Introduction

Shining 3D DentalScan EX+ User Manual V2.15

AutoScan series are specially designed to provide solution for dentistry with expertise, developed by Shining3D Tech Co. Ltd independently. The process of calibration and scan are fully automatic. Scanner brings precise 3D scanning and effective order management, providing the customers with a simple and intuitive workflow to improve the efficiency of production

The manual describes Scanner consisting of following parts

1. The Use of Fixture
2. Create Order
3. Scan Operate
4. Pre-design function
5. Scan Type
6. Occlusion
7. Calibration
8. System Test
9. Notes
10. Safety Notices
11. Contact Us

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Disclaimer

This user manual is an instruction for installation, operation, and maintenance, but not product warranty. All efforts have been made to ensure the accuracy and completeness of the information in this manual. However, Shining3D Tech Co., Ltd. accepts no responsibility for any errors or an omission contained in the documentation and reserves the right to explain and revise the publishing and fault of this manual. The information in this manual is subject to change without notice.

Shining 3D Tech Co.Ltd.

1. The Use of Fixture

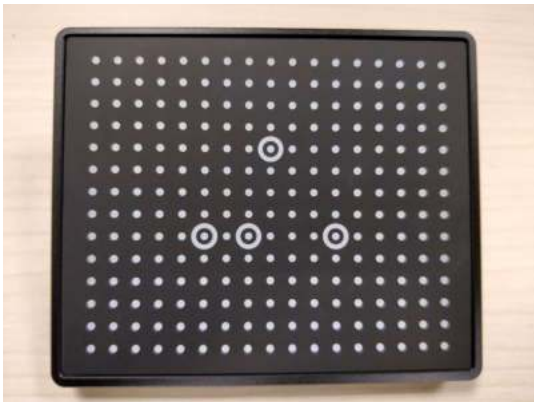
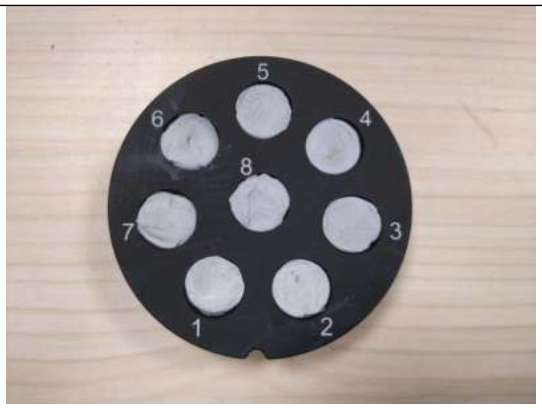
The fixtures will be used to fix model, models in occlusion and die(s), etc. The details of fixture are as follows.

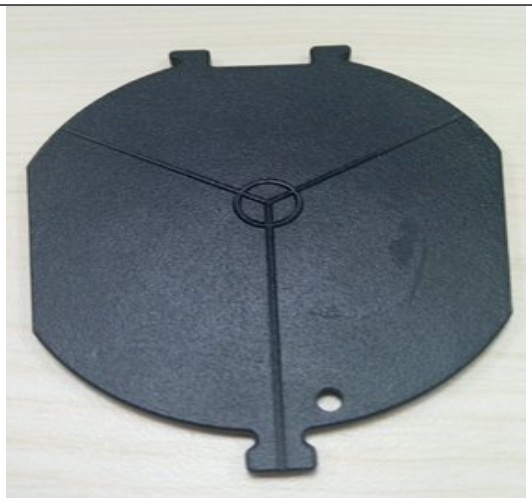
1. The fixture of Calibration plate

2. Model fixing fixture
3. The fixture of die
4. Height adapter
5. Fixing of articulation transfer fixture
6. The fixture of dental model
7. Fixing targets fixture

Accessories

uantity	Picture	Usage
1		To connect scanner and compu
1		To power ups
1		To provide power

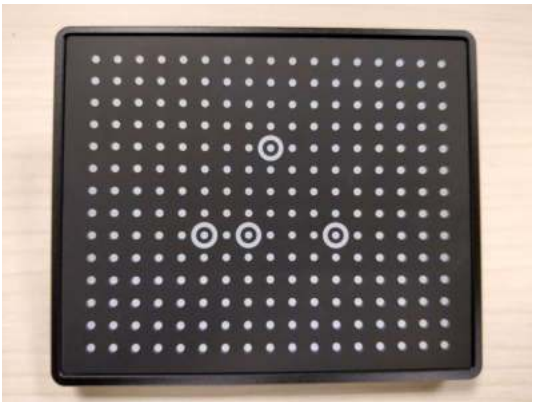
1		To run software
1		To calibrate scanner
1		To calibrate White Balance
1		To scan die(s)

1		To scan upper and lower quar jaws and dies
1		To scan arch (use blue-tack arch on it)
1		To scan occlusion (see below for how to place models)

1		To scan articulator-mounted
1		To scan articulator-mounted
2		To scan dental arch

1		To scan impression
1		For calibration, die(s) scanning and dental arch scanning. Placed directly or scanner’s rotation base
1		For articulator scanning
1		Pad for dynamic articulator

1.1. The fixture of Calibration Plate



Calibrate plate

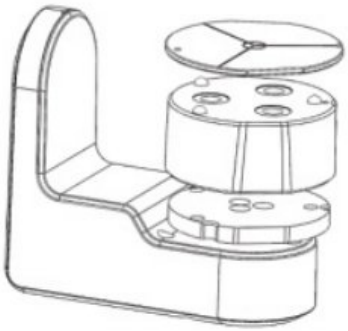
The fixture of calibration plate: align the No. 1 hole at the base of calibration plate with the No.2 hole on the rotating table.

1.2. Model fixing fixture

Front side

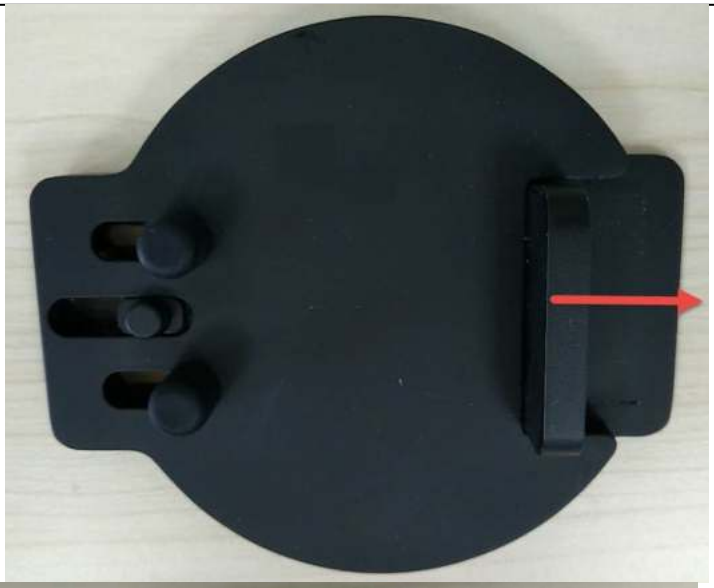
back side

Model fixture fixing: Align the No.1 hole on the fixture with the No.2 hole on the rotating table.



Fixture of DS-EX+:

(1)Following the direction of the red arrow, push the plaster model to the edge until it is fully inserted

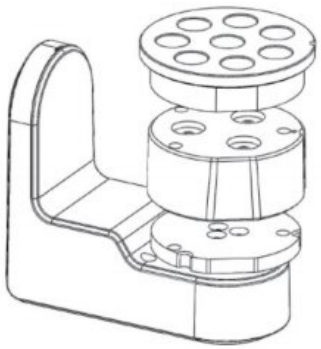


(2)Take Amann Girrbach plaster model for example, it shall be fine when the transfer plate and the plaster model are overlapped at the circled area as below.

1.3. The fixture of Die

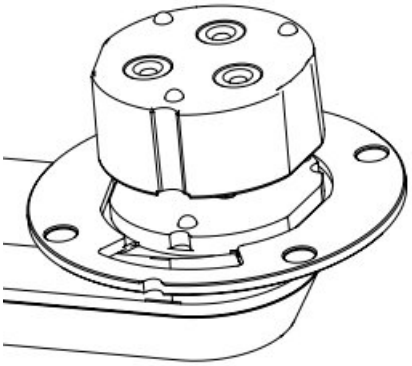
clamping

(1) **The fixture of tooth die:** Align two arrows on the die tray and rotating table, as well as hole 1 and hole 2.



1.4. height adapter

height adapter: it can be applied in following processes(calibration, die scanning, upper jaw and lower jaw scanning of non-articulation transfer order)



Static articulator scan pad: use it during static bite scan. See Artex articulator below as an example:

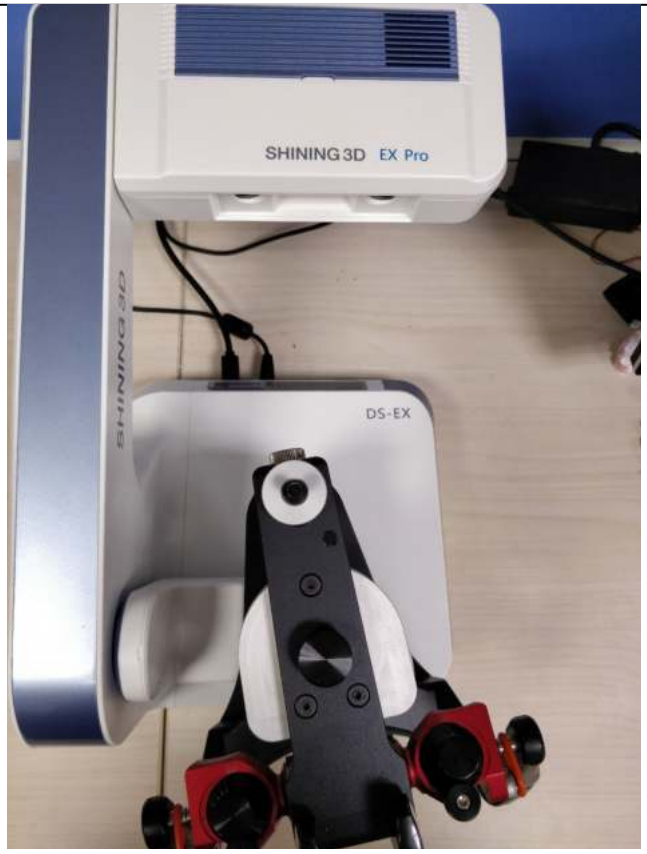
Place the articulator onto the scanner as below picture:

Front view

Bird’ s eye view

Dynamic articulator scan pad: it is used for dynamic articulator scan process, see Corident articulator below as an example:

Place the articulator onto the scanner as below picture:



Front view Bird’s eyes view

1.5. The fixture of dental model

(1) **The fixture of dental full arch :** Place full arch model on the plate, fixing by rubber band, blue-tack or screw depends on dental models and model fixing fixture came with the scanner, shown as the images below.

The model fixing fixture came with the scanner, shown as the images below.

(2) the fixture of the quadrant arch：Fix the quadrant jaw with blue-tack, shown as the figure below.

(3) **The fixture of occlusion：**Use rubber band or wax to fix upper arch and lower arch in occlusion, and fix them by using blue-tack or screw on the plate, please see images below

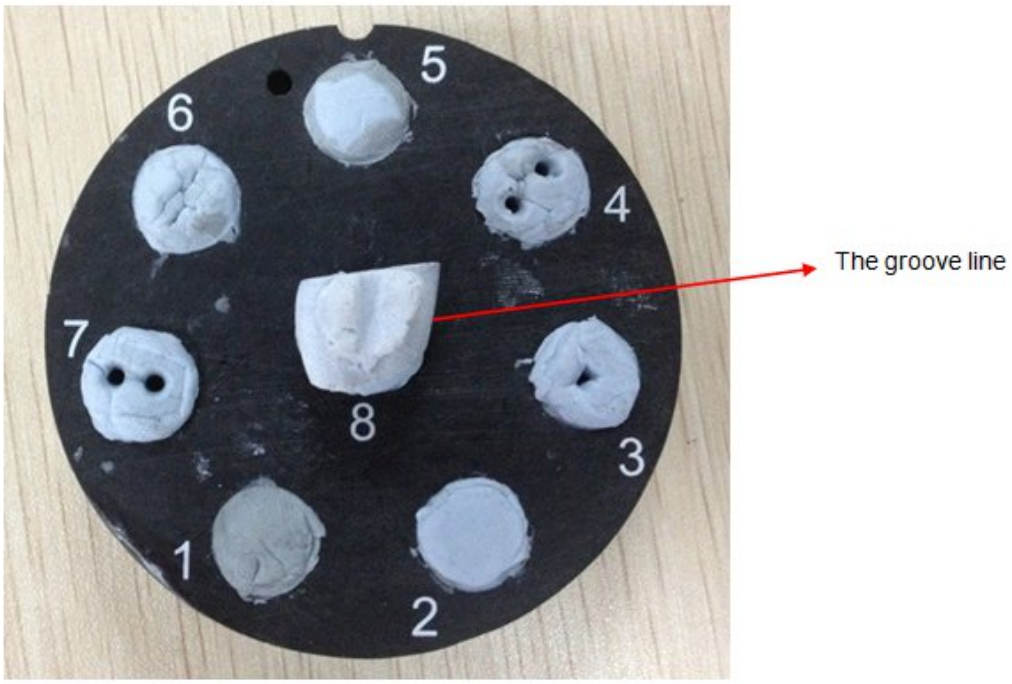
(4) **Impression Fixture**

4.1Fix the fixture

The impression fixing fixture came with the scanner, shown as the images below.

(5) **Die Fixture:** insert the teeth into the hole of blue-tack.

(6) **Inlay fixture:** in order to scan the inlay completely, when make sure the groove line on the inserted inlay is in line with the straight line between hole 5 and hole 8.



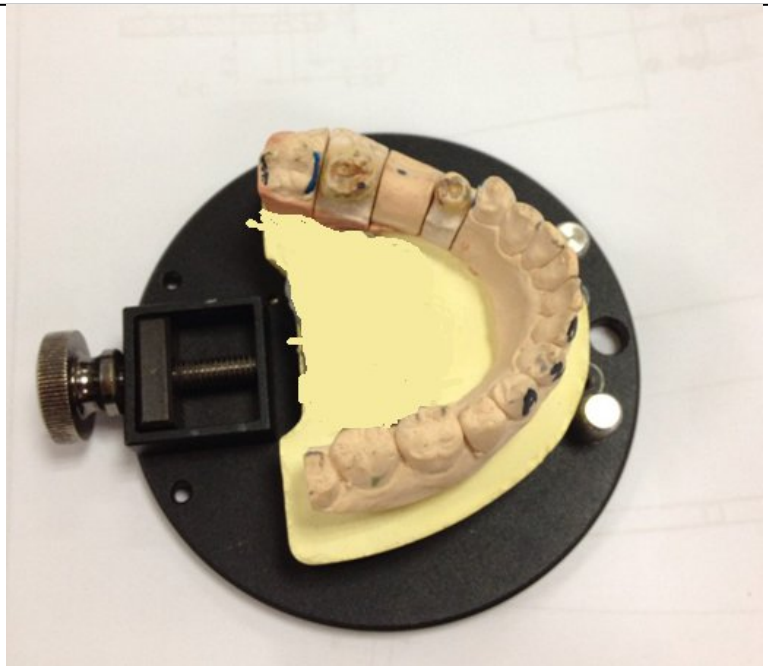
(7) **Implant model fixture**: it includes fixing the teeth model with scan pole and fixing teeth model with gum.

Clamping tooth model with scan pole

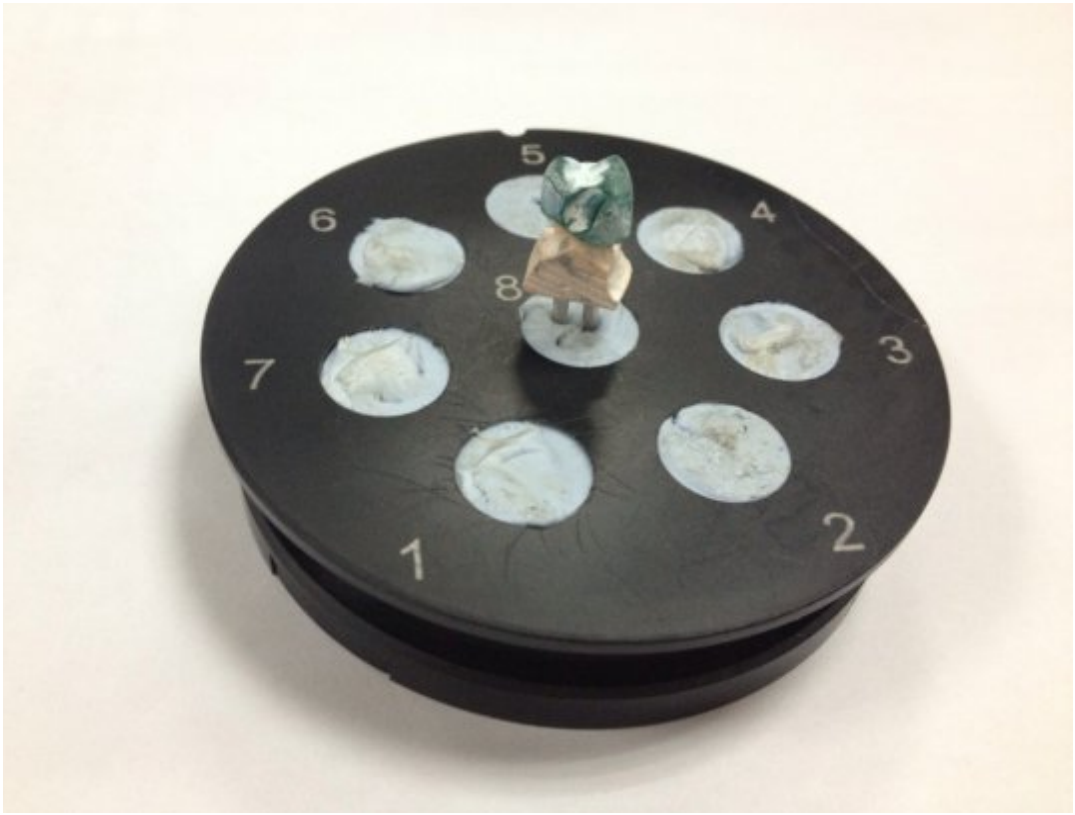
（8） **waxup fixture**

8.1Partial arch

8.2Full arch



8.3Die with waxup



2. Create Order

User have to calibrate the scanner before perform any scanning, otherwise message will pop-up.

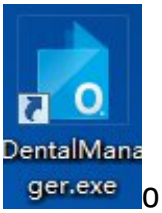
To launch calibration, user could open DentalScan.exe software and click icon , or Click "Start "of Windows, locate DentalScan >Calibration.Please refer to chapter "Calibration" for more information.

AutoScan offers three methods to create new order, the scanning process is the same yet no matter how the order is created.

1.Create order from DentalManager.exe
2.Create order from exocad DentalDB

2.1. DentalManager

DentalManager is consist of two parts:1. Order Information 2. Settings

User could open DentalManager by clicking icon 

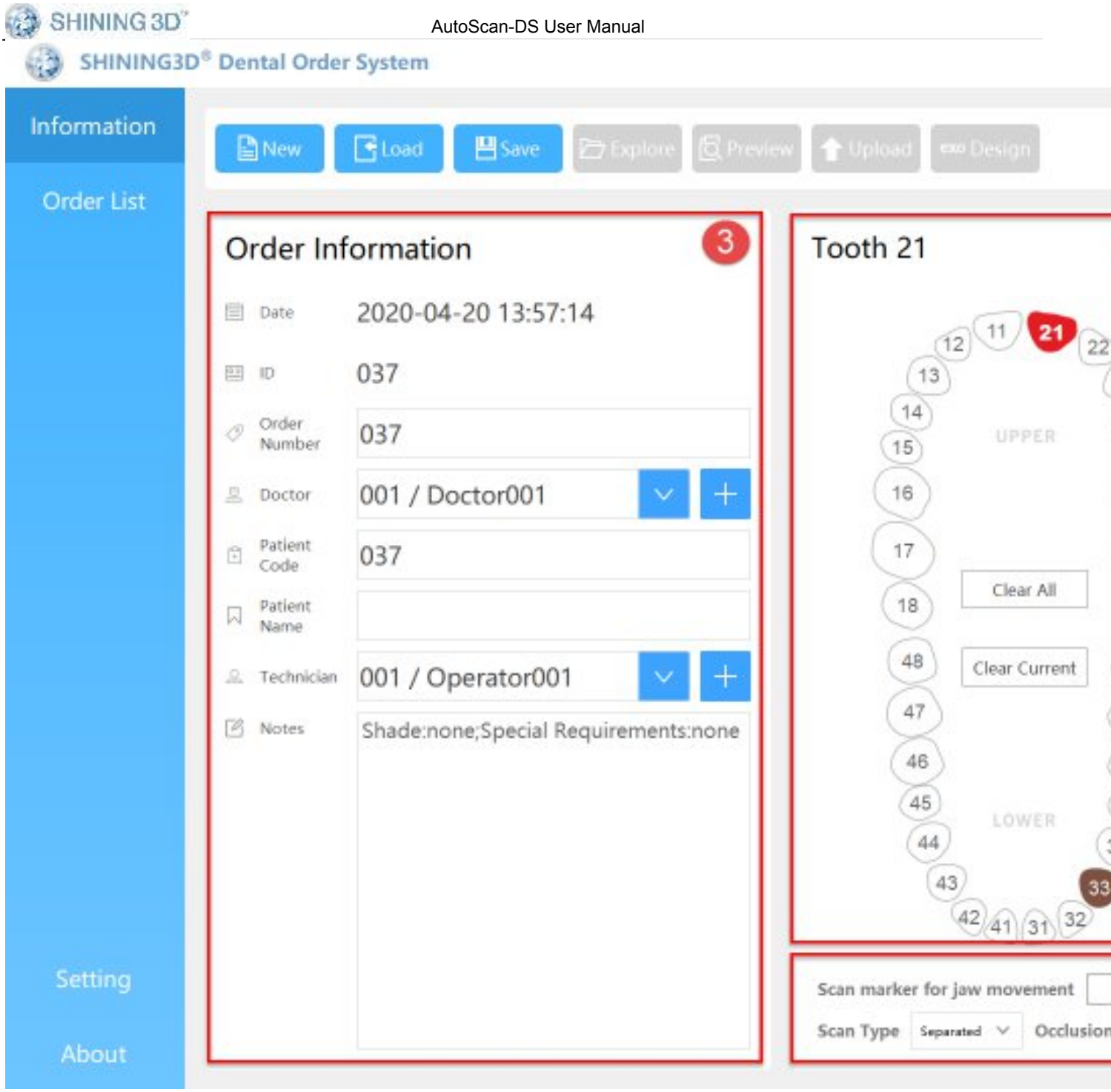
on desktop or from "Start"of Windows> DentalScan >DentalManager

2.1.1. Order information

The order is divided into three modes according to different user requirements:Patient mode,Multidie mode,Clinic mode.

2.1.1.1. Patient mode

Select "patient mode"as shown in the picture below.



① Customer service: contact after-sales personnel & connect with support via TeamViewer

② Calibration: calibration software

③ Order Information: for user to edit order number and fill in information such as doctor,patient,technician, notes, etc.

④ Tooth Notation

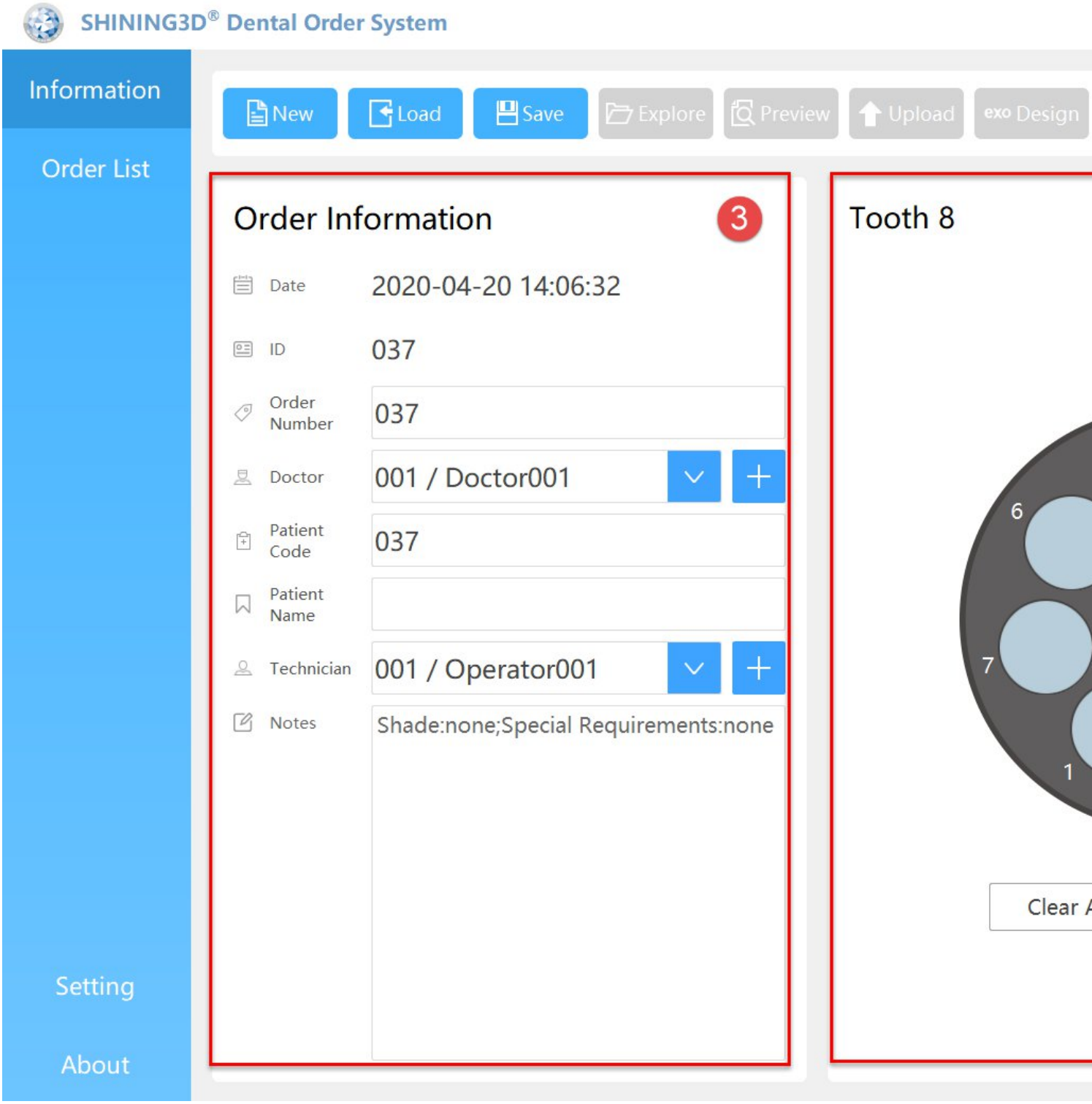
⑤ Scan Type and Occlusion Type

⑥ Restoration

⑦ Other information

2.1.1.2. Multidie Mode

Select “multidie mode”as shown in the picture below.



① Customer service: contact after-sales personnel & connect with support via TeamViewer

② Calibration: calibration software

③ Order Information: for user to edit order number and fill in information such as doctor,patient,technician, notes, etc.

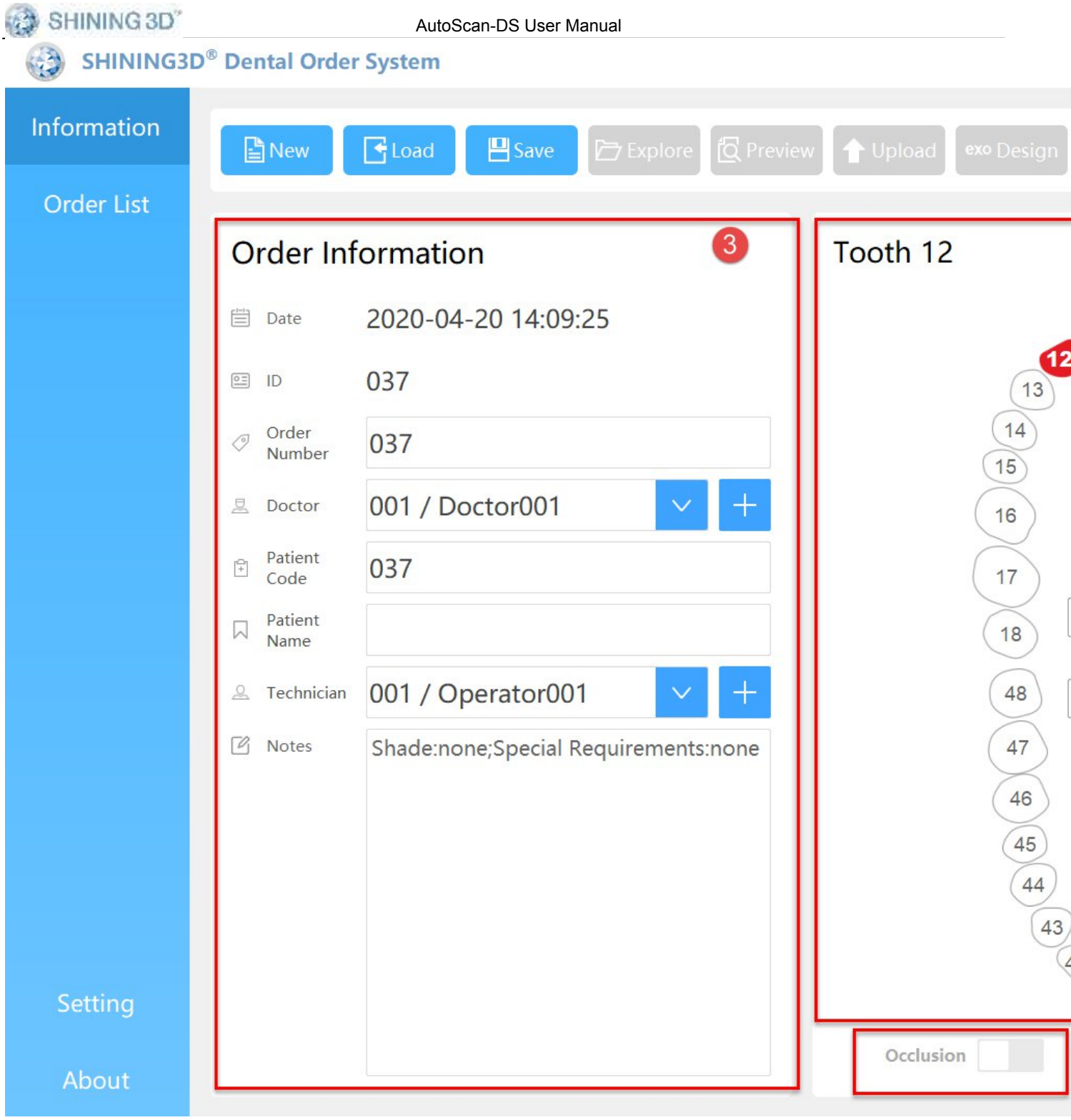
④ Die Plate

⑤ Restoration type

2.1.1.3. Clinic mode

Find "device type" under "Setting" button, select "clinic", click "Apply" button, then the following interfaces pop up, for separated/impression/Non separated model.

Separated model:



① Customer service: contact after-sales personnel & connect with support via TeamViewer

② Calibration: calibration software

③ Order Information: for user to edit order number and fill in information such as doctor,patient,technician, notes, etc.

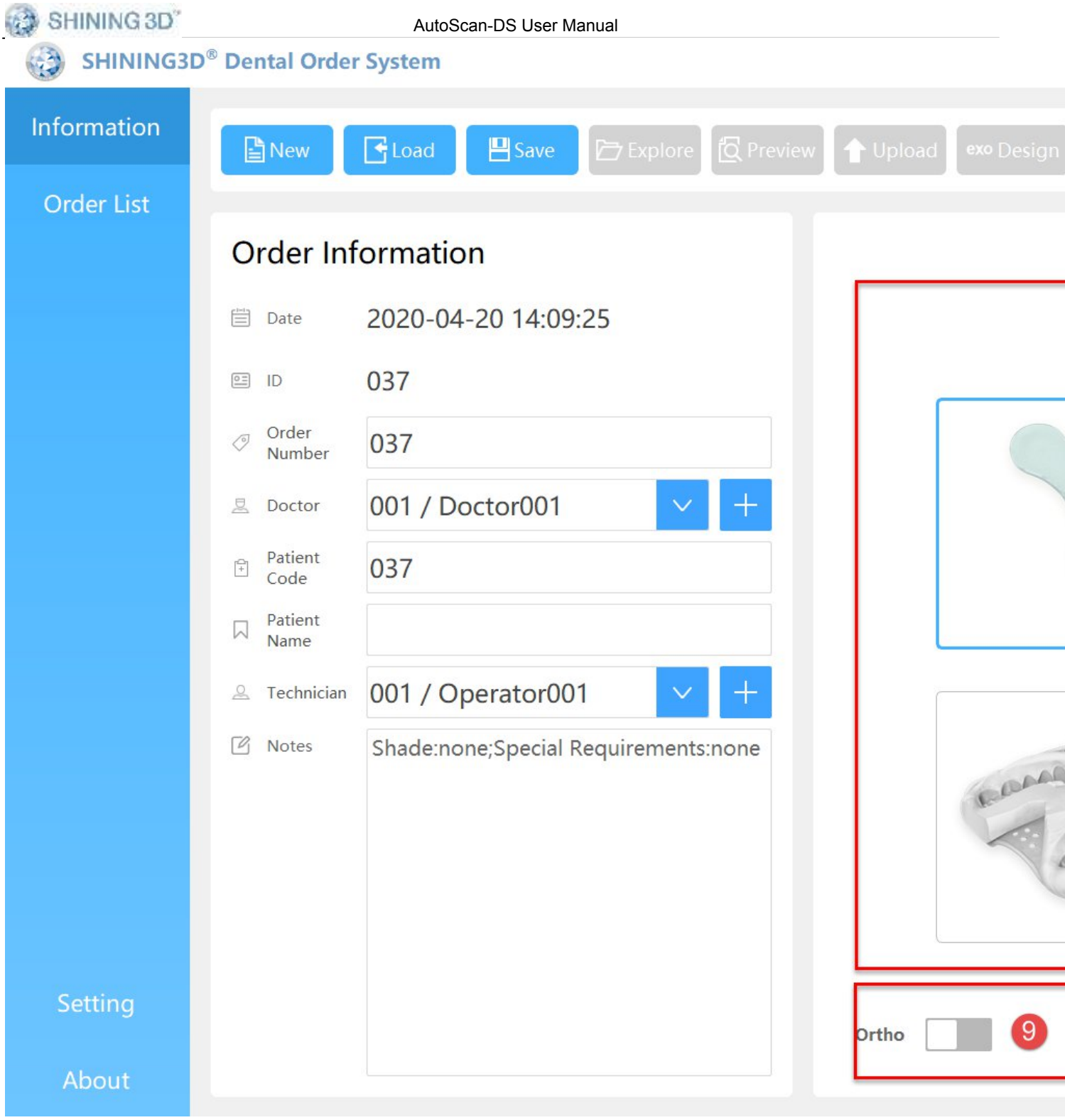
④ Tooth notation

⑤ Restoration type

⑥ Bite option

⑦ Materials and parameters

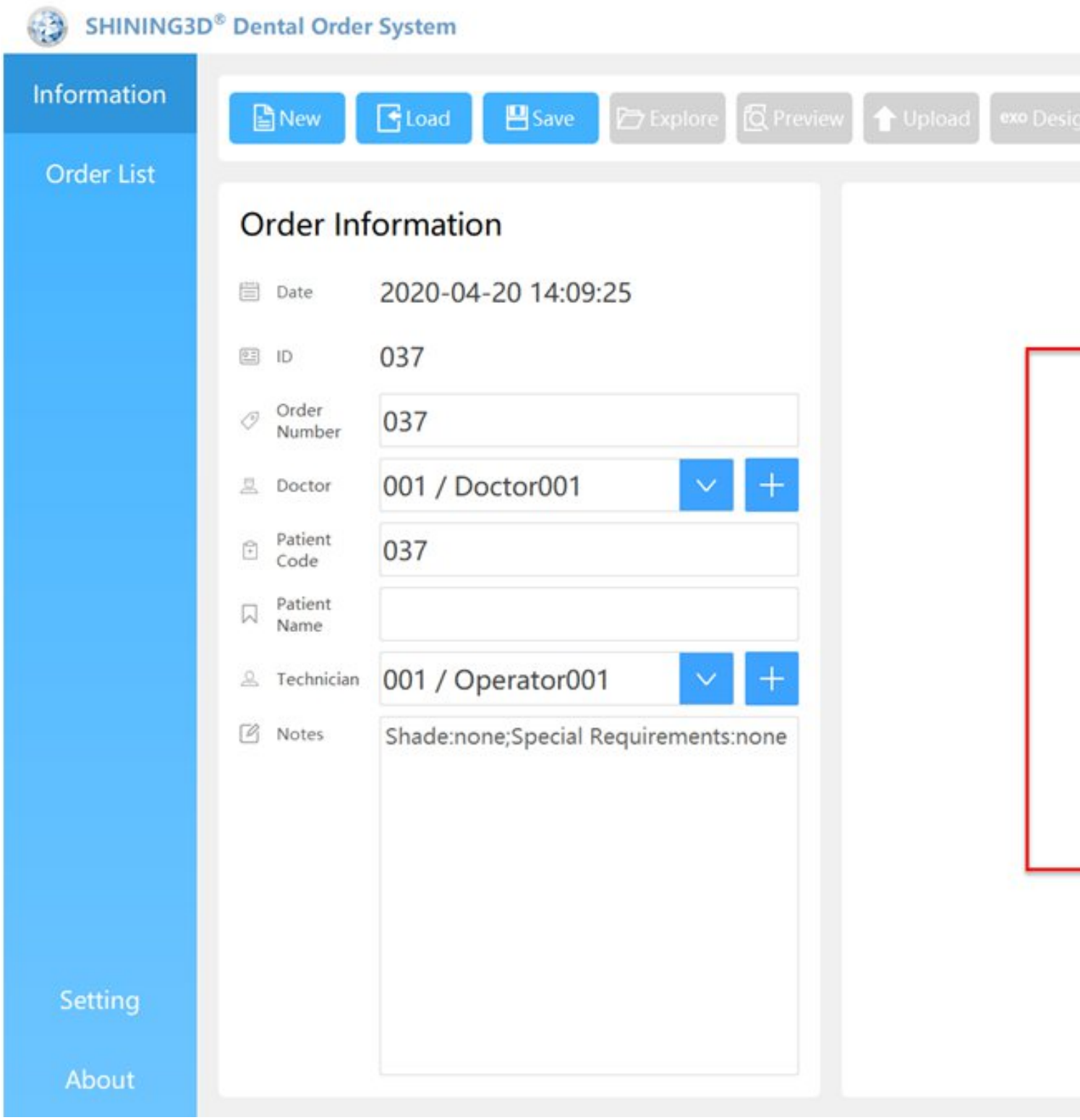
Impression



⑧ Scan type: single arch impression, wax bite, plaster stone.

⑨ Orthodontic option: scan data can be integrated in design software if it is ticked.

Non-separated model



⑩ natomy diagram

⑪ Free scan: jaws can be switched during process.

Notes：

How to check tooth definition： Right click on tooth and select

restoration type.

How to copy a defined tooth information：Choose a defined tooth first, press Ctrl and click another tooth you want to apply the same settings

How to copy tooth information: Select tooth with set information and click new tooth.

Attention: click spare part of tooth notation will cancel the current information.

After user create a new order, fill order information, define teeth and click Save, the Scan button will be available, now user can perform scanning by clicking Scan.

2.1.2. Order data share

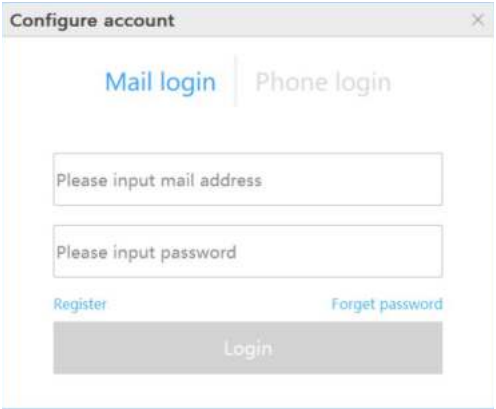
2.1.2.1. Private Cloud

Dental cloud aims to connect labs and clinics, which allows users to manage their information with parents.

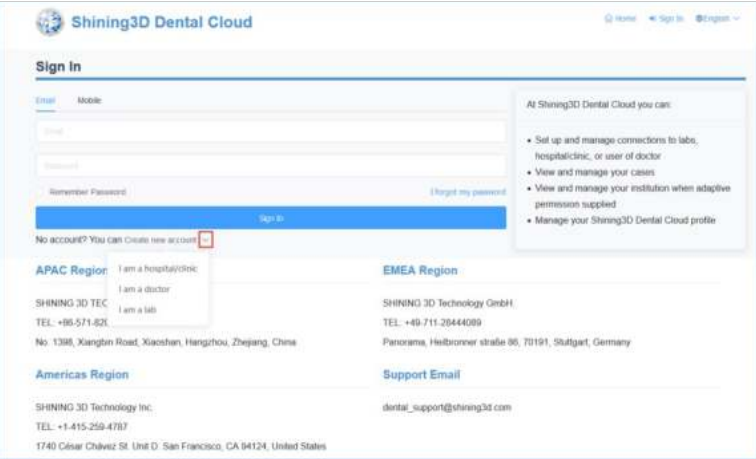
Please go to http://dental.shining3d.com

2.1.2.2. Account registration

To register for the dental cloud account, click the “Register” link to go to the dental cloud website. It is recommended to open the dental cloud website using browsers such as Chrome, Firefox, and Safari.



Click “Login” in the top right corner of the homepage to open the login page.



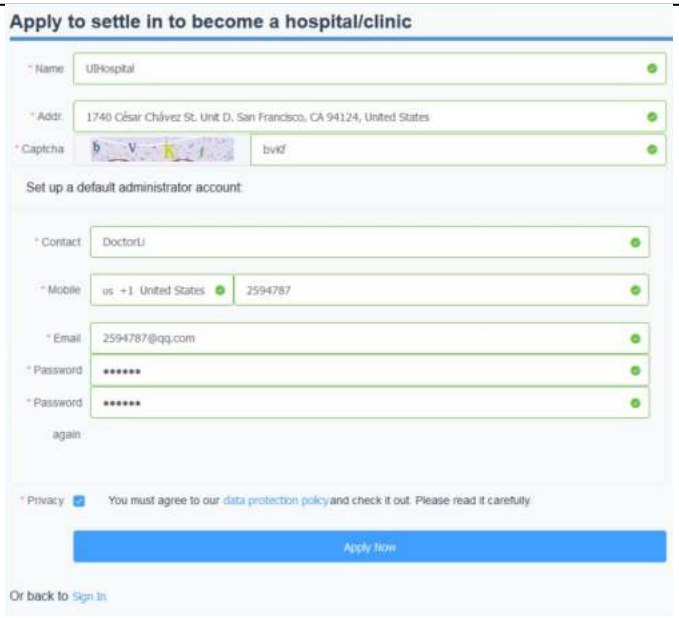
"Create new account", select the registration type.

🎧 🎧I am a hospital/clinic: register as a hospital/clinic institution and administrator. After registration is successful, you need to wait for the system administrator to review before you can log in.

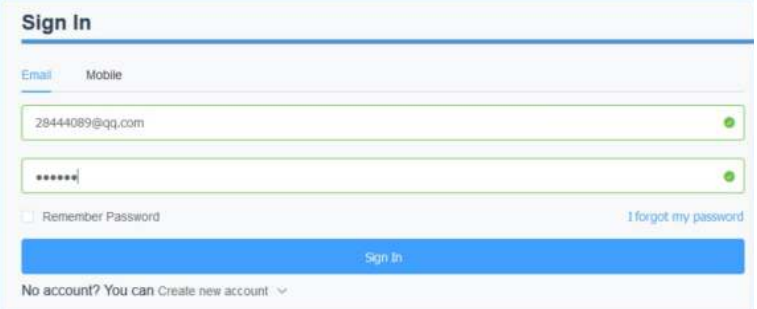
🎧 🎧I am a doctor: register as an individual user. You can log in directly after registration.

🎧 🎧I am a lab: register as a dental laboratory and administrators. After registration is successful, you need to wait for the system administrator to review before you can log in. Note that this type of account can only be used on the web side and cannot be used on the desktop client.

Fill in the real application information as required (the notification of information such as the relationship network and order status will be sent to the mobile phone number and email address filled in the application)



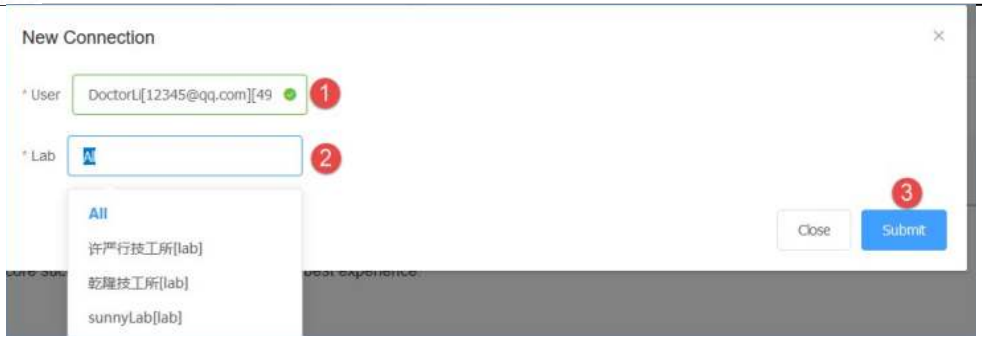
After the registration is successful, the page automatically jumps to the login interface, enter the mailbox or mobile phone number and password, you can tick “Remember Password” for subsequent quick login.



After the login is successful, the hospital, clinic or doctor's account can establish a network connection with the partner technical institution (i.e. add a lab)

2.1.2.3. Networking

The network can only be created by a doctor/hospital/clinic account and then the lab can accept or reject the connection. The doctor can only upload the order data to the laboratories that accept the connection. After logging in as a hospital, clinic or doctor account, select “Relational Network” in the upper right corner of the interface to create a new network.



① User: Select the user

② Lab: Select a partner lab from the drop-down list

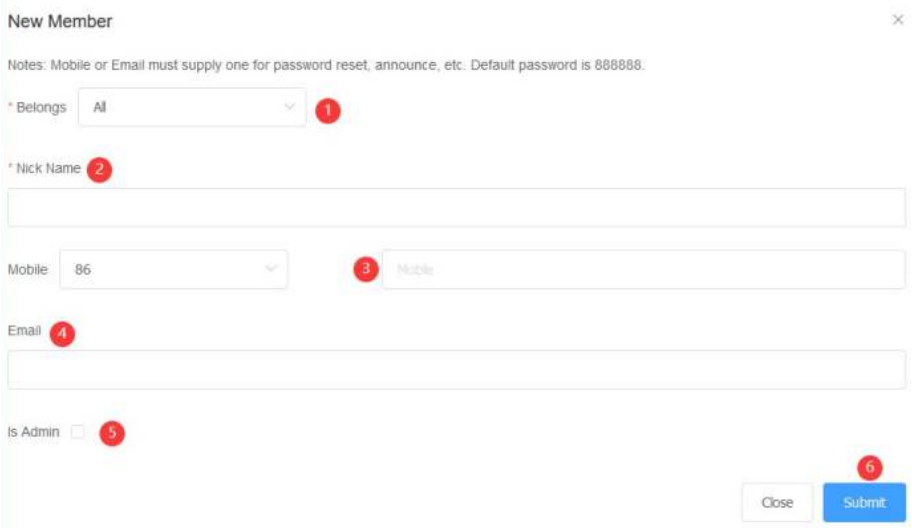
③ Submit: Submit the newly created network

The submission is successful and is displayed in the page list. The relationship status of the newly created relationship is “to be confirmed”. You need to wait for the lab to accept the confirmation (the relationship status is “active”), and only after the relationship is confirmed by the lab can clinicians the data.

2.1.2.4. Institution management

Institution administrators can add / remove members for this organization.

After login, select “Admins” ->“Members”, and create a new administrator and ordinary members for the institution.



① Belongs: Select the name of the institution.

② Nick Name: Member nickname.

③ Mobile: The mobile number of this member. It is also the account of the mobile phone user. The default password for login is 888888. You can either fill in the mobile phone or mailbox.

④ E-mail: This member's e-mail. It is also the account of the e-mail user. The default password for login is 888888.

⑤ Is Admin: Set the member as an administrator. The default is No.

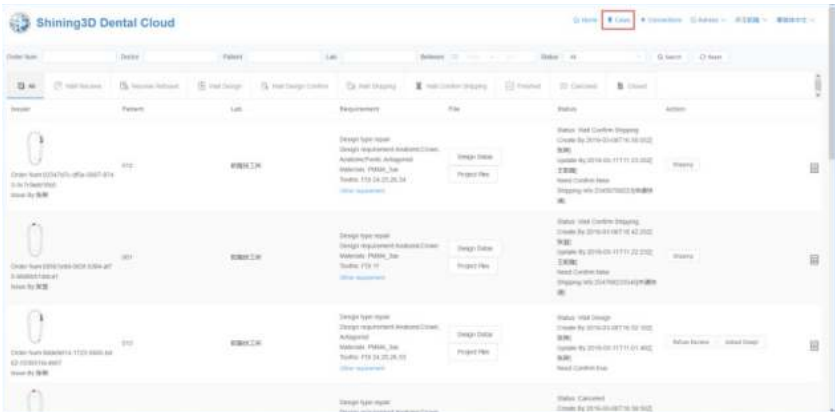
⑥ Submit: Fill in the information and the member is added successfully.

Remove members:

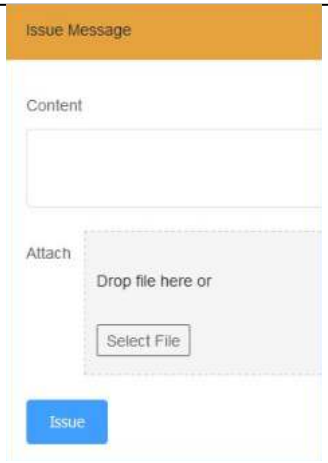
Select the member to be deleted, select the "Delete" button, and confirm the deletion.

cases Management:

After login, select "Case" in the upper right corner of the page to list all cases managed by this member.

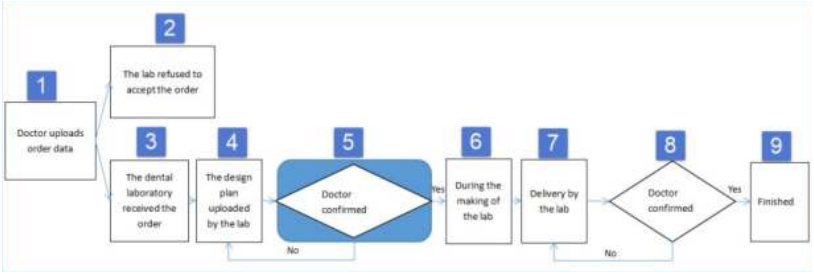


Doctors and technicians can communicate instantly on the web page, select to expand the communication box, transmitting information or documents.



2.1.2.5. Order status

The order is transferred between the hospital (clinic/doctor) and the laboratories, and the two parties cooperate to advance the entire process from visit to completion of treatment. The doctor operates in the client Dental Manager Pro, and the lab operates on the web page side. The most common workflow for uploaded order is as follows:

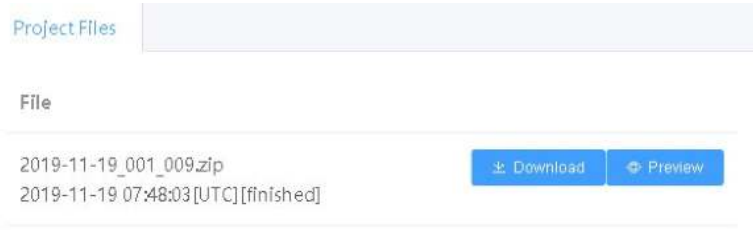


Brief introduction to the workflow:

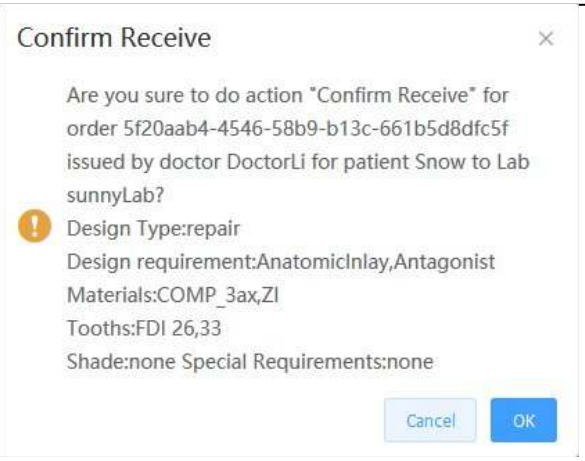
(1) Doctor uploads order data: see the previous section for details.

(2) The lab refused to accept the order: the technician of the lab refused to accept the order.

