Training manual
H-5489-8405-05-A

RENISHAW
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Renishaw inciseCAD™ Training manual

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Renishaw part no: H-5489-8405-05-A

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Contents

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Before you begin

Introduction

Overview

This document will guide you through the process of installing and operating your Renishaw incise scanner and using it alongside inciseCAD to design a variety of different framework types in preparation for manufacture.

We recommend you use it in conjunction with the inciseCAD help files and the Clinical and Laboratory Recommendations, part no. H-5489-8500, which can be found on the dental homepage at www.renishaw.com/dental.

Safety

Information to the machine supplier / installer

It is the machine supplier's responsibility to ensure that the user is made aware of any hazards involved in operation, including those mentioned in Renishaw product literature, and to ensure that adequate guards and safety interlocks are provided.

If this product is not used in its intended manner, any protection provided may be impaired.

WARNING

Boxed Renishaw incise DS10 scanner: A two-person lift is required.

Tools and services

In order to follow this manual through and complete the process of machine installation, framework scanning / design and machine maintenance we recommend that you have access to the following:

- 13 A power
- PC (see 'System Specification' section)
- Cleaning kit, part no. A-5351-0060

Renishaw incise products

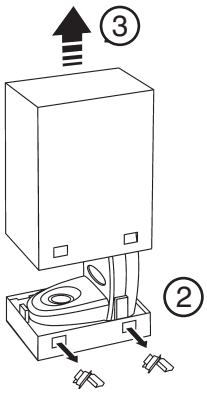
Hardware	
Renishaw incise™ DS10	Dental scanning machine for precise form analysis of a variety of dental models. Also referred to as the scanner or scanning machine.
Renishaw incise™ DM10	Dental milling machine for precise machining of frameworks from a selection of incise billets. Also referred to as the mill or milling machine.
Software	
Renishaw inciseCAD™	Used alongside the incise DS10 to design frameworks and submit them for manufacture. Also referred to as CAD.
Renishaw inciseCAM™	Used alongside the incise DM10 to manage and position the CAD design data prior to milling. Also referred to as CAM.
Frameworks / materials	
Renishaw incise™ LaserPFM™	Non-precious, cobalt chrome frameworks manufactured centrally using a unique DMLS manufacturing process. Also referred to as CoCr or cobalt chrome.
Renishaw incise™ Zr100	Zirconium dioxide frameworks manufactured locally or centrally using the incise DM10. Also referred to as ZrO_2, zirconia, Zirconia 0-3 (various shades) or Y-TZP.
Renishaw incise™ PM100	Polymethylmethacrylate frameworks manufactured centrally for temporary crowns or bridges. Also referred to as temporary PMMA, Temporary PMMA 1-4 (various shades) or PMMA.
Renishaw incise™ WX100	Investment wax frameworks manufactured locally or centrally for lost-wax casting of semi-precious or precious metals. Also referred to as burnout wax or wax.
Renishaw incise™ LaserAbutments™	Custom-made device intended for aiding prosthetic functional and aesthetic rehabilitation. Available as screw-retained or cement-retained. Also referred to as custom abutment, single piece / multiple abutment, waxup abutment or screw-retained crown.
Renishaw incise™ Realistic	Zirconium dioxide fabricated in such a way to give extra translucency for full-form restorations that can be manufactured centrally or locally. Also known as full contour zirconia (SCZ) or translucent zirconia (TZi).

Installation and set-up

Hardware installation

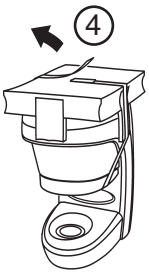
Unpacking the machine

1. Remove the outer box and follow the instructions printed on the box inside.

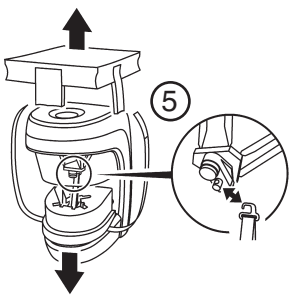


2. Remove the 4 × retaining clips.

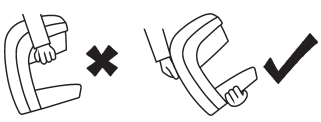
3. Remove the outer cover and place the machine on a solid work surface.



4. Undo the strap that holds the mechanism packaging.



5. Remove the transit packaging by unhooking it from the probe body.

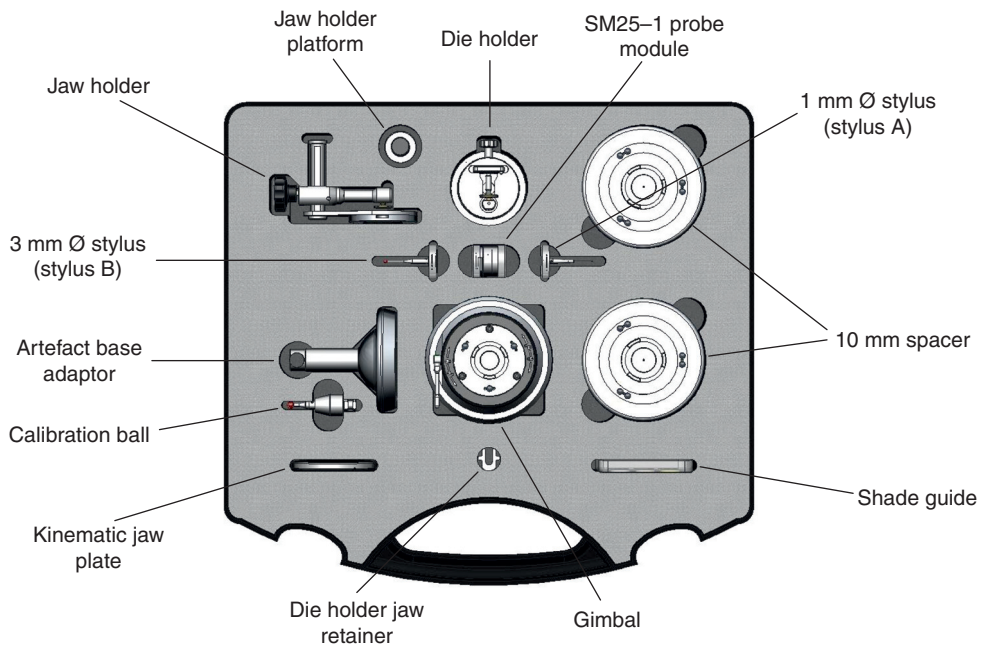


6. Lift the DS10 scanner from the packaging and place on a solid work surface.

Inside the box

- 1 × Renishaw incise DS10 scanner
- 1 × power supply (specific to region)
- 1 × USB cable
- 1 × accessories kit

Accessories kit



To view a list of all available parts, see the 'Parts List' section at the rear of this document

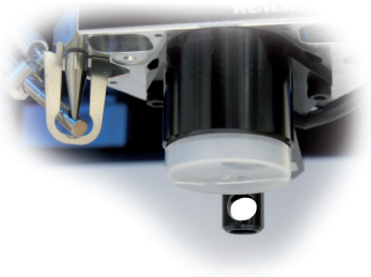
Loading the probe module

The probe module needs to be connected to the probe body to enable the measuring system to operate.

CAUTION: Do not touch the glass window as it can impair the accuracy of the scanned data.

1. Remove the probe module from the accessory case and remove the protective end caps.

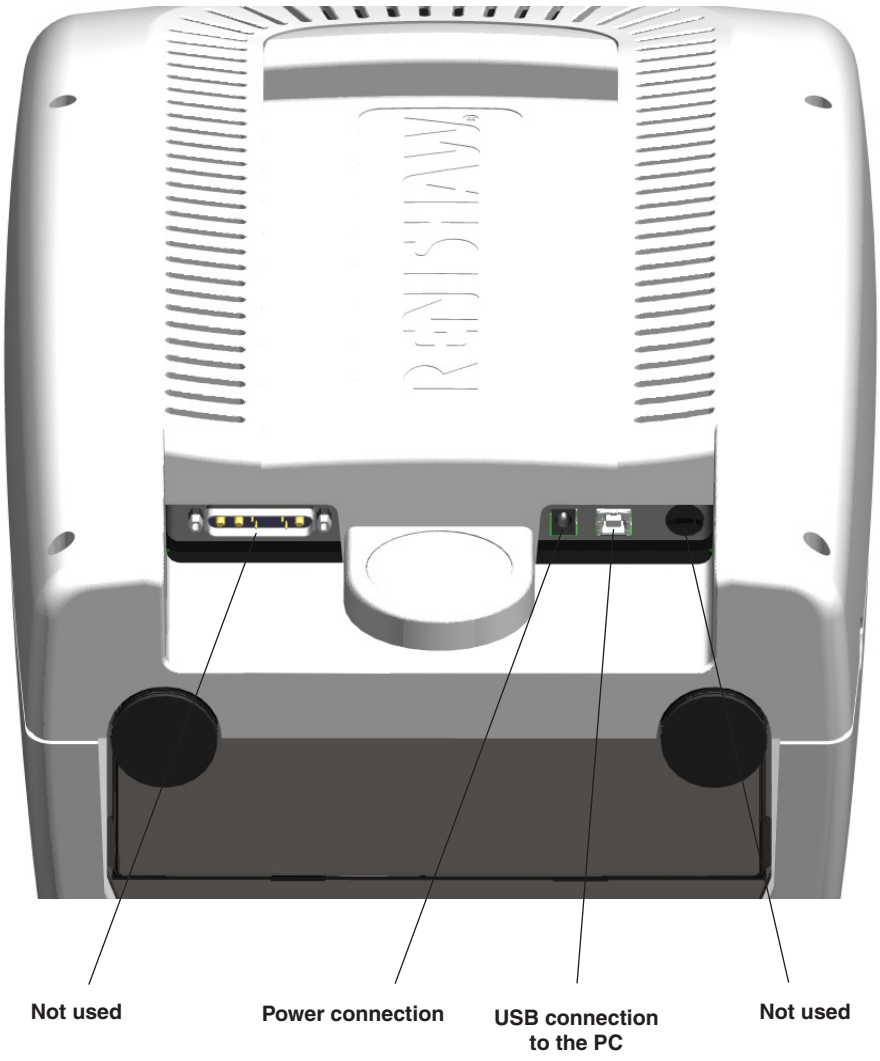
2. Remove the end cap from the probe body.



3. There is a magnetic location system that retains the module in position. Align the front of the probe module (indicated by the dot marker above the word 'Renishaw') with the front of the probe body.

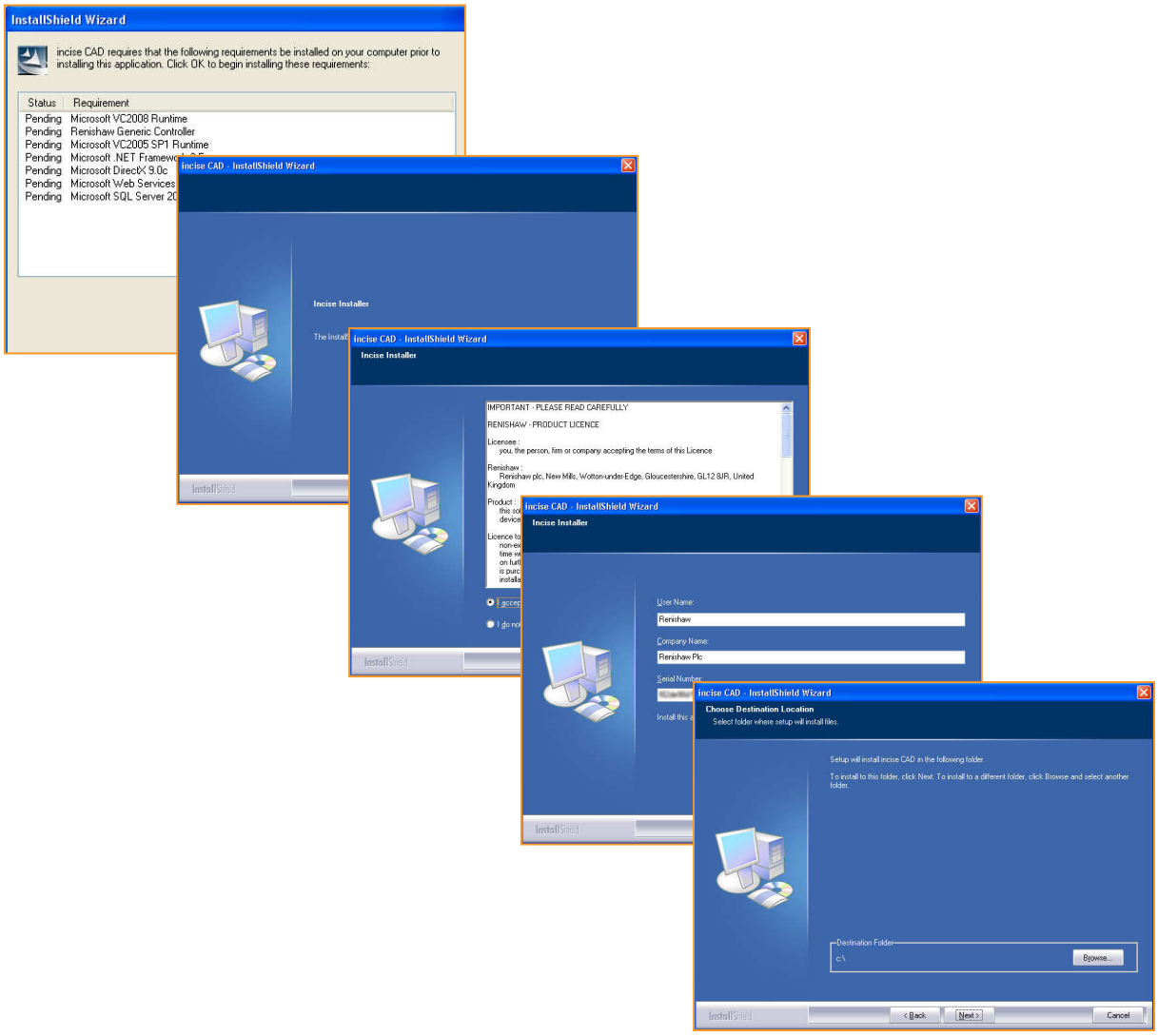
4. Slightly tilt the module with the lower alignment dot facing towards you, offer it up and 'roll' it into position, allowing the magnetic force to gently connect the kinematic joint.

Renishaw incise DS10 connections



Software installation

1. Ensure the DS10 scanner is switched off.
2. Load the installation CD into the PC. The installation process will automatically execute.
3. The InstallShield Wizard will prompt you to install any prerequisites. Click **Install**.
4. The incise software will ask you if would like to install inciseCAD on your computer. Click **Next** to proceed.
5. Read through the product licence. In order to proceed you will need to accept the terms of the agreement and click **Next**.
6. Enter your User Name and Company Name, followed by the serial number (supplied by Renishaw). Click **Next** to proceed.
7. No further information should be entered. Continue to click **Next** through the remaining dialogs.

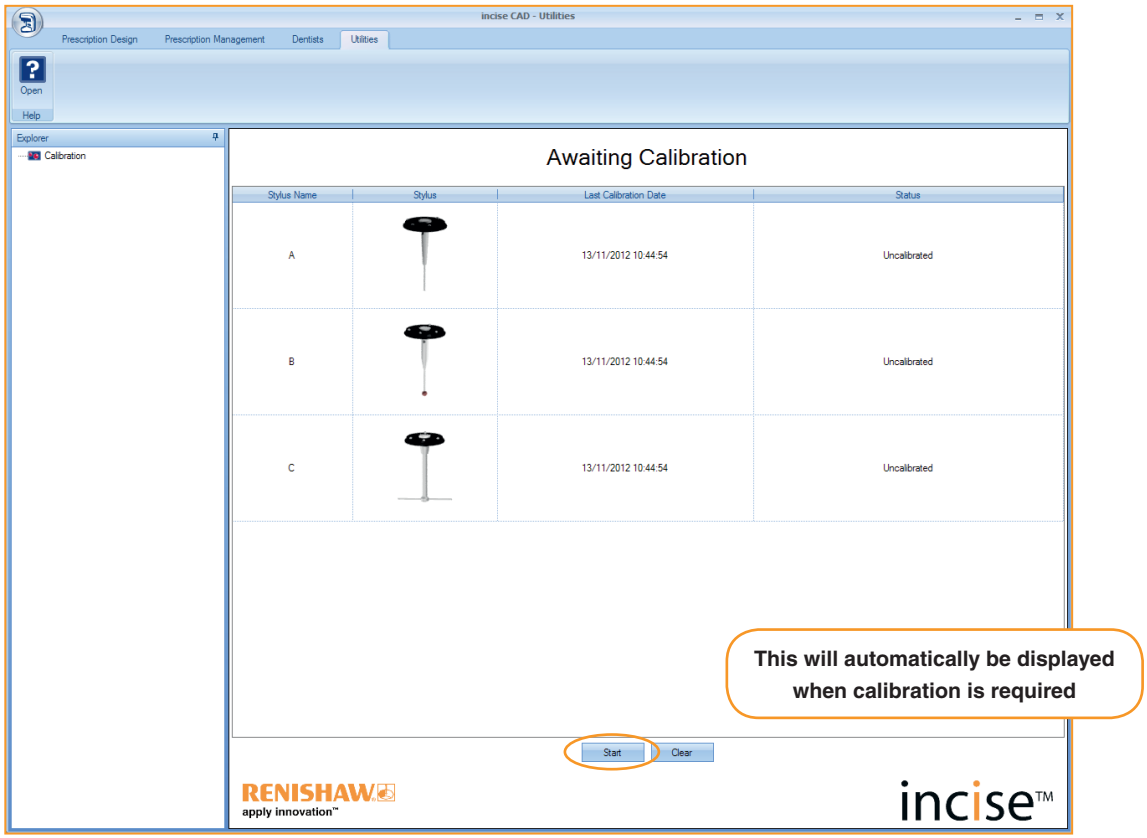


8. When the software installation is complete, switch on the machine. The PC will detect the device and the system will be ready for use.

Calibration

The calibration process will occur automatically following the installation processes and when a scheduled calibration is due. It can be performed manually by selecting the 'Utilities' tab.

1. Switch on the scanner.
2. Open inciseCAD.
3. Select **Start** to initiate the calibration.



4. Insert the calibration ball assembly into the artefact and secure with the thumbscrew.

5. Follow the sequence of prompts, firstly loading the artefact assembly onto the baseplate ensuring correct orientation by aligning the dots.

IMPORTANT: Make sure there are no spacers fitted between the base plate and artefact.

6. Load stylus A when prompted:

   - Hold the stylus with the white orientation line towards you.
   - Offer the stylus up to the probe and allow the magnetic force to pull it into position.

7. Click **OK** and allow the scanner to run through the calibration sequence.

8. Follow the on-screen prompts to load styli B and C.

Notes:

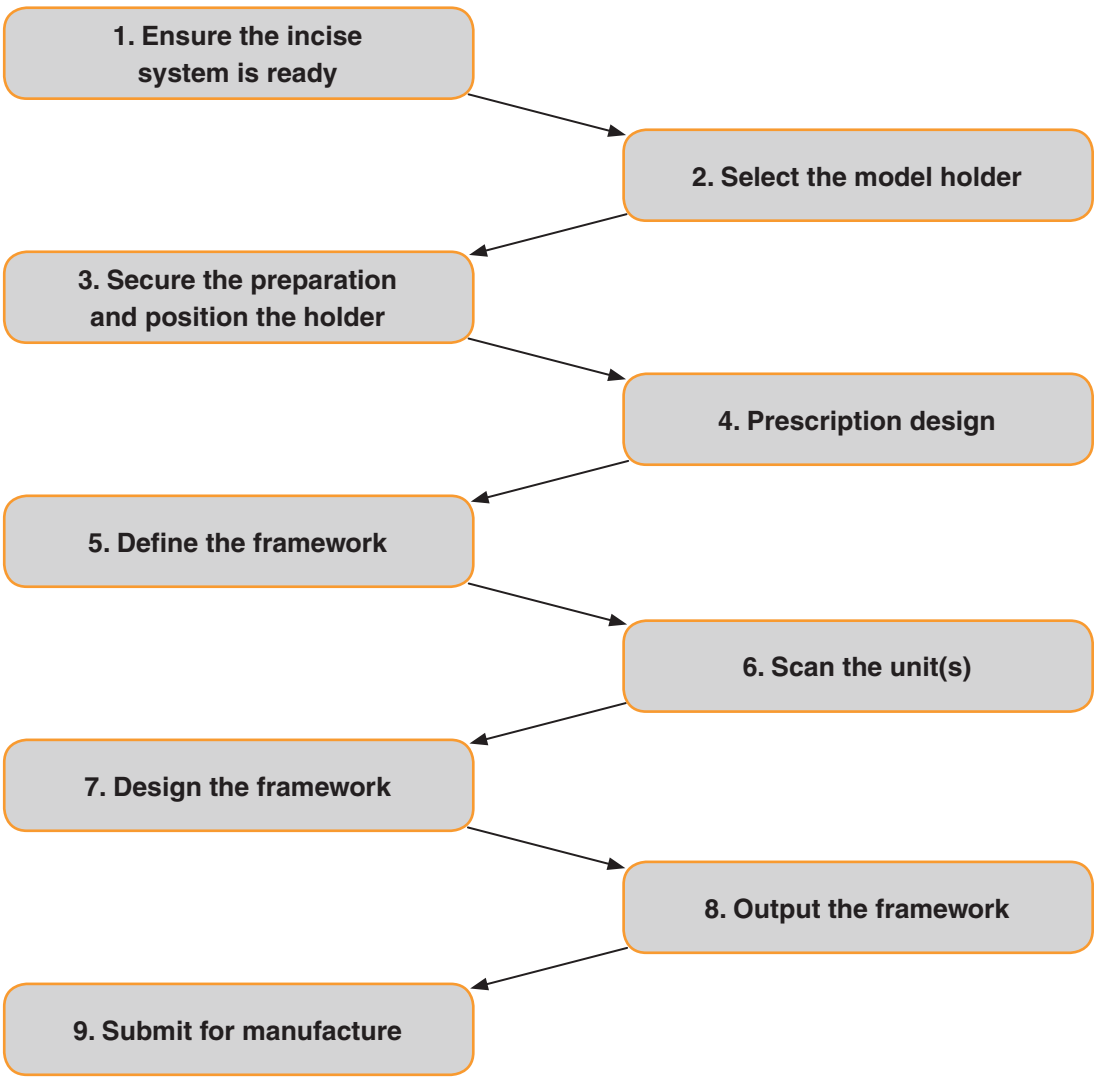
- The first time you run the calibration process, the system will automatically find the calibration sphere and store its values. You will need to run it a second time to calibrate the system.
- Calibration can be carried out at any time by selecting it from the 'Utilities' tab.
- Recalibration should be completed if a stylus is replaced and if you reposition the DS10 scanner.
- It is possible to skip calibration of styli that you may not be using. We recommend that styli A and B are always kept within calibration.
- The 'Clear' option deletes all calibration data, the system reverts to a new machine state and the calibration sphere will be reset in the software.
- The calibration process will initiate one week after the system was last calibrated.
- Calibration should be carried out if a stylus is replaced or if the scanner is repositioned.

Scanning and designing

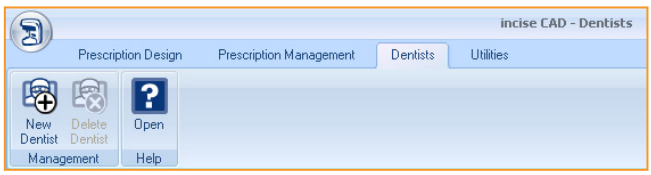
Introduction

The inciseCAD software is split into two sections. The front-end is the scanning interface used for calibration, prescription management, scanning, and final job submission. The back-end is used solely for the design processes.

The process



Dentist Management

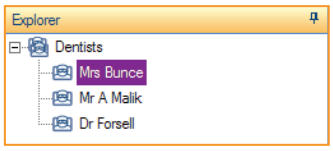


The Dentist Management tool is used to create a record of all your dentists' contact details and their personal default cement space and thickness preferences.

