INNOPLAN

Experience the Next Level

INSTRUCTION FOR USE

rev 1 10 Jan 2024

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Introduction

INNO PLAN is stand-alone software designed for trained qualified dental practitioners.
The key scientific concept of the INNO PLAN software is the visualization of a patient's medical image data (DICOM file from third-party CT/CBCT scanners) to pre-operative digital implant planning, surgical guide (drill guide) file (output of the pre-operative implant planning) creation.

Note!	The software as medical device has no patient contact

The followings are the major functions of INNO PLAN:

- Patient DICOM dataset loading and visualization*
- Data (DICOM, .stl files) input; Data (.stl file) output for manufacturing; Surgical report (drilling protocol .pdf) output.
- Nerve tracing
- Virtual crown(s) positioning
- Virtual implant placement
- Collision detection
- Patient treatment plan creation
- Surgical guide design and creation
- Surgical protocol design and creation
- Modeling of provisional crowns and custom healing abutments
- Project information management and sharing
- Designed surgical guide data can be exported to a third-party system for manufacturing**

Note!	The software is not intended for diagnosis, please use the software offered by the Computed Tomography Scanner manufacturer, on which scanning was performed for the diagnosis and expert opinions. The software does not apply any compression, modifications, or adaptation to the DICOM files and model surface scan STL-files during their upload, alignment, design, and export.

**Paid option

Indications for Use

INNO PLAN is stand-alone software designed for trained qualified dental practitioners, including dentists and dental technicians.

The software can be used to visualize a patient's medical image dataset output in DICOM format from third-party CT/CBCT scanners.

INNO PLAN is intended for use as a pre-operative tool for the dental implant(s) positioning based on the CT/CBCT image dataset aligned to optical 3D surface scan(s) and for the surgical guide planning result file creation. The surgical guide can be manufactured using a planning result file when used as input to 3D manufacturing systems.

3D manufacturing is out of INNO PLAN software control, depends on many external factors and lie within the sole responsibility of the user.

1. SYSTEM SETTINGS

1.1 System hardware and software requirements

	Minimum System Requirements	Recommended
OS	Windows 7 PRO Mac OS 12 and higher	Windows 10 Home Windows 10 PRO Windows 11 Mac OS 12 and higher
Central Processing Unit (CPU)		Intel Core i5 or higher
Memory (RAM)	4GB	8GB and more
Graphics Card	Any discrete or integrated graphics card supporting OpenGL 3.2	A dedicated NVIDIA 2GB or more
HDD	3GB of free space	100GB of free space or more
Monitor resolution	1600 x 900 pixels	1920 x 1080 pixels or higher

1.2 Network Settings

Note!	In order to identify user account, import/export order forms, share INNO PLAN projects and communicate with customer partner(s), personal computer must be connected to the Internet.

Internet connection is required for the support, help and training provided by Customer Support Service.

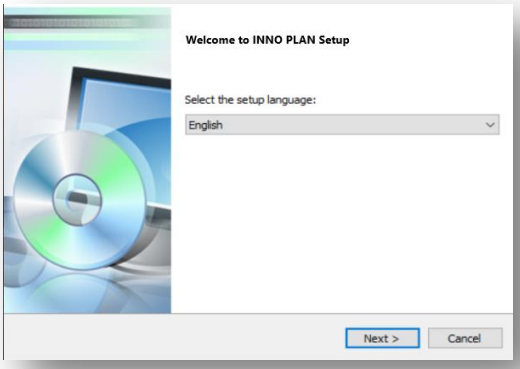
2. INSTALLATION AND UPDATE

Step 1

Open download directory on website (cowellmedi.com), then click on the appropriate download link. Start installation process manually by executing the loaded INNO PLAN Setup file on personal computer.

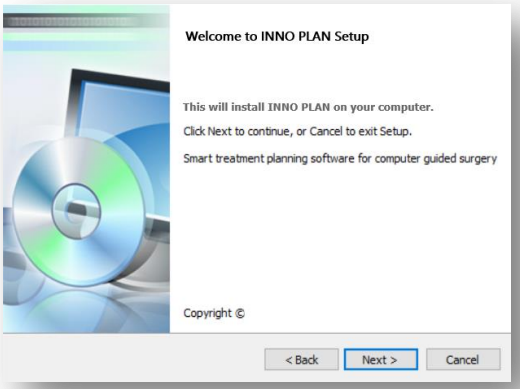
Step 2

Choose language settings and click Next to move to the next step



Step 3

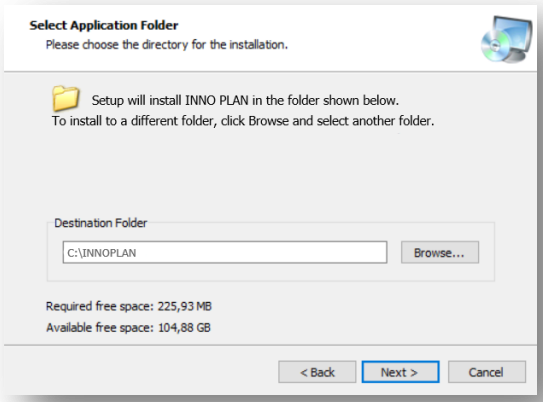
Click Next to move to the next step



Step 4

Browse for app location and click Next to move to the next step

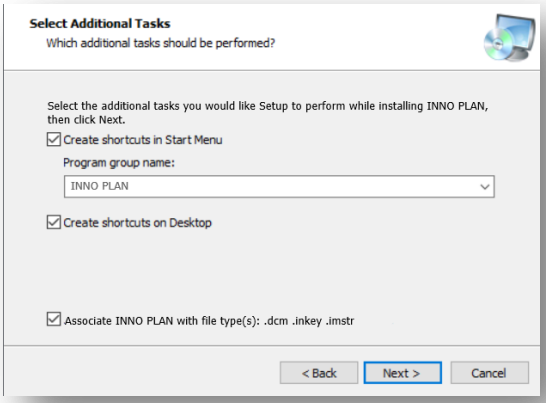
It is recommended to locate main INNO PLAN folder in the "C:" drive root