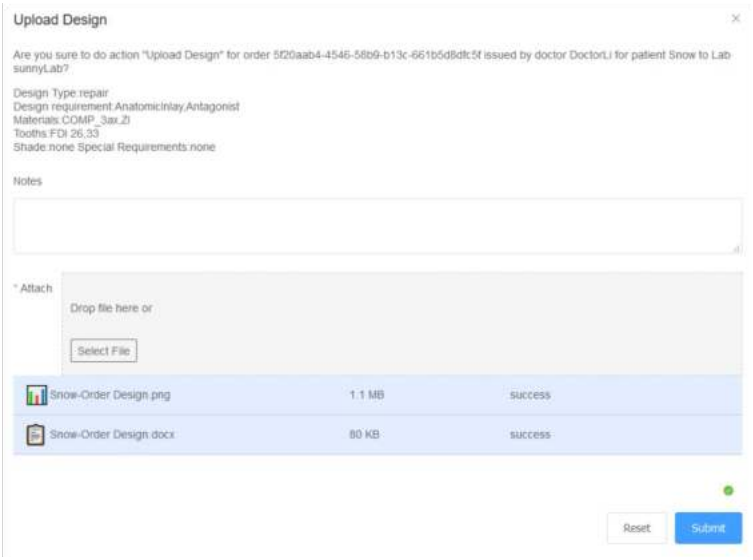
(3) The lab received the order: the technician of the lab can download or preview the order data.



The lab confirmed the order.

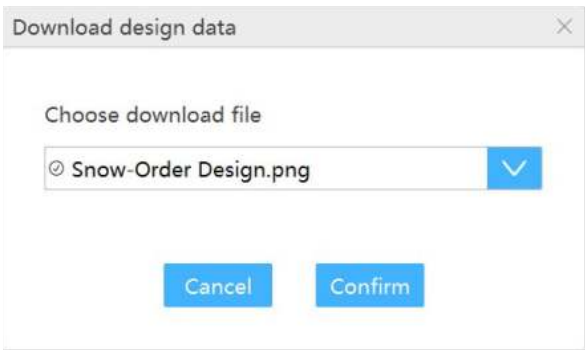


(4) The design plan uploaded by the lab: the technician of the lab uploads the design plan, including the documents and data.



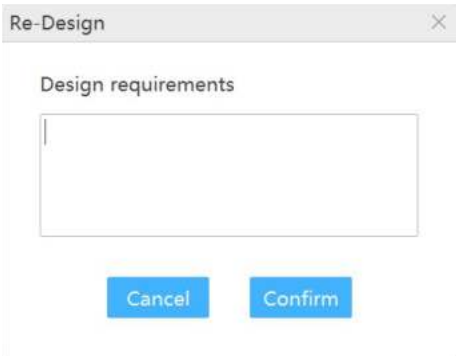
Select the file to be uploaded. After the file is uploaded successfully, click Submit.

(5) Doctor confirmed plan: After the technician uploads the design plan, the order status is “Need Confirm Design”, and the doctor can download the design plan in the client Dental Order System.



The design data is saved by default in the DesignData folder of the

order catalog.The doctor can approve the design plan by clicking “Confirm Design” and the order status will become “Making”; if not approved, the doctor can click “Request Re-design”and make clear the design requirements, and the order status will become “Accepcted”, which requires the lab to redesign and upload the plan.Then the doctor can check the plan again.



the doctor chooses not to review the design when uploading data, skip this process.

(6) During the making of the lab: After the doctor confirms the design plan, the order status is “Making”, indicating the processing data of the lab.

(7) Delivery by the lab: The data processing is completed in the lab, and the logistics information is submitted and the goods is delivered. The order status is “Delivering”.

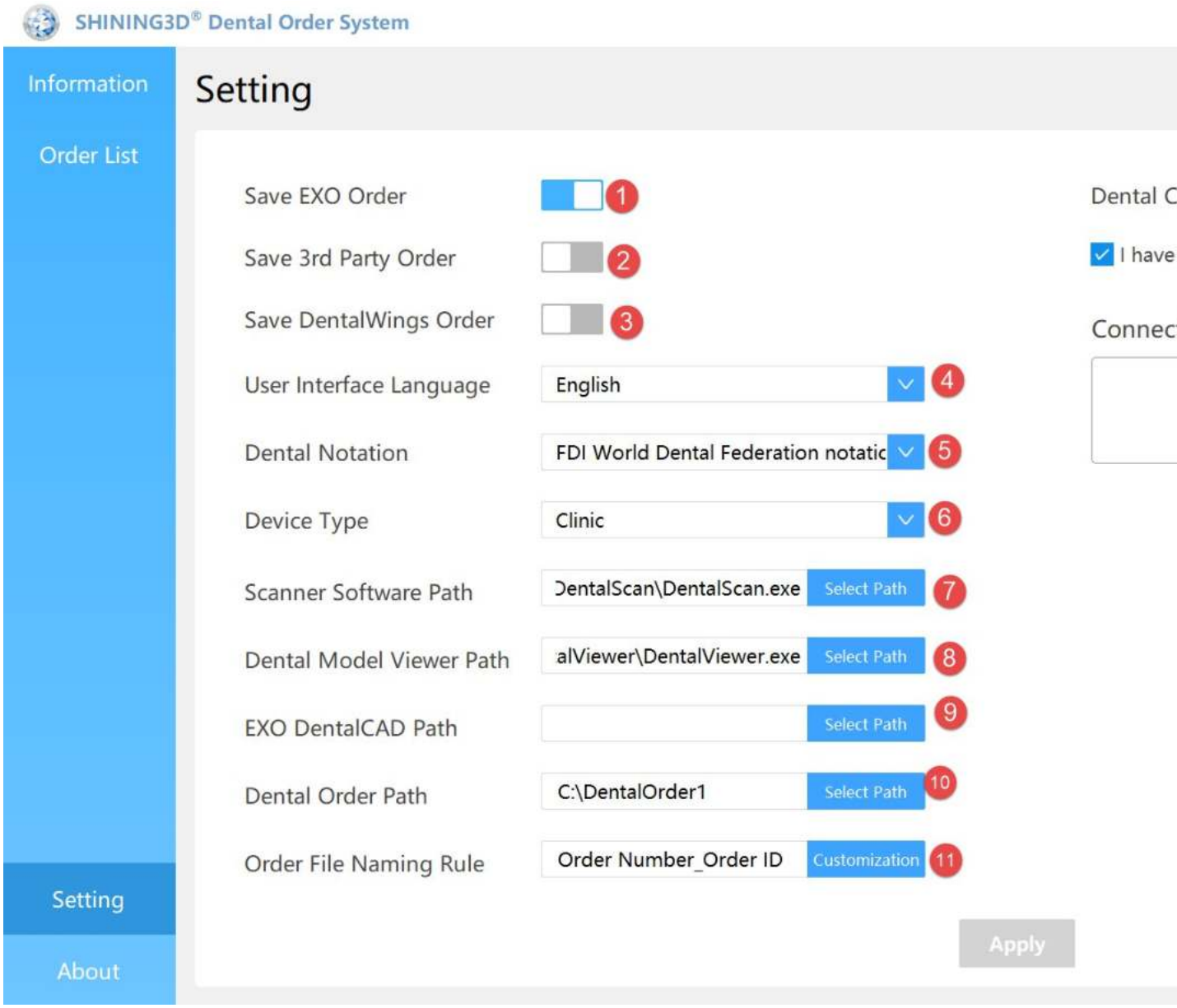
(8) Doctor confirmed the receipt: After the lab delivers the goods, the doctor can view the logistics information, and confirm the receipt after receiving the goods. The order status is “Finished”. If the doctor does not receive the goods or the goods have problems, the doctor can request a re-delivery, and the order status is “Wait Shipping”. In this circumstance, the lab needs to re-deliver the goods, and the doctor can

confirm the receipt after receiving the goods.

(9) Finished: This order is completed

2.1.3. Settings

User can check or configure settings by accessing Settings button.



① If enable this option, exocad dentalDB can import the order directly,The default setting is active.

② If enable this option,3rd party software can import 3D data with preferred orientation.The default setting is inactive.

③ Save DentalWings order: If enable this option,DentalWings software can import 3D data for design directly.Currently only support crown and bridge indications. The default setting is inactive.

④ User interface language: user can modify the interface language and default language is decided when users install the software.

⑤ Dental notation: FDI world dental federation notation and universal numbering system.

⑥ Device type: Clinic, DentalScan. The default is DentalScan.

⑦ Scanner software path: users can set the software path.

⑧ Model preview software path: users can set the software path.

⑨ Configure order output directory.

⑩ Data Cloud: Public Cloud,Private Cloud。The default is Private Cloud.

⑪ Order file naming rule: users can name the order file folder with their own preference.

⑫ DentalCloud： The privacy policy needs to be agreed. See the order data share(2.1.2) for configuration.

Note: To save and make setting change takes effect, please click 'Apply' button after configuration.

2.2. EXO

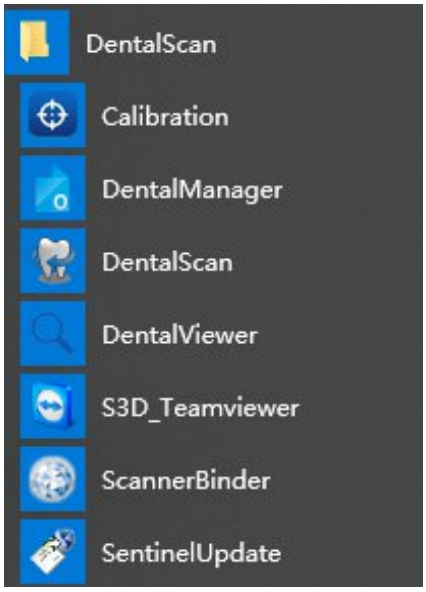
The activate tool are only used to bundle with Exocad, users don't have Exocad software don't need to bundle.

There are three steps: start activation tool, select bundle files and then bundle successfully.

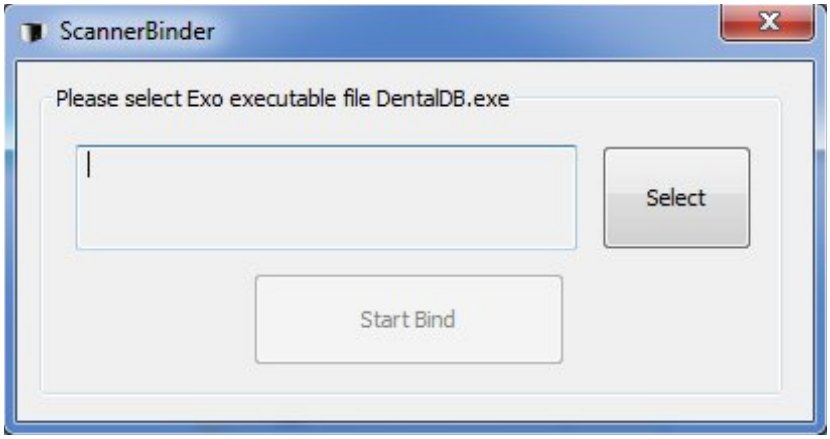
① Start activation tool

After installation is finished, select start 'Activator' or choose

from ‘start-all the program’ to find ‘ScannerBinder’

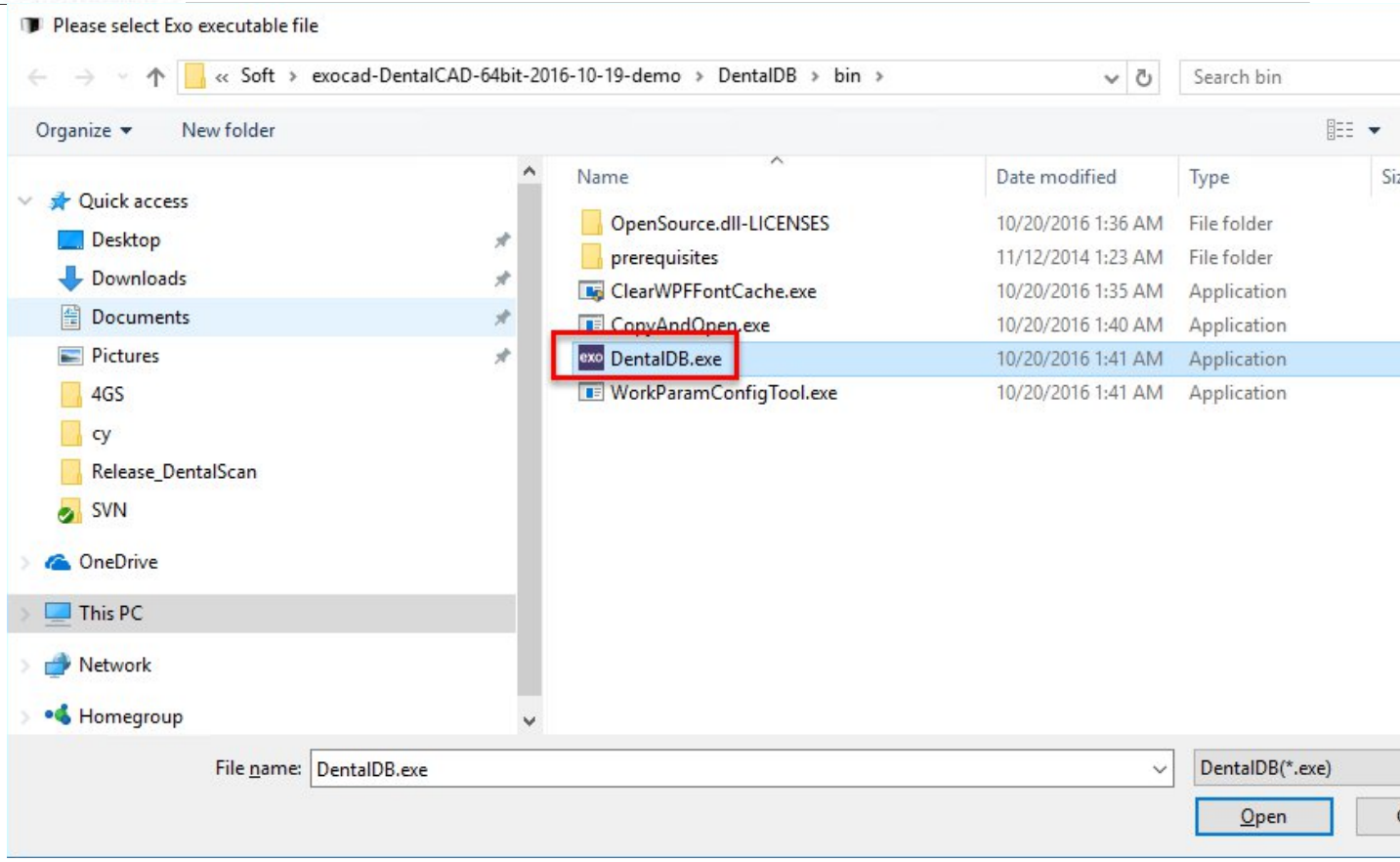


Click ‘start activation tools’; see the photo as below, click button of ‘select ’



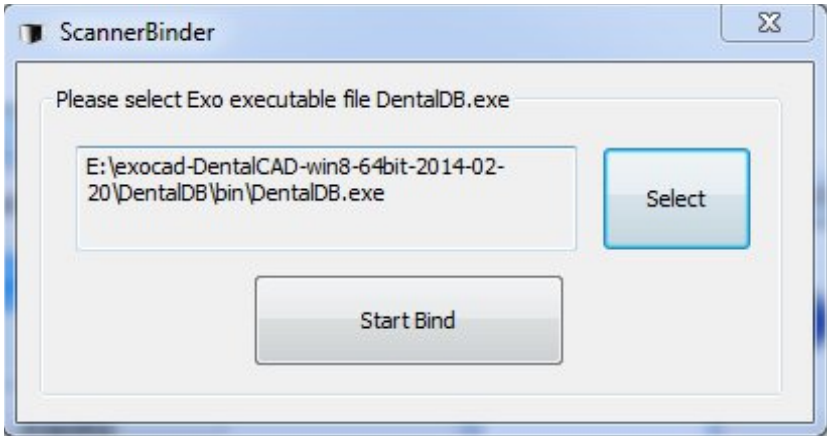
② Select the folder for bundled file

Find the path for DentalDB.exe; choose DentalDB and then bundle with the software.



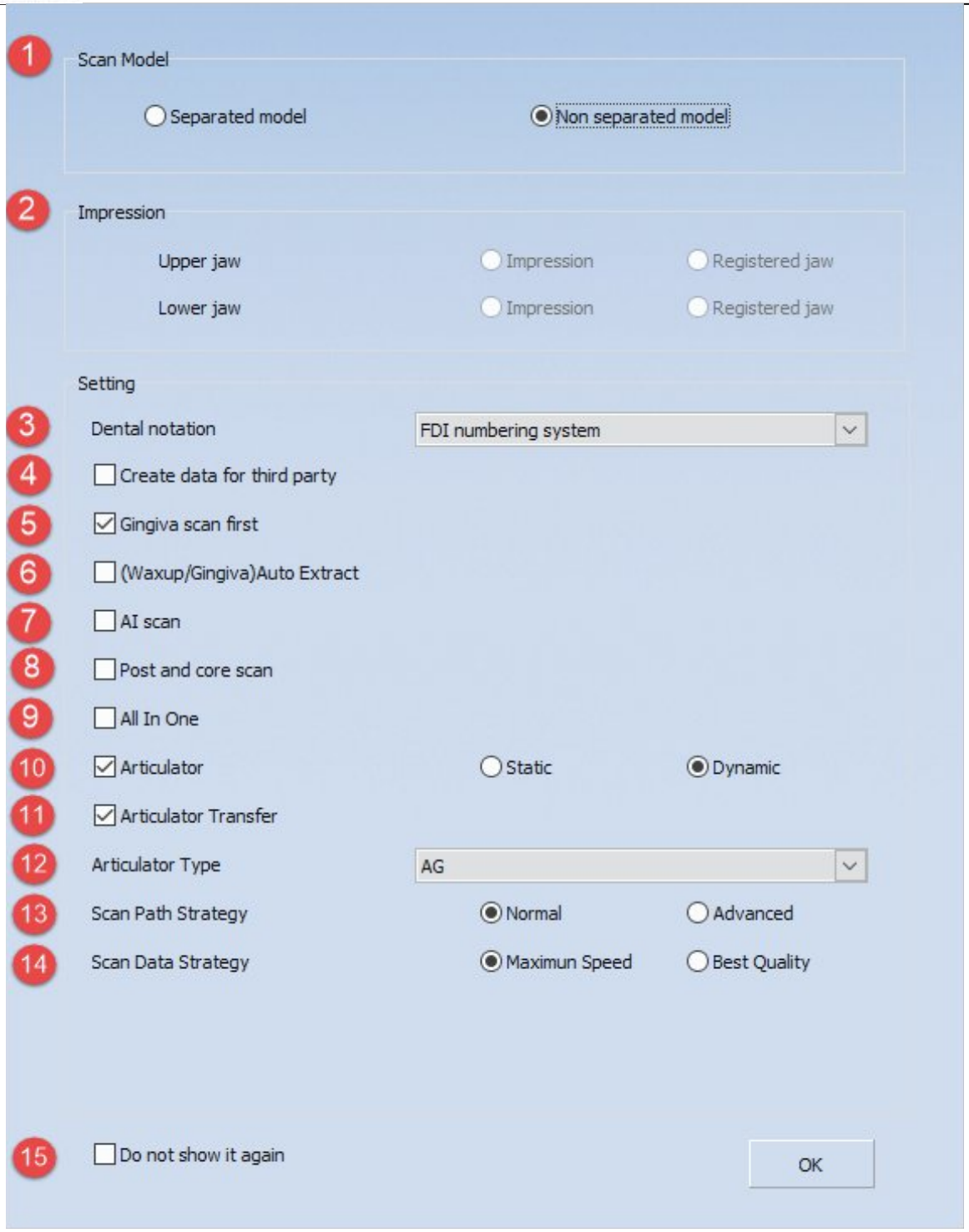
③ Binding successful

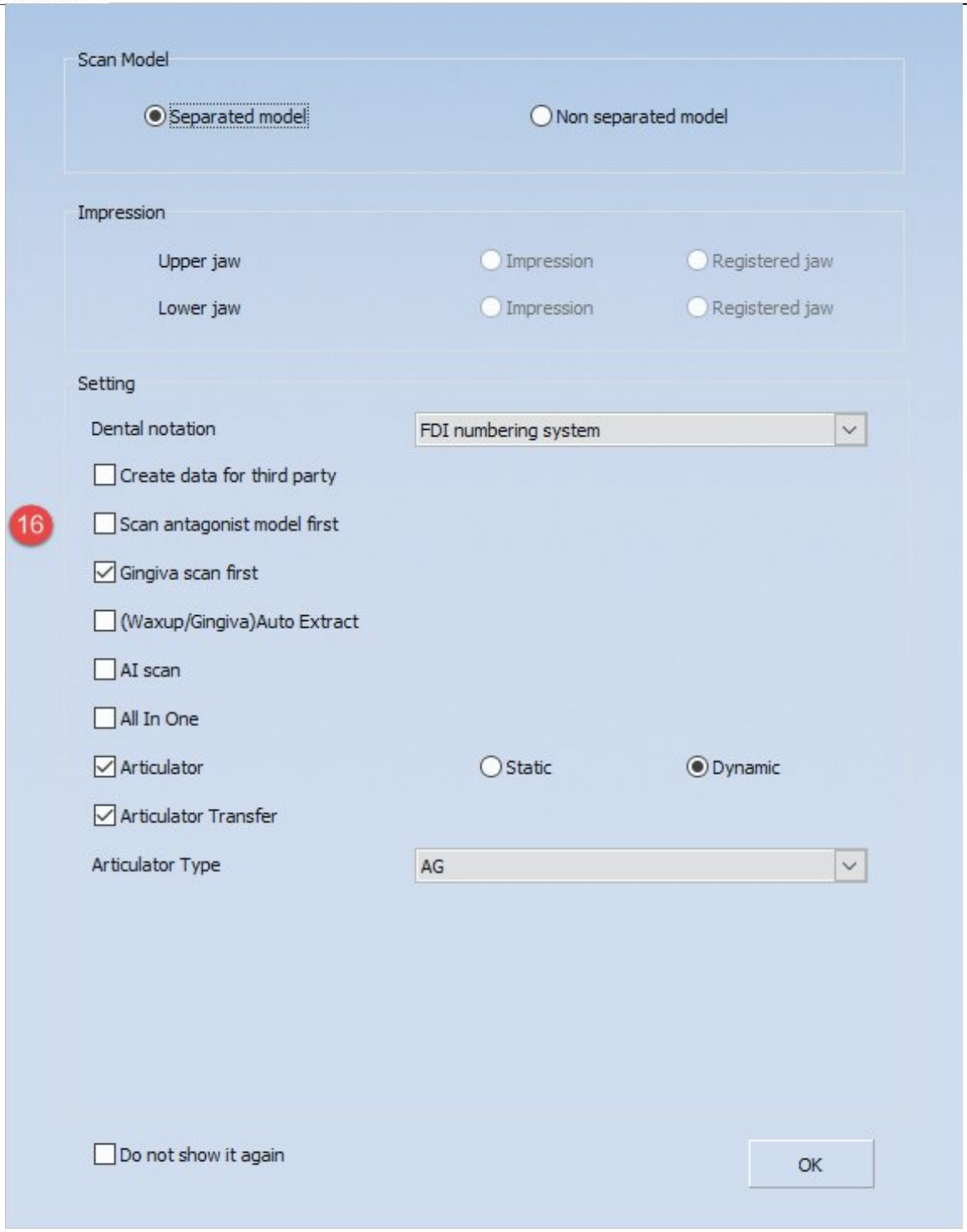
Click ‘start binding’ to bundle with the Exocad, if it is successful, there will be a reminding show as below.

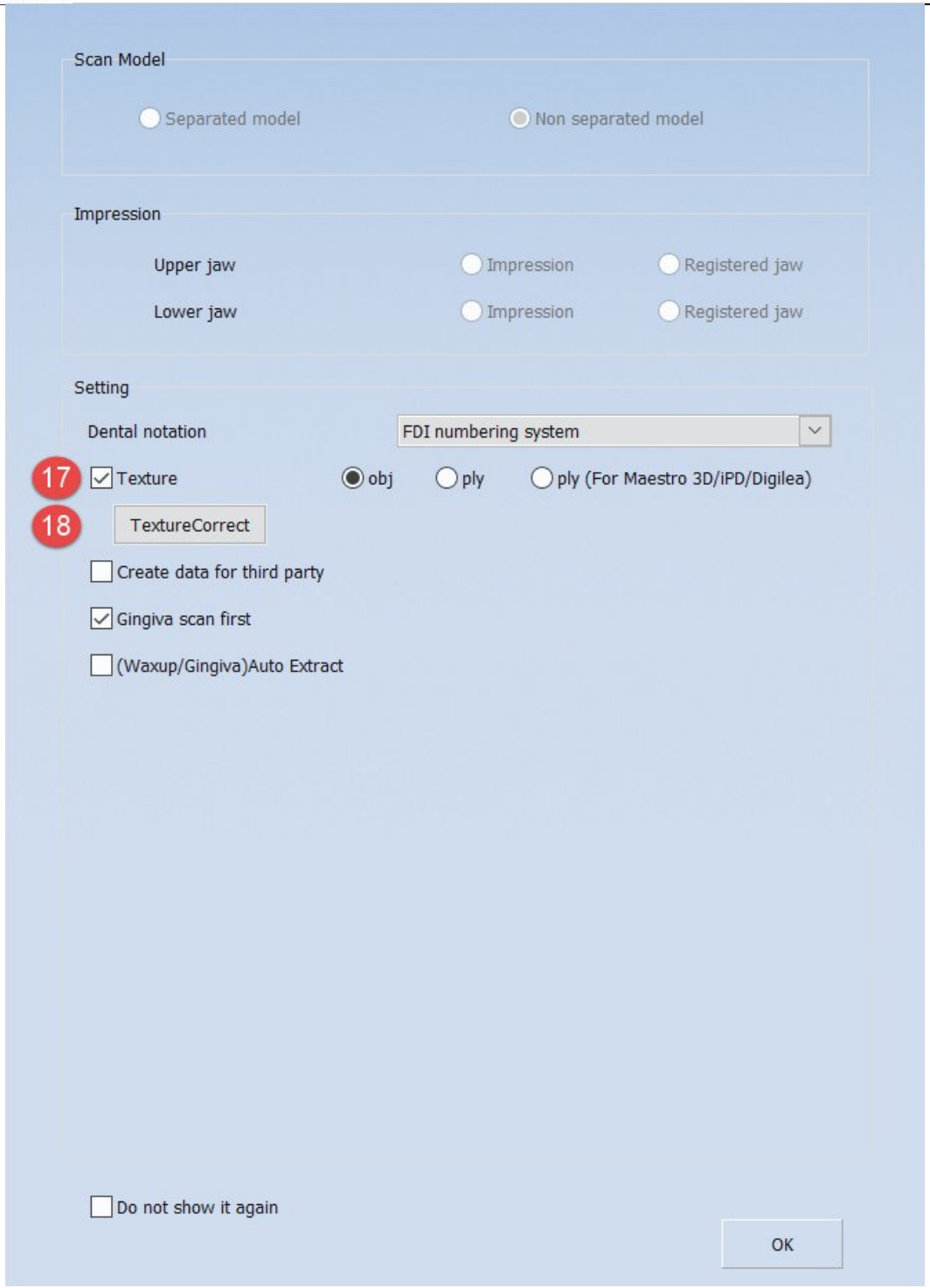


3. Scan Operate

The following function buttons will be used during scanning, they can made the scanning process more convenient.


1
Scan Model
Separated model
Non separated model
2
Impression
Upper jaw
Impression
Registered jaw
Lower jaw
Impression
Registered jaw
Setting
3
Dental notation
FDI numbering system
4
Create data for third party
5
Gingiva scan first
6
(Waxup/Gingiva)Auto Extract
7
AI scan
8
Post and core scan
9
All In One
10
Articulator
Static
Dynamic
11
Articulator Transfer
12
Articulator Type
AG
13
Scan Path Strategy
Normal
Advanced
14
Scan Data Strategy
Maximun Speed
Best Quality
15
Do not show it again
OK


Scan Model
Separated model
Non separated model
Impression
Upper jaw
Impression
Registered jaw
Lower jaw
Impression
Registered jaw
Setting
Dental notation
FDI numbering system
Create data for third party
16
Scan antagonist model first
Gingiva scan first
(Waxup/Gingiva)Auto Extract
AI scan
All In One
Articulator
Static
Dynamic
Articulator Transfer
Articulator Type
AG
Do not show it again
OK



hange between separate model and non-separate model scan mode.

sers can choose upper jaw and lower jaw to be impression or registered jaw(gypsum mod

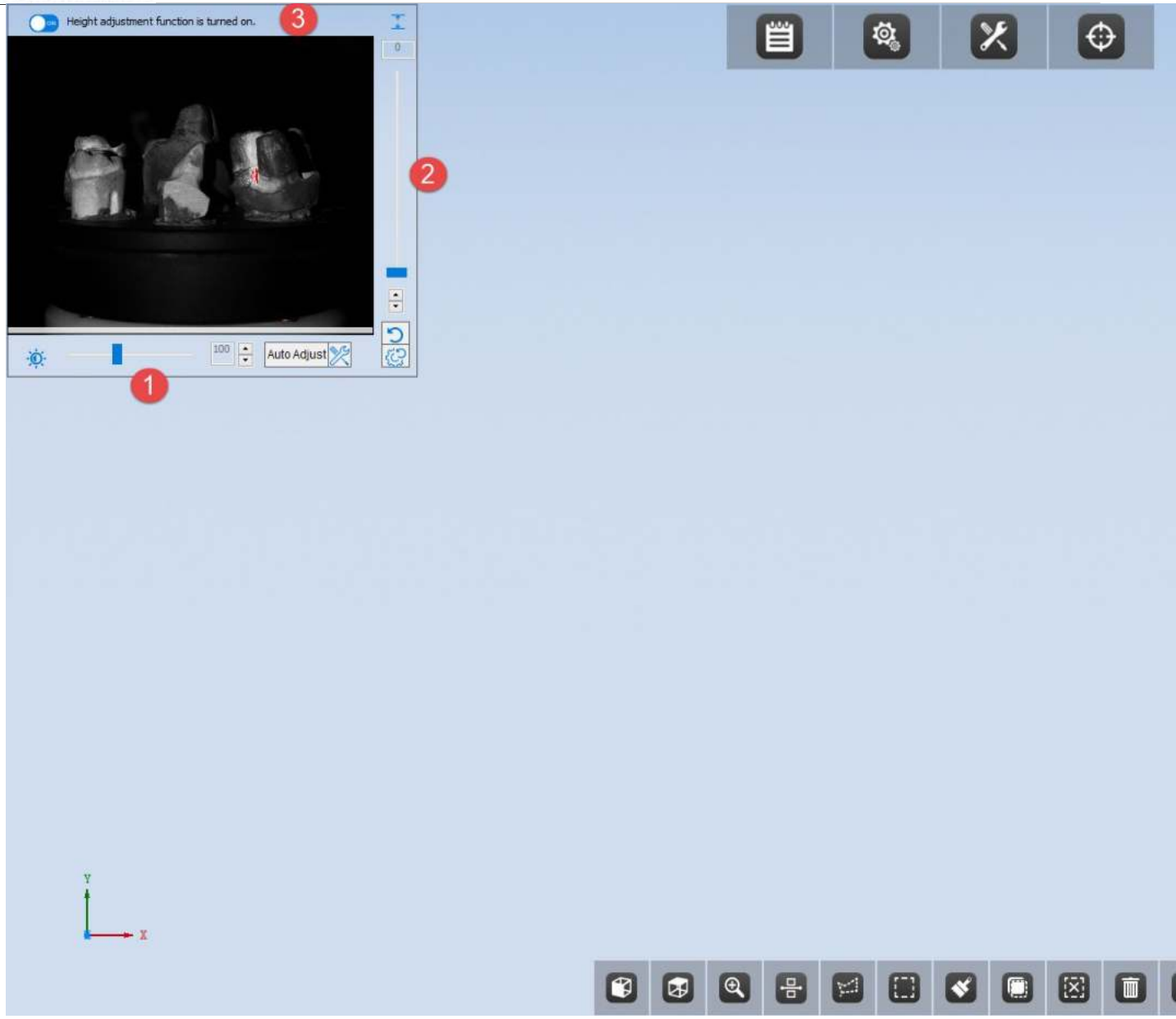
on:"FDI World Dental Federation notation"and "Universal numbering system"to choos

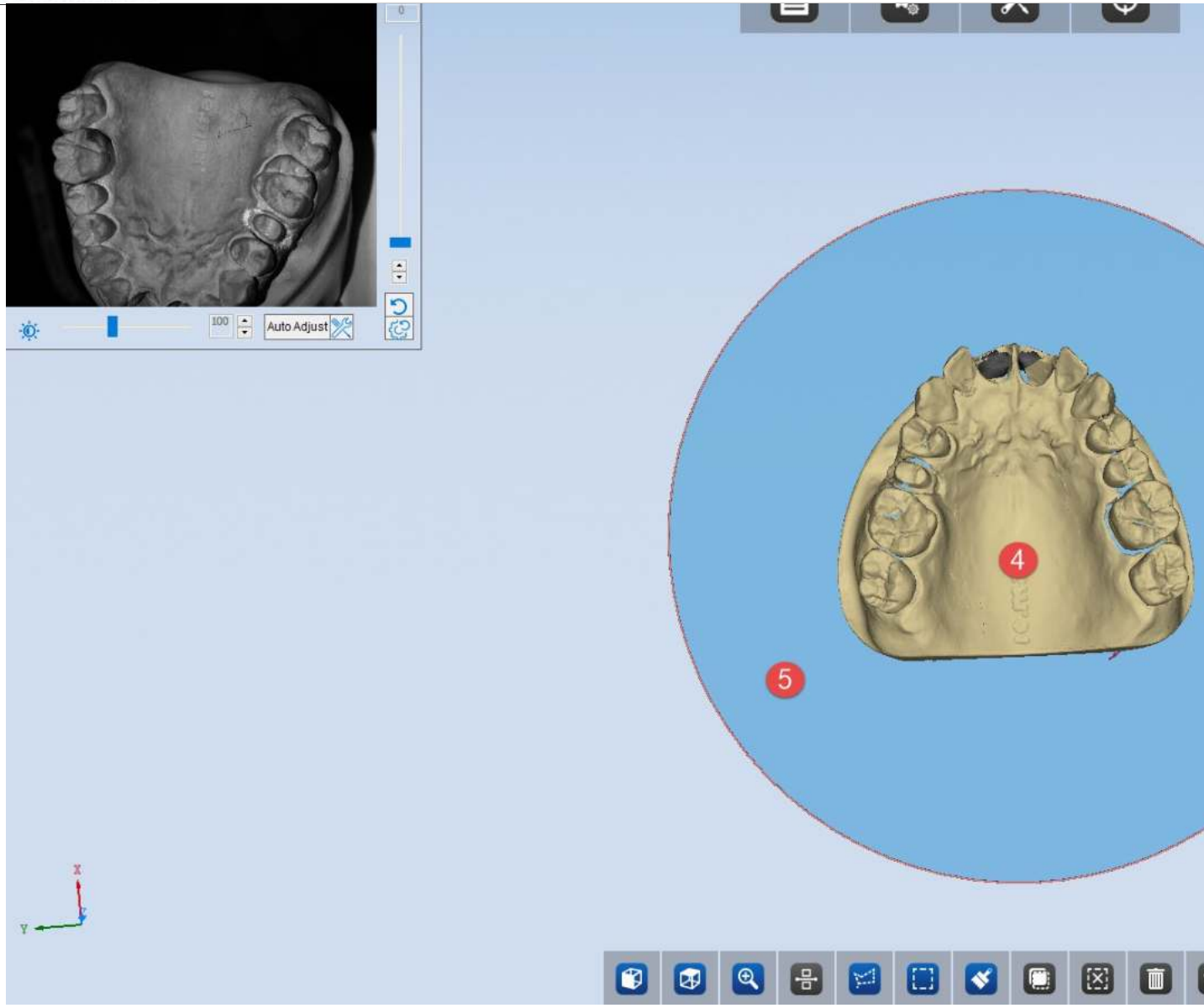
for third party: Once checked, software can export 3D data compatible with 3sha
nactive.

first: check this option to scan the gingiva first before scanbody or abutment.

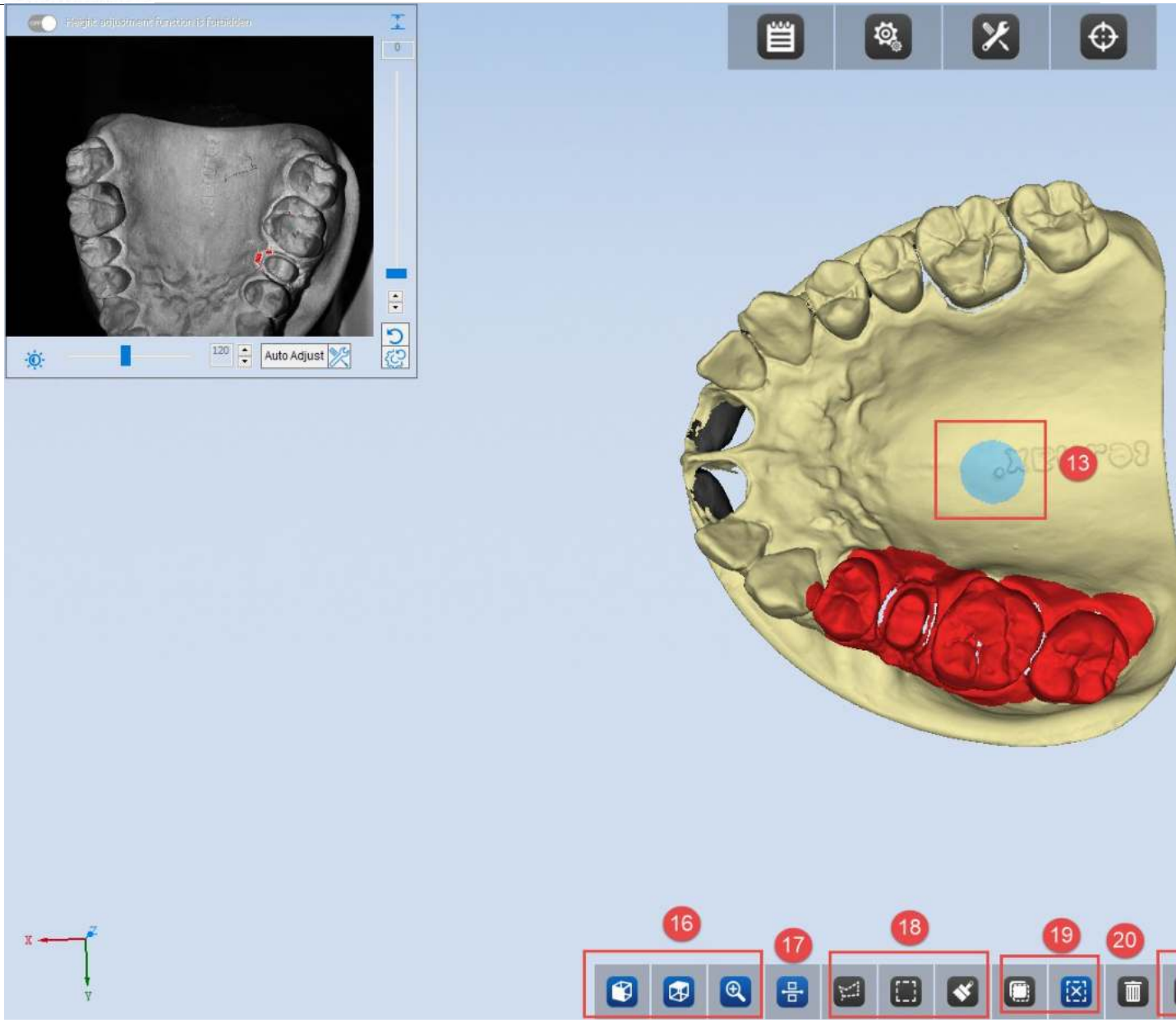
va)Auto Extract: Once checked, waxup and gingiva data will automatically delete overl

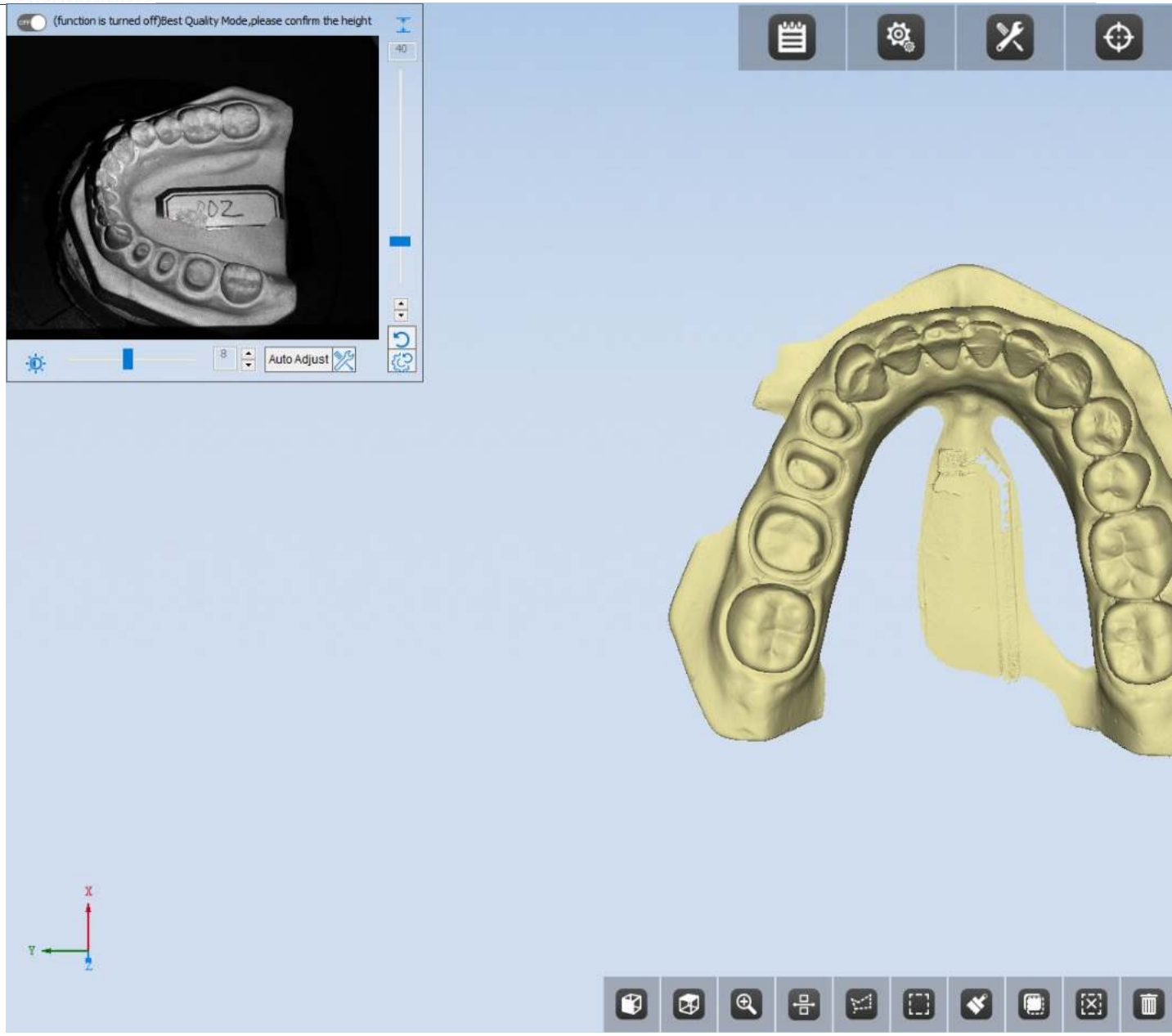
ck this option to excute automatic intelligent add-scan after the completion of model
e scan: occurs at scan orders of inlay, which is also for post scan.
For scan orders of separated/unseparated models with indications of crown/coping/ve where the occlusion type is two stone.
Static mode, swing(dynamic scan) mode
Transfer: it occurs when tick Articulator, providing transferring function.
Type: occurs when tick articulator transfer**,** including AG, Bio-art, Kavo, SAM.
y: When users scan unseparate model, they can choose normal or advanced mode; advanced ger time but better scan result.
rategy: When users scan unseparated model/impression, they can choose speed priority o
again: Once checked, pre-set window will not pop out next time. If needed, users can ner.
st model first: Priority to scan antagonist model once tick this option.
e calibration: it's available once selected texture. Before that, better to calibra color. No need to calibrate white & black scanner. re will automatically calibrate white balance once put the board on edge, until finis
checked, software will capture texture.

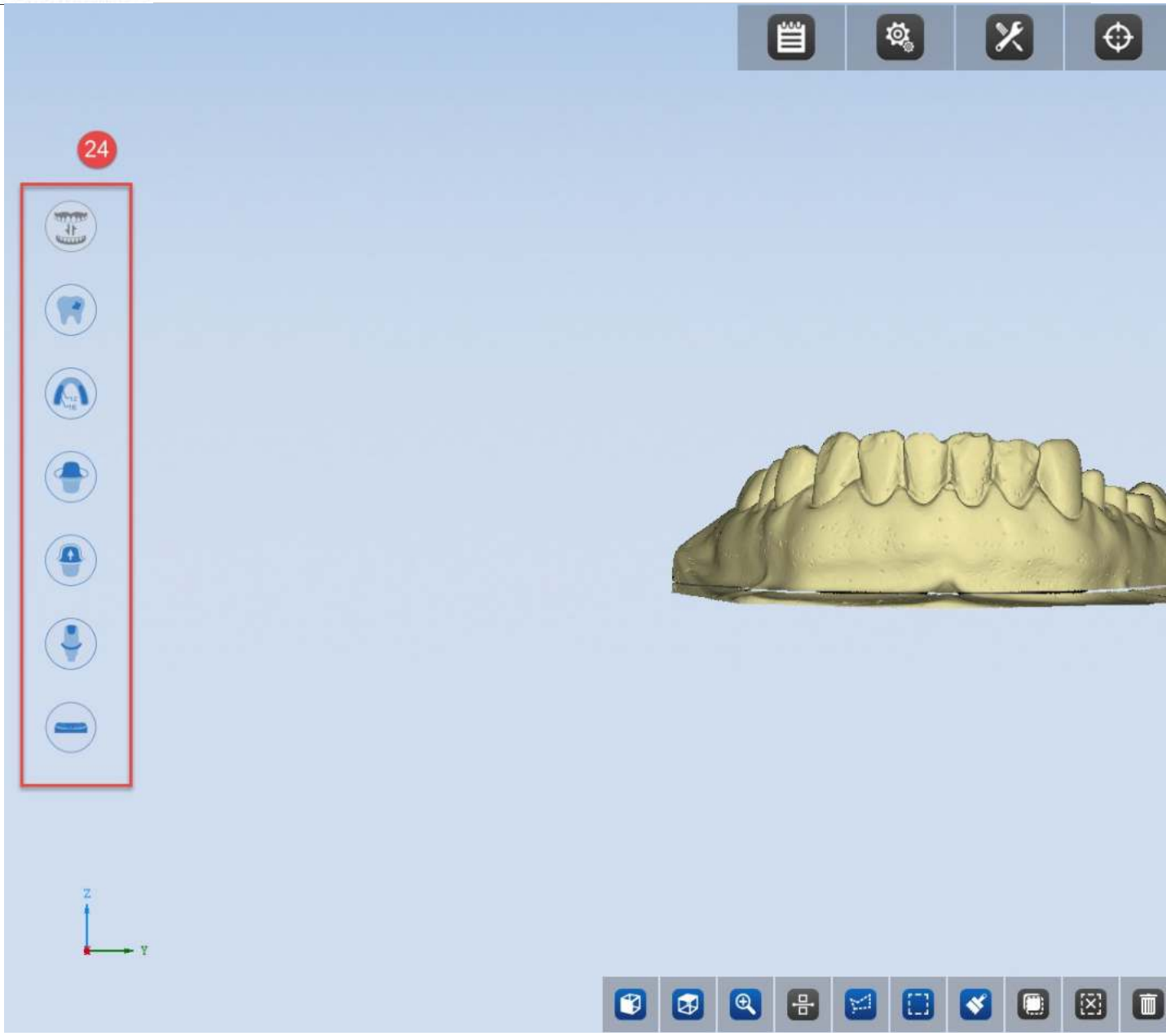

Height adjustment function is turned on.
3
2
1
100
Auto Adjust
Y
X

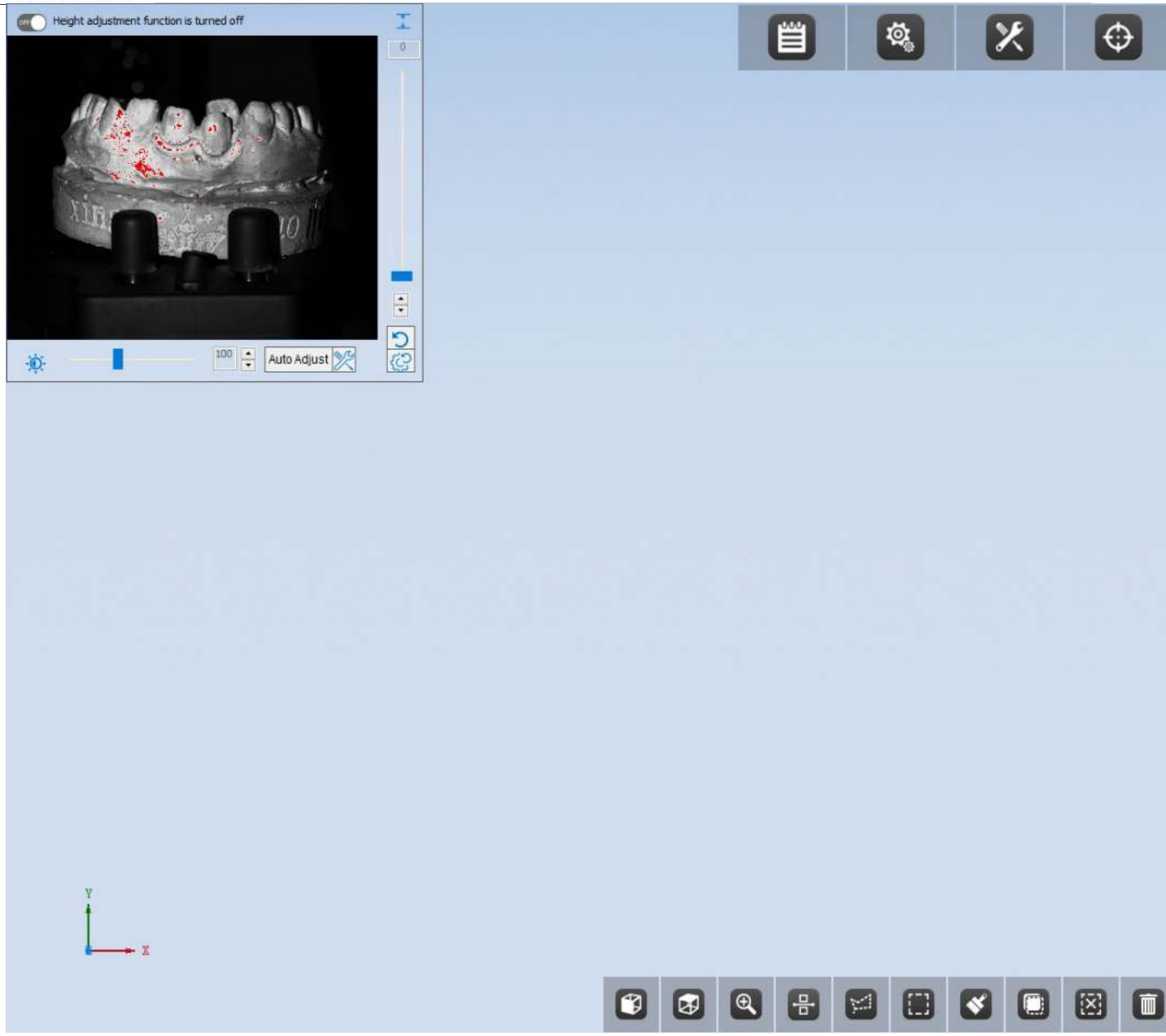


Click “intelligent add-scan” to enter automatic add-scan


Auto Adjust
13
16
17
18
19
20


(function is turned off)Best Quality Mode,please confirm the height
40
8
Auto Adjust
X
Y
Z


24
Z
Y



indows: click the “auto adjust” button, the program will adjust the brightness based
ically and this is benefit to scanning process.

adjustment: users can drag the bar or click on the arrow buttons to adjust the Z-
e better view of the scan object.

preference : users can choose preferred data height to display by activating this func

s a real-time display of scanning model during and after scanning process;

when the scanning process is done, users can cut and delete the unnecessary data; use
king mouse key to adjust the cut height .

can: If there is data remain unscanned on the model, you can rotate to the specified
n " button to do the add scan.You can also use the shortcut keys (double-click the l
keyboard) to trigger the manual add-scan operation.While entering the next interface,
"Insert the model" and scan the model again if you want to add scan to the model.

the button "apply" when the scan process is completed, then software will registe
model .and saved the STL in the "Scandata" folder; the button "Next"can also registe
model

he latest mended data is not suitable, click this button to discard the latest mended

dd-scan : if the scan data is incomplete, users can choose certain areas for add-scan
-scan automatically starts by clicking "Scan"; different levels of intelligent
You can use the shortcut keys (double-click the left mouse button or press the 1 on
operation

gital model will rotate to a preset angle.

click the "+,-" button or move the slider or click the slider and roll mouse wheel t

: advanced (12 scan positions) , medium (9 scan positions) , basic (6 scan positions)

on : left click mouse to select hole filling areas; selected areas will turn red; u
ng both "shift"and left mouse key to choose; users can adjust the ball size by pressi
el.

ntelligent add-scan.

om intelligent add-scan.

iew, top view, fit view.

intelligent add-scan process, users can click it to exit from add-scan and display d

click Free Edit or Rect Edit and Brush Edit, press the "shift" key and press
delete.

tion\cancel selection: reverse the selected region or clear the selected region.