1. Click on the **New Dentist** button and enter the details for the dentist contact

2. Click **OK** to save the information.

You can edit or delete a dentist by clicking on it in the explorer bar.



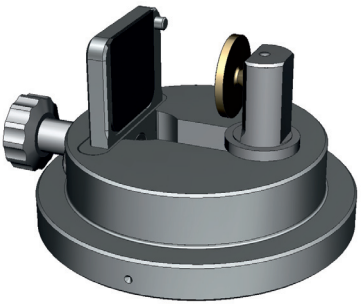
Starting a new prescription

Select the **Prescription Design** tab and ensure the scanner is connected, homed and calibrated.

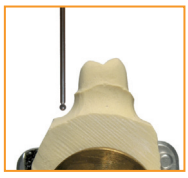
The holder

Before scanning can be started, the preparation needs to be held securely in a holder. The type of holder varies depending on the type of unit being scanned (see table on page 69).

Single unit preparations should be secured in the die holder with the buccal face at the front of the scanner.



Die holder



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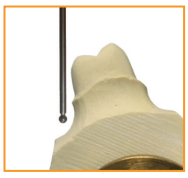
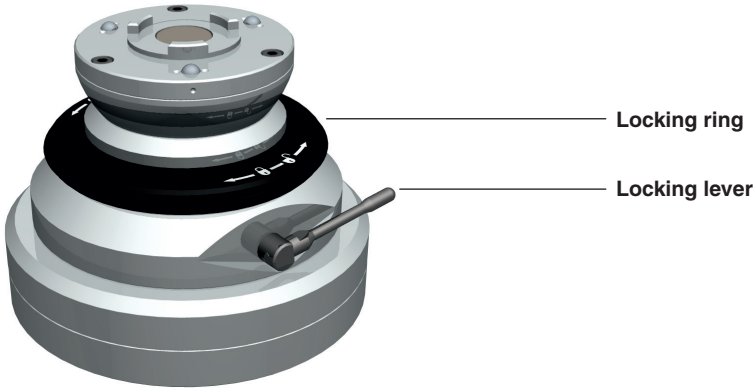


✘

The preparation needs to be positioned so the probe can vertically access and read all the contours. This is achieved by adjusting the die holder and gimbal together so that the margin line is visible from above.

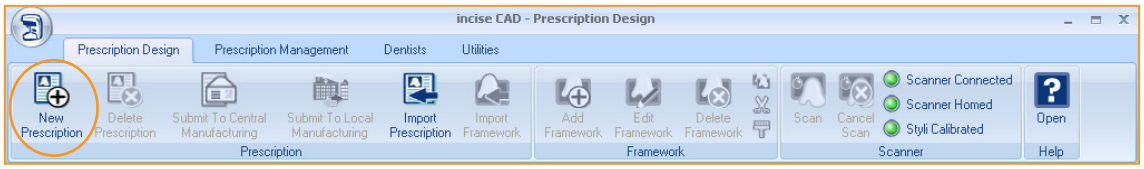
The gimbal



The correct angle can be achieved by releasing the locking-ring on the gimbal and adjusting the top-plate. The horizontal position can be adjusted by releasing the locking-lever. Position the preparation so that it is within the working area whilst being as close to the centre of the gimbal as possible. Two spacers are provided to achieve the correct height of the preparation.

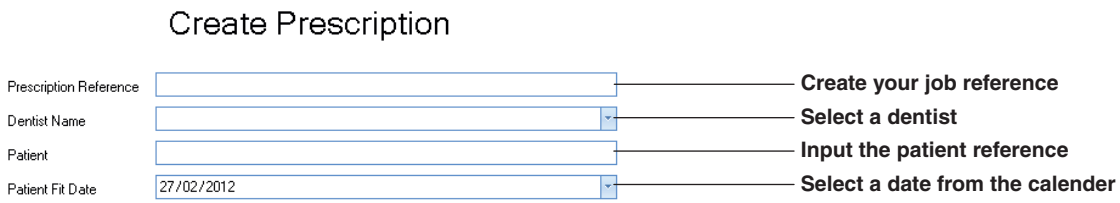
Prescription Design

This is the first step of the scanning process. Click on **New Prescription** to proceed.



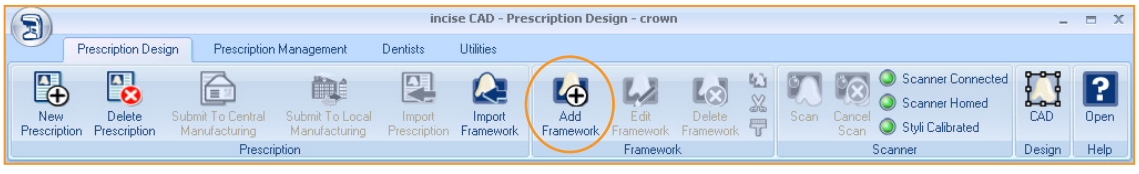
Create a prescription

Enter the details for the job to be scanned. This information will be saved and can be viewed from the **Prescription Management** tab.



Add a framework

Once the prescription has been created, you can add a framework. Click on the prescription and then on **Add Framework**

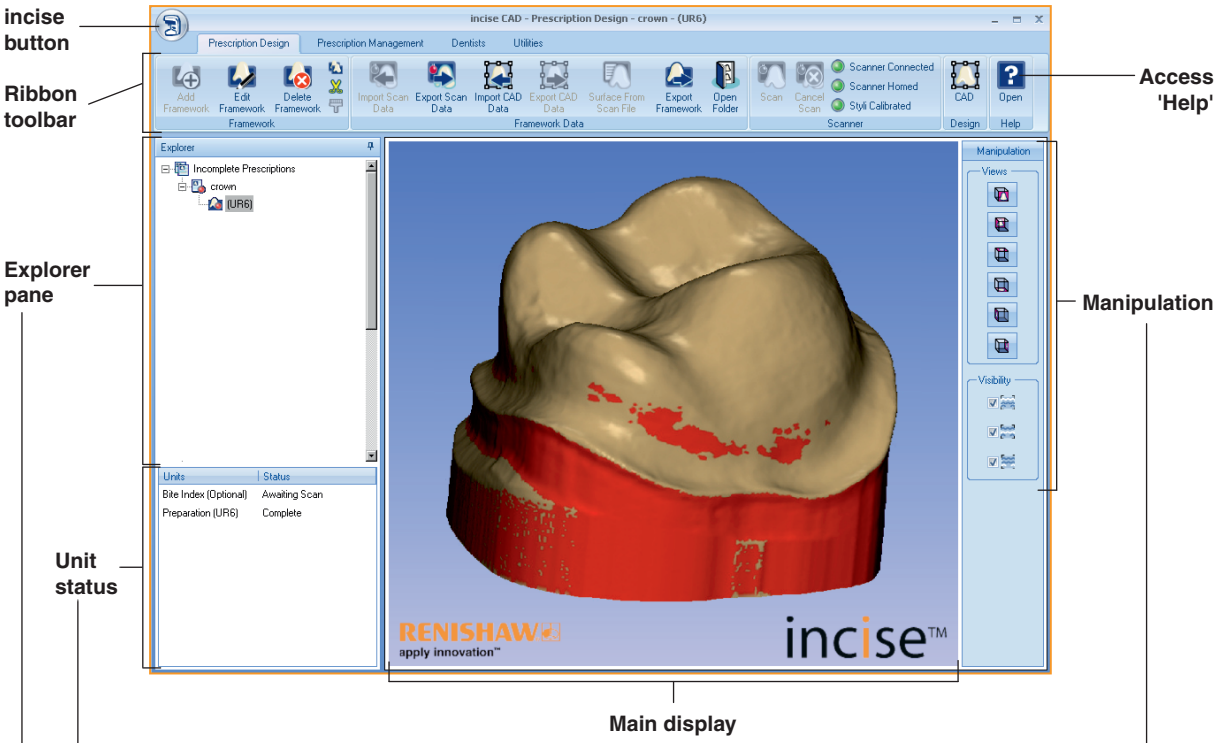


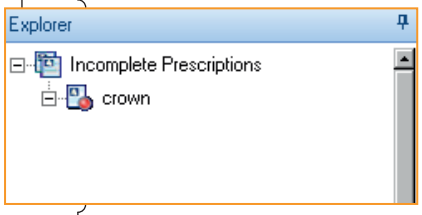
inciseCAD Scan interface

This is an introduction to the scanning side of inciseCAD. It shows you how the interface will be displayed and how it operates following the scanning process.

With inciseCAD loaded, power-up the DS10. You will see the 'Scanner Status' change from red to green.

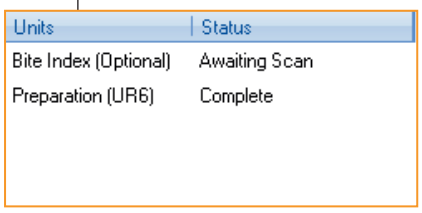
The interface contains a ribbon toolbar which is a set of functions specific for the tab selected, a main view displaying the scanned preparation, an explorer and status pane and view / visibility manipulation tools.



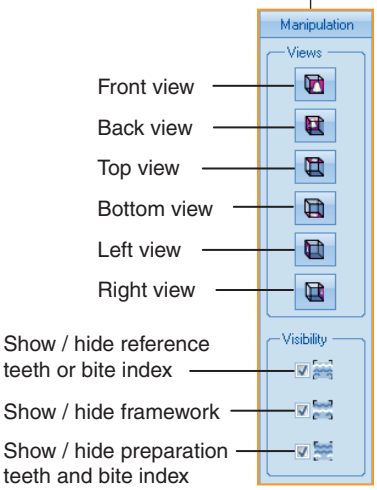


The prescription reference and framework both use icons to indicate their status

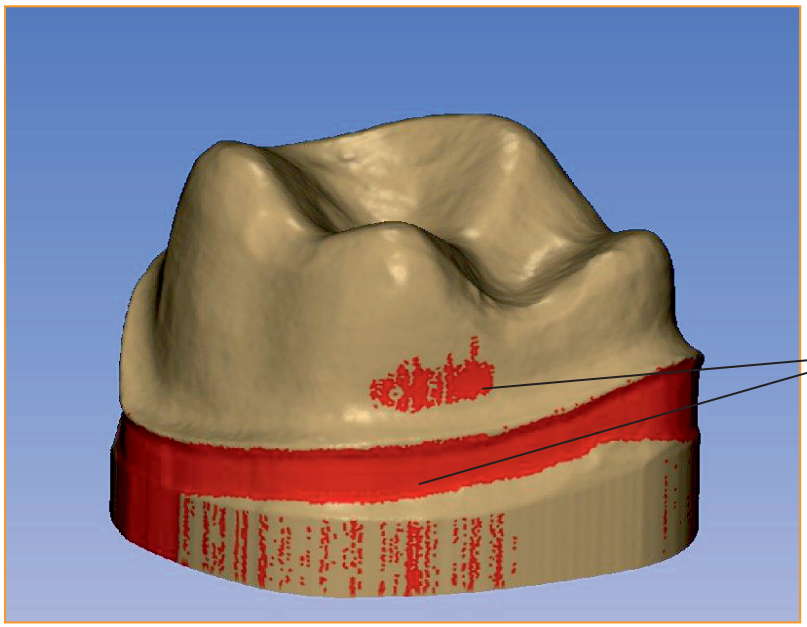
- Prescription incomplete
- Prescription complete
- Framework incomplete
- Framework complete



The unit status displays the current state of the scanning process. Right click on a unit to open the options available



Undercuts



Undercuts should be avoided where possible when close to, or crossing the margin area. Readjust the gimbal positioning and/or the position of the preparation in the die holder.

Mouse controls

The incise system is compatible with two-button and scroll-wheel mice. We recommend a scroll-wheel mouse is used for optimum usability.

Left click

Left click and drag rotates the model.

Right click

Right click and drag moves the model position without rotation.

Scroll wheel

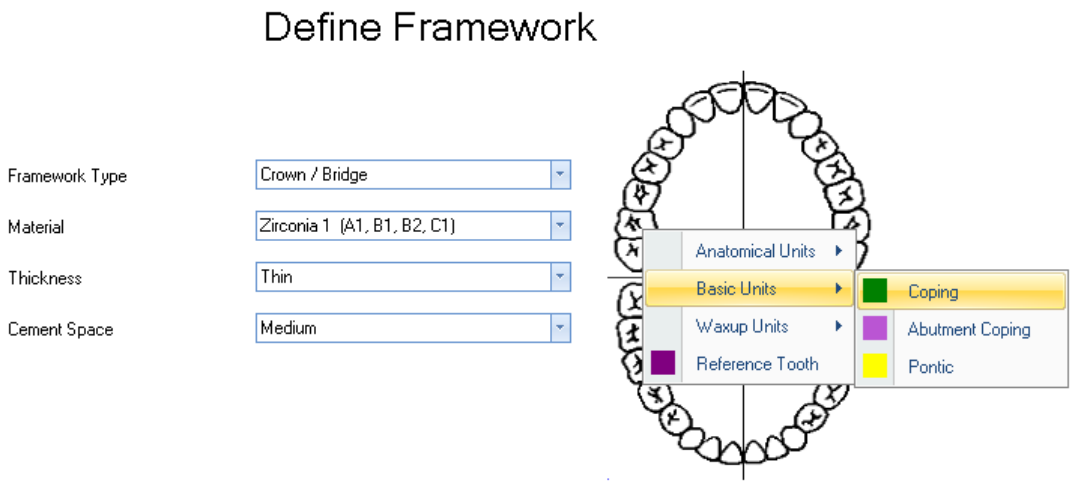
Use the wheel to zoom in and out. Depress and drag also zooms in and out.

Right + left

Click both and drag back to zoom in and push forward to zoom out.

Framework types

When defining a framework, you have to select a type and a sub-type (excluding link abutments). Select the framework type, click on the relevant unit and select the sub-type from the drop-down list. In the example below we are selecting a basic coping for a crown/bridge at position UR6.



Crown / Bridge

A standard tooth- or abutment-supported framework. Each crown or bridge sub-type has further options for copings or a pontic.

Pick from four shades of zirconia (Zr100), four shades of PMMA, cobalt chrome (LaserPFM), fourteen shades of translucent zirconia (Renishaw Realistic) or wax (WX100).

Select between three predefined thicknesses (thin = 0.5 mm, medium = 0.6 mm, thick = 0.7 mm) and three predefined cement spaces (tight, medium, loose).

Sub-type	Description	
Basic Units	This scans standard preparations or ridges and the data is passed through to inciseCAD design where it can be designed for manufacture.	
	Sub-type options	Coping / Abutment Coping / Pontic
Anatomical Units	This scans standard preparations or ridges. However, when the scan data is passed through to inciseCAD design, the anatomical form will be visible on the design to define the outside surface of the framework.	
	Sub-type options	Anatomical Coping / Anatomical Abutment Coping / Anatomical Pontic
Waxup Units	This performs two scans; one for the preparation / ridge (depending on the sub-type) and one for the waxed outer surface. Scans can be done in either order. The waxup scan will be used by inciseCAD design to define the outside surface of the framework.	
	Sub-type options	Waxup Coping / Abutment Waxup Coping / Waxup Pontic
Reference Tooth	This scans the adjacent tooth to the framework. The scan can then be used to aid the design process.	
	Sub-types options	Not applicable

Waxup Bridge

Similar to a standard bridge but the bridge form is supplied as a single waxup for the complete bridge. An additional scan of the complete outside form of the bridge will be required. It will be used by the inciseCAD system to define the outside form of all the units.

Pick from four shades of zirconia (Zr100), four shades of PMMA, cobalt chrome (LaserPFM), fourteen shades of translucent zirconia (Renishaw Realistic) or wax (WX100).

Select between three predefined thicknesses (thin = 0.5 mm, medium = 0.6 mm, thick = 0.7 mm) and three predefined cement spaces (tight, medium, loose).

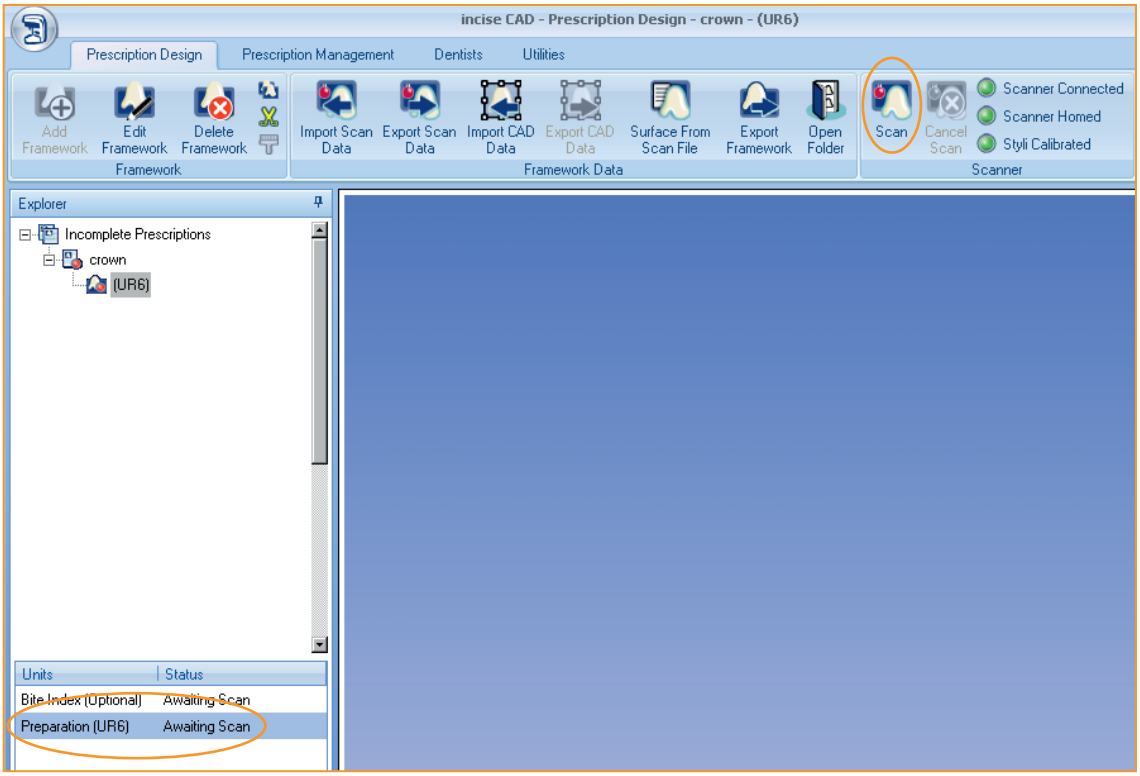
Sub-type	Description
Waxup Bridge Coping	This scans a tooth preparation. The coping that is produced will have a standard cement space.
Waxup Bridge Abutment Coping	This scans an abutment. The coping that is produced will have a reduced cement space.
Waxup Bridge Pontic	This scans a ridge.
Reference Tooth	This scans the adjacent tooth to the framework. The scan can then be used to aid the inciseCAD design process.

Other framework types

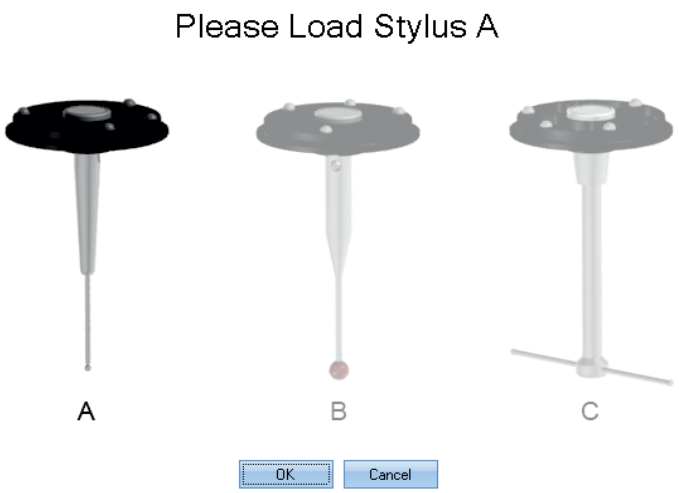
You will notice that there are more framework types including Link Abutment, Implant Bridges and Single Piece Abutments, full details of which can be found in the 'Advanced features' section later in the manual.

Scanning a single basic framework

1. Click on the preparation in the Unit Status pane followed by **Scan** 
(you can also right click the preparation and select **Scan** from the pop-up).

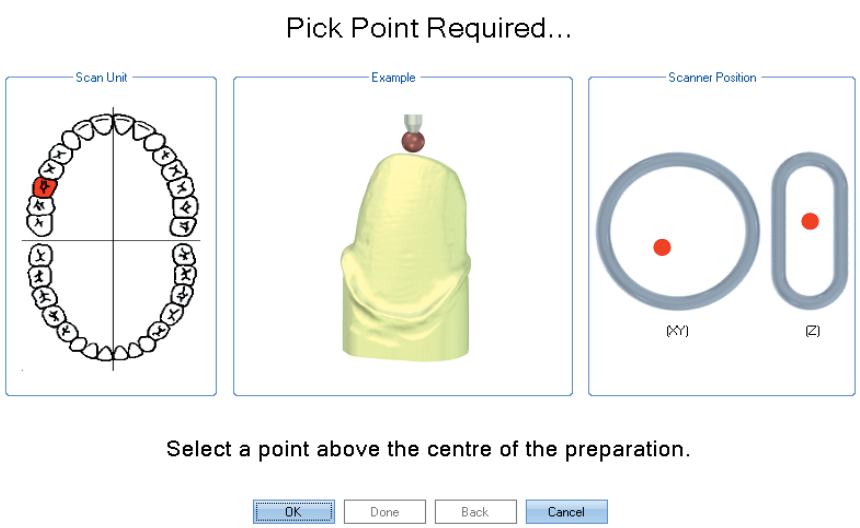


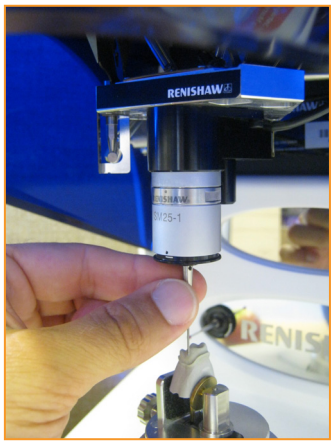
2. Load stylus A when prompted and click **OK**.



With the white marker facing you, offer the probe up to the module and allow the magnetic force to pull it into position.

3. Select the upper pick point.

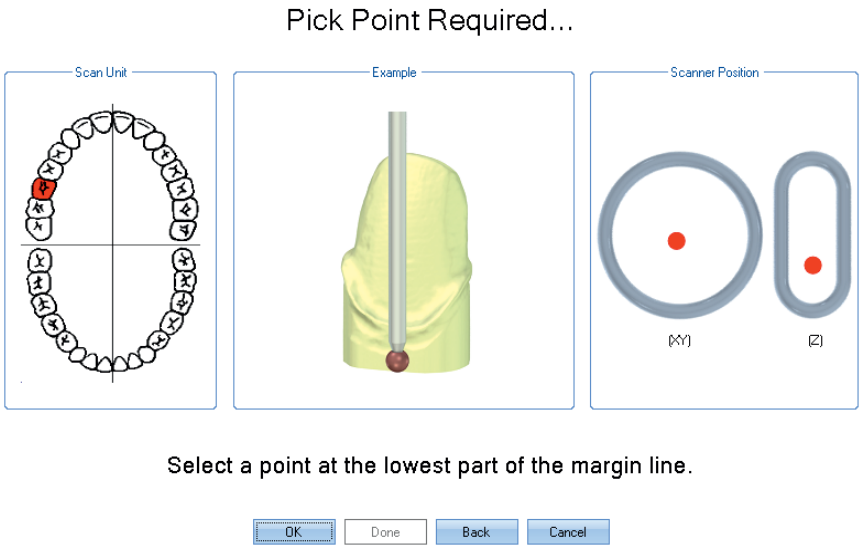




Hold the probe stem and move the stylus above the centre of the preparation. Ensure that you keep within the working volume (XY and Z tolerances)

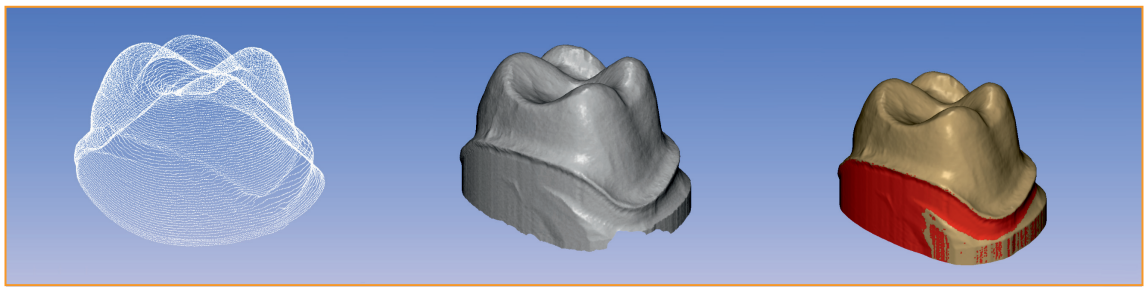
Click **OK** when complete.

