

Scan & Send

Training Workbook

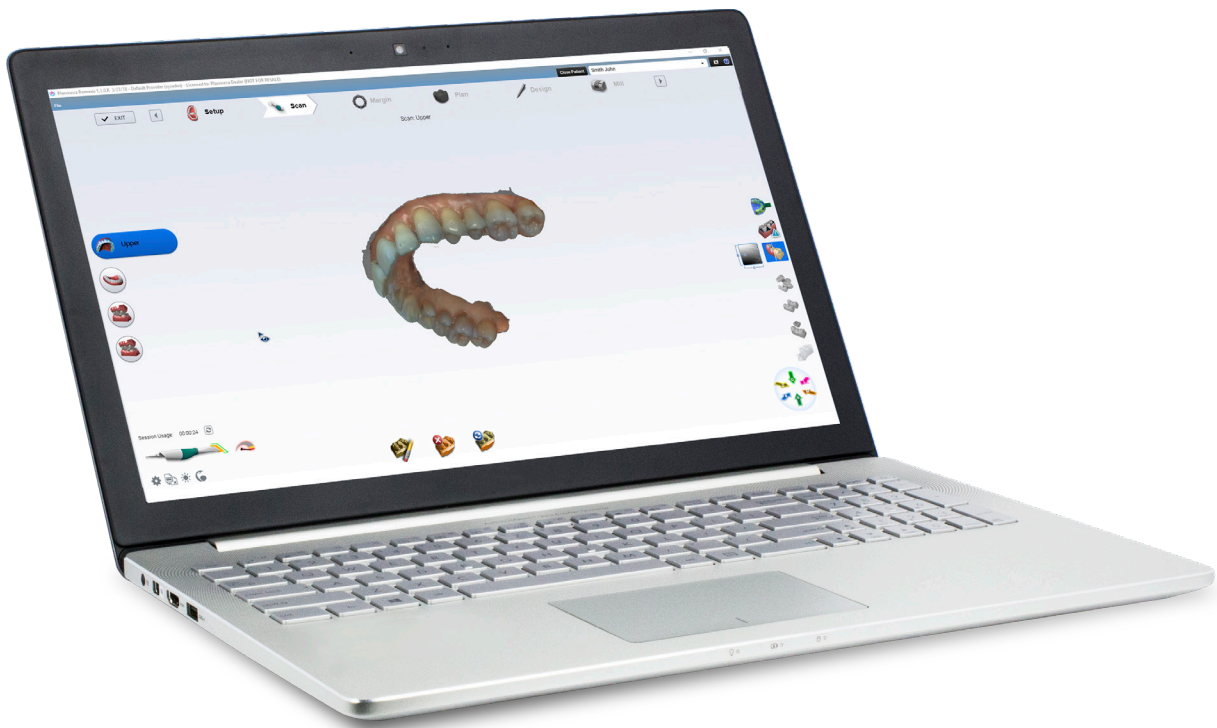


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Customer Support Information

Planmeca CAD/CAM Customer Support
1.800.537.6070

customersupport@planmecausa.com
7am-6pm Central Time Mon-Fri

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

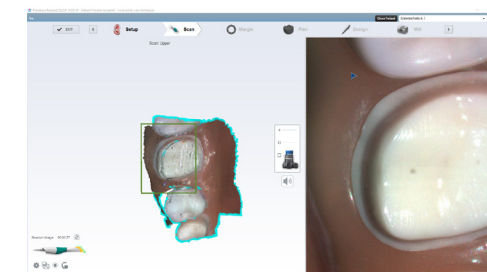
Setup Tab

- 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

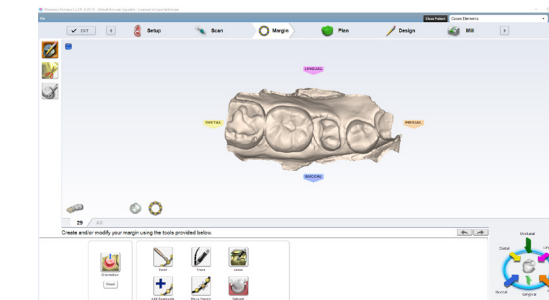
- Scan the Pre-op
- Scan the Prepared tooth
- Scan the Bite Registration or Buccal Bite and Opposing
- Scan the Impression
- Evaluate and adjust the scanned models
- Define the relevant Bite Registration area
- Invert the Impression
- Manually align the models if necessary



Margin Tab

- Set the Orientation
- Draw and edit the Margin
- Use the Retract tool

The models are exported from Romexis.



Planmeca System & Equipment Overview

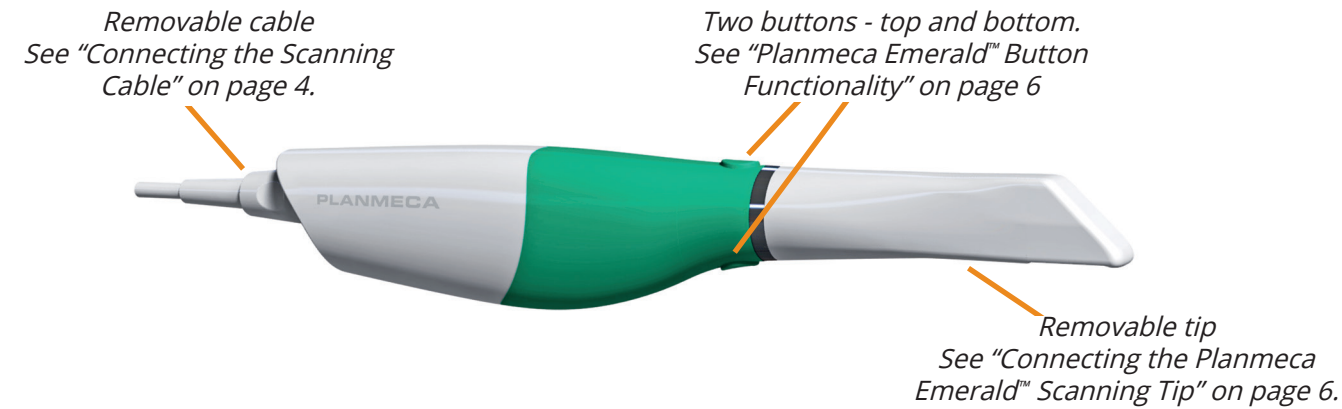
Laptop

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



Planmeca Emerald™ Scanner

These instructions are for the Planmeca Emerald™ scanner. See "" on page <?> for instructions relating to that scanner.



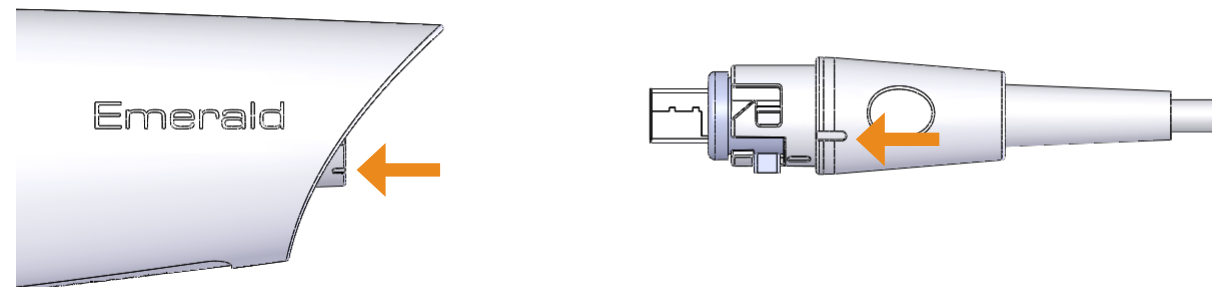
Accessories

The Planmeca Emerald™ system has a set of removable components.

