

EZCAD 2022

User Guide

Version 1.0



Copyright © by 2022 Inteware Co., Ltd. All rights reserved.

EZCAD User Guide v1.0 English language version. (Updated 24 November, 2022)

No part of this manual may be reproduced, photocopied, stored in a retrieval system, or transmitted in any manner (electronic or mechanical) for any purpose other than the customer's normal usage, without the prior written permission of Inteware Co., Ltd.

This manual is subject to change without prior notice.

For further inquiries, contact your sales representative or customer service.

Table of Contents

1.	About EZCAD	1
	1.1 System Requirements.....	1
	1.2 User Account Control Settings	1
	1.3 NVIDIA Settings	2
	1.4 DPI Settings	3
2.	User Interface	4
	2.1 Main Menu.....	4
	2.2 Toolbar.....	5
	2.2 Mouse Operation.....	6
	2.3 Setting	6
	2.4 Design Parameter	7
	2.5 Custom Crown Library	9
3.	Design Process.....	13
	3.1 Single Coping / Crown Design Process	13
	3.2 Bridge Design Process	13
	3.3 Digital Model Design Process (for IntraOral Scanner)	14
	3.4 Provisional Crown Design Process	14
	3.5 Inlay/Onlay Design Process	14
	3.6 Anatomic Crown Shell Design Process	15
	3.7 Diagnostic Waxup Design Process	15
	3.8 Custom Abutment Design Process	16
	3.9 Screw Retained Abutment Design Process	16
4.	Create Order	17
	4.1 Open Project	19
5.	Model Preprocess.....	21
	5.1 Adjust Occlusion	21
	5.2 Edit Model.....	22
6.	Draw Margin.....	25
7.	Set Insertion.....	29

8. Set Design Parameter.....	30
9. Crown Design.....	31
9.1 AI Crown Design	31
9.2 Design Crown.....	33
10. Design Pontic.....	38
11. Attachment Design	39
12. Design Connector.....	42
13. Export.....	43
14. Design Digital Model	44
15. Design Provisional Crown	48
16. Design Cutback	50
17. Quick Design Change	53
18. Register Meshes.....	54
19. Design Custom Abutment.....	58
19.1 Scanbody Registration	59
19.2 Draw Margin	60
19.3 Set Insertion	60
19.4 Design Abutment.....	61
19.5 Deformation.....	64
19.6 Export	64
20. Design Screw Retained Abutment	65
Appendix I. Shortcut Keys List.....	68

1. About EZCAD

EZCAD is computer-aided design software that allows dental technicians to quickly and efficiently design copings, crowns and bridges, as well as abutments in a virtual environment. Many of its automated functions enable the users to conduct quick design according to actual needs.

1.1 System Requirements

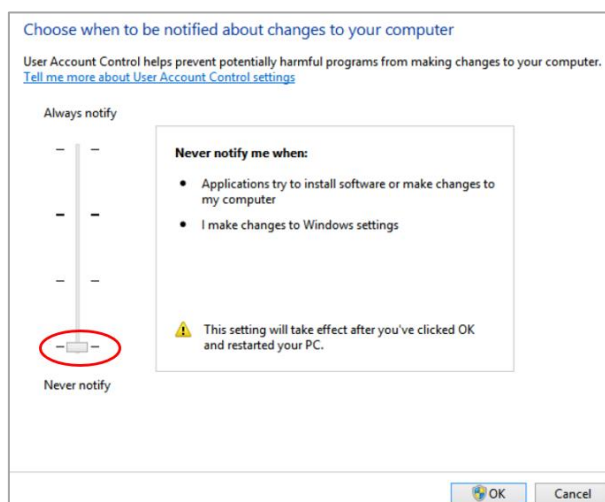
The following table lists the required computer specifications for the use of EZCAD software.

Item	Minimum requirements	Suggested requirements
CPU	Intel Core i7 8th	Intel Core i7 10th
Ram	16 GB	32 GB
Graphic Card	Intel UHD Graphics 630	nVidia GeForce GTX1060, 6GB
HDD Space	500GB SSD	1 TB SSD
OS	Windows 10 64-bit	Windows 10 64-bit
Monitor Resolution	1920 x 1080	1920 x 1080

1.2 User Account Control Settings

To avoid problems or limitations during software usage, it is necessary to set User Account control.

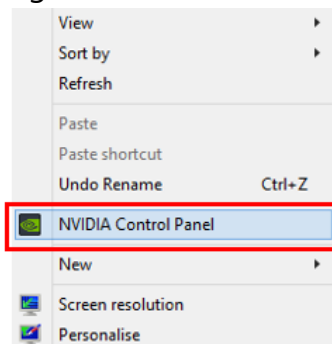
1. Click **Start** menu and search by "User Account". Then, select **Change User Account Control settings**. Alternatively, follow the path: Control Panel -> User Account -> Change User Account Control settings."
2. In the User Account Control setting dialog, move the slider to the bottom at "Never Notify" and click **OK** button.



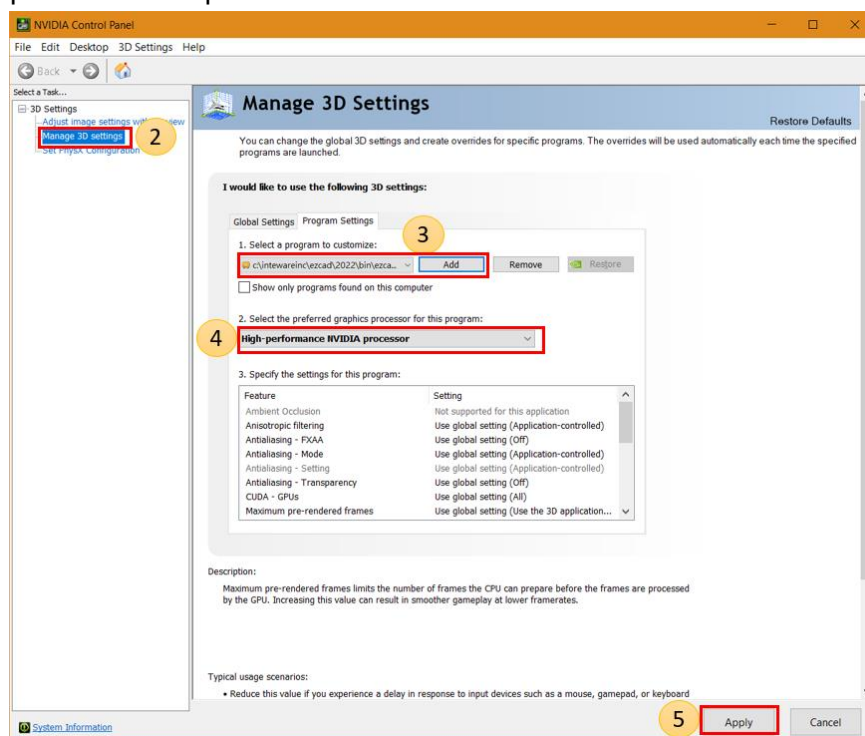
1.3 NVIDIA Settings

For the computer with NVIDIA graphics card, it is suggested setting the dedicated NVIDIA graphics card for the software use after installing the software.

1. Right-click on the desktop and select **NVIDIA Control Panel**.



2. Select **Manage 3D Settings** under 3D Settings task lists.
3. Click **Program Settings** tab, and click **Add** button to browse to the below path: Computer> Drive (C)> InteWareInc> EZCAD> 2022> Bin. Then, select **EZCAD** and click **OK**.
4. Select **High-performance NVIDIA processor** from the preferred graphics processor drop-down list.

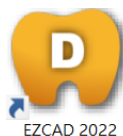


5. Click **Apply** button.

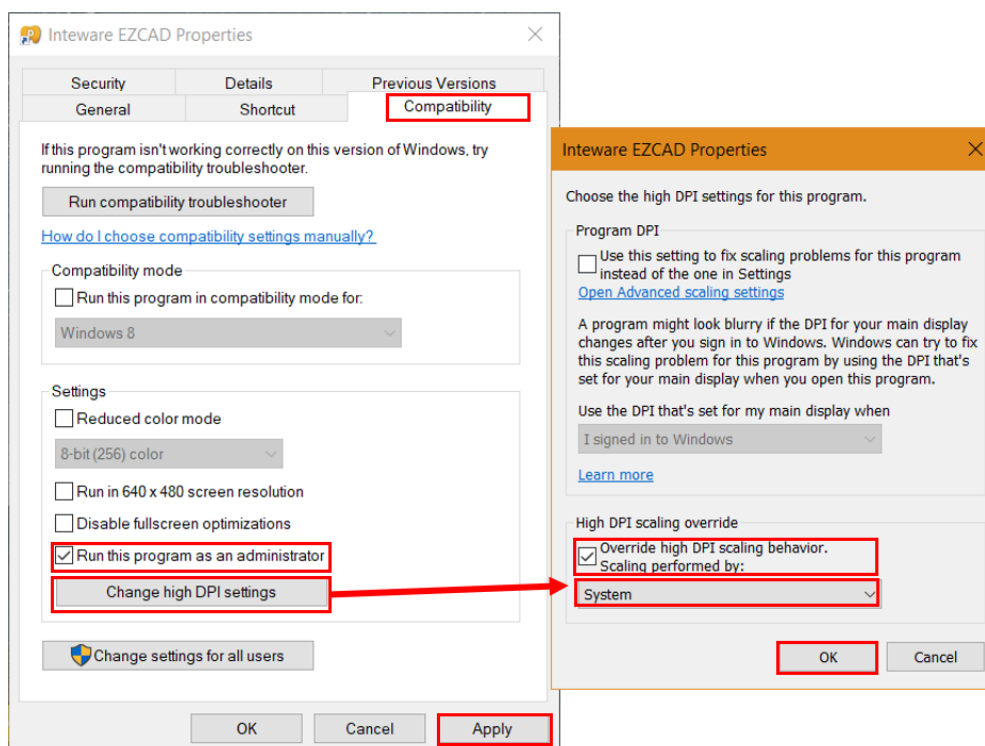
1.4 DPI Settings

To ensure the correct display of EZCAD, it is recommended adjusting DPI settings before software usage.

1. Right-click on the software shortcut icon in the file folder.



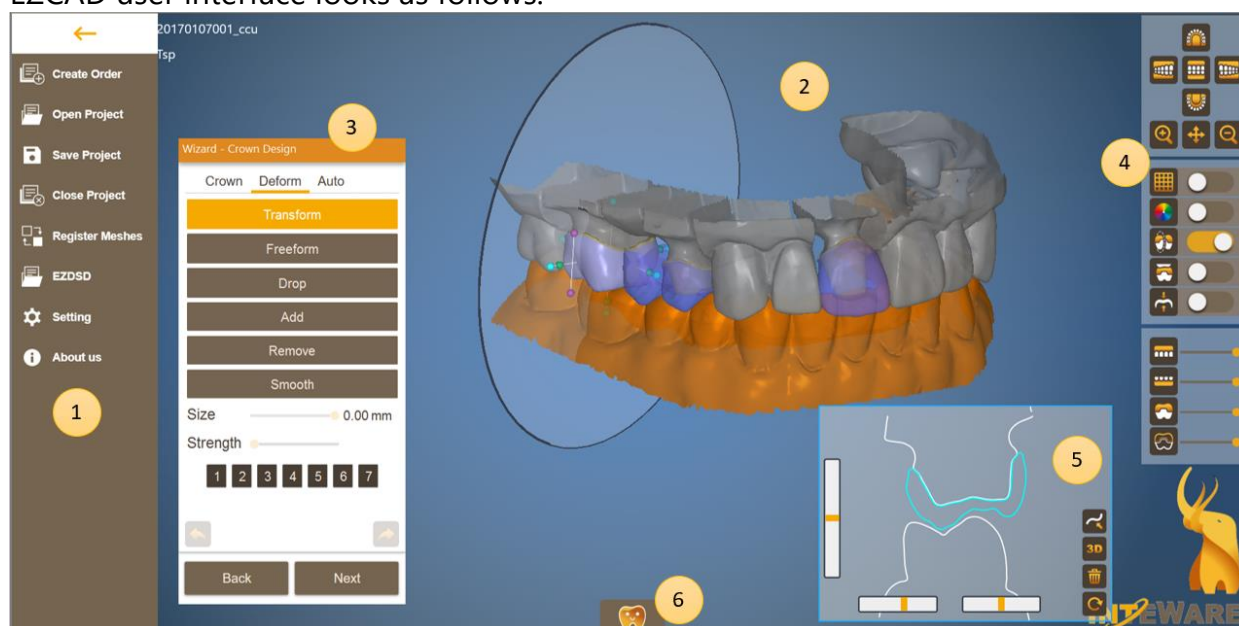
2. Select **Properties** in the right-click menu.
3. Select **Compatibility** tab, and tick "Run this program as an administrator."
4. Click **Change high DPI settings** button. Tick "Override high DPI scaling behavior." Then, select **System** in the scaling performance drop-down list. Click **OK** button.



5. Click **Apply** button.









2. User Interface

EZCAD user interface looks as follows:











1	Main menu	4	Visualization toolbar
2	3D view window	5	Cross-sectional view window
3	Function panel	6	Design change menu

2.1 Main Menu






	Create Order		Register Meshes
	Open Project		EZDSD: create mockup veneer
	Save Project		Setting
	Close Project		About

2.2 Toolbar






- Viewing tools:**

	Top view		Bottom view
	Left side view		Zoom in
	Right side view		Zoom out
	Front view		Initial size

- Object display tools:**




	Show grid (1mm*1mm)
	Show color
	Show cross section
	Show collision with bite or neighboring tooth
	Show the thickness

- Visualization sliders:**


	<ul style="list-style-type: none"> Show/hide upper model Change the transparency of upper model
	<ul style="list-style-type: none"> Show/hide lower model Change the transparency of lower model
	<ul style="list-style-type: none"> Show/hide the active crown Change the transparency of the active crown
	<ul style="list-style-type: none"> Show/hide the inactive crowns Change the transparency of the inactive crowns
	<ul style="list-style-type: none"> Show/hide the pre.op Change the transparency of the pre.op

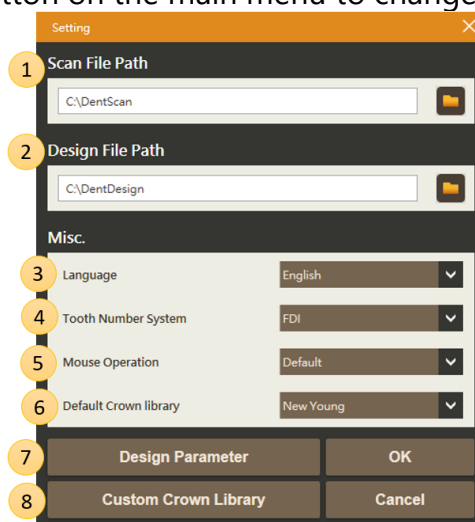
2.3 Mouse Operation









The default mouse operation:

	Set the object as active and execute functions
	Rotate view
	Pan view

2.4 Setting


Click  **Setting** button on the main menu to change system settings if needed.



	Set scan file path (STL)
	Set the path where design project is saved
	Set system language
	Set tooth number system (FDI, UNS)
	Set mouse operation system (Default, 3Shape, or exoCAD)
	Set default crown database
	Design Parameter (Please refer to Chapter 2.4)
	Custom Crown Database (Please refer to Chapter 2.5)

2.5 Design Parameter

The user can set various kinds of design parameters for different materials.

Click  **Setting** button on the main menu and select **Design Parameter** button to open *Design Parameter Manager*.

Design Parameter Manager											
	Material	Name	Cement Gap	Cement Height	Extra Cement Gap	Minimum Thickness	Cutback	Margin Extension	Slope Extension	Slope Angle	Drill Radius
<input checked="" type="checkbox"/>	Zirconia	Default	0.05	1.0	0.07	0.50	1.2	0.30	0.30	45	0.6
<input type="checkbox"/>	Metal	Default	0.03	1.0	0.05	0.40	1.2	0.15	0.15	60	0.6
<input type="checkbox"/>	Composite	Default	0.05	1.0	0.05	0.50	1.2	0.30	0.30	45	0.6
<input type="checkbox"/>	PMMA	Default	0.05	1.0	0.07	0.50	1.2	0.20	0.20	60	0.6
<input type="checkbox"/>	Others	Default	0.05	1.0	0.05	0.50	1.2	0.20	0.20	60	0.6

NOTE: There should be at least one material in the *Design Parameter Manager*.

Double left-clicking on the material and the parameter details will pop up. You can enter the desired name for the material. Each parameter can be adjusted by dragging the slider or enter the desired values on the field. Then, click **Save** button.

Material Zirconia

Name

Cement Gap 0.05

Cement Height 1.0

Extra Cement Gap 0.07

Minimum Thickness 0.50

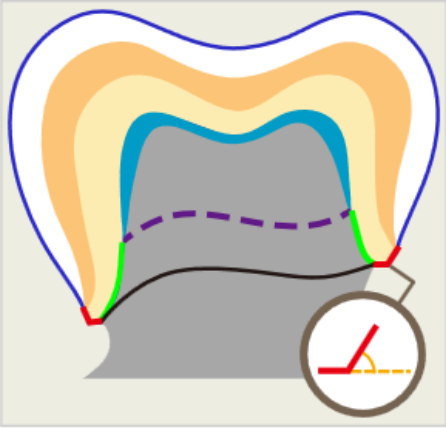
Cutback 1.2

Margin Extension 0.30

Slope Extension 0.30

Slope Angle 45

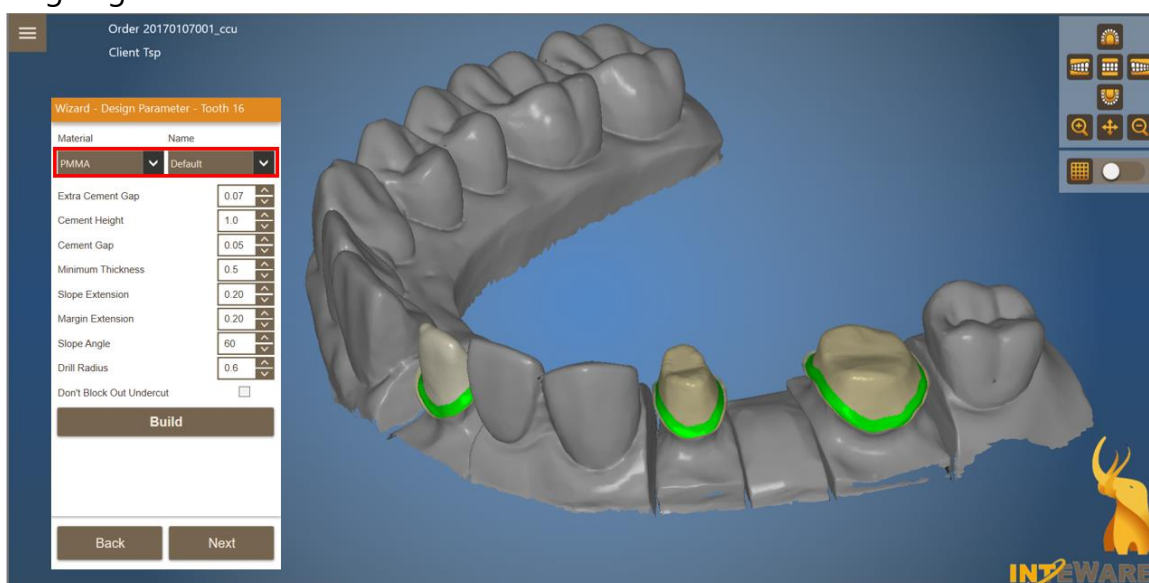
Drill Radius 0.6




You can select one material and click **Set as default material** button. The material with ● represents the default material.

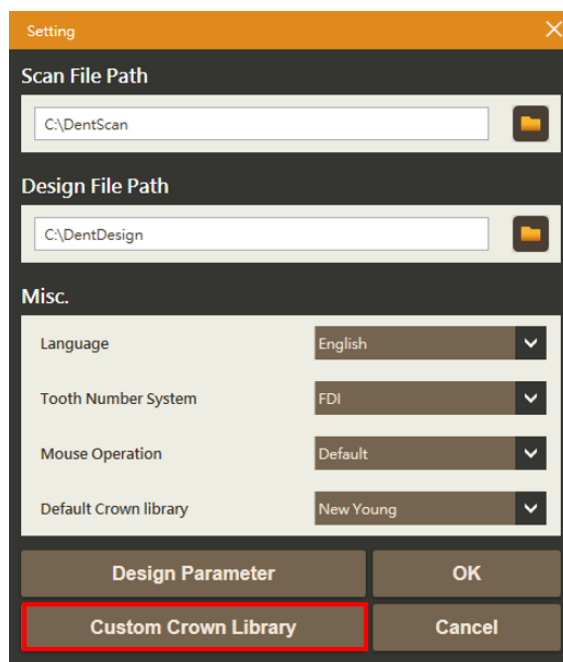
Design Parameter Manager											
	Material	Name	Cement Gap	Cement Height	Extra Cement Gap	Minimum Thickness	Cutback	Margin Extension	Slope Extension	Slope Angle	Drill Radius
	Zirconia	Default	0.05	1.0	0.07	0.50	1.2	0.30	0.30	45	0.6
	Metal	Default	0.03	1.0	0.05	0.40	1.2	0.15	0.15	60	0.6
	Composite	Default	0.05	1.0	0.05	0.50	1.2	0.30	0.30	45	0.6
	● PMMA	Default	0.05	1.0	0.07	0.50	1.2	0.20	0.20	60	0.6
	Others	Default	0.05	1.0	0.05	0.50	1.2	0.20	0.20	60	0.6

Then, the default material will be shown at the Design Parameter step before designing the crown.

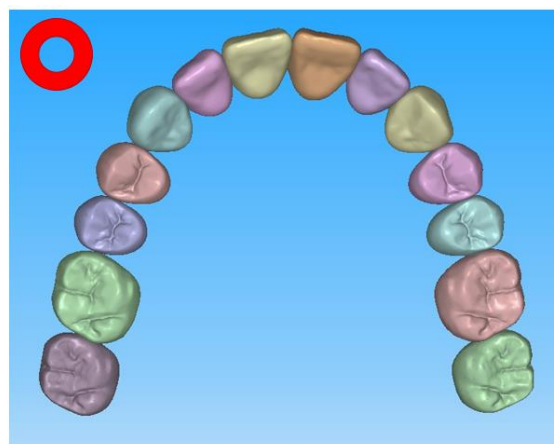
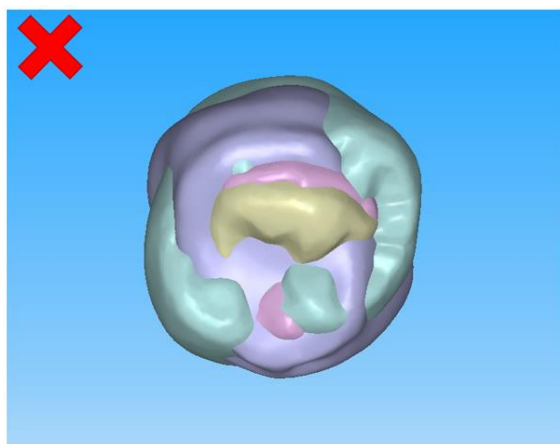


2.6 Custom Crown Library

The user is free to add the desired crown library to EZCAD software. Click  **Setting** button on the main menu and select **Custom Crown Library** button.

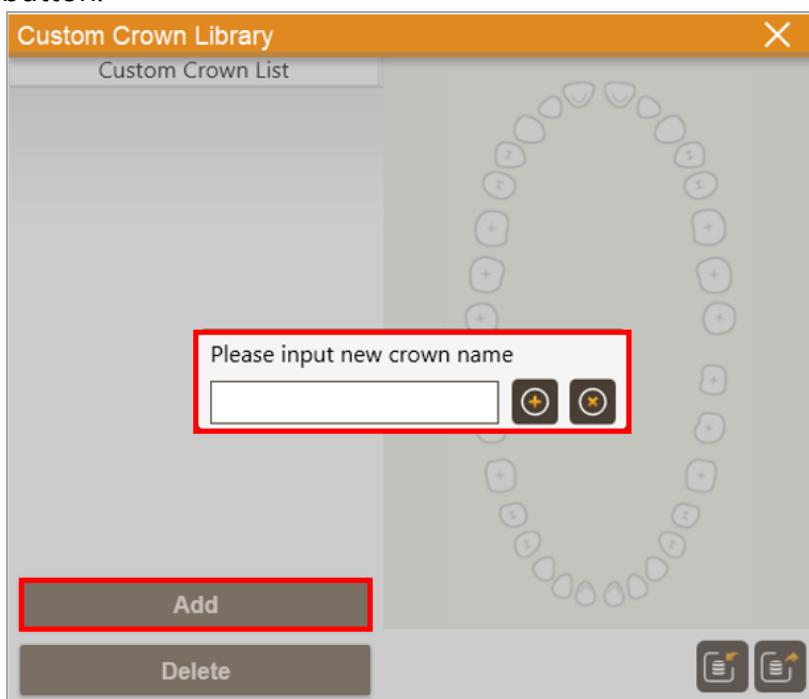


NOTE: For the preparation for the crown library, each scanned single crown needs to be aligned to the model to obtain the correct dentition.