4. Select the lower pick point, ensuring it is low enough to scan the complete margin line.



Click **OK** and the scanning will start.

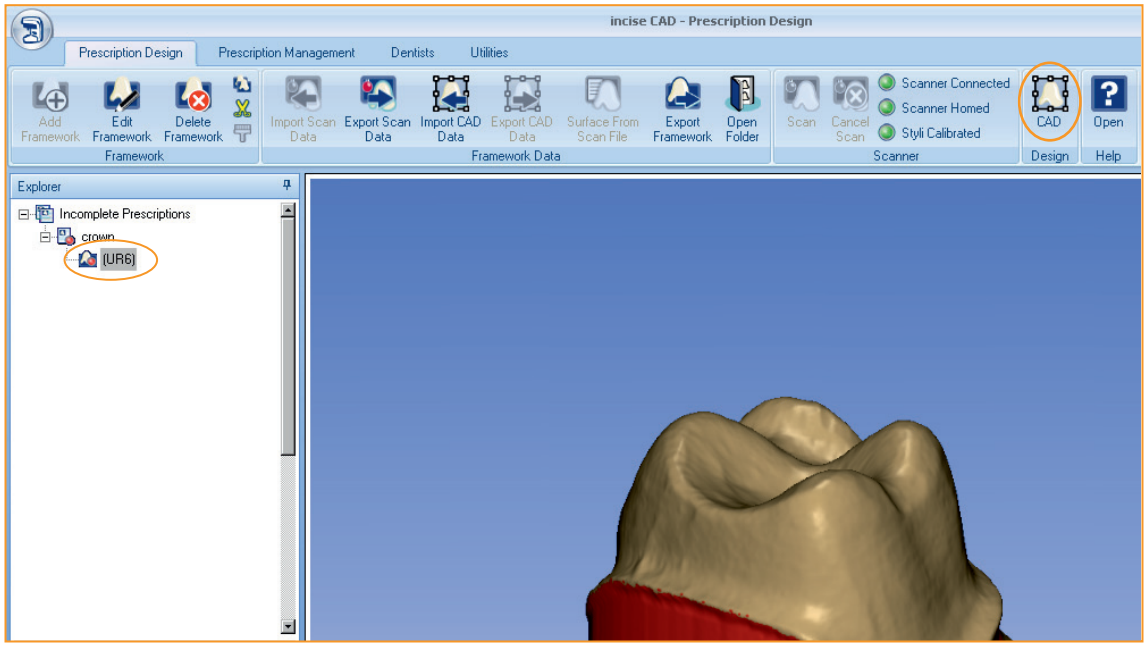
The model data is captured and built on screen firstly as a wire-frame, followed by surface generation and finally fully rendered showing re-entrant data (undercuts) in red.



Re-entrant data below the margin is acceptable as this does not affect the coping. Re-entrant data above the margin should be minimised as it can create an uneven cement gap. Re-entrant data crossing the margin should be completely avoided if possible as it can create an uneven edge around the coping which causes fitting problems.

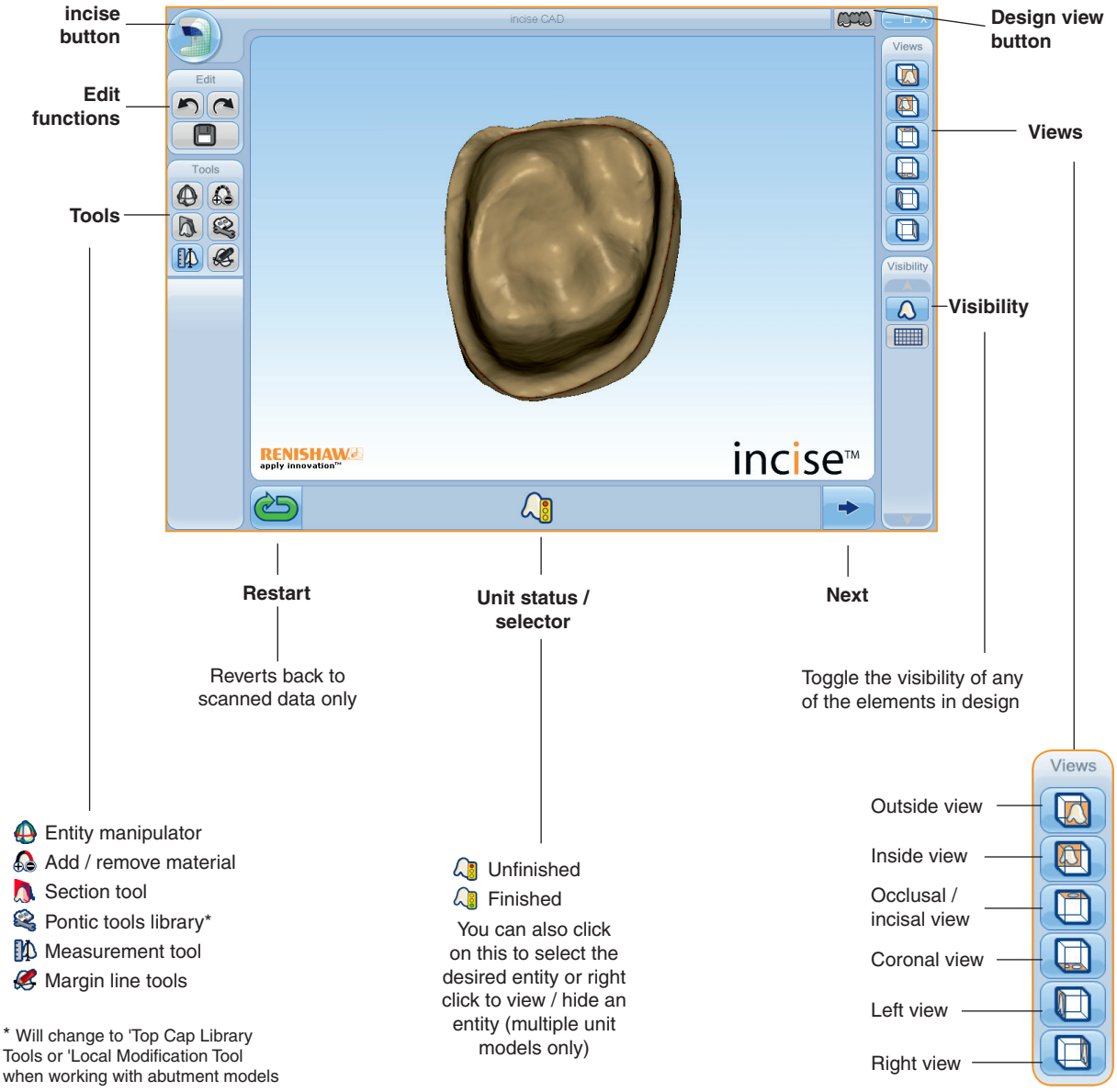
Submitting the data to inciseCAD Design

When the scanning process is complete, the model is ready for inciseCAD Design. Click on the framework in the explorer pane and click on **CAD** in the ribbon toolbar.



inciseCAD Design interface

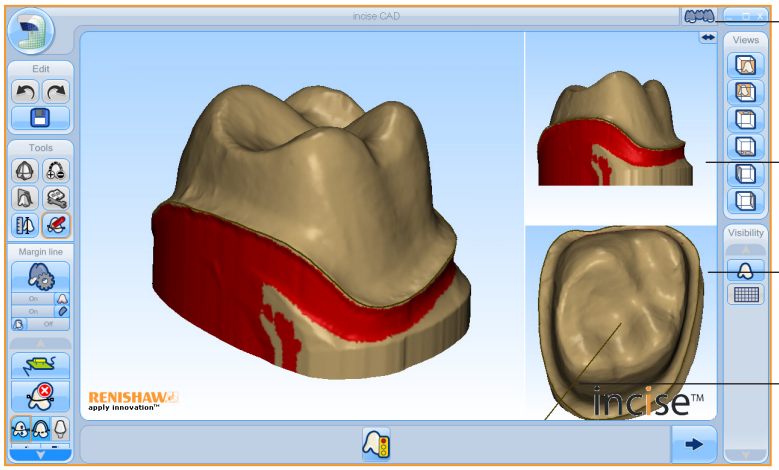
The exported model is displayed in inciseCAD Design as shown below. Use the different viewing options to verify the model data is correct:

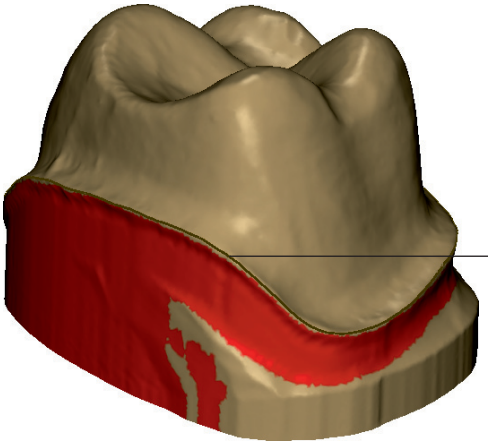


Add a margin line

Enable the margin line tool functions by clicking **Next**

Whilst holding Ctrl, left click on the margin line area of the model. The margin line is displayed and you can now use the margin line tools to manipulate it to the required shape and position.





Rotate the model around to check the fit and position of the margin line. If editing is required it must be done before clicking **Next**

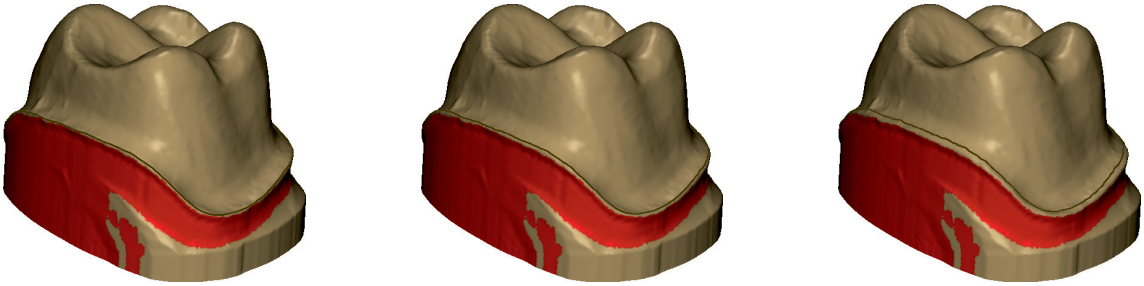
Ctrl + left click generates a best fit margin line.
Additional Ctrl + left click actions allow you to guide the arrow slowly to draw or reposition the margin line on the model.

Margin line tool functions

There are a number of tools and functions available. For this example, we will be using those used typically for crown design.

Nudge tools

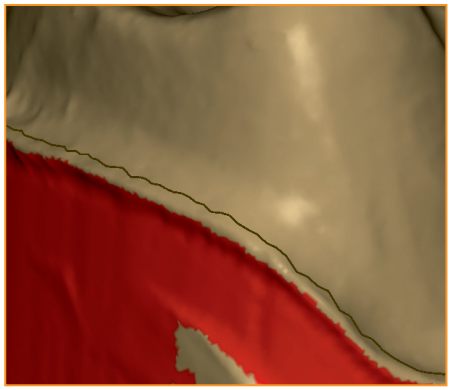
Ensure the nudge tools are selected. Move the margin line with **nudge up** / **nudge down**



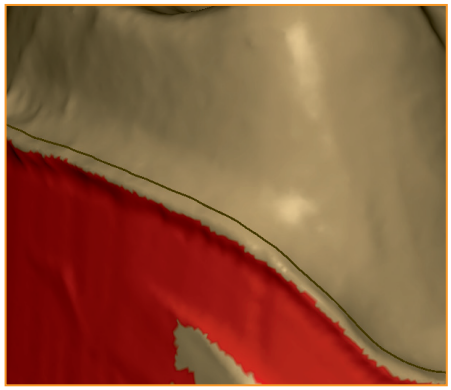
In this example we can see how using the nudge-up tool affects the margin line. Each click of the tool moves the margin line up the surface.

Smooth tool 

This smooths the margin line to the form of the model.



Margin line after several nudge-ups



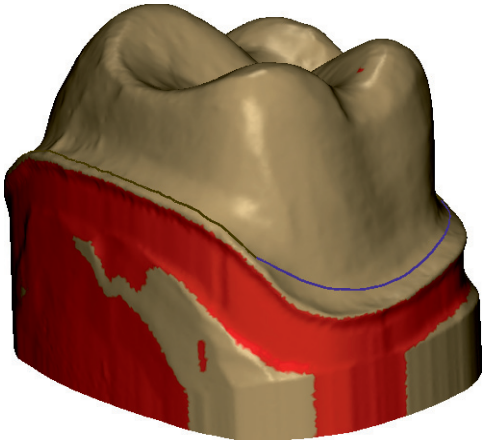
Margin line after several nudge-ups then smoothed

Partial nudge tools 

The partial nudge tools are useful if you want to apply a cutback to a portion of the coping. They allow a section of the margin line to be nudged up or down with a smooth transition area automatically generated at both ends.

After the margin has been generated, select **Nudge Tools** and then select **Partial Nudge**. Hold Ctrl and click on the margin line. The partial nudge span is highlighted blue.

Before partial nudge-up



After partial nudge-ups

 The + and - icons increase or decrease the size of the partial nudge span.

 The position slider moves the partial nudge span around the margin line.

 This moves the partial nudge span up or down.

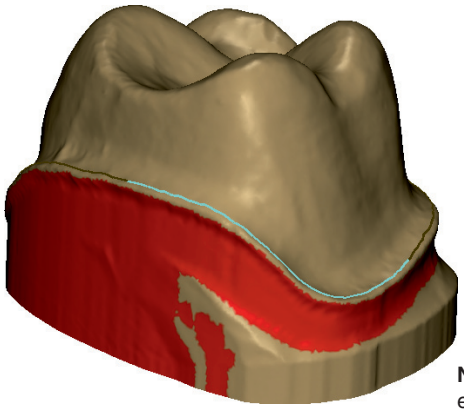
 The cancel partial nudge takes you back to the standard nudge tools.

Collar tools 

These are used to apply a collar to the complete margin or a portion of it. The way collars are generated varies according to the unit type. For basic units, a section of the margin line can be marked as containing a collar which will then be added onto the coping when it is generated. The collar tools operate in a similar manner to the partial nudge tools.

Following the generation of the margin line, ensure the **Collar Tools** are selected and click on **Add Collar** 

Hold Ctrl and click on the margin line. The collar span is highlighted in light blue.



Note: See the 'Appendix' for a full explanation of the collar parameters

 This allows you to open and close the collar for a partial or full collar.

 Collar Width (mm).

 Collar Height (mm).

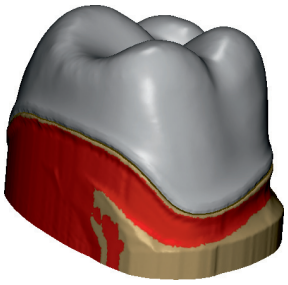
 Finishing Allowance. Additional collar material to allow for manual finishing (mm).

 Slide left to increase concavity of the Finishing Allowance, slide right to increase convexity.

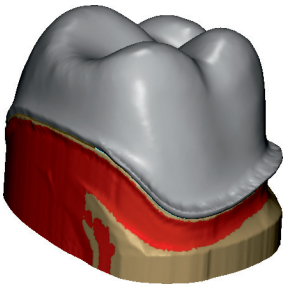
 The position slider moves the partial collar span around the margin line.

 The + and - icons increase or decrease the size of the partial collar span.

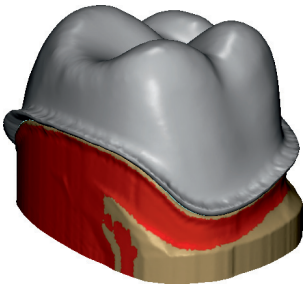
 This removes any collar that has been designed into the model.



No collar



Partial collar



Full collar

When you are happy with the form and position of the margin line, click on **Generate Coping** 

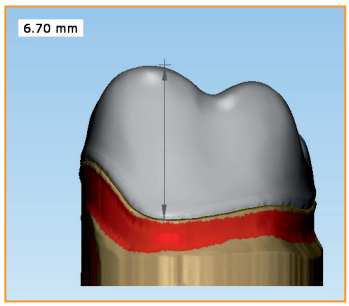
Measurement tools

Three measurement tools are available to aid the design process. They are accurate to 0.01 mm.

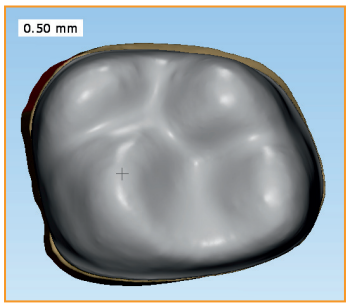
Point to Point – holding Ctrl, click two points to display the distance between them.

Coping Thickness – hold Ctrl to display the thickness at the selected point.

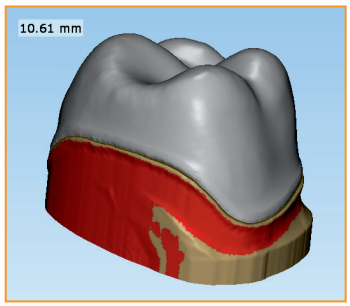
Framework Height – click on the icon to give the overall height of the framework in its unsintered state which is useful to ensure it will fit into a billet.



Point to Point



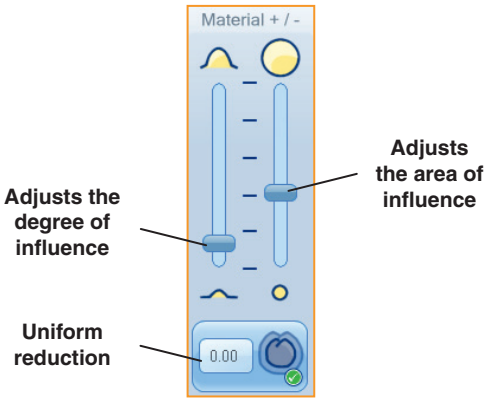
Coping Thickness



Framework Height

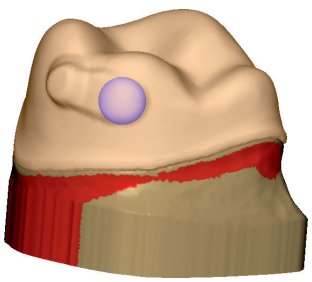
Tip:
For a rough idea of size you can use the **Grid** visibility to give you a 0.5 mm grid in the main view
Click once to view the grid behind the model and click again to bring the grid in front.

Add / Remove Material

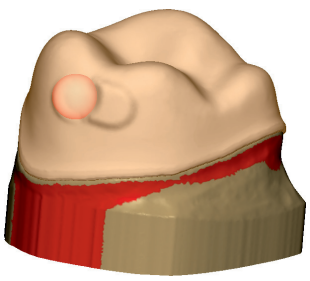


Following coping generation, material can be manually added or removed as required. Ensure the coping is highlighted (double click or click on unit / status selector). Hold Ctrl and move your mouse over the area of coping, left click to add material (purple), right click to remove material (red). Holding the shift key and left clicking smoothes sharp features (yellow).

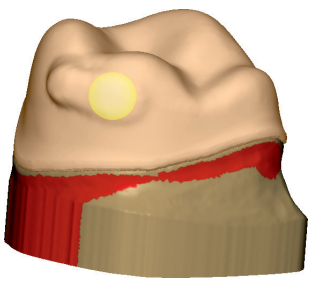
A uniform reduction can be applied to copings and pontics, subject to maintaining the fixed minimum coping thickness.



Adding material



Removing material



Smoothing material

Tip:
Toggle between displaying the original and post-uniform reduction by using the **Show / hide outer reduction surface** feature 

Notes:

- A uniform reduction amount is absolute from the outside surface, e.g. a reduction of 0.5 mm followed by a reduction of 1.0 mm will reduce by 1.0 mm in total.
- Reduction in multi-unit frameworks is only applied to the unit selected. This allows for different reductions of different units.
- Reduction cannot be applied to the final framework.
- Reduction cannot be applied to connectors.

Saving a framework

Once you are satisfied with the design of your framework, generate the final framework by clicking on **Generate Framework** 

There are now three options available:

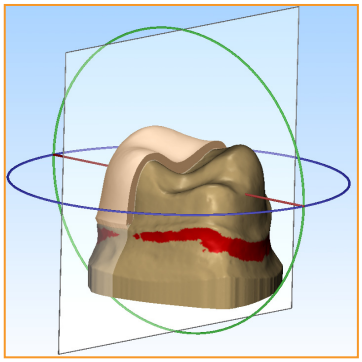
 Restart the design process. Click to reset all design changes performed since the scan.

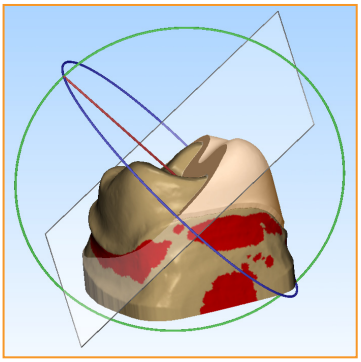
 Save and output framework. Click to take the design framework back to inciseCAD Scan ready for submission.

 Delete the framework. Click to go back a step where further modifications can be made before re-generating the framework.

Section tool

Following coping generation the section tool allows you to view a cross sectional area. Select a line or sphere by hovering over it until it turns yellow, click and hold to adjust the view.



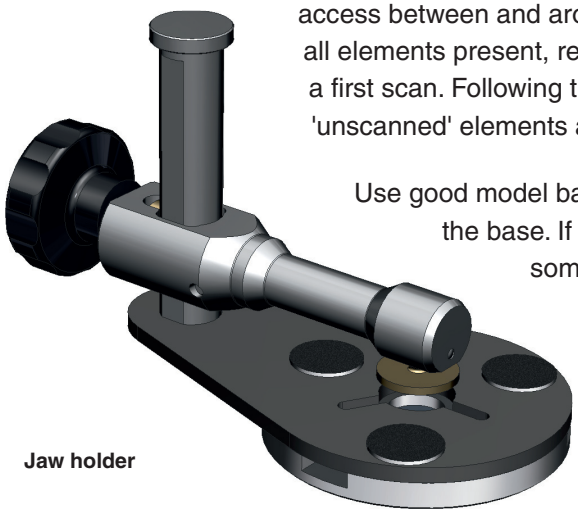


Select a straight line to translate, select a circle to rotate and select the pane to position the cross sectional view.

