Getting to Know VPX

An essential guide to VPX. Whether a novice user or in need of a refresher.

Contents

Introduction to Glidewell

The Glidewell Advantage is a multi-faceted benefit that empowers dentists across the globe to deliver the highest quality experience possible to their patients. This advantage has been honed over 50 years of service to and solution development for the dental community and it envelops everything to which we've been committed since we were founded: innovations in science and technology, excellence in manufacturing, unparalleled customer service and focus, and social responsibility.

Product Description

Virtual Plaster Experience (VPX) was created to digitize Bite Articulation, Margin Marking, Virtual Die Trimming, and perform Pre-Design Analysis that was originally done with stone models. It is one of Glidewell's major steps toward a digital manufacturing objective. At Glidewell, we believe digital manufacturing and automation workflow is the key to efficiency and accuracy in our work. The more we're able to process through digital manufacturing workflow the better quality of product we can produce.

With VPX, we still receive a case from our customers, but instead of creating a stone model, we CT scan it. From there it goes directly into a digital manufacturing workflow.

A Brief History of Our Traditional Manufacturing Process

Glidewell Laboratories has been in the mail order dental lab business almost 50 years. Traditional lab workflow has always introduced numerous design and manufacturing challenges.

Traditionally, Glidewell Labs received impressions from doctors' offices, poured the plaster models, trimmed the dies, scanned both the plaster models and dies, designed, milled, sintered, made finishing adjustments, stained and glazed, then did the final QC and shipped the new units back to our customers.

The problem is plaster models are not very accurate, and plagued with problems. These issues had to be corrected using manual work, leaving room for error.

Air bubbles, voids, tears, blood, saliva, polymerization, shrinkage, distortion and other contamination commonly occur due to a variety of causes, and can render an impression unusable. Pinning the dies can lead to inaccuracies in models.

Contamination also created problems with reduction copings, which would be printed out, modified by hand, scanned in and printed out again in an inefficient, labor-intensive cycle. Any of these problems can result in extensive adjustments and may even make the impression useless.

Plaster methods can lead to inaccuracies, and are far less efficient than digital methods. Some issues are not readily apparent during the plaster process and are encountered after the fact, leading to downtime, unnecessary dental procedures, redoing the case, and ultimately, unsatisfied customers. Manual die trimming can lead to errors. Some delays can take up to a month!

At Glidewell, our goal is to achieve the fastest turnaround time possible.

Within the last eight years, Glidewell has increasingly adopted digital technology. Instead of taking a physical impression, Glidewell utilizes CT scans, or uses an intraoral scan right from the patient's mouth. Both scans make ultra-precise images. This results in both consistency and reliability of the restorations. Digital impression systems also offer numerous benefits to us as a laboratory, including increased productivity, lower rejection and lower remake rates.

Introducing VPX...

The digitizing of physical impressions using CT scanning proved both faster and more accurate, and reflects Glidewell's march toward a digital workflow model. VPX is a culmination of these experiences and technical developments, and was developed to effectively work with the growing number of digital files brought in by CT scans. VPX includes features that make bite articulation and margin marking easier.

Using VPX, Glidewell is able to make a more accurate assessment of the margin, thus producing a higher-quality product. Now VPX accepts files in STL, PLY, DCM and CTM formats.

Technicians are able to mark the margin more efficiently. For example, using the Spline Reroute Tool helps reroute the margin under scan data that should not be there, such as saliva, debris or gingival tissue. This allows technicians to bypass such obstacles, saving time and money. And now VPX accepts color scans for both DCM and PLY files, furthering is adaptability and effectiveness.

For an explanation of the most common problems, click here.

Getting Started with VPX

Starting CloudPoint VPX and Opening a Case

Click the VPX Desktop App 

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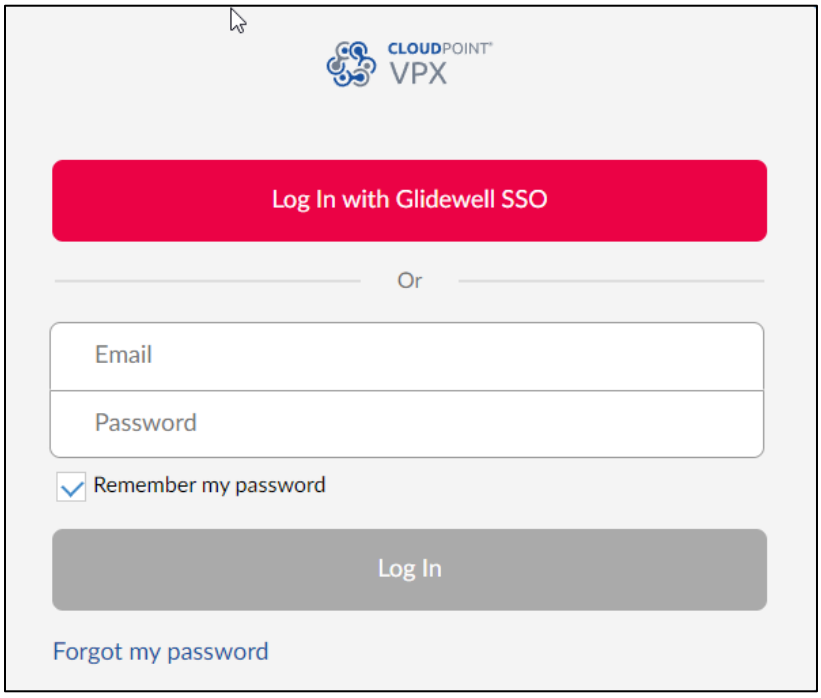
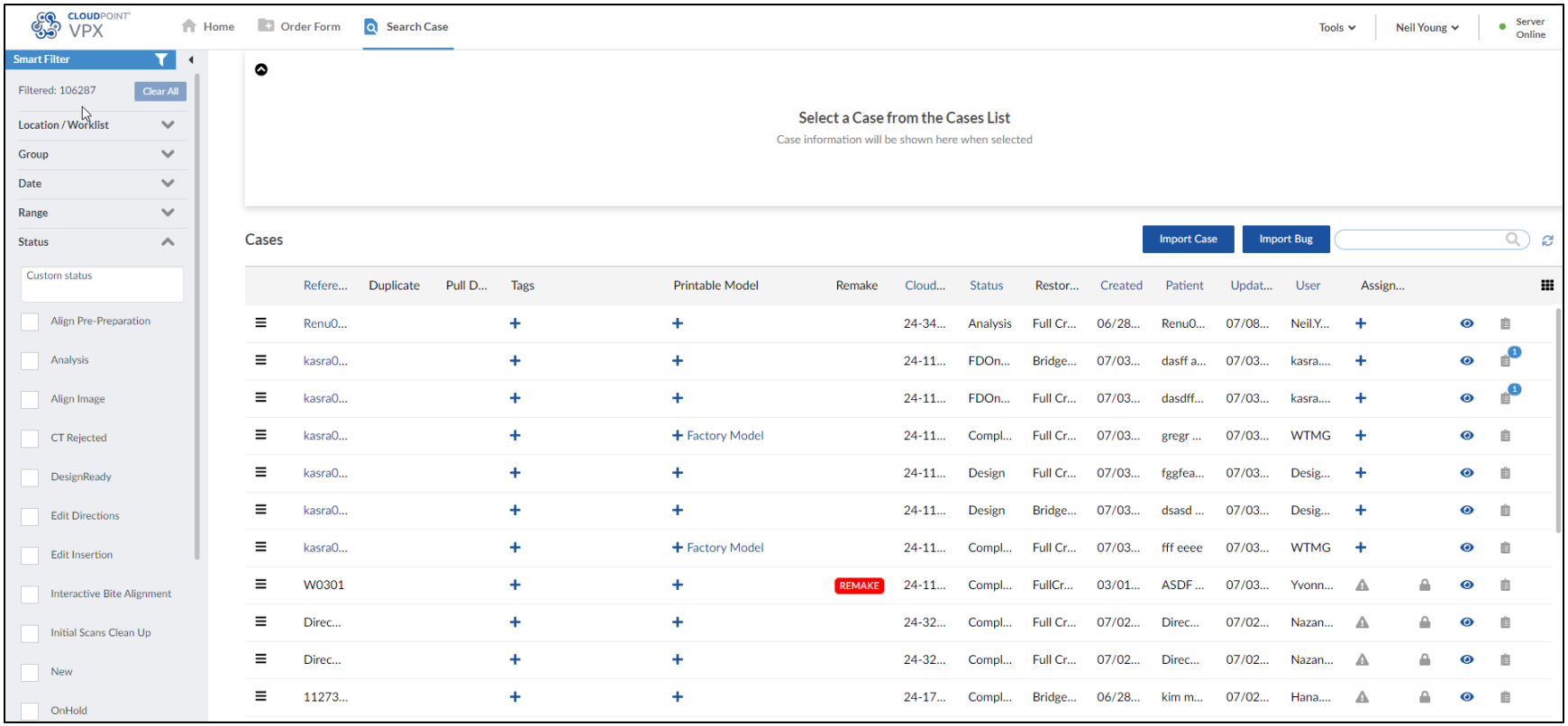
The CloudPoint window displays (per below)



1. Enter Email
2. Enter Password
3. Click **Log In**

The Search Case Form

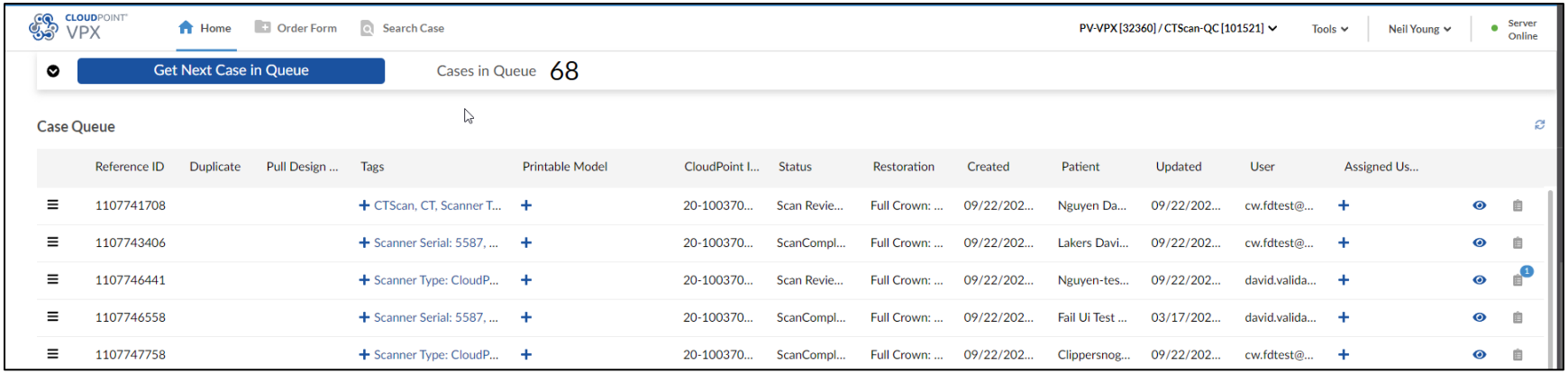
The user will be taken to the Search Case Screen, as illustrated below:



From here, there are four choices on the overhead menu:

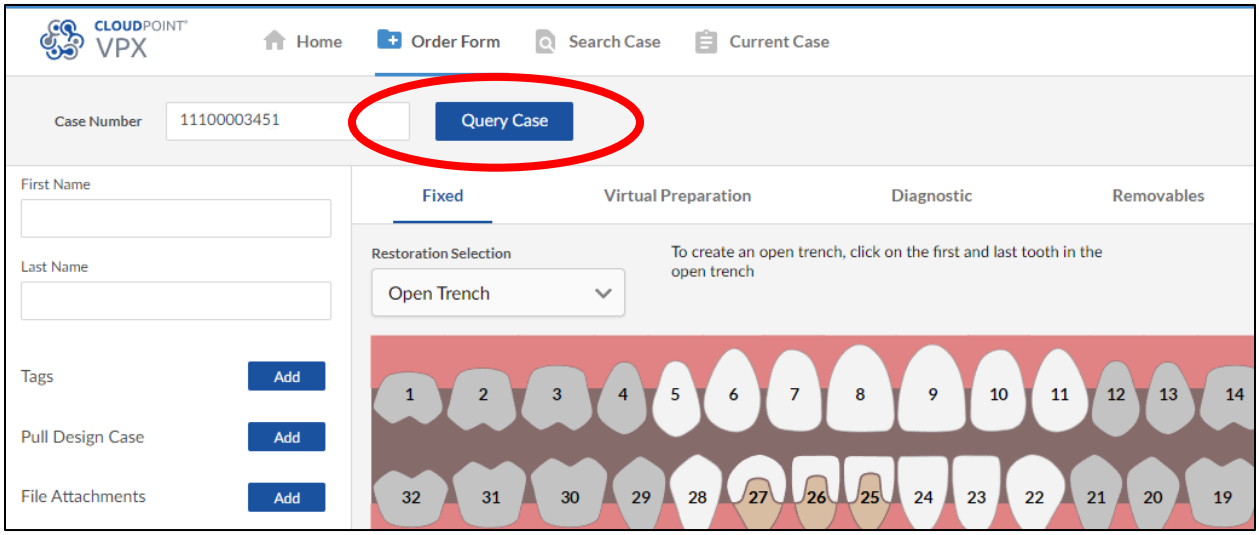
- Home
- Order Form
- Search Case (Case Search)
- Current Case

Home



The Home Page details everything in the queue, and lists the total count of cases in the queue. From here, the Reference ID (Case number) can be clicked on to select the case.Alternatively, the Get Next Case in Queue button can be selected. This takes the user to the case currently being worked on.

Order Form

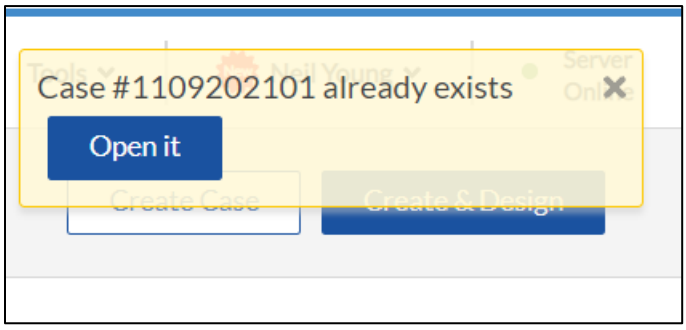


This search allows users to find an existing case file. To do this:

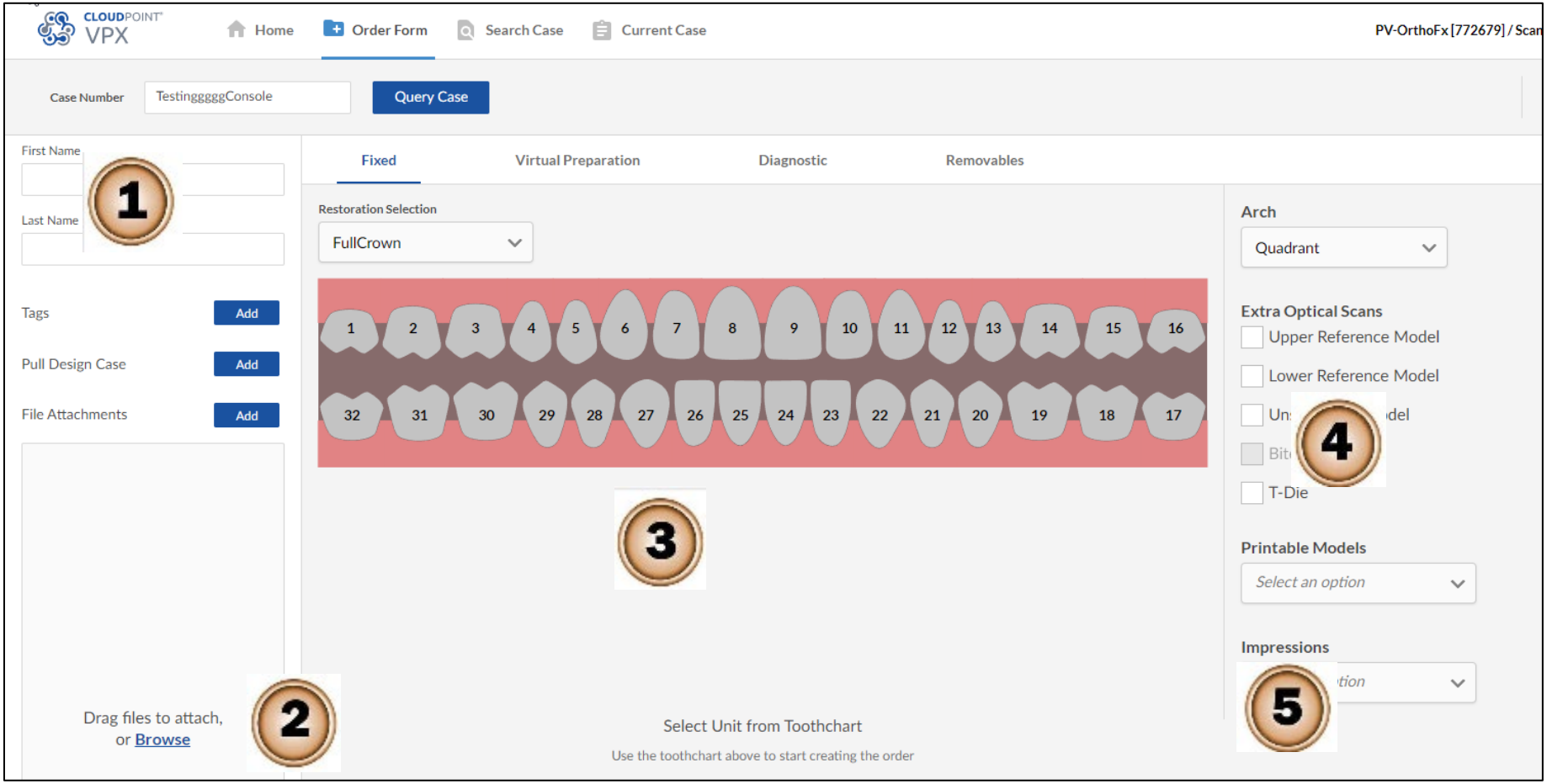
Input the Case Number into the field to the left of the Query Case button.

Click **Query Case**.

A window appears, confirming the case exists. Click **Open It**.



The full case displays in Virtual Preparation.


CLOUDPOINT VPX
Home
Order Form
Search Case
Current Case
PV-OrthoFx [772679] / Scan
Case Number
TestingggggConsole
Query Case
First Name
Last Name
1
Tags
Add
Pull Design Case
Add
File Attachments
Add
Drag files to attach,
or Browse
2
Fixed
Virtual Preparation
Diagnostic
Removables
Restoration Selection
FullCrown
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17
3
Select Unit from Toothchart
Use the toothchart above to start creating the order
Arch
Quadrant
Extra Optical Scans
Upper Reference Model
Lower Reference Model
4
T-Die
Printable Models
Select an option
Impressions
5

The case will display with the order details filled in. The following should be auto-filled:

1 – First Name, Last Name

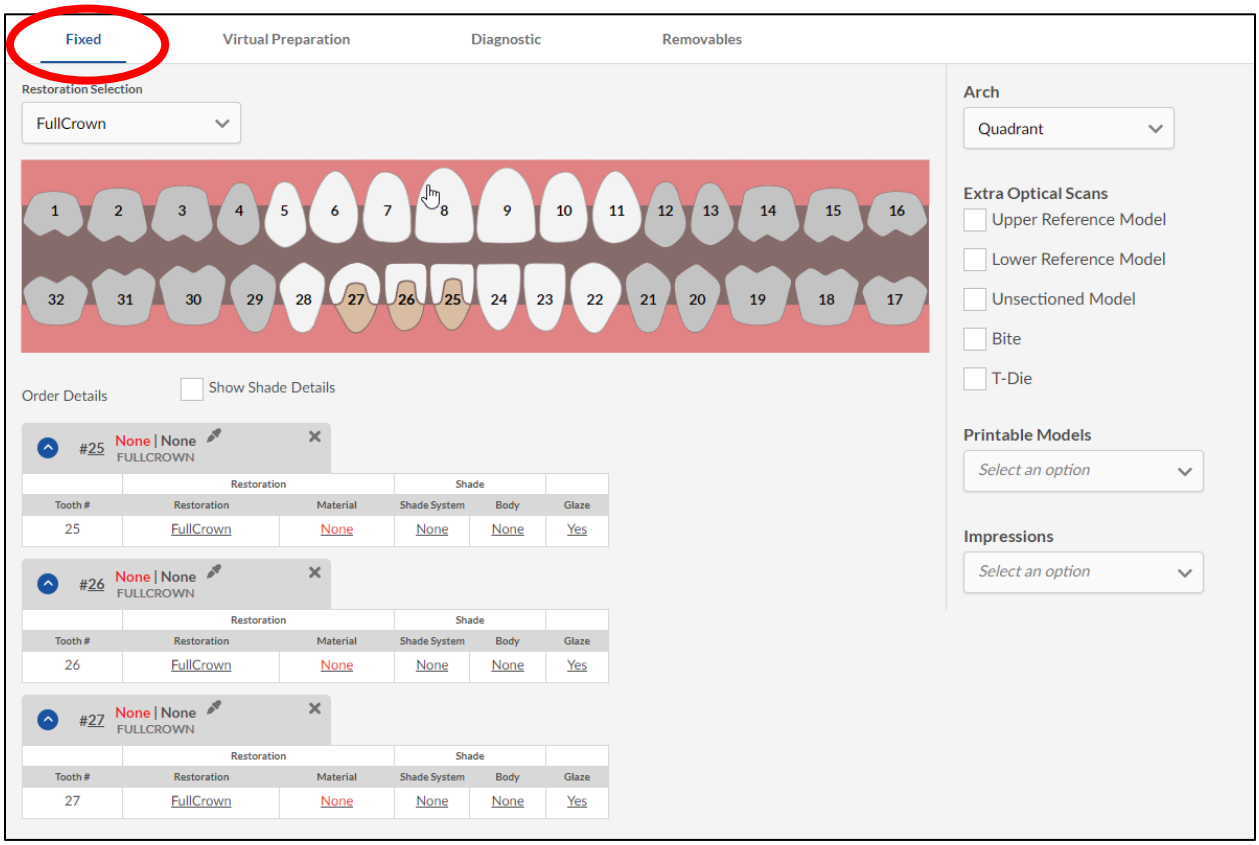
2 – File Attachments

3 –Restoration Selection – this central bite image will show which tooth (or teeth) is being worked on in the case file.

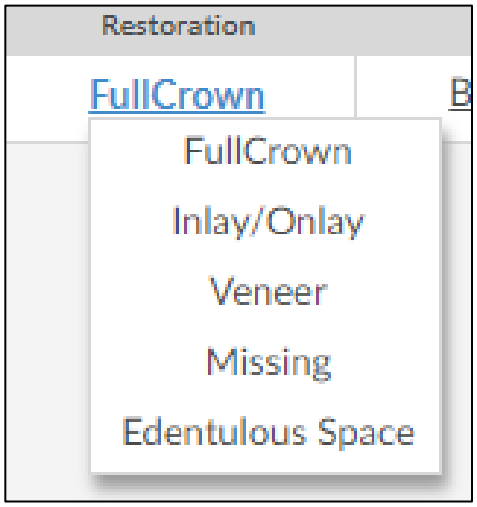
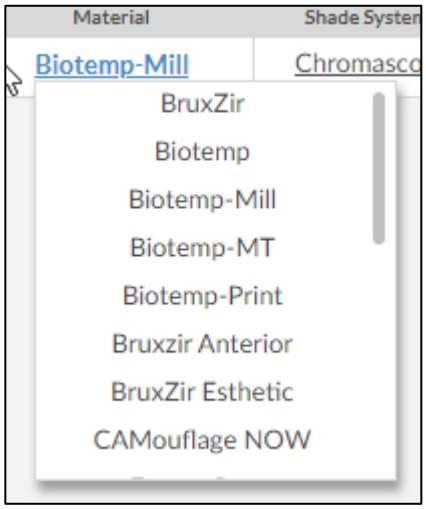
4 – Show Order Details Check box – Turns order details on and off. **NOTE**: For missing teeth, no shading information will be listed.

5 – Order Details

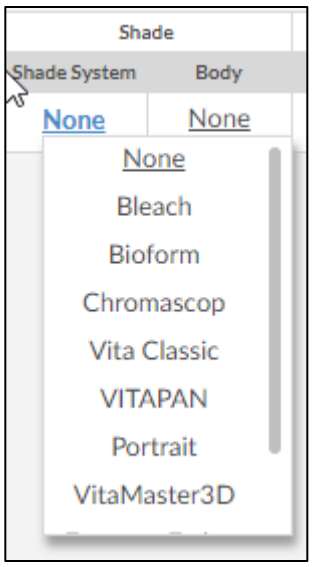
NOTE: **Fixed** and **Removables** can be selected.



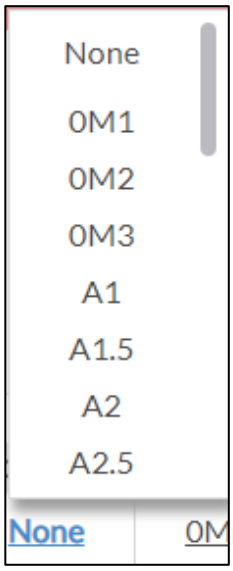
NOTE: There are drop-down menus available for each of the Order Detail columns. Select the correct detail for the scan.

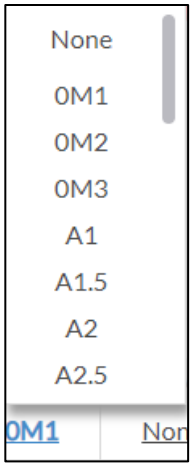
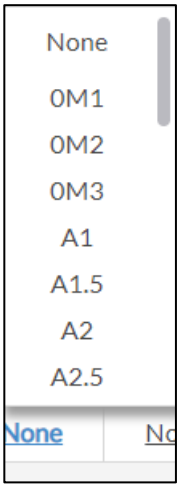
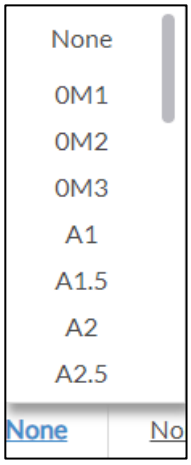
Order Detail	Selection
Restoration	
Material	

Shade System



Body

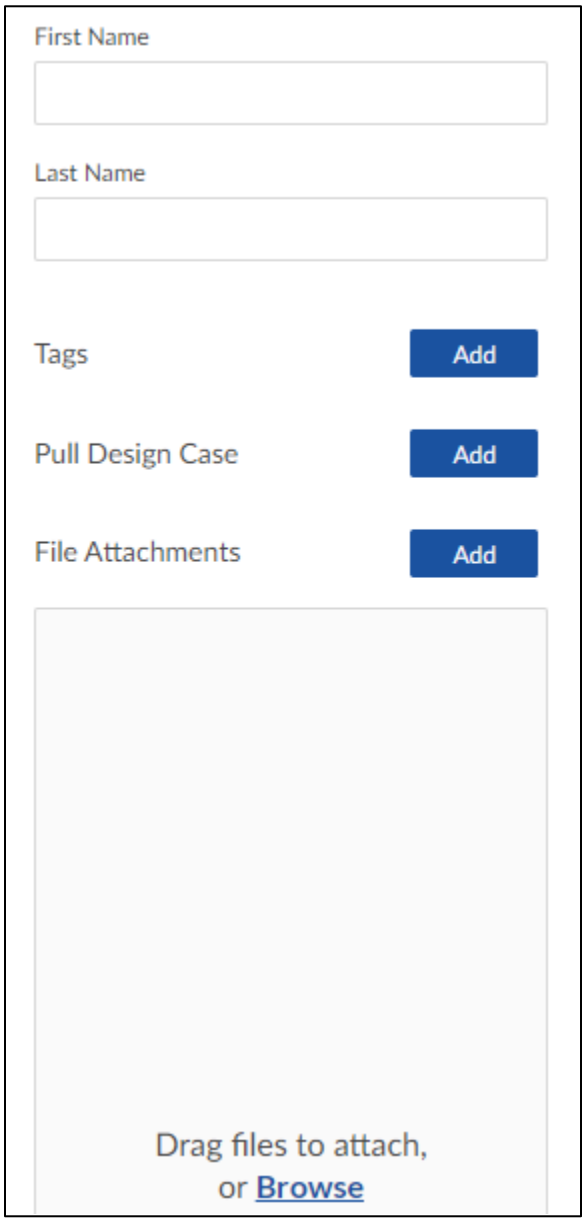


Body	
Gingival	
Stump	

Oc. Staining	
Glaze	

Attach Files

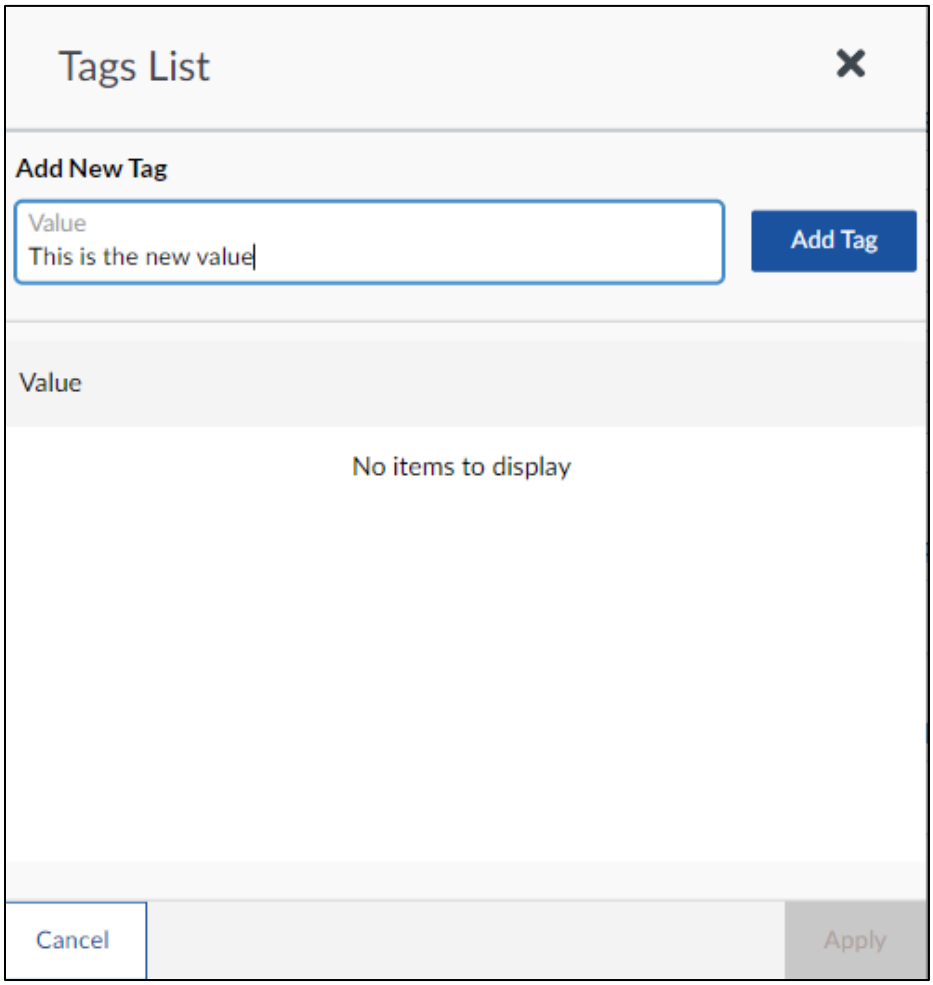
Includes all the relevant information concerning the case, including patient name, tags design case and any relevant file attachments.



Tags

Clicking the Tags Add button displays the Tags List window.

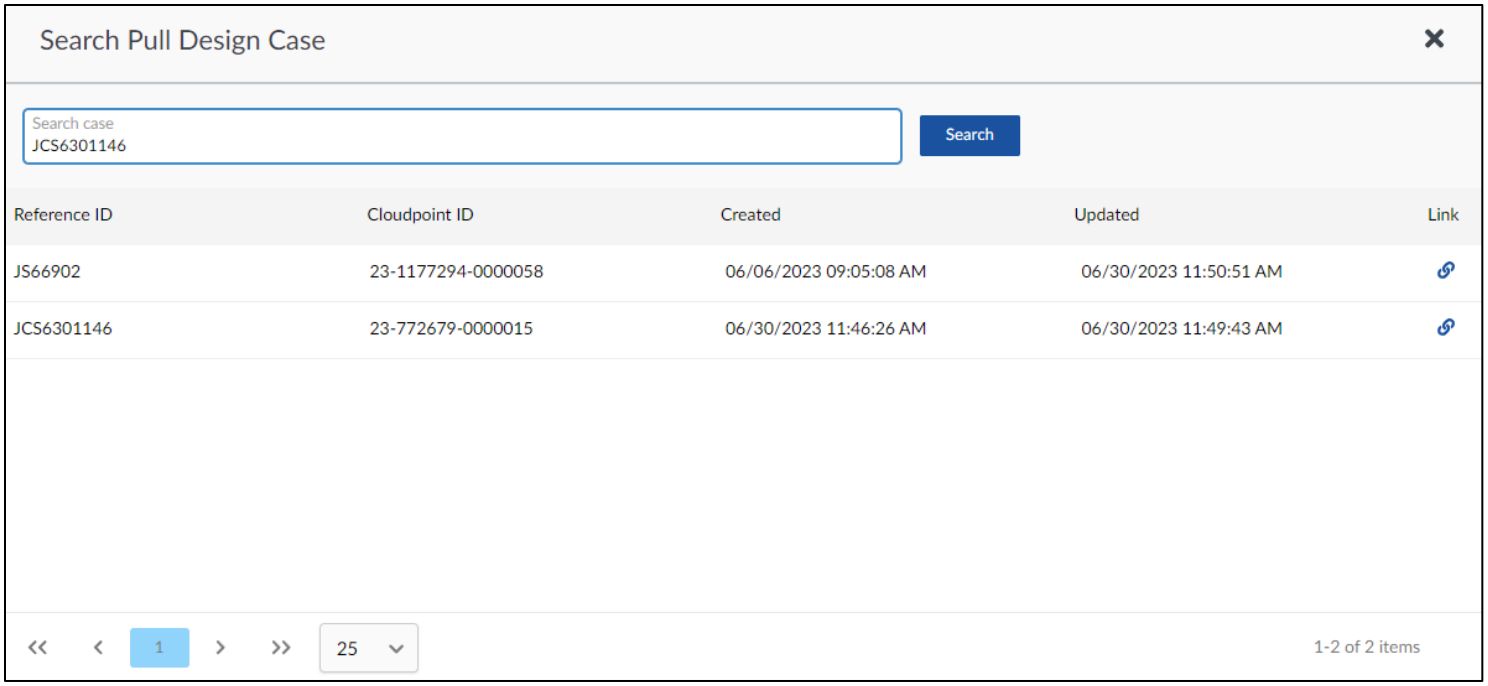
1. Type the New Tag value into the **Add New Tag** Value box.
2. Click **Add Tag**.
3. Repeat steps 1 and 3 for additional tags.
4. Click **Apply** when done.



Pull Design Case

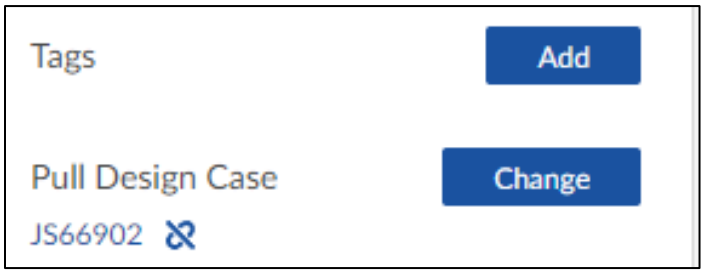
Clicking the Pull Design Case Add buttong displays the Search Pull Design Case. This allows cases to be linked to the order form.

1. Type in the desired case number
2. Click Search
3. Click the link icon.



The case appears under the Pull Design Case, with the button switched to ‘Change’ in the advent the linked case needs to be switched out.

Clicking the remove attachment icon deletes the attached case.

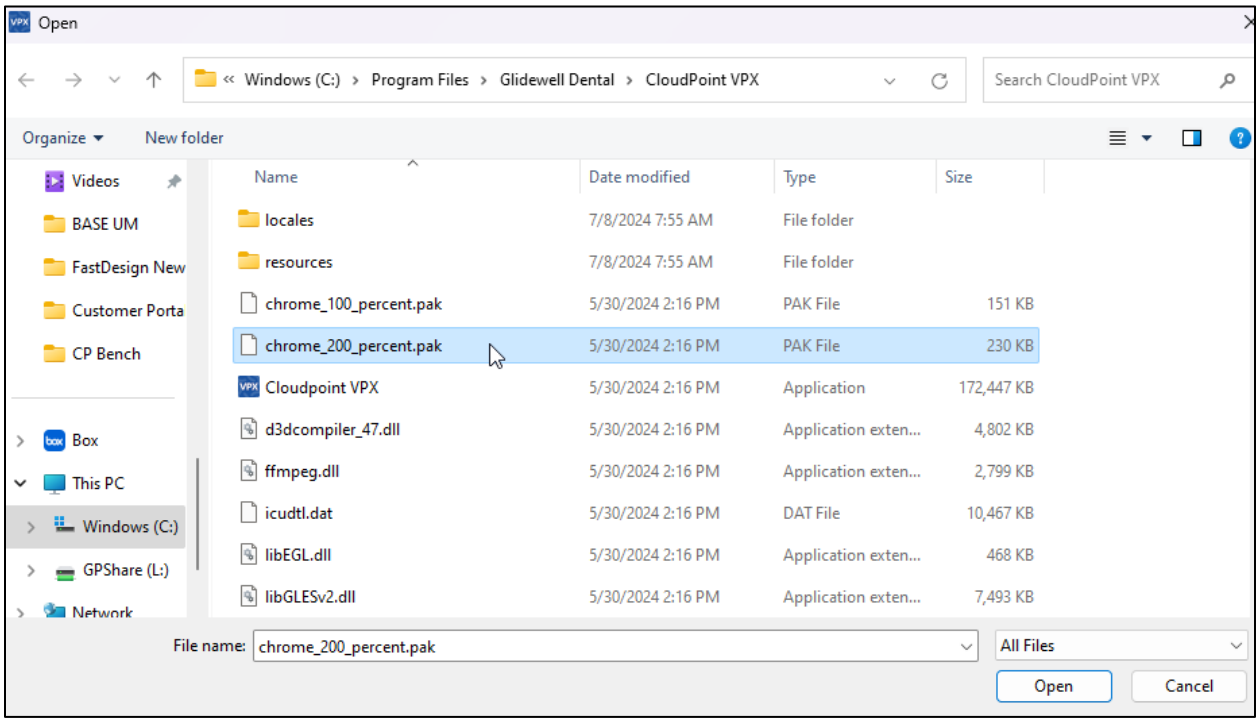


File Attachments

To add files to the case, click the Add button for File Attachments or click Browse in the window below it. These bring up a conventional File Folder window.

Simply navigate to the desired file, highlight the file and click **Open**.

Alternatively, files can be manually dragged to the attachement window.

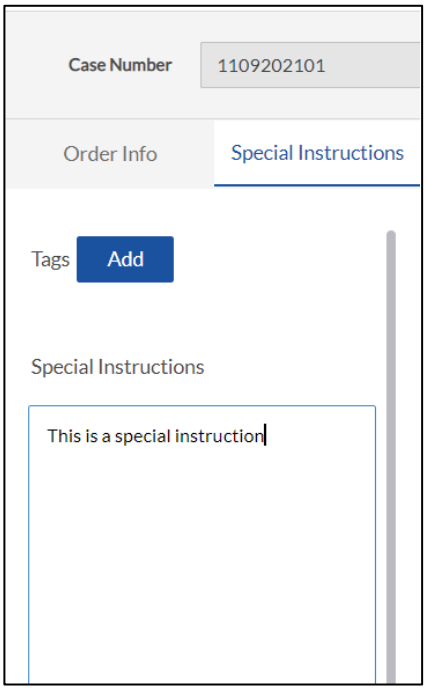


Special Instruction: Is a feature that allows users to add specific details, notes and guidance for the case.To utilize:

Click the Special Instructions Menu item.

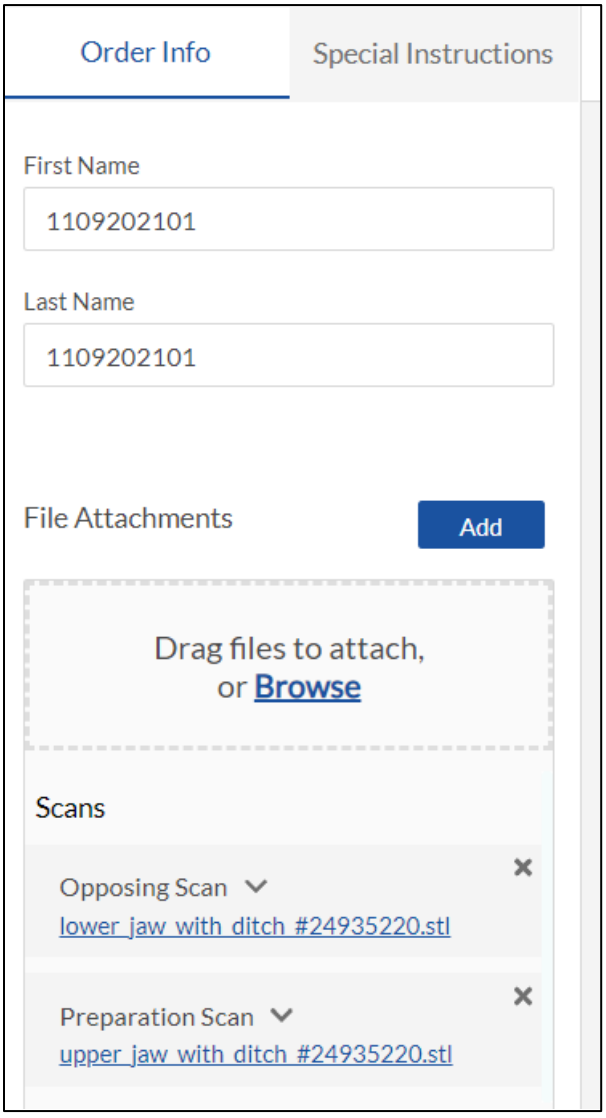
Type the instructions in the Special Instructions box.

Click **Add.**



Order Info

Order Info is a function to allow users to attache relevant files to the case. It functions as a typical file attachment or drag and drop. In either case, files successfully attached will display under the Scans heading.