- Scanning Tip
- Scanning Cable
- Cradle
- Color Balancer

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.

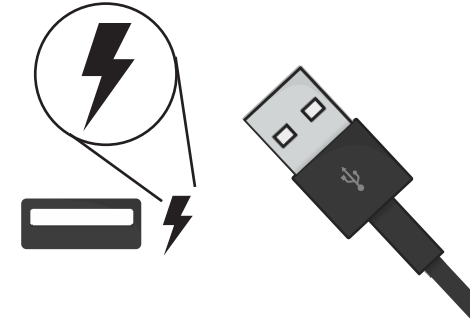


- 2 Push the cable in and turn clockwise until the notch on the cable is aligned with the larger notch on the back of the scanner.

- 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 the laptop. Make sure it's the **USB connection with the power indicator**.



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.

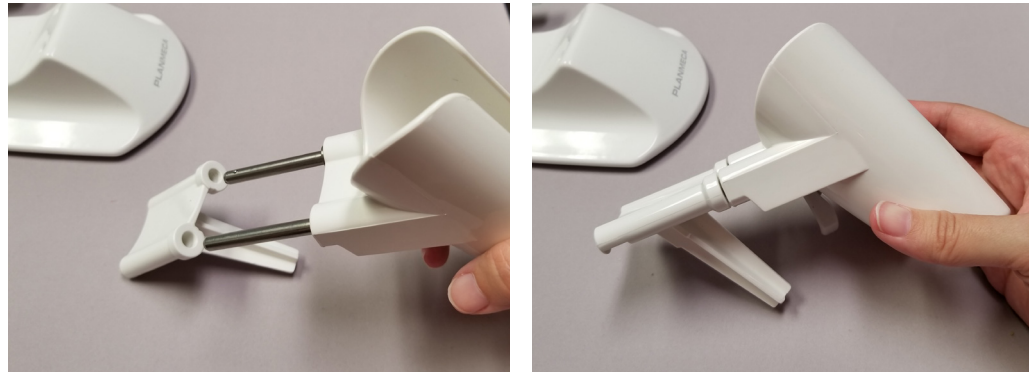


The cradle can be separated and inserted into a holder in your operatory equipment (i.e. the slow speed suction holder).

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.

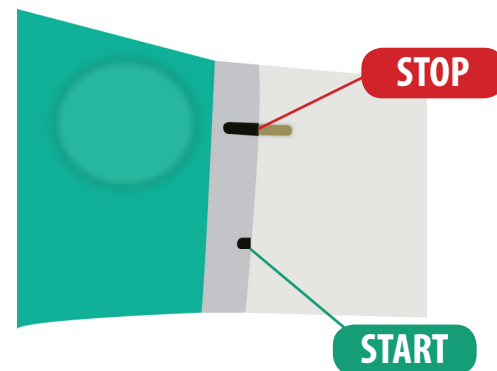


Connecting the Planmeca Emerald™ Scanning Tip

(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.

Failure to follow this procedure can damage the scanning tip.



Disconnecting the Planmeca Emerald™ 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.)

Planmeca Emerald™ Button Functionality

Top Button - Activate/Deactivate scanning (same as before)

Bottom Button functionality depends upon the current state of the scanning process.

- While the scanner is active, use the bottom scanner button to show/hide extraneous data on the model.
- After scanner is deactivated, generate the Model (instead of pressing M on the keyboard or using the mouse)
- Select the next scan type (ex. go from Upper to Lower, from Lower to Buccal)



Planmeca Emerald™ Button and Motion Controls

Top Button

- Activate scanner
- Deactivate scanner
- You can use the button instead of a mouse click to activate a button when you see this icon.



Bottom Button

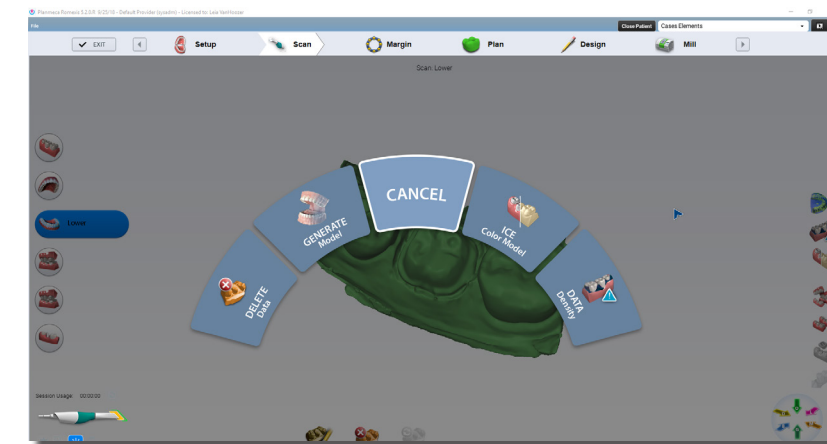
- Switch Scan Types
- While scanning (Live View is open), click to turn ON/OFF the Active Delete functionality.
- You can use the button instead of a mouse click to activate a button when you see this icon.



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
- ICE view
- Data Density



Single Unit Workflow

Planmeca Romexis®

- 1 On the main screen of Planmeca Romexis®, click **Add Patient**.
- 2 Add your name in the patient demographics screen, complete the options in bold.
- 3 Click **Save Patient** at the bottom of the screen.
- 4 Move the cursor to the left of the screen to open the charms menu and click **CAD/CAM**.
- 5 Under **Scan & Design New Restoration** click **New Scan Only**. This will take you to the Setup Tab.

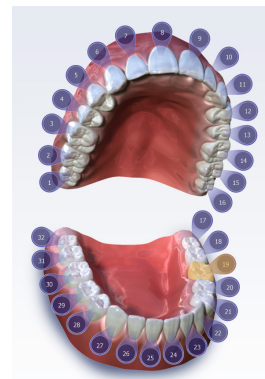
Setup Tab

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

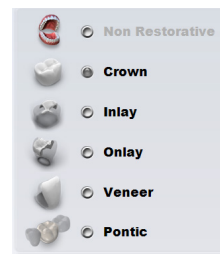
The Setup screen must be filled out for restorative cases.

The Setup screen 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:

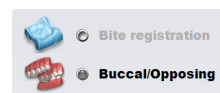
- 1 Select a restoration site by clicking on the anatomical model. If no teeth have been selected, the anatomical model is closed until the mouse cursor is moved near it.



- 2 Choose the restoration type.