Scanning a bridge

Jaw holder

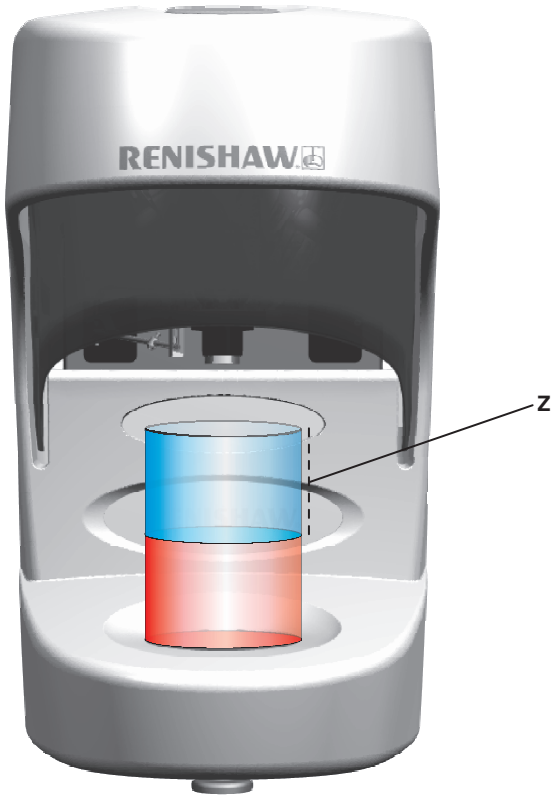
Firstly, the bridge needs to be held in the jaw holder which in turn will be fitted to the gimbal. Mount the model base in the jaw holder with only the required elements present. Ensure that the arm of the holder does not obstruct probe access and that the probe will have sufficient access between and around each element. If this cannot be achieved with all elements present, remove one or more of the elements and perform a first scan. Following this, remove the scanned elements, replace the 'unscanned' elements and perform a second scan.

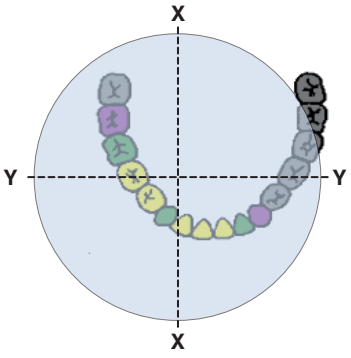


Jaw holder

Use good model bases to ensure the clamping action does not distort the base. If the preparation wobbles in the base, fix it with some wax. Movement during the scanning process will generate undersize data. Plastic bases can distort when clamped in the jaw holder if not sufficiently supported. To prevent this happening we recommend using a die-stone or support plate.

Working volume





The diagram to the left shows the working volume in blue. The diagram above shows the orientation of the jaw to the centre of the working volume. Note that the preparations being scanned are central and those not being scanned (grey) may fall outside the working volume.

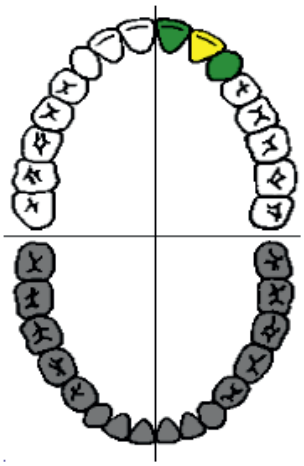
The two spacers can be used under the gimbal to achieve a good Z axis placement.

Three-unit bridge

In this example we will be scanning a ridge UL2 and two-preparations UL1 and UL3 to make a three-unit bridge.

Prescription design

Click on **New Prescription** to create the new bridge scan.



Specify framework

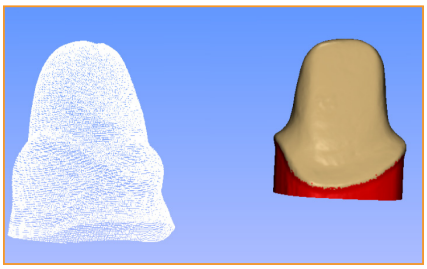
Click on the required tooth then select **Basic Units** followed by **Coping** as a 'Unit type' for the retainers.

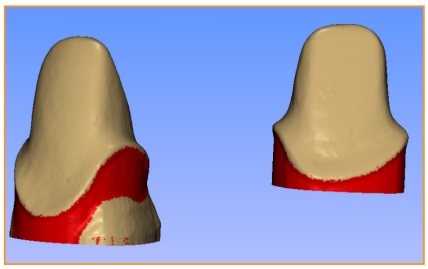
Repeat the process clicking on **Basic Units** followed by **Pontic** for the ridge.

Click **OK** when done.

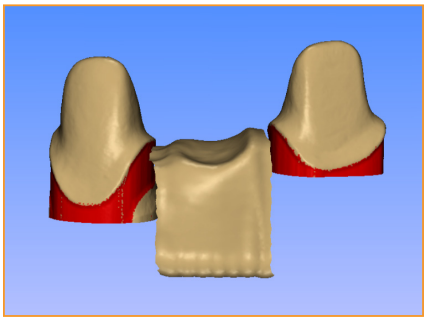
Scan

1. Remove the ridge and adjacent teeth from the model base.
2. Scan preparations UL1 and UL3.
3. Check the alignment.
4. Remove the preparations from the model base and replace the ridge.





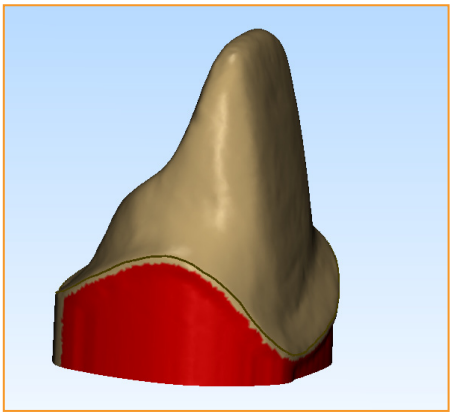
5. Scan UL2 (stylus change is prompted).



6. The model is now ready to be designed. Click on **CAD**

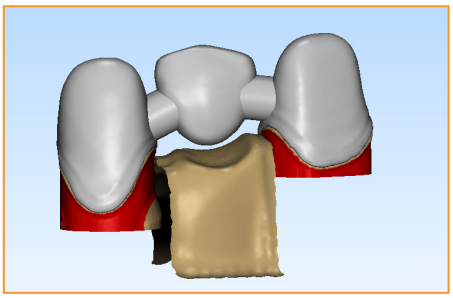
7. Ensure the correct model is displayed in incise Design and click on **Next**

8. Place a margin line on the first retainer by holding Ctrl and clicking on the margin line.

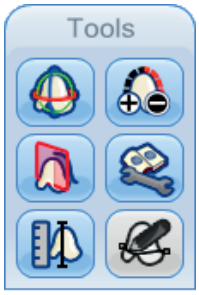


9. Using mouse controls and the margin line tools, adjust the margin line to suit. Click **Next**

10. With the second retainer now displayed, add the margin line to it, adjust as required and click **Next**



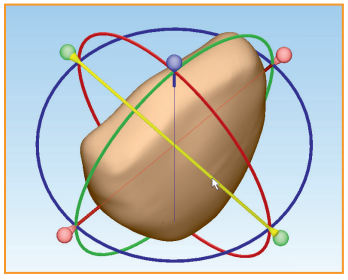
The retainer copings and pontic are now displayed. Click on an element and additional tools become available.



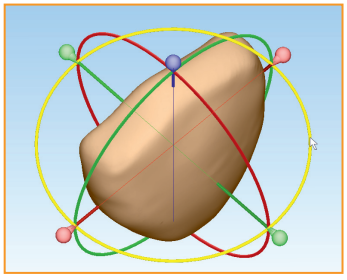
Entity manipulator

11. Use this tool to resize and reposition the pontic and connectors.

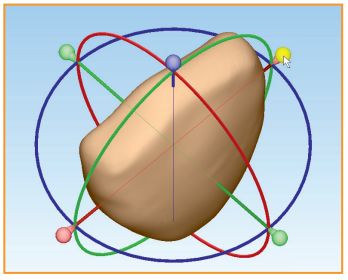
There are three modifications which can be made – translation, rotation and scaling. When the cursor is placed over one of the control elements, that element will change colour to yellow indicating it will be selected if clicked.



Select a line to **Translate**



Select a circle to **Rotate**

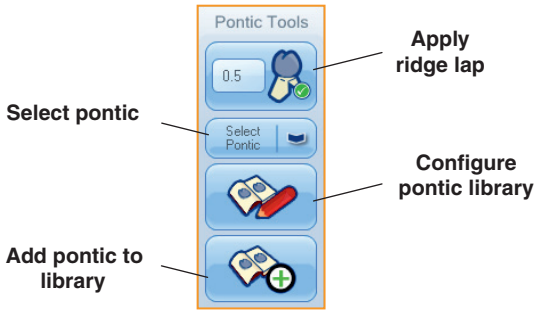


Select a sphere to **Scale**

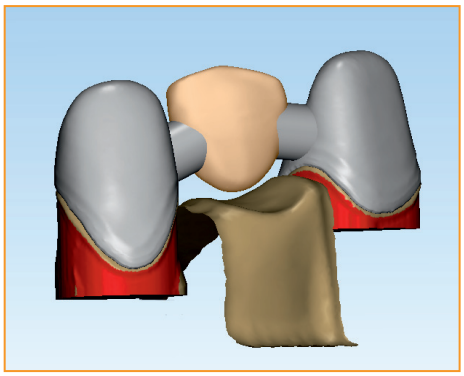
When scaling, dragging a sphere will scale the element unidirectionally, i.e. from the side you are dragging. Holding Ctrl and dragging will scale the element bidirectionally, acting as though both spheres are being dragged in opposite directions.

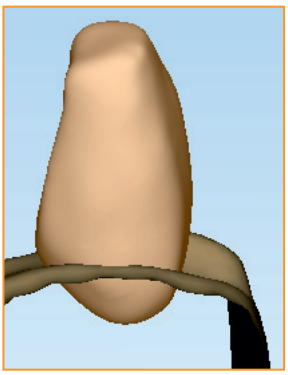
Pontic tools

12. Use the pontic tools to use previously designed pontics from the library or to apply a ridge lap.

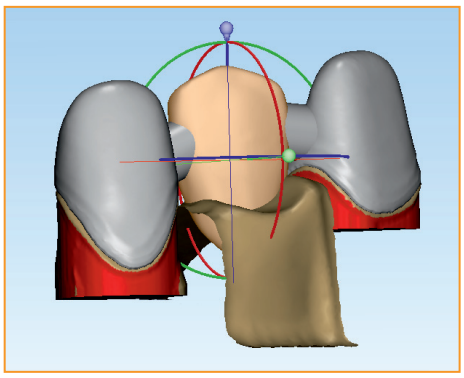


The ridge lap process will only remove material from the pontic. Highlight the pontic.

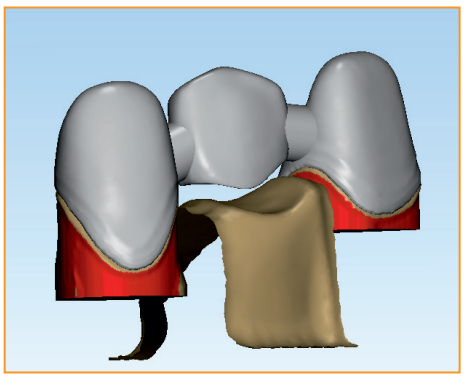




Use the Entity Manipulation tool to stretch the pontic below the ridge.

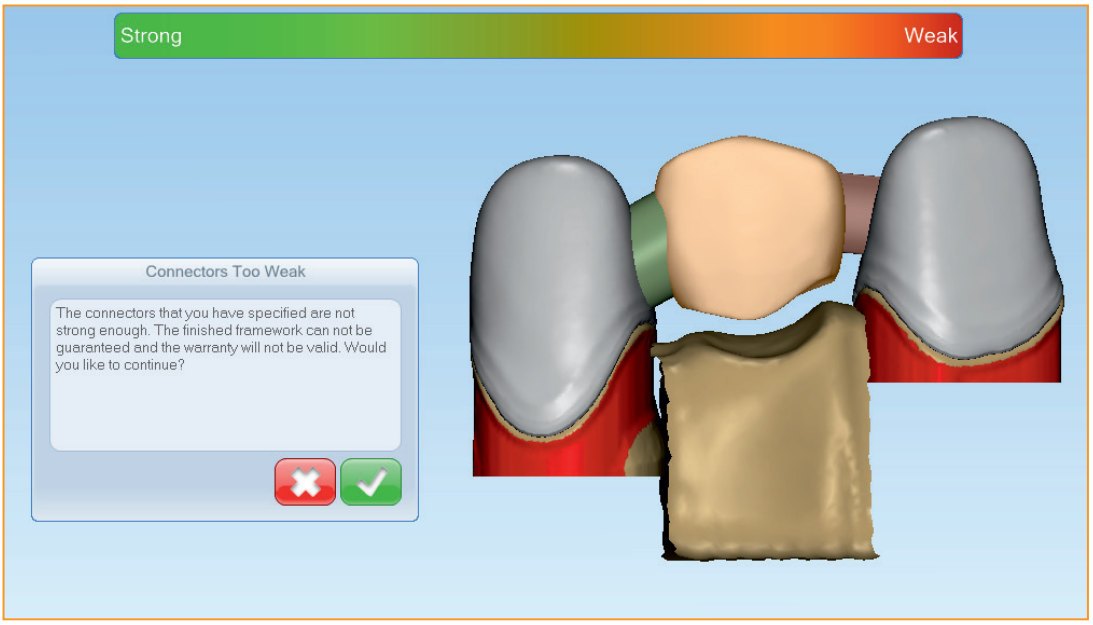


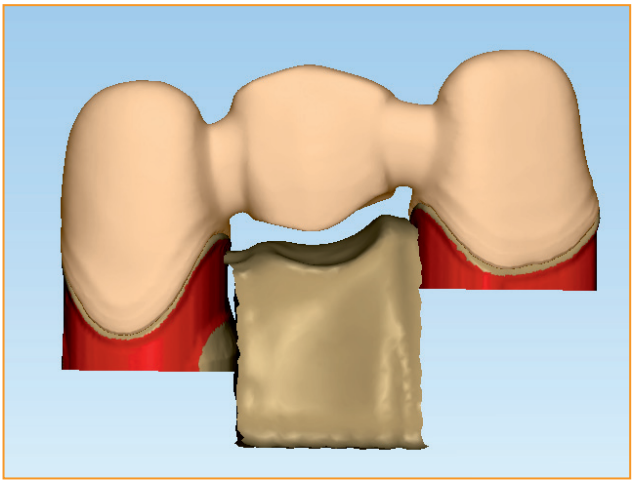
Set the ridge lap offset. Positive and negative values can be used depending on whether you want it offset above the ridge or below it. Apply the ridge lap.



13. Once you are happy with the design, click on **Generate Framework** 

During this process, the connector strength will be tested against the design. If it does not meet the lower threshold the system will give you a warning message. If this occurs, click **No** 





The design is taken back to the pre-generated state. Use the Entity Manipulation tool to make the connectors stronger. Click on **Generate Framework** again to ensure they are strong enough. To submit the framework for manufacture, click on **Save and output framework** 

The framework opens in inciseCAD scan where the prescription can be managed and submitted for manufacture.

Waxup pontic

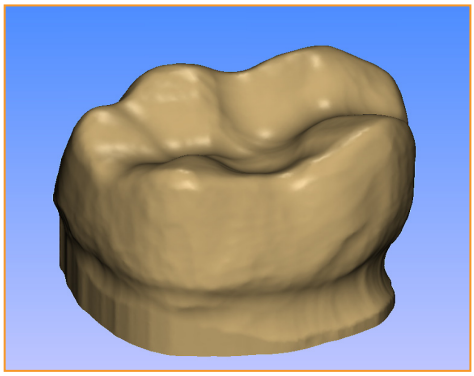
If a waxup pontic is selected, the process will follow the bridge process with an additional scan of the waxup pontic.

The waxup pontic needs to be waxed onto the ridge with no connectors present. The scan will capture the top half of the waxup and the bottom will be generated taking into account the data from the ridge scan.

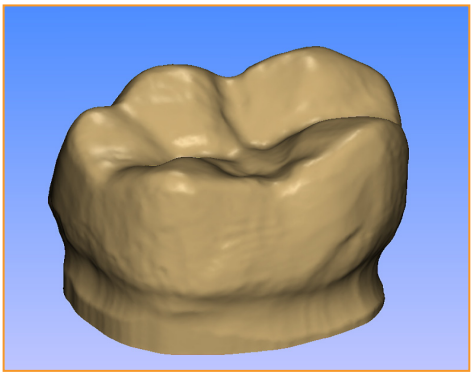
Scanning a waxup coping

In this example we will be scanning a single waxup unit UL7. When scanning waxup frameworks, the system will perform two scans – one for the preparation and one for the waxup. The order in which the scans are taken is not important – the units can be waxed-up and checked in an articulator prior to any scanning, thus scanning the waxup first. Alternatively, the units can be set to the correct insertion axis, scanned and then waxed-up.

You will be given the option of using stylus B only or a combination of stylus A and B. Using both will give increased detail but will take longer.



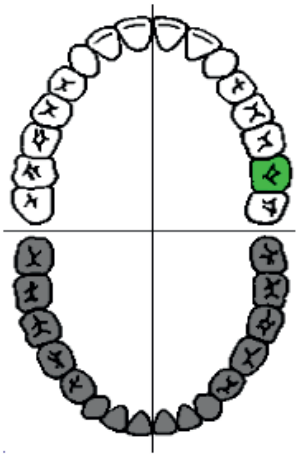
Stylus B



Styli B and A

Prescription design

Click on **New Prescription** to create the new waxup scan.



Specify framework

Click on the required tooth then select **Waxup Units** followed by **Waxup Coping**.

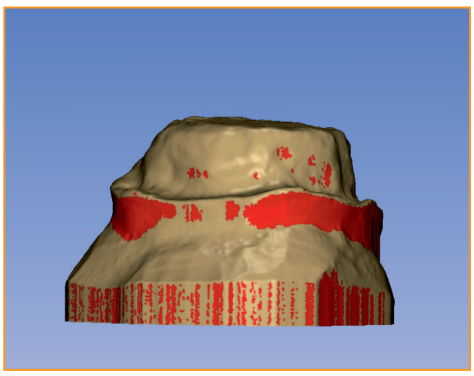
Click **OK** when done.

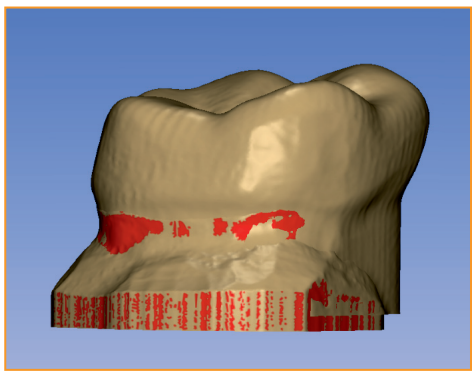
Scan

1. Right click on the waxup and select **Scan**

2. Remove the wax from the preparation so that is ready to scan. Highlight the preparation and select **Scan**

The software will place the preparation surface inside the waxup surface.





You can toggle between views of wax surfaces and preparation by using the visibility tools 

3. Following successful scanning click on **CAD** 

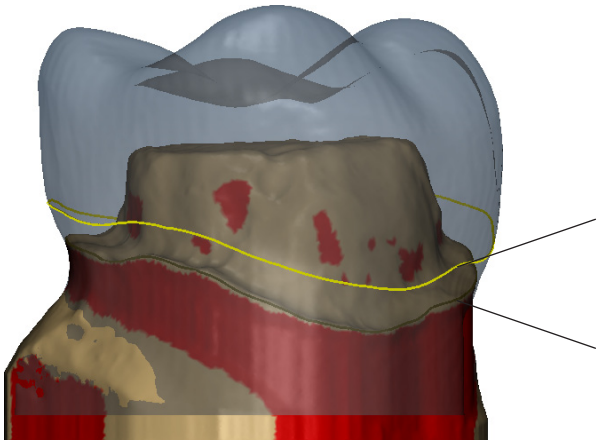
inciseCAD design will display the preparation as solid and the waxed scan as translucent.

4. Click on **Next** 

Two margin lines will be required – the primary margin for the preparation and the secondary for the waxup.

5. Select the margin line tools, hold Ctrl and click on the margin line area of the preparation. Use the margin line tools and create the primary margin line.

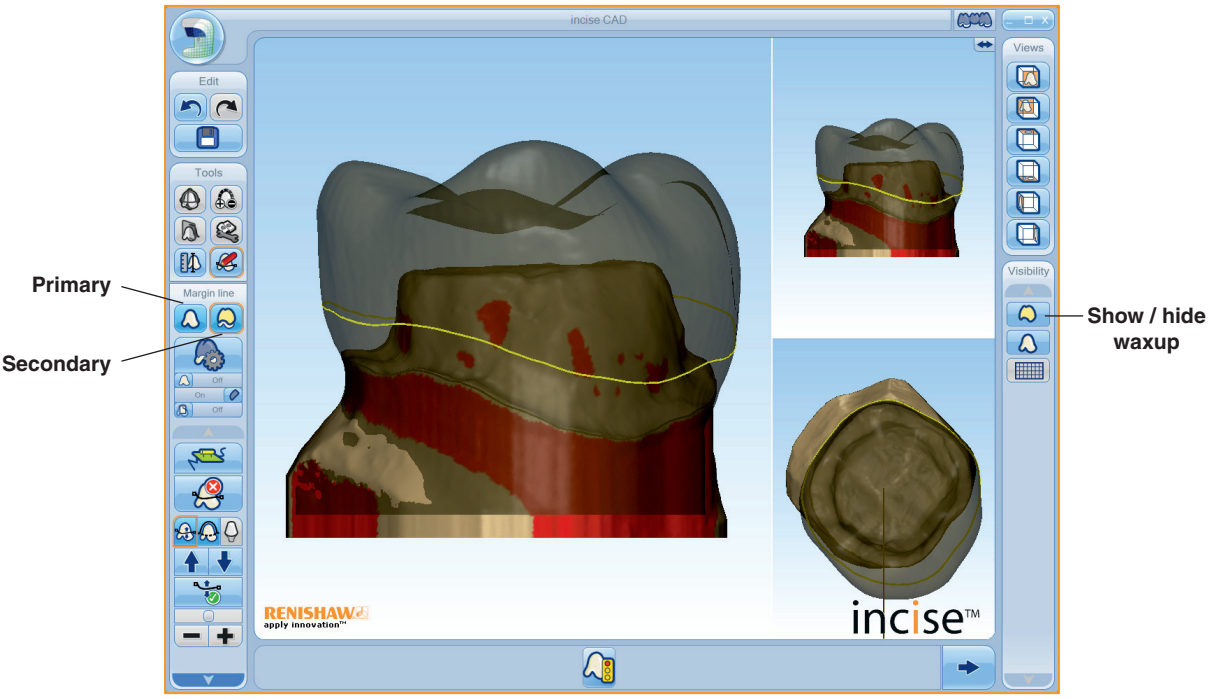
6. The system will automatically create the secondary, or waxup margin line. To adjust it, show the waxup surface using visibility tools and select the wax surface in the margin line tools 



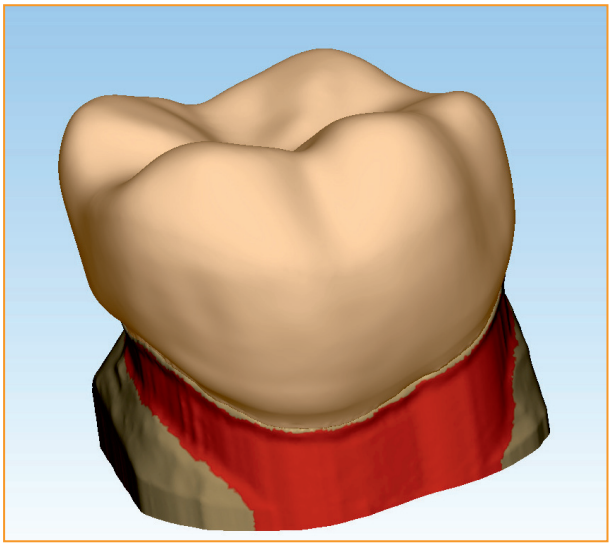
Secondary margin line
If a point is selected below the primary margin line, the secondary margin will 'snap' to the primary. In this example it has also been nudged and smoothed.

Primary margin line
Created first and smoothed.

The system uses the space between the secondary and primary margin lines to allow the coping to blend into the margin line.



7. To generate the coping, Click on **Next**



Use the various visibility and viewing options to check the coping. If necessary, you can use the various tools to measure and/or, add or remove material.