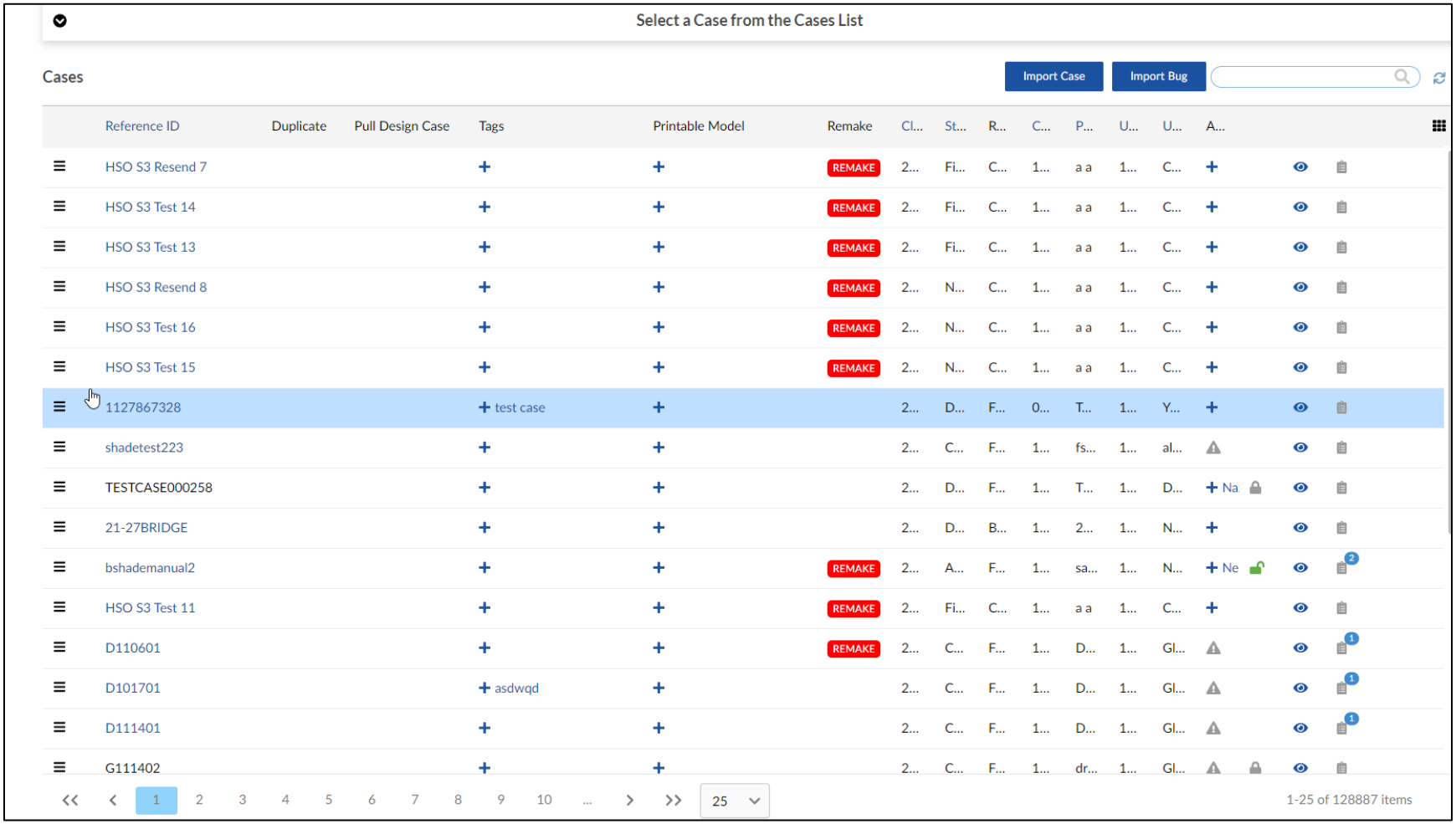


When the user is ready to work on the case immediately, click **Create & Design**.

If the user wants to store the case for future work, click **Create Case**.

The case will be created in VPX.

The Main Case Screen displays.



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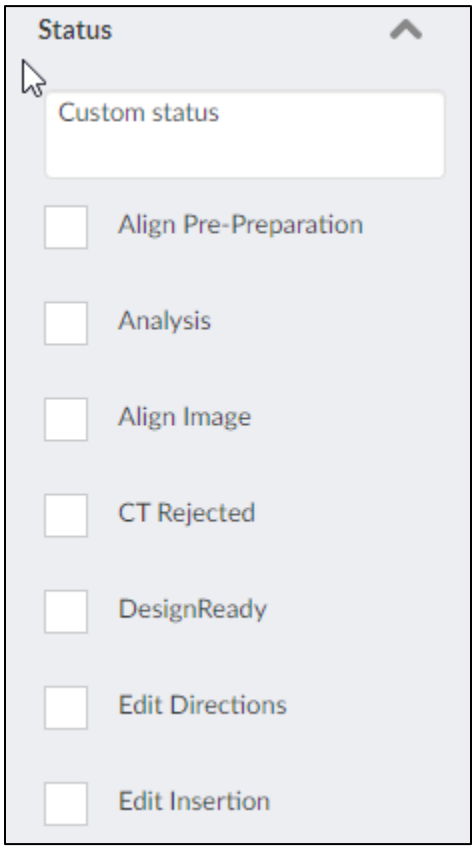
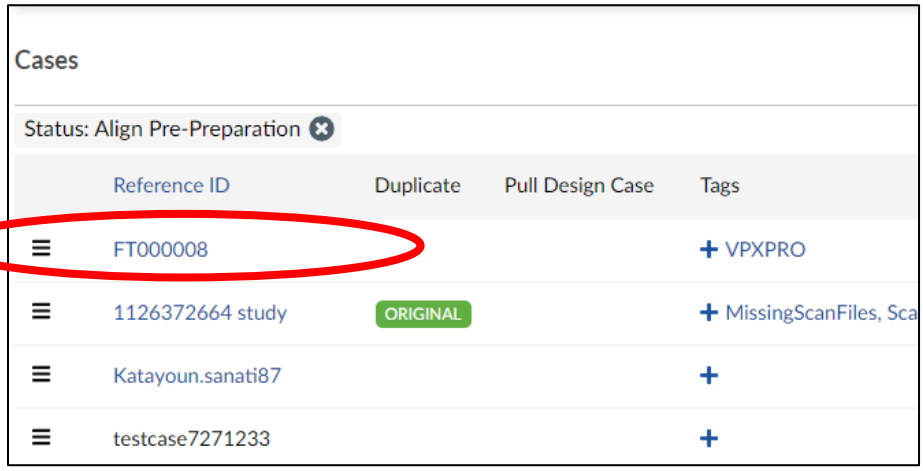
Check any of the status boxes in the gray left-hand column or type a description in the Custom Status window to narrow the user search.

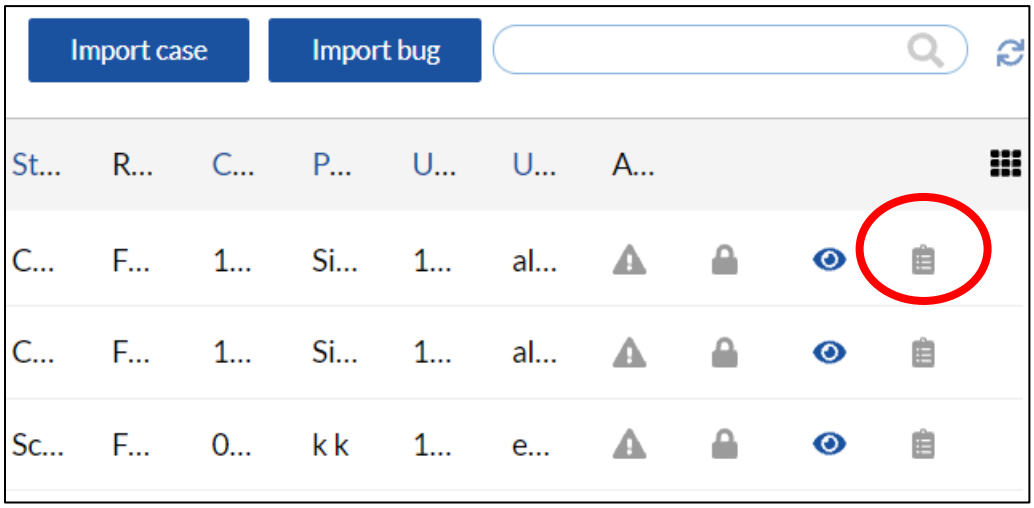


Once located, click the desired case number



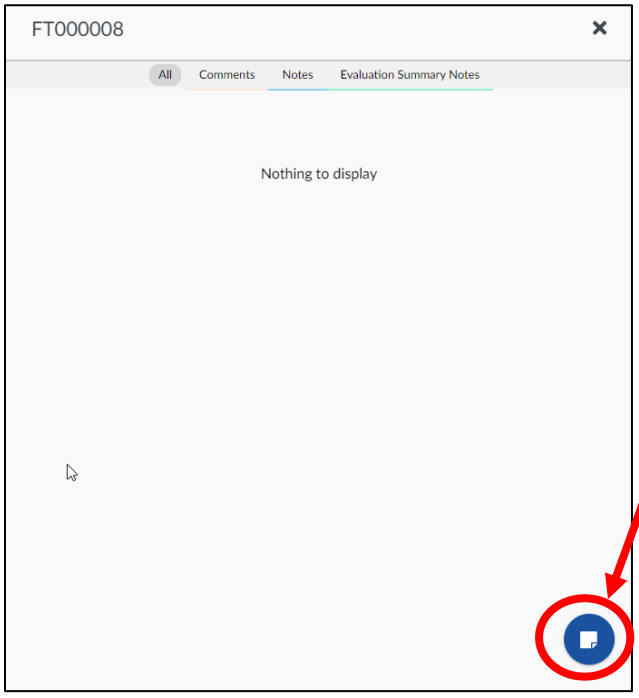
Manufacturing Notes

The Notes feature can be accessed in two ways, from the Manufacturing Notes and by clicking on the clipboard icon at the right-end of the case listing.



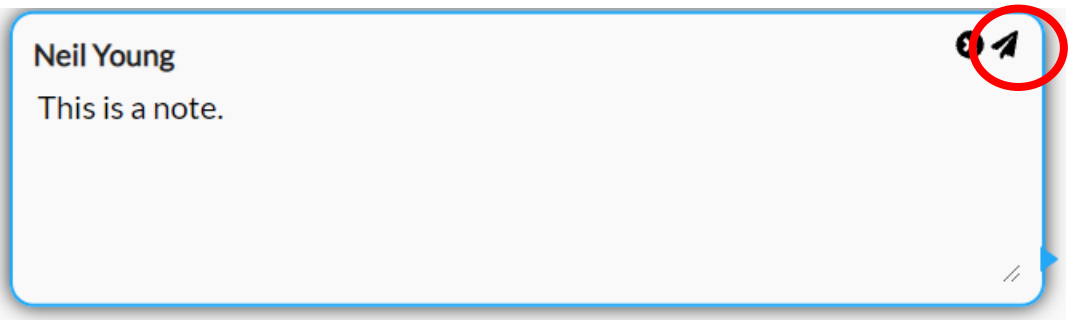
A note window displays, with the Reference ID of the case.

Click the add notes icon in the bottom right corner.

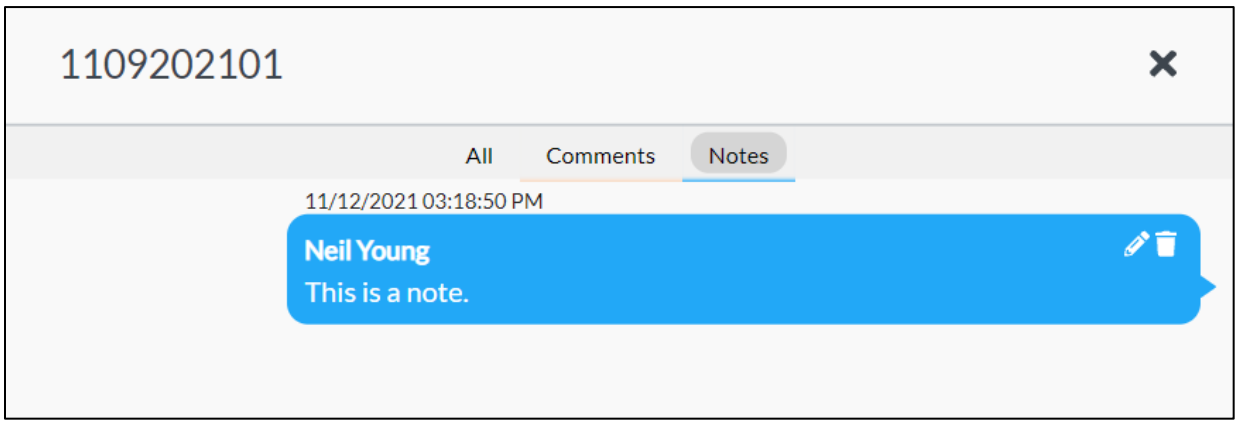


Input the desired message in the Add note text box.

Press the Send Icon.

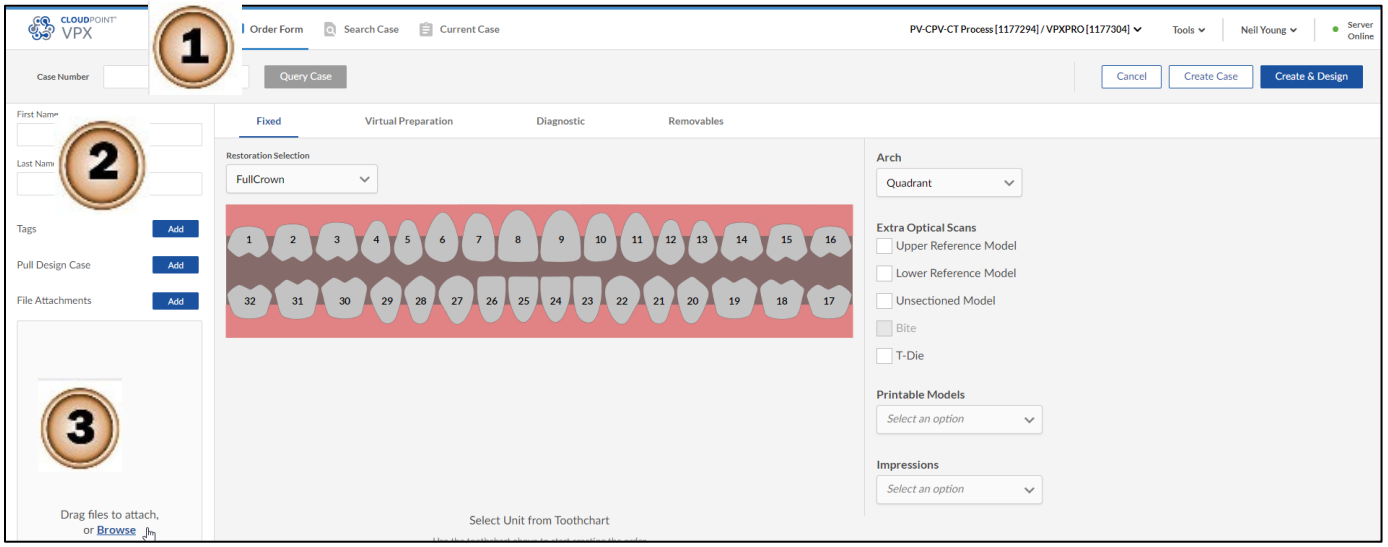


The note appears in the notes window.



Order Form

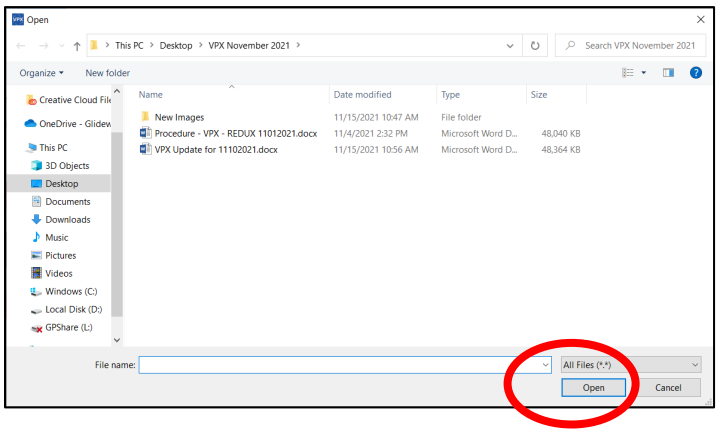
1. On the order form, create a case number (make it a number and/or letter combination that is easy to remember).
2. Input the patient's first and last name.
3. Attach the scan files by clicking Add. These will appear under File Attachments.



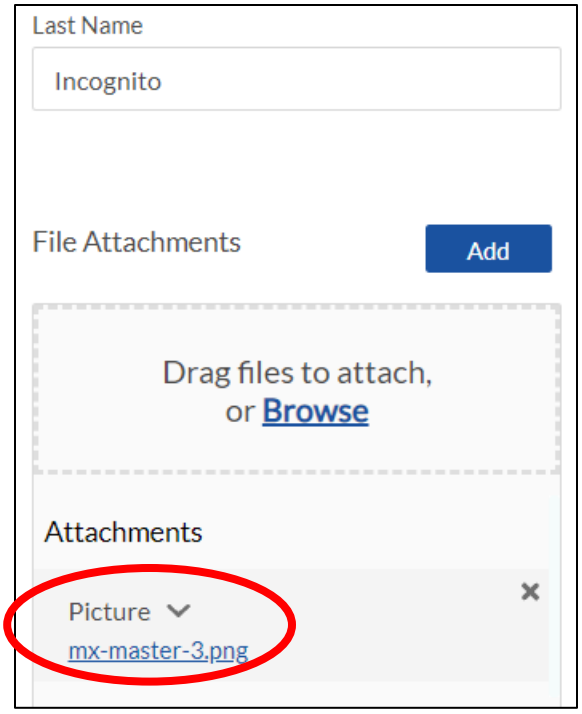
Click Create & Design 

Select the location to save the new case file.

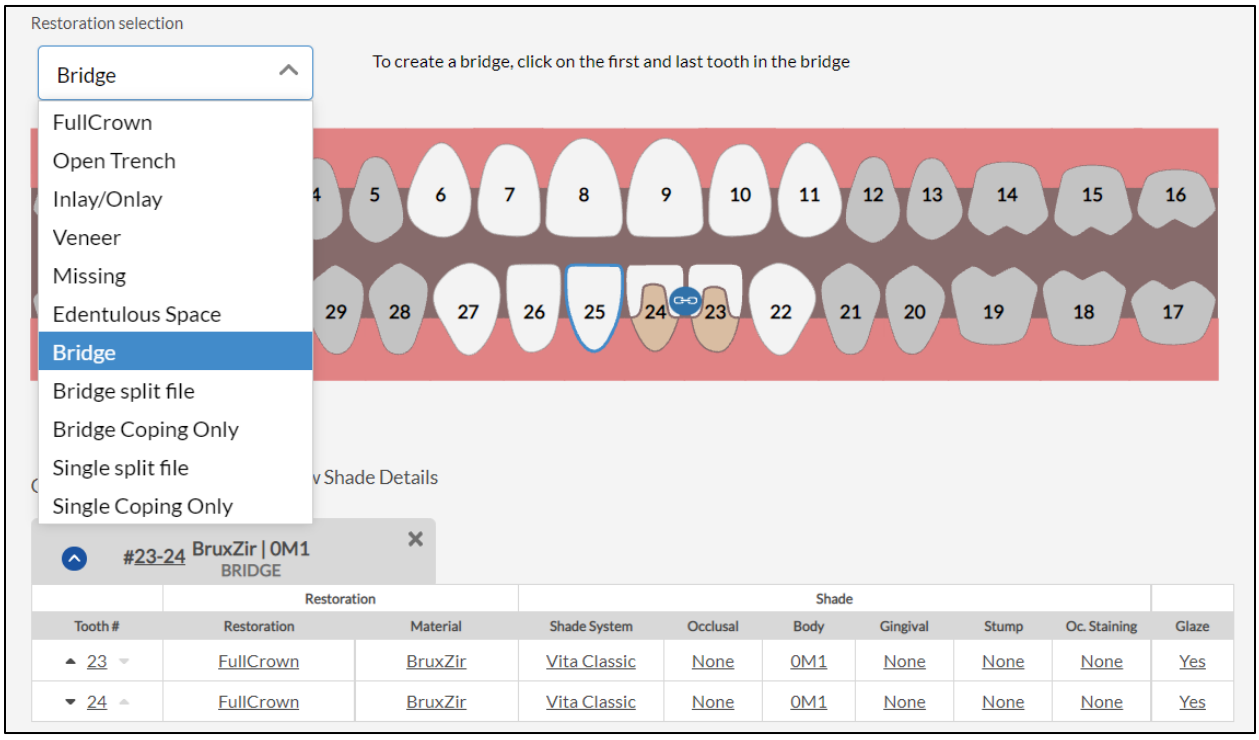
Click Open



The attachment displays under the file window.


Last Name
Incognito
File Attachments
Add
Drag files to attach,
or Browse
Attachments
Picture
mx-master-3.png

From the drop-down Restoration Selection, choose the type of restoration desired.



Click on the tooth to assign the restoration. The tooth graphic changes to match the restoration selection, as Figure 1 and 2 examples below:

Figure 1 – Full Crown Restoration

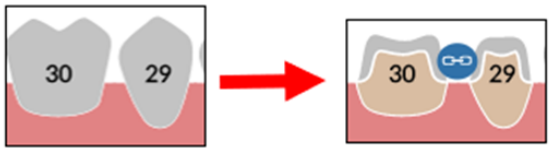
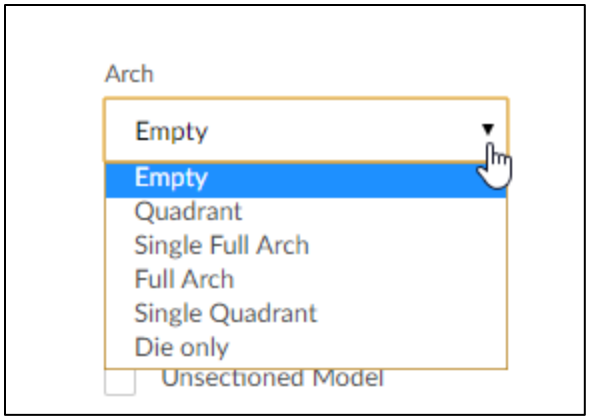


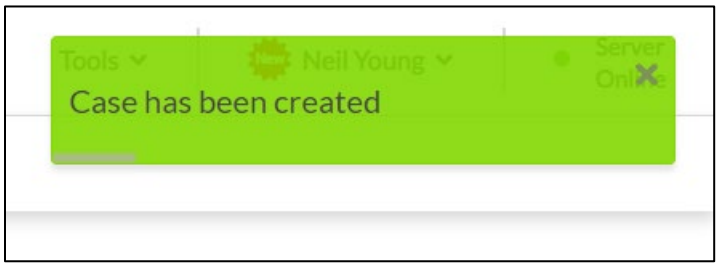
Figure 2 – Bridge Coping

Select the Arch type from the drop-down menu on the right side of the page.

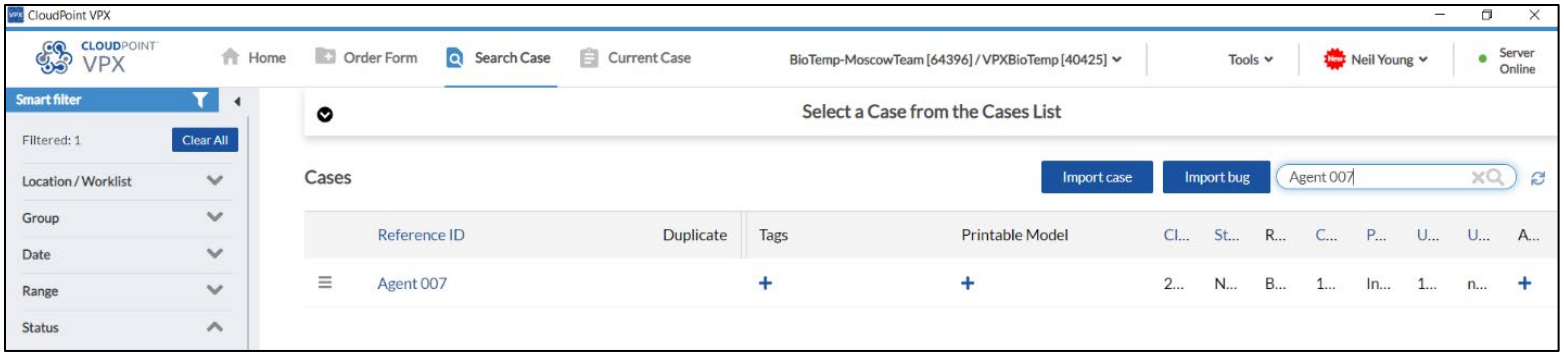


Click Create (for files to be worked on in the future) or Create & Design (to work on the case immediately).

When created, a green window displays in the upper right corner.



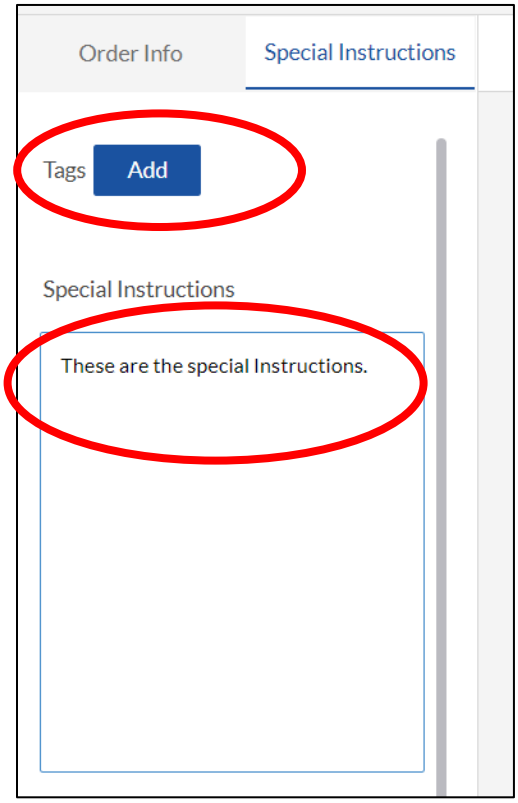
The new case can now be found in the application.



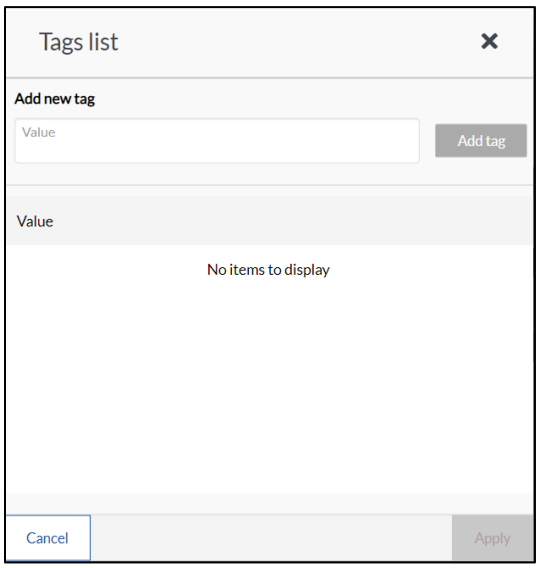
Under the Order Form header, click the Special Instructions tab (optional).

Type the explanation in the Special Instructions box.

Click **Add**.

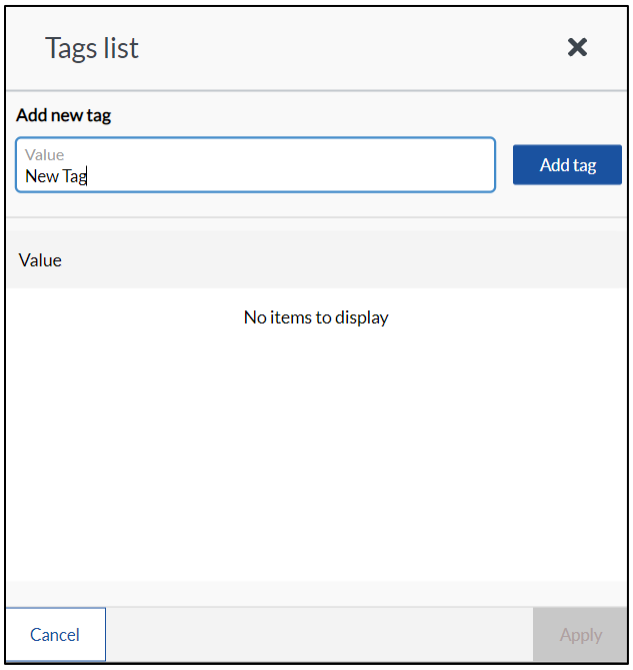


The Tags List displays.

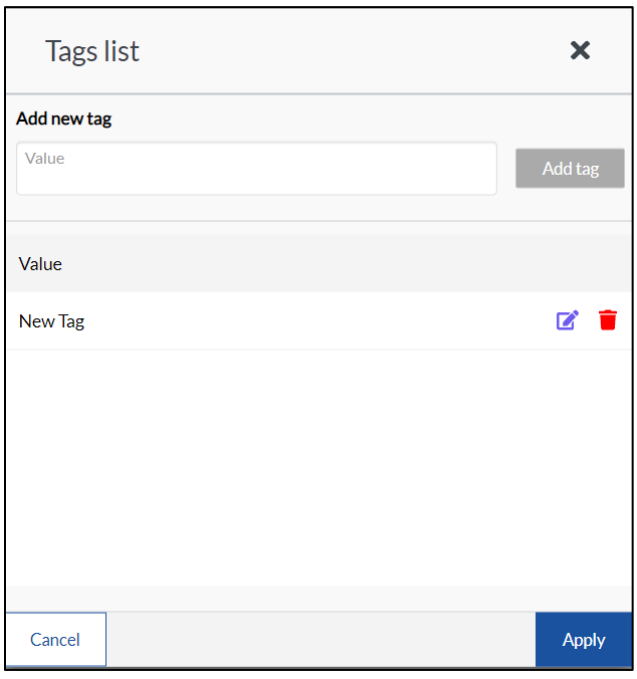


Type the value of the new tag.

Click **Add tag**.



The new tag appears in the value window below.



Scanning Cases

Note on Calibration

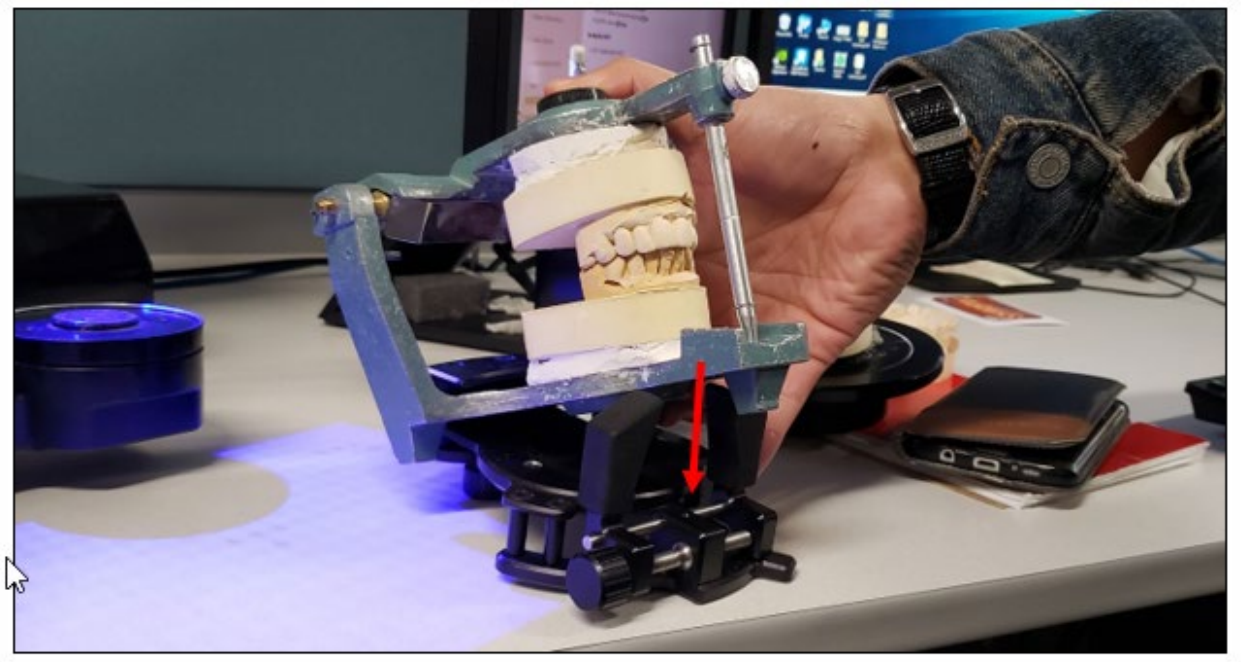
It is imperitive that the scanner be properly calibrated. This must be done often. For instructions on properly calibrating the DSM scanner, see the Calibration section in this document.

Install the actuators

Depending on the scan, either a small articulator or large articulator will be used. The large articulator is the full jaw, upper and lower. While the small aritculator is a section of the jaw.

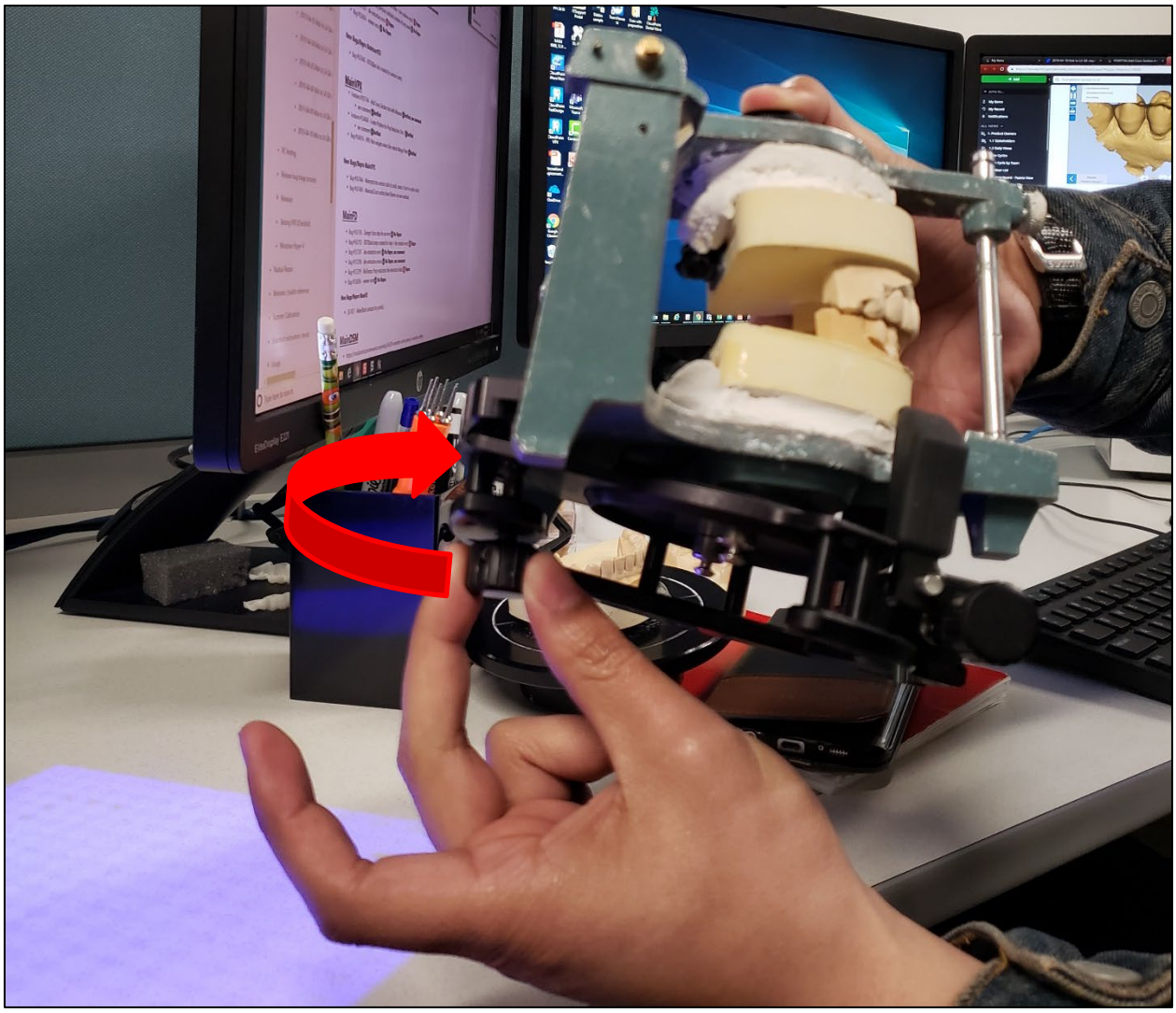
Large Articulator

NOTE: The large articulation needs to be fitted and secured to a pedestal, as shown.



Step 1: Fit the big articulation into the pedestal.

Step 2: Tighten the front screw.



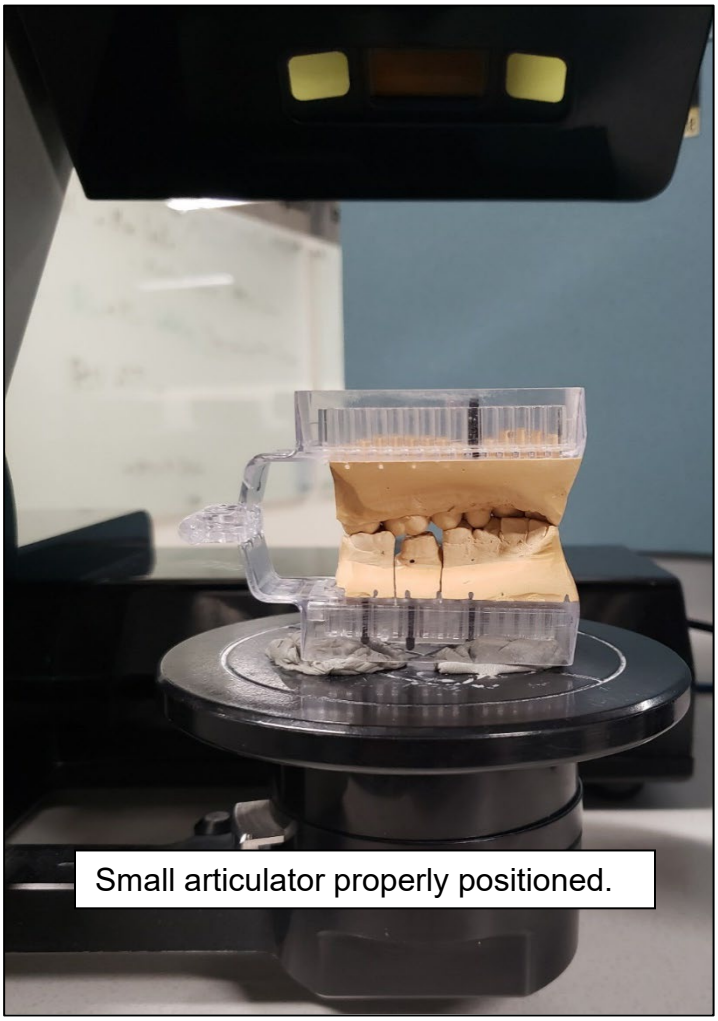
Step 3: Tighten the back screw on the bottom of the pedestal.

NOTE: In the case of the small articulator, be sure the base is mounted with clay so it does not slide during scanning.

The large articulator (L) and small articulator (R) correctly mounted on their respective pedestals.

Small Articulator

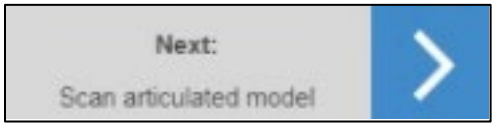
Be sure to use clay to secure the articulator so it doesn't slip or fall of during scanning. Position the buccal facing the scanner arm to properly capture the bite.



Small articulator properly positioned.

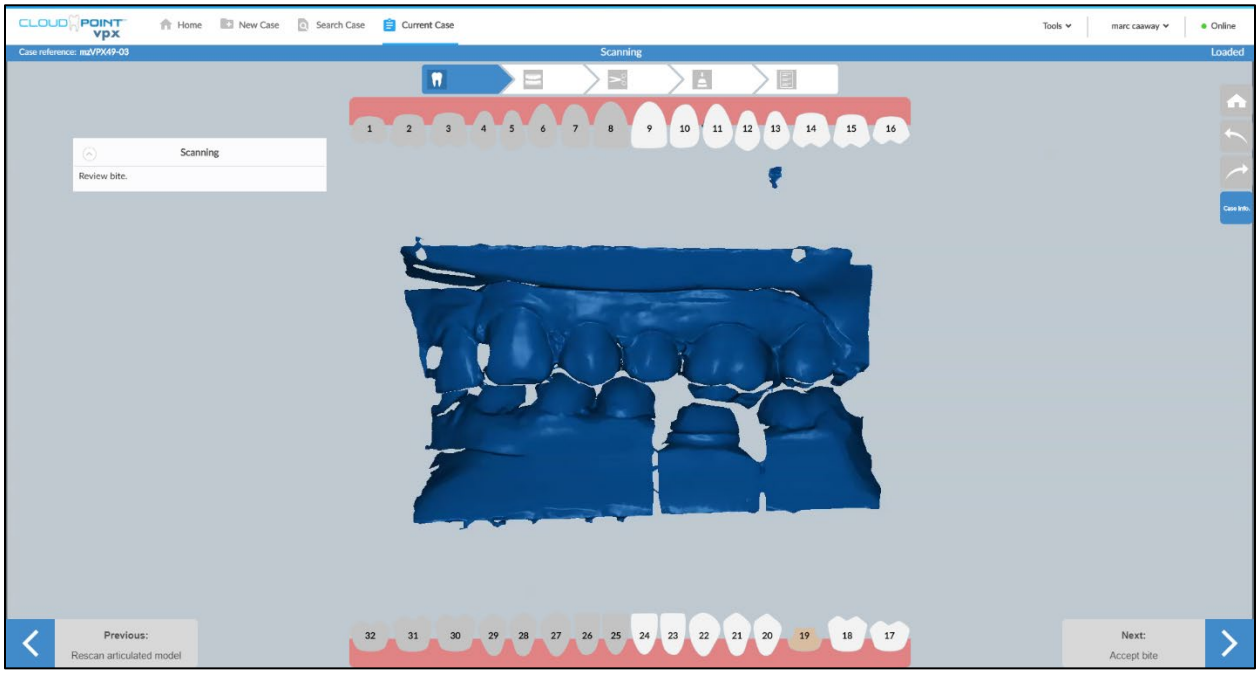
Click **Next** to scan the articulated model.

Scan the Articulated Model

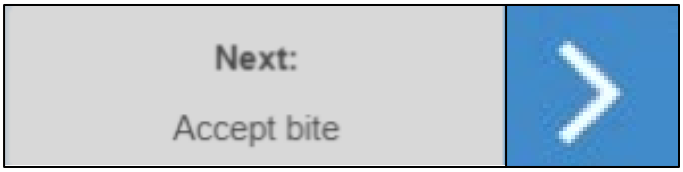


The actual scan takes around 10 seconds to complete.

When finished, the completed scan will look like the image below. This scan is important because it captures the articulate bite. It displays how the upper and lower jaws touch.



If the scan is valid, click **Next Accept Bite**.

