Elements

Training Workbook

PLANMECA
Digital Academy

PlanCAD® Easy, Version 6

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Customer Support Information

Planmeca CAD/CAM Customer Support
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customersupport@planmecausa.com
7 am—6 pm CT, Monday—Friday

This workbook is yours to keep; don't be scared to write in it! Words in **BOLD** are icons or choices within the software. You'll also find quick tips and time savers throughout. Hover over icons in the software to reveal their names.

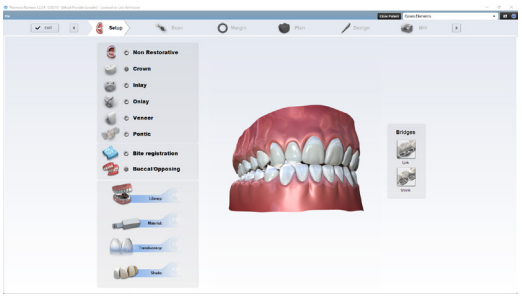
Workflow Overview

The workflow follows a logical progression:

1. Add or select a patient in Planmeca Romexis®.
2. Open the CAD/CAM module and start a new case.
3. Set up a new restoration: tooth number, restoration type, occlusion type, anatomical template (library), material, translucency, and shade (Setup tab).
4. Capture images of the intraoral environment, model, or impression to create a virtual 3D model (Scan tab).
5. Draw the margin on the virtual model (Margin tab).

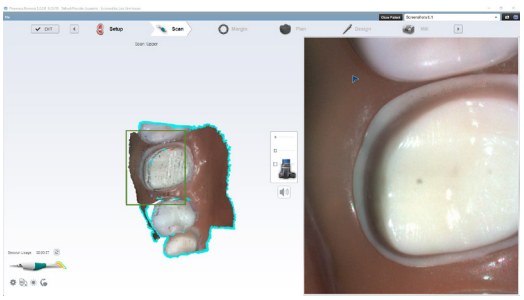
Abilities on Each Tab of the CAD/CAM Software

Setup Tab



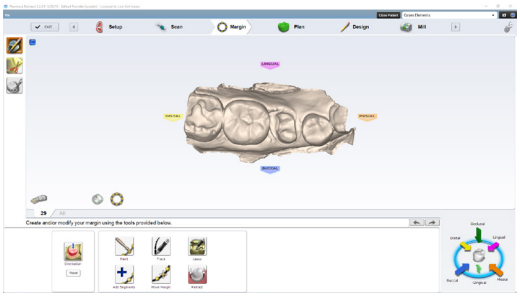
- Select the Tooth Number(s)
- Select the Restoration Type
- Select the Occlusion Type
- Select the Library
- Select the Material
- Select the Translucency
- Select the Shade
- Designate a Bridge

Scan Tab



- Scan the Pre-op
- Scan the Prepared tooth
- Scan the Bite Registration or Buccal Bite and Opposing
- Scan the Scan Body
- Scan the Impression
- Evaluate and adjust the scanned models
- Define the relevant Bite Registration area
- Invert the Impression
- Manually align the models if necessary

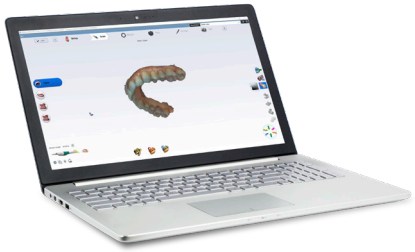
Margin Tab



- Set the Orientation
- Draw and edit the Margin
- Use the Retract tool
- Mark selection area
- Draw and edit the Pre-Op

System & Equipment Overview

These instructions are for the Planmeca Emerald™ and Emerald™ S scanners.



Laptop

1. Powering ON and OFF the laptop
2. Care and general maintenance

System Warnings

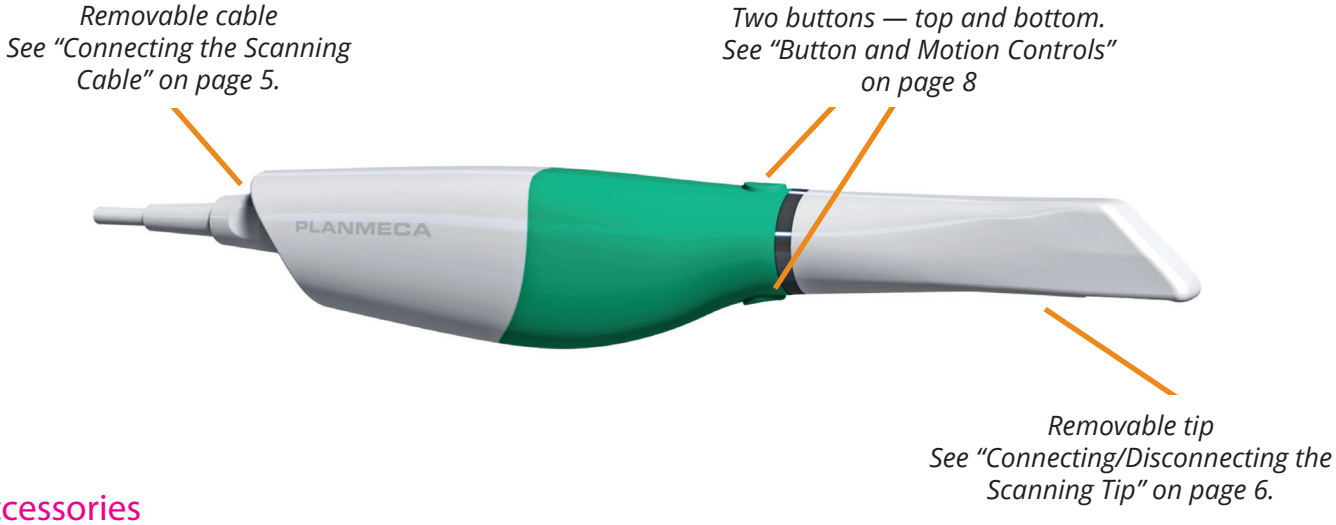
Hardware compatibility warning — Not all hardware is compatible with the scanning software. You will get an error message if you attempt to use the PlanScan* scanner or an incompatible laptop.

**Only Planmeca Emerald and Emerald S scanners are compatible with PlanCAD Easy 6.3.*

Windows update warning — A dialog box will appear if a windows update is being installed in the background. Scanning is not recommended during Windows updates.

Low disk space warning — A dialog box will appear 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.

Planmeca Emerald & Emerald S Scanner Features



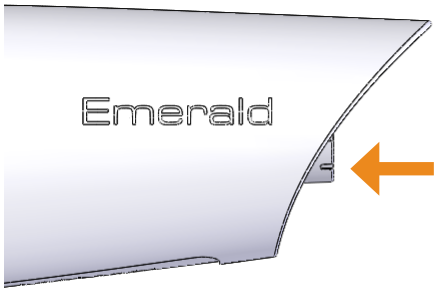
Accessories

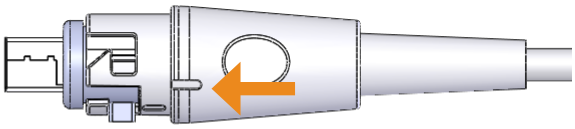
- Scanning Tip
- Scanning Cable
- Cradle
- Color Balancer

NOTE: Pull the USB connector from the laptop when the scanner is not in use

Connecting the Scanning Cable

1. To connect the scanner cable, align the notch on the cable to the small notch on the back of the scanner.



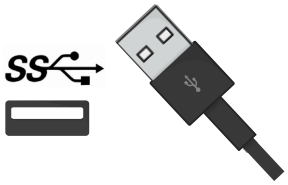


2. Push the cable in and turn clockwise until the notch on the cable is aligned with the larger notch on the back of the scanner.
3. Keep the scanner connected to the cable at all times. Remove the cable from the scanner only when directed by Customer Support or when replacing the cable.

Plugging the Scanner into the Laptop

Insert the USB-C cable into a USB 3 port on the laptop. All of the ports on the Planmeca Laptop are USB 3.

If you are not using a laptop provided by Planmeca, refer to your laptop's user manual to find the USB 3 port. Laptop must have an appropriate NRTL mark for compliance with IEC 60601-1 or IEC 60950.



Pull the USB connector from the laptop when the scanner is not in use. You do not need to "eject" the USB device from Windows. Do not pull on the cable to disconnect. Bending or twisting the cable may impact system usability.

Pull the USB connector from the laptop when the scanner is not in use. You do not need to "eject" the USB device from Windows. Do not pull on the cable to disconnect. Bending or twisting the cable may impact system usability.

Cradle

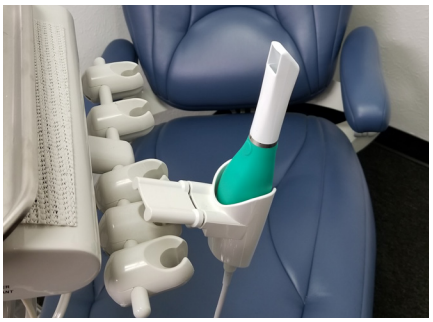
The system comes with a standalone cradle for the scanner.

The cradle can be separated and inserted into a holder in your operatory equipment using the chair adapter (i.e. the slow speed suction holder).

Squeeze the grey trigger and pull to separate the cradle from the base. The trigger is used every time that you want to insert or remove the scanner holder.

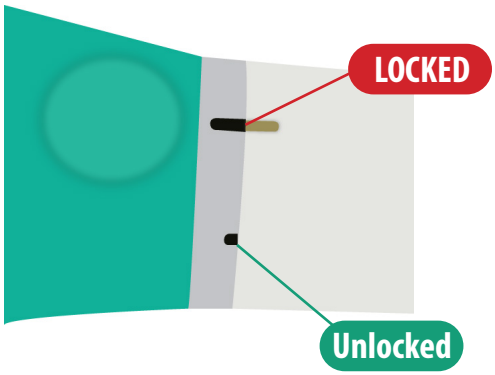
Insert the cradle into the chair adapter.

Insert the holder into a holder in your operatory equipment.



Connecting the Scanning Tip

(After disinfection if scanning intraorally. See insert with scanning tips for further details.)



1. Grasp the body of the scanner with one hand.
2. Use the other hand to slide the scanning tip onto the scanner as shown. Line the mark on the tip up to the smaller mark on the scanner body. Twist the scanner tip to lock it into place. Ensure the marks on the tip and the base are aligned.

Disconnecting the Scanning Tip

(Failure to follow this procedure can damage the scanning tip.)

1. Grasp the body of the scanner with one hand.
2. With the other hand, twist the scanner tip to the unlocked position and remove it.

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

Cleaning the Scanner Tip

After every patient

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

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

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

4. After brushing, rinse the mirror and surrounding crevice under running water for additional 15 seconds.
5. Wipe the mirror with an optical lens wipe.
   - If there is any visible debris remaining after performing the cleaning steps above repeat the process.
   - If there is any debris that cannot be removed or visible deterioration such as cracks or discoloration, the tip should be disposed of and replaced.
6. Place each scanner tip individually into an autoclave pouch.
7. Place one to three pouches per tray or cassette. **DO NOT stack tips on or around other metal instruments.**
8. Select the **Wrapped, Wrapped Instruments**, or **Pouch** autoclave cycle with a minimum sterilization temperature of 132° C (269° F).
   - For **Pre-Vac** autoclaves minimum sterilization time is **3 minutes**.
   - For **Gravity** autoclaves minimum sterilization time is **10 minutes**.

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

Manufacturer's specifications, additional information, and cautions

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

Autoclave cycle times, parameters, and names differs among manufacturers and autoclave types. Refer to your manufacturer's manual for sterilizing wrapped instruments. **Autoclave sterilization cycle times exceeding 10 minutes could be considered excessive and may damage the tip**. To verify that minimum cycle parameters are met, see the User's manual of the autoclave manufacturer. For more information, refer to the User's manual or call customer support.

DO NOT use a chemical sterilant.
DO NOT place in an ultrasonic cleaner.
DO NOT pouch with other instruments.
DO NOT stack tips on or around other metal instruments.
Excessive cycle times may prematurely reduce the life and function of the tip.

Button and Motion Controls

Button Functionality

The following gives an overview of the actions that can be performed by utilizing the scanner's buttons for easy hands-free operation.

Top Button

- Activate scanner
- Deactivate scanner
- Manipulate the model if you press and hold it, then rotate the scanner (Emerald S scanner only)
- Activate a button when you see this icon

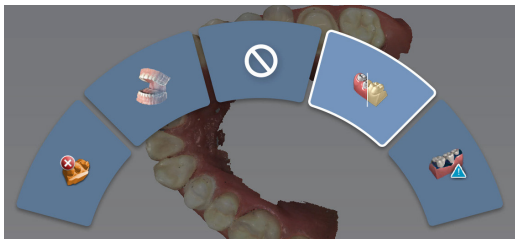
Bottom Button

- While scanning (Live View is open), click to turn ON/OFF the Active Delete functionality (this will also show/hide extraneous data on the model)
- While scanning (Live View is open), press and hold to take a Snapshot
- Select the next scan type (ex. go from Upper to Lower, from Lower to Buccal)
- Activate a button when you see this icon

Top and Bottom Simultaneously

Hold down both buttons simultaneously. A menu appears. Point the scanner towards the screen and rotate the scanner clockwise or counterclockwise to highlight the desired action and then release the button(s).

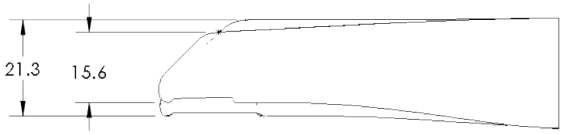
- Delete Model
- Generate Model
- Color Model View
- Data Density

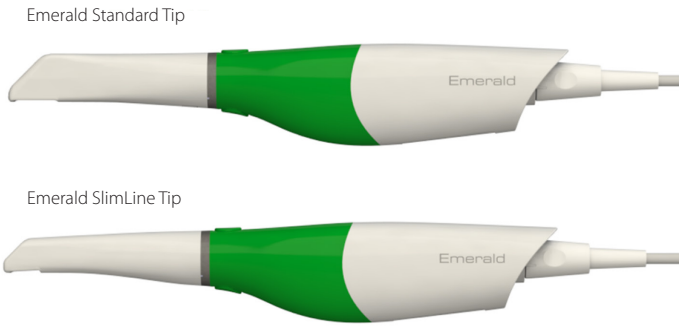


Planmeca Emerald™ SlimLine Tip

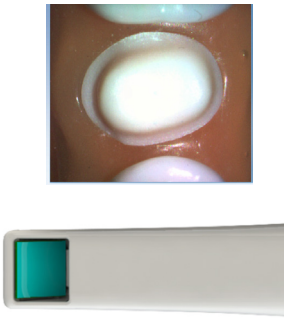
SlimLine Tip

SlimLine is 5.7mm thinner than the standard Emerald tip. SlimLine logo is on the tip and the S displays on screen when in use.





30% smaller field of view

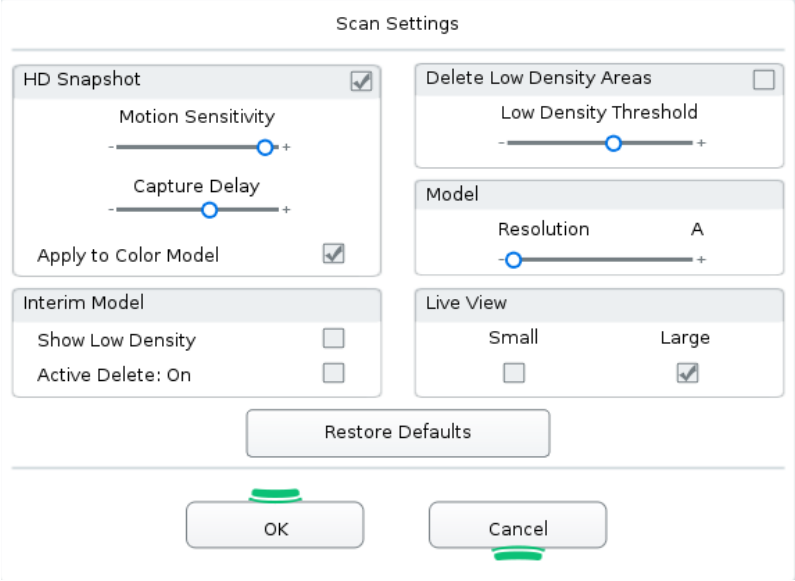


Scanning Tips are consumables and will require periodic replacement. Life will depend on wear and tear and autoclave/type of cycle used.