8. When satisfied with the coping, click **Generate framework**

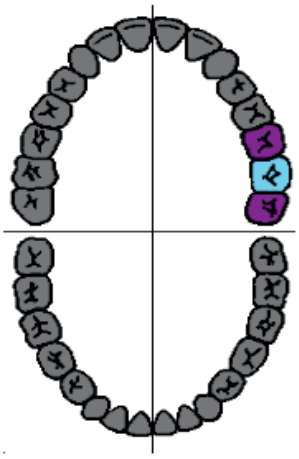
9. To submit the framework for manufacture, click **Save and output framework**

Anatomical frameworks

When designing anatomical frameworks we advise that reference teeth and a bite index are also scanned. In this example we will scan the preparation UL7, its two neighbouring teeth, UL6 and UL8, and a bite index.

Prescription design

Click on **New Prescription** to create the new anatomical scan.



Specify framework

Click on the required tooth then select **Anatomical Units** followed by **Anatomical Coping**.

Click on the neighbouring teeth and select **Reference Tooth** for each.

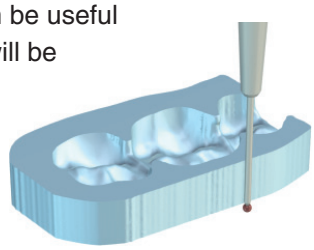
Click **OK** when done.

Scan

Scan the units in the usual way.

Bite index

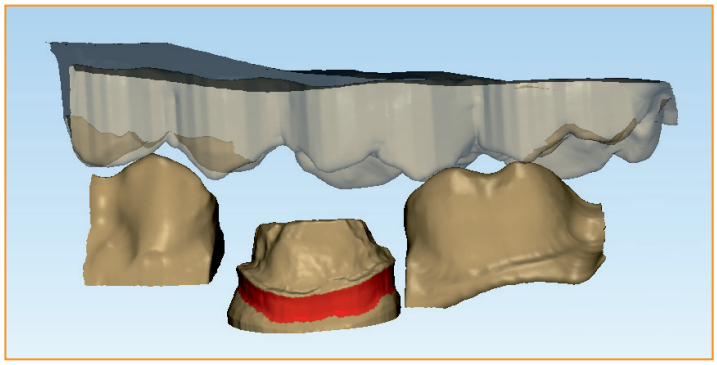
Scanning a bite index gives an impression of the opposing teeth which can be useful for the positioning and design of various forms of frameworks. Firstly you will be asked to select the pick points. It is recommended that you scan at least one full unit either side of the framework being designed. For bite indexes, you will be prompted to scan a minimum of three points around the perimeter of the index, be sure to set them wide enough to obtain all the dentition detail.



1. Following selecting the low point, you will be required to pick a minimum of 3 points around the perimeter. Click **OK** for each point and **Done** when you have completed a loop of points.

When all scanning is complete, click on **CAD** 

The preparation, reference teeth and bite index are all displayed in inciseCAD Design.



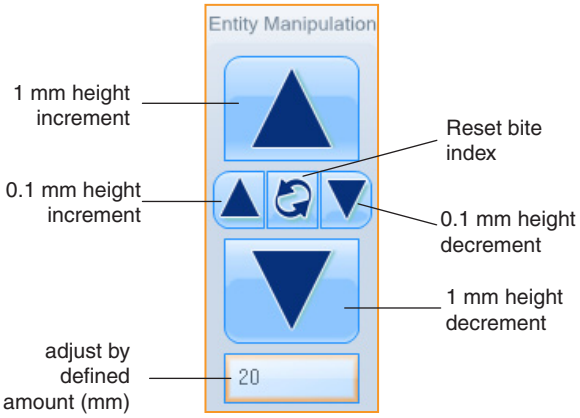
Toggle

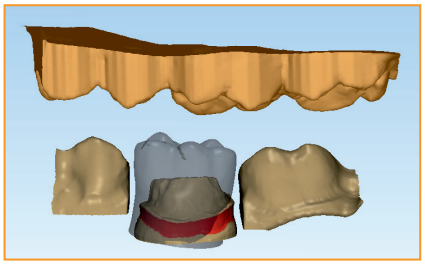
Hide re-entrant / hide preparation / show all 

Hide neighbours / show neighbours 

Translucent bite index / full bite index / hide all 

2. Click on **Next** and define both margin lines for each anatomical unit (in this case, UL6 only). Note that the secondary margin line defines the point at which the anatomical shape begins blend into the margin line shape.
   - Add and adjust the primary margin line and click **Next** 
   - Add and adjust the secondary margin line and click **Next** 
3. Click on **Next** again and the anatomical forms will be displayed in a grey translucent render.
4. Select the anatomical form. Resize and position it using the **entity manipulation** 





You can also use the entity manipulator on bite indexes to move them up or down for increased design accuracy and so that the bite can be checked.

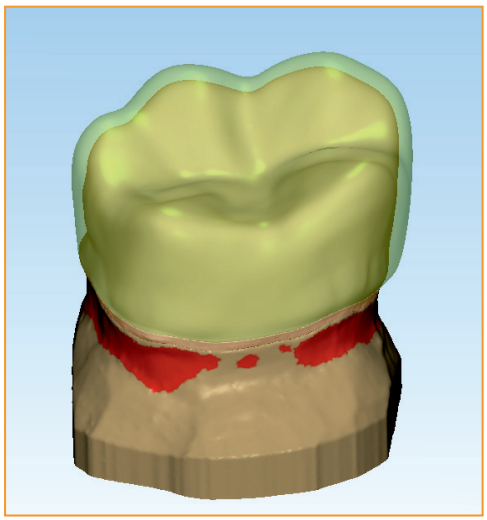
5. Now that the coping has been generated, you can continue to design the framework as required.

A uniform reduction can be applied to the outer surface of copings and pontics (subject to maintaining the minimum thickness). This is particularly useful for anatomical and full waxup units as the outer form can be designed and then reduced to allow for porcelain.

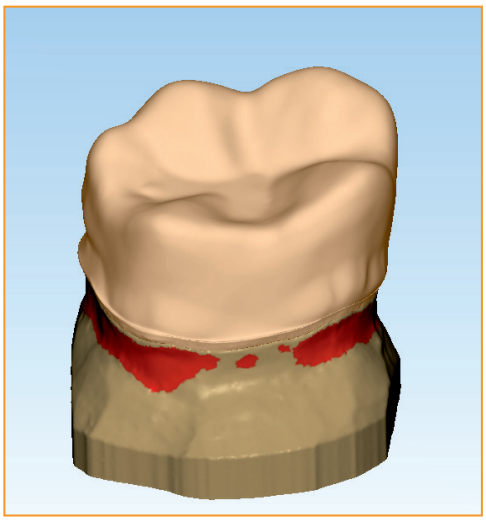
Tip: Toggle between displaying the original and post-uniform reduction by using the **Show / hide outer reduction surface** feature 

Notes:

- A uniform reduction amount is absolute from the outside surface, e.g. a reduction of 0.5 mm followed by a reduction of 1.0 mm will reduce by 1.0 mm in total.
- Reduction in multi-unit frameworks is only applied to the unit selected. This allows for different reductions of different units.
- Reduction cannot be applied to the final framework.
- Reduction cannot be applied to connectors.
- If a collar was defined during the margin line definition, the collar is only generated if a reduction is applied.



Translucent original surface



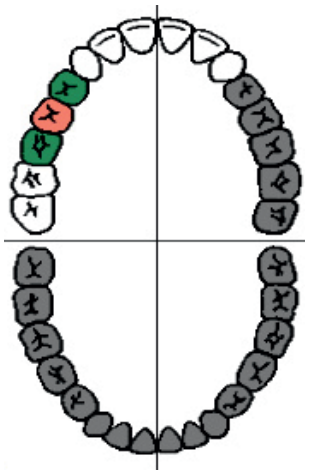
Offset reduction surface

Scanning a full waxup bridge

For waxup bridges you can scan waxup bridge copings, waxup bridge abutment copings and waxup bridge pontics. In this example we will be scanning a three-unit waxup bridge – UR6, UR5 and UR4. The scan must cover the full waxup bridge.

Prescription design

Click on **New Prescription** to create the new anatomical scan.

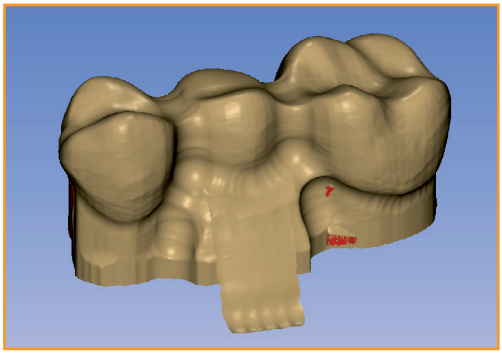


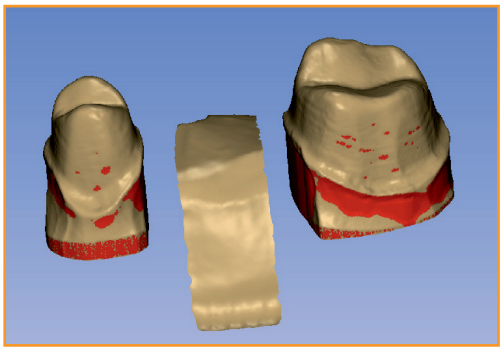
Specify framework

Click on the required teeth and select **Waxup Bridge Coping**. Select **Waxup Bridge Pontic** for the remaining teeth.

Click **OK** when done.

1. Scan the full waxup bridge first followed by the supporting preparations. Scan the ridge for the waxup bridge pontic.

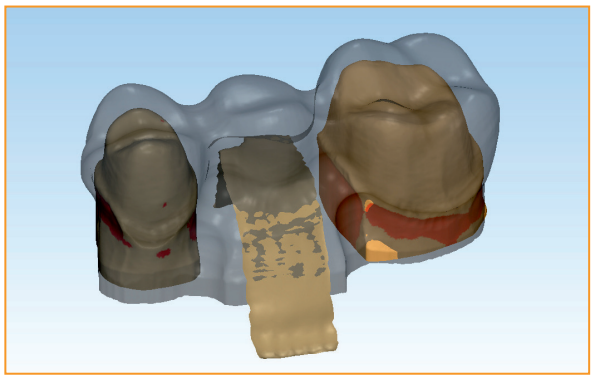




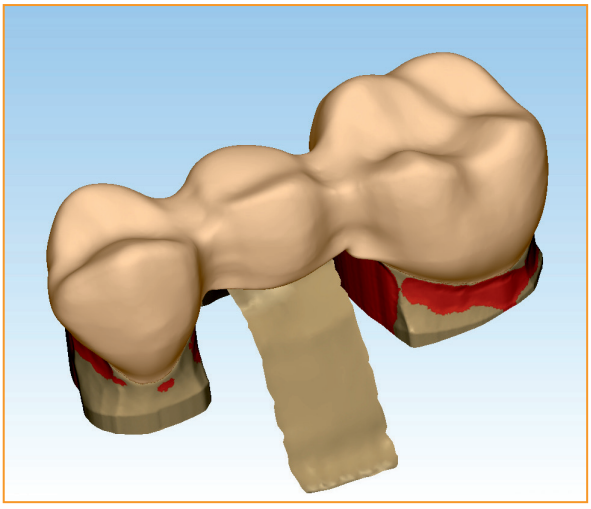
2. When the scanning is complete, click **CAD** 

3. Click **Next** for the supporting preparation to appear. Create and modify the margin line as required.

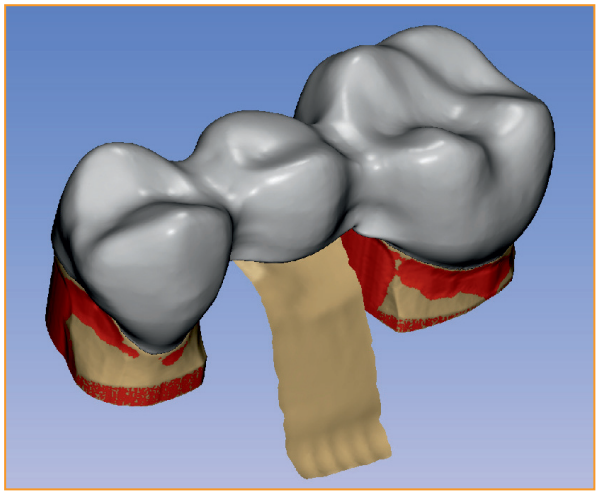
4. Repeat this for the other supporting preparations.



5. Use the Visibility tools and Add / Remove Material tool as required. When satisfied with the design, click on **Next**

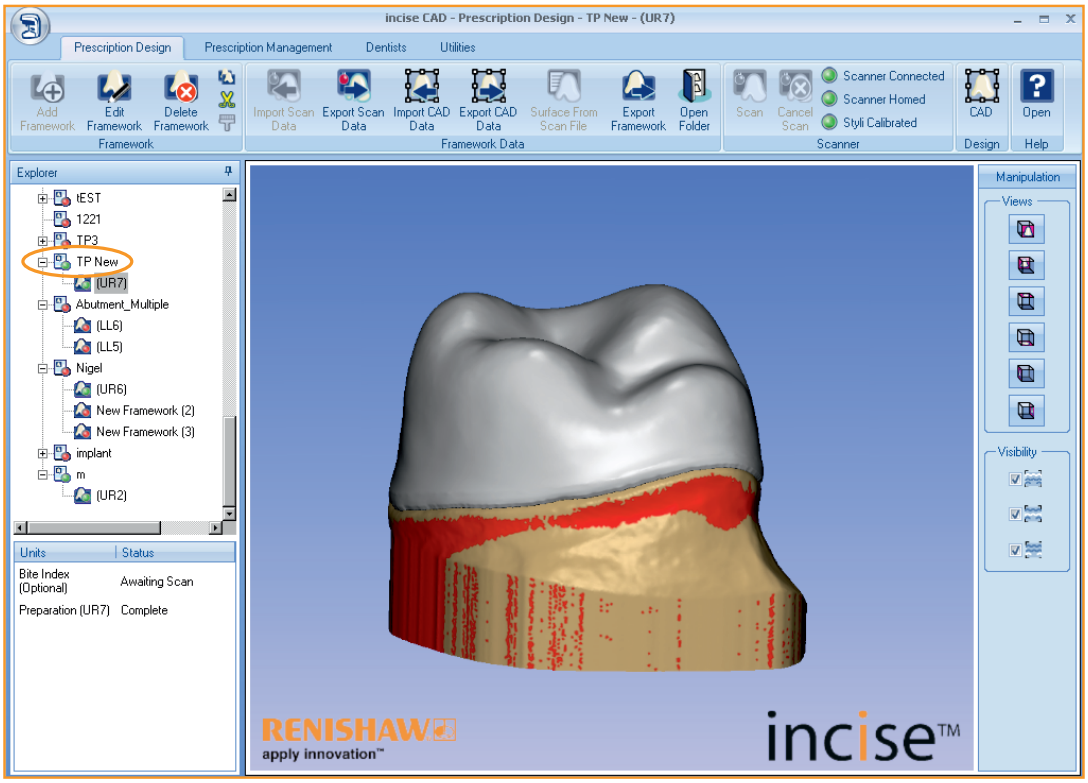


The system will virtually test the framework strength and, if satisfactory, output it ready for job submission.



Job submission

When a framework has been saved and output from inciseCAD Design, it will be displayed and be ready for submission to manufacture.



By clicking on the prescription, the main view will change to the Update Prescription just in case you need to make any final adjustments.

The ribbon bar will also change giving you the manufacturing options. Depending on the Renishaw incise equipment installed and material used in the design*, you can submit it either locally or centrally.

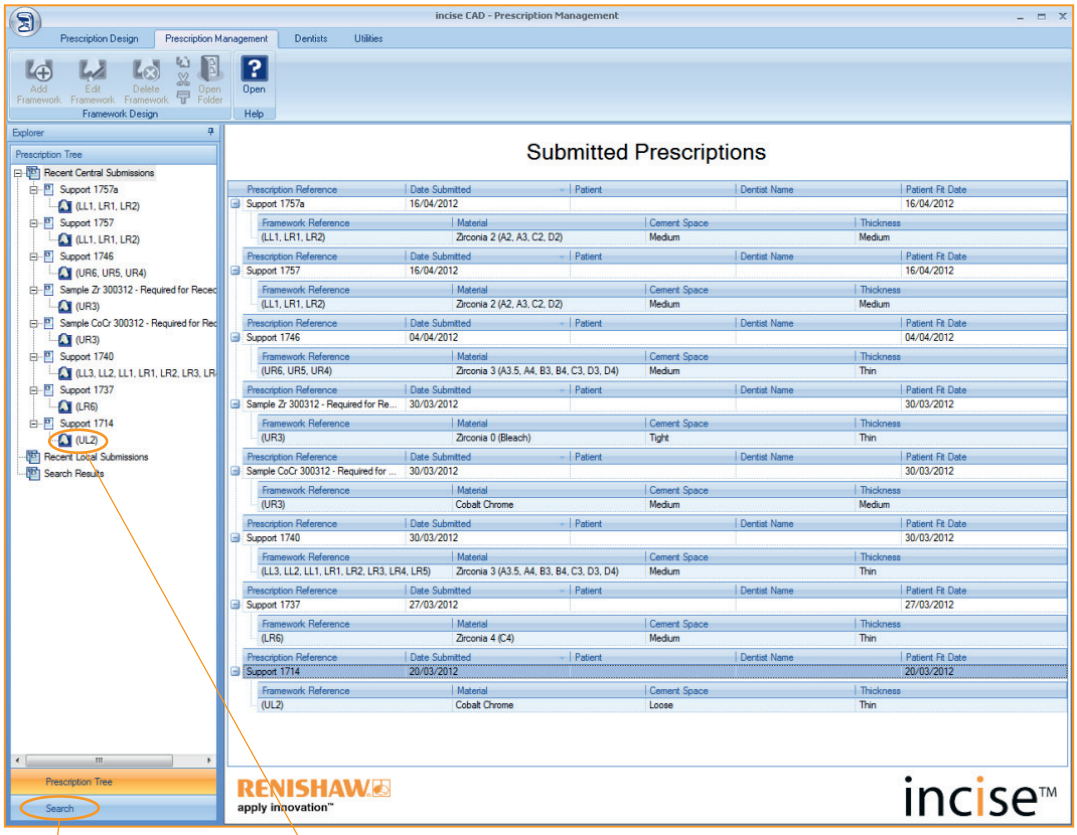
Submit to local manufacturing

Submit to central manufacturing

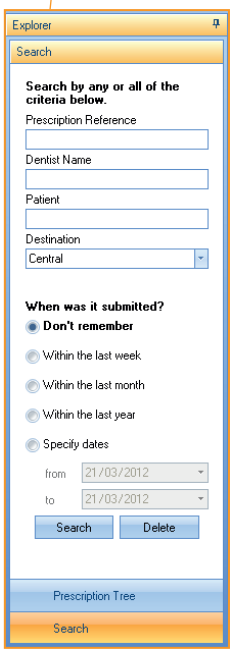
* Prescriptions can be submitted locally if a Renishaw incise DM10 has been purchased, installed and the material chosen in Prescription Design is incise Zr100 (zirconia), or WX100 (wax).

Prescription management

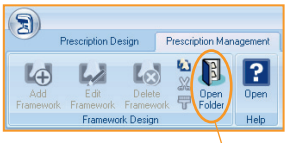
By selecting the **Prescription Management** tab, you can find a list of all your jobs submitted both centrally and locally since the system was set up. It includes a search facility allowing you to search prescriptions by reference, dentist name, patient name, submission destination or date of submission.



Click on the framework to view the design. You will see the **Copy Framework** icon and **Open Folder** icon are now lit.



Click on **Search** to switch from the 'Prescription Tree' to the 'Search' facility.



Click **Open folder** to access the folder containing the inciseCAD data files.

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Advanced features

Implant bridges

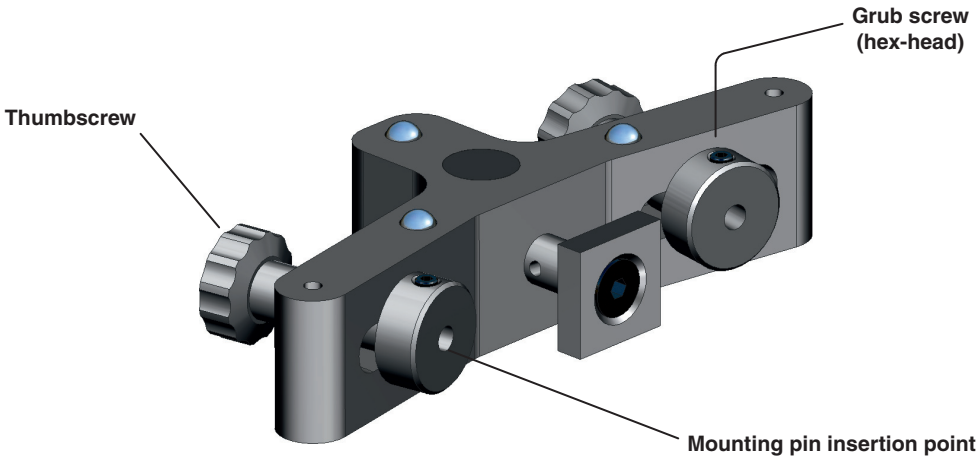
The incise system allows you to design and manufacture implant bridges. The process requires a plaster master of the implant positions and a replica of the implant bridge to be produced.

Note: Images are training models and not working examples

The implant positions will be measured first, followed by the implant bridge. Both sets of data are combined to insert accurate implant interfaces into the implant bridge form prior to machining.

Using the implant bridge holder

Firstly the implant bridge replica needs to be mounted on pins. Fit each pin into the holder and tighten the thumbscrews ensuring there are no lateral forces working against it.



Using a hex key, secure the implant bridge replica in position. Place the holder onto the mounting plate with the replica's gum-side up.

Supported implant systems

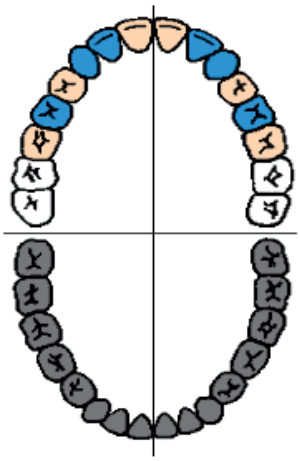
- Astra Tech™ – 20° UniAbutment 3.5/4.0 and 4.5/5.0
- Astra Tech™ – 45° UniAbutment 3.5/4.0 and 4.5/5.0
- Biomet 3i™ Certain® – 3.4, 4.1, 5.0 and 6.0
- Biomet 3i™ External Hex – 3.4, 4.1, 5.0 and 6.0
- Biomet 3i™ Low profile abutment
- Nobel Biocare® Brånemark System® MkIII – 3.3 NP, 4.1 RP, 5.0 WP
- Nobel Biocare® Brånemark multi-unit – 3.5 NP, 4.8 RP, 6.0 WP
- Nobel Biocare® Replace™ Select – 3.5 NP, 4.3 RP, 5.0 WP, 6.0 WP
- Nobel Biocare® NobelActive™ Internal – 3.5 NP, 4.3 RP, 5.0 RP
- Straumann® Bone Level – 3.3 NC, 4.1 RC, 4.8 RC
- Straumann® SynOcta® – 4.8 RN, 6.5 WN

Scanning an implant bridge

In this example we will be scanning implants at UR5, UR3, UR2, UL2, UL3 and UL5 (Biomet 3i™ External Hex 4.1).
UR6, UR4, UR1, UL1, UL4 and UL6 are pontics.

Prescription design

Click on **New Prescription** to create the new implant bridge scan.



Specify framework

Click on the required teeth and select the type(s) of implant being used.

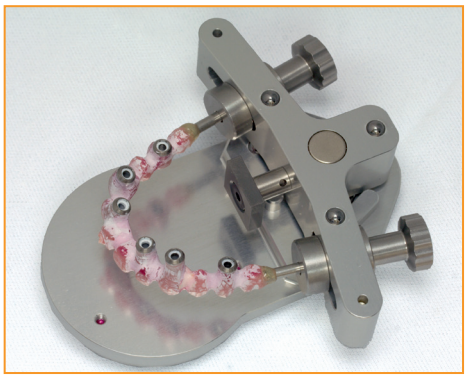
Click on the relevant teeth and select the pontics.