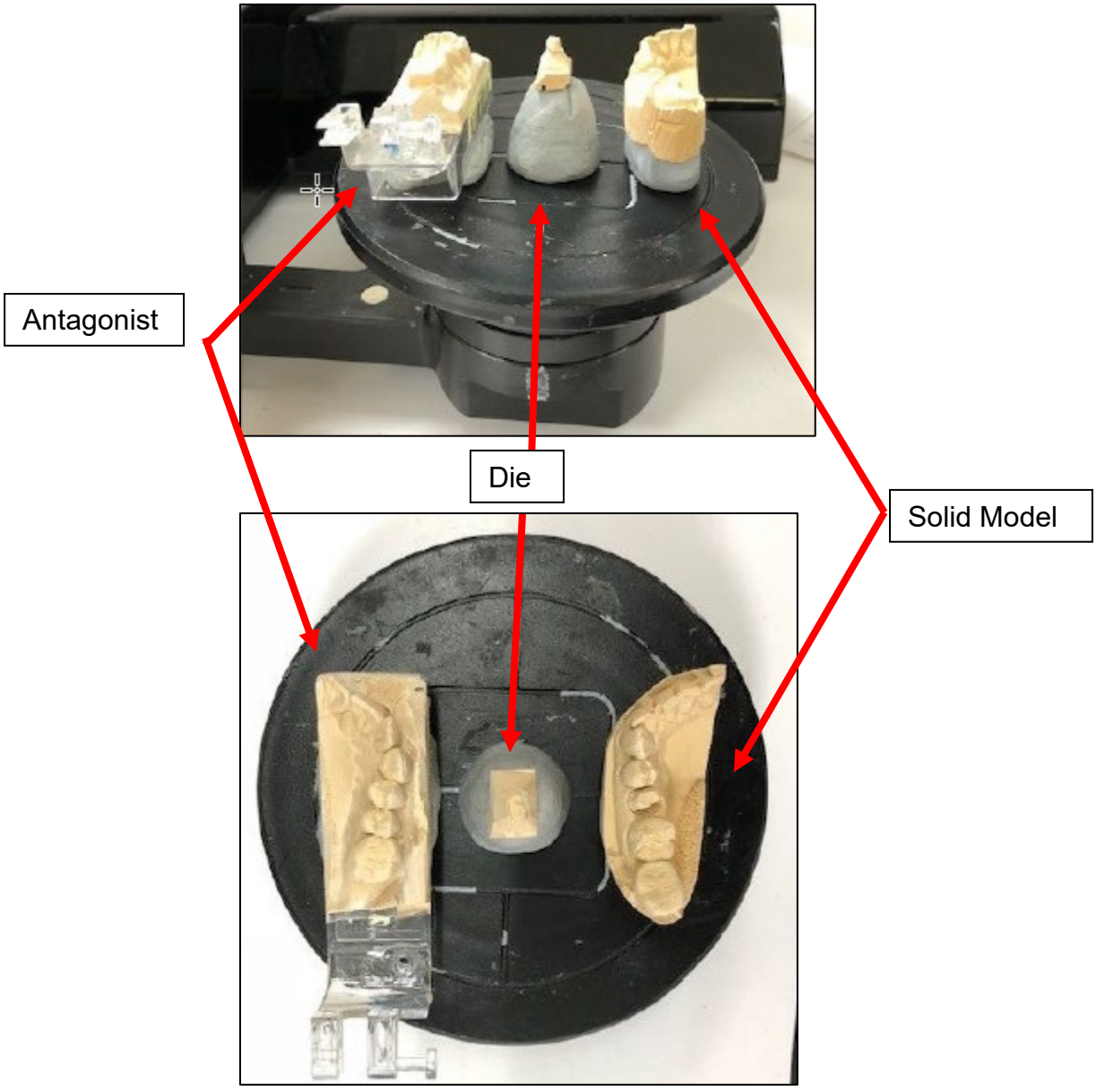


The Second Scan

Now that the first scan is complete, a second, more precise scan, needs to be taken.

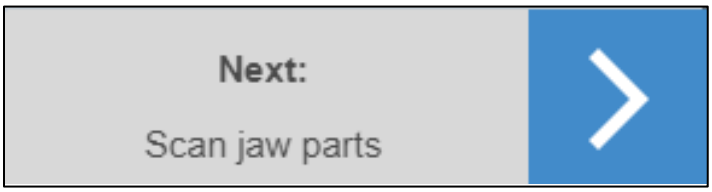
Break the articulation up, separating the die, the solid model, and the antagonist. Arrange them on the pedestal so they don't overlap but are within the circle, as in the example below. Be sure the three items are well secured with clay so they don't fall off during scanning, are elevated 2 centimeters from the pedestal, and must not touch each other.

The preferred positioning is shown below.



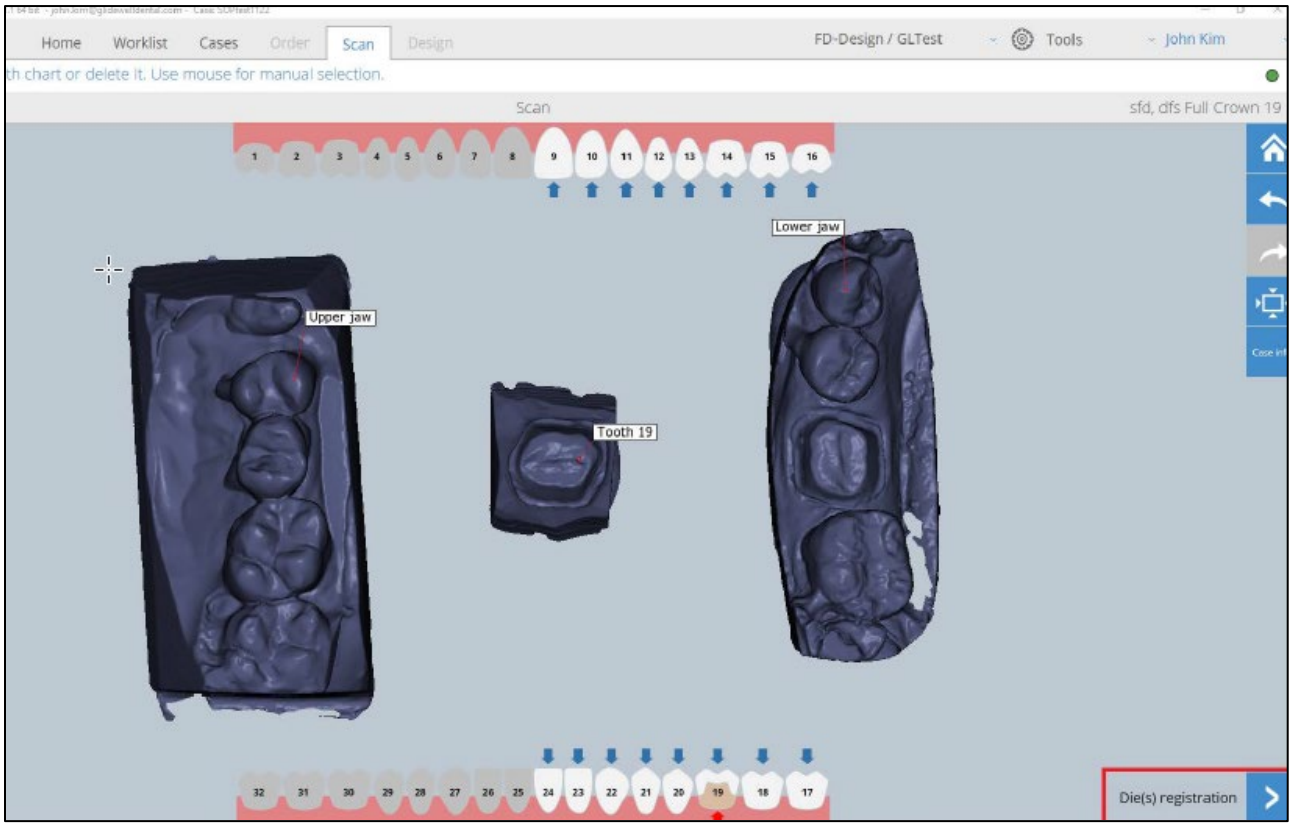
Mount the pedestal on the scanner mounting. It should click in place with magnets.

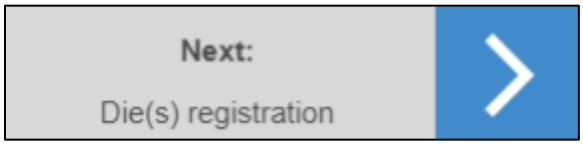
Click **Next: Scan jaw parts**.



The second scanning takes approximately 2 minutes. When the scanning completes, the scan displays as purple, with IDs of each of the three models. Similar to the image below.

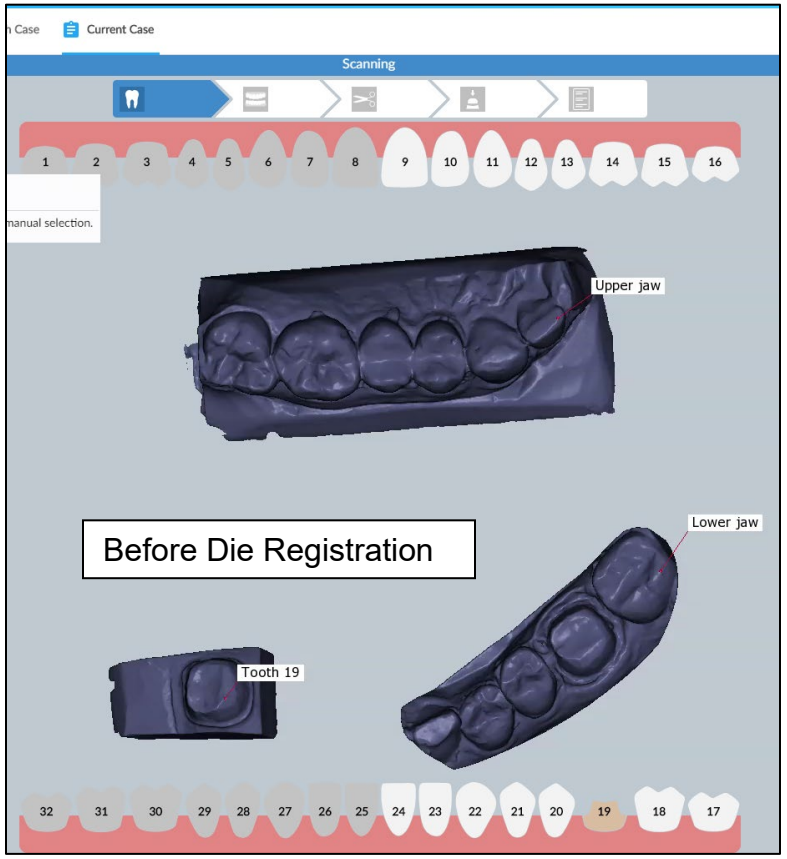
Click **Die(s) Registration**

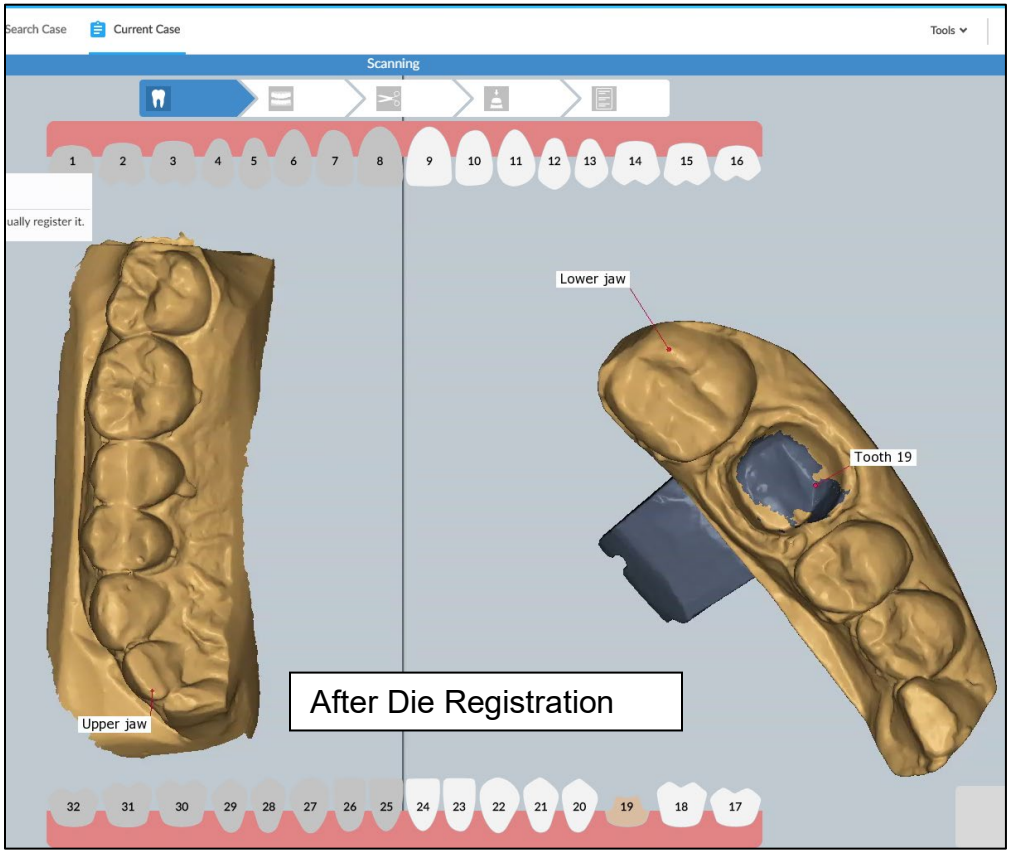




Die Registration

Clicking Die Registration  fits the die into the solid model, the lower jaw in this example.

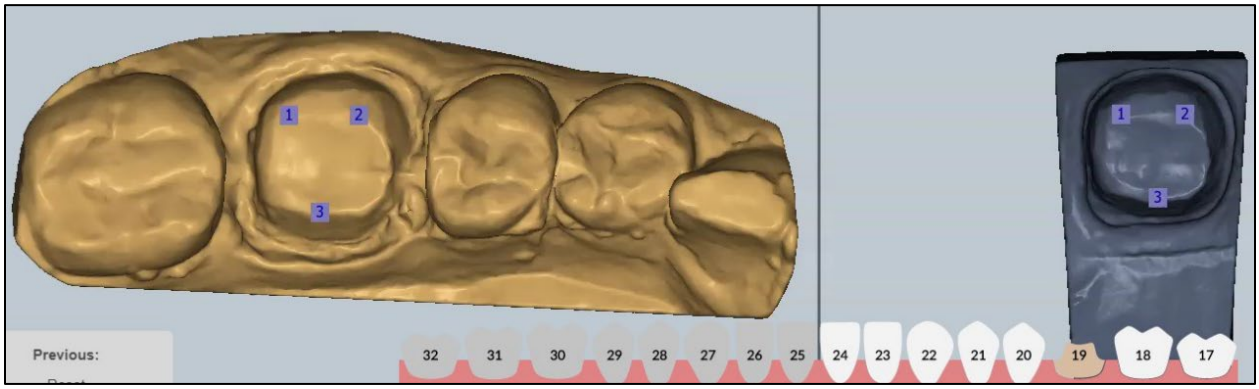




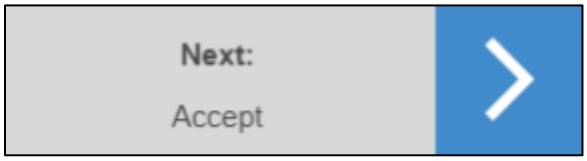
Manual Die Registration

In the case the automatic function does not work, it is necessary to register the die manually. To register the tooth to the jaw, manually play three points on each object to create correspondence. Do this by positioning the cursor on the die and clicking the left mouse button.

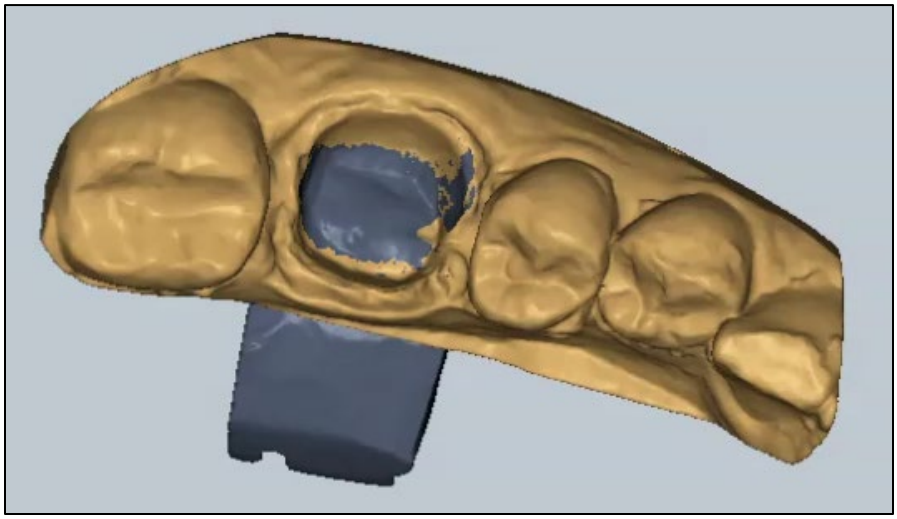
See below:



Click **Next** to accept.



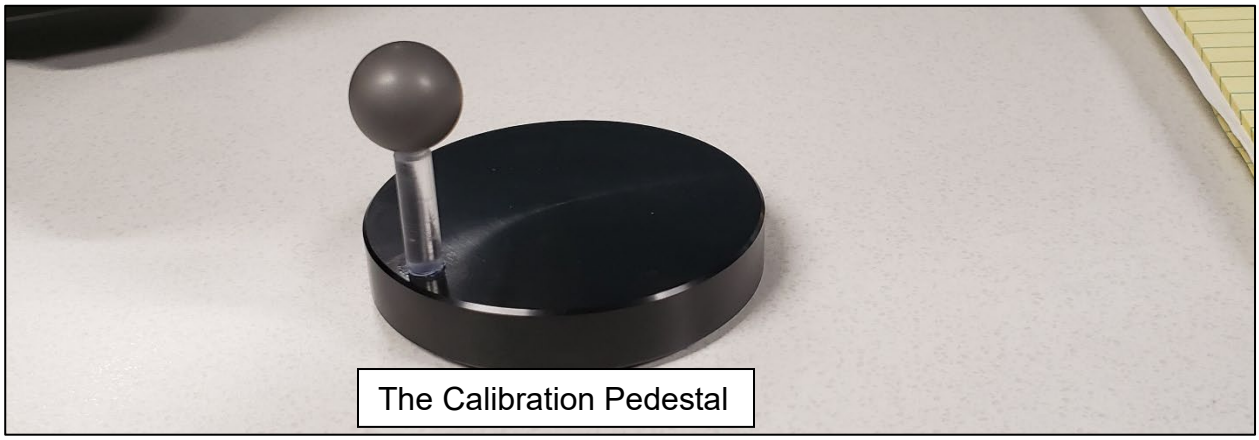
The result should look like the image below, which is the same result when done automatically.



Calibration

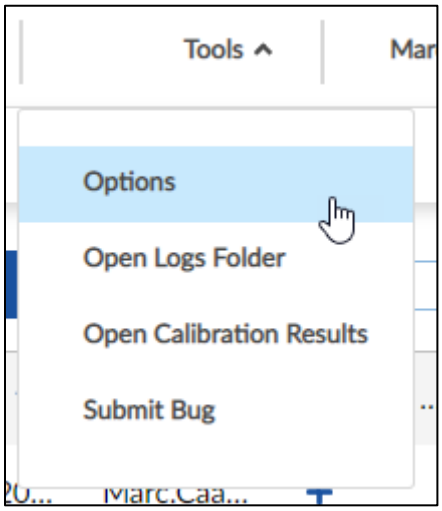
With every upgrade and new build of VPX, the scanner needs to be re-calibrated.

Mount the calibration pedestal on the scanner.

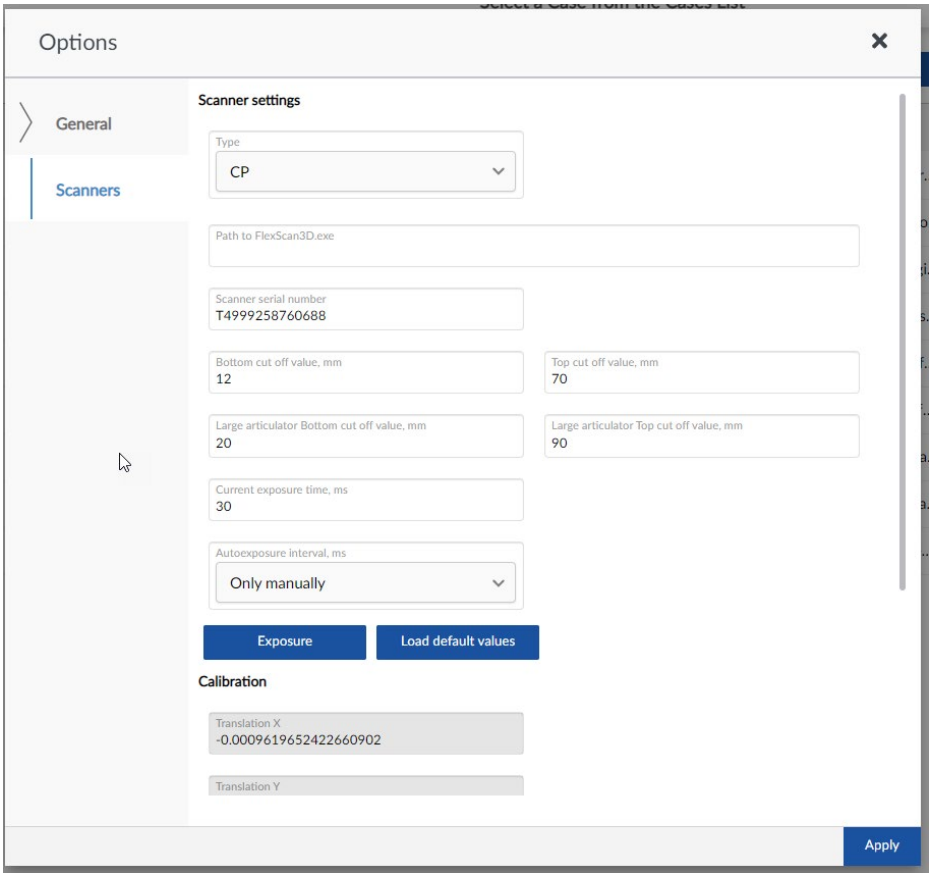


The Calibration Pedestal

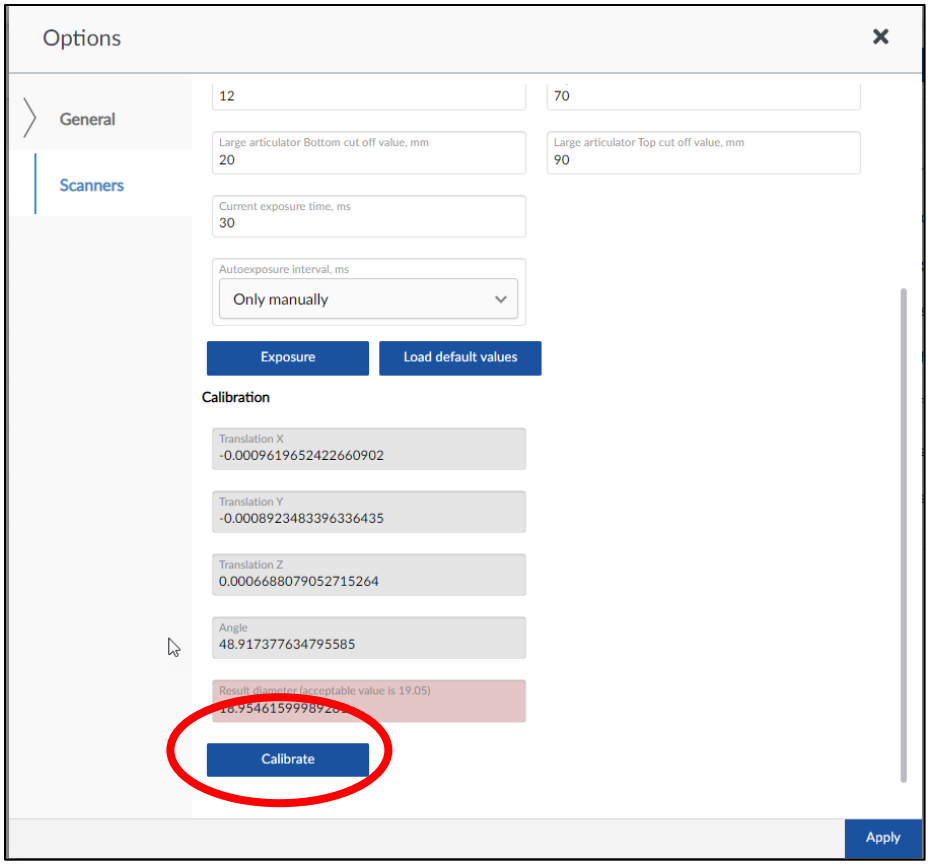
To calibrate the scanner, go to **Tools>Options**.



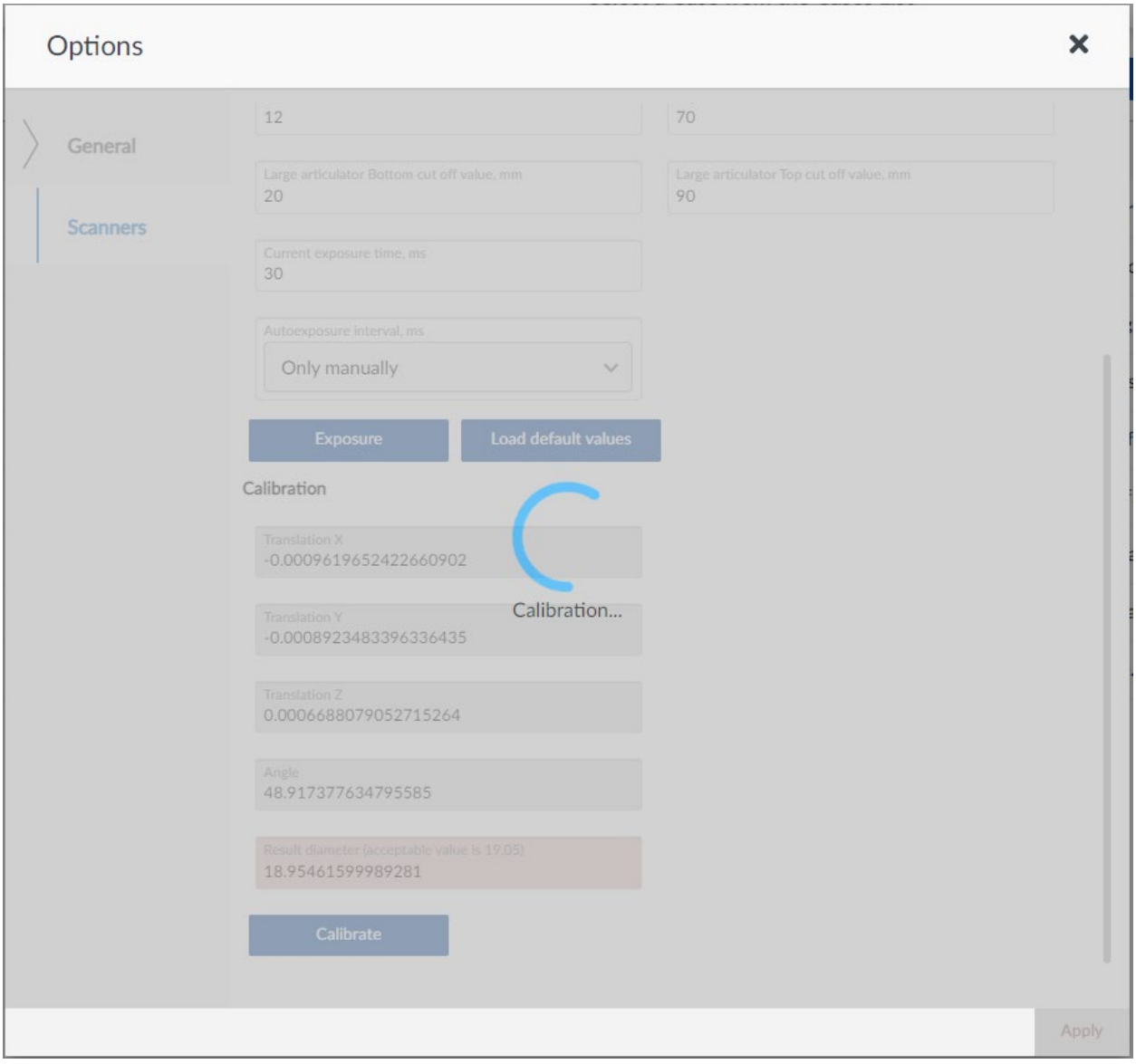
Select **Scanners.**



Click **Calibrate.**


Options
General
Scanners
12
70
Large articulator Bottom cut off value, mm
20
Large articulator Top cut off value, mm
90
Current exposure time, ms
30
Autoexposure interval, ms
Only manually
Exposure
Load default values
Calibration
Translation X
-0.0009619652422660902
Translation Y
-0.0008923483396336435
Translation Z
0.0006688079052715264
Angle
48.917377634795585
Result diameter (acceptable value is 19.05)
Calibrate
Apply

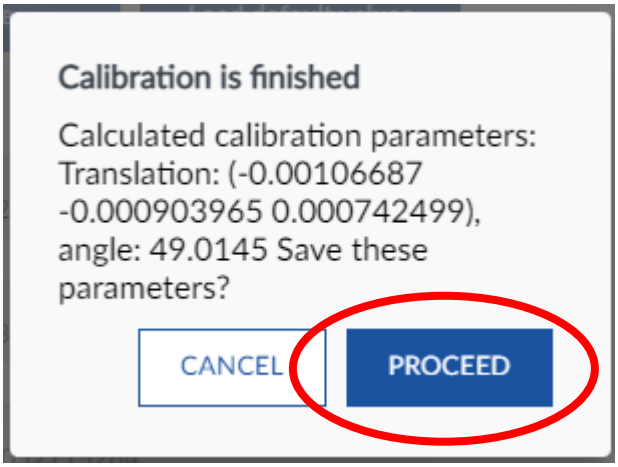
An activity window displays as the scanner is calibrated.



When the scanner has been calibrated, a finished window displays. Calibration takes approximately 3 minutes to complete.

NOTE: Pay attention to the angle of the calibration. Be sure that it is between 45 and 55 degrees or the scanner will not work properly.

Click **Proceed**.



Click **Apply**.

The Calibration is complete.

Trim the Base

As the base of the model is not needed for designed the prep/die, VPX allows for the base to be removed from the model to allow for easier, less crowded views for the user.

Trim Upper Base

Trim Lower Base

Un-Register the Model

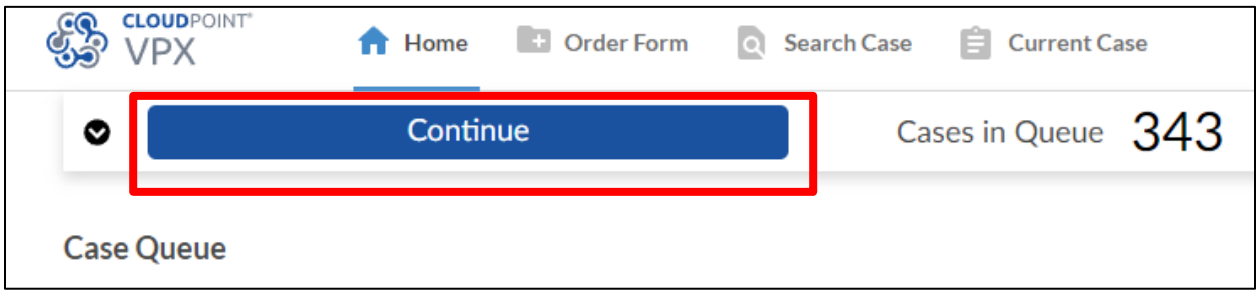
At any time, the Unregister Base function is available to undo the die registration.

Unregister Die

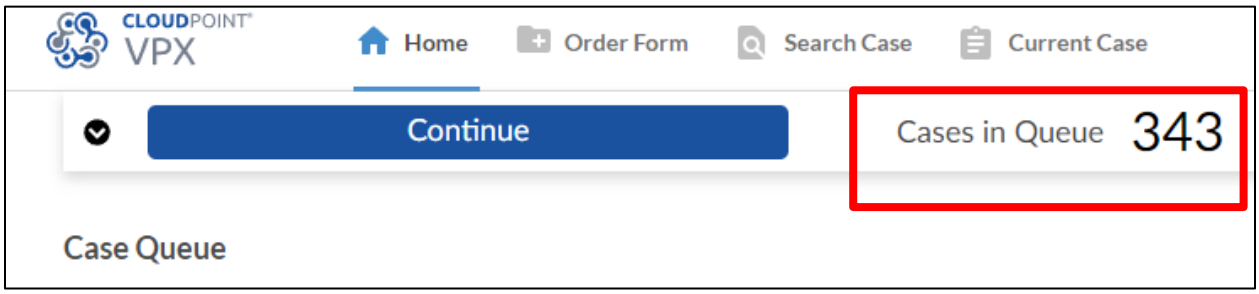
Accessing Cases (For Existing Files)

At the home screen, the user may access cases two ways:

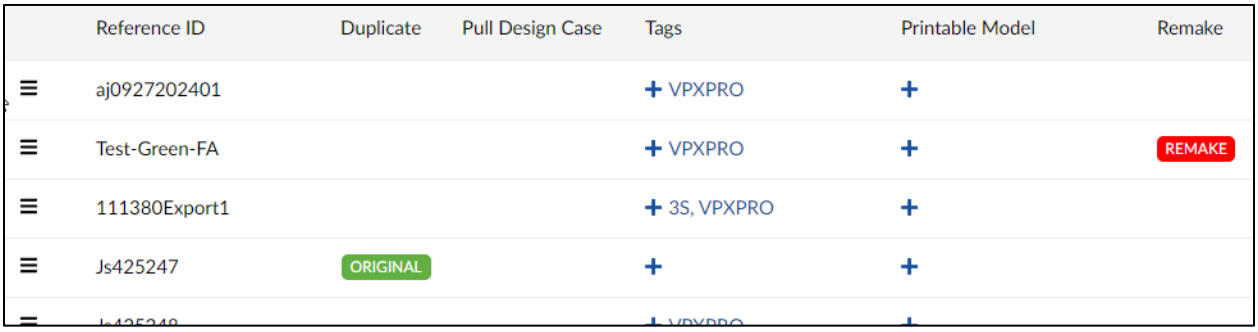
1. **Continue** assigns the next case in the queue to the user. **NOTE**: Queues will not be available for all locations.



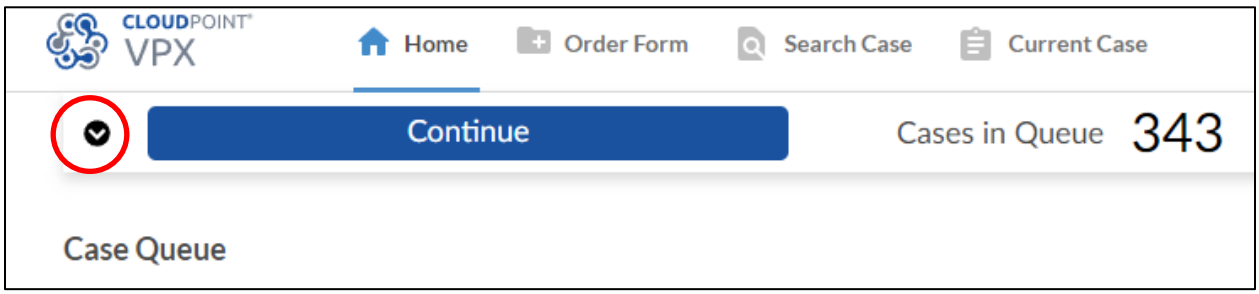
There will also be statistics for the user on the home screen as well, including **Cases in Queue** in some locations



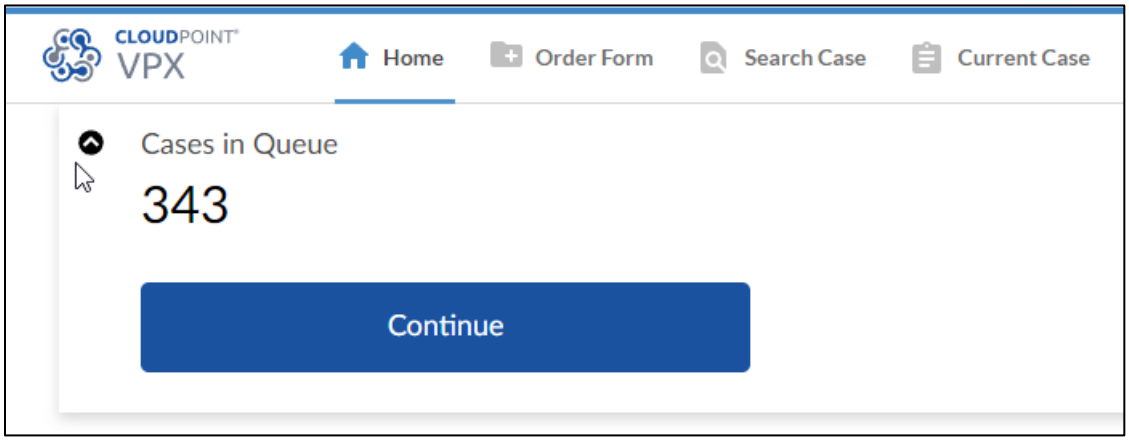
2. Click on the Reference ID



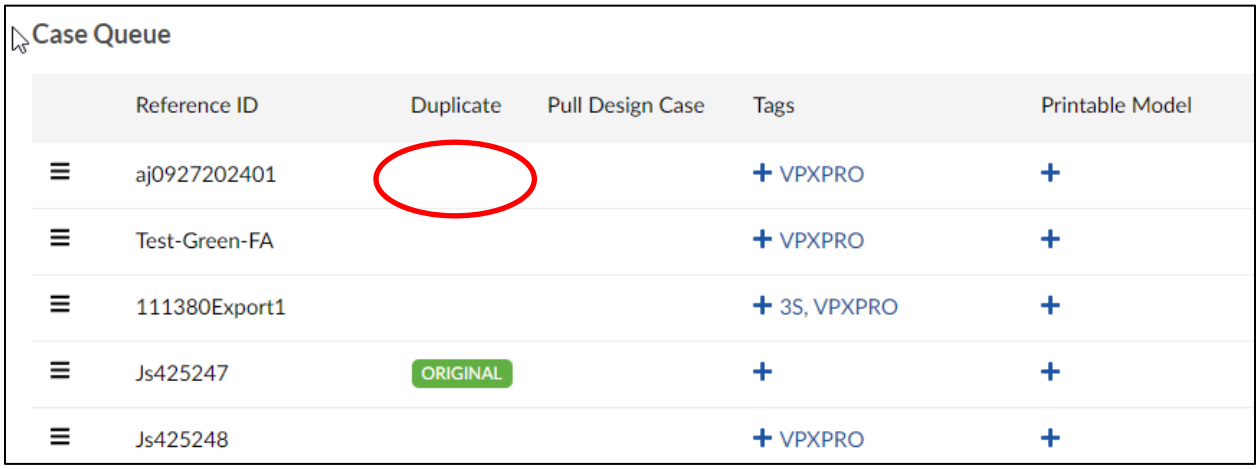
Optionally, the user interface offers a preview feature. To access this feature, click the arrow



The menu items reset.

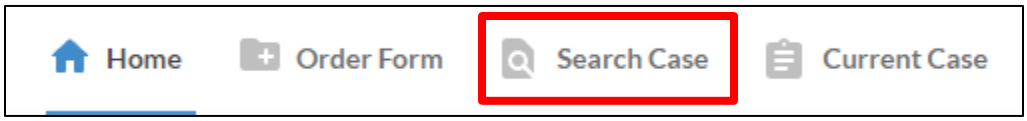


Click on the empty section of the desired case.



The case previews.

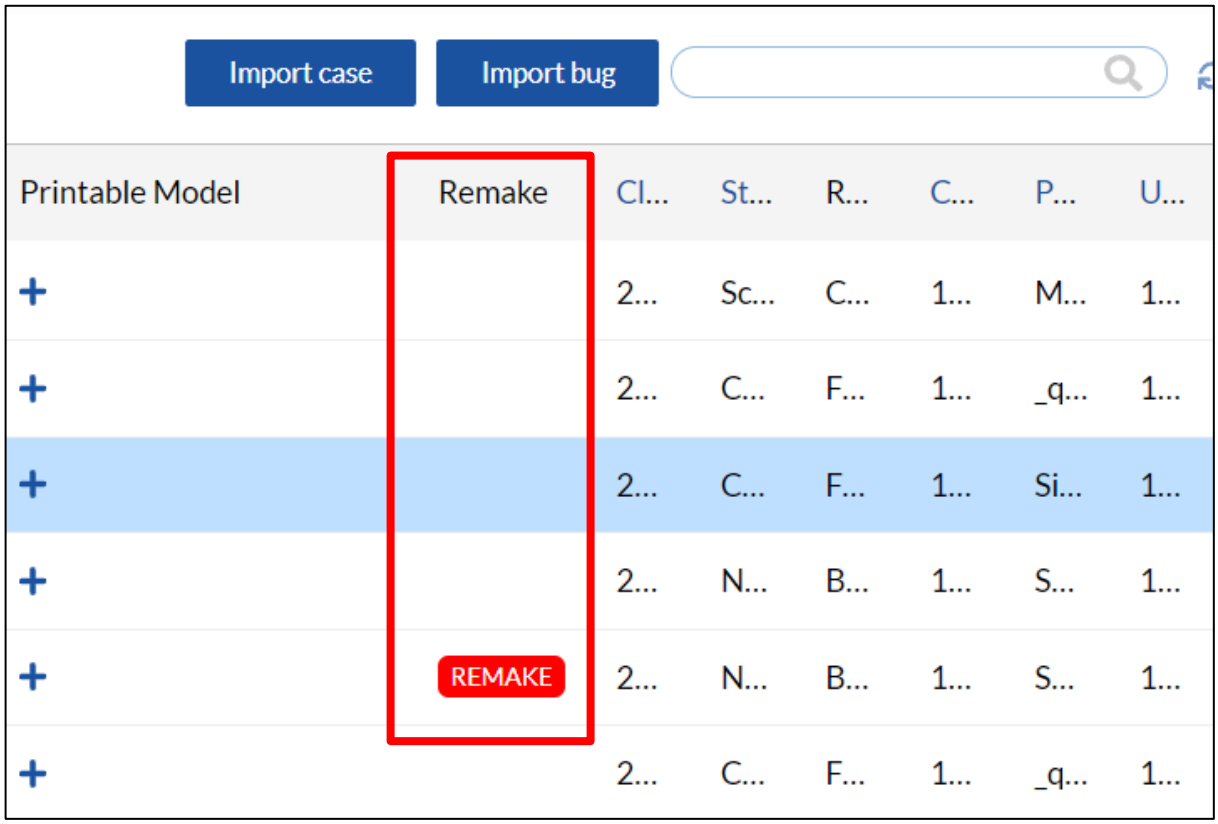
Search Case



Search Case to search for an existing case.

A case can be selected from the queue itself, click the case Reference ID on the case desired. A case can only be selected if in the Search Case Tab.

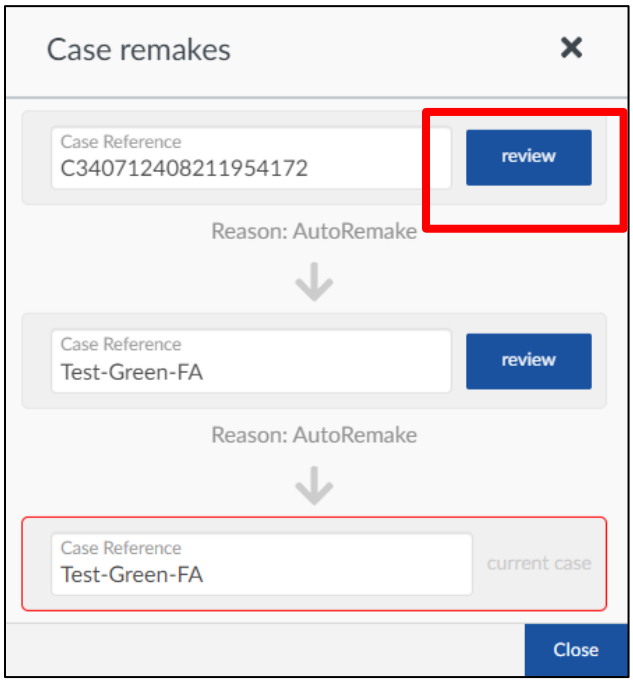
If the case is a remake (a case that is returned to the lab to be manufactured again. Reason can vary: contact open, wrong shade, loose fit, etc.) it will be noted by an icon in the Remake column of the page.



If the user hovers the cursor over the remark, the old case reference will display.

A window showing the Remake case displays.

