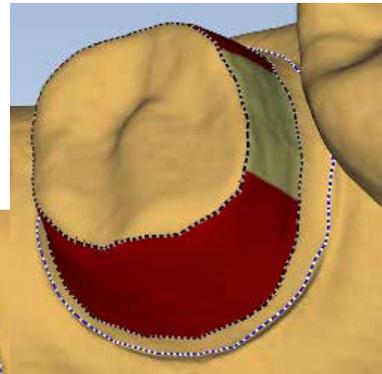
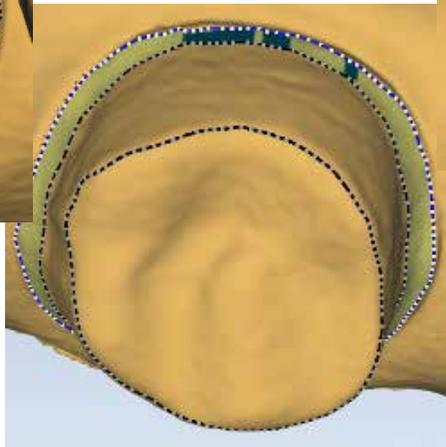
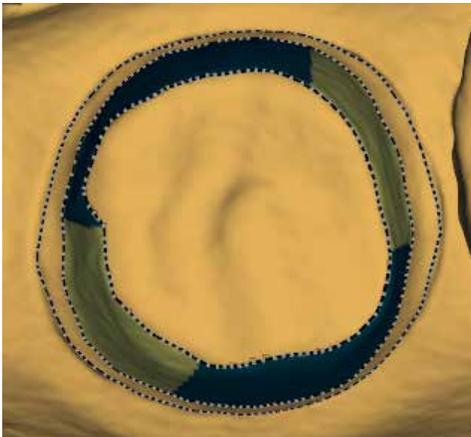
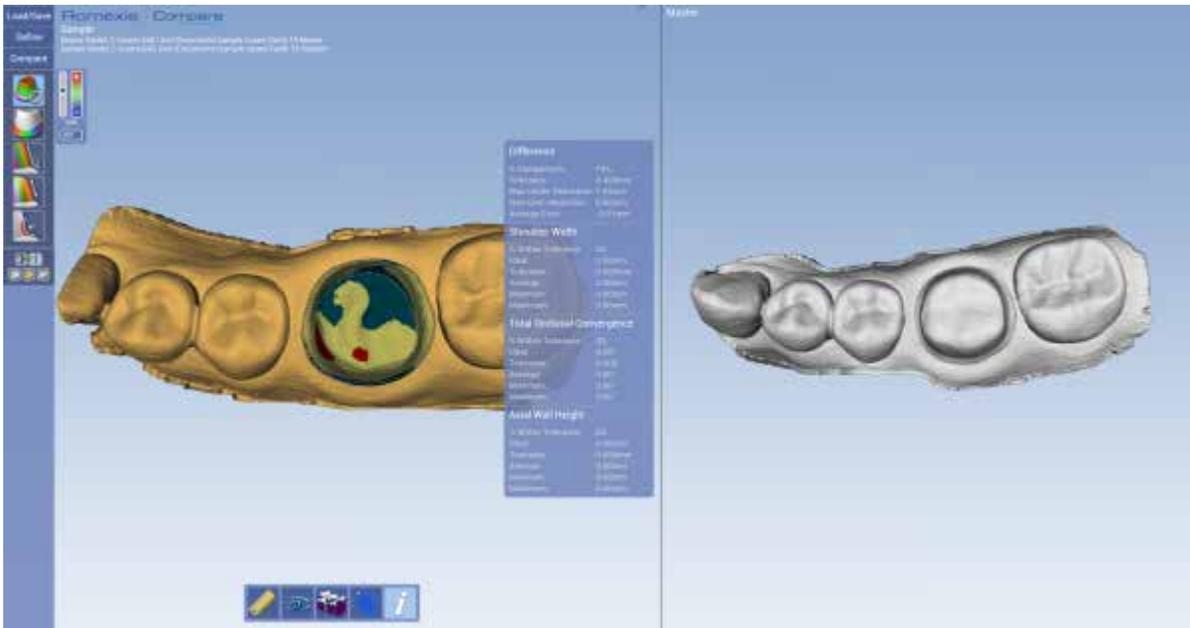


Romexis

Compare

ADAPTIVE LEARNING TECHNOLOGY

User Manual



PLANMECA

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Introduction

Romexis Compare™ is used by teaching institutions to evaluate scanned models of a tooth prepared by students in relation to a master model prepared by an instructor.

The preparations can be visually compared and measured on very specific aspects.

- Difference measurements between the master model and the sample
- Shoulder width
- Total Occlusal Convergence (TOC)*
- Axial wall height
- Undercuts (visual evaluation only)
- Manually selected measured distance

The instructor prepares the master model and scans it with Planmeca PlanScan™. The same master file can be used repeatedly for multiple students. The instructor's master model does not need to be scanned each time.

Installation

Note: Trial versions can be accessed 25 times.

Minimum System Requirements

- Windows 7 **64-bit**
- 4GB RAM
- GeForce or Radeon video card
- Mouse with scroll wheel

Install Instructions

- 1 Open the **Compare Installation** folder.
- 2 Double-click **dxwebsetup** to install it. Follow the installation instructions. An internet connection may be required to run this setup.
- 3 Double-click **Compare_2.x** to install Compare.

A Compare icon and a Report Compiler icon appear on your computer's desktop. The software installation is now complete.

Sample Cases Available

If desired, download the Sample Cases to your **My Documents** folder or wherever you would prefer to save them for easy access. https://drive.google.com/file/d/0BwblCaOATtJ_STNKUUIUd0ExN2c/edit?usp=sharing

There are 4 sets of sample cases: two posterior cases, two anterior cases. Tooth 19 is recommended as the first sample case.

*Goodacre, Charles J. Campagni, Wayne V. Aquilino, Steven A. (2001) Tooth Preparation for Complete Crowns: An Art Form Based on Scientific Principles. The Journal of Prosthetic Dentistry, April. 363 – 376.