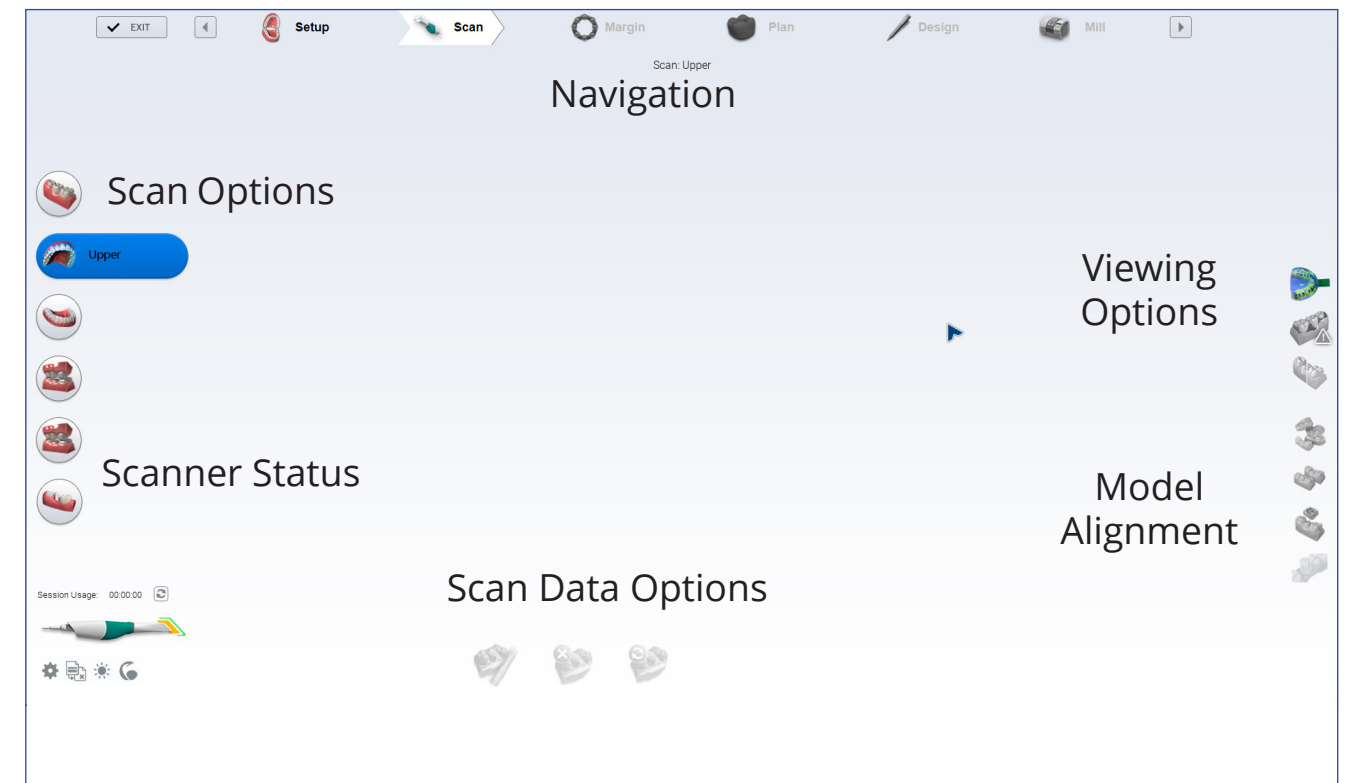


- 3 Select the opposing scan type.



- 4 Choose **Library A**.
- 5 Pick the material.
- 6 Select transparency.
- 7 Select shade.

Scan Tab Overview



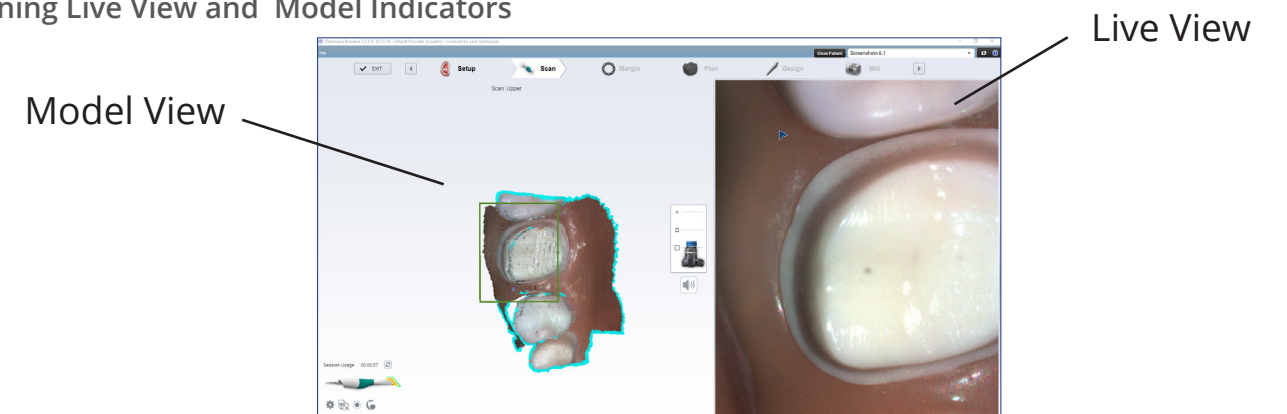
Holding the Scanner

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



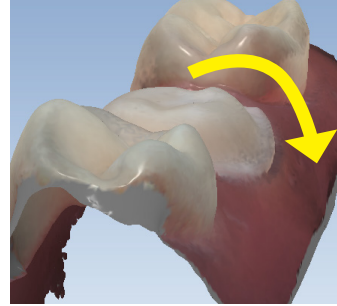
The tip of the scanner must point toward the distal of the preparation.

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.

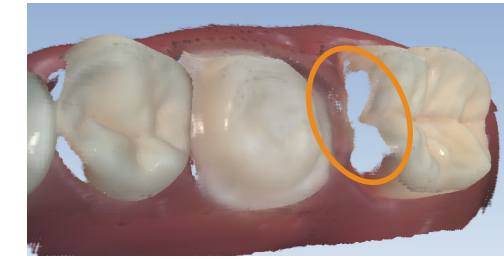


Scroll Wheel

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.

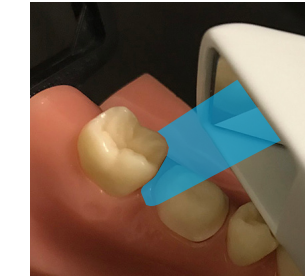
2 Rotate the model to look for low data areas in key areas: the preparation, interproximal contacts, etc..



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

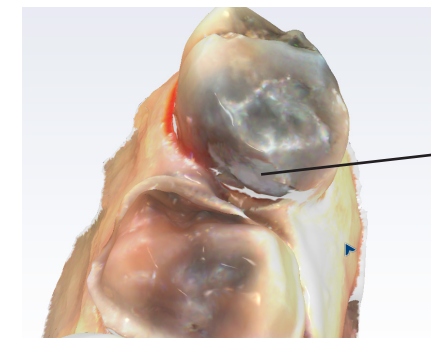


Distal Tip - Rest the end of the scanner tip on the distal neighbor; rock the scanner to point the blue laser into the mesial interproximal area.



Mesial Tip - Rest the neck of the scanner tip on the mesial neighbor, rock the scanner to point the blue laser into 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.

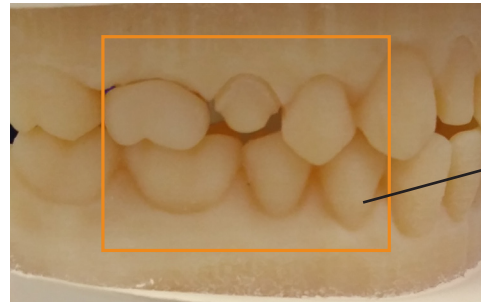


Focus on the contact zone, not the gingival contours.

- 4 Erase any interfering data such as extra teeth, tongue, cheek, and cotton rolls.
- 5 Click **Generate Model** or press **M** on the keyboard to finish building the model.

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.

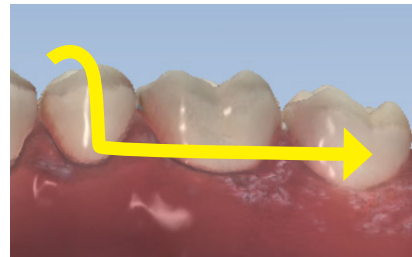


Identify the three teeth directly opposing those in the prep scan.