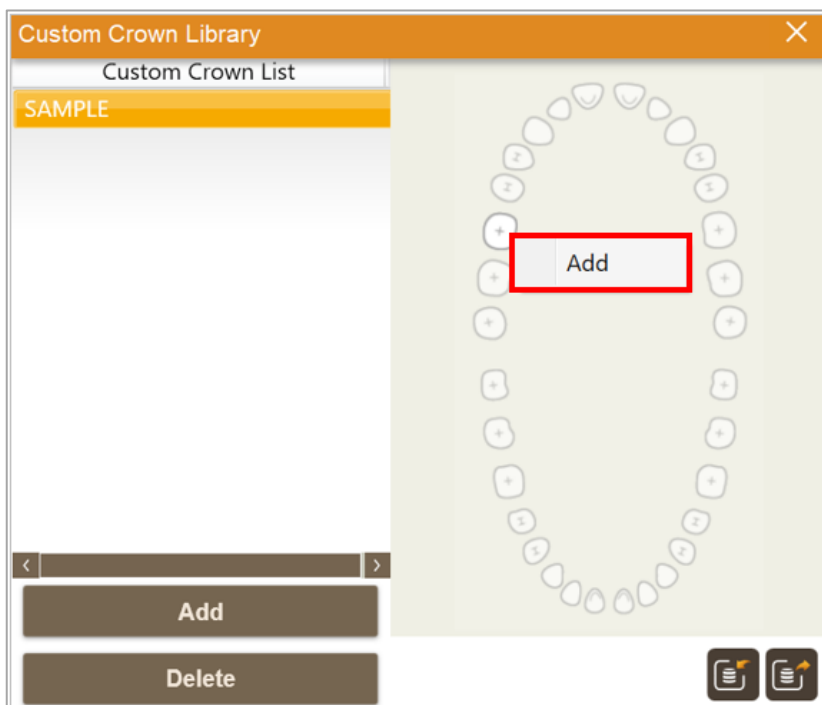


The procedures of creating crown library are illustrated in the followings:

1. Click "**Add**" button. Name the crown library in the bank field and click button.

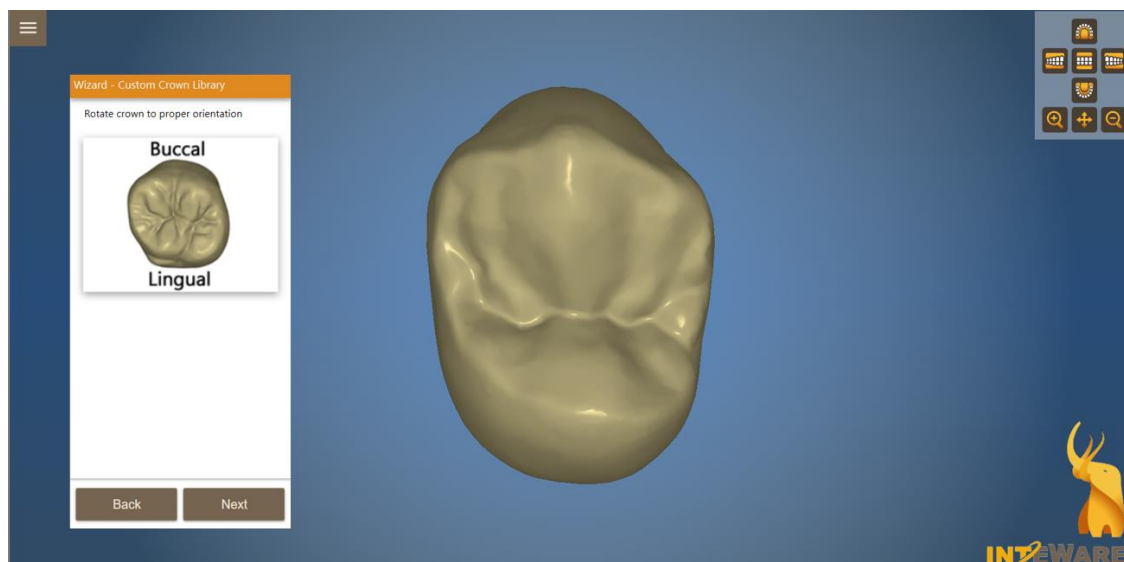


2. Click the tooth on the tooth chart and click **Add** button.

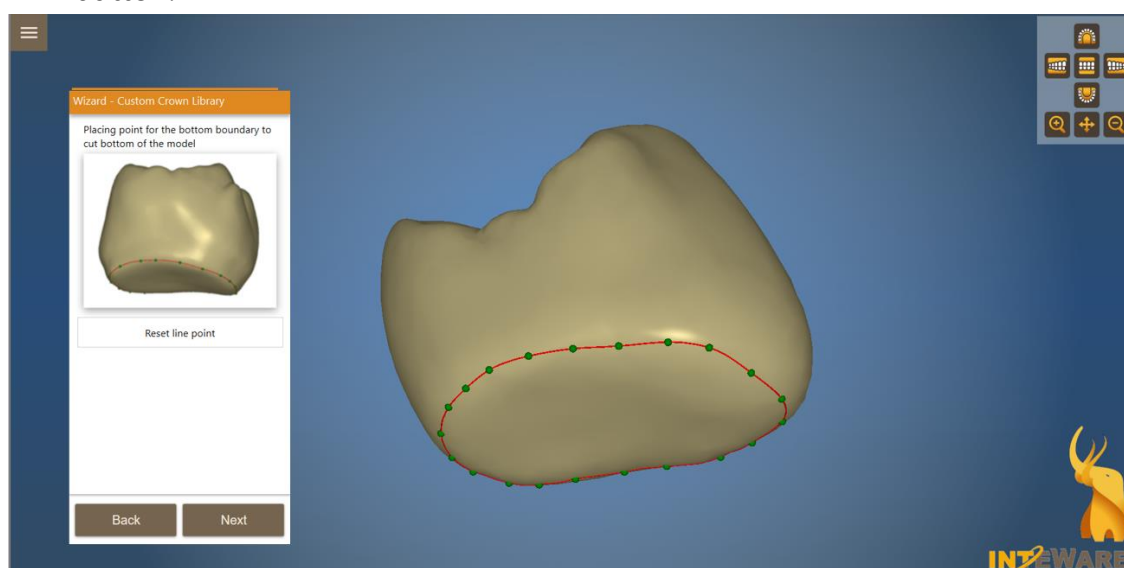


3. Browse to the computer and select the scanned crown file (*STL format). After importing the crown file, please rotate the crown to the correct buccal-lingual direction. Click **Next** button.

NOTE: The occlusion should face the user.



4. Left-click to place control points on the bottom of the crown. Click **Next** button.

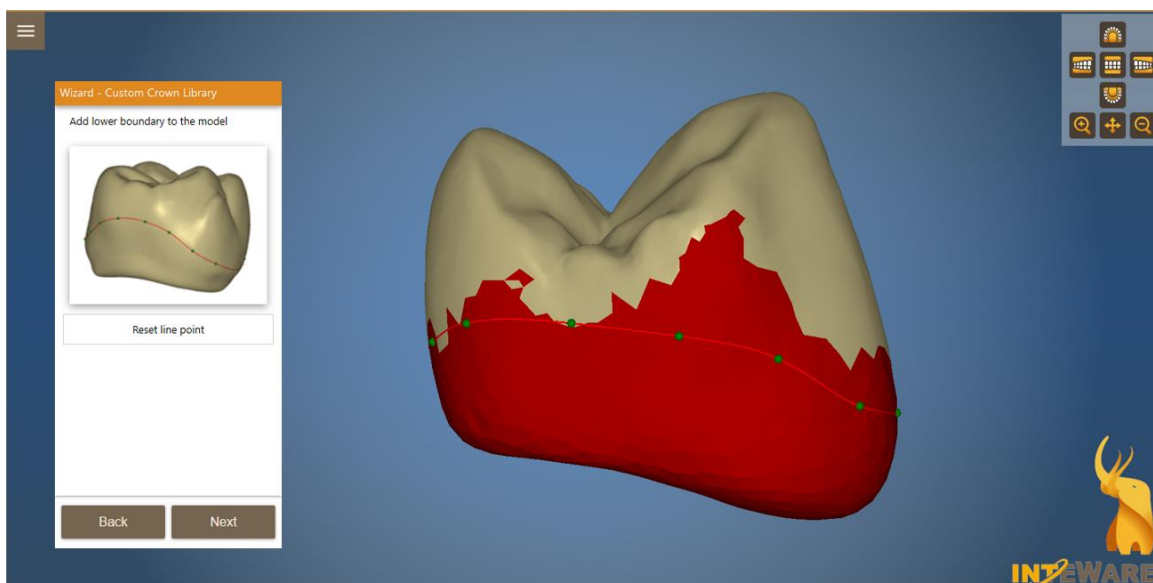


Move and insert a control point.



Remove the previous control point.

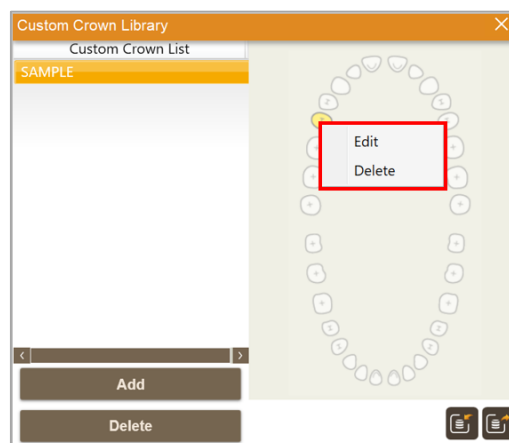
5. Click to place control points on the contour of the crown. Click **Next** button to return to Custom Crown Library function panel.
 - The red area represents the undercut.



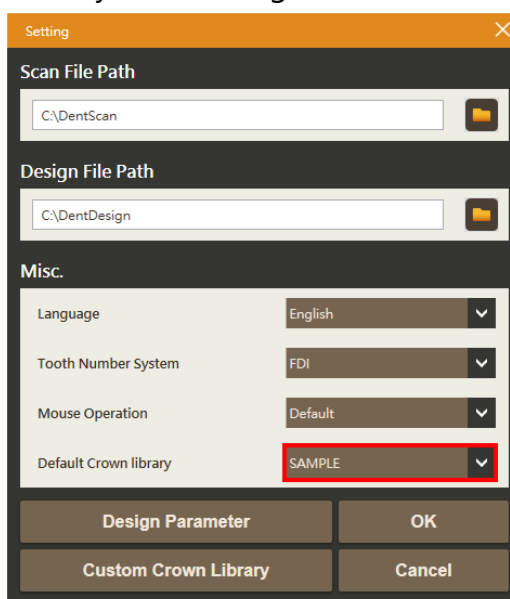
The user can follow the above steps to create the crown library for more teeth.

Once the crown library is established, click the tooth on the tooth chart to **Edit** or **Delete** the established crown data.

You can click  **Import** or  **Export** the selected crown database.

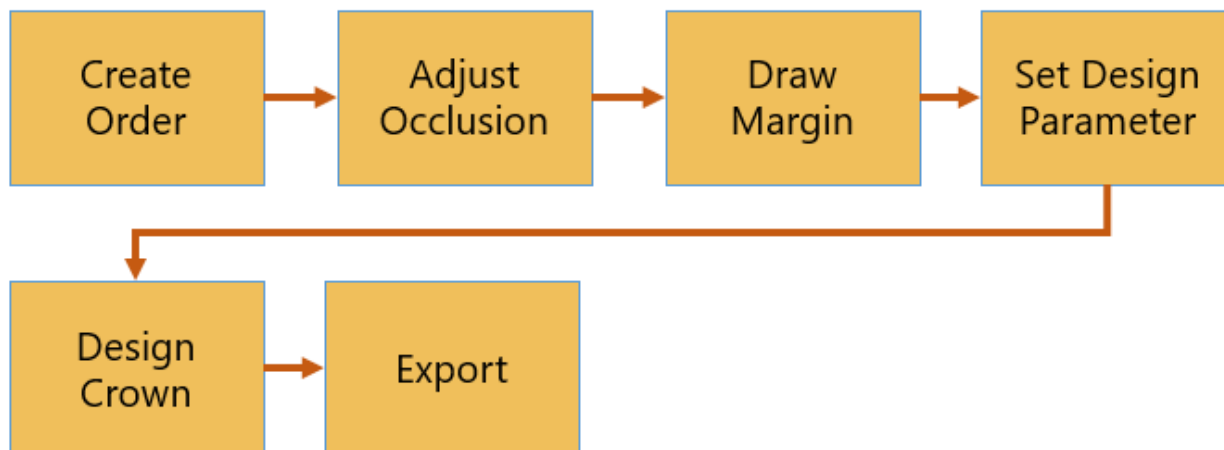


When the crown library containing all teeth (32 teeth) is established, you can set it as Default Crown Database on System Setting.



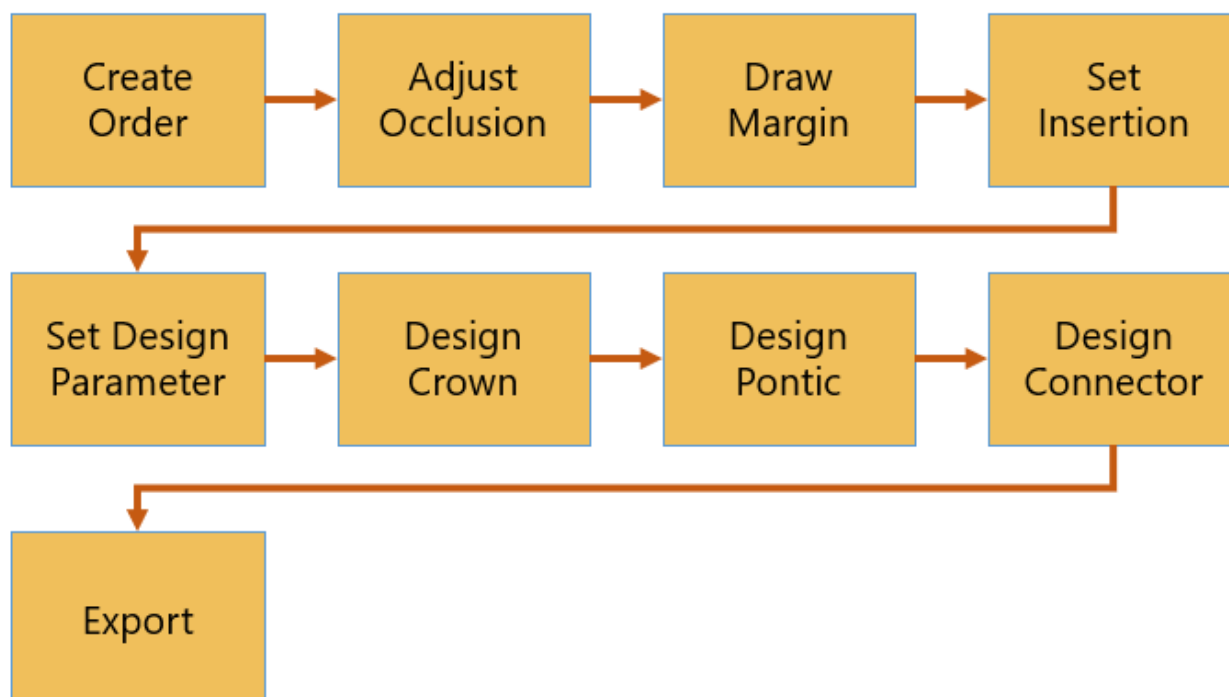
3. Design Process

3.1 Single Coping / Crown Design Process



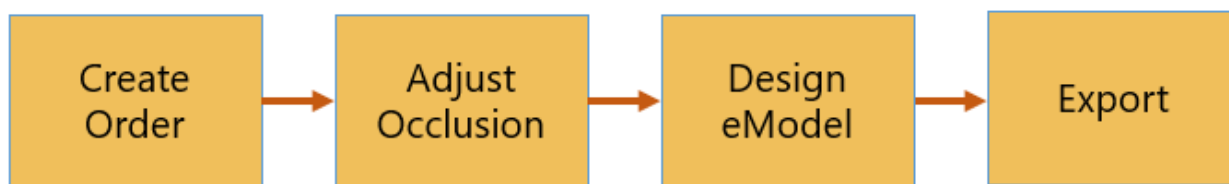
* Crown design process varies depending on the product

3.2 Bridge Design Process

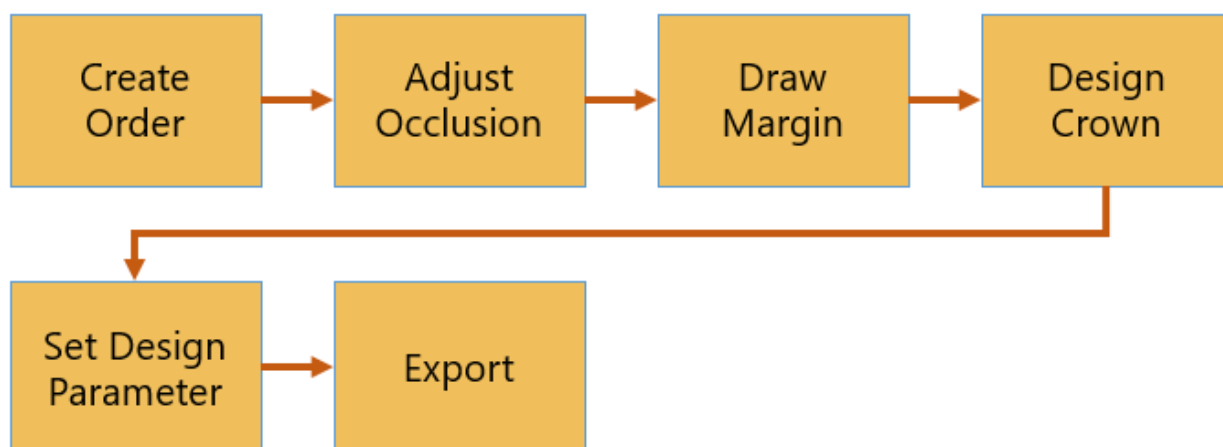


*Crown design process varies depending on the product

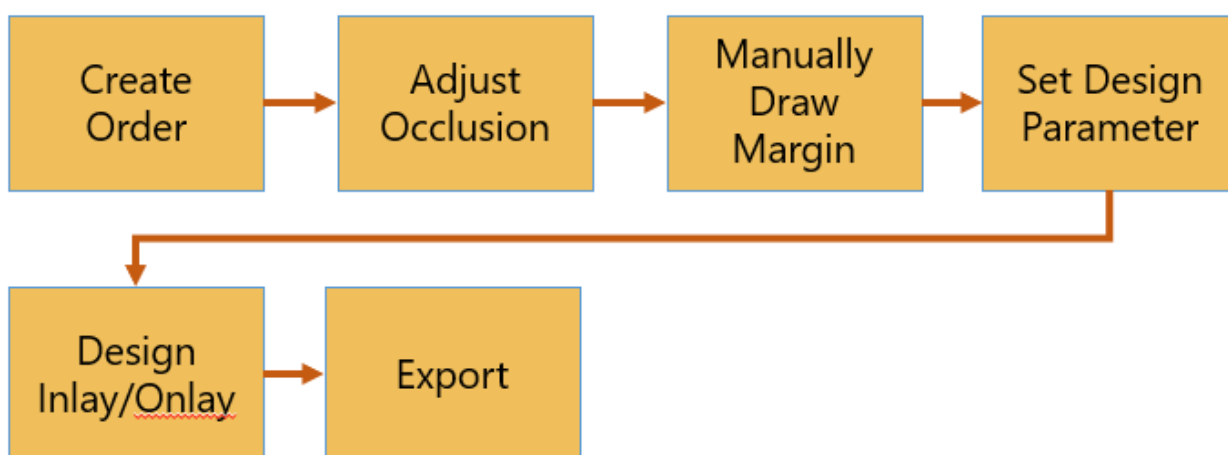
3.3 Digital Model Design Process (for IntraOral Scanner)