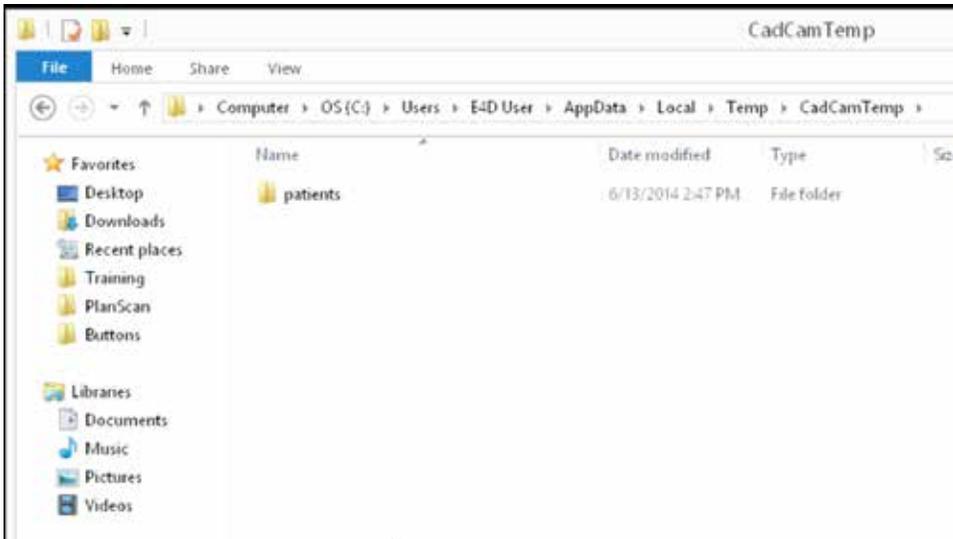
Before Opening Compare

Note: For information on using the scanning software, see the PlanScan User Manual.

File Sharing Setup

These are suggested steps to create a shortcut to the patients folder.

- 1 Click **File Explorer** in the bottom left corner of the Windows Taskbar. 
- 2 In the address bar, type **C:\Users\E4DUser\AppData\Local\Temp\CadCamTemp** and press Enter.
- 3 The Patients folder appears.



- 4 Right-click and drag the **Patients** folder to the **Desktop** and select **Create Shortcuts Here**.

You may wish to set up another shortcut for the destination folder if the files will be used on another computer.

Sharing Files

If Compare will not be used on the same computer where the models were scanned, copy the entire patient file of each master and student to the desired location. The files can be stored on a network server, USB drive, online server, etc.

Copy the master files to a permanent folder on the computer or network. The patients link on the desktop is to a temporary folder. These files are eventually deleted. If a case is no longer in the temporary folder, open the case in PlanScan to refresh the information.

Create Student or Master Model

The same master model can be used repeatedly and shared among multiple computers.

- 1 Prepare the master according to the institution's preparation guidelines.
- 2 Open Romexis.



Adding a New Patient

- 1 Click **Add Patient**.
- 2 Enter your **First** and **Last Name**. Enter a **Patient ID** if required (bold).
- 3 Click **Save Patient**.

Note: Patient files are organized by Patient ID on the computer, so you must make note of the Patient ID or create one that will be easy to reference later.

Find Existing Patient

- 1 Enter the first few letters of the last name and press **Enter** or click **Find** without any search criteria to see all patient files.
- 2 Double click a patient file to open it.

Scan the Model

- 1 Click **CAD/CAM**.
- 2 Click **New Scan Only**.

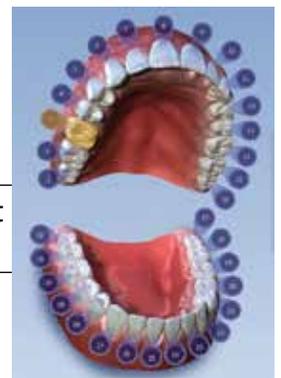
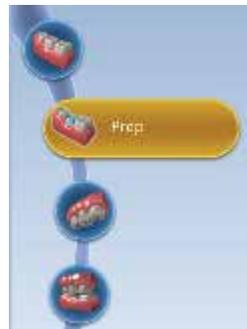


The Setup tab appears.

- 3 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.
- 4 Select random choices for the **Tooth Library, Material, and Shade**.

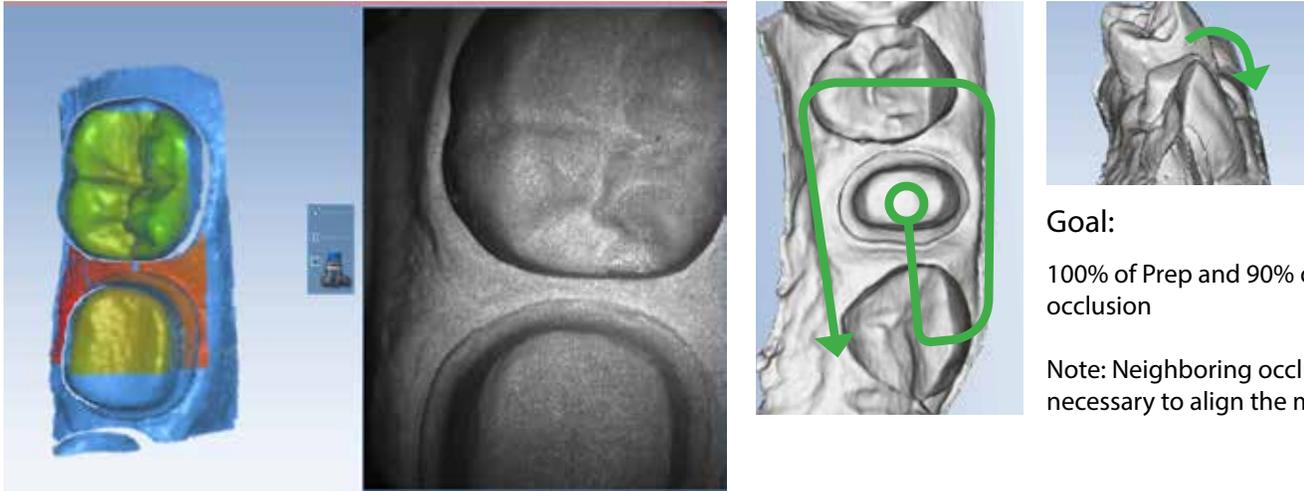
Note: The information from the Setup tab is not imported into Compare, but it is necessary to fill in the Setup information to continue.