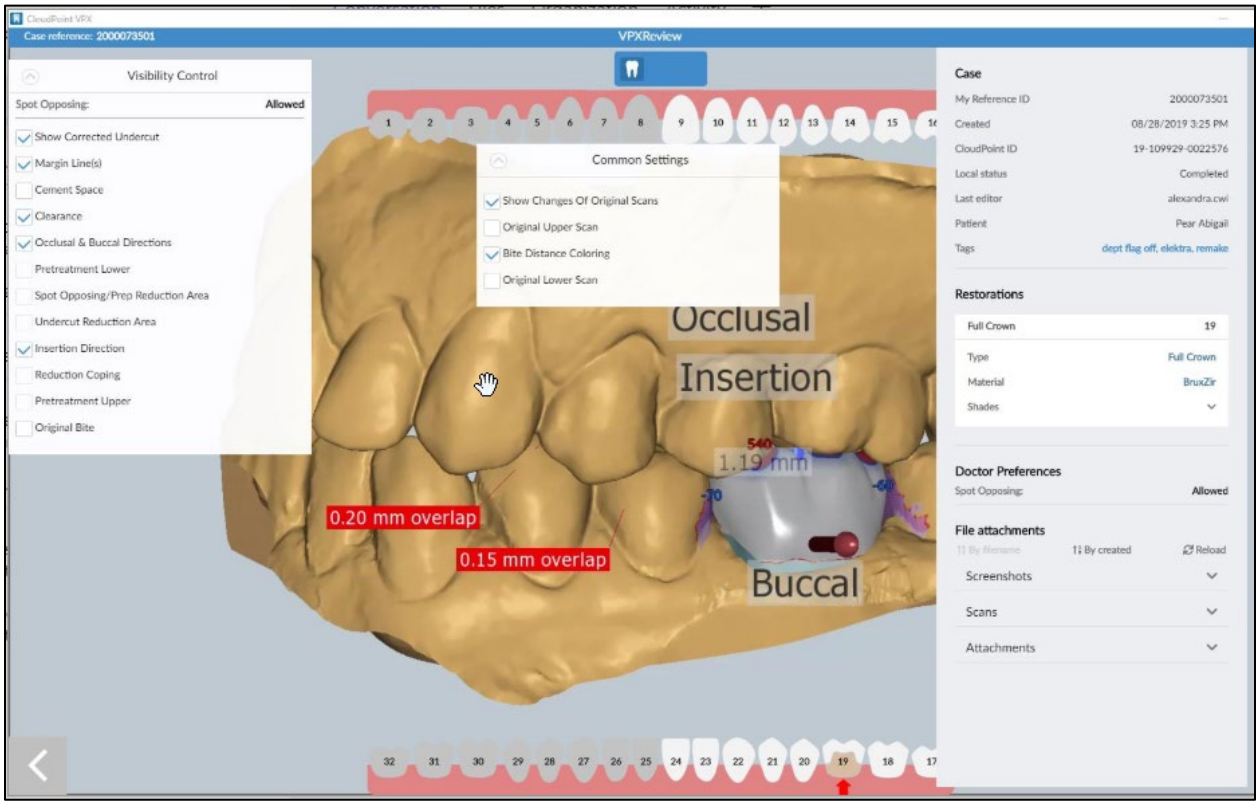
Click **Review**.



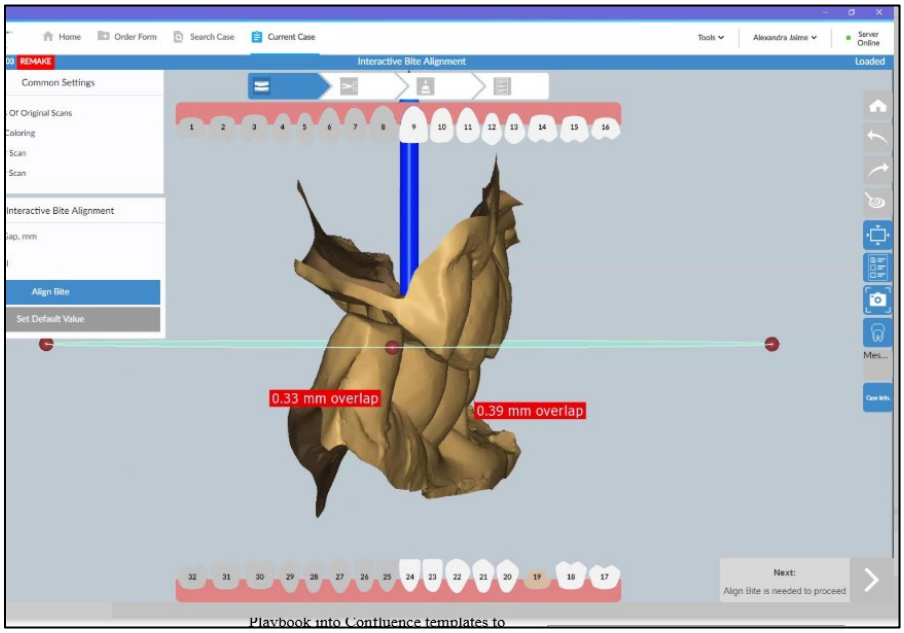
Note on Remake Cases

When clicking on Remake scans, the user will be presented with both the review (old version) of the scan as well as the new case. Usually, the screens will be stacked, with the review case on top of the news case.

The Rx information will be attached to the older version, as well as the case information. These cases can be easily positioned on different screens for easy view and comparison.



Original Case Image

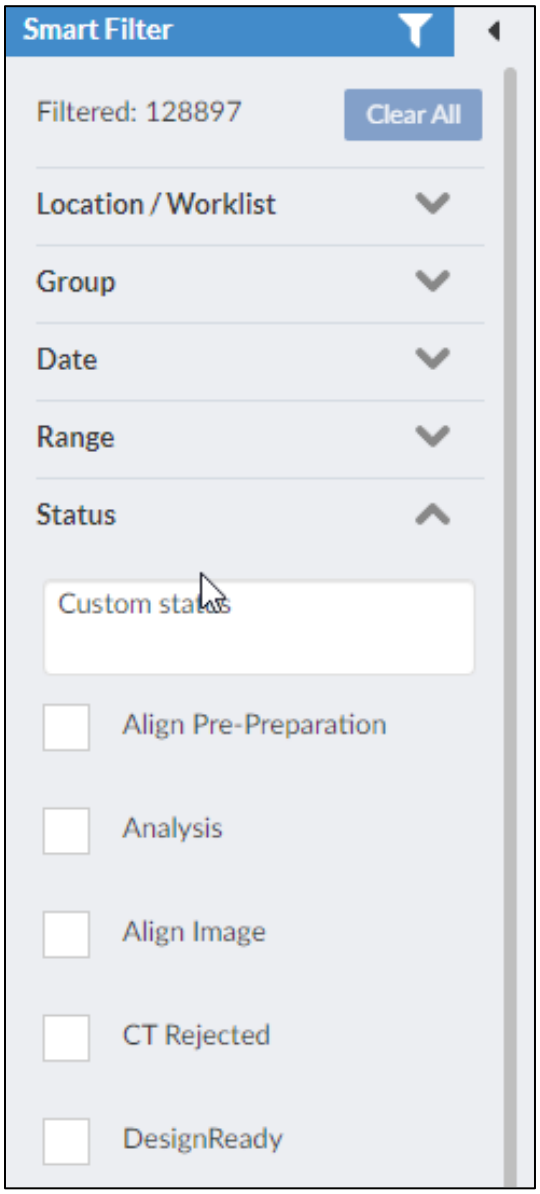


Remake Case Image

Search Filter

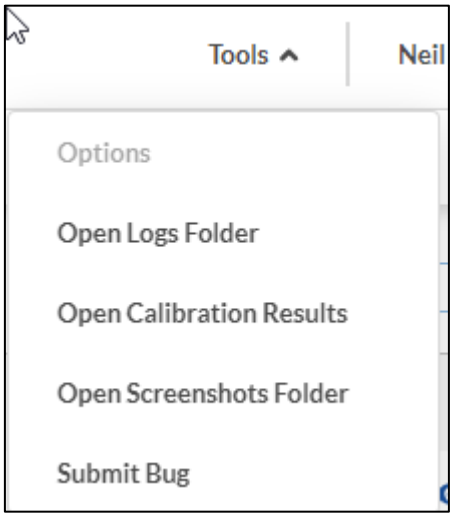
On the left sidebar of the Cases window, there is a search filter that allows narrowing of searches by:

1. Group
2. Date
3. Range
4. Status (Analysis, Design, QC, etc.)



The Top Tools Menu

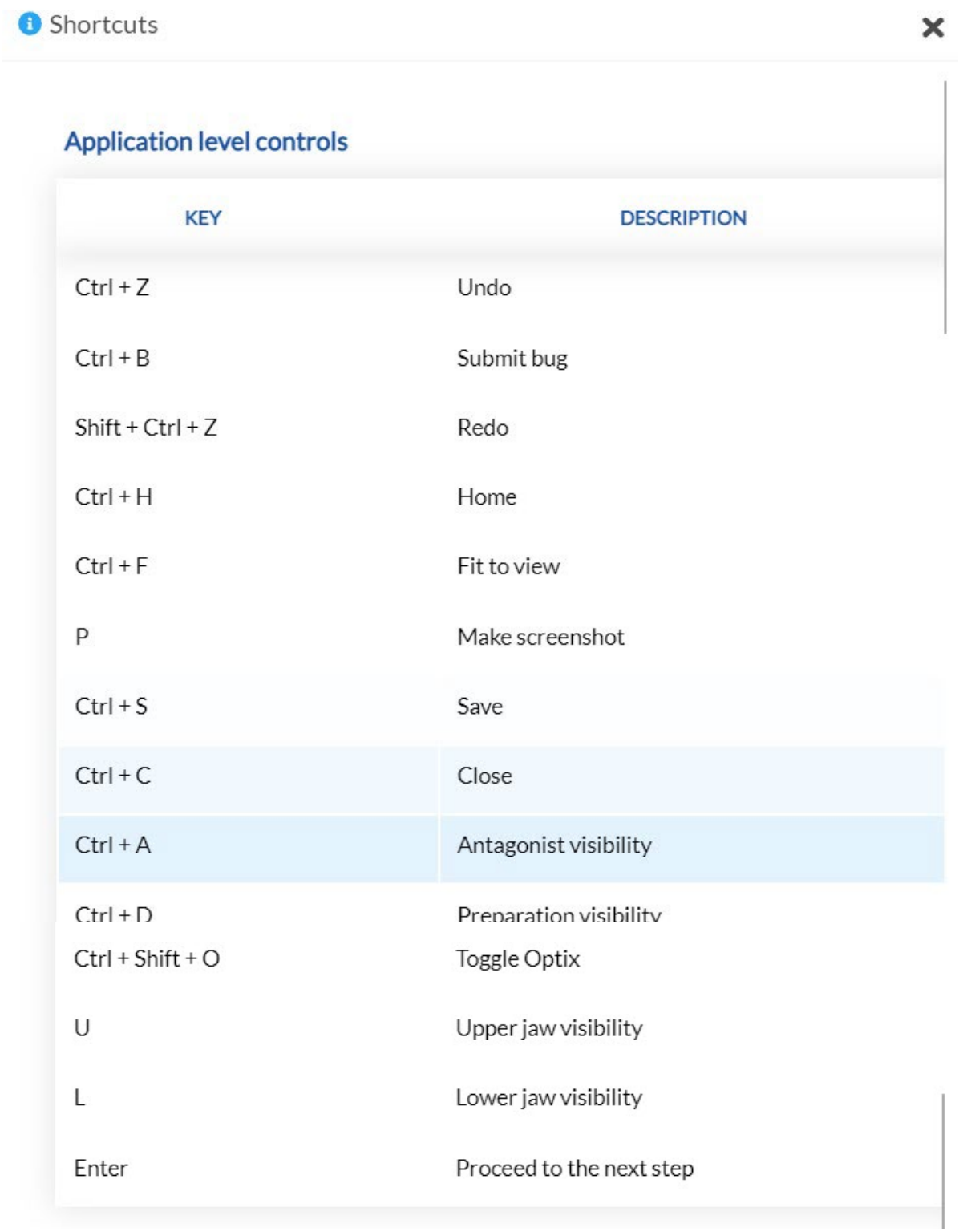
On the top right side of the screen, there is a Tools pull-down menu. Each of the items in this menu can be used to enhance the functionality of VPX. Different options are available with the case it closed (left image) or the case it opened (right image).



Options:

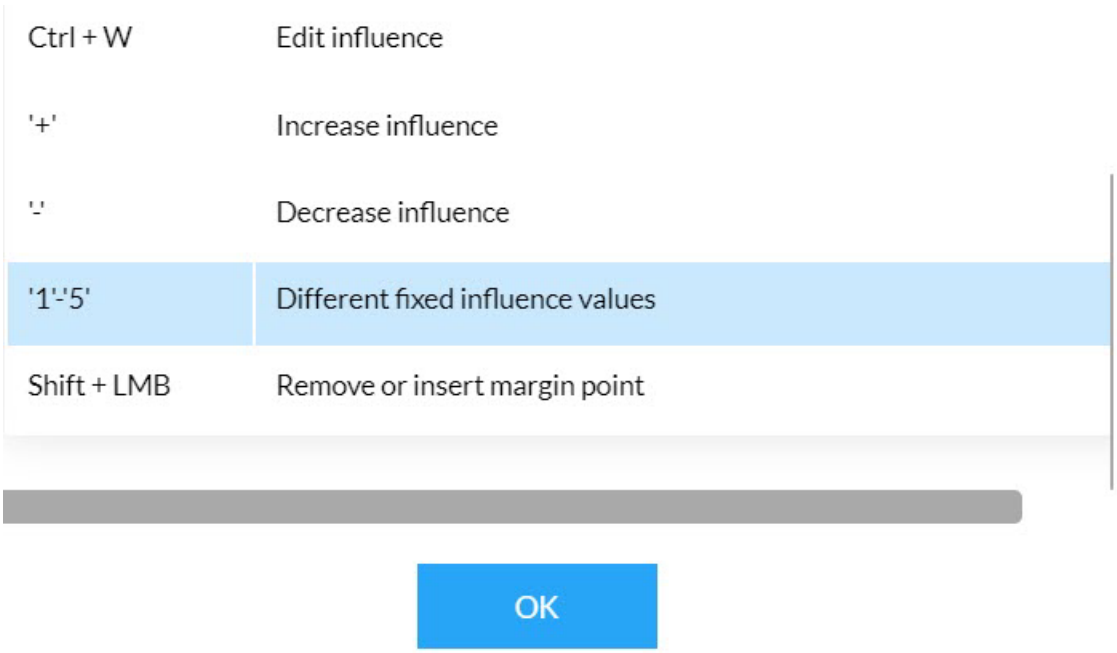
1. **Open Logs Folder:** Shows the logs of all the text files associated with the case.
2. **Open Calibration Results:** Shows the current results from the most-recent scanner calibration.
3. **Open Screenshots Folder:** Displays all screen shots taken of the case.
4. **Submit Bug**: Opens the Submit Bug window, where users enter the problem, description and steps to be taken.

VPX Shortcuts



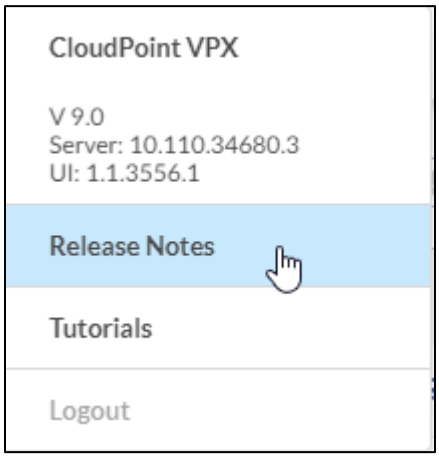
Tool level controls

KEY	DESCRIPTION
O	Relax margin
F	Flatten
E	Freeform
M	Mesh Doctor
X	Cross Section
T	Reroute
Ctrl + T	Spline Reroute
Z	Rotation mode for MRS
Shift + B	Move, scale, rotate
W	Swap upper and lower jaw
H	Partial fill hole
Delete	Delete scan data
A	Add
R	Remove
S	Smooth
Shift + '1'-'5'	Different fixed profile values for Add/Remove

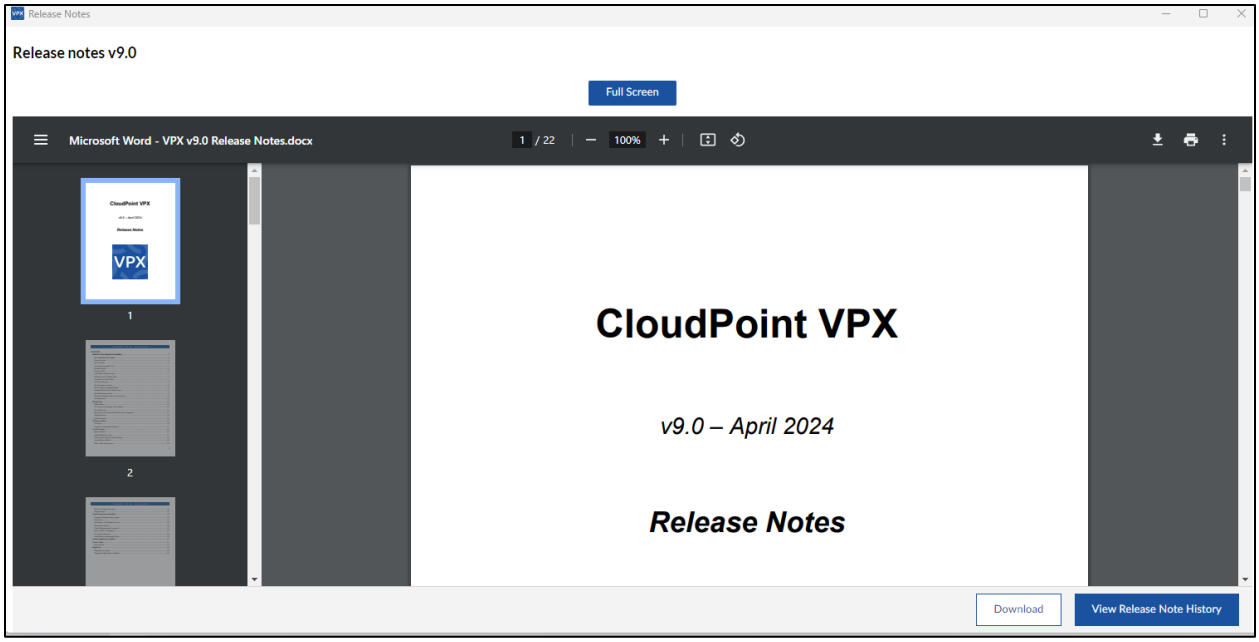


Release Notes

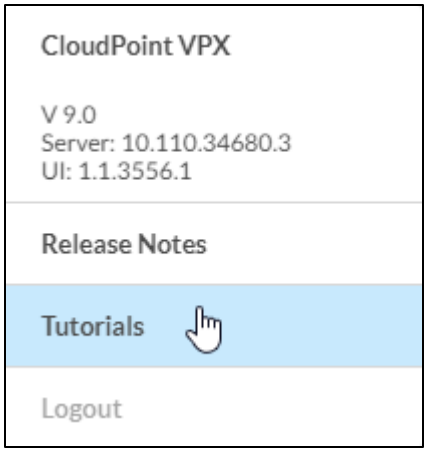
To access the most up-to-date release notes about VPX, select **Release notes** from the user name menu in the top right corner, to the right of the Tools menu.



This will cause the release notes window to appear with the version of the the software. This is scrollable.

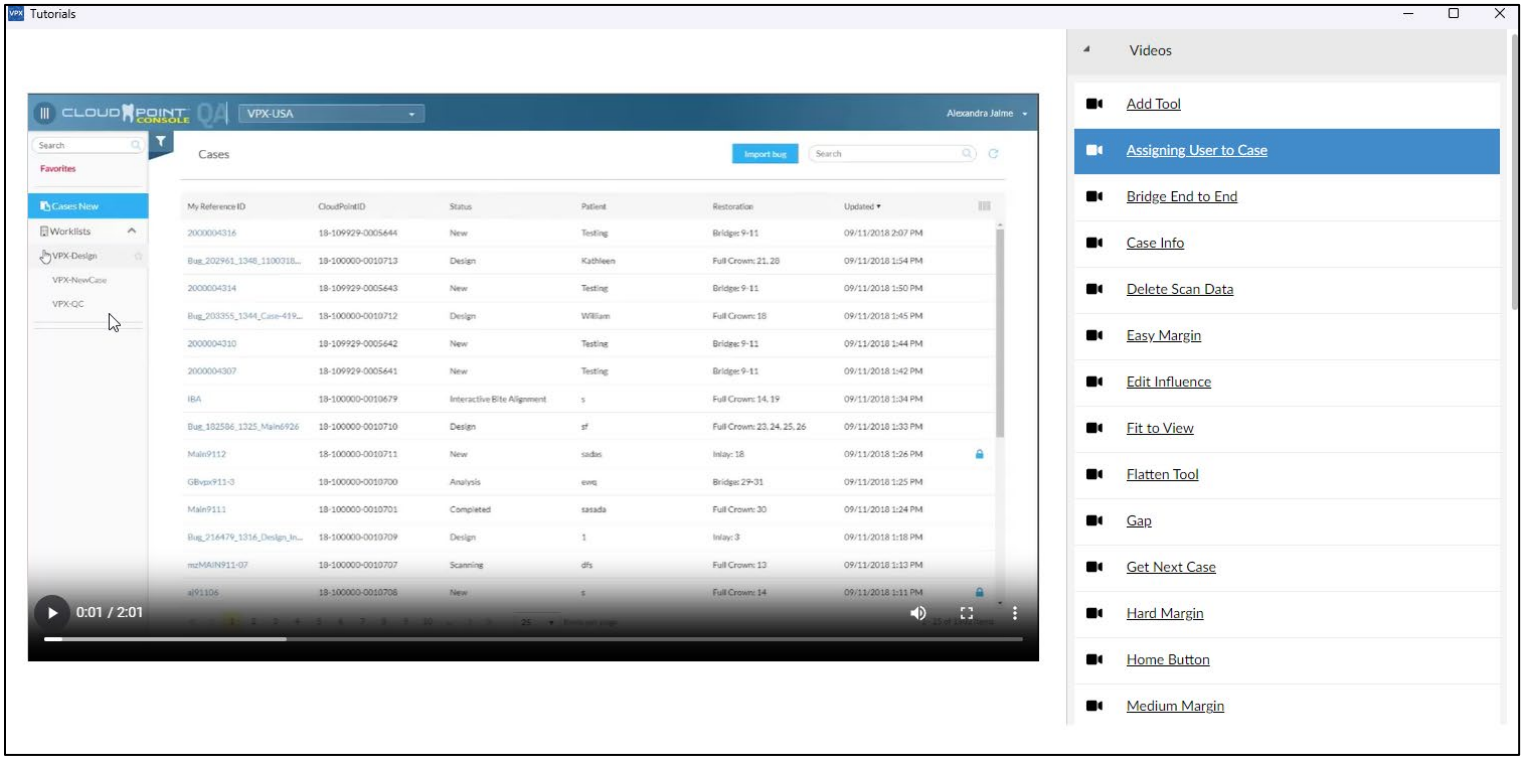


From this page, users can print, download or view the reselease notes history.



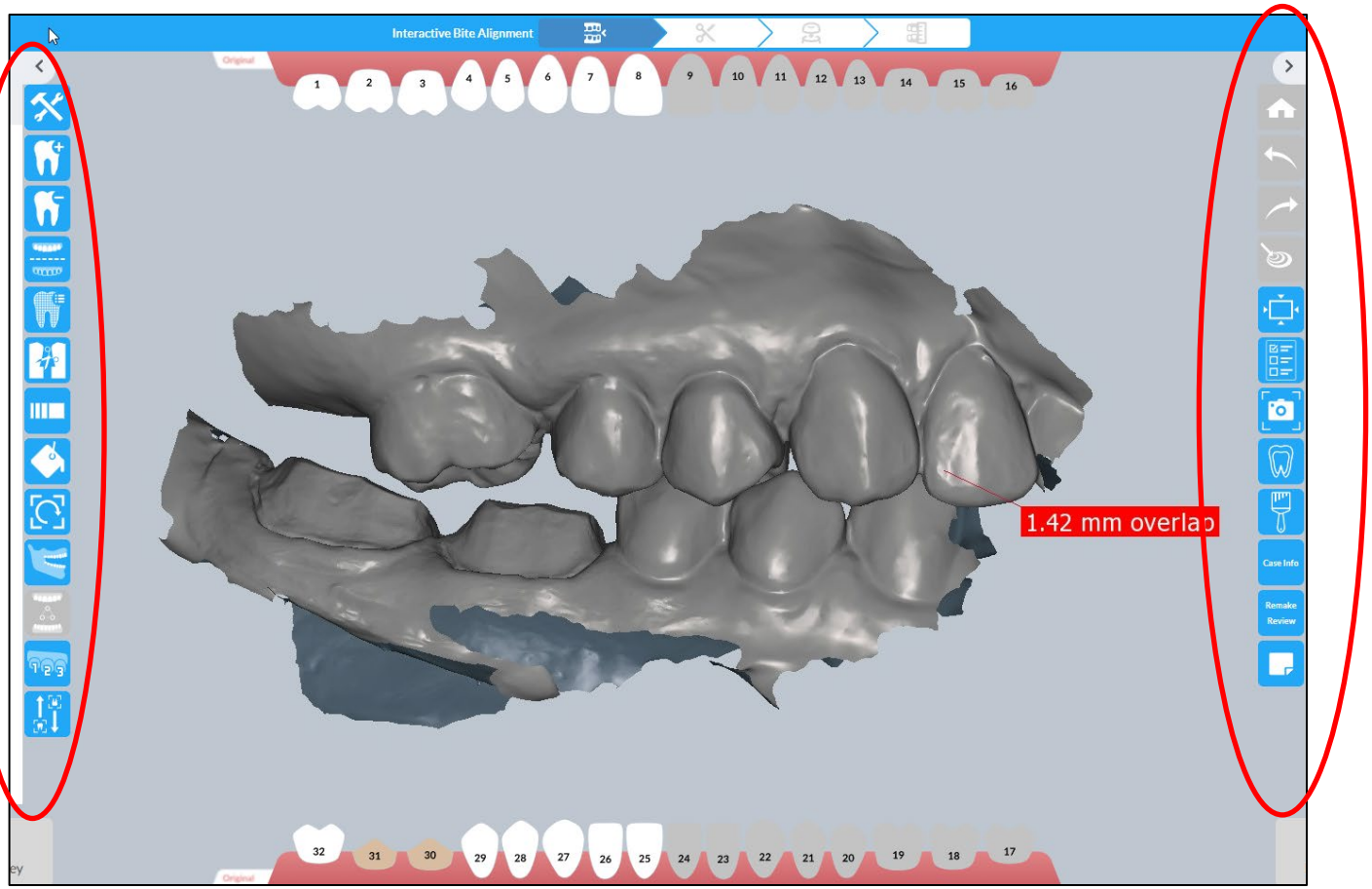
Tutorials

Selecting the Tutorials option brings up a series of selectable video instructions detailed how to use various features of VPX.



The Opening Screen Vertical Tools

The opening screen is the Interactive Bite Alignment screen, or beginning, stage. It will appear much like the image below. The tools to operate VPX are located in vertical menu bars, in blue, on either side of the screen. The left-hand toolbar will change as the user progresses through the changes. The right-hand menu bar remains static.



The Tools on the Right

Home Button 

This tool completely resets the user's actions and displays the original state of the scans.

Undo/Redo 

The tool undoes a user's action or puts their action back to the previous modification. Once an action has been performed, click the Undo icon. This includes work on the die itself, even if the die has been created and the user has moved on to the next stage.

If the user wants to retrieve that last action, click the Redo icon.

Edit Influence 

Edit Influence helps the user to easily change the size of the current tool.

First, click on Add/Remove/Smooth tool. Second, click on Edit Influence button. Third, move mouse cursor to the scans, press and hold Left Mouse Button while moving mouse up or down.

Fit to View 

Clicking this button will recenter the scan from whatever magnification or view the user has manipulated the scan to. If you are not able to see scans in the view, use this tool to bring scans back.

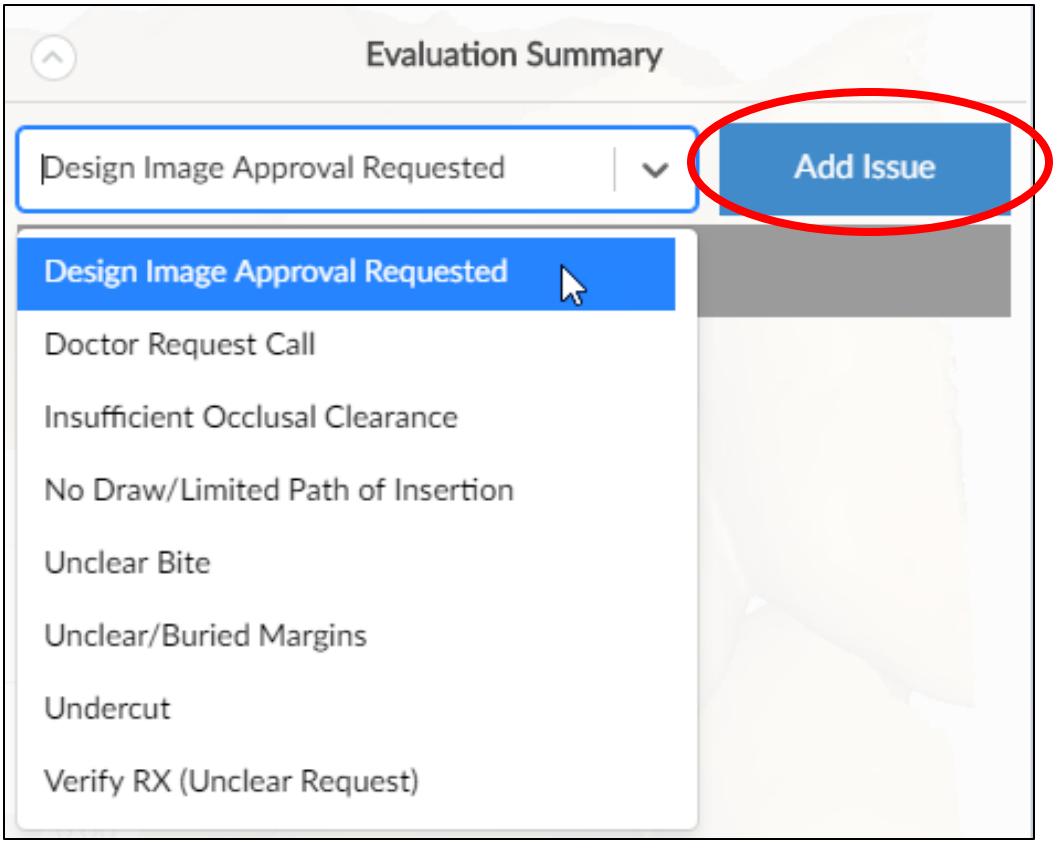
Evaluation Summary

NOTE: This feature requires integration with Elektra! Not available for some locations!

1. While the user is preparing the scans for design, they may come across technical issues preventing design and need to confer with the Technical Advisor (TA). The Technical Request Widget comes preset with the 8 most common issues: Open the Evaluation Summary.

2. From the widget, select the issue from the **Design Image Approval Requested** pull-down menu.

3. Click **Add Issue**. Add as many issues as necessary.

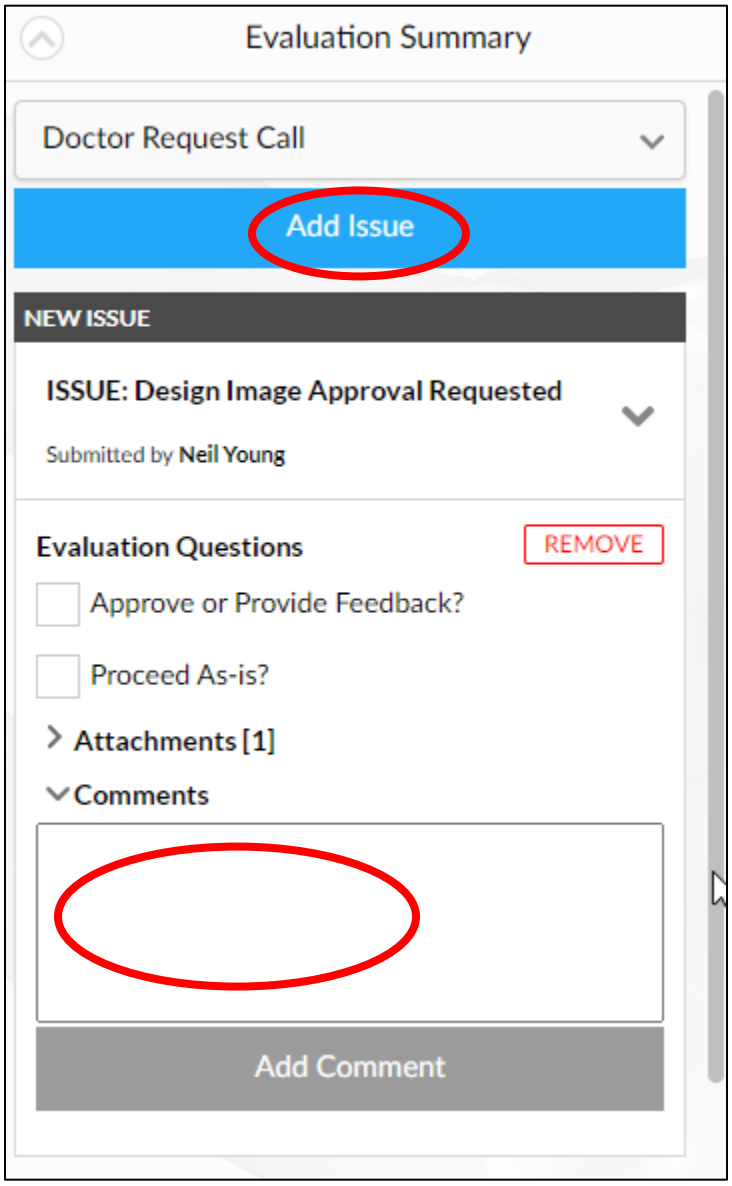


An evaluation summary window displays. Fill out the necessary information and comments, including the **Add Screenshot** button so an image of the problem area can be sent to the TA.

NOTE: The user cannot submit the evaluation until the Analysis Stage.

Once added, the form will ask a number of evaluation questions. Check the boxes of all that apply. In the **Comment** section below the evaluation questions exists to include any description needed to clarify the issue.

Below the Comment box is an **Add** button to include any attachments, if necessary. Please note, the current view of the case will automatically be included.



Technical Request (Receiving case from Elektra)

NOTE: Requires integration with Elektra.

Click the Evaluation Summary icon on the right-side menu to see the resolution provided by the Doctor.

NOTE: When opening a returned case from a Technical Advisor, note that the software will prevent the user from finishing the case, unless the issue has been resolved.

Please keep in mind that the user has access to return to any stage. After resolving the issue, click “mark issue as resolved” in the evaluation summary widget.

Screen Shot 

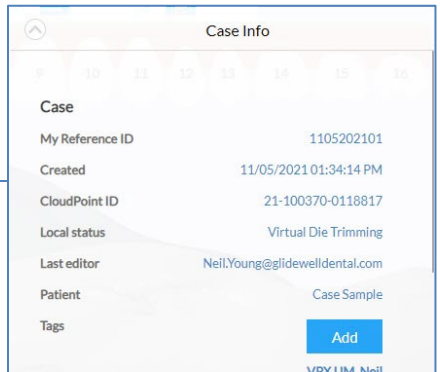
The Screen Shot tool takes a screenshot of the current view displayed, including jaw part, widgets and buttons.

1. Press the Screen shot tool.
2. A pop up will appear asking the user to name the file.
3. Click OK.
4. To view file, close out the case and click on the case name in the worklist.
5. Go to the Files tab
6. Open the history folder.
7. Open the screen shot folder. All case screen shots will be listed there.
8. Click the file and the screen shot will download.
9. Open the screen shot.

Case Info Tool 

This button, when clicked, displays information about the case. in a scrolling widget, Including:

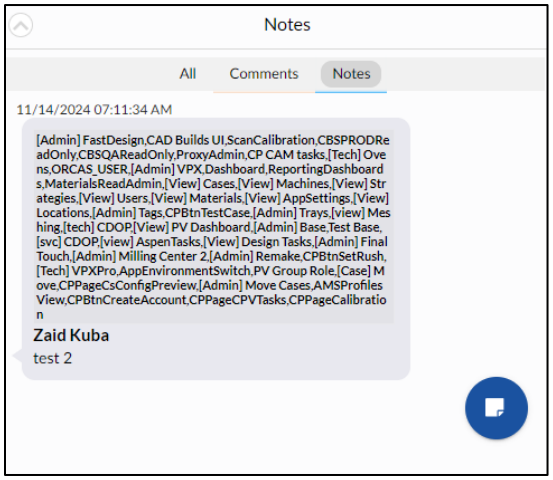
- Reference ID



- Date Created
- Cloudpoint ID
- Local Status
- Last Editor
- The Patient’s Name
- Tag Add Feature (See Below)
- Remake Information
- Type of Restoration
- Case Doctor Preferences
- Impression Survey (See Below)
- File Attachments Organized
    - Scans
    - Attachments
    - Manufacturing Notes

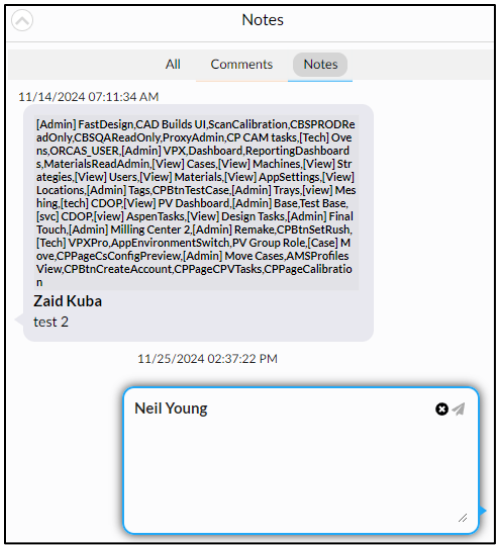
Notes

This button displays the Notes window. The Notes window shows the latest notes and information that was previously created and by whom.



Click the Add Notes button  .

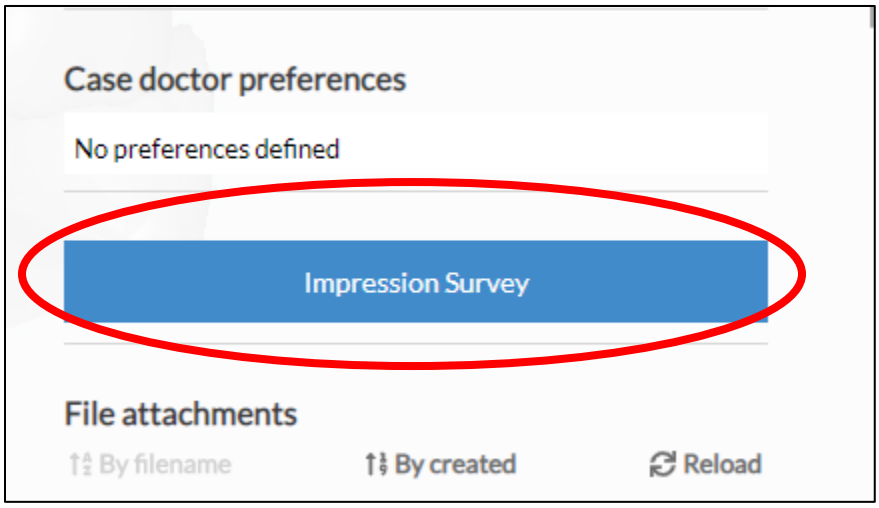
The note window displays below the Notes window.



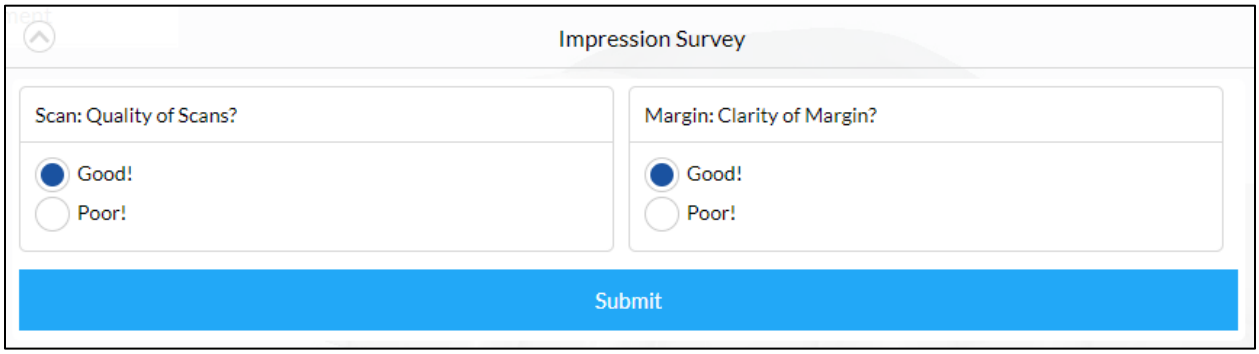
Click the Add Notes window and type the comments. When done, click the send arrow  to send the message note.

Impression Survey

Accessible from the Case Info button or displaying before the user finishes with the scan is the Impression Survey. To activate this feature, click the **Impression Survey** bar.



The impression image displays, along with two survey questions.



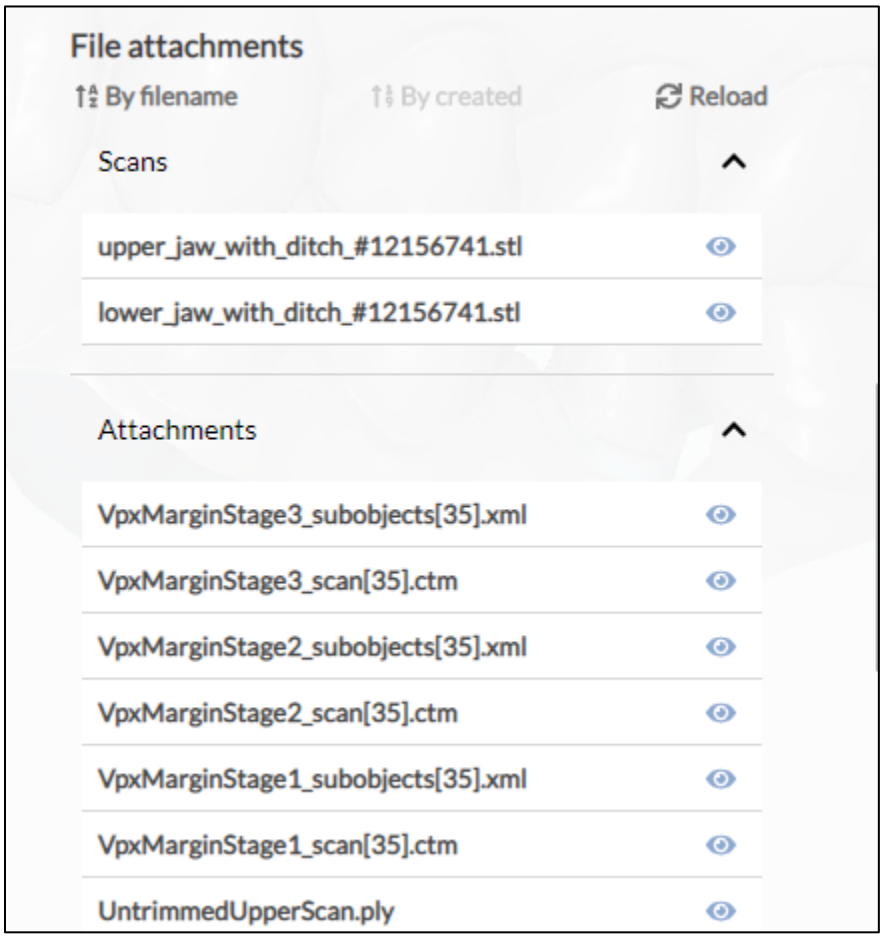
The left question asks about the quality of the impression. Select either **Good!** Or **Poor!**

The right question asks about the clarity of the margin, Again, select either **Good!** Or **Poor!**

After making the selections, click **Submit.**

File Attachments

At the bottom of the Case Info window is the File attachments, which are accessable from pull-down menus and have the preview icon to allow the user to examine the files.