NOTES

Scanner Settings

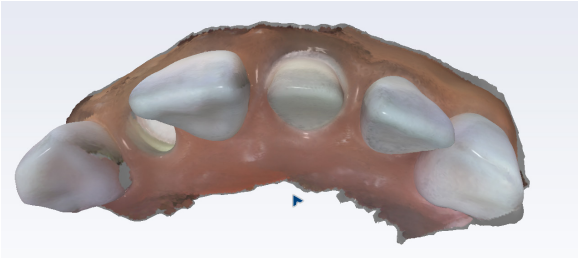
Click the **Scan Settings** icon to view/change settings. Most users will leave use the default settings.

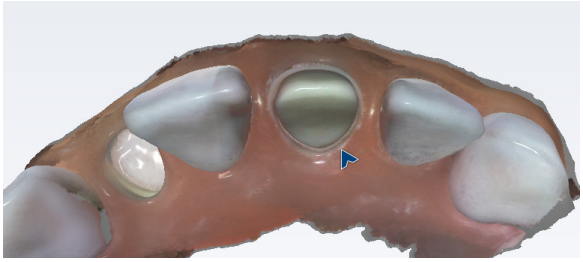


HD Snapshot

Hover over an area to take a high definition snapshot. Hover until you hear the shutter sound, which indicates that the picture has been taken.

- The Motion Sensitivity slider adjusts how affected this function is by movement of the camera.
- The Capture Delay slider adjusts how long you have to stay still to take the snapshot.
- Apply to color model adds the HD picture onto the color view of the model





HD Snapshot applied to color model

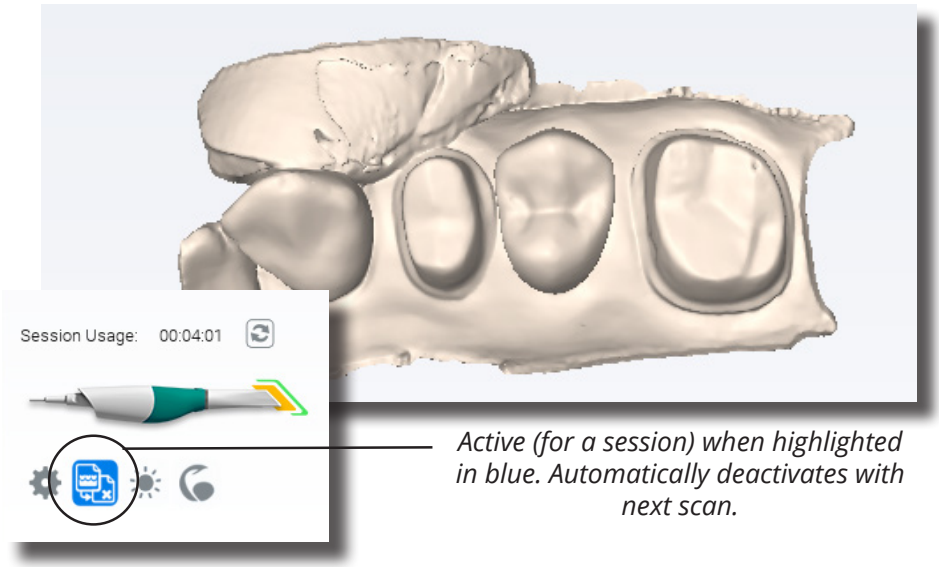
Delete Low Density Areas

Use this feature when your laboratory has requested for low data to be removed. The Delete Low Density Areas setting allows the user to adjust the automatic fill of low density data within the generated model. Use the slider to increase and decrease the level of data that should be shown on the model.

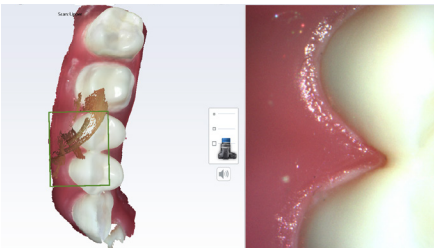
Active Delete Default Option

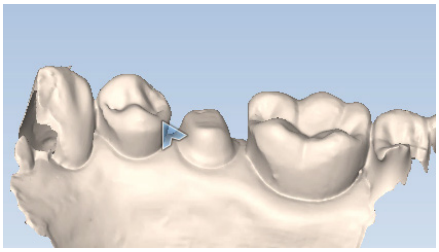
The default option for **Active Delete** be changed to ON or OFF in Settings if desired. Active Delete may also be turned on/off by pressing the bottom scanner button while the scanner is active, or you can click the icon with the mouse.

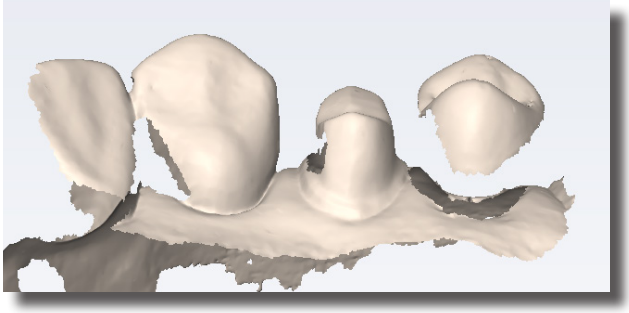
Once active, hover over the desired area for 2-3 seconds to remove the unwanted data. In some cases, rotating over the surfaces will assist in data removal. Always verify **Data Density** after using this feature.

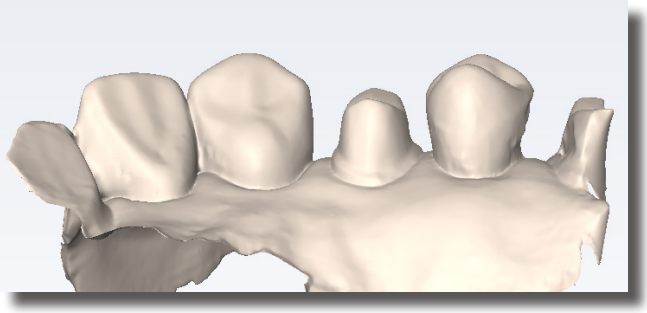


Active (for a session) when highlighted in blue. Automatically deactivates with next scan.







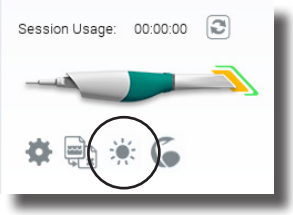


Model Resolution

Use this feature only at the request of Customer Support.

Model Scanning

The default setting for the scanner is for intraoral scanning. Click the **Sun** icon next to the scanner icon to switch to a dimmer setting (sunset icon) when needed for models or anytime the live view is too bright.



Default setting — sun icon represents brighter laser for intraoral use.

Activate the dimmer setting for external scanning.

Color Balancer

It is recommended to use your color balancer on a weekly basis or as needed.

Insert scanner with sterilized Standard size tip into the color calibration device to calibrate colors. Click **Next** to proceed.

Always use a Standard tip to run the color balancing utility. If you mistakenly use a SlimLine tip, repeat the procedure with a Standard tip.

NOTES

Scan Swap

If you accidentally scan a model under the wrong scan type, it can be transferred to the correct type.

- Right-click and hold on the **Scan Type** icon. The mouse cursor changes to up and down arrows.
- Drag the cursor to the desired Scan Type and release the mouse button.
- A message similar to the following appears: “Would you like to swap upper and lower scan mode data? This will reset alignment.” Click **OK** to complete the swap. The message varies depending on which scan models are being swapped.

Single Unit Workflow

Planmeca Romexis®

1. On the main screen of Planmeca Romexis, click **Add Patient.**
2. Add the name in the patient demographics screen, complete the options with the red asterisk.
3. Click **Save** at the bottom of the screen.
4. Click **CAD/CAM** module on the left side of the screen.
5. At the top of the screen click **Scan**. This will take you to the **Setup** Tab.

Setup Tab

Enter the setup information for this case, then proceed to the **Scan** tab.

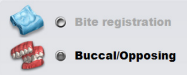
The **Setup** tab must be filled out for restorative cases.

The **Setup** tab requires that the settings be made in a particular order because certain parameters depend upon previous selections. Always define a restoration in the following order:

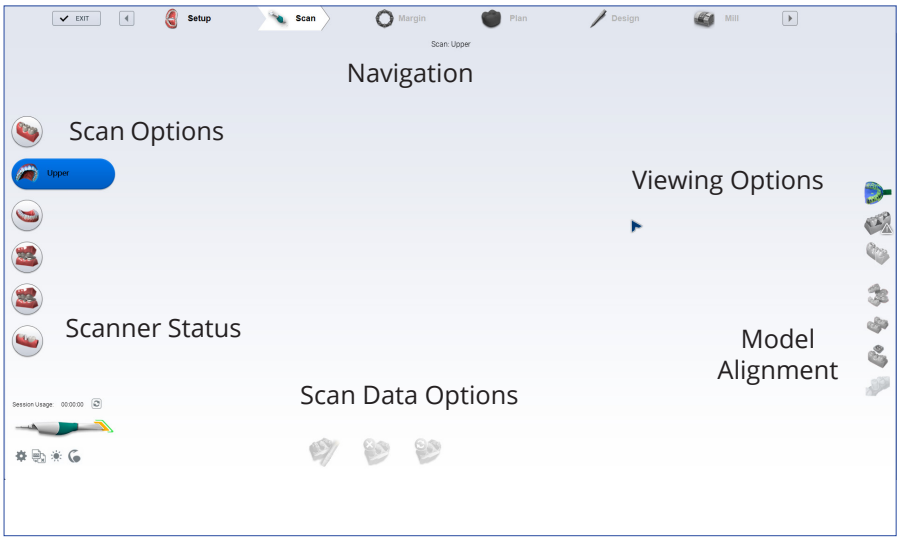
1. Select a tooth on the model. If no teeth have been selected, the model is closed until the mouse cursor is moved near it.

2. Choose the **Restoration Type**.

3. Select the **Opposing Scan Type**.
4. Choose **Library A.**
5. Pick the **Material**.
6. Select **Transparency.**
7. Select **Shade**.

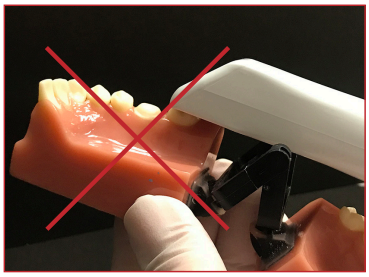


Scan Tab Overview



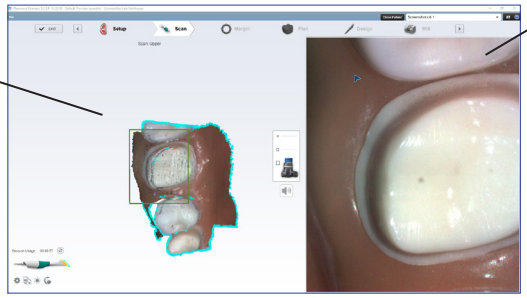
Holding the Scanner

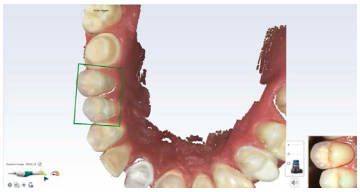
Hold the scanner close to the tip like a handpiece or overhanded. Rest the neck of the scanner on the adjacent teeth.

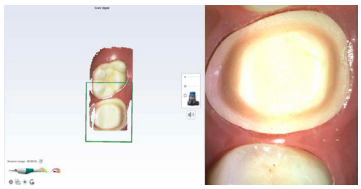


The tip of the scanner must point toward the distal of the preparation.

Scanning Live View and Model Indicators

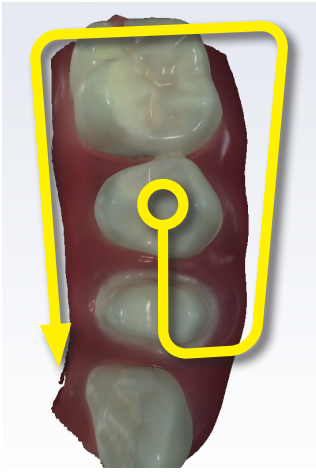


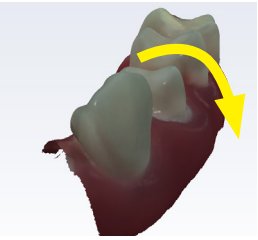




Basic Scanning Pattern

Begin scanning directly over the occlusal surface of the preparation. Move in a gradual, continuous motion toward the mesial neighbor. Transition from the occlusal, cusp, axial wall, to gingival surfaces. The scanner should be held close to 90° while scanning parallel to the buccal surface.





Goals of Prep Scanning

100% of the prep
Interproximal contact point
90% of the adjacent teeth
Good axial data for design
2-3 mm gingival tissue on buccal and lingual

Keep your eyes on the screen and use the model and live view to track your progress and current position.

Evaluate the Model

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

Left-Click

Select — position the cursor on an item and click the left button to select.

Right-Click

Rotate Model — press and hold the right button while dragging the mouse on the desktop.

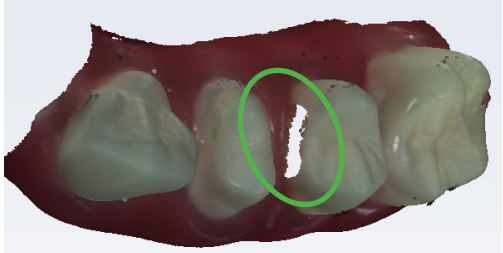
Scroll Wheel

Zoom — rotate the scroll wheel to change the size of the model.

Move — press and hold the wheel to move the model.

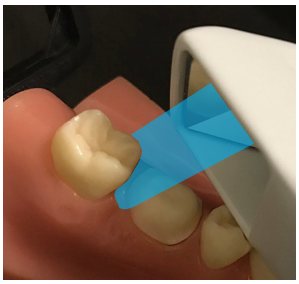
It's important to practice using the mouse. Ensure you are comfortable moving the model and zooming in/out.

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



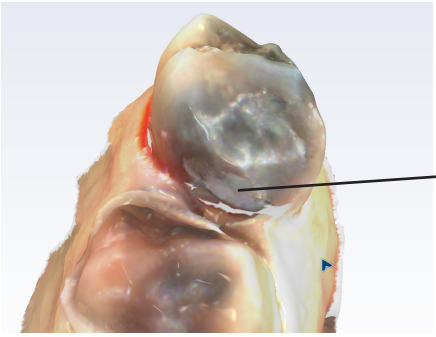
3. Fill in any required missing data by activating the scanner. Use the fill in techniques.

Distal Tip — Rest the end of the scanner tip on the distal neighbor; rock the scanner to point the blue laser into the mesial interproximal area.



Mesial Tip — Rest the neck of the scanner tip on the mesial neighbor, rock the scanner to point the distal interproximal area.

Ensure your model has 100% of the preparation, the interproximal contact areas, and at least 90% of the adjacent teeth and full cusps.