- 5 Click the **Scan** tab.
- 6 Click **Prep** on the left side of the screen.
- 7 Press the button on the scanner to begin scanning.



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

Start with an occlusal scan of the preparation. Move in slow and steady motions to capture the proximal teeth and rotate to capture all of the preparation.



Goal:

100% of Prep and 90% of adjacent occlusion

Note: Neighboring occlusion is necessary to align the models.

The system changes the Live View to orange if you have moved too far and the system needs data overlap.

The most recent scan added to the model displays with a color coding to indicate the focal distance of the data added.

- Green - close to the tip
- Yellow/Orange - middle of the range
- Red - end of the range (far away from tip)

Note: Any color shown means the scanner IS capturing data. The colors only correspond to the focal distance.

The building model rotates to match the Live View.

8 Click the button on the scanner to stop scanning.

A raw data model is displayed.

9 Click **Generate Model** or press **M** on the keyboard to create the 3D model. If you exit without generating the model, the scans will be lost.

10  Click **Data Density View** to evaluate the model for low data. Dark blue and purple areas indicate low data. Ensure there is no missing data on the preparation. Rescan the area if needed.

11 Return to the Patients screen.



Open Compare

- 1 Double-click the **Compare** icon on your desktop to open the software.
- 2 Double-click the title bar to make the software full screen.



Using the Mouse

When rotating the model, the central axis point is the center of the screen (not the center of the model).



Select position pointer on item and click left button to select



Zoom Model rotate the wheel button to change the size of the model on the screen



Rotate Model press and hold the right button, then drag



Move Model up/down, left/right: press and hold the wheel button, then drag.

The Workflow

- A Load the models
- B Verify the student model - is there missing data that would provide incorrect measurements?
- C Align the models (if necessary)
- D Define the areas of the preparation
- E Set the Occlusal Angle (path of insertion)
- F Compare
 - Compute the differences between the two models
 - Measure the aspects of interest
- G Report

A. Loading Models

- 1 Click **Load Master** on the left side of the screen.



Note: The master model is used to compare the two models and evaluate the differences in the preparations. The master model is not necessary if you only want to measure the various areas of the sample model.

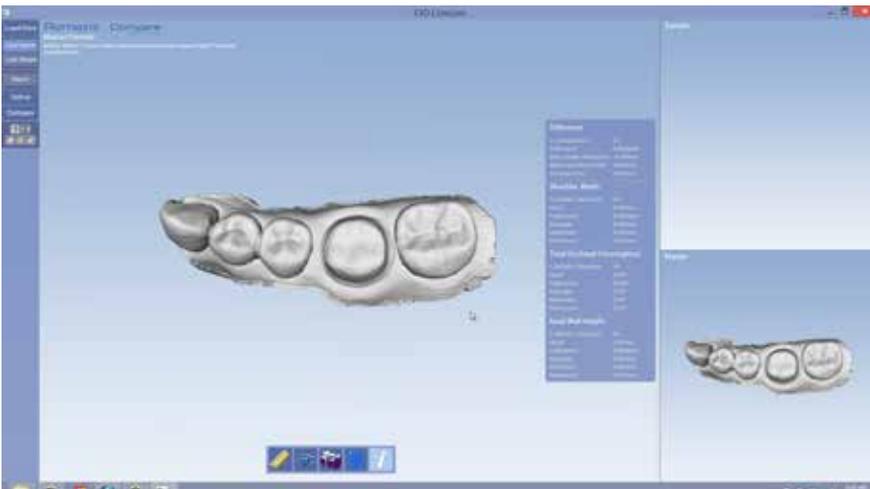
- 2 Navigate to the folder where you are storing your master files or use the Patients shortcut on the desktop.

Note: To use the provided models, double-click the **Sample Cases** folder and click once on the desired master file. **Tooth 19 Master** is recommended as the first case. Highlight the desired folder and click Select Folder at the bottom. Skip ahead to the loaded master picture below.

All of the Patient folders are listed by Patient ID.

- 3 Double click the desired **Patient ID**.
- 4 Double click the patient name folder.
- 5 Double click the **Restorations** folder.
- 6 Double click the desired date file.
- 7 Single click the **Prep** folder to highlight it.
- 8 Click **Select Folder** at the bottom.

The system loads the selected case into the Master and Master/Sample sections.



9 Click Load Sample.



10 Double click the **Patients** folder (or other location for your master files) to open it.

11 Double click the desired **Patient ID**.

12 Double click the patient name folder.

13 Double click the **Restorations** folder.

14 Double click the desired date file.

15 Single click the **Prep** folder to highlight it.

The system loads the selected case into the Sample and Master/Sample sections. There is a slight delay as the system automatically aligns the two models.

Note: If no model loads, you may have selected the wrong folder. Try the Preop folder or return to the case in Romexis to see which scan type was selected when the model was created.



Screen Layout Options

There are 5 options for viewing the models: 2 split screen options and 3 individual model views.

Click the Screen Layout buttons to change the views when desired.



B. Verify the Student Data

The student should evaluate their model when it is scanned to ensure there is no missing data on the preparation. The model can be evaluated in Compare to ensure all of the measurements are accurate.