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

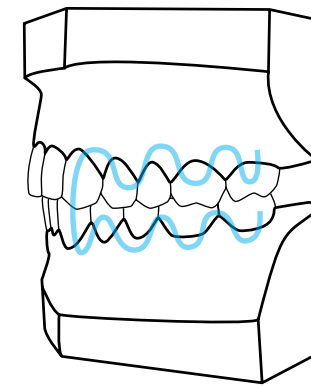
2-3 mm gingival tissue on the buccal surface

Lingual data not necessary

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

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

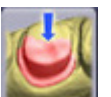

Note: Be sure to verify the status of the buccal alignment.

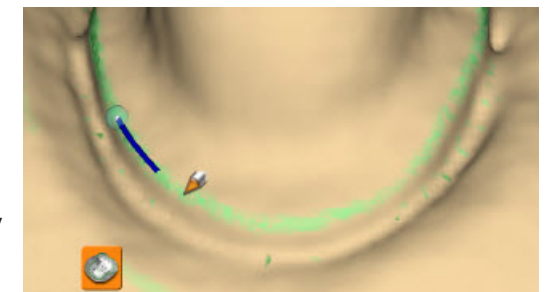


In most cases, alignment is done automatically by the software. A green dot in the Buccal icon indicates a successful alignment. Always verify the alignment before continuing with the next step.

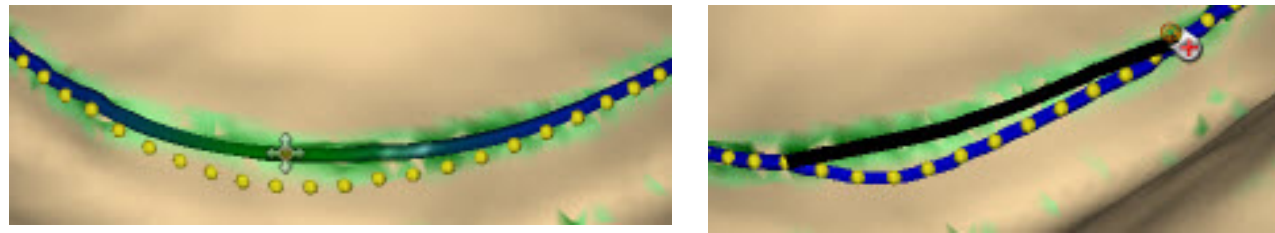
Margin Tab

Use the steps below to designate the margin for your virtual model recipient.

- 1 Click the **Margin** tab.
 - 2 Unplug the scanner.
 - Planmeca Emerald - unplug the scanner from the laptop
 - Planmeca PlanScan - unplug the FireWire connector from the Thunderbolt adaptor..
 - 3 Orientation is automatically activated. For Scan Only systems, this step is not necessary. Click **Orientation** to deactivate it. 
 - 4 Click **Show Features**.  Show Features highlights areas of high contour, which helps define the margin. On equigingival and subgingival cases, this may not help you.
 - 5 Zoom in on the preparation.
 - 6 Click **Trace** and click on the inside of the green line along the margin.
 - 7 Moving in small increments, click as you move around the preparation.
- Don't worry if you make a mistake while drawing the margin. It is easy to edit the margin.
- 8 The margin is finished when the original point (blue dot) is clicked to finish the circle.



9 Practice adjusting the margin with both **Move Margin** and **Add Segments**.



Move Margin is used for minor adjustments.



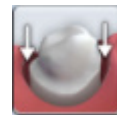
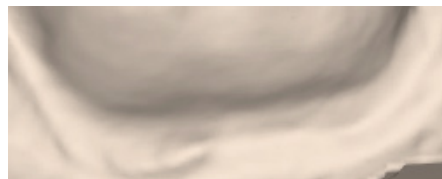
Add Segments is used to redraw a section of the margin.

Retract

Use the Retract tool on STL export cases with a subgingival or equigingival margin. This tool ditches the 3D model since the margin line does not convert to STL.

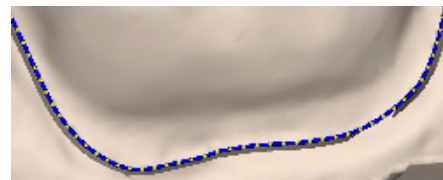
ICE View is not converted to STL format and cannot be used as a visual aid by the recipient of your case.

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



1 After the margin has been drawn and edited, click **Retract**.

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

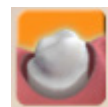


Margin drawn
No ditching

Margin drawn
With ditching

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

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



3 Click **Toggle Retraction** to show/hide the virtual ditching.



4 Click **Return to CAD/CAM Home**.

The case is now ready to be exported. The export process will be covered during your training.

Review

In this section, you learned:

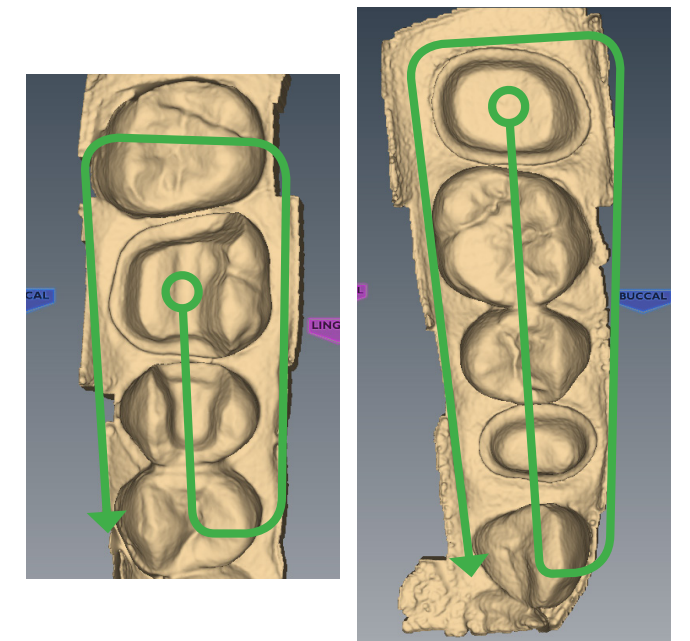
- Basic scanning method
- Evaluating scanned data
- Scanning the opposing dentition
- Scanning the buccal bite
- Drawing and editing the margin
- Using the Retract tool

Scanning Multiple Restorations

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

- 1 On the Setup panel, select the tooth number for the first preparation and then select a **Preparation Type, Library, Material, Translucency, and Shade**.
- 2 Repeat for each prepared tooth.
- 3 Click the **Scan** tab.
- 4 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.

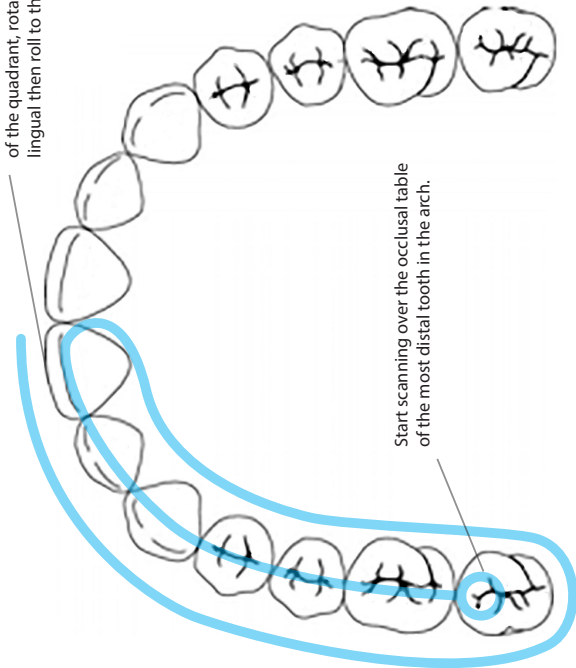


The basic scanning pattern is expanded to encompass the extra preparations and any teeth in between.