Step 5

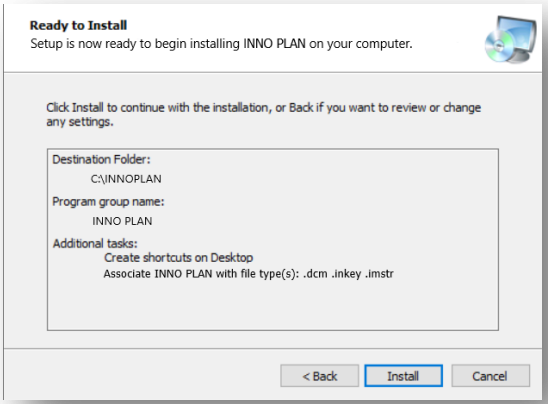
Select the additional tasks you would like setup and click Next to move to the next step

For not experienced user it is recommended to choose all options



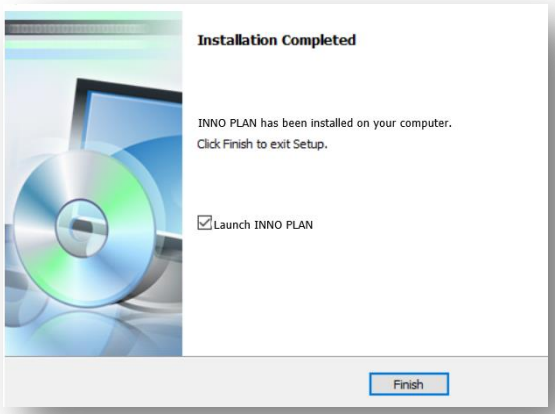
Step 6

Click Install to continue with the installation



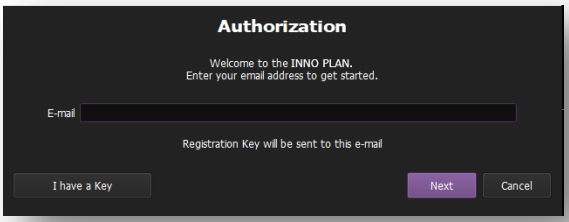
Step 7

Click Finish



Step 8

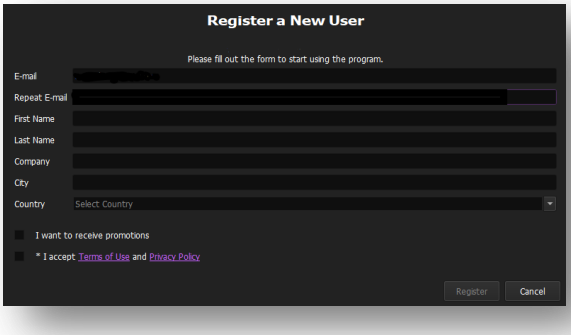
Fill in the E-mail for Authorization and click Next



Step 9

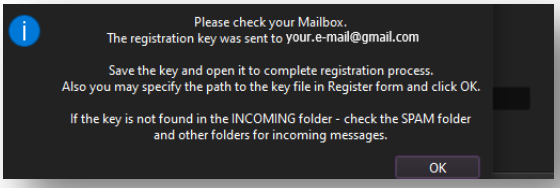
If you are new user fill up the registration form.

It is recommended to choose option "I want to receive promotions, an overview of new products and features".
It is recommended to enter phone number.



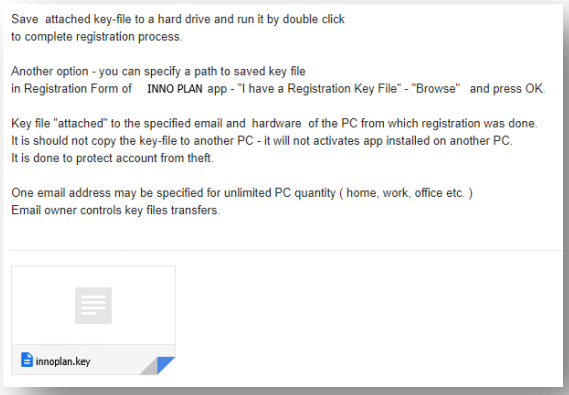
Step 10

Press OK, then software will be automatically closed.
Please check your e-mail.

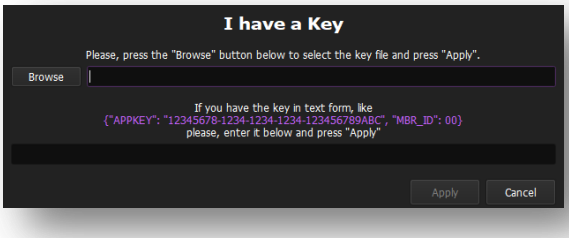


Step 11

Open your inbox e-mail folder, save attached key-file to a hard drive, open it by double clicking to complete a registration process



Optionally
you may specify a path to the saved key file using the Registration Form of INNO PLAN app: *open "I have a Registration Key File" tab > "Browse" tab, choose saved Key-file in the folder and press OK;* OR copy-paste info from key-file as a text to the appropriate text-field



Note! Key file(s) “Library” folder and other important information are located in the folder "INNO PLAN" (C:\Users\”user name”\AppData\Roaming\INNO PLAN) for Windows

If the INNO PLAN License Key file is not received after registration process, check the SPAM and other folders for incoming messages in your specified email box.

