - 3.b. Click the same distinctive feature on the second model to attach a matching red dot.
 - 3.c. Repeat these steps twice more for the green and blue dots.



Correct: Dots form a triangle as in the figure below.



Incorrect: Do not put the dots in a straight line as in the figure below.



4. Rotate the models to evaluate the alignment.
If the alignment fails, the Apply button is greyed out and the user is prompted to move the points or scan more and try again.

Click and drag the points to move/adjust them into an improved alignment or click **Reset** to start over.

5. Click **Apply** to save the current alignment or **Cancel** to exit without saving the alignment.

9.25 Scanning pre-op

About this task

Use **Scan Pre-op** when you want to scan a pre-operative tooth or a wax-up.

Steps

1. Select **Upper** or **Lower Pre-op** as your workflow.
2. Click the Pre-op layer.
3. Scan the pre-operative tooth or wax-up and adjacent teeth.



4. Prepare the tooth.
5. Click the appropriate prep layer.
6. Scan the teeth.

9.26 Scan body workflow

About this task

Follow these instructions to use the scan body workflow.

Steps

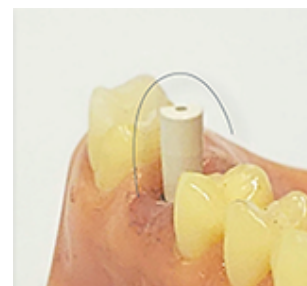
1. Select **Scan Body**.
2. After removing the healing cap, the soft tissue (where the implant is placed) is scanned in as the preparation model.



3. Scan the opposing and buccal bite.
4. Insert the scan body and scan it under the Scan Body scan layer.
5. Start the scanning at the gingival to capture enough data.

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. Scan the rest of the model with the scanner's normal scan pattern.

- Try and get as close as possible to the scan body, but do not put it inside the tip.
- Use the larger tip size because of the bigger field of view to aid in alignment.



TIP

If you start scanning from the occlusal on a scan body, you may not capture enough data, and it is difficult to create a good model. Start scanning from the gingival to start with good data.

6. Verify the alignment.
7. Follow the normal procedure for exporting the case to your laboratory.

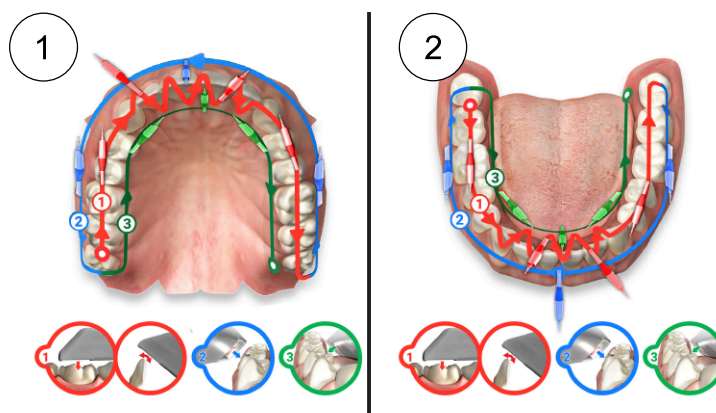
9.27 Full arch scanning

About this task

Follow these steps to perform full arch scanning.

Steps

1. Start on the distal side and scan the occlusal of the entire arch.
On the anteriors, rotate back and forth from the lingual and facial.
2. Scan all of buccal.
3. Scan all the lingual.
4. Evaluate the model and rescan areas with low data, if necessary.
5. To aid automatic alignment, start the scans on the opposing molars and continue to the buccal scan in the same quadrant.



- 1 Upper
- 2 Lower

9.28 Using Open Bite workflow

About this task

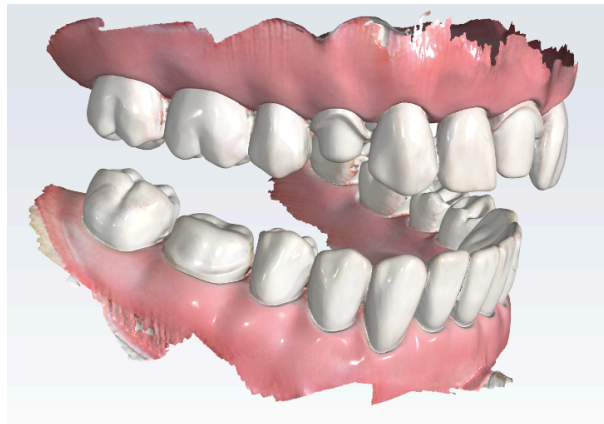
The Open Bite workflow is used for sending data to your lab to design a night guard and other such appliances. Follow the instructions below to use the Open Bite workflow.

Steps

1. Select **Open Bite** as the workflow.
2. Scan the Upper and Lower arches following the normal procedure.
3. Have the patient bite on the bite registration appliance of your choice.
4. Select the Open Bite layer and scan the buccal bite with the bite partially open.

Results

The system attempts to align the models automatically. Manually align them if needed.



9.29 360° scanning

You can scan the underside of an appliance to be sent to a laboratory. The example below is of a denture that has been scanned into an Upper scan layer. These pictures are of one model.





9.30 Importing model

About this task

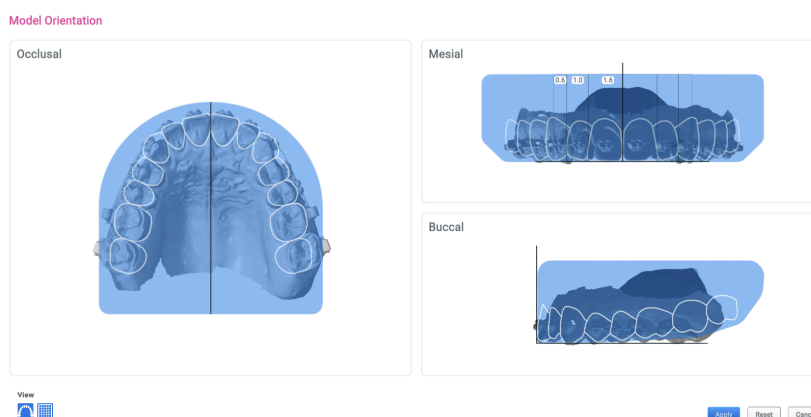
Follow these instructions to import a model.

Steps

1. Click a scan layer to select it.
2. Right-click the scan layer and select **Import Model**.
3. Navigate to the desired file on your computer.

You can import **.ply**, **.stl**, or **.obj** files.

The model is imported and an orientation graphic displays.



4. To activate/deactivate the Standard Tooth Position overlay, click the View icon in the bottom left corner.
5. To activate/deactivate the Golden Proportion Grid overlay, click the grid icon in the bottom left corner.
The numbers inside the Mesial box denote the proportions used in the grid.
6. To rotate the model, first right-click and hold the model and then drag it.
7. To move the model, first middle-click and hold the model and then drag it.
8. In aligning the model, right-click and drag the model to rotate the alignment around each axis.
 - Align the mesial by positioning the centre vertical guideline between the central incisors, then position the bottom of the frontmost intact tooth on the lower guideline.

- Align the occlusal by positioning the frontmost intact tooth into the appropriate position using the Standard Tooth Position overlay, and then aligning as many of the remaining teeth into their positions into the overlay as feasible.
 - The buccal may or may not align within the standard tooth position overlay.
9. Click **Apply** to save changes and exit the dialogue.
 10. Click **Reset** to revert to the default orientation.
 11. Click **Cancel** to exit the dialogue without saving changes.
 12. Trim the model if needed.

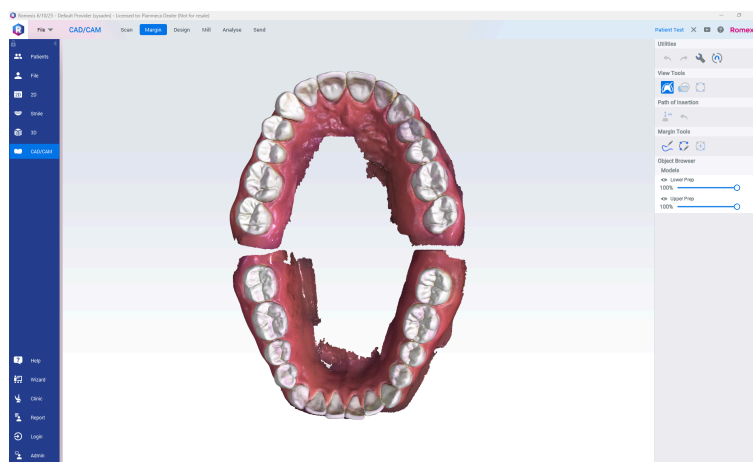
NOTE

You cannot add scanning data or use Erase Data, Trim Model or Lock Scan Area tools on imported models.

13. Repeat for all the desired layers.

10 Margin tab

The *Margin* tab contains tools for creating and modifying the margin quickly and easily.



The Model Orientation dialogue will automatically open for any Upper or Lower scan layers which have not already been oriented.



To manually open the Model Orientation dialogue, click the Model Orientation icon. See section "Importing model" on page 72 for more information.

10.1 Drawing margin

About this task

Follow these instructions to use the Draw Margin tool.

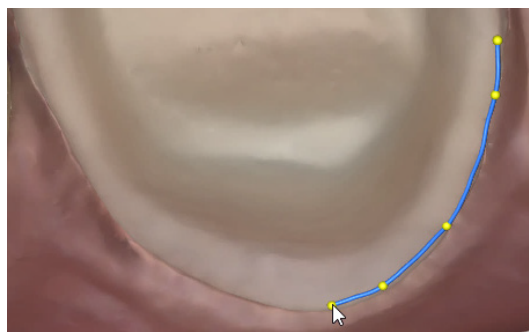
Steps

1. Click **Draw Margin** or **Lasso Tool** to display the Tooth Selection screen.

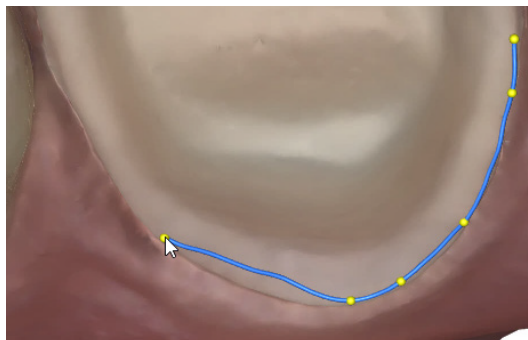
Any previous Point of Insertion or Undercuts will be hidden.

2. Click the desired tooth number.
3. Click the indication.
4. If needed, select the milling material.
5. Click **Create**.
6. Zoom in and rotate the model until there is a good view of the desired location to draw a margin.
7. Click on the margin to set a control point.
 - For Draw Margin
 - Click along the desired margin as necessary to set control points.

The margin line will follow the contour of the anatomy between control points.



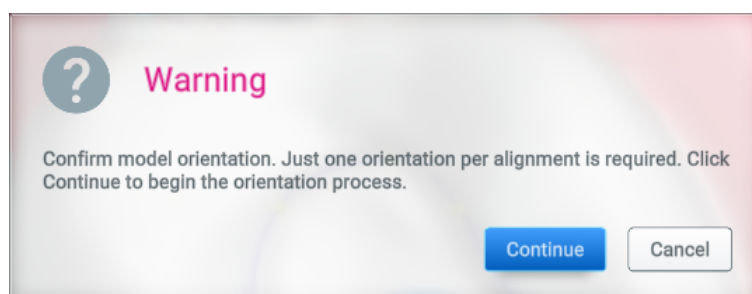
- If the margin is hard to see or the software loses track of the margin edge, the margin line may be corrected after the margin is finished.



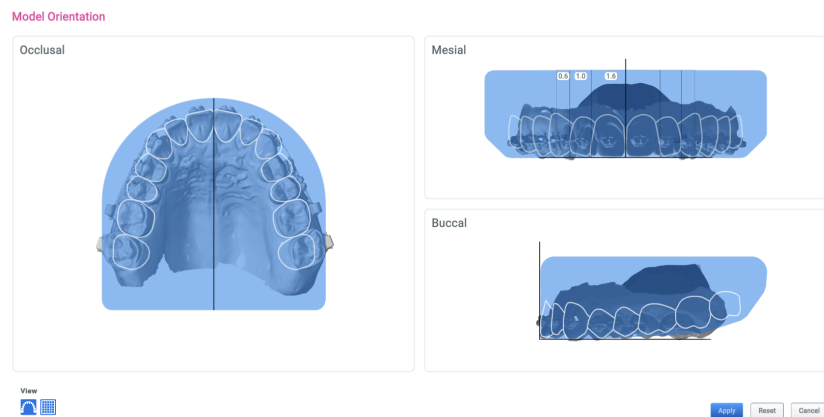
- For Lasso Tool
 - Hover the mouse over the desired margin and control points will be automatically set.
 - Click as necessary to manually set Control Points.
8. Click the starting point to finish the margin.



If the model is not already oriented, the following orientation warning pops up:



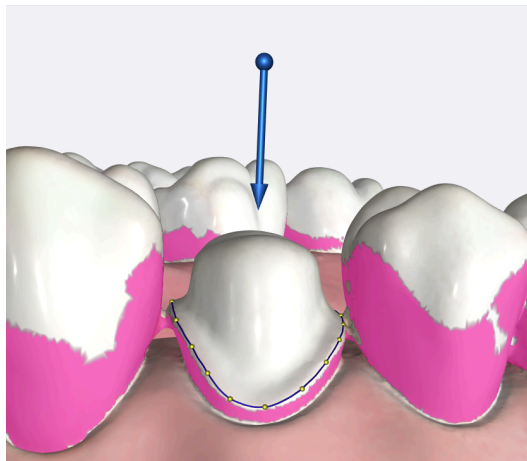
If accepted, the user will be shown the Model Orientation dialogue:



When the margin is finished:

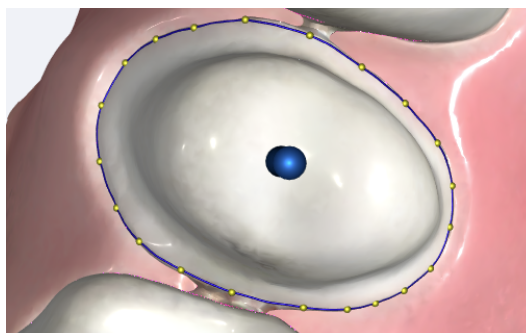


- The Show Hide POI tool will automatically toggle on and an arrow indicating the point of insertion (POI) will appear.
- Undercuts from the Point of Insertion arrow will be shown with a pink highlight.



- When Show Hide POI is on, you may click and drag the arrow to adjust the POI and the related undercuts.
- You may toggle the Point of Insertion and undercuts off by clicking the Show Hide POI icon.

9. Grab any yellow dot to drag the margin line to a better location.



10. You can add yellow control points to any place of the margin line with a left click.

What to do next

Repeat the steps above to draw another margin.

TIP

Deactivate **Path of Insertion** before drawing the next margin if the POI highlight is obscuring the margin.

10.2 Views

There are several ways to view the models to aid in drawing/evaluating the margin.

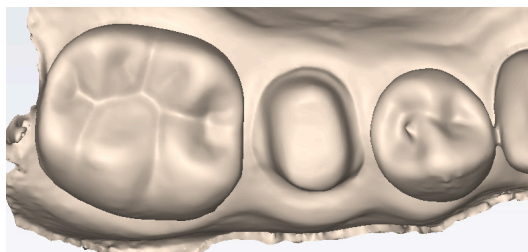
10.2.1 Color mode view

NOTE

The color mode view is for intraoral cases only.



Use **Color Mode** to toggle between colour view and stone view. This can help in seeing the margin in some cases.

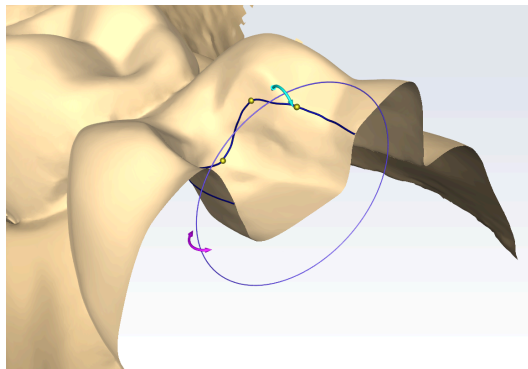


10.2.2 Using Slice Plane tool

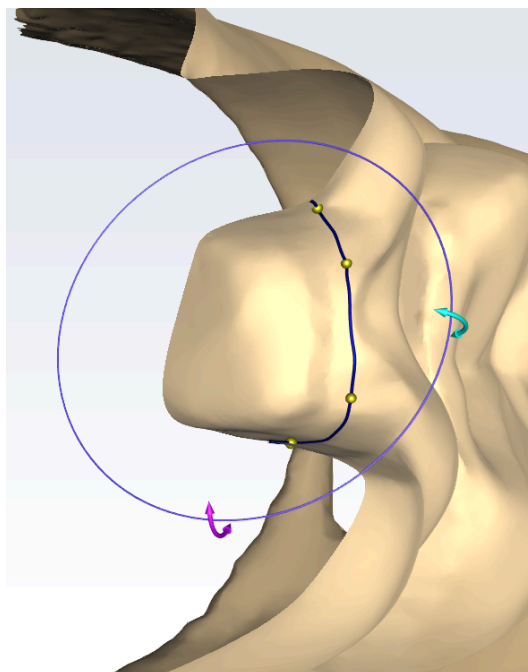
About this task

The Slice Plane tool can be used to slice the model and enable you to evaluate/visualise the margin in a different way. The tool is available once a margin is finished and active. The slice always starts on the active margin.

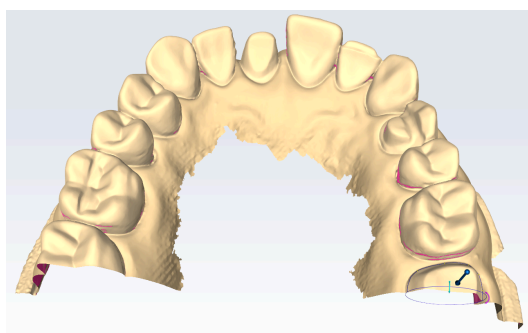
Quadrant slice 1



Quadrant slice 1 rotated to view other side



Full arch slice 1



Steps

1. Click the Slice Plane tool icon to place the slice plane at the active margin.
2. Click and drag the slice plane to move it perpendicular to the plane.
3. Click and drag on the directional arrows to change the angle of the slice.
4. Rotate and zoom as needed to view the desired area.

10.2.3 Show Hide Margin



Click **Show Hide Margin** to toggle the margin on/off.

10.2.4 Model opacity

Use the sliders in Object Browser to change the opacity of models. Click the eye icon for each model to toggle visibility of that model.

10.3 Using Path of Insertion tool

About this task

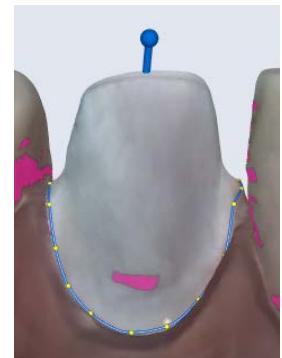
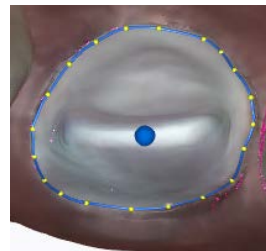
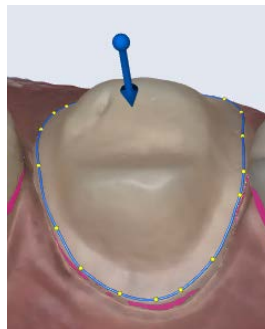
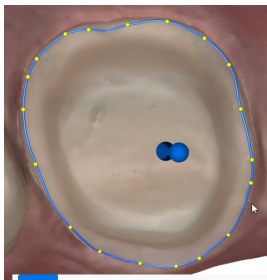
The Path of Insertion tool is automatically activated when a margin is drawn. Follow these instructions to use the Path of Insertion tool.