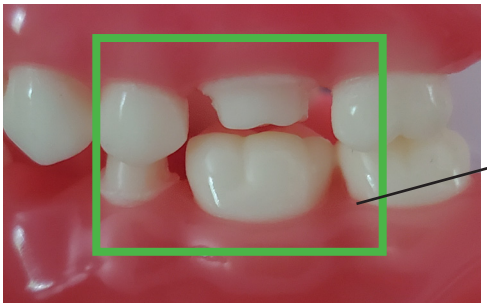


Focus on the contact zone, not the gingival contours.

4. Click **Generate Model** or press **M** on the keyboard to finish building the model. You can also use the hands-free feature.
5. Global Alignment will occur during model generation.

Buccal Bite and Opposing

The opposing teeth are scanned to acquire bite information for the proposal. The buccal bite is scanned to align the preparation model with the opposing model. Scan the teeth that are opposing the teeth in the preparation scan.

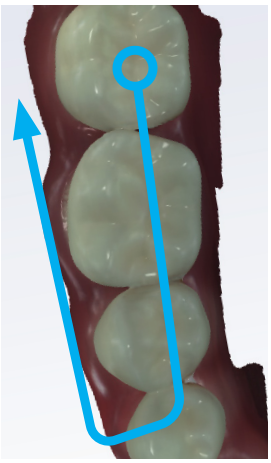


Identify the three teeth directly opposing those in the prep scan.

Note: Many clinical operators scan the Opposing while the patient is being anesthetized.

Scan Opposing

1. Click the opposing arch in the scan options on the left of the screen.
2. Starting with the distal tooth, scan the occlusal data.
3. Transition to the buccal and scan the buccal surface. Include 2-3 mm of gingival data. (Cusp tip, axial wall, gingival) Lingual data is not necessary.



Goals of Opposing Scans

100% of the occlusal and buccal surfaces

2-3 mm gingival tissue on the buccal surface

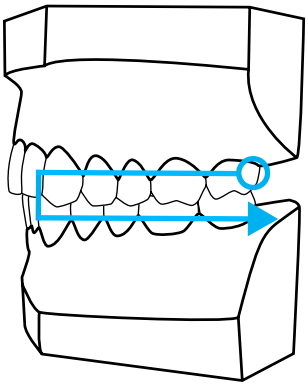
Lingual data not necessary

4. Erase interfering data such as tongue, cheek, and cotton rolls.

NOTES

Scan Buccal

1. Click **Buccal** in the scan options on the left of the screen.
2. Close the articulated model gently. If it shifts during the scanning, the alignment may be incorrect.
3. Always begin scanning on the upper arch. Scan the buccal surfaces of the teeth that were captured in the preparation and opposing models. Ensure some gingival data is captured.



Goals of Buccal Bite

Capture the buccal surface of the dentition in the prep and opposing

2-3 mm gingival data

No rotations necessary

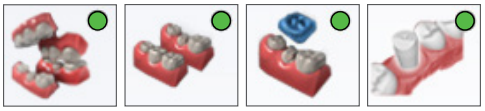
Note: Be sure to verify the status of the buccal alignment.

In most cases, alignment is done automatically by the software. A green dot in the Buccal icon indicates a successful alignment. The red dot indicates the software was unable to automatically align the scans. Always verify the alignment before continuing with the next step.

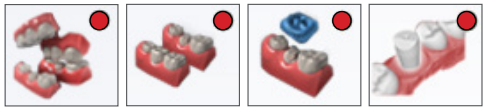
Model Alignment

The alignment icons are on the right side of the screen. There is a different icon for each alignment type: Align Buccal, Align Pre-Op, Align Bite Registration, and Align Scan Body. The system attempts to automatically align the models as they are generated. A green dot means the scans are aligned. A red dot means they are not aligned.

Properly aligned



Not properly aligned



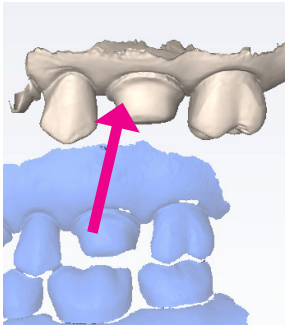
Click the icon to view the alignment. All of the alignment icons have a Refresh button. Click **Refresh** to reset the alignment and manually align the models. Automatic alignment should be used in most cases. Full arch mode requires manual alignment.

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

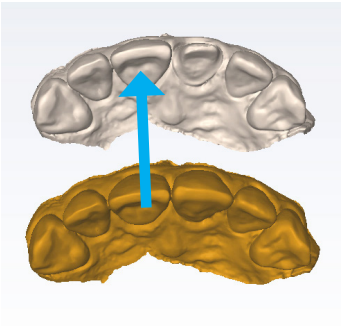
The buccal bite model is translucent when the **Align Buccal** icon is activated to aid in evaluation.

The buccal bite has an extra **Show/Hide Buccal** option. This enables you to hide the buccal bite model and evaluate the opposing and prep models.

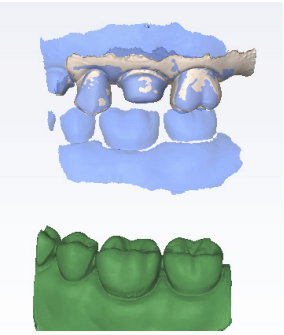
To align models, drag and drop the buccal bite, pre-op, or bite registration over the prep model.

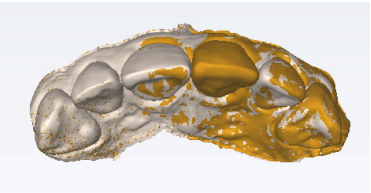


Tip: Click on papilla of blue model and drag to the exact same papilla on beige model



The models will snap into place or will return to their original positions. In Buccal/Opposing cases, the opposing model appears after the prep and buccal bite are aligned. Click and drag the opposing model to match the buccal bite model.

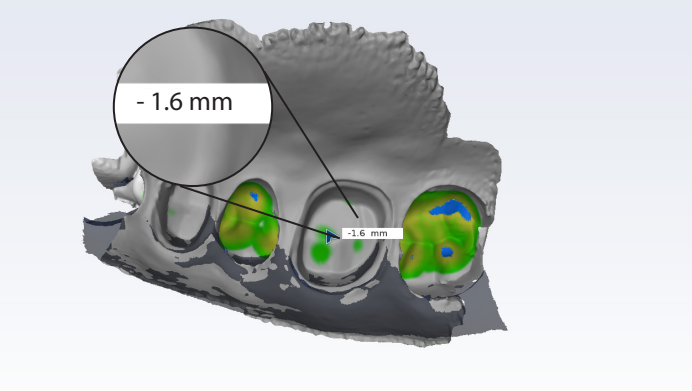




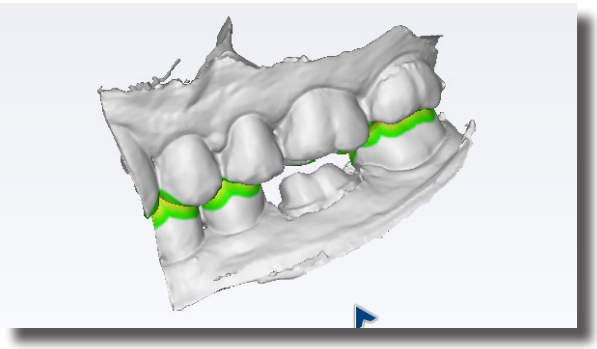
Prep Clearance and Contact Strength

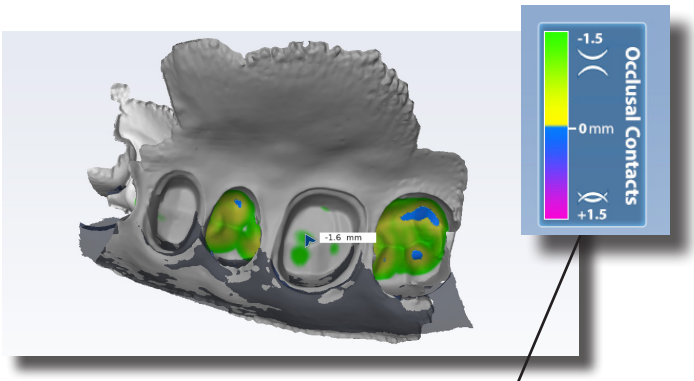
Prep Clearance displays the distance to the opposing dentition just by moving over the prep with your mouse.

When the **Align Buccal** icon is activated, rotate the model to view the prep. Use the mouse pointer to hover over the area. A distance indicator (in mm) appears as you move around the model.



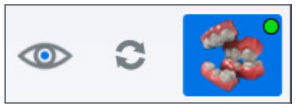
The Occlusal Contacts heat map in the Align Buccal tool displays intensity of the bite or distance to the opposing dentition.





Use the Occlusal Contacts legend to assist in bite intensity and clearance.

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



Rotating the Models

When necessary to aid in alignment, you can rotate the buccal bite or opposing model.

With the mouse cursor directly over the buccal or opposing model, right-click and drag to rotate.

With the mouse cursor on the background, right-click and drag to rotate all of the models at the same time.

Left-click and drag to move the models on the screen (only for buccal bite and opposing models).

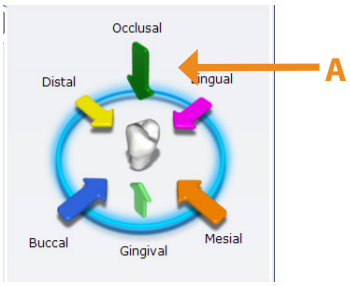
Once the models are in good relation to one another, use the steps in the previous section to align the models.

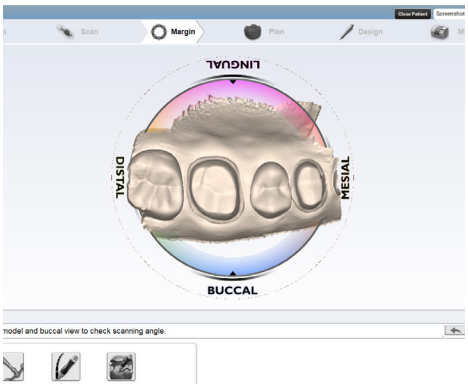
NOTES

Margin Tab

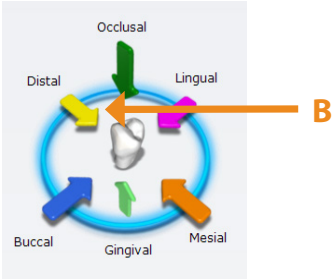
Use the steps below to ensure appropriate orientation and accurate margin placement

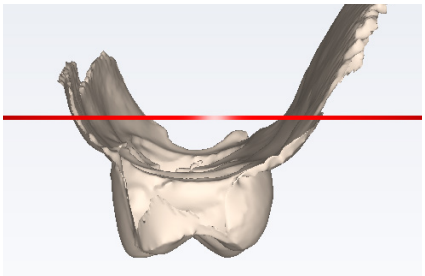
1. Click the **Margin** tab.
2. Evaluate and adjust the Orientation using **View Controls** to change the point of view.
   A. In the Occlusal View, balance the model from buccal to lingual.



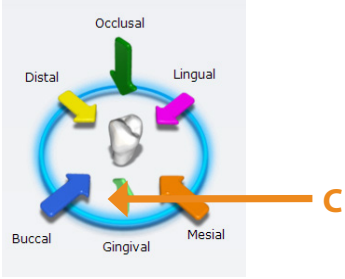


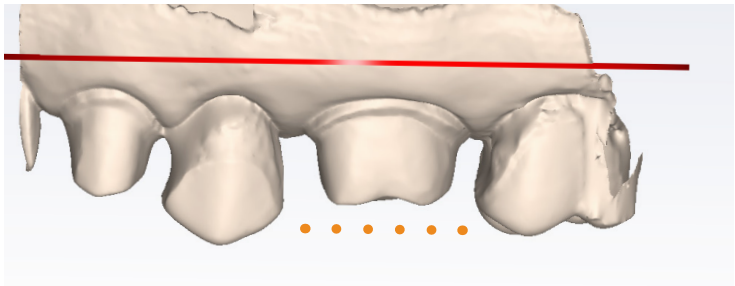
   B. In the Distal View, align the buccal cusps of the neighbors.





   C. In the Buccal View, evaluate marginal ridge alignment.

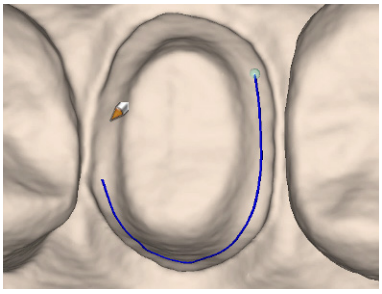




3. Click the **Orientation** icon to accept the current position.

NOTE: Pull the USB connector from the laptop when the scanner is not in use

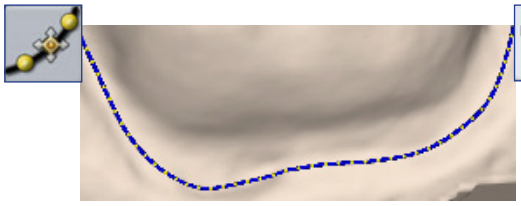
Mark the Margin



1. Use the scroll wheel to zoom in on the preparation.
2. Click **Trace** and click on the inside of the margin.
3. Moving in small increments, click as you move around the preparation.

Don't worry if you make a mistake while drawing the margin.

4. The margin is finished when the original point (blue dot) is clicked to finish the circle.
5. Practice adjusting the margin with both **Move Margin** and **Add Segments**.



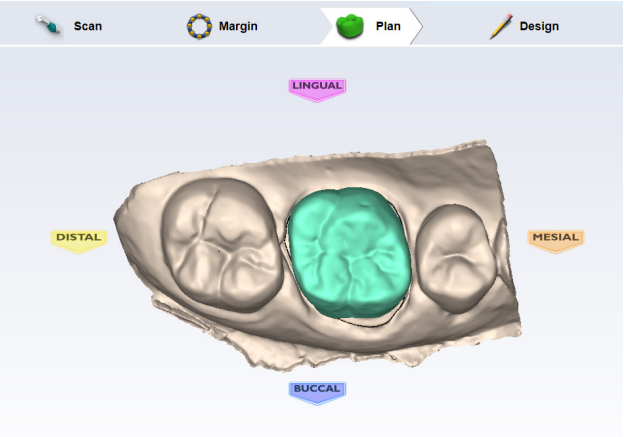
Move Margin *is used for minor adjustments.*

Add Segments *is used to redraw a section of the margin.*

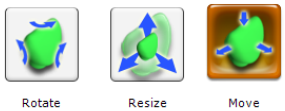
6. If you are sending a case to the lab, click **Retract** to ensure the lab receives the margin is visible to the lab.

Plan tab

The main goal of the **Plan** tab is to establish the proper size and position of the tooth to aid in autogenesis. The Plan tab is designed to help plan cases with multiple restorations for optimal outcome.

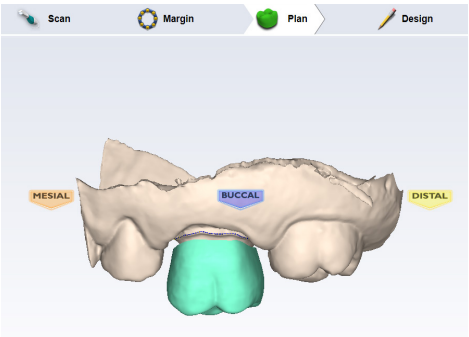


Check the position from the occlusal to verify central groove and cusp are aligned with adjacent teeth. Make changes with the Rotate, Resize and Move tools.