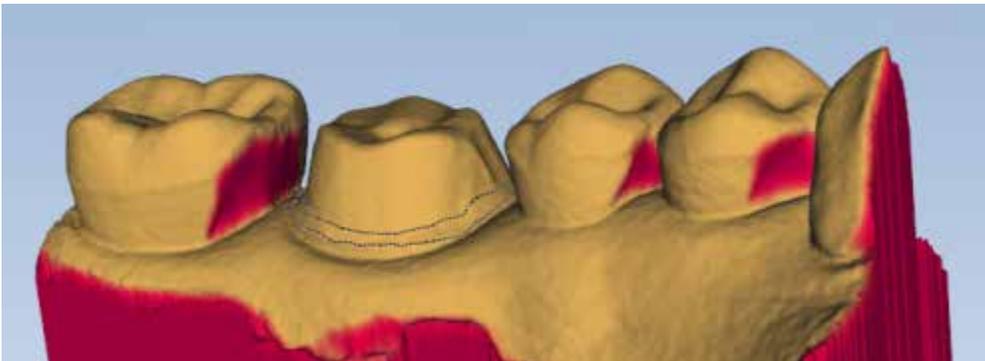
1 Click **Sample View**.



2 Click **Data Density** to evaluate the model.



The dark pink areas indicate low data density. Rotate the model to evaluate and verify that there is no low data on the preparation.



Rotate Model press and hold the right button, then drag

Note: The rotation of the model is based on the middle of the screen.

3 If there are areas of low data on the preparation, have the student rescan or keep that area in mind during the evaluations.

Define

C. Align the Models

If the master and sample models are scanned at different angles or if there is not enough of the neighboring teeth scanned in, the models may not align automatically.

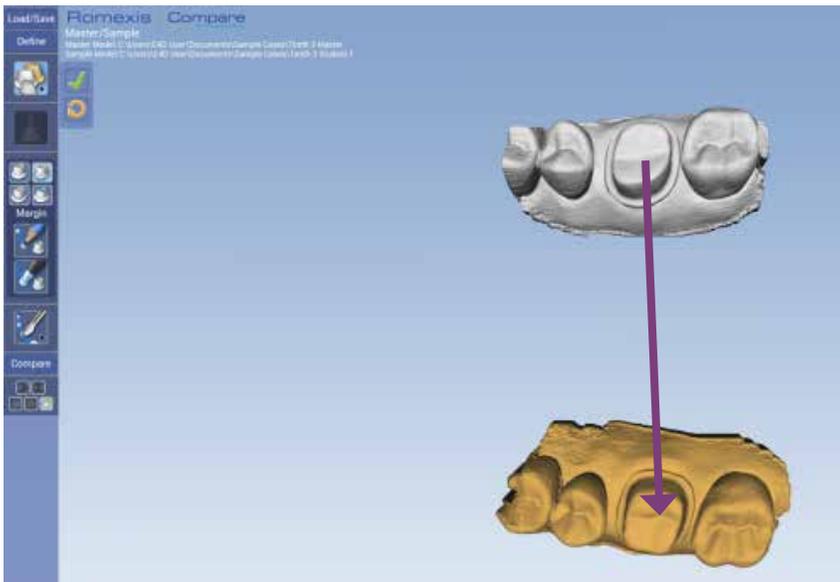
Note: The only sample cases that need manual alignment are for Tooth 3.



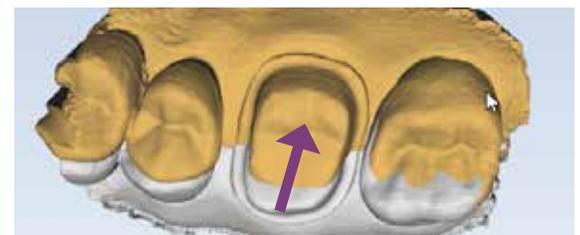
- 1 Click **Define**.
- 2 Click **Drag Align** on any cases that need to be manually aligned.

The view changes and the two models are separate on the screen.

Click in the middle of the master (white) model and drag it down to the sample (stone) model.

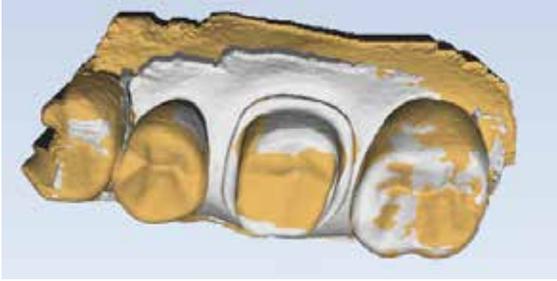


Move the sides of the master to rotate it.



Continue moving the master model until the two models are close in alignment.

- 3 Click **Accept**.  The system uses the new positions to create the alignment.

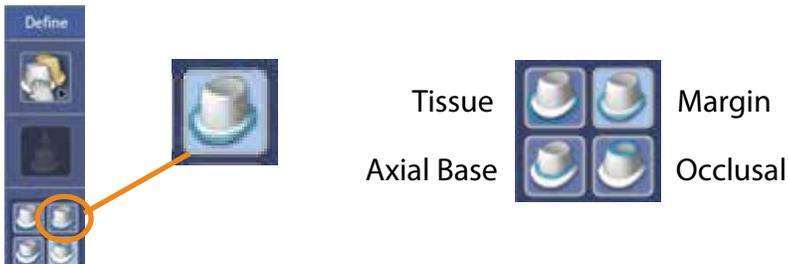


Note: If you are dissatisfied with the new alignment, click **Reset**  and start over.

D. Define the areas of the preparation

The next step is to designate the different areas of the preparation. These are defined on the student model only.

- 1 Select an area to define.



Note: Tissue is not currently used for calculations.

The screen layout is changed to show the sample model.

Note: Tooth 19 Sample case has the margin and axial base already defined on the model.

- 2 Select your drawing tool.



Trace - Click in small increments along the edge you are defining. The system draws a straight line between each click.



Wand - Click in large increments along the edge you are defining. Use this tool only on high contour edges.

- 3 Click along the edge of the area that you are defining. When you connect to the starting point, the circle is completed.