Steps



1. Click **Path of Insertion** to toggle the view on/off.

When active, a directional arrow appears over the drawn margin showing the path of insertion.



2. Click and drag the arrow to adjust the path of insertion.

Pink highlights show undercut areas. Use this to evaluate your prep for possible fit issues.

NOTE

The path of insertion information is not exported. This is for information purposes only.

3. If there are multiple preparations, click the tooth number to evaluate each prep.



4. Click the **Reset** icon to revert the path of insertion back to the original angle.

This icon is available only when the Path of Insertion icon is active.

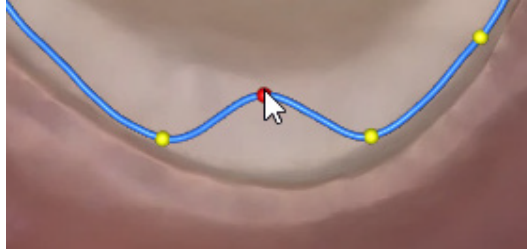
What to do next

Click **Show Hide POI** to hide the path of insertion and undercuts.

10.4 Editing margin

The margin is made up of control points with interconnecting lines. There are a variety of ways to edit the margin. These can be done in any order.

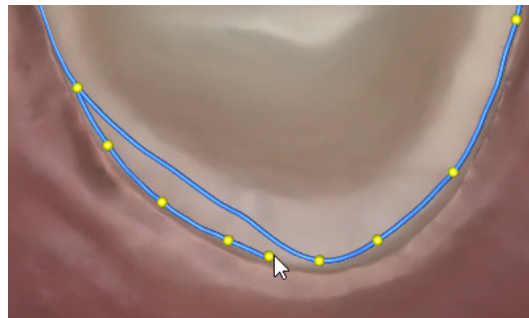
- Click and drag a control point to move it.



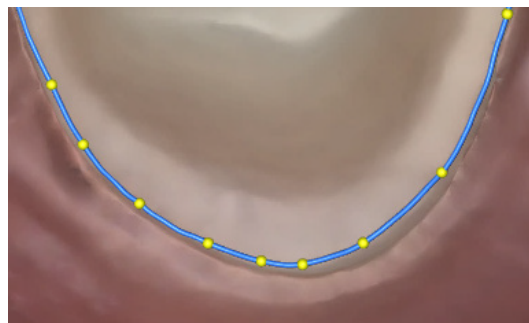
- Right-click on a control point and select:
 - **Delete Control Point** to remove a single dot.
 - **Delete Margin** to delete the entire margin.
 - **Edit Margin Info** to edit the tooth number.
- To add a new control point, click on the blue line. A new control point appears.



- Click **Add Segment** to redraw a section of the margin.
 - Click a control point on a portion of the margin that is good. This is your starting point.
 - Click in small increments to add new points across the gap.

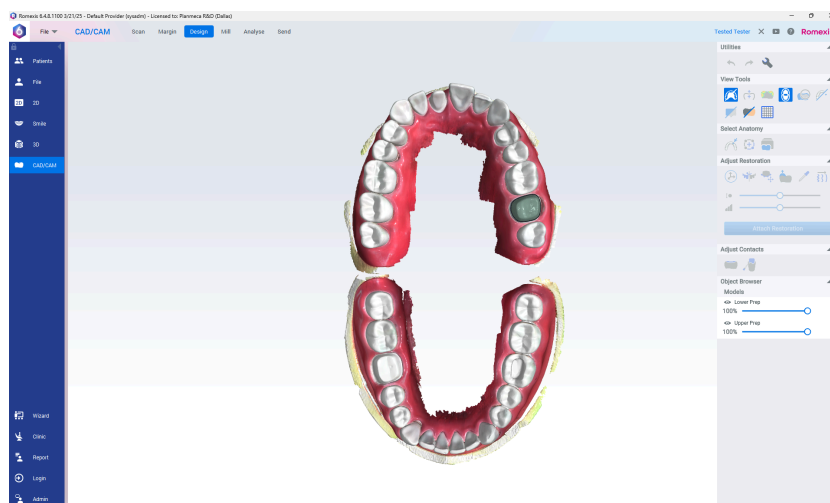


- Click another good point on the margin to complete the new line.



11 Design tab

Go to the *Design* tab to create restoration proposals for milling.



To rotate a model, first right-click and hold the model and then drag it.

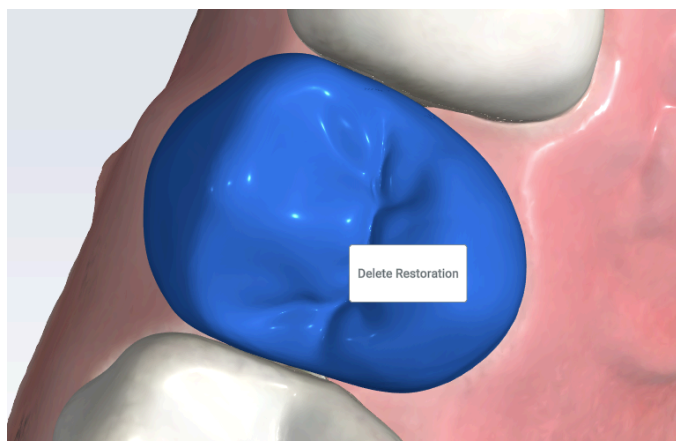
To move a model, first middle-click and hold the model and then drag it.

The active spacer without a restoration is highlighted in green. Non-active spacers without restorations are highlighted in grey.

11.1 Context menu

To invoke the camera view menu, right-click on the screen. To reorient the camera, click the desired option.

To open the restoration edit menu, right-click an existing restoration. To delete a restoration completely, click **Delete Restoration**.



11.2 Toolset

11.2.1 Utilities



To undo the last action, click the undo icon.



To cancel the undone action, click the redo icon.



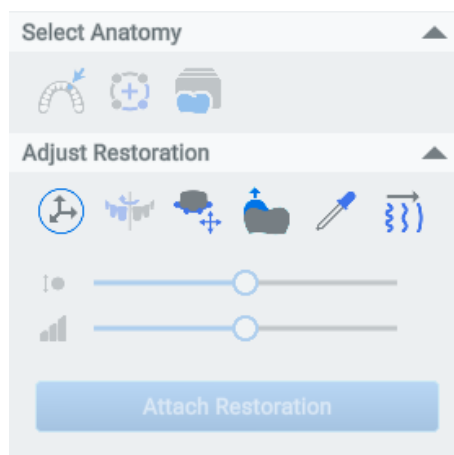
To open the Settings dialogue, click the Settings icon.

11.2.2

Design

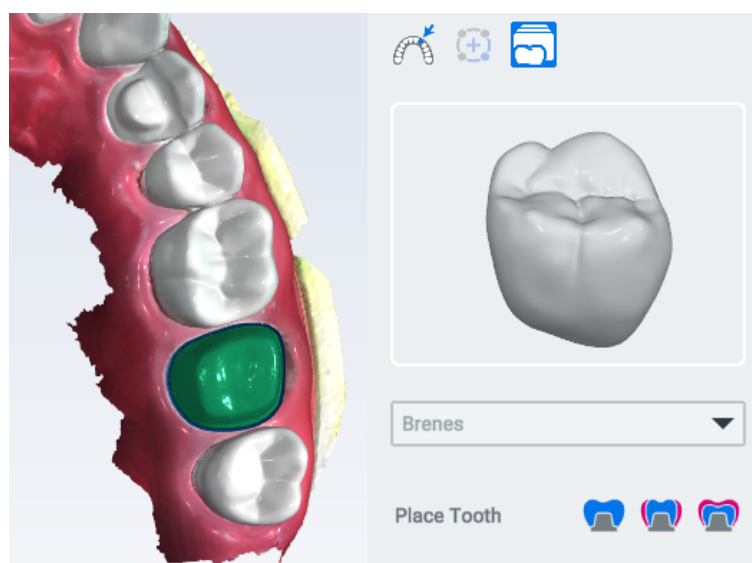


Use the Place Selection tool to copy any anatomy for the selected restoration.



Go to **Tools** to adjust the selection area as if it were a margin, or cancel the selection.

Alternatively, use the library drop-down menu to generate a proposal from a library.



Click **Place Tooth** to generate a proposal using the selected method.



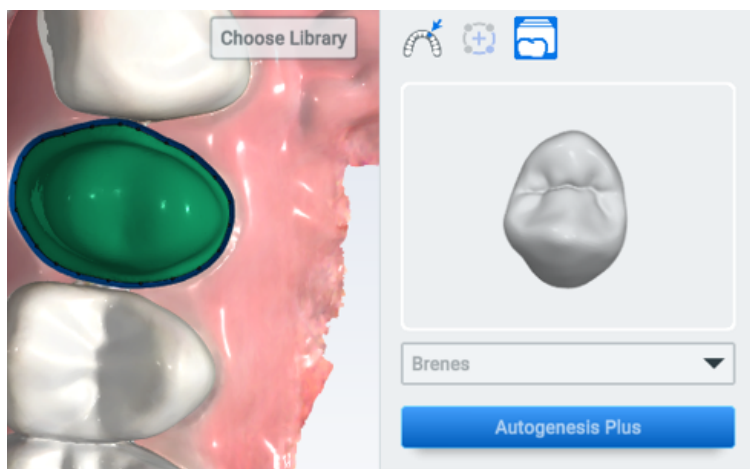
Click **Place Tooth without Autogenesis** to morph the restoration without adjusting the contacts.



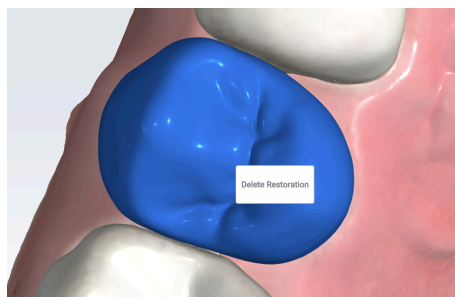
Click **Place Tooth with Autogenesis** to morph the restoration and adjusting for interproximal contacts.



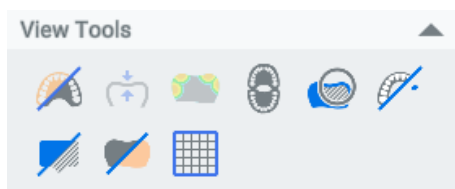
Click **Place Tooth with Autogenesis Plus** to morph the restoration and adjust interproximal and occlusal contacts.



Right-click **Delete Restoration** to reapply a different library on a selection area.



11.2.3 View Tools



Click **Color Mode** to toggle between realistic colour and colour-coded stone view modes.

Click **Material Thickness** to select a heatmap representing the amount of material in a restoration.

Click **Contacts** to select a heatmap showing contact strength, a restoration and opposing arch, interproximal contact strength, and tissue contact strength (if applicable).

Click **View Open** to select a clamshell type view of both opposing arches.

Click **Slice Plane** to activate/deactivate a cutaway view with a widget showing the location of the slice plane.

- Click and drag the widget to move it perpendicularly to the plane.
- Click and drag arrows located at the edges of the widget to rotate the plane.
- Deactivate the tool to reset the widget.

Click **Show/Hide Neighbors** to hide the rest of the current restoration's arch.

Click **Show Hide Surface Indicators** to toggle visibility for directional indicators.

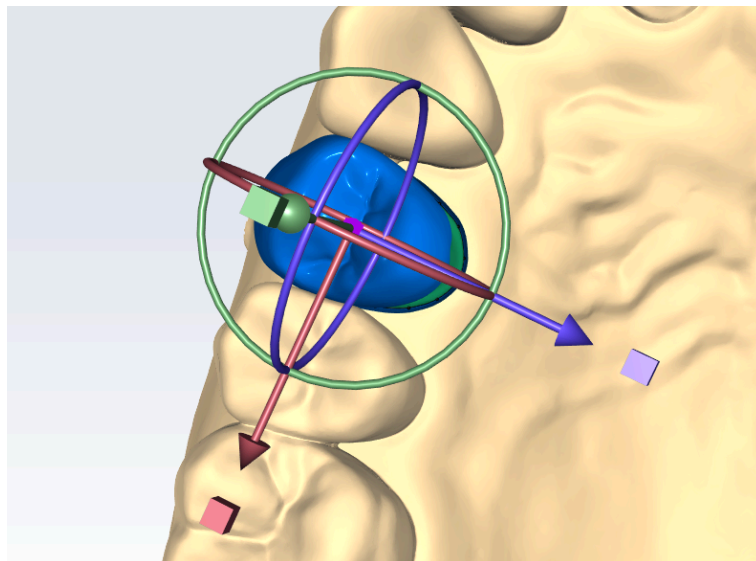
Click **Stone Restoration** to show only restorations in stone colour mode.

Click **Grids** to select/deselect grids and to toggle between a normal grid and a Golden Proportion Grid overlay.

11.2.4 Adjust Restoration



Click **Combo Tool** to activate/deactivate its widget.



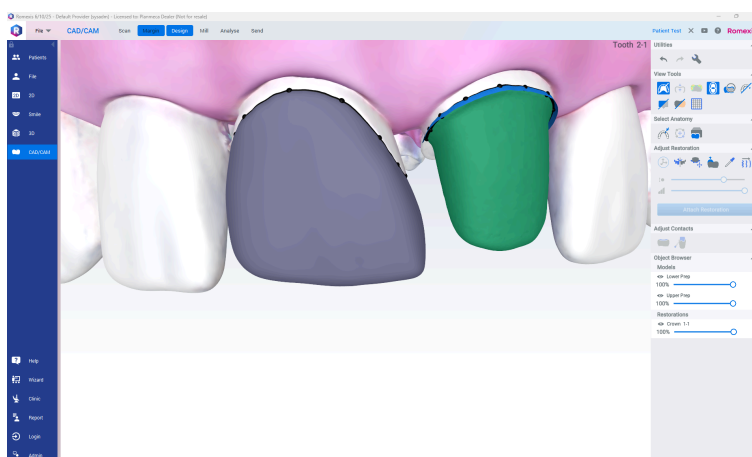
- Each axis has a different colour.
- Click and drag the outer linear arrow of an axis to move the restoration on that axis.
- Click and drag the inner circular arrow of an axis to rotate the restoration on that axis.
- Click and drag the outer square box to expand the restoration.



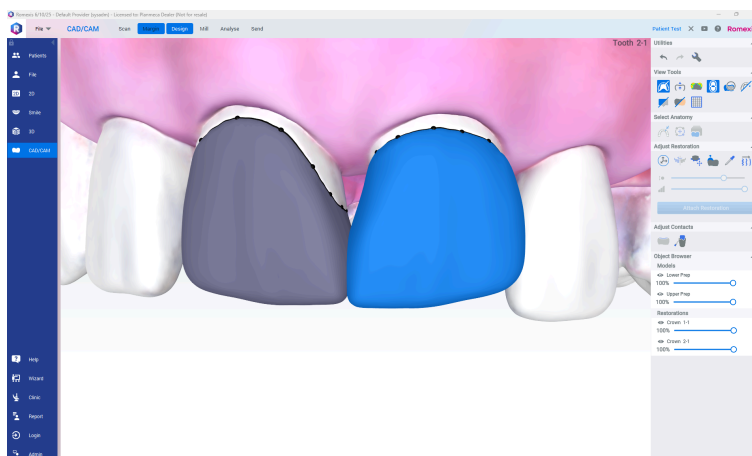
Click **Mirror** to activate/deactivate anatomy copying function.

- Click on the margin of the tooth you want to mirror.
- Design the tooth.

- Click on the margin of the neighbouring preparation.

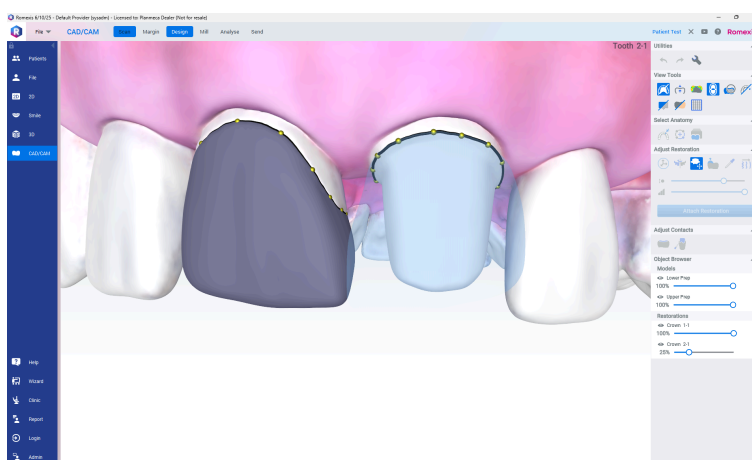


- Click the Mirror icon.
- Adjust the restoration as needed.
- Attach the restoration.



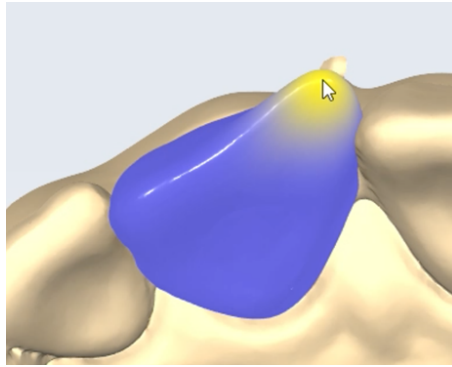
Click **Move Margin** to edit margin line position.

- Click **Adjust Margin** to modify margin points.

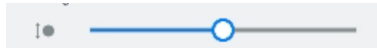


Click **Rubber Tooth** to activate/deactivate the adjustment of free-form tooth material.

Click and drag to stretch material in a direction.



Use the Brush Size slider to adjust the area of effect.



Use the Strength slider to adjust the potency of the tool.



Click **Add Remove Material** to active/deactivate the tool.

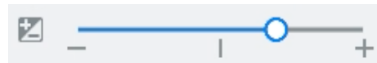
- Click and hold to add or remove material.
- Use the Brush Size slider to adjust the area of effect.



- Use the Strength slider to adjust the amount of material removed.
 - To remove material, go to the negative direction.



- To add material, go to the positive direction.

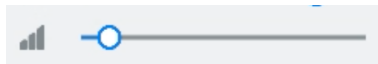


Click **Smooth** to activate/deactivate the tool.

- Click and hold to smooth the material.
- Use the Brush Size slider to adjust the area of effect.



- Use the Strength slider to adjust the potency of the tool.

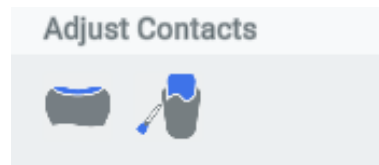


11.2.5 Attach Restoration

Click the Attach Restoration button to convert a restoration proposal into a restoration and attach it to its margin.



11.2.6 Adjust Contacts



- Click **Snap Occlusion** to snap restoration to an opposing tooth.

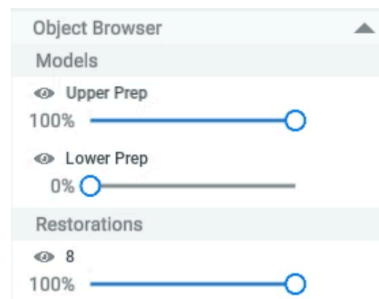


- Click **Snap Interproximal** to snap restoration to a neighbouring tooth.

NOTE

Check material thickness and contact strength before manufacturing.