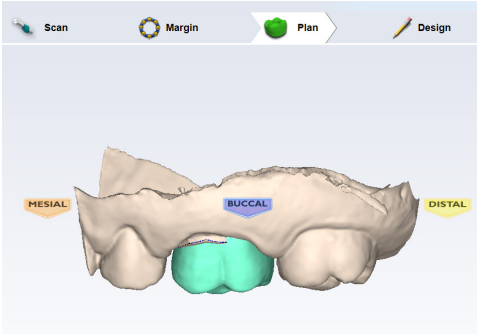


Helpful hints:

- *Always look from the buccal view to make sure the cusp tips are aligned with the adjacent teeth and/or the tooth is positioned within the occlusal plane.*
- *It is not important that the Planned tooth closes the interproximal spaces and/or touches the margin line*



Poor Positioning

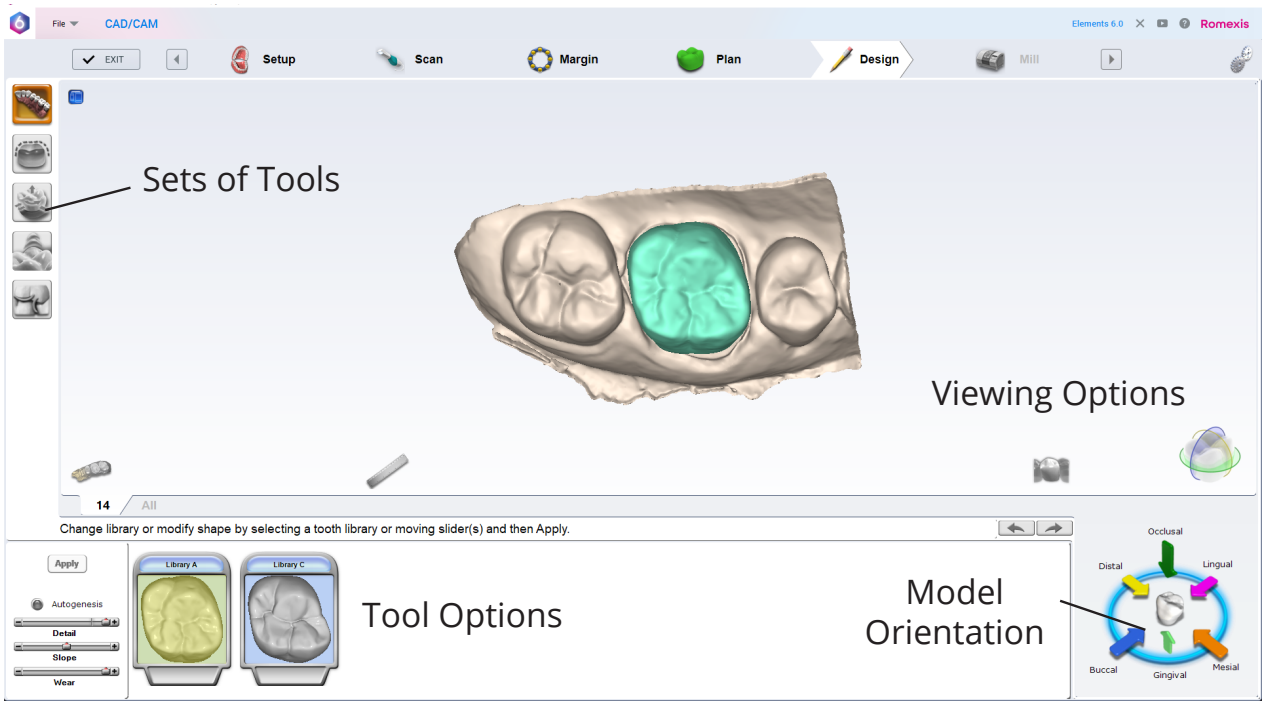


Ideal Positioning

Design

Click the Design tab. The Tooth Libraries automatically appear.

Please reference the CAD/CAM workflow for design. We will use this form throughout the design process.



Generate

1. Click **Apply** to have **Autogenesis** generate the proposal.

Fit

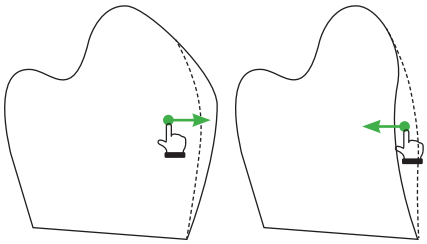
2. Click **Incremental Change Tools** to evaluate the proposal for large adjustments. Use the tool options to make changes where needed. Click **Apply** before continuing.

Form

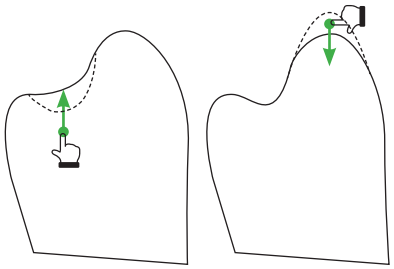
3. Click **Freeform Change Tools** and **Material Thickness** (in view options) to evaluate the proposal. The proposal should be blue/green with a yellow margin.

   Click **Rubber Tooth** and adjust the axial walls, marginal ridges, and embrasures.

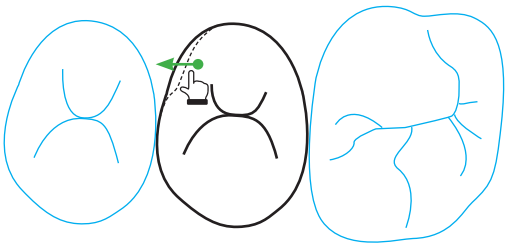
Function—Bite/Occlusion



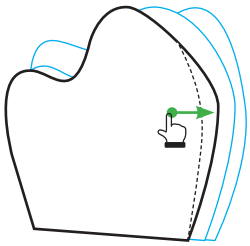
Adjust axial wall contours by pulling material away from or toward the preparation.



Adjust central grooves and cusps by pulling material up or down.



From the occlusal view, adjust the embrasure shapes.

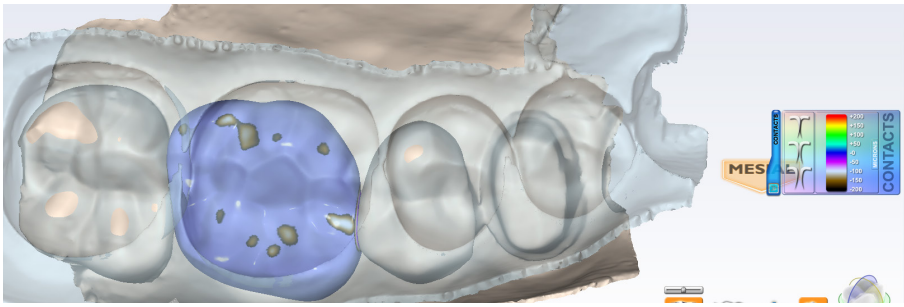


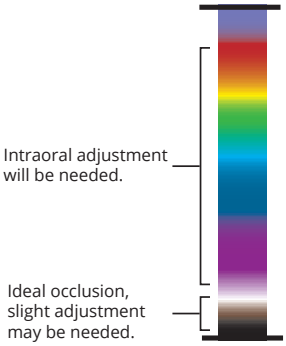
Check the emergence profile and adjust.

4. Click **View Bite Registration** to see the opposing dentition model above the proposal. Click **View Bite Registration** a second time to make the template transparent.

Adjust the translucency of the opposing model.

5. Click **View Contacts.** Use **Contact Refinement** to adjust to White, Brown, Black.

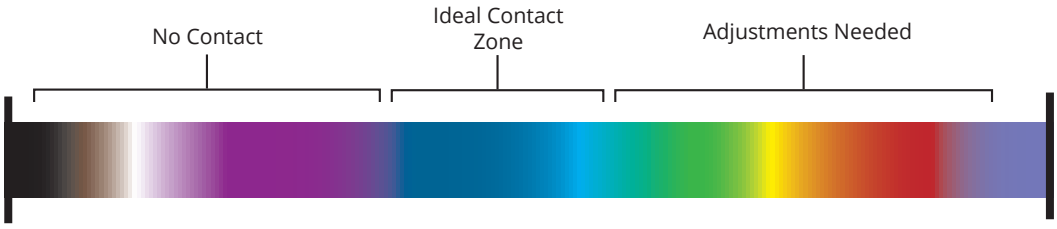




6. Click **View Bite Registration** again to deactivate the template.

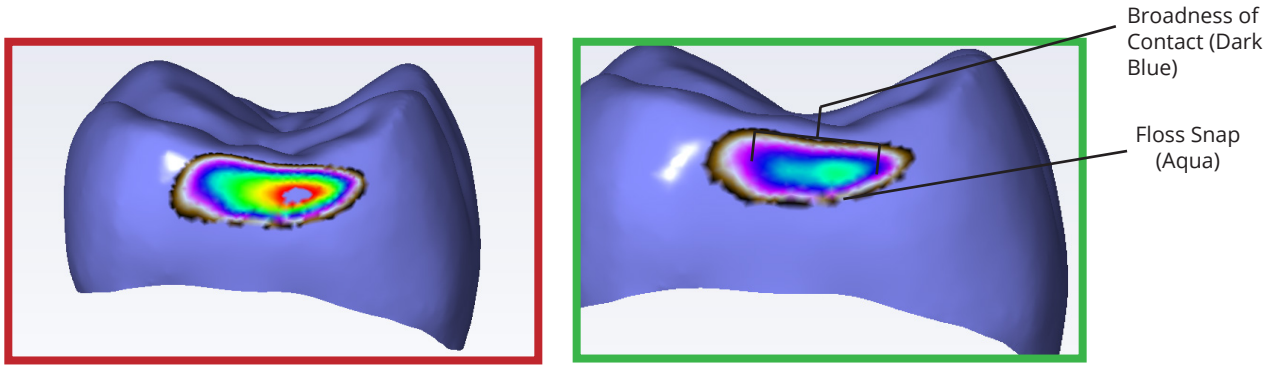
Interproximal Contacts

7. Click **Hide Model** to remove the model from view.
8. Rotate the proposal to view the interproximal contacts. Adjust interproximal contacts as needed with **Smooth Surface** in **Freeform Change Tools**.



The goal is dark blue with a hint of aqua.

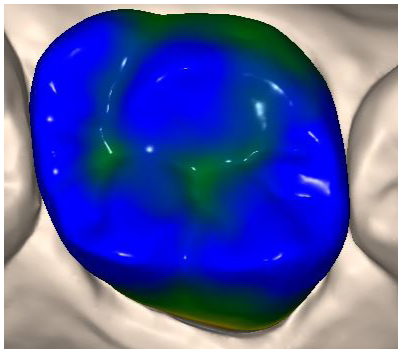
Note: to add material activate dropper and left click on the area to add.



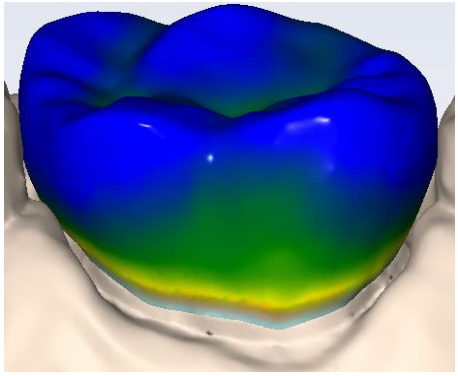
Before Goal

9. Deactivate **Hide Model.**
10. Click **Material Thickness.**

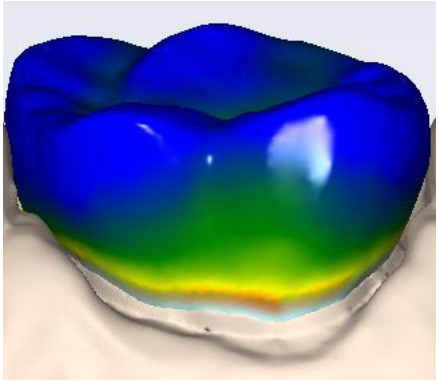
The desired material thickness is based on the block manufacturer's recommended thickness for your restoration type. The desired material thickness for a crown is 1-1.5 mm along the axial walls and 1.5-2 mm on the occlusal table.



11. Evaluate the margin. The material thickness should be yellow around the margin with no red or orange.



Good example — yellow margin



Poor example — Red or orange along the margin

12. If there is red or orange around the margin, click **Move Margin** to evaluate the margin for accurate placement. Adjust the margin, if needed.

Going back to the Margin tab and making changes to the margin will result in losing your design.

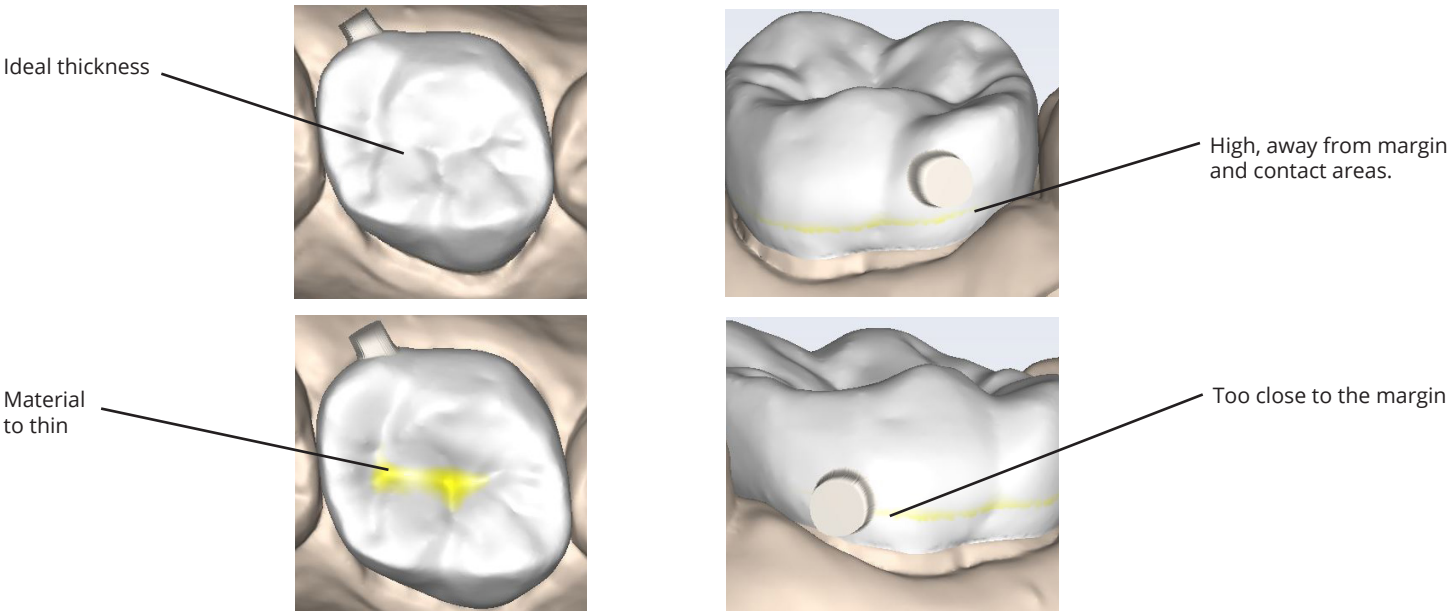
13. If the margin is placed accurately and is still red/orange, use the **Dropper** tool to add material thickness.

NOTES

Review the CAD/CAM Workflow found on page 51 before continuing to the Mill tab.

Milling

1. Click the **Mill** tab
2. Evaluate your design. There should only be yellow near your margin.
3. Check the sprue position and use the **Sprue Placement** wheel to adjust when needed.
4. Select the block size (also based on sprue positioning)



5. Click **Mill Sim.** The system defaults to standard or detailed depending on the block size. I12 Detailed C14 – Standard.

Note: You can mill an I12 block using the Standard mode. Always click on Mill Sim to evaluate under and/or over milling to prevent complications with delivery of the restoration.