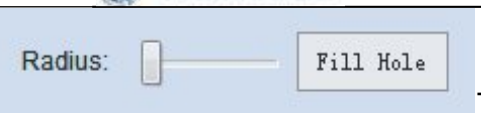
e the selected region.

do the latest delete operation or redo the delete operation.

tment: optimization is performed when the Ti- base shoulder is thin

oof: optimize the problem of poor data caused by severe reflection on the abutment (

filling : at the final complete step, users can swipe open the function and manually
mm in circumference; more options are provided for hole filling; click the kettle-li



fill three levels of radius 2/4/6 after the order was comple

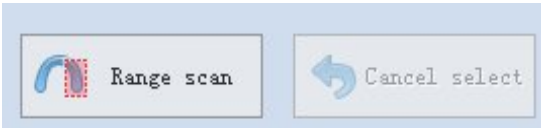
: allow scan models with gingiva or relief wax, without power spray.

an press left and right mouse keys at the same time to move the data.

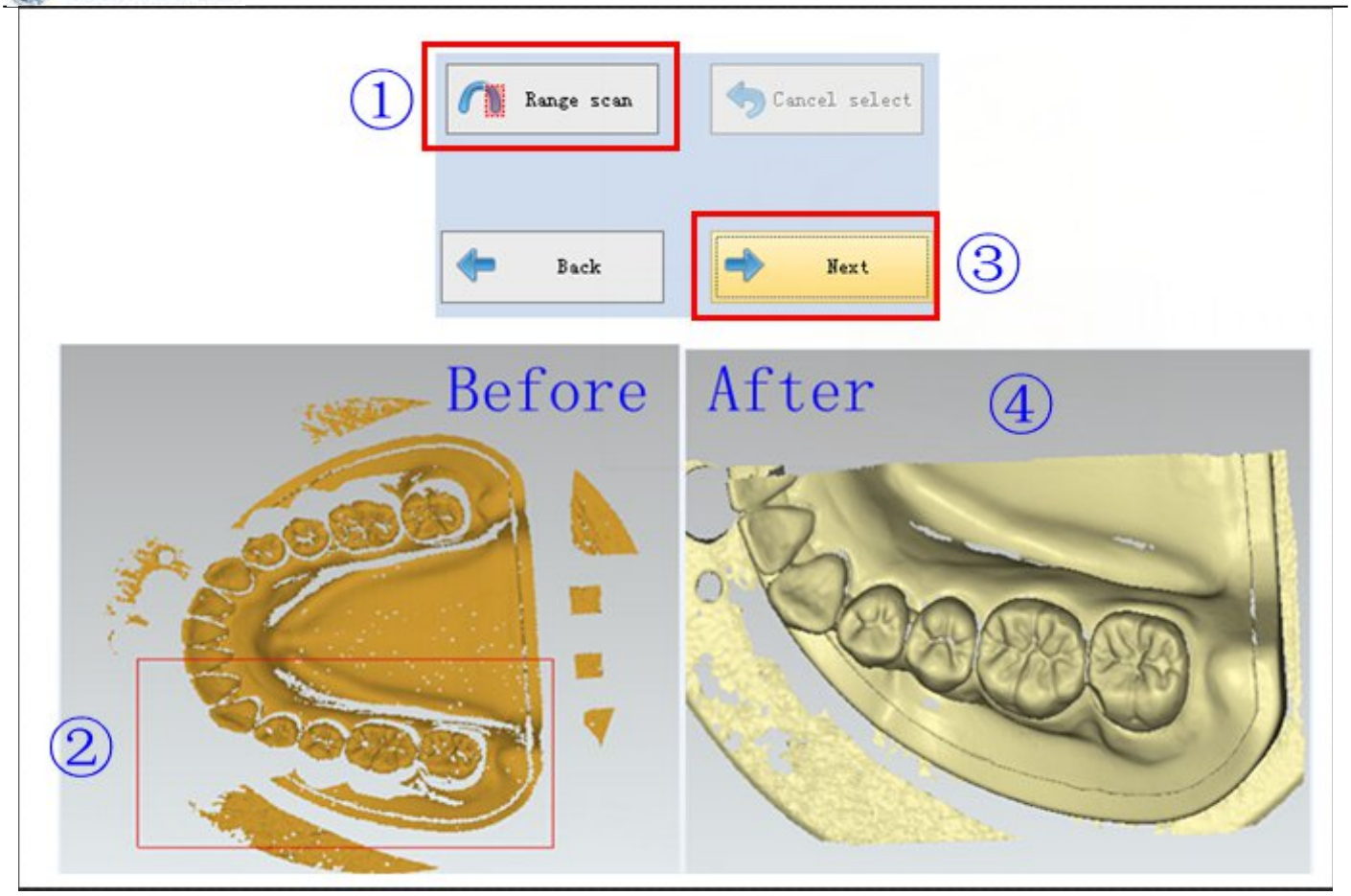
can rotate the data by right clicking the mouse key.

.

3.1.1. Range scan



Steps: put in the model, click button of 'Range Scan', press left mouse button to select the target area of model, and then click Scan to start range scanning.



Select target area Scan result

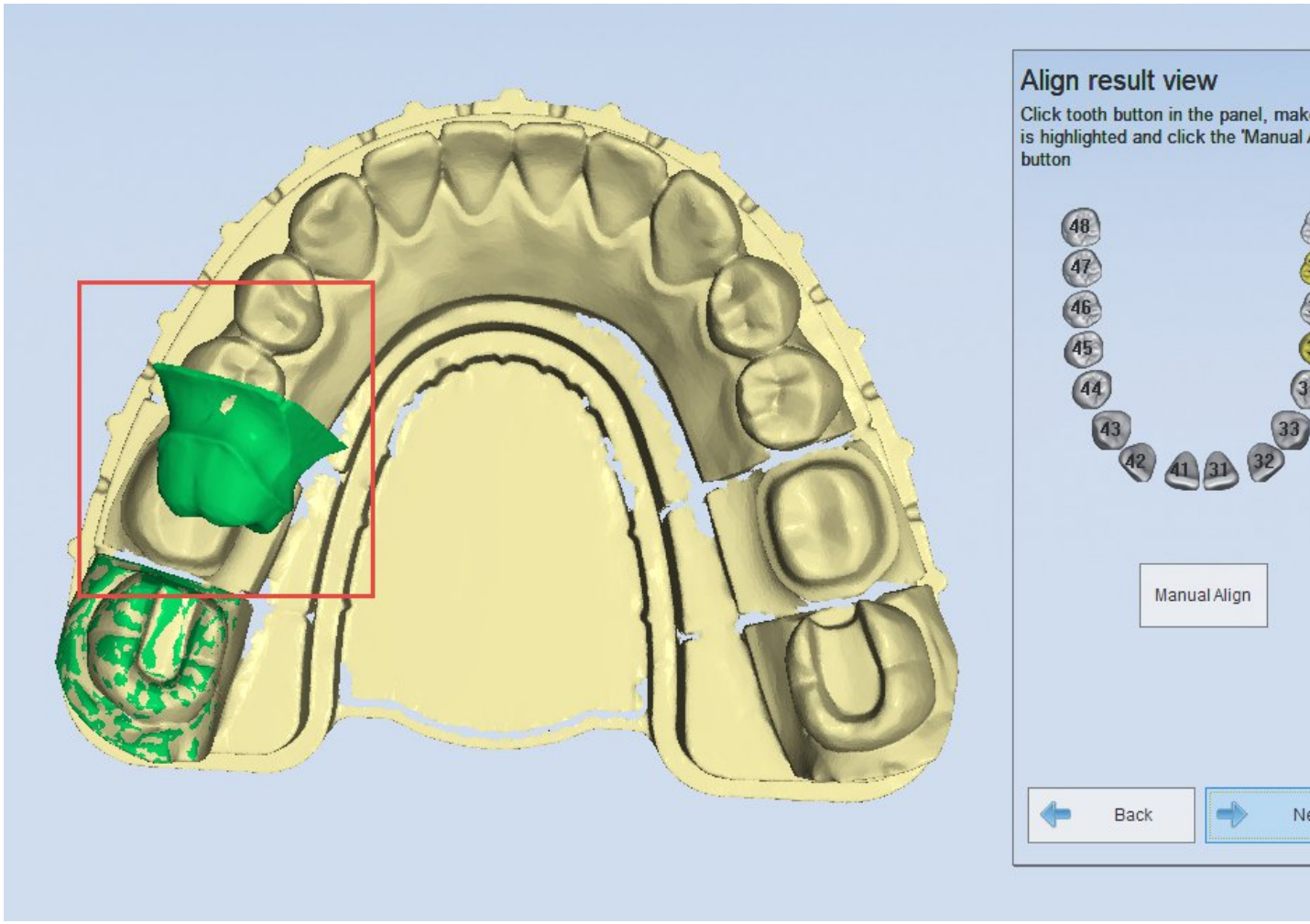
Select the scanning area: press left mouse button to select the scanning area, users can select several areas for one model, the system will scan the chosen area.

Cancel select: cancel the selected area. Click the button of 'cancel select', the selected area will be canceled, users can reselect the scanning area or click '' to start scanning the whole model.

3.1.2. Manual alignment

Manual alignment is designed especially for the condition that the auto alignment of tooth and jaws fails. Take the tooth manual alignment for example. (the manual alignment of combination jaws is the same as that of tooth)

As shown in the figure below, the auto alignment of the tooth 35 and 37 fails.

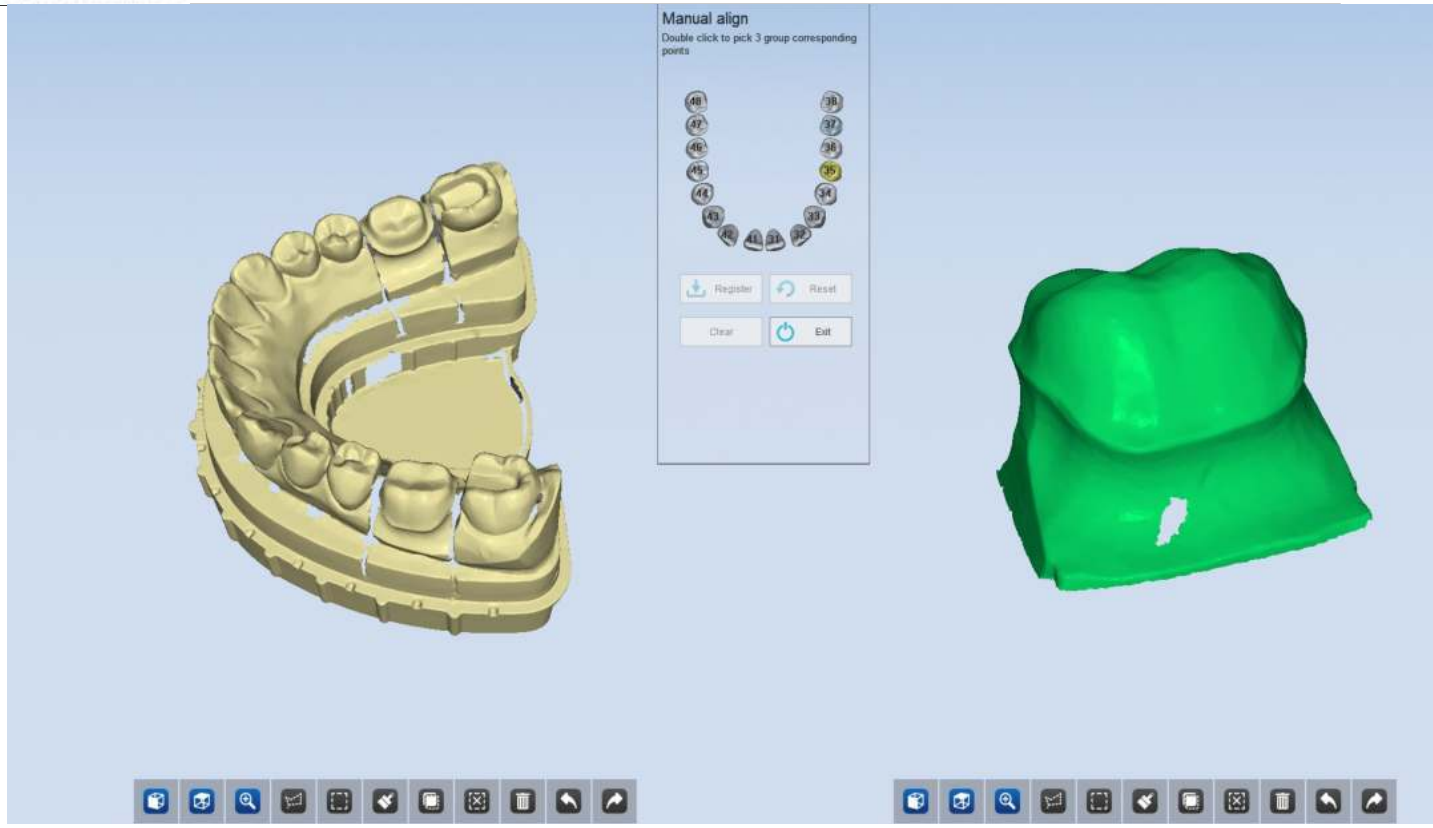


Note : If you have checked the tooth number in the window “Align result view”, then click “Manual Align”, the tooth will not be displayed, you have to exit and enter again.

Click “Manual Align” to enter the alignment interface, the operation is as follows.

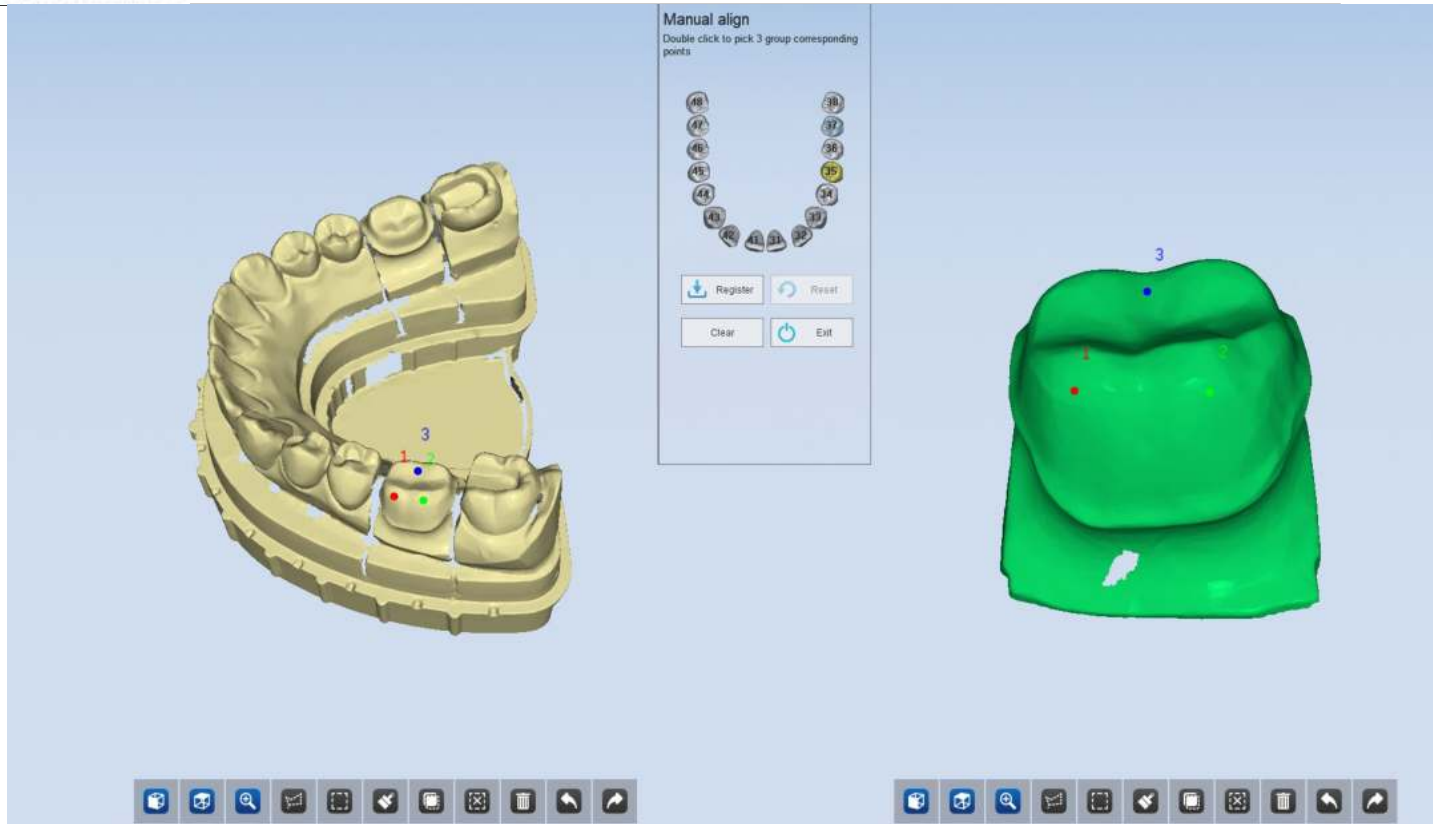
1) choose the tooth 35

Choose the tooth 37 to begin the manual alignment.



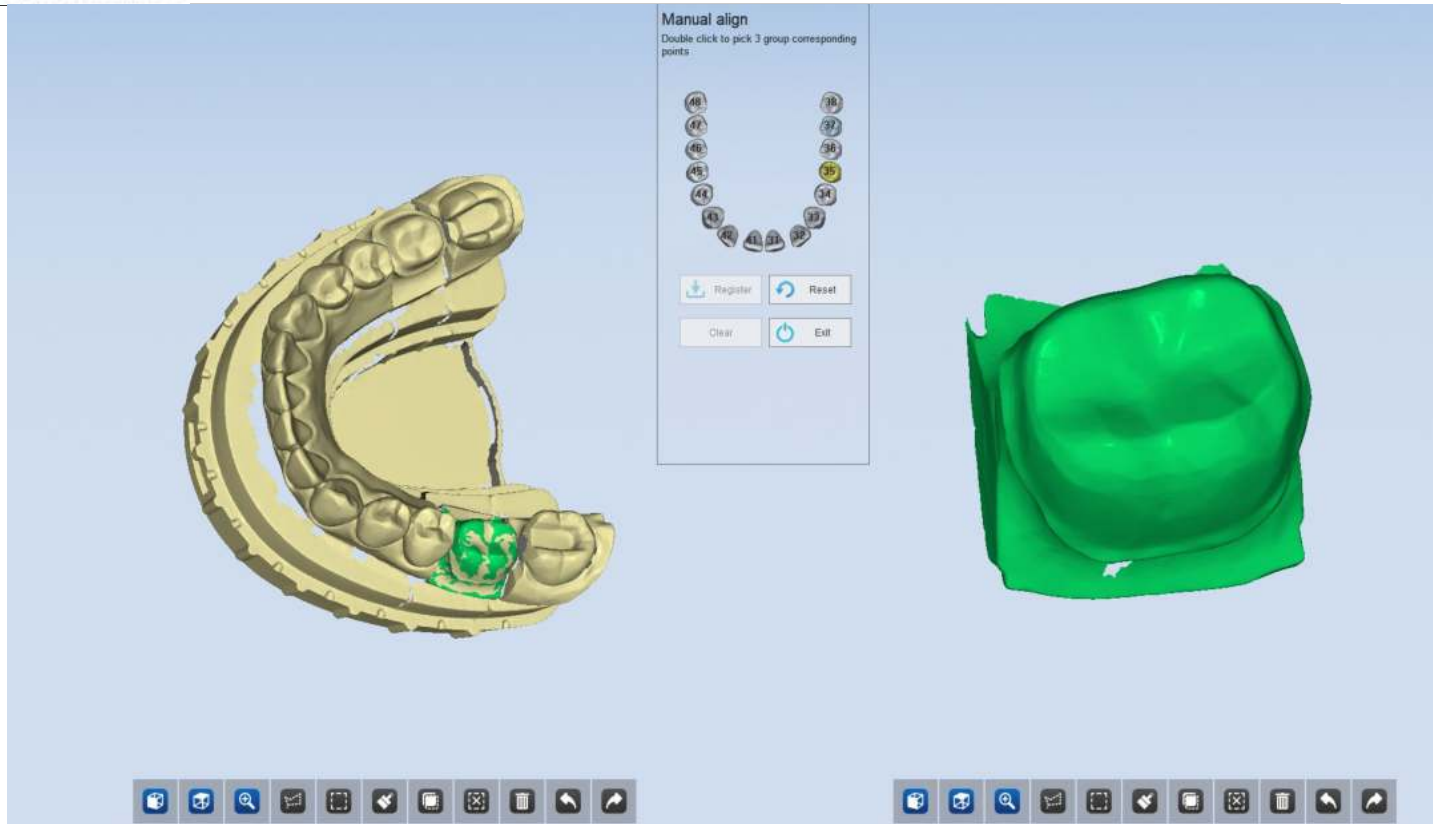
2) click 3 groups of corresponding points

Operate according to the prompts to double click the corresponding tooth to select it, shown as the figure below. Double click 3 groups of points respectively on the tooth 35 and the model on the right.



3) click "Select"

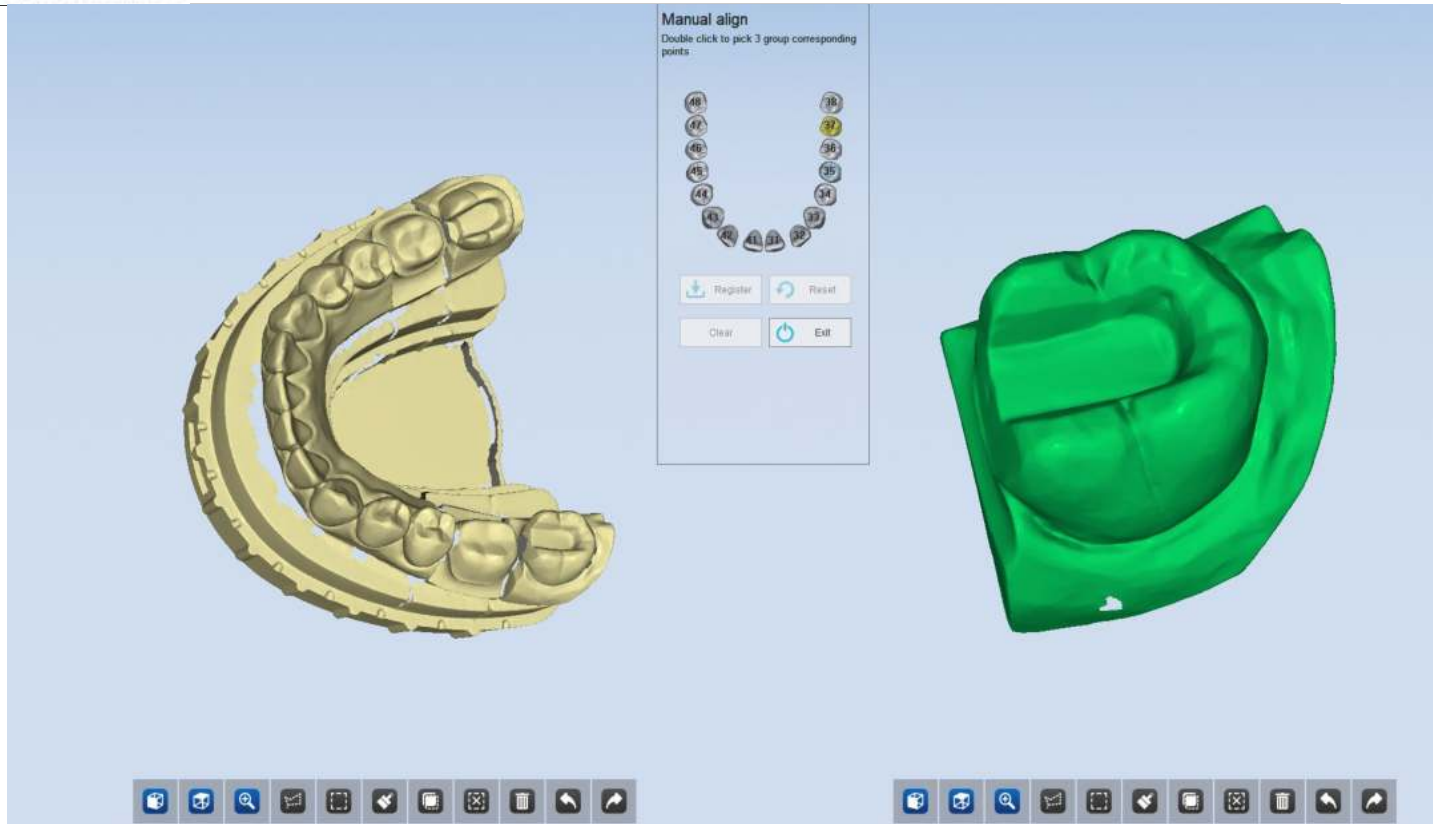
After selecting the 3 groups of points, click "Select" to complete the alignment, the result is shown as the figure below.



4) choose the tooth 37

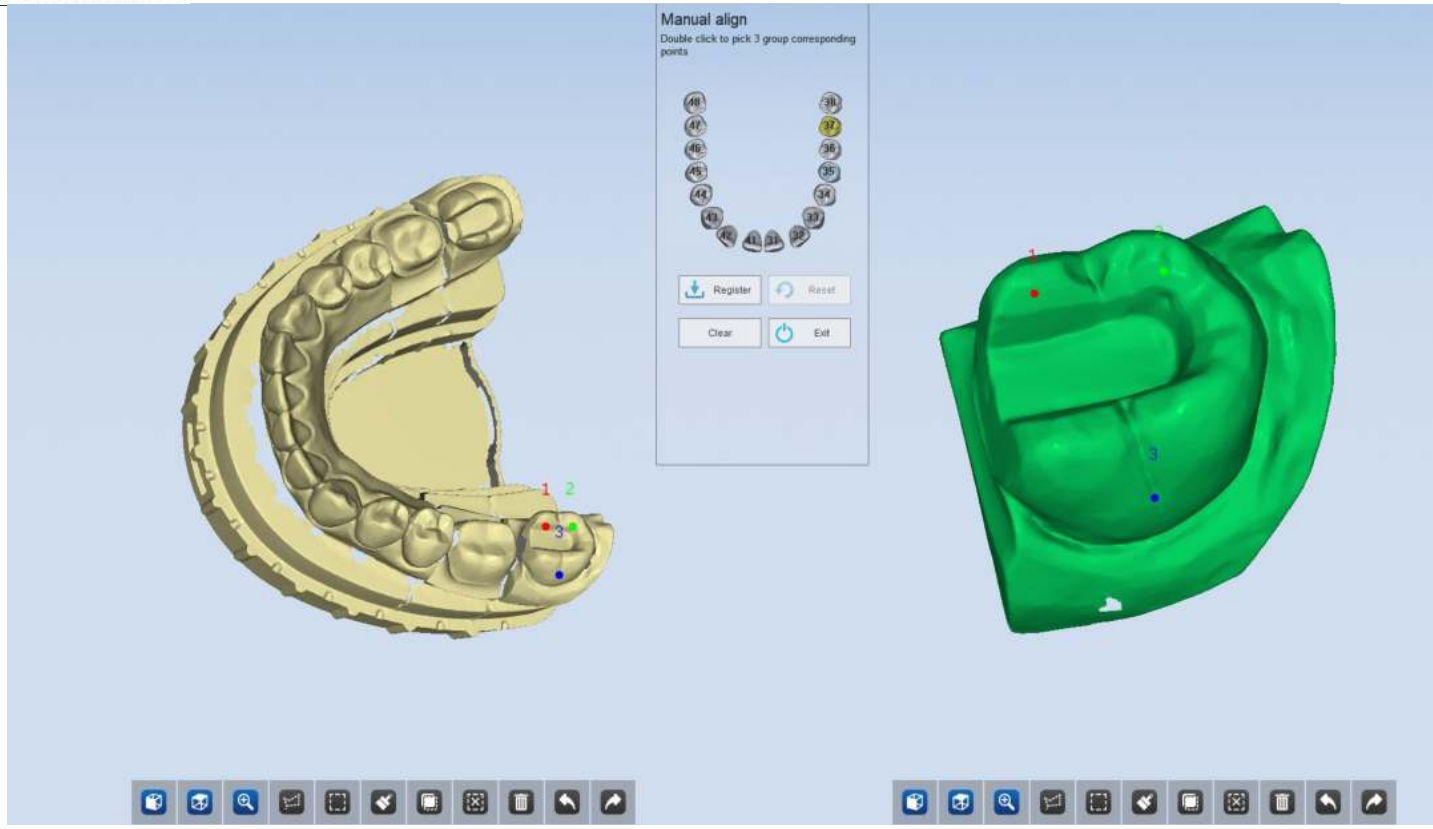
After completing the alignment of the tooth 35, you can click “Exit” to view the alignment result, or you can choose the tooth 35 to continue the alignment.

Choose the tooth 35, and the tooth 37 will be hidden, shown as the figure below.



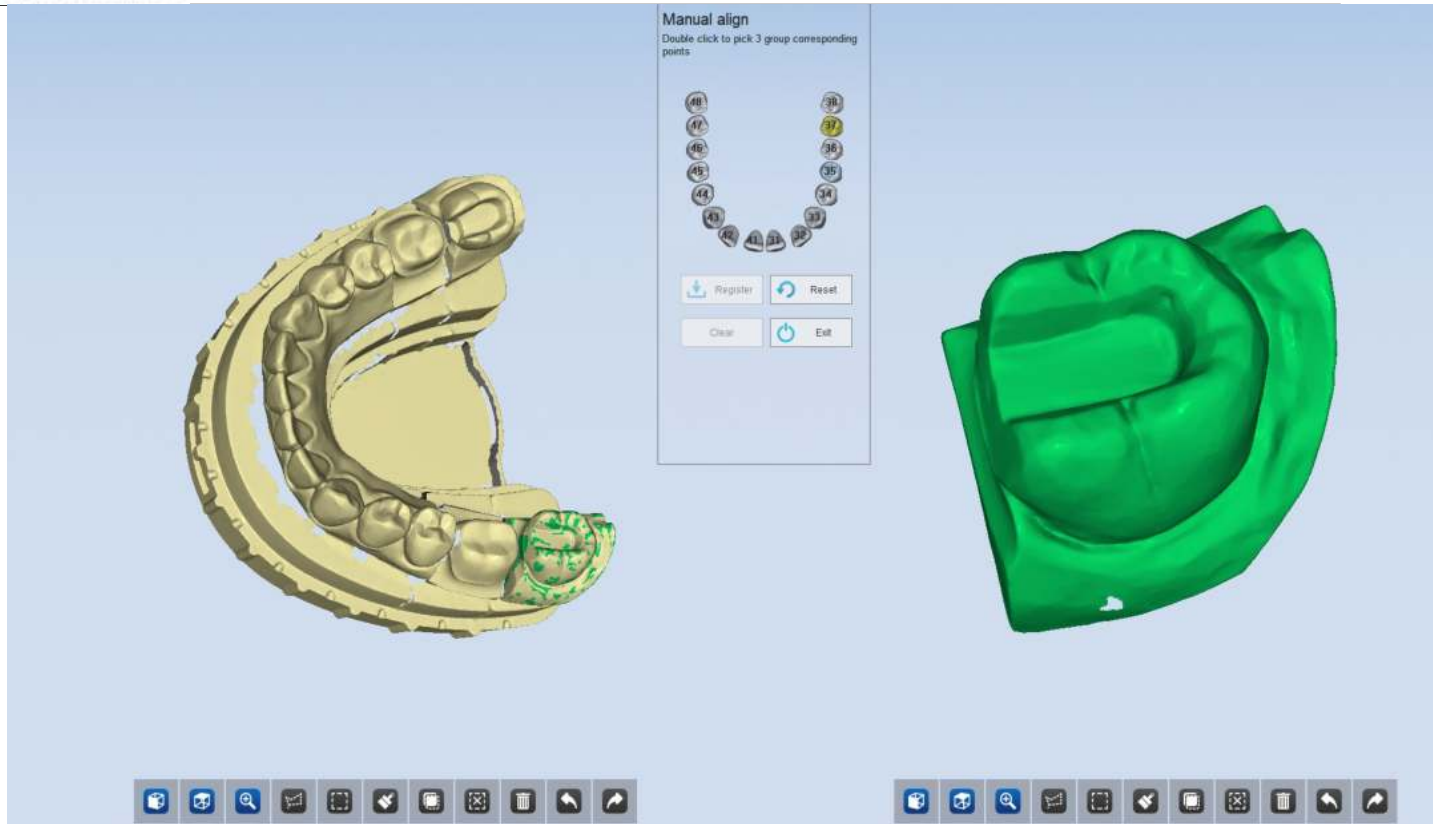
5) click 3 groups of corresponding points

Operate according to the prompts to double click the corresponding tooth to select it, shown as the figure below. Double click 3 groups of points respectively on the tooth 37 and the model on the right.



6) click "Select"

After selecting the 4 groups of points, click "Select" to complete the alignment, the result is shown as the figure below.



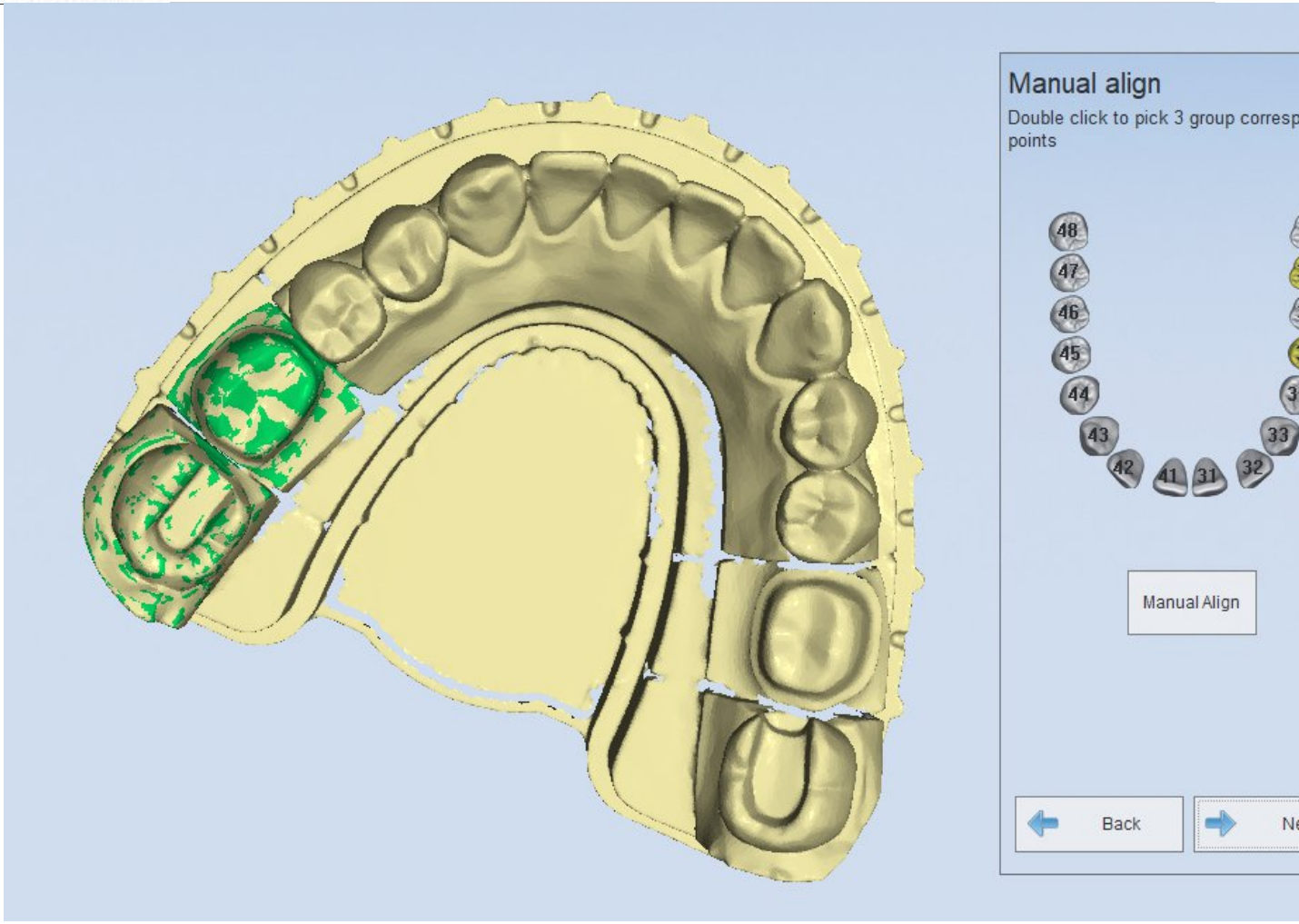
7) Reset&Clear

Reset: users can click ‘reset’ to go back to the data before alignment if you are not satisfied with the result.

Clear: users can click ‘clear’ or click the right mouse button to clear the selected points if you are not satisfied with the selected position.

8) Exit

If the alignment result is right and satisfactory, click “Exit”, it will display the alignment result, shown as the following figure.

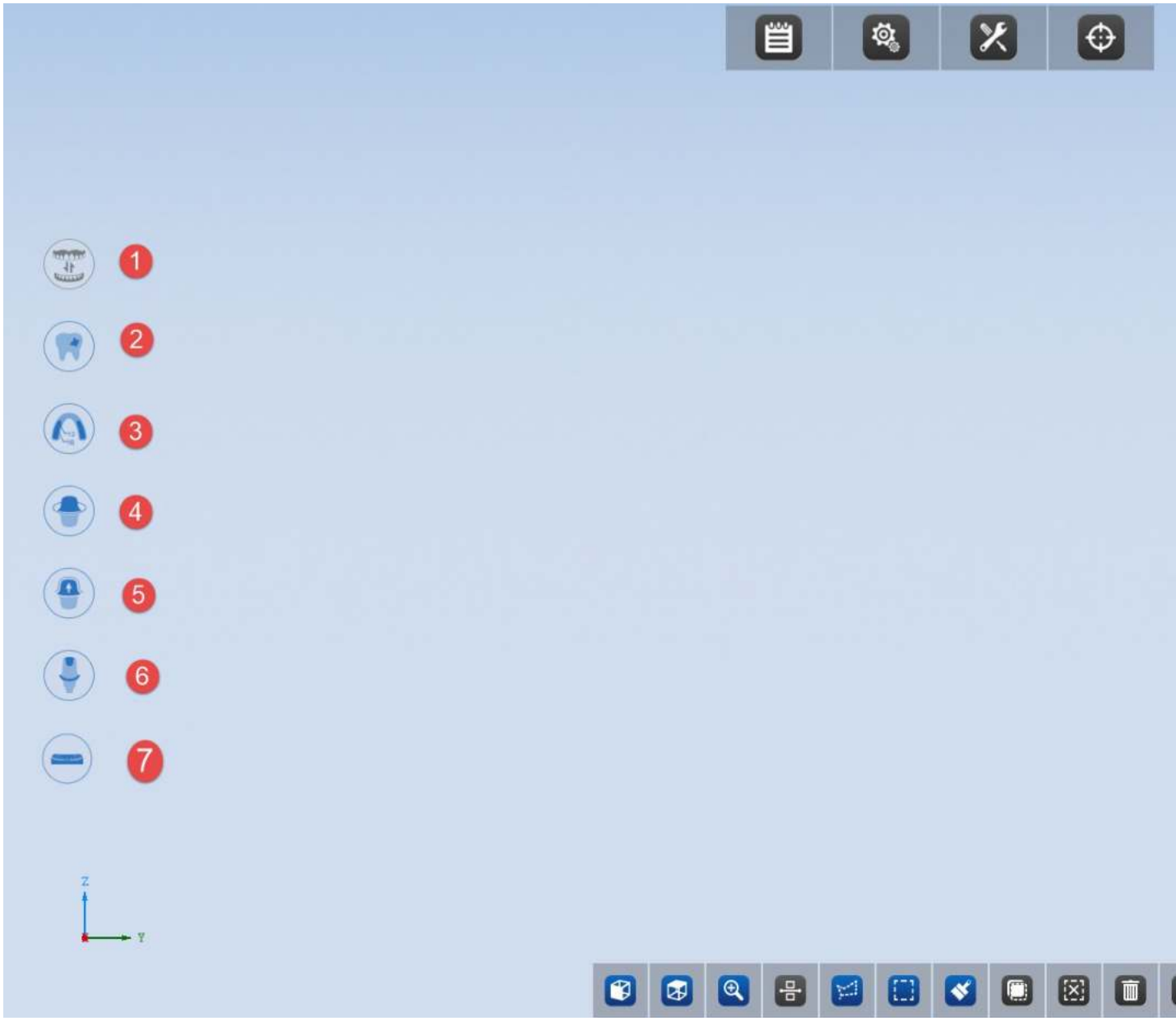


Note :

1. You can cancel the selected points by right clicking the mouse.
2. After completing the alignment of the first tooth manually, if you click “Exit” or choose another tooth, the alignment of the first tooth will be saved and the “reset” is invalid.
3. When clicking the 4 groups of corresponding points, you’d better choose the area with obvious features. Please don’t choose the points at the same plane.
4. When scan more than one teeth on the die, the alignment of a few teeth may fail, you need to align the teeth manually.
5. If the tooth for alignment is the existing model, or you go back to the last interface after auto alignment, it will result in failure in auto alignment. Then you need to align the tooth manually again.

4. Pre-design function

After finishing the scan, a series of pre-design functions will be displayed to the left side of the completion interface. The pre-design functions vary with different scanning process.



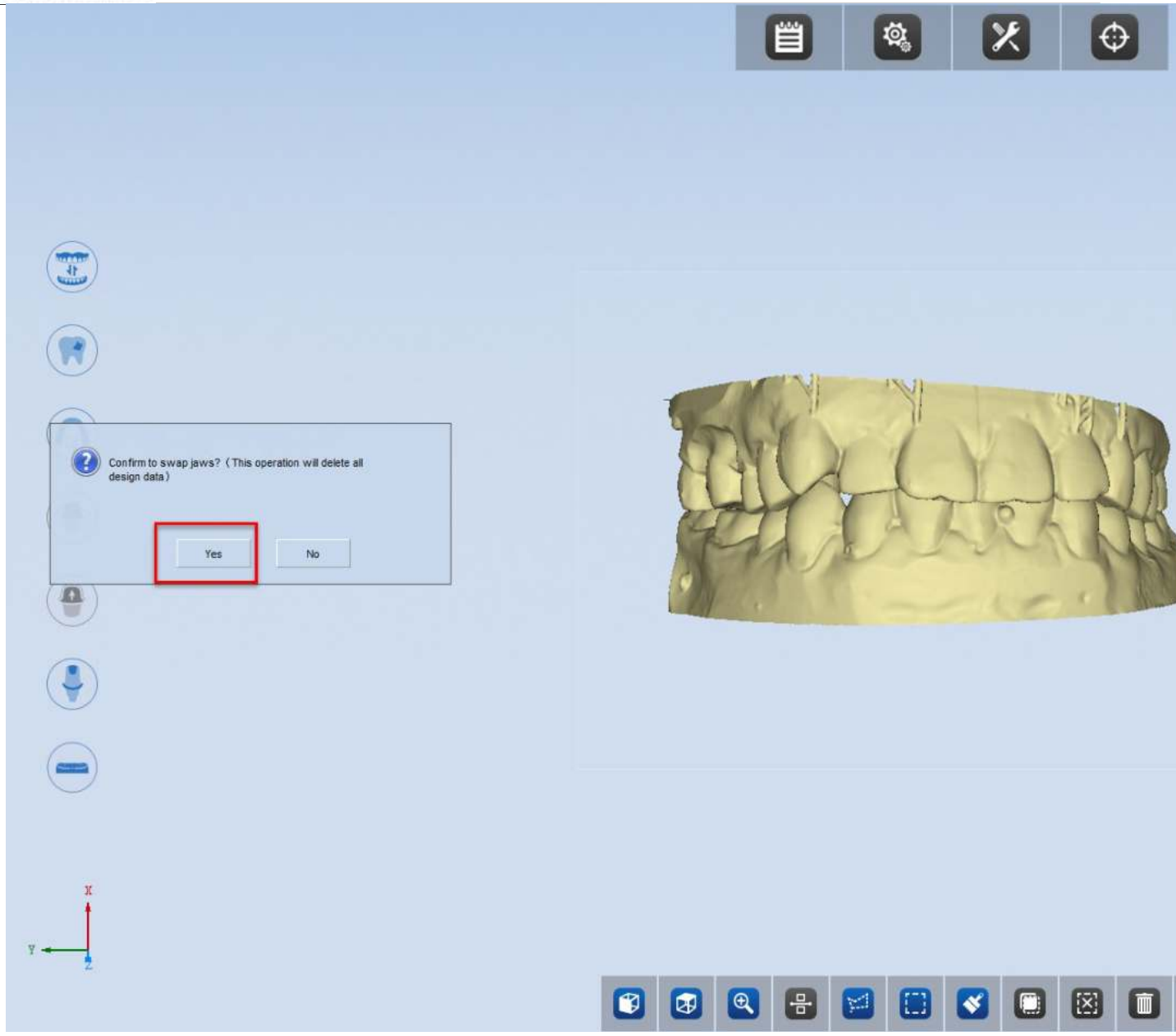
Swap jaws : swap upper jaw data with lower jaw data;

Manually fill holes: all the holes are identified, you can manually select the hol hem;
Mark tooth number : mark the tooth number information of the model ;
Extract margin line: draw and extract the margin ;
Check undercut : display the undercut of the model ;
Seal the screw channel : seal the screw channel of the abutment in a digital way.
Modeling: perform operations of model shell, bottom sealing & lettering

4.1 Swap jaws

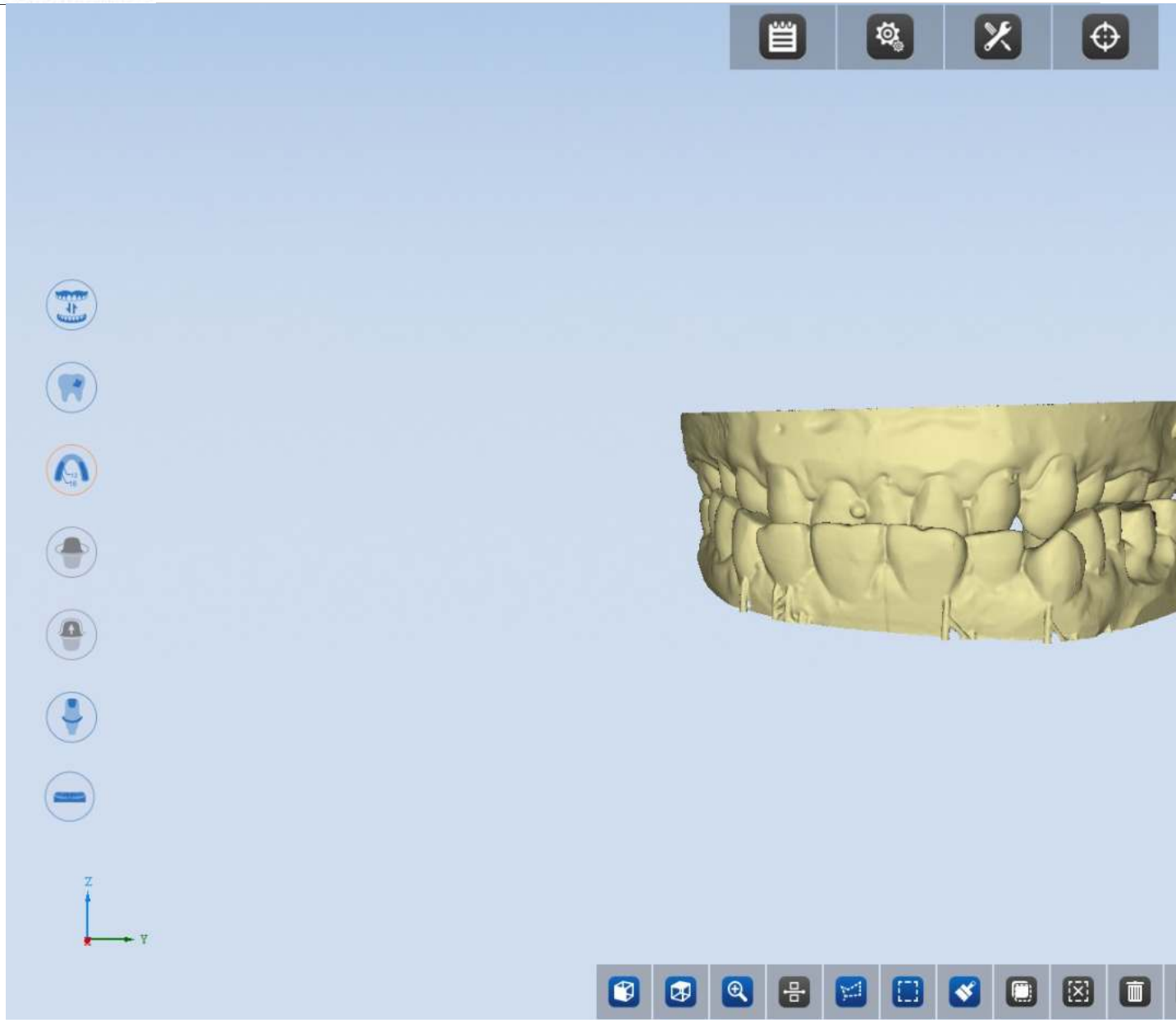
This function is only activated in the scanning cases of “Non-separated model - all in one”and “triple tray”

click button to activate this function.



Note：all the pre-design data will be deleted when using this function.

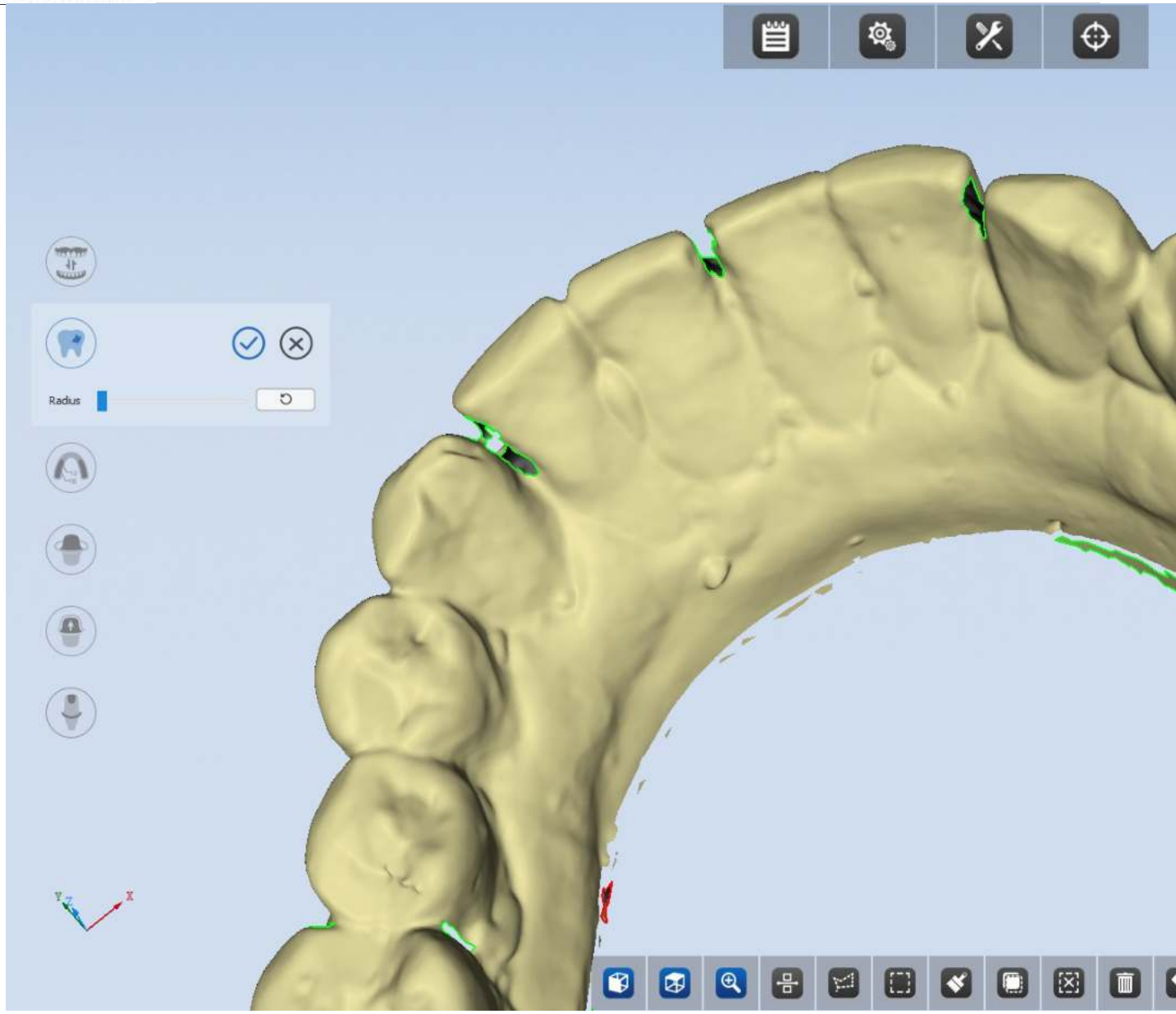
After a successful swap：



4.2 Manually fill holes

This function is enabled for all scanning cases except“Texture scanning”.

click button to activate this function.