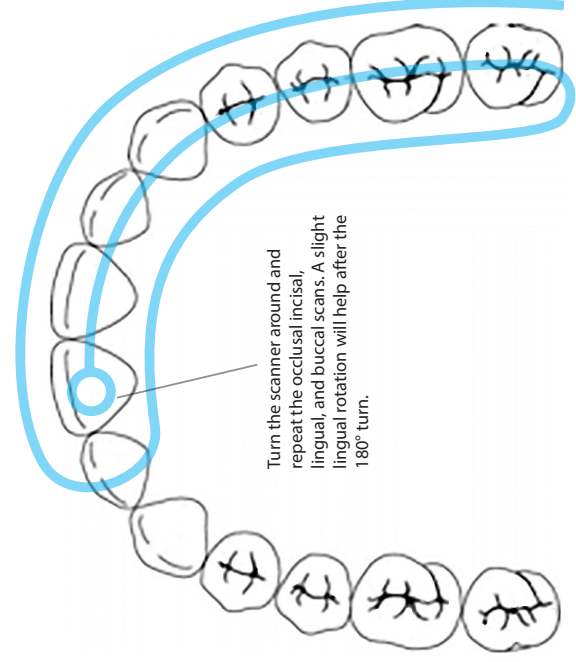
First Half

Scan the occlusal incisal surfaces of the quadrant, rotate to scan the lingual then roll to the buccal.



Start scanning over the occlusal table of the most distal tooth in the arch.

Second Half

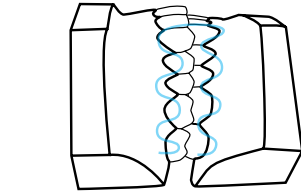
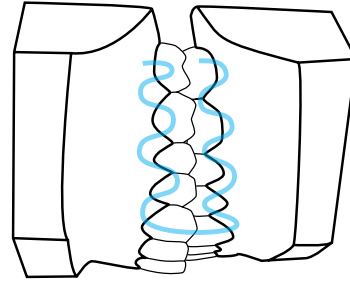


Turn the scanner around and repeat the occlusal, lingual, and buccal scans. A slight lingual rotation will help after the 180° turn.

Repeat the scan pattern for the opposing arch.

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. Use the Refine Alignment tool when needed after verifying the bite. If additional alignment is needed, proceed to Buccal 2. Repeat the refinement on Buccal 2 when needed.



- Basic Buccal Bite Workflow:
- Scan Buccal 1
 - Refine
 - Verify alignment
 - If needed:
 - Scan Buccal 2
 - Refine
 - Delete one of the two bite scans

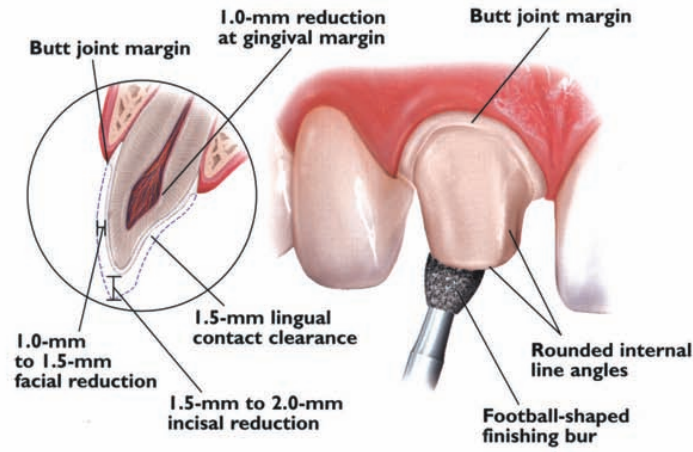
Preparation Guidelines

The following is the all-ceramic prep guidelines from Ivoclar Vivadent.

Anterior Chairside Preparation Guide

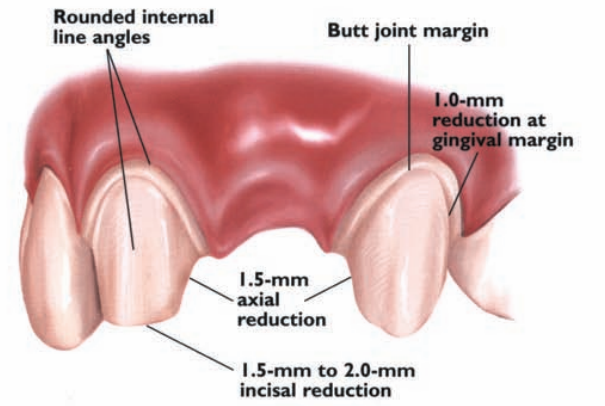
Full-Coverage Restorations

ANTERIOR CROWN PREPARATION



3-Unit Bridge Restorations

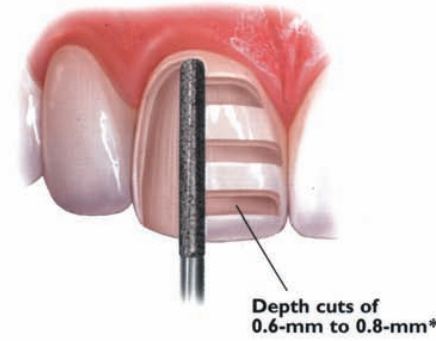
3-UNIT BRIDGE PREPARATION



Veneers

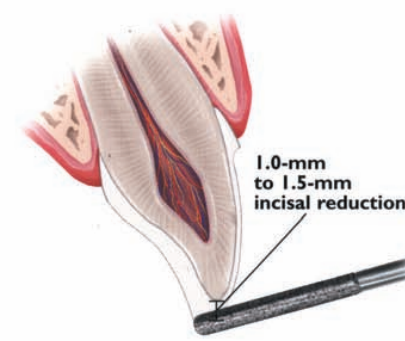
VENEER PREPARATION

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



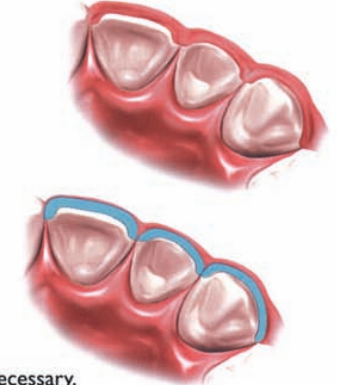
INCISAL PREPARATION

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



CHAMFER MARGINS

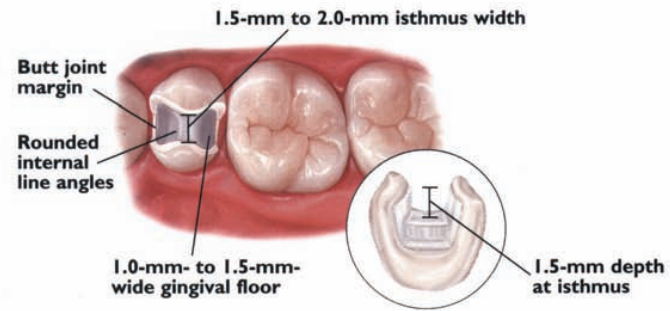
Correct preparation of the chamfer margins interproximally allows the appropriate bulk of porcelain.