Standard — Full Coverage Crowns
Detailed — Inlay, Onlay and Veneers

standard or detail for I12 blocks

The detailed mode is not recommended for e.max c14 blocks and may result in broken

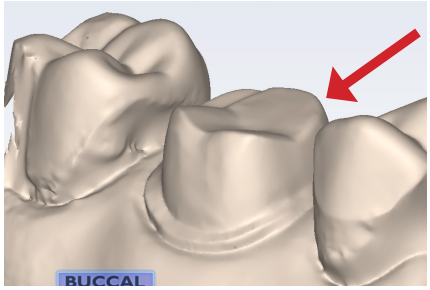
	Crown	Bridges	Inlay	Onlay	Veneer
I-12	Detailed	Standard	Detailed		
C-14	Standard		N/A		
C-16	Standard				
IPS e.max ZirCAD	Detailed	Detailed			

note: that this is an example for the commonly used e.max material

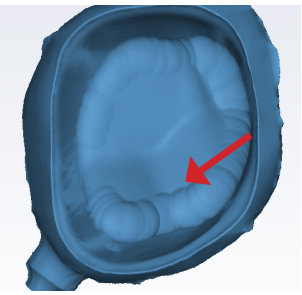
Evaluate the simulation

- Are there hangups? Hangups are areas where the tools cannot completely remove the material for the interior of the proposal.
- Is there overmilling? Overmilling is caused by areas of the preparation that are smaller than the tools. The tools must “overmill” and remove extra material so that there is no hangup. Is the overmilling drastic enough to cause a loss in retention

1. Click **Hide/View Model** and click the **Gingival** arrow to view the interior aspect of the proposal. The simulation will show swirl marks in areas where the milling tools have to overcompensate for small prep areas.



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



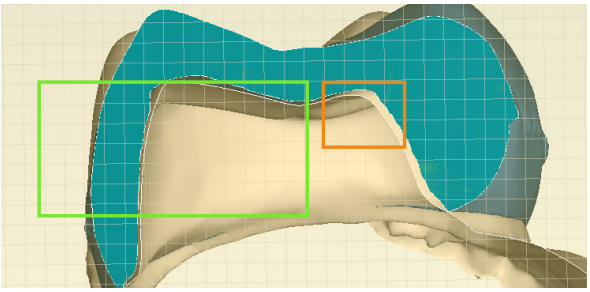
Swirl marks indicate overmilling. The rest of the proposal’s interior is relatively smooth.

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

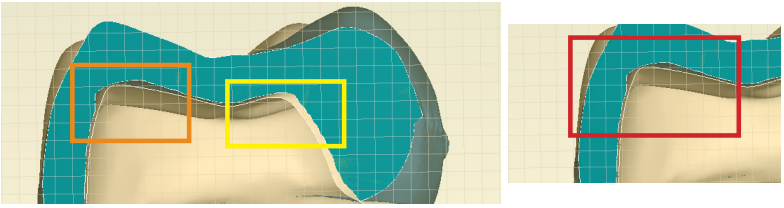
A maximum zoom of 1 mm is recommended.

Imported restoration cases do not display the model, you will only see the mill simulation.

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

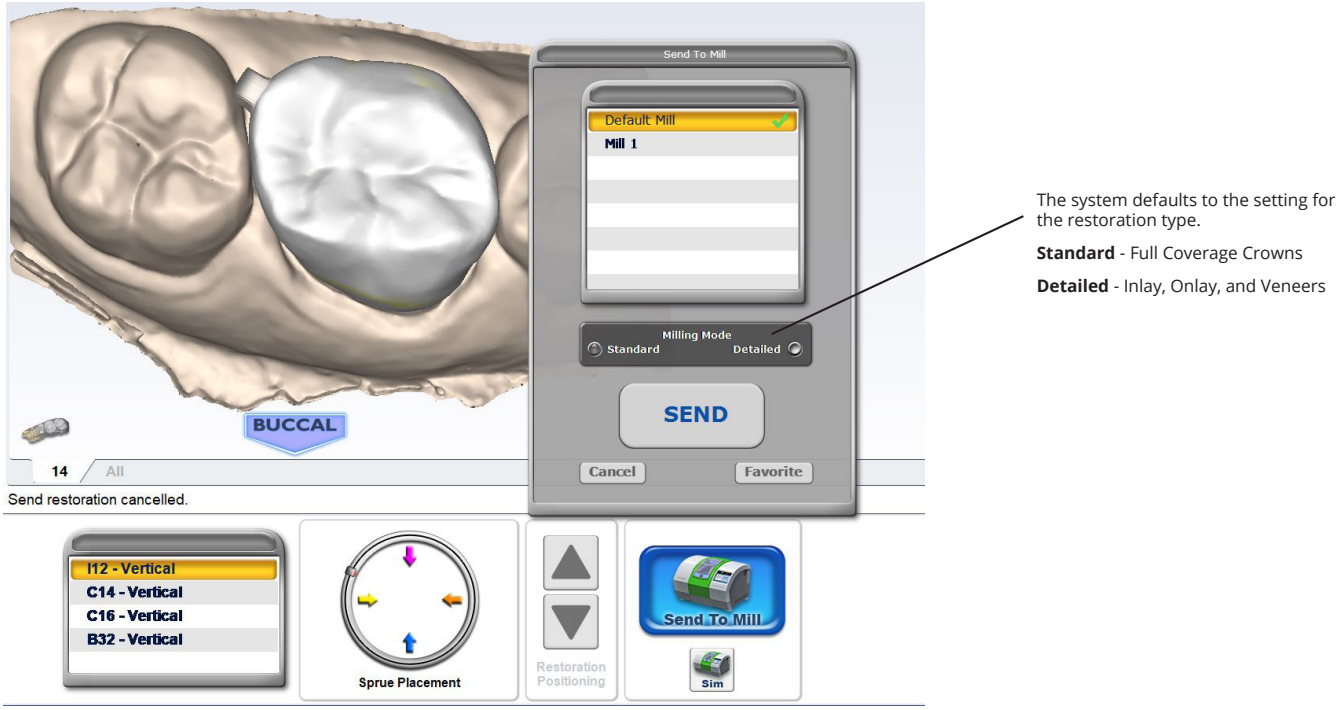


Example B: In the example below, there is large overmilling (orange), minor overmilling (yellow) with only a slight increase in the spacer, and on a different slice of the same proposal, there is an overlap which would cause a hangup (red).



If you feel there are hang-ups or excessive over-milling, we recommend calling **Customer Support** at **(800) 537-6070** to have them evaluate your simulation before you mill. If you mill a problematic design, you may have too much spacer and loss of retention or you may have hang-ups and will need to adjust the restoration, adjust the preparation, or mill another block.

5. Click **Send to Mill**, click **OK**



Pre-op Crown Workflow

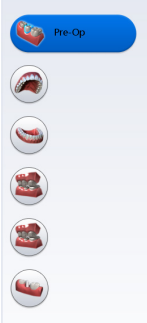
Setup

Enter the setup information for this case:

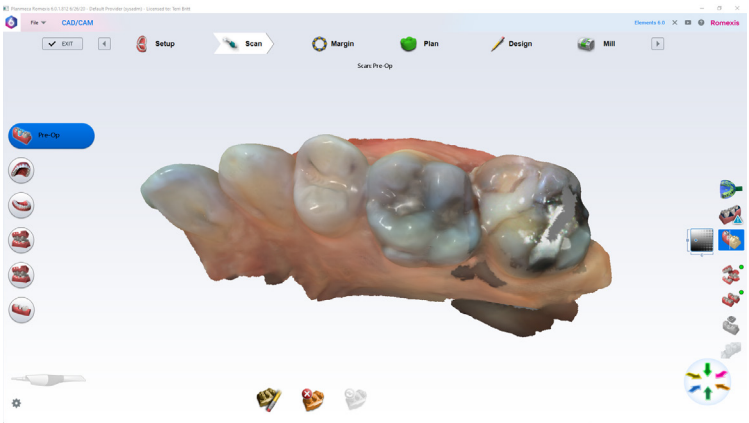
- **Select tooth from the model**
- **Select restoration type**
- **Select pre-op from the library**
- **Select material**
- **Select translucency**
- **Select shade**

Scan Pre-Op

1. Click the **Scan** tab.
2. Click **Pre-Op.**



3. Follow the basic scan pattern.
4. Evaluate the pre-op model.

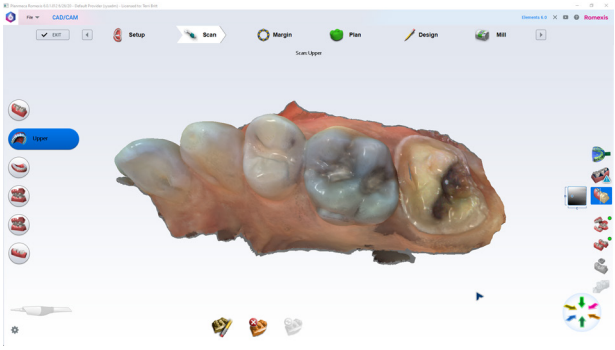


Goals of Pre-Op Scanning

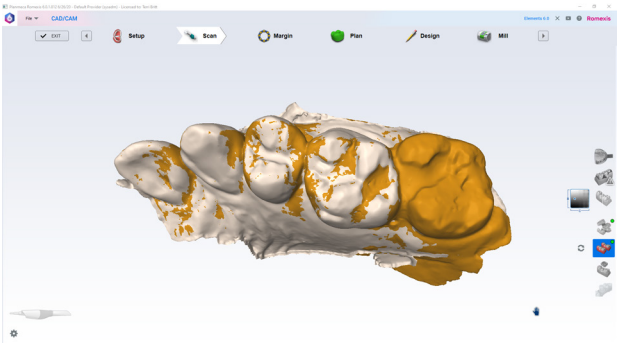
100% of the pre-op tooth
90% of the adjacent teeth
Good axial data for design
2-3 mm gingival tissue on buccal and lingual

5. Click the arch of the prep (**Upper** or **Lower**).
6. A Time Saver prompt appears. Click **Yes** to copy the pre-op scan to the prep scan file or **cancel** to re-scan the prepped quadrant. If copying the pre-op, you will need to erase the pre-op tooth out of the model as seen in the picture.

7. Scan in the data of the prepped quadrant by beginning over the adjacent teeth and move the scanner over the prep tooth to capture.
8. Evaluate the model for any missing data and Fill in areas as needed.
9. Generate the model.



10. Verify the pre-op and prep scans aligned properly by clicking on pre-op alignment.



Orientation

1. Click the **Margin** tab.
2. Evaluate and adjust the Orientation using **View Controls** to change the point of view. (reference page 21 for further Orientation instructions/visuals)

   A. In the Occlusal View, balance the model from buccal to lingual.
   B. In the Distal View, align the buccal cusps of adjacent teeth
   C. In the Buccal View, evaluate marginal ridge alignment.

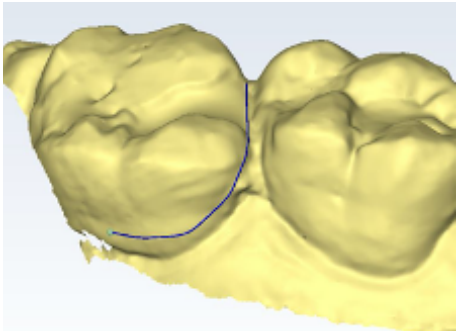
3. Click the **Orientation** icon to accept the current position.

Mark the Margin

1. Use the scroll wheel to zoom in on the preparation.
2. Click **Trace** and click on the inside of the margin.
3. Moving in small increments, click as you move around the preparation.
4. The margin is finished when the original point (blue dot) is clicked to finish the circle.

Edit the Pre-op

1. Click **Pre-Op Editing.**
2. Use the **Trace** tool to designate the area of the model that you want to use as the Pre-op library surface. Stay away from rough areas and the margin.



3. Click on the blue dot to finish the pre-op area.
4. Use **Move Curve** and **Add Segments** to edit the Pre-op if needed.

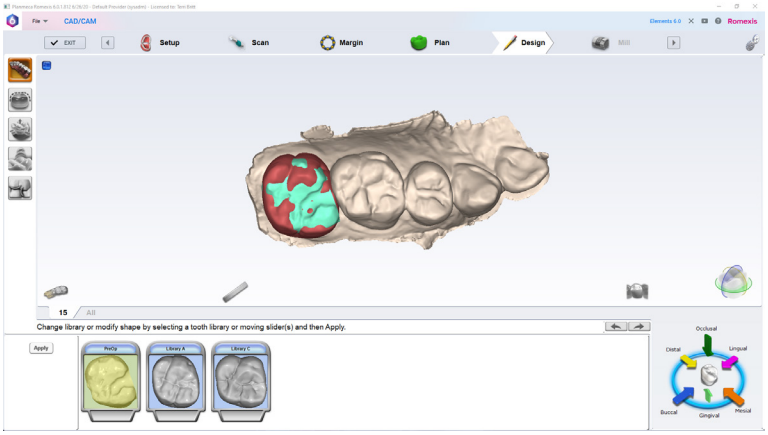
Plan

The Plan tab is not used for Pre-op cases.

Design

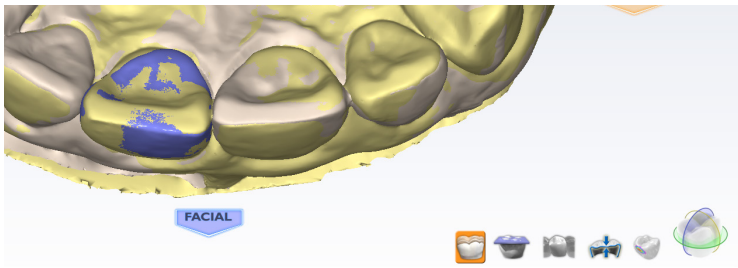
1. Click the **Design** tab.

Note that the Library at the bottom of the screen now includes Pre-op.



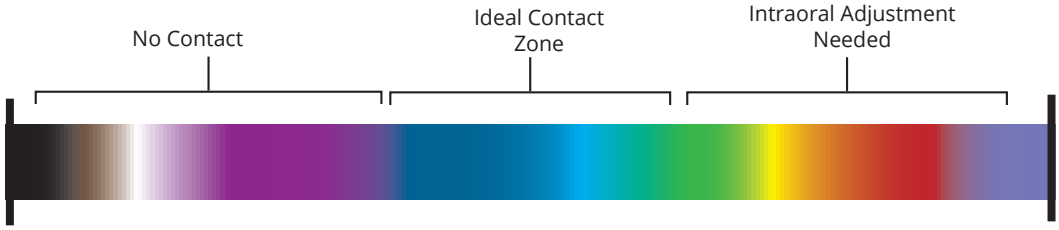
2. Click **Apply.** Autogenesis creates a proposal based on the Pre-op area that you designated and Library A.

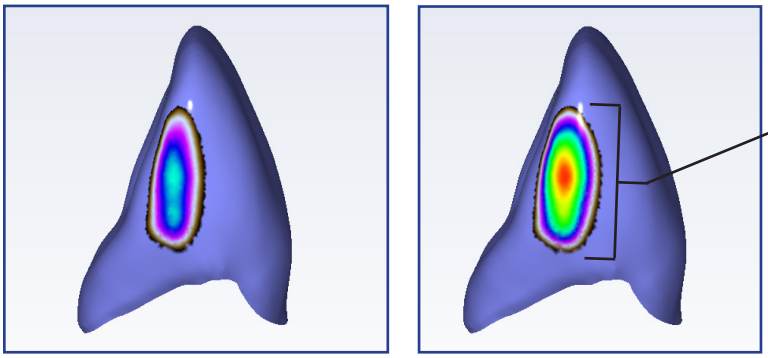
3. Click **View Pre-op** to see the combination of the pre-op model and the prep model. Speckled areas are where the pre-op is in close proximity to the proposal. Solid stone color shows where the pre-op is above the proposal. Solid proposal color is where the proposal is above the pre-op.