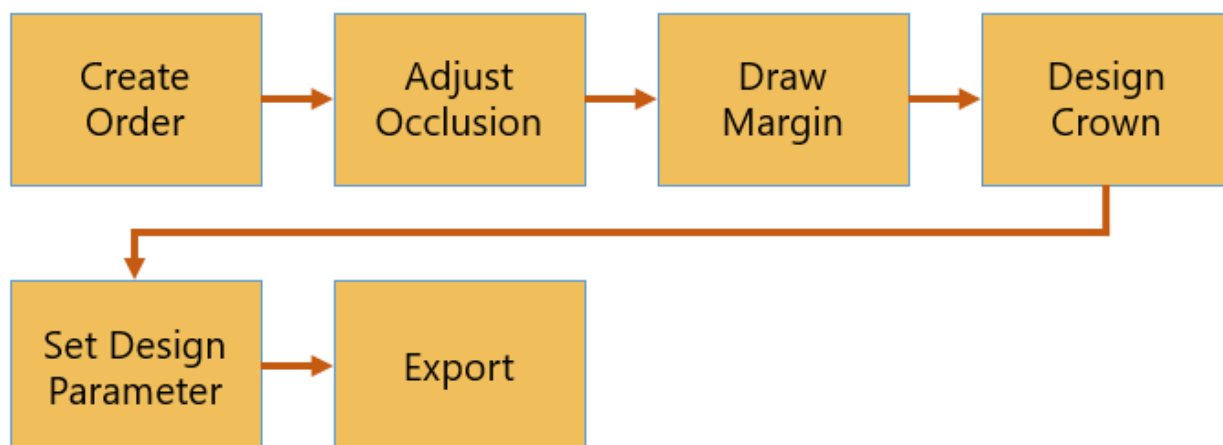
3.4 Provisional Crown Design Process



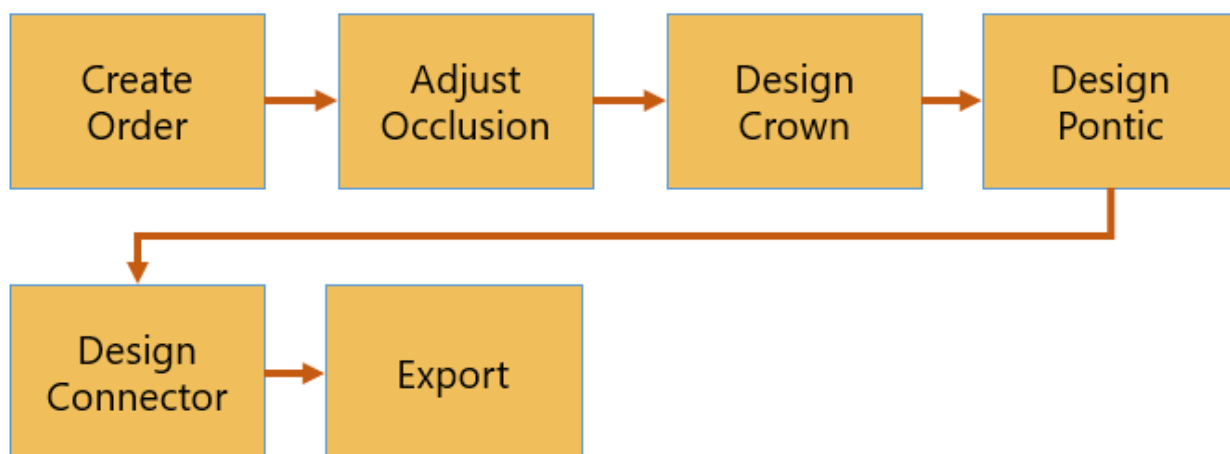
3.5 Inlay/Onlay Design Process



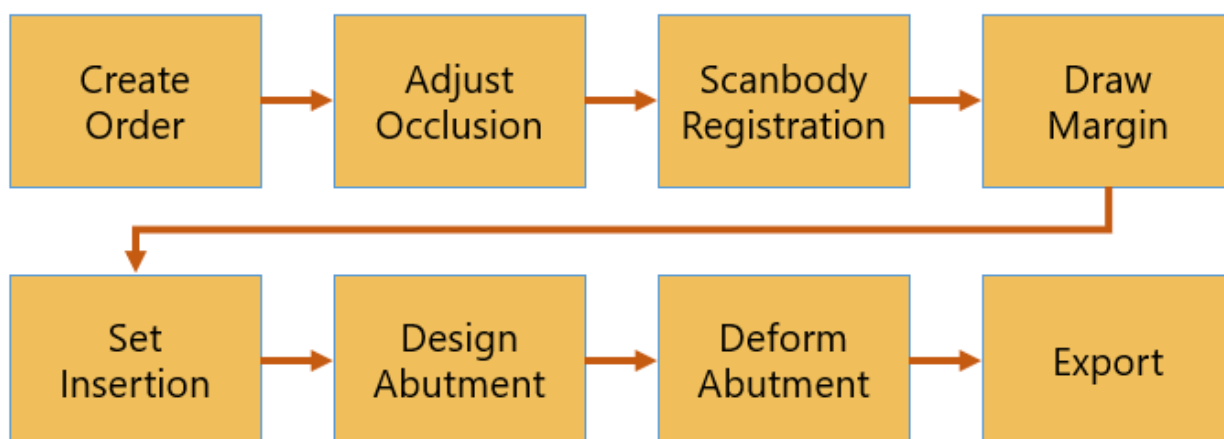
3.6 Anatomic Crown Shell Design Process



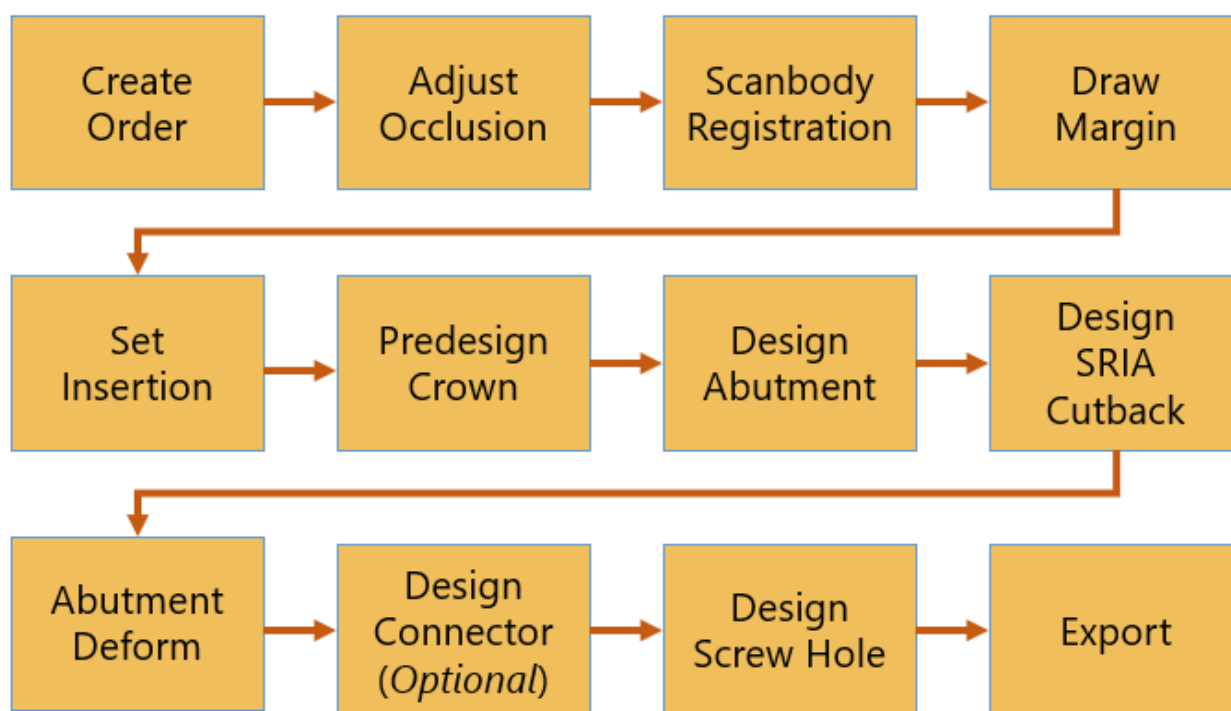
3.7 Diagnostic Waxup Design Process




3.8 Custom Abutment Design Process

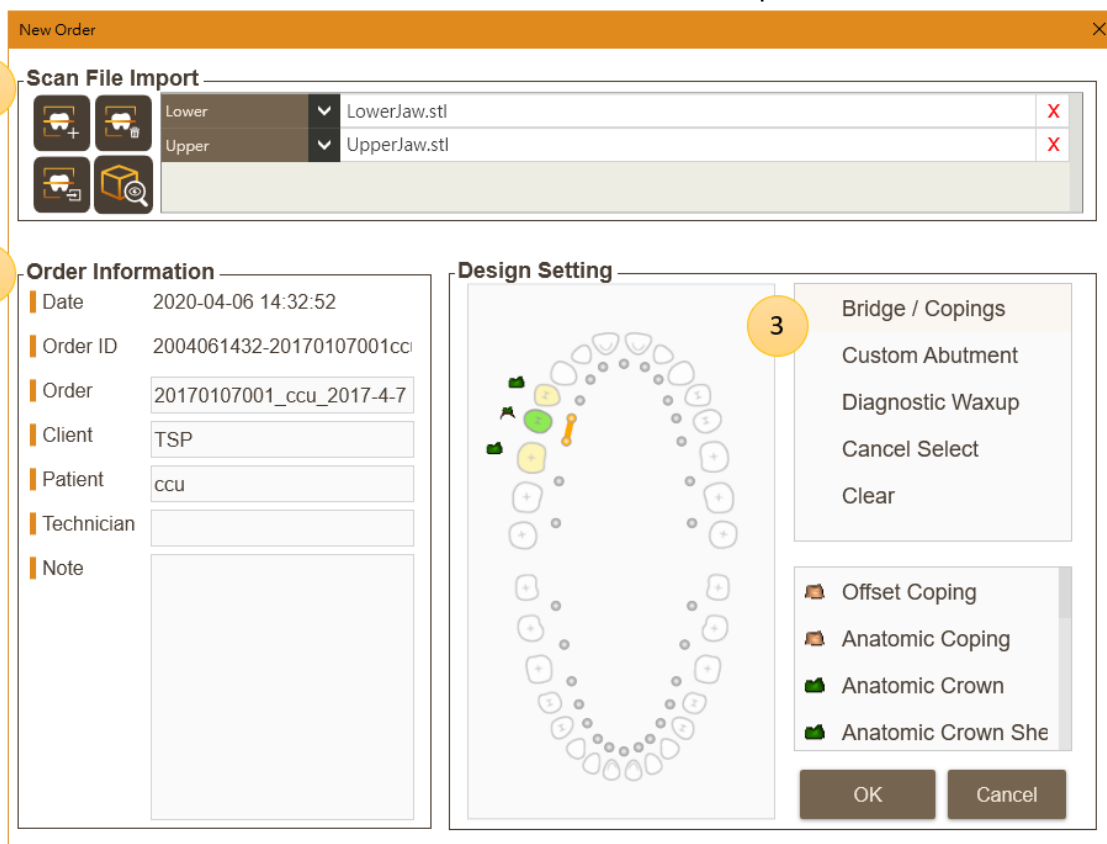


3.9 Screw Retained Abutment Design Process







4. Create Order

1. Click  **Create Order** button on the main menu to open the New Order window.

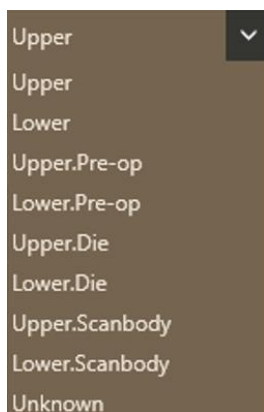


1 Scan File Import:

	Add scan files
	Clear all scan files
	Import scanner project (from Shining3D scanner, iTero scanner or Medit i500)
	Show model preview

The software can directly import the project files from the following scanners.

- Shining3D: bom.xml
- iTero: V10-V23 xml
- Medit i500: *.colLabProject



When the scan file name contains "Upper" or "Lower", the program will automatically detect the scan file type. If the file name does not contain "Upper" or "Lower", the user needs to select the scan file type from the drop-down list.

When the die scan file is the independent scan file, the user can also select "Upper.Die" or "Lower.Die", and the software will automatically integrate with "Upper" or "Lower" scan file.

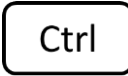



2 Order Information:

Input order information if needed.


3 Design Setting:

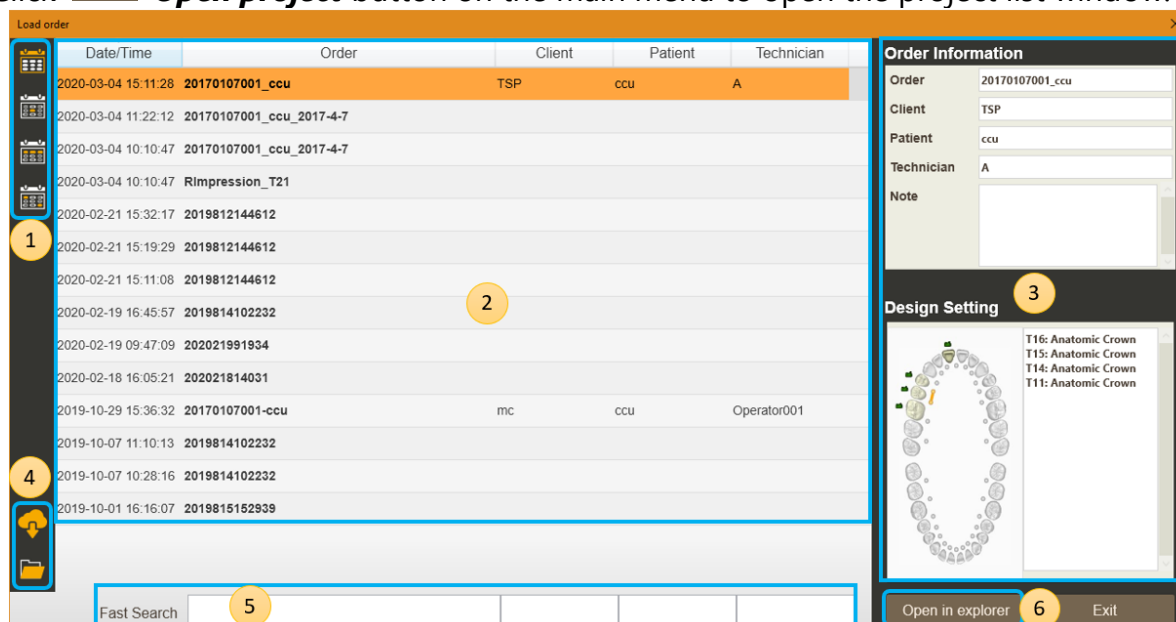
Select the teeth and the product type.

While selecting the teeth, the shortcut keys are available to select multiple teeth quickly.

		Select multiple teeth in separate positions.
		Select multiple teeth in contiguous positions.

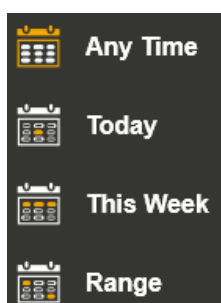
4.1 Open Project

Click  **Open project** button on the main menu to open the project list window.



Project List window includes the following contents:

1 Filter by time



Any Time: All the orders will be displayed in the Order list table.

Today: The order created today will be displayed in the Order list table.

This Week: The orders created this week will be displayed in the Order list table.

Range: The orders created during the set date range will be displayed in the Order list table.

2 Order list table

The Order list table shows all the orders or search results. Double left-clicking on the selected order will open the project file in the software.

3 Order information

The order information and design setting details of the selected order will be shown on the right side.

4 Open File



Browse on the computer and import project file from AirDental.



Browse on the computer and search for a specific order. Select the project file (*.xml format) to import to the software.

5 Fast search:

Search by entering the text on the corresponding columns.

Date/Time	Order	Client	Patient	Technician
2020-04-06 14:10:09	20170107001_ccu_2017-4-7	Test	demo	
2020-03-05 13:40:09	20170107001_ccu	Tsp	ccu	
2020-03-05 09:57:10	20170107001_ccu	TSP	ccu	
2020-03-04 11:22:12	20170107001_ccu_2017-4-7			
2020-03-04 10:10:47	20170107001_ccu_2017-4-7			
2019-10-29 15:36:32	20170107001-ccu	mc	ccu	Operator001

Fast Search	ccu			
-------------	-----	--	--	--

6 Open in explorer

Select the order on the Order list table. Click **Open in explorer** button to view the project folder of the selected order.

5. Model Preprocess

After the order is created, the software will navigate to the model preprocess.

5.1 Adjust Occlusion

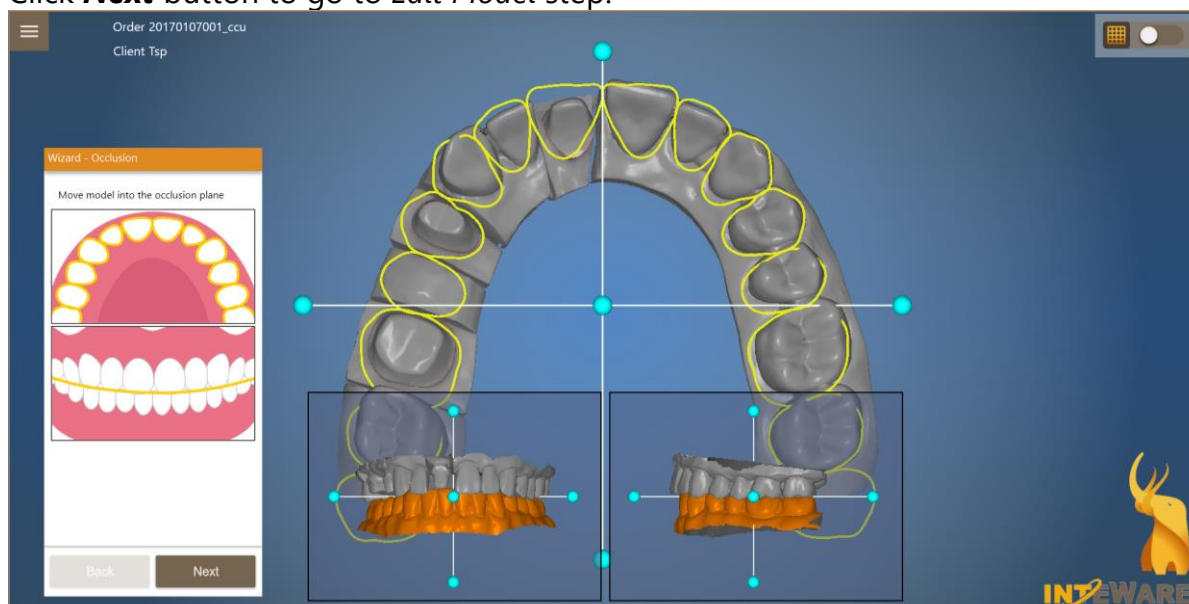
At Occlusion step, there are three view windows.

In the main view window, move the model to fit the tooth contour in yellow.

Referring to the bottom two view windows, move the model to the occlusion plane.

- Click on the model and drag to move the model.
- Drag the cyan points to rotate the model.

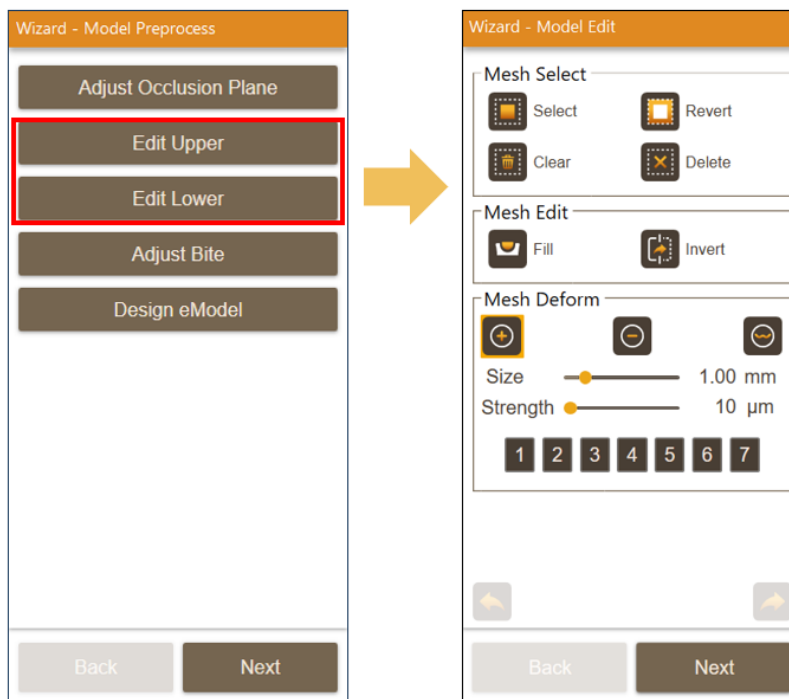
Click **Next** button to go to *Edit Model* step.



5.2 Edit Model







1. Edit model mesh

When occlusion adjustment is complete, you will be navigated to Model Preprocess step. Click **Edit Upper / Edit Lower** button to edit the model mesh data. Model editing is not mandatory. You can click **Next** to skip this step and go to the next design step.









The Model Edit function panel contains the following functions:

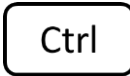



Mesh

	Select the redundant area by drawing a line.
	Clear the selection.
	Revert the selected mesh.
	Delete the selected mesh.
	Fill the hole by clicking on the surroundings around the hole.
	Invert the mesh.

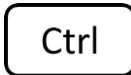




Deform

		Add - The amount of added material will be accumulated when dragging the mouse on the same area back and forth. Toggle to Remove by pressing Shift+Left-click .
		Remove - The amount of material will be removed when dragging the mouse on the same area back and forth.
		Smooth - Smooth the surface of the model.

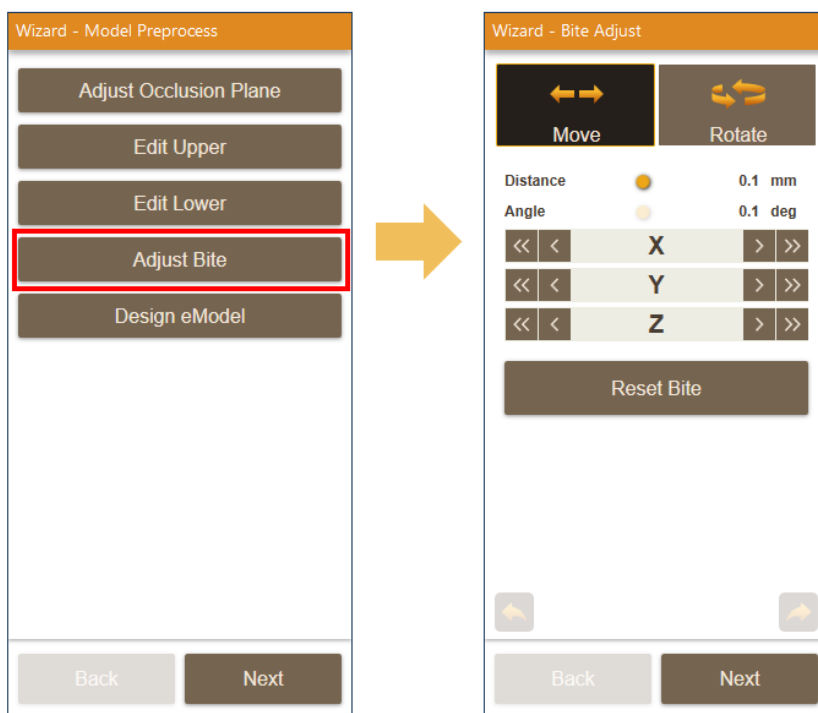
The size and strength of the deformation can be quickly adjusted by the following shortcut keys.

		Change the strength of the deformation.
		Change the size of the deformation.




Deformation functions of Add/Remove/Smooth can be quickly switched with predefined shortcut keys.

			Save the corresponding size and strength of Add/Remove/Smooth as the defined settings.
			Apply the corresponding predefined settings of Add/Remove/Smooth.



2. **Adjust Bite** is an optional function that enables the user to adjust the position of the bite.



The Bite Adjust function panel contains the following functions:

	Select to move or rotate the bite.
Distance / Angle	Adjust the moving distance and rotation angle.
	Move or rotate the bite according to the distance or angle value.
	Move or rotate the bite by 2 times of distance or angle value.
Reset Bite	Reset to the original bite position.





Undo and Redo actions can be used with the following shortcut keys.

	Ctrl Z	Undo
	Ctrl Shift Z	Redo

6. Draw Margin

In Margin Operation step, there are two ways to obtain margin: One is to automatically detect the margin, and the other is to manually draw the margin.

The Margin Operation function panel contains the following functions:

	Automatic mode to detect margin line.
	Manually mode to draw margin line.
Move Point	Adjust control points.
Fast Edit	Manually draw the desired margin line with the cursor.
Clear Margin	Clear the margin.
Set View as Insertion	Set viewing direction as insertion.
Go Insertion View	Turn to the current insertion view.
	Ditching type (Plaster model).
	No Ditching type (IntraOral Scanner).

1. Draw the margin

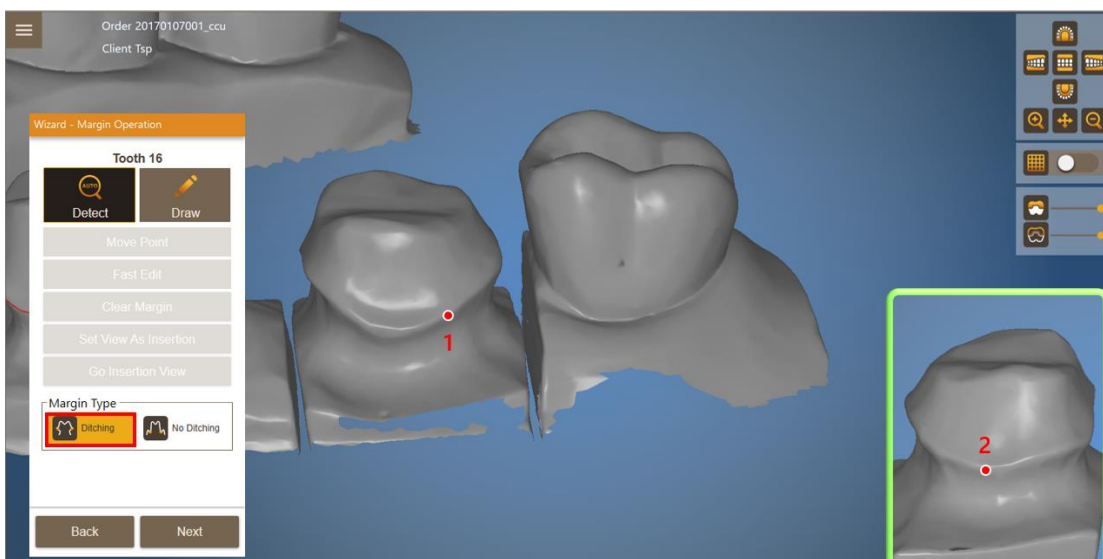
(1) In  **Detect** mode.


- Generate the margin in one click

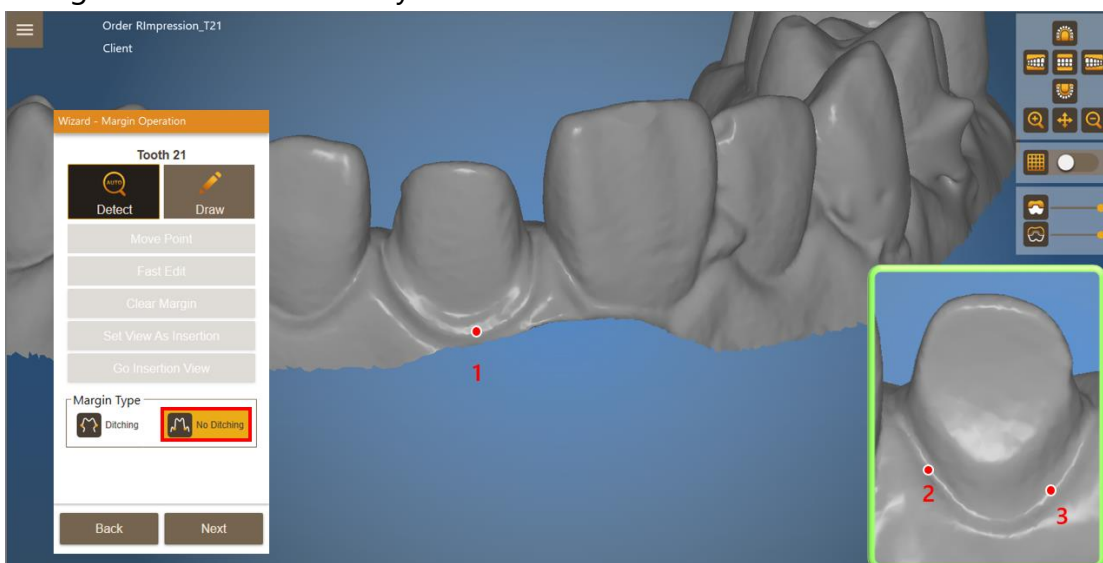
Select the margin type (Ditching or No Ditching) according to the model, and then **ONE-CLICK** on the margin. The margin will be automatically generated.

- If there is no margin after one click, please follow the below process:

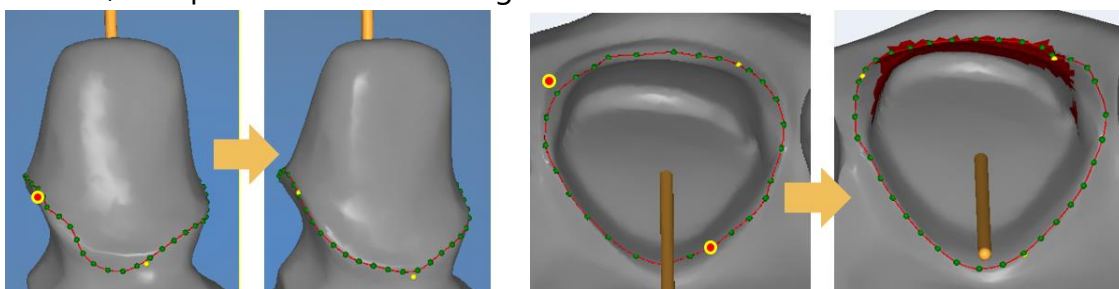
- For  **Ditching** type, click on **ONE** prominent point on the margin at the buccal side and **ONE** prominent point at the lingual side to generate the margin.





- For  **No Ditching** type, click on **ONE** pit on the margin at the buccal side and click on **TWO** pits at the lingual side. The margin line will be generated automatically.



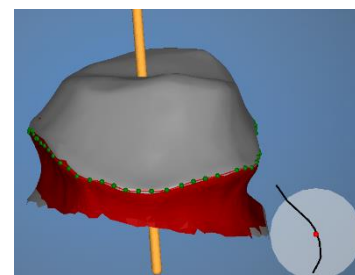
- If the margin result is not good after one click, press **Ctrl + Left-click** to place **1** point at another side of the margin to improve the margin for ditching mode, or **2** points for non ditching mode.



(2) When  **Draw** mode is selected, left-click to place control points to on the margin.

	Form the margin line as a closed-loop when the last point is close to the first point.
---	--







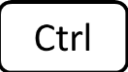




When moving the mouse cursor over the model, 2D cross-section view will be automatically displayed to help locate the right margin position.



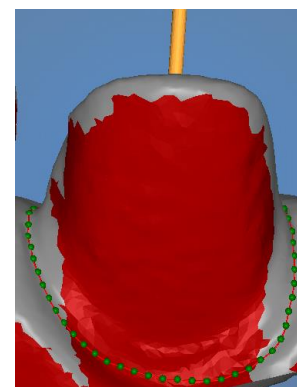
After margin line is formed, you could adjust the margin with the following tools:

- **Move Point** button allows you to drag the control points to the desired positions.
- **Fast Edit** button allows you to adjust margin position quickly by drawing the desired margin line with the mouse cursor.

The following shortcut keys for margin adjustment are available:

	Move and insert control point.
	Remove the previous control point during drawing the margin.
	 Remove control point on the formed margin.
	 Shift margin 0.05 mm.
	 Shift margin 0.1 mm.
	Hide/Show undercut.
	Switch to the previous/next control point.
	Move the control point up/down.

2. For a single coping/crown design, the insertion needs to be set at this step. When the margin line is obtained, the undercut area will be shown in red. **Space** key enables you to show or hide the undercut display.