The holes in the model will be shown with green borders. Move the slider to adjust the radius for filling holes. Holes whose radius is smaller than set will be filled and displayed with red borders.

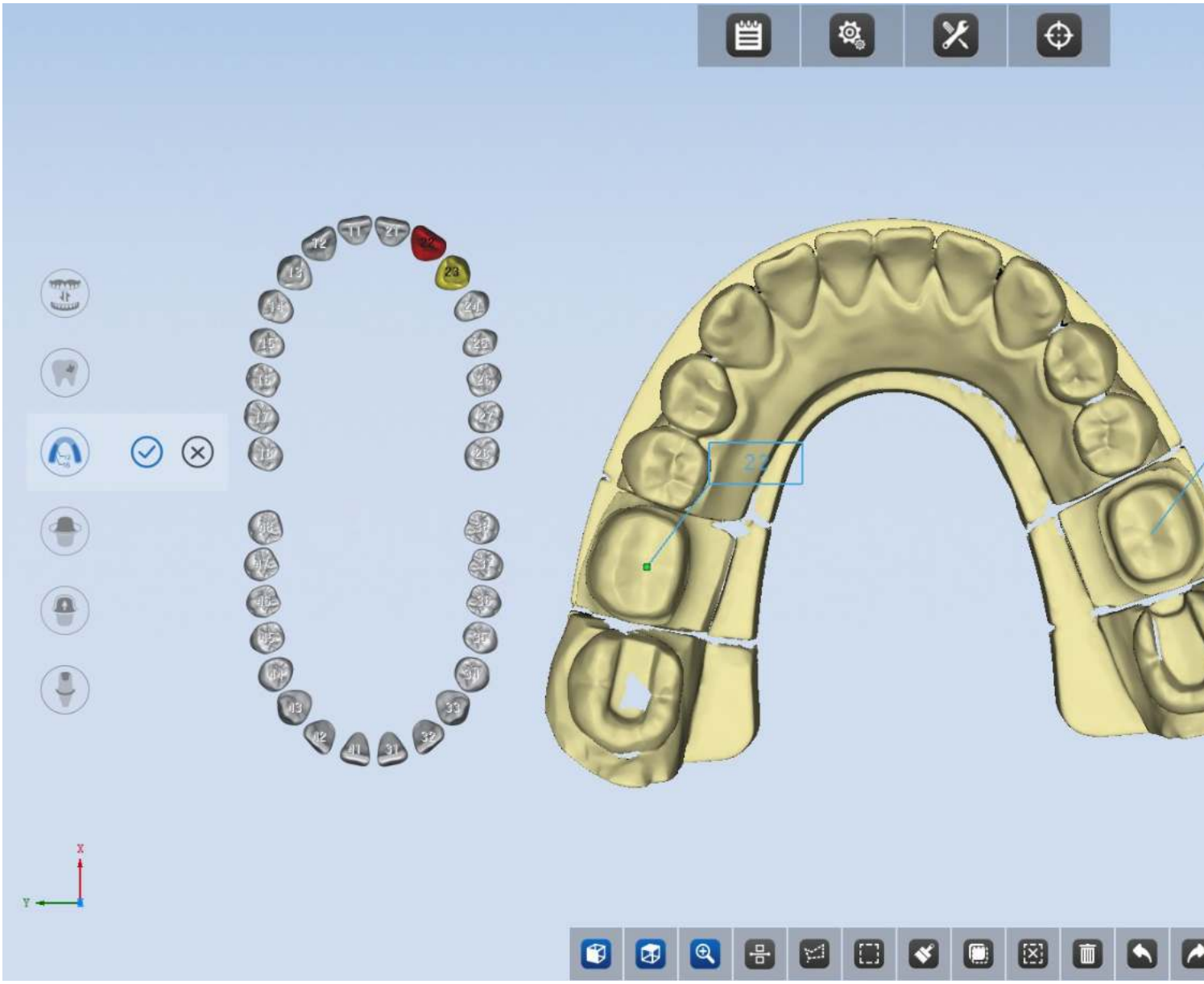
You can left click on the green border to fill the hole; or right click on the red border of the sealed hole to cancel the filling.

Click to cancel all previous filling. Click to apply the current modification and close this function. Click to cancel the current modification and close this function.

4.3 Mark tooth number

This function is enabled for all scanning cases. Die, abutment and scan body will be marked automatically.

If manual tooth marking is required, please click to manually mark tooth.



When tooth in the tooth map is selected as red, double-click the corresponding tooth on the model, then the tooth number is marked.

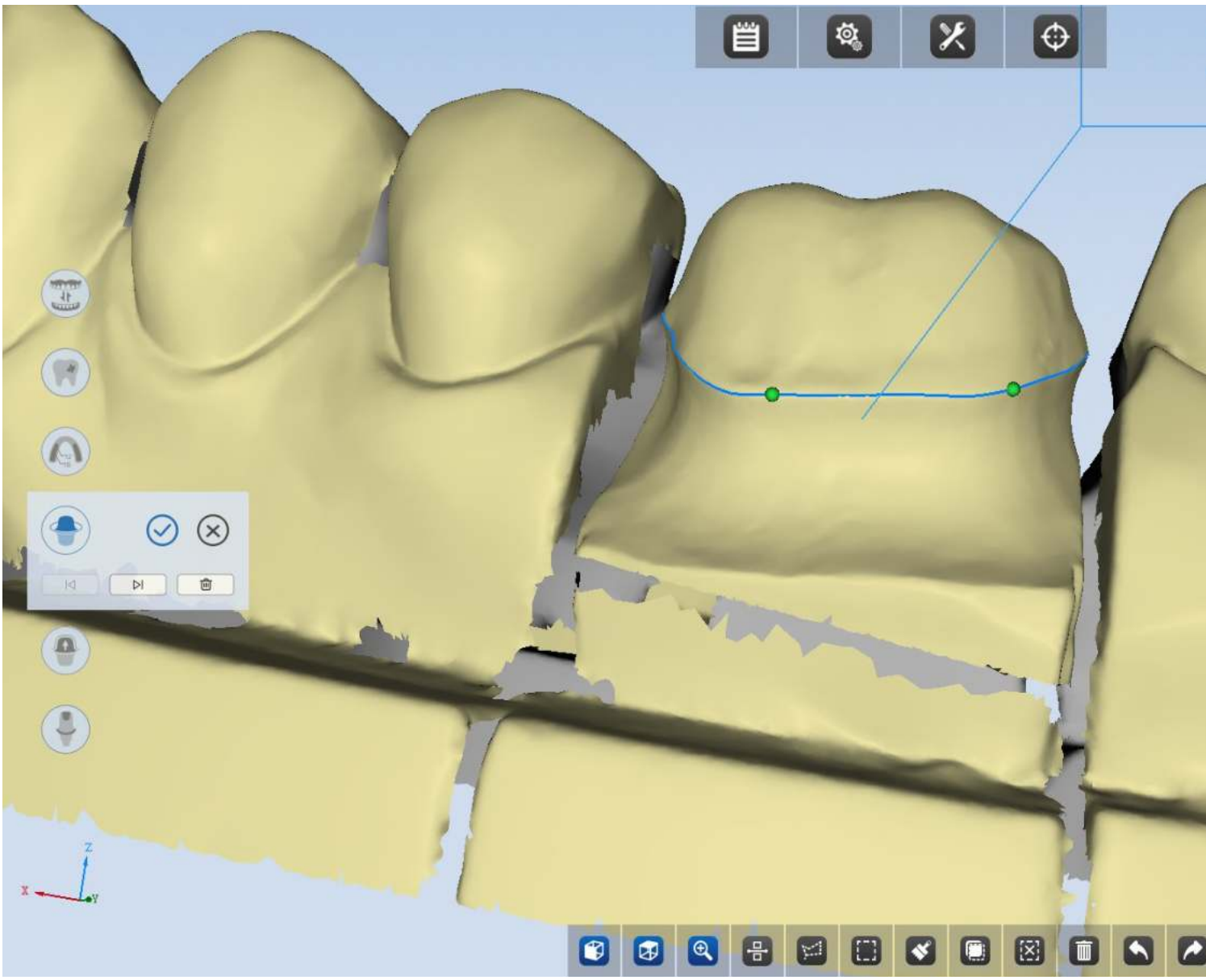
click to apply this modification and close this function. Click

to cancel this modification and close this function.

4.4 Extract margin line

This function will be enabled on the completion interface of all the scanning cases. Tooth number marking is required before using this function.

click to activate this function.



If the tooth number has been marked, the model will be displayed with

the current tooth as the visual center. Double click the left mouse button to generate a green point. By double clicking the point for four times, the margin line will be automatically generated.

If you are not satisfied with the automatically generated margin line, you can continue to double-click to add points, the new margin line will be adjusted along these additional points. You can also hold down the left mouse button and drag the points to adjust the margin line.

The point will turn to red after you left click it, which means the point is selected. At this time, you can click to delete the point. If the point is not selected before you click , all the points and margin will be deleted.

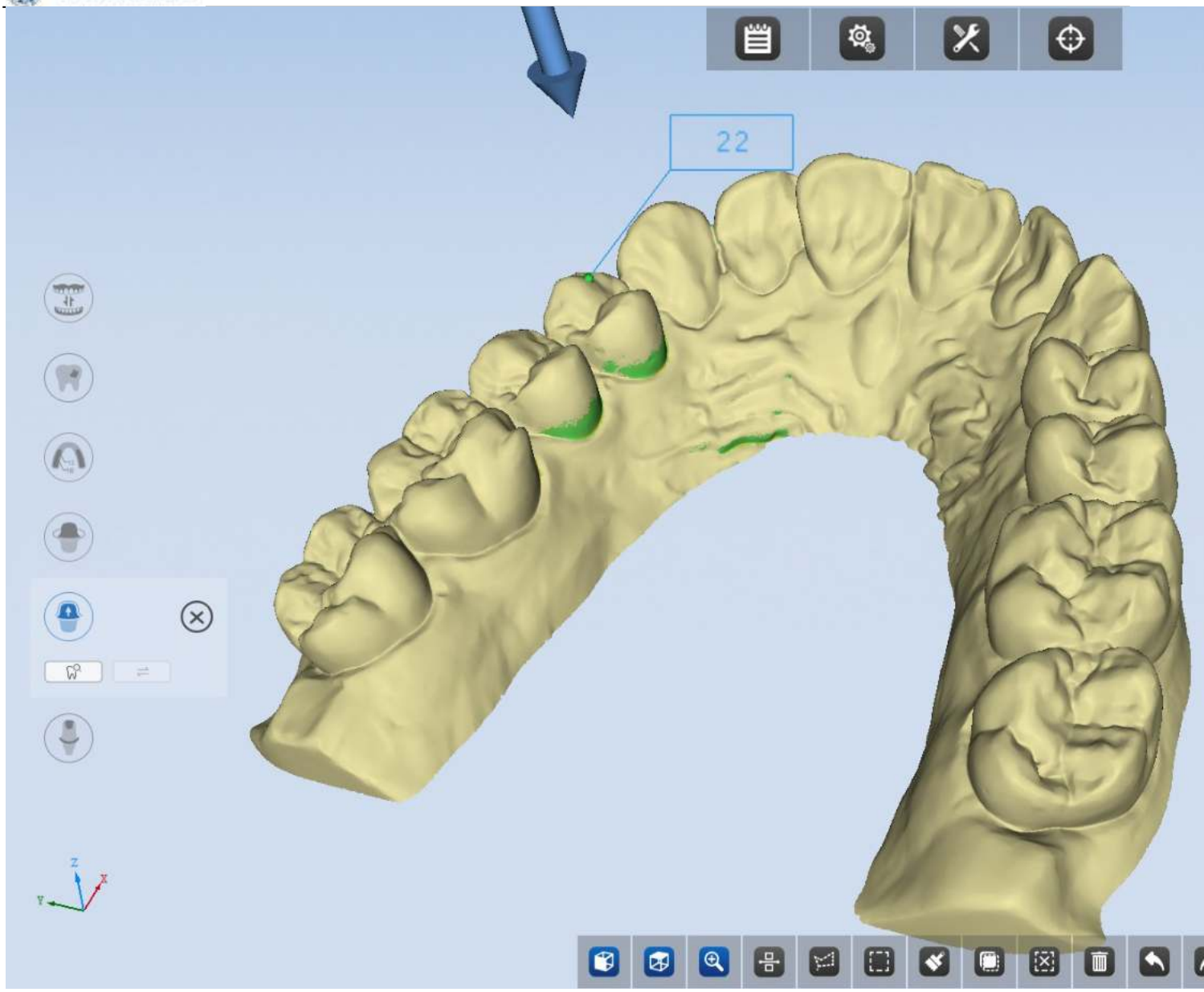
Click or to switch between the teeth.

Click to apply current modification and close this function. Click to cancel current modification and close this function.

4.5 Check undercut

This function will be enabled on the completion interface of all the scanning cases. Tooth number marking is required before using this function.

Click to activate this function：



Click or double-click the left mouse button to generate undercut.

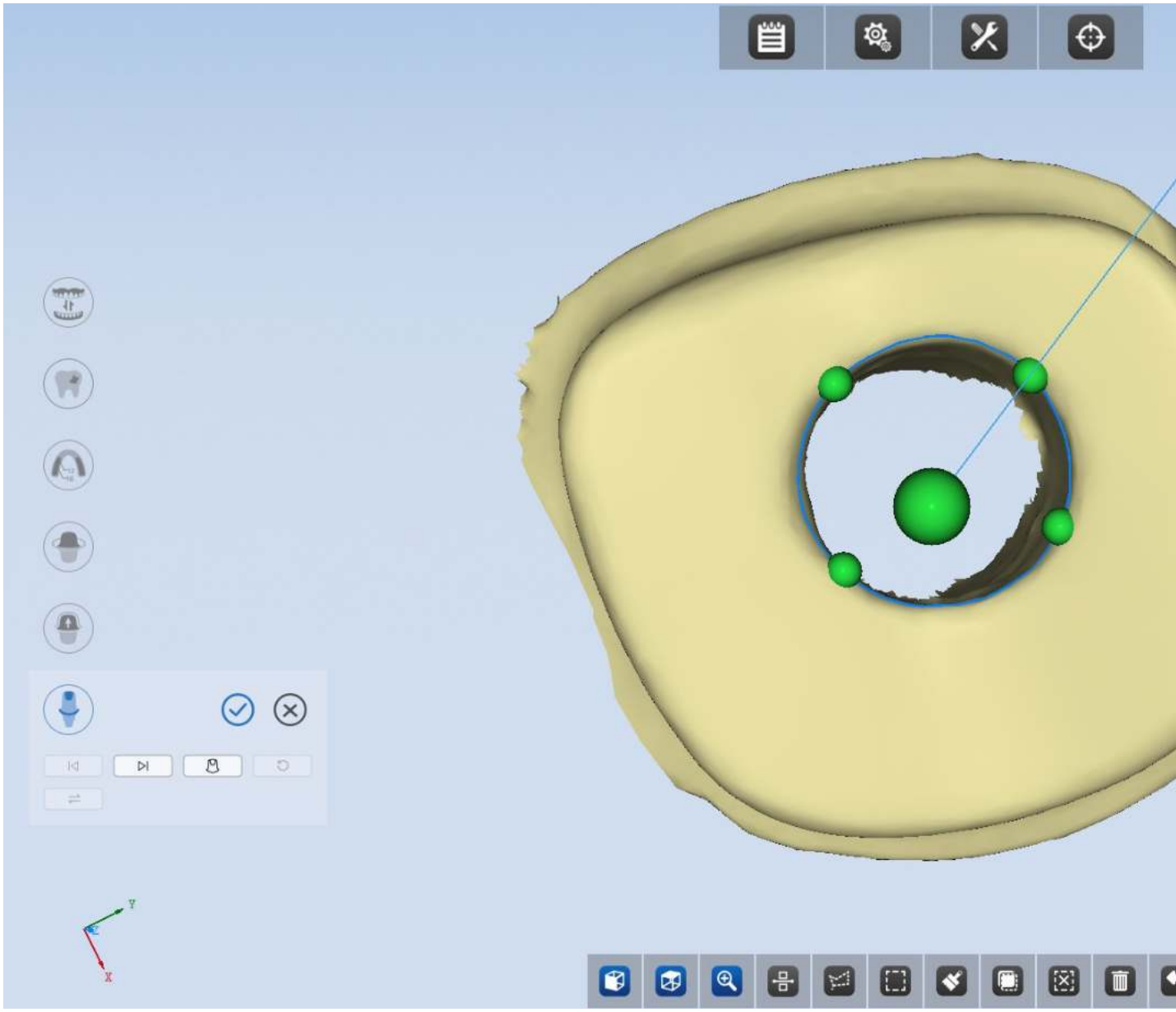
Click to swap upper and lower jaw.

Click to close this function.

4.6 Seal the screw channel

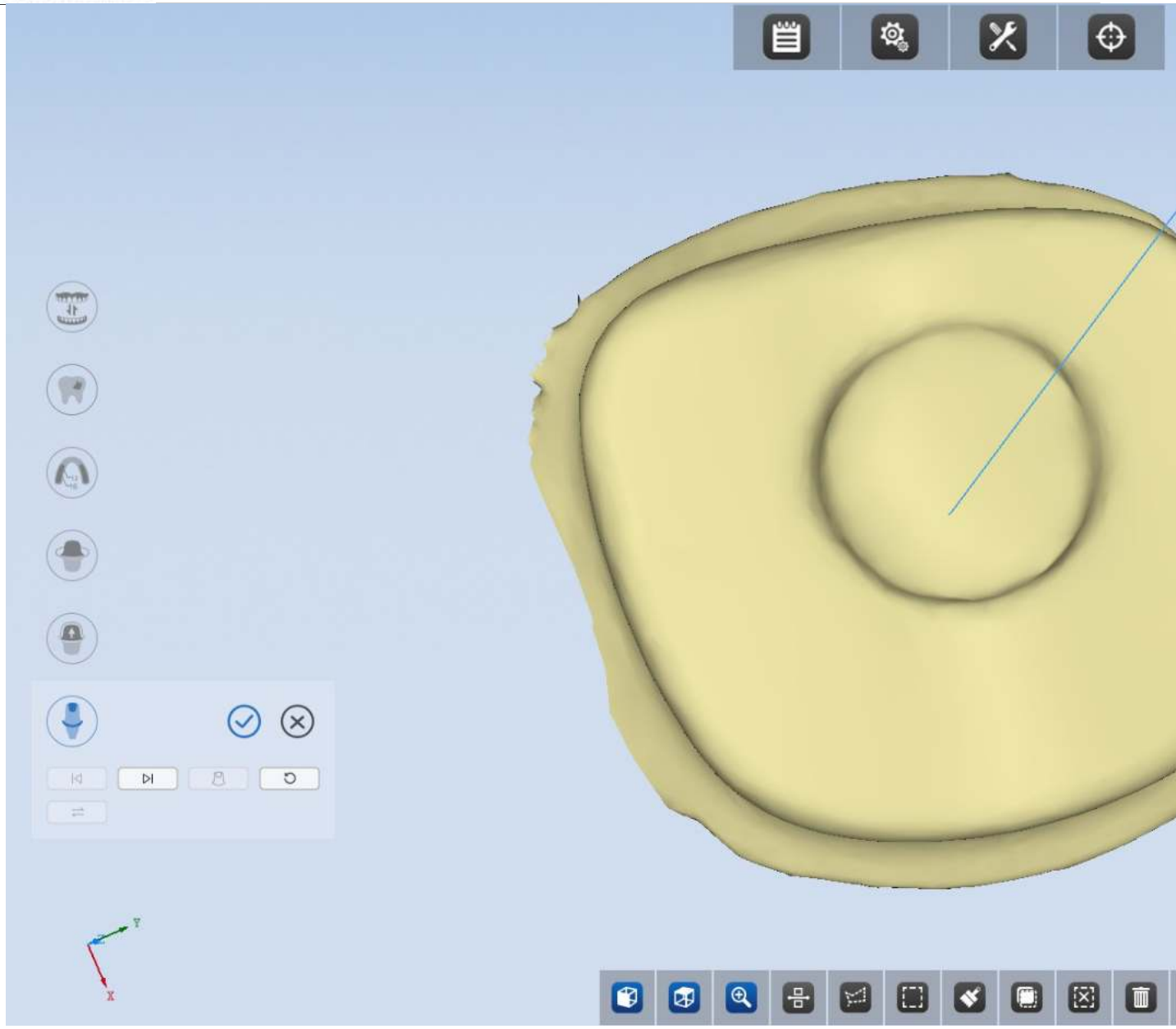
Seal the screw channel of the abutment in a digital way.

Click to activate this function.



If the tooth number has been marked, the model will be displayed with the current tooth as the visual center. Double click the left mouse button to generate a green point. By double clicking the point for four times, the sealing line will be automatically generated.

Click to seal the screw channel. The sample is as follows:



Click 、 to switch between the abutments.

Click to cancel previous sealing (Note: once only).

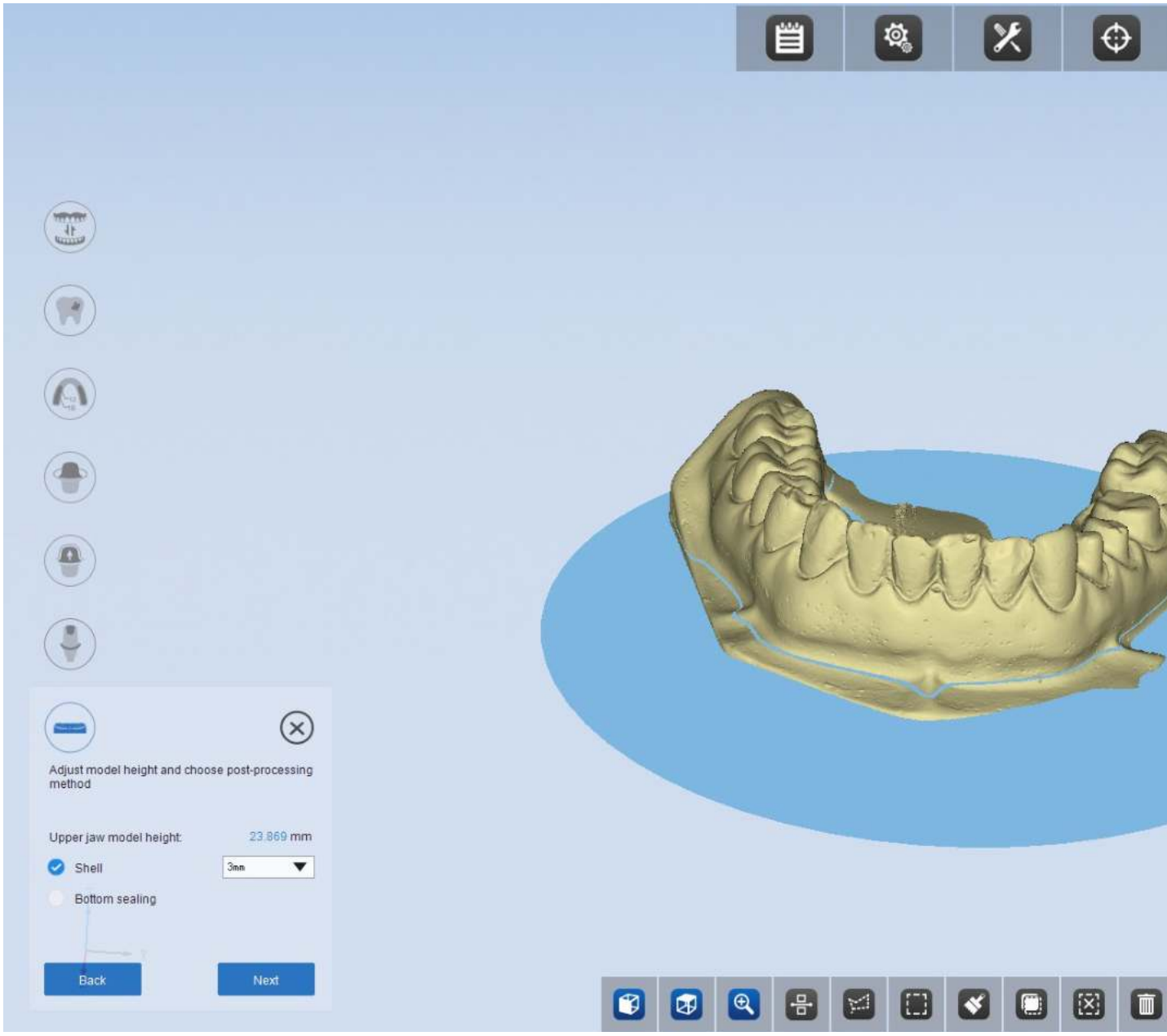
Click to swap upper and lower jaw.

Click to apply current modification and close this function. Click to cancel current modification and close this function.

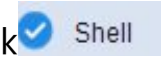
4.7 Modeling

Modeling:This function is only available during impression scanning

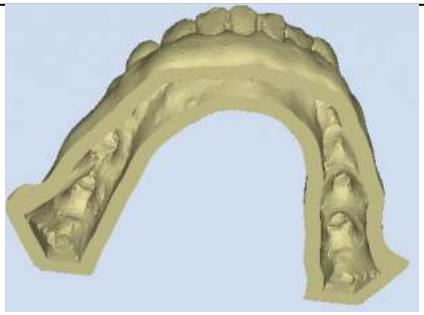
and non-separated model scanning.



Click to excute the operation of model shell, bottom sealing and lettering.

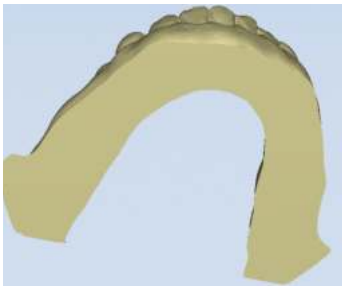
Drag the blue disk to adjust the height of the model, select the modeling method, click 

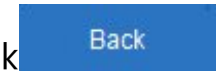
and select the height of the shell from the



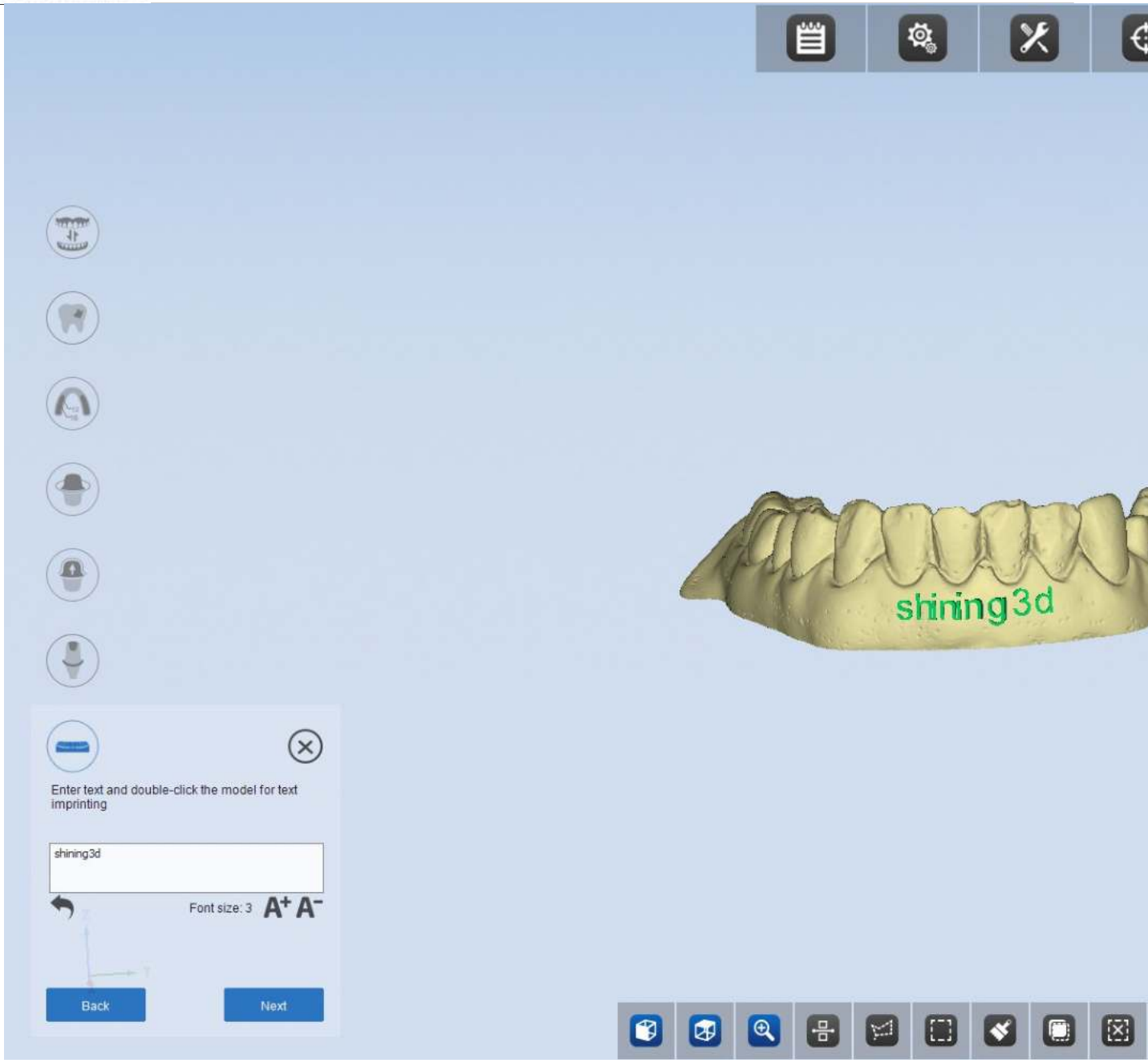
drop-down box. Then click Next. The shell is done.

Click then click "next", bottom sealing is finished.



Click  to go back to the previous step.

Type content in the input box & double-click the model to display the lettering information, drag the font on the model to change its position Magnify the font size Reduce the font size. The sample is as follows



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Clicking will generate a complete model and exit the modeling function. Click to cancel the current modification and exit the modeling function.

5. Scan Type

The scan type contains “Separated model”, “ Non separated model”, “Impression” and “Die”.Following orders are all created through DntalManager.exe. The following examples of scan type are all based on the condition that the “Occlusion” type is “None”.

Note :

1.After a model is scanned, you can “Add scan”and “Edit”it. If you go to the next interface and click “Back”to return, you will not be able to “add scan”to the model, but you can still edit it. If you need to add scan to this model, you must go back to the interface of “please insert the model”step to scan again.

2. Under the interface of “please insert the model”and click “Next”, you can not “add scan” to the model if you use the existing model, but you can edit it.

3. When the number of crown and veneer is no more than 8, you can scan these models at a time. If the number is more than 8, you need to scan these models more than one time.

4. You can scan only one inlay each time. If there are several inlays in an order, you should scan several times correspondingly.

5.1.1. Separated Model

The“Separated Model” is designed especially for the separated model, which contains scan types as follows: single crown, inlay, veneer, wax crown, wax inlay, combination and so on.

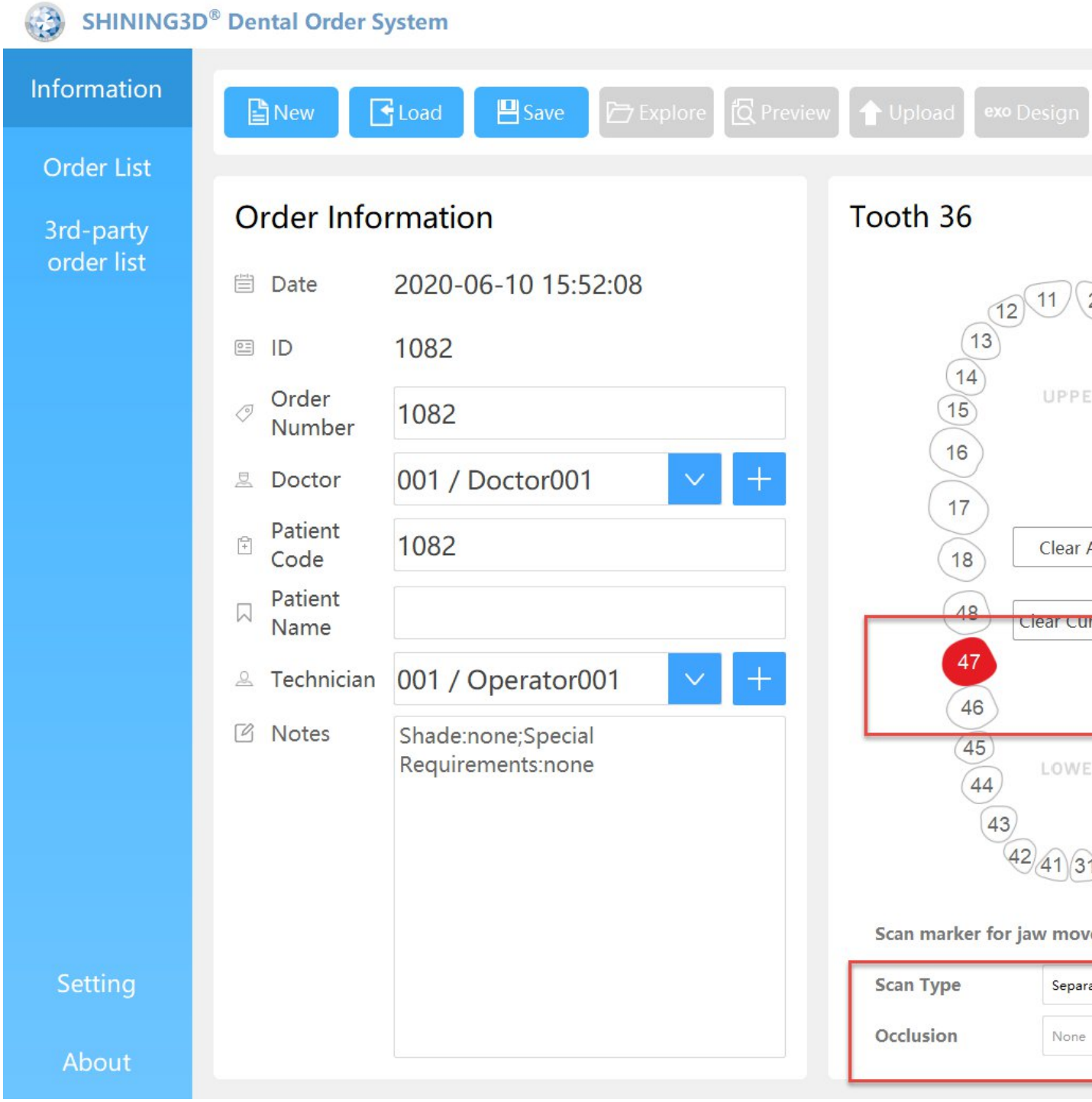
You need to clamp the model during scanning, please refer the following links for the reference.

1. The clamping of crown: please refer to the clamping of a jaw
2. The clamping of tooth: please refer to Tooth clamping
3. The clamping of inlay: please refer to Inlay clamping
4. The clamping of implant: please refer to Implant clamping

5.1.1.1. Crown

(1) Create Order

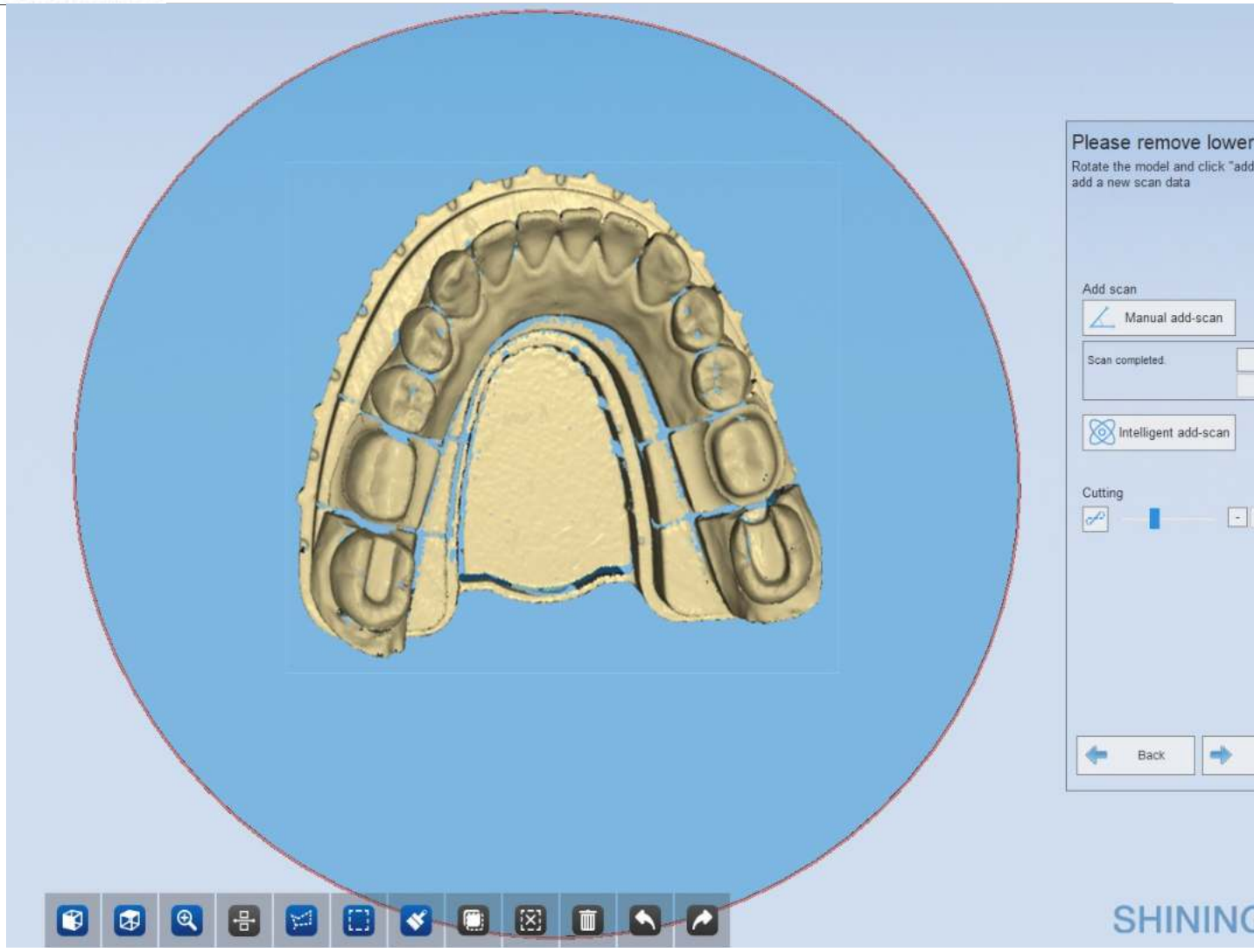
You can choose “Single Crown”in the “Crown”, then choose the tooth to be scanned (you can choose one or several teeth at a time) ; the “Scan type”is “Separated Model”and the “Occlusion” type is “None”, shown as the figure below.



(2) Scan Jaw

After creating the order, click “Scan”, the following interface will pop up. According to the tips on the interface, insert upper/lower jaw, and click “Next”.

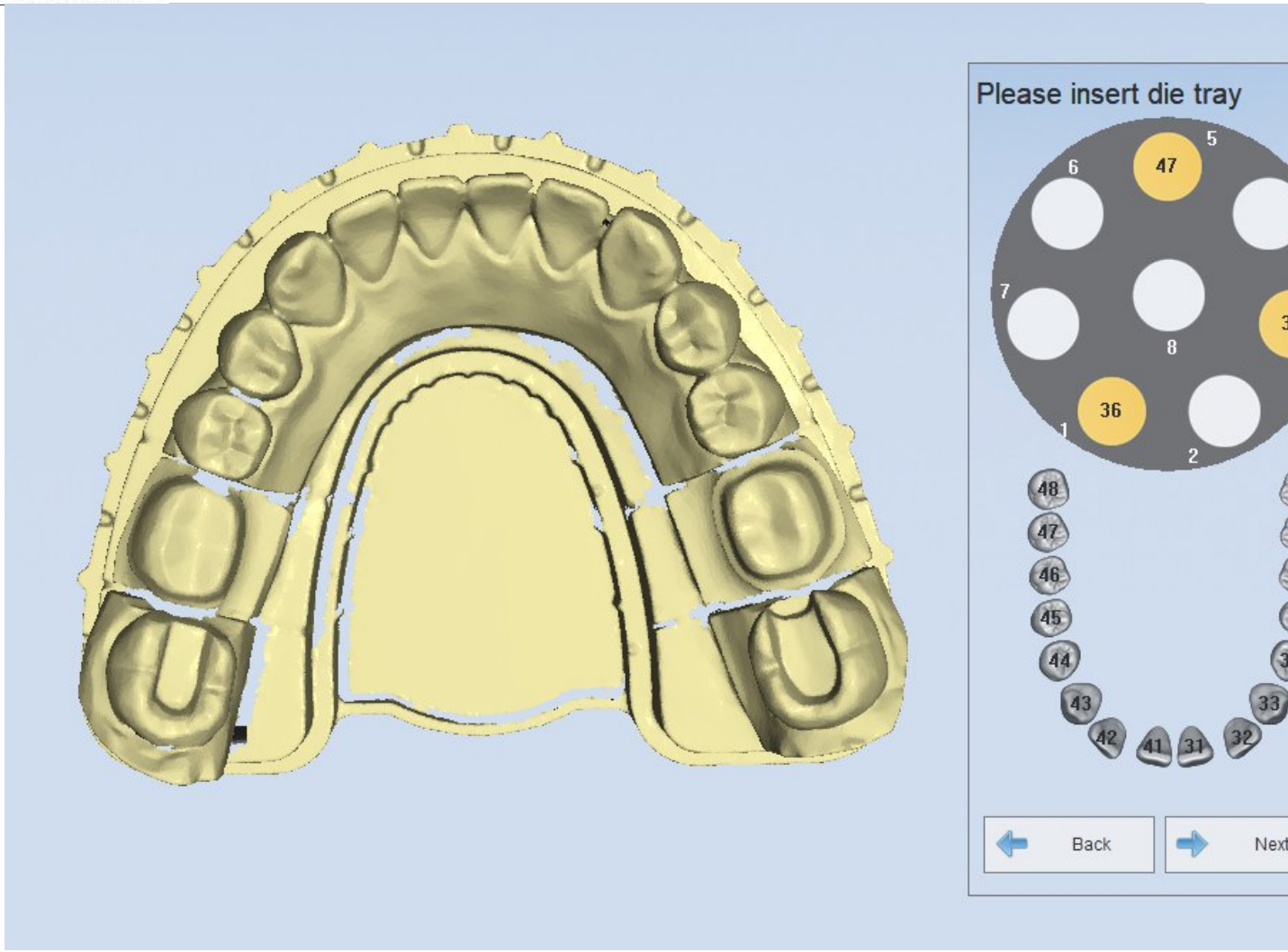
After automatic scanning, you can click “Add Scan” to have better scanning result if need be. Then you can click “Apply” for data optimization as below.



Note : After a model is scanned, you can “add scan”and “Edit”it. If you enter the next interface and click “Back”to return, you will not be able to“add scan”to the model, but you can still edit it.

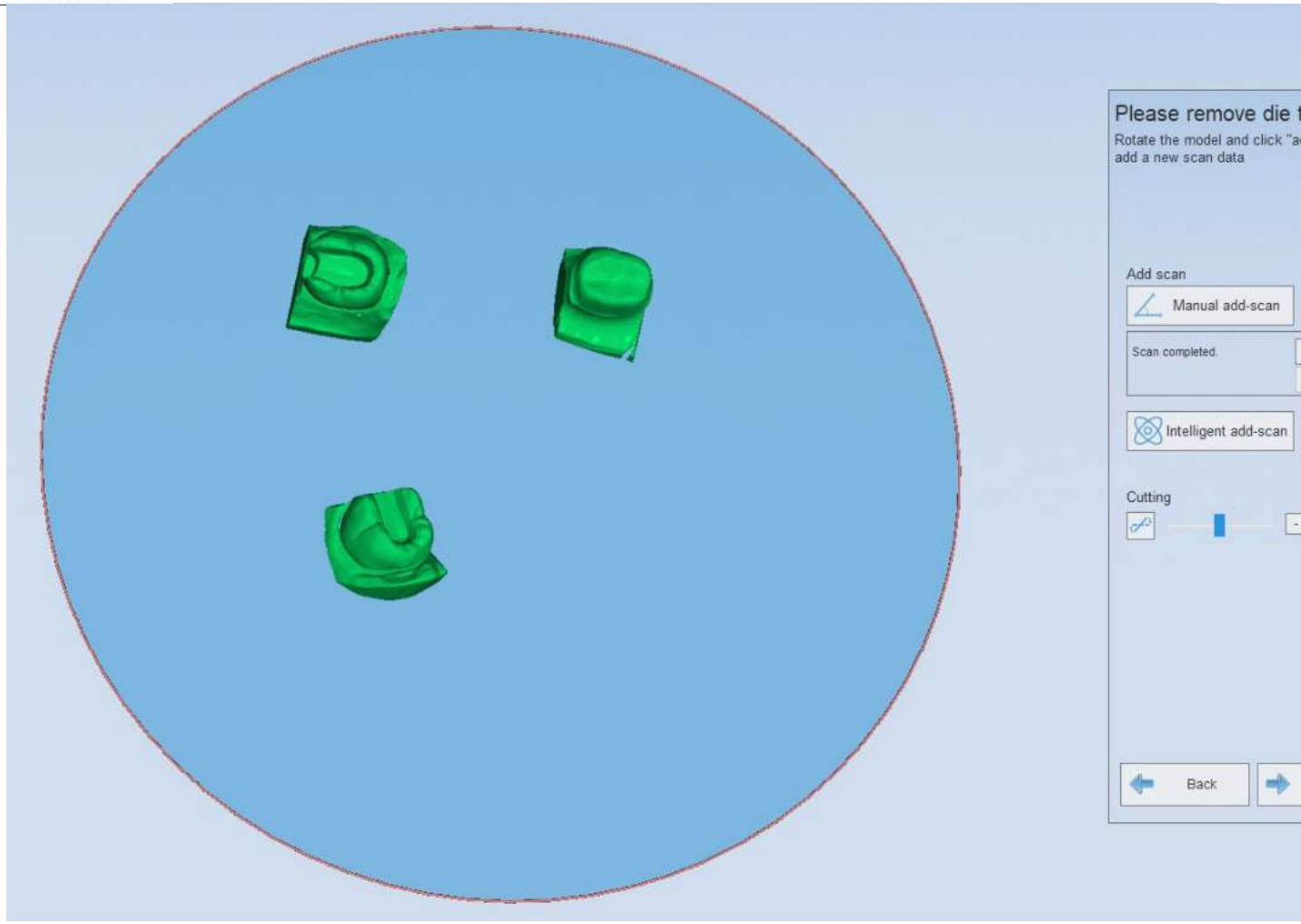
(3) Scan Tooth

After scanning the jaw, click “Next”, it will enter the scan interface, shown as the figure below. Then insert the tooth according to the tips.



Note: When the number of crown and veneer is no more than 8, you can scan these models at a time. If the number is more than 8, you need to scan these models more than one time.

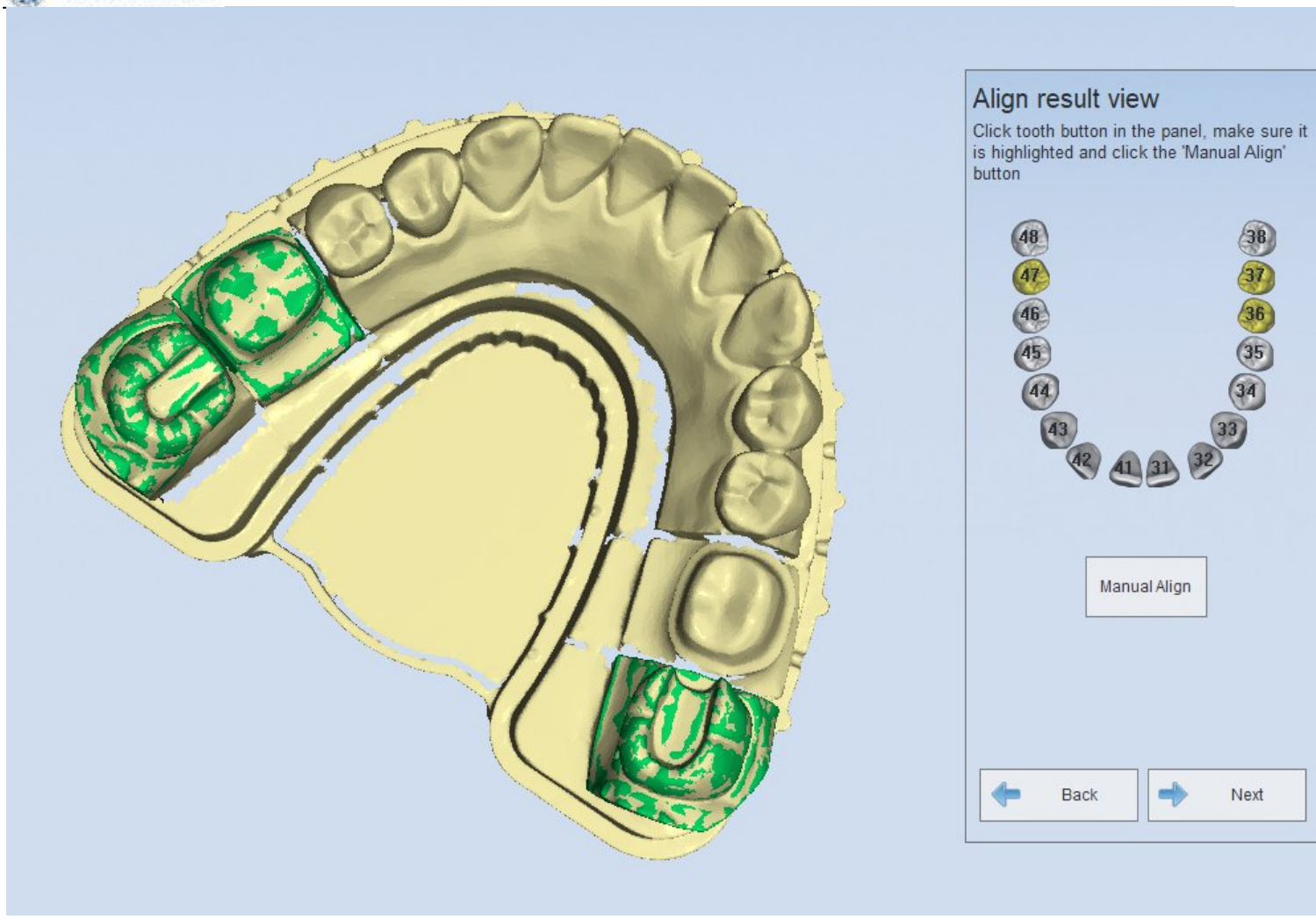
After automatic scanning, you can click “Add Scan” to have better scanning result if need be. Then you can click “Apply” for data optimization as below.



Note : After the model is scanned, you can “add scan”and “Edit”it. If you enter the next interface and click “Back”, you will can not “add scan”the model, but you can edit it only.