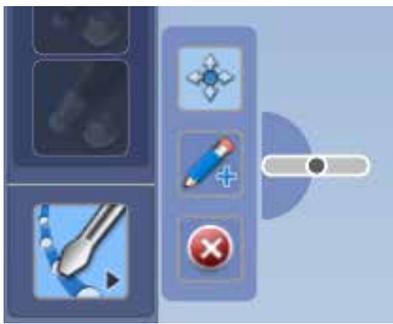
Note: See the Using the Mouse section for how to manipulate the 3D models. The rotation of the model is based on the center of the screen, not the center of the model.

- 4 Once the area has been defined, the tool automatically changes to the **Move** tool. You can click and drag areas of the occlusal line to adjust them or use the Add Segment tool to redraw a section.

Note: You can hover over a different line to change the focus and edit any of the defined areas.

- 5 Use the editing tools to adjust your line until you are satisfied with it.

Drawing and Editing Tools



Edit Curve Tools - There are three tools: Move, Add Segment, and Delete. Use the bar graphic to change the area of influence if desired.

Move is activated by default after an area has been defined. Click and drag any section line.

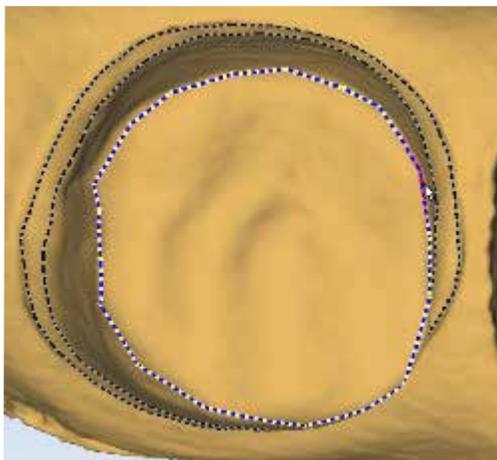
Click **Add Segments** to redraw a section. Click the button to indicate you are finished with the new section.

Click **Delete** to remove a circle and start over.

- 6 Click another area icon to define it. As each area is defined, the icon for it is gray.



Repeat the above steps to define each area. The Tissue area is not used for calculations at this time.



ICE View

ICE View is available if the model was two-toned. This can aid in seeing equigingival or subgingival margins.

None of the sample models require the use of ICE, but they were scanned using two-toned models so that you can see how the ICE View works.



E. Occlusal Angle (Path of Insertion)

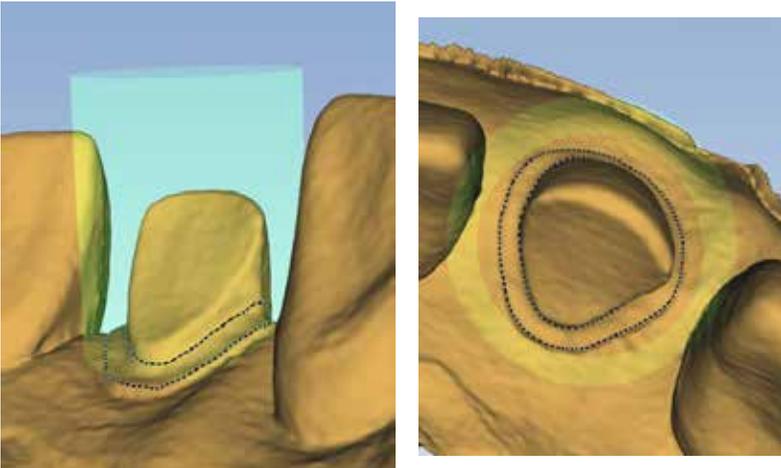
After the margin has been drawn, you can verify/adjust the path of insertion. The path of insertion is used to determine if there are undercuts in the preparation.

- 1 Click **Occlusal Angle**.



- 2 A cylinder appears over the preparation. Rotate the model until you are viewing the preparation from the occlusal surface or view.

Note: None of the sample cases have drastic undercuts, but minor undercuts can be seen on some of the anterior cases.



- 3 Click and drag to reposition the cylinder if necessary. Larger preparations may not fit within the circle. The goal is to align the cylinder with the path of insertion.

Once all the areas of the preparation have been defined, the sample model is ready for analysis.

F. Compare

Note: Some of the example measurements in this document are used to illustrate the different color maps and may not be realistic "ideal" measurements that would be used to evaluate a student.

Click **Compare**. A new set of tools appear.

Each tool has a different Ideal and Tolerance option. To change the ideals and tolerances, use the sliders and/or type into the text fields using the numbers above the letters (not the number keypad).

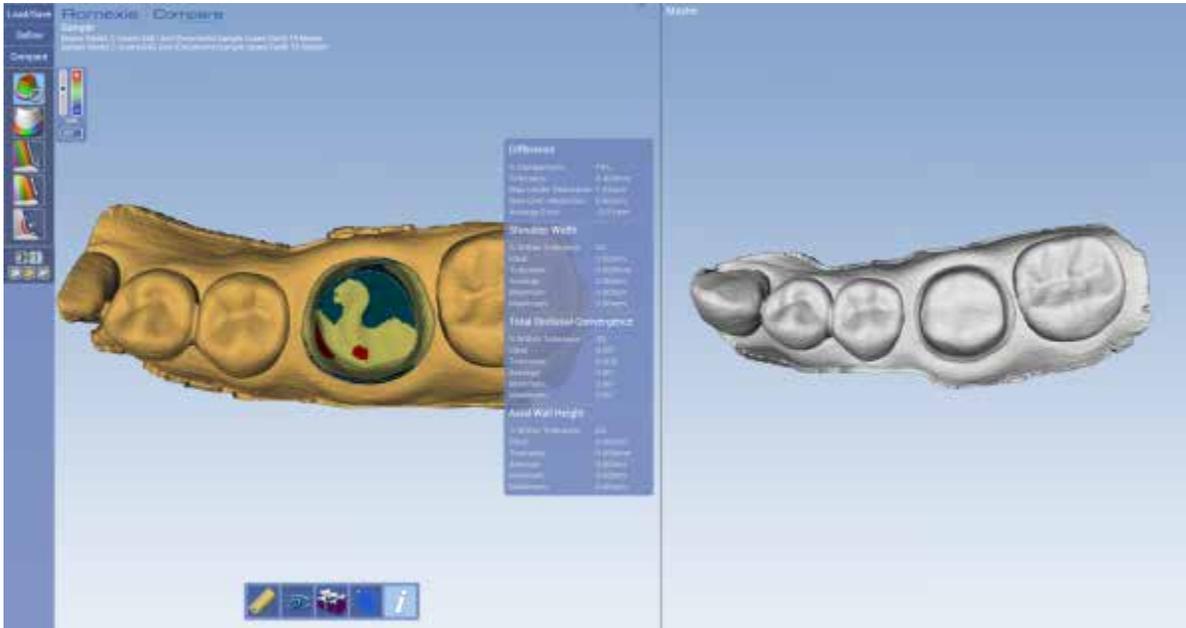
Hover the mouse over a measured area to see the specific data for that spot.