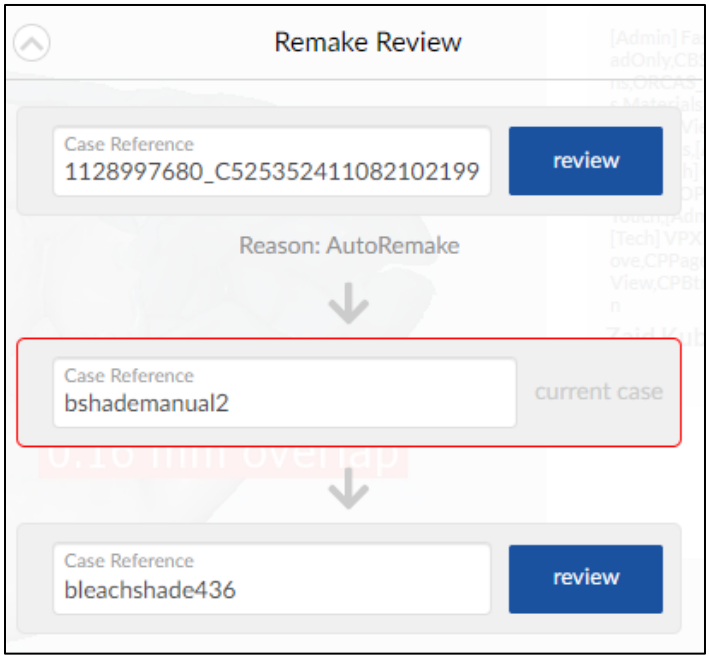


This is a primary method to determine the suitability and useability of the case and is important for case feedback. When clicked, window displays asking about the quality of the impression.

The user can select **Good!** or **Poor!**
and click **submit**.

Remake Review 

Selecting this widget brings up the review window. On it are shown the number of iterations of the case (the remakes) as well as the reasons why they were remade.



The Tools on the Left Menu Interactive Bite Alignment Screen

The following tools appear with the Interactive Bite screen's left-hand menu. They are as follows.

Flatten 

The flatten tool is used to repair scan data: Spikes, small holes, extra scanned data, bubbles. Or the flatten tool is used to block out undercuts on the die surface. This function is also known as the digital block out tool, which is useful for evening out protrusions, spikes, holes and other imperfections in the scan..

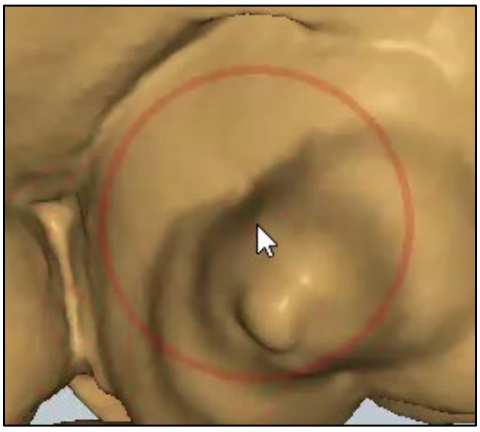
Add 

When clicked, a widget will appear on the screen that allows the user to modify how wide and how strong they want the effect to be.

Change the strength and area affected by using the sliders on the widget.

The profile slider determines the affected area. The strength slider determines the depth of tool penetration. Having a higher profile and strength with give a deeper and wider removal. While a lower profile and strength will create a narrower and shallower removal.

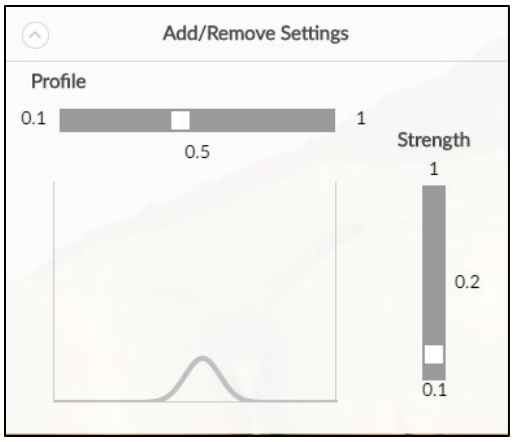
Apply to the scan model to make the changes needed.



Remove 

This tool removes scan data by reducing the surface. When the remove tool is activated a tool widget will open.

Change the strength and area affected by using the sliders on the widget.

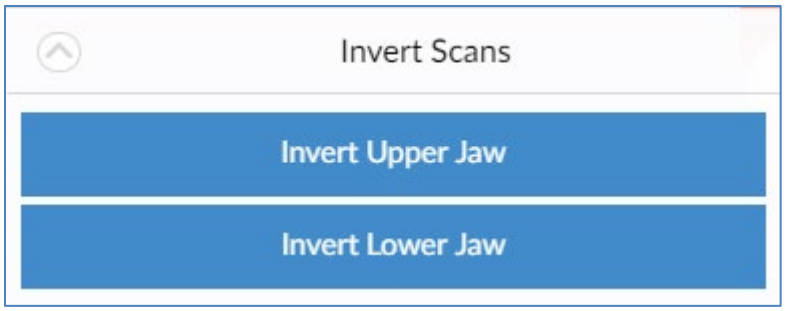


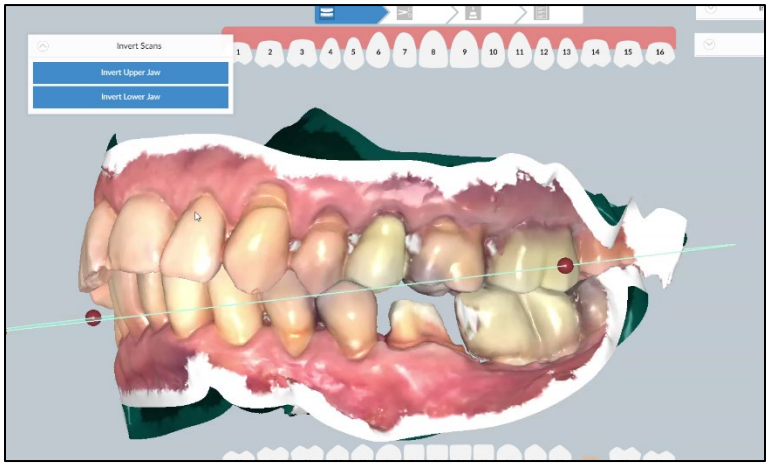
The profile slider determines the affected area.
The strength slider determines the depth of tool penetration.
Having a higher profile and strength with give a deeper and wider removal. While a lower profile and strength will create a narrower and shallower removal.

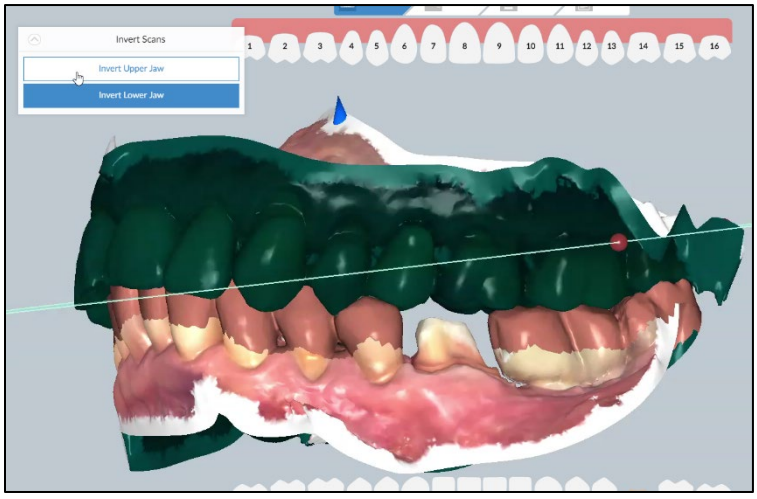
When clicked, the remove tool will look like the image below.

Invert Scans 

In the audvent a scan appears inverted (i.e. inside out) that scan will display darker than normal. Click on the icon and a window displays asking the user to specify whether the upper or lower jaw needs to be inverted. Once corrected, the inverted section will appear at its normal shade.



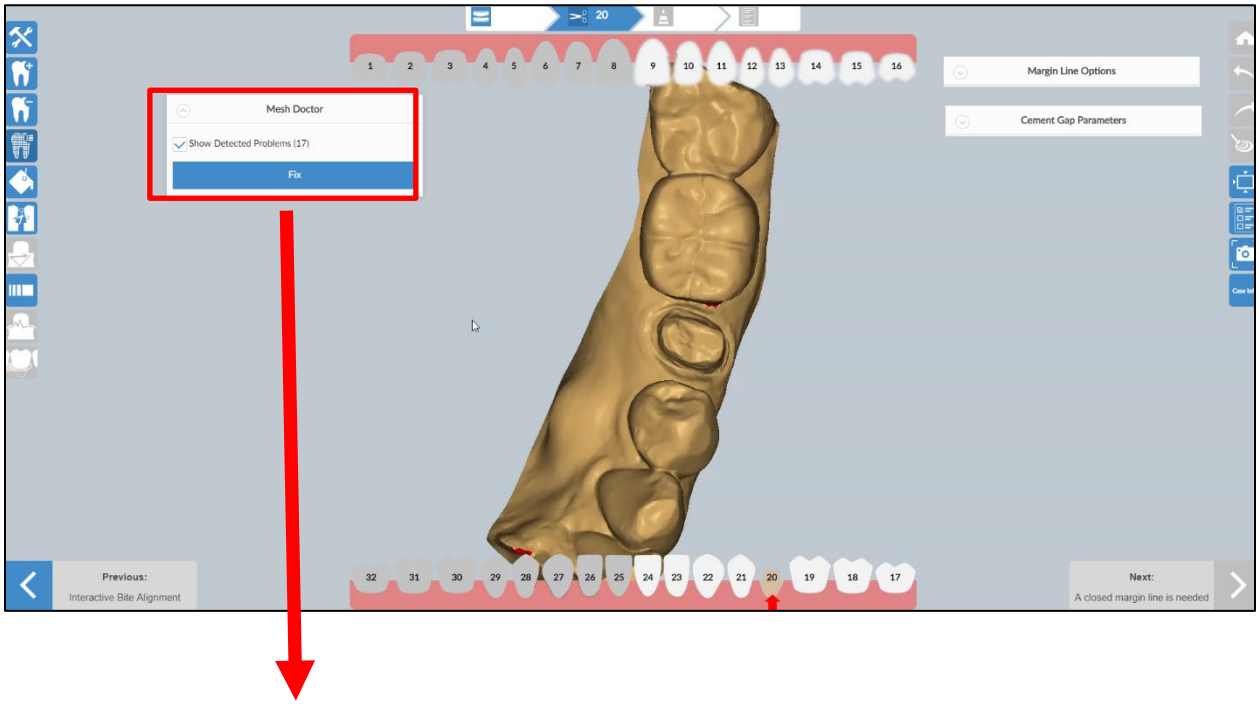


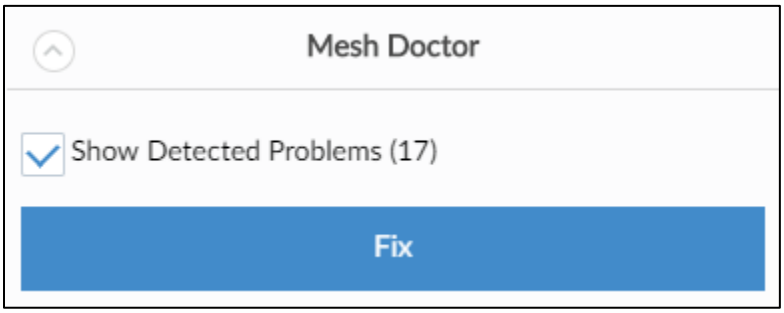


Surface Issue Repair (Mesh Doctor Tool) 

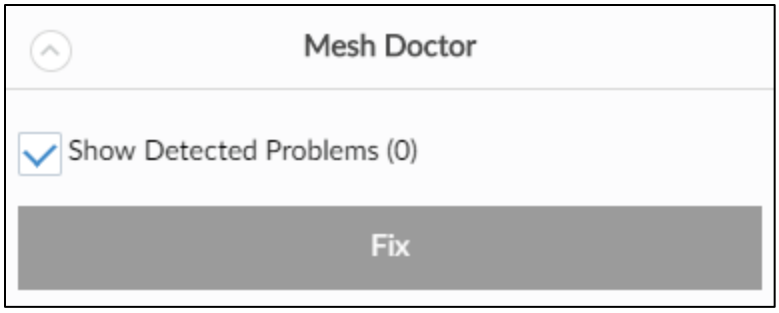
Allows for the auto-fixing of distorted scan data with the model.

1. Click the icon.
2. A Mesh Window pop up displays, listing all the problems with the case. The number of errors (in parentheses) show.
3. Click **Fix**.





All the issues should be reduced to zero. As in the image below:



Partial Filled Hole 

Allows for holes in the scanned jaws to be filled.

Click the icon.

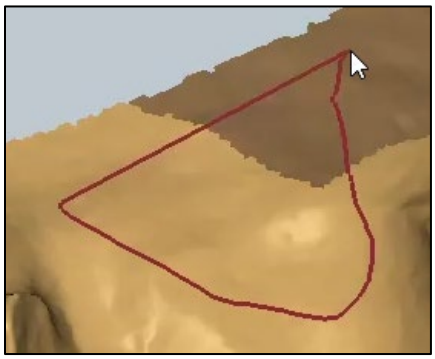
The cursor becomes a red line.

Follow the outline of the hole with the red line. NOTE: There is no need to continuously click.

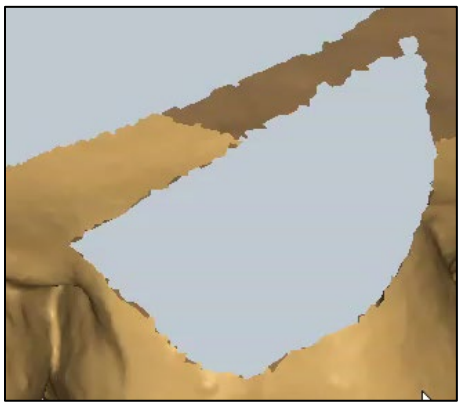
Once the line comes full circle, the hole disappears.

Delete 

This selection allows for any section of the model to be removed, or ‘cut’ once the cursor is placed on the area in question. Click the tool located on the left side of the screen, then draw a circle around the area to be deleted.

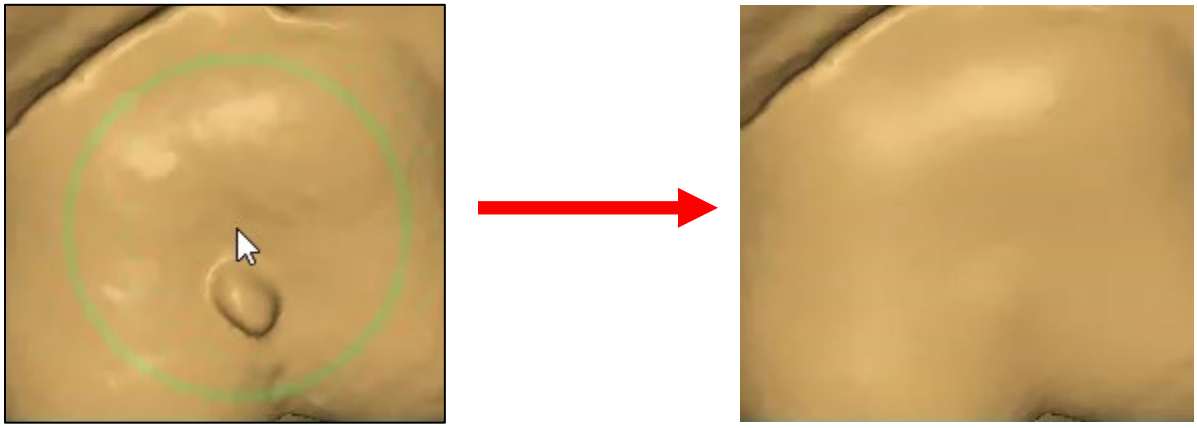


Release the left mouse button (LMB). The area will be deleted automatically.

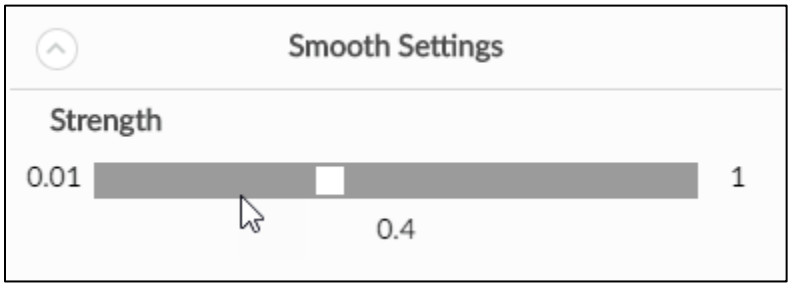


Smooth Tool 

This tool reduces or increases the texture on the scan. This is indicated by a circle over the restoration when the left mouse button is pressed. Dragging while holding the left mouse button continues to smooth the targeted area on the scan.



The strength of the Smooth tool can be adjusted with the Smooth Strength slider.



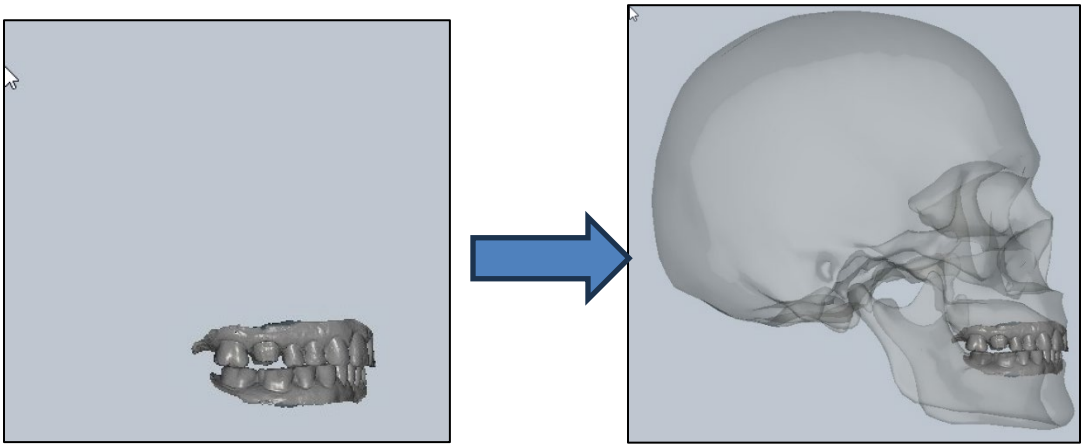
- Left is for a lighter effect
- Right is for a stronger effect,
- 1 being strongest.

Swap Upper/Lower 

This tool switches identification of the upper and lower jaw for better access. For example, if the upper jaw is labeled Scan 1 and the lower jaw is labeled scan 2, pressing the swap button reverses this order.

Anatomic Jaw Movement  (Shift + NM)

This view shows the technician were the restoration is positioned with regard to the entire head. The switch appears much like the images below:

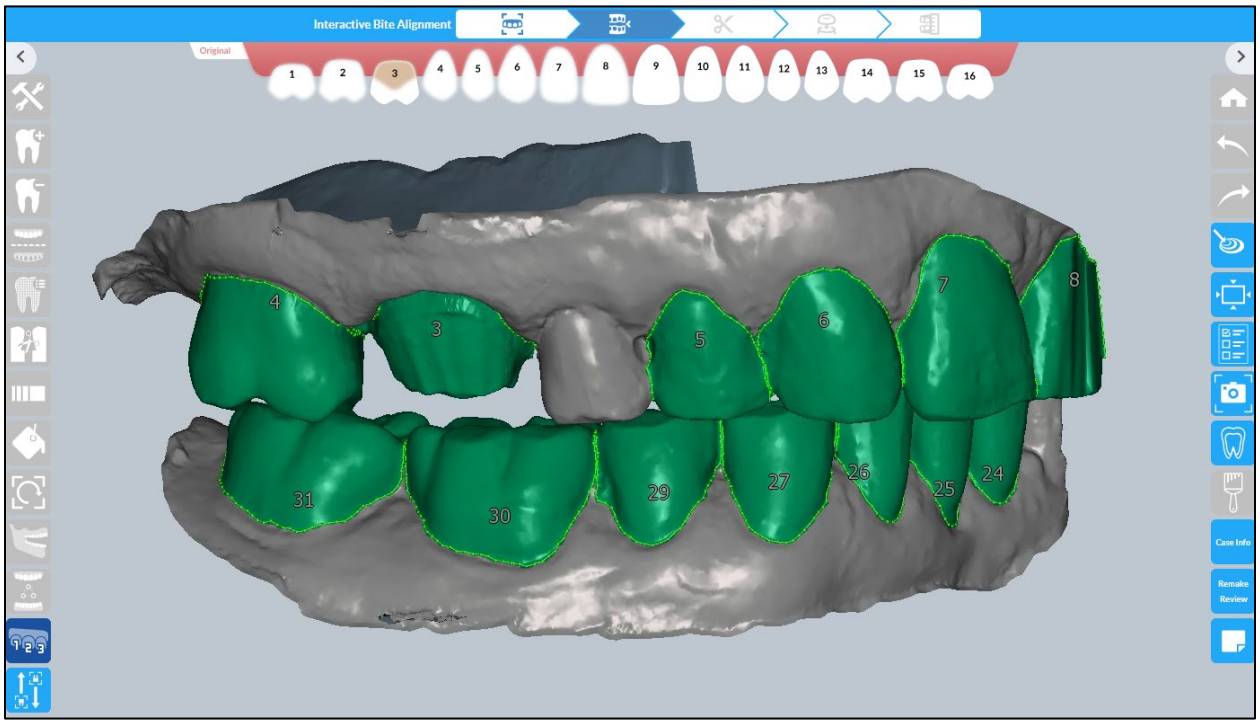


Edit Segmentation  (Shift + S)

This tool adjusts the segmentation. It provides visual confirmation to the automatically found segments by the network

Tool will provide ability to view and adjust segments

- Adjust
- Add
- Remove
- Assign



NOTE: As many tools are depend on segmentation to work properly (i.e. contacts, reduction, bite, etc.) this tool is ONLY to help adjust and fine tune segmentation in case of tool failure.

NOTE: Segmentation CAN NOT be used as guideline on how design should be finalized and is NOT an SOP.

Midline Plane 

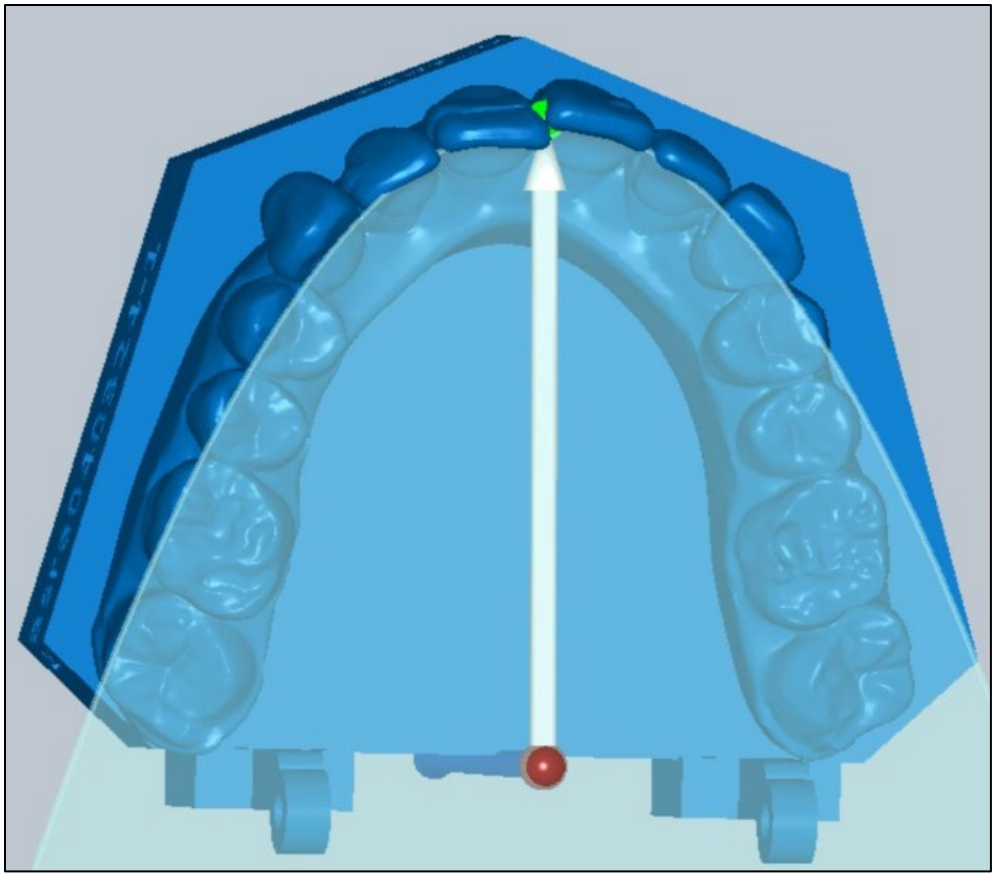
Used as a reference guide for design, this menu item is used to identify the midline of a scan. It can also be used in conjunction with other applications to create a more accurate printable model.

If jaws are:

Articulated - midline plane is attached to the lower jaw, so occlusal direction (blue arrow) should be set to match lower jaw occlusal direction.
Not articulated - every jaw will have its separate midline plane, so occlusal direction (blue arrow) should be set to match current (selected) jaw occlusal direction.

Forward direction (white arrow) should be set in direction toward the jaw anterior midline.

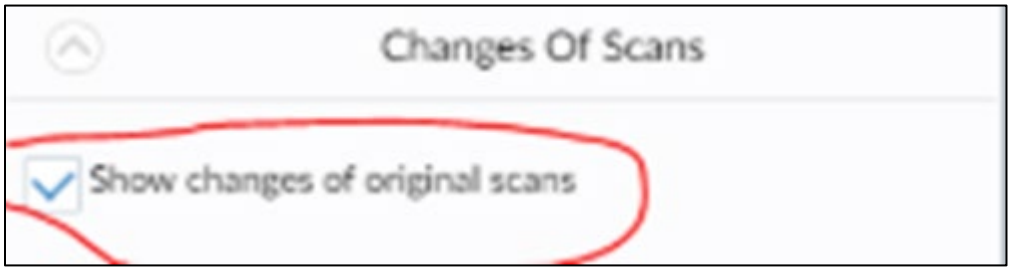
Anterior center (green ball) should be placed right between anteriors: 8 (FDI 11) and 9 (FDI 21) for upper jaw, 24 (FDI 31) and 25 (FDI 41) for lower jaw
Jaw back center (red ball) should be set between posteriors depending on desired base length. If back center is closer to anterior, base is generated shorter, if it's closer to the end of the jaw, base is generated longer.



Change Of Scans

The Change Of Scans window is used to show the reductions and additions made to the original scan by using the Flatten and sculpt tools.

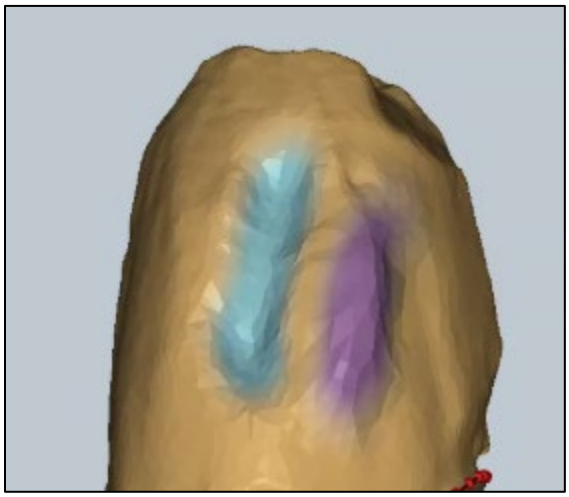
In the Change Of Scans window, select the Show changes of original scans check box.



,

The virtual die will show additions and reductions. If the scan was adjusted under the original mesh and mesh was removed, it will show in blue.

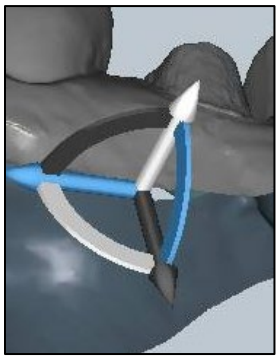
If the scan was adjusted over the original mesh and mesh was added, it displays in purple.



Move Rotate Scale (MRS) 

Clicking this feature allows for rotation of the scan for various views and directions as indicated in the graphic below:

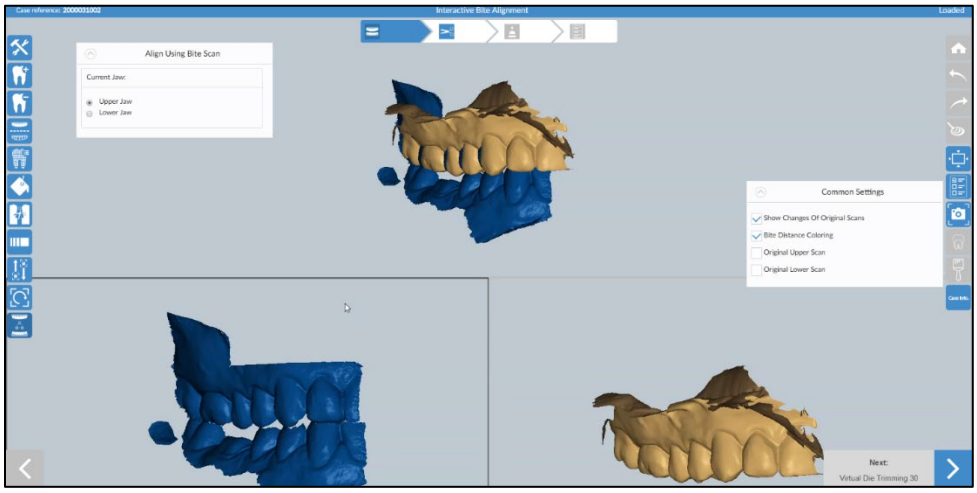
The tool will look like the following image. Click at any point on the desired color and drag up, down, or side to side.



Align Using Bite Scan 

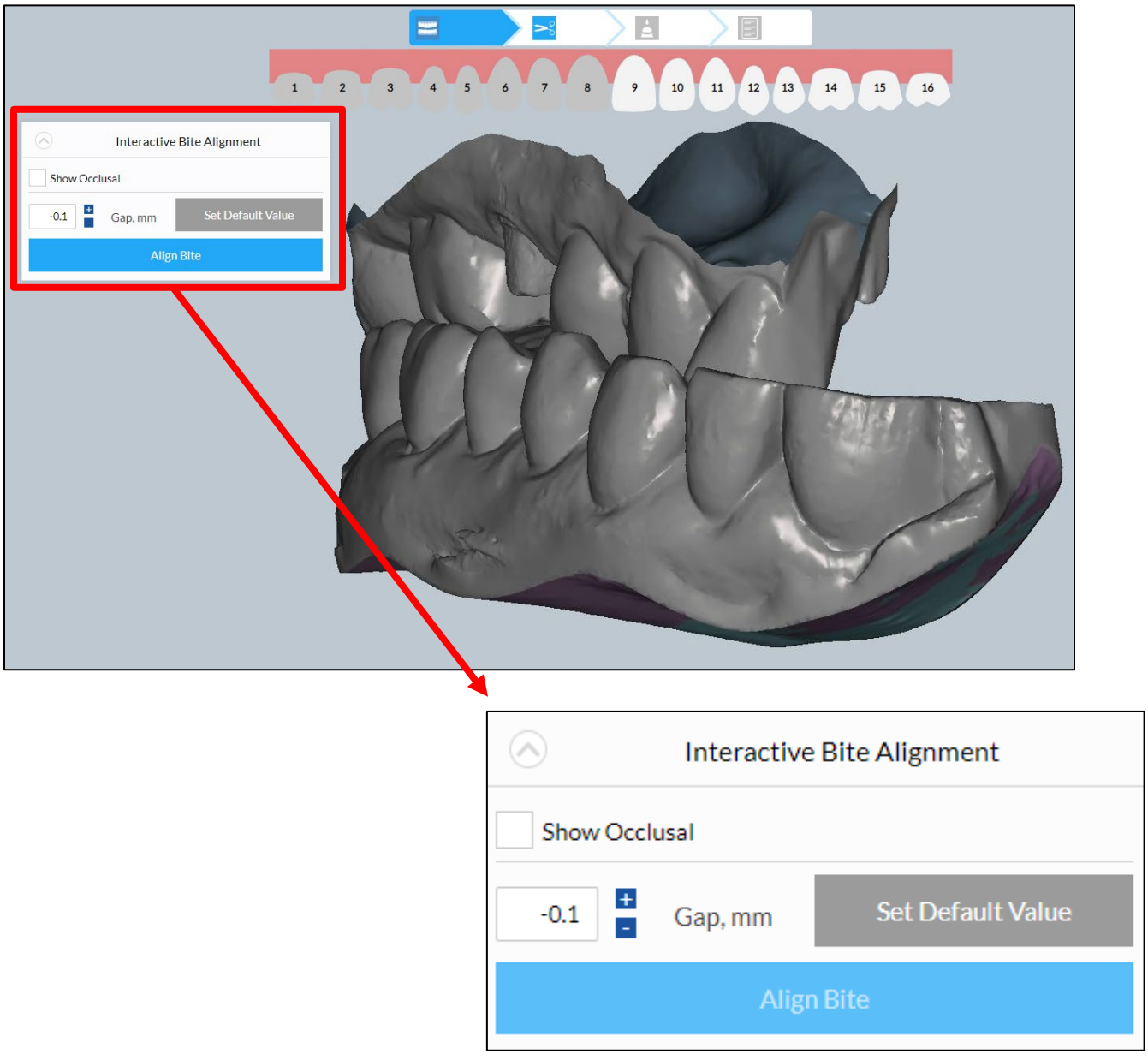
In the Interactive Bite Alignment stage, this button allows for the separation of the case into three screens. The lower left (in blue) shows the bite scan, while the lower right screen shows the original scan (in gold if selected in VPX Options).

The top screen shows the combined image, with the user having the option to select whether the upper or lower jaw is viewed.



This stage also has the Interactive Bite Alignment widget. When selected, this check box combines the digital scan and the case scan so the user can determine the correctness of the fit and make adjustments as necessary. There is also a check box to display the Occlusal.

When seleted, the case scan will display (see image below).



The Tools on the Right Menu Interactive Bite Alignment Screen

Home Button 

This tool completely resets the user's actions and displays the original state of the scans.

Undo/Redo 

The tool undoes a user's action or puts their action back to the previous modification. Once an action has been performed, click the Undo icon. This includes work on the die itself, even if the die has been created and the user has moved on to the next stage.

If the user wants to retrieve that last action, click the Redo icon.

Edit Influence 

Edit Influence helps the user to easily change the size of the current tool.

First, click on Add/Remove/Smooth tool. Second, click on Edit Influence button. Third, move mouse cursor to the scans, press and hold Left Mouse Button while moving mouse up or down.

Fit to View 

Clicking this button will recenter the scan from whatever magnification or view the user has manipulated the scan to. If you are not able to see scans in the view, use this tool to bring scans back.

Screen Shot 

The Screen Shot tool takes a screenshot of the current view displayed, including jaw part, widgets and buttons.

1. Press the Screen shot tool.
2. A pop up will appear asking the user to name the file. Click OK. To view file, close out the case and click on the case name in the worklist. Go to the Files tabOpen the history folder.
3. Open the screen shot folder. All case screen shots will be listed there.
4. Click the file and the screen shot will download.
5. Open the screen shot.

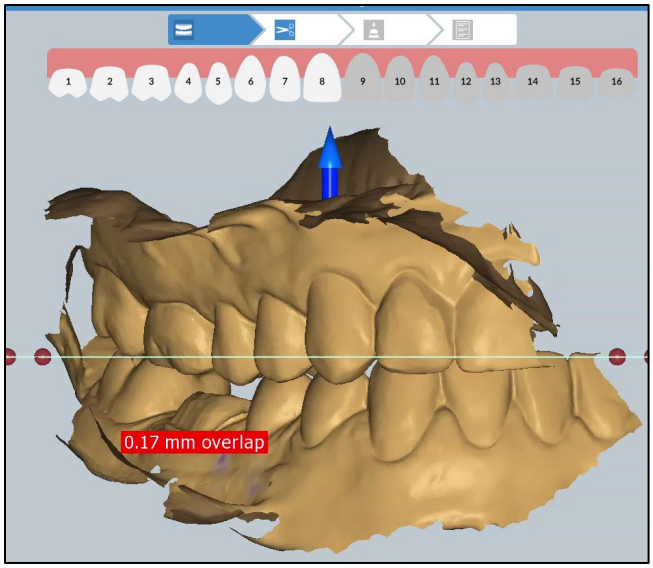
Cross Section Tool 

The Cross section tool will provide a 2-D view of the restoration and model. The point where the section view occurs on the restoration is controlled by the placement of the red line in the Clip plane widget. While in the cross section view, the contour of the restoration can be adjusted by clicking and dragging on the blue outer section line of the crown. This allows for very precise control of the occlusion.

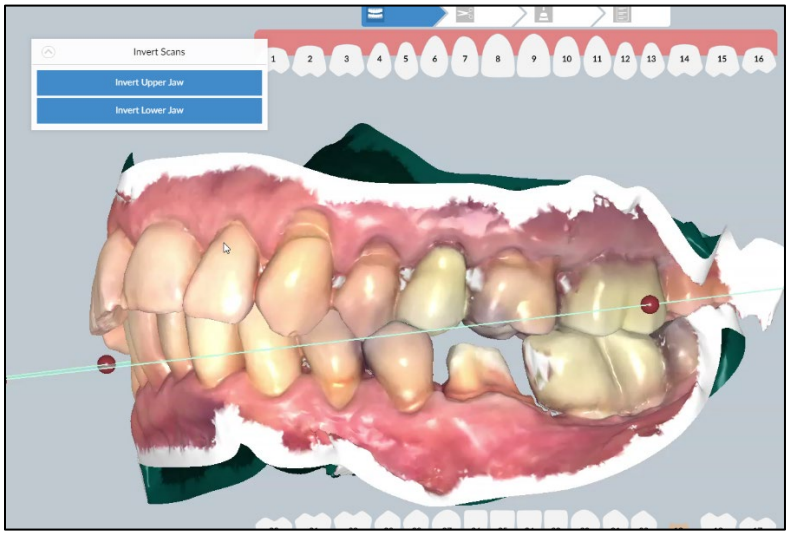
The Cross section tool also provides for measurement of the restoration. By pressing and holding the Shift and Ctrl keys and then left-clicking on the outer section line of the crown, the measurements will be displayed.

Scan Colors 

This function allows for the colorized viewing of the case. In this way, margins are clearly marked, gingiva, crowns and teeth are easier to see and mark. This assumes the case has the scan information. The images below demonstrate the differences in images.

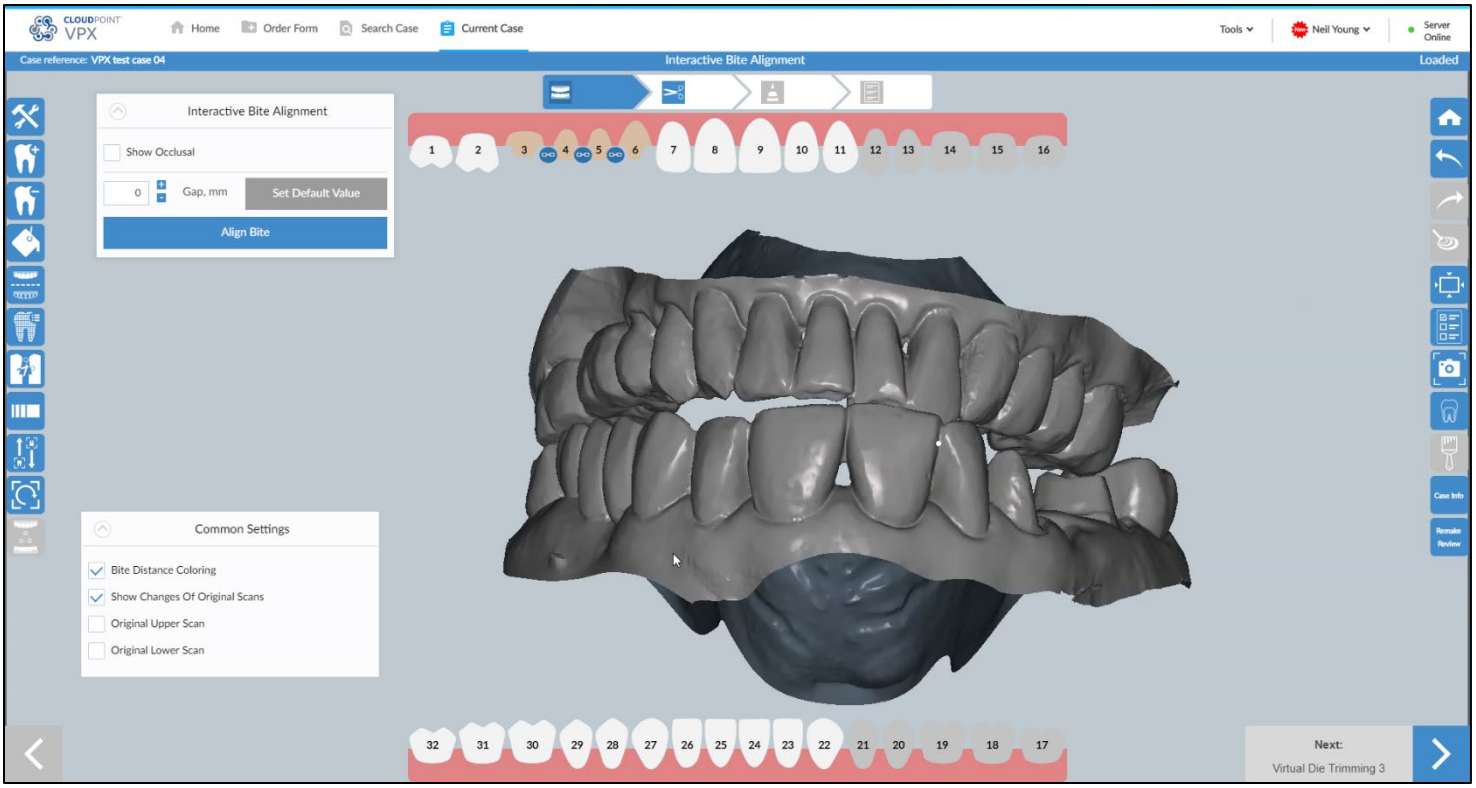


Before Scan Colors.



After Scan Colors

The Interactive Bite Alignment Stage



Observations

There are several issues with the bite alignment that need to be noted, as these affect crown insertion. It also is valuable to notice any wear on the teeth. Technicians should be instructed in centric occlusion (bite types), which can best be determined by looking for:

Edge-to-Edge Bite: An occlusion in which the anterior teeth of both jaws meet along their incisal edges when the teeth are in centric occlusion. Also called an end-to-end bite or an end-to-end occlusion.