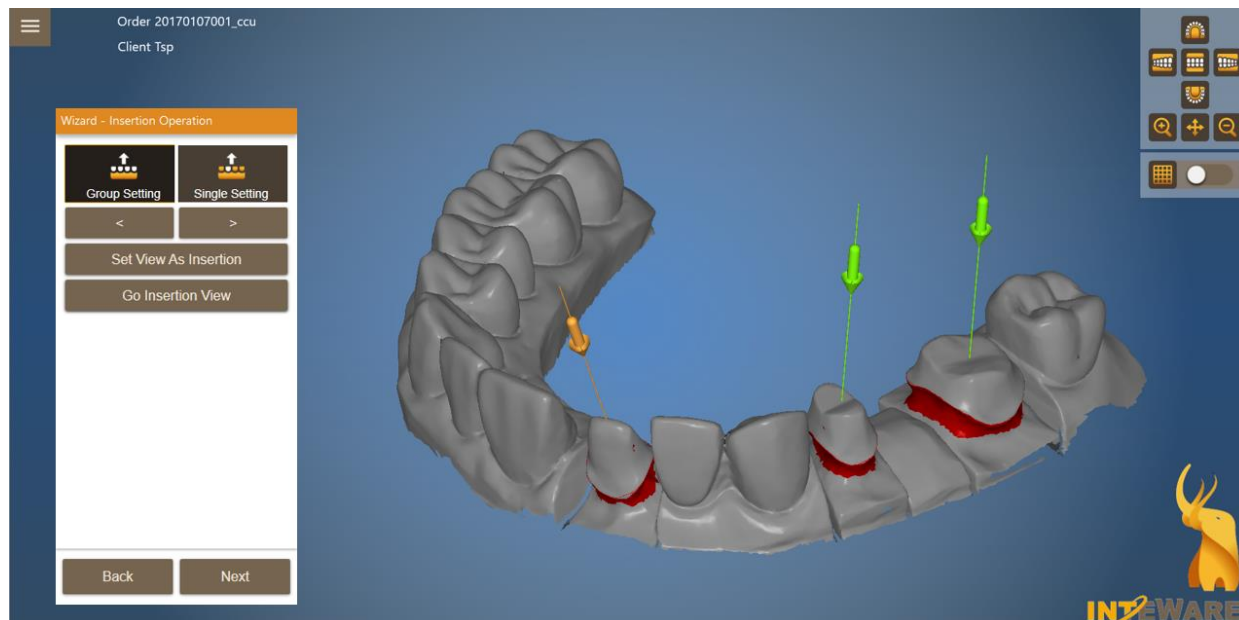







You can adjust the margin line according to the undercut.

- Click **Go Insertion View** button to examine the current insertion.
 - Adjust the viewing direction and click **Set View As Insertion** button.
3. After the margin is adjusted, click **Next** button to set the margin for the next tooth. When the margin of all teeth is obtained, the software will navigate to the next design step.

7. Set Insertion

For the bridge design, the software will navigate to Insertion step. You need to set the insertion for each bridge. The undercut generated from the insertion will be removed in the next step.

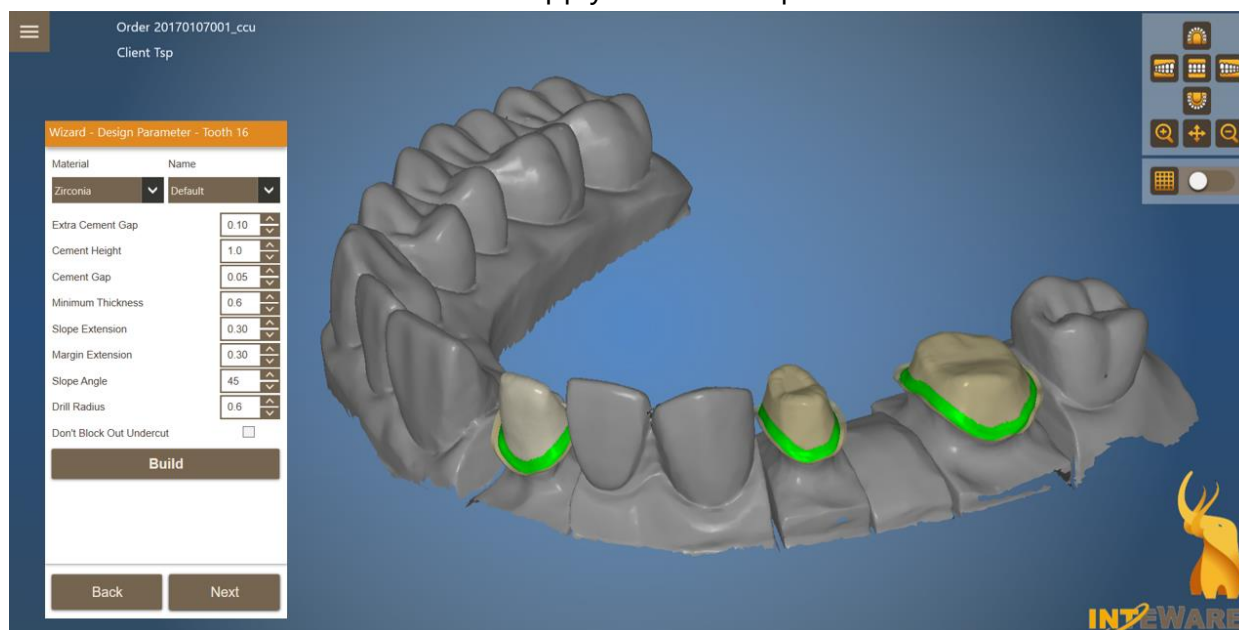


	Insertion setting for the bridge.
	Insertion setting for a single unit.
	Previous /Next bridge or tooth.
Set View as Insertion	Set viewing direction as insertion.
Go Insertion View	Turn to the insertion view.
	In the Single Setting, click the arrow of one tooth to set as active. (The arrow of the active tooth is green).
	In the Single Setting, click the arrow of the multiple teeth to set the same insertion for the selected teeth. (The arrow of the active teeth turns into green).


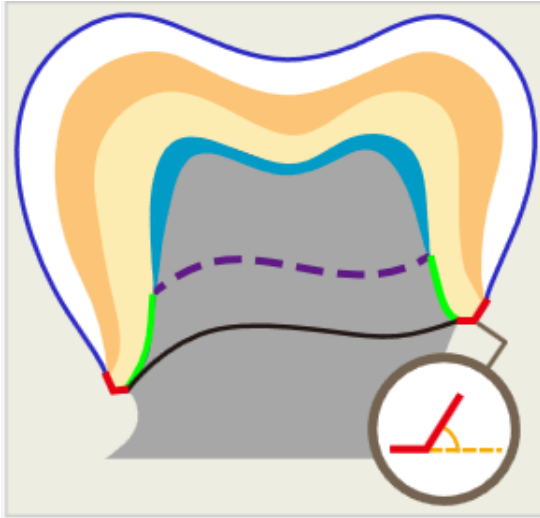






After adjusting the insertion, click **Next** button to go to the next design step.

8. Set Design Parameter

At Design Parameter step, you can select the preferred material from the drop-down list (Please refer to [Chapter 2.4](#)) and adjust the parameters when needed. Then, click **Build** button. In the case of multi-unit teeth with the same parameters, right-click on **Build** button and click **Build All** button to apply the desired parameters to all teeth.



Parameters are explained as follows.

Extra cement gap		
Cement height		
Cement gap		
Coping thickness		
Cutback		
Slope extension		
Margin extension		
Don't Block Out Undercut		Undercut will not be blocked out.

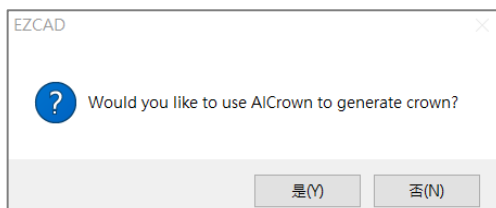
Once the parameters are set, click **Next** button to go to the next design step.

9. Crown Design

9.1 AI Crown Design

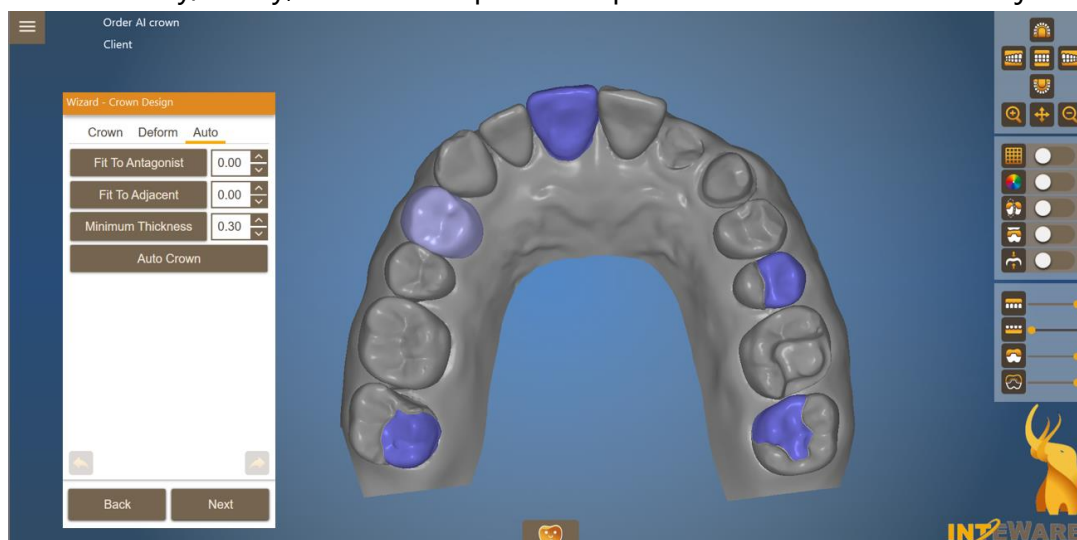
AI crown design is available when the product is an anatomic Coping, Anatomic Crown, or Inlay/Onlay.

When entering Crown Design step, the pop-up dialog enables you to decide whether to adopt AI crown design.



Automatic AI Design can only work successfully under the following prerequisites:

- Only work on a single tooth, instead of multi-unit teeth.
- For the Anatomic Coping or Anatomic Crown, there should be both sides of adjacent teeth around the designated tooth. The exceptions are for T17, T27, T37, and T47 where one adjacent tooth is enough.
- For Inlay/Onlay, there is no specific requirement for two sides of adjacent teeth.



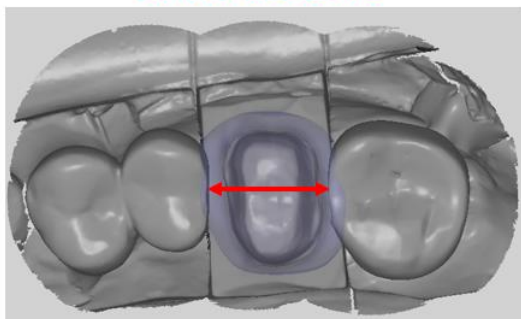
When AI designed result is not good, you can select a tooth and click **Auto Crown** button to manually activate AI design function again.

NOTE: The conditions of adjacent teeth are the factors affecting the success of Automatic AI Design, including the distance, size, morphology, and position of adjacent teeth.

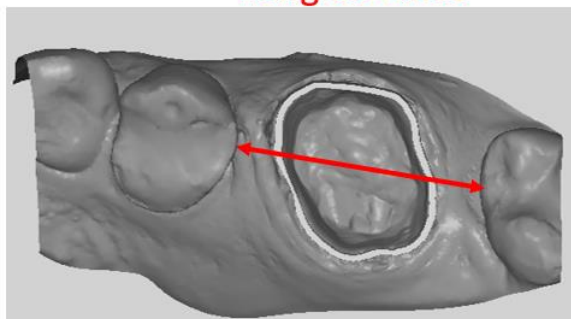
The following examples show the limitations of Automatic AI Design, and these adjacent conditions would probably generate inadequate result:

- (1) The distance between adjacent teeth is too short or long.

Short distance

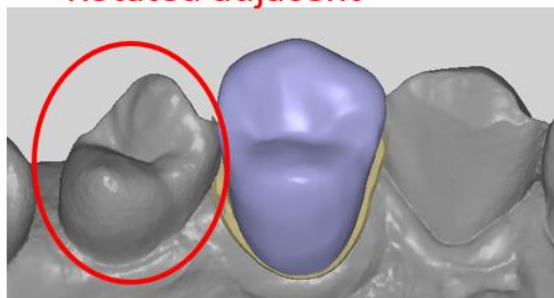


Long distance

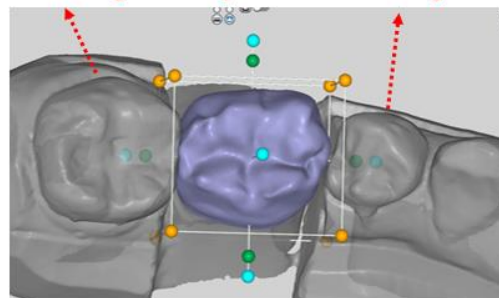


- (2) The adjacent tooth is rotated or tilted.

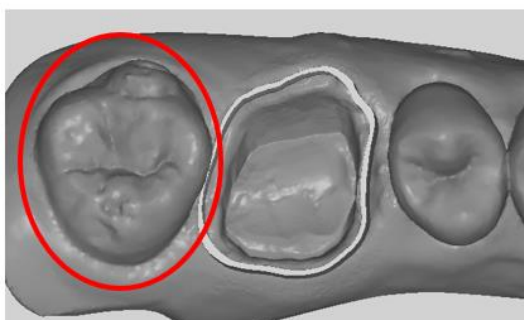
Rotated adjacent



Tilted adjacent; Rotated adjacent

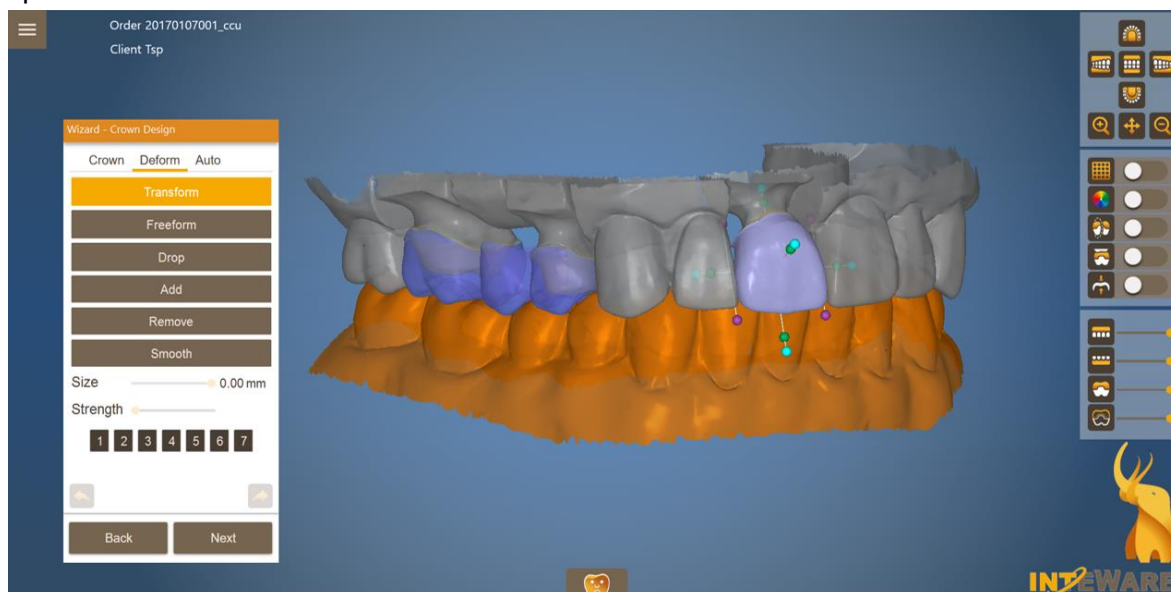


- (3) The shape of the adjacent tooth is abnormal.

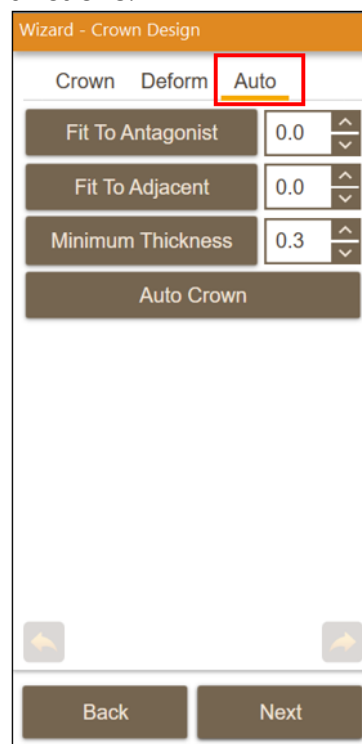
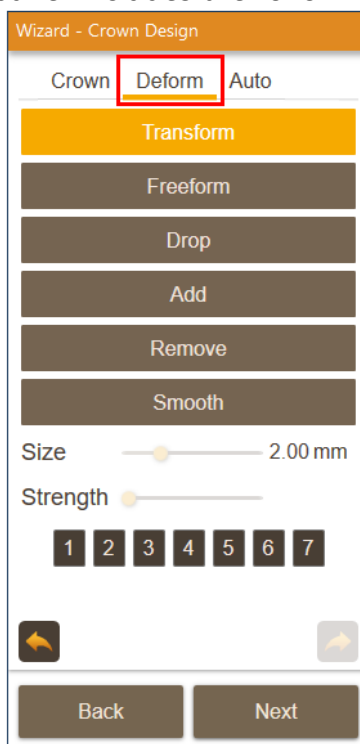
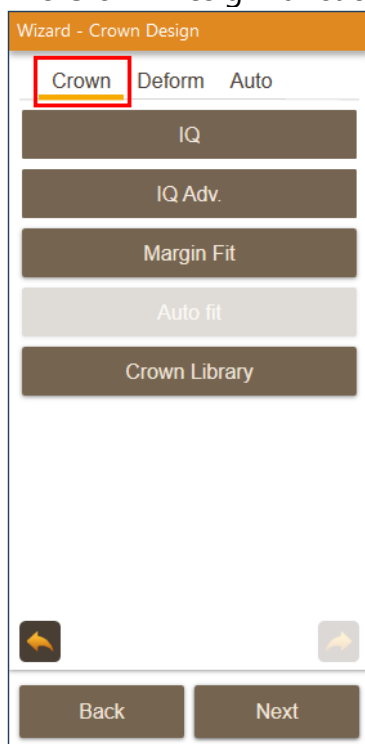


9.2 Design Crown

In this step, deformation functions are provided to modify the crown or to modify the specific areas of the crown.



The Crown Design function panel includes the following functions.



Crown tab

IQ	This function is to modify the specific areas of the restoration based on the different crown morphology. Drag the point to change the shape of the crown.
IQ Adv.	This function makes detailed modifications to the specific areas of the restoration. Drag the point to change the shape of the restoration.
Margin Fit/Restore	Stitch the crown bottom area to the margin, or to restore.
Auto fit	This function is only available if pre.op or denture scan file is loaded in Create Order step.
Crown library	Apply crown library.










Deform tab

Transform	Adjust the position, shape, and angle of the restoration quickly. <ul style="list-style-type: none"> - Click on the orange control point to change the size. - Click on a green or purple control point to change the shape. - Click on the cyan control point to rotate the restoration. - Click on the crown and drag to move the restoration.
Freeform	When selected, left-click on the area you want to modify and drag to the desired position.
Drop	Hold down the left mouse button, and drag across the area where you want to add the material. Pressing Shift+Left-click key to remove the material.
Add	The amount of added materials will be accumulated when dragging the mouse on the same area back and forth. Toggle to Remove by pressing Shift+Left-click .
Remove	The amount of removed material will be accumulated when dragging the mouse on the same area back and forth.
Smooth	This function is to smooth the surface.
1 ~ 7	Deform function switch key.

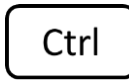



Auto tab

Fit To Antagonist	Automatically set the occlusal contact area.
Fit To Adjacent	Automatically set the contact area with the adjacent tooth.
Minimum Thickness	Automatically set crown thickness as the input value.
Auto Crown	Automatically generate and position the crowns.



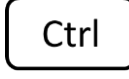
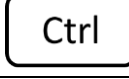

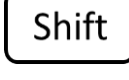

Deformation functions can be operated by the following shortcut keys:

	Transform
	Freeform
	Drop
 or 	Add
 or 	Remove
 or 	Smooth

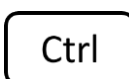




Below shortcut keys can be used to quickly adjust the size and strength of the deformation.

 	Change the strength of the deformation.
 	Change the size of the deformation.



When **Transformation** button is selected, the following shortcut keys are available.

 	Select multiple teeth in contiguous positions.
	Adjust the symmetrical teeth simultaneously.
 	Scale 0.1mm.
 	Scale 0.05mm.

Add/Remove/Smooth functions can be quickly switched with predefined shortcut keys.

 +  ~ 	Save the corresponding size and strength of Add/Remove/Smooth as the defined settings.
 ~ 	Apply the corresponding predefined settings of Add/Remove/Smooth.

Undo and Redo actions can be operated with the following shortcut keys.

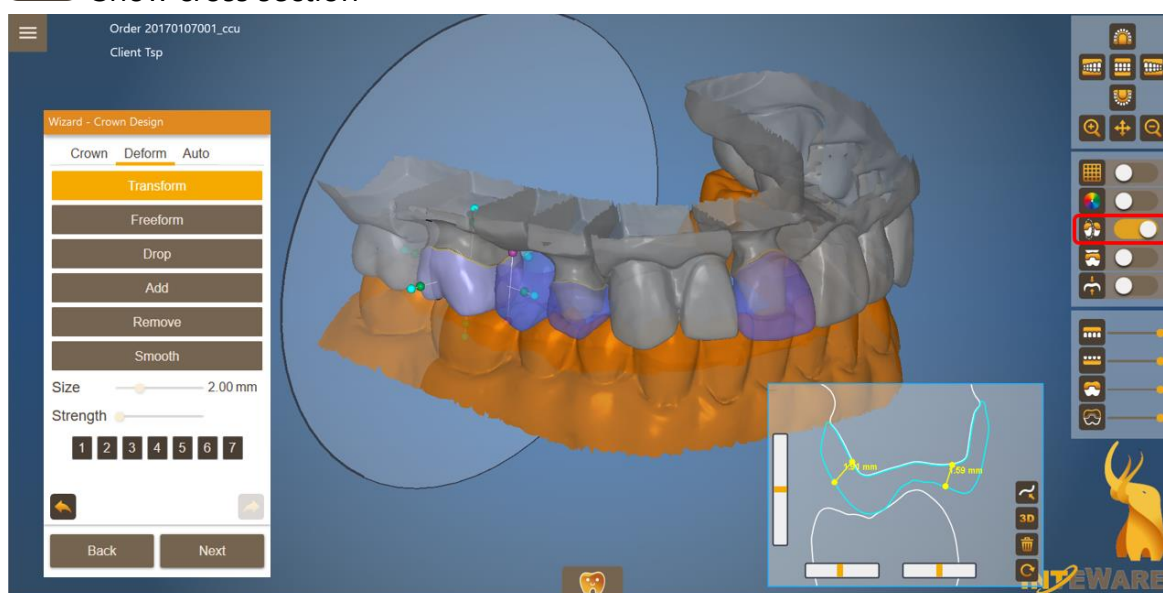
	Ctrl Z	Undo
	Ctrl Shift Z	Redo

Use the following shortcut keys to adjust the object display.

A	Switch the visibility of the antagonist model.
S	Switch the visibility of the preparation model.
D	Switch the visibility of the active tooth.
F	Switch the visibility of the inactive teeth.

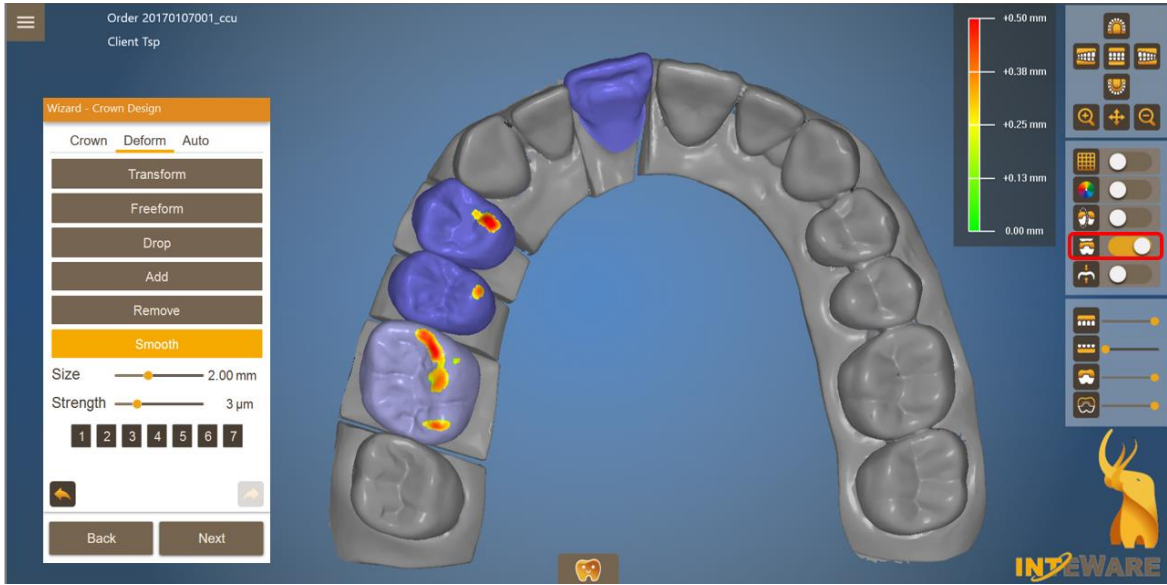


Show cross section

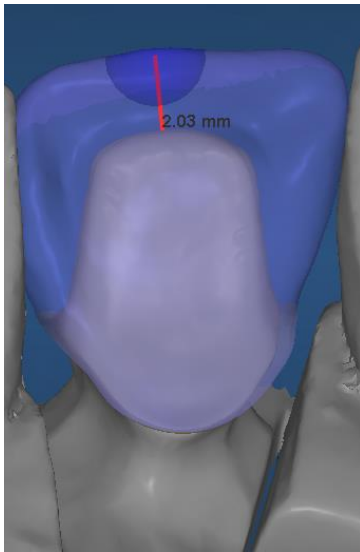




Show the collision in colors.