Select the material.

Click **OK** when done.

The implant bridge framework is now ready to be scanned. Three types of scan need to be performed. These can be performed in any order but typically they are done in the following order:

A) Implant bridge



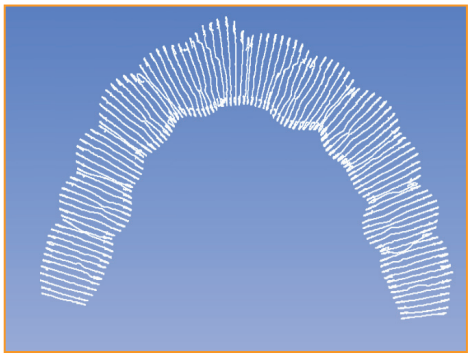
1. Fit the implant bridge replica as described on page 41.

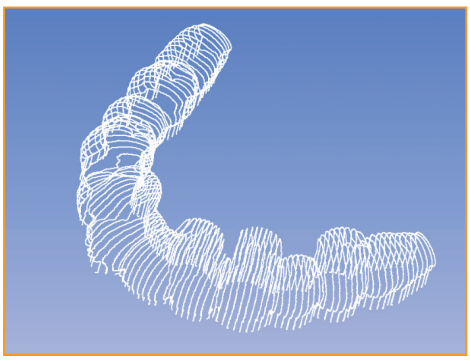
2. Fit the mounting plate onto the pillar and place it in position on the scanner.

3. Five pick points around the bridge need to determined.

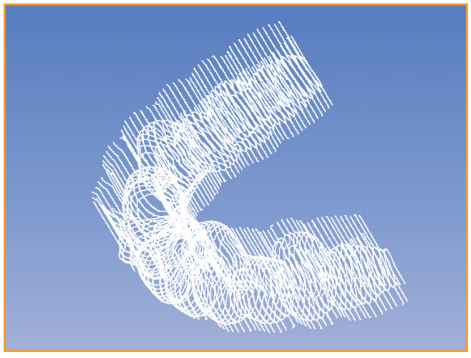
   - The position of the first mounting pin (this can be either pin).
   - The position of the second mounting pin. If a partial implant bridge is being scanned and mounted on one pin, repeat the first position.
   - The position of the start of the scan (first limiting point).
   - The position of the end of the scan. If a partial implant bridge is being scanned and mounted on one pin, repeat the first position.
   - The lowest point of the implant bridge.

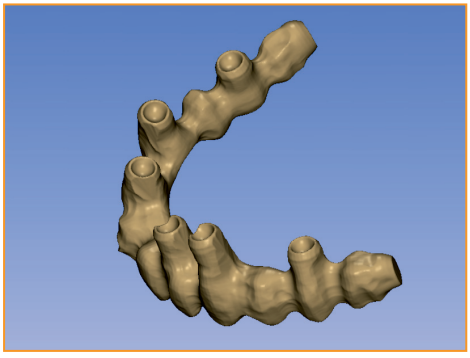
   Click **OK** when done.





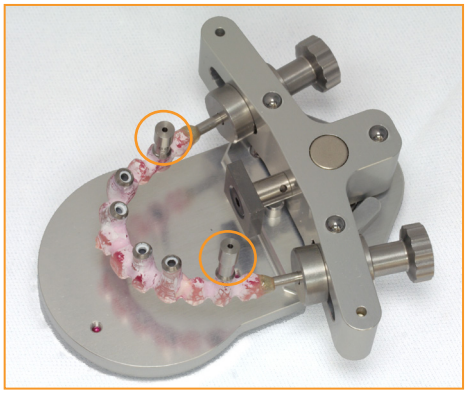
4. Scan the occlusal side – flip the bridge over on the mounting plate when prompted and click **OK**.



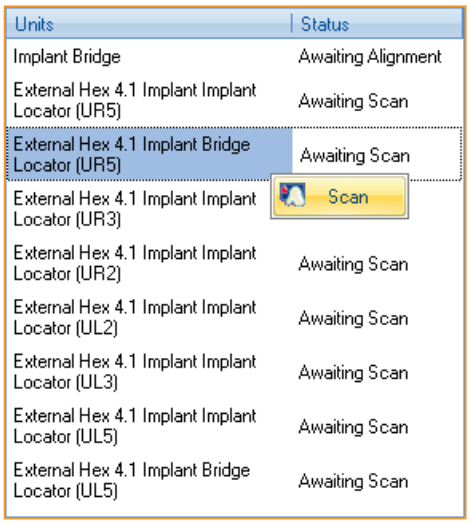


B) Implant bridge implant locations

The two outside mounting positions need to be measured on the implant framework replica so that the framework can be aligned to the master implant positions.

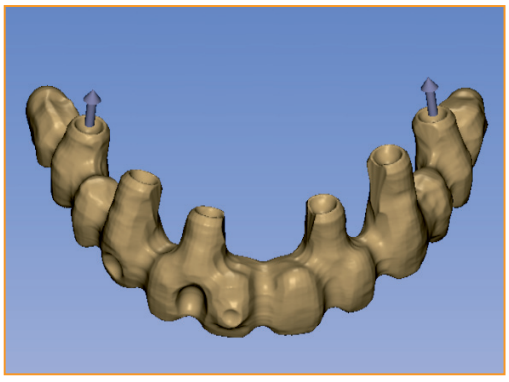


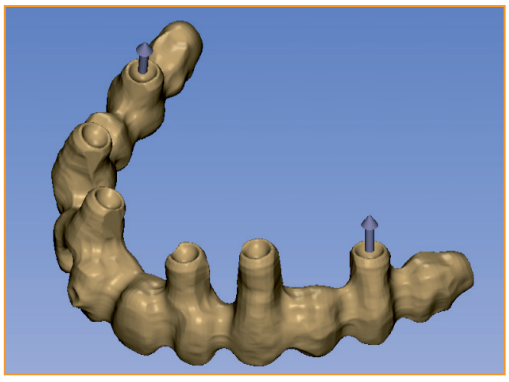
1. Fit the implant bridge locators to the replica and secure them using the bolts supplied.



2. Right click on the first implant bridge locator and select **Scan**
   Follow the on-screen instructions and indicate the position of the first implant bridge locator.
   - Move the stylus just above the centre of the locator.
   - Click **OK**.

3. Repeat step 2 for the second implant bridge locator.

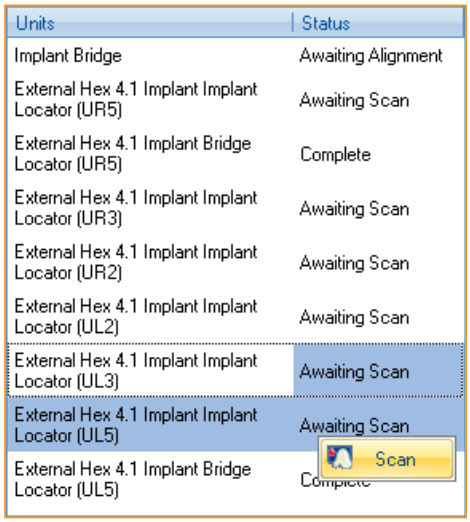




C) Master implant positions

Each of the master implant positions needs to be measured.

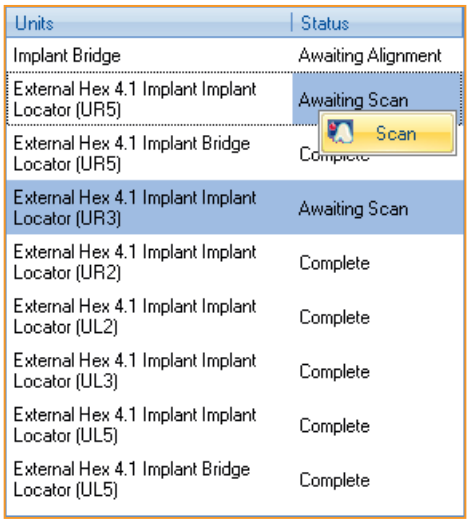
1. Fit the implant locators to the model base (plaster master) and secure them using the bolts supplied (here we are scanning two at once, UL5 and UL3).

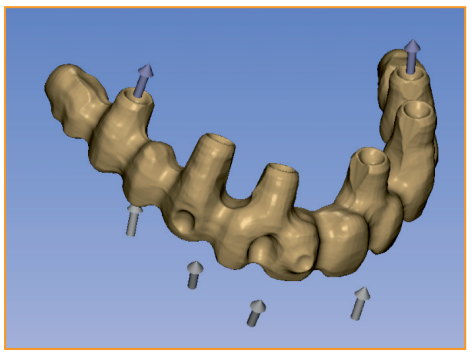


2. Using Ctrl, select the corresponding 'implant implant' locators. Right click and select **Scan**. Follow the on-screen instructions and indicate the position of the 'implant implant' locators.

   - Move the stylus just above the first locator (UL5 in this instance).
   - Click **OK**.
   - Repeat for the second locator.

3. Reposition and scan each locator around the model base.

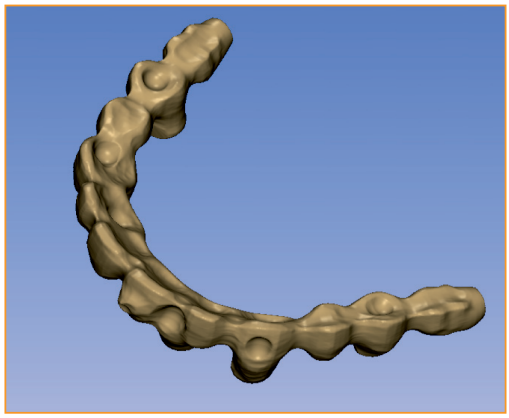




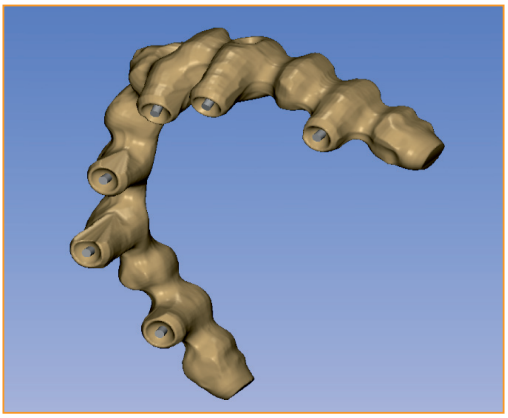
Note that the locators and the implant positions do not align. This is normal and inciseCAD will snap them into position once they are all scanned.

Scanned elements aligned and complete

1. When the three stages of scanning are complete and the alignment takes place, the model will be ready to be opened in inciseCAD design. Ensure there are no abnormalities and click **CAD**

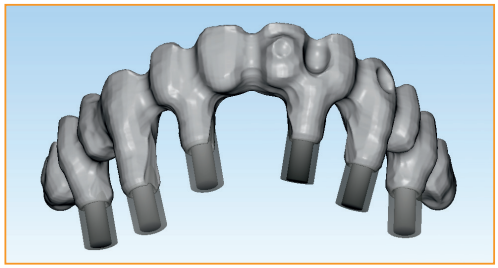


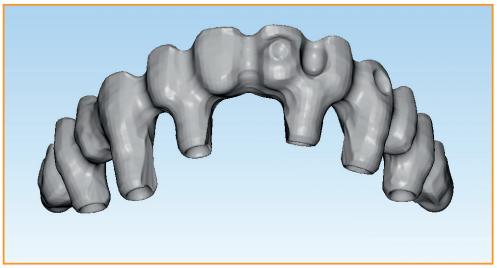
Occlusal view



Gum-side view

On entry to the inciseCAD design process, the implant bridge is displayed with cylinders indicating the screw access holes. You can toggle between views using the show / hide screw access holes

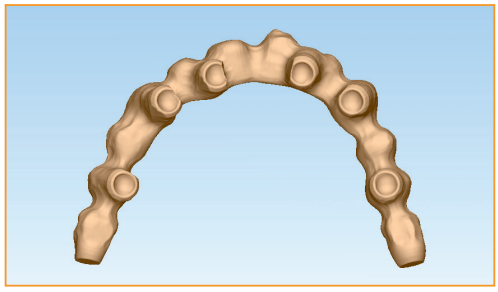


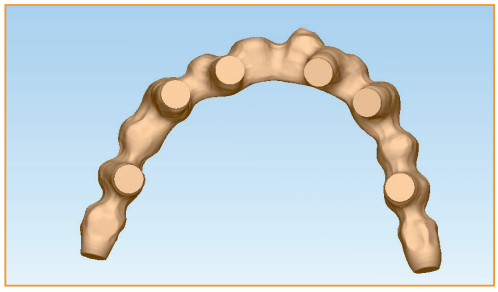


2. Select the bridge by double clicking on it or clicking on the status selector icon

If required use the add or remove material tool

3. When satisfied with the design, generate the final bridge by clicking on **Generate Framework**

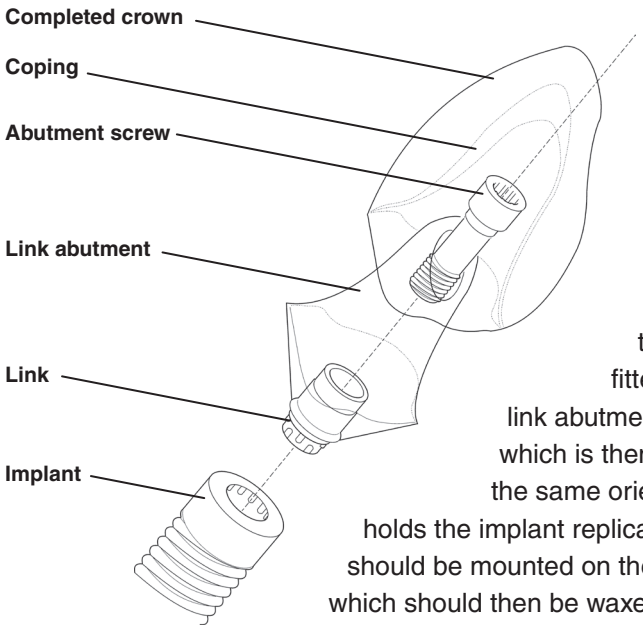




inciseCAD inserts precise implant interface details into the model

Save and exit the design process

Link abutment



Description

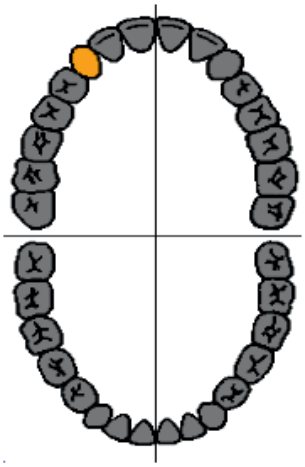
A link abutment (or two-part abutment) is a framework that fits to an implant in the jaw. The completed crown is then fitted to the abutment. When scanning the link abutment we need to use the link abutment holder which is fitted to the artefact base adaptor. The link abutment must firstly be designed in wax which is then fitted onto the link and scanned in the same orientation. The link abutment holder holds the implant replica in a vertical position. The link should be mounted on the replica with an appropriate screw which should then be waxed over.

Scanning a link abutment

In this example we will be scanning a link abutment at position UR3.

Prescription design

Click on **New Prescription** to create the new link abutment scan.

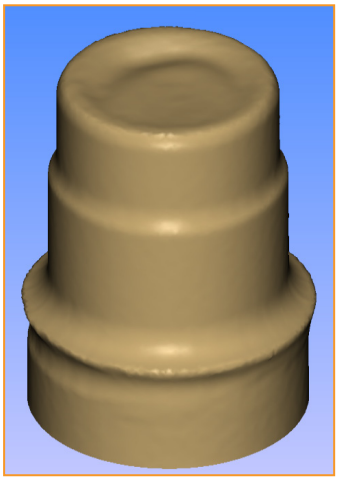


Specify framework

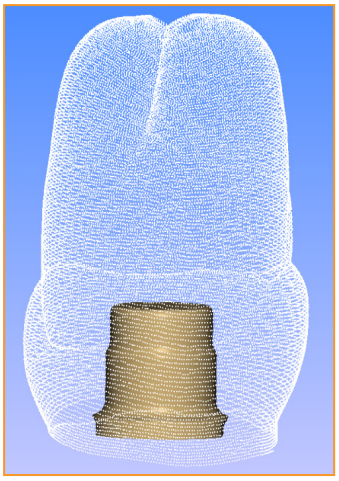
Click on the required tooth and select **Link Abutment**

Click **OK** when done.

1. Secure the link abutment holder to the artefact base adaptor.
2. Ensure the link has been waxed so that the probe does not scan into the screw-hole.
3. Clamp the lab analogue in the abutment holder and, following the on-screen instructions, scan the link.



4. Mount the waxed-up abutment onto the link and scan it.



5. Start the design process by clicking on **CAD** 

The model opens displaying the link only. Click on **Next** to see the margin line generation screen. The link abutment is displayed translucently.

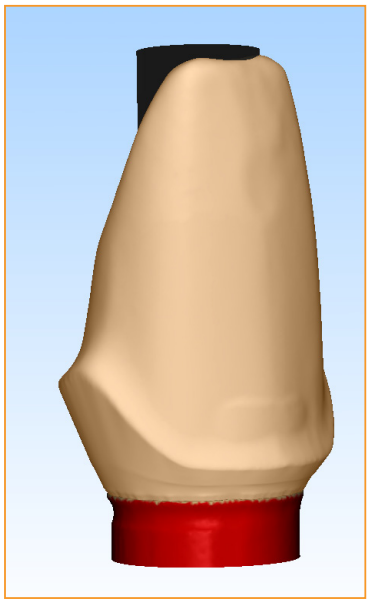
6. Add the primary margin line for the link by holding Ctrl and clicking in position. Edit the margin line as required and click on **Next**

7. Use the visibility tools to toggle between waxup off, translucent and solid waxup.

8. Select the wax surface under the margin line tools

9. Create the secondary margin line to define the top of the emergence profile, adjust as required and click **Next**

The black cylinder indicates where the screw hole will be made during manufacture. The original wax surface is indicated by the darker colours.



Note: The screw hole indicator will not be displayed when the framework is saved and output.

10. Use the tools and add / remove material as required. When you are satisfied with the design, click on **Generate final framework**

11. Take the framework to 'Prescription Management' by clicking **Save and output framework**

Custom abutments (LaserAbutments™)

Custom abutments can be designed as screw- or cement-retained and are available in CoCr (LaserPFM™).

Supported implant systems

- Biomet 3i™ Certain® – 3.4, 4.1, 5.0 and 6.0
- Biomet 3i™ External Hex – 3.4, 4.1, 5.0, 6.0
- Nobel Biocare® Brånemark System® MkIII – 3.3 NP, 4.1 RP, 5.0 WP
- Nobel Biocare® Replace™ Select – 3.5 NP, 4.3 RP, 5.0 WP, 6.0 WP
- Nobel Biocare® NobelActive™ Internal – 3.5 NP, 4.3 RP, 5.0 RP
- Straumann® Bone Level – 3.3 NC, 4.1 RC, 4.8 RC
- Straumann® SynOcta® – 4.8 RN, 6.5 WN

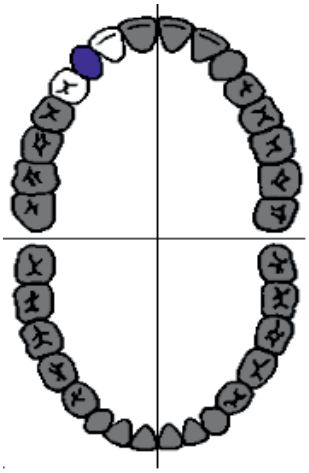
Waxup custom abutment (automatic sub-gingival)

The scanning process uses the optional wax abutment holder kit. When designing a waxup abutment, you can either opt to have inciseCAD generate the sub-gingival region automatically or you can scan it yourself; the scanning and design processes are very similar. In the first example we will be designing a waxup abutment at UR3 (Biomet 3i™ Certain® 4.1 Implant) with the sub-gingival being generated automatically. In the second example we will be designing the same abutment but using the waxed-up sub-gingival region.

Prescription design

Click on **New Prescription** to create the new waxup abutment scan.

Specify framework



Select **Custom Abutment** in the framework type and select **Waxup** in the framework sub-type.

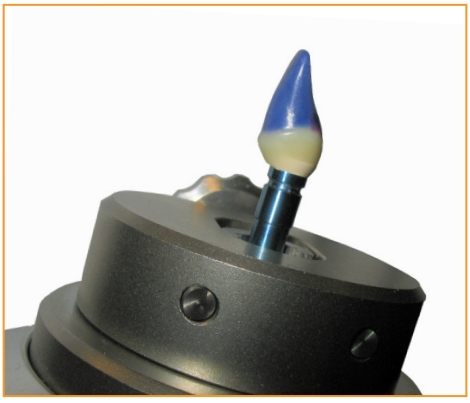
Click on the required tooth and select the implant type and size.

Click **OK** when done.

1. Secure the waxup abutment into a lab analogue of the correct type.

2. Wax over the screw hole.

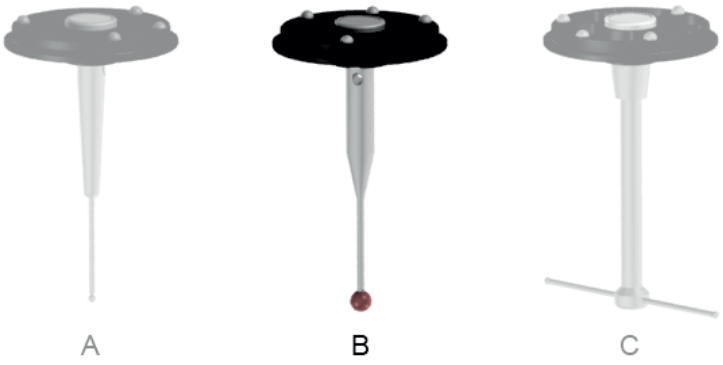
3. Mount the analogue in the abutment holder and fit it to the gimbal.



Position the gimbal to ensure the stylus can access all the supra-gingival area of the waxup abutment.

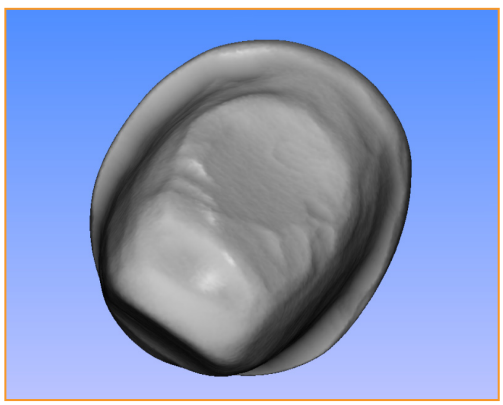
4. Click on the wax abutment and select **Scan**

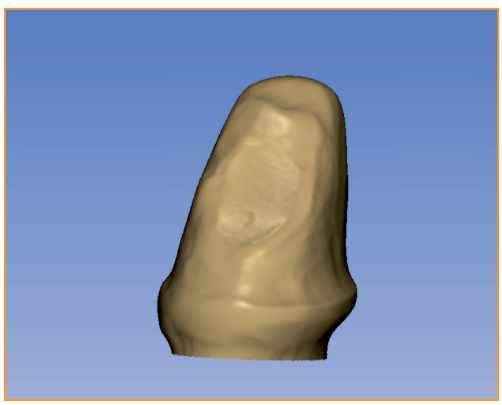
5. You are now asked to select the stylus or styli. Select 'Scan using stylus B only' and click **OK**.