Compute Difference



Click **Compute Difference**.

The screen layout changes to the Sample and Master views. The system calculates the differences between the two preparations. This is the only tool that uses the Master model. The rest of the computations are based on the areas that were defined in the previous section.



Use the slider or the number field next to Compute Difference to change the tolerance level.

- Red: Over-reduction
- Blue: Under-reduction
- Yellow/Green: Within the tolerance range.



The information panel displays the numeric details. The details on the information panel are filled in as each Compare tool is activated.

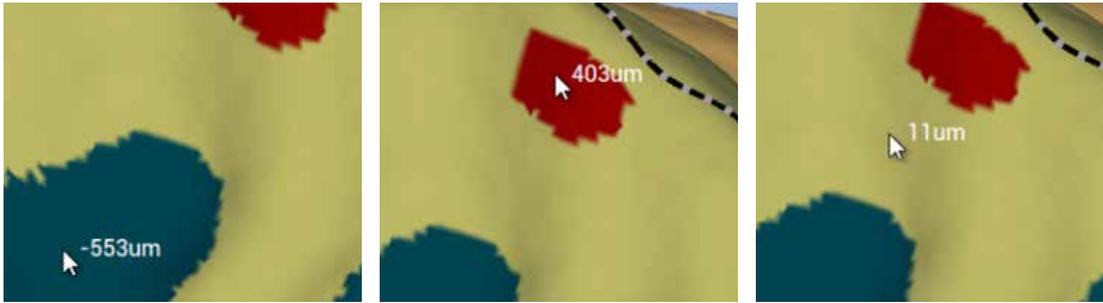
Difference	
% Comparison:	74%
Tolerance:	0.300mm
Max Under-Reduction:	1.04mm
Max Over-Reduction:	0.66mm
Average Error:	-0.01 mm

You can show/hide the information panel with the Information button.



Spot Check Details

Place the mouse cursor over any spot on the model to see a specific measurement. This can be used with any of the measurement tools.



Slice Plane

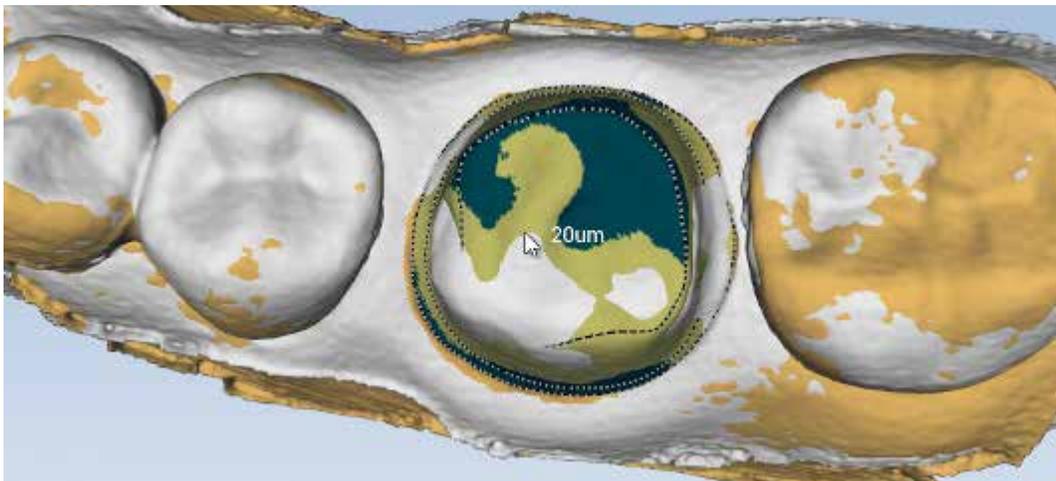
Slice Plane can be used to slice the combined model and see the differences between the two models.

Note: Slice Plane can be used at any time. Compare Difference does not need to be active.

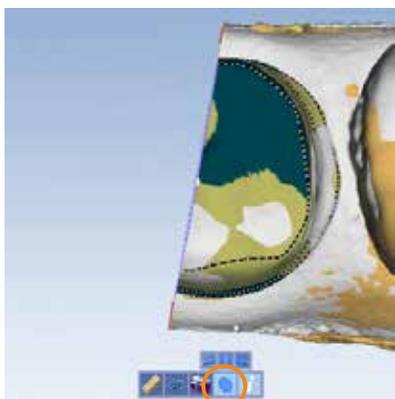
1 Click **Combined Model View**.



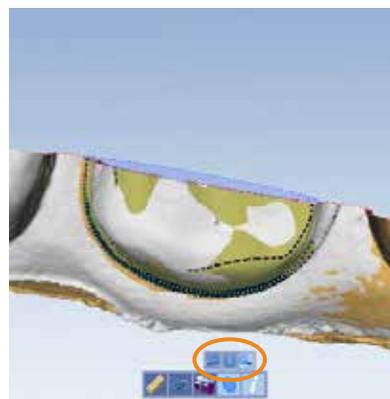
The system shows the two models combined. The sample model is yellow. The master model is white.