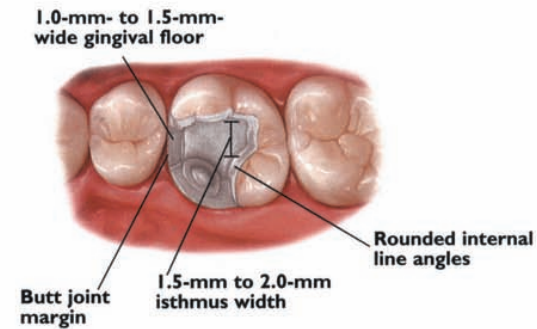
*Please note: For additional masking capabilities and/or layering techniques, further reduction may be necessary. Contact your laboratory for further information.

Inlays/Onlays

INLAY PREPARATION

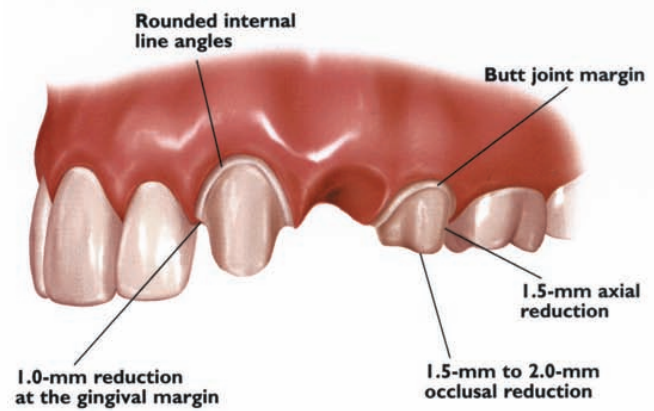
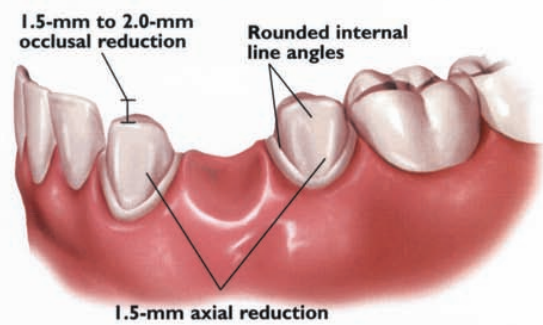


ONLAY PREPARATION



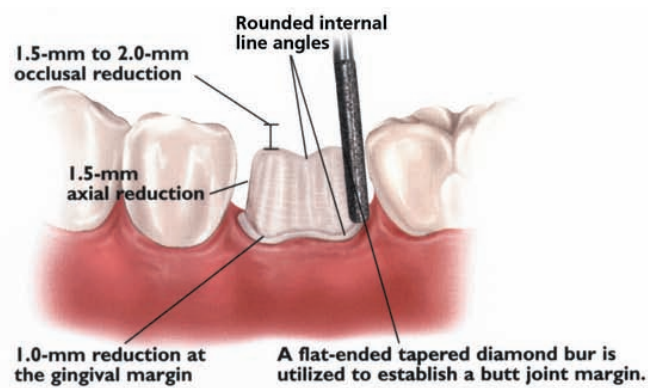
3-Unit Bridge Restorations

3-UNIT BRIDGE PREPARATION

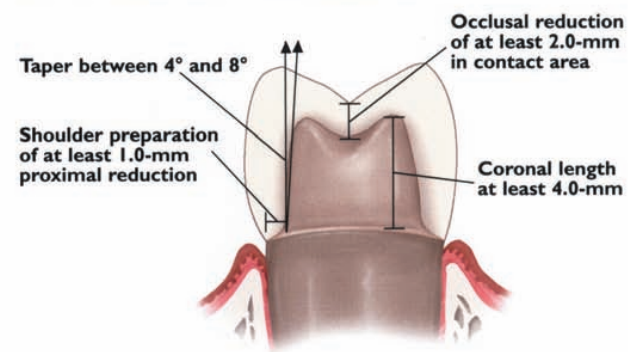


Full-Coverage Restorations

POSTERIOR CROWN PREPARATION



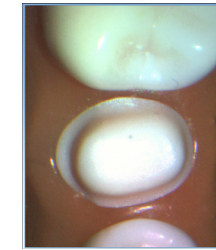
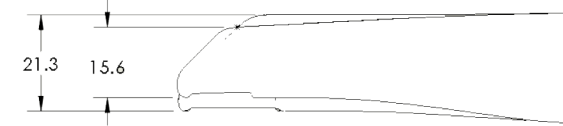
CONVENTIONAL CEMENTATION PREPARATION



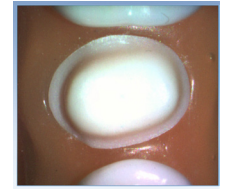
When layered or pressed ceramic margins are preferred in conjunction with a zirconia framework, enhanced gingival esthetics can be achieved with a definitive 90 degree shoulder preparation.

Planmeca Emerald™ SlimLine Tip

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



30% smaller field of view



Scan Swap

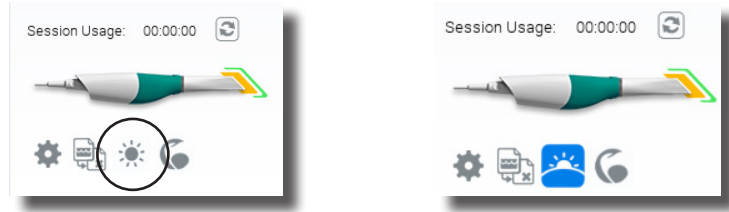
If you accidentally scan a model under the wrong scan type, it can be transferred to the correct type.

- 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.



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.

Scan Body Workflow

For United States users, the Scan Body scan type is for export cases only.

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



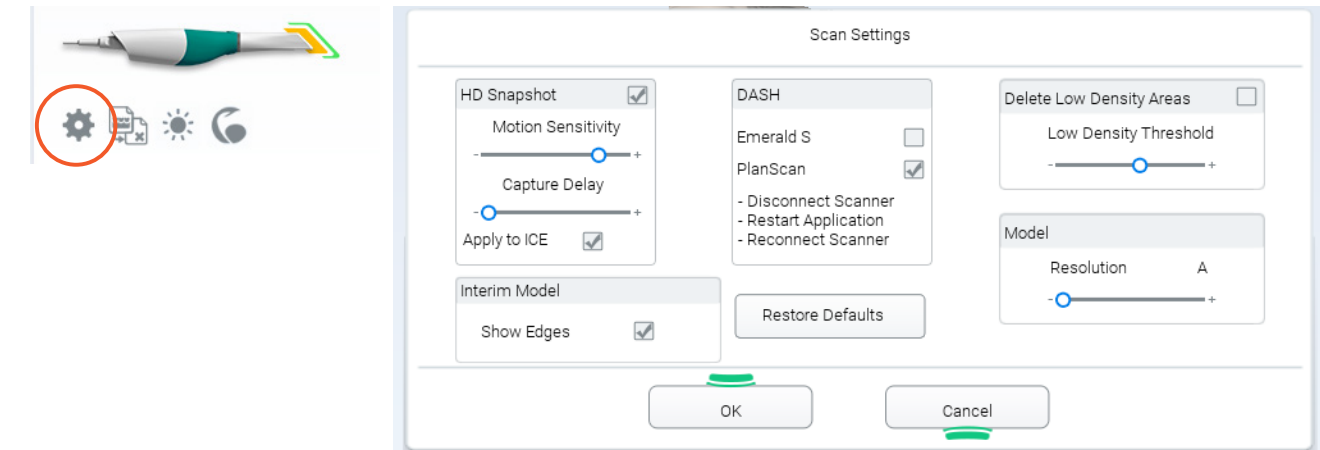
- 2 Scan the opposing and buccal bite.
- 3 Insert the scan body and scan it under the Scan Body scan type.