Show the thickness where the mouse cursor is placed.

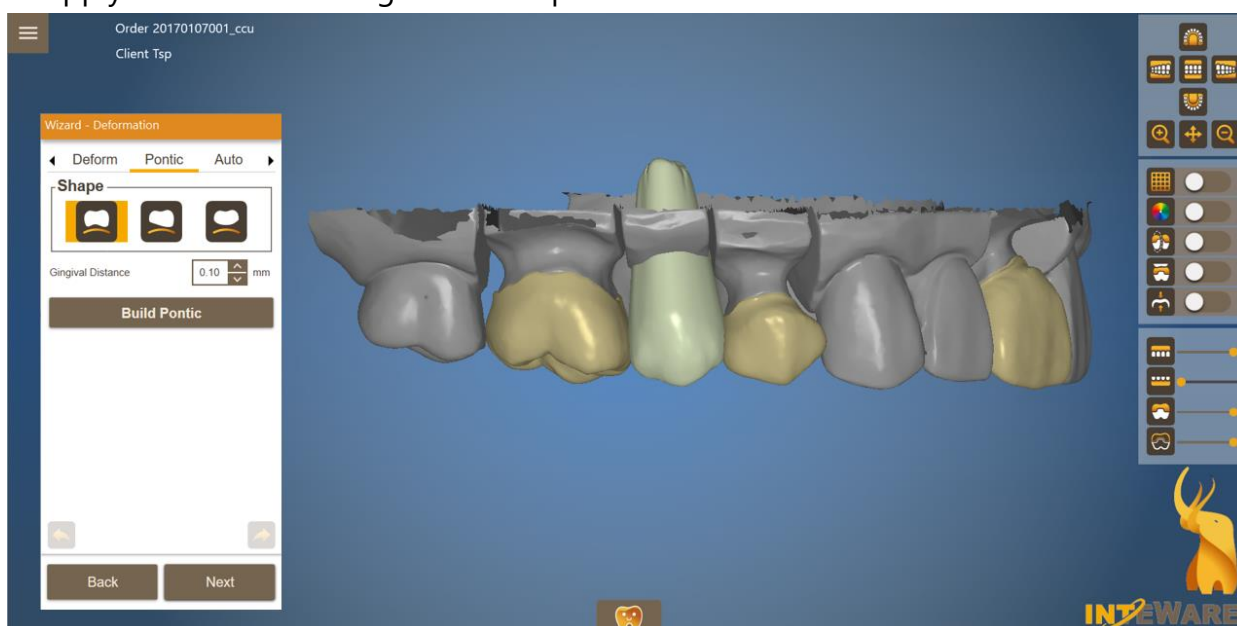


10. Design Pontic



At Deformation step, you can still make the modifications to the crown when there is a pontic. At this step, you can design pontic or create an attachment here.

For pontic design, toggle to the pontic tab. Select the desired pontic shape, adjust the desired gingival distance and click **Build Pontic** button.

For the multi-unit pontics, right-click on **Build Pontic** button and click **Build All** button to apply the desired settings to all the pontics.



There are three pontic shapes.


	Saddle
	Ridge Lap
	Bullet-shape

11. Attachment Design

You can create attachments or dig holes in the design in this step.

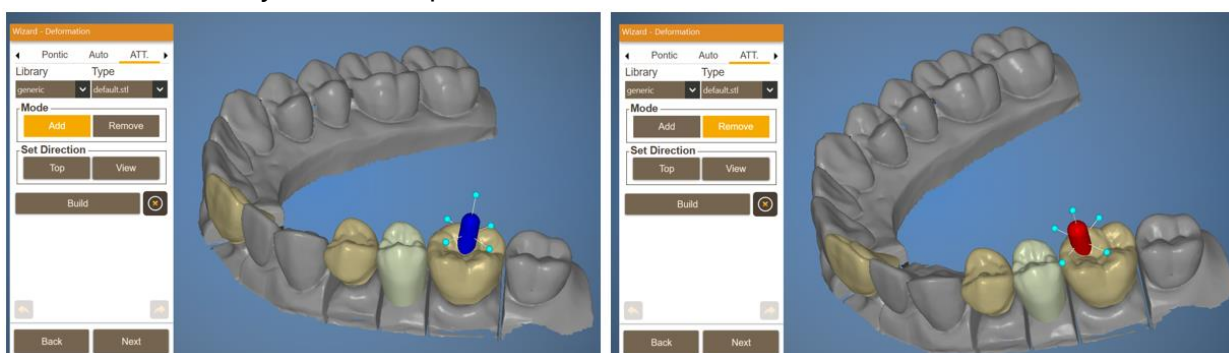


The ATT. tab contains the following functions.





Library	Attachment library
Type	Attachment types
Add	Add an attachment.
Remove	Attachment will be used to dig holes on the restoration.
Top	Turn the object to Top view (Z-axis).
View	Set the attachment according to the current view.
	Clear attachment.
Build	Execute the operation of adding or removing the attachment.

The following explains how attachment operation works:

1. Select the **Library** and **Type** of attachment.
2. Select the mode for attachment operation.
 - **Add**: The attachment shown in blue will be added to the crown.
 - **Remove**: The attachment in red will be removed and this can be used to dig a hole on the crown.
3. Click on the model to place the attachment.
 - Use the cyan control points to rotate the attachment.



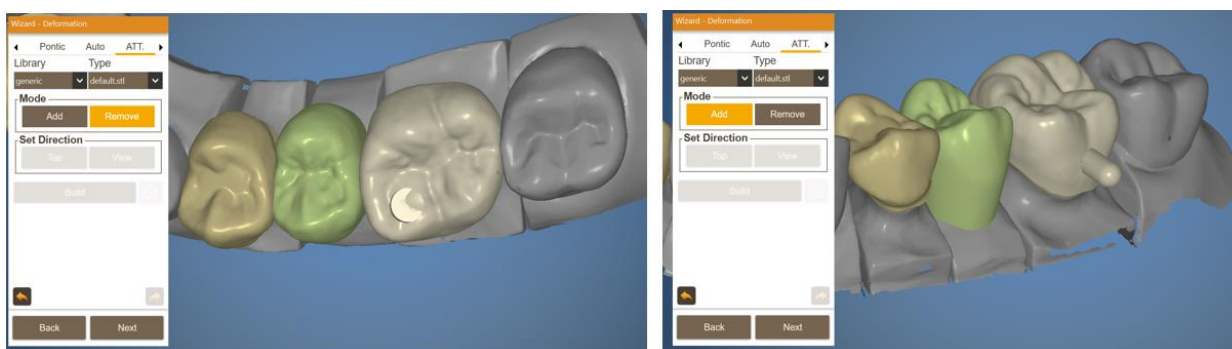
Shortcut keys for adjusting the attachment position and size are explained as below:

	Hold down and drag to the desired position.
	Scale the attachment in Z-axis.
Ctrl 	Scale the attachment in XY axis.
Shift 	Scale the attachment in XYZ axis.

4. Adjust the model to the desired viewing direction.
 - Click **Top** button to set to the top view.
 - Click **View** button to set the attachment to the current view.



5. Once the attachment adjustment is complete, click **Build** button to add/remove the attachment.

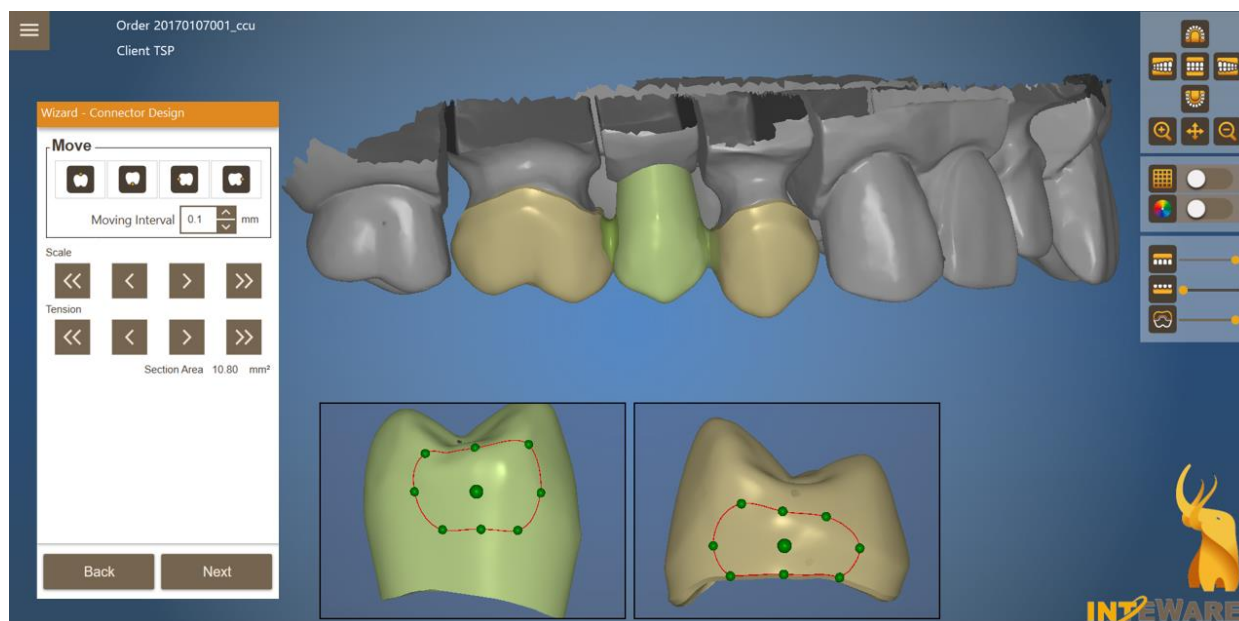



6. Click **Next** button to proceed.

12. Design Connector

For the bridge, the connectors can be designed at this step.

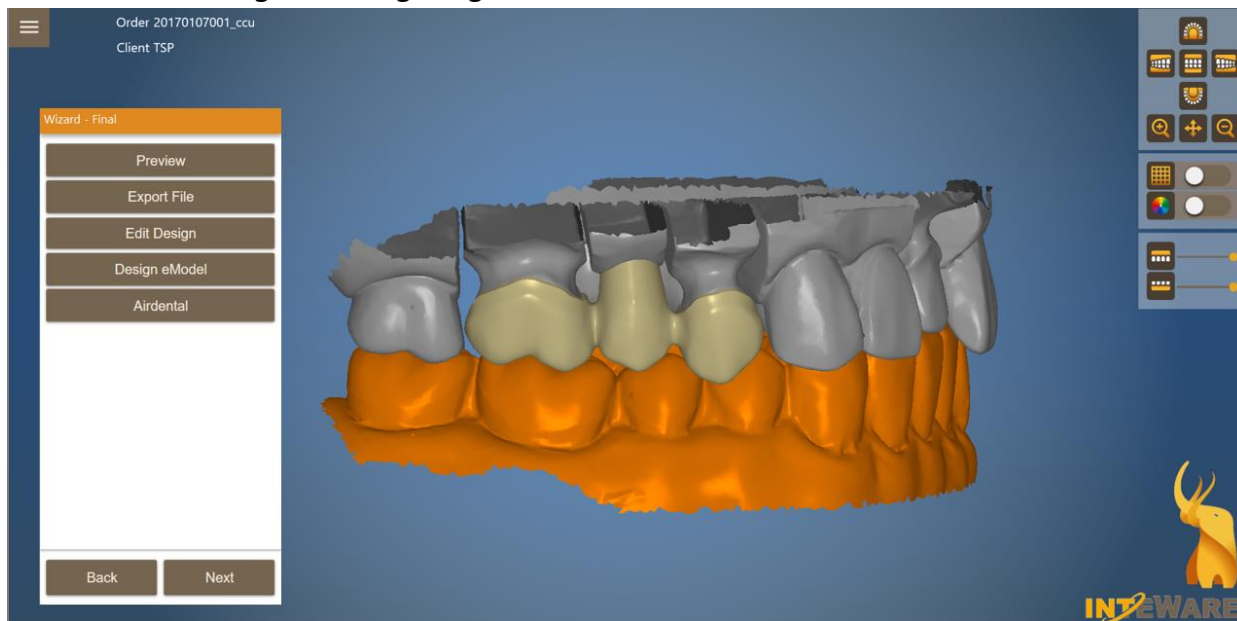
- 3D window shows the bridge including copings, pontics, and connectors.
- The two bottom windows show the connected areas at both sides of an active connector.
- The active connector is transparent; the inactive connector turns to solid and is not available for modification.



	<p>Click one of the four buttons to move the connector up, down or in the buccal or lingual direction. The increment of each movement can be set in the Moving Interval field.</p>
<p>Scale</p>	<p>Click the arrow button to set the size of the selected connector. The right arrow is to enlarge, and the left arrow is to narrow down.</p>
<p>Tension</p>	<p>Click the arrow button to adjust the central area of the connector. The right arrow is to increase, and the left arrow is to decrease the central area of the connector.</p>

13. Export

Once the design is complete, you will be navigated to Final step. You are able to export files, edit the design or design digital eModel.

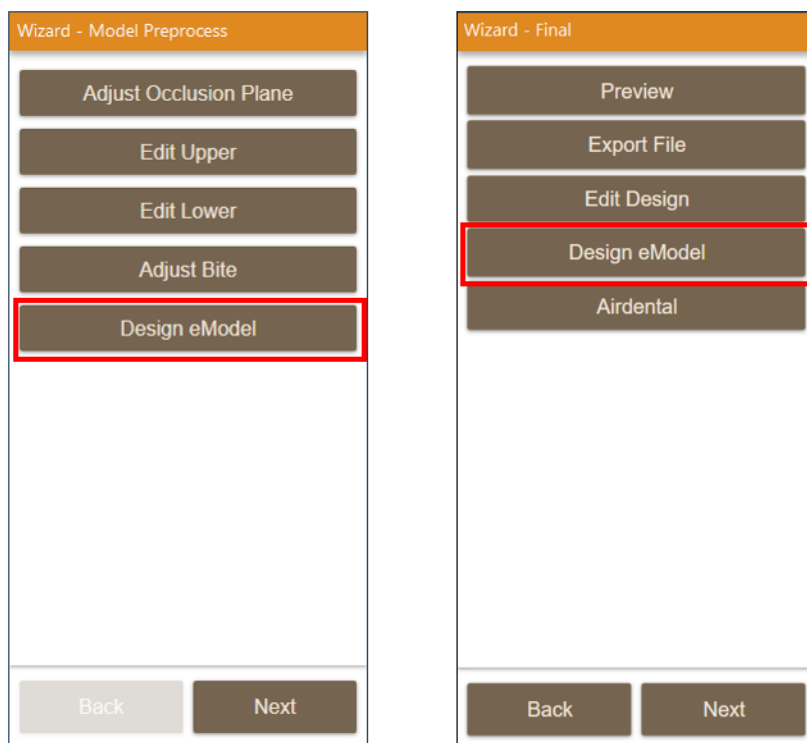


Preview	The designed file will be exported and the designed file folder will be automatically opened.
Export File	Move the coordinate system of the design file to (0, 0, 0) and output design file in STL and PTS format for manufacturing use.
Edit Design	Adjust the design by using deformation functions.
Design eModel	Design a digital model.
Airdental	Export project file in CDP format for Airdental.

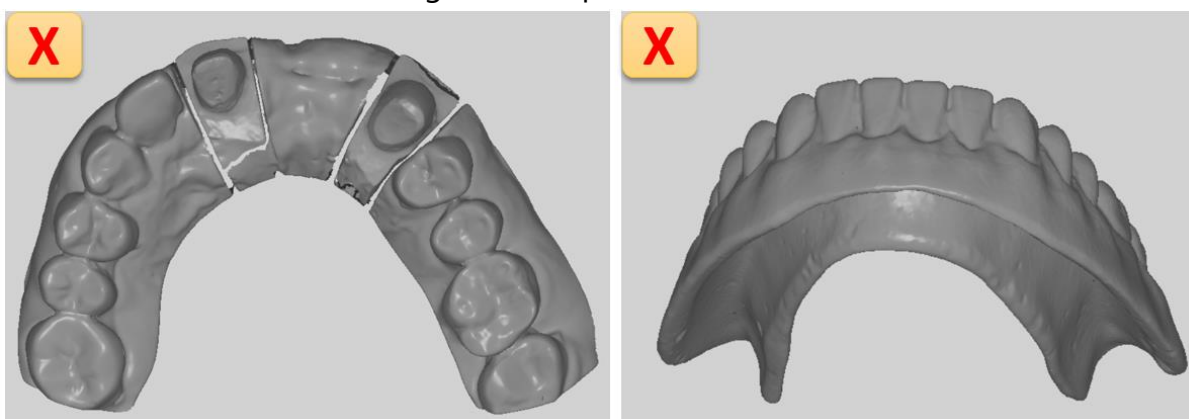
14. Design Digital Model

There are two entries to design the digital model:

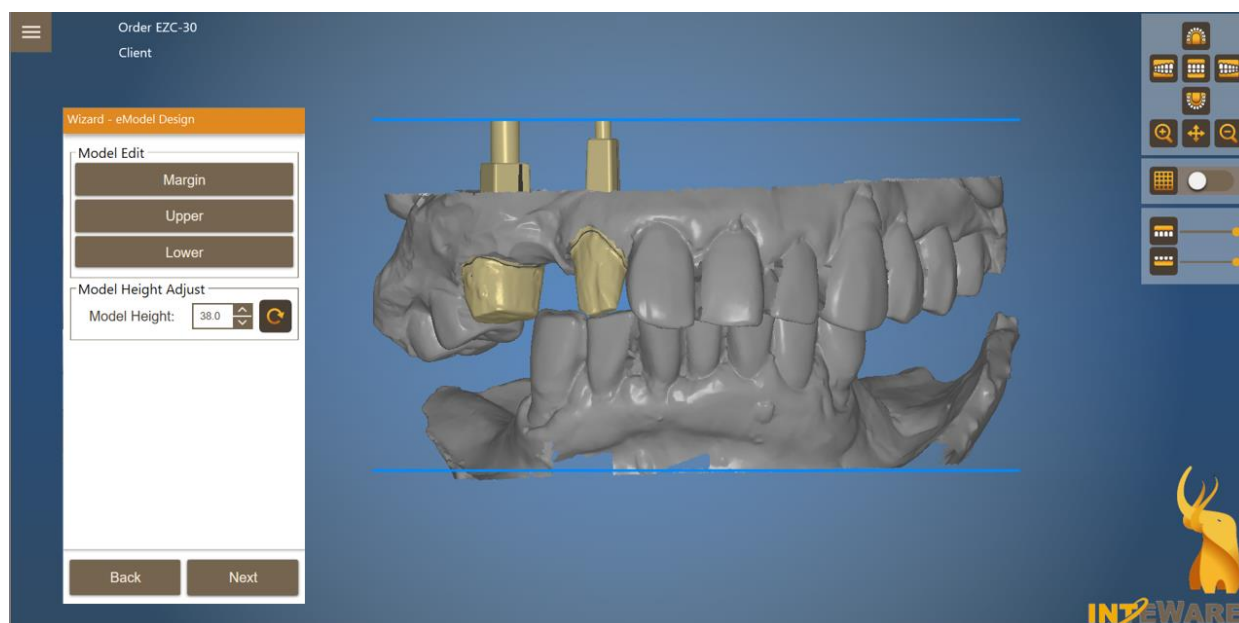
1. In Model Preprocess step, click **Design eModel** button.
2. In Final step, click **Design eModel** button.



NOTE: eModel cannot be designed on separated model and closed model.



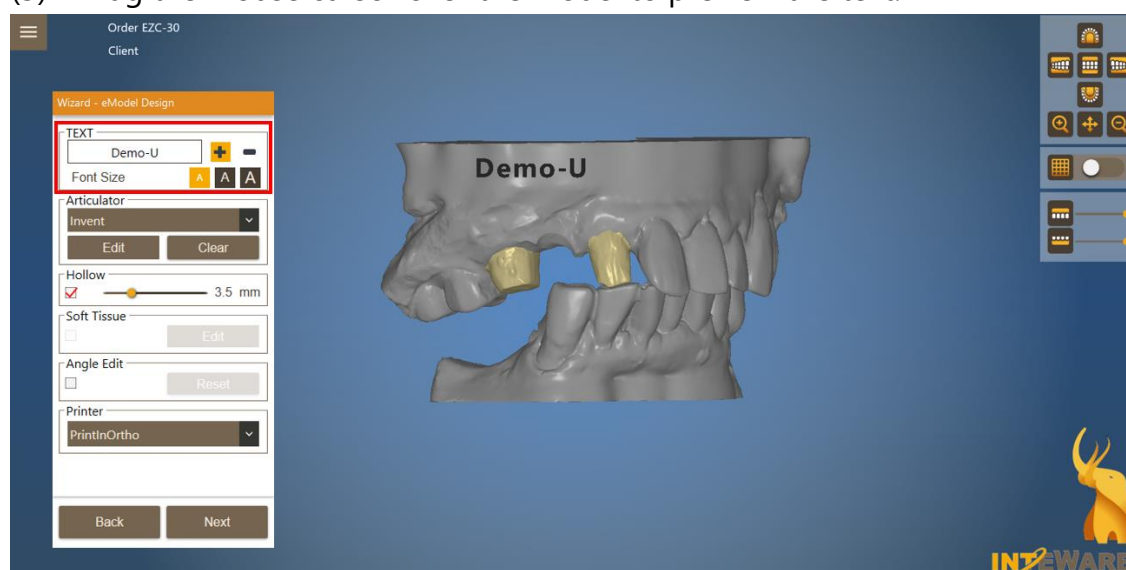
On eModel Design function panel, you can edit margin, and edit Upper/Lower model mesh data. You can adjust the total model height here. Then, click **Next** button. You can also skip this step and directly click **Next** button to construct digital eModel.



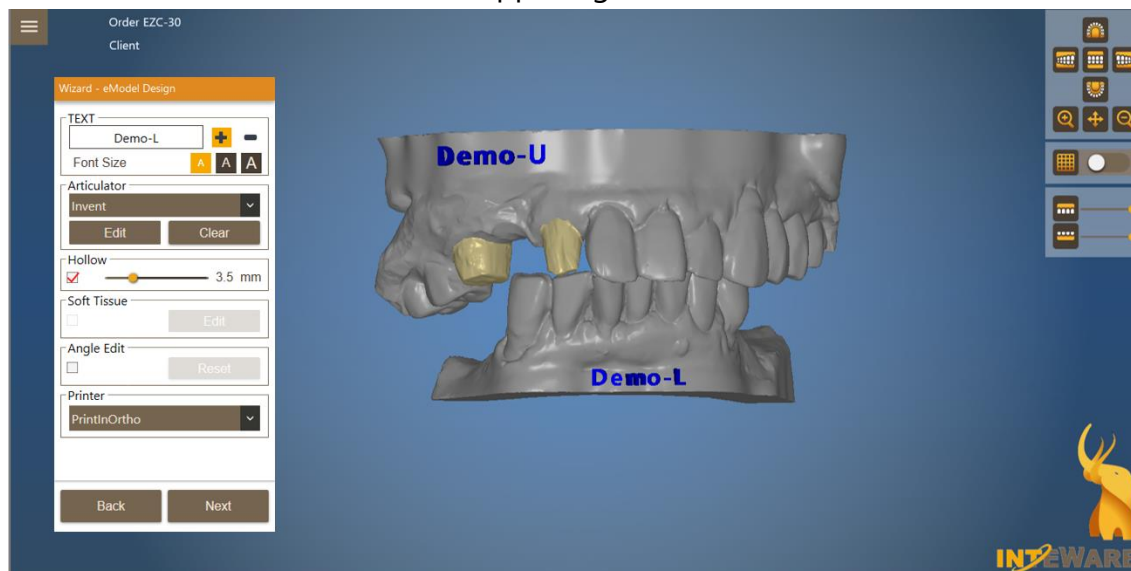
The eModel Design function panel allows you to perform the following action:

- **Add Text:**

- (1) Enter the letters in the *TEXT* field and click **+** button.
- (2) Select the font size.
- (3) Drag the mouse cursor over the model to preview the text.



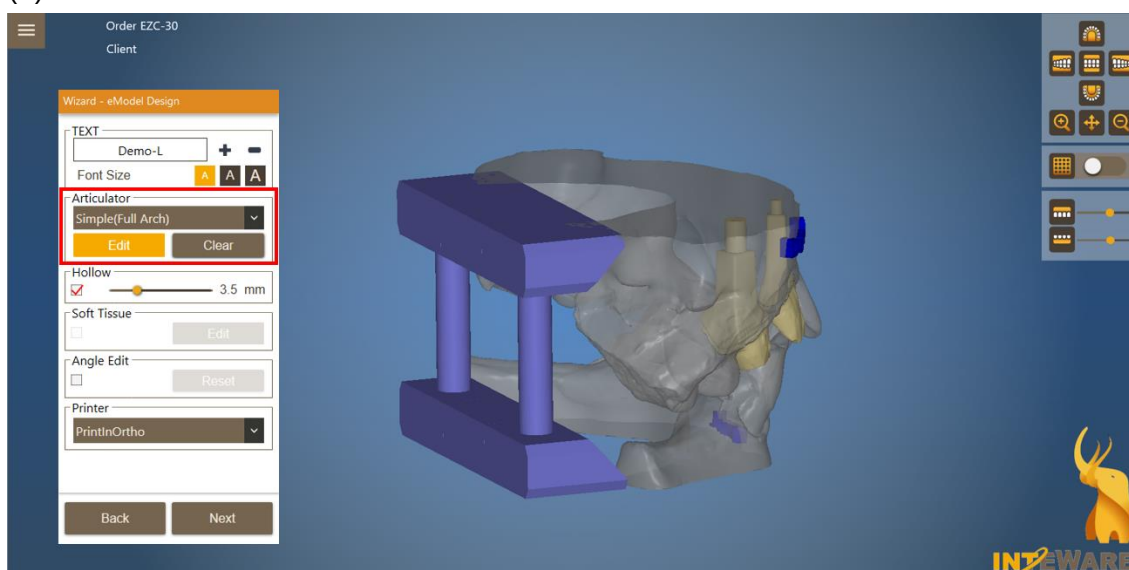
- (4) Left-click to place the text on the model and the text will turn into blue. You can add different text to the opposing model.