Note!	The INNO PLAN License Key file is "attached" to the specified email address and hardware ID of the PC from which registration was done.

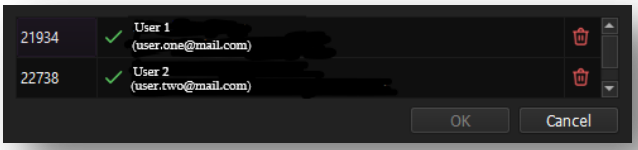
Warning!	The INNO PLAN License Key file should not be copied and used with another PC. In aim to protect the user's personal information and prevent thefts, the key file will activate app installed only on the PC from which registration was done.

One email address maybe specified for unlimited quantity of PC (home, work, office etc.)
Only an e-mail owner able to control INNO PLAN License Key files transfers.

The INNO PLAN Settings menu enables user to register several accounts, attached to different e-mail addresses.
In case of several accounts are registered on one PC the “Select user” window appears.
Check paragraph Setting to know how register new or additional users.

If your browser automatically converts key-file to text - copy an appropriate string with the code to bookmark "I have a registration key-file"

The window shows all available user accounts.
Please select the one you want and press OK.



UPDATE

To check the current version of the software click the "Help" button, then select "About application" line

If an update is available, the "Update Application" menu pops up automatically when the software starts up. Click "OK" to update (recommended), or click "Cancel" to continue to work with the current version.

If the update does not occur, or it gives you an error, reinstall the software by clicking the link in the update dialog window.

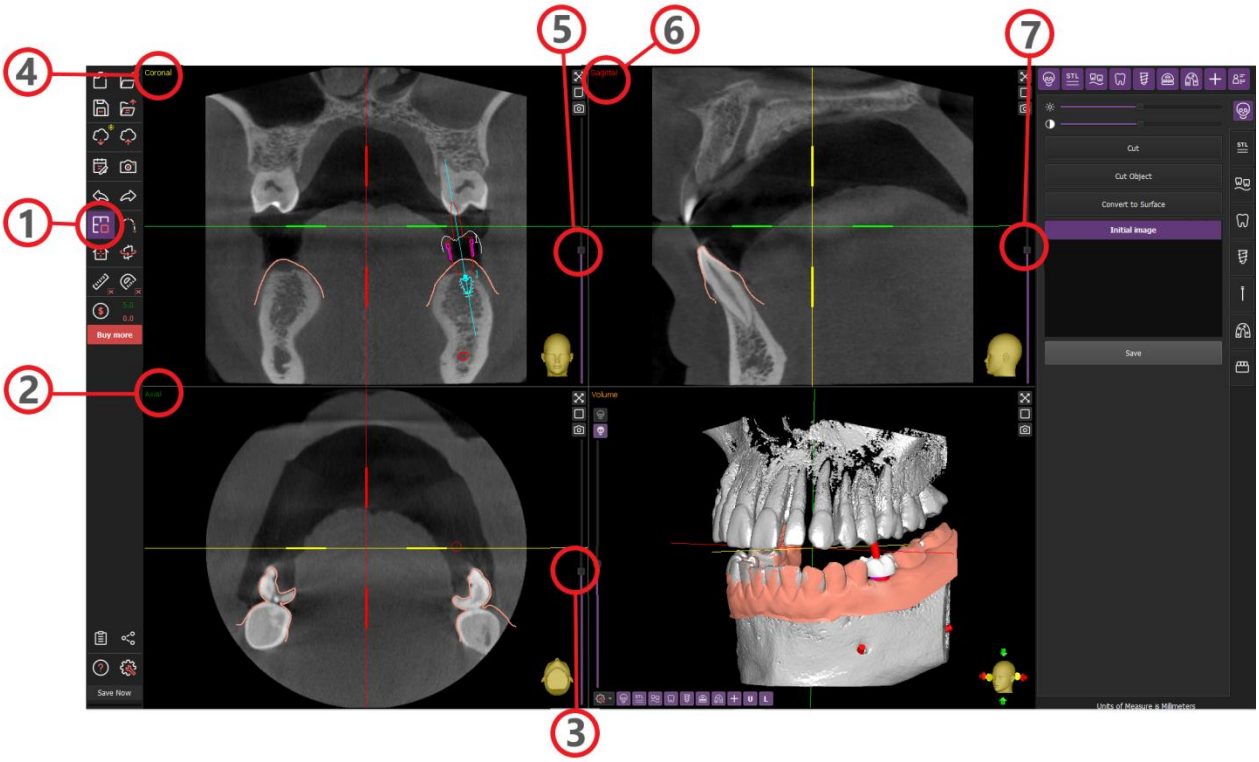
Note!	Software installation package or update package is a secured deliverable package. This secure deliverable package is uniquely encrypted and key-hashed to ensure the integrity and authenticity of its origin.

3. USER INTERFACE

The INNO PLAN user interface enables users to visualize the patient's DICOM dataset using the Coronal, Sagittal, Axial, Panoramic, Rotating Slice and 3D view in corresponding windows.
MPR and Panoramic display can be used to generate interactive slices in free, oblique planes.

3.1 Multi-Planar Reconstruction (MPR) Display

The software automatically provides multi-planar windows (coronal, sagittal, and axial) and 3D view. This Multi-Planar Reconstruction can be used to work on any spatial plane to obtain different types of high-quality diagnostic images obtained from 3rd parties medical CT or CBCT scanners.