Underbite: A nontechnical term applied to mandibular underdevelopment or to excessive maxillary development. Note this will cause undue wear on the tooth surface and must be compensated for. An underbite, or mandibular prognathism, is a Class 3 malocclusion or “bad bite.”

A Class 3 malocclusion occurs when the lower first molar is anterior (or more towards the front of the mouth) than the upper first molar. In this abnormal relationship, the lower teeth and jaw project further forward than the upper teeth and jaws. There is a concave appearance in profile with a prominent chin. Class 3 problems are usually due to an overgrowth in the lower jaw, an undergrowth of the upper jaw, or a combination of the two. Like Class 2 problems, they can be genetically inherited.

Overbite: is an extension of incisal ridges of the upper anterior teeth below the incisal ridges of the corresponding lower teeth when the jaws are closed normally. Class 2 is where the lower first molar is posterior (or more towards the back of the mouth) than the upper first molar. In this abnormal relationship, the upper front teeth and jaw project further forward than the lower teeth and jaw. There is a convex appearance in profile with a receding chin and lower lip. Class 2 problems can be due to insufficient growth of the lower jaw, an overgrowth of the upper jaw, or a combination of the two. In many cases, Class 2 problems are genetically inherited, and can be aggravated by environmental factors such as finger sucking. Class 2 problems are treated via growth redirection to bring the upper and lower teeth and jaws into harmony.

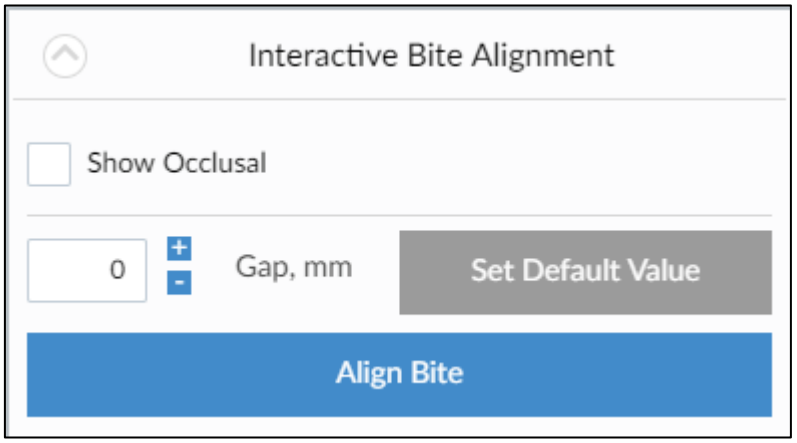
Cross Bite: A form of dental malocclusion in which the cusps of one tooth, e.g., arising from the maxilla, close within the cusps of the tooth arising in the mandible (or vice versa).

Centric Occlusion: is the occlusion of opposing teeth when the mandible is in centric relation. Centric occlusion is the first tooth contact and may or may not coincide with maximum intercuspation. It is also referred to as a person's habitual bite, bite of convenience, or intercuspation position (ICP). Centric relation, not to be confused with centric occlusion, is a relationship between the maxilla and mandible.

This occlusion is a Class 1, which is a normal relationship between the upper and lower teeth and jaws, or balanced bite.

The Interactive Bite Alignment Widget

This widget displays in the Interactive Bite Alignment Stage.



By entering and number value next to the Gap, the user can increase, or decrease the space between the two jaw parts.

Click Align Bite and VPX will automatically align the bite.

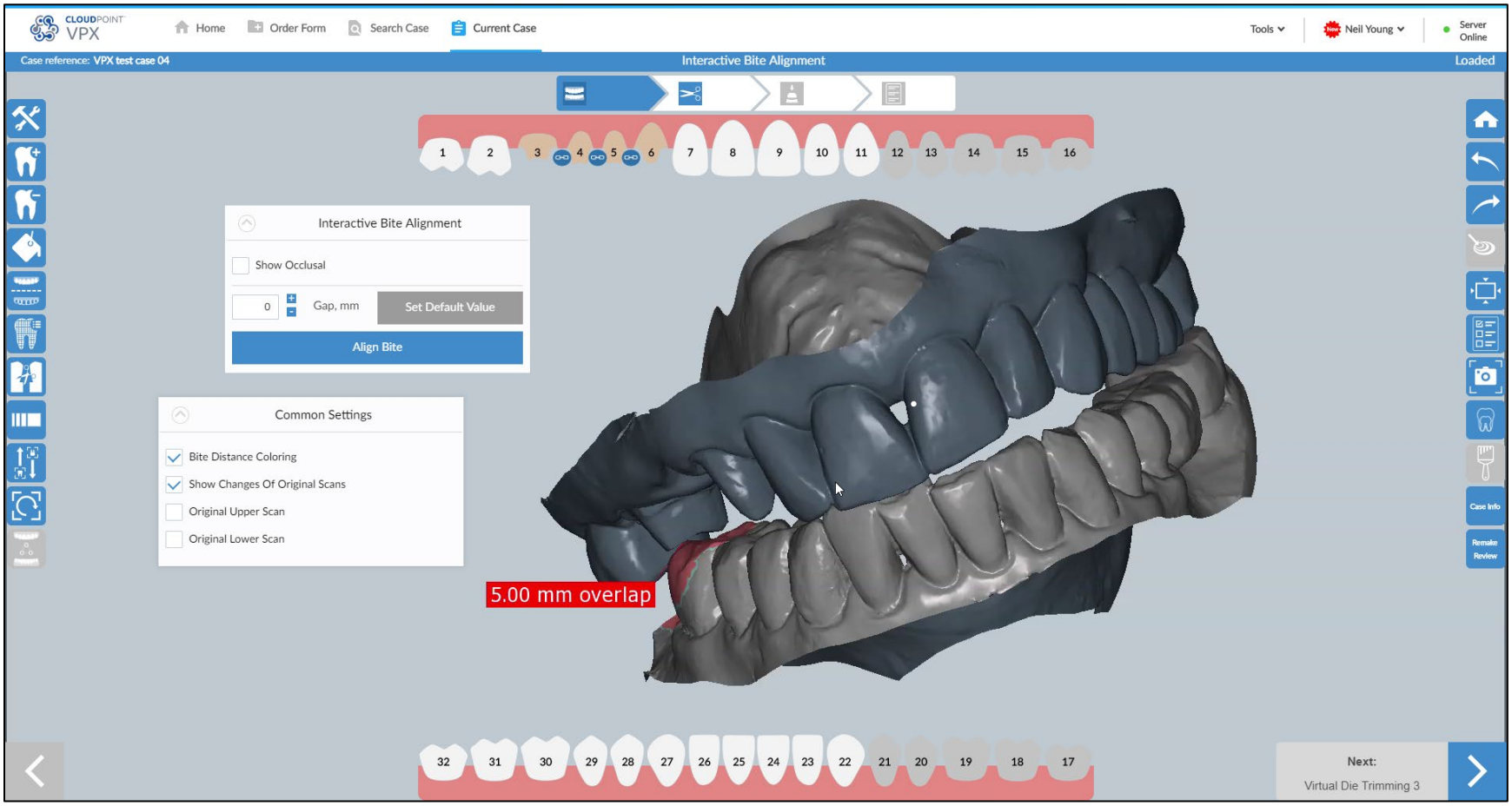
A green ‘Auto Bite Set is done’ pop-up confirms the new bite adjustment.

The Set Default button is used to set a default number value in the input box next to the Gap. A slight overlap is desirable to better accommodate the reconstruction of the CT scans.

Occlusal equilibration is a dentistry term to describe the process of adjusting the way the upper and lower teeth bite together. Altering the chewing surfaces of some or all of the patient’s teeth allows the jaw joints to fit together. The overall goal of this treatment is to allow both sides of the mouth to contact in an equal balanced occlusion. (Bilateral Simultaneity), and thus create a “solid” bite.

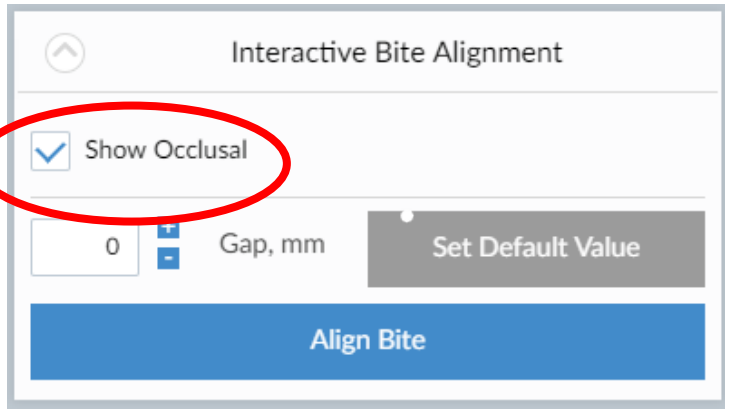
The inability of having the jaws fully seated can cause tooth wear and joint problems. This is usually because the jaw has to shift in order to allow the teeth to fit together. This shifting of the jaw creates stress in the joints, the muscles and the teeth.

NOTE: The Next button will remain deactivated until the Align Bite button is pressed. If the user attempts to move to the next stage, an alert window appears informing the user they must align the bite.

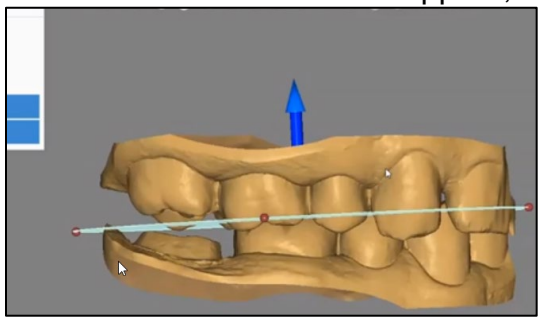


Isolating the Jaw

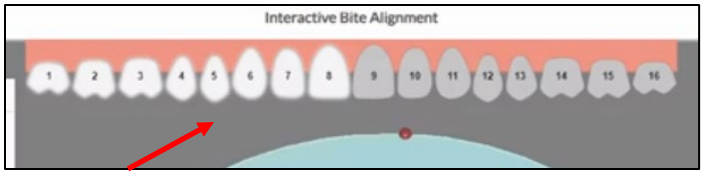
1. On the Interactive Bite Alignment Widget, select the Show Occlusal box.



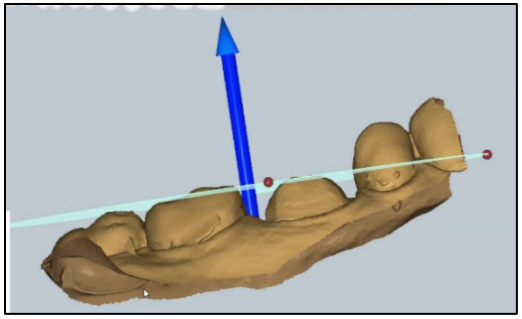
2. The blue occlusal arrow will appear, along with the occlusal plane represented by a gray circle.



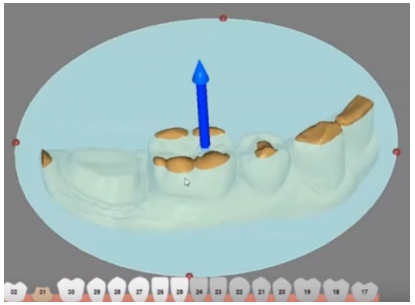
3. Hide the opposing jaw by clicking on the upper or lower display the jaw being worked on.



The jaw section displays.

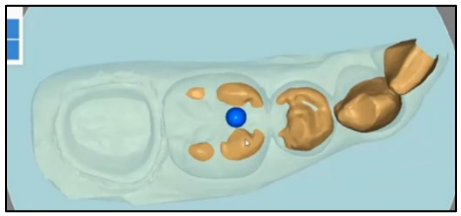


4. At the user interface, adjust the Occlusal (blue) arrow, by double-clicking on it.



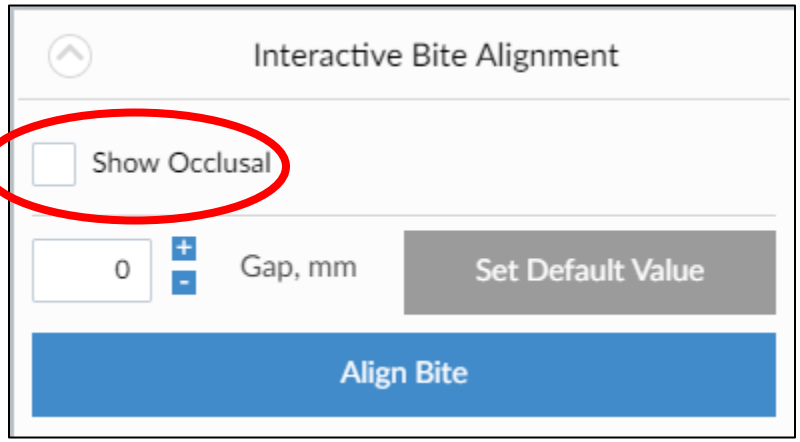
5. The user must rotate the model to the ideal occlusal view. Then double click the blue arrow to reset the location to the viewed location.

6. Rotate the view till the blue arrow is straight up from the user POV.



7. This will align the bite based on the closed direction.

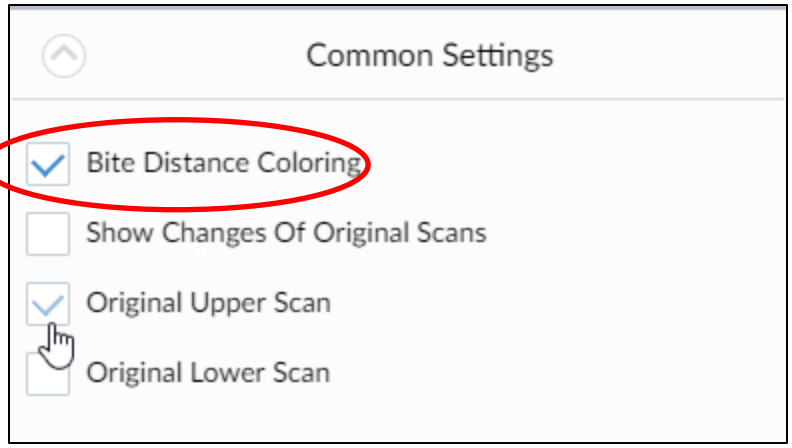
8. Clear the Show Occlusal box on the widget.



Show Distance Coloring

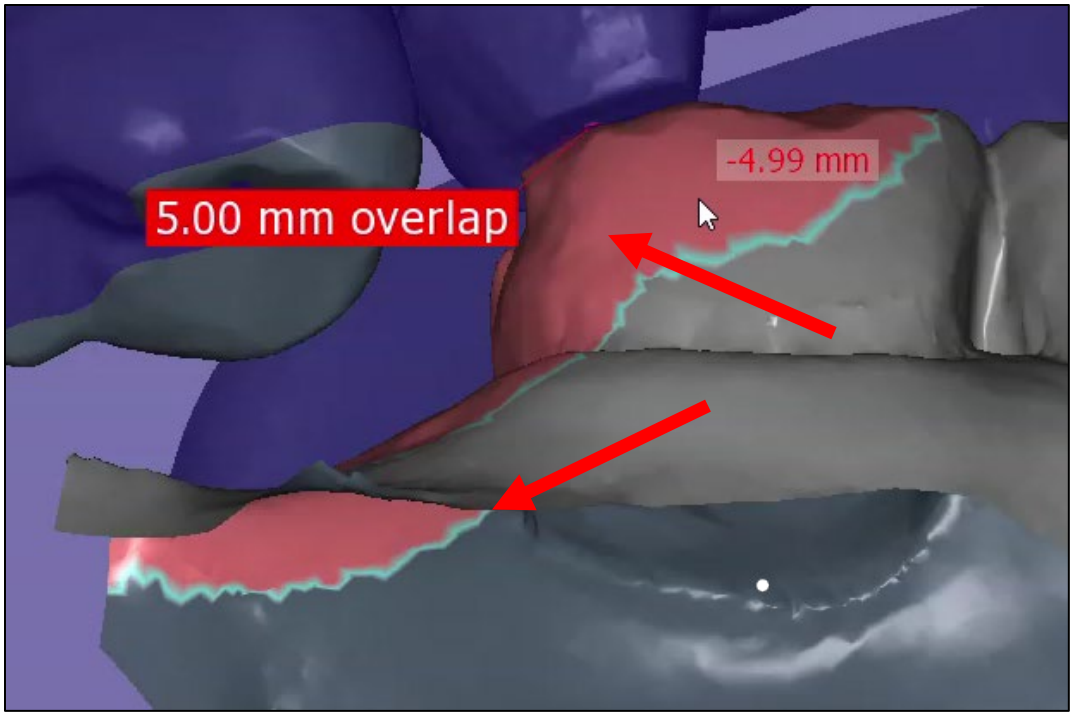
Shows the places the jaw parts intersect.

Select the **Bite Distance Coloring** box on the Interactive Common Settings window.



- Light Blue colored sections show parts are touching lightly.
- Red colored sections show bite penetration.
- All Red colored sections need to be adjusted to prevent low fitting crowns.

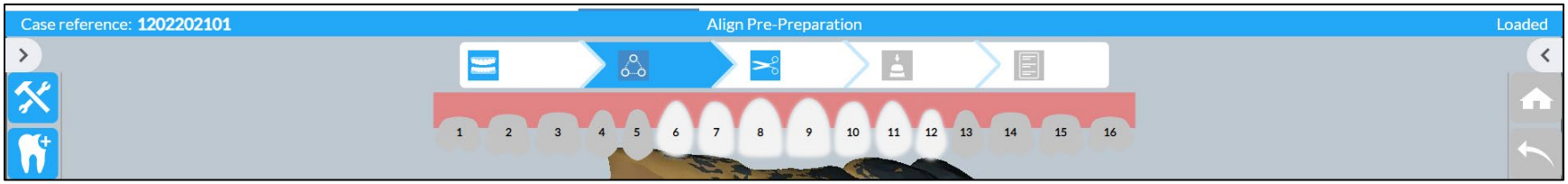
NOTE: The distance value must be greater than or equal to -.15mm. If the user hovers the mouse cursor over any part of the color map, a distance measured value will display



Next:

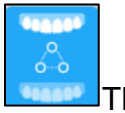
Align Pre-Preparation (Lower

Align Pre-Preparation Stage



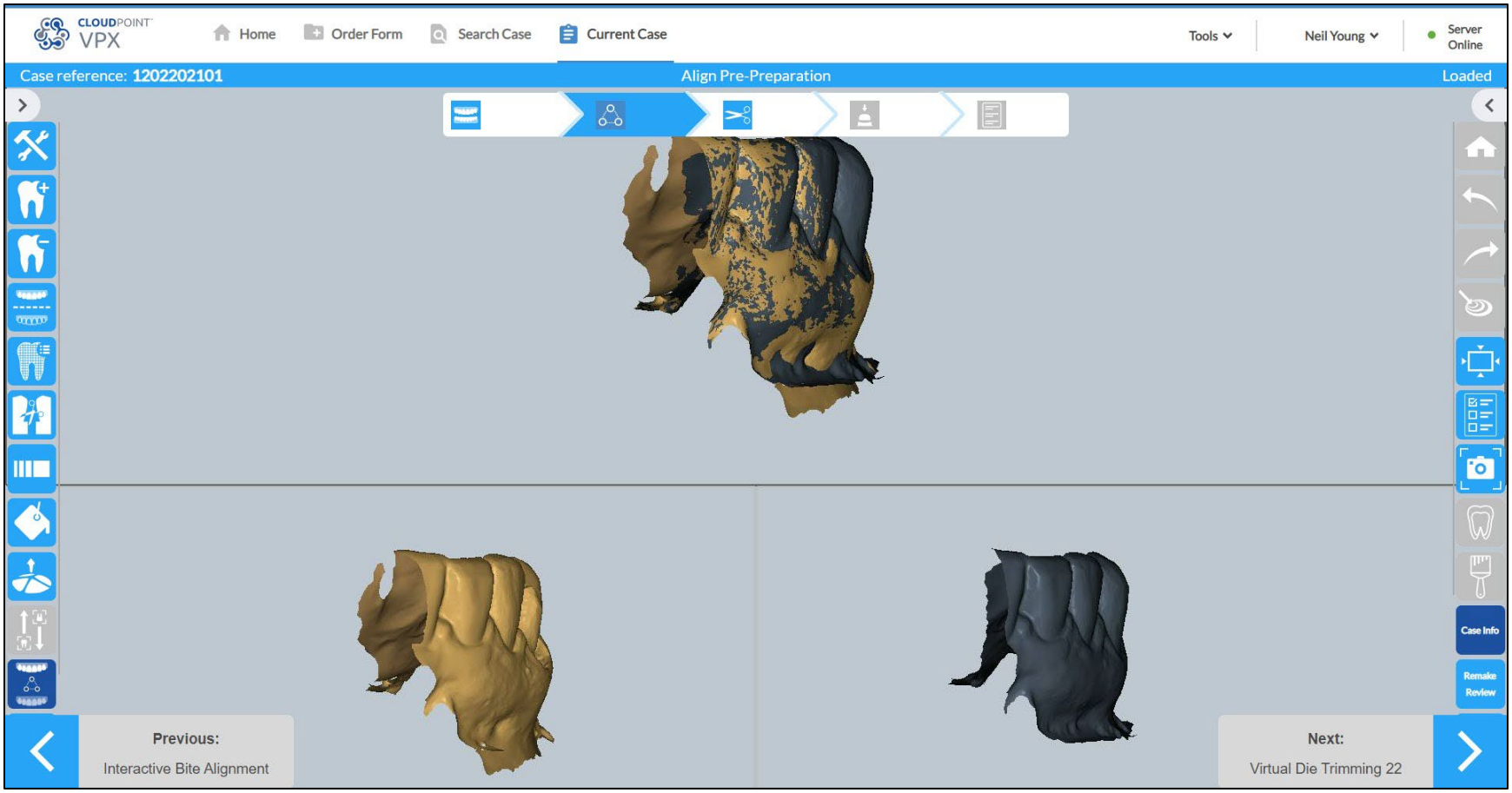
NOTE: If there is no pre-prep scan, skip to Mark the Margin.

Align Pre-Preparation

 The pre-prep scan with crown (dark) and the prep model scan (light) automatically loads if the alignment is off (Left, below). If the alignment is on, then the view will be blended (Right, below).

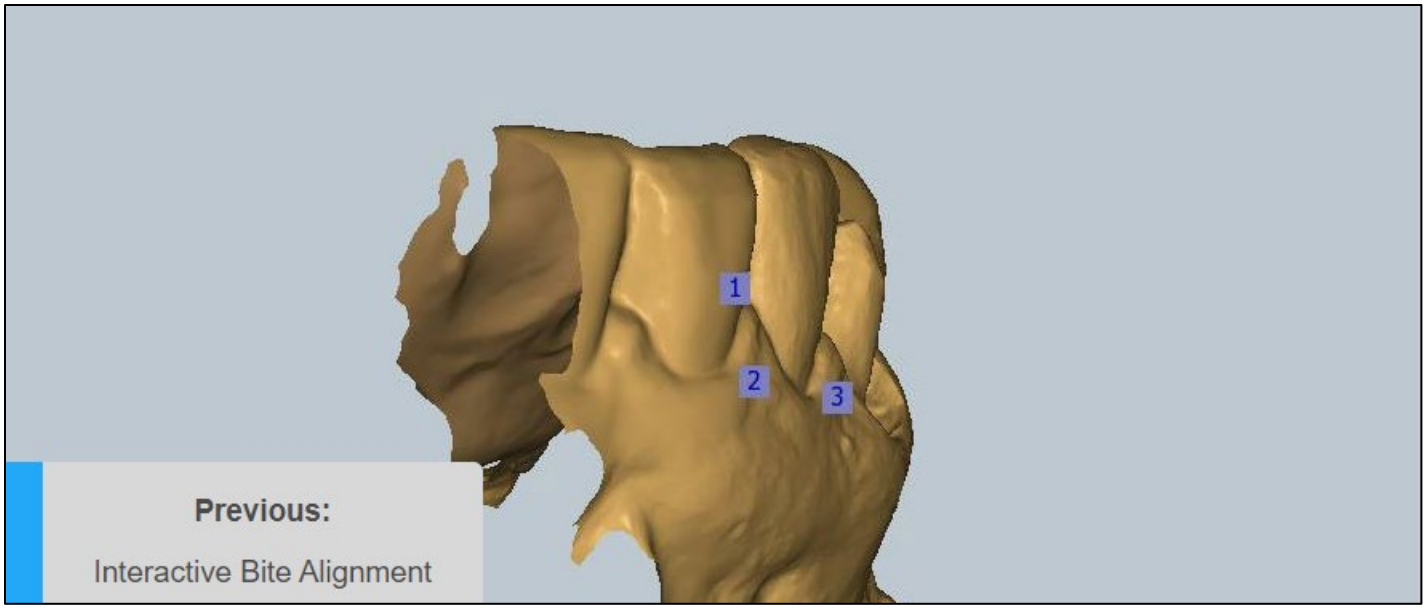
Click the **Alignment Pre-Preparation** tool.

The screen splits into three view panes; the combined scan view, the prep model scan and the pre-prep scan with the crown.

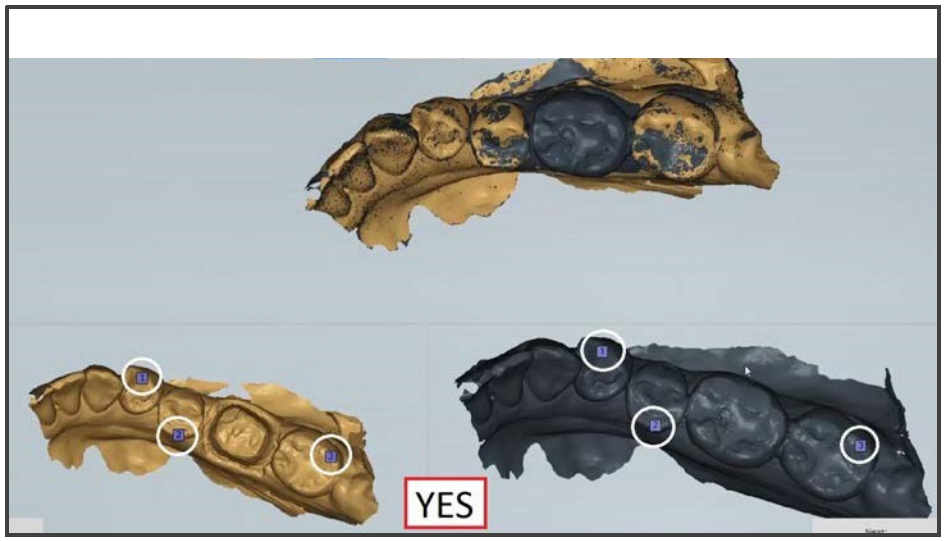


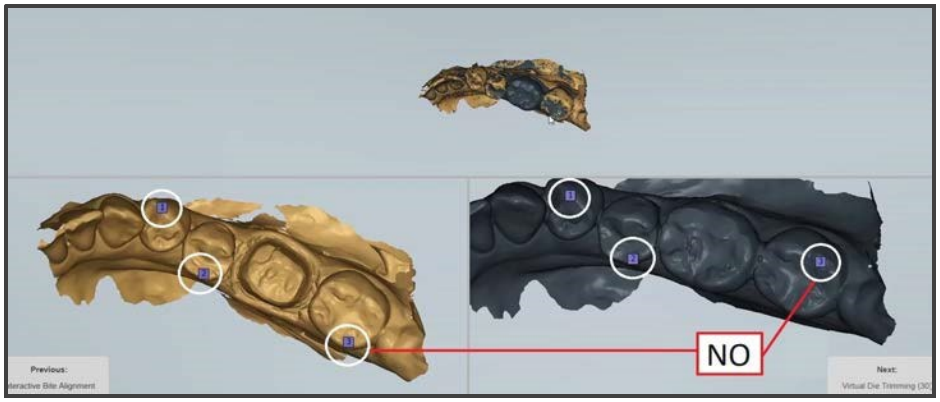
Click on the prep model scan in three different places to add three points on the teeth along the scan.

NOTE: To start, the user can also click first on the pre-prep scan to add the three alignment points.



Click on three points on the scan in the opposite pane, in about the same places as the first three points selected on the opposing scan.





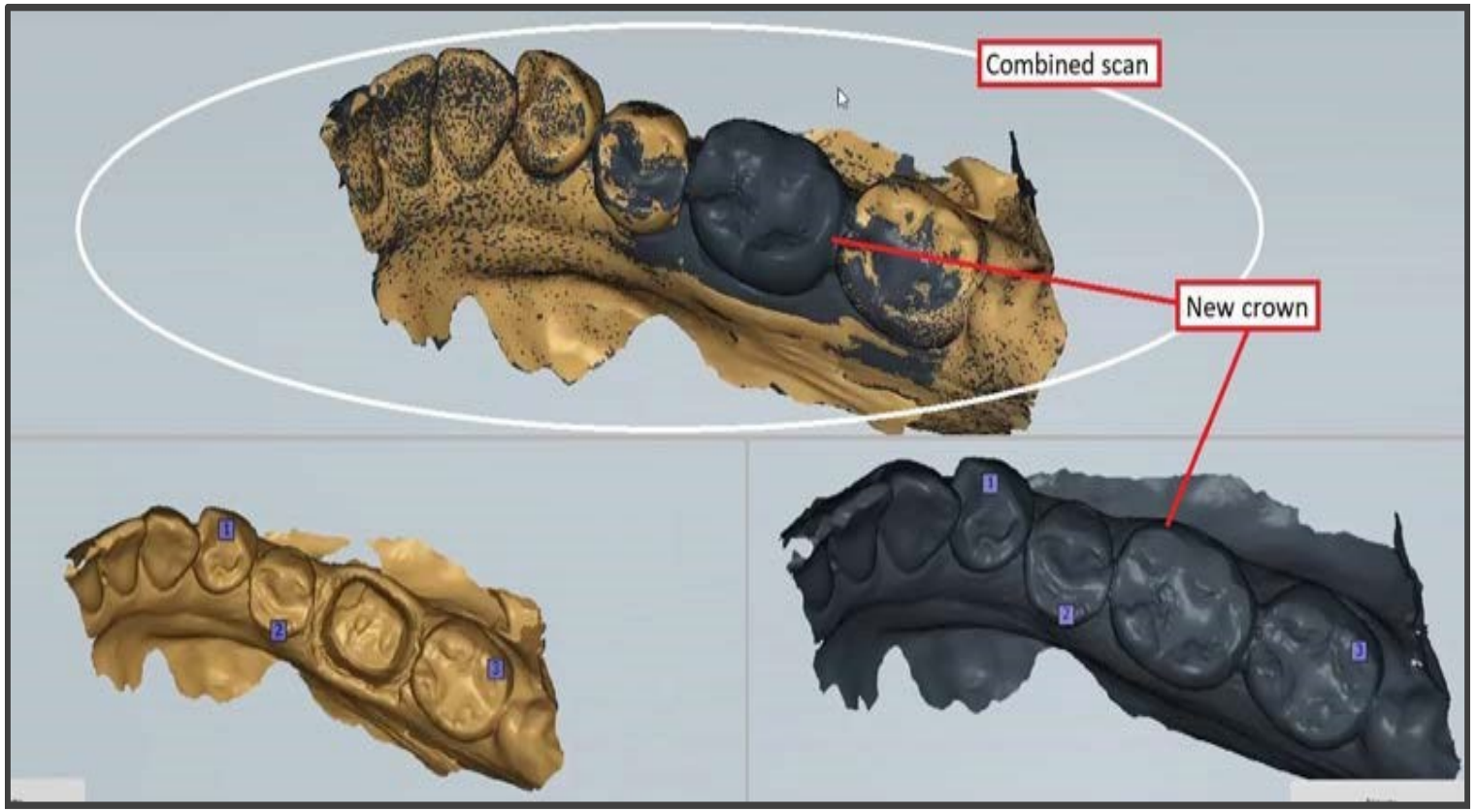
VPX combines the prep-model scan with the new crown prep scan.

If 3-Point Alignment is good, skip to the Virtual Die Trimming step.

NOTE: The 3-Point Alignment and Lasso tools are used to align scans only when the case has a pre-treatment scan. The Align the PrePreparation step automatically opens when needed.

If scans cannot be aligned with the 3-Point Alignment tool, use the Lasso tool. Upon success, go to the Virtual Die Trimming step.

If scans cannot be aligned with the Lasso tool, attempt alignment with the MRS tool. Upon success, go to the Virtual Die Trimming step.



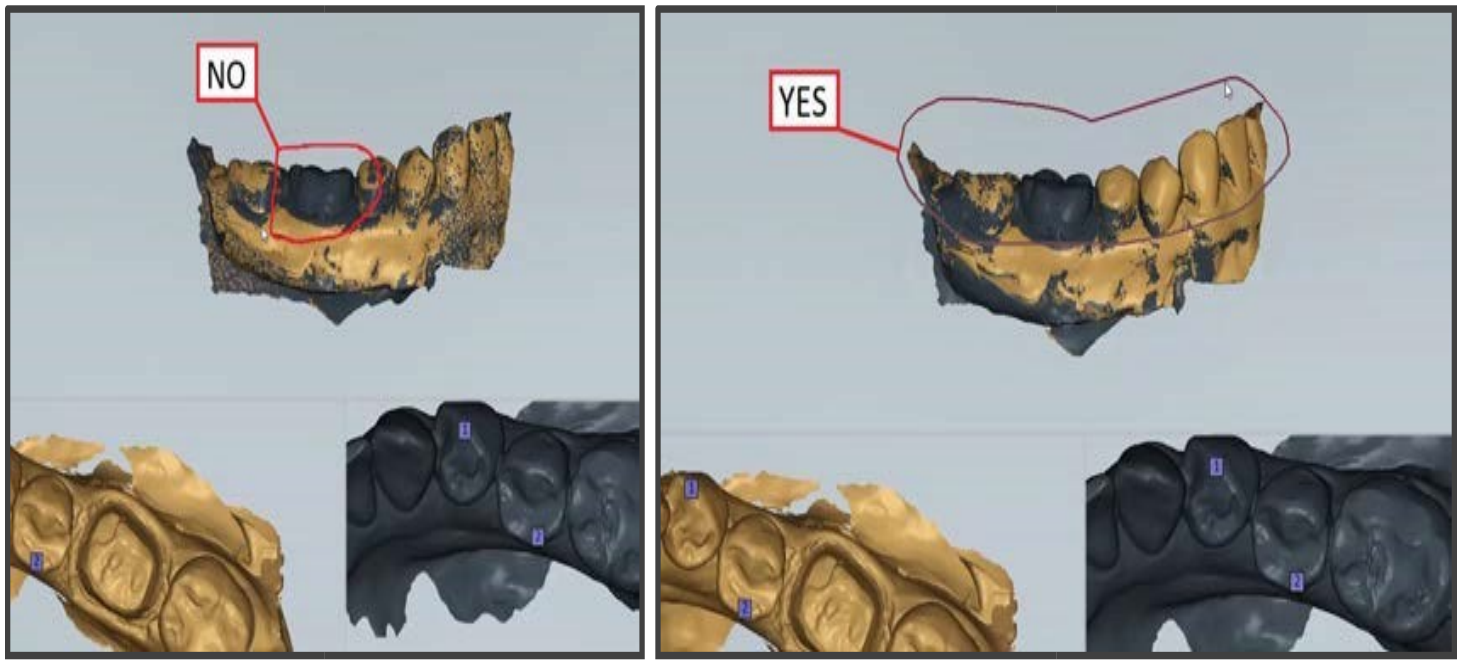
Lasso Tool

The 3-Point Alignment tool activates the Lasso tool. Use the Lasso tool after using the 3-Point Alignment tool.

Hold the mouse cursor down and draw a lasso around the entire combined scan at the top of the screen.

Release the mouse cursor. VPX increases the accuracy of the scan alignment.

NOTE: Use the Lasso tool to select the entire scan image of the teeth at the top of the screen.



Move, Rotate, Scale (MRS) and Align Pre-Prep

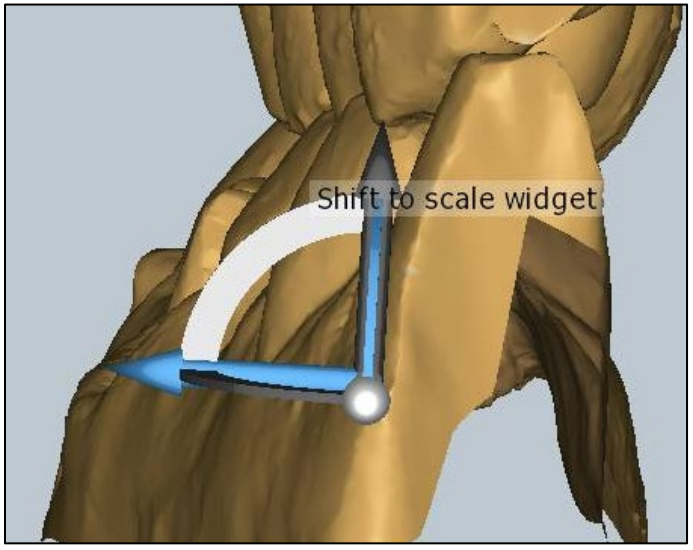
NOTE: If there is no pre-prep scan, skip to Mark the Margin.

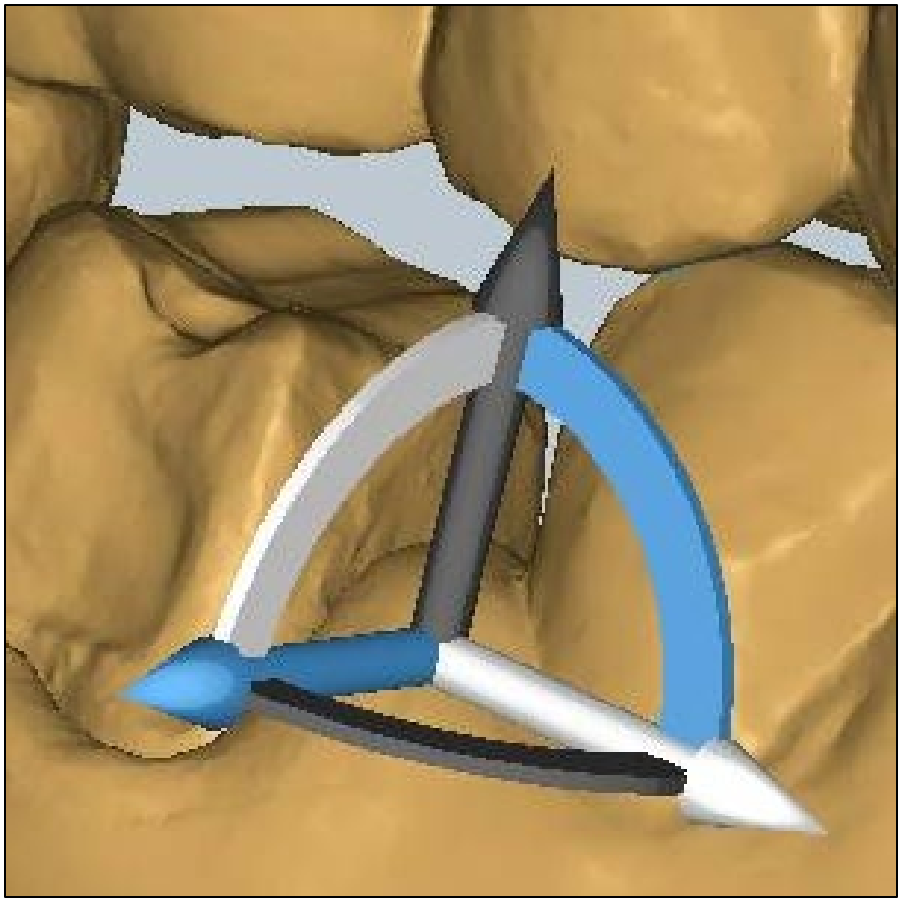
Use the Move, Rotate, Scale (MRS) tool to manually adjust the bite aligns to the prep-model scans, when needed.

NOTE: Use the Align Pre-Prep tool to manually adjust the bite aligns to the prep-model scans, when needed.

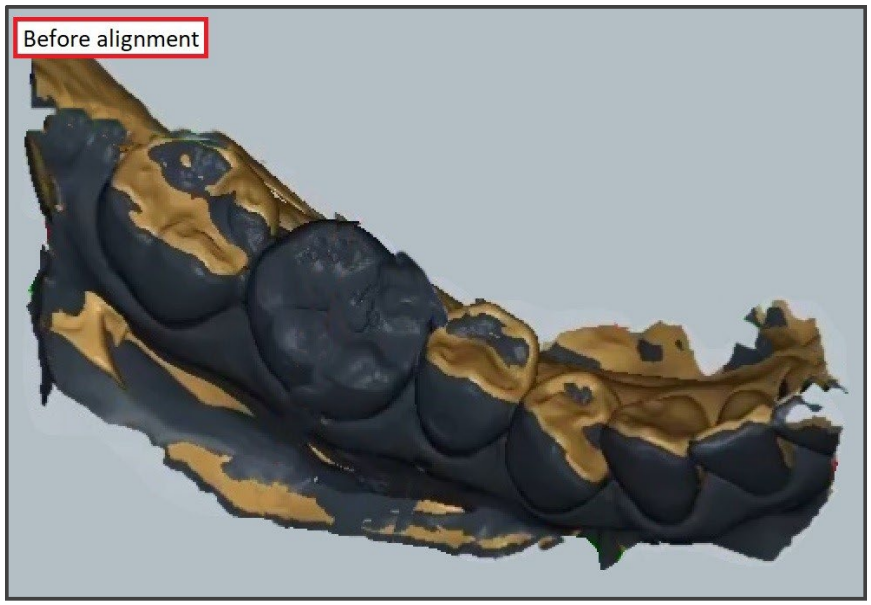
Click the **MRS** tool to view the MRS axes.

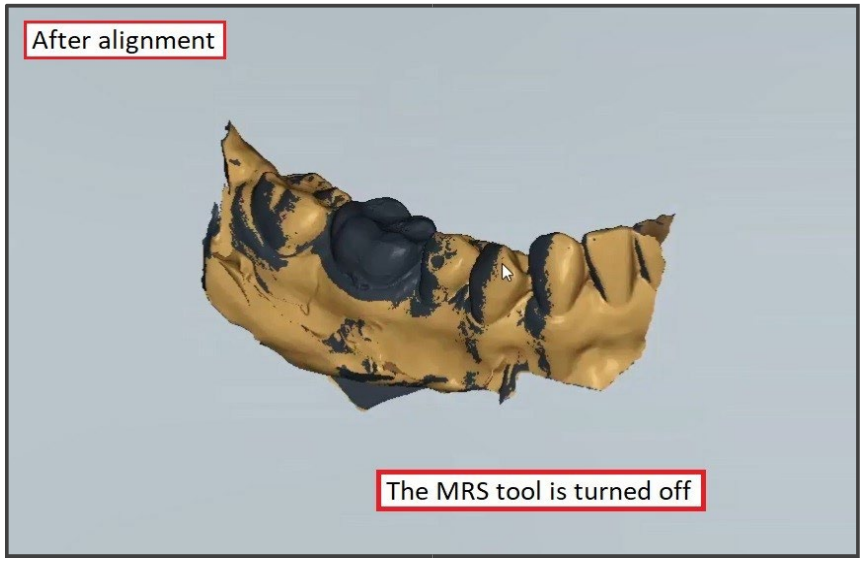
NOTE: During use, the active MRS axis becomes a dark color if the options are selected in VPX.As listed in the MRS commands mentioned earlier, slide along the desired axis.





NOTE: Marbling is an even mix of two colors. The marbling on the scan below helps the user see that a scan has been well aligned. The new crown is a solid dark color.