(4) Auto Alignment

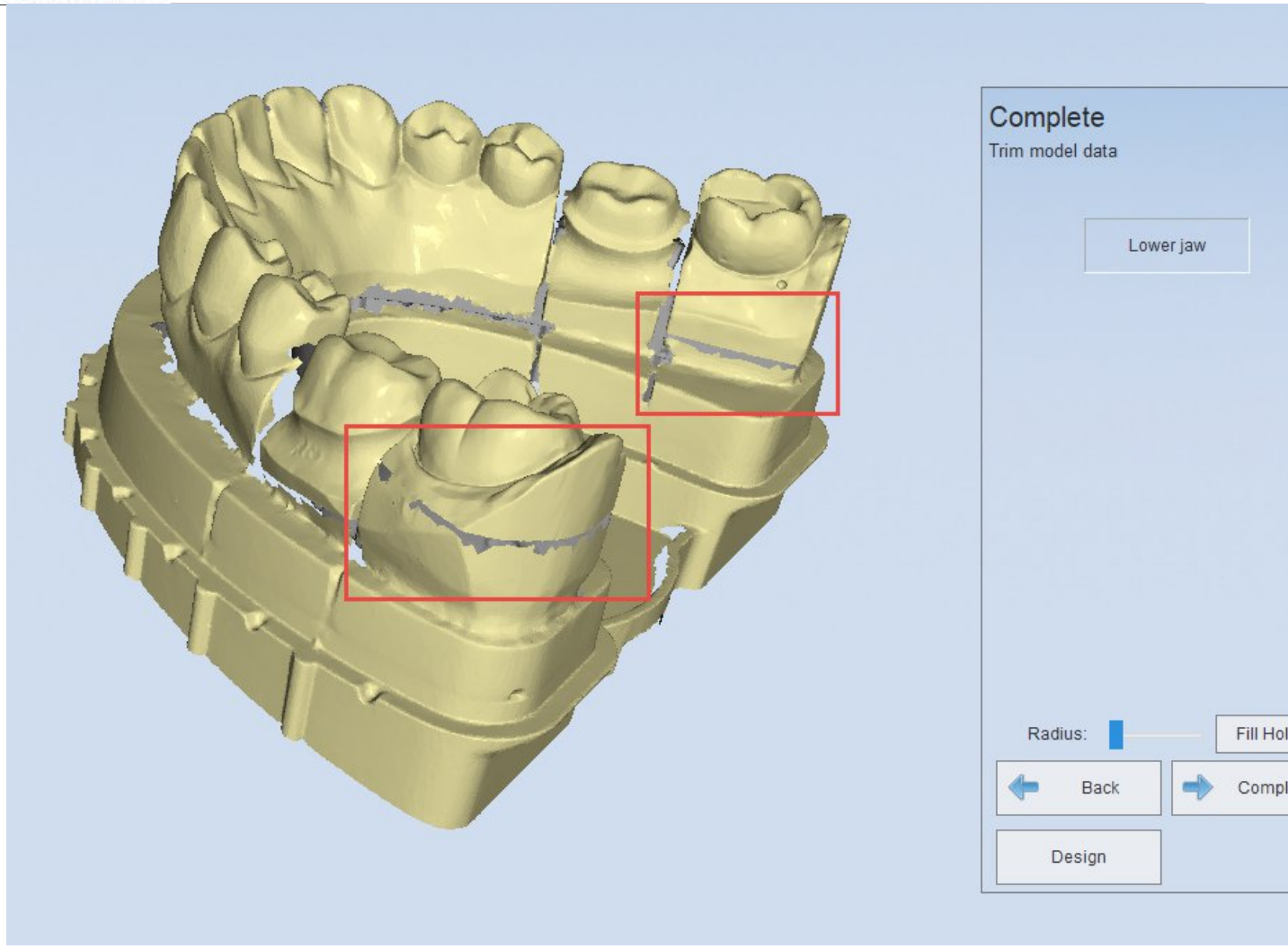
After completing the die scan, click “Next”to enter the auto alignment interface, shown as the figure below.



Note : After the alignment fails, you can align the model manually.

(5) Completing scan

After the alignment is completed, click “Next”, the interface will pop up, shown as the figure below. Click “complete”, the whole order is completed.

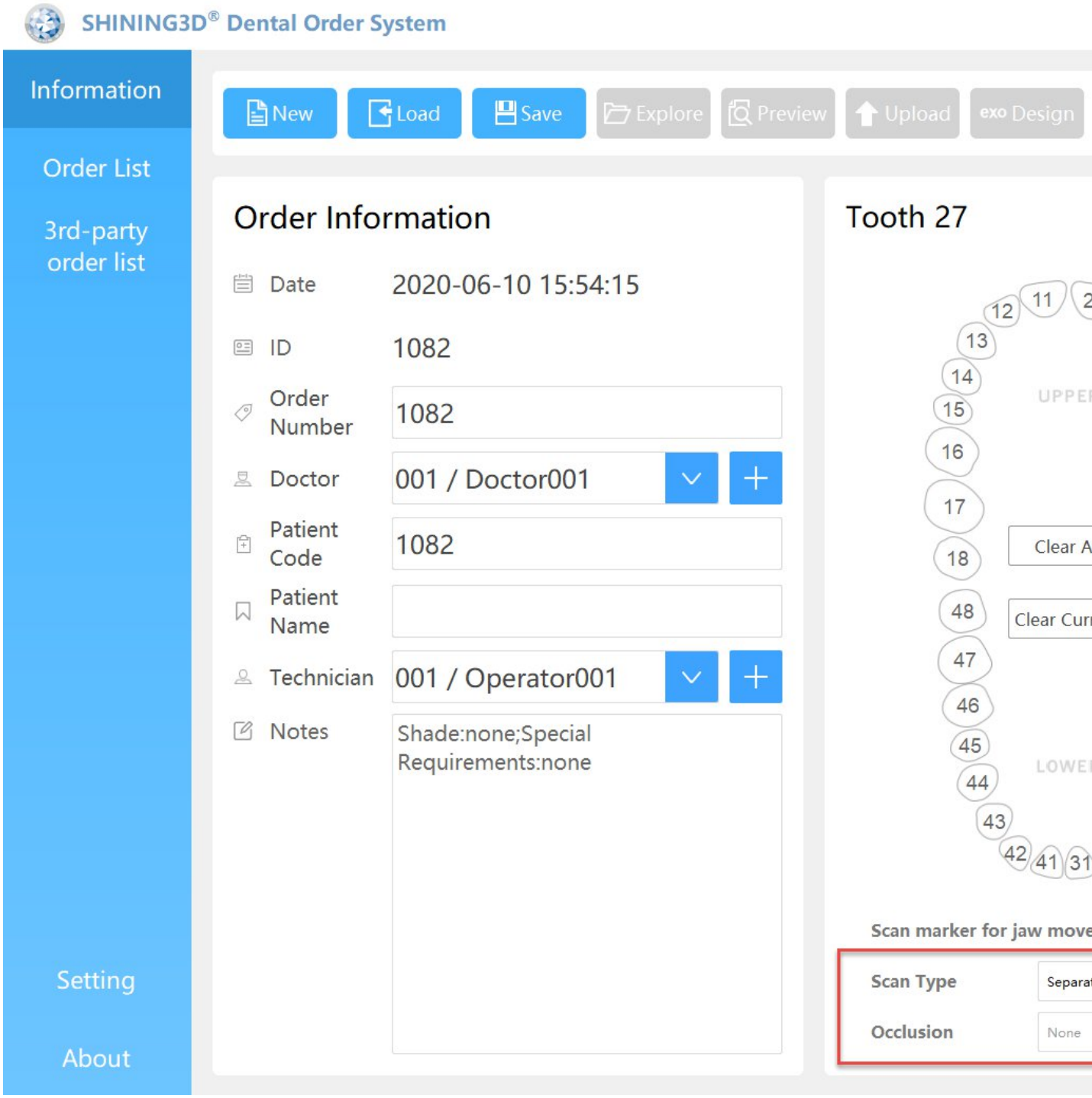


Rotate the jaw to observe that there are parting line between the aligned tooth and jaw, shown as the figure below.

5.1.1.2. Inlay

(1) Create order

You can choose “Single inlay”in the “Inlay/Onlay”, then choose the tooth to be scanned (26 and 27) , the “Scan type”is “Separated model”and the “Occlusion” type is “None”, shown as the figure below.

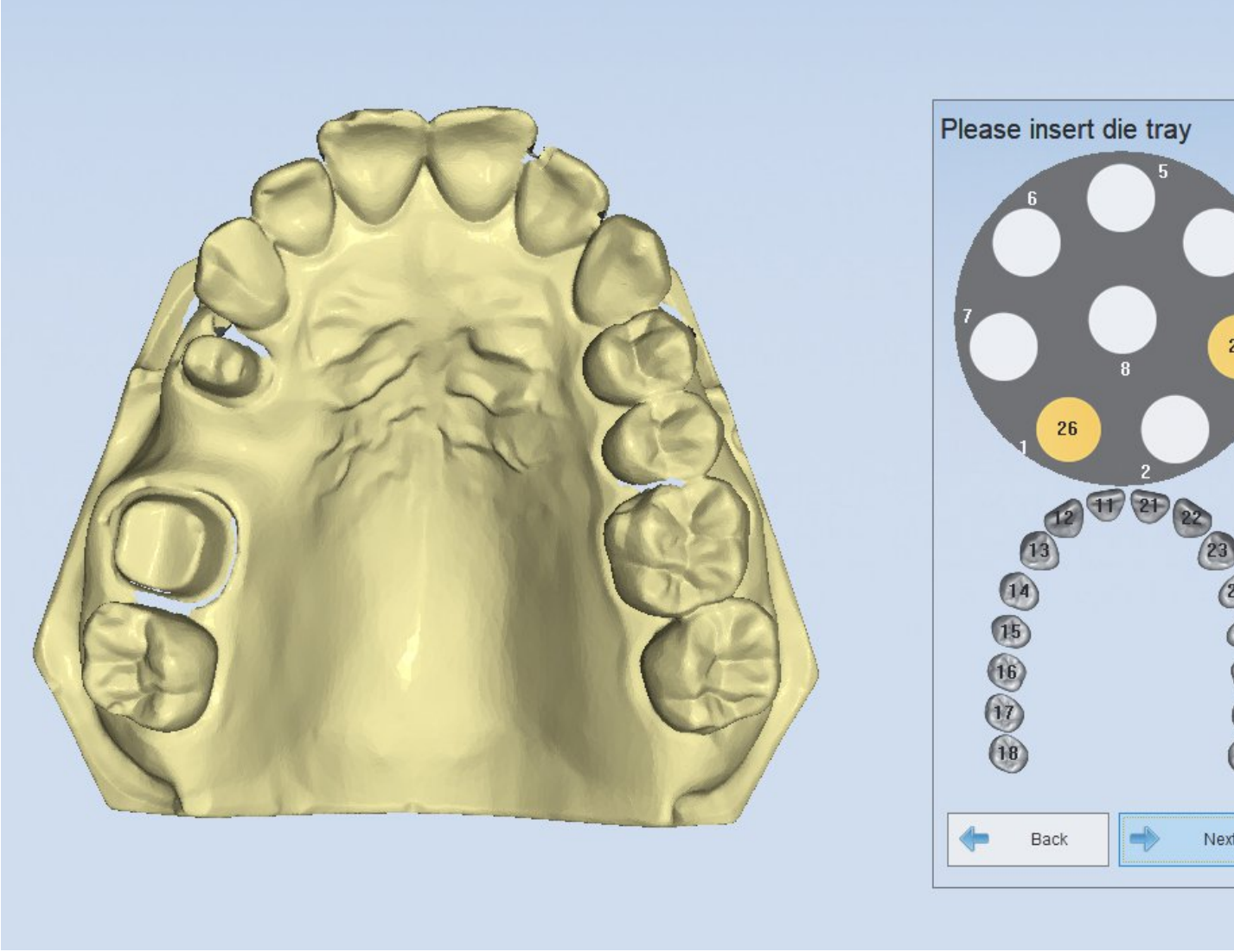


(2) Scan Crown

The scan operation is the same with the “Single jaw”in the “Separated model”, refer to the Crown for the operation.

(3) Scan the first tooth

Insert the tooth “26、27”into the die according to the prompts, then begin to scan, refer to Scan Tooth .

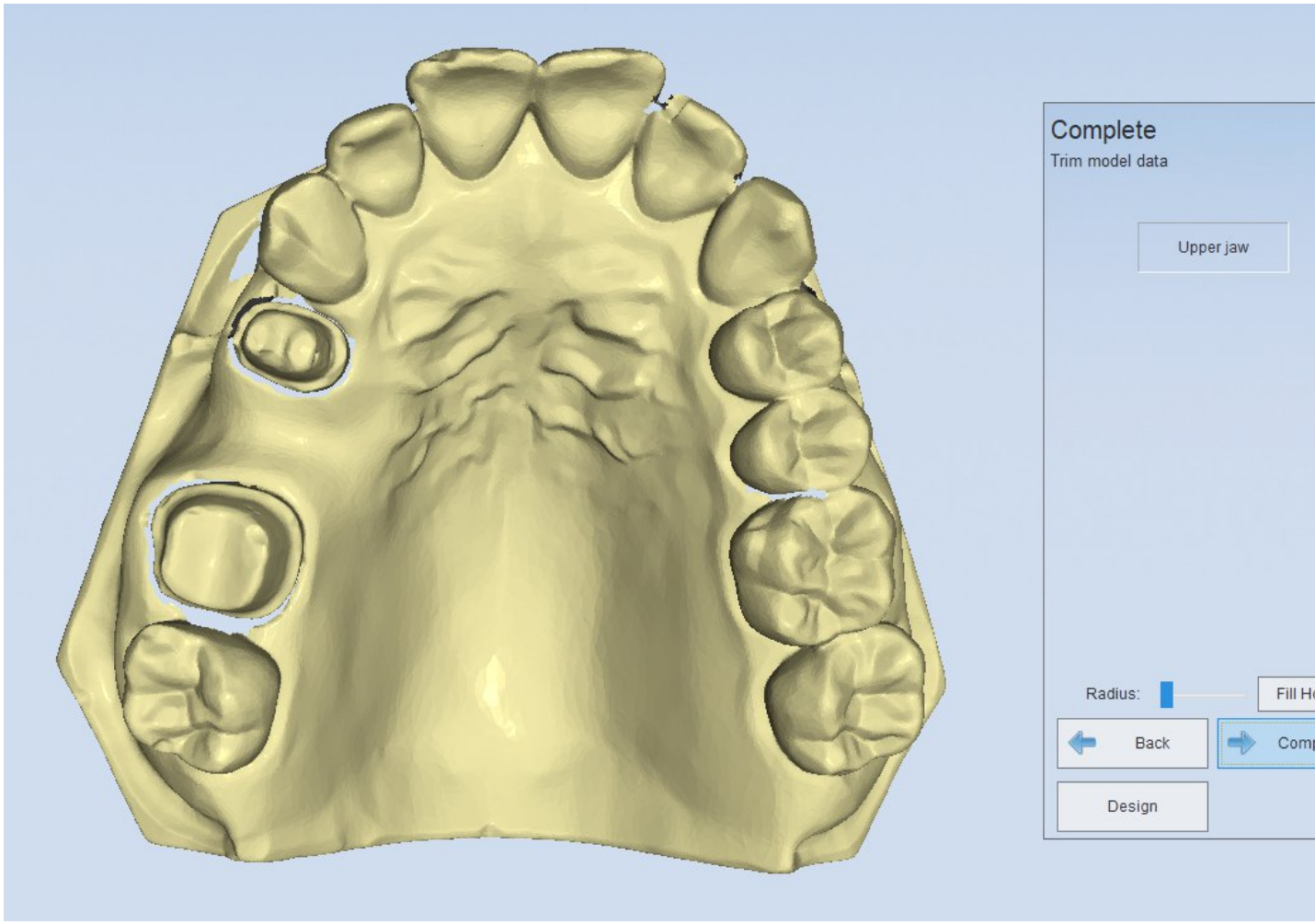


(4) Auto alignment

After the scan of the tooth“26、27”is completed, it will enter to auto alignment. Refer to Auto Alignment for operation.

(5) Completing scan

After the alignment is completed, click “Next”, the interface will pop up, shown as the figure below. Click “complete”, the whole order is completed.

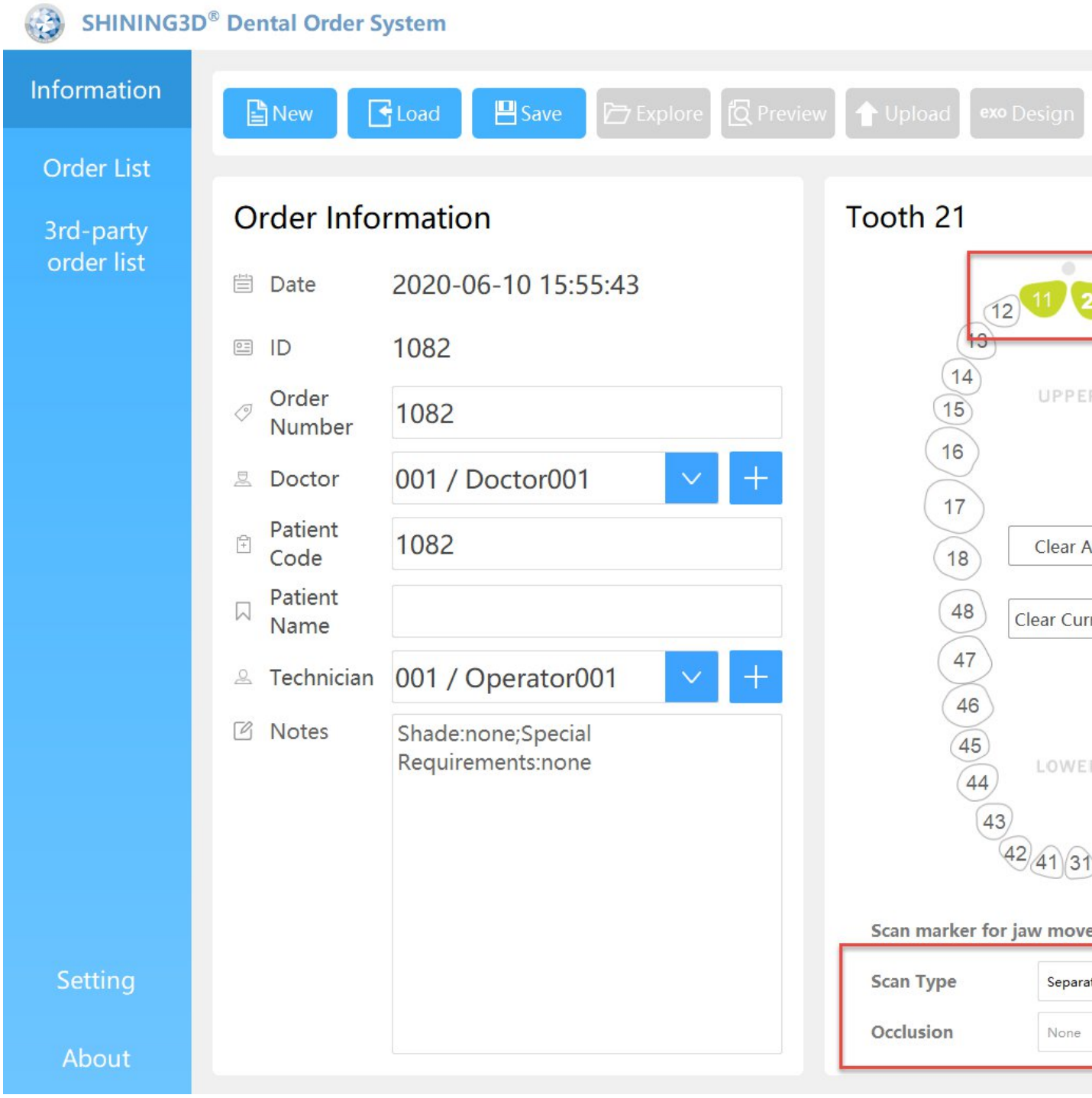


Note: You can scan only one inlay at each time. If there are several inlays in a order, you should scan several times.

5.1.1.3. Veneer

(1) **Create order**

You can choose “Veneer”in the “Inlay/Onlay”, then choose the tooth to be scanned , the “Scan type”is “Separated model”and the “Occlusion” type is “None”, shown as the figure below.



(2) Scan Crown

The scan operation is the same with the “Single jaw”in the “Separated model”, refer to the Crown for the operation.

5.1.1.4. Implant

There are four types of restoration for implant as follows

implant

abutment

implant wax

abutment wax

Note:

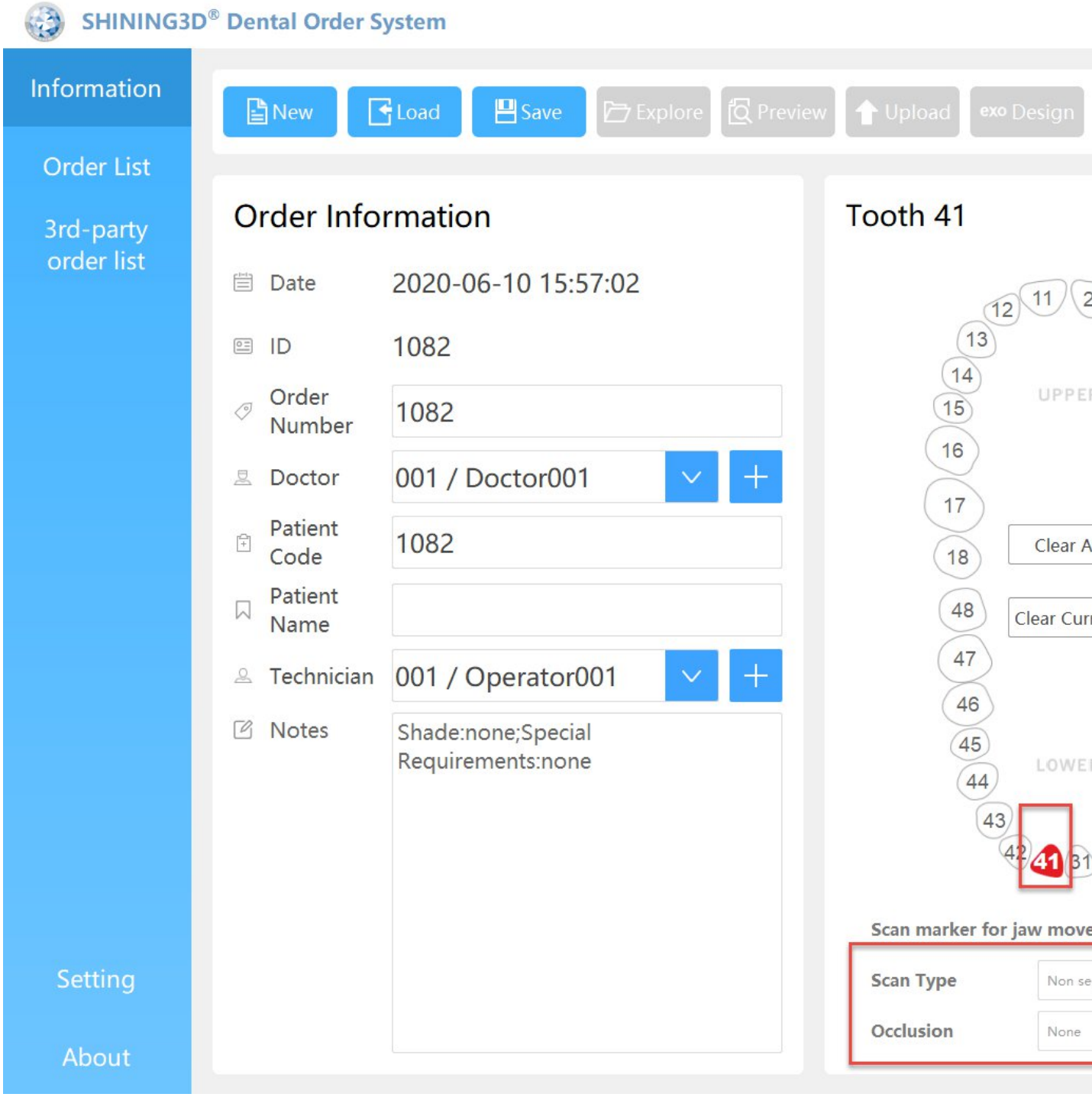
During the implant scanning process, either upper jaw or lower jaw can be scanned with implant. If there are implant on both upper and lower jaws, it will lead to scanning and design error.

5.1.1.4.1. Implant

Implant includes 6 steps: Create order, Scan bridge wax,Scan gingiva, Scan scan bar, extract the implant bar, Complete.

(1) Create order

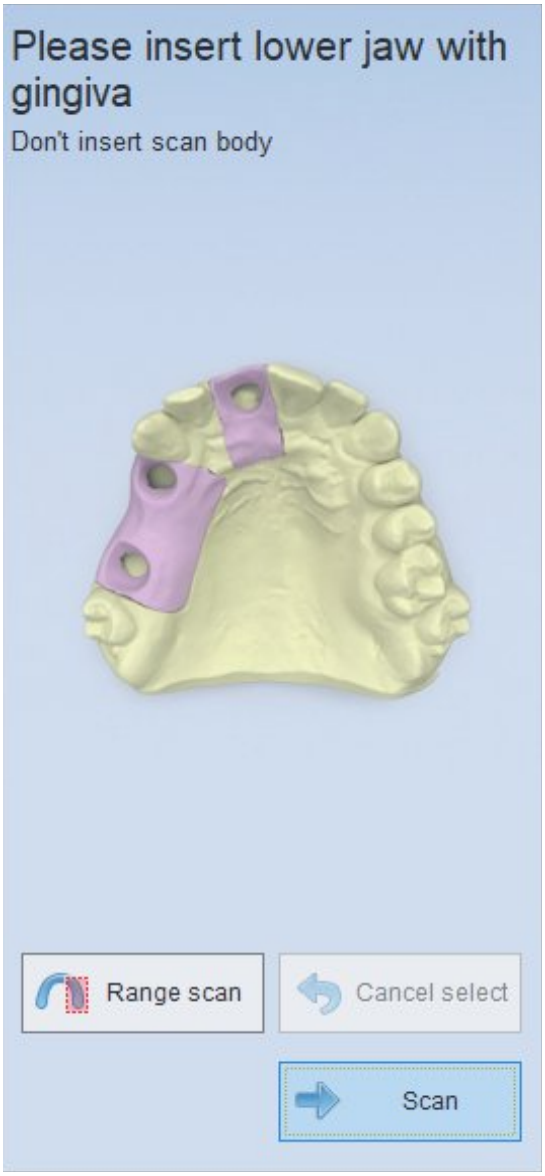
Choose “Implant”in the interface, then choose the tooth location of the implant, shown as the figure below. The “Scan type”is “Separated Model”and the “Occlusion” type is “None”.



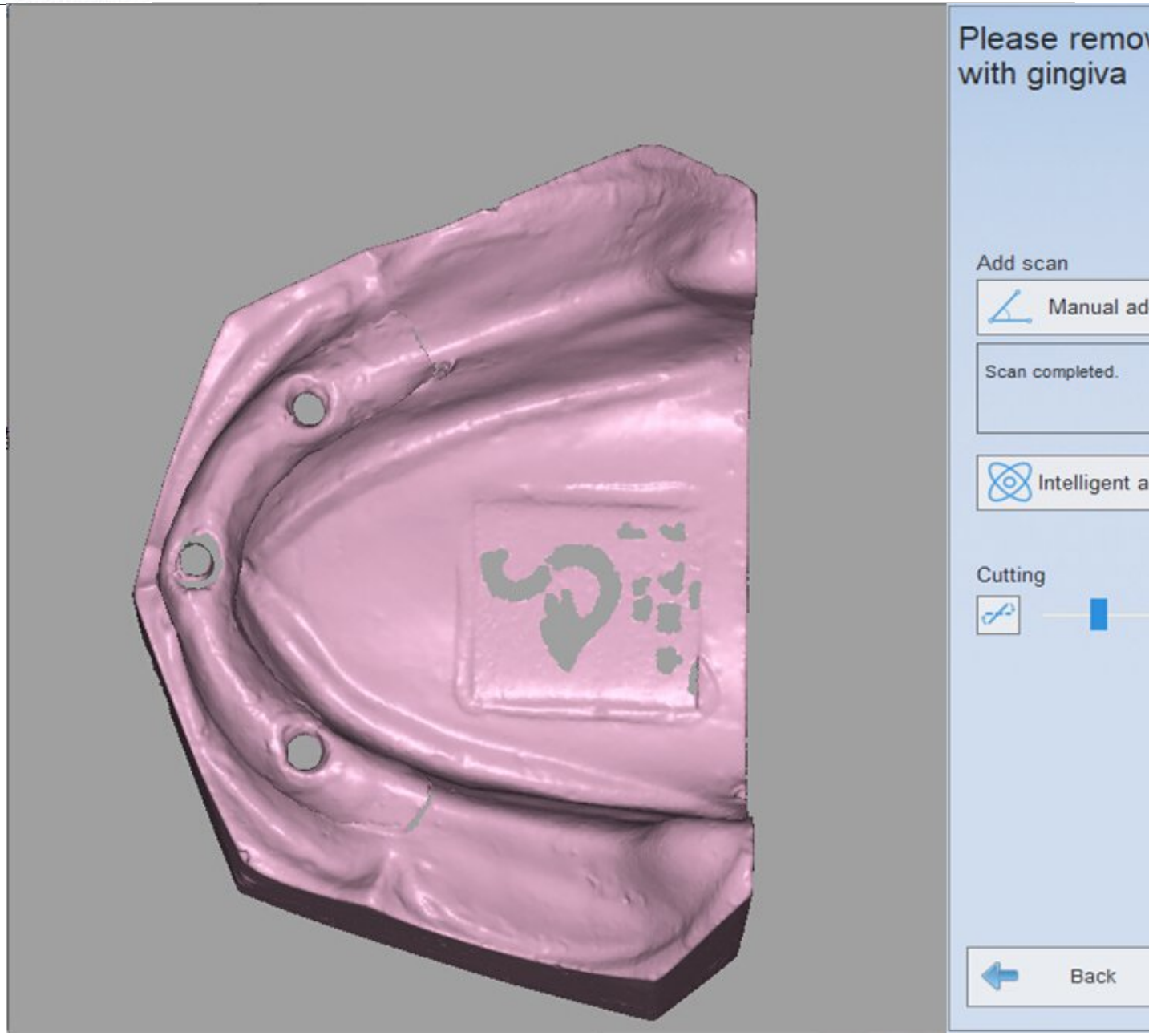
Note : the scan type of implant can only be “Separated model”. It is set by default and can not be modified.

(2) Scan gingiva

After creating the order, click “Scan”, the interface will pop up. Insert the up/lower jaw with gingiva (Gingiva Clamping)



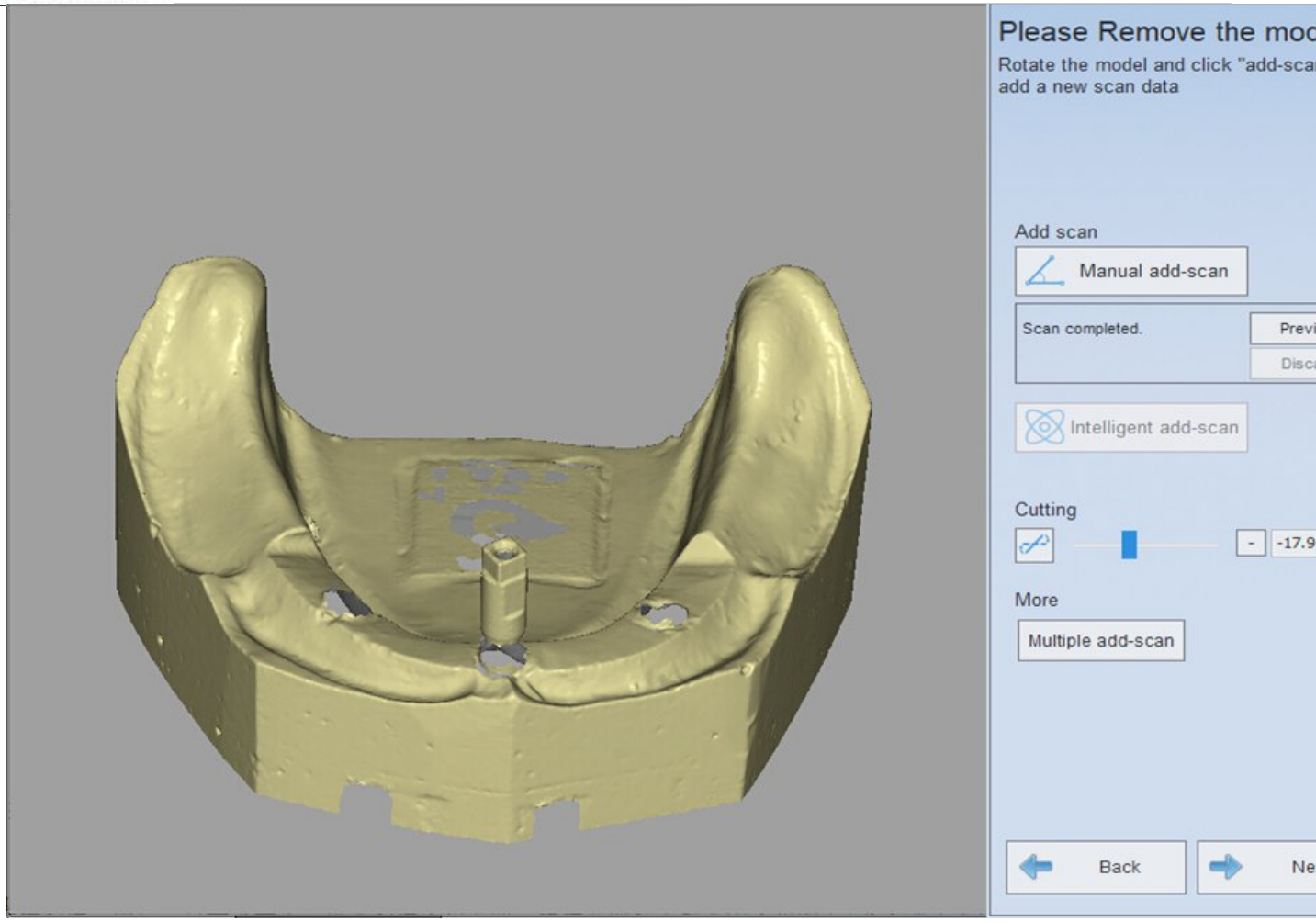
After automatic scanning, you can click “Add Scan” to have better scanning result if need be. Then you can click “Apply” for data optimization as below.



(3) Scan bar of implant

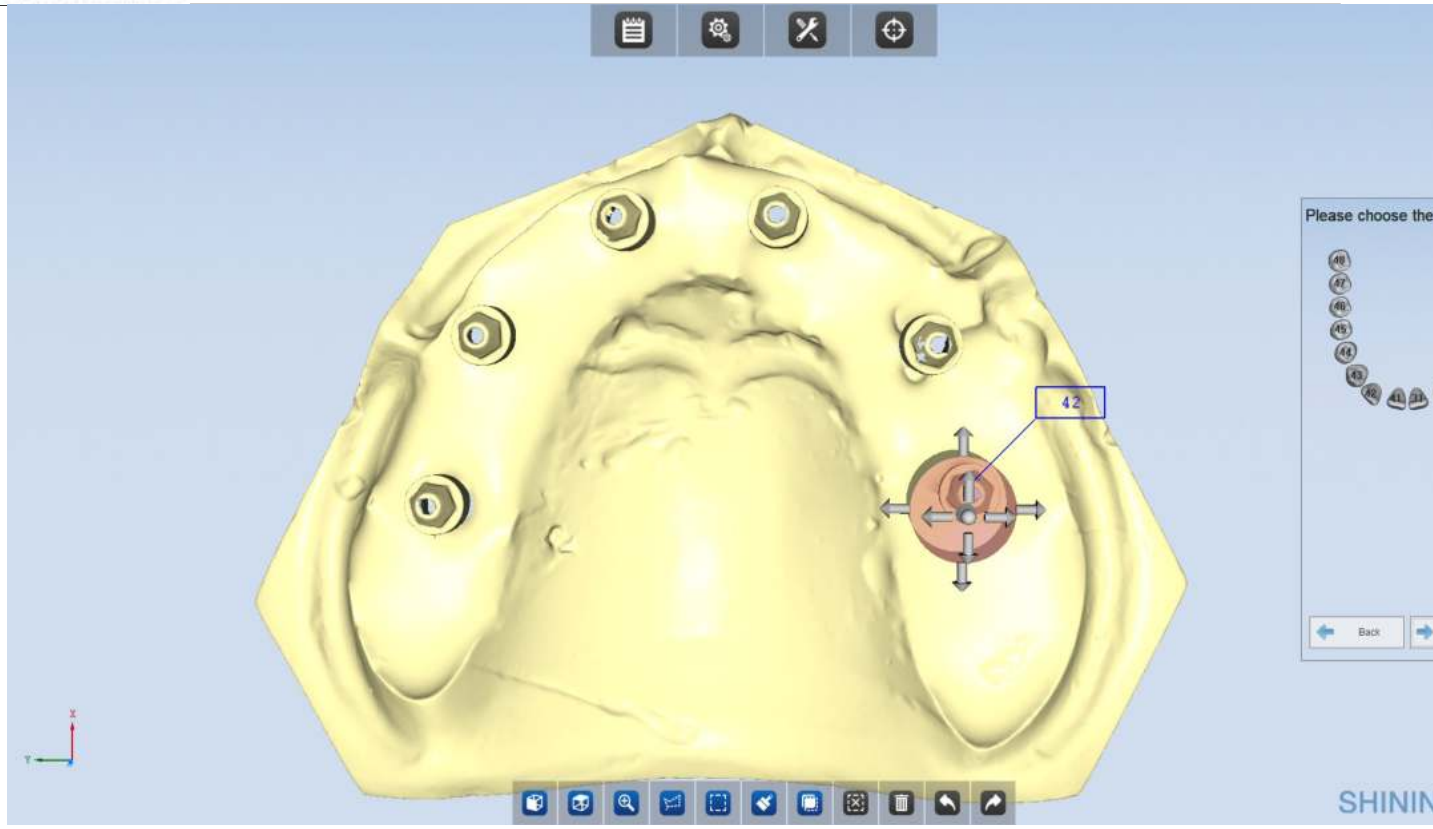
After scanning the gingiva, click “Next”and enter the interface shown as the following figure. Then Insert lower jaw with scan body (Bar Clamping) according to the prompts.

After automatic scanning, you can click “Add Scan” to have better scanning result if need be. Then you can click “Apply” for data optimization as below.

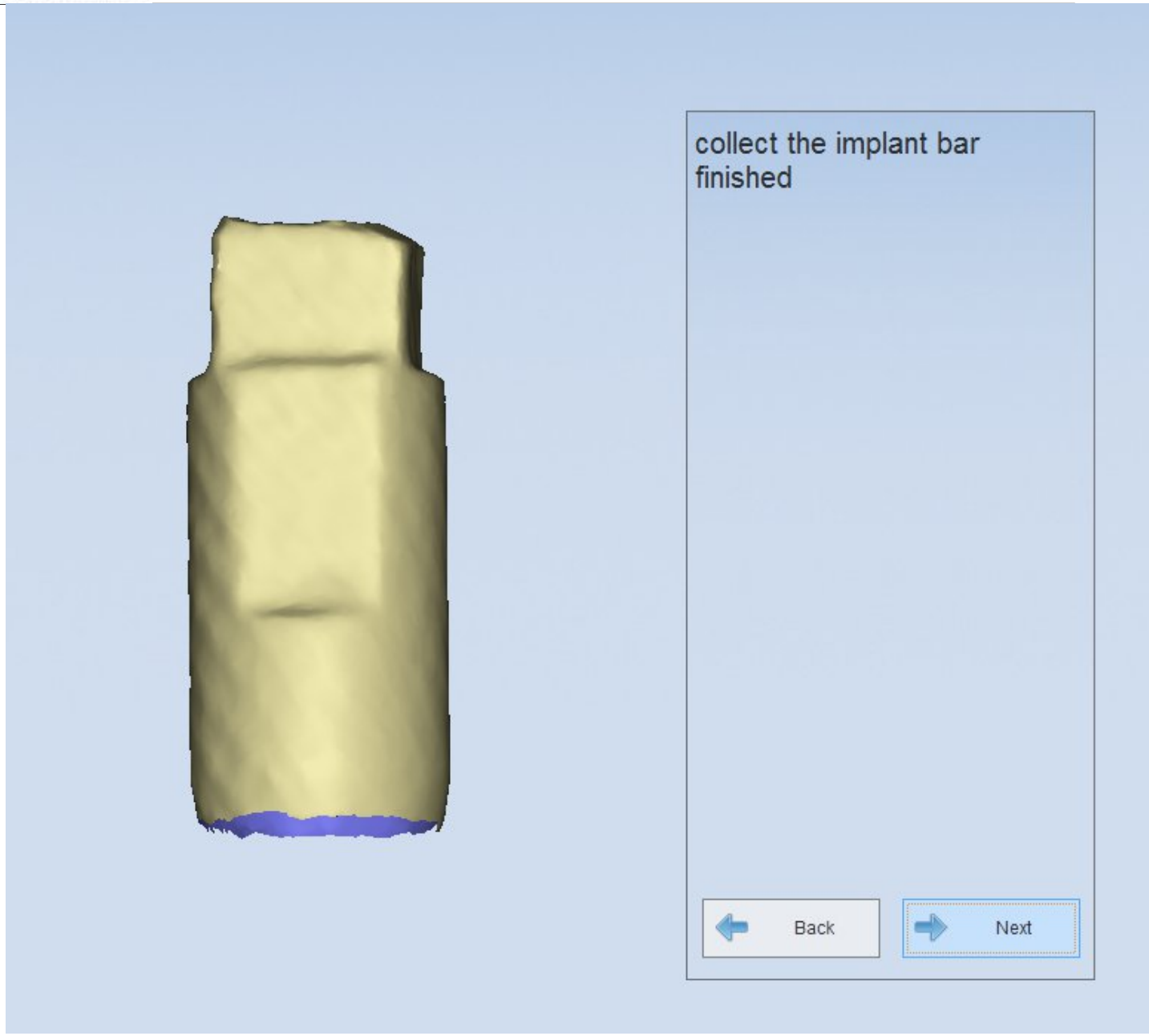


(4) extract the implant bar

After scanning the Scan body, click “Next”, it will enter “extract the implant bar” interface , then select tooth number and click corresponding implant bar.Thus the software will generate bounding volume automatically, shown as the figure below.

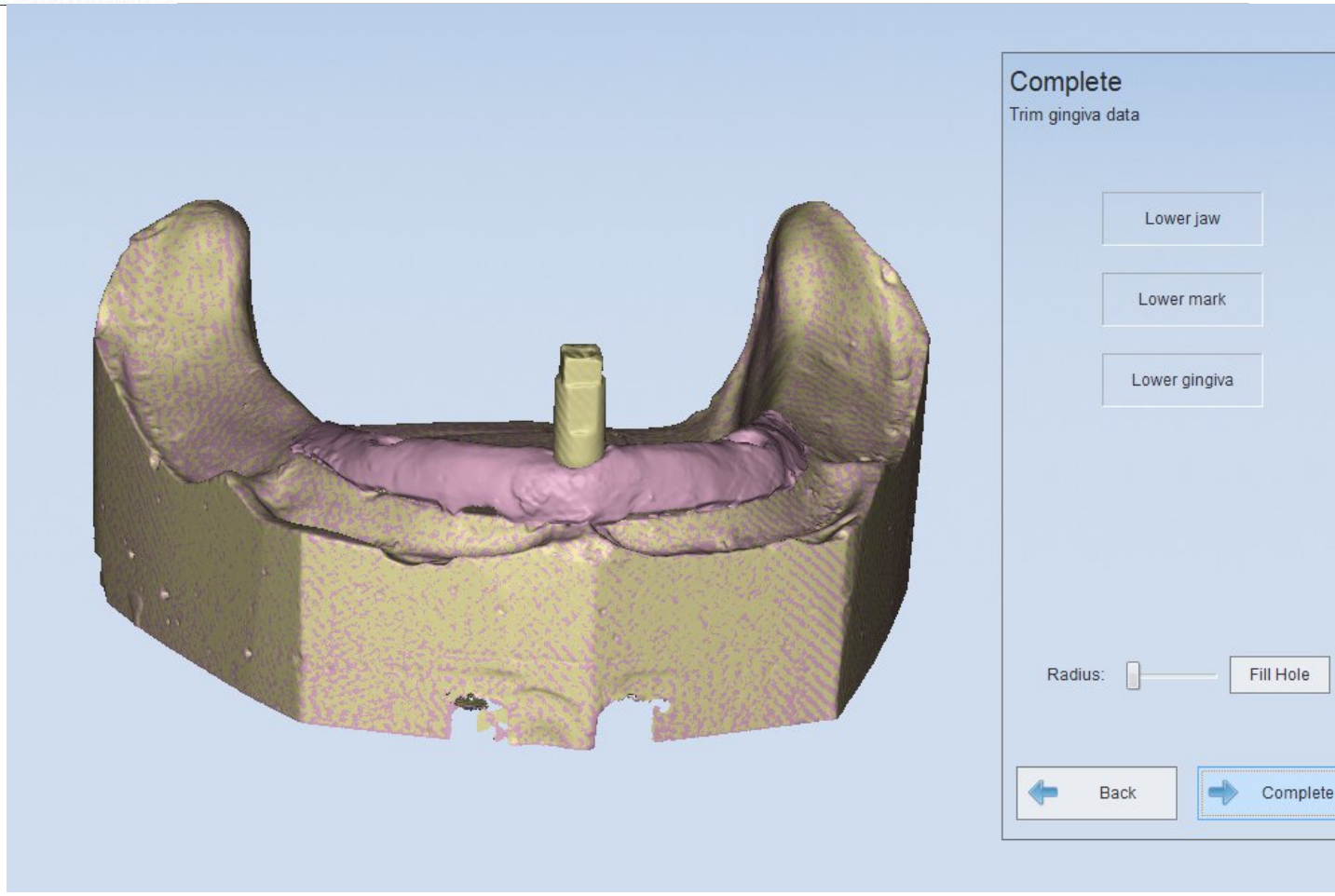


click “Next”, it will enter the extract the implant bar finished interface, shown as the figure below.

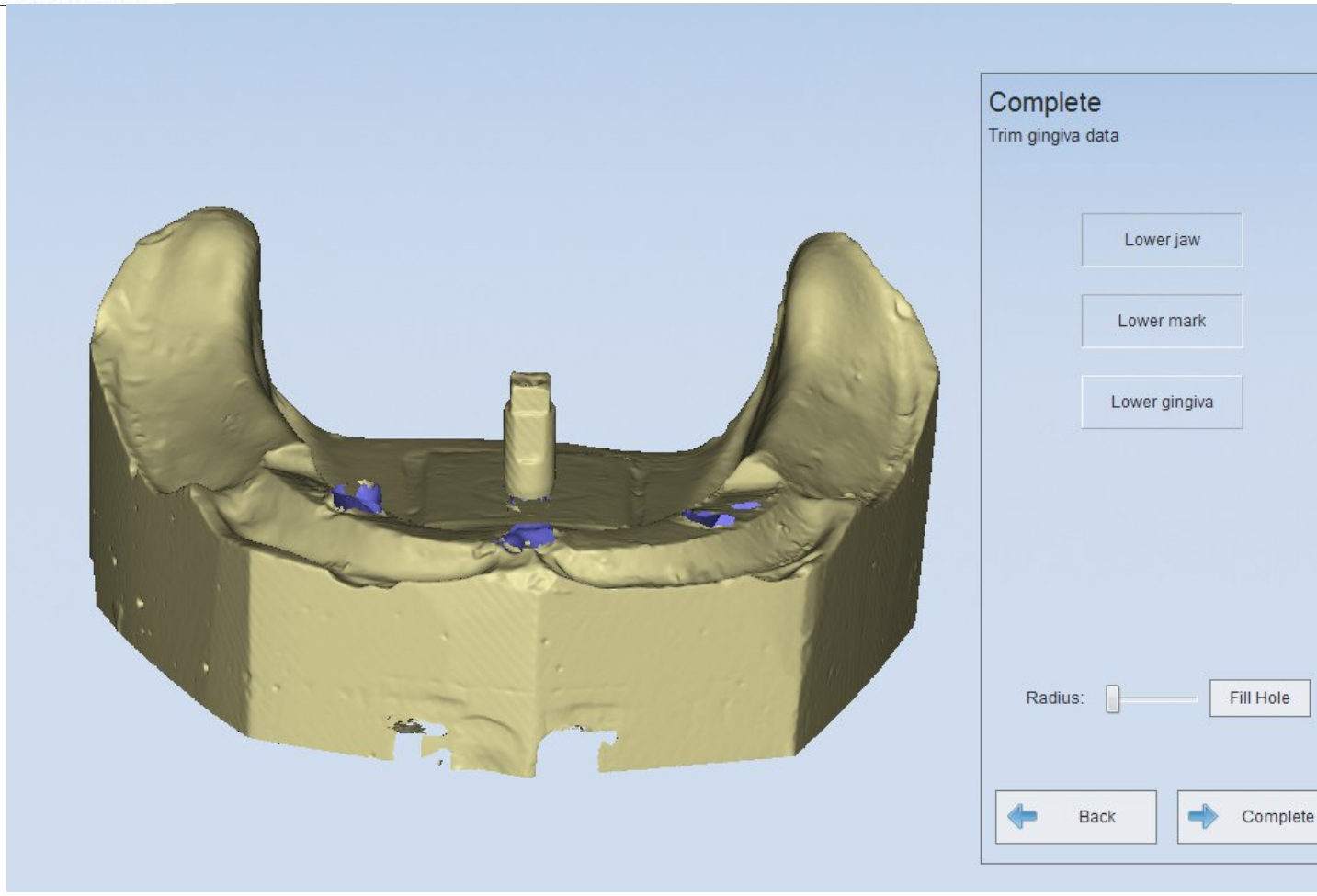


(5) Completing scan

After the collect the implant bar is completed, click “Next”, the window will pop up, shown as the figure below.



If you want to edit “Lower jaw”only, you can uncheck “Lower gingiva”. Or else, you should uncheck “Lower jaw”. If you check the two options, the two options will be edited simultaneously. After edit is completed, click “complete”to complete the whole order.

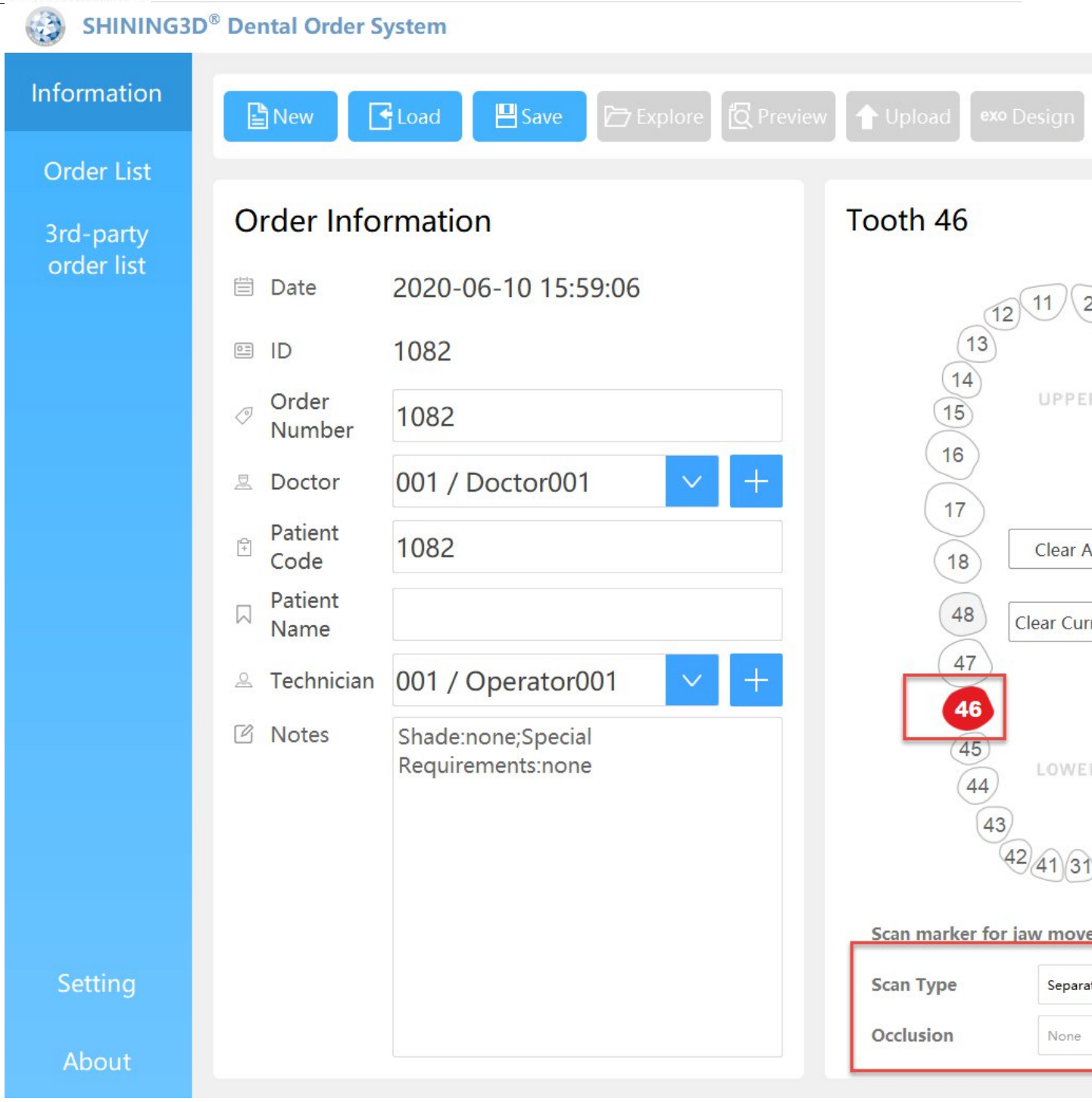


5.1.1.4.2. Abutment

Abutment scanning includes 5 steps: Create order,Scan Gingiva, Scan abutment, Scan die, Complete

1) Create order

Choose “Abutment”in the “Implant”area; then choose the tooth location(single or multi tooth);“Separated Model”for Scan type and “None”for Occlusion.See the following picture for reference.