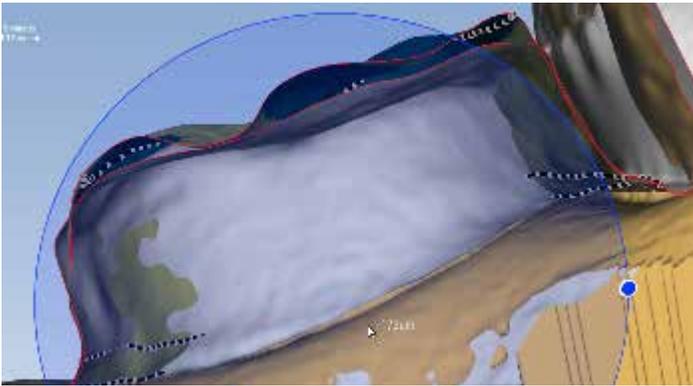
2 Click **Slice Plane**.



3 Click a different Slice Orientation, if desired.



- 4 Click and drag the edge of the circle to change the location of the slice.
- 5 Rotate the model to view the slice from the side. Use this as a visual evaluation or you can use the Measure tool.



Distance

Use the **Distance** tool to measure the space between two custom points.

- 1 Click **Distance**.



- 2 Click the **Draw** button.



- 3 Click the first point of interest.
- 4 Click the second point of interest.

A line appears with the distance between the two selected points.

Repeat as many times as desired.

- 5 Click the **Delete** button to remove any unwanted lines.
- 6 Click the **Distance** button to show/hide the measurements.



Shoulder Width

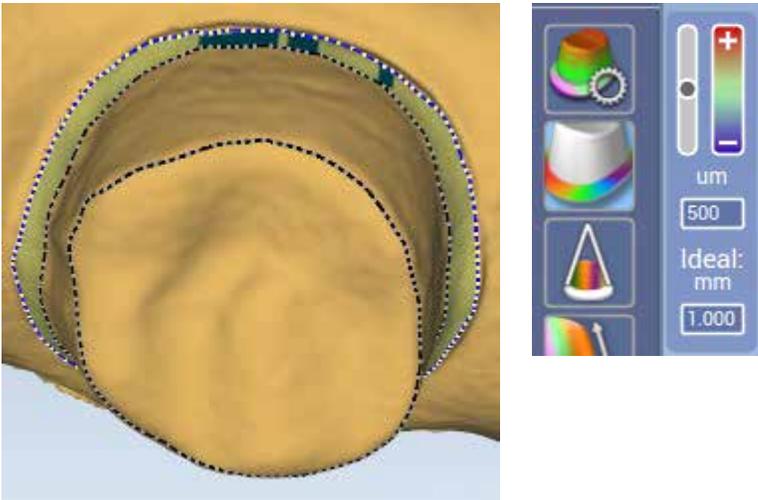
- 1 Click **Sample View** if you are still in the combined view.



- 2 Click **Shoulder Width**.



The system computes the distance between the previously defined axial and margin lines. A color map is displayed and shows any areas that are outside of the selected tolerance.



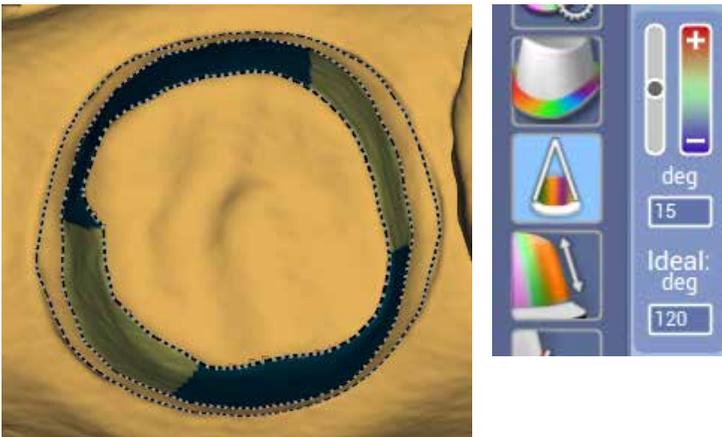
- 3 Change the Ideal shoulder width and the tolerance if desired.
- 4 Use the mouse to do spot checks or use the Distance tool if desired.

Total Occlusal Convergence

- 1 Click **Total Occlusal Convergence**.



The system measures the angles of the opposing axial walls. The margin, axial, and occlusal lines are all used in this calculation.



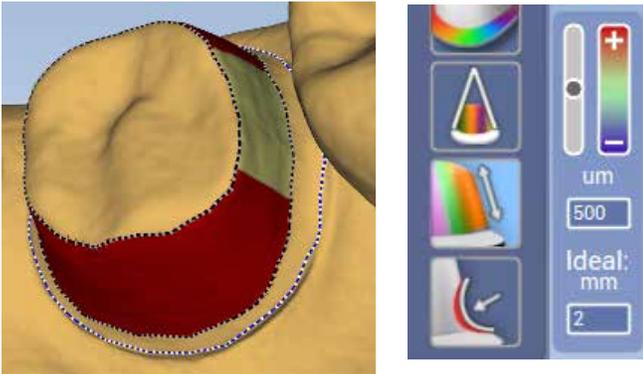
- 2 Change the Ideal degree and the tolerance if desired.
- 3 Use the mouse to do spot checks or use the Distance tool if desired.

Axial Wall Height

1 Click **Axial Wall Height**.



The system measures the distance between the axial and occlusal lines. Change the ideal height and tolerance if desired.



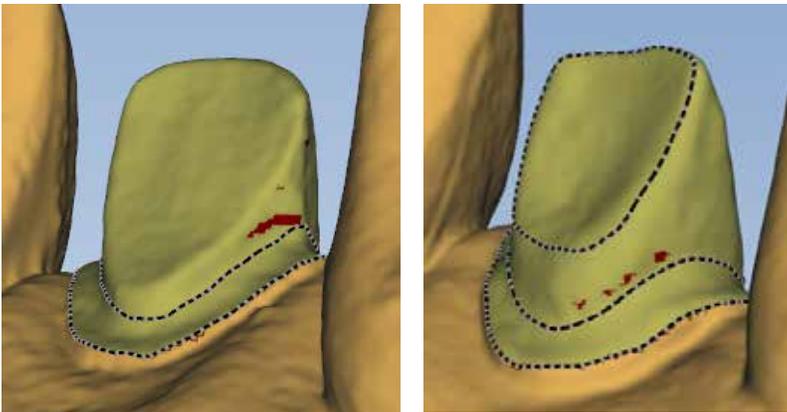
2 Use the mouse to do spot checks or use the Distance tool if desired.