1 Multi-Planar Reconstruction button

2 Axial window

3 Slider to view the whole sequence of axial images

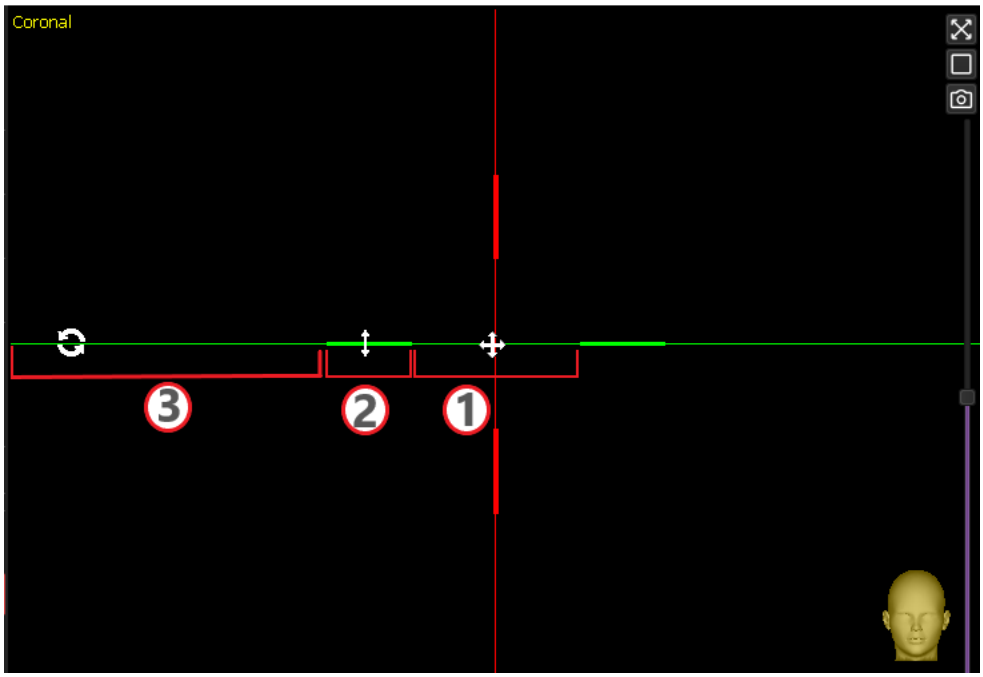
4 Coronal window

5 Slider to view the whole sequence of cross-sectional images in coronal plane

6 Saggital window

7 Slider to view the whole sequence of cross-sectional images in saggital view

PLANE-AXIS NAVIGATION



1 Center of the axes intersection for moving

2 Bulky part of axis for parallel movement of the plane

3 Behind bulky part of axes for 2D view rotation

HOW TO ADJUST THE PLANES

Free adjustment of the view by moving the center of the crossed planes
To move the center of the view axes intersection, put the cursor on it, then left-click and drag. The intersection of the view axes will move within the chosen plane. This movement will be synchronized with the change in slice depth in other MPR windows.

Hint	Use the "head" icon in the corresponding window to see the orientation of scans

Quick adjustment of the view by clicking the desired point
To move the center of the crossed planes, put the cursor on the desired position and double left-click on it. The center of the axes intersection will move to the selected point immediately.

Quick adjustment of the view by clicking the implant image or name
The double left-click on the implant image or implant name in the implants list enables users to set up the coronal axis in the same position with the implant axis and move the center of axes intersection to the implant reference point.

Adjustment of the oblique view (plane rotation)
To rotate the plane, put the cursor on the plane line of the corresponding plane, behind bulky part, left-click, hold and rotate it. The plane will rotate around the center of the crossed planes. By adjusting the only one plane, the other two views in oblique multi-planar will be generated automatically.

Zoom in/out
Zoom in/out the views by holding down the right mouse button and moving the mouse forward or backward.

2D view rotation
To rotate the 2D view, put the cursor on any point of the desired window, press and hold down the left mouse button and rotate the object.

MOVEMENTS OF THE PLANES

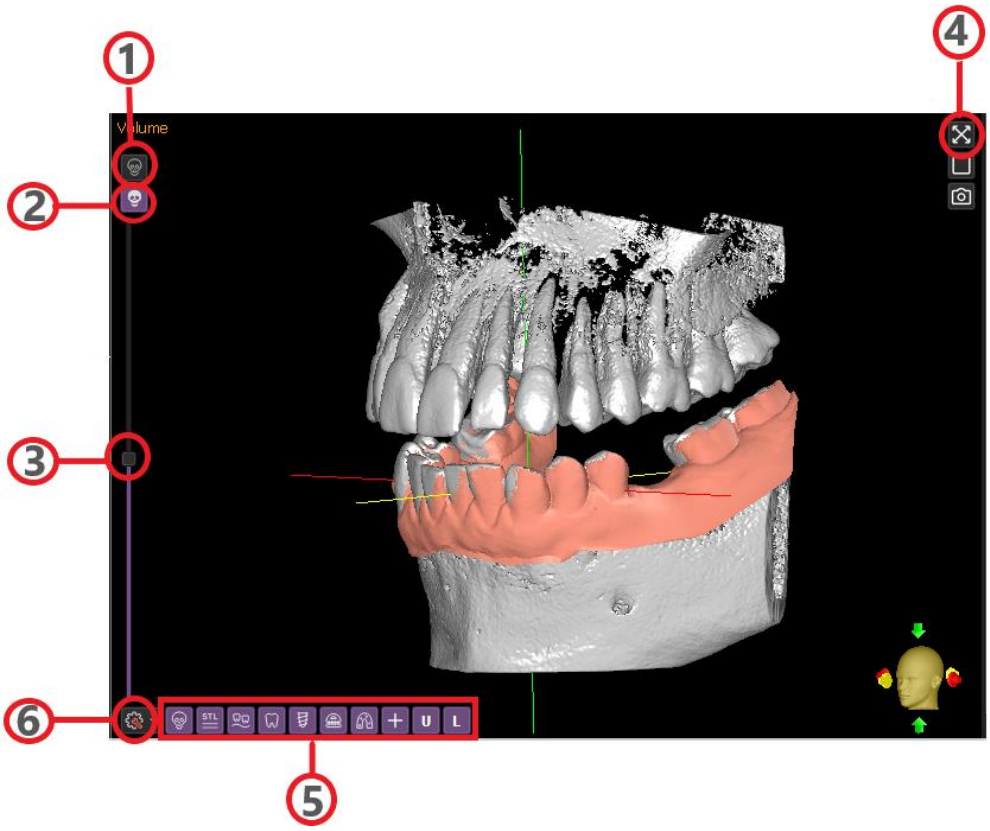
Parallel movement of the planes
To provide the parallel movement of the plane, put and hold the left mouse button on the bulky part of the indicator line of the plane and drag it.