2) Scan gingiva

Gingiva scanning is the same as implant's gingiva scanning, please refer to Implant's gingiva scanning

3) Scan abutment

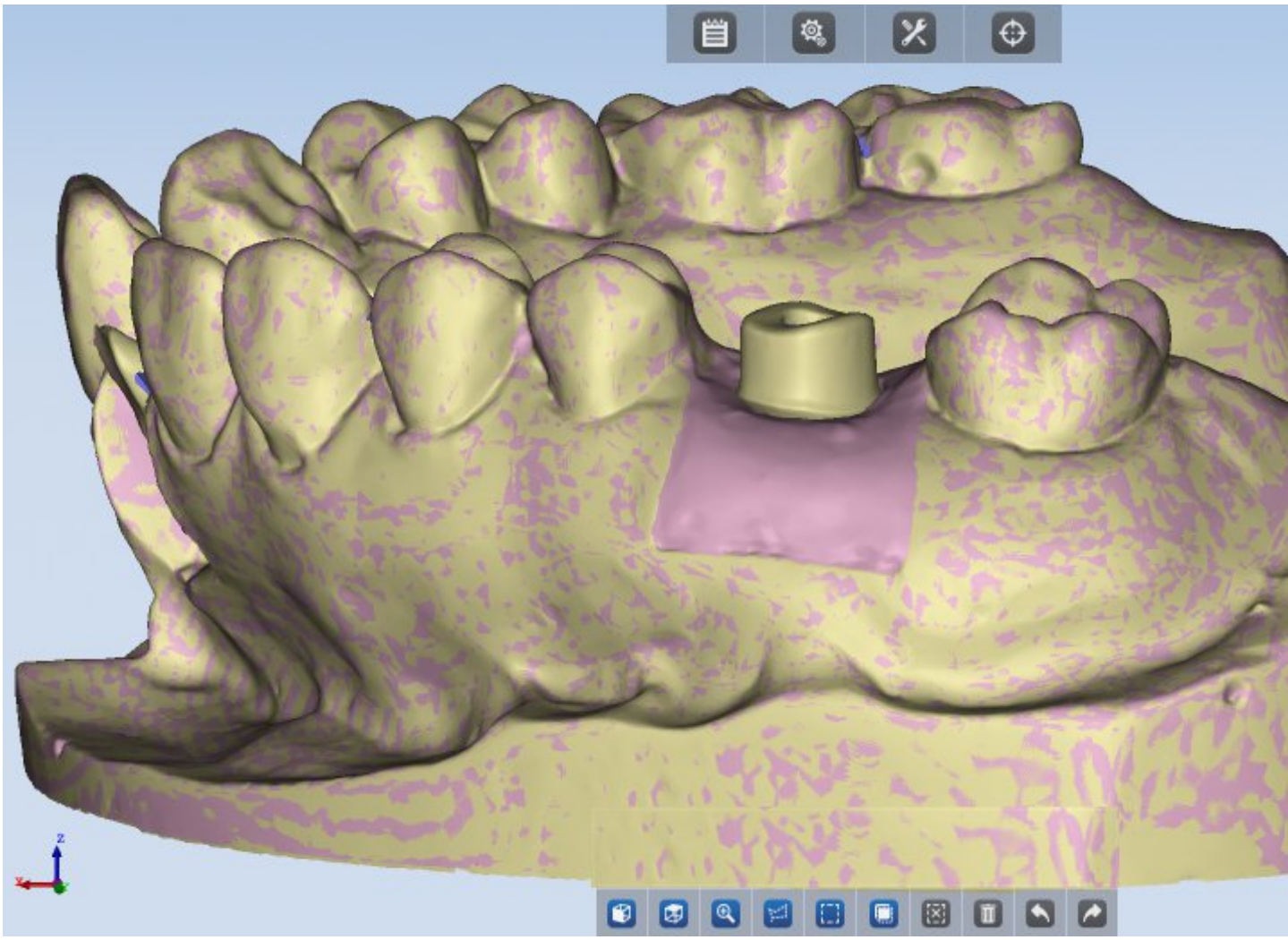
Scan bar scanning is the same as implant's scan bar scanning, please refer to implant's scan bar scanning

4) Scan die

Die scanning is the same as crown's scanning, please refer to Crown's tooth scanning and auto-alignment

5) Complete

After scanning, click "Next" to enter the "Complete" interface. You can choose the model with the right column for edition



5.1.1.4.3. Implant wax

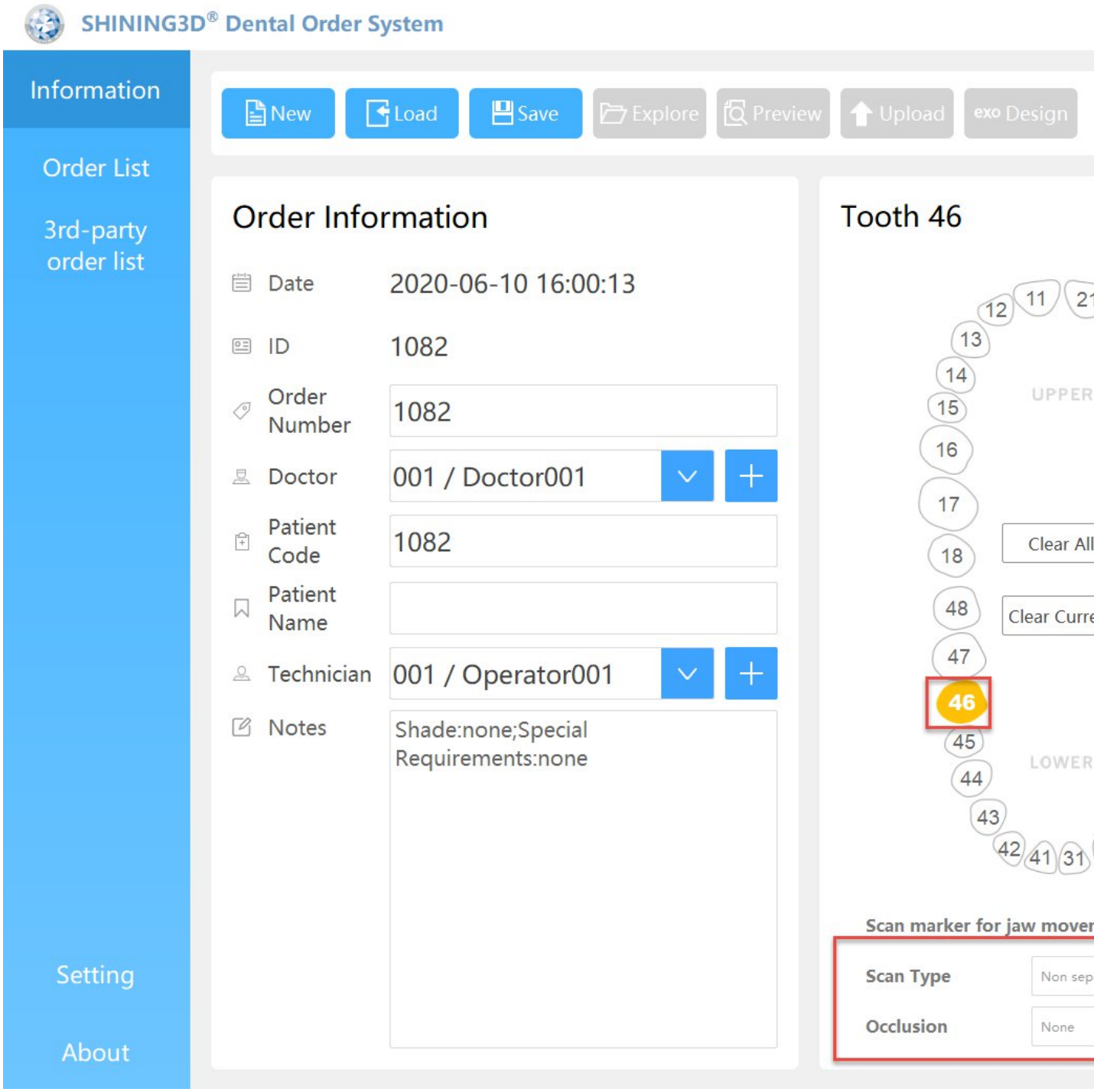
wax scanning includes 6 steps: Create order, Scan bridge wax,Scan gingiva, Scan scan bar, extract the implant bar, Complete.

There is "Bridge wax"added.

1) Create order

Choose "Implant wax" from "Implant"area;then choose tooth location(single or multi tooth);"Separated Model"for Scan type and

"None"for Occlusion.See the following picture for reference.



2) Scan bridge wax

Please refer to single bridge wax's Scan wax crown

3) Scan gingiva

Please refer to implant's scan gingiva

4) Scan scan bar

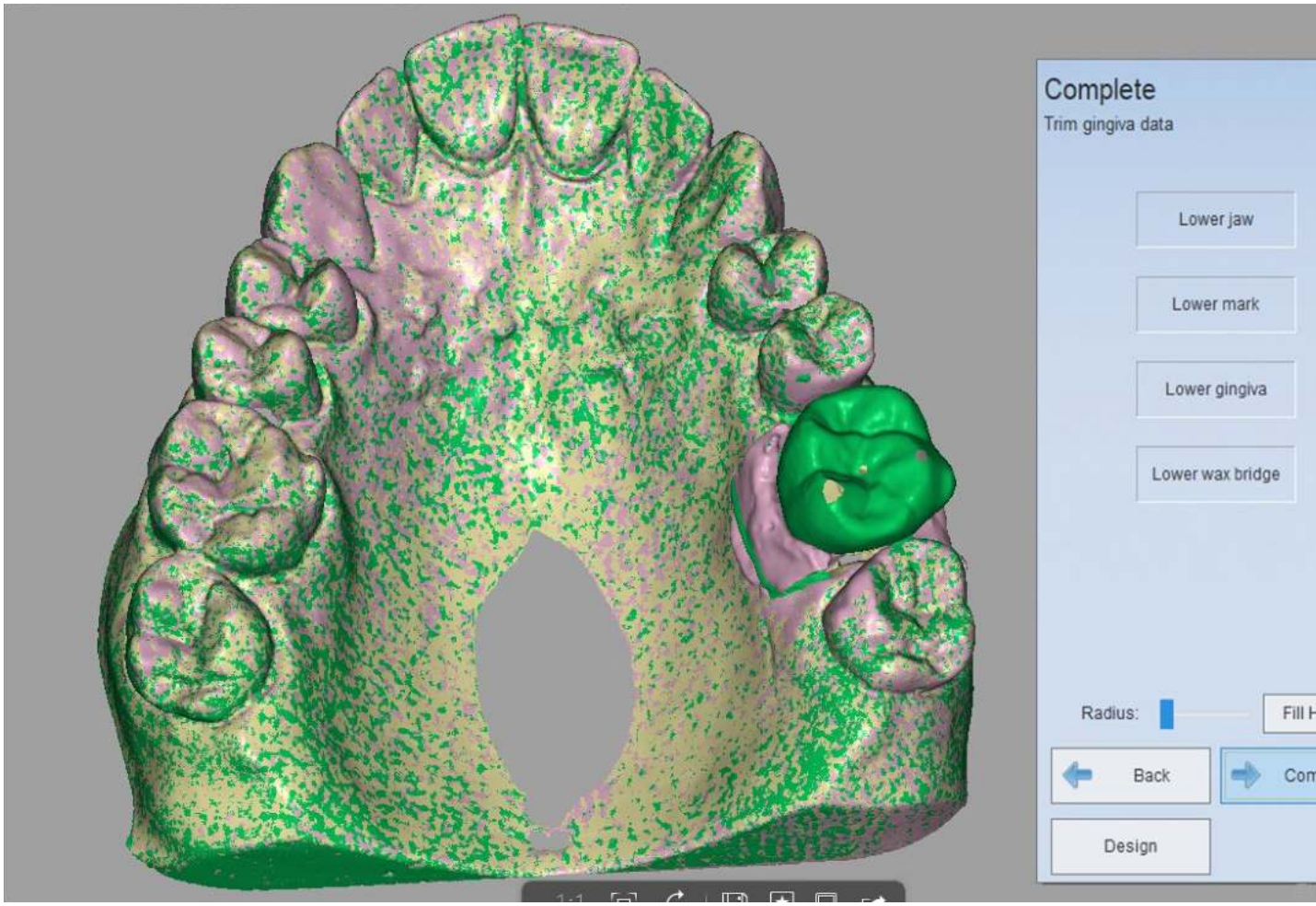
Please refer to implant's scan scan bar

5) Collect the implant bar

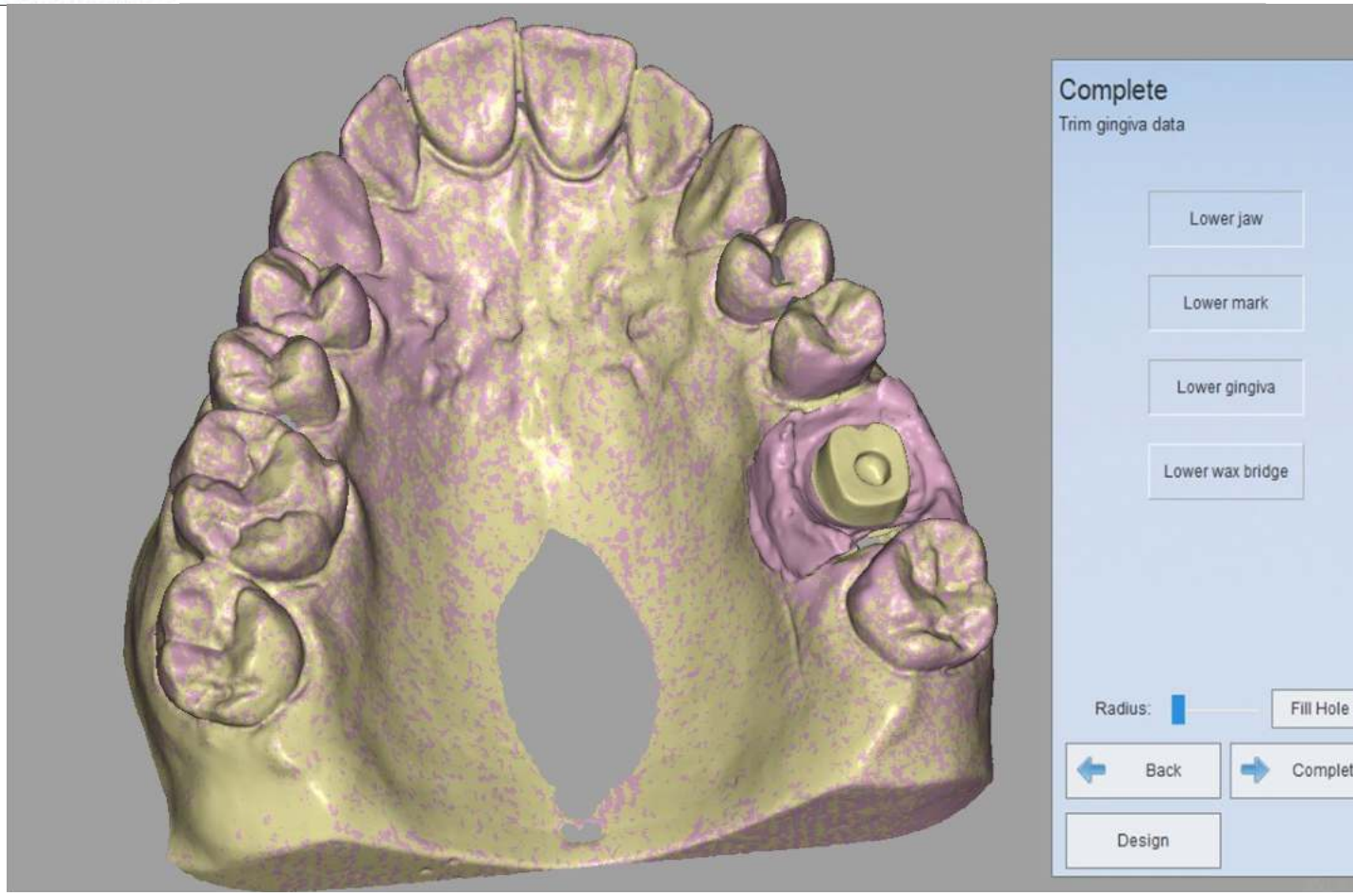
6) Please refer to implant's extract the implant bar

7) Complete

You can choose the model with the right column for edition



If you don't want to edit the lower jaw bridge wax, you can uncheck it, same for other options. After edition, click "Complete" to finish scanning.



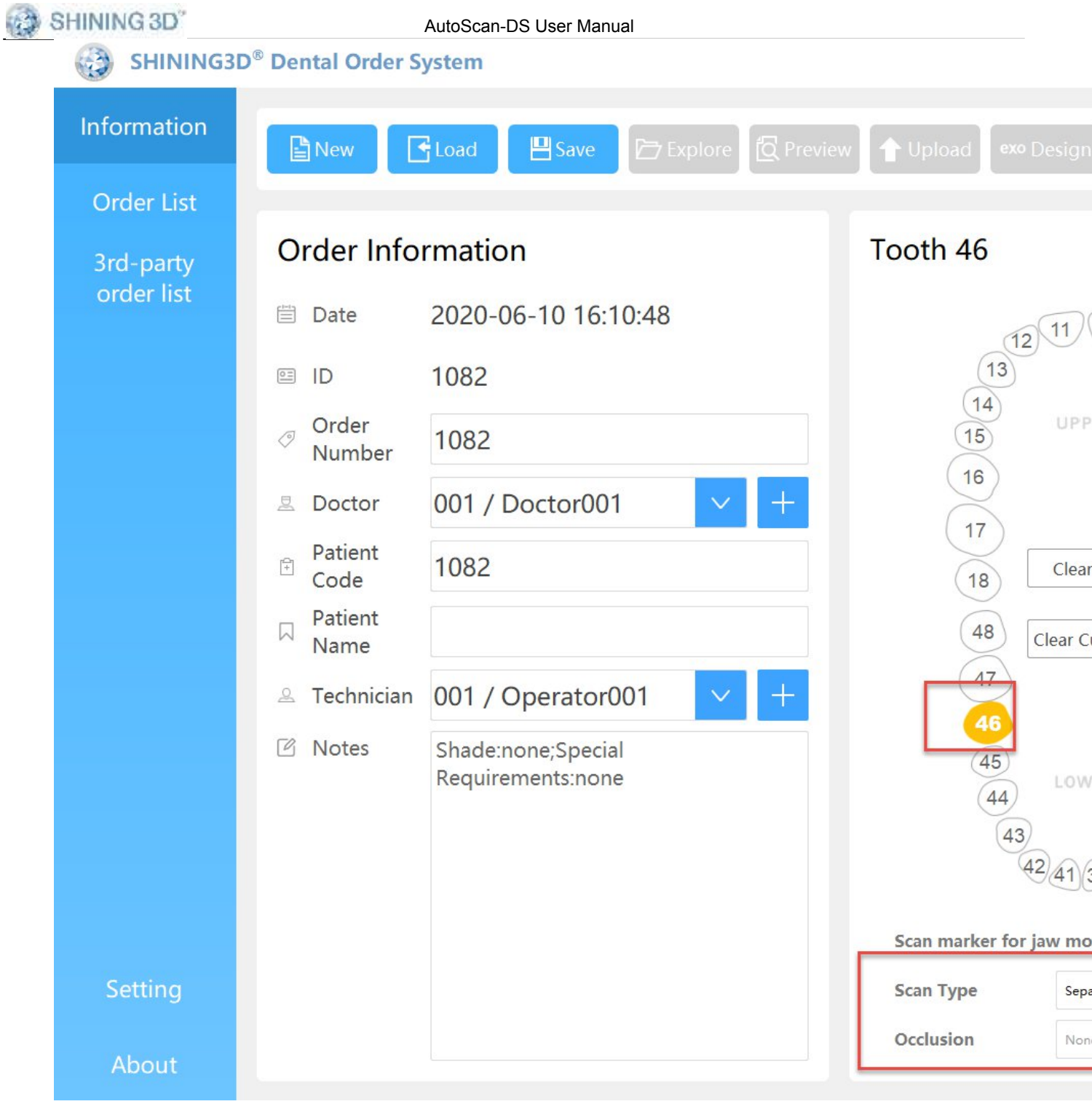
5.1.1.4.4. Scan abutment wax

Abutment wax scan includes 6 steps: Create order, Scan gingiva, Scan abutment, Scan die, Scan bridge wax, Complete.

There is “Bridge wax”added.

1) Create order

Choose “Implant wax” from “Implant”area;then choose tooth location(single or multi tooth);“Separated Model”for Scan type and “None”for Occlusion.See the following picture for reference.



2) Scan bridge wax

Please refer to single bridge wax's Scan wax crown

3) Scan gingiva

Please refer to implant's scan gingiva

4) Scan abutment

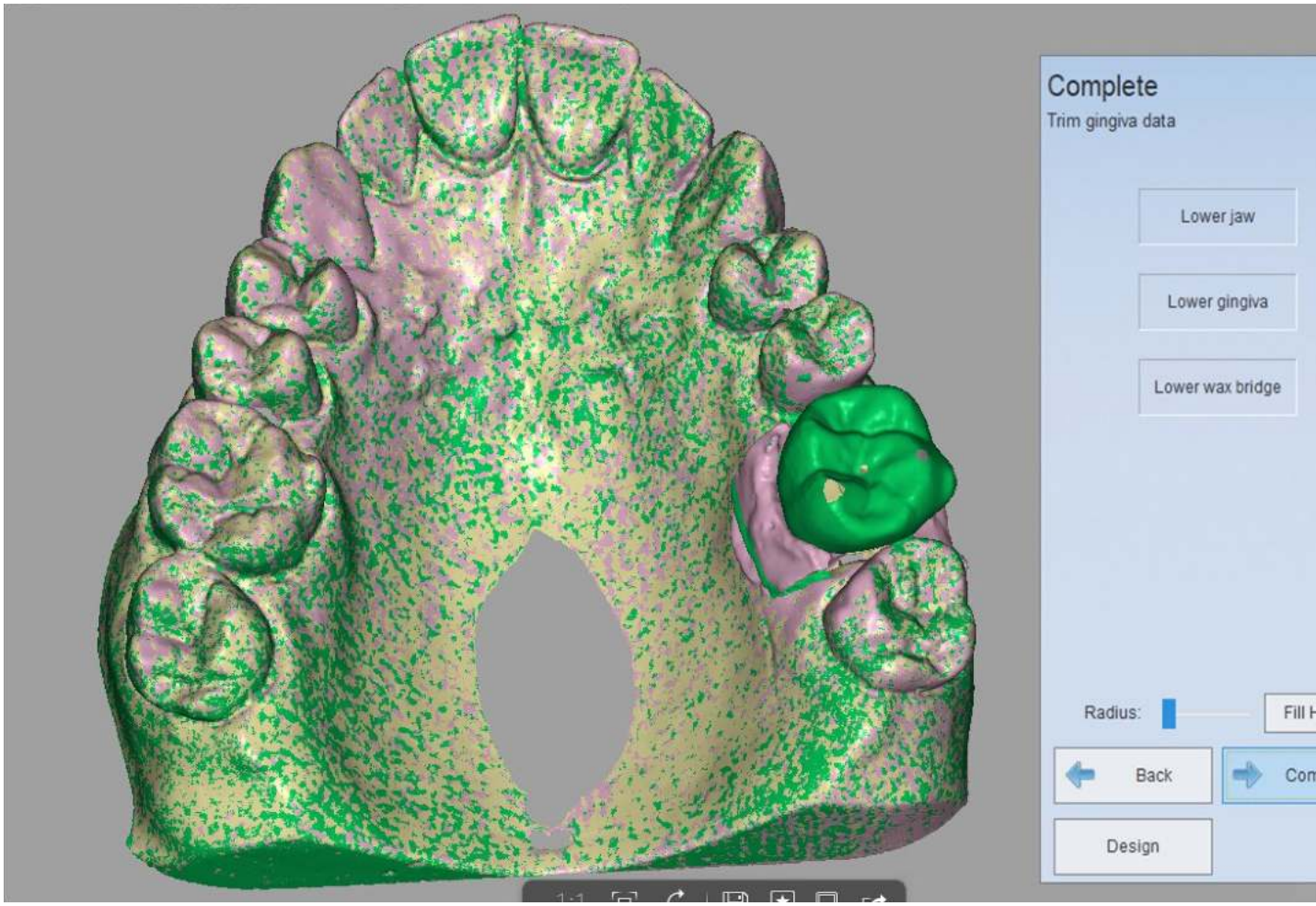
Please refer to implant's scan scan bar

5) Scan die

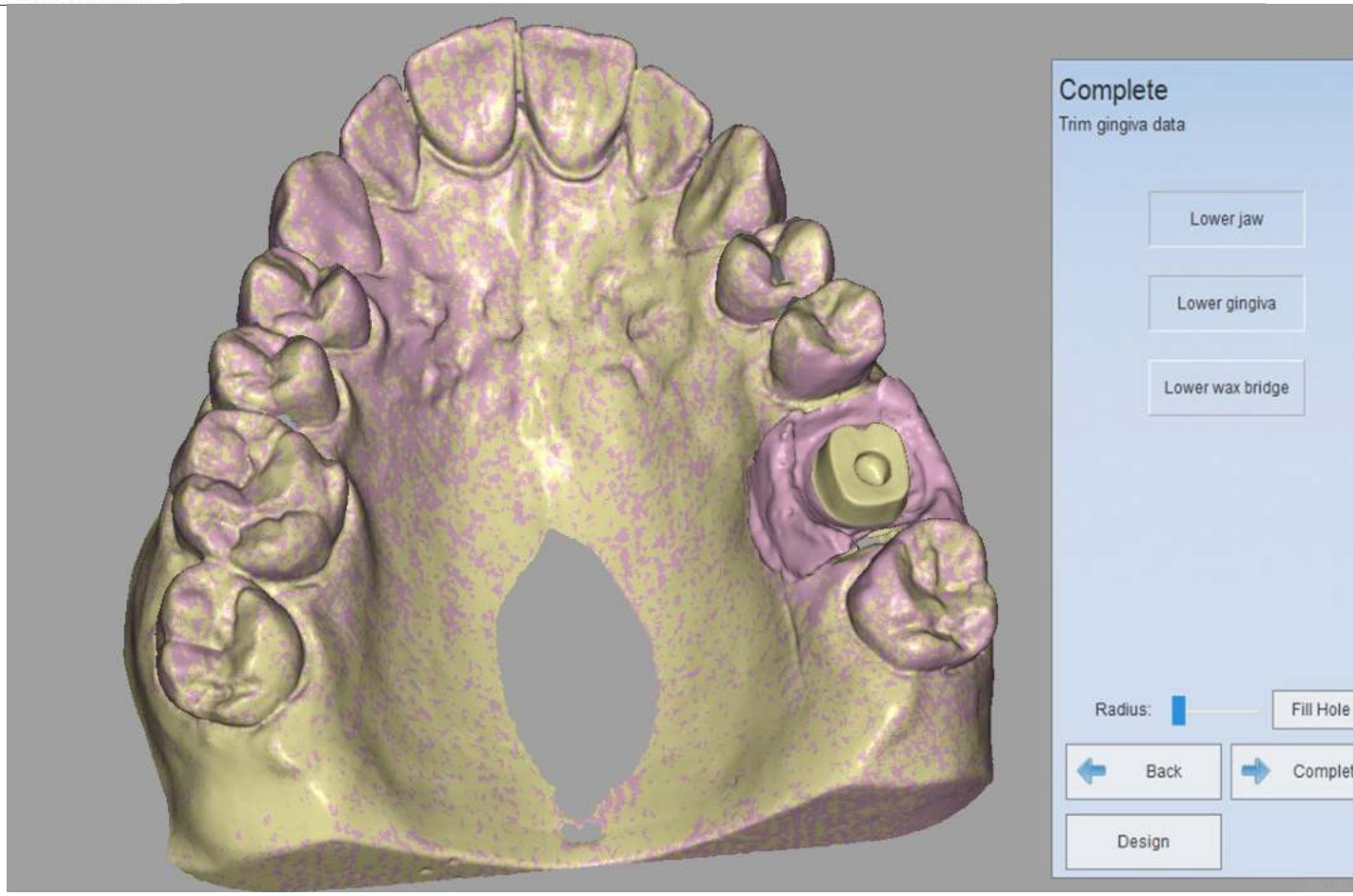
Please refer to crown's tooth scan and auto-alignment

6) Complete

You can choose the model with the right column for edition



If you don't want to edit the lower jaw bridge wax, you can uncheck it, same for other options. After edition, click "Complete" to finish scanning.



5.1.1.5. missing tooth（Pontic）

You can refer to "Scan combination" for the operation of scanning missing tooth.

Note:

the missing tooth can not be scanned alone, it should be scanned with crown, inlay or veneer together. The missing tooth is not an individual, and it can be ignored.

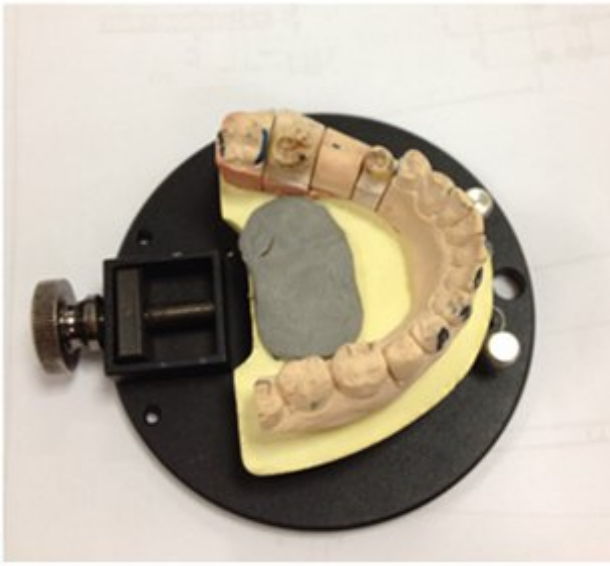
5.1.1.6. wax

wax contains many scan types. The main types are as follows.

wax Crown

You need to insert the following models during scanning.

Part of the model

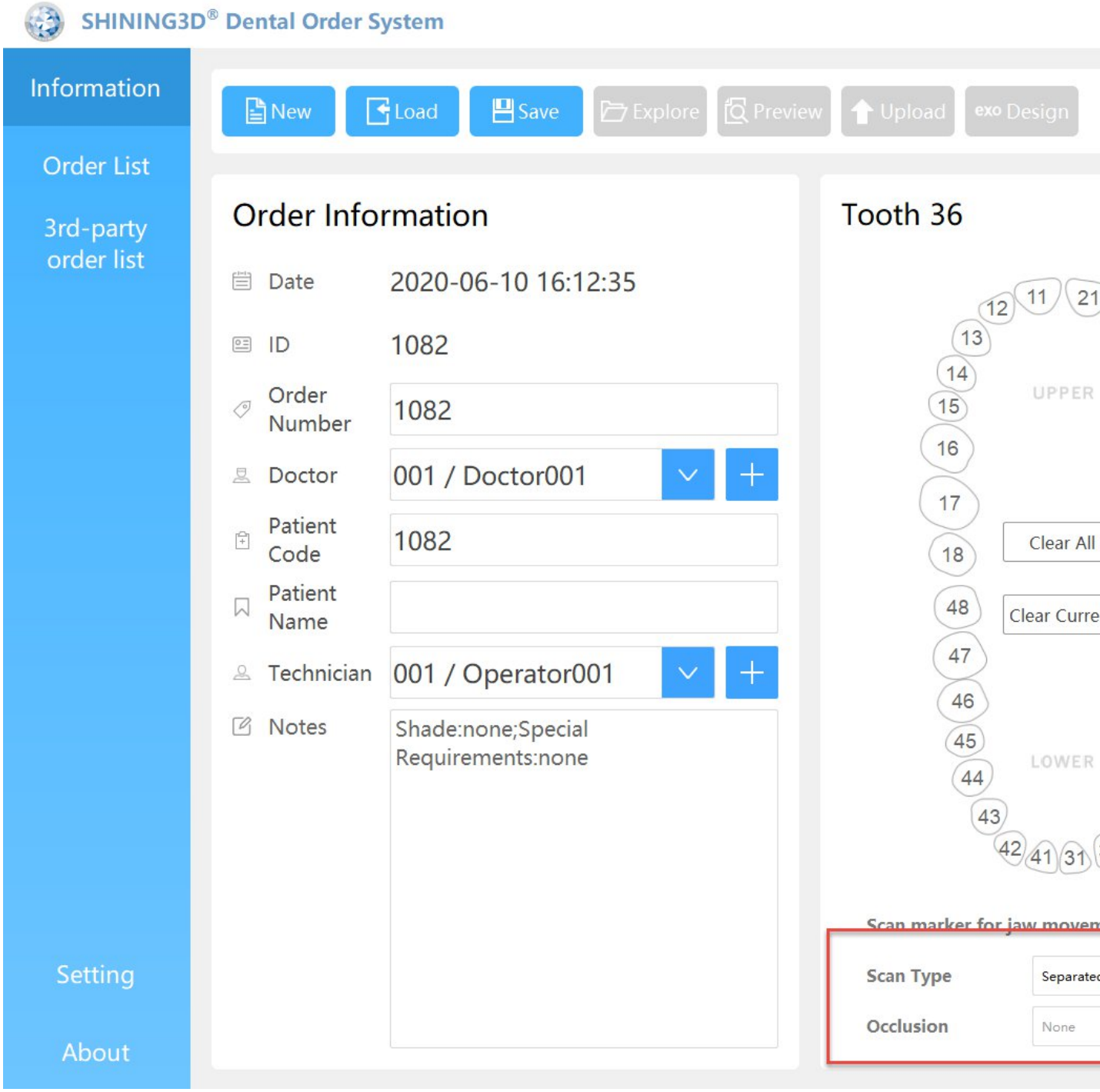


Whole jaw

5.1.1.6.1. wax Crown

(1) Create order

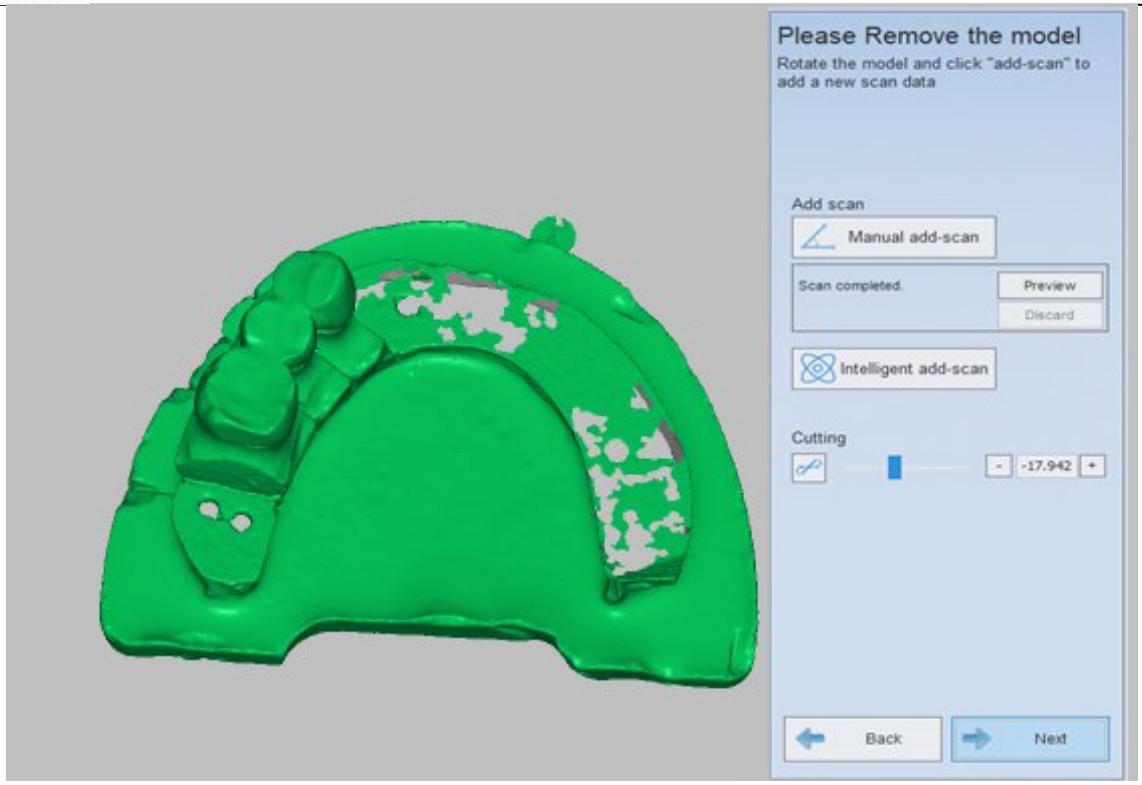
Choose “Pontic Wax”in the interface, then choose the tooth location(37 and 35), choose the “missing tooth wax”, then choose the tooth(36), shown as the figure below. The “Scan type”is “Separated model”and the “Occlusion” type is “None”.



(1) Scan wax crown

insert the partial lower crown model with wax, click “Next”to begin to scan.

After automatic scanning, you can click “Add Scan” to have better scanning result if need be. Then you can click “Apply” for data optimization as below.

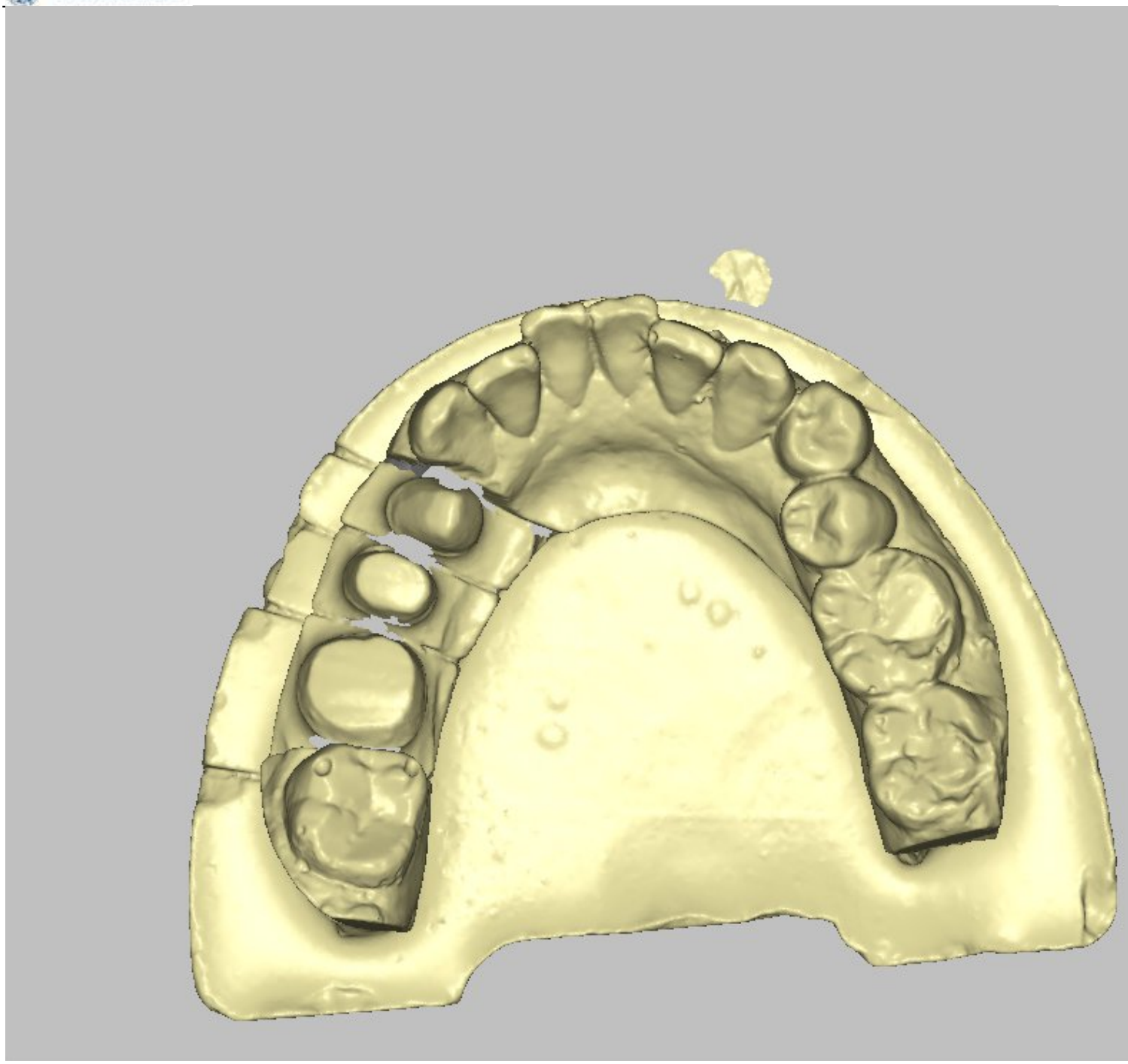


(2) Scan crown

After creating order, click “Scan” to enter the following interface. Insert the lower crown according to the prompts, refer to the Crown for the operation.

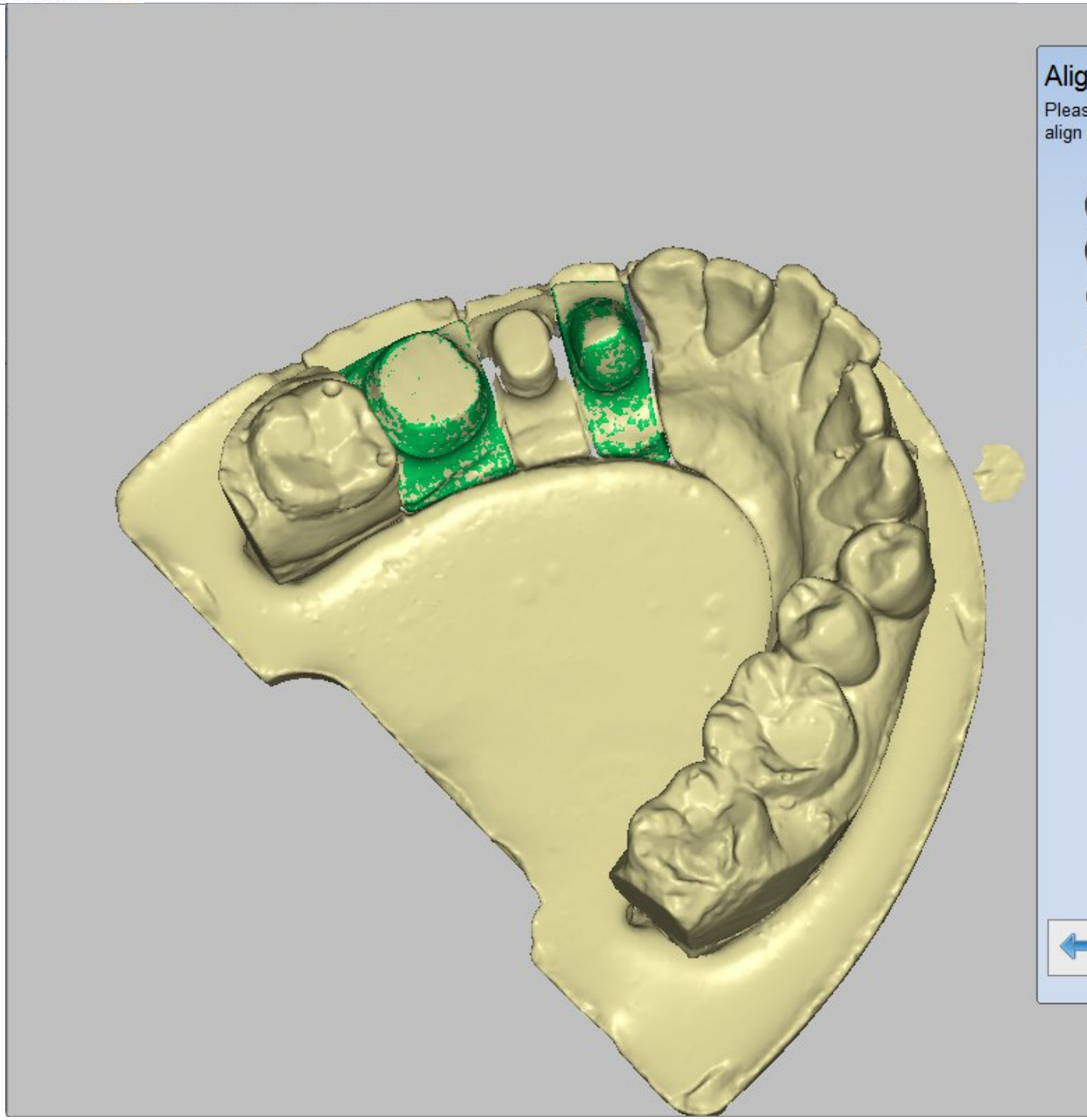
(3) Scan tooth

After scanning the crown, click “Next”, it will enter the scan interface, shown as the figure below. Insert the model according to the prompts, refer to the Scan Tooth for the operation.



(4) Auto alignment

After scanning the tooth, click “Next”, it will enter the auto alignment interface, shown as the figure below.

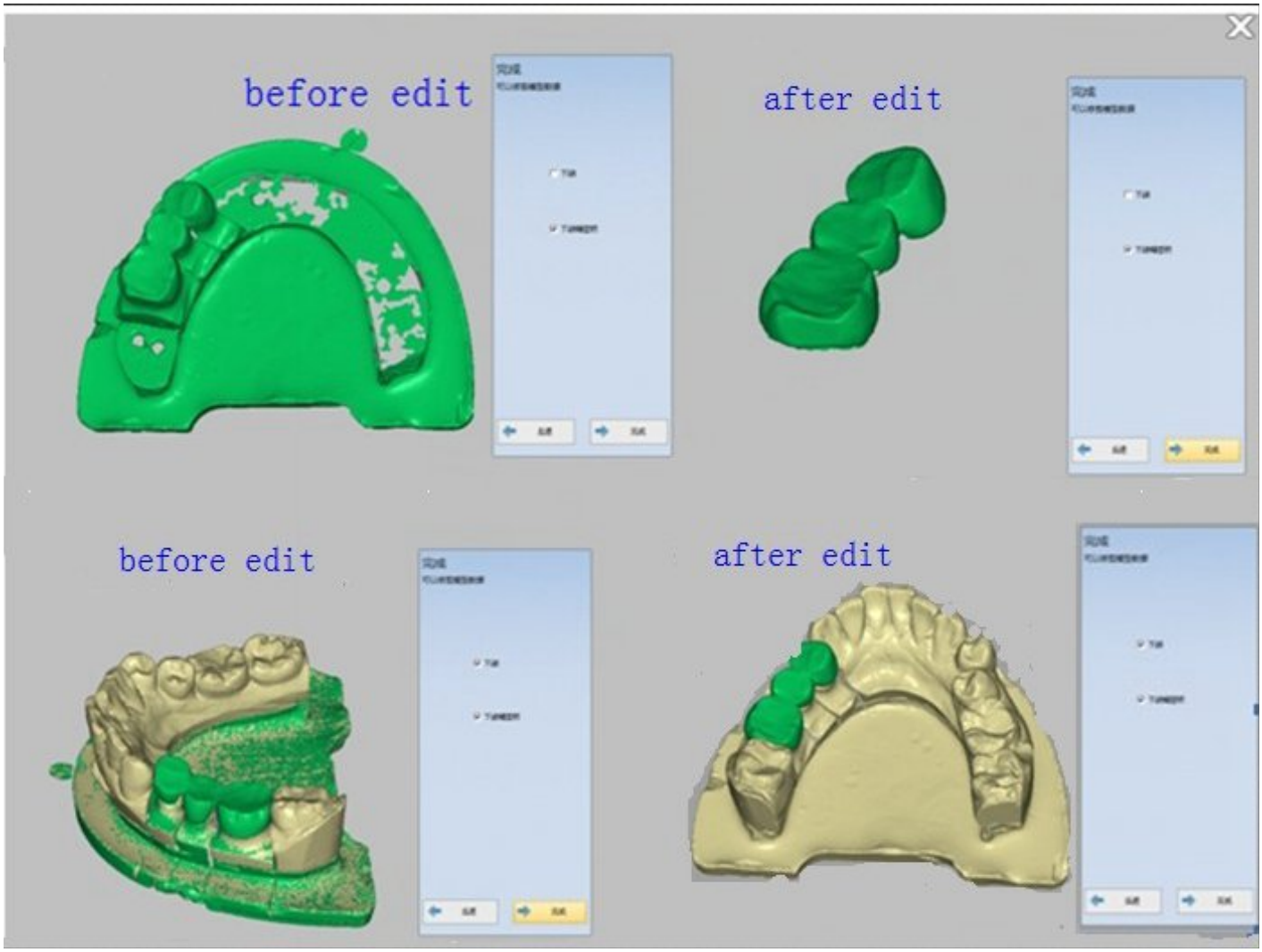


Note : it displays the alignment result between tooth and crown in the interface, the wax is not displayed in the interface.

(5) Completing scan

After the alignment is completed, click “Next”, the interface will pop up, shown as the figure below. You can view or edit the model, click

"Complete" to save the model.



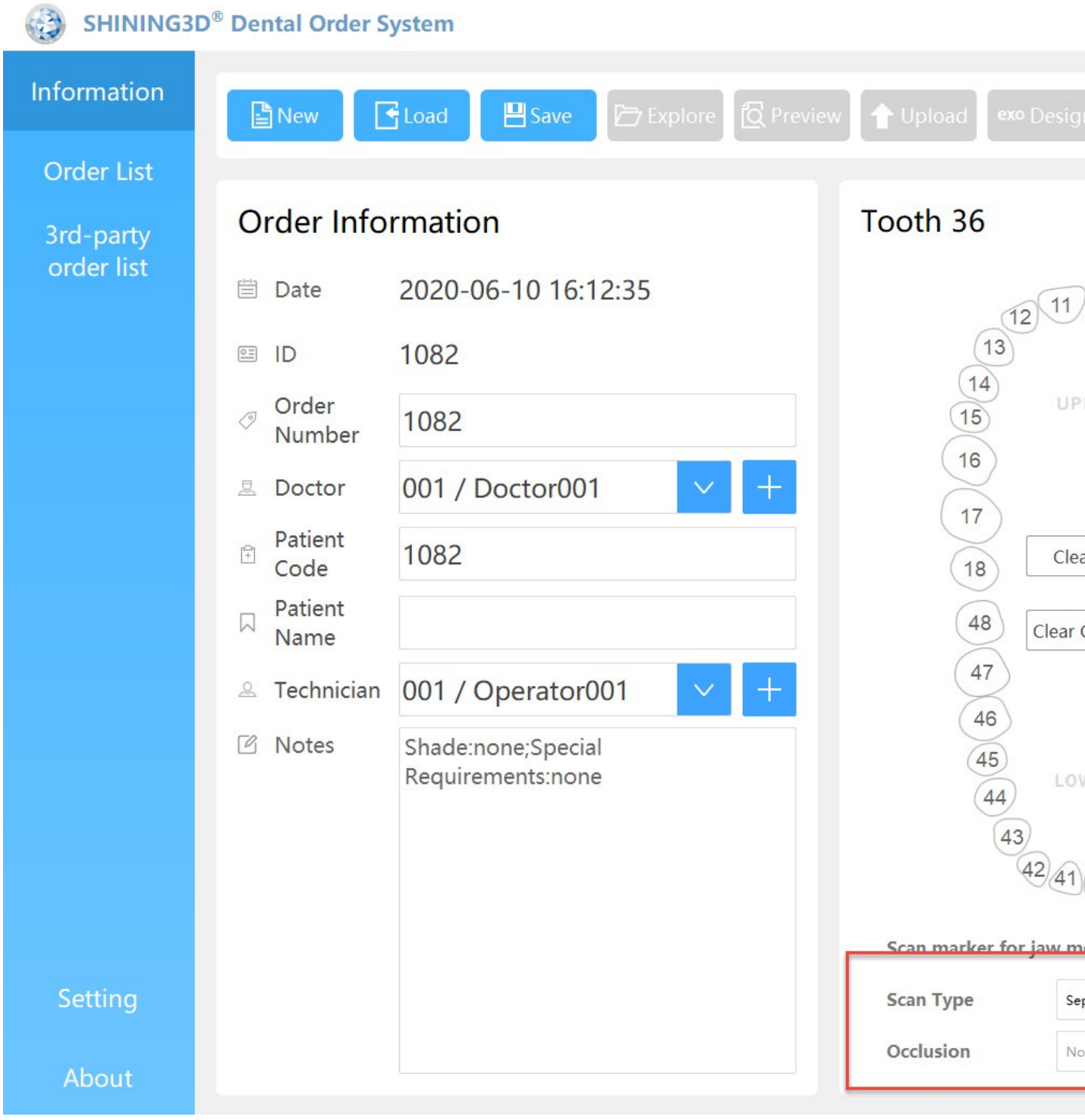
Note : you can design the wax after editing the data in the interface.

5.1.1.7. Scan combination

There can be different types of teeth in a order, you can operate according to the selected scan type and tooth type. If scan a order of single jaw, a inlay, veneer and missing tooth, the steps are as the follows.

(1) Create order

Choose the tooth type of a pontic (the tooth 15 and 17, the missing tooth 16), the tooth 24 and two inlay (26 and 27) in the crown, shown as the figure below. The “Scan type”is “Separated model”and the “Occlusion” type is “None”.