Click View Pre-op a second time to make the pre-op model translucent.

4. Rotate the proposal to view the interproximal contacts. Adjust interproximal contacts as needed with Smooth Surface in Freeform Change Tools. The goal is light green/aqua surrounded by dark blue. Final adjustments may be made after the restoration is milled.





Broadness of Contact (Dark Blue)

Leave a little green in the contact area to finalize after testing the fit.

Partial Restoration Workflow

Setup

Enter the setup information for this case:

- **Select tooth from the model**
- **Select restoration type**
- **Select material**
- **Select translucency**
- **Select shade**

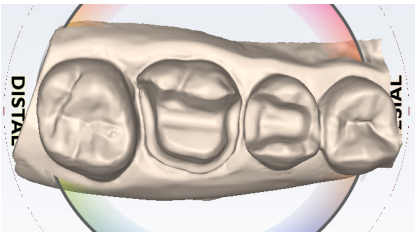
Acquire Scans

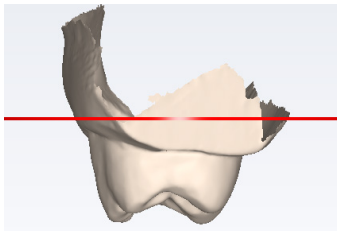
1. Click the Scan tab.
2. Follow the basic scan pattern.
3. Evaluate the preparation model. The same basic scan pattern is used for partial restorations.
4. Scan the opposing and buccal dentition.

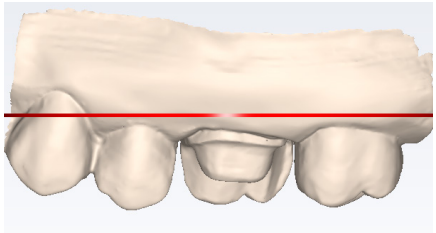
Orientation

The pictures for this case are of a different onlay. The procedure is the same.

1. Click the Margin tab.
2. Set the Orientation for the onlay. Use the remaining anatomy of the prepped tooth to aid your orientation.







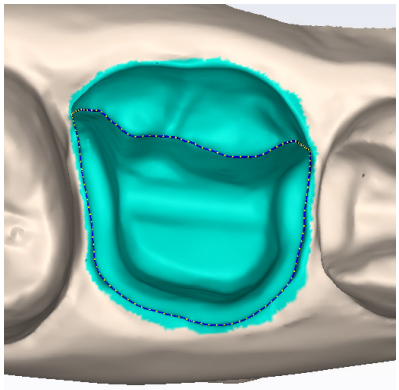
Mark the Margin

1. Use the scroll wheel to zoom in on the preparation.
2. Click **Trace** and click on the inside of the margin.
3. Moving in small increments, click as you move around the preparation.
4. The margin is finished when the original point (blue dot) is clicked to finish the circle.

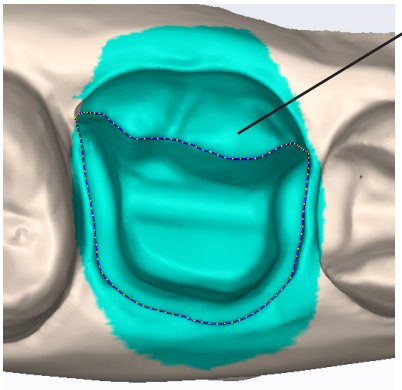
Once the margin is drawn for an inlay or onlay, a notification screen appears.

Note: If this screen doesn't appear, click **Selection Area.**

5. Click **Take Me There** to go to the Selection Area screen.
6. Click **Add to Selection** and circle Tooth.



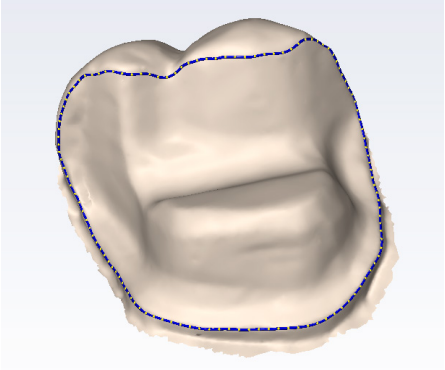
Good Selection



Poor Selection

Using Selection Area will define the area of the tooth structure for design. Over selection of an area will cause a poor proposal.

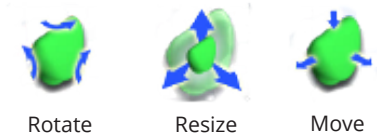
7. Complete the Selection Area and return to the **Margin Tool** screen.
8. Click **Hide Model** to isolate the preparation and to evaluate and adjust the margin with **Move Margin** and **Add Segments** as needed.



Please reference the CAD/CAM workflow page for design. We will use this form throughout the design process.

Plan

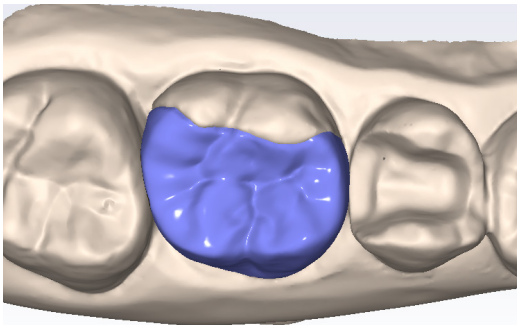
Position the proposal to aid autogenesis.



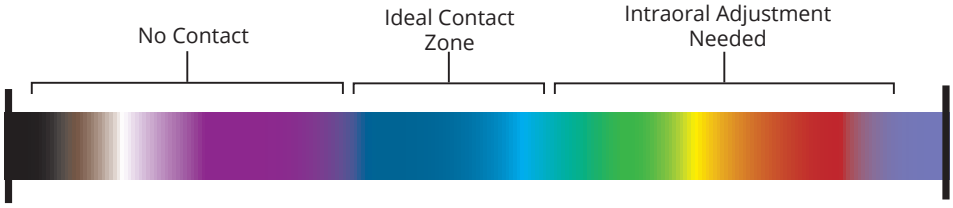
Design

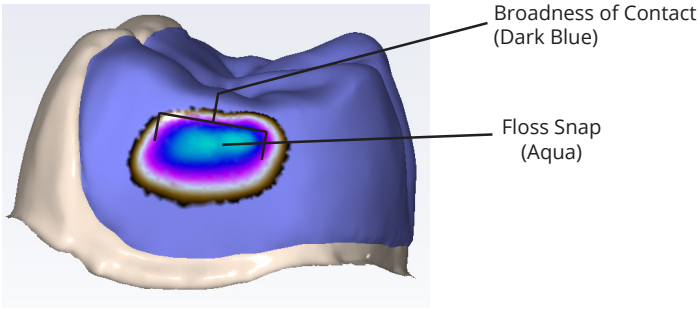
1. Click the **Design** tab.
2. Ensure Autogenesis is **ON** and click **Apply.**

Autogenesis creates a proposal based on the Selection Area designated.

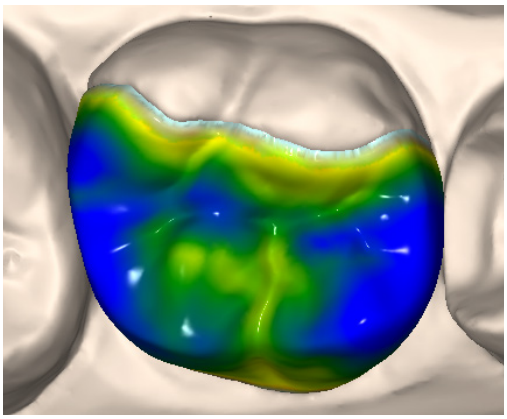


3. Click **Incremental Change Tools** to evaluate the proposal for large adjustments. Use the tool options to make changes where needed. Click **Apply** before continuing.
4. Click **Freeform Change Tools** and **Material Thickness** (in view options) to evaluate the proposal. The proposal should be blue/green with a yellow margin.
5. Click **Rubber Tooth** and adjust the axial walls, ridges, and embrasures. Activate **Move Feature** to adjust surfaces incrementally.
6. Click **View Contacts.**
7. Rotate the proposal to view the interproximal contacts. Adjust interproximal contacts as needed with **Smooth Surface** in **Freeform Change Tools**. The goal is dark blue with a hint of aqua.

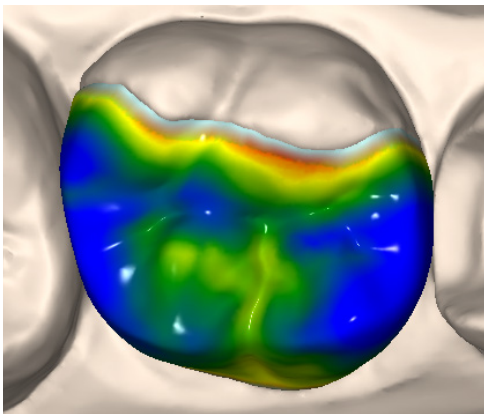




8. Deactivate **Hide Model.**
9. Deactivate **View Contacts.**
10. Click **Material Thickness.**
11. Evaluate the margin. The material thickness should be yellow around the margin with no red or orange.



Good example — yellow margin

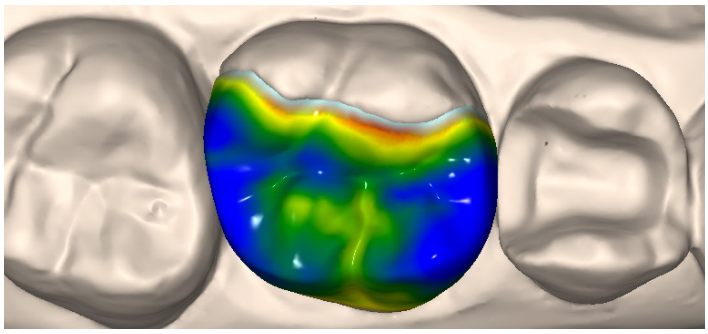


Poor example — red or orange along the margin

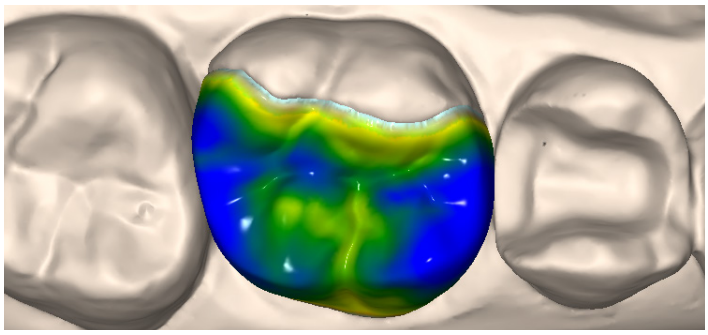
12. If there is red around the margin, click **Move Margin** to evaluate the margin for accurate placement. Adjust the margin if needed.

Going back to the Margin tab to make changes will result in losing your design.

13. If the margin placement is accurate, use the **Dropper** tool to add material thickness.
    In some situations, it will be difficult to attain ideal occlusal contact strength and reach minimum material thickness. In the example below, the red material thickness around the margin indicates the margin is too thin.



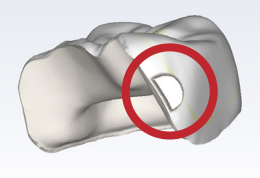
14. Click **Dropper** and add material thickness. This will result in adequate material thickness strength but may create a strong contact with the opposing dentition. This can be corrected intraorally.

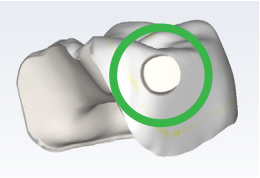


Review the CAD/CAM Workflow before continuing to the Mill tab.

Mill

1. Click the **Mill** tab.
2. Evaluate your design and review the material thickness indicators.
3. Click **Hide Model** and check the sprue position and use the **Sprue Placement** wheel to adjust when needed. Ideal sprue placement is away from the contact and away from the margin.
4. Ensure the total circumference of the sprue is visible.





5. Select the block size (also based on sprue positioning).
6. Select the block size.
7. Evaluate the simulation.
8. Click **Send to Mill**, Click **Send**.

The system defaults to the setting for the restoration type.

Standard - Full Coverage Crowns

Detailed - Inlay, Onlay, and Veneers

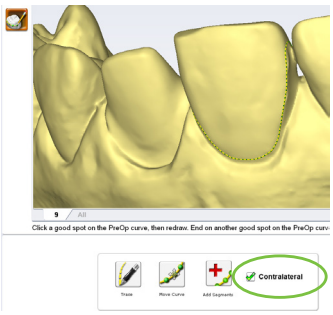
NOTES

Contralateral Tooth Copy

Copy existing contralateral dentition onto the prep or copy a designed restoration onto the prep.

Copy Contralateral Dentition

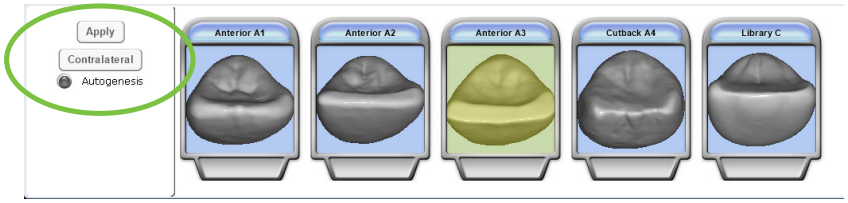
1. Use the **Scan Pre-op** Scan Type and capture the prep and the desired contralateral dentition. (Note: Use the Scan Swap feature if you accidentally skip this step.)
2. Scan the prep and proximal dentition again.
3. Scan the Opposing and Buccal with the normal procedure.
4. Set the Orientation and mark the Margin.
5. Click **Pre-Op Editing** and designate the anatomy of the contralateral dentition that you want to copy.
6. Click the **Contralateral** checkbox.



7. Proceed to the Plan tab and adjust the position of the contralateral shell to match the placement and alignment of the preparation.
8. Proceed to the Design tab. The contralateral pre-op anatomy is mirrored and acts like a normal pre-op case.

Copy a Restoration Design

1. Follow the normal scan, orientation, and margin draw workflow for both preparations.
2. Fully plan and design the first restoration proposal.
3. Click the second tooth tab.
4. On the Tooth Libraries screen, click the Contralateral button to designate that you want to copy the other design. (This only appears after the first tooth is designed.)



5. Proceed with the normal design workflow.

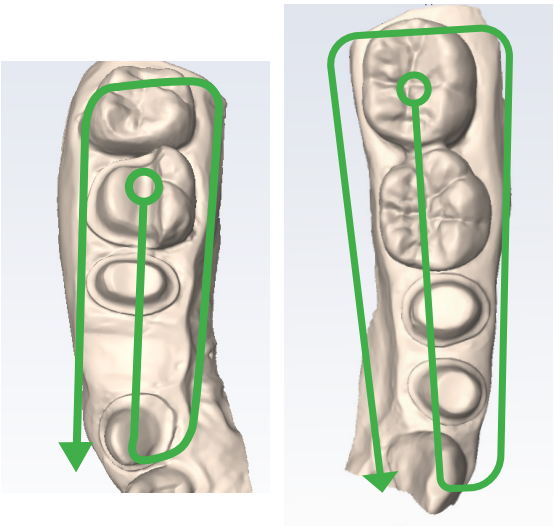
Note: The goal in the Plan tab is to focus on proper size and position of the tooth. Any changes on the Plan tab for the second tooth is ignored when a design is being copied. The position of the contralateral design is based on the Orientation of both preparations. Ensure you have good orientations for both tooth numbers..

Scan Multiple Restorations

In scanning multiple restorations, the basic scanning technique is expanded to encompass the additional preparations.