Move the plane by scrolling the mouse wheel
Put the cursor on any point of the MPR window, and then scroll the mouse wheel.

Moving/dragging views in windows
To move a view in a 2D or 3D Window, press and hold down the mouse wheel, then move the object within the selected window. Without a mouse - press and hold the Space button on a keyboard, and then move an object within a selected window.

3.2 3D Rendering Window (Volume)

The 3D volume rendering view can be used to visualize 3D data generated by X-Ray and optical scanners in three-dimensional space in aim to simplify the spatial orientation and object placement control.



1 MIP mode (Maximum Intensity Projection) button

2 ISO mode (Isosurface)

3 Slider to adjust the DICOM rendering optical density threshold.

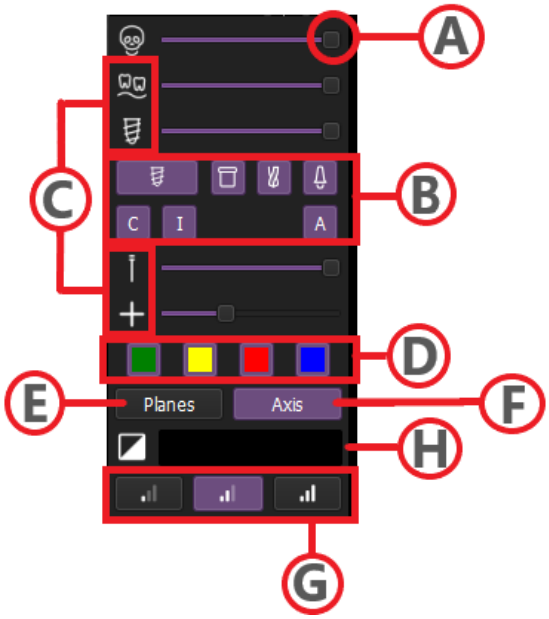
4 Maximize or minimize 3D Volume Rendering Window button

5 Visualization panel

6 Settings button of the 3D Volume Rendering Window

Hint	Press appropriate arrow near 3D head icon for quick set of 3D view

SETTINGS MENU OF THE 3D VOLUME RENDERING WINDOW:



A DICOM opacity slider

B Buttons of toggling the visualization of the implant, sleeve, drill or abutment