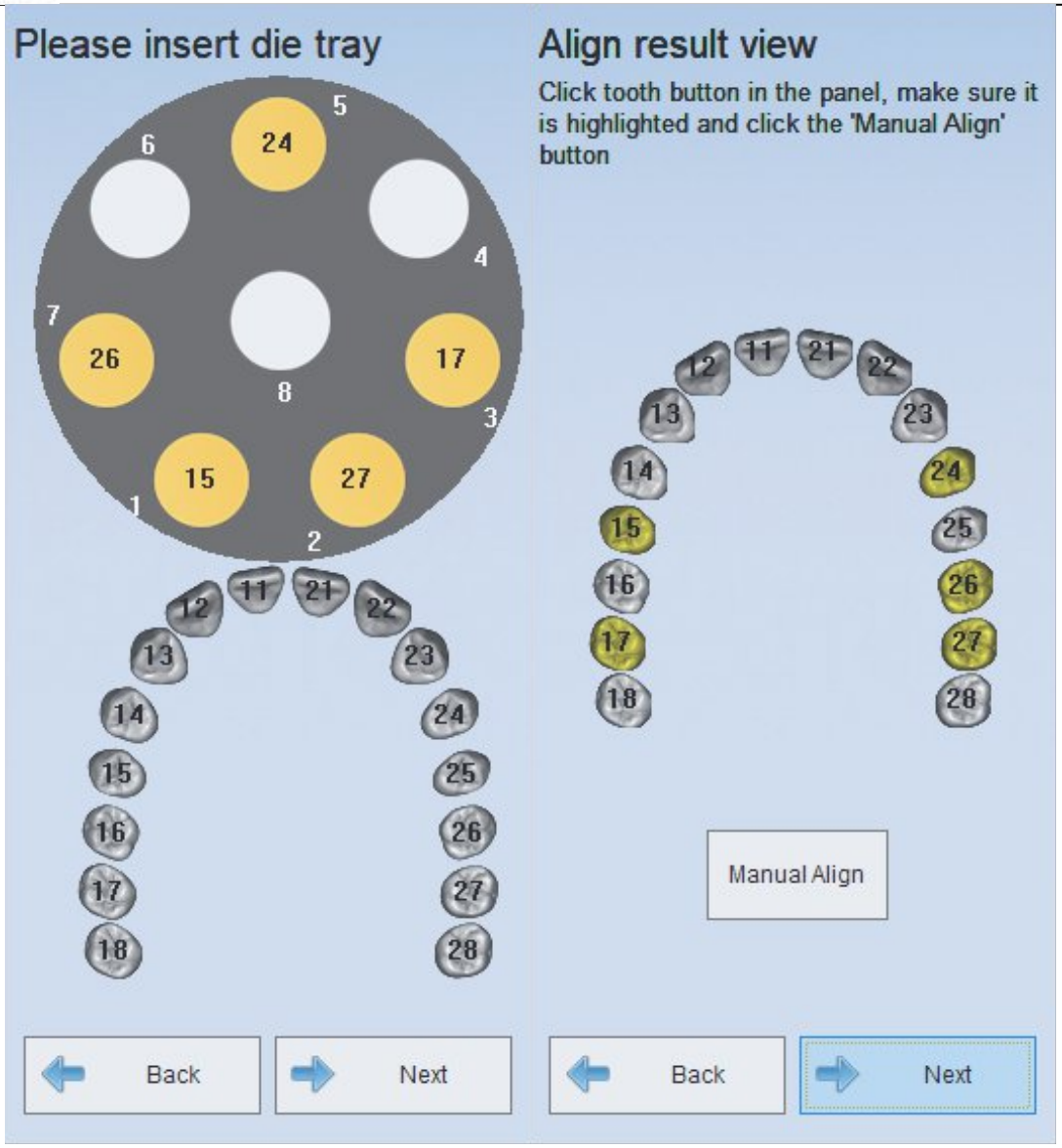
Note: the missing tooth can not be scanned alone, and generally it's scanned with the crown.

(2) Scan crown

After creating order, click "next" to enter the interface of scanning crown. The scan operation is the same with the "Single jaw"in the "Separated model", refer to the Single Crown for the operation.

(3) Scan tooth

After scanning the crown, click "Next", it will enter the interface of scanning tooth, shown as the figure below. Scan the die at first. After scanning the die, it will enter the auto alignment interface. Refer to "Scan tooth" and "Auto alignment".

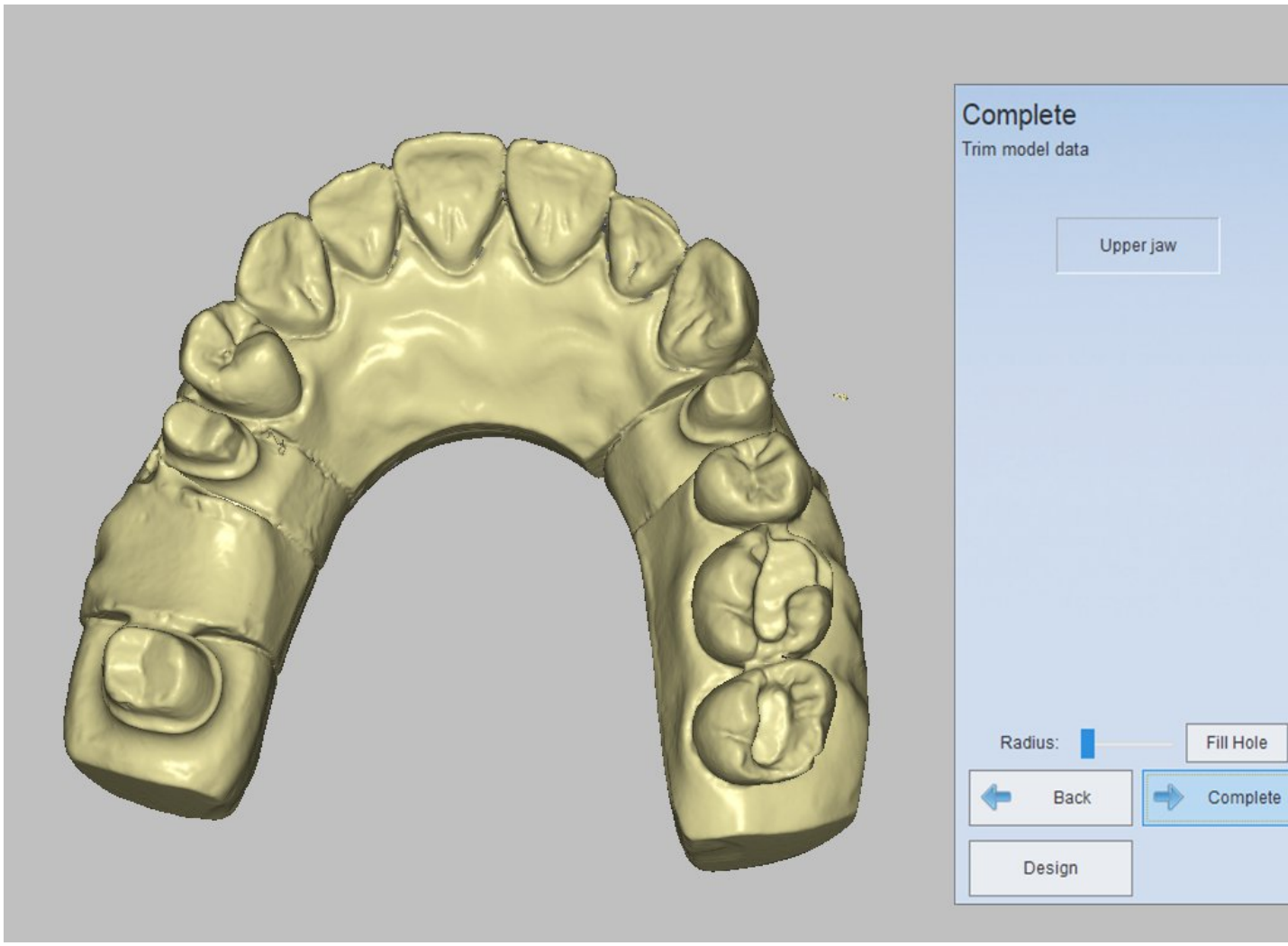


Note :

1) After scanning the tooth on the die tray, it will enter the interface of auto alignment.
2) when scan the teeth of inlay, crown and veneer at a time. When the number of crown and veneer is no more than 8, you can scan these model all at a time. If the number is more than 8, you should scan these model more than once.
3) Pontic tooth will not be scanned like the die.

(4) Completing scan

After the alignment is completed, click “Next”, the interface will pop up, shown as the figure below. You can edit the model in the interface. After editing the model, click “Complete” to save the model.



5.1.2. Non separated Model

The“Non separated model” is designed specially for scanning jaw in the Non separated model, which contains single crown, inlay and veneer.

You need to clamp the model during scanning, please refer to the clamping of a jaw or the fixture of the half jaw

Note :

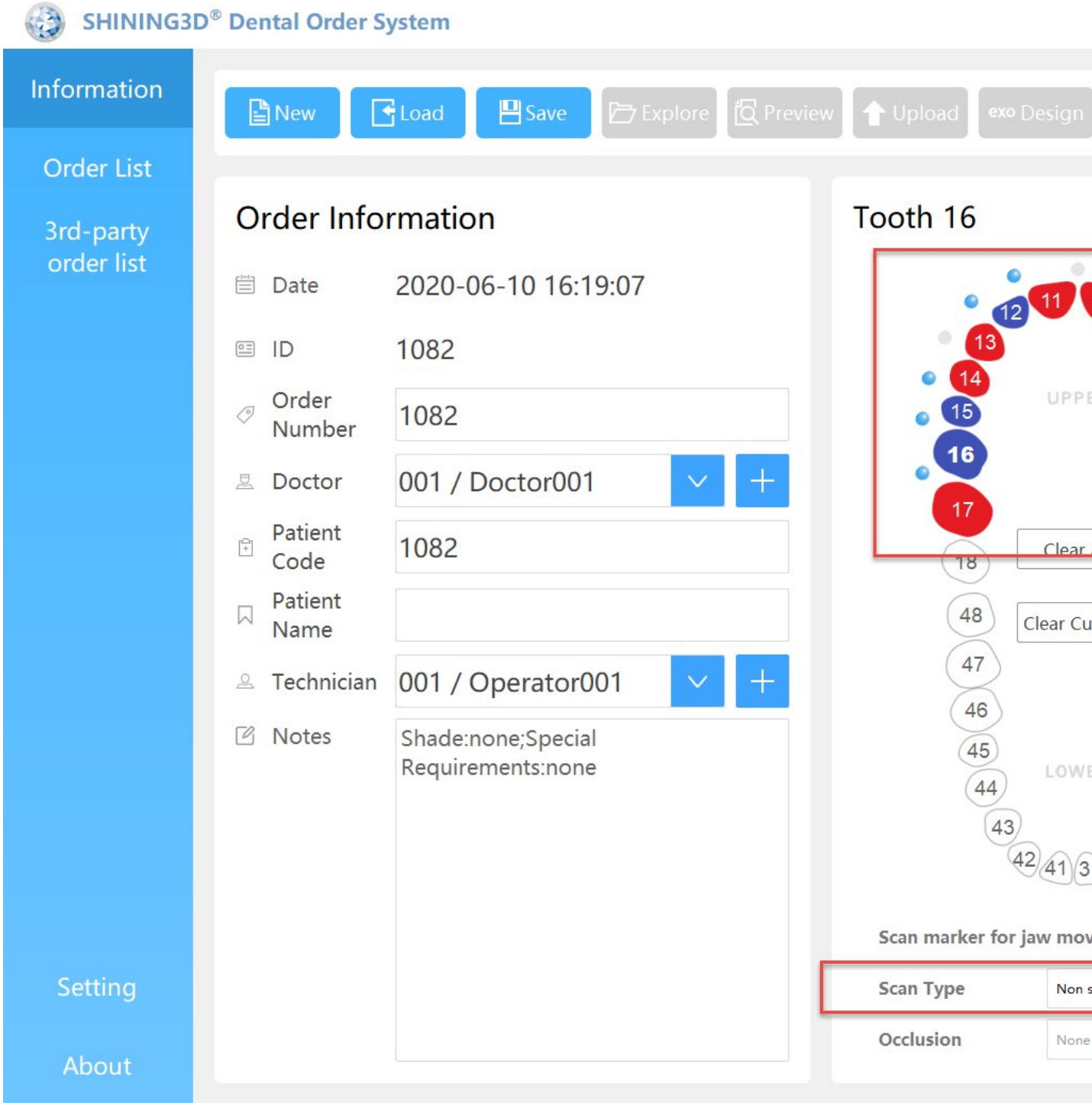
1.If there are different types of teeth or more than one tooth in an order under the “Non separated model”, you need to scan it once only.

2. the missing tooth can not be scanned alone.

5.1.2.1. Single Crown

1. Create order

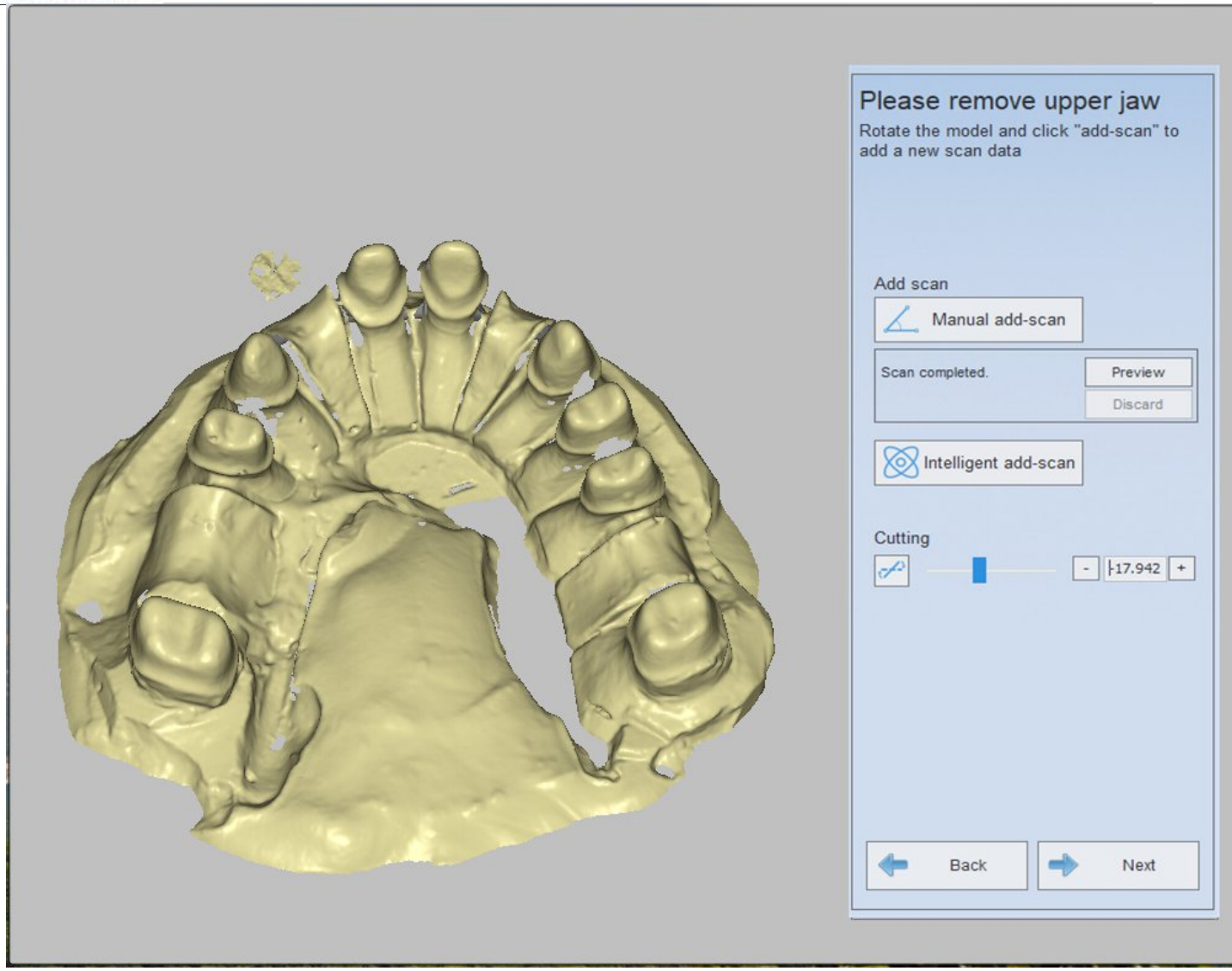
Choose the scan type of “Non separated model” and the “Occlusion” type is “None”. Choose “Crown”in the “Crown”, then choose the tooth location(one or more disjunct teeth), shown as the figure below.



2. Scan crown

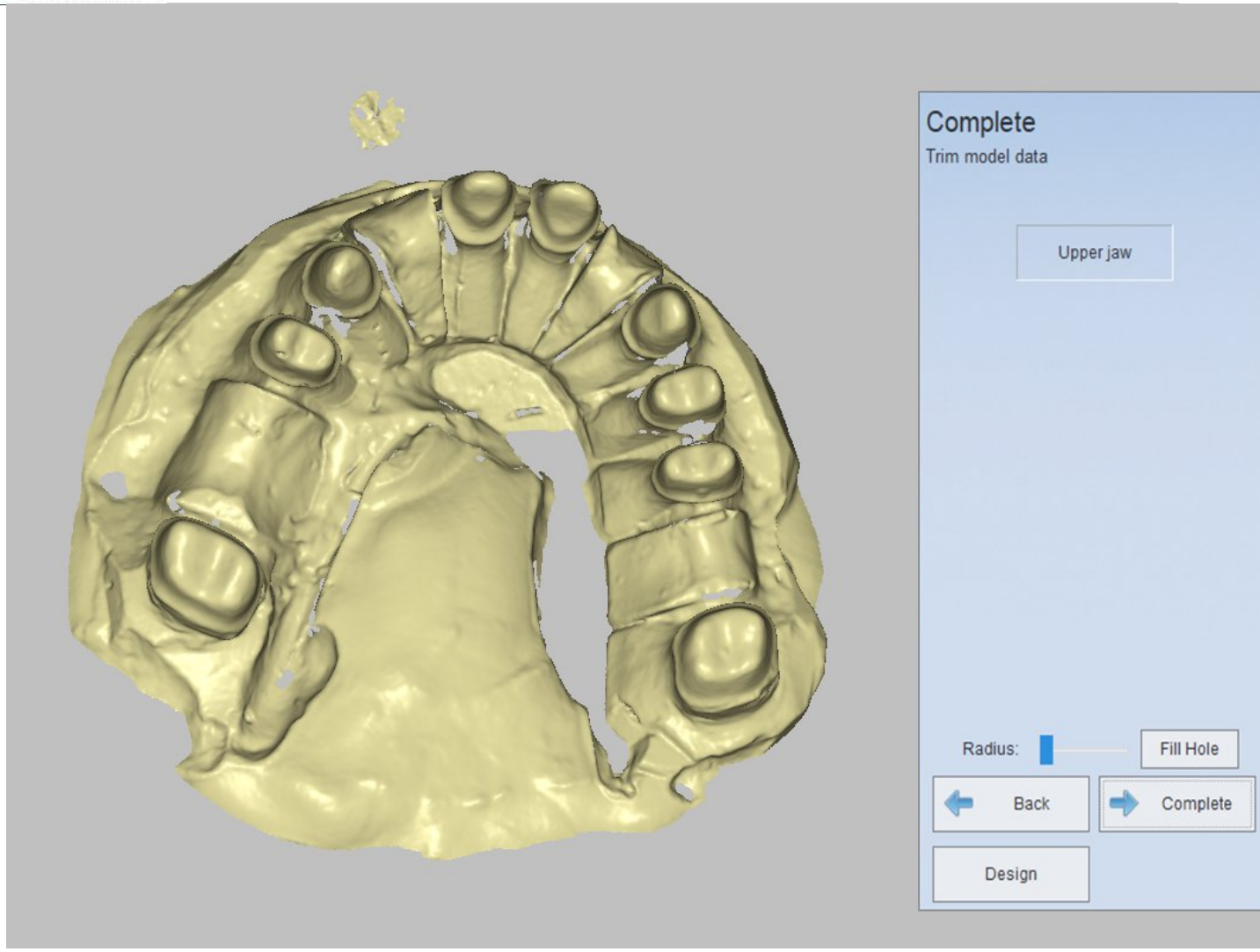
After creating order, click “Scan”, the interface will pop up, shown as the figure below. Insert the jaw according to the prompts.

Then click “Next” to begin to scan. After the models is scanned, it will align the scanned model automatically. When alignment is completed, it will show “Complete model optimization” at the bottom, shown as the following figure.



3. Complete scan

After the alignment is completed, click “Next”, the interface will pop up, shown as the figure below. Click “Complete” to complete the scan,



Note： If there are different types of teeth or more than one tooth in an order under the “Non separated model”, you need to scan it once only.

5.1.2.2. Single Inlay

The scan operation is the same with the “Single Crown”in the “Non separated Model”, refer to the Single Crown for the operation.

5.1.2.3. Scan Veneer

The scan operation is the same with the “Single Crown”in the “Non separated model”, refer to the Single Crown for the operation.

5.1.3. Impression

The“Impression” is designed specially for Impression models.

You need to clamp the model during scanning, please refer to Impression Fixture

.

Crown

The scan operation is the same with the “Single Crown”in the “Non separated model”, refer to the Single Crown for the operation.

Note： If there are different types of teeth or more than one tooth in an order under the “Non separated model”, you need to scan it once only.

5.1.4. Die

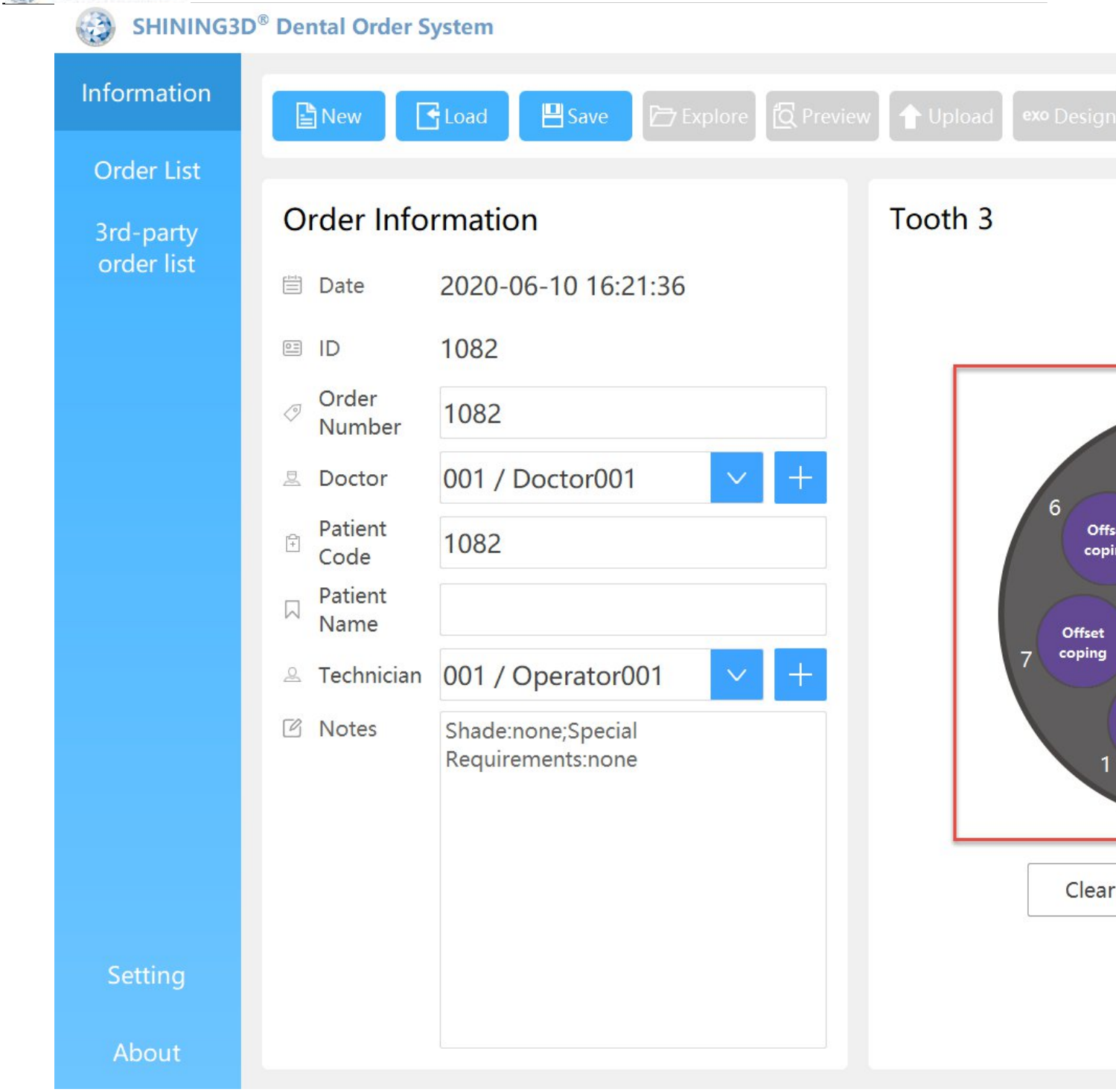
The“Die” is designed specially for a large number of simple tooth models. It is used to scan data for making the inner crown generally. Take the single crown as the example.

You need to clamp the model during scanning, please refer to the Clamping of tooth Die.

Single Crown

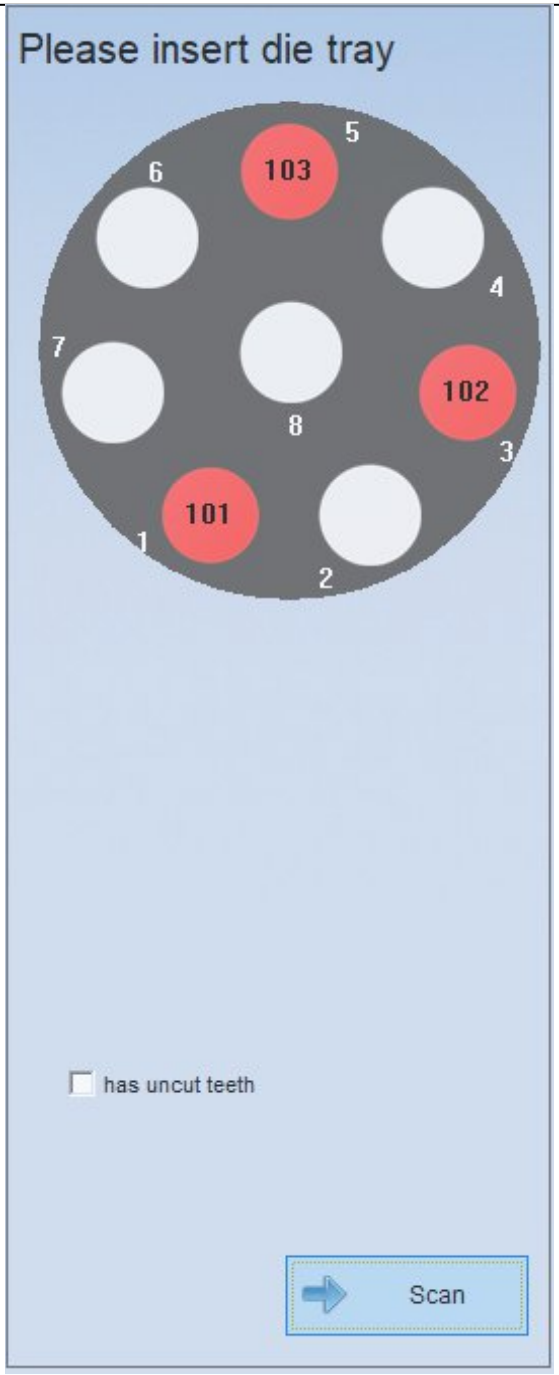
(1) Create order

Choose the scan type of “Die” and the “Occlusion” type is “None”. Choose “Crown”in the “Crown”, then choose the location of the tooth to be scanned (one or more teeth), shown as the figure below.

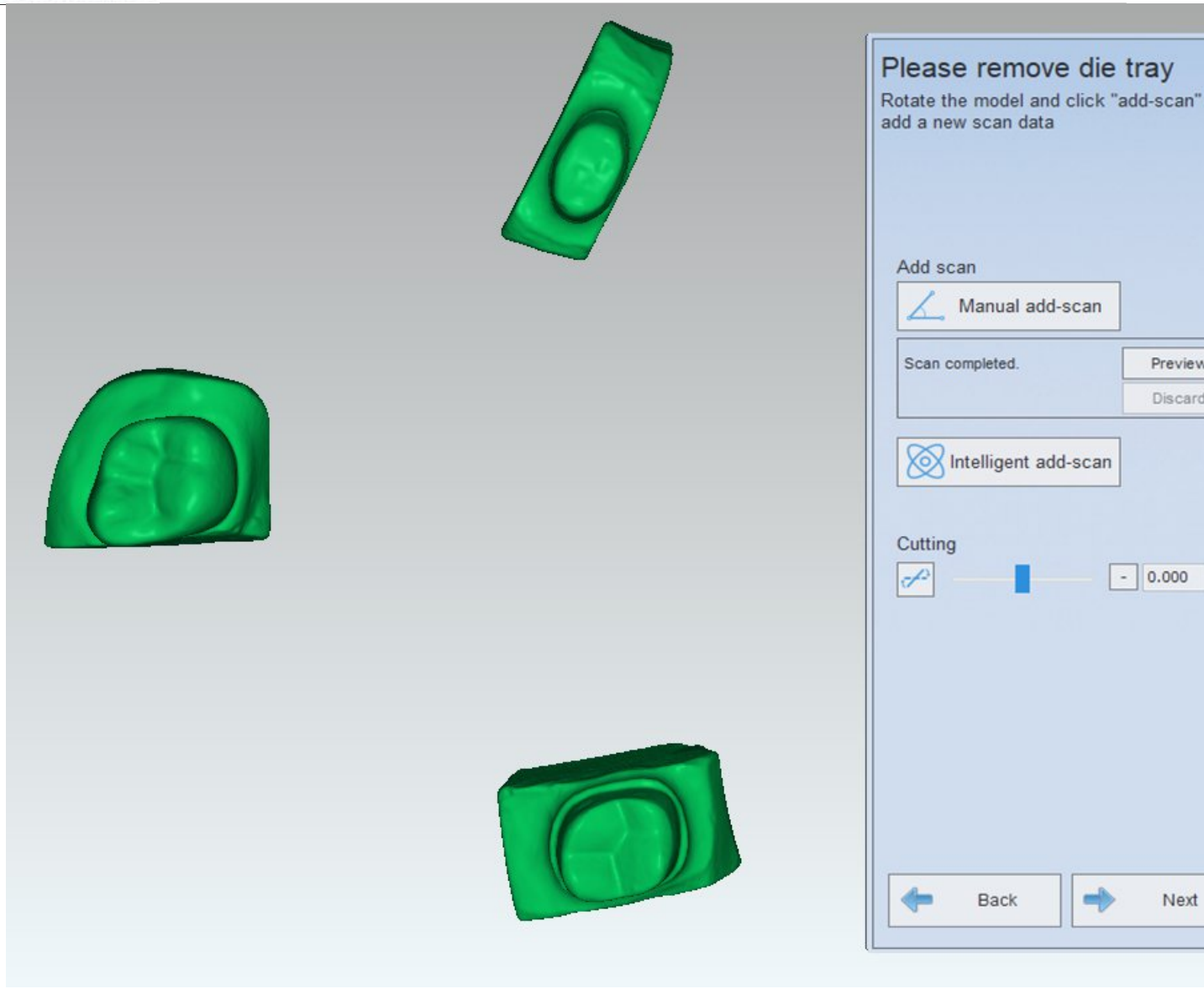


(2) Scan die

After creating order, click “Scan”, the interface will pop up, shown as the figure below. Insert the die tray with teeth according to the prompts.

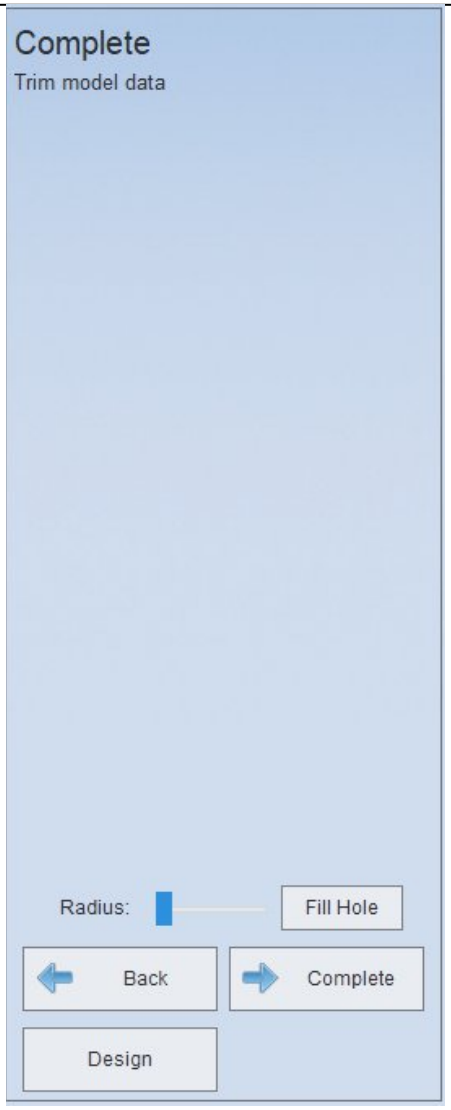


Make sure that die tray are inserted with die before you click “Next” to start scanning. After scanning, you can “Add scan”to get better scan result. Then click “Apply”to optimize the scan data as below.



(3) Completing scan

After the alignment is completed, click “Next”, the interface will pop up, shown as the figure below. Click “Complete” to complete the order scan.



Note :

1. If there are three types of teeth in an order, which are crown, inlay and veneer, you can scan crown , Inlay and veneer at a time.
2. Scanning for die of upper and lower jaw are the same. When the number of crown and veneer is no more than 8, you can scan these models all at a time. If the number is more than 8, you should scan these models more than once according to the hole location on the die tray.
3. The scan type of die cannot be wax or implant and the “Occlusion” type can only be “None”.
4. The missing tooth can not be scanned alone. When choose the missing tooth in the order, the type will be ignored by default.

6. Occlusion

The “Occlusion” types contain “None” 、“Registered jaw”“Bite impression”‘Triple Tray impression’.

None: The operation of None “Occlusion” type is introduced in Separated Model, Non separated Model, Impression, Die.

The following orders are created through DentalScan.exe.In this chapter, the “Registered jaw” and “Bite impression” will be introduced.

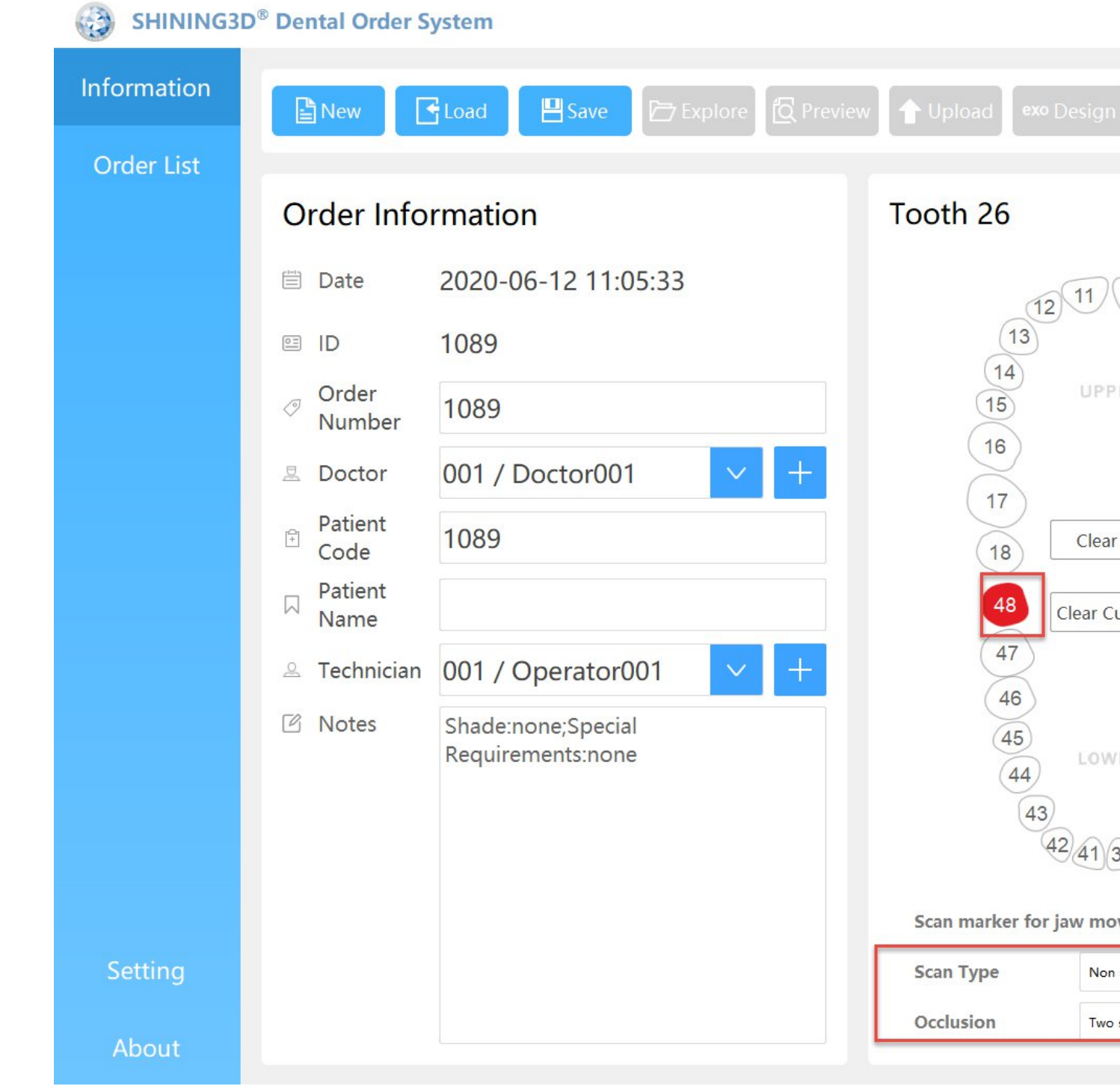
6.1.1. Registered jaw

Choose the scan process of “Registered jaw” according to the selected tooth type and scan type. Take the single crown in the “Separated model”for example .

Note : While scanning the combination jaws with wax, the wax can exist only in the upper jaw or lower jaw. If both of the two crowns have wax, the scan design will be wrong.

1) Create order

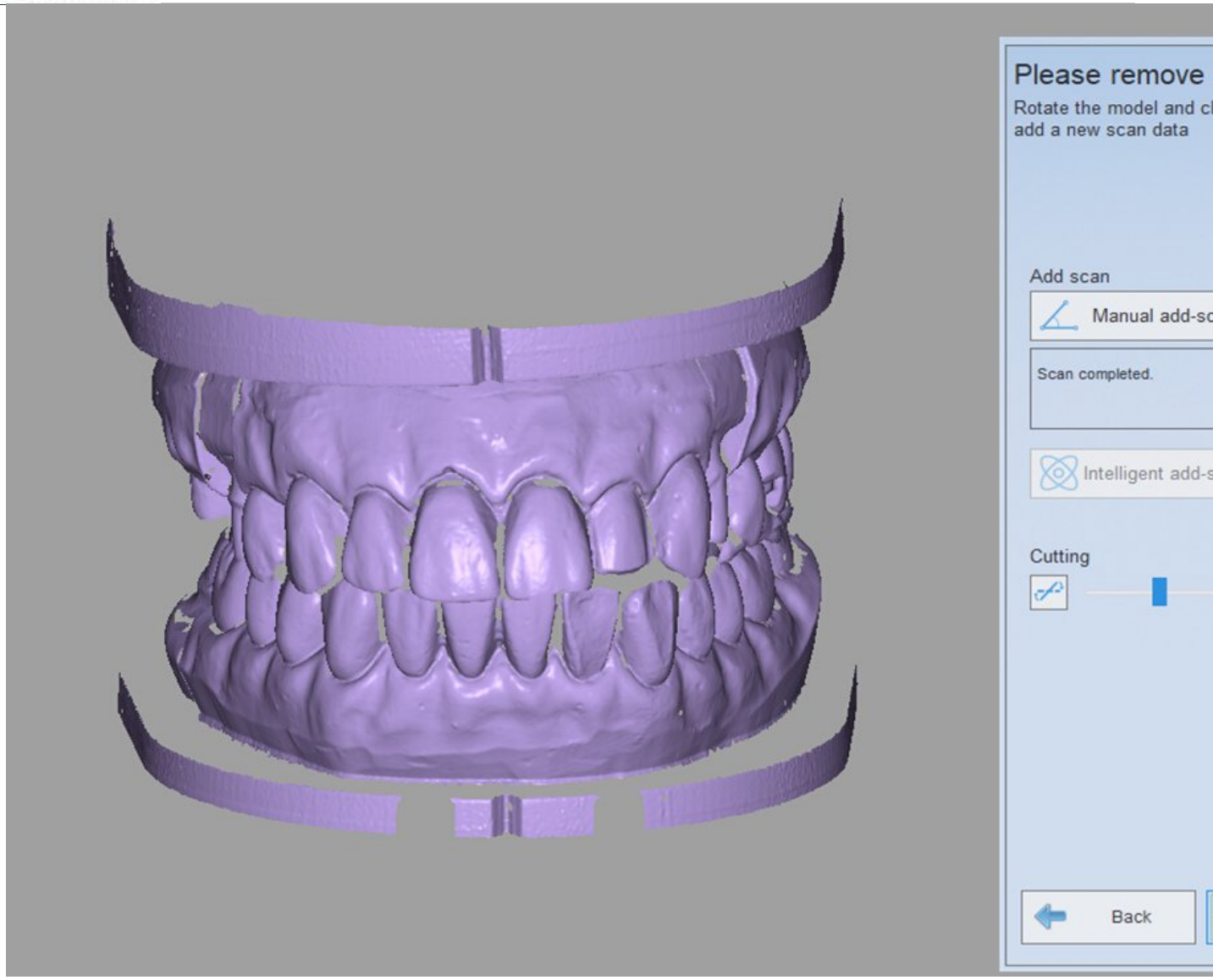
Choose“Non Separated model”for the scan type and“Two stone models occlusion”for“Occlusion” type. Choose “Crown”option in the “Crown”, then choose the location of the tooth to be scanned (26, 48), shown as the figure below.



2) Scan the combination jaws

Insert the model according to the prompt, shown as the figure below, click “Next” to begin to scan.

After scanning the model ,the result is shown as the figure below.



3) Scan the lower jaw

After scanning the totaljaw, click “Next” to enter the interface of scanning the combination jaws.Insert the lower jaw according to the prompt.

4) Scan upper jaw

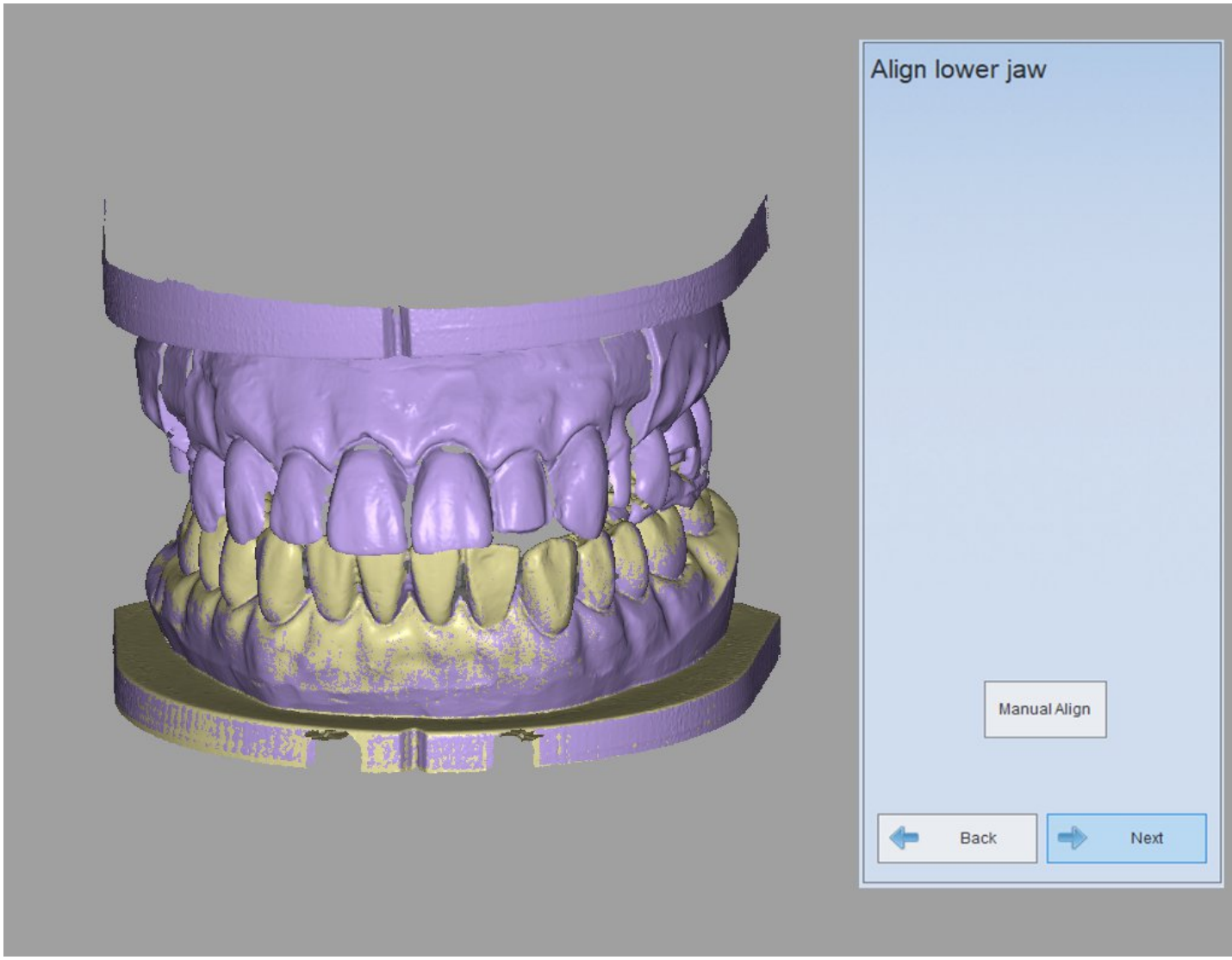
After scanning the Up jaw, click “Next” to enter the interface of scanning the combination jaws. Insert the lower jaw according to the prompt.

(5) Auto alignment

Auto alignment of the lower jaw

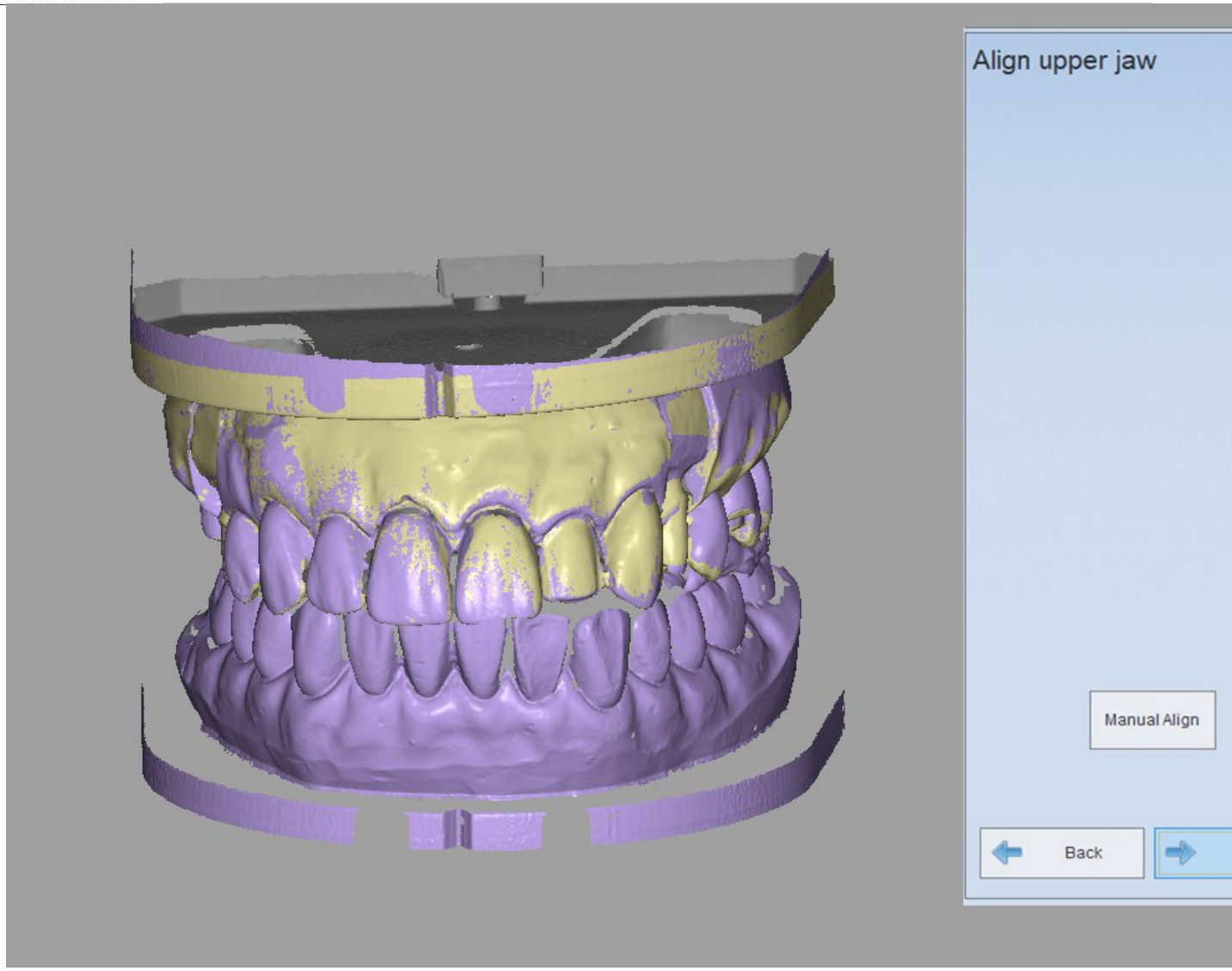
After scanning the totaljaw、loweraw、upperjaw model, click “Next” to enter the interface for auto alignment of lower jaw. It will align the model automatically. When alignment is completed, the model is shown as

the following figure.(if the auto alignment result is not satisfactory, you can choose to align it manually)



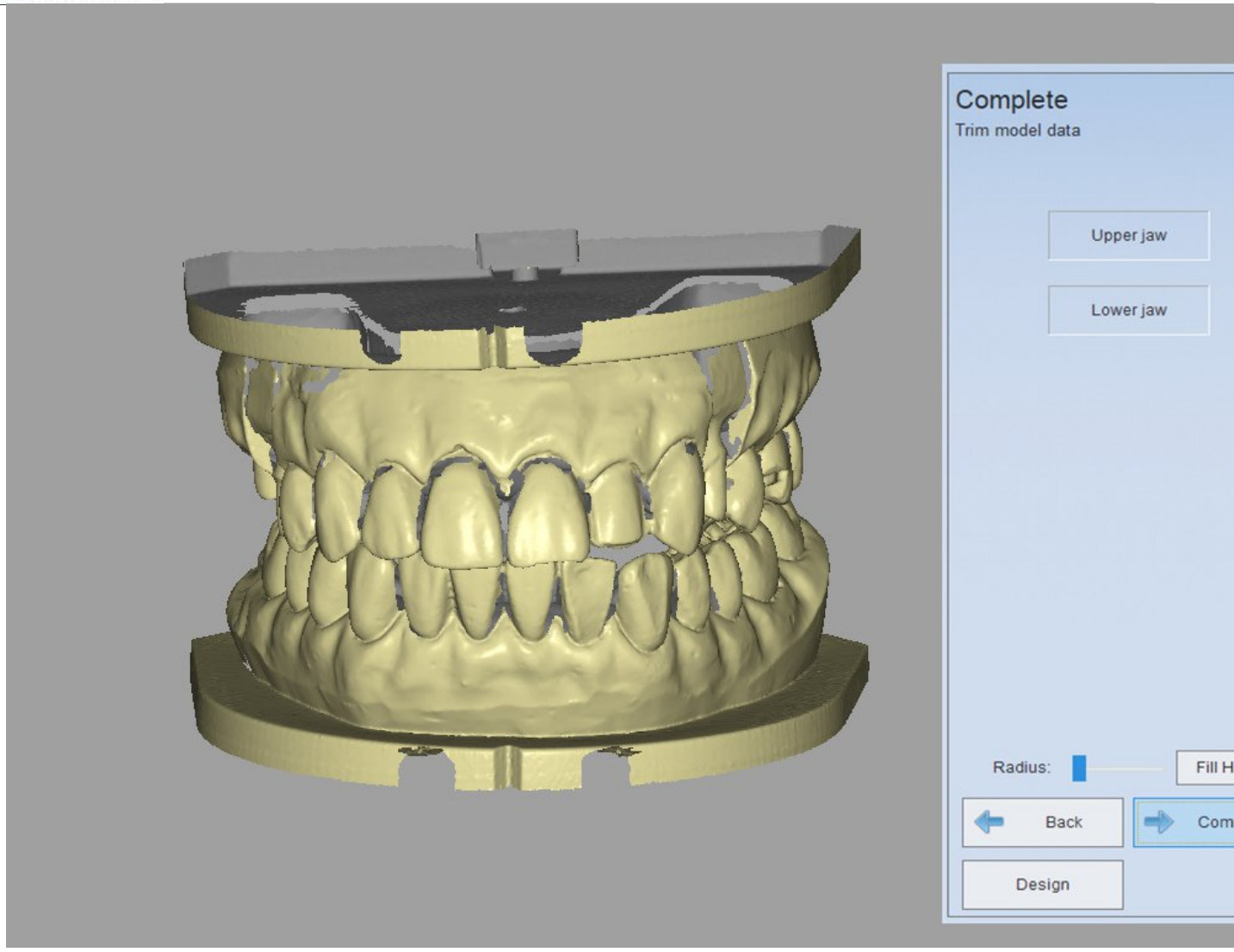
Auto alignment of upper jaw

Click “Next” to enter the auto alignment of upper jaw (you can also choose the “Manual Align”), shown as the figure below.