1. On the **Setup** tab, select the tooth number for the first preparation and then select a **Preparation Type, Library, Material, Translucency,** and **Shade.** When you add an additional restoration to a case, the **Material, Translucency, and Shade** from the previously selected tooth will be used as the default values. You may then change them if desired.
2. Click the **Scan** tab.
3. Start on the most distal preparation. Two examples of multiple restoration models shown below.

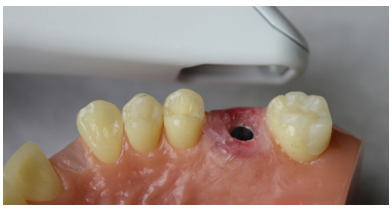
When marking the margin for multiple teeth, ensure the correct tooth tab is selected when marking the margin for each tooth.



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

Scan Body Workflow

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



2. Scan the opposing and buccal bite.
3. Begin scanning on the occlusal surface of an adjacent tooth. Roll into a 45° angle BEFORE approaching the scan body. It is important to capture the sides of the scan body before capturing the direct occlusal to ensure proper model alignment.

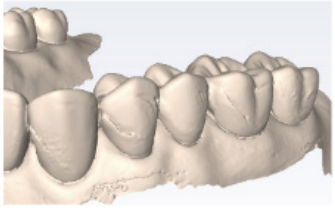
4. Verify alignment or both buccal and scan body.
5. Follow the normal procedure for exporting the case to your laboratory. See your scanner's user manual for more information.

Global Alignment

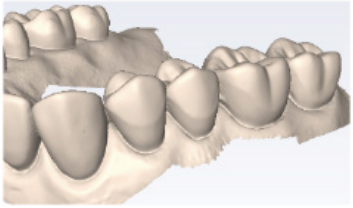
Global Alignment reprocesses your scans to correct misalignments (where possible) and improve overall model trueness and precision. Rescan a misaligned area from multiple angles. The system will replace and realign the data.

The following examples are of a model that was scanned in a drastically bad scan pattern resulting in misalignments and then rescanned with Active Delete ON. Global Alignment enables most misalignments to be corrected.

Global Alignment occurs during model generation.



Model with misalignment



Model with Global Alignment

NOTES

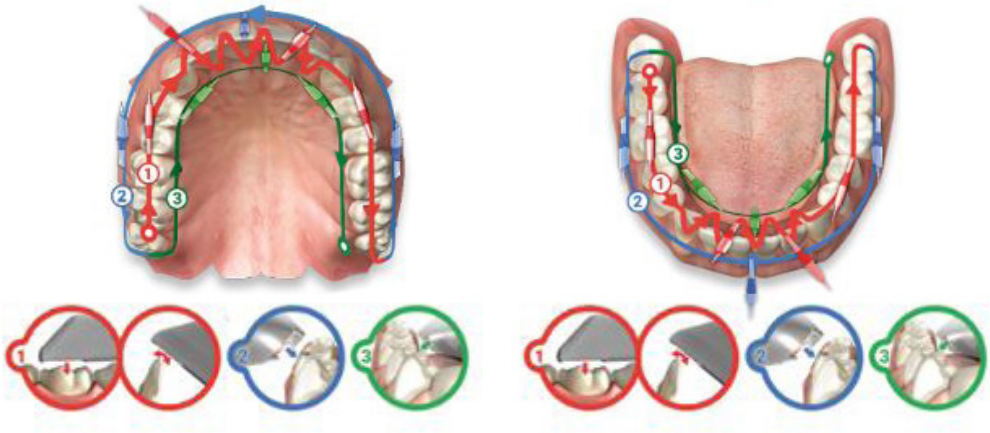
NOTES

Non-Restorative and Full Arch Scanning

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

Full Arch Scanning Pattern

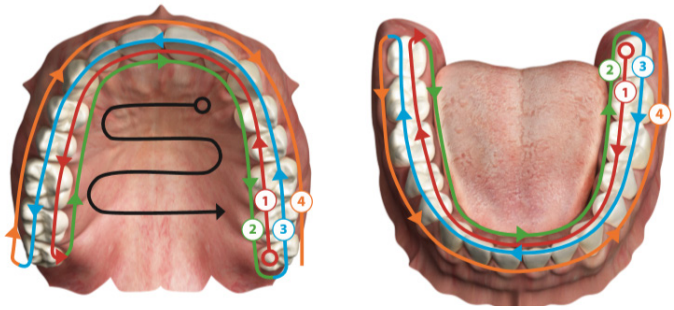
Upper *Lower*



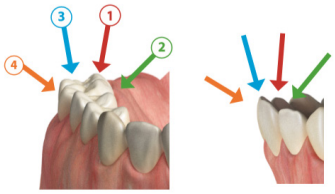
1. Start on the distal of one side, scan the occlusal of the entire arch. On the anteriors, rotate back and forth from the lingual and facial.
2. Scan all of the buccal.
3. Scan all of the lingual.
4. Evaluate the model and rescan any low data areas.
5. Follow the buccal scan pattern below.

Alternative Full Arch Scanning Pattern

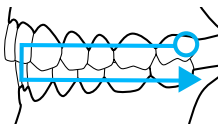
Upper *Lower*



1. Start at a 45° angle on the distolingual of one side and scan the entire arch from this angle.
2. Transition to a 90° angle on the lingual and scan the entire arch from this angle.
3. Transition to a 45° angle on the distobuccal and scan the entire arch from this angle.
4. Transition to a 90° angle on the buccal and scan the entire arch from this angle.
5. For scans requiring palatal data, begin the scan in the anterior region and sweep side to side working your way to the distal.
6. Evaluate the model and rescan any low data areas.
7. Follow the buccal scan pattern below.



Buccal Scan



Start the buccal segment scan over the gingival tissue of the maxillary arch. Capture the maxillary teeth until the Maxillary Full Arch appears. Then start to capture the mandibular until the Mandibular Full Arch appears. In some instances, the models may not appear.
In this case, stop scanning and manually align the models in the Bite Align tool.

All-Ceramic Chairside Preparation Guide

Anterior Chairside Preparation Guide

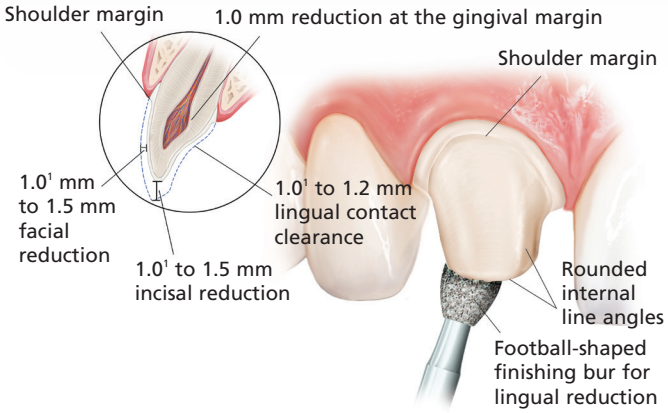
ivoclar vivadent
passion vision innovation

For IPS e.max® indications

		IPS e.max Ceram/ZirPress	IPS e.max ZirCAD	IPS e.max CAD/Press
Anterior	**Crown**		✔	✔
	Veneer	✔		✔
	Bridge		✔	✔
Posterior	**Crown**		✔	✔
	Bridge		✔	

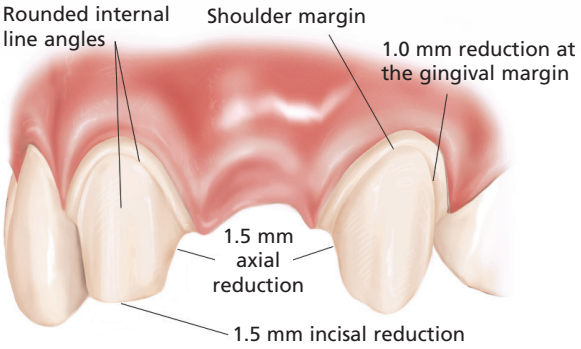
Full-Coverage Restorations

NEW *Anterior Crown Preparation*



3-Unit Bridge Restorations

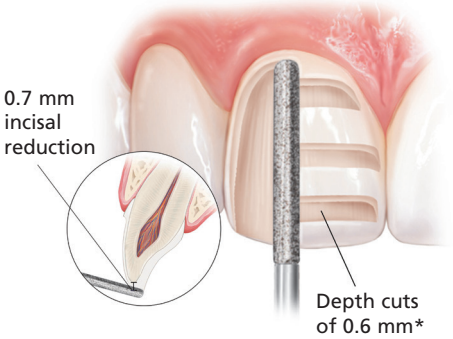
3-Unit Bridge Preparation

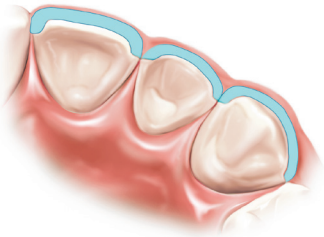


Veneers

A medium grit, round-ended, diamond bur is used to remove a uniform thickness of facial enamel by joining the depth-cut grooves.

The diamond bur is angled to bevel back the incisal edge.





Thin Veneers

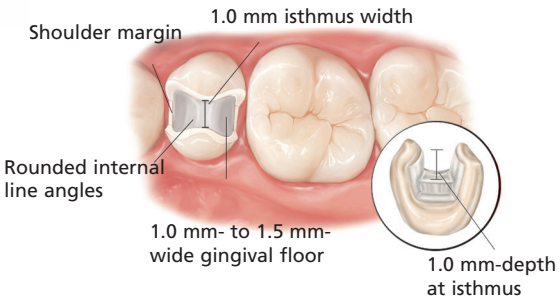
IPS e.max can be pressed to as thin as 0.3 mm for veneers. If sufficient space is present, IPS e.max can be placed over the existing teeth without the removal of any tooth structure. Depending on the case requirements, however, some teeth may need to be prepared to accommodate for the thickness of the ceramic and to ensure for proper contour and emergence profile.

*Please note: For additional masking capabilities and/or layering techniques, further reduction may be necessary. Contact your laboratory for further information.
[1] 1.0 mm only suitable with adhesive cementation.

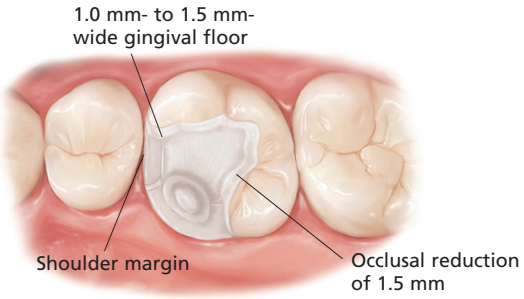
Posterior Chairside Preparation Guide

Inlays/Onlays

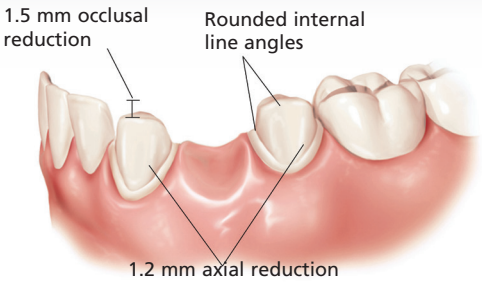
Inlay Preparation

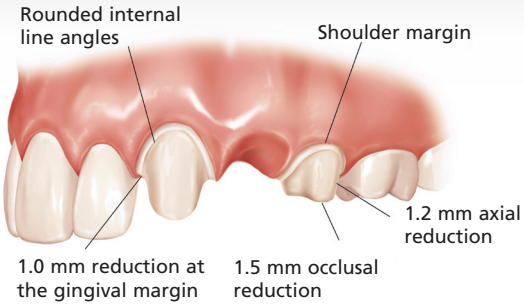


Onlay Preparation



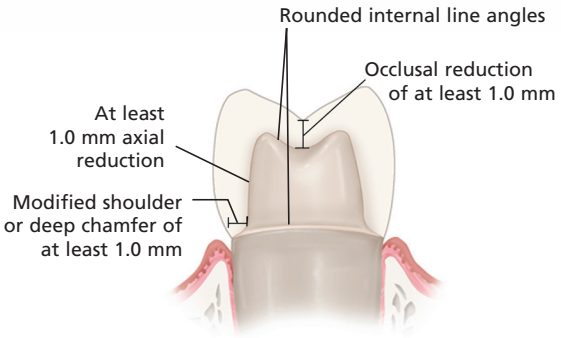
3-Unit Bridge Restorations *3-Unit Bridge Preparation*



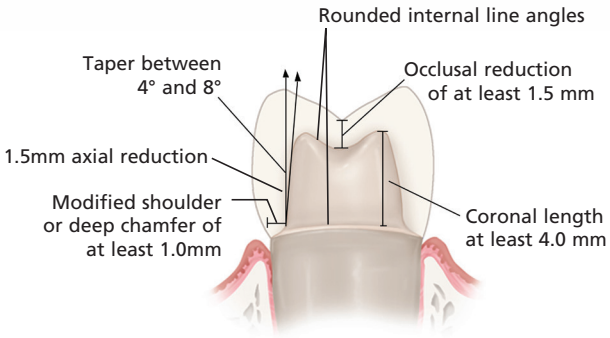


Full-Coverage *Posterior Crown Preparation*

NEW *Adhesive Cementation Preparation*



Conventional Cementation Preparation



When layered or pressed ceramic margins are preferred in conjunction with a zirconia framework, enhanced gingival esthetics can be achieved with a definitive 90-degree shoulder preparation.

CAD/CAM Material Indications

	Block	Manufacturer	Material	Anterior Full Coverage	Posterior Full Coverage	Veneer	Inlay/Onlay	Bridge
Reinforced Composites	Lava Ultimate	3M	Resin Nanoceramic			●	●	
	GC Cerasmart	GC	Force-Absorbing Flexible Nanoceramic	●	●	●	●	
	VITA ENAMIC multiColor	VITA	Dental Hybrid Ceramic	●	●	●	●	
	Tetric CAD	Ivoclar Vivadent	Cross-linked Dimethacrylate	●	●	●	●	
Glass Ceramics	VITABLOCS Mark II	VITA	Feldspathic Ceramic	●	●	●	●	
	VITABLOCS TriLuxe forte	VITA	Feldspathic Ceramic	●	●	●	●	
	IPS Empress CAD	Ivoclar Vivadent	Leucite-Reinforced Ceramic	●	●	●	●	
	IPS Empress CAD multi	Ivoclar Vivadent	Leucite-Reinforced Ceramic					
Reinforced Glass Composites	IPS e.max CAD	Ivoclar Vivadent	Lithium Disilicate	●	●	●	●	● Anterior to Premolar
	VITA SUPRINITY PC	VITA	Zirconia Reinforced Lithium Silicate	●	●	●	●	
	Straumann n!ce	Straumann	Lithium Disilicate Reinforced Ceramic	●	●	●	●	
Zirconia	IPS e.max ZirCAD	Ivoclar Vivadent	Pre-Sintered Zirconia	●	●			
	IPS e.max ZirCAD multi	Ivoclar Vivadent						
Acrylic	Telio CAD	Ivoclar Vivadent	PMMA	Provisional Only				
	BOB	E4D Technologies	Burn-Out Acrylic	For cast or pressed only				

Block names are trademarks of their respective manufacturers.

Indications from this chart are based on manufacturer specifications. To find out more go to 3m.com, gcamerica.com, ivoclarvivadent.com, vita-zahnfabrik.com, and straumann.com.

Scanning Technique

Goals & Patterns

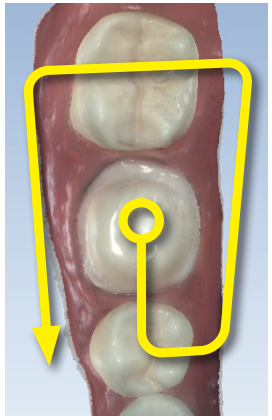
Preparation

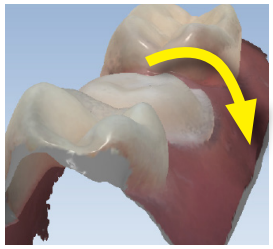
100% of the prep and interproximal contact areas.