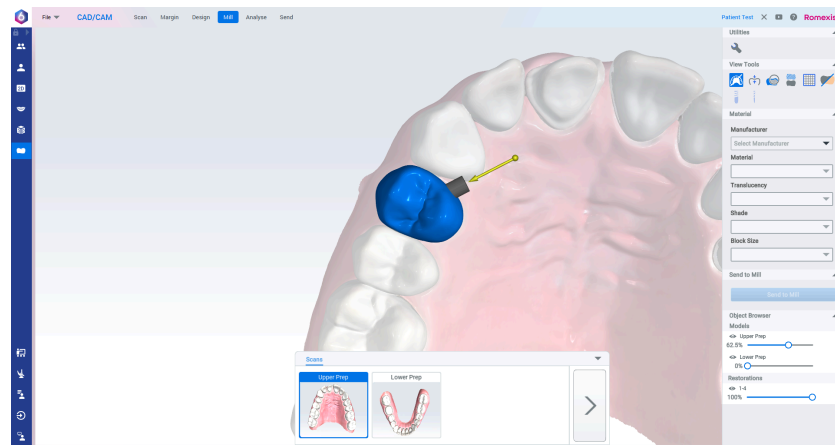
11.2.7 Object Browser



- Drag the slider for a given object to adjust the visibility of that object.
- Click the eye icon of an object to toggle between not visible and visible at the last set opacity.

12 Mill tab

Go to the *Mill* tab to simulate mill tool paths for restorations and send restorations to connected mills for production.



If you do not have a mill set up before you select the Mill tab, you cannot set material definitions, and the Send to Mill button remains inactive.

To rotate a model, right-click and hold the model and then drag it.

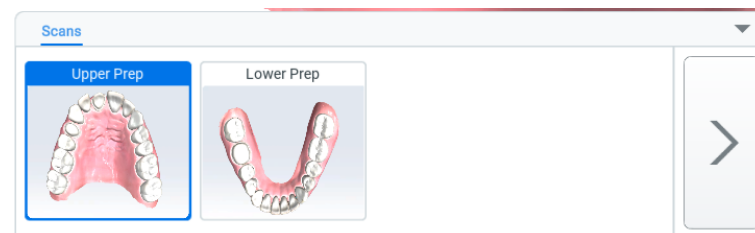
To move a model, middle-click and hold the model and then drag it.

The active margin without a restoration is highlighted in green.

Click and drag the sprue on an active restoration to change its position. If the sprue is moved to an invalid position, the sprue will be shifted automatically to the nearest valid position.

12.1 Catalogue

The Scans tab displays all scans in the active case. Thumbnails change according to scanned data. To scroll through the layers of an active case, click the arrow on the right.



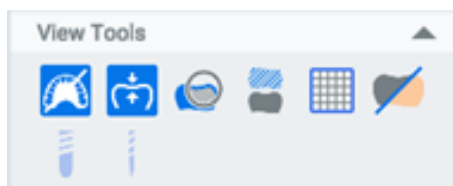
12.2 Toolset

12.2.1 Utilities



To open the Settings dialogue, click the Settings icon.

12.2.2 View Tools



Click **Color Mode** to toggle between realistic colour and colour-coded stone view modes.

Click **Material Thickness** to select a heatmap representing the amount of material in a restoration.

Click **Slice Plane** to activate/deactivate a cutaway view with a widget showing the location of the slice plane.

- Click and drag the widget to move it perpendicularly to the plane.
- Click and drag arrows located at the edges of the widget to rotate the plane.
- Deactivate the tool to reset the widget.

Click **Show/Hide Opposing** to show or hide the restoration's opposing arch.

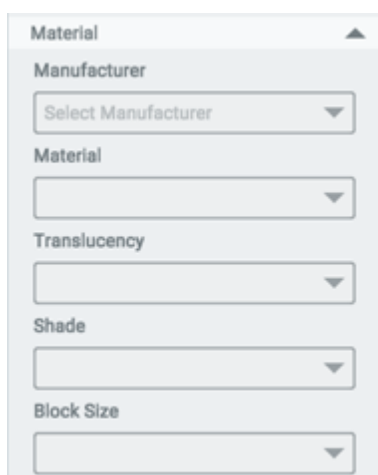
Click **Grids** to select/deselect grids and to toggle between a normal grid and a Golden Proportion Grid overlay.

Click **Stone Restoration** to show only restorations in stone colour mode.

Click **Standard** to run a quicker normal simulation of tool path results from milling the active restoration. This is best used for crowns.

Click **Detailed** to run a more detailed simulation of tool path results from milling the active restoration. This is best used for all non-crown indication types, but may be used for crowns also.

12.2.3 Material



If go to **Material** when you have drawn a margin, the Material drop-down menus will already be populated.

Use the drop-down menus to select a specific block type for the restoration material. A drop-down menu becomes available when the drop-down menus above it meet its requirements.

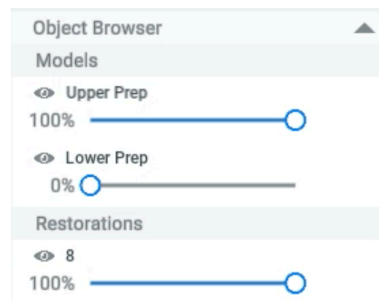
All block sizes not fitting the restoration are greyed out.

12.2.4 Send to Mill

Click the Send to Mill button to invoke a dialogue where you can select the mill and standard or detailed tools. The default selection is based on the restoration type.

- Select the desired mill from the drop-down menu. Your favourite mill will be automatically selected.
- Select **Standard** or **Detailed**.
- Click **Send** to send the job to the selected mill.
- Click **Cancel** to exit the dialogue without sending any job.

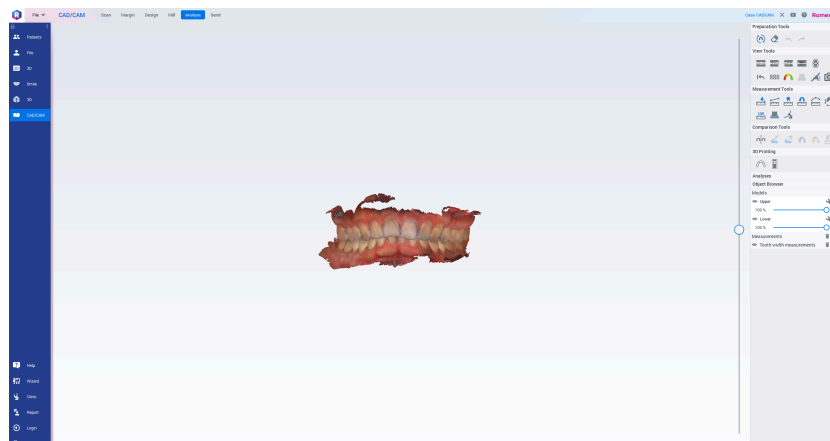
12.2.5 Object Browser



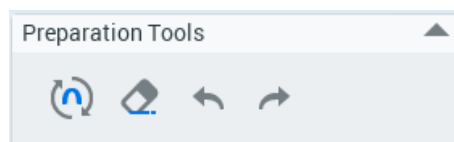
- Drag the slider for a given object to adjust the visibility of that object.
- Click the eye icon of an object to toggle between not visible and visible at the last set opacity.

13 Analyse tab

When the scan is opened from the case list, it appears in the **Analyse** tab.



13.1 Preparation tools

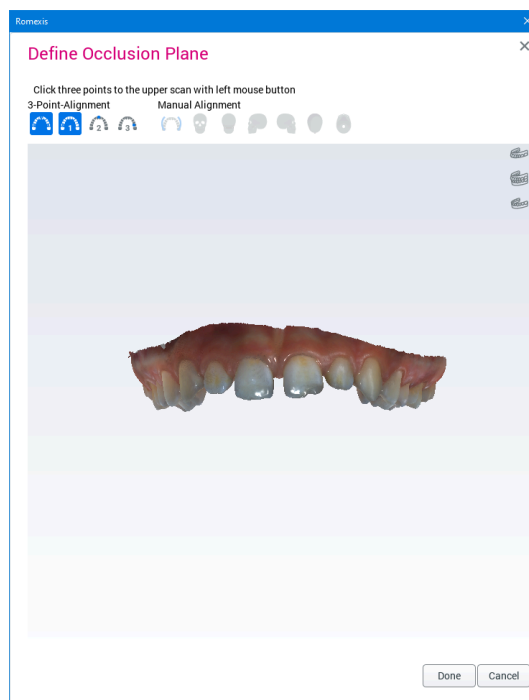


13.2 Defining occlusion plane



To orientate a model, define the occlusal plane and midline.

After scanning or importing files into the CAD/CAM module, a dialogue for defining the occlusion plane opens up automatically with the 3-point alignment dialogue where the lower model is hidden. The model is automatically rotated to horizontal with front teeth facing the user. To accept the result of the automatic orientation, click **Done**. If the automatic orientation is not good enough, the orientation can either be redone using the 3-point alignment or fine-tuned using the manual alignment.



13.2.1 3-point alignment

About this task

Follow these instructions to define 3-point alignment.

Steps

1. Indicate 3 points (right molar, midline and left molar) from the surface of the model by clicking on the model.

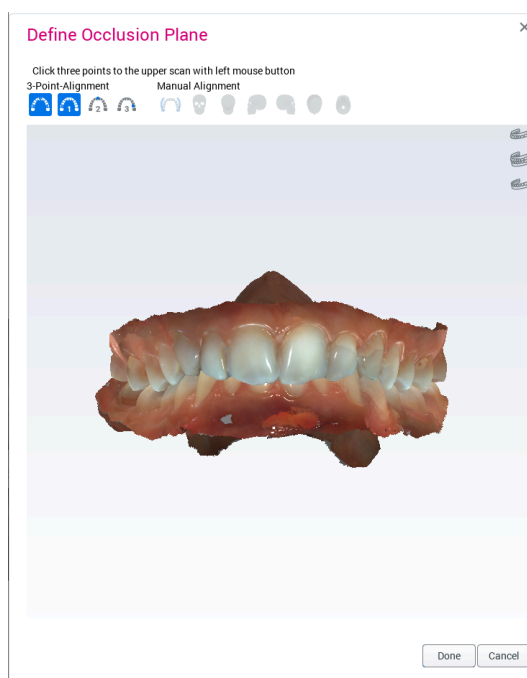
If you want to use the lower model in the definition, select it from the viewing buttons in the upper right corner of the dialog.



The models are automatically aligned.

2. If necessary fine-tune the alignment manually, see section "Manual alignment" on page 94.

3. Finish the alignment and exit the dialog by clicking **Done**.

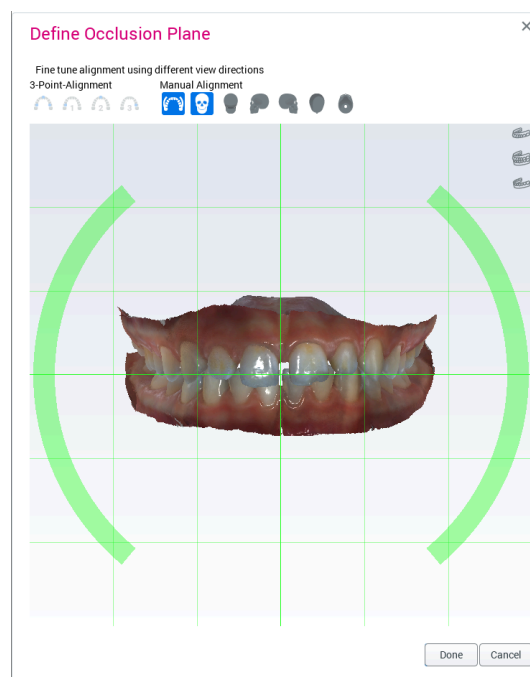


13.2.2

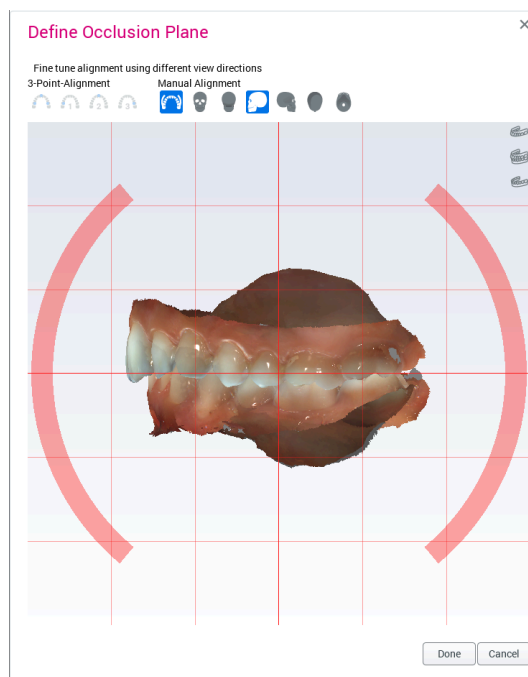
Manual alignment

If necessary, you can use manual alignment to fine-tune alignment after 3-point alignment.

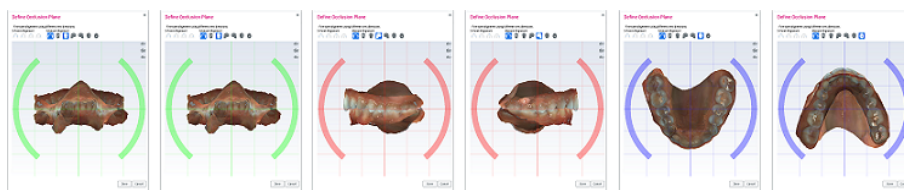
You can freely translate the models by dragging.



To rotate the models, drag from the arcs around the models.



To change viewing direction, use the buttons on the manual alignment toolbar.

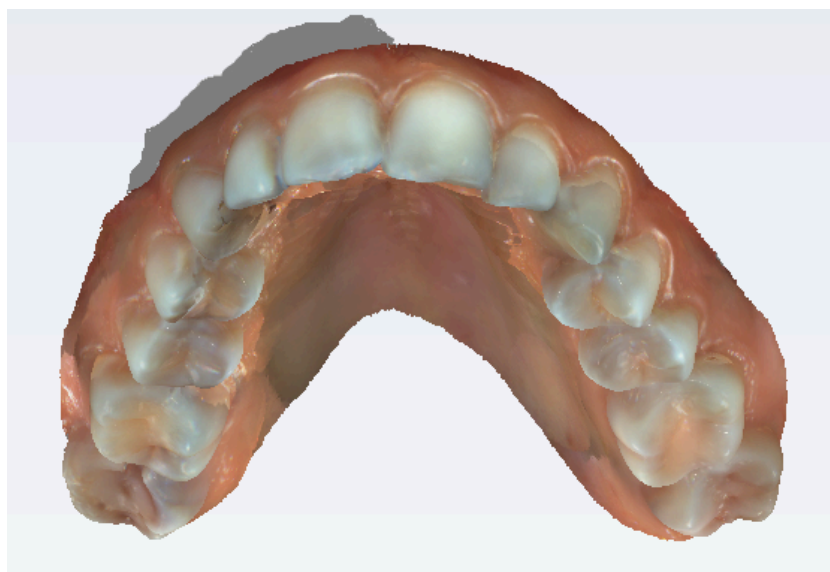


13.3 Trimming model

Paint ROI to trim



Select **Paint ROI to trim** and drag the tool on the model to remove any unwanted areas.

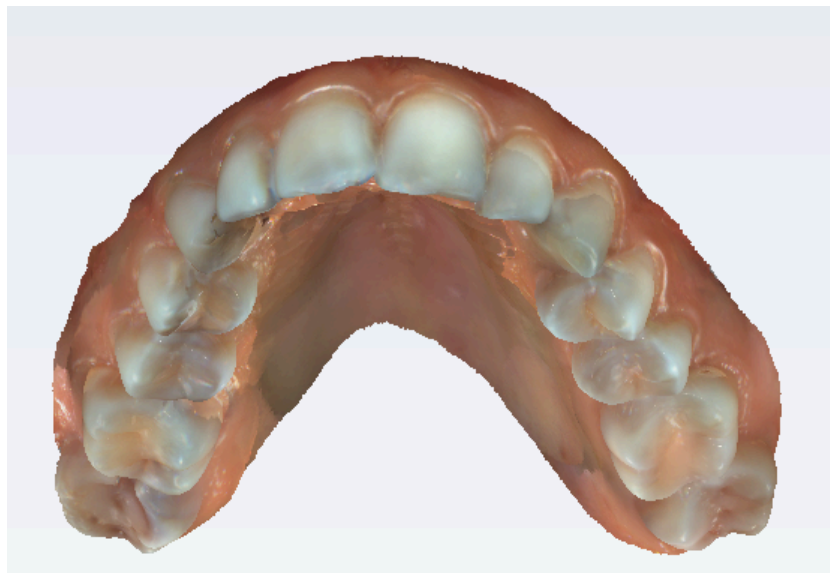


To change the brush size, hold down the **Ctrl** and **Shift** keys while scrolling the mouse wheel.

To increase the size of the trimming tool, zoom out.

To rotate models while trimming, hold down the **Alt** key while dragging.

The surfaces behind the painted area(s) are automatically removed.

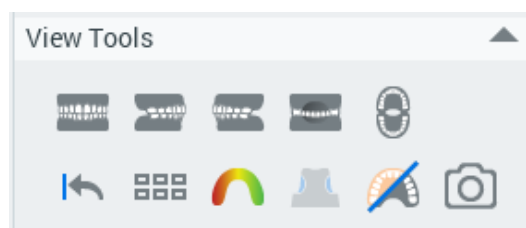


To undo/redo modifications, click the **Undo** and **Redo** buttons.



13.4

View tools



To view models from different directions, click the front, right, left, back and open mouth view buttons.



Reset view

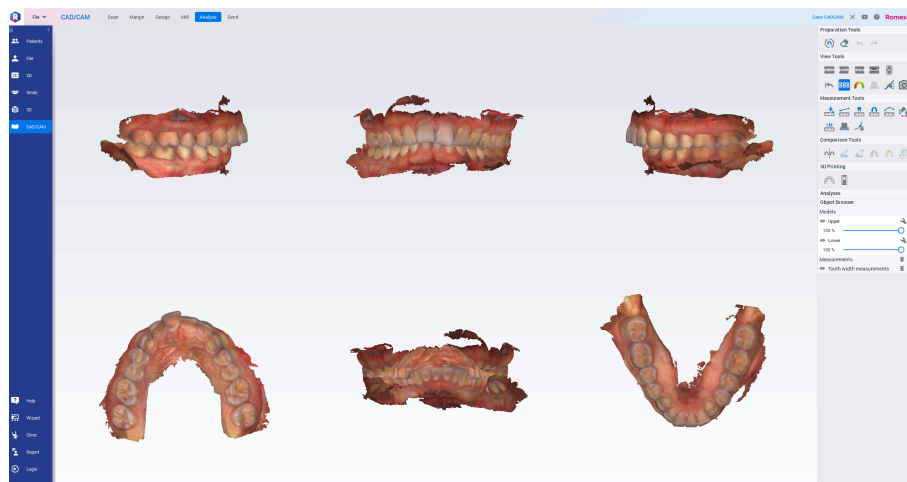
Click this button to reset orientation to the state right after model orientation.



Multi-view



To visualise models from different directions and occlusal view at the same time click multiple views.