- 4 Verify alignment.
- 5 Follow the normal procedure for exporting the case to your laboratory. See your scanner's user manual for more information.

Scanner Settings

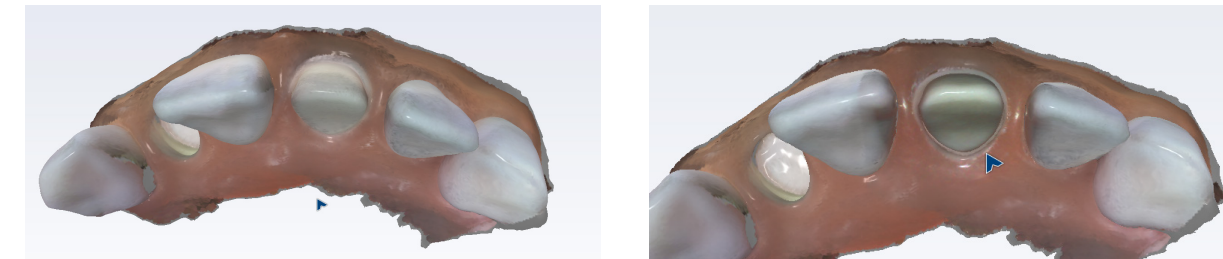
Click the Scan Settings icon to view/change settings. Most users will leave use the default settings.



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 ICE adds the HD picture onto the ICE view of the model



HD Snapshot applied to ICE

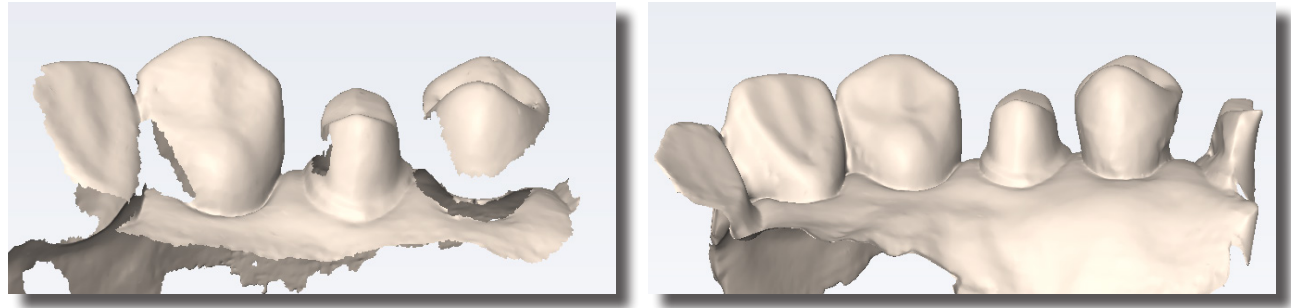
Planmeca PlanScan® DASH

The Planmeca PlanScan® DASH (Dynamic Adaptive Scanning Host) feature is active by default. Speeds up the scanning rate of the Planmeca PlanScan®. This feature does not affect the Planmeca Emerald™ scanner.

If you choose to turn this feature on/off, you must save the change, disconnect the scanner, restart the software, and then reconnect the scanner.

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.



Model Resolution

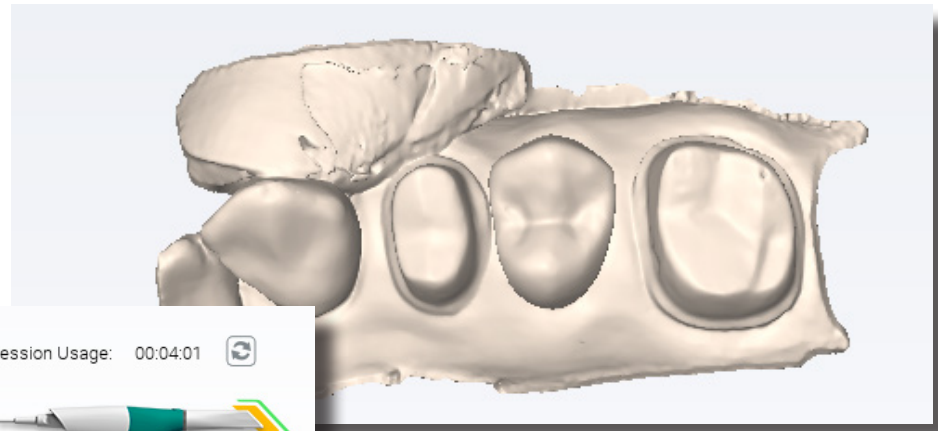
Use this feature only at the request of Customer Support.

Active Delete

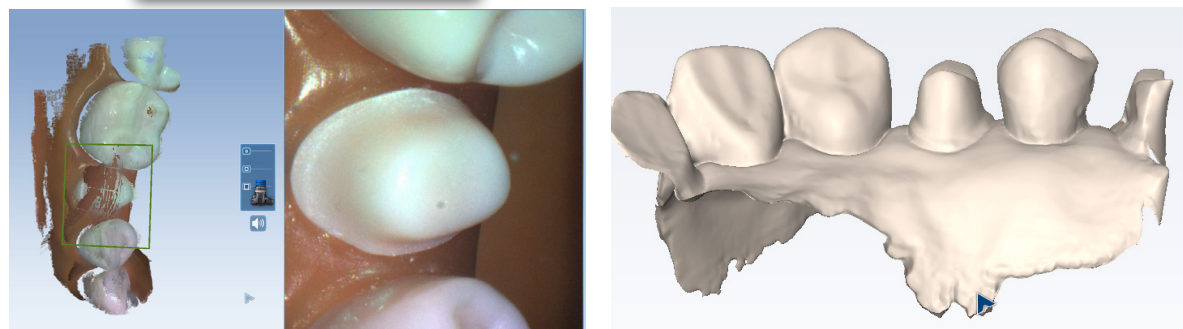
Active Delete gives you the opportunity to remove unwanted data that was scanned inadvertently.

There are two methods to activate this tool. The first way (for both scanners) is to click the active delete icon underneath the scanner in the lower left of Planmeca PlanCAD®. The second is to depress and release the bottom button of the Planmeca Emerald™ scanner while the scanner is active.

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.

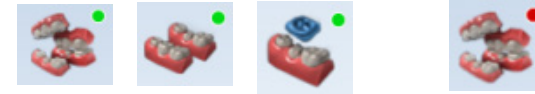


Active (for a session) when highlighted in blue. Automatically deactivates with next scan.



Model Alignment

The alignment icons are on the right side of the screen. There is a different icon for each alignment type: Buccal Bite, Pre-op, and Bite Registration. 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.



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.