C Objects opacity threshold settings

D Axis planes visualization settings

E Planes button

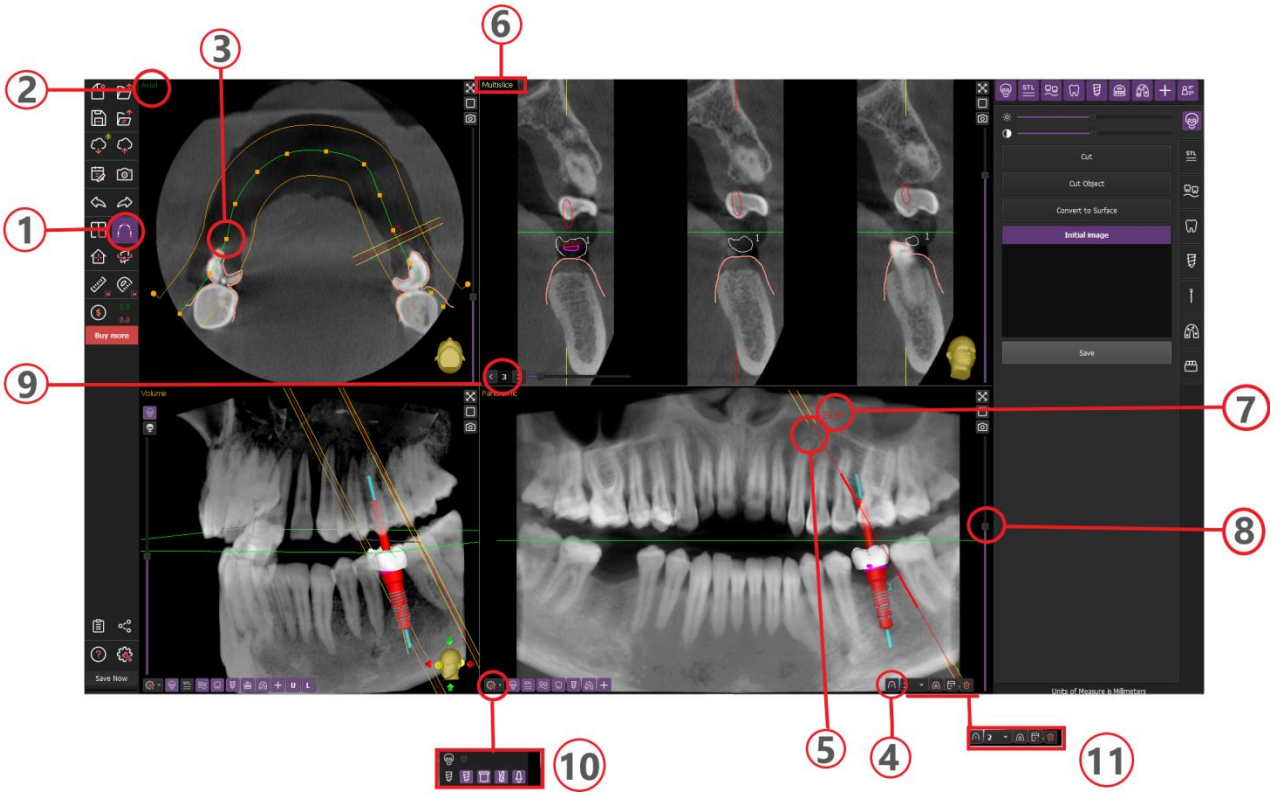
F Axis button

G Buttons of switching between low, medium and high-performance graphics settings, depending on the customer PC graphics card processor capacity

H Color indicator to change the background colour of 3D window

3.3 Panoramic Mode

Serves for general review of the maxillofacial region and allows users make expanded evaluation of the implant(s) position



1 Switch to PANO mode button

2 Axial Window

3 Yellow dots for editing existing panoramic curve

4 Add new Panoramic curve button

5 Indicator Line of the panoramic slice

6 Multislice Window

7 Numerical value of the angle of inclination

8 Slider in Panoramic Window to change the panoramic curve thickness

9 Number of slices of Multislice Window

10 Settings menu of Panoramic Window

11 Control panel of Panoramic Window

PANORAMIC CURVE

The Panoramic Curve identifies the dental arch position.

Hint	The best area where to place the curve is in the half of the length of teeth roots, where the canals are going to be good markers for the curve tracing

Put the mouse cursor over the image and draw new panoramic curve using the left mouse button by placing points one after another on the arch, then double-click to finish tracing. In case of misplacement, move the dots by clicking with the left mouse button on each yellow dot and dragging it into the right position.

The Indicator Line (5) of the panoramic slice appears in the axial and in panoramic window. Put the cursor on the Multislice Window (6), scroll the mouse wheel to move the indicator line along the panoramic curve to see the desired cross-sectional slice(s).

Hint	Quick adjustment of the view. To move the indicator line, put the cursor on the desired area in axial or in panoramic view and double left-click on it. The indicator line of the panoramic slice will move to the selected point immediately

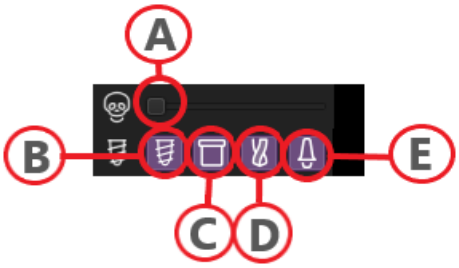
To adjust the inclination of the cross-sections in the panoramic view click on indicator line and tilt it. The numerical value of the angle of inclination (7) will appear near the indicator line.

Click and drag the slider in Panoramic Window to change the panoramic curve thickness (8).

The default settings for Multislice window (6) assume three separate cross-section images with distance increment of one millimeter. The number of slices can be increased to five and reduced to one (9).

Note!	The angle of inclination will be indicated correctly only if the occlusal plane of chosen jaw is parallel to axial plan

SETTINGS MENU OF THE PANORAMIC WINDOW:



A Image opacity threshold

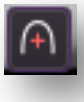
B Implant visualization button

C Sleeve visualization button

D Drill visualization button

E Abutment visualization button

CONTROL PANEL OF THE PANORAMIC WINDOW:

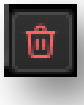


"Add Panoramic Curve" button

Click on the Panoramic View list button to choose initial or created panoramic view(s)