13.4.1

Calculate contact map

Calculate and show contact map



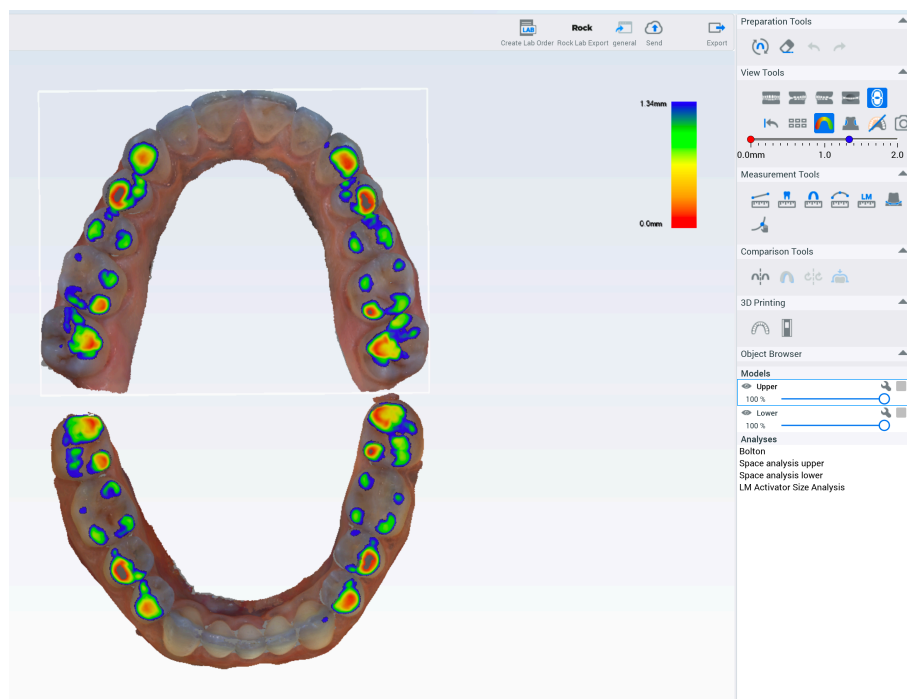
Click this tool to visualise distances between upper and lower models.

The color map scale can be adjusted from both ends.

To indicate contact and the distance under which all is visualised in red, drag the red dot.

To set the maximum distance visualised, drag the blue dot.

Model overlap is visualised in grey.



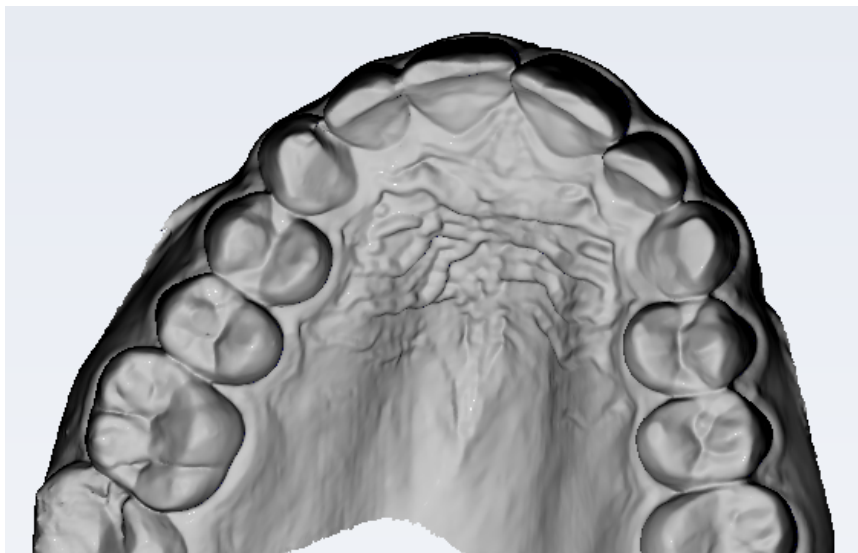
13.4.2 Calculate undercuts

About this task

Follow these instructions to calculate undercuts.

Steps

1. Select the surface model in the object browser.
2. Rotate the model to the desired insertion direction.

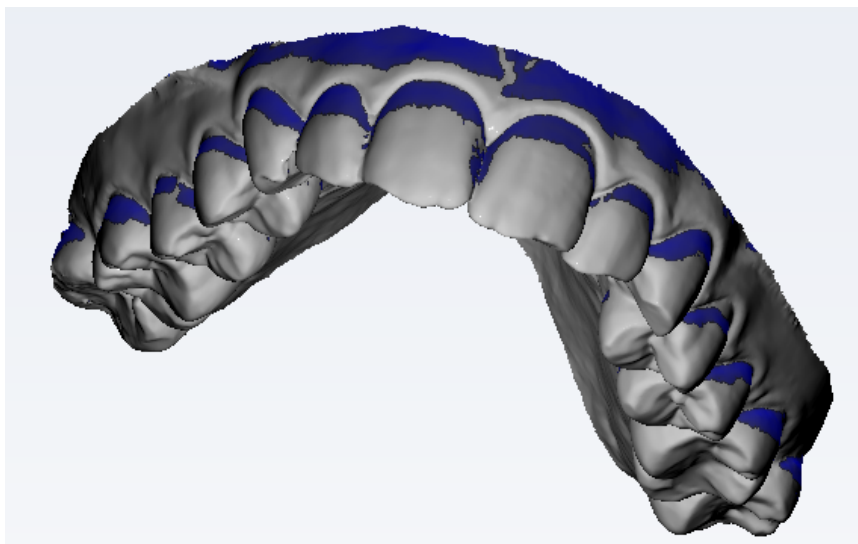


3. Click the **Calculate and show undercuts** button.



The undercut areas in the selected insertion direction are coloured in blue.

To change the insertion direction, deactivate the tool, re-orient the model and click the button again.



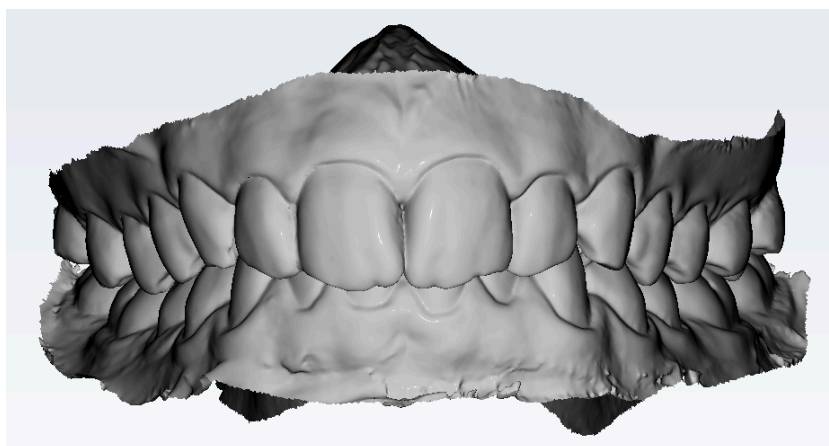
The colour of the surface model returns to normal when the tool is deactivated.

13.4.3

Colours



Use this tool to show/hide model colour.



13.4.4

Taking 2D quickshot

About this task

Follow these instructions to take a 2D quickshot.

Steps

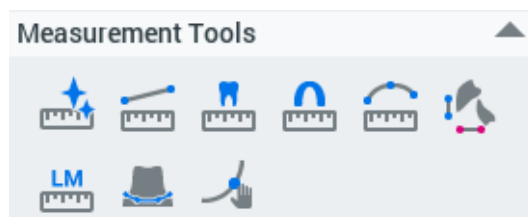


1. Click the **Quickshot** button.

Results

The quickshot is saved to 2D imaging module under *Photos*.

13.5 Measurement tools



13.5.1 Smart analysis

About this task

Use this tool to create automatic measurements and analysis.

NOTE

Scans taken from deciduous or mixed dentition are not supported by smart analysis.

Steps

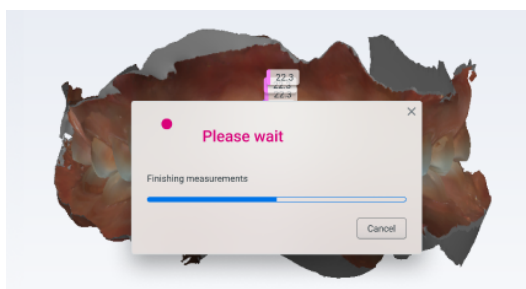


1. Activate the **Smart analysis** tool to create:
 - Upper and lower arch measurements.
 - Tooth width measurements.
 - Overjet & overbite measurement (OB/OJ) for teeth 11 and 21.
 - LM-Activator size analysis.

NOTE

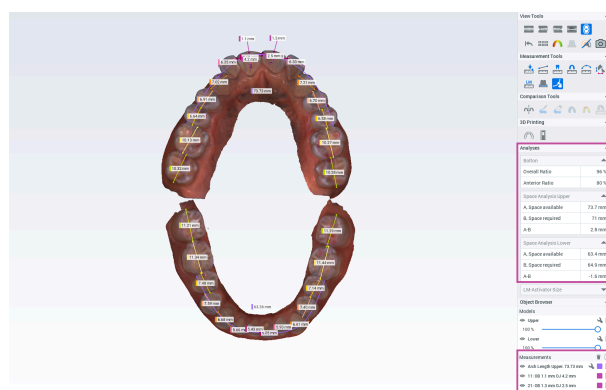
When measuring OB/OJ, the automatic measurement point on the lower model is taken perpendicular to the mesiodistal axis of the upper tooth. If teeth are rotated out of arch, it is recommended to take the measurement manually or correct the automatically made measurement. See section "Overbite/overjet" on page 106.

2. Accept the disclaimer, if you agree with it.
3. Romexis will run the automatic analysis.



Results

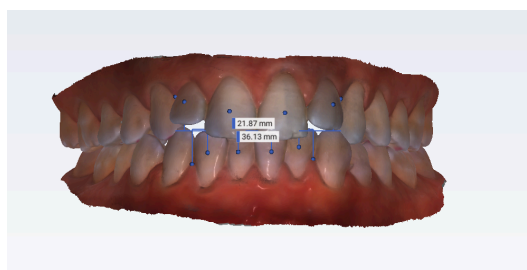
The analysis results and measurements are shown on the right.



What to do next



After running smart analysis, you can click the LM-Activator tool to automatically calculate the LM-Activator arch length measurement.



13.5.2

Point-to-point measurement

About this task

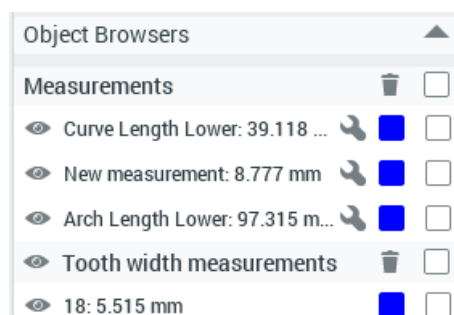
Use this tool to measure a distance from one point to another.

Steps



1. Activate the **Point-to-point** measurement tool.
2. Click the model where you want the measurement to start.
3. Click the model where you want the measurement to end.

The 3D measurements are shown in the object browser under *Measurements*.



13.5.3 Tooth width measurement

About this task

Follow these instructions to take a tooth width measurement.

Steps



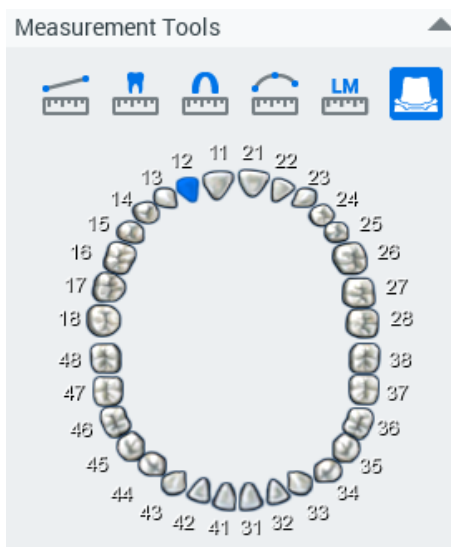
1. Click the **Tooth width measurement** tool.
2. Click a numbered tooth on the chart.

In the upper jaw start from the posterior right side, in the lower jaw start from the posterior left side.

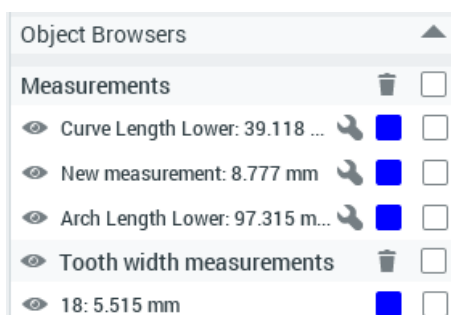
3. Click the distal and mesial side of the tooth.

The next tooth is automatically selected from the chart.

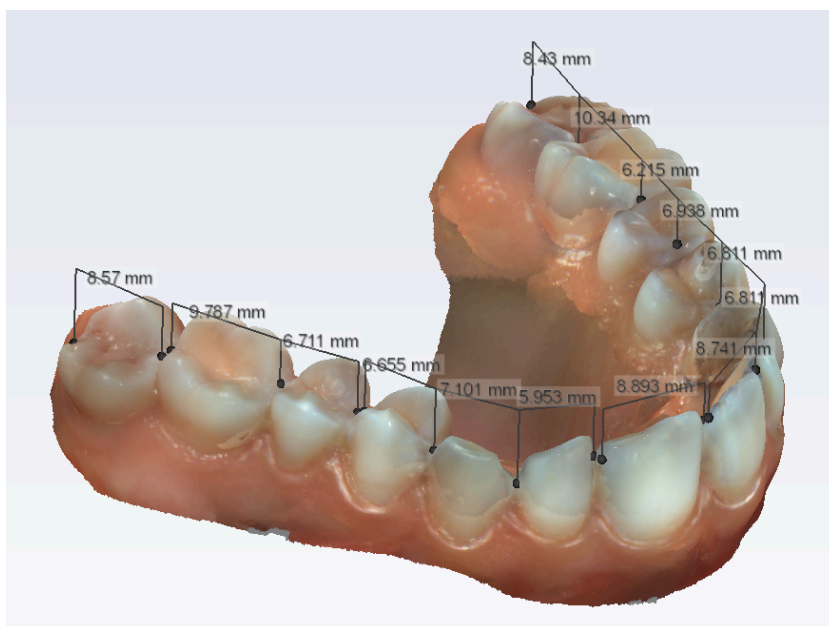
- To skip a tooth, click on another tooth on the chart.
- To re-measure a tooth, click it on the chart.



The measurements are shown in the object browser under *Tooth width measurements*



The width measurements are calculated as a projection of the 3D points on the occlusal plane. The measurements are used in some of the analyses.



13.5.4 Arch length measurement

About this task

Arch length measurement is calculated as a projection of the 3D points on the occlusal plane. This measurement is used in some of the analyses.

NOTE

The first arch length measurement per jaw is used in the calculation of Space analysis. Measure arch lengths from distal of 5 to distal of 5 for the Space analysis to be calculated correctly.

To measure arch length:

Steps



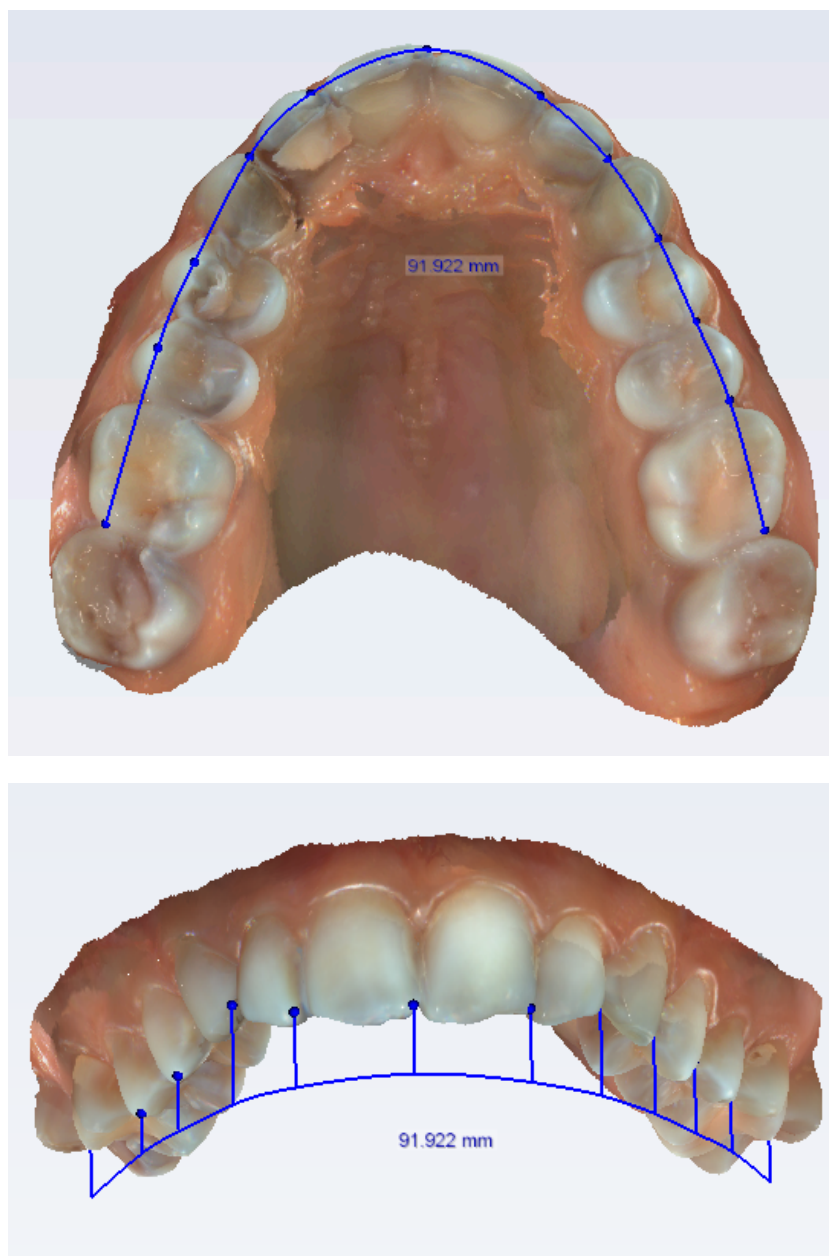
1. Activate the **Arch length measurement** tool.

The open bite view opens by default.



2. Add measurement points by clicking on the occlusal surface of the upper or lower arch.

To adjust the view, hold down the **Alt** key while dragging the model.



- When enough measurement points have been added, complete the arch by deselecting the measurement tool or right-click on the model.

Results

The measurement appears in the object browser.

Measurements			☐
	Arch Length Upper: 91.922 mm		☒
	Margin line 17		☒
	Margin line 14		☒

What to do next



If necessary, you can fine-tune the measurement points by activating the **Drag measurement points** tool and dragging the points to correct locations.

13.5.5 Curve measurement

About this task

Follow these instructions to measure curve.

Steps



1. Click the **Curve measurement** tool.
2. Click the model to draw curve.
3. Add measurement points by clicking the surface of the upper or lower arch.
To adjust the view, hold down the **Alt** key while dragging the model.
4. Finish the curve by right-clicking the model or deselecting the measurement tool.

Results

The measurement is shown in the image and in the **Object browser**.

What to do next



To fine-tune the measurement points, select **Drag measurement points** tool and drag the points to correct locations.

13.5.6 Overbite/overjet

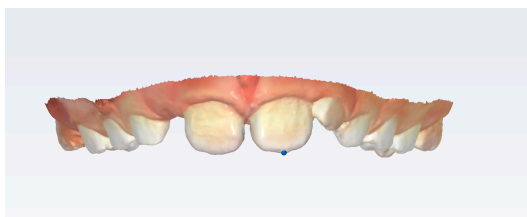
About this task

Use this tool to create overbite and overjet measurements.