- (5) Click  button and click on the text to delete it.

● Add Articulator

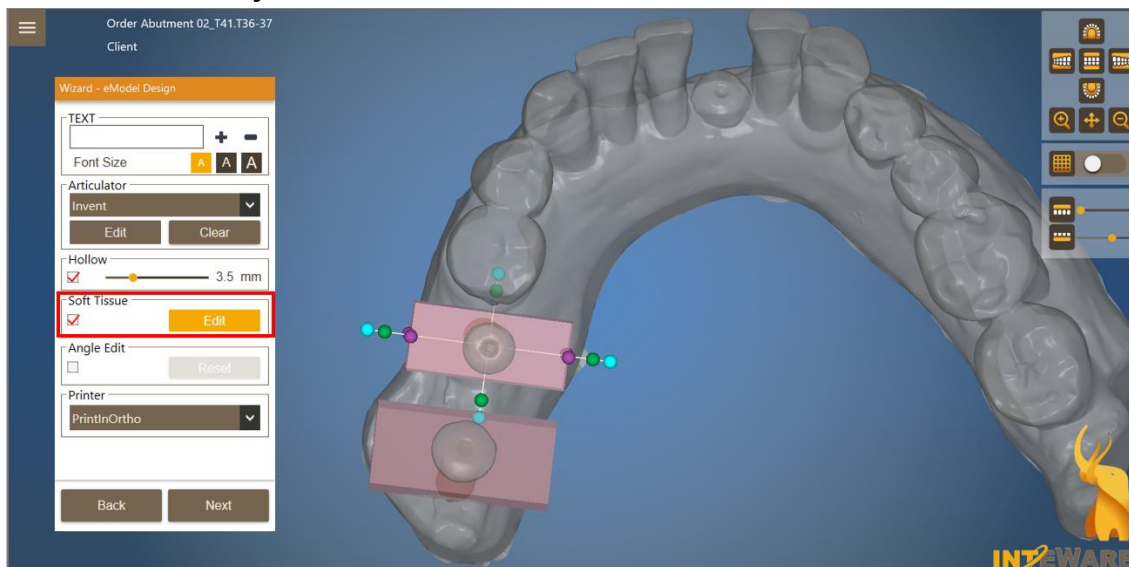
- (1) Select the articulator type.
- (2) Click **Edit** button and click to place the articulator on the model.
 - Click and drag to move the articulator
 - Drag cyan control points to rotate the articulator.
- (3) Click on the articulator and click **Clear** button to delete.



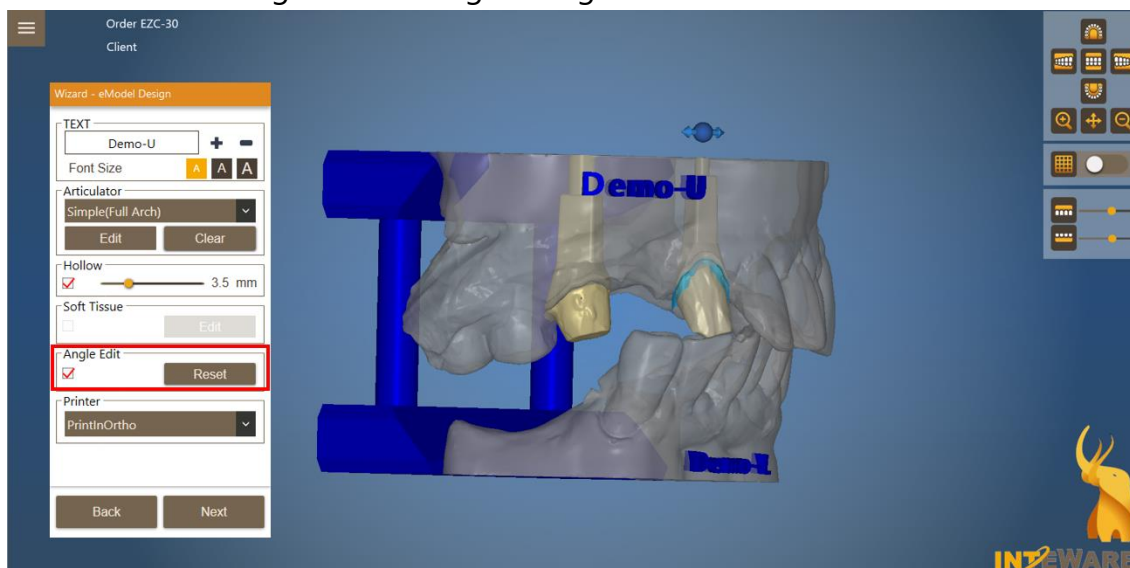
● Hollow the model

- Tick **Hollow** checkbox and drag the slider to adjust the hollowing thickness.

- **Soft Tissue** (available when there is an analog file in the abutment database)
 - (1) Tick the checkbox to enable this function.
 - (2) Click **Edit** button and select the soft tissue to be adjusted. The bounding box is used to adjust the soft tissue.



- **Angle Edit**
Tick the checkbox and drag the arrow to adjust the angle of the pin to prevent it from interfering with the neighboring tooth.

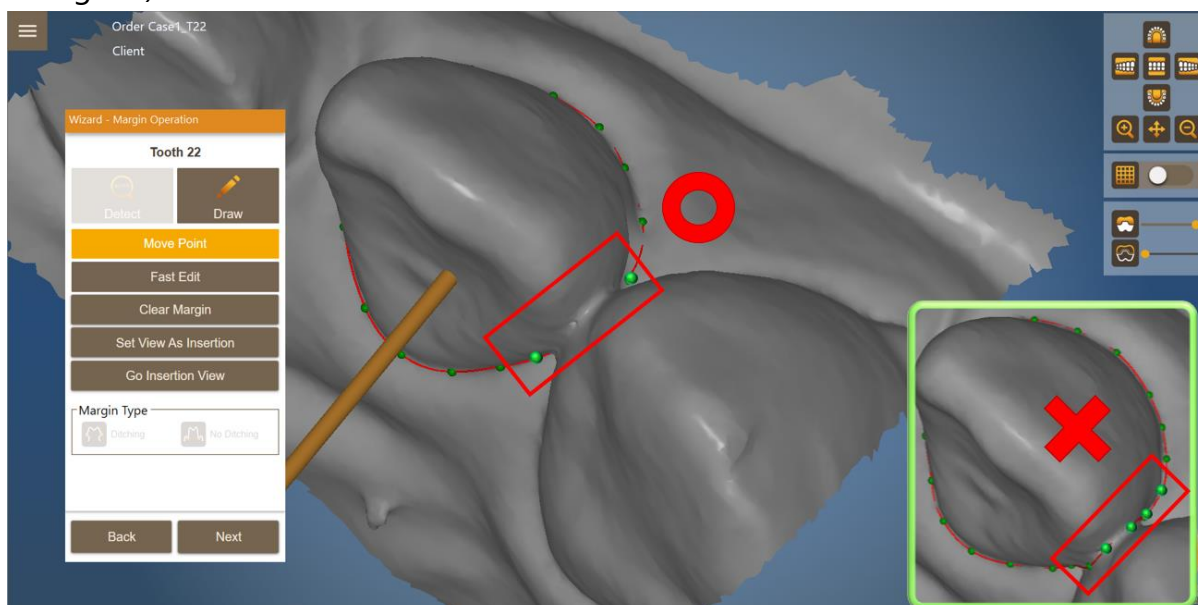


- **Printer**
Select the printer to set the die and model tolerance as the selected printer settings. You can browse to the below path: Computer > Drive (C) > InteWareInc EZCAD > 2022 > Bin. Then, open **Printer** file (*.xml) to add or edit the printer model and parameter.

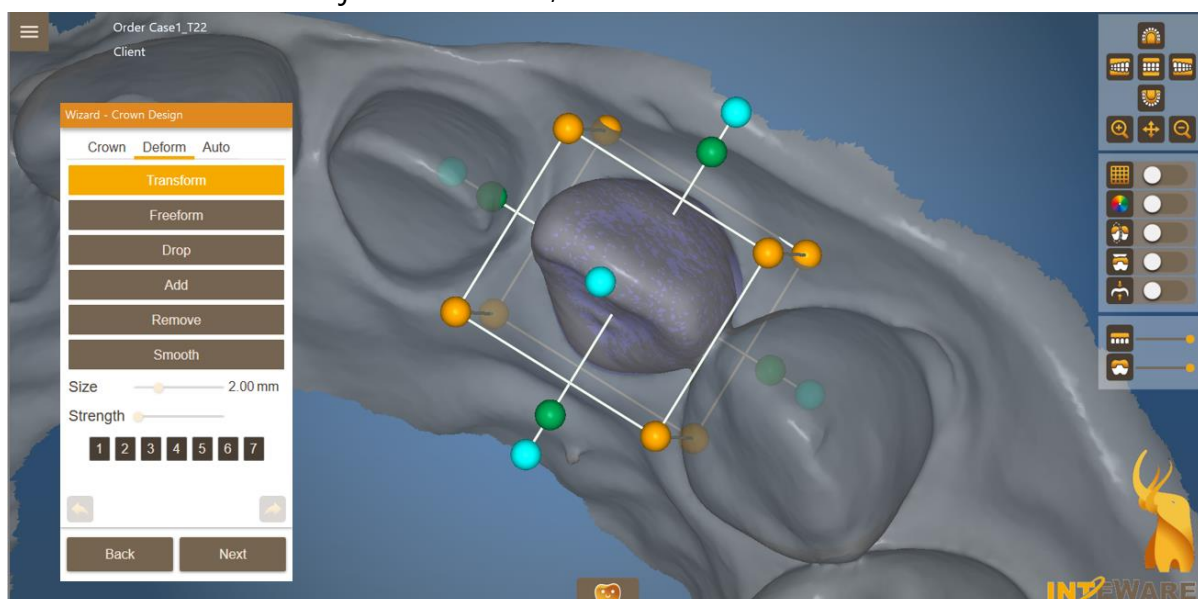
15. Design Provisional Crown

When the product type is set as Provisional Crown, some of the design processes are different. The different design processes are explained below.

1. Manually draw the margin. Please let the margin points across the mesiodistal area, instead of placing the margin points on the scan data. (Please refer to the following figure.)



2. The provisional crown is automatically positioned. Deformation functions are available for the adjustment. Then, click **Next** button.

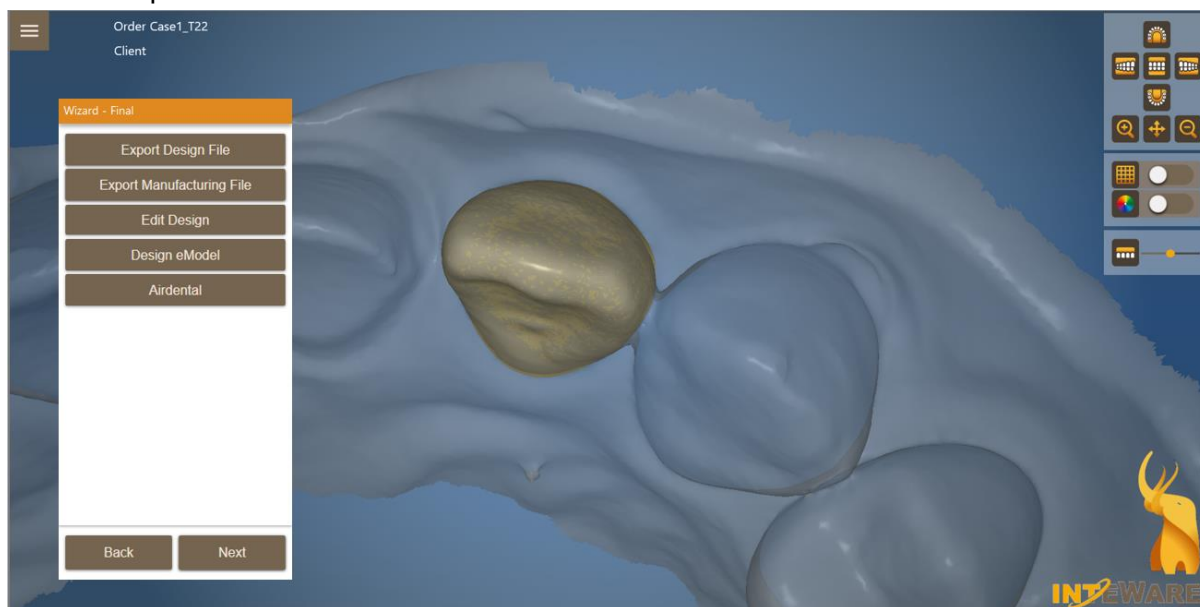


- The default thickness of the provisional crown is 0.5mm. The default margin width is 0.3mm. Click **Build** button to create the provisional crown.



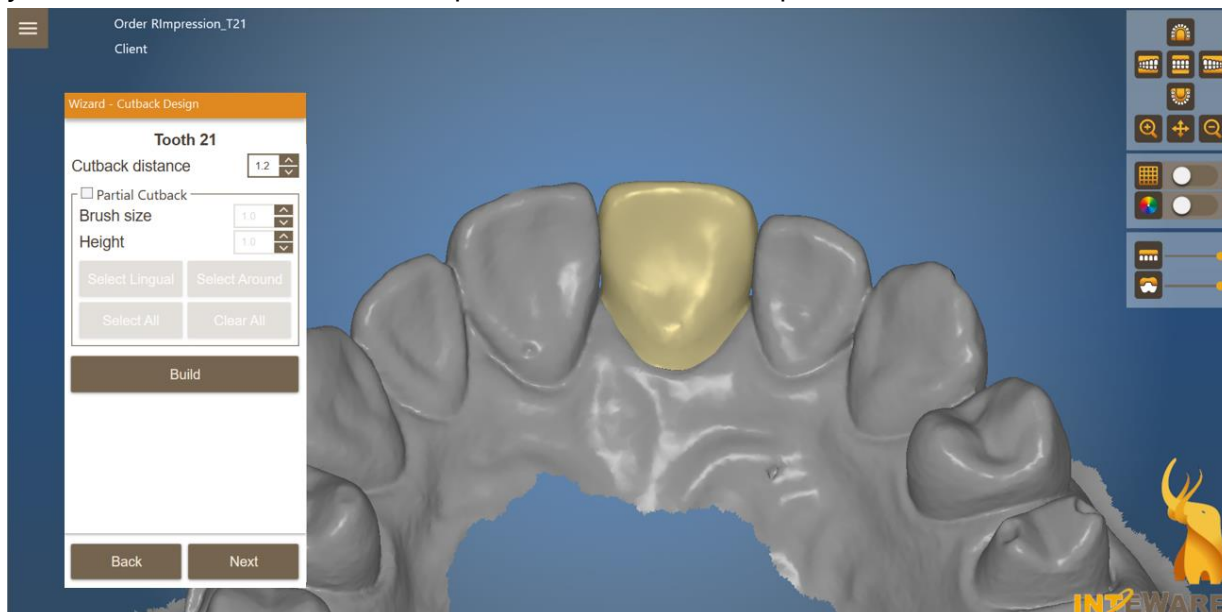
For multiple provisional crowns, right-click over **Build** button and click **Build All** button to apply the desired settings to all provisional crowns.

- After the provisional crown is created and edited, the digital model can be designed and exported.



16. Design Cutback




When the product is anatomic copings or reduced pontics, cutback operation allows you to reduce the anatomic shapes in order to create space for ceramic.



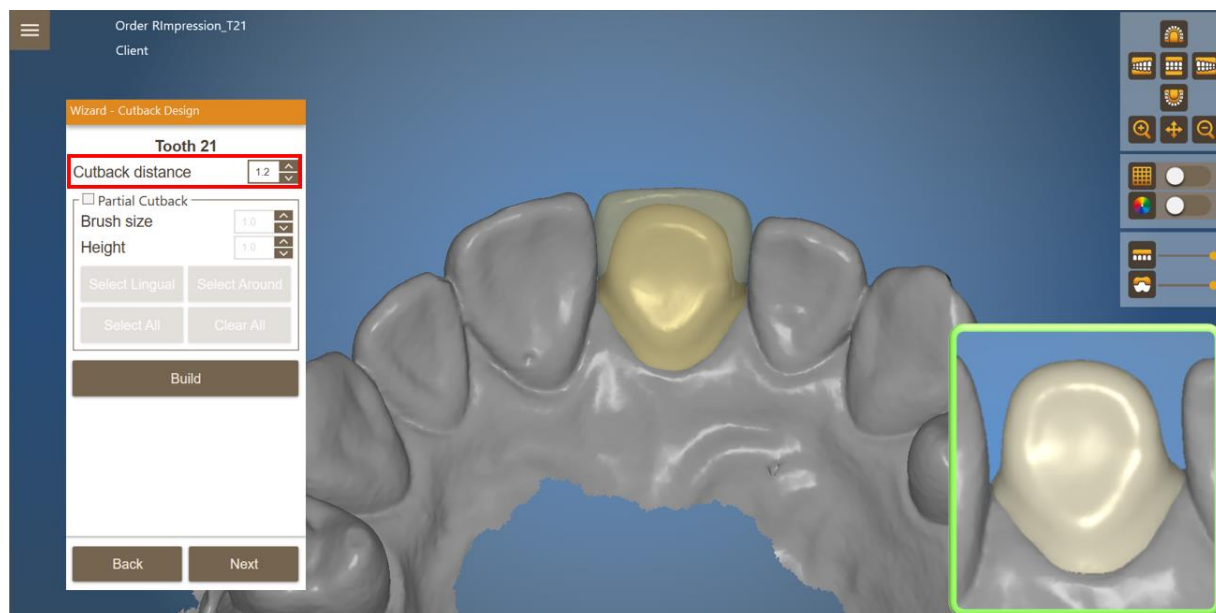
The following functions are provided to design cutback:

Cutback distance	The amount of cutback applied to the whole unit.
Partial Cutback	Tick to select partial cutback.
Brush size	The size of the brush is used for marking.
Height	The height of the band.
Select Lingual	Mark the lingual band.
Select Around	Mark a band which encircles the whole unit.
Select All	Mark the whole unit.
Clear All	Clear the marking of the whole unit.
Build	Perform the cutback operation.

Shortcut keys can be used to adjust the cutback.

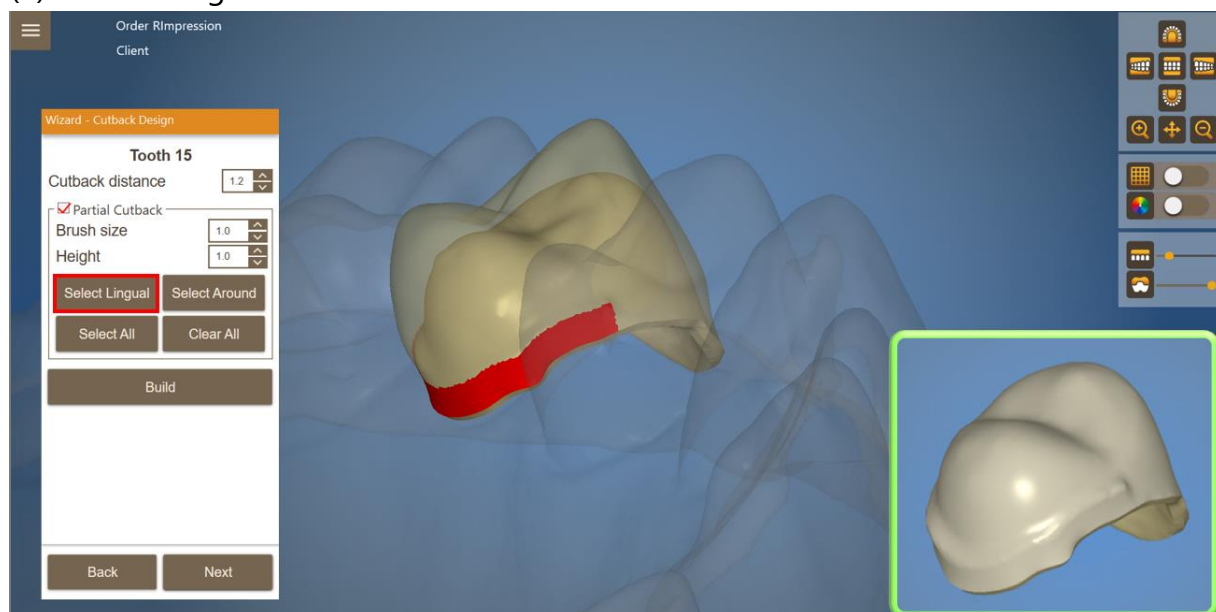
	Mark the areas in red which will be excluded from cutback operation.
Ctrl 	Switch the brush to green and draw to erase the marking.
Shift 	Change the brush size.

Cutback on the whole unit

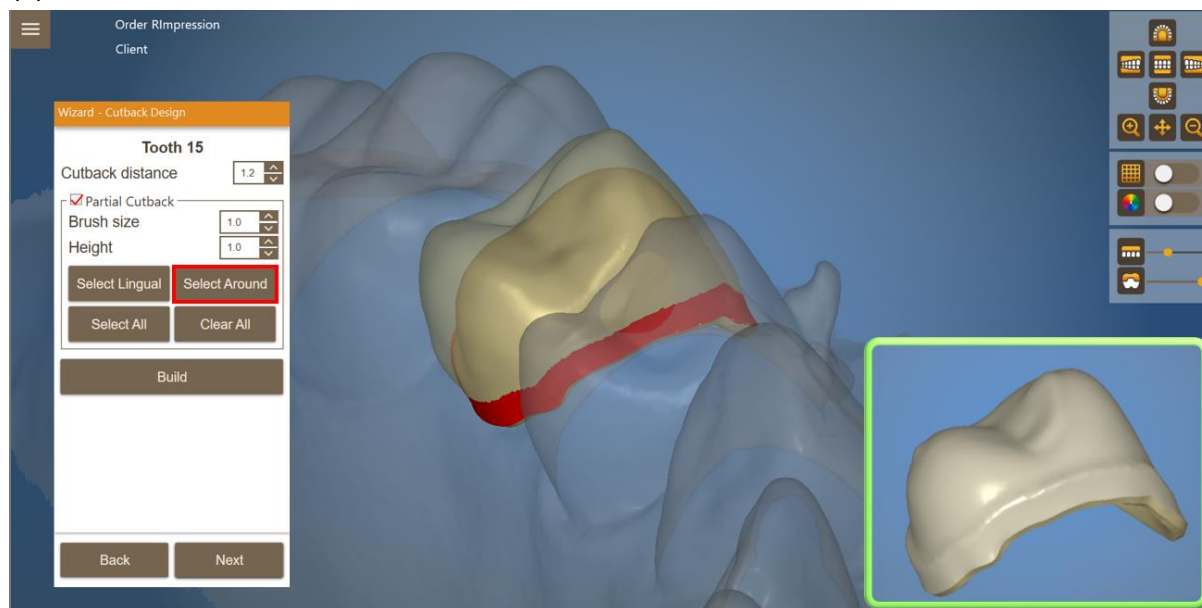


Partial Cutback

(1) Select Lingual

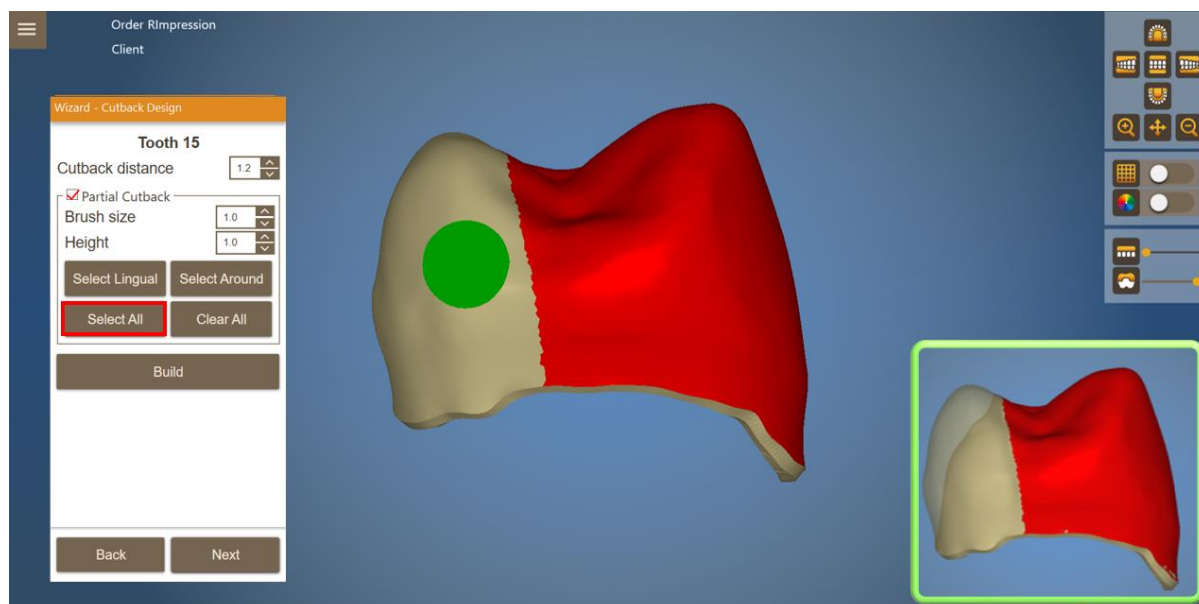


(2) Select Around



(3) Select All

The whole unit turns red. The marking area in red will be kept in full anatomic shape. You could press **Ctrl+L-click** to erase some red areas. The cutback will be performed in non-red areas.




(4) Clear All

Clear all marked areas.

17. Quick Design Change

At Crown Design step, Design Change menu at the bottom of the main window facilitates the user to quickly modify the current change.