Click on the button to switch between Narrow or Wide mode

Click on the button to add the panoramic image to Surgical Protocol



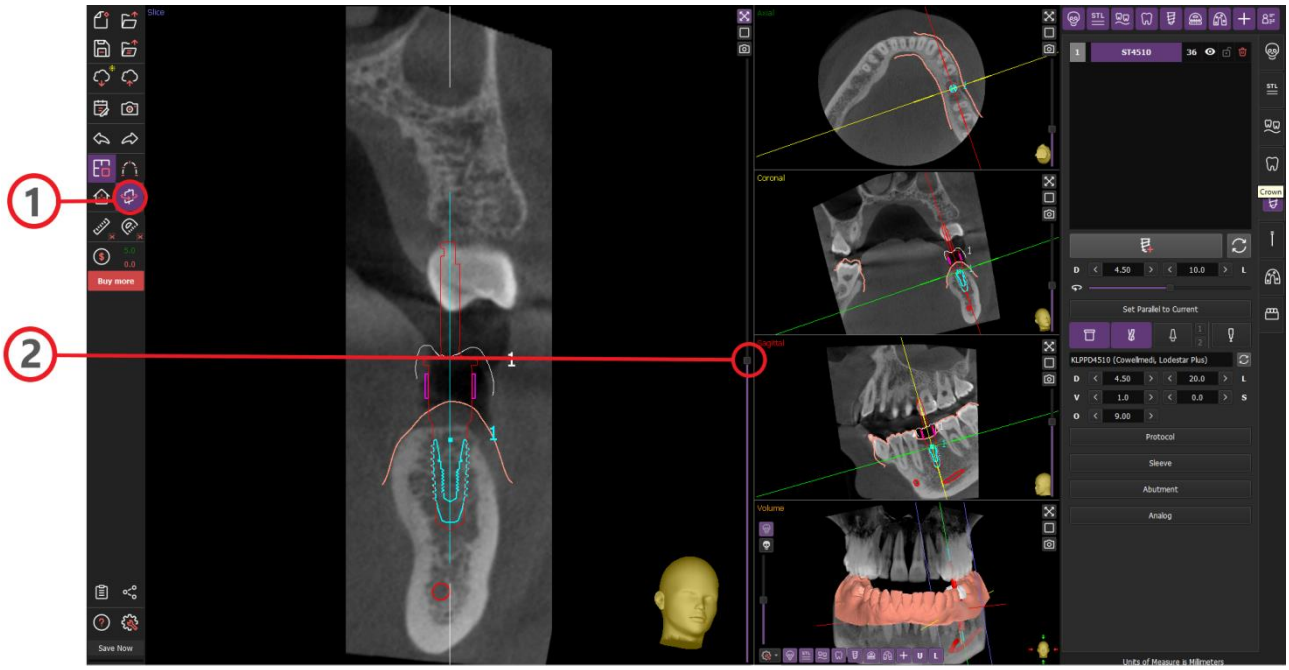
"Delete Panoramic Curve" button

3.4 Rotating Slice Window

The main purpose of the Rotating Slice View is visualization of tissues around the implant for final control and precise correction of the implant and sleeve position.

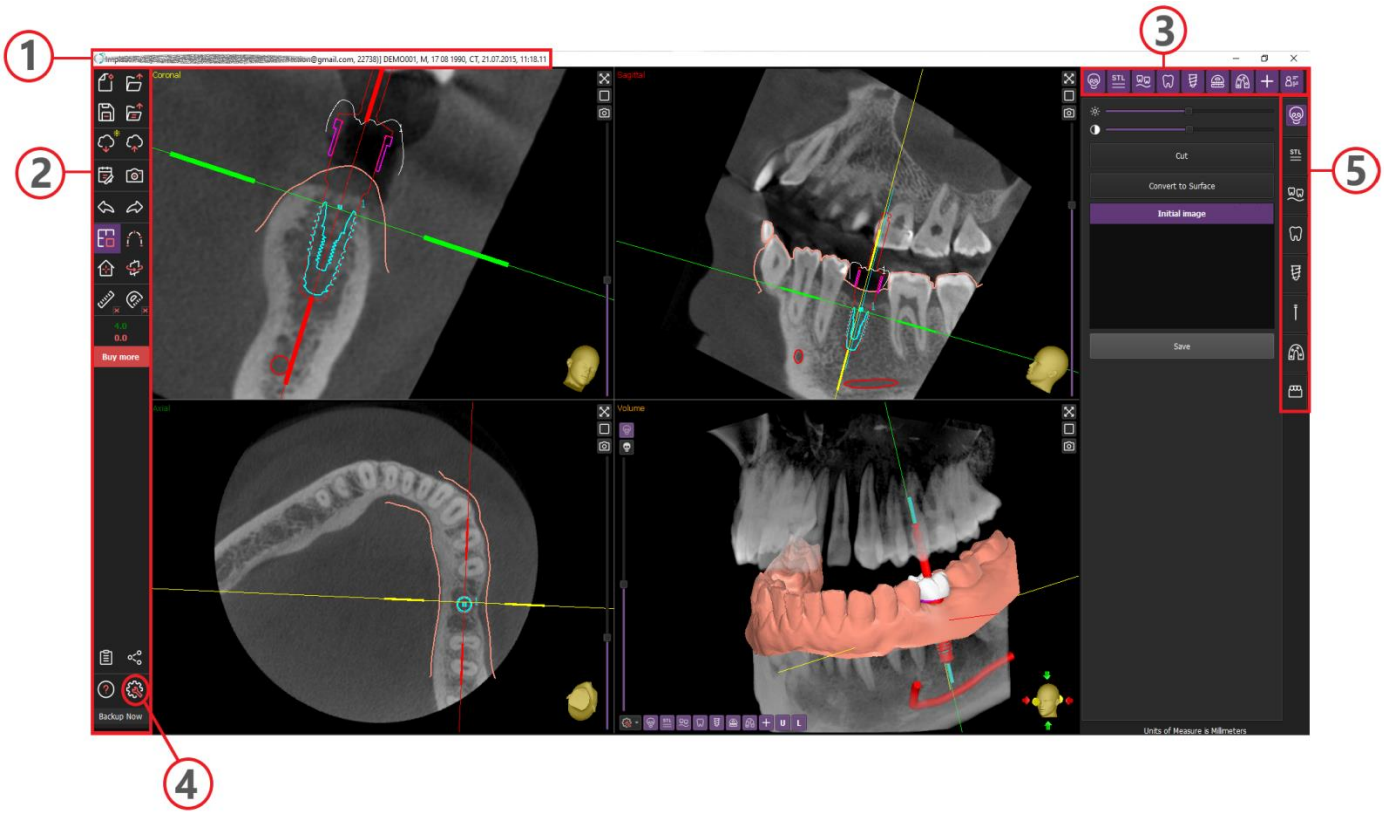
Double click on an implant in 2D, 3D or implant list to adjust rotational slice axis along implant axis.

To rotate the image around the Implant axis, put the cursor on any point of the Rotating Slice window and scroll the mouse wheel or click and drag on the right part of the window.



1	Open Slice button to open the Rotating Slice Window
2	Slider to rotate the image around the Implant axis

3.5 Buttons and Basic Functions



1 INFO panel

2 Tool panel

3 MPR Visualisation panel

4 Settings menu button

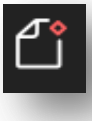
5 Tab panel

INFO PANEL

The INFO panel displays information on the customer name, customer email address and registration number, patient's name, patient's date of birth and gender, CT scan data.