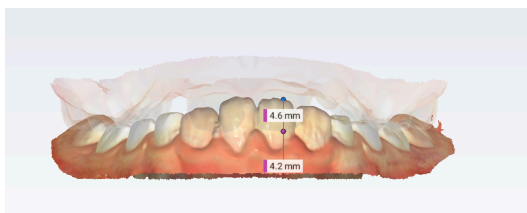
Steps



1. Activate the **Overbite/overjet** measurement tool.
2. Select a point on the cusp in the upper model.

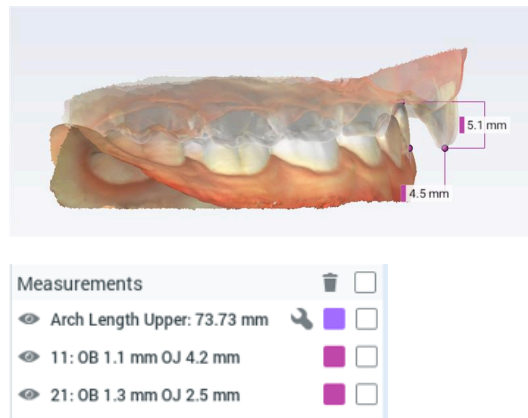


3. Select a point on the cusp in the lower model at the corresponding location.



Results

The overbite (OB) and overjet (OJ) measurements are shown on the models and in the object browser under **Measurements**.



Overbite value shows the vertical distance between the points placed on the upper and lower models.

Overjet value shows the horizontal distance between a point on the upper model and a point automatically created on the labial surface of the lower teeth at the same height as the point on the upper model.

The tooth number of the upper tooth is shown if overbite/overjet measurement is created automatically.

13.5.7 LM-Activator arch length measurement

About this task

The LM-Activator arch length measurement tool aids in the selection of the appropriate appliance model and size. The tool measures the distance across the incisors (from the mesial surface of the right canine to the mesial surface of the left canine) and indicates the estimated size of the appliance.

NOTE

Complete tooth width measurements are needed for the LM-Activator analysis. In case of missing frontal or lateral incisors mark the estimates of the widths of unerupted teeth. If necessary, see estimations for the widths of unerupted teeth.



WARNING

Disclaimer: In case of crowding or diastemas (e.g. in case of deciduous incisors) the size estimation may be inaccurate. Evaluate individually the extra space needed for the eruption of the permanent maxillary and mandibular lateral incisors and re-evaluate the size of the appliance. Also, in case of mixed dentition consider the expansion of the dental arches.



WARNING

Disclaimer: In case of tooth-size-discrepancy, the estimated size of the upper and lower jaw may be different. Evaluate individually to select or design the appropriate appliance.

TIP

You can use the Romexis Space analysis to evaluate crowding or diastemas in the anterior region and Bolton analysis to evaluate if patient has tooth-size-discrepancy.

**WARNING**

Disclaimer: Double-check that the impressions of all teeth are complete and e.g. the distal surface of the molars or second molars is not missing. Incomplete impressions may reduce the accuracy of estimations.

**WARNING**

Disclaimer: Fit the appliance on the patient and double-check that the teeth fit correctly in the appliance. If the patient's teeth are not guided towards the bottom of the slots but constrained by the ridges between the slots, treatment may not be successful. It is particularly important to check that the LM-Activator applies desired force on the canines.

NOTE

The LM-Activator appliance is intended to be used on one patient and then discarded. It may exceptionally be reprocessed (inspected, cleaned and high-level disinfected or sterilised) for use on another patient in case the appliance has been used on a same-day procedure (e.g. fitting the appliance) under the monitoring of health care professionals. If the appliance has been used by a patient at home, it shall not be reprocessed for use on another patient. See the Cleaning and preventive maintenance instructions for details.

NOTE

Please refer to LM-Activator documentation for more information.

Steps

1. Click the **LM-Activator** tool.
2. Read and confirm you have read the following statement.

i

LM Activator Arch length measurement

The Romexis software features used for the measurement and selection of the correct size of LM-Activator may be used only as an aid in planning the treatment of the patient and in orthodontic appliance selection and design. Before taking the LM-Activator orthodontic appliance into use by the patient, the treating health care professional shall be responsible for evaluating that the orthodontic appliance of correct size and fit for the specific patient purpose by testing and fitting the orthodontic appliance together with the patient. The health care professional is solely responsible and liable for the diagnosis, treatment, and evaluating whether treatment with any specific orthodontic appliance is fit for the specific patient, and for the outcome of any treatment. Planmeca, its distributors and the manufacturer of the LM Activator shall waive from any and all liabilities relating thereto.

The health care professional shall hold Planmeca, its distributors and the manufacturer harmless of any damage incurred due to any breach of the health care professional's liabilities defined herein or in any applicable agreement, terms of use, or instructions relating to the respective orthodontic appliance.

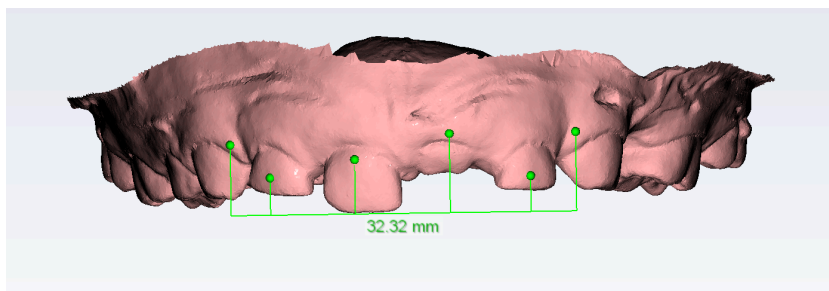
Please refer to manufacturer's instructions for use when applicable.

The front view of the model is automatically displayed.

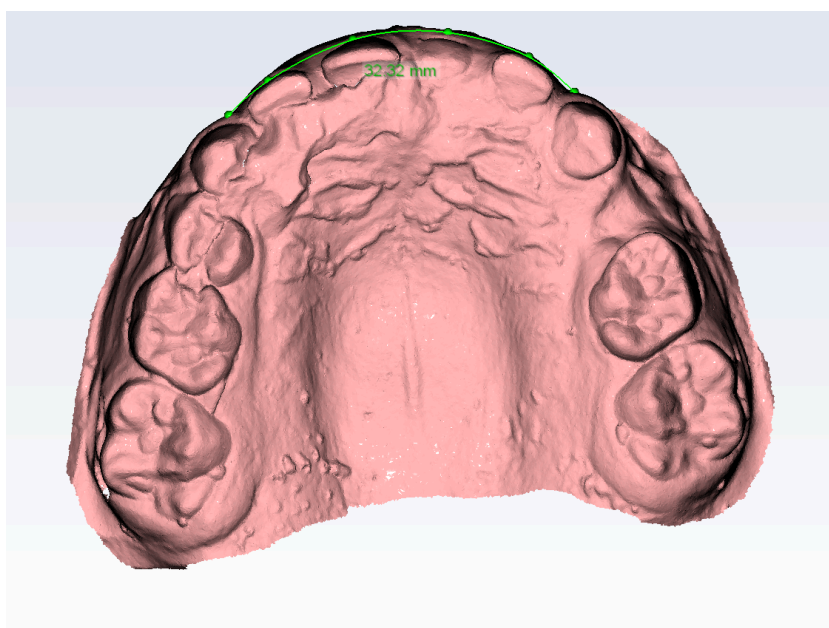
To zoom in the model, hold down the **Alt** key while scrolling the mouse wheel.

To adjust the view, hold down the **Alt** key while dragging the model.

3. Measure the arch length from the mesial surface of 13 to mesial surface of 23 by clicking on the vestibular surface of the crowns in between.



4. End the measurement by disabling the tool.
5. Verify the arch shape by rotating the model as illustrated.



If necessary, fine-tune the position of the points and the shape of the arch using the **Drag measurement points** tool.

6. Complete the measurement by deselecting the tool.
7. Repeat the process for lower teeth.

Results

Measurements			☐
	Upper LM-Act: 32.09 mm		☐
	Arch Length Upper: 97.36 mm		☐
	Lower LM-Act: 30.19 mm		☐
	Arch Length Lower: 95.18 mm		☐

Analyses	
Bolton	
Overall Ratio:	105.5 %
Anterior Ratio:	90.3 %
Space analysis upper	
A, Space available:	97.4 mm
B, Space required:	65.7 mm
A - B:	31.7 mm
Space analysis lower	
A, Space available:	95.2 mm
B, Space required:	67.9 mm
A - B:	27.3 mm
LM Activator Size Analysis	
▼ Upper	
LM-Activator 1 size:	40 S
Narrow LM-Activator 2 size:	45 S
Wide LM-Activator 2 size:	45 S
▼ Lower	
Narrow LM-Activator 2 size:	70 S
Wide LM-Activator 2 size:	70 S

13.5.8 Drawing tooth margin

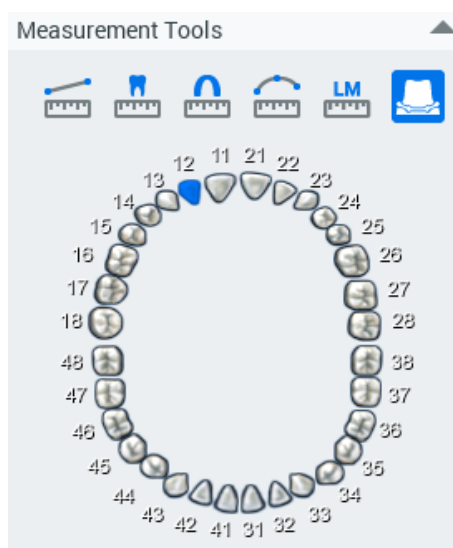
About this task

Margin line can be used for drawing an outline for prepared teeth before sending the scan to a laboratory. The outline can be used to improve the fit off the prepared tooth.

Steps

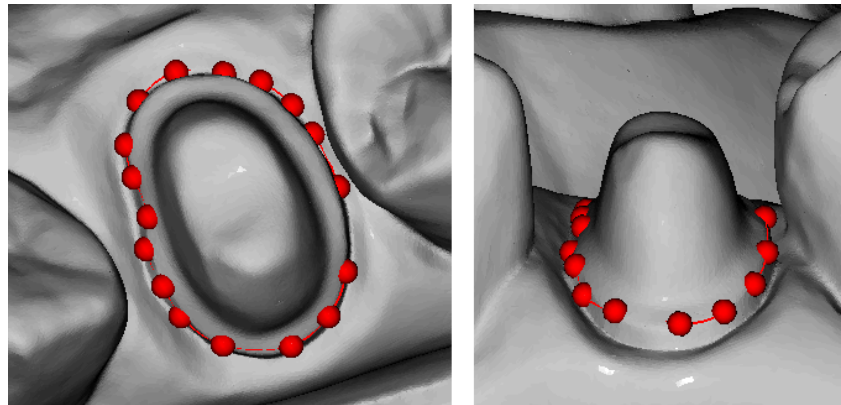


1. Click **Margin Line** tool.
2. On the tooth chart click on the tooth for which you want to draw a margin.



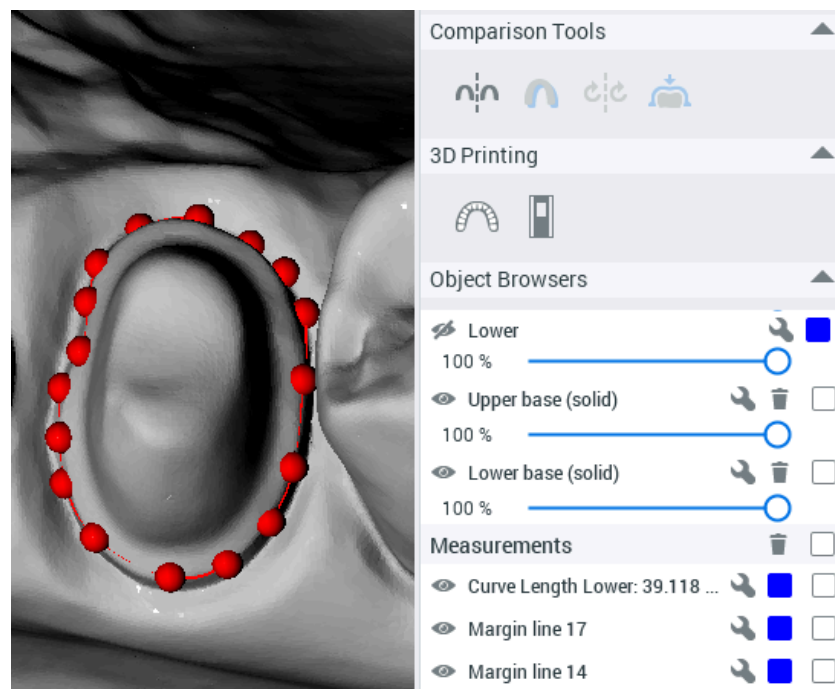
3. Click around the tooth to add points for a margin line.
At minimum three points are required.

A margin line is automatically drawn between the added margin points.



Results

When points have been added around the entire tooth and you click next to the first added point, the margin is completed, and it appears in the object browser.



To adjust the location of margin points, deselect the Margin Line tool, hold down the **Shift** key while dragging a point to a desired area.

To delete a margin, check the box of the margin in the object browser and click the trash can icon.

The default colour of the margin is red. To change the colour, click the red square next to the margin in the object browser and select the desired colour from the colour map.

To change the camera viewing angle, hold down the **Alt** key while dragging on the model.

13.5.9 Fine-tuning measurements

About this task

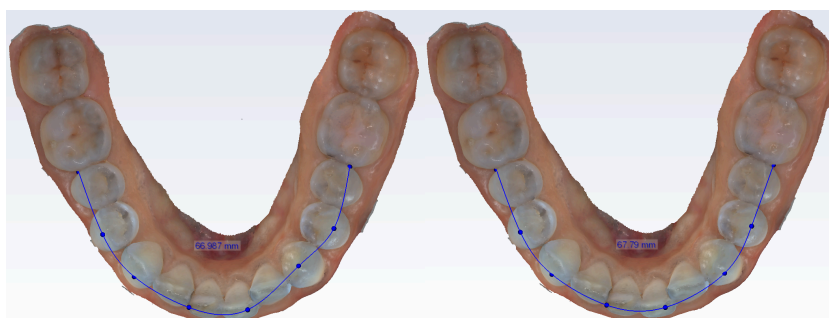
If necessary, the measurement points of all types of measurement (Point-to-point, Tooth width, Arch length, LM activator and Margin Lines) can be fine-tuned using the **Drag measurement points** tool.

Follow these instructions to fine-tune measurements.

Steps



1. Select the **Drag measurement points** tool.
2. Drag the point(s) to correct locations.



Results

The measurement is updated to the object browser and on the measurement label.

13.5.10 Editing models in object browser

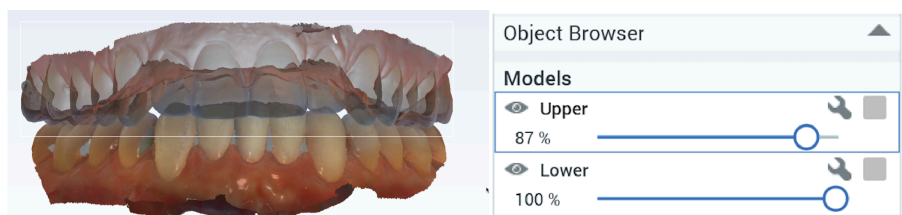
In the object browser you can:



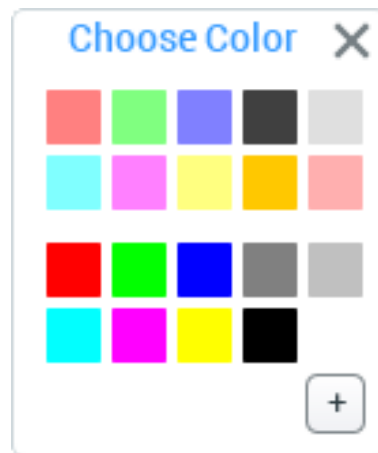
Show/hide models by clicking this button.



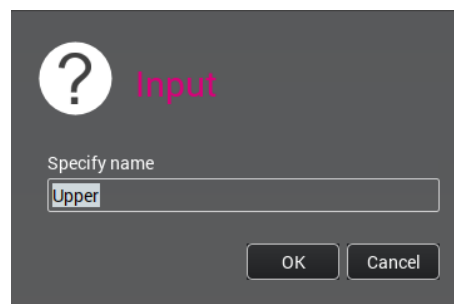
Adjust transparency using the sliders.



Change model colour by clicking the square next to the model and choose colour.

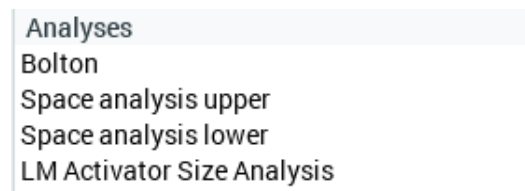


Name the model by clicking the wrench icon and entering a suitable name.



13.6 Analyses

The analyses are shown when all the necessary measurements are available. Otherwise they are shown in red.



Bolton

Tooth width measurements are used to obtain the Bolton analysis using the following formulae:

- Bolton overall = (sum of mesiodistal widths of 12 mandibular teeth) / (sum of mesiodistal widths of 12 maxillary teeth) * 100%
- Bolton anterior = (sum of mesiodistal widths of 6 mandibular teeth) / (sum of mesiodistal widths of 6 maxillary teeth) * 100%

Space analysis

To obtain tooth width and arch length measurements for space analysis use the following formulae:

- Measure arch circumference from mesial of first molar to mesial of first molar = **space available**

- Measure the mesiodistal width of teeth from 5 to 5 and add together = **space required**:
- Reduce the space required from the space available = **arch length discrepancy**

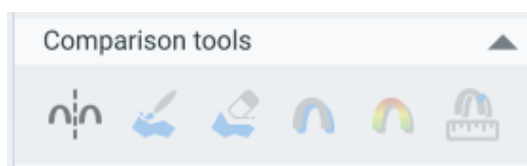
NOTE

The first arch length measurement for upper and lower jaw is used in the calculation of Space analysis.

13.7

Comparison tools

The comparison tools can be used to compare the models from different time-points.

**Side-by-side comparison**

Compares scans of different time points (e.g. at the beginning and end of treatment).

Paint ROI

Paint region of interest.

Remove ROI

Removes areas from the region of interest.

Superimposition

Superimposition fits the selected cases together.

Heat map

Shows a heat map that indicates the closest distance of first CAD/CAM case to the second case.

Two surface measurement

Used to make a measurement between superimposed models.

13.7.1 Side-by-side comparison

About this task

To compare scans of different time points (e.g. at the beginning and end of treatment):

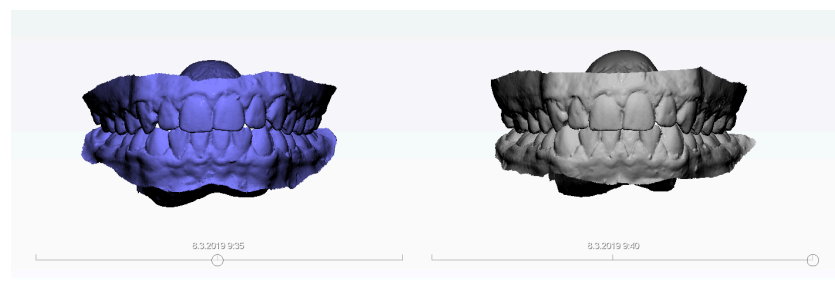
Steps



1. Click the **Side-by-side comparison** tool.

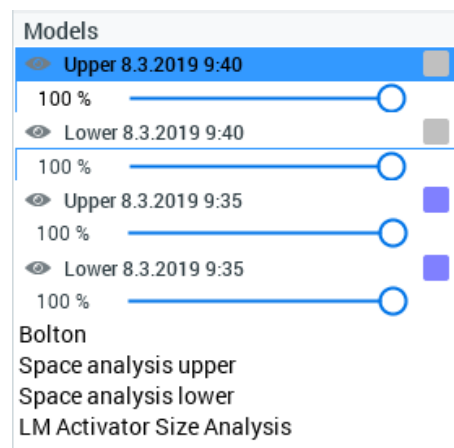
Results

The previous scans are loaded from database for comparison. All scans are shown as a notches on the timeline. To select a scan for comparison, click on the desired notch.