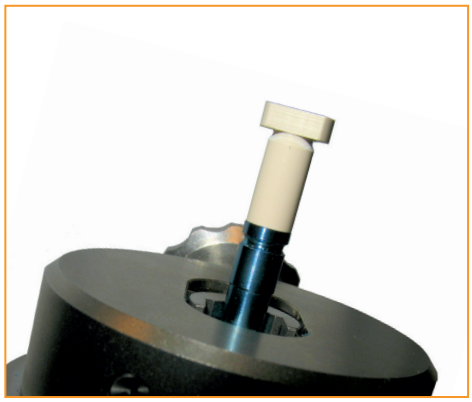
Note that if Styli A and C are picked, ensure the holder is positioned so that the thumbscrew faces the front or back of the scanner and therefore does not obstruct stylus C during the scan.

6. Follow the instructions to select the pick point. Click **OK** and scanning will begin.



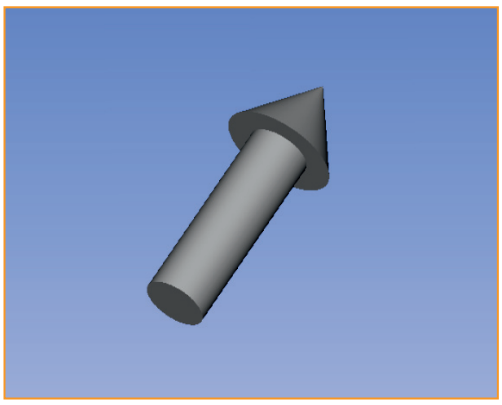


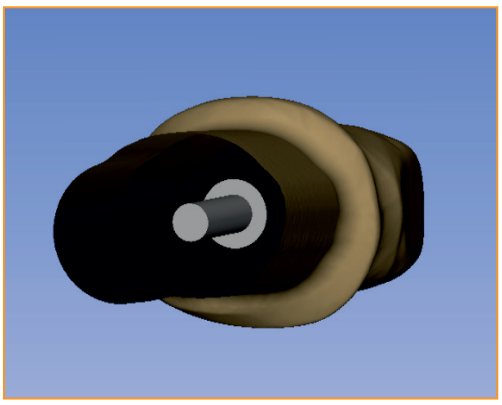
7. Remove the wax abutment and fit the implant locator to the analogue.



IMPORTANT: Do not remove the analogue from the holder and do not re-orientate the gimbal.

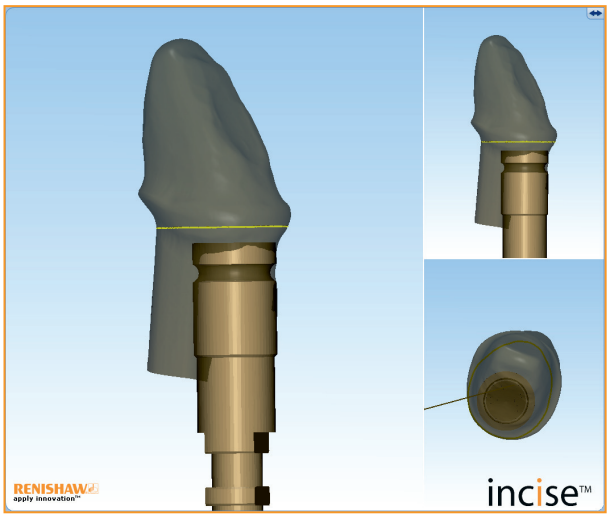
8. Select the implant locator and click on **Scan** 
Follow the on-screen instructions selecting the pick point and measure the implant location.





9. Start the design process by clicking on **CAD** 

10. Generate the abutment by clicking **Next** 



Note: The abutment is generated using the default margin line. If the stylus ball did not maintain full contact with the sub-gingival during the scanning process, this margin line will need to be redefined.

If this is the case:

- Select the abutment
- Select the margin line tools
- Delete the abutment
- Delete the margin line
- Place the correct margin line
- Re-generate the abutment

11. If you have waxed-up for a screw retained abutment, the supra-gingival surface (above the margin line) can be reduced to allow space for the porcelain. Select **Apply Reduction** under the Add / Remove Material tools. Specify the reduction amount and apply the reduction.

12. Use the various visibility and viewing options to check the abutment. If necessary, you can use the various tools to measure and/or, add or remove material.

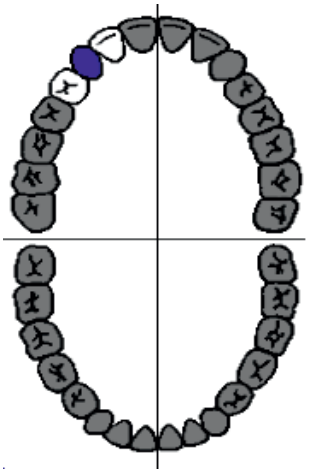
13. When you have finished all modifications, click on **Generate Framework** 

14. Take the prescription back to inciseCAD by clicking on **Save and Output Framework** 

Waxup custom abutment (scan sub-gingival)

Prescription design

Click on **New Prescription** to create the new waxup abutment scan.



Specify framework

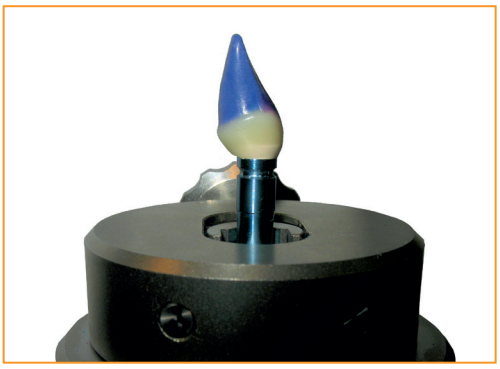
Select **Custom Abutment** in the framework type and select **Waxup** in the framework sub-type.

Click on the required tooth and select the implant type and size.

Click **OK** when done.

1. Secure the waxup abutment into a lab analogue of the correct type.

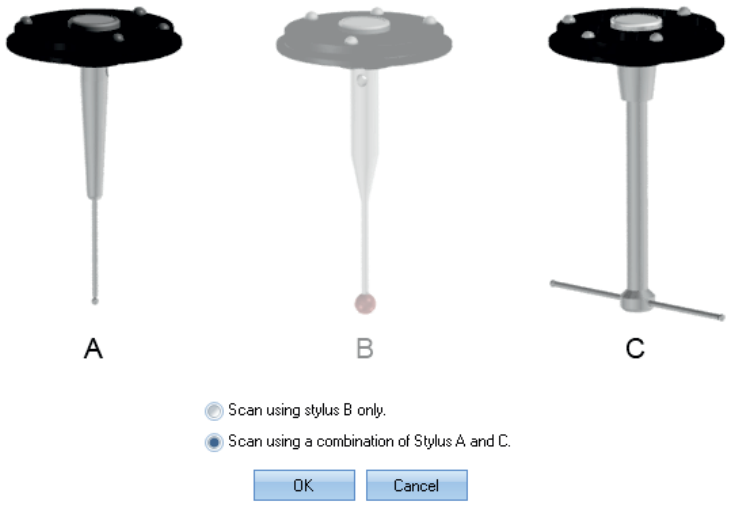
2. Wax over the screw hole.



3. Mount the analogue in the abutment holder. Fit the holder onto the gimbal so the thumbscrew is facing the front or rear of the scanner. Position the gimbal on the scanner so that the analogue is roughly vertical.

4. Click on the wax abutment and select **Scan** 

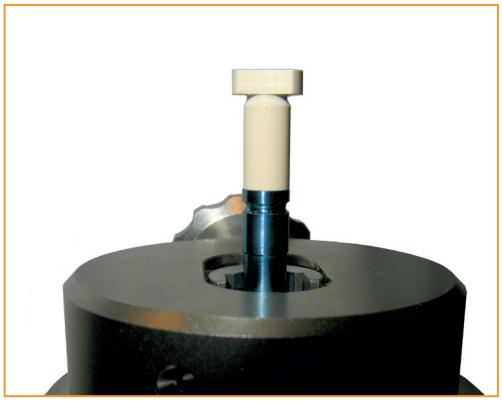
5. You are now asked to select the stylus or styli. Select 'Scan using a combination of Stylus A and C' and click **OK**.



6. Follow the instructions to load Stylus A and select the pick point. Click **OK** and scanning will begin.

7. Load Stylus C when prompted.

8. When the scanning is complete, remove the wax abutment from the holder and fit the implant locator to the analogue.

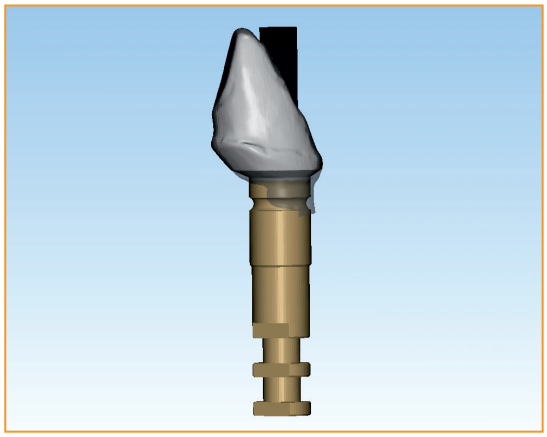


IMPORTANT: Do not remove the analogue from the holder and do not re-orientate the gimbal.

9. Select the implant locator and click on **Scan**
Follow the on-screen instructions to select the pick point and measure the implant locator.

10. Start the design process by clicking on **CAD**

11. Generate the abutment by clicking **Next**



12. If you have waxed-up for a screw retained abutment, the supra-gingival surface (above the margin line) can be reduced to allow space for the porcelain.
    - Select the abutment
    - Select Margin Line Tools
    - Delete the margin line
    - Hide the abutment
    - Place the margin line to define the region to be reduced
    - Select Apply Reduction under the Add / Remove Material tools

13. Use the various visibility and viewing options to check the coping. If necessary, you can use the various tools to measure and/or, add or remove material.

14. When you have finished all modifications, click on **Generate Framework**

15. Take the prescription back to inciseCAD by clicking on **Save and Output Framework**

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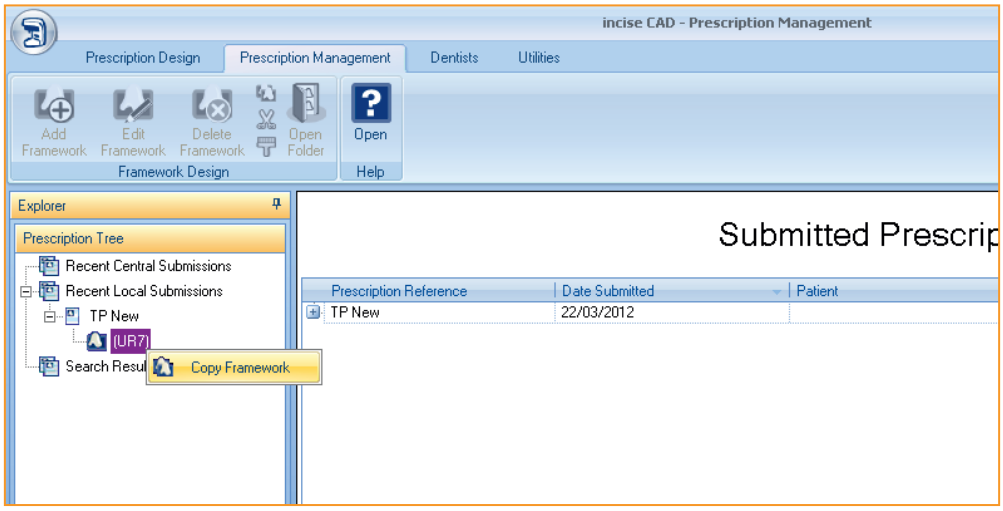
Additional functions

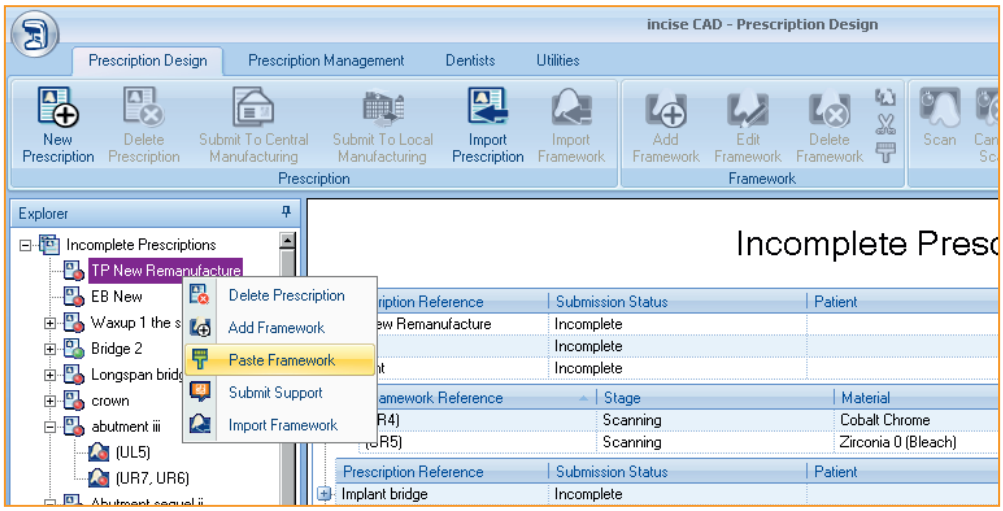
Copying a framework / remakes

After a framework has been submitted, it will be moved from the 'Prescription Design' to the 'Prescription Management' section. If the framework needs to be remanufactured, the data has to be copied into a new prescription.

1. Right click on the framework to be copied from within Prescription Management and select **Copy Framework**



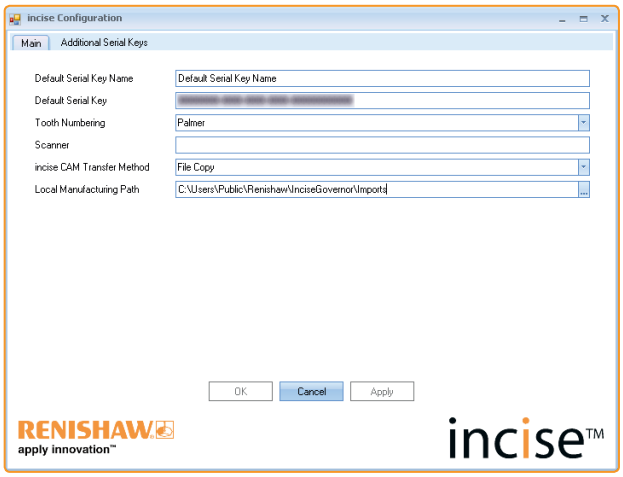
2. Create a prescription in Prescription Design. Right click on the prescription and select **Paste Framework**



inciseCAD support

There are a range of support features that can be accessed through the Windows Start menu. Ensure inciseCAD is not open and click on **Start** > **All Programs** > **Renishaw plc** > **inciseCAD**.

Configuration ('Main' tab)



Default Serial Key Name

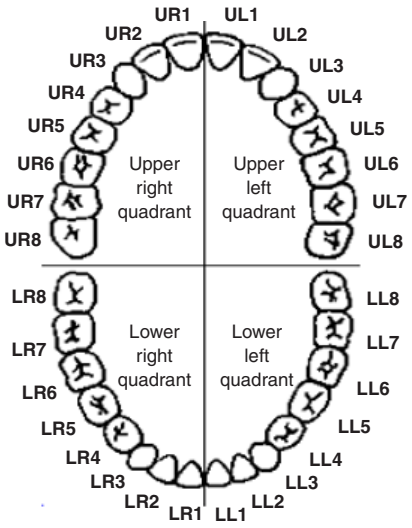
You can allocate a unique name to your default serial key.

Default Serial Key

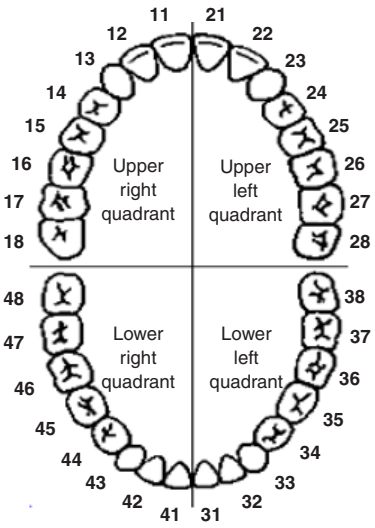
This is where the software serial number is displayed.

Tooth Numbering

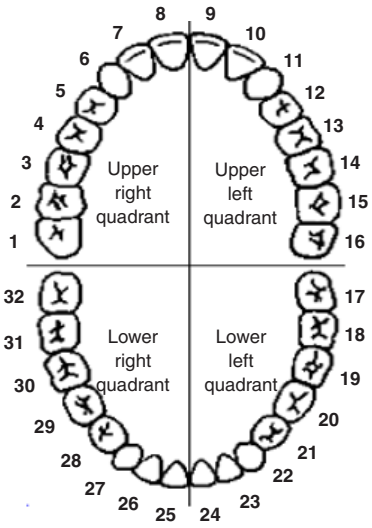
Here you can change the tooth numbering notation. It is set to Palmer as default but can be changed to the FDI World Dental Association Notation or Universal Numbering Notation.



Palmer Notation



FDI World Dental Association Notation



Universal Numbering Notation

Scanner

If there is a DM10 milling machine connected for local manufacturing, the DS10 scanner serial number needs to be entered here to allow both systems to communicate.

Note: The inciseCAM configuration needs to be set up in the same way for both systems to communicate.

inciseCAM Transfer Method

Select the method for transferring inciseCAD data into the inciseCAM system.

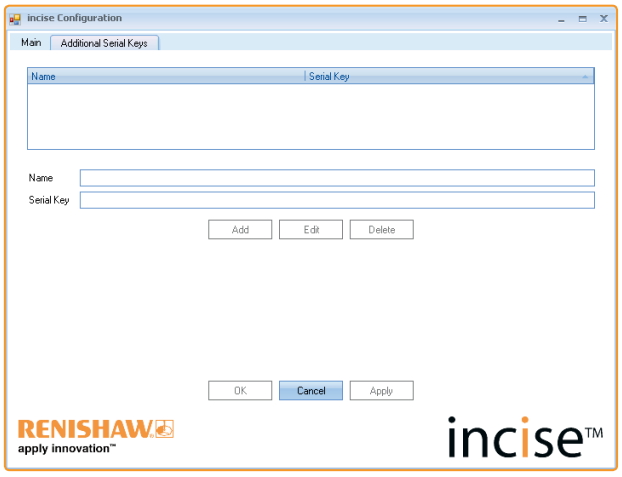
Local Manufacturing Path

File Copy:
The user needs to specify the local directory where the inciseCAD data will be placed.

FTP:
The user needs to specify the FTP Host Name, FTP Username, FTP Password and FTP Local Path (where the data will be retrieved from).

Configuration ('Additional Serial Keys' tab)

This information is required if inciseCAD users submitting data for central manufacture require more than one address for delivery of their frameworks. A request must be sent to Renishaw for an additional Serial Key which should then be input here.

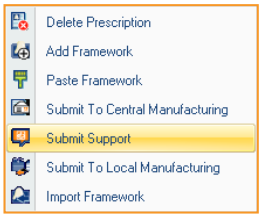


Submitting a support job

You may be requested to submit a support job so that a framework can be investigated. Jobs submitted using this option will **not** be manufactured and should only be submitted when requested by Renishaw.

If the job had previously been submitted, it should be copied from 'Prescription Management' to 'Prescription Design'.

To submit a support job, right-click on a prescription and select 'Submit Support'.

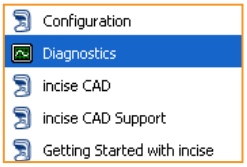


Diagnostics tool

There is a diagnostic facility that will check the Renishaw incise DS10 and send the data back to the Renishaw Support Team for analysis.

To access the diagnostics tool, click on **Start** > **All Programs** > **Renishaw PLC** > **inciseCAD** > **Diagnostics**

When the diagnostics tool is opened, you will be given instructions on the actions required.



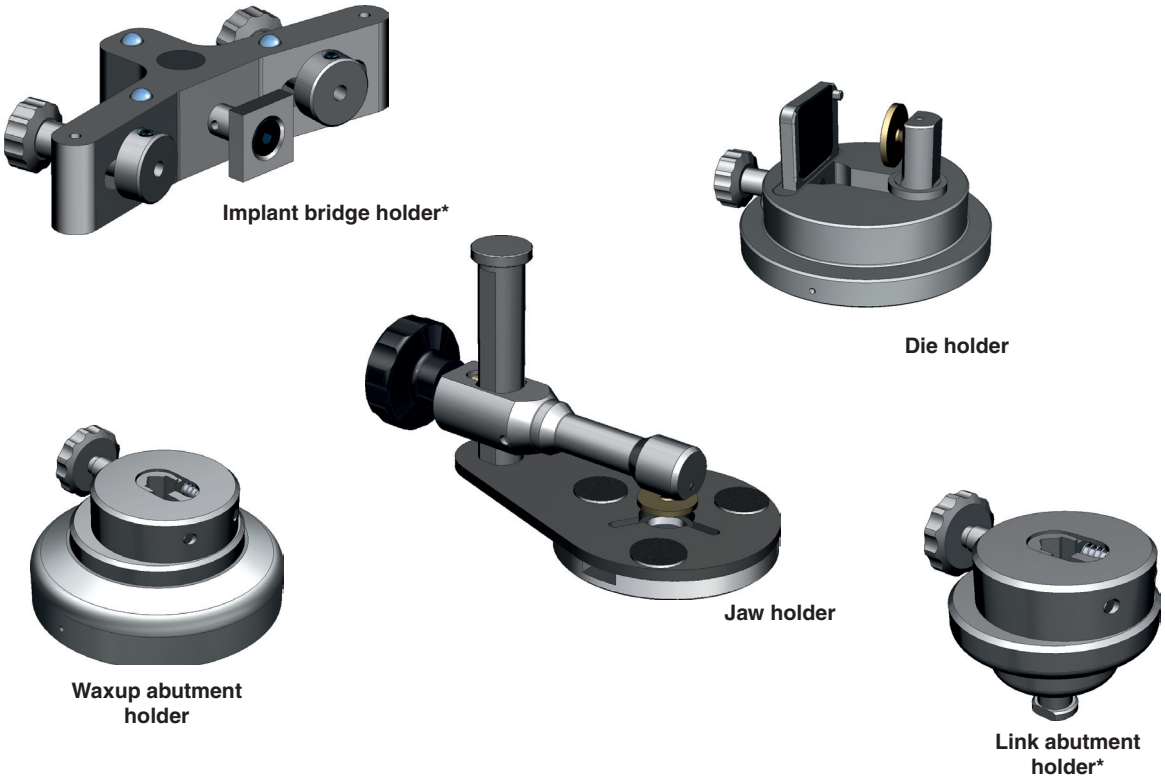
Exporting inciseCAD data for third-party editing and machining

When the framework has been designed using inciseCAD, the option of additional design and manufacturing using third-party services is now available using a security enabled USB dongle. For further information, or to purchase the USB dongle, please call our Support Line on +44 (0) 1453 524111.

Reference guide

Model holders

There are five types of holder used depending on the type of restoration being scanned.



* Not part of standard kit and can be ordered separately

The die holder, jaw holder and waxup abutment holder are fitted to the gimbal. The implant bridge holder is part of an assembly kit comprising the holder, a pillar and a mounting plate. The link abutment holder attaches to the artefact base adaptor.

Holder	Suitable for
Implant bridge holder	Implant bridges
Die holder	Single units
Waxup abutment holder	Custom abutments (waxup)
Jaw holder	Bridges
Link abutment holder	Link abutments

Icons

inciseCAD scan

incise button 

Right click the incise button to save, undo / redo, set preferences, access help or open the 'About' dialog.

	**Features**	Opens the 'Feature Manager' which lists the features that are licenced to your system.
	**About**	Displays application information including the version number.
	**Help**	Opens the help dialog (also accessible on the ribbon toolbar).
	**Exit**	Closes the application.

'Framework' group

	**Add framework**	Add a new framework to a prescription.
	**Edit framework**	Edit the details of an existing framework.
	**Delete framework**	Delete the framework from a prescription.
	**Copy framework**	Copy a framework from a prescription.
	**Cut framework**	Cut a framework from a prescription.
	**Paste framework**	Paste a copied or cut framework.