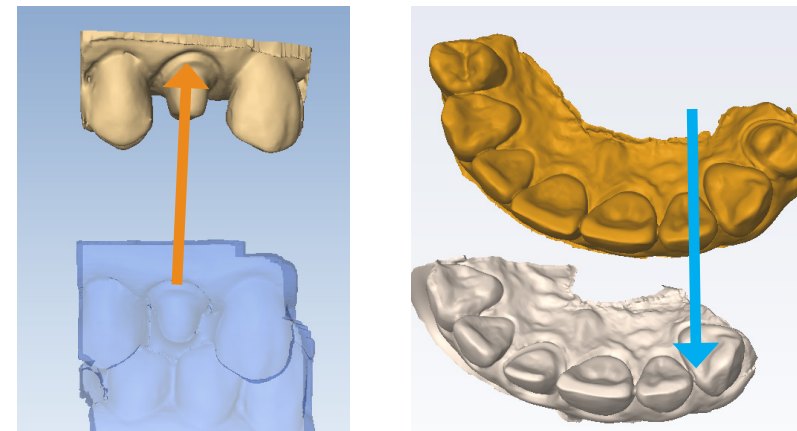


If there is extra data that might be interfering with the scans (tongue, cheek, etc.), try trimming the extra data before manually aligning.

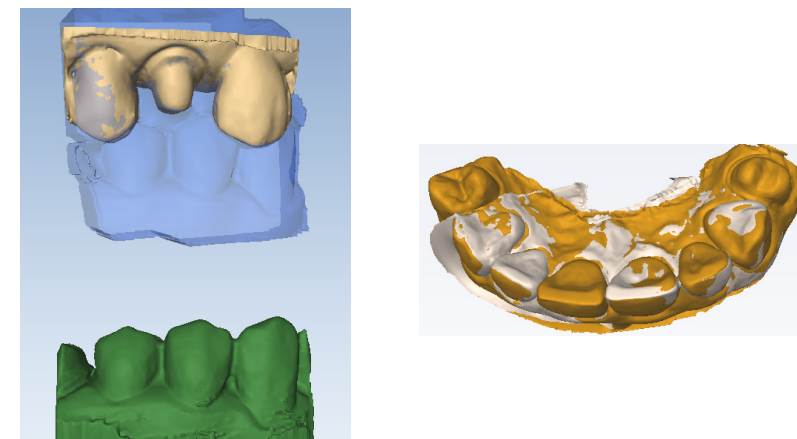
The buccal bite model is translucent on the Alignment screen to aid in evaluation. The buccal bite has an extra Show/Hide Buccal option. This enables you to hide the buccal bite model and evaluate the opposing and prep models.



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



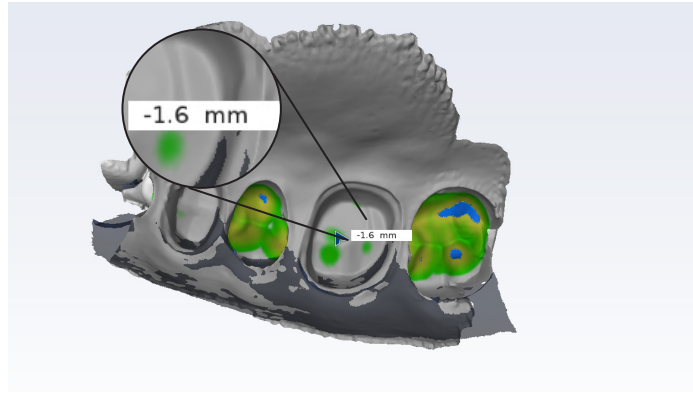
The models will snap into place or will return to their original positions. In Buccal/Opposing cases, the opposing model appears after the prep and buccal bite are aligned. Click and drag the opposing model to match the buccal bite model.



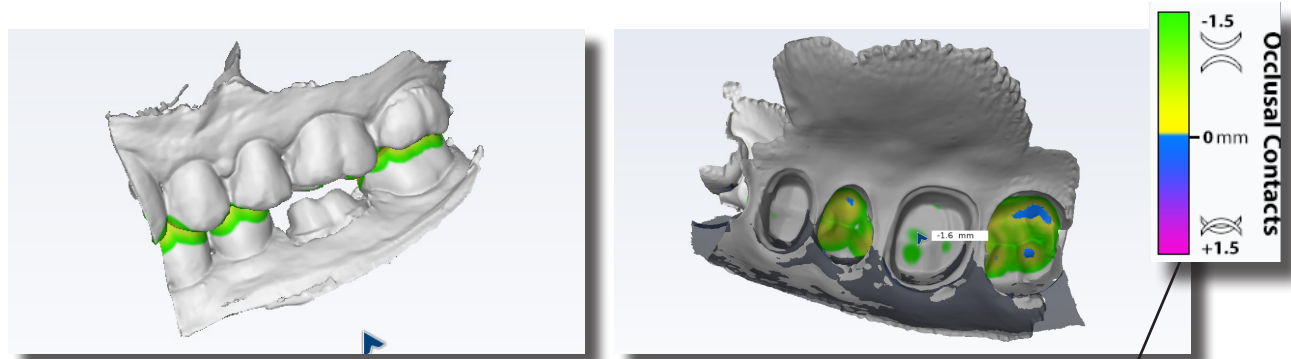
Prep Clearance and Contact Strength

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

While in the Bite Align tool, 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 Bite Alignment 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 (orange).



Rotating the Models

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

The preparation model cannot be rotated, it is always stationary. After alignment is complete, if the prep model needs to be rotated, this can be done in the Margin tab with Orientation.

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.

Once the models are in good position in relation to each other, use the steps in the previous section to align the models.

Quadrant Scans & STL Export Workflow

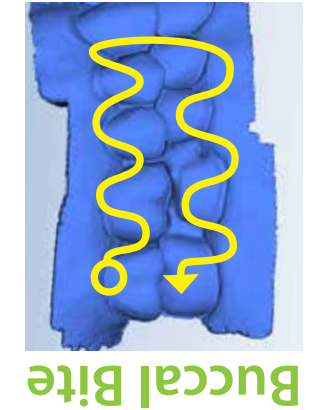
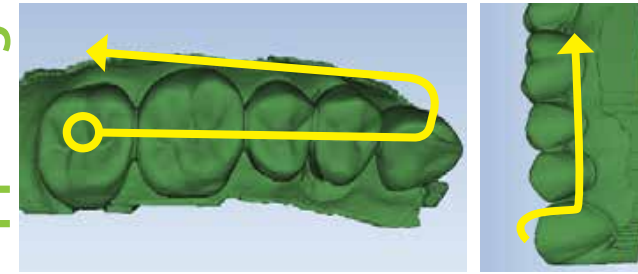
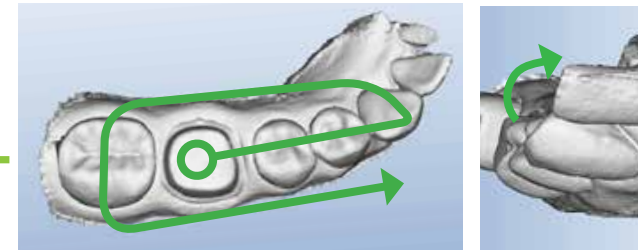
QUESTIONS? Contact Support @ 800.537.6070

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.
 - 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.
- Note: Information regarding Pre-op scanning can be found in the PlanScan Users Manual.

TECHNIQUE

Preparation Opposing



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.
 - ICE 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 ICE View.
- ## EXPORT
- Ask your laboratory which file type(s) they prefer. Click the case in the Patient's Case Files list, then **3D model export**.
- Navigate to the desired destination folder. It is recommended to create a new folder on the desktop to easily find the files later.
 - Select the file type: **STL, PLY** (PlanCAD), or **30x2** (3Shape)
 - Click **Export**.
 - A message appears "Use algorithm to fill holes in the model?" If the model is going to be printed, click Yes. For all other cases, click No unless requested by the lab.
 - Upload to your lab through their desired portal/method.
- See the scanner's User Manual for more information on other export options.