What to do next

You can adjust the colour and opacity of a model by selecting it in the object browser and dragging the slider.



To hide models from view, click the **Show/Hide** button.

13.7.2 Paint ROI (Region of interest)

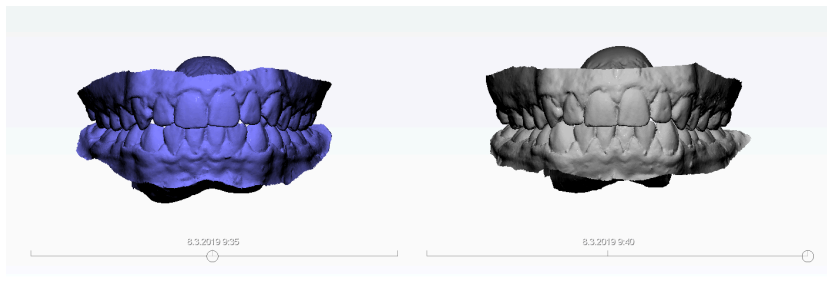
About this task

To compare scans of different time points (e.g. at the beginning and end of treatment):

Steps



1. Click the **Side-by-side comparison** tool.
The previous scans are loaded from database for comparison. All scans are shown as a notches on the timeline. To select a scan for comparison, click on the desired notch.

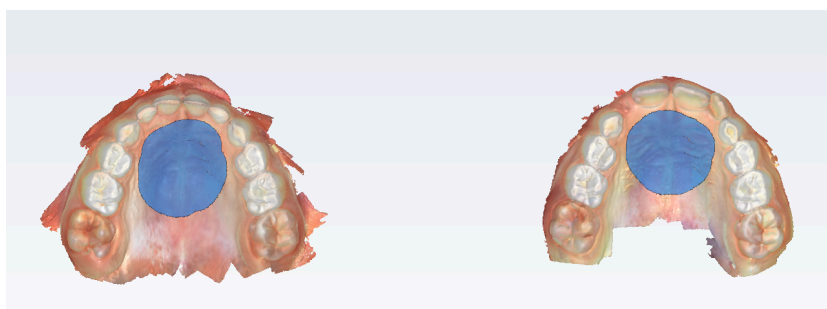


2. Click the **Paint ROI** tool.



3. Hide lower jaws from the object browser one at a time.
4. Paint matching areas on both models by clicking on mouse left button and dragging.

Change brush size by Alt+mouse wheel.



5. Toggle the eraser tool to erase unwanted areas from selection.

What to do next

Continue to section "Superimposition" on page 116.

13.7.3

Superimposition

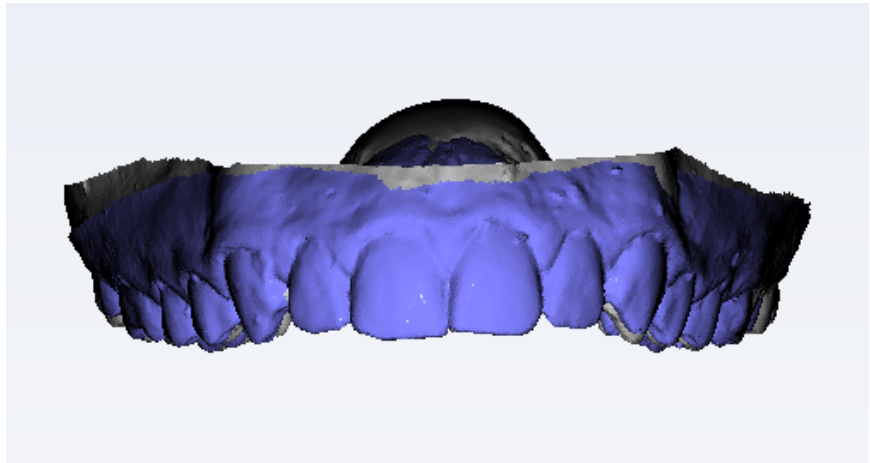
About this task

Superimposition fits the selected cases together based on the defined ROIs. If ROIs are not defined, full models are used to perform the fitting

Steps



1. Click the **Superimpose** button.



2. Toggle lower jaw's visibility from the object browser.

13.7.4 Heat map

About this task

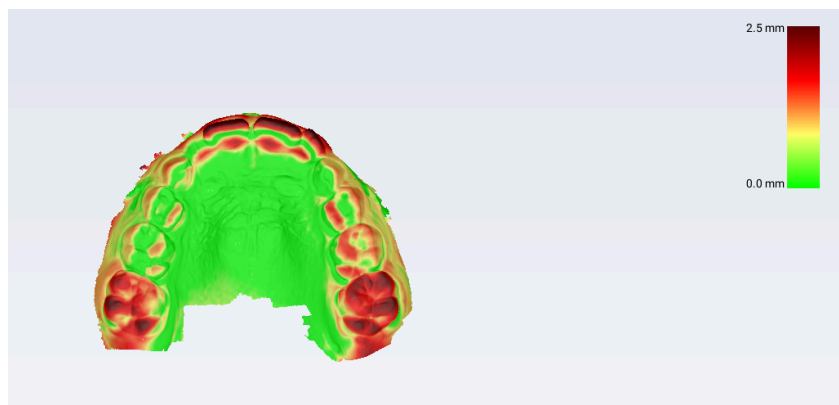
The heat map is a rendering option for the Superimpose view. To use the heat map:

Steps

1. Click the **Heat map** button.



A heat map indicating the closest distance of first CAD/CAM case to the second case is displayed.



2. Hover your mouse cursor over the heat map to show a number label, indicating the distance value for that vertex (or triangle).

A range slider is also displayed below the Comparison Tools buttons, allowing you to change the range of the heat map colours.

13.7.5 Two surface measurement

About this task

To make a new measurement:

Steps



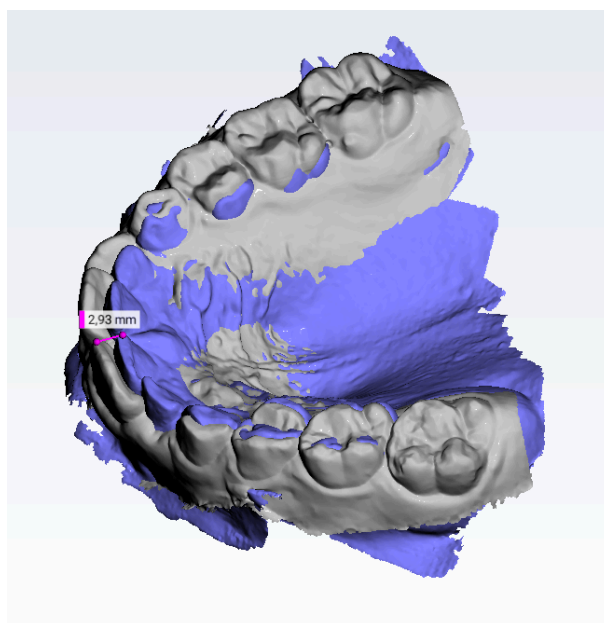
1. Click the **Two surface measurement** tool.
2. Click with left mouse button on the model where you want to start the measurement.
3. Click with left mouse button on the model where you want to end the measurement.

NOTE

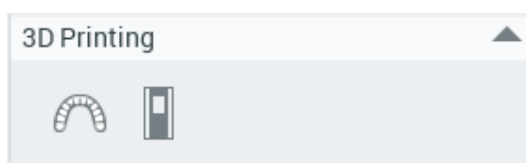
The rendering view can be rotated and panned by holding down ALT-key while adding measurements.

Results

Saved measurements are displayed in under heading Measurements in the object browser.



13.8 3D printing

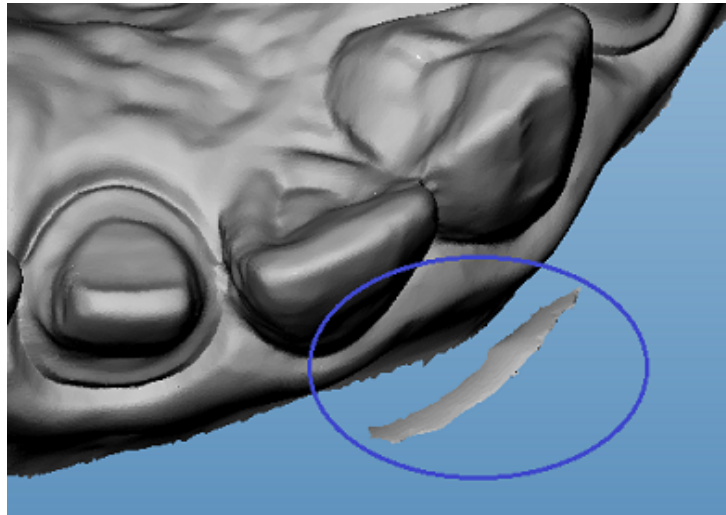


13.8.1 Creating 3D printable models

Before you begin

NOTE

Check the trimming to make sure no extra data is left outside the model.



About this task

Follow these instructions to create 3D printable models.

Steps

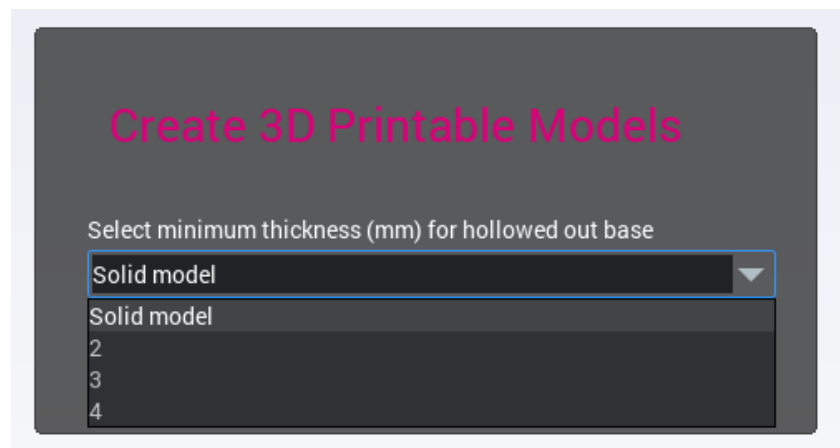


1. Click the **Generate a solid or hollowed-out model** button.

NOTE

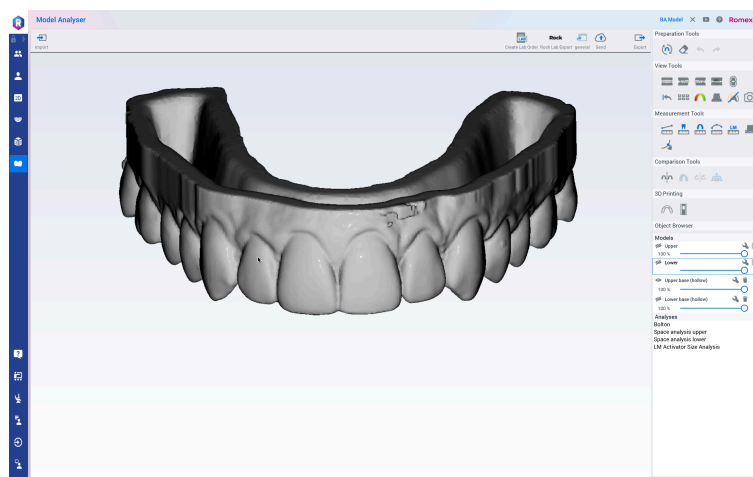
The orientation of the model defines the orientation of the base so that the bottom of the base is orientated parallel to the occlusal surface of the model. The height of the model also defines the height of the base.

2. Proceed as applicable:
 - To create a solid model, simply click **OK** in the following dialogue.
 - To create a hollowed-out base, select the suitable wall thickness from the drop-down menu and click **OK**.



Results

The models appear in the object browser as separate surface models.



13.8.2 Exporting 3D models with bases

About this task

The folder where the models are exported must be defined in the *Admin* module, for more information see the Romexis technical manual.

Steps



1. Click the **Export the selected base(s)** button.

Results

The models are exported as .stl files into the configured folder from where they can be sent to the 3D printer.

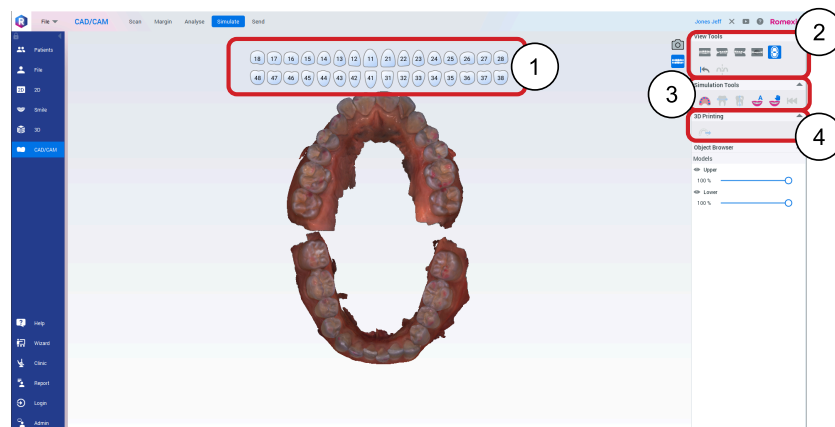
14 Simulate tab

NOTE

DISCLAIMER: The simulation is solely intended for patient communication purposes and does not constitute an actual treatment plan proposal.

Incomplete scans, such as scans without proper gingiva around all teeth, scans with many missing teeth, deciduous or mixed dentition, metal appliances, attachments, very crooked, chipped or worn teeth, or other abnormalities are not supported and may not produce good results in segmentation or simulation.

When opening a scan in **Simulate** tab for the first time, the scan is shown in an open bite view. When a simulation is already available, it is shown in a side-by-side view with the original segmented model.



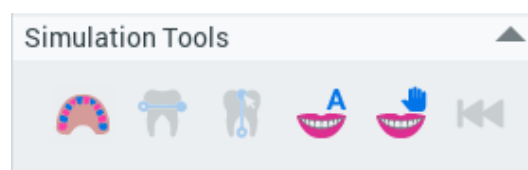
- 1 **Tooth Chart** above the models shows existing and missing teeth when segmentation is available.
- 2 **View Tools** includes tools for predefined viewing directions.
- 3 **Simulation Tools** includes all the tools needed to perform segmentation and simulation.
- 4 **3D Printing** to export current simulation result to a previously configured 3D printer export folder.

Teeth need to be segmented to simulate tooth movement either automatically or manually. The segmentation consists of a labelling step and axes correction steps. Automatic labelling and axis detection results are reviewed, and manual changes can be made if necessary.

When the segmentation is ready, either the Automatic Simulation or Manual Simulation can be used.

It is possible to go directly to either automatic or manual simulation without going through the segmentation steps beforehand, but in that case you may need to return to these steps for manual corrections.

14.1 Simulation tools



Segmentation



See section "Segmentation" on page 122 for more information.



Mesio-distal axis adjustment

See section "Mesio-distal axis adjustment" on page 125 for more information.



Long-axis adjustment

See section "Long-axis adjustment" on page 126 for more information.



Automatic Simulation

See section "Automatic Simulation" on page 126 for more information.



Manual Simulation

When the Manual Simulation button is clicked, the segmentation starts to run. Segmentation is performed if not done prior to clicking the button. After segmentation, the Manual Simulation can be started. You can, at any time, return to adjust labelling or axes, if necessary.



Reset

Resets both the segmentation and simulation.

14.2 Segmentation

About this task

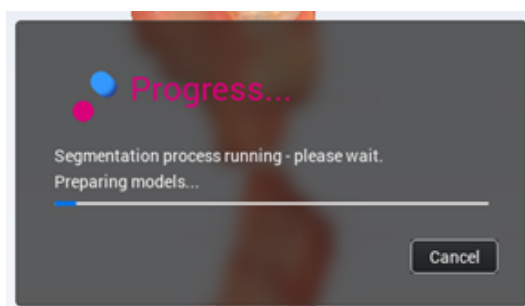
Segmentation is done as follows.

Steps

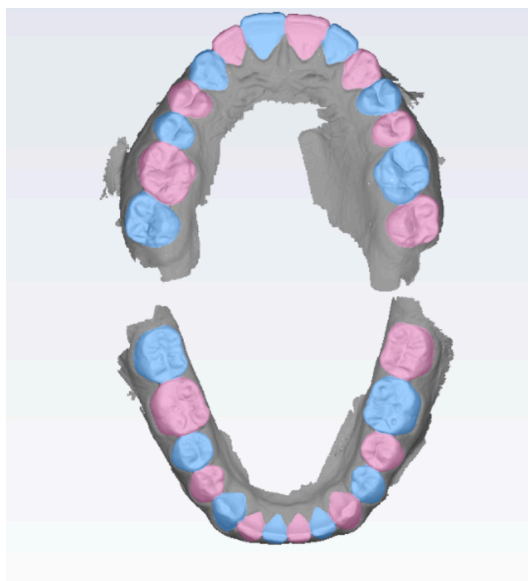


1. Click on the segmentation icon.

An automatic segmentation of crowns starts.



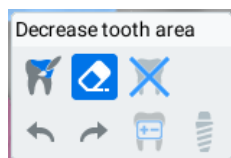
Crowns from the scans are identified and labelled, as well as tooth axes detected. The crowns are painted in alternating colours to help in understanding the situation quickly.



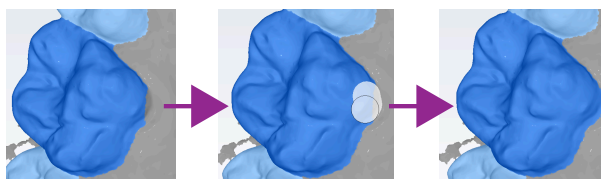
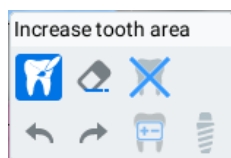
2. Review the labelling results including the painted crown areas and numbers.
3. Make modifications to the tooth labeling result as necessary by clicking on a crown and using the **Segmentation tools**.



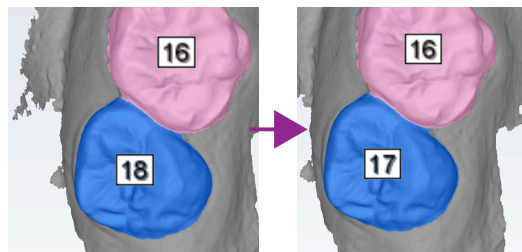
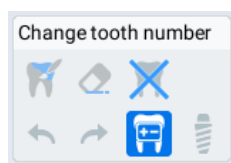
To decrease tooth area:



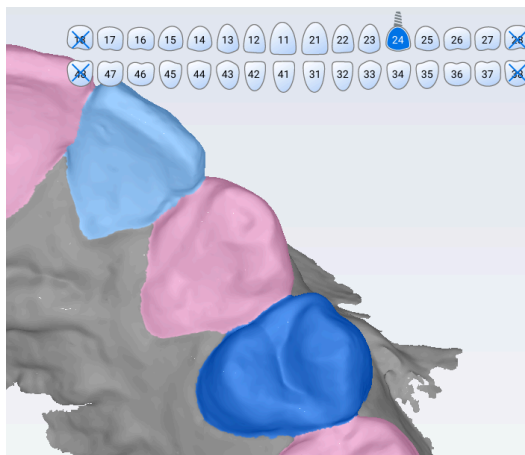
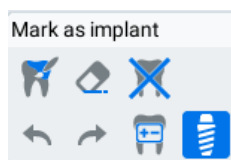
To increase tooth area:



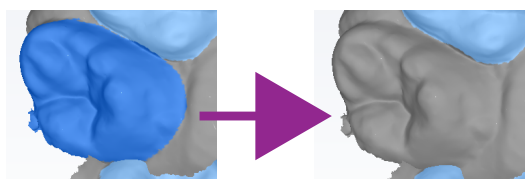
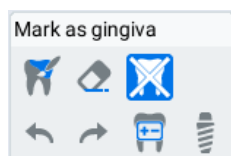
Change tooth number by increasing or decreasing its number with the help of the arrow buttons.