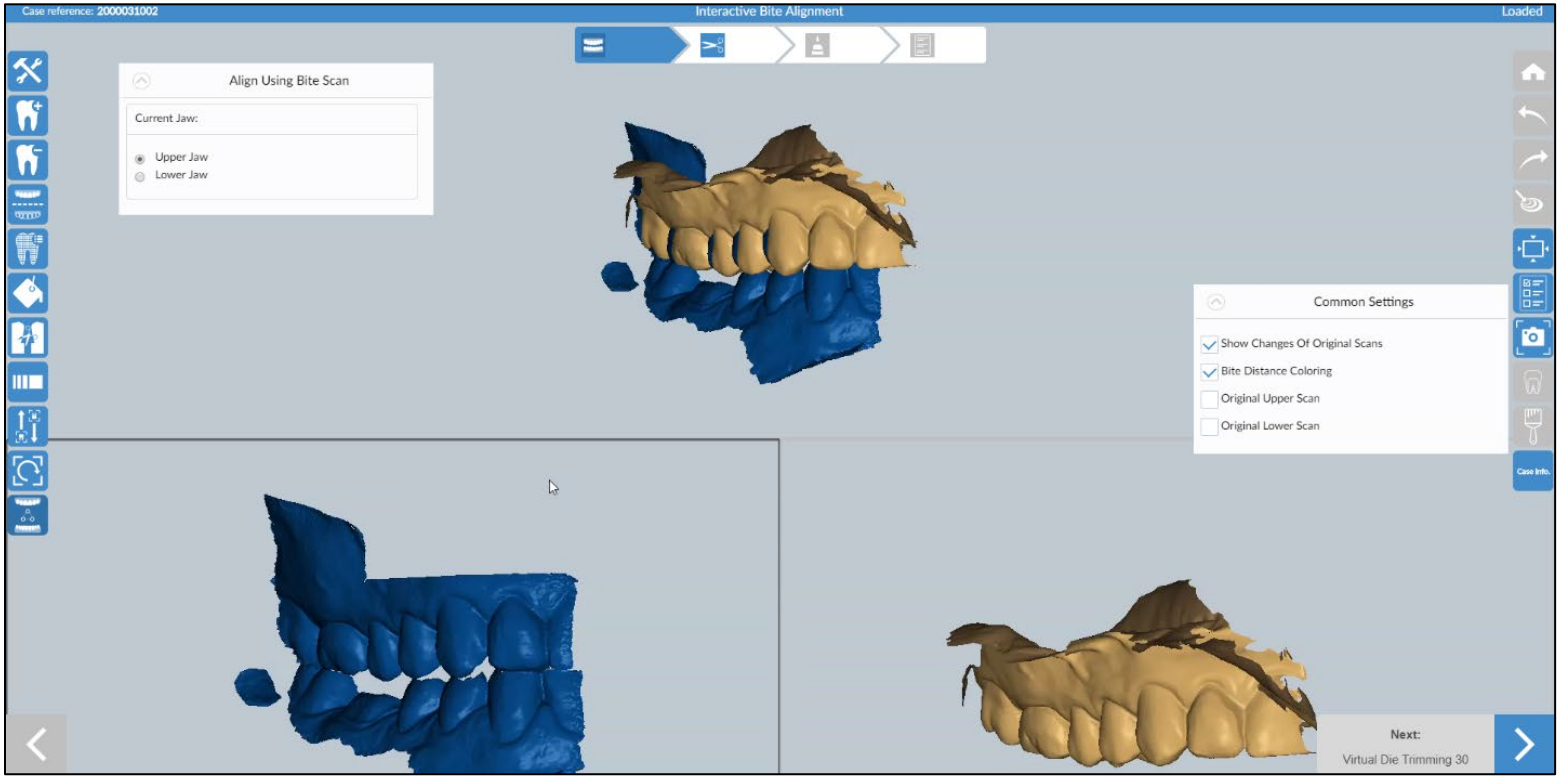

Before alignment

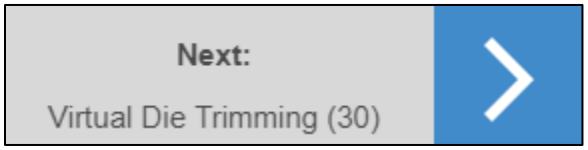

After alignment
The MRS tool is turned off

Align Using Bite Scan 

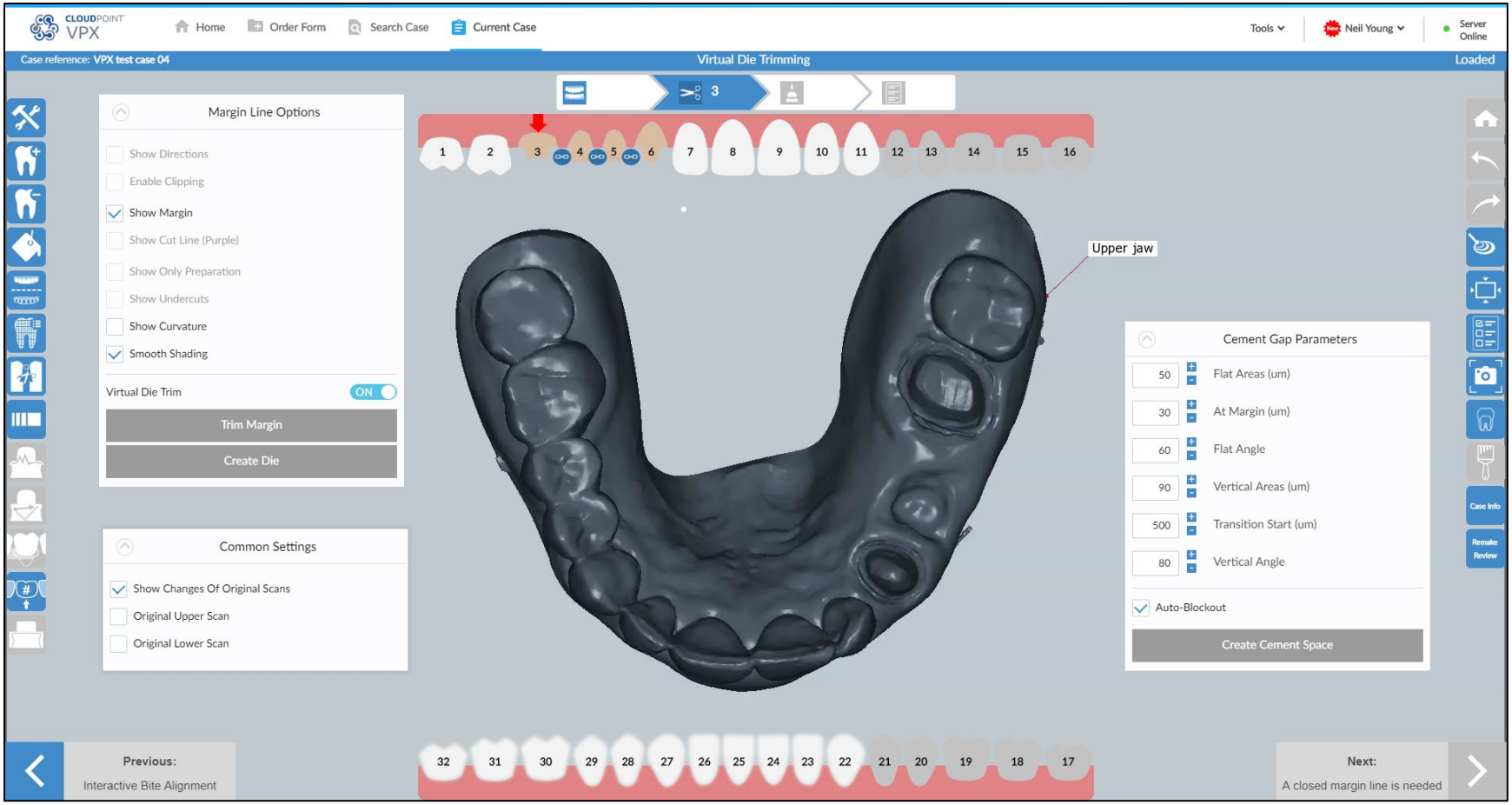
In the Alignment Pre-Preparation stage, this button allows for the separation of the case into three screens. The lower left shows the bite scan, while the lower right screen shows the original scan (in gold if selected in VPX Options).

The top screen shows the combined image, with the user having the option to select whether the upper or lower jaw is viewed.




Next:
Virtual Die Trimming (30)

Virtual Die Trimming Stage



At this stage, the following margin-specific tools appear on the left side vertical menu bar:

Relax Margin Line 

This tool helps smooth out any rough or sharp lines in the margin.
The more you click on the tool, the more the margin line will smooth out.
This makes it easier to place the margin where needed.

Reroute Margin 

The Reroute tool can be used to move the margin line more efficiently than manually moving the margin.

1. Click a dot to create a starting point.
2. Go around the margin to add as many points as desired.
3. Click the connecting dot and the margin will be rerouted.

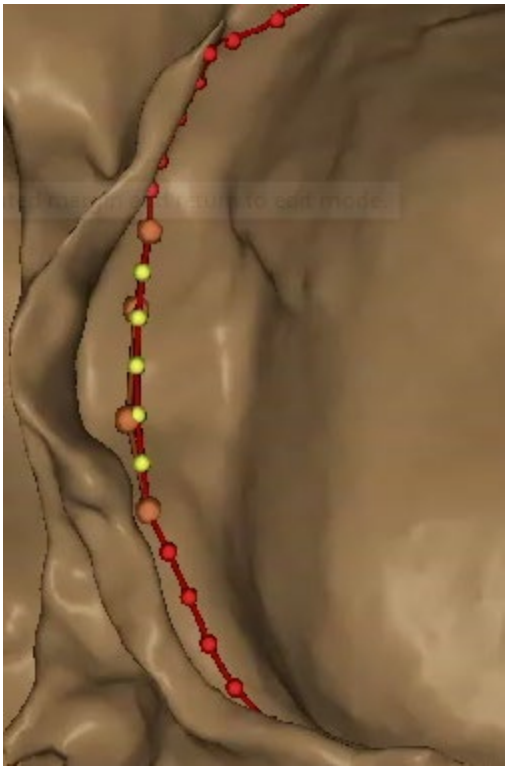
Spline Reroute 

The Spline tool helps reroute the margin under scan data that should not be there, such as saliva or gingival tissue. This can cause a hidden or unclear margin.

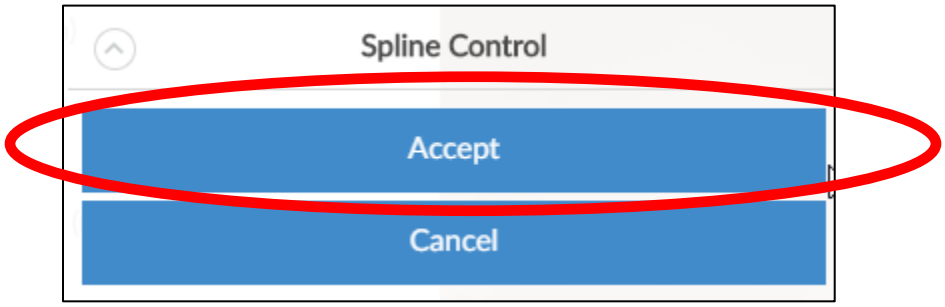
1. Click a margin dot to mark the starting point.

2. Click on another dot to mark the end point.

3. The line segment will disappear. Adjust if needed.
4. Flip the scan over to see where the margin has been rerouted under the model.



5. Click **Accept**.



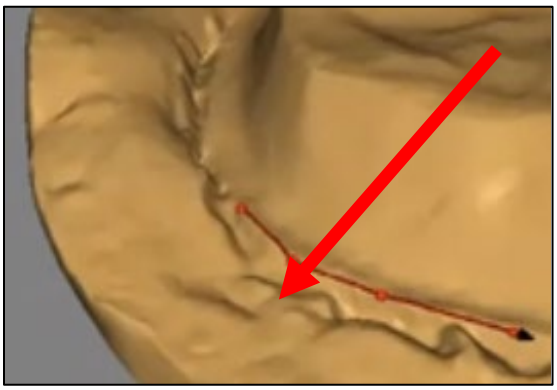
Change Tooth ID 

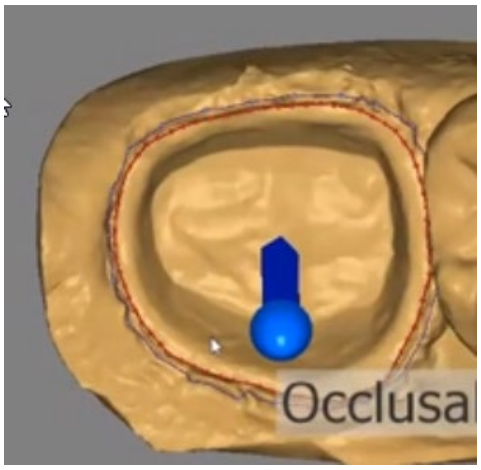
1. Select single preparation on toothchart(bridge not supported)
2. Select new position for preparation
3. You cannot select new position on another jaw if margin was created
4. If you need swap tooth numbers to each other use tooth without preparation as buffer
5. All changes will be applied and case will be reopened in the first command after exiting the mode

Set the Margin

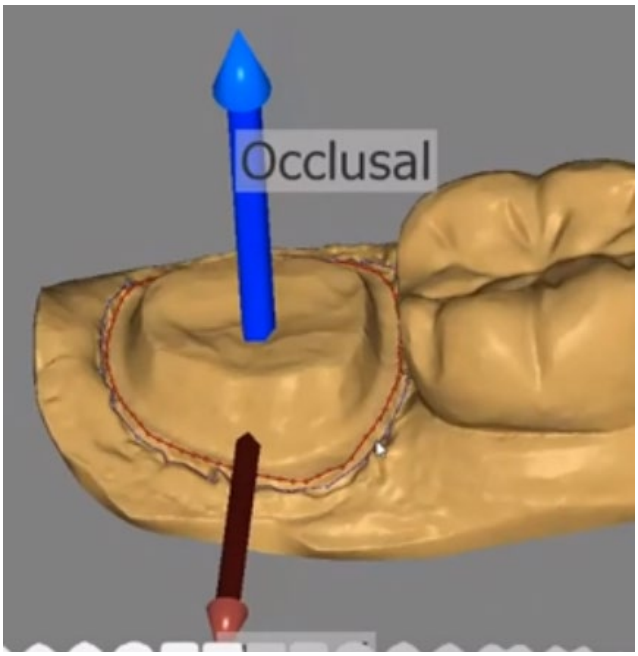
1. Left-click to create points around the prep tooth to set the margin; the points link together.

2. Continue until the margin comes full-circle and closes.

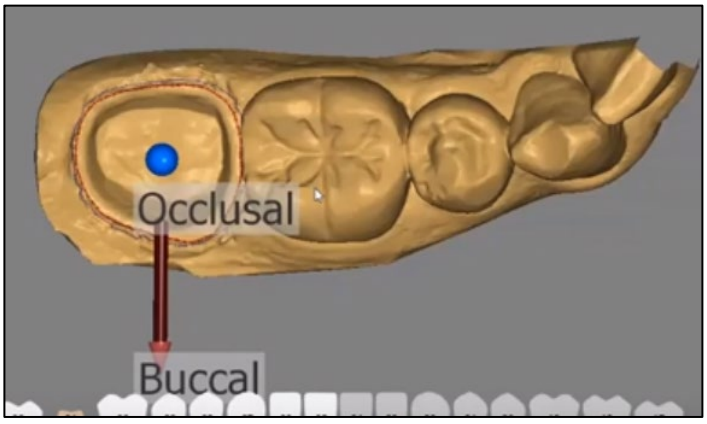




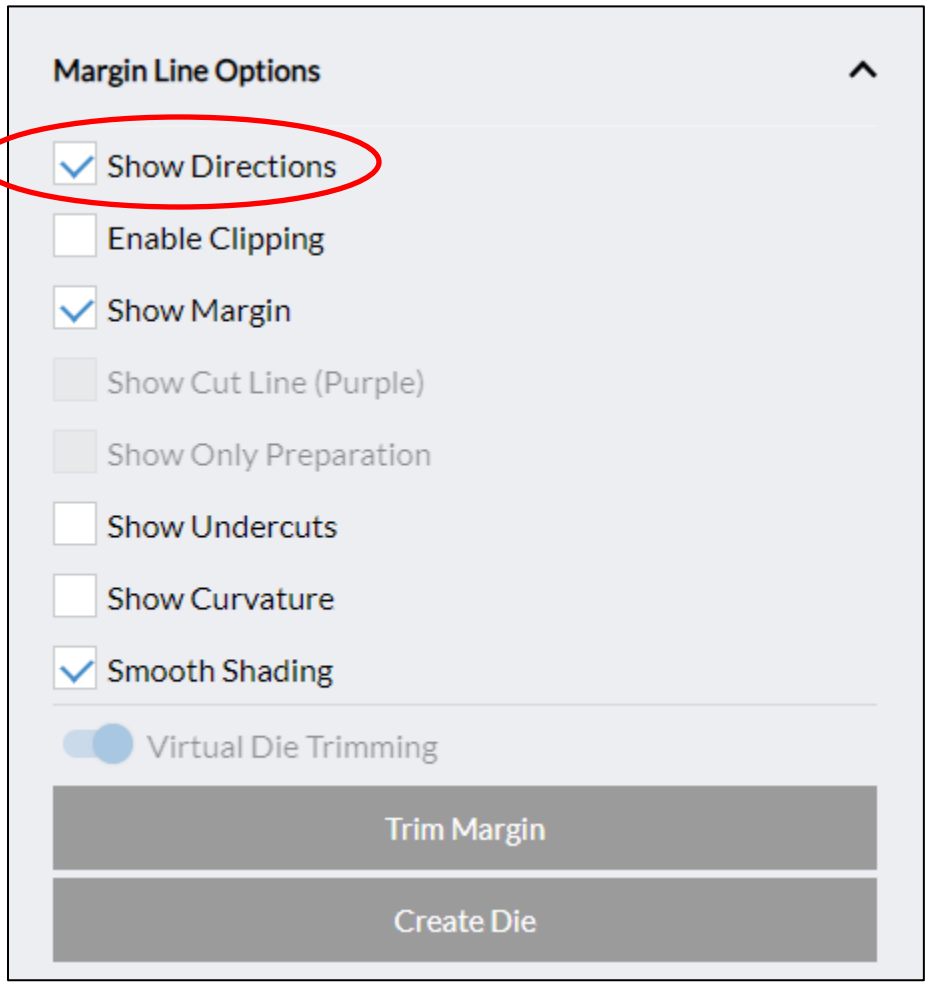
3. Once the margin is set, the Occlusal (Blue) and Buccal (Red) arrows appear.



4. User must set the direction for these arrows.
5. Double-click on the blue arrow. Align the arrow by looking directly above the occlusal direction.
6. Set the Buccal (red) arrow towards the buccal side of the prep.

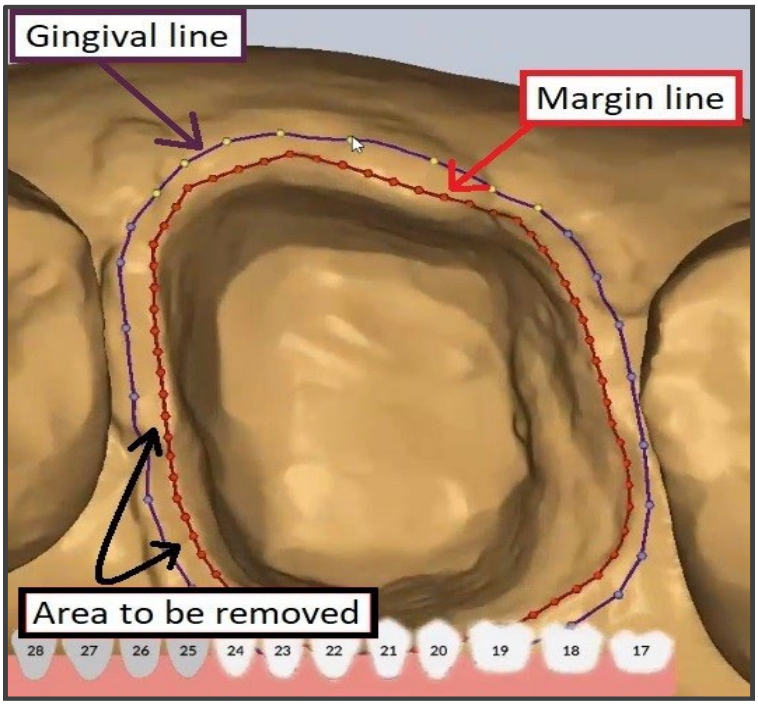


7. To toggle off the arrows, clear the **Show Directions** box in the Margin Line Options.

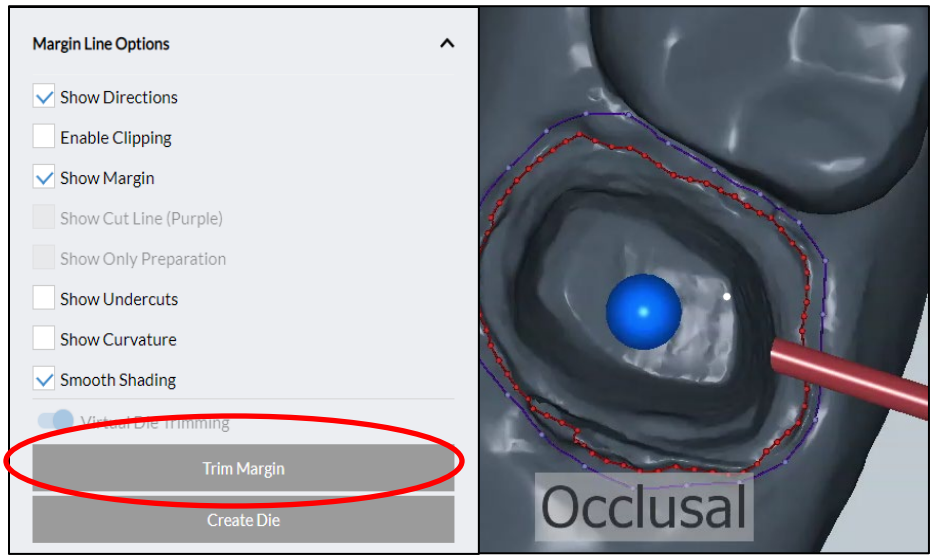


Separating the Margin and Gingival Lines

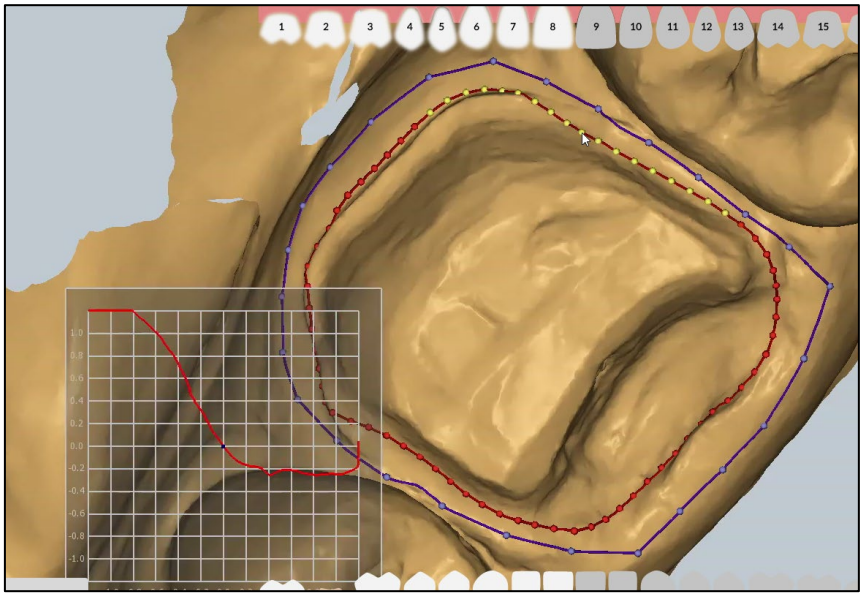
1. Click and drag the margin line (in red) and the gingival line (purple)
2. Keep the margin and gingival lines apart.



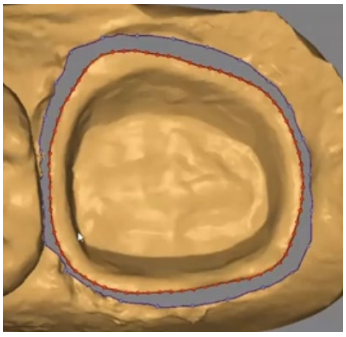
3. Once done, click **Trim Margin**



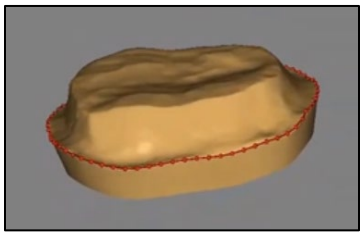
4. When clicking on the full margin point, a graph appears displaying the highest and lowest points on the margin.



5. The area between the gingival and margin lines will show in gray.



6. Click Create Die.



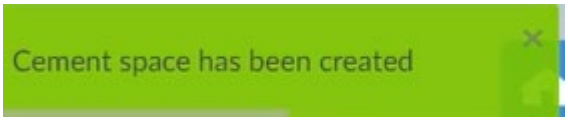
Auto-Blockout (Optional)

Auto-Blockout will be automatically selected, and may be deselected if the user wishes.

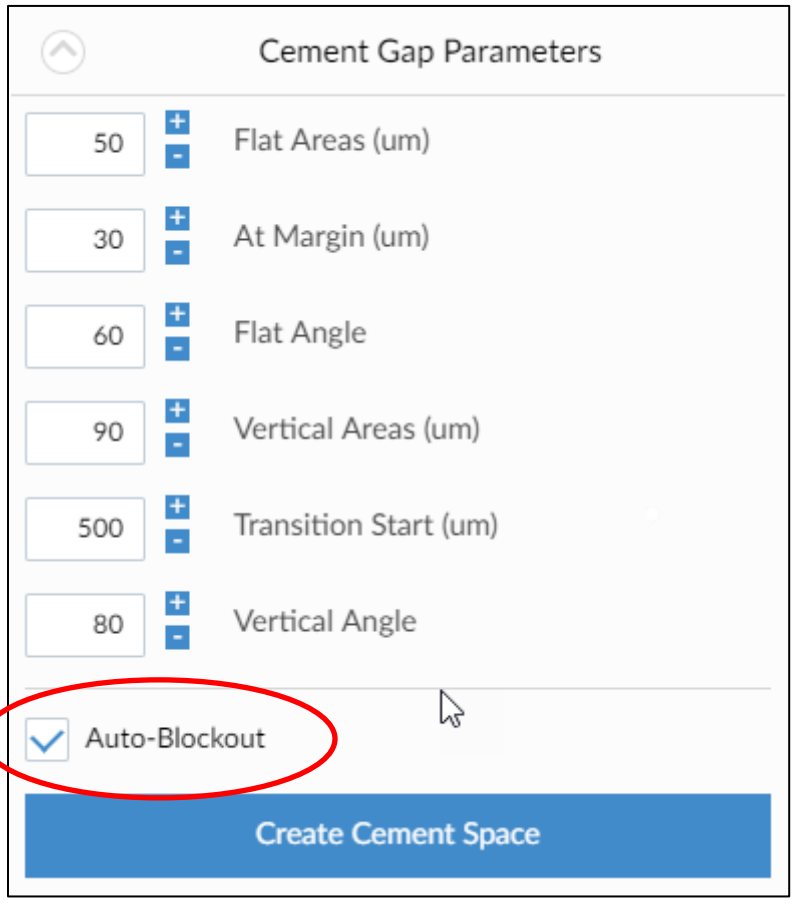
This feature automatically blocks out the preparation by removing concavites. This will help improve overall seating for the doctor, and improve accuracy of milling.

Note: the tool will not block out 100% of cases. The user must still evaluate if manual block out is needed.

A window will display, showing a cement space has been created.



On the Cement Gap Parameters window, clear the **Auto-Blockout** box if desired.



Click **Create Cement Space**.

Change Tooth Number 

The Change Tooth ID button allows the user to select a new position for the preparation.

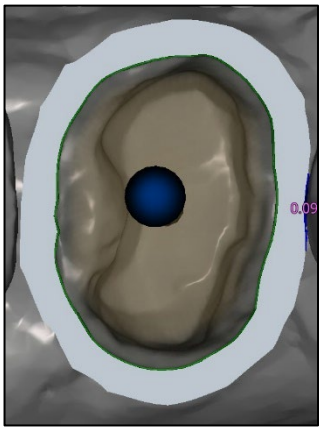
1. Select a single prepara
2. tion tooth on the toothchart (NOTE: bridges are not supported).
3. Select a new position for the preparation. NOTE: Users cannot select a new position on another jaw once the margin is created.

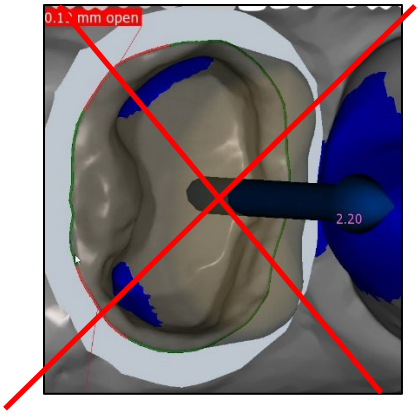
To swap tooth numbers to each other, use the tooth without preparation as the buffer.

All changes will be applied and the case will be reopened in the first command after exiting the mode.

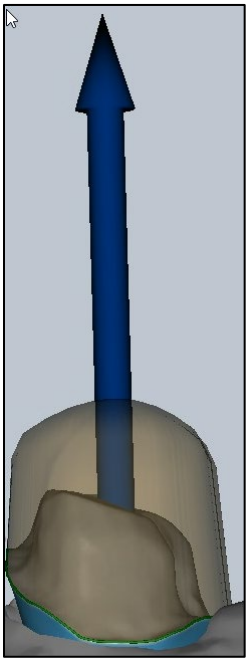
Edit Insertion Stage

1. Insert the correct path of the insertion.
2. Adjust the blue arrow where there is minimal undercut with the margin in full view.





3. Consider the contacts when inserting the direction.

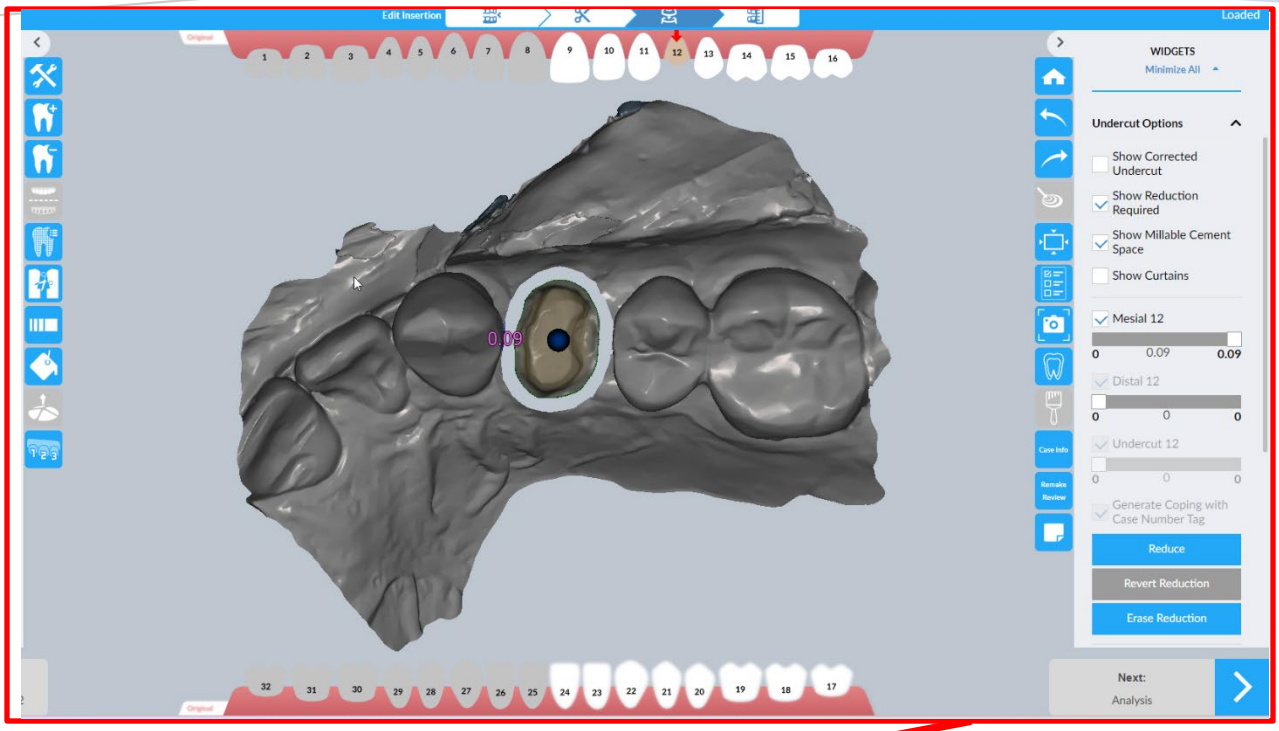


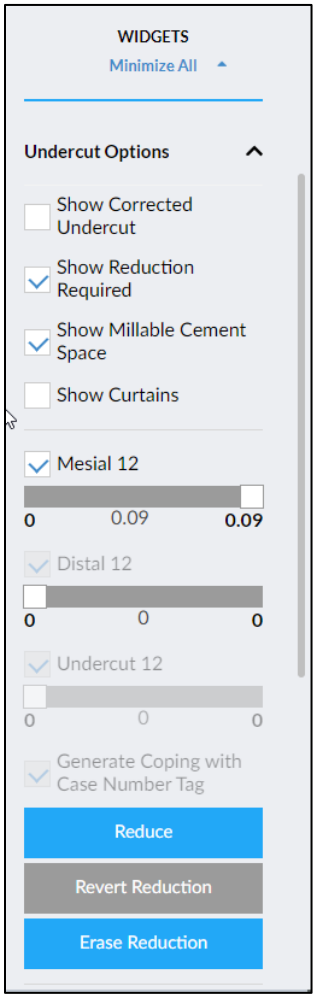
NOTE: Not doing this can cause insertion problems.

Processing Cases with Undercuts

Periodically, cases will present with an undercut. An undercut is a protrusion of the insert that will not allow for enough room for the crown to be inserted. When this happens, the insertion angle is incorrect and must be reset.

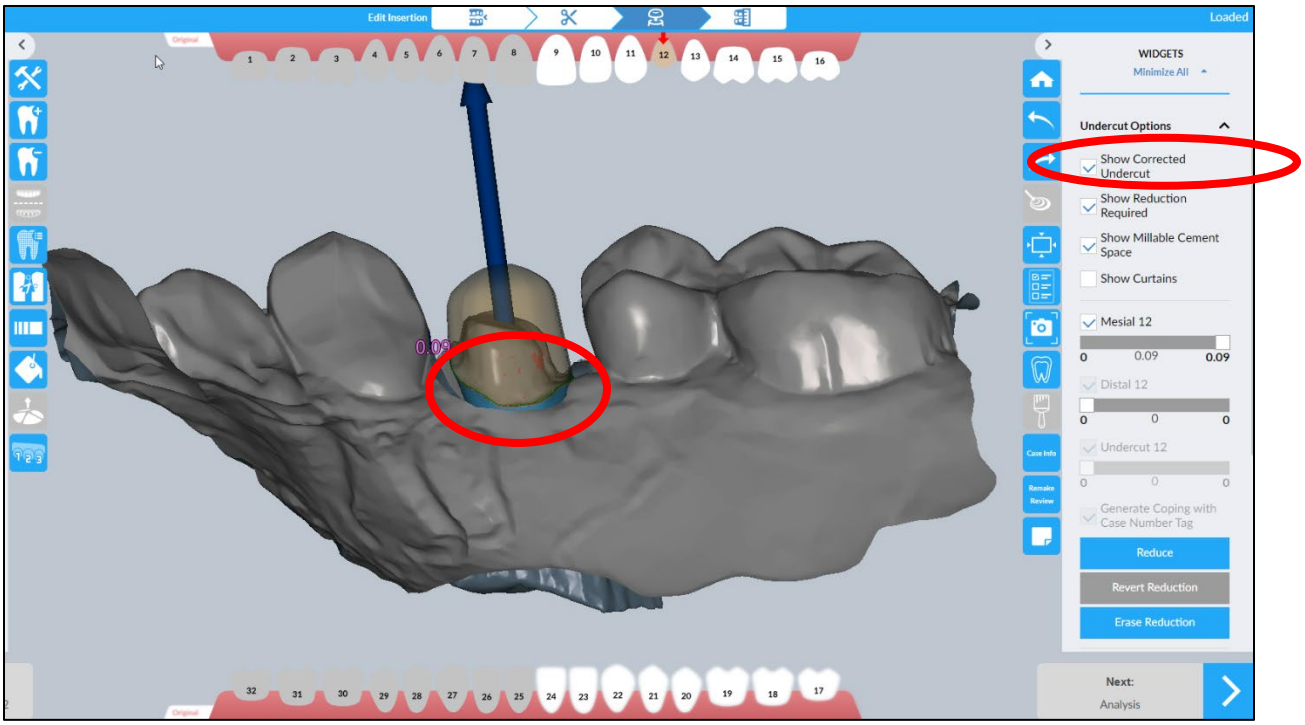
If an undercut appears, it will display on the Edit Insertion screen. The undercut areas will be identified by their measurements (in millimeters).



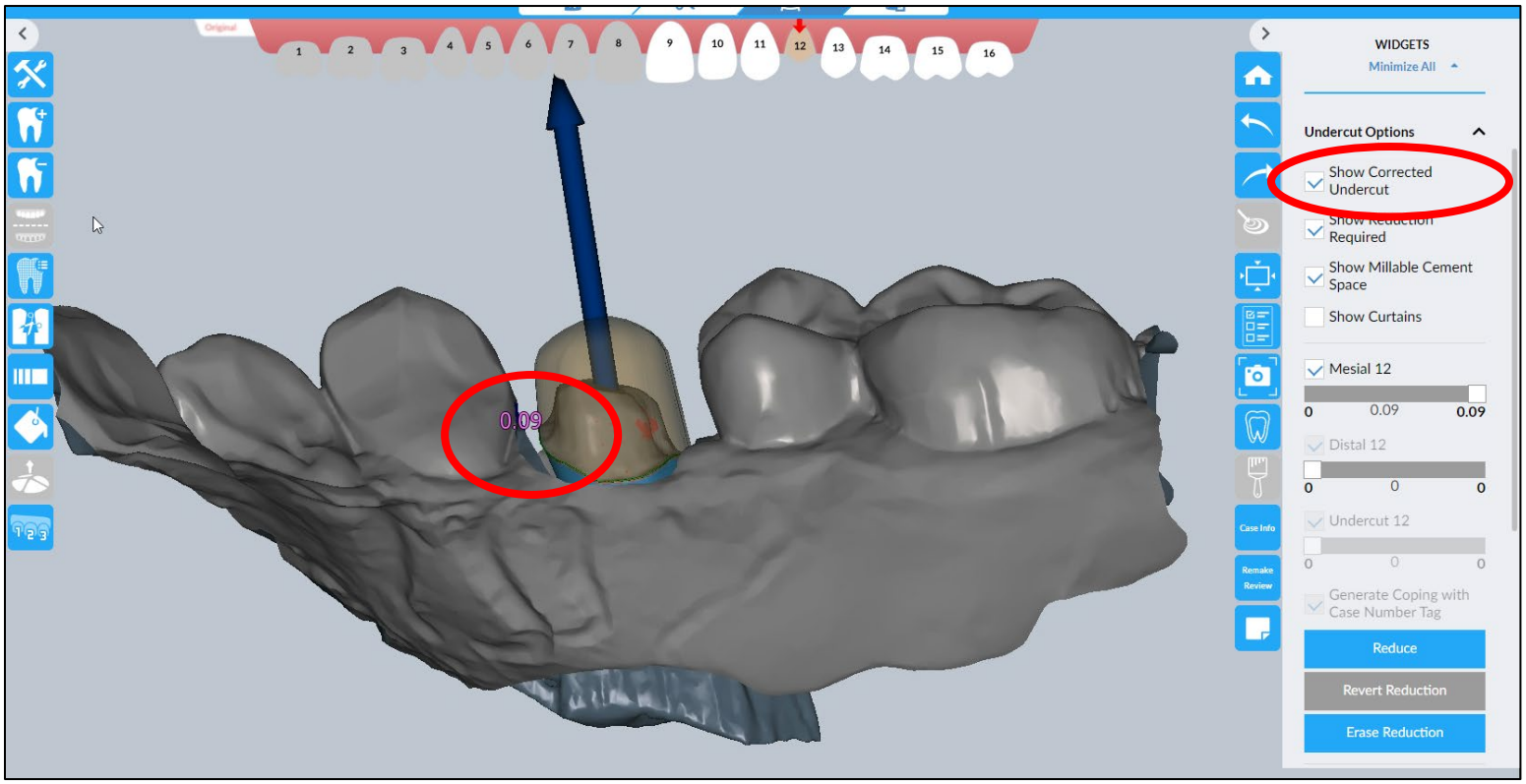


The Undercut Options Widget is central to the user's functionality. It has the slide bar to remove the undercuts value, as well as a selection of checkboxes that allow for a view of the various effects with the undercut.

Clear the checkmark in the **Show Corrected Undercut** checkbox. The actual undercut displays.



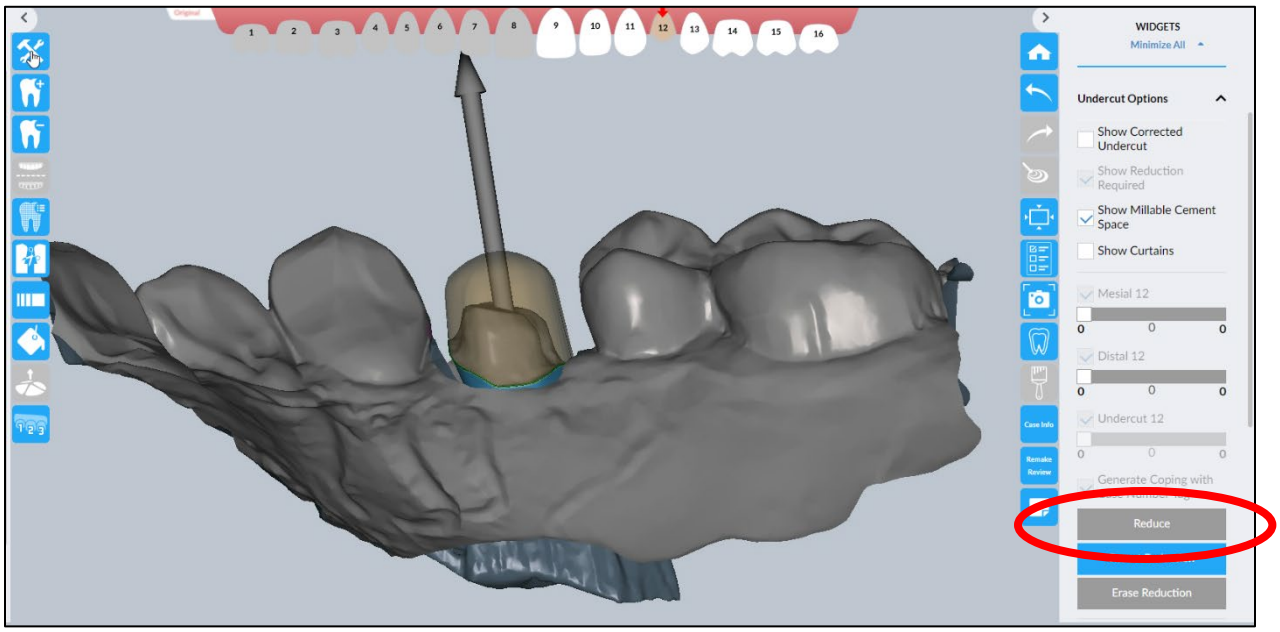
Select Show Corrected Undercut and clear Show Reduction Required. This will show, in pink numbering, the area of the overbite.