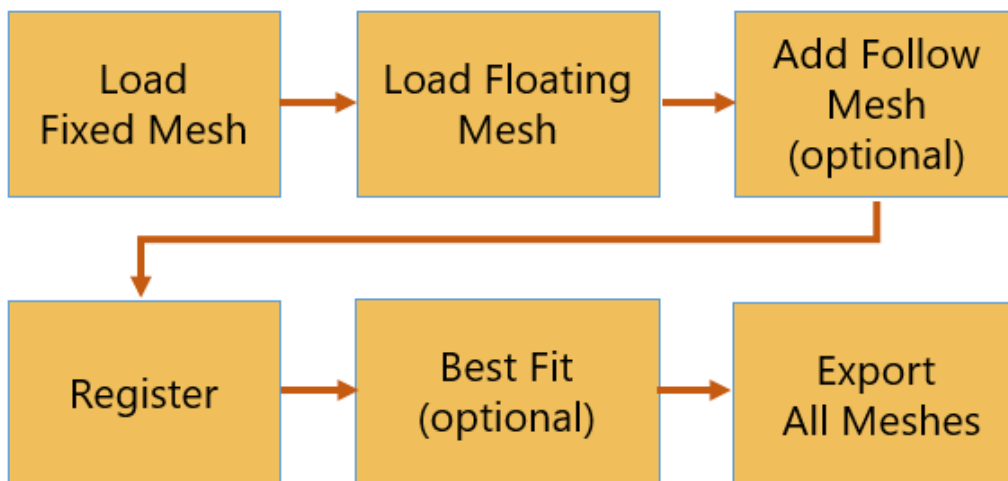
Click  button and left-click the tooth on the chart. Select the quick design change function from the menu.

Reset Crown	Restore the crown shape.
Edit Margin	Return to Margin Operation step to adjust the margin.
Adjust Insertion	Return to Insertion Operation step to adjust the insertion.
Change Design Parameter	Return to Design Parameter step to change the parameters.


18. Register Meshes

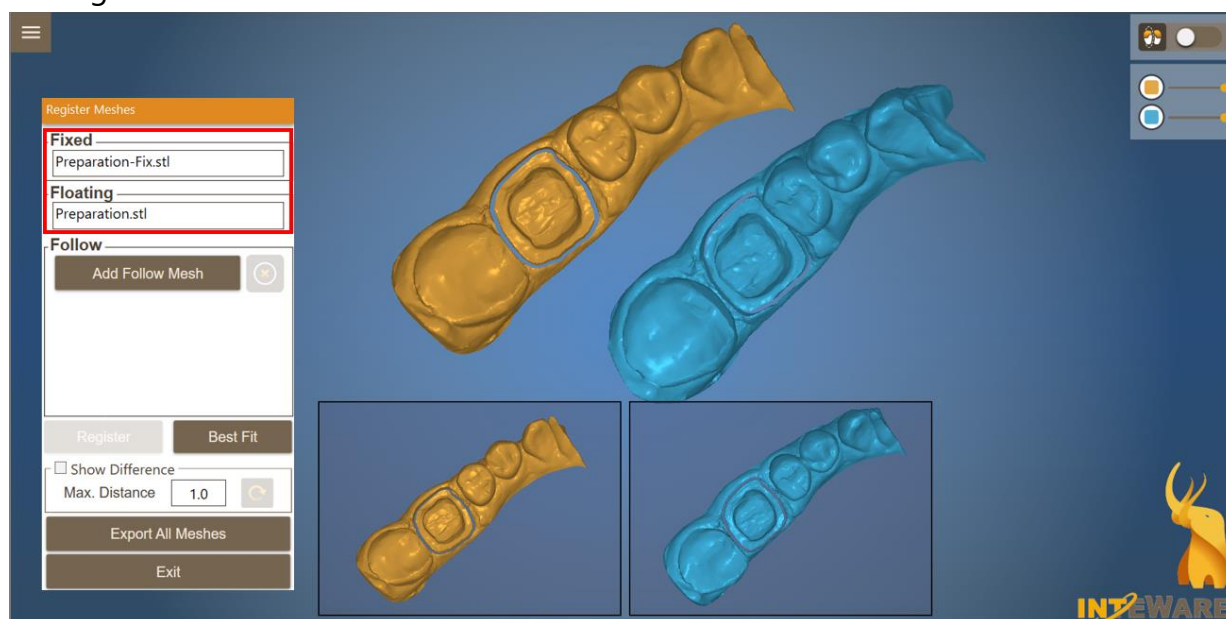
This software provides a handy Register Meshes function for the user to align mesh data.


The workflow of registering meshes is as follows.

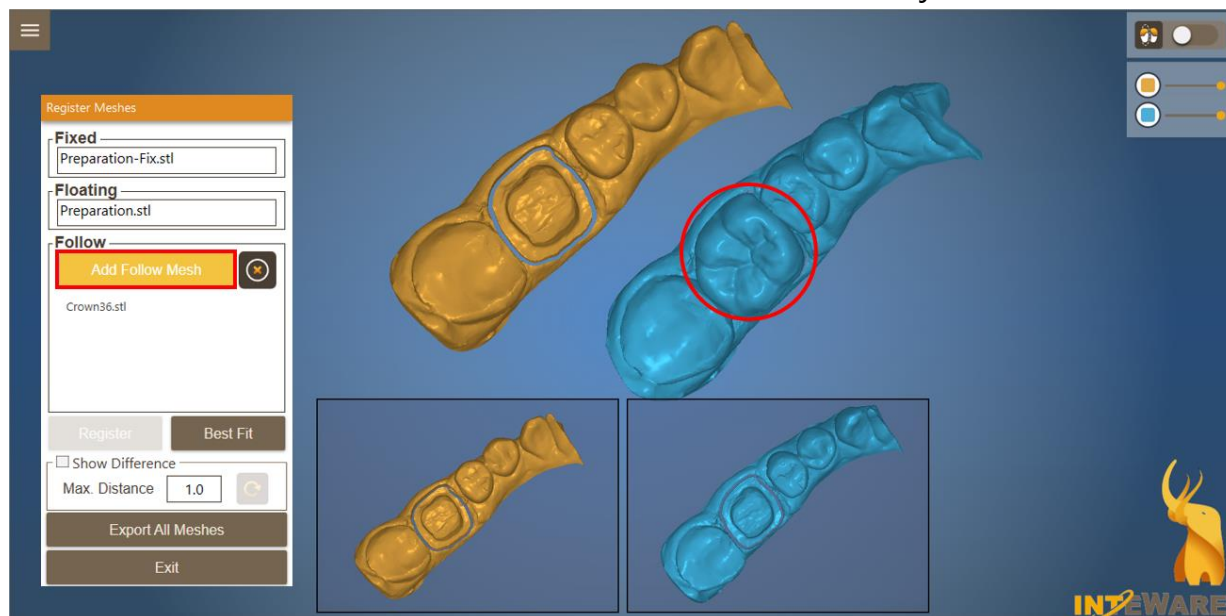


Following the steps below to register meshes:

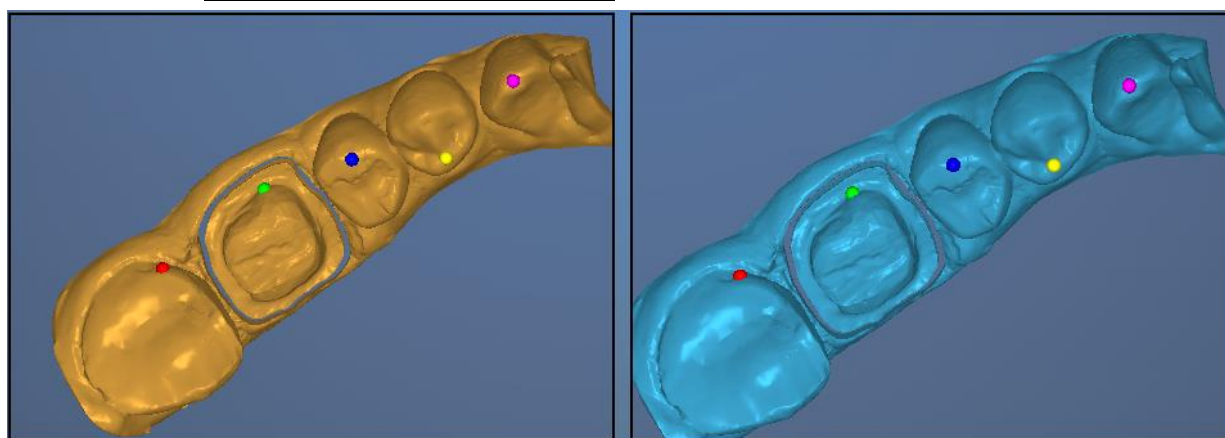
1. Click  **Register Meshes** button on the main menu.
2. In the pop-up Load Fixed Mesh window, select the referenced mesh data from the computer.
3. In the pop-up Load Floating Mesh window, select the mesh data which will be aligned to the reference data.





4. If there is any mesh object to be added onto the floating mesh object, click **Add Follow Mesh** button and select the follow mesh data.
 - Click  **Clear** button to delete the followed mesh object from the list.



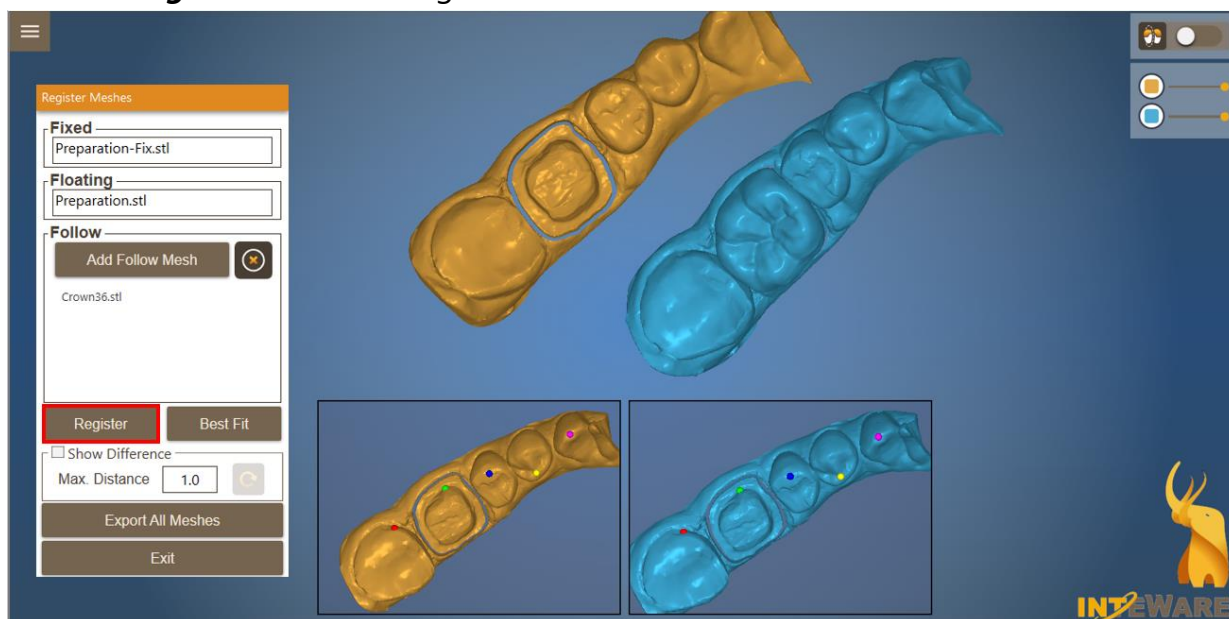
5. Click to mark matching points between mesh objects. The marked point numbers should be more than 3 and less than 10.



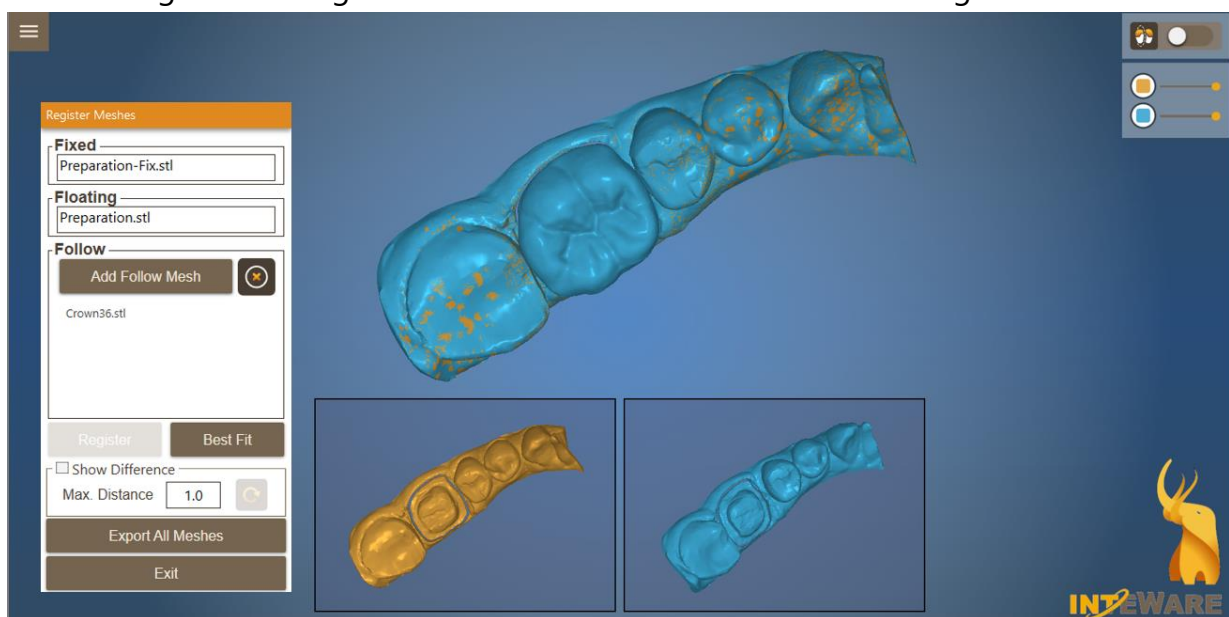
The matching point operation is shown as follows:

	Add a matching point.
	Remove the previous matching point.



6. Click **Register** button to align both mesh data.

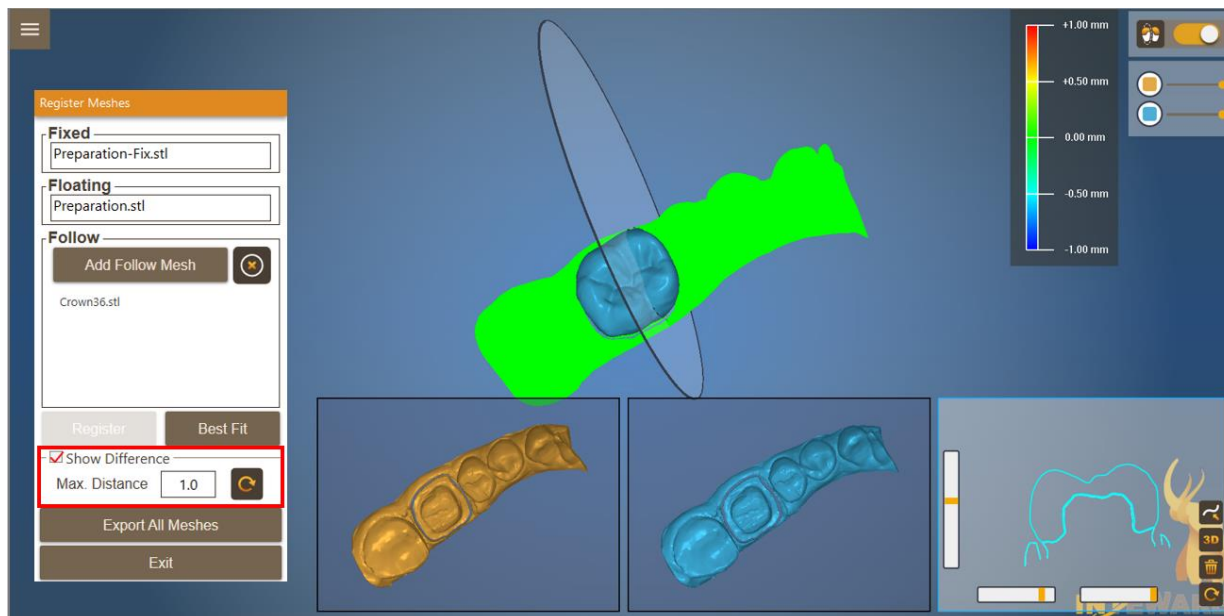


The floating mesh is aligned to fixed mesh as shown in the below figure.



7. If the registered mesh result is not satisfying, click **Best Fit** button to fine-tune both mesh registration result.

8. Tick **Show Difference** checkbox to show the difference between the fixed mesh and floating mesh.
 - You are able to define the preferred maximum distance of the difference on **Max Distance** field. Then, click  button to update the color map.
 - You can use  function to show the cross-section of two mesh data.



9. When Mesh registration is complete, click **Export All Meshes** button and save registered mesh data to the desired folder.

19. Design Custom Abutment

If you want to create custom abutment or Screw retained abutment, it is required to import the scanbody file in Create Order step. You need to select "**Upper.Scanbody**" or "**Lower.Scanbody**" for scanbody file. Then, select the teeth and product type from Custom Abutment categories. Click **OK** button.

New Order
×

Scan File Import

		Lower	▼ Lower.STL	X
		Upper	▼ Upper.STL	X
		Upper.Scanbody	▼ Upper-Scanbody.STL	X

Order Information

Date 2022-10-11 11:24:31

Order ID 2210111124-Abutment 01T13

Order


Client

Patient

Technician

Note

Design Setting



Bridge / Copings

- Custom Abutment
- Diagnostic Waxup
- Cancel Select
- Clear

Abutment

- Abut. + Offset Coping
- Abut. + Anatomic Coping
- Abut. + Anatomic Crown

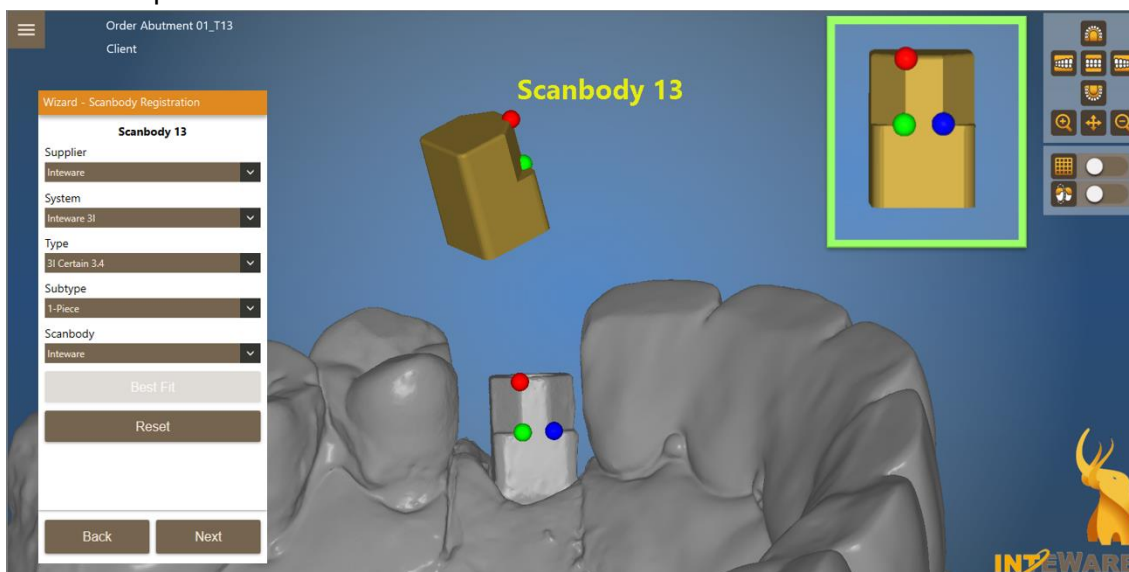
OK
Cancel

Continue to adjust occlusion (see [Chapter 5.1](#)). Then, click **Next** button to go to the next step.

19.1 Scanbody Registration

When Occlusion adjustment is complete, you will be navigated to Scanbody Registration step.

1. Select scanbody supplier, system, type and subtype from the drop-down list.
2. Click to mark **3** points on the scanbody and mark **3** corresponding points on the same positions on the scan data.

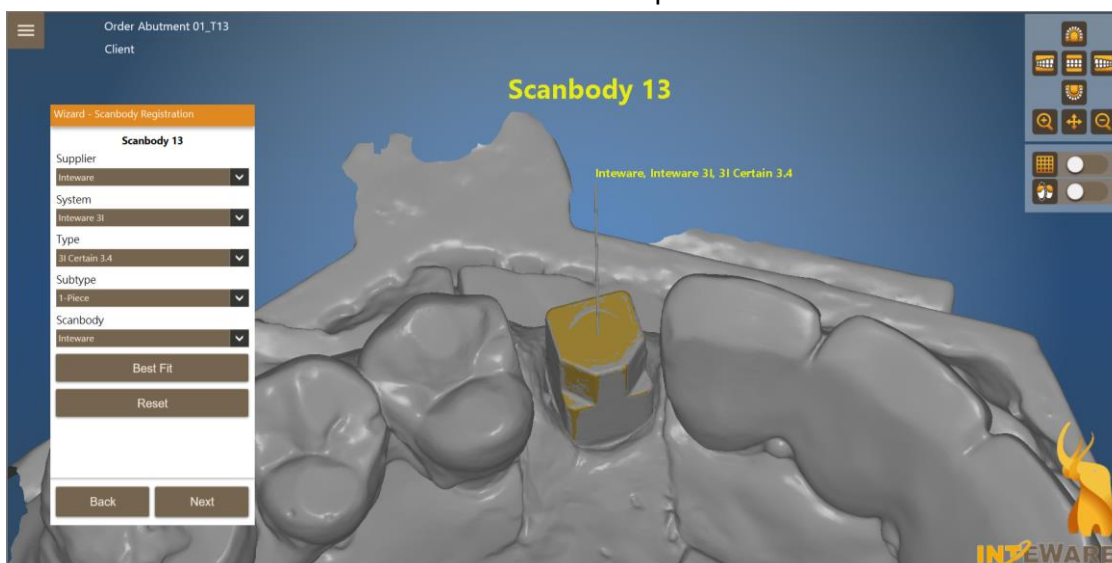


Add a matching point.



Remove the previous matching point.

3. Scanbody registration will be automatically executed. Click **Best Fit button** to fine-tune the registration result when needed. Then, click **Next** button to orient the next tooth or move on to the next step.

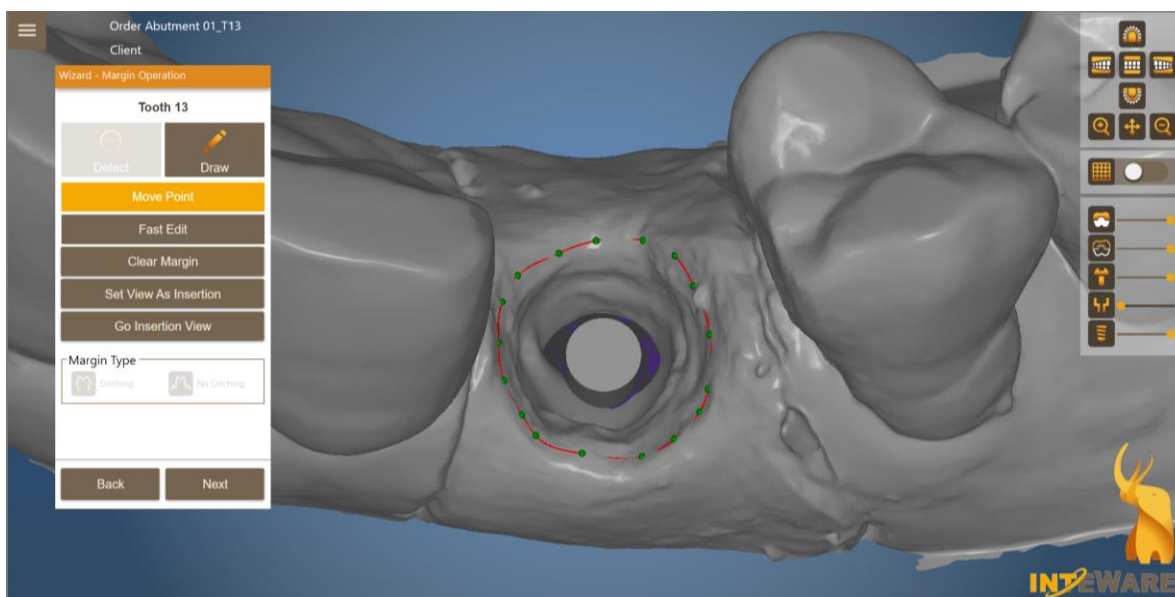


19.2 Draw Margin

When the scanbody is correctly placed, please manually draw the margin line. The process is similar to draw the margin line for the restoration. (Please refer to [Chapter 6](#)). Click **Next** button to go to the next step.



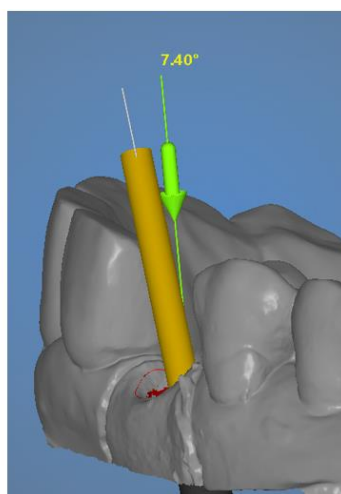
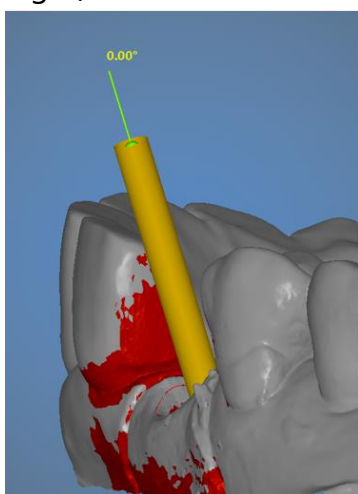
Form the margin line as a closed-loop when the last point is close to the first point.