To mark tooth as implant



To mark tooth as missing e.g. in case erroneous marking of a tooth on gingiva or on a tooth that already has a label or a wisdom tooth:



NOTE

Implants are not moved in simulation and may have a negative effect on the simulation results.

NOTE

It is recommended to mark the third molars i.e. wisdom teeth as missing to improve the simulation visualization.

What to do next

Proceed to "Mesio-distal axis adjustment" on page 125.

14.3 Mesio-distal axis adjustment

About this task

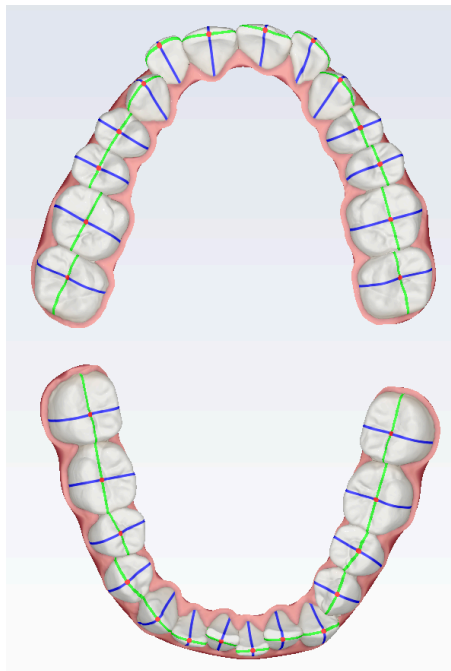
In this step the teeth's mesio-distal / bucco-lingual axes are shown and can be adjusted.

Steps



1. Click on the **Mesio-distal axis adjustment** button.
2. Drag from the blue line to rotate the line around the tooth center point.

The objective is to align the blue line bucco-lingually and the green line mesio-distally. These lines are later used in rotating teeth correctly on the arch.



What to do next

Proceed to "Long-axis adjustment" on page 126.

14.4 Long-axis adjustment

About this task

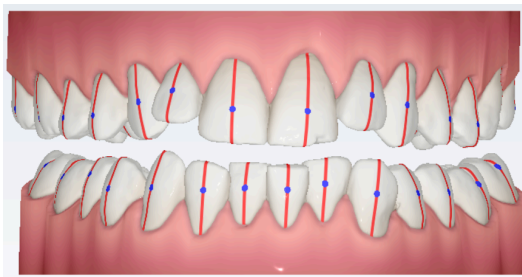
In this step the long axes of the teeth can be adjusted.

Steps



1. Click on the **Long-axis adjustment** button.
2. Drag from the red lines to rotate the axis around tooth center point.

The objective is to align the long axis along the direction of the tooth's root. This line is later used in aligning teeth parallel to each other on the arch.



NOTE

Make sure to align the long axes of the front teeth well. This has a positive effect on the simulation.

What to do next

Proceed to simulation.

14.5 Automatic Simulation

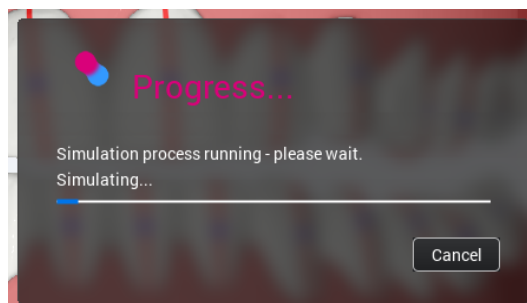
About this task

Automatic Simulation is done as follows.

Steps



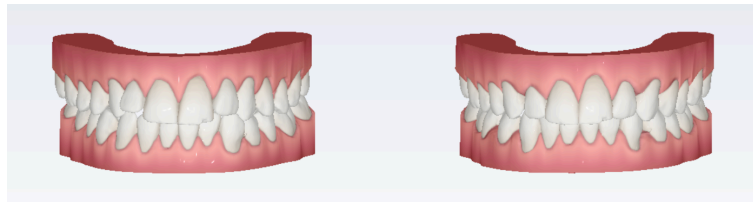
1. Click the **Automatic Simulation** button to start the simulation.



If segmentation is not performed prior starting simulation, it is run first. In this case you cannot review or adjust labelling or axes before simulation, but you can return to edit them later.

Results

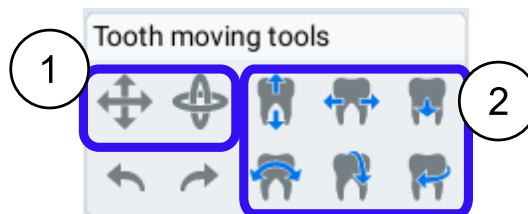
When simulation is ready, a side-by-side view of the segmented original model (on the left) and simulated model (on the right) appear.



What to do next

You can now adjust tooth positions manually by clicking on a tooth and selecting the desired tool from the floating toolbar. You can also use keyboard short cuts: SHIFT+CTRL+LMB translates a tooth and SHIFT+CTRL+RMB rotates a tooth.

Drag with LMB to either translate or rotate the tooth **(1)** or use the dedicated translation and rotation buttons **(2)** to make more precise adjustments.



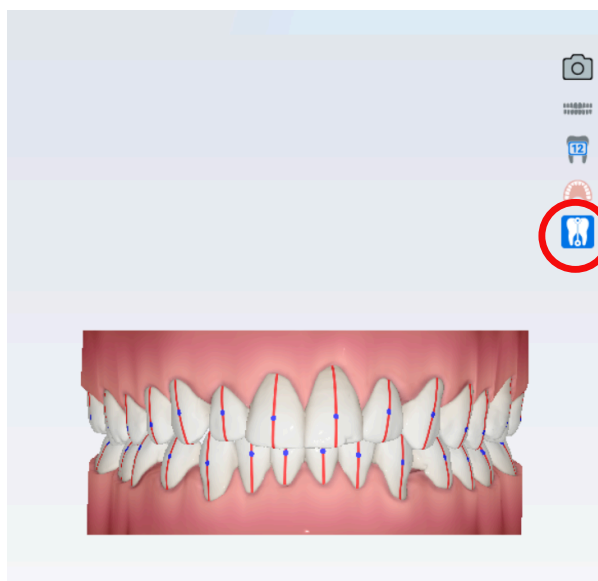
Automatic or manual simulation can be fine-tuned using either the side-by-side view or in a single view by disabling the former.

If a tooth is selected, the model is rotated around the selected tooth and if no tooth is selected, the model is rotated around the model centre point.

NOTE

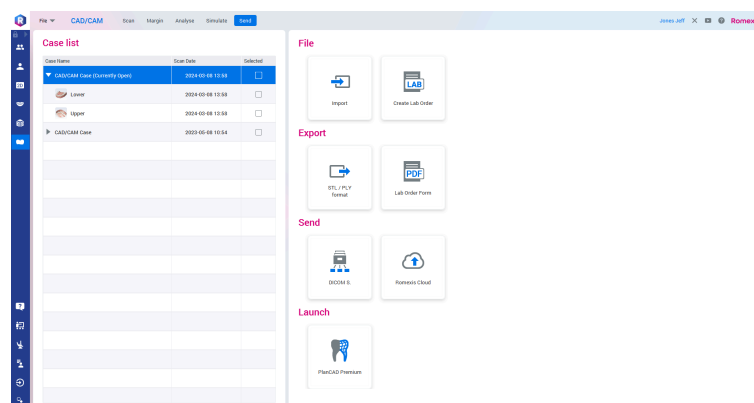
If the simulation is very much off, it might be due to incorrect labelling or axes detection. In that case it is recommended return to labelling and axis, and correct. Bad axes detection can cause teeth to be tilted or misaligned. Bad labelling can cause gingiva to show as a tooth or vice versa. Due to bad numbering, teeth can be misplaced in simulation.

To see the Axes in the Automatic Simulation click on the Axis button on the right side of the canvas.



When changes to labelling or axes occur, the Automatic Simulation is re-run from the beginning.

15 Send tab



15.1 Opening and inactivating cases in Case list

Opening cases

To open a CAD/CAM case in the Analyse tab, double-click the case folder or select *Open* from the right-click menu.

NOTE

Old CAD/CAM cases from PlanCAD Easy cannot be opened in Analyse tab.

Case list

Case Name	Scan Date	Selected
▶ CAD/CAM Case	2022-06-08 10:17	☒
▶ CAD/CAM Case	2022-06-01 16:54	☐

Currently open case is indicated in the case list with blue background.

▼ CAD/CAM Case (Currently Open)	2020-09-29 16:11	☐
Lower	2020-09-29 16:11	☐
Lower base (solid)	2021-10-26 18:51	☐
Lab Order Form	2022-01-04 11:36	☐

Inactivating cases

Select the case folder and click *Inactivate* from the right-click menu.

Case Name	Scan Date	Selected
▶ CAD/CAM Case	2022-06-08 10:17	☒
▶ CAD/CAM Case	2022-06-01 16:54	☐

To inactivate a single STL file, select the file and click *Inactivate STL* from the right-click menu.

15.2 File

15.2.1 Importing 3D models

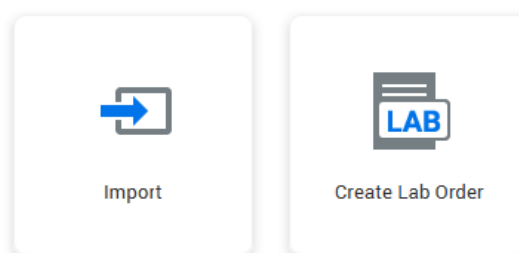
About this task

Follow these instructions to import 3D models.

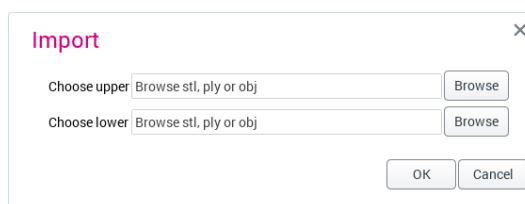
Steps

1. Click **Import** under **File**.

File



2. Click the **Browse** buttons to select the upper and lower models in *stl* or *ply* or *obj* format.



The imported models are automatically opened to *Analyse* tab.

15.2.2 Filling in lab order form

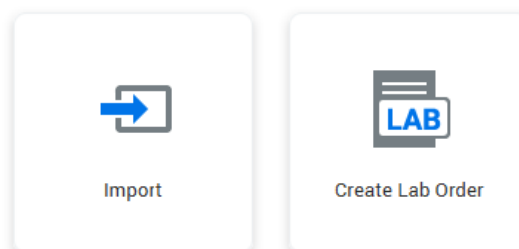
About this task

Follow these instructions to create an order form in PDF format.

Steps

1. Select the case in **Case list**.
2. Click **Create Lab Order** under **File**.

File



3. Fill in information on the receiving lab, of the patient, and of the referring clinic.

To add a restoration, click **Add Restoration**.

Lab Order Form ✕

Patient Name Jeff Moon ID 112233 Age 33 Gender Male		Clinic Name Clinic Contact Email clinic@clinic.com Contact Name Dr. Jane Doe	
Receiving Laboratory Name Laboratory		Order Information Order date Jun 8, 2022 Due date	

Comments

Add Restoration

Restorations	Comments

4. Select tooth, indication, material and shade.

Add Restoration To Order ✕

Tooth selection

23

Indication

- Crown
- Coping**
- Pontic
- Temporary
- Bridge
- Inlay/Onlay
- Veneer
- Implant crown
- Abutment
- Implant guide
- Aligner
- Denture
- 3D printed model

Material

- Ceramics
- Glass ceramics
- Zirconia
- Composites**
- PMMA
- NP metal
- P metal
- CrCo
- Titanium

Shades & Character

A1	B1	C1
A2	B2	C2
A3	B3	C3
A3.5	B4	C4
A4		

0M1	2L1.5	3L1.5	4L1.5
0M2	2L2.5	3L2.5	4L2.5
0M3	2M1	3M1	4M1
	2M2	3M2	4M2
1M1	2M3	3M3	4M3
1M2	2R1.5	3R1.5	4R1.5
	2R2.5	3R2.5	4R2.5

Character

Comments

Add Restoration

Restorations	Comments



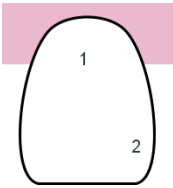
To select the whole upper or lower jaw, select the correct jaw icon in the centre of the chart. Implant guide, Aligner, Denture, and 3D printed model are only available for full arch.

5. Click **Character**.

6. Click image and add characteristics.

Add characteristics - Tooth 24 ×

Click image to add characteristic text



Place	Characteristics	
Place 1	Shade A1	×
Place 2	Shade A2	×

Cancel OK

7. Click **OK** to close the characteristics window.
8. Click **Add Restoration**.
9. When finished with adding restorations, click **Ready**.
- The restoration appears at the bottom of the window.

Lab Order Form ×

Patient

Name

ID Age

Gender

Clinic

Name

Contact Email

Contact Name

Receiving Laboratory

Name

Order Information

Order date

Due date

Comments

Add Restoration

Restorations	Comments	
26 - Pontic - Composites 2L2.5		×
24 - Coping - Composites 0M1		×

Cancel Save

Results

Once a lab order has been created it can be inactivated, viewed as PDF or edited by right-clicking.

The form is stored in the **Cases** list.

Case list

Case Name	Scan Date	Selected
▶ Crown 2-1	2022-03-10 15:51	☐
▶ CadCam Case	2022-05-23 15:49	☐
▶ CadCam Case	2022-05-30 15:45	☐
▼ CadCam Case	2022-05-23 10:34	☐
 Lower	2022-05-23 10:34	☐
 Upper	2022-05-23 10:34	☐
 Lab Order Form 1	2022-06-03 11:14	☐

Edit Order Form
 Inactivate Order Form
 View Order PDF

To inactivate, edit or view the form, select applicable option from the right-click menu.

To export the form, see section "Sending lab order form" on page 134.

The form can also be accessed in the *File* module under *Attachments* from where it can be opened by double-clicking.

15.2.3 Adding abutments to lab order form

About this task

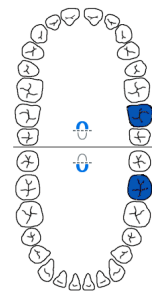
To define an underlying implant:

Steps

1. Select **Abutment** in the indication field and select suitable implant.

Add Restoration To Order

Tooth selection
27, 37



Indication

- Crown
- Coping
- Pontic
- Temp
- Bridge
- Inlay
- Veneer
- Implant
- Abutment
- Implant
- Aligner
- Denture
- 3D print

Material

- Ceramics
- Glass ceramics
- Zirconia

Shades & Character

A1	B1	C1
A2	B2	C2
A3	B3	C3
A3.5	B4	C4

Implant Selection - Tooth 27,37

2L1.5	3L1.5	4L1.5
2L2.5	3L2.5	4L2.5
2M1	3M1	4M1
2M2	3M2	4M2
2M3	3M3	4M3
2R1.5	3R1.5	4R1.5
2R2.5	3R2.5	4R2.5

Character

Implant library

Manufacturer: Straumann

Product Line: Bone Level Roxolid SLA

Diameter: 3.3 Model:

Description:

Comments

Restorations

Restorations	Comments

OK Cancel Add Restoration

Cancel Ready

2. Click **OK** to save selections.

15.2.4 Adding bridges to lab order form

About this task

Follow these instructions to add bridges.

Steps

1. Add the necessary restorations before proceeding.
2. Select one tooth to be included in the bridge in the *Tooth selection* field.
3. Select **Bridge** as indication.

Add Restoration To Order

Tooth selection
23

Indication
Crown
Coping
Pontic
Temporary
Bridge
Inlay/Onlay
Veneer
Implant crown
Abutment
Implant guide
Aligner
Denture
3D printed model

Material
Ceramics
Glass ceramics
Zirconia
Composites
PMMA
NP metal
P metal
CrCo
Titanium

Shades & Character
A1, B1, C1, D2, A2, B2, C2, D3, A3, B3, C3, D4, A3.5, B4, C4, D4, A4
OM1, 2L1.5, 3L1.5, 4L1.5, OM2, 2L2.5, 3L2.5, 4L2.5, OM3, 2M1, 3M1, 4M1, 5M1, 2M2, 3M2, 4M2, 5M2, 1M1, 2M3, 3M3, 4M3, 5M3, 1M2, 2R1.5, 3R1.5, 4R1.5, 2R2.5, 3R2.5, 4R2.5
Character

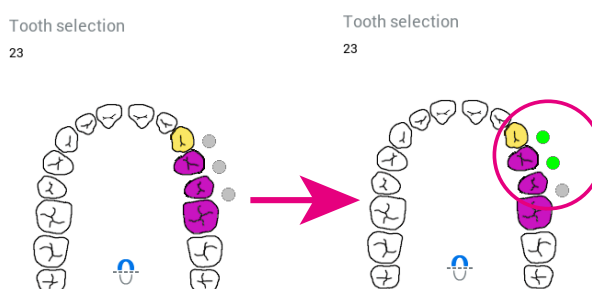
Comments

Add Restoration

Restorations	Comments
23 - Crown - Zirconia OM1	X
24 - Crown - Zirconia OM2	X
25 - Crown - Zirconia OM3	X
26 - Crown - Zirconia A3	X

Cancel Ready

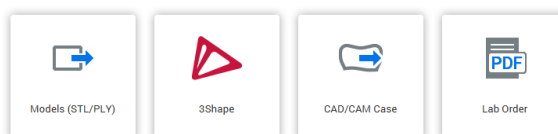
4. Create the bridge structure by clicking on the grey dots.
The clicked dots turn green marking the location of the bridge.



15.2.5 Sending lab order form

The order and STL files can be sent to the lab either over Romexis Cloud data transfer or exported under **Export** from the *Send* tab.

Export



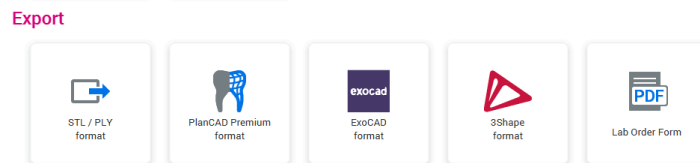
15.3 Export

About this task

The 3D models can be exported to local disk in **.stl** or **.ply** format, depending on the original data. The margin lines are exported in **.xyz** format and are only available when exporting in PlanCAD Premium, ExoCad or 3Shape formats.

Steps

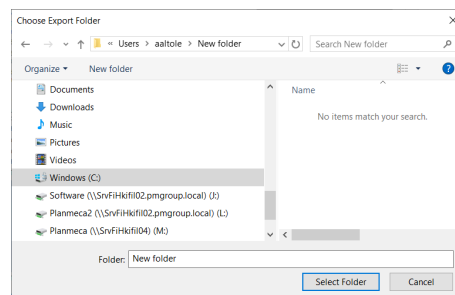
1. Select the case in **Case list**.
2. Select the desired option under **Export**.