(6) Completing scan

After the alignment is completed, click “Next”, the following interface will pop up, shown as the figure below.



Note :

1. In the mode of “Registered jaw”, if the selected teeth are all in the lower jaw, please scan the lower jaw first before scanning the upper jaw.

2. While scanning the combination jaws with wax, if there is a pontic in the upper or lower jaw, operate it according to the operation of the pontic with wax.

3. While scanning the combination jaws with wax, the wax can exist only in the upper crown or lower crown. If the wax exists in both of the two crowns, the scan design will be wrong.

4. If you click “Back” during the combination jaws scanning, the auto alignment will fail, and then you need to align it manually.

5. If you use the previous model by importing order, the auto alignment will fail, and then you need to align it manually.

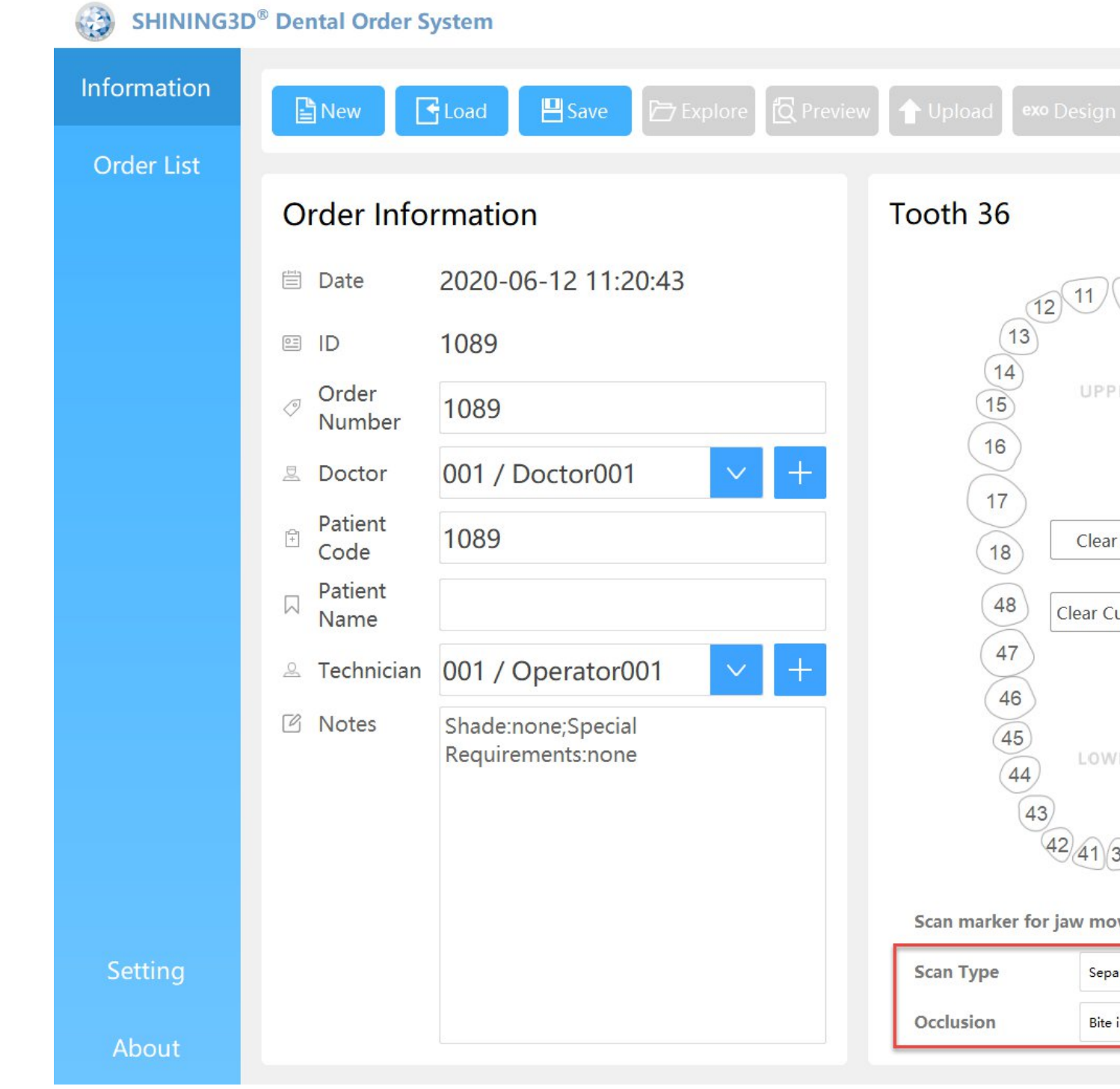
6.1.2. Bite impression

According to the selected tooth type or scan type then choose the scan process of “Bite impression”.

The order which includes wax model or the order which both up and down jaws had chosen teeth is unsupported to the “Bite impression” type. Take the single crown in the “Separated model”for example

1) Create order

Choose “Separated model” for the scan type and “Bite impression” for “Occlusion” type. Choose “Crown” option in the “Crown”, then choose the location of the tooth to be scanned (26), shown as the figure below.



2) Scan the mushbite

Insert the model according to the prompt, shown as the figure below, click “Next” to begin to scan.

3) Scan the jaw

After scanning the mushbite click “Next” to enter the interface of scanning the jaw. Insert the lower jaw according to the prompt, the detailed process can referred to “Non separated Model”.

4) Completing scan

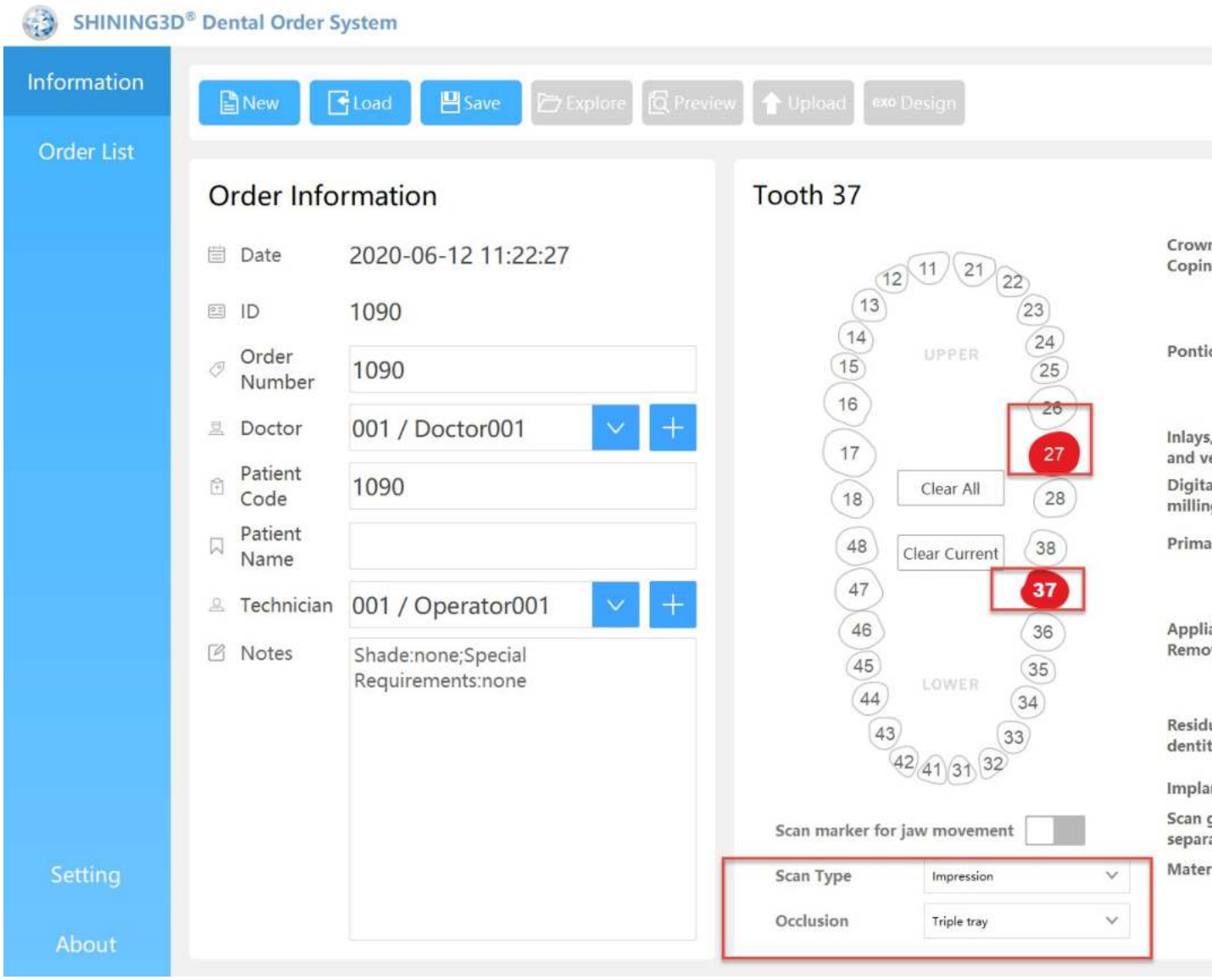
After the scan process is complete, click “Next” to the “complete” interface, the mushbite will align with the jaw automatically. After the alignment is completed, edit and delete the unneeded region to make the later design more easily.

6.2. Triple Tray

Choose “impression”when users want to scan triple tray impression

1) Create order

Choose “impression” in scan type,choose “triple tray”in occlusion, choose “anatomic crown” in crowns/copings session as below.



2) Scan lower impression

After order is created, click scan to start scanning, insert the lower

impression as requested.

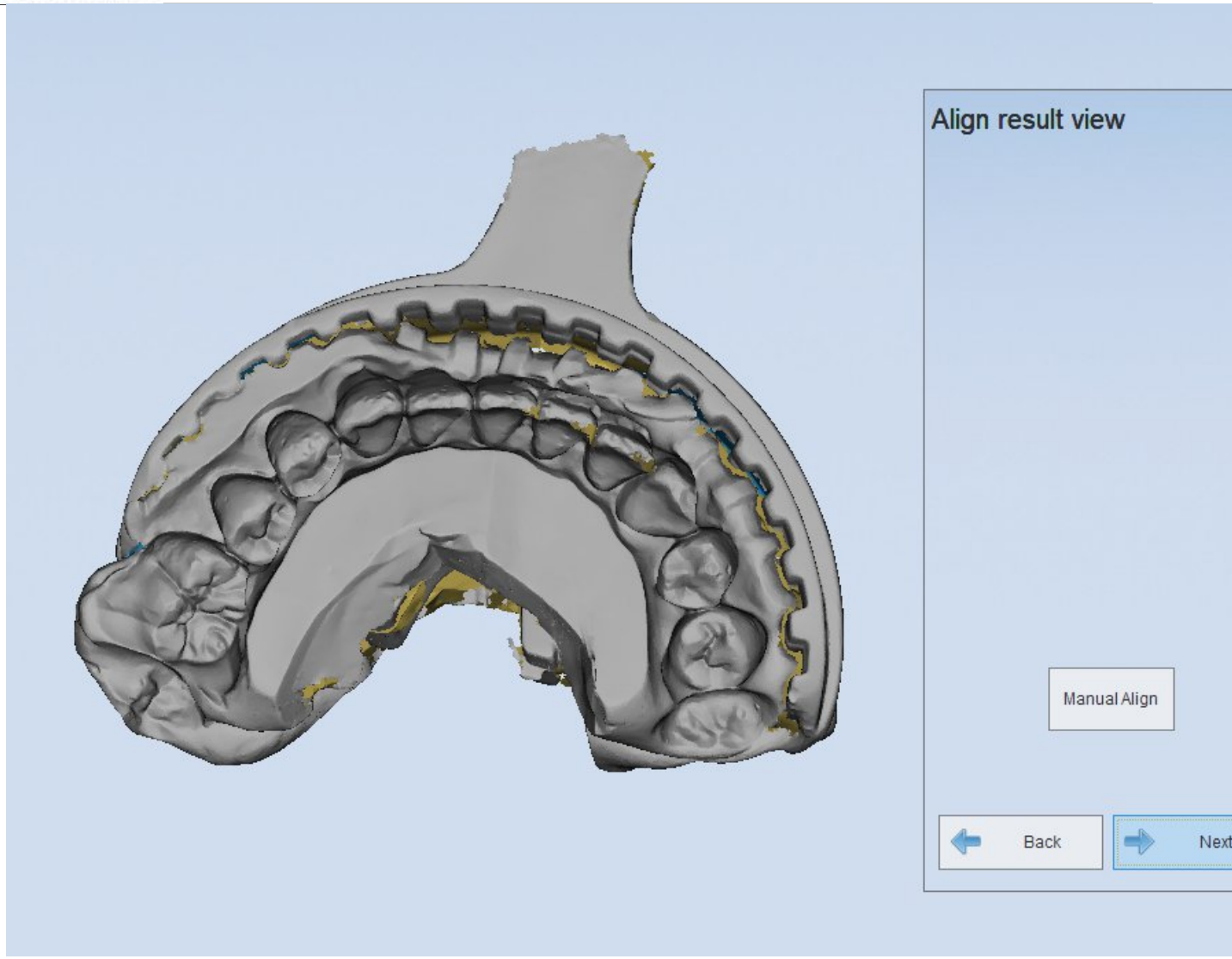
3) **Scan upper impression**

After lower impression scan is finished, go to next step to scan upper impression.

4) Automatic alignment

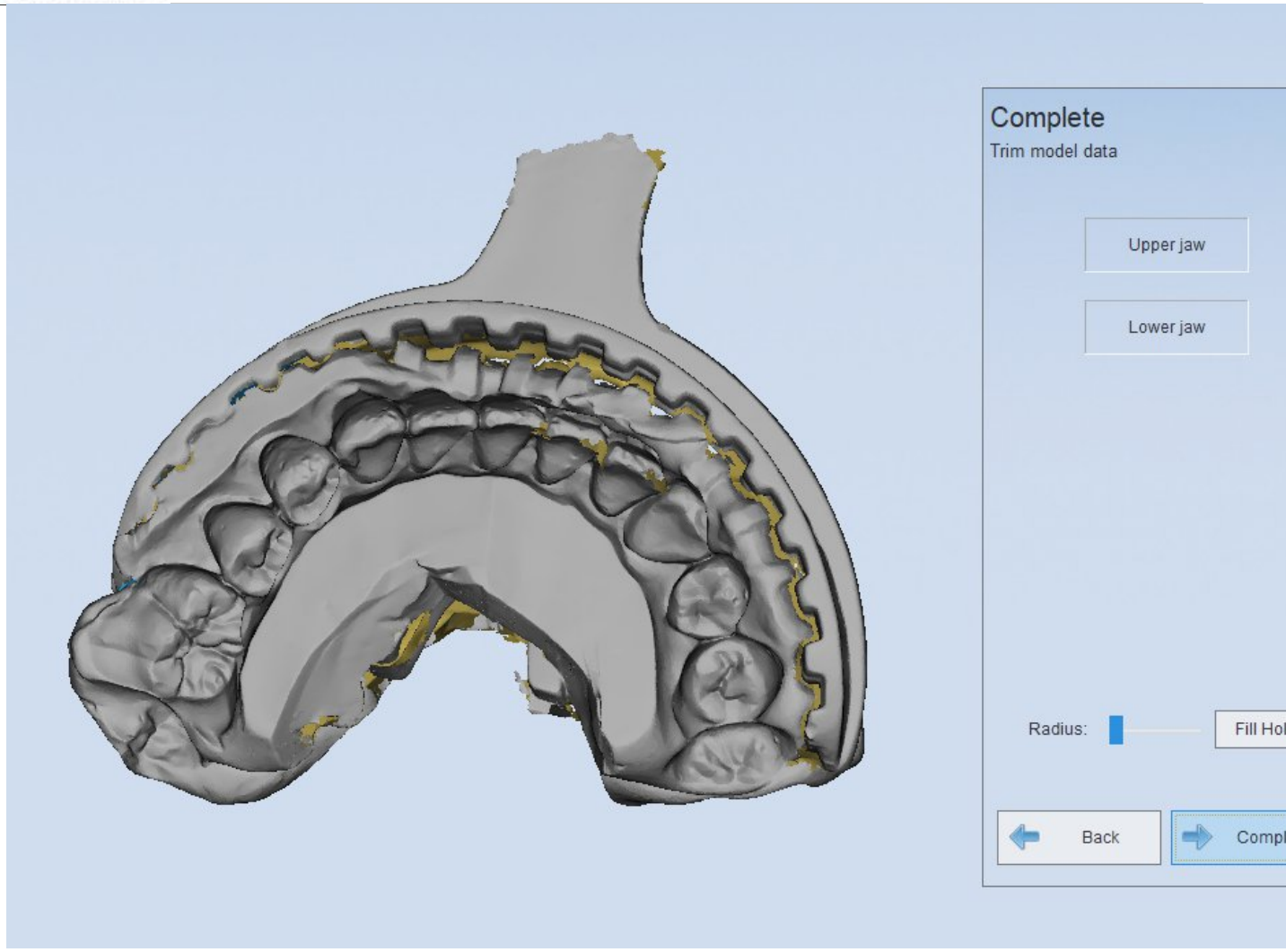
Automatic alignment between upper and lower impression.

After both upper and lower impressions are scanned, go to next step to align two impression data.



5) Complete scan

After alignment is finished, go to next step to complete scan process.



7. Calibration

calibration precision directly affects the scanning accuracy of system. The system requires calibration under the following conditions :

1) 3DScanner is used for the first time or it hasn't been used for a long time.

2) 3DScanner suffered from serious vibration during transportation.

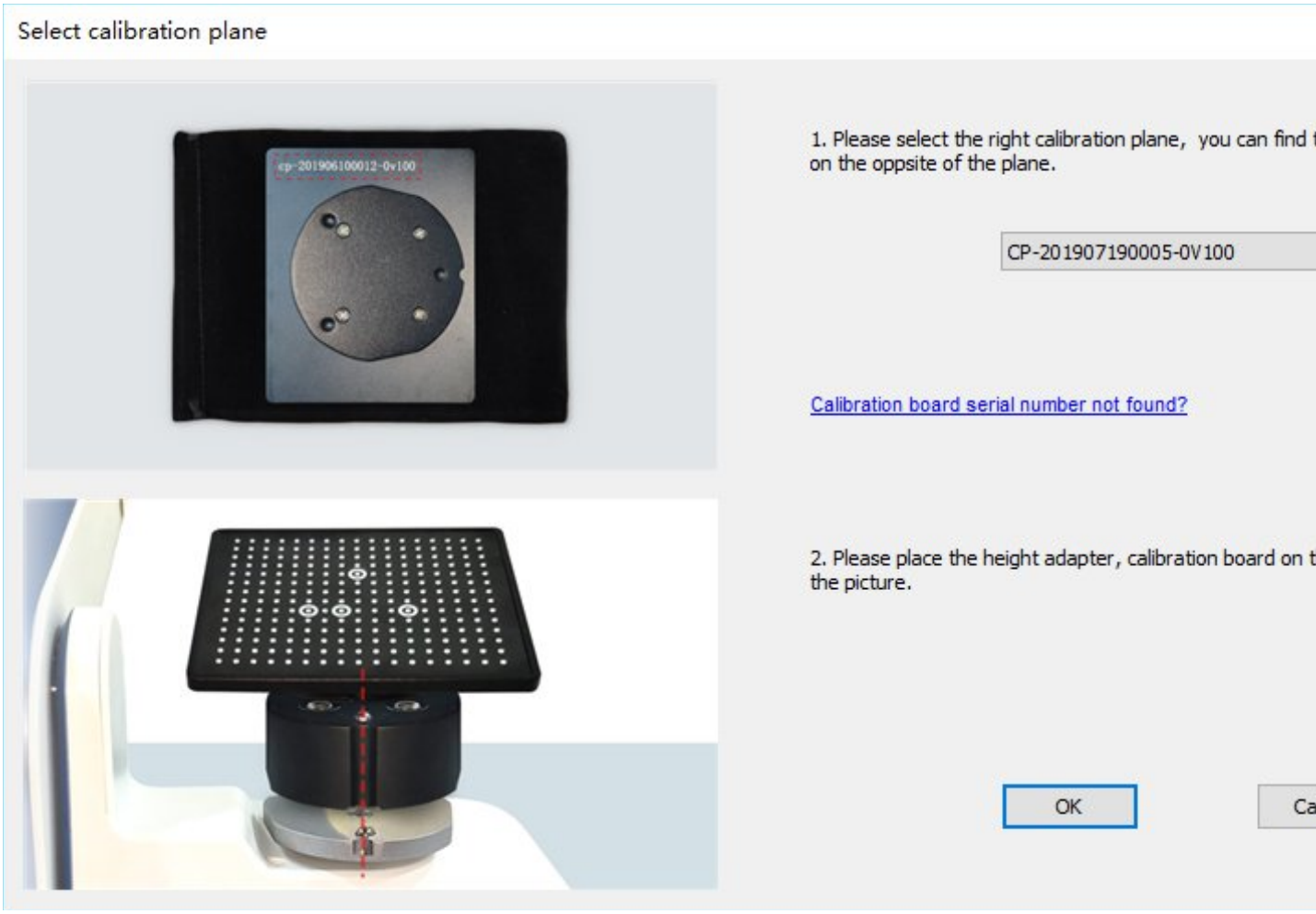
3) The scanned data is very rough surface, or problems appear such as

registration error.

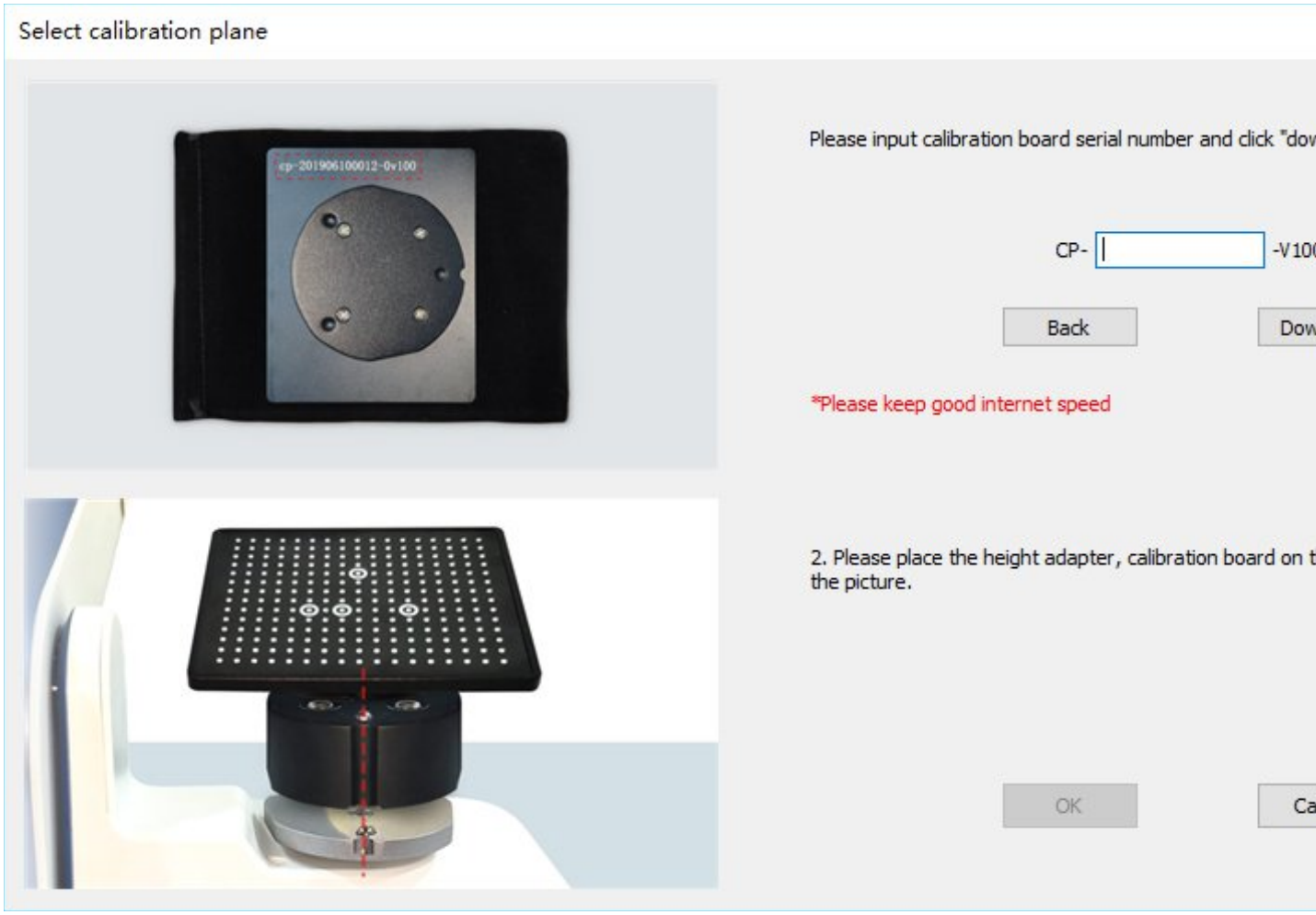
Operation steps :

You can open "DentalManager" and click ... to activate calibration. It can also be activated by clicking 'DentalScan->Calibration' from the 'start' menu.

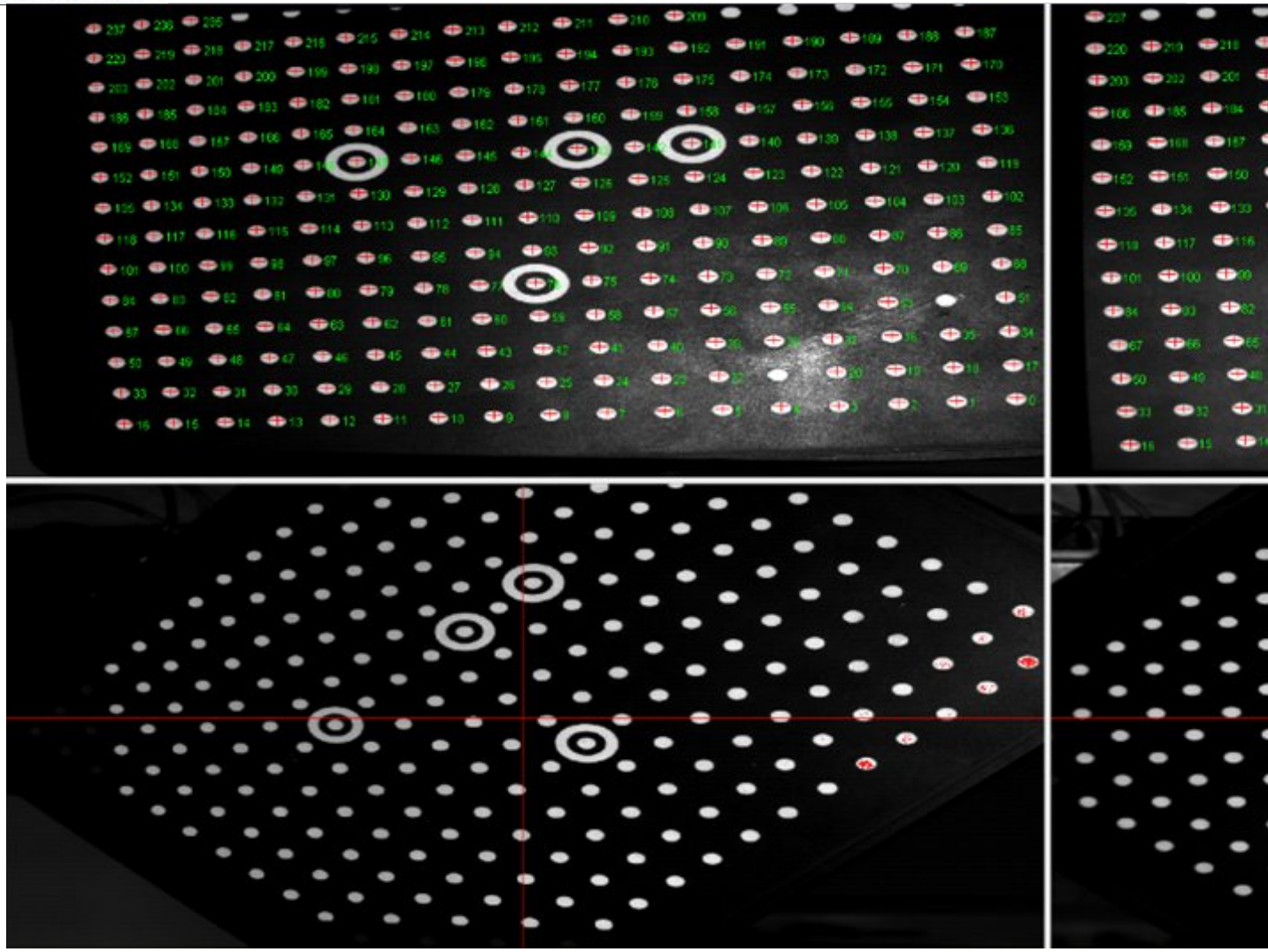
When the following interface is displayed, you can select the corresponidng calibration plate from the drop-down box. If there is no corresponding plate in the drop-down box, click "serial number of calibration plate not found?".



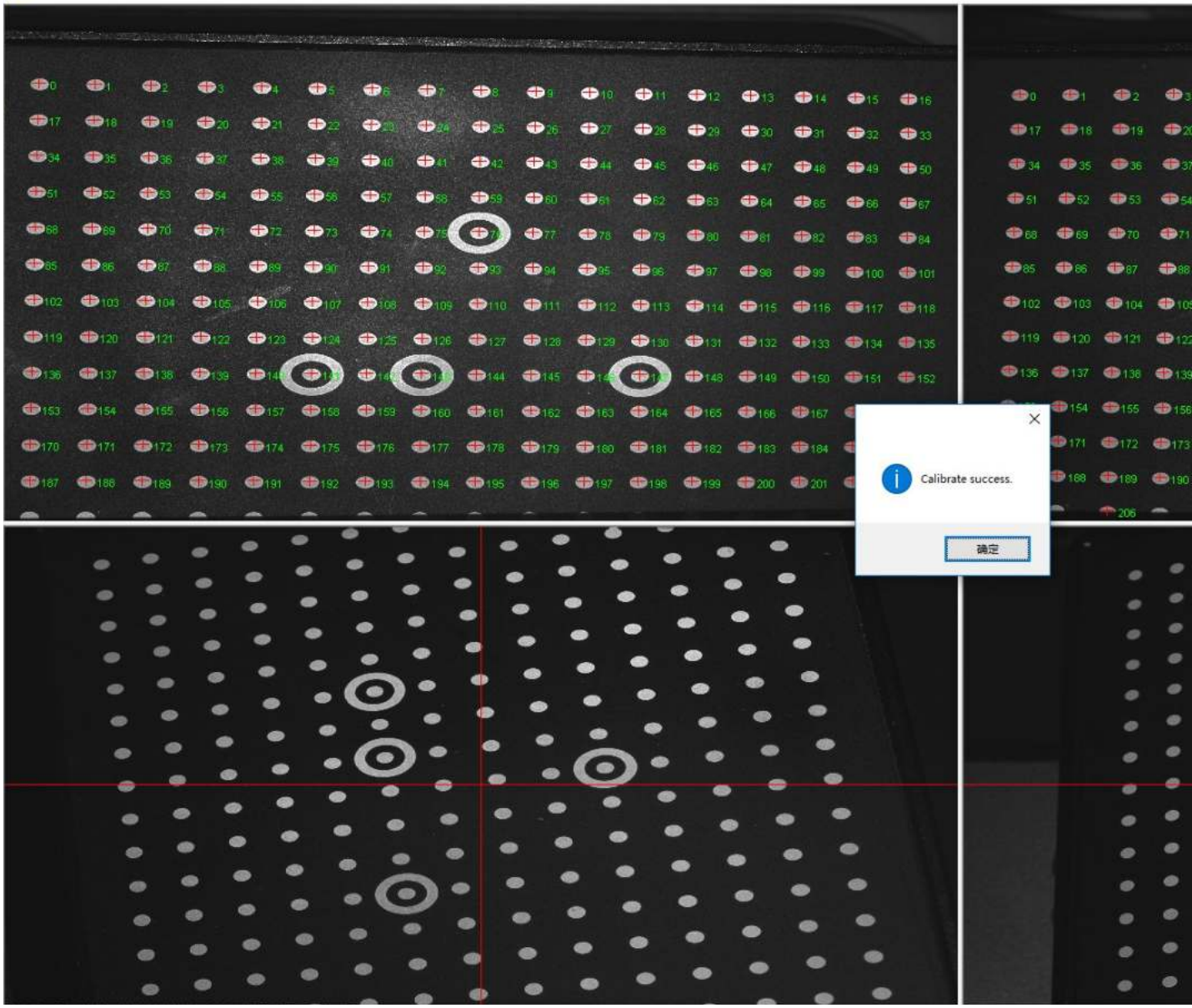
As shown below: type the serial number of the calibration plate you are using in the input box. After the download is done, click ok.



Click “Yes”, the work table will rotate automatically. In addition, it shows “Scan Data” at the bottom, which means that it is collecting and calibrating. The whole process is running automatically.The interface is shown as the figure below.

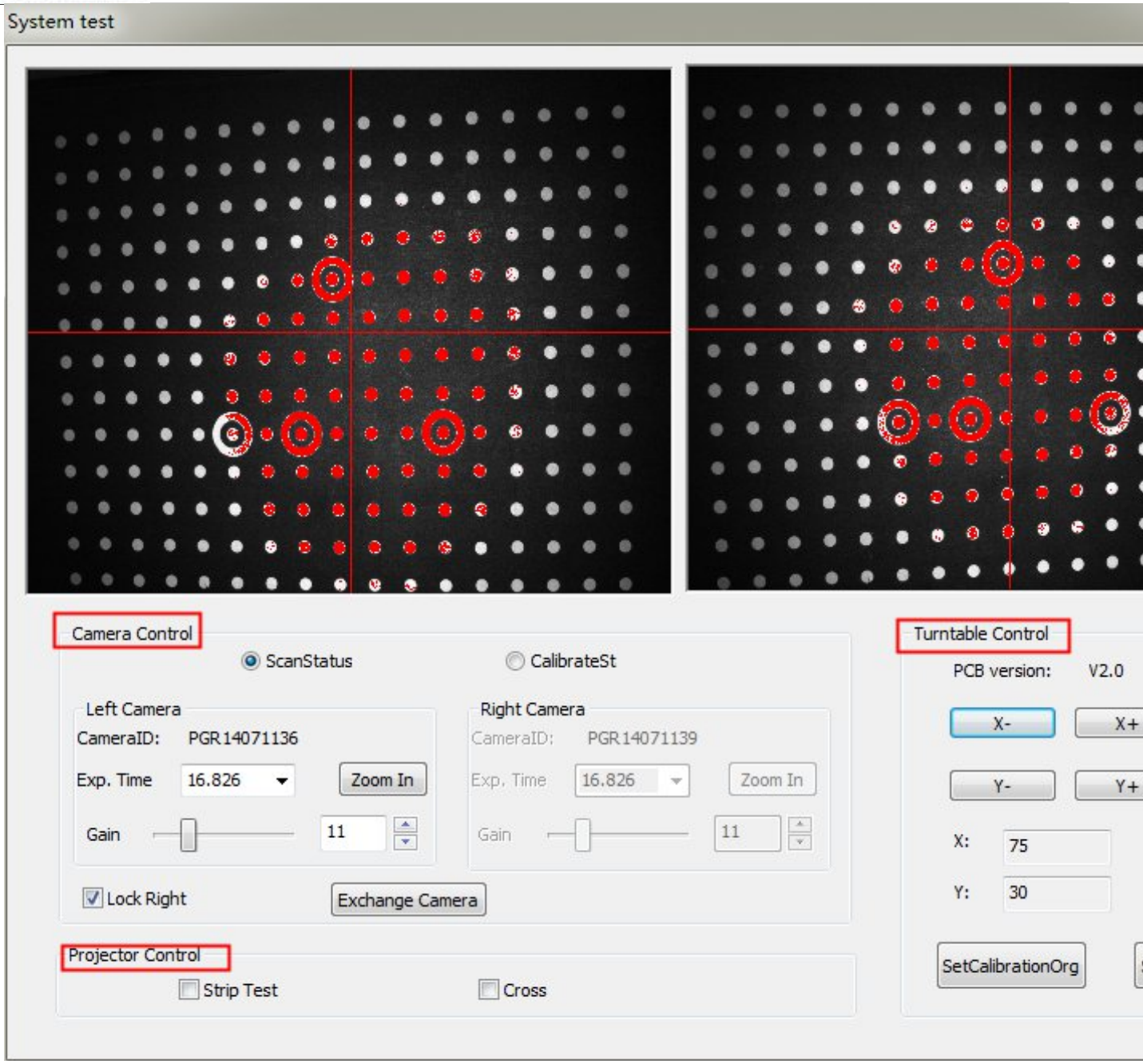


It will take 7-10 minutes to complete the calibration process.。Once the calibration is completed, the calibration result will appear, shown as the figure below. It is the errors on X, Y, Z axis. Click “Finish” and the whole calibration process will be finished.



8. System Test

“SysTest” is used to observe the working condition of hardware and diagnose problem. Click the menu “SysTest”, a dialogue will pop up, shown as the figure below. The interface contains the parts of ①camera control, ② projector control and ③turntable control.



The parameters of projector control and camera control are predefined before delivery, which is not suggested to reset. Technician checks the scanner working condition and make problem diagnosis by those setting.

As shown in the figure above, when adjust the parameters of turntable control, Click X+ or X- to increase or decrease the value of the rotary angle on X axis, or Y+ or Y- to increase or decrease the value of the rotary angle on Y axis.

Note:

The parameters of projector setting and camera setting are predefined before delivery . To avoid abnormal working condition, it is not suggested to change the setting without technician advice.If the parameters are changed by users and then the scanner can not work properly, the users should adjust the parameters according to the following chapter: "Guide for machine testing" or connect with professional technician for help.

8.1.1. Guide for machine testing

User guide includes two parts: **Scanning process** and **Calibration process**. Please set the parameters according to the following operation guide

Notes:

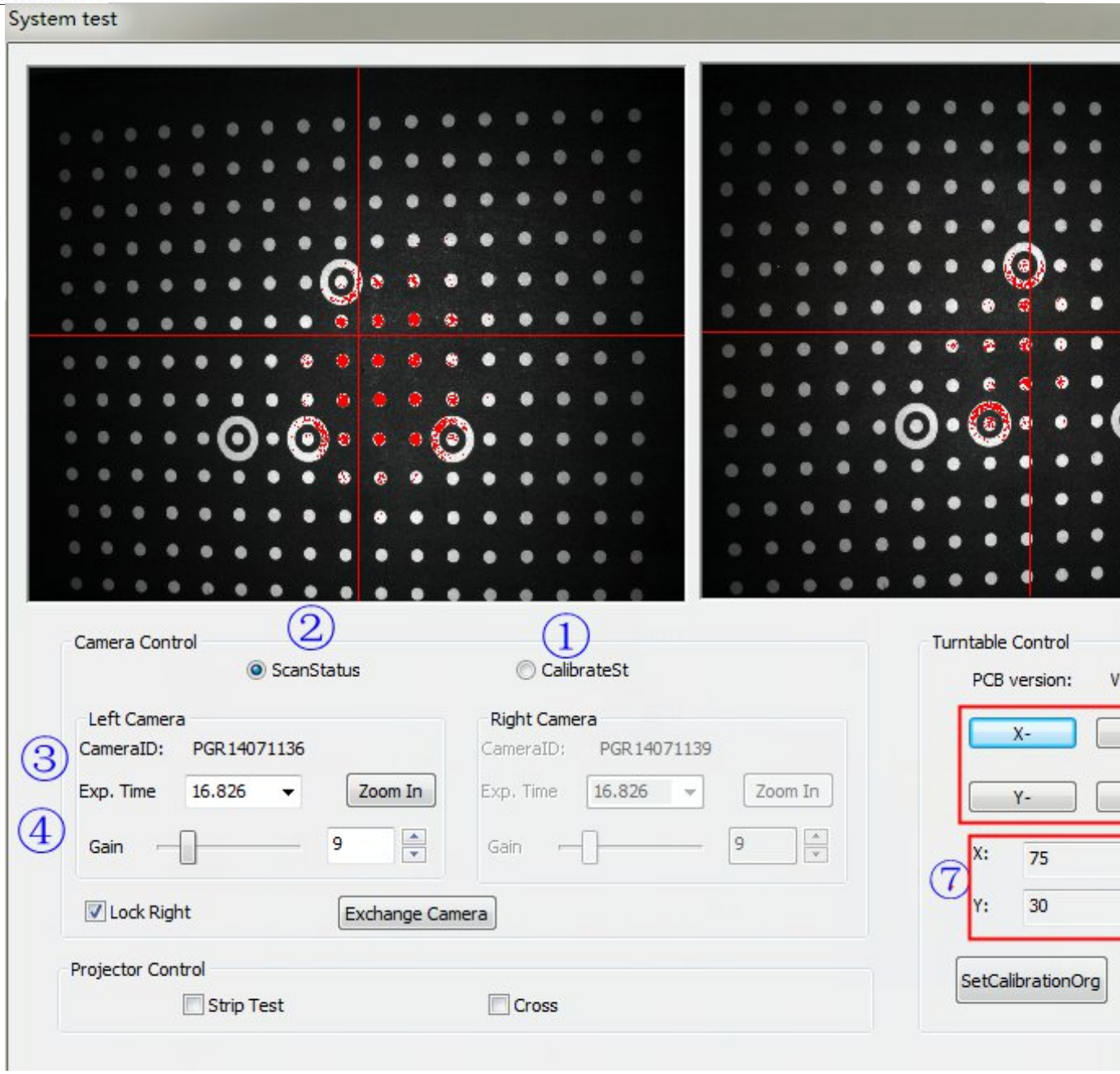
- When the result of scanning or calibration is failed, we can test the scanner by setting "camera setting" and " turntable control" parameters
- When doing calibration and scanning, there is no need to change.

1) **Calibration process**

Check the brightness and SetCalibrationOrg before calibration.

Choose for calibration and put the calibration board on the turntable. Adjust and to modify the exposure(set the proportion of red points to white points is about 1:5)

Put the calibration board on the turntable, click to reset. Input angle values in boxes. Click Y+,Y or X+,X- for adjustment, making sure that the calibration board is facing upfront and cross is projected on the middle of the calibration board as shown below. You can see the adjusted angle values of X and Y axes through. After the two calibration boards at the two windows are in the same position, click (SetCalibrationOrg) to complete the calibration initial point setting.



2) Scanning process

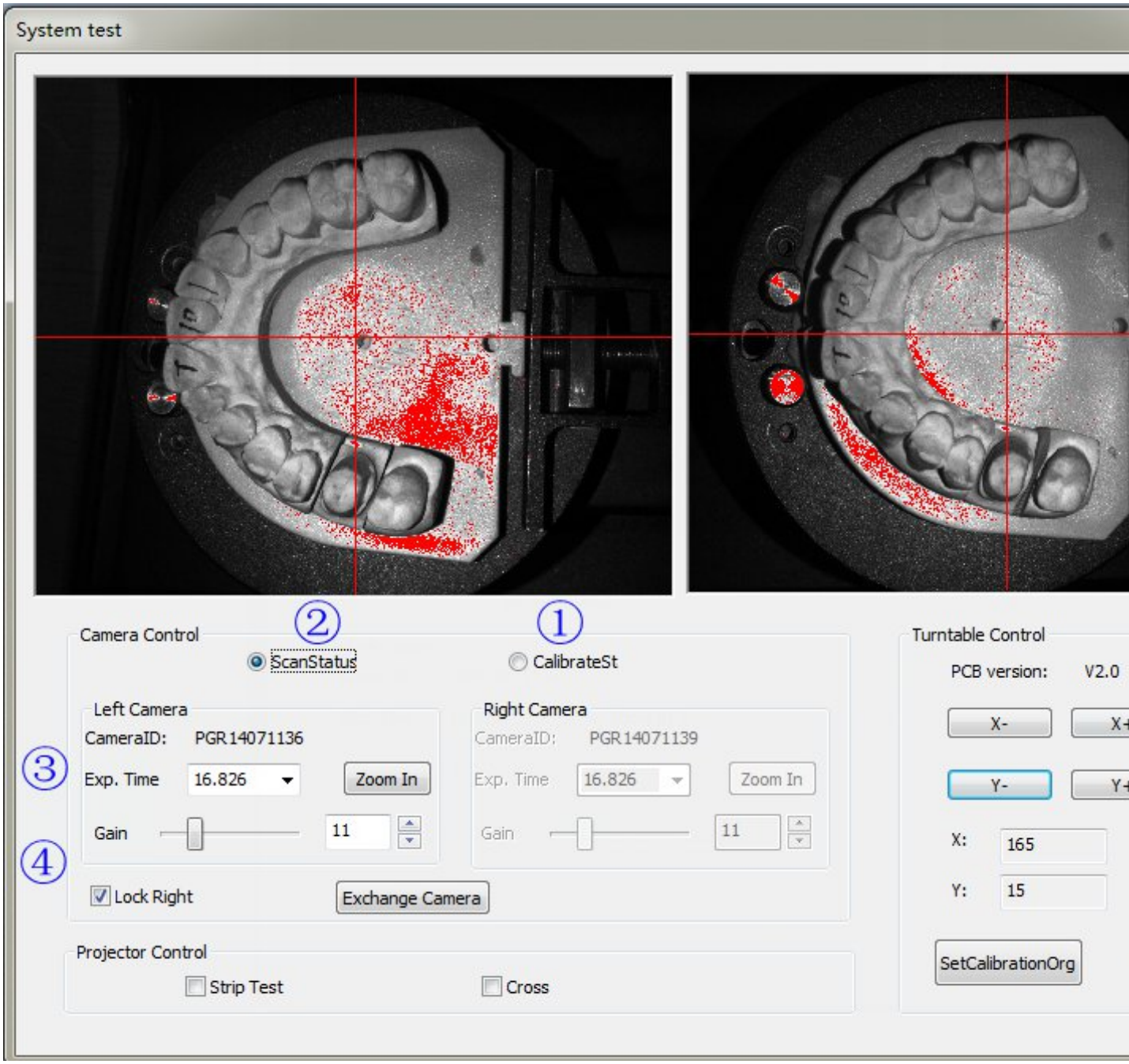
Please check exposure and SetMendscanOrg before first scanning.

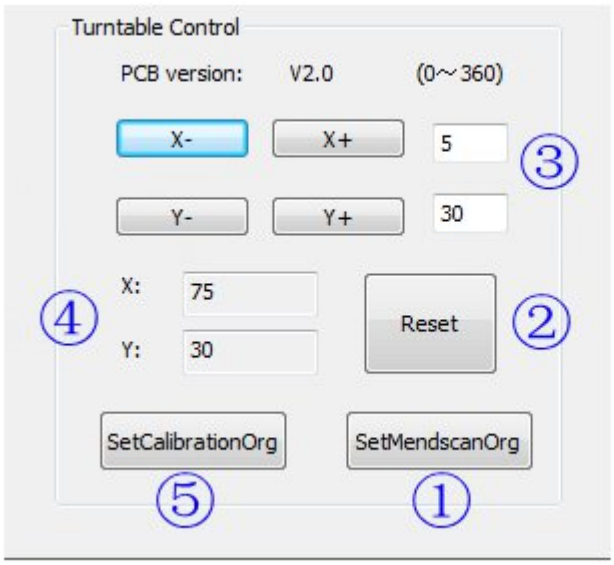
Choose for scanning and input the dental model onto the turntable. Adjust to modify the model brightness(take the snapshot below for reference)

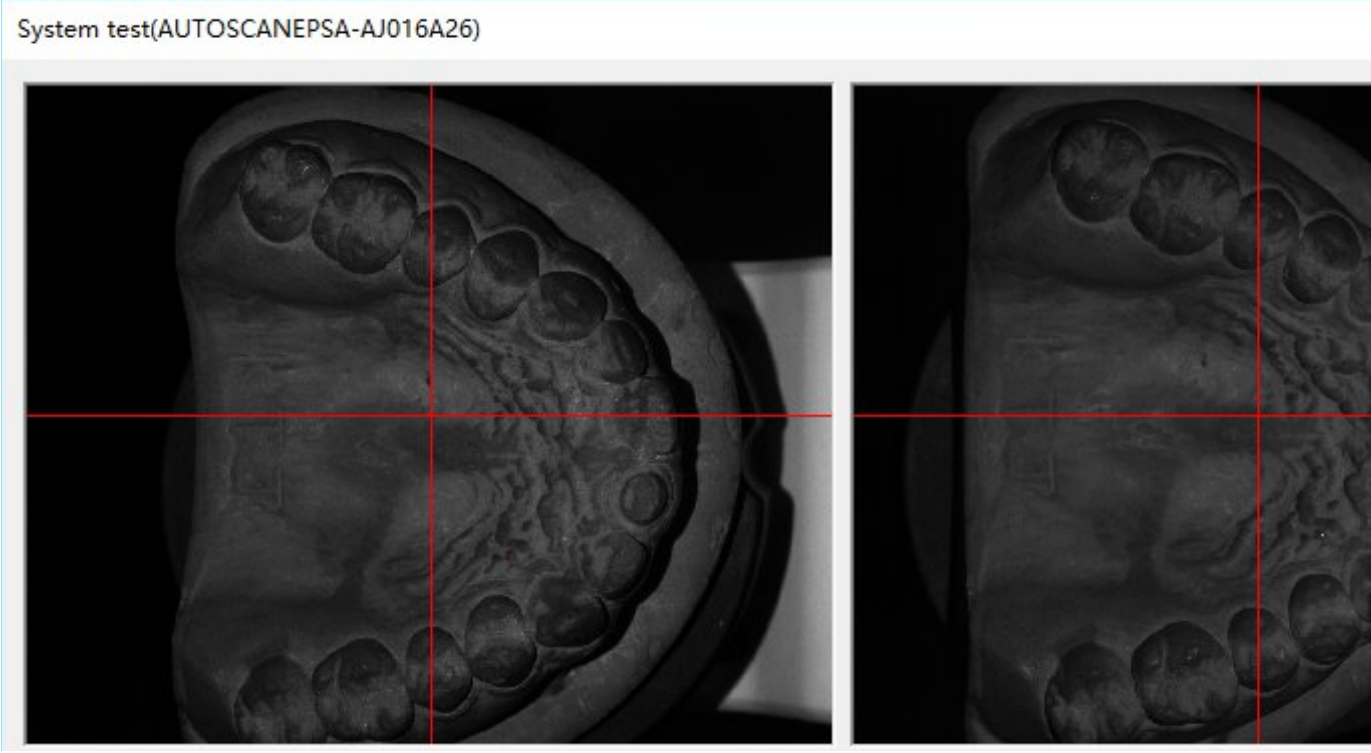
Put the dental model on the turntable, click to reset. Input angle values in boxes. Click Y+,Y or X+,X- for adjustment, making sure that dental model is facing upfront and the cross's horizontal line come across

the middle of the hole as shown below(circled in blue).

You can see the adjusted angle values of X and Y axes through . After the two calibration boards at the two windows are in the same position, click (SetMendscanOrg) to complete the mend scan initial point setting.







9. Notes

1) Don’t insert the USB data cable and softdog into the USB ports in the same area.
2) Please use the Nvidia graphics card to acquire high efficiency

for scan.

3) Each software binds to a certain calibration plate; so don't mix up the calibration plates Number.

4) Please don't move the devices.

5) Please keep the scan box clean.

6) Please do not start the software in the U disk directly. You must copy the software from the U disk to the PC before using, and you must have

the permissions to read/write the folder of the scan software, or else the software will not work normally.

7) If the software reminds "cannot recognize the scanner" please turn off the scanner and shutdown the software, then unplug USB data cable that connect the scanner and PC,then plug back in.

8) Users can not insert the USB wireless card.

10. Safety Notices

1) Maintain good ventilation,keep environment temperature no higher than 30 ℃, no flammable and corrosive materials in the air.

2) Carry and place it carefully, no crushing, prepare protection from sun, rain, vibration, etc.

3) Once machine malfunctions, dismantling and repairing are allowed only by professional personnel or under their guidance.

4) Watch your hand.

5) Children are forbidden to operate this machine.

6) Once machine lifetime comes to an end, please hand it over to authorized agency to deal with it, do not randomly throw away to dustbins.

11. Contact Us

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