19.3 Set Insertion

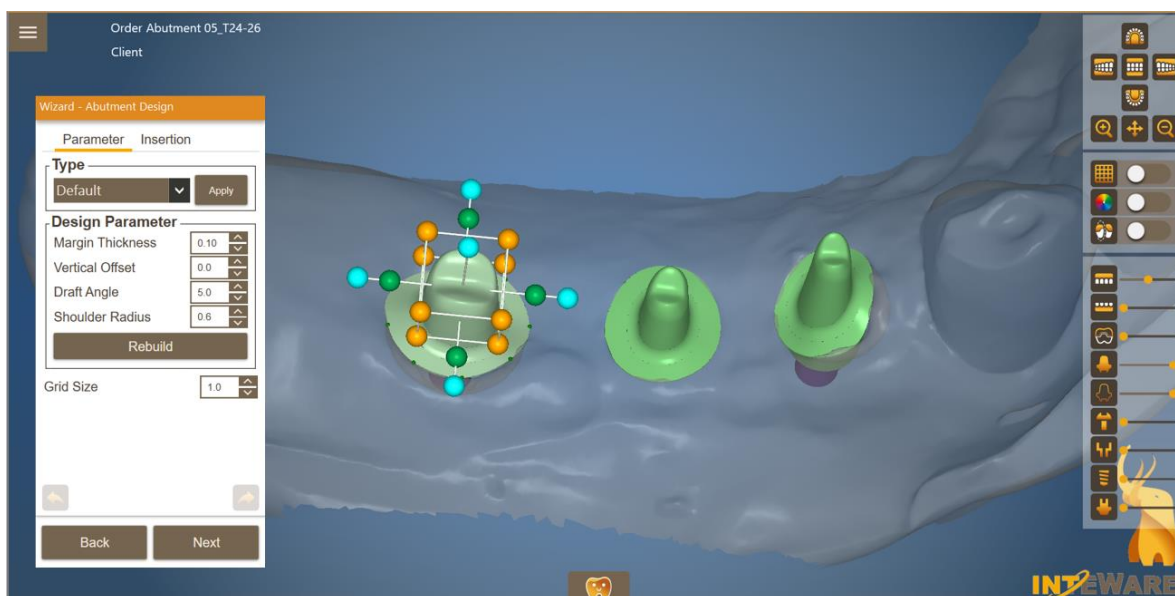
It is necessary to set the insertion for the abutments.

1. The initial insertion axis is the same as the axis of the implant (as below left).
2. The angle between the implant axis and the insertion axis will be shown (as below right).







3. After adjusting the insertion, click **Next** button to go to the next step.

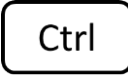



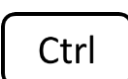

19.4 Design Abutment



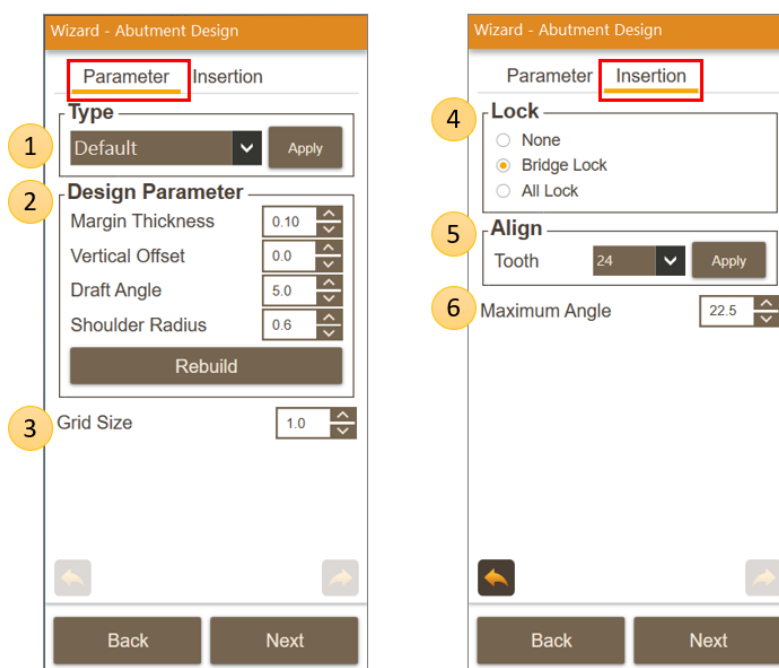
In Abutment design step, object display toolbar includes the following tools:

	Upper jaw		Inactive Abutment.
	Lower jaw		Screw
	Active coping/crown.		Screw hole channel
	Inactive coping/crown.		Implant
	Active Abutment.		Ti-base

The following shortcut keys can be used to quickly adjust the abutment.

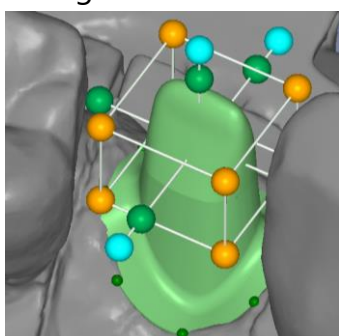
		Scale abutment by 0.1mm.
		Scale abutment by 0.05mm.
		Simultaneously moves control points around the margin area or tissue area.

The *Abutment Design* function panel includes the following functions:

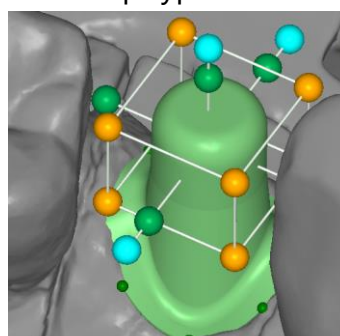


1 Type

The setting of the abutment top cap. Select the cap type and click **Apply** button.



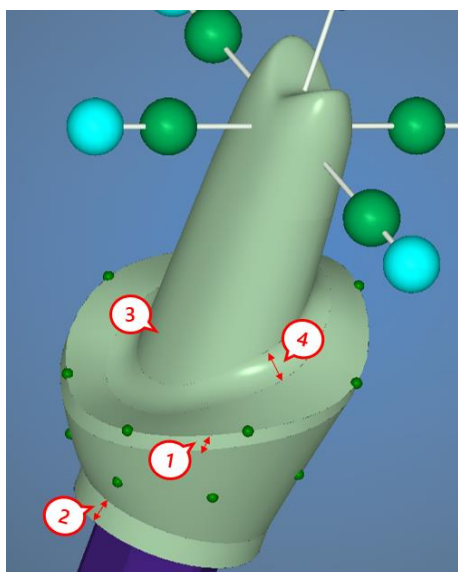
(Default)



(Cylinder)

2 Design Parameter

Margin Thickness	The thickness of the abutment margin.
Vertical Offset	The height of a vertical cylinder on the lower part of an abutment.
Draft Angle	The side angle of the lower part of the abutment top cap.
Shoulder Radius	The rounding radius of the lower part of the abutment top cap.
Rebuild	Execute the design parameter.



- (1) Margin Thickness
- (2) Vertical Offset
- (3) Draft Angle
- (4) Shoulder Radius

3 Grid Size

The size of a grid which appears when the mouse cursor is placed over a control point.

4 Lock

The Lock function is used to enable the locked abutments to have paralleled insertion direction.

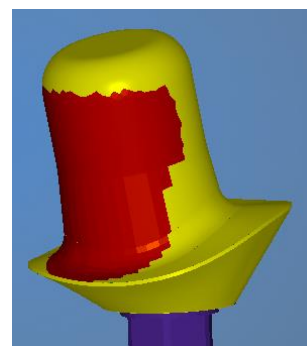
- **Bridge Lock:** Set the grouped abutments to parallel with the insertion direction of the active abutment.
- **All Lock:** Set all abutments to parallel with the insertion direction of the active abutment.

5 Align

The active abutment will be parallel with the selected abutment. Click one abutment (T24) and select **Tooth number** (T25). Click **Apply** button. T24 abutment will be parallel with the insertion direction of T25 abutment.

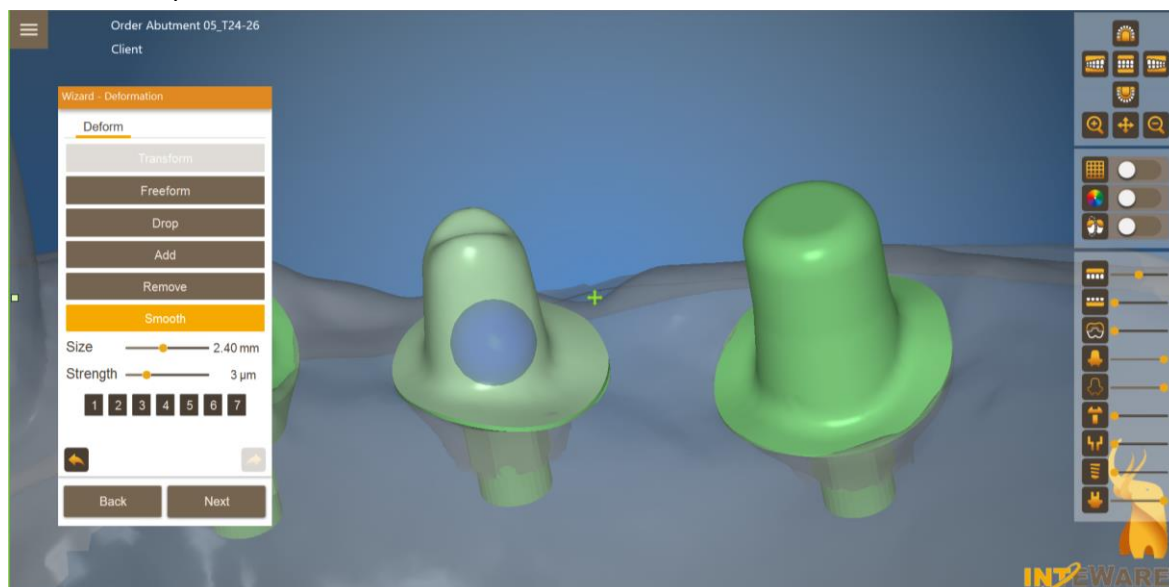
6 Maximum angle

Determine the maximum angle of the abutment. When the abutment angle is larger than the set angle, the abutment will turn into yellow as the warning.



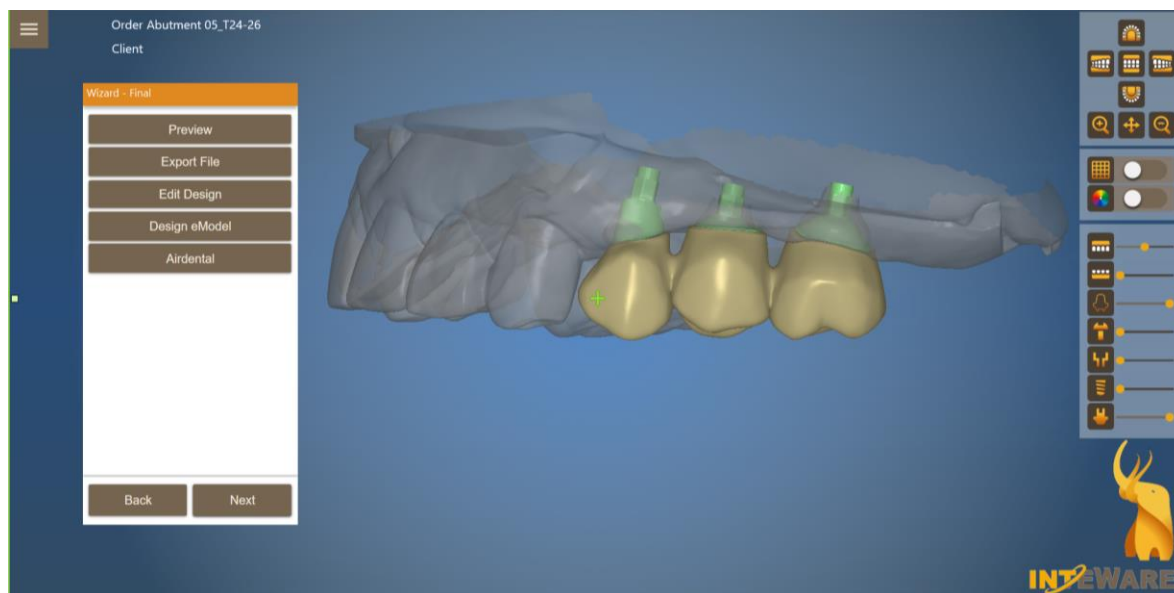
19.5 Deformation

In this step, you can make some deformation on the abutment. The deformation functions are similar to those for crowns. (Please refer to [Chapter 9.2](#) for more information).



19.6 Export

Once the abutment design is finished, you can export either the design file or CAM file.

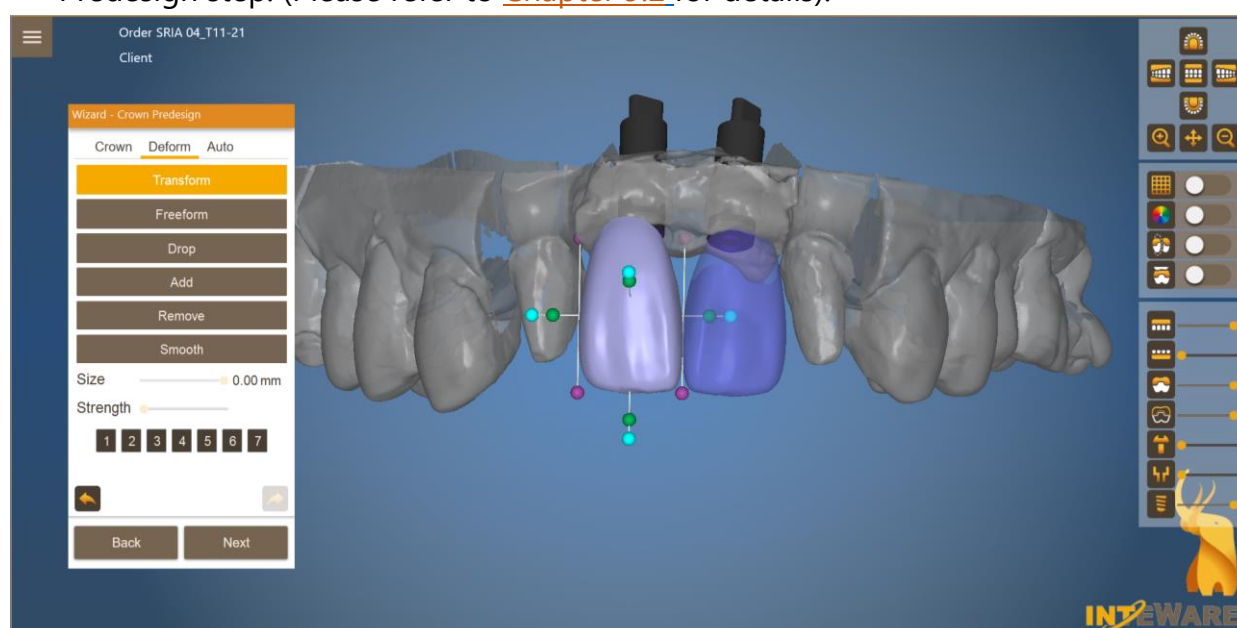


When the order is abutment with coping/crown, you will be asked whether to make a screw hole on the coping/crown after clicking **Export File** button.

20. Design Screw Retained Abutment

When Screw Retained Abutment or Screw Retained Abutment (Anatomic Crown) is the desired product, some of the design processes are different from custom abutment design. The Screw Retained Abutment design processes are explained as below.

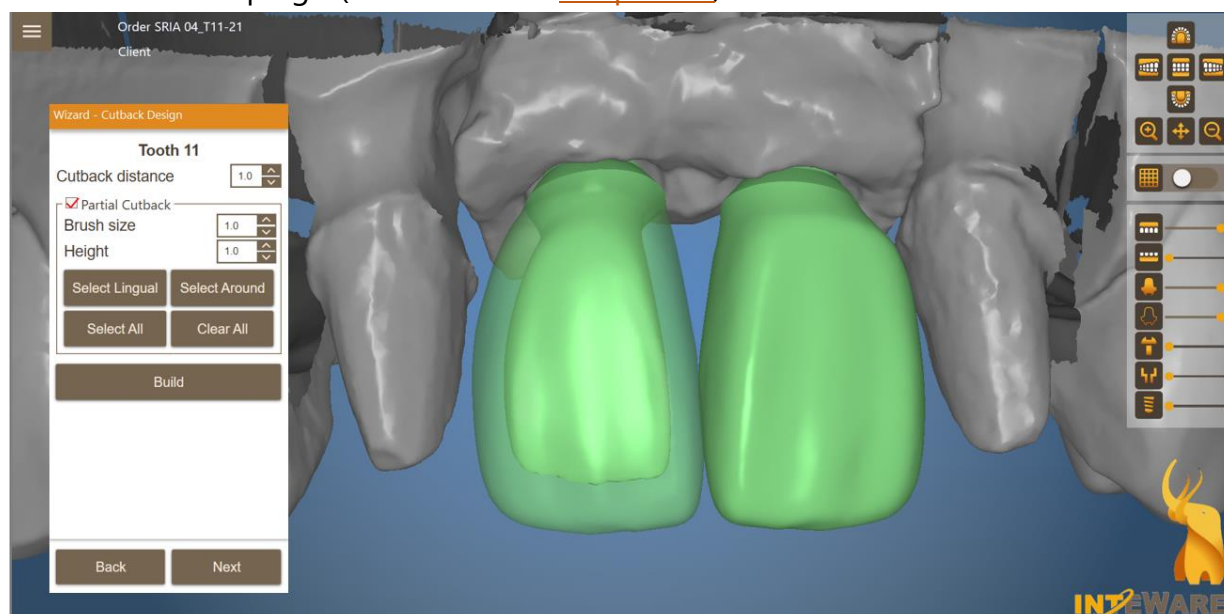
1. Design workflow before insertion setting step is the same as Custom Abutment design workflow.
2. After the insertion is set, the coping/crown needs to be designed first in Crown Pre-design step. (Please refer to [Chapter 9.2](#) for details).



- Design abutment by using green control points. Only vertical offset parameter is available.



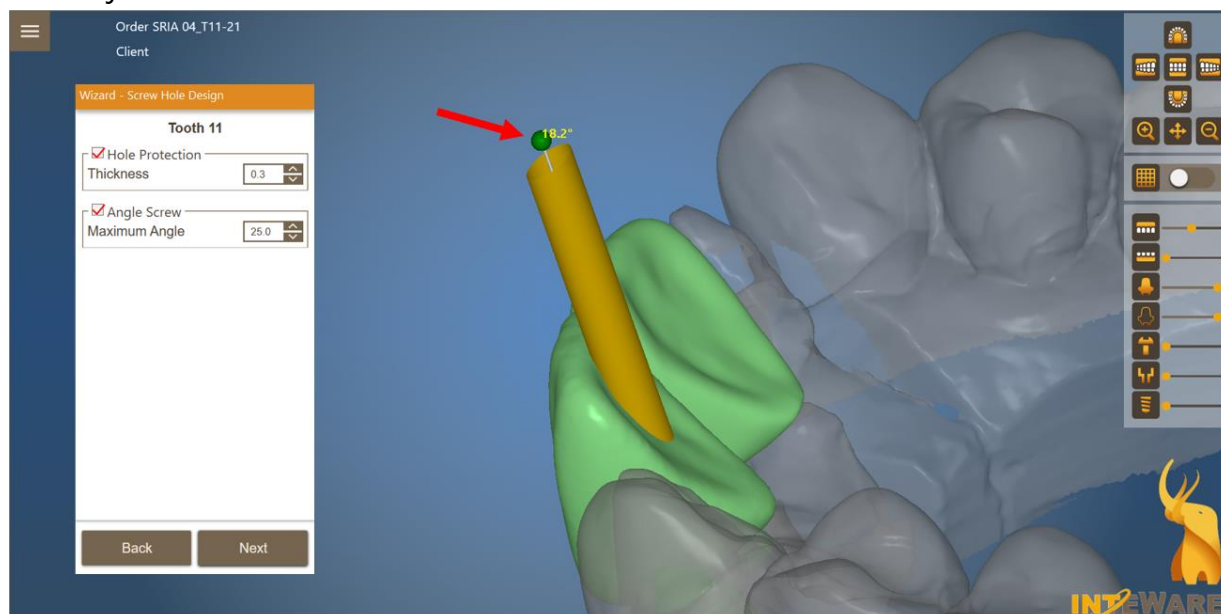
- For screw-retained abutment, the cutback design functions are similar to that of anatomic copings. (Please refer to [Chapter 16](#)).



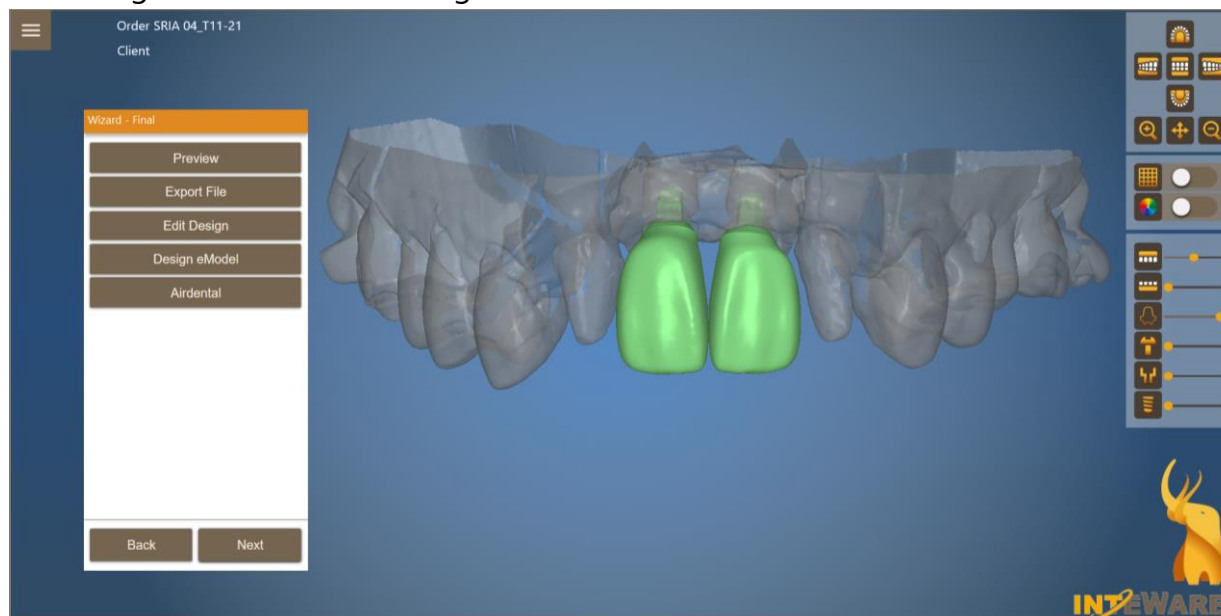
- Make deformation on the abutment when needed.
- Design connectors for the screw-retained bridge. (Please see [Chapter 12](#))

- You can tick **Hole Protection** checkbox to add a screw hole protection by entering the desired hole thickness.

When **Angle Screw** checkbox is ticked, you can drag the green control point to change the angle of the screw hole. The maximum angle of the screw hole can be adjusted.

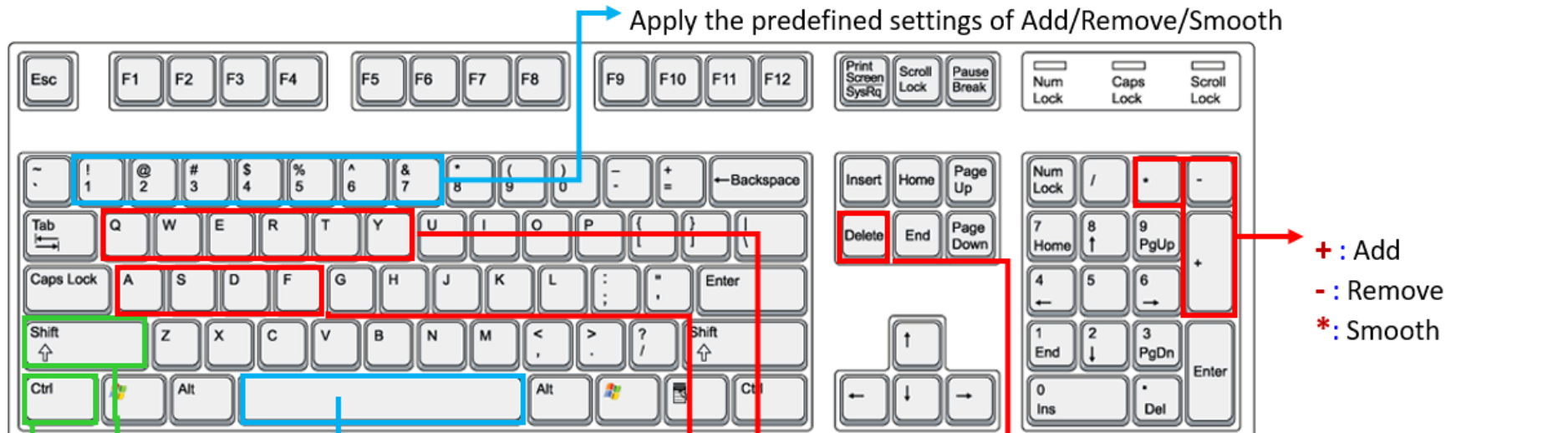


- Once the screw-retained abutment design is finished, you can export either the design file or manufacturing file.



Appendix I. Shortcut Keys List

Apply the predefined settings of Add/Remove/Smooth





+ : Add
- : Remove
***** : Smooth


Q: Transform
W: Freeform
E: Drop
R or **+** : Add
T or **-** : Remove
Y or *****: Smooth


Delete: delete the active articulator

Switch the visibility of
A: the antagonist model
S: the preparation model
D: the active tooth
F: the inactive teeth

Shift  : Move margin
 Scale crown & abutment (0.05mm)
 Change the size of deformation
 Scale attachment in XYZ axis

Shift  : Remove margin control point

Ctrl  : Move margin/Scale crown & abutment(0.1mm)
 Change the strength of deformation
 Scale attachment in XY axis

Ctrl  : Erase the marking at cutback step
 Simultaneously move points around margin or tissue area on the abutment

Ctrl+ Z: Undo
Ctrl+ Shift + Z: Redo
Ctrl+ 1~7: Save the settings for Add/Remove/Smooth



INTEWARE
Taiwan Soft Power