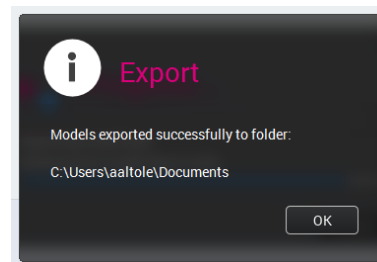
NOTE

CAD/CAM export to 3Shape Dental System 2015 in **.30xyz** format is compatible with 3Shape Dental System 2015 software revision 15.5.0.

3. Select the folder where to export the models.



When the export is complete the message indicating that the export was successful appears.



4. Click **OK**.

NOTE

The following cases are supported when exporting cases to PlanCAD Premium:

- Exporting upper scan, lower scan and buccal scan and margin line either in upper or in lower scans, not in both.
- Exporting scanbody scans either in upper or lower scans, not in both
- Exporting one buccal alignment at a time. If the patient has several alignments, export them one at a time.

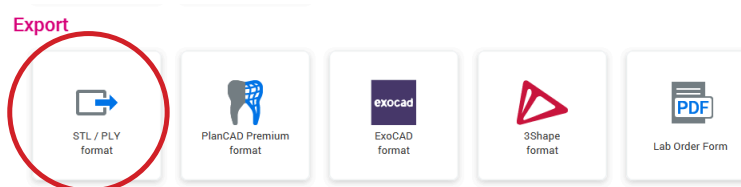
15.3.1 Export complete case

About this task

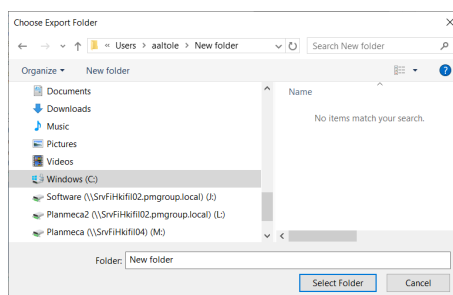
You can export a complete case including models and lab order as follows:

Steps

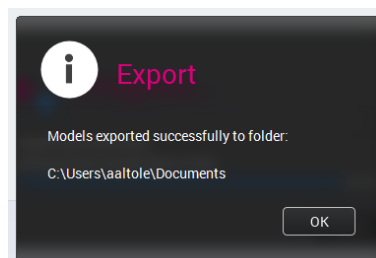
1. Select the case in the **Case list**.
2. Select the STL/PLY option under **Export**.



3. Select the folder where to export the case.



When the export is complete the message indicating that the export was successful appears.



4. Click **OK**.

15.4 Send

15.4.1 Romexis Cloud

About this task

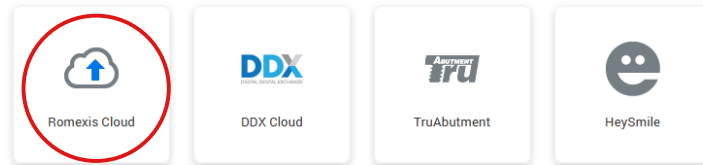
Follow these instructions to send models to Romexis Cloud.

Steps

1. Select the case in **Case list**.

- Click the **Romexis Cloud** button under **Send**.

Send



- Fill the **To** field with the recipient's email address and add optional message to the **Comment** field.
- Select Cloud case sending option, see section *Cloud case sending options* in the Romexis user's manual.



- Click the **Send** button.

For more information on the Romexis Cloud management, see section *Cloud Management* in the Romexis user's manual.

15.4.2 DDX Cloud

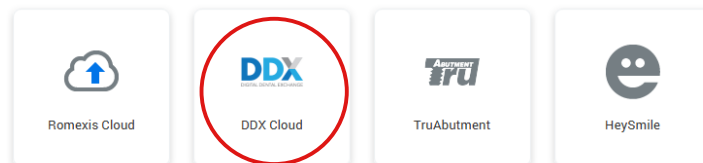
About this task

Use Digital Dental Exchange to send cases digitally.

Steps

- Select the cases to export in **Case list**.
- Click **DDX export** under **Send**.

Send

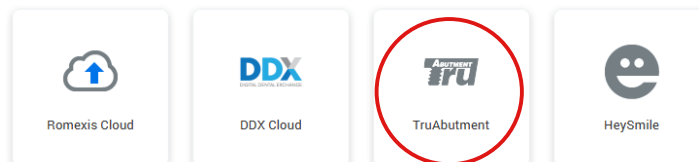


For more information see section *DDX Cloud* in the Romexis user's manual.

15.4.3 TruAbutment

Use the **TruAbutment** button to send a selected case and/or lab order form to TruAbutment Inc.

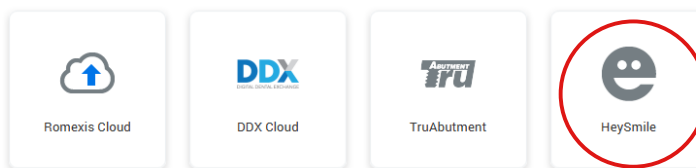
Send



15.4.4 HeySmile

Use the **HeySmile** button to export the selected case and open the HeySmile online platform.

Send



15.4.5

Sim to Care

About this task

Sim to Care (S2C) uses tooth surface models as an input allowing the user to virtually operate on them using virtual drills, explorers, etc.

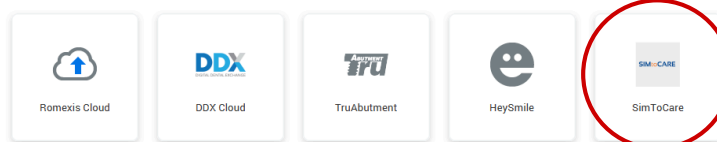
On how to configure the Sim to care export see the Romexis technical manual.

Follow these instructions to send models.

Steps

1. Select the case to export in **Case list**.
2. Click **SimToCare** under **Send**.

Send



3. Enter a valid email address, a message and if desired, a due date.

TIP

By default, the due date is set to a month from the current date but can be changed by clicking the icon next to the date.

4. Click **OK**.

Send models to SIMtoCARE

E-mail

Message

Due Date
 Nov 6, 2020

OK Cancel

The file transfer is shown by a progress bar.

Results

When the transfer is completed you receive a QR code from the Sim to Care server. You can take a picture of the code if needed.

NOTE

The code is not saved anywhere. Once the QR code dialog is closed you cannot retrieve the code from Romexis



In addition to the QR code a password is requested.

If necessary, you can re-send the models.

If the sending fails an error dialog appears.

15.5 Launch

15.5.1 Opening cases in PlanCAD Premium

About this task

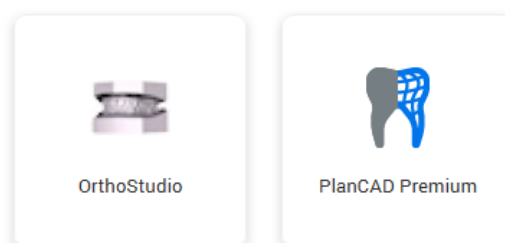
PlanCAD Premium is a dental design platform intended for dental technicians and dentists to design dental restorative prosthetic devices from digital optical impressions.

To launch a case in PlanCAD Premium dental design platform:

Steps

1. Select the case in **Case list**.
2. Click **PlanCAD Premium** button under **Launch**.

Launch



For detailed description on how to use the PlanCAD Premium software see the PlanCAD Premium user's manual.

16 Cleaning / preventive maintenance

16.1 Tip infection control procedure

NOTE

For intraoral scanning systems only.



The following instructions are for the removable tip of the scanner, not for the entire scanner. See section "Cleaning scanner base and other surfaces after every patient" on page 143 for cleaning the base of the scanner.



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

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



WARNING

Do not place in an ultrasonic cleaner.



WARNING

Do not use any chemical sterilant.



WARNING

Do not pouch with other instruments.



WARNING

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



WARNING

Autoclave sterilisation cycle times exceeding 10 minutes are excessive and may damage the tip.



CAUTION

To prevent scratches, avoid brushing the mirror.



CAUTION

Autoclave baskets are not indicated for this cleaning procedure.

16.1.1 Cleaning tip after every patient

About this task

Follow these instructions to clean scanner tips.

Steps

1. Wipe down the scanner body with a cloth before detaching the tip to avoid any germicide coming into contact with the sensitive connection points or lenses.
2. Place some protective film or a similar cover over the scanner body's connection points and lens to prevent any liquid or dust from entering the scanner when a tip is not on the scanner.
3. Remove the scanner tip from the scanner.
4. Soak the tip in warm tap water (40–50 °C [104–122 °F]) for 5 minutes.
5. Using a soft bristle brush, such as a bottle brush, rinse and brush the external surface of the tip under warm running water (3–3.5 L/min. @ 30–35 °C [86–95 °F]) for a minimum of 15 seconds, with emphasis on the tip alignment indicator.

NOTE

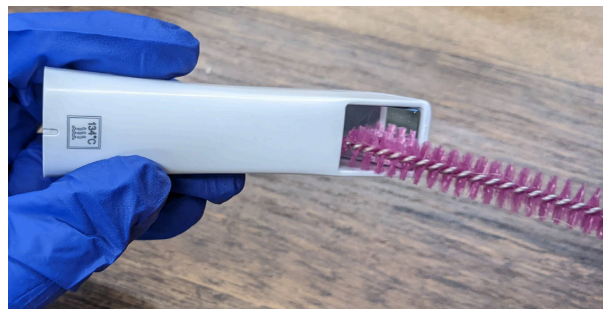
A typical water tap should be able to produce a low rate of between 4–8 Lpm.

6. Rinse and brush around the edge and surrounding crevices of the mirror under running water for a minimum of 30 seconds.

NOTE

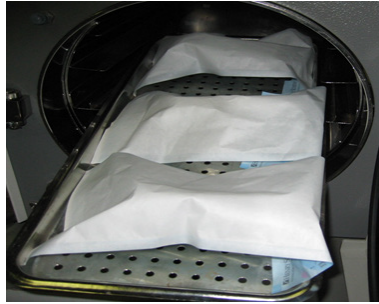
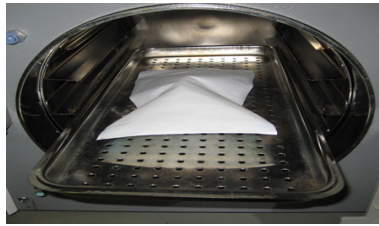
To avoid scratching the mirror, be careful that only the bristles touch its surface.

In the example figure there is no running water for visibility purposes. Use the bristles of the small brush on all crevice edges of the mirror.



7. After brushing, rinse the mirror and surrounding crevice under running water for additional 10 seconds.
8. 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 discolouration, the tip should be disposed of and replaced. Contact your local distributor to purchase a replacement tip.
9. Place each scanner tip individually into an autoclave pouch.

10. Place one to three pouches per tray or cassette.



11. Select an autoclave cycle with a minimum sterilisation temperature of 132 °C (269 °F).

NOTE

The minimum time and temperature values listed below reflect the specific discrete values used to validate the sterilisation process for the tip.

- Use distilled water to avoid reducing the tip life. The high temperatures of the autoclave could cause the chlorine in tap water to corrode the tip contacts.
- For Pre-Vac autoclaves minimum sterilisation time is 3 minutes.
- For Gravity autoclaves minimum sterilisation time is 10 minutes.
- For any autoclave, use a minimum dry time of 30 minutes.

12. When the cycle has completed, store the tip for later use.

16.1.2 Storage

About this task

Follow these instructions to store cleaned scanner tips.

Steps

1. Wipe water off the mirror using non-woven optical wipes.
2. Optional: Insert the tip into a sterilisation pouch.
3. Store for later use.

What to do next

Prior to scanning, visually confirm that the scanning mirror and scanner connection points of the scanning tip are clean and dry. To clean either surface, use an optical cloth or 2x2 gauze with a small amount of alcohol to gently remove residue. Ensure that each surface is dry before connecting it to the scanner.

16.2 Cleaning scanner base and other surfaces after every patient

About this task

NOTE

For intraoral scanning systems only.

NOTE

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



CAUTION

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 saturated with a hospital grade disinfectant or pre-moistened germicidal wipes when cleaning the scanner.

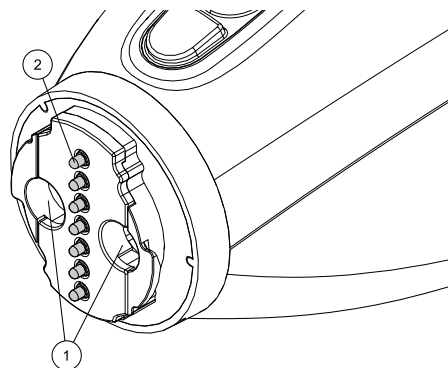
Steps

1. Using a clean, non-woven sponge that has been saturated with a hospital-grade, TB-rated germicide or pre-moistened germicidal wipes, 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. Ensure that the lenses (1) and connection points (2) of the scanner base are dry before connecting the tip.

To prevent the connection points and lenses from getting wet, have a tip in place when wiping the scanner base down with the germicidal wipe.



3. Follow the germicide manufacturer's instructions.

17 Technical specifications

Manufacturer



PLANMECA Oy



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Scanner operation with cable	5 Vdc, 15 W
Scanner operation with battery	3.6 Vdc; 3300 wAh; 11.88 Wh
Indications	• Inlays • Onlays • Veneers • Crowns • Full arches • Scan bodies • Models • Impressions
Integration	Connected to a router and PC
Data output	Scans of lower and upper arches in occlusion exported as open STL files
Scanning options	True color
Scanning tips	Two options, both removable and autoclavable • Standard size height 21.3 mm • SlimLine height 15.6 mm ideal for patients with smaller mouths; for enhanced reach to the posterior, compromised dentition, or for capturing interproximal areas
Field of view	17.6 x 13.2 mm
Anti-fogging technology	Actively heated tip, guaranteed non-fogging operation when used intraorally
Capturing speed	Video capture displays over 67 3D data sets per second
Scanning technology	Projected pattern triangulation
Light source	LED

Dimensions	Scanner with tip and without battery: 45 x 43 x 275 mm Scanner with tip and battery: 45 x 43 x 292 mm Scanner tip: 24.6 x 24.6 x 88.6 mm Scanner battery: 30 x 31 x 86 mm
Weight	Scanner with tip and without battery: 222 g Scanner with tip and battery: 286 g Scanner tip: 17 g Scanner battery: 65 g Scanner cable: 111 g
Connecting cable	Scanner end connects to the opening in the scanner vent All cables are designed to transmit data via USB 2
Use environment	Dental clinic or laboratory
Electrical ratings	5 Vdc, 15 W
Storage conditions	-20 °C to +60 °C (-4 °F to 140 °F)
Operating conditions	15 °C to 25 °C (59 °F to 77 °F)

17.1 Applicable standards

Product safety



ANSI/AAMI ES60601

IEC 60601-1, 3rd Edition

EMC

IEC 60601-1-2

US FCC CFR 47, Part 15B

LED product safety

IEC62471

Packaging and environmental

IATA PI 966

Bio-compatibility

ISO 10993

European standards

(EU) 2017/745 Medical Device Regulation

EN 60601-1:2006 Safety of Medical Electrical equipment

EN 60601-1-2 Electromagnetic Compatibility

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

CFR 21, Part 820

FDA Class II Special Controls for Computer Assisted Design and Manufacturing of Dental Restorations

International standards

ISO 14971 Risk Management

ISO 13485 Quality Management Systems

Battery, charger and charger power supply standards

Battery	UN 38.3 IEC 62133-2 EN 55032+EN 55035 UL 2054 UL 62368 (Canada) RCM (Australia) J62133-2 (Japan) TIS62133 Part 1-2565 (2022)
Charger	IEC 60601-1 IEC/UL 62368
Power supply	IEC 60601-1:2005+A1/ EN60601-1:2006+A11+A1+A12 IEC 60601-1-6: 2010+A1 IEC 60920-1:205+A1+A2 IEC 62368-1:2014 UL62368-1 & CAN/CSA C22.2 No. 62368-1-14 ANSI/AAMI ES60601-1 CAN/CSA-C22.2 No. 60601-1

17.2

Planmeca Onyx ETL

Planmeca Onyx is ETL classified and conforms to ANSI/AAMI ES60601-1 and is certified to CAN/CSA C22.2 No. 60601.1

18 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 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 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.

Immunity test	IEC 60601 Test level	Compliance level	Electromagnetic environment -guidance
Electrostatic discharge (ESD) IEC 61000-4-2	± 8 kV contact +/- 15 kV Air	± 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.

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: U_T 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 scanner, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.

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	Recommended separation distance $d = 1.2\sqrt{P}$ $d = 1.2\sqrt{P} \text{ 80 MHz to 800 MHz}$ $d = 2.3\sqrt{P} \text{ 800 MHz to 2.5 GHz}$ 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). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey should be less than the compliance level in each frequency range. Interference may occur in the vicinity of equipment marked with the following symbol: 
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. 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. b. Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3V / m.			
Recommended Separation Distances Between Portable and Mobile RF Communications Equipment and the scanner.			

Immunity test	IEC 60601 Test level	Compliance level	Electromagnetic environment -guidance
 CAUTION Portable RF communications equipment (including peripherals, such as antenna cables and external antennas) should be used no closer than 30 cm (12 in.) to any part of the scanner, including cables specified by the manufacturer. Otherwise, the performance of the scanner may degrade.			
The scanner is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The user of the scanner can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the scanner as recommended below, according to the maximum output power of the communications equipment.			
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
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.			
Note 1: At 80 MHz and 800 MHz, the separation distance for 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.			

19 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.
- Why does the tip flash on and off when connected?
- I'm having trouble scanning scan bodies.
- How do I change the tooth number or preparation type on an existing margin?

Which USB port do I plug my scanner in?



Always make sure it's plugged into the USB 4 port labelled as such.

How do I know if my scanner is connected?

See section "Scanner status" on page 40.

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.

If the scanner overheats when you use it wirelessly, remove the battery from the scanner.

Why is my image fogging while scanning intraorally?

Ready

It is always advisable to let the tip heat for approx. 15—30 seconds until you see the orange & green status indicators on the front of the tip image.



The colour seems off on my scanner.

Colour balancing should be done monthly or as needed. This is an optional step to optimise the colour represented on screen. This does not affect the stone model nor the amount of data collected by the scanner. See "Color balancing" on page 43 for more information.

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.

Why does the tip flash on and off when connected?

1. Make sure the contacts on the rear of the tip are clean and dry.
2. Reseat the tip and test.
3. In addition, try another tip and see if it connects properly.

I'm having trouble scanning scan bodies.

- Try to get as close as possible to the scan body, but do not put it inside the tip.
- 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.



How do I change the tooth number on an existing margin?

1. Right-click on a margin point and select **Edit Margin Info**.
2. Change the **Tooth Number** information.

Same arch models are not automatically aligning

When scanning a Prep and Pre-op, the models should automatically align. Try stopping and restarting the scan of the second model.

I'm having trouble with Manual Alignment.

Try using Refine Alignment or resetting the alignment and doing the manual alignment again.

20 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.

21

Saving screen shots



For communicating with associates or the manufacturer 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 screenshot and saves it in the **Libraries > Pictures > Screenshots** folder.

The screenshots 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.

22 Disposal



CAUTION

Comply with all applicable regulations when disposing of waste materials from the product

To reduce the environmental load over the product's entire life cycle, the product is 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 devices 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.

Batteries must be disposed of in accordance with local waste legislation and instructions, and by following the requirements of EU battery regulation (EU) 2023/1542 as applicable.

This product must not be disposed of with other waste. It is the user's responsibility to dispose of their electrical and electronic waste equipment by handing it over to an approved reprocessor, or by returning it to the manufacturer for reprocessing. For more information on where you can send your waste equipment for recycling, contact your local city office or the manufacturer.

For information on removing patient data and images, see section *Data decommissioning* in the Romexis 6 technical manual.