90% of the adjacent teeth.

Good axial data for design.

2-3 mm gingival tissue on buccal and lingual.

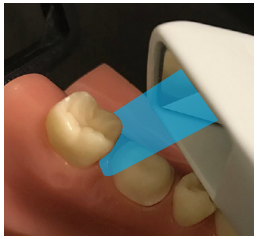




Interproximal

To achieve 100% of the interproximal contact area, a slight rotation of the scanner will be needed.

Rest the scanner on the proximal dentition and perpendicular to the arch.

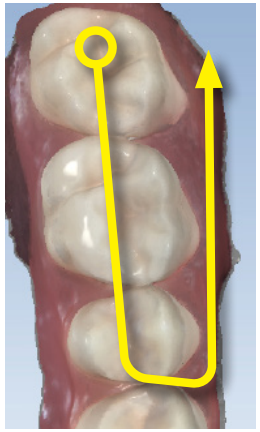


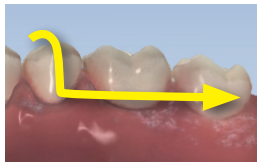
Opposing

100% of the cusps.

2-3 mm gingival tissue on the buccal side.

Lingual and gingival data not necessary.





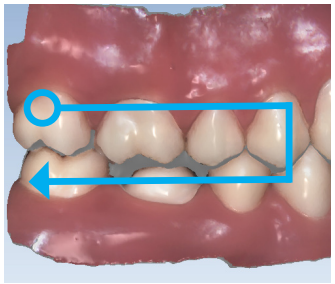
Buccal Bite

Focus the scanning on one arch until the model for that arch appears, then go to the opposing arch and repeat.*

Capture the buccal surface of the dentition in the prep and opposing.

2-3 mm gingival tissue

No rotations necessary



Note: Information on scanning Bite Registration material can be found in the User Manual.

*If the models do not automatically appear for each arch, follow the scan pattern and then manually align them with the Bite Alignment tool.

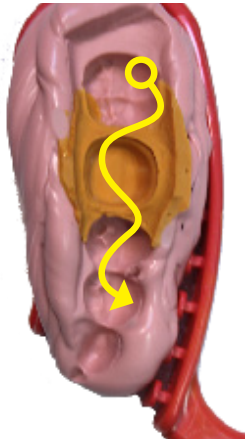
Impressions

100% of the prep and interproximal contact areas.

90% of the adjacent teeth.

Good axial data for design.

2-3 mm gingival tissue on buccal and lingual.



IPS e.max CAD

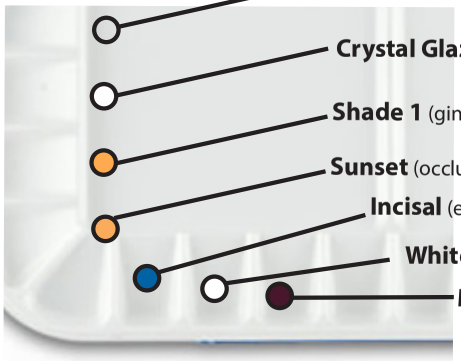
Characterization Process

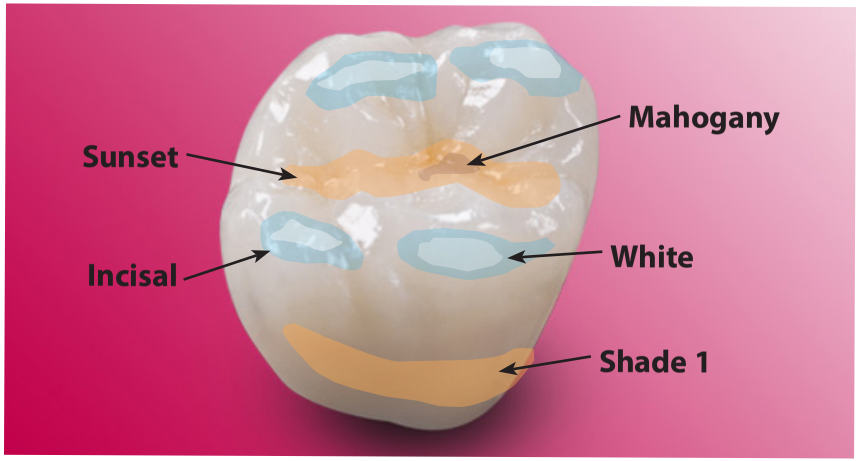
1
Preparing the restoration

Object Fix
Flow (shown) will be used to affix the restoration to the firing pin for characterization and firing. Object Fix - Putty can also be used

Crystallization Tray
After characterization place the restoration onto the crystallization tray for firing. Note there is an additional Speed Crystallization Tray for IPS e.max

2
Characterization of IPS e.max





3
Oven program and firing

Information bar
Indicates current furnace temp and selected furnace programs

Main screen
Indicates the selected firing program, firing progress, and other menu options

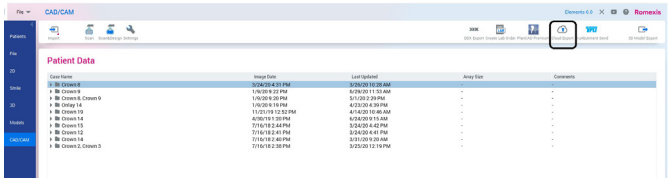
Navigation bar
Browse between programs and settings

Program Information
Check your oven's User Manual for program information.

Case Export Instructions

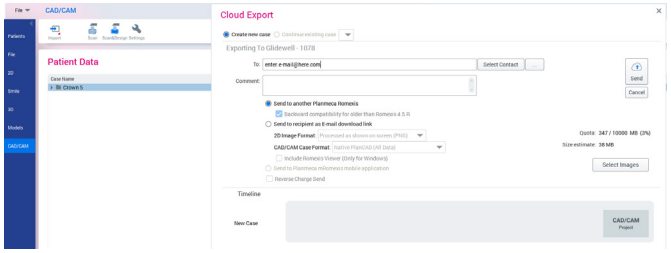
Romexis® Cloud Export

1. Highlight case and select **Romexis Cloud Export**.



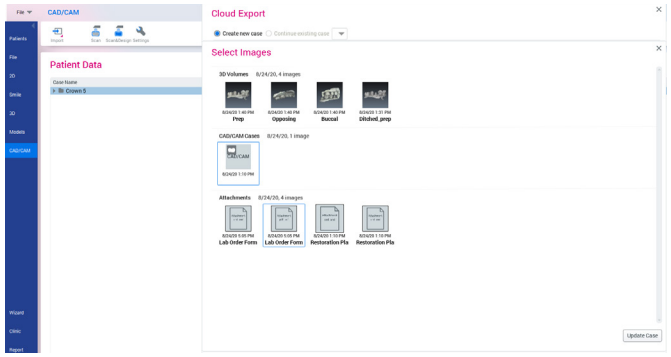
2. Select send to recipients as an E-mail download link or another Planmeca Romexis user.

3. Select **CAD/CAM Case Format** as Native PlanCAD (All Data).

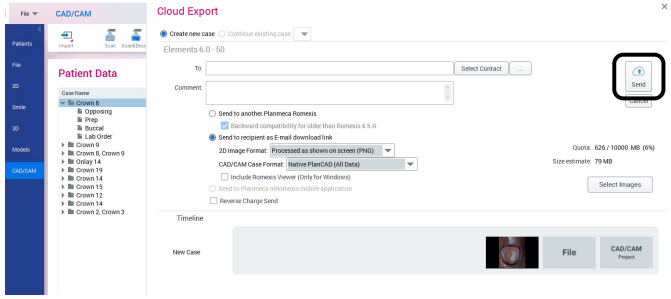


4. Click on **Select Images**—to add images or lab order.

5. Select the images or Lab Order Form (PDF) to add to the case—click **Update Case**.



6. Click on **Send**—window will close once case has been sent.



7. Cases can be monitored in **Patient Management > Cloud Management**.

3D Model Export

1. Click the case in the Patient's Case Files list, then **3D model export**.

2. Navigate to the desired destination folder. It is recommended to create a new folder on the desktop to easily find the files later.

3. Select the file type:

   .STL — universal file format for all 3D programs

   .3OXZ — compatible with 3Shape software

   .PLY — compatible with PlanCAD Premium or Exocad

4. Click **Export**.

5. If your case was scanned in a software version prior to PlanCAD 6.3, a message appears, **"Use hole filling algorithm to optimize the exported model files?"** If the model is going to be printed, click **Yes**. For all other cases, click **No** unless requested by the lab.

6. Upload to your lab through their desired portal/method.

See the scanner's User Manual for more information on other export options.

QUESTIONS? Contact CAD/CAM Support @ (800) 537 6070

Quadrant Scan & 3D Model Export Workflow

SCAN

Upper or Lower is the default based on the selected tooth number.

Scan Prep
100% of Prep and 90% of adjacent teeth.

Use the **Eraser** tool to remove excess data after model generation.

Scan Opposing
100% Occlusal and 2mm of buccal gingival data.

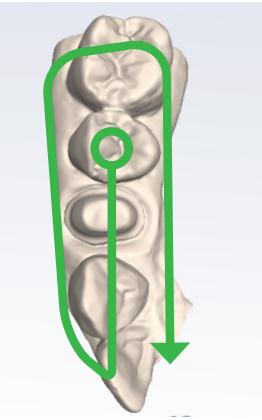
Scan Buccal
Start on the Upper and capture all teeth in prior scans.

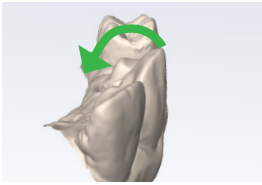
Verify buccal alignment, and re-align if needed.

! Verifying the appropriate amount of scan data (quadrant) will ensure a better fitting restoration.

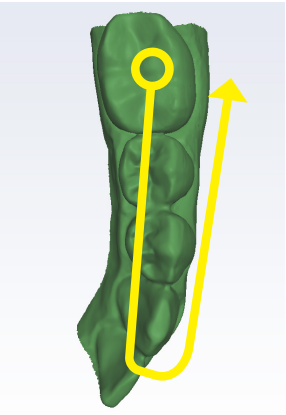
TECHNIQUE

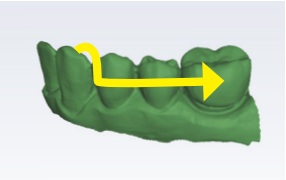
Preparation



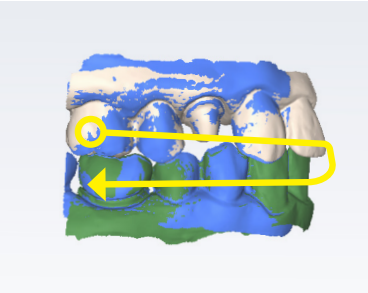


Opposing





Buccal Bite



While scanning the buccal, the Upper and Lower model will automatically appear in the model build view.

Use the Buccal Alignment tool if the models do not automatically align.

MARGIN

Orientation
Automatically active; level model using a left-click and drag. Deactivate **Orientation.**

Trace Margin
From the occlusal view, mark the margin on the shoulder.

Use **Move Margin** to adjust placement.

Use **Add Segments** to redraw a portion.

Color Model View *can be used in margin detection when tissue management is not ideal.*

Retract
Use the **Retract** feature to aid in margin identification. Recipients of STL files do not receive traced margins or Color Model View.

EXPORT OPTIONS

3D Model Export
Use this option if your lab has their own portal.

Romexis® Cloud Export
Use this option if you are sending to your lab via email.

See Case Export Instructions page for more information.

CAD/CAM Workflow

SCAN

Verifying the amount of scan data will ensure a better fitting restoration.

Upper or Lower is the default based on the selected tooth number.

Scan Prep Goals

- 100% of Prep.
- Contact areas.
- 2-3 mm of buccal gingival data.

Data Density View

Dark blue areas indicate missing data.

Eraser Tool

Tongue, Cheek, Fingers or Extra Data.

Scan Opposing Goals

- 100% occlusal.
- 2-3 mm of gingival data.
- Capture Lingual data if sending to lab.

Scan Buccal Goals

Start on the upper and capture all teeth and gingival data in prior scans.

Bite Alignment

Verify Alignment and proper reduction based on Material before moving to the margin tab.

MARGIN

Orientation

Automatically active; use the left mouse button to position the model.

Occlusal - Equal amounts of buccal/lingual axial walls.
Distal - Align buccal cusp tips.
Buccal - Verify marginal ridges are parallel with red line.

Orientation can be deactivated or activated at any time using this icon.

Trace Margin

From the occlusal view, mark the margin on the shoulder.

Use Move Margin to adjust placement.

Use Add Segments to redraw a portion.

PLAN

Goals

Rotate - check cusp position.

Resize - Adjust size of tooth from occlusal view.

Move - Check that tooth is in occlusal plane from buccal view.

DESIGN

Follow the design flow. Return to a section and repeat any necessary steps when needed.

1 - Generate

Create the initial proposal.

Autogenesis **ON** - Click Apply

2 - Fit

Customize the proposal to fit in its place over the prep.

Use **Incremental Change Tools** to adjust overall fit.

Click an arrow next to the desired adjustment. Twist, Rotate, or Expand to fit in place then click apply.

3 - Form

Refine contours, marginal ridges, embrasures, and cusps.

Use **Freeform Change Tools** to make small adjustments to contour.

Helpful Hint *Click on Material thickness tool to check proper thickness of restoration while contouring the tooth.*

Rubber Tooth can be used to adjust: axial walls, contours, and embrasures.

Move Feature can be used for non-functional cusps, occlusal table, and marginal ridges.

4 - Function - Bite/Occlusion

Click **View Bite Registration (x2)**

Activate **View Contacts.**

Use **Contact Refinement** to make adjustments.
Goal: **White, brown, black**

Return to **Freeform Change Tools**.
Deactivate **View Bite Registration**.

5 - Interproximal Contacts

Activate **Hide Model.**

Adjust the contacts:

Smooth Surface - removes material.

Dropper - adds material.

Goal: **Light green/aqua surrounded by dark blue**

6 - Final Checks

Ensure the restoration will mill properly.

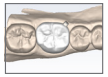
Material Thickness:
Occlusal table 1.5 - 2 mm
Axial walls 1 - 1.5 mm.

Ideal margins are Yellow.

If red/orange verify margin placement with **Move Margin**.

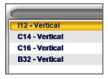
Use **Dropper** as needed to add material.

MILL



Sprue Position

Adjust the sprue away from margins, contacts, and occlusion when needed.



Block Size Selection

Select the block size for the chosen restoration and material.

Block size will only show if the restoration will fit on it.

Mill Sim

Check the internal fit of your restoration before milling.

Look for internal interferences in the intaglio surface of the restoration and use Slice Plane when needed to evaluate.

Overmill

Intaglio View

PLANMECA
Digital Academy

Investing in new technology opens the door to new services, advanced workflows, better diagnostics and improved patient care. To harness the potential and get the most out of your investment, Planmeca Digital Academy, has developed an extensive curriculum to help our customers realize their practice goals. Our programs begin the moment you invest in our technologies and lead you to more advanced programs to increase your technical knowledge and proficiency.

We offer educational opportunities in a variety of platforms from self-paced videos, webinars and in person training at customer locations and at our state-of-the-art training facility located in Hoffman Estates, Illinois, just outside Chicago. These programs were developed in collaboration with our Planmeca Board of Education, a group of doctors committed to delivering best-in-class education programs and advancing digital dentistry.

To view the latest training and education opportunities visit

planmeca.com/training

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