'Framework Data' group

	**Import scan data**	Click on the preparation to be scanned and select to import third-party scan data in preparation for inciseCAD design.
	**Export scan data**	Export the incise scan data for third-party CAD design.
	**Import CAD data**	Import a CAD designed framework from other incise or third-party software in preparation for manufacture.
	**Export CAD data**	Export the designed framework as an 'stl' file (Stereolithography Interface Format) which can then be manufactured (activated by a software security dongle).
	**Surface from scan file**	Surface the selected unit from a scan file.
	**Export framework**	Save the incise framework for opening at a later date or on another incise system.
	**Open folder**	Open the data folder where the current framework exists.

'Scanner' group

	**Scan**	Click to begin scanning the framework.
	**Cancel scan**	Click to stop the scanning process.
	**Scanner status**	Indicates the current status of the scanner. All lights should be green for scanning to commence.

'Design' group

	**Open in CAD**	Following successful scanning, click this to open the current framework in the CAD design software.

'Help' group

	**Help**	Click this at any point to access the help files.

'Management' group

	**New dentist**	Add a dentist and their contact details to your database You can also select their preferred cement space and thickness This information will be set as default when in the design part of CAD.
	**Delete dentist**	Click to remove the selected dentist details from your system.

'Prescription' group

	**New prescription**	Click this to originate a new prescription.
	**Delete prescription**	Click to cancel an existing prescription.
	**Submit to central manufacturing**	Submit the completed job to central manufacturing.
	**Submit to local manufacturing**	Submit the completed job for local milling (requires Renishaw Dental Milling Machine).
	**Import prescription**	Bring in a prescription created on a third-party system or another Renishaw inciseCAD system.
	**Import framework**	Import a framework from another prescription.

Views

	**Front View**	Snaps to a front view of the scanned surface.
	**Back View**	Snaps to a back view of the scanned surface.
	**Top View**	Snaps to a top view of the scanned surface.
	**Bottom View**	Snaps to a bottom view of the scanned surface.
	**Left View**	Snaps to a left view of the scanned surface.
	**Right View**	Snaps to a right view of the scanned surface.

inciseCAD design

incise button 

Right click the incise button to save, undo / redo, set preferences, access help or open the 'About' dialog. Open the 'preferences' to set defaults for 'Margin line material tool compensation', 'Emergence profile radius', 'Margin line material edge thickening' and 'Default library view'.

Edit functions

	**Undo**	Undo your last command.
	**Redo**	Following an 'Undo', click this to redo the action.
	**Save**	Click this to save the current status of the design.

Views

You have the option of using the main display on its own or you can use the viewport function as well (as shown above). The preset viewing angles can be used to quickly snap to the desired position or you can click and drag in the main display area to achieve the desired perspective. The panning handle found in the lower viewport can be used to rotate the preparation model without affecting any other positioning.

	**Outside view**	Snaps to the outside (front) view.
	**Inside view**	Snaps to the inside (rear) view.
	**Occlusal / incisal view**	Depending on the preparation model, snaps to the occlusal or incisal (top) view.
	**Coronal view**	Snaps to the coronal (underside) view.
	**Left view**	Snaps to the left view.
	**Right view**	Snaps to the right view.

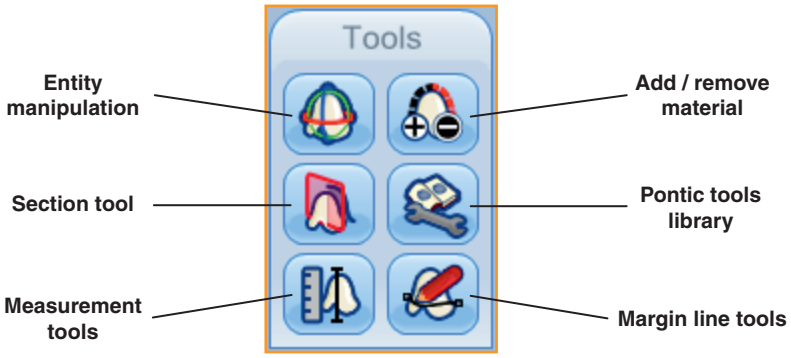
Visibility

The visibility options allow you to toggle between various views of the preparation depending on its type. You can also display a dimension grid to assist you through the design process. Visibility can also be controlled by right clicking on the 'Unit status and selection' icons where you can enable or disable various elements of the current job.

	Show / hide coping		Show / hide waxup
	Show / hide neighbours		Show / hide preparations
	Show / hide ridges		Show / hide pontic
	Show / hide connector		Show / hide bite index
	Show / hide screw access holes		Show / hide unreduced surfaces
	Show / hide tooth gingiva		Show / hide full waxup
	Show / hide implant replica		Show / hide gingiva
	Show / hide abutment		Show / hide implant
	Show / hide top cap		Show / hide emergence surface
	Show / hide anatomical surface		Show / hide grid

Tools

There are six main design tools each with their own set of functions (or sub-tools).



Margin line functions

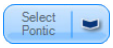
	Generate coping	When you are satisfied with the margin line position, click this to generate the coping.
	Margin line material tool compensation (off / on)	Sometimes known as ballooning. Extra material added to sharp features close to the margin line (for further information see H-5489-8500 – Clinical and Laboratory Recommendations).
	Emergence profile radius (off / on)	When on (default), the edge of the margin emergence is smoothed. When off the margin emergence will retain a sharp edge.
	Gutter fill	If a guttered margin is created use this to level it out.
	Smooth tool	Use this to reduce sharp areas of the margin line. Note that this affects the complete margin line.
	Delete margin line	Delete the current margin line.
	Nudge tools	Nudge the margin line up and down.
		Select to use partial nudge. Hold Ctrl and click on a point along the margin line, this will be the centre point of the partial nudge section.
		With partial nudge selected, you can move this slider to move the partial nudge section left or right.
		This decreases / increases the partial nudge section from its centre point.

	**Collar tools**	 Enable a collar.
		 Disable the collar.
		 Open / close collar. Open for partial collar addition or close for full circumference collar addition.
		 Collar width. Add a value in mm.
		 Collar height. Add a value in mm.
		 Finishing allowance. Additional collar material allowing for manual finishing. Slide right to increase convexity of the curvature.
		Move this slider to move the collar span section left or right.
		This decreases / increases the collar span from its centre point.
	**Abutment tools**	 Abutment vertical offset.
		 Abutment platform.

Measurement tool 

	**Point to point measurement**	To display the distance between two points, hold Ctrl and click the first point and then the second point.
	**Coping thickness**	Hold Ctrl and click on various positions of the coping to determine its thickness.
	**Framework height**	Click the icon to display the maximum height of the framework.

Pontic tools 

	**Apply ridge lap**	A pontic base can be stretched beyond and then trimmed to the ridge.
	**Select pontic**	Select and apply a pontic from the library.
	**Configure pontic library**	Opens the pontic library dialog.
	**Add current to library**	Add the current designed pontic to the pontic library.

Section tool 

Following coping generation the section tool allows you to view a cross-sectional area.

Entity manipulation 

This tool allows you to scale, translate and position your pontic, connector, anatomical surface and top cap.

Add / remove material 

Following coping generation, this tool allows you to manually add or remove material.

Machine maintenance

The Renishaw incise DS10 scanner is a precision instrument and must be handled accordingly.

Cleaning

WARNING: Disconnect the power before cleaning the incise scanner.

Cleaning the scanner

The components of the incise scanner do not require any special maintenance other than cleaning. A lint-free cloth and glass cleaner can be used to clean all outer surfaces of the scanner body. Avoid cleaning the internal components and mechanics of the scanner. If these areas do need cleaning, an air-blast should be used. Cleaning solutions are not recommended.

Cleaning the probe body, probe module and stylus

The probe assemblies are fitted with kinematic coupling mechanisms. These utilise precision ball and V-groove seatings, electrical contacts and permanent magnets.

It is recommended that these features are cleaned at the following intervals:

- Before the scanner is used for the first time.
- After every 500 changes.

Removing the probe module and stylus

You must remove the probe module and stylus from the probe body before cleaning the probe. The probe body forms part of the mechanism of the scanner and cannot be removed.

Remove the stylus by holding the stem and tilting it away, breaking the magnetic joint. Remove the probe module by holding it and tilting it away from the probe body.

Cleaning the probe body and module

A cleaning kit is supplied for cleaning the kinematic coupling mechanisms of the probe assembly. This comprises of 'yellow tack' strips and an optical cleaning cloth.

IMPORTANT: Do not use the yellow tack to clean the optical window of the probe body or module.

1. Clean the external surfaces only using a lint-free cloth. All parts must be kept dry.
2. With clean hands, take off a small piece of yellow tack and shape it into a ball. Press it onto and into each feature.
3. Using the optical cleaning cloth, clean the optical windows on the underside of the probe body and topside of the probe module.

Cleaning the stylus mount and stylus

Regularly inspect the ball of each stylus for damage or component material deposits.

1. Clean the stylus ball and mating face using the cleaning cloth or a solvent.

Refitting the probe module and stylus

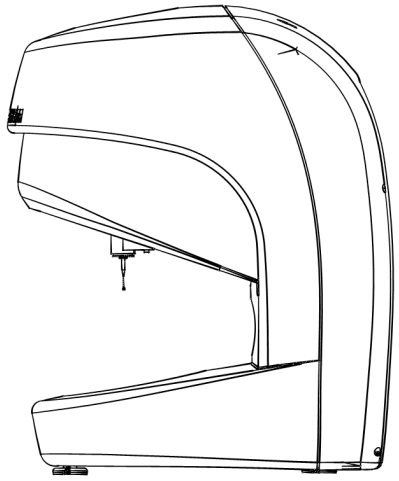
1. Align the front of the probe module (indicated by the dot marker above the word 'Renishaw') with the front of the probe body.
2. Slightly tilt the module with the lower alignment dot facing towards you, offer it up and 'roll' it into position, allowing the magnetic force to gently connect the kinematic joint.
3. Align the stylus with the probe module by pairing the white line with dot marker.
4. Tilt the probe so the stem is facing towards you, offer it up to the module and roll it into position, allowing the magnetic force to gently connect the kinematic joint.

Cleaning the accessories

1. Dampen a cloth with glass cleaner and clean each of the accessories.
2. Use a soft brush if any of the clamping faces need cleaning.

System Specification

Renishaw incise DS10



Dimensions	Width Depth Height	300 mm (11.8 in) 400 mm (15.7 in) 550 mm (21.7 in)
Weight	25 kg (maximum)	
Operating environment	Temperature Relative humidity Altitude	15 °C to 26 °C (maximum temperature change of 2 °C per hour) 20% to 80% 2000 m maximum
Transportation environment	Temperature Humidity	20 °C to +70 °C 0% to 95%
Voltage for power supply (ac to dc adaptor)	100 V to 240 V ac	
Frequency range	50 Hz to 60 Hz	
Voltage for scanner	18 V dc	
Power supply rating	70 W	
Communications to PC	USB	
Connectors on scanner	USB, power	
Switch	On / off power	

Minimum PC specification

Processor	Intel Pentium 4, 3.0 GHz (or equivalent)
Hard drive	100 MB minimum free space is required for installation. Additional hard disk space is required to store frameworks as they are created. A minimum of 200 GB is recommended.
Memory	1 GB RAM (for Windows XP SP3) 2 GB RAM (for Windows Vista SP1 and Windows 7)
Graphics adaptor	Fully DirectX 9 compatible graphics adaptor 256 MB (minimum) video RAM
Colour display resolution	1024 × 768 capable
Mouse	Scroll-wheel or 2-button mouse or pointing device
CD-ROM drive	Required for software installation
USB	Three USB ports are required
Broadband internet connection	Minimum 2 Mb/s, operational
PC operating system	Microsoft Windows XP SP3 (x32 Edition only) Windows Vista (x32 and x64) Windows 7 (x32 and x64)

Note: A dual-core processor is recommended if operating the scanner and milling machine from the same PC.

Parts lists

Main parts list

Part	Part number	Description
	A-5351-0060	Probe body and module cleaning kit
	A-2237-1111	Probe module (SM25-1)
	A-5351-4150	Packaging kit
	A-5351-4151	Gimbal
	A-5351-4152	Jaw holder
	A-5351-4153	Die holder
	A-5351-4154	Artefact base adaptor
	A-5351-4155	10 mm spacer
	A-5351-4156	Jaw holder platform
	A-5351-4157	Calibration ball
	A-5351-0095	Link abutment holder kit
	A-5495-0060	Implant bridge holder kit
	A-5351-1003	Wax abutment holder kit
	A-5351-4159	1 mm stylus (Stylus A)
	A-5351-4260	3 mm stylus (Stylus B)
	A-5351-4233	T-stylus (Stylus C)
	A-5351-4270	Die holder jaw retainer
	A-5351-4271	Kinematic jaw plate kit
	P-EA02-0020	Power supply unit
	P-CA38-0006	Power cable (UK)
	P-CA38-0036	Power cable (US)
	M-5351-1025	Dust cover

Implant associated parts

Engaging pin kits (for custom abutments)

Each kit contains one pin (in PEEK compatible with optical and contact scanners) and one screw.

Implant system		Part number	Kit name
Biomet 3i™	Certain® 3.4	A-5495-4385	Engaging Pin Kit VV
	Certain® 4.1	A-5495-4386	Engaging Pin Kit WW
	Certain® 5.0		
	Certain® 6.0		
	External Hex 3.4	A-5495-4384	Engaging Pin Kit UU
	External Hex 4.1	A-5495-4367	Engaging Pin Kit BB
	External Hex 5.0		
	External Hex 6.0		
Nobel Biocare®	Brånemark System® 3.3 NP	A-5495-4373	Engaging Pin Kit HH
	Brånemark System® 4.1 RP	A-5495-4366	Engaging Pin Kit AA
	Brånemark System® 5.0 WP	A-5495-4368	Engaging Pin Kit CC
	Replace™ Select NP	A-5495-4369	Engaging Pin Kit DD
	Replace™ Select RP	A-5495-4370	Engaging Pin Kit EE
	Replace™ Select 5.0 WP	A-5495-4371	Engaging Pin Kit FF
	Replace™ Select 6.0 WP	A-5495-4372	Engaging Pin Kit GG
	NobelActive™ Internal NP	A-5495-4396	Engaging Pin Kit AJ
	NobelActive™ Internal RP	A-5495-4397	Engaging Pin Kit AK
Straumann®	Bone Level NC	A-5495-4391	Engaging Pin Kit AD
	Bone Level RC	A-5495-4392	Engaging Pin Kit AE
	SynOcta® RN	A-5495-4394	Engaging Pin Kit AG
	SynOcta® WN	A-5495-4395	Engaging Pin Kit AH

Non-engaging pin kits (for implant bridges)

Each kit contains two bridge pins, two model pins (stainless steel – only compatible with contact scanners) and two screws.

Implant system		Part number	Kit name
Biomet 3i™	Certain® 3.4	A-5495-3385	Non-engaging Pin Kit VV
	Certain® 4.1	A-5495-3386	Non-engaging Pin Kit WW
	Certain® 5.0		
	Certain® 6.0		
	External Hex 3.4	A-5495-3384	Non-engaging Pin Kit UU
	External Hex 4.1	A-5495-3367	Non-engaging Pin Kit BB
	External Hex 5.0		
	External Hex 6.0		
	Low Profile Abutment	A-5495-3393	Non-engaging Pin Kit AF
Nobel Biocare®	Brånemark Multi-unit Abutment 3.5 NP	A-5495-3375	Non-engaging Pin Kit JJ
	Brånemark Multi-unit Abutment 4.8 RP		
	Brånemark Multi-unit Abutment 6.0 WP	A-5495-3376	Non-engaging Pin Kit KK
	Brånemark System® 4.1 RP	A-5495-3367	Non-engaging Pin Kit BB
	Replace™ Select 3.5 NP	A-5495-3369	Non-engaging Pin Kit DD
	Replace™ Select 4.3 RP	A-5495-3370	Non-engaging Pin Kit EE
	Replace™ Select 5.0 WP	A-5495-3371	Non-engaging Pin Kit FF
	Replace™ Select 6.0 WP	A-5495-3372	Non-engaging Pin Kit GG
	NobelActive™ Internal NP 3.5	A-5495-3396	Non-engaging Pin Kit AJ
	NobelActive™ Internal RP 4.3	A-5495-3397	Non-engaging Pin Kit AK
	NobelActive™ Internal RP 5.0		
Astra Tech®	20° UniAbutment™ 3.5	A-5495-3389	Non-engaging Pin Kit AB
	20° UniAbutment™ 4.0		
	20° UniAbutment™ 4.5		
	20° UniAbutment™ 5.0		
	45° UniAbutment™ 3.5	A-5495-3390	Non-engaging Pin Kit AC
	45° UniAbutment™ 4.0		
	45° UniAbutment™ 4.5		
	45° UniAbutment™ 5.0		
Straumann®	Bone Level NC	A-5495-3391	Non-engaging Pin Kit AD
	Bone Level RC 4.1	A-5495-3392	Non-engaging Pin Kit AE
	Bone Level RC 4.8		
	SynOcta® RN 4.8	A-5495-3394	Non-engaging Pin Kit AG

Screw kits

Available in one-piece kits or ten-piece kits.

Implant system		Kit number (× 1)	Kit number (× 10)
Biomet 3i™	Certain® 3.4	P-DENT-0031	P-DENT-0042
	Certain® 4.1		
	Certain® 5.0		
	Certain® 6.0		
	External Hex 3.4	P-DENT-0038	P-DENT-0049
	External Hex 4.1		
	External Hex 5.0		
	External Hex 6.0		
Nobel Biocare®	Brånemark System® NP	P-DENT-0032	P-DENT-0043
	Brånemark System® RP	P-DENT-0034	P-DENT-0045
	Brånemark System® WP	P-DENT-0033	P-DENT-0044
	Replace™ Select NP	P-DENT-0028	P-DENT-0039
	Replace™ Select RP	P-DENT-0029	P-DENT-0040
	Replace™ Select WP		
	NobelActive™ Internal NP	P-DENT-0032	P-DENT-0043
	NobelActive™ Internal RP	P-DENT-0035	P-DENT-0046
Straumann®	Bone Level NC	P-DENT-0036	P-DENT-0047
	Bone Level RC	P-DENT-0037	P-DENT-0048
	SynOcta® RN	P-DENT-0030	P-DENT-0041
	SynOcta® WN		

Accessories

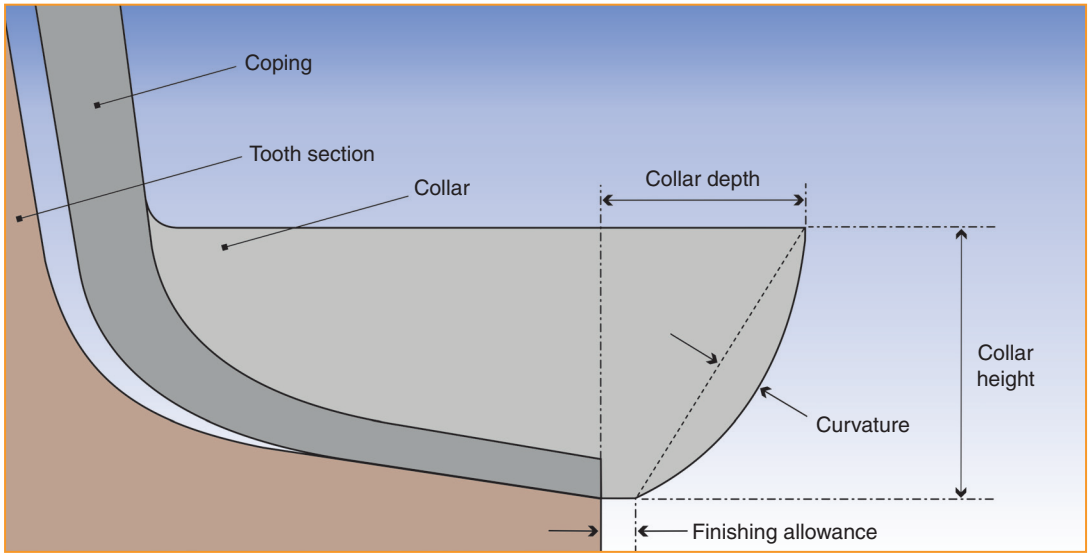
Implant system	Part description	Part number
Biomet 3i™	Screwdriver 1,20 hex L=24	P-DENT-0053
Nobel Biocare®	Screwdriver UniGrip L=24	P-DENT-0052
Straumann®	Screwdriver Torx T06 L=24	P-DENT-0051
All of the above	Screwdriver handle	P-DENT-0050

Appendix

The flexible nature of the incise software means that it is possible to design a framework which is either clinically unsuitable, impossible to manufacture or both. Most technicians understand what works and what does not when designing frameworks, however, there are some key points about using the incise systems which need to be explained.

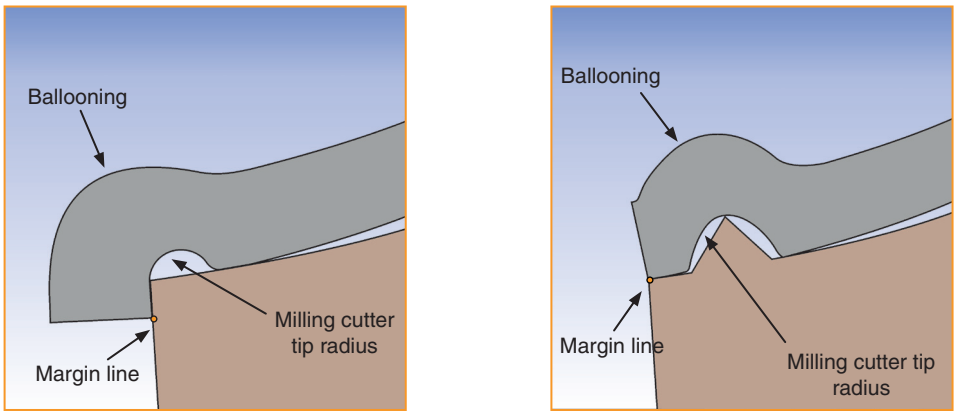
Note: Full recommendations can be found in our guidelines document H-5489-8500 – Clinical and laboratory recommendations.

Collar design parameters



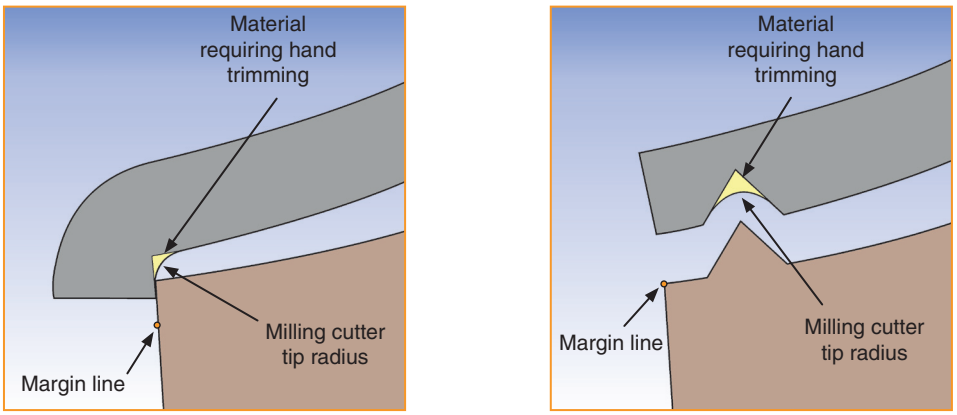
Tool compensation

Tool compensation or 'ballooning' is material added to maintain minimum thickness of the coping when the margin line is over the edge of the preparation, or if there is a sharp feature close to the edge of the preparation. It is added because the milling tool has a radiused tip and therefore cannot cut sharp corners. The software compensates for this by adding extra material at the design stage so that when it is cut, the minimum thickness is maintained. The gap will be filled with cement during the luting process.



Margin Line Material Tool Compensation ON

It may not be desirable to have the ballooning and the gap that it creates. We recommend that 'Margin Line Material Tool Compensation' is set to 'Off' (default setting). This does mean that manual trimming may be necessary following the milling process but will ensure ballooning does not occur.



Margin Line Material Tool Compensation OFF

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