Undercuts

Click **Undercuts**.



None of the sample cases have drastic undercuts, but minor undercuts can be seen on some of the anterior cases. Red shading indicates an undercut area. This is determined by the Occlusal Angle.



Undercuts is a visual evaluation only. This information is not included in the Report.

G. Report

You can create a .csv file which can be opened in a spreadsheet software such as Microsoft Excel or Google Sheets. You can then create reports and charts in the spreadsheet software that compare the various preparations from one student or multiple student results on one preparation.

Saving Individual Reports

The report saves the measurements that are displayed in the Information panel. Click the **Information** icon to show/hide the panel. Ensure all of the desired measurements have been created before saving the report.



Difference	
Asymptotic	7%
Distance	-2.21mm
Max. Occl. Medial	1.71mm
Max. Occl. Medial	0.87mm
Average Dist	16.07mm
Shoulder Width	
A. Width Tolerance	8%
Dist	1.20mm
Tolerance	3.90mm
Average	3.77mm
Minimum	0.41mm
Maximum	0.97mm
Total Occlusal Convergence	
A. Width Tolerance	8%
Dist	1.21mm
Tolerance	14.00°
Average	14.18°
Minimum	25.11°
Maximum	88.39°
Axial Wall Height	
A. Width Tolerance	8%
Dist	1.20mm

- 1 Click **Load/Save**.
- 2 Click **Report**.
- 3 Select a destination folder and enter a file name. Click **Save**.

Note: Reports should be grouped by student or by class, depending on the University's preferences.

Combining the Individual Reports

Once you have multiple .csv files, you can use the Report Compiler to combine the information and import the data into your spreadsheet software for graphing and comparisons.

- 1 Minimize or close **Compare**.
- 2 Use **Windows File Explorer** to organize the desired files. The compiler combines all of the individual .csv files in the designated folder into one large file. You may need to copy/paste the desired files into a single folder before running the compiler.
 - Combine all of the files for one student into a folder. This would enable you to see their overall scores or their progression over time.
 - Combine the same preparation results from multiple students into one folder. See how multiple people handled the same assignment.
- 3 Double click the **Report Compiler** icon on the desktop.
- 4 Click **Select Reports Directory**.
- 5 Single click the desired folder to highlight it and click **OK**.

Note: All of the .csv files that you want to combine must be in a single folder. The compiler will NOT include files that are in sub-folders.

- 6 Click **Save Compiled Report**.
- 7 Find the desired location for the report file, type in a name for the file, and click **Save**. This creates a new .csv file. It should NOT be saved in the same directory as the individual files.

Opening .CSV Files

To open a .csv file in Microsoft Excel:

- 1 Click **Open** in Excel.
- 2 Change the file type to **All File Types**.
- 3 Find the desired file and click **Open**.

To open a .csv file in Google Sheets:

- 1 Click **Upload** to add the file to Google Drive.
- 2 Find the desired file.
- 3 Check the **Convert Documents** option.
- 4 Click **Start Upload**.

To create graphs or charts based on the data, please see the help files for your spreadsheet software.

Switching Cases

If you open a new master or sample case, the system attempts to align the models, even if they are not a match. Continue and open the matching master or sample model.

Taking Screenshots

You may wish to take a screenshot to aid in communication with others in the school or with Customer Support.

Note: Windows+Print Screen is not available within Compare.

Some versions of Windows include a program called Snipping Tool that you can use to capture part of the screen and then save or copy it into an email.

All Windows computers allow you to press Alt+Print Screen to put a picture of your screen on the clipboard. You can then open Paint or another graphics program and Paste the picture to save it.

COMPARE

PATIENT



Open Romexis.

Adding a New Patient

- 1 Click **Add Patient**.
- 2 Enter your **First** and **Last Name**. Enter a **Patient ID** if required (bold).
- 3 Click **Save Patient**.

Find Existing Patient

- 1 Enter the first few letters of the last name and press **Enter** or click **Find** without any search criteria to see all patient files.
- 2 Double click a patient file to open it.



Click **CAD/CAM**.

Click **New Scan Only**.

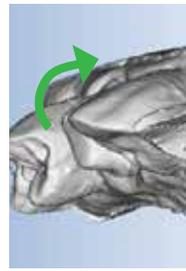
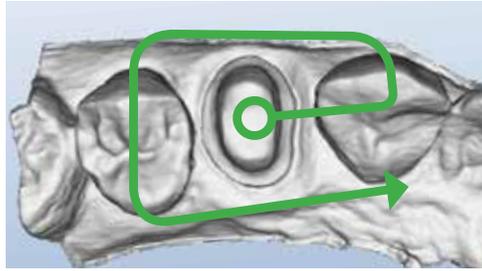
SCAN



Click Scan Prep
100% of Prep and 90% of adjacent occlusion



Click Data Density View to evaluate for low data on the prep.



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

Minimize the Romexis window.

Open Compare.

Load Models

- 1 Load master. University master file location: _____
- 2 Load sample.
University file location: _____
Default location: **Desktop - Patients - ID# - Name - Restorations - Date - Prep**

Define Areas

- 1 Mark the **Margin**. 
- 2 Mark the **Axial Base**. 
- 3 Mark the **Occlusal Table**. 



Set the Occlusal Angle (Path of Insertion)

Compare/Measure - Click each button



Compute Differences

um: _____



Shoulder Width

um: _____



Total Occlusal Convergence

deg: _____

ideal: _____ ideal deg: _____

Report

- 1 Click **Load/Save**.
- 2 Click **Report**.
- 3 Save the .csv file. Report file location: _____
- 4 Send the .csv to your professor.