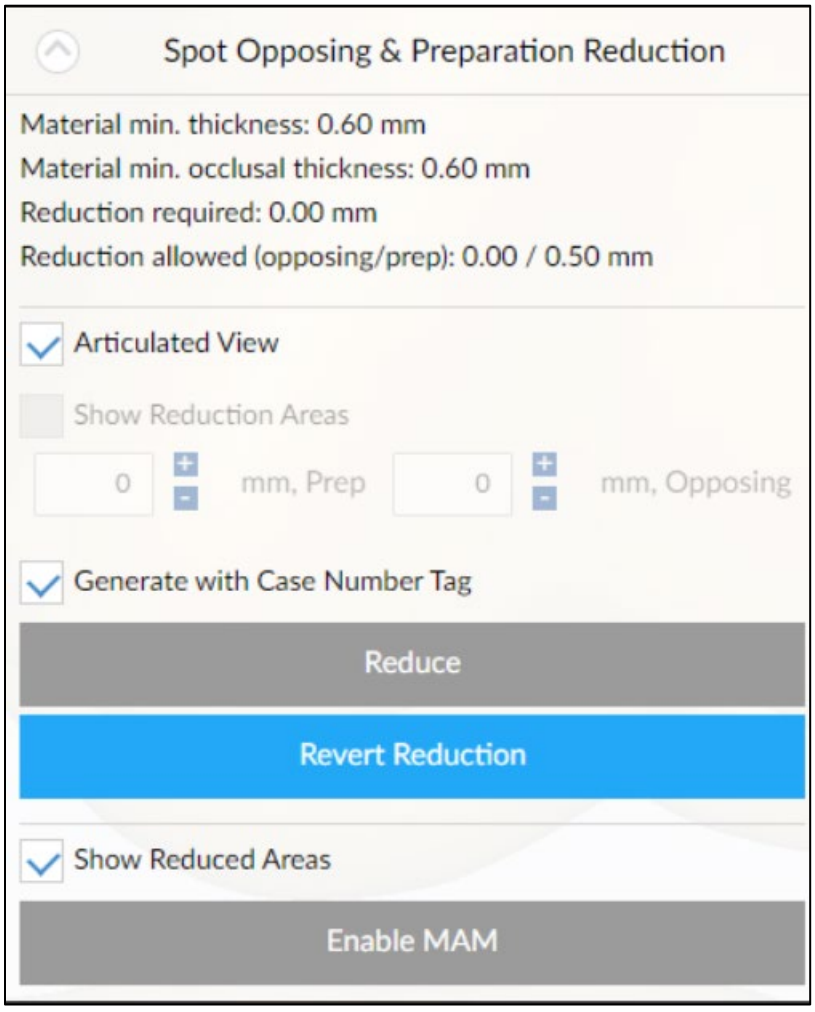
On the Undercut Options widget, use the slide bar to choose how much to reduce.

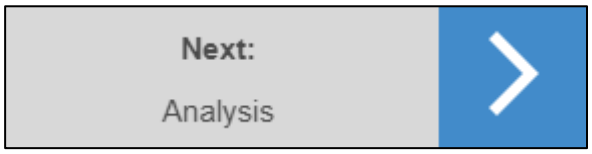
Click the **Reduce** button.

What has been reduced shows in purple.



Select the **Show Copings** box on the widget. The Guidance Coping file is exported to be 3D Printed





The Analysis Stage

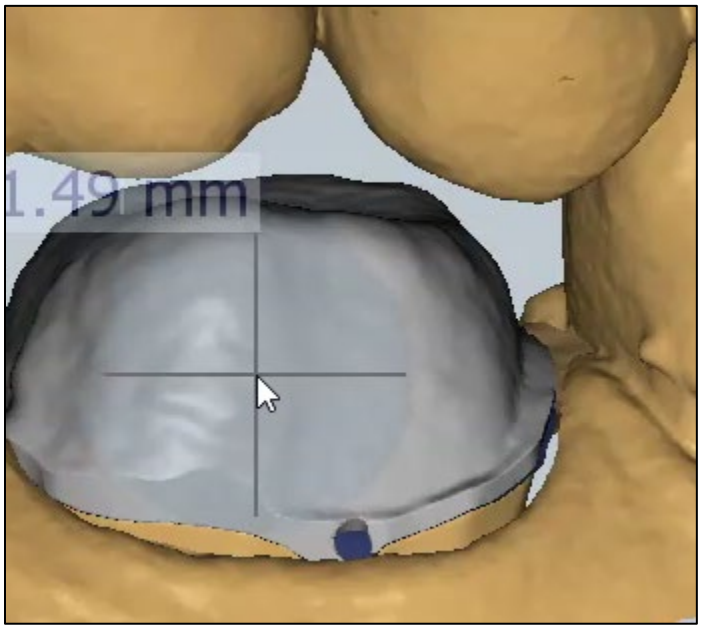
In the Analysis Stage, the user is able to make their last evaluation of the scanned data.

At this stage, the Freeform Tool displays.

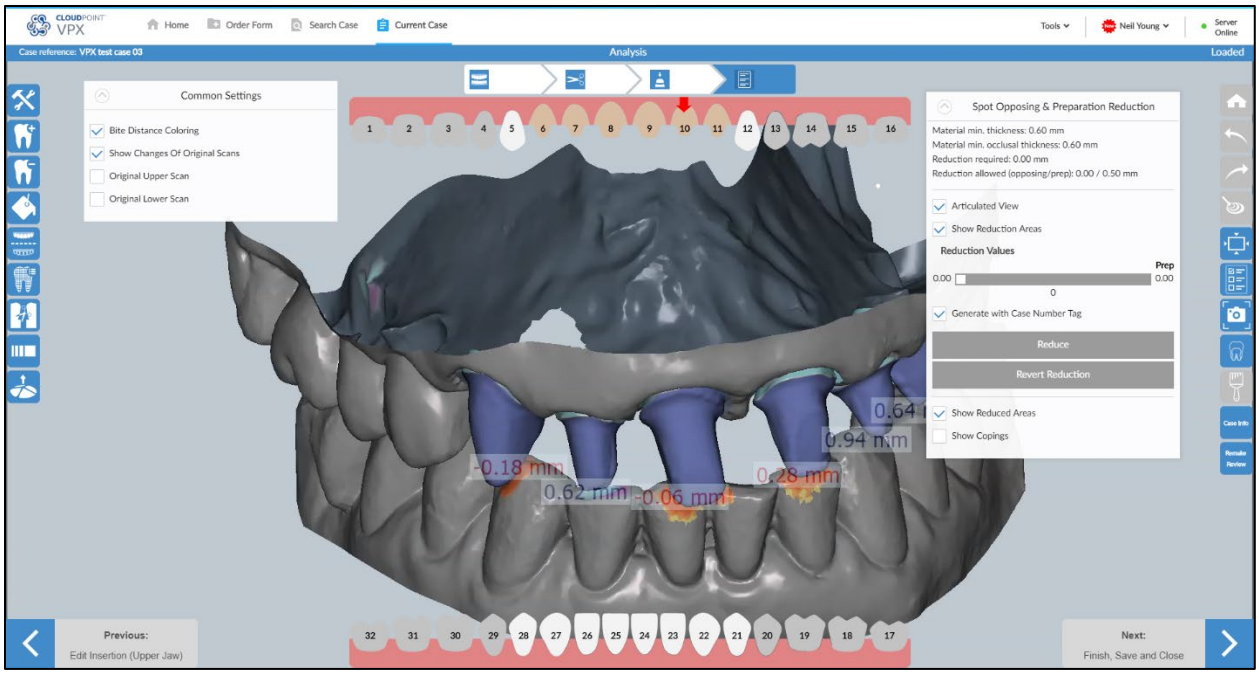
Freeform Tool 

This tool provides for deformation of the restoration. The deformation occurs in the plane of the display. Alternatively, the restoration can be deformed in a direction perpendicular to the surface by pressing Ctrl, then clicking and dragging on the restoration in the desired area.

The area the freeform tool acts upon is shown as a gray circle with crosshairs. This area can be made larger or smaller by adjusting the area of influence.



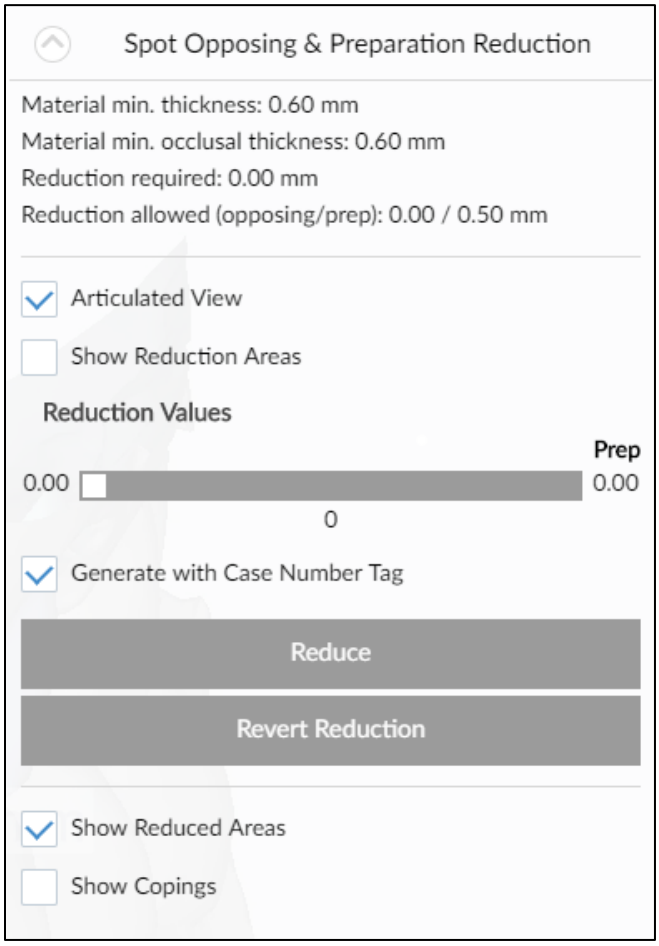
The stage will provide automatic calculations of the clearance. If there isn't adequate space for a restoration, the software will provide options to either virtually reduce the opposing or preparation scans (See Clearance Reduction, below).



Clearance Reduction

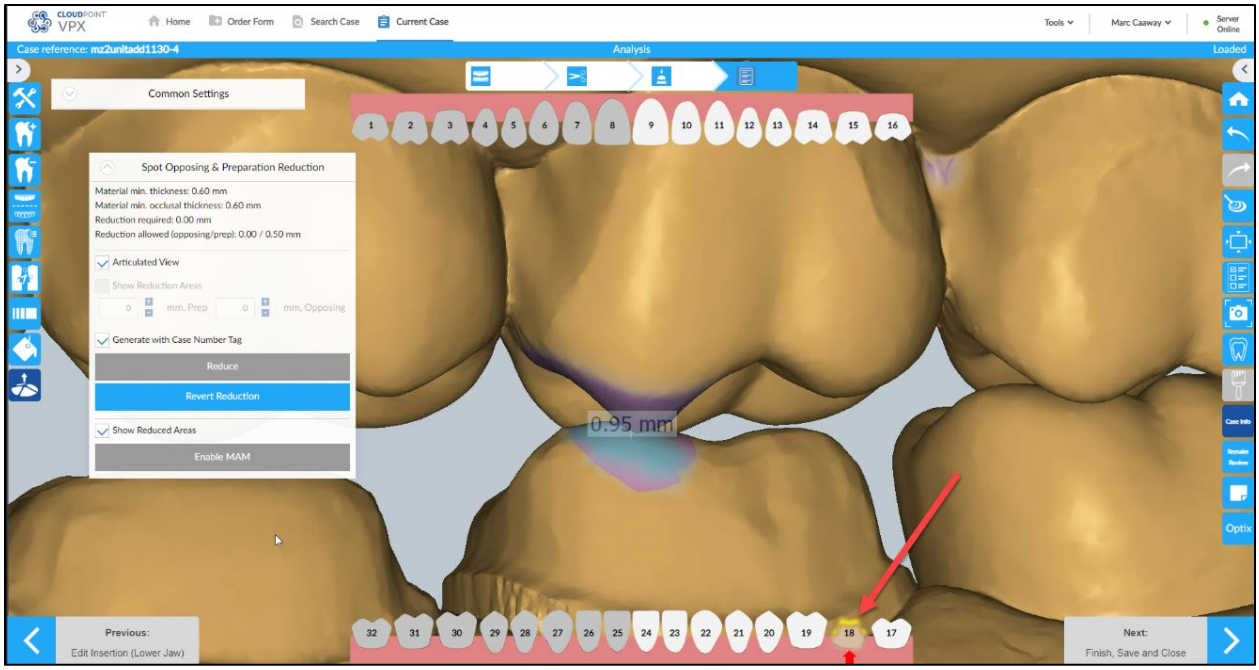
When there are clearance issues with the crown, the Spot Opposing & Preparation Reduction widget displays.

Using the Reduction Values sliding scale, the user has options to reduce the opposing only, prep only, or opposing and prep together. Even the distance out as much as possible, to try to save the natural opposing tooth.

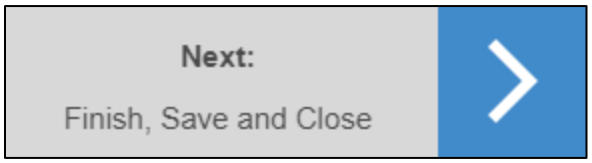


Once the Reduction Values have been set, click the Apply reduction button 

Click Show Modified Areas. The areas cut will display in purple.



Once satisfied, click Next to save and finish the case.

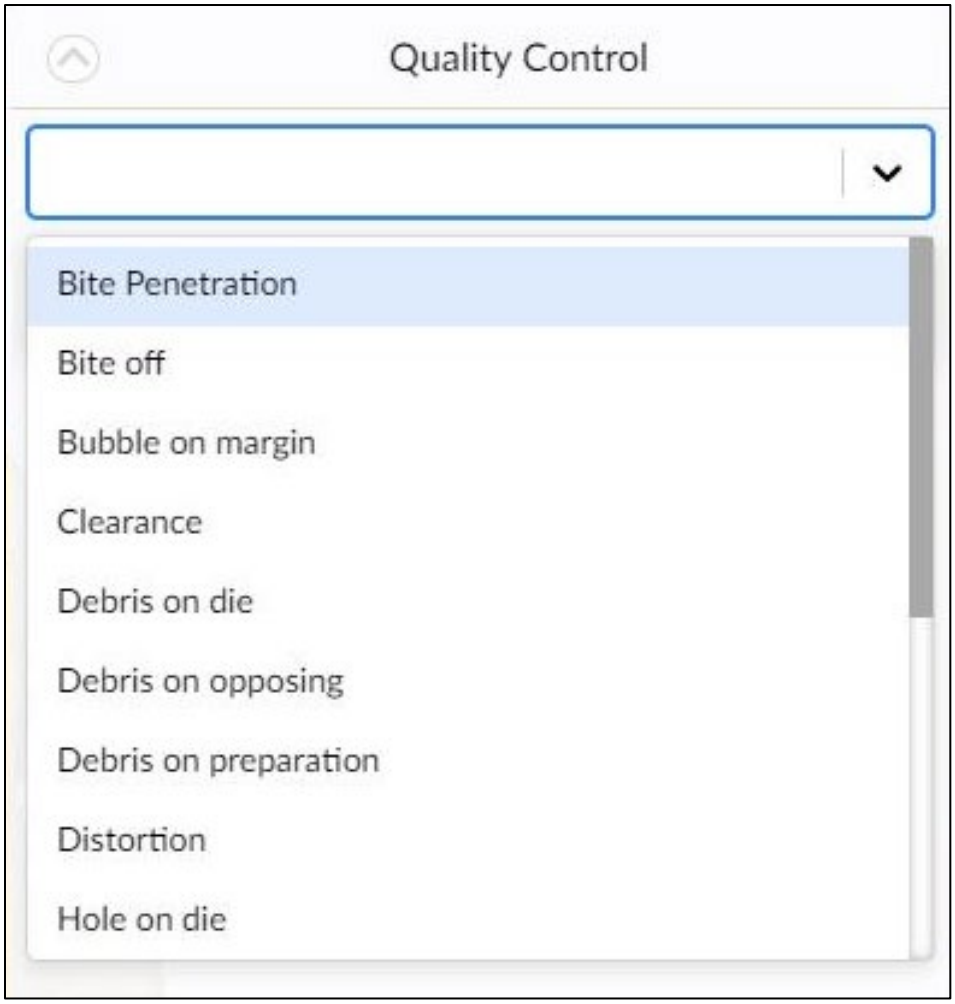


VPX-QC

The quality control for the VPX cases. After the case has been processed, it appears in VPX-QC worklists. This is not required, but this is the only method to get back to the case when the user is done with the case.

In the VPX filter, select VPX-QC:

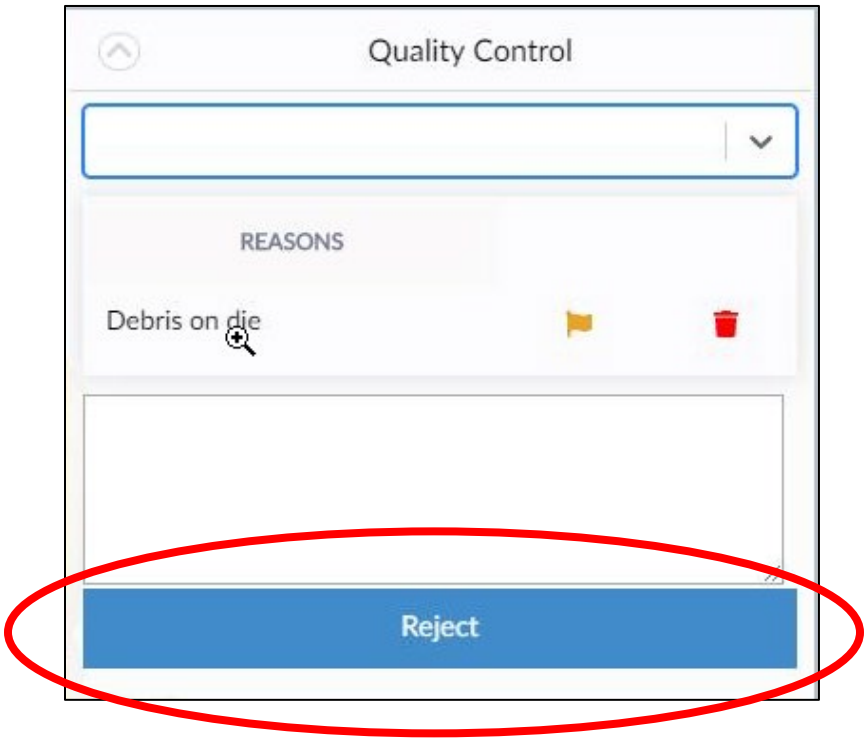
1. Click the VPX-QC case.
2. The case opens.
3. The Quality Control Widget displays:
    a. The Quality Control Widget has reasons for the rejection to highlight (see image below).



b. The Rejection Widget allows the user to input a reason for rejecting the case.

   i. Check the appropriate reason, along with any comments in the box near the top.

   ii. Click **Reject**



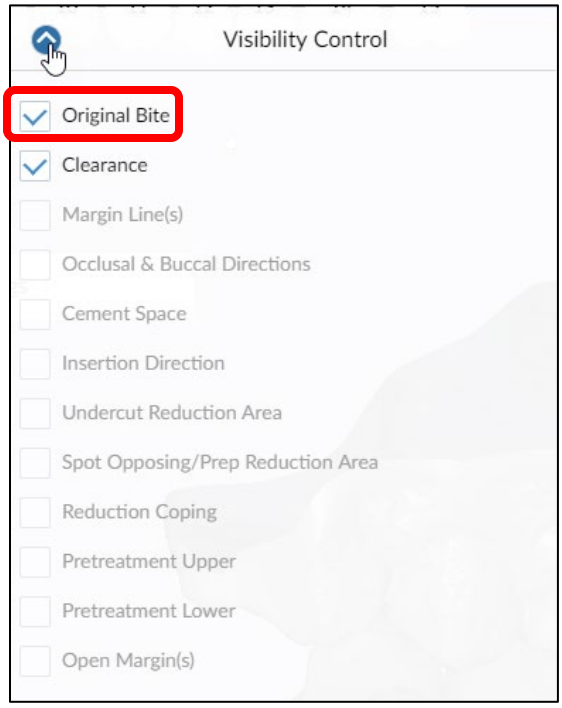
c. The Visibility Widget that allows for visibility reference.

NOTE: The QC stage allows QC to notify the user of the mistakes. The VPX technician is responsible for making the necessary adjustments.

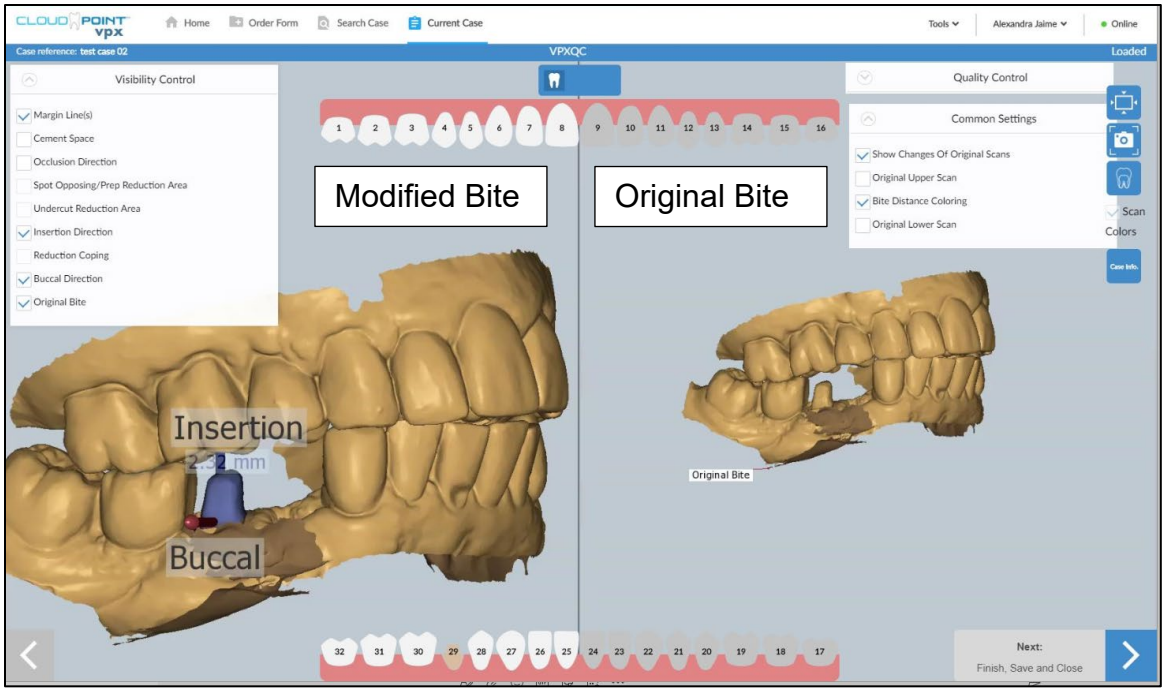
View of Original Bite

In order for QC to see the total affect of the work performed, the original bite image (before the adjustments) can be displayed in a split screen option with the modified bite image (after the adjustments).

To access this feature, select the **Original Bite** check box at the bottom of the Visibility Control widget.

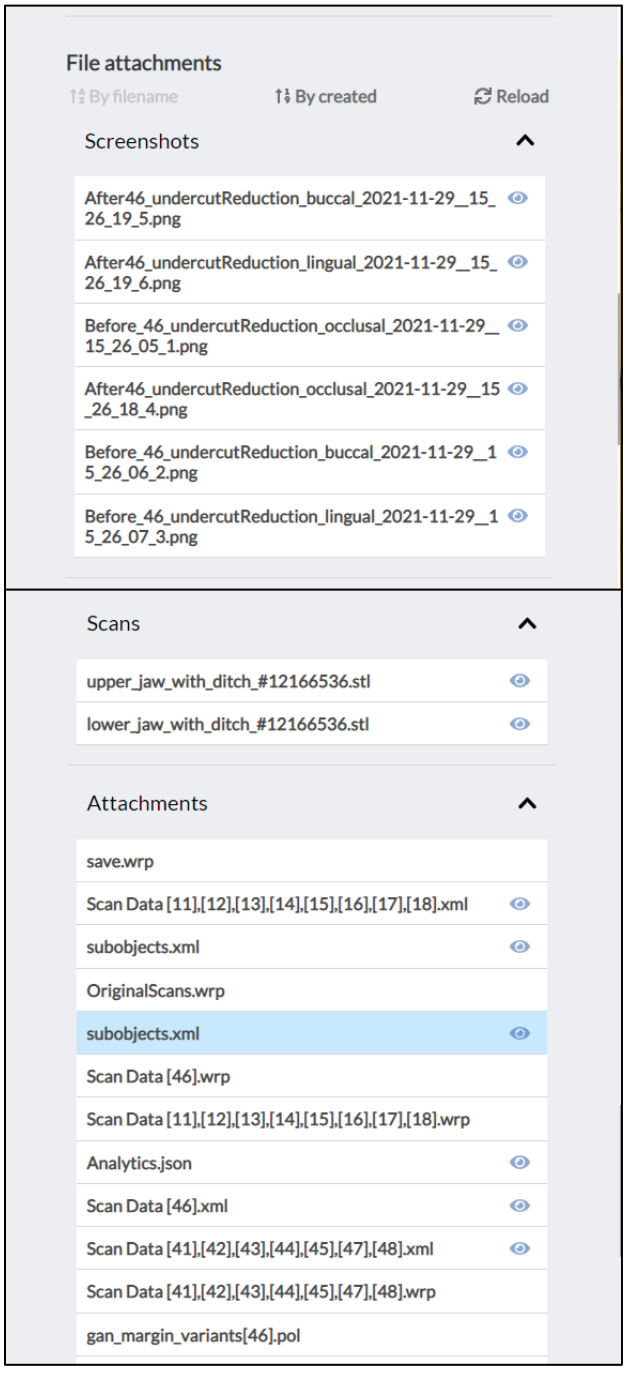


Selecting this box switches the screen to a split view.


Home
Order Form
Search Case
Current Case
Tools
Alexandra Jaime
Online
Case reference: test case 02
VPXQC
Loaded
Visibility Control
Margin Line(s)
Cement Space
Occlusion Direction
Spot Opposing/Prep Reduction Area
Undercut Reduction Area
Insertion Direction
Reduction Coping
Buccal Direction
Original Bite
Modified Bite
Original Bite
Quality Control
Common Settings
Show Changes Of Original Scans
Original Upper Scan
Bite Distance Coloring
Original Lower Scan
Scan Colors
Case Info.
Insertion
2.32 mm
Buccal
Original Bite
Next:
Finish, Save and Close

Case

At the bottom of the Case Widget is the dedicated area for listing the Screenshots, File Attachments, and space for Scans.



Troubleshooting Guide

Problem: Bite Alignment

Often, overlapping bites appear correct on the scan. If this is the case, the bite impression used to make the case was taken incorrectly.

This is corrected by hiding the opposing jaw and rotating the view until the user is looking directly above the occlusal direction. The arrow should be pointing directly at the point of view of the user, or occlusally.

To adjust the bite scan, please click on “Align Bite” and VPX will automatically align the bite.

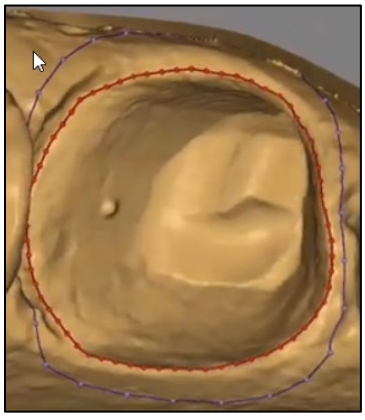
Problem: Bubbles in the impression

Bubbles that occurred in the initial impression come out as holes on the scan. When this occurs, use the Flatten Tool to fill in the holes.

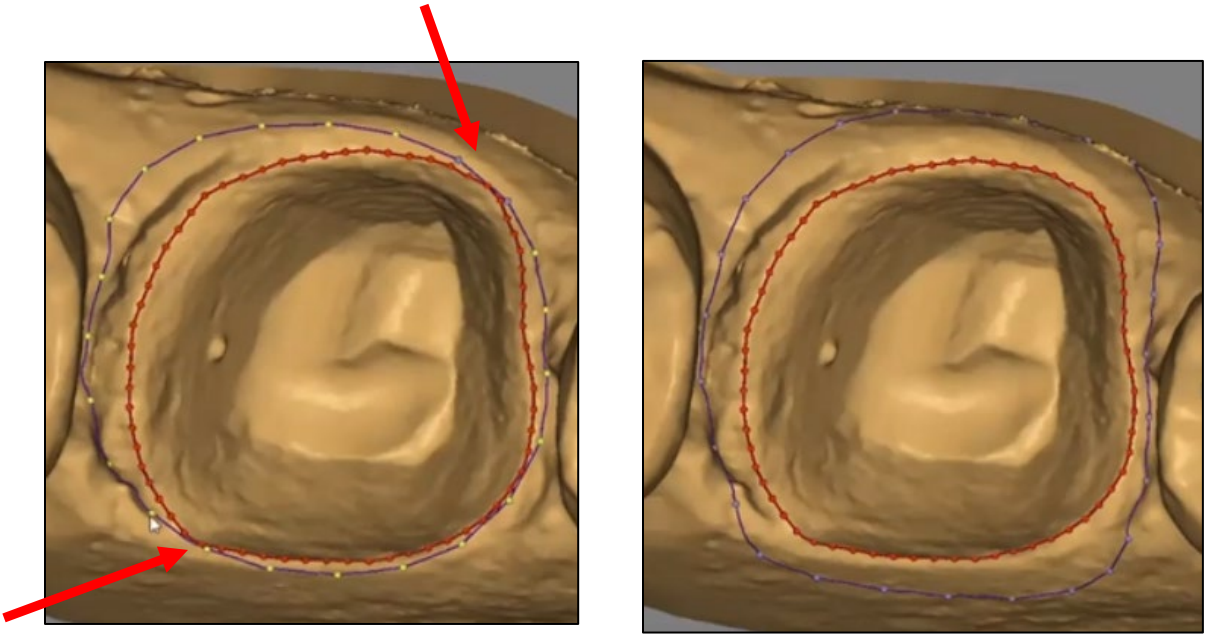
Problem: Margins

As often happens, the marginal line and the gingival lines touch. For the die to be valid, these lines must not touch at any point on the scan. It is often easy to overlook due to the angle of view.

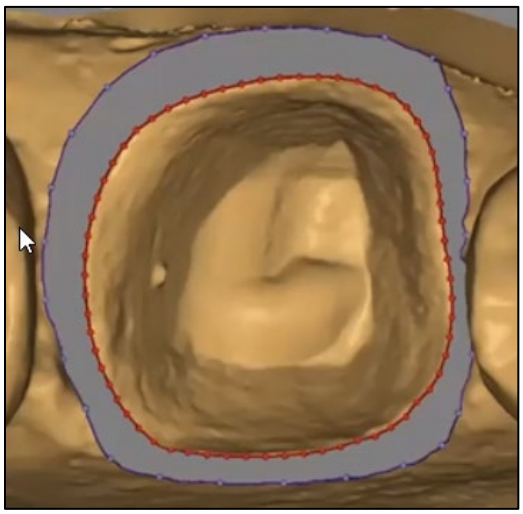
In the image below, for example, the left-hand side of the lines cannot be seen. As such, the user cannot tell from that angle if the marginal and gingival lines are touching or not.



In order to assure the lines are not touching, change the angle on the view until is directly above the tooth. Carefully move the two lines apart, until neither line touches the other. See right image.



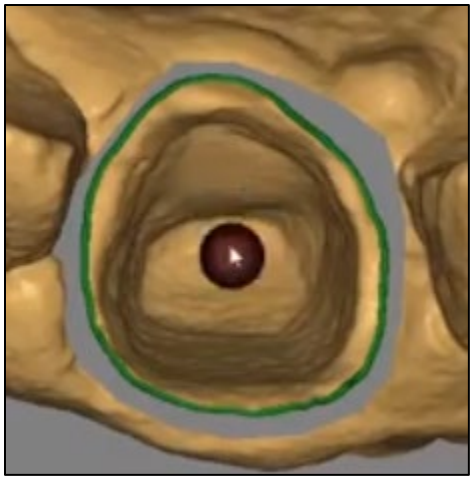
When the margin is trimmed, a single gray line of varying thickness will surround the tooth (as shown below). Note the scan in the gray area is deleted.



Problem: Insertion Direction

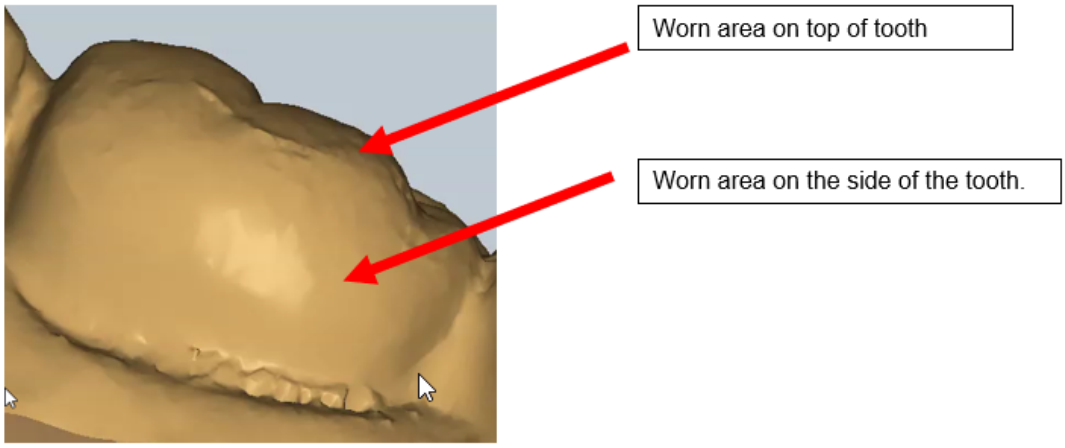
In some instances, the insertion direction will be off and require recalibration.

At the insertion direction stage, the user must select the correct path of insertion. This will happen along the angle of the blue arrow. Be sure to adjust where there is minimal undercut and the margin is in full view. Consider the mesial and distal contacts when setting the insertion direction, as this can potentially cause insertion problems.



Problem: Extra Gingival Around the Contacts

For the best methods to work with material interference with the margins, see Margin Specific Tools.



Problem: Bite Articulation and Equilibration

Many bite captures in the triple tray impression are often incorrect. Technicians need to pay close attention to this possibility, as it will likely cause low or high occlusion complaints from the customer.

When looking at the case, look for substantial wear on the teeth. Often, they will appear as worn on the top, as seen below. The worn areas will show, especially from a close-upside view. Look for the worn areas on top abd on the side, which will stand out.

Often in our business, the doctor will not always follow the recommended procedures for taking an impression. The procedure might be rushed at the doctor's office, or there might be problems in the material or the way it is used. In a number of cases, the doctor may not trim the tooth properly, and even the process of pureeing the impression and making the preparation can be flawed.

Even if the technique for creating the impression was done correctly the results can be altered by the condition of the gums (swollen, abscesses, scarring, etc.) which is extremely common. As such, imperfections in the impression occur often and lead to open margins.

Open margins become a problem when plaque (which is mostly mold and bacteria) develops under the crown, especially when food bits are caught in the open area. This can eventually cause decay (commonly known as caries) around or under the restoration. This decay under the crown can go undetected until the infection reaches the nerve and causes an abscess, sensitive or bleeding gums, bad breath, as well as 'catching' the tongue and cutting the inside of the mouth. If left untreated, this condition will necessitate the tooth being removed.

Ideally, there should be a smooth transition and seal between a restoration and the surrounding tooth. No gaps, spaces, grooves or jagged areas.

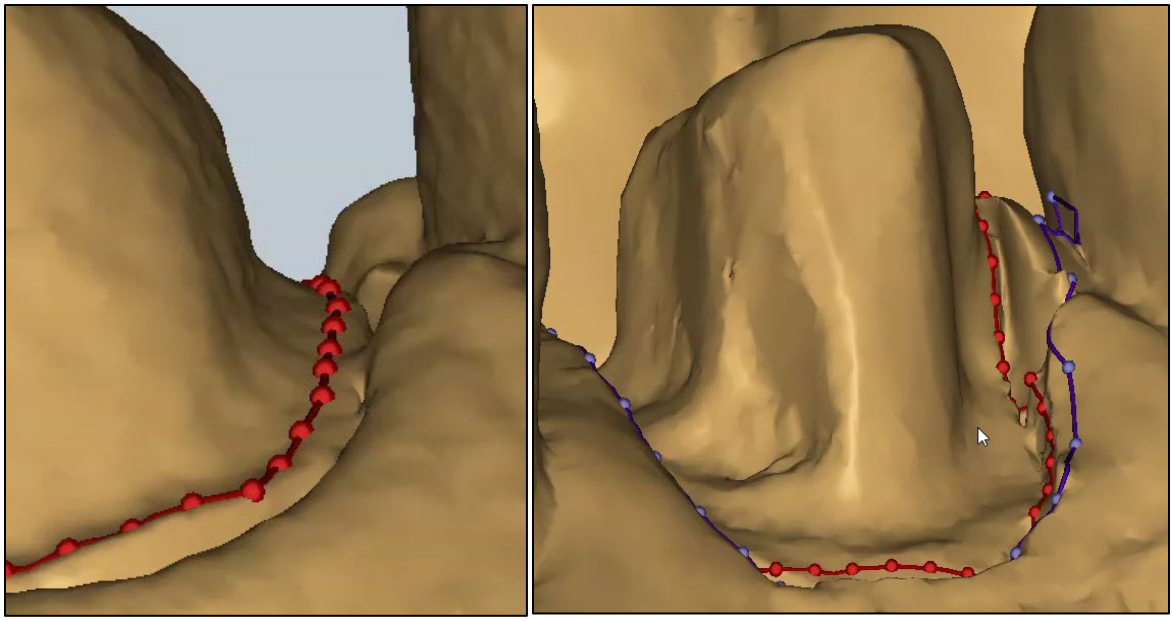
One common example is the double cord impression technique.

This technique can go wrong in many ways. One of the prime reasons is the dentist taking the impression on inflamed tissue. With swollen gums, the margin will not show up properly or be unclear.

Improper application of the cord is another major problem. Improper cord sizes, cords not applied properly, and not wetting the cord properly are all reasons the impression can end up inaccurate.

Correcting this problem using conventional techniques relies heavily on plaster technicians to recover an unclear margin. This is time-consuming and error-prone.

With VPX, the unclear margin can be rerouted using the Spline Tool. As noted before, an unclear margin is any margin that is either steep or deep in the margin's line. Ideally, the margining should be fairly flat along the entire circumference of the tooth, as noted in the image to the left below. The image on the right shows an unclear margin, one that shows a steep rise.



In the right image, the Spline Tool is used to work under the margin. To do this, select the Spline Tool.

Problem: Scan Doubles

Periodically, a scan may show a double image. Such scans were not taken properly or had a software or hardware glitch. In such cases, we cannot process the scan. It must be referred back to the originating doctor.

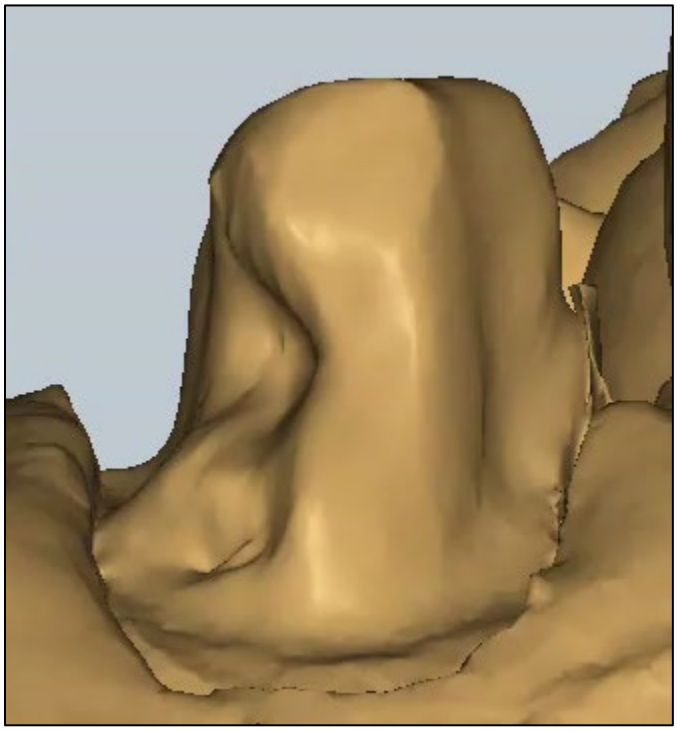
Problem: Holes in the Scan

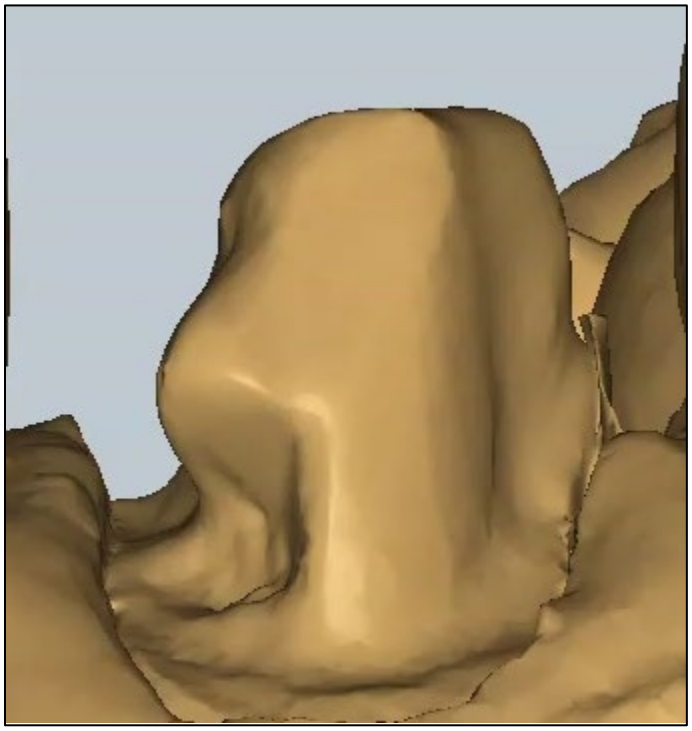
This occurs when the scan is incomplete, and there are holes in the original scan. The technician will not see this, as the software fills in the holes with flat surfaces. Any time a disproportionate number of flat surfaces is spotted in a scan, the originating doctor must be contacted.

Problem: Protrusions and Holes

There are cases where the dental prep has high-frequency features such as protrusions(right image, below) or holes (left image, below) that will prove impossible to reproduce when milling or printing the crown. As such, it's necessary to remove these difficulties using the VPX tools Flatten, Smooth, Surface Issue Repair (Mesh), Remove, Partial Fill Hole and Add, depending on the feature to be effectively blocked.

Special attention needs to be given to NOT shrinking the size of the prep, as this can lead to previously-mentioned problems with an open margin.





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Problem: QC Tech Rejections

In the case a QC Tech rejects the case, the VPX Tech opens the case and returns to the Bite Stage. The user then presses the Home button to undo all Bite adjustments. The user then makes the necessary corrections and finishes the case.

NOTE: The user shouldn't undo any other action made to the scans (clean up, trimming, etc.).

Problem: Unable to proceed with scan or unable to complete case in FD

At times there will be different type of mesh issues that will cause inability to proceed with case in VPX or could cause crashing in FastDesign. In order to prevent this it is important to use Mesh Dr tool to fix all issues on scan.