TOOL PANEL

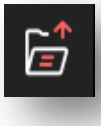
The Tool Panel basically consists of buttons customer needs to manage the case, set up view, make a measurement, purchase exports, etc.



Click the New Project / Load DICOM button to upload DICOM data

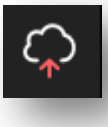
Click the Open Project button to open the existing project

Click the Save Project button to save project

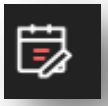


Click the Open Recent Projects button to open the list of the recent projects

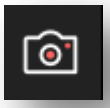
Click the Cloud Service button to download projects from cloud storage or manage them



Click the Save or Send to cloud button to save the created project to cloud or share it with others



Click the Edit Notes button to note an information



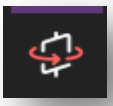
Click the Take Snapshot button to take a snapshot

Click the Undo button to cancel the last action

Click the Redo button to reverse the last Undo. Used only after Undo.

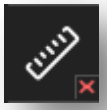
Click the Switch to MRP mode button to

Click the Switch to PANO mode button to edit or trace the panoramic reconstruction curve

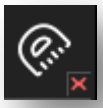


Click the Open Slice button to open the Rotating Slice Window

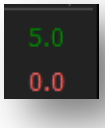
Click the Reset Views button to reset view settings to default



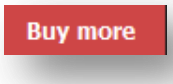
Click the Measure Distance button to perform distance measurement



Click the Measure Angle button to perform angular measurement

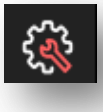


Regular and Time-limited exports balance

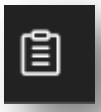


Click the Purchase Exports button to order and purchase the export packages

Help button opens app-specific help sections or links when clicked

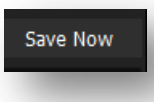


Click the Settings button to open the Settings Menu



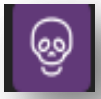
Click the Order Form button to fill out the digital order form

Click the Quick Pass button to send the current project to previously specified email address



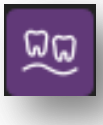
Click the Backup Now button to save the intermediate modifications to the backup file. The Indicator below used for autosave also.

MPR VISUALIZATION PANEL

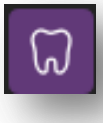


Click the button to enable or disable the visualization of the DICOM

Click the button to enable or disable the visualization of the STL surface

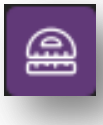


Click the button to enable or disable the visualization of the Nerve Tracing



Click the button to enable or disable the visualization of the Crown

Click the button to enable or disable the visualization of the Digital Implant



Click the button to enable or disable the visualization of the Measurements

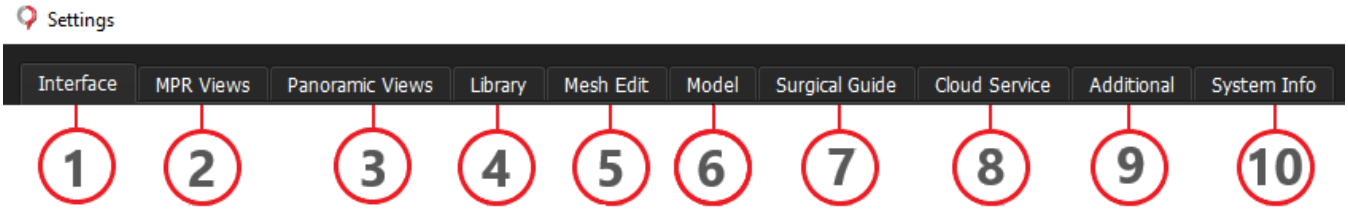
Click the button to enable or disable the visualization of the Surgical Guide

Click the button to enable or disable the visualization of the Axis

Click the button to enable or disable the visualization of the Patient Data

SETTINGS MENU

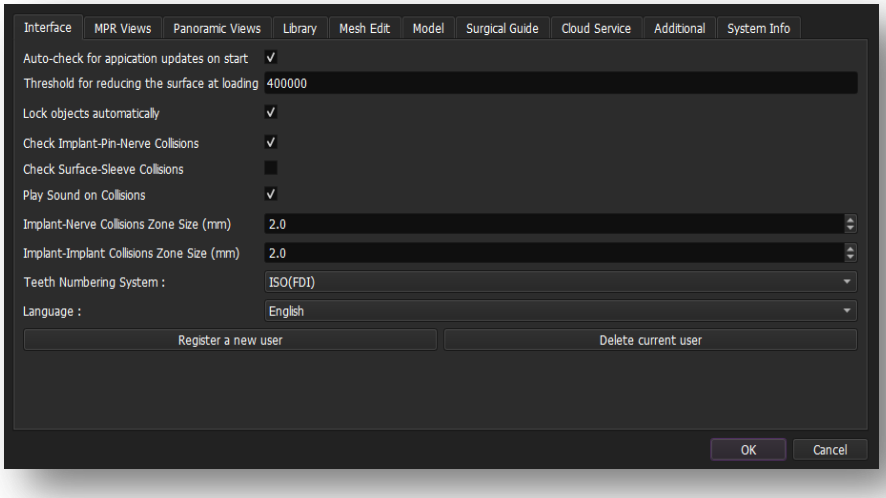
This menu allows setting the preferences for the software.
The following settings can be set from this page:



1. Interface tab

Set :
- auto-updates mode;
- max weight of imported STL;
- auto-block of objects movement;
- objects collision detection settings;
- language;
- Teeth Numbering system;
- register a new user or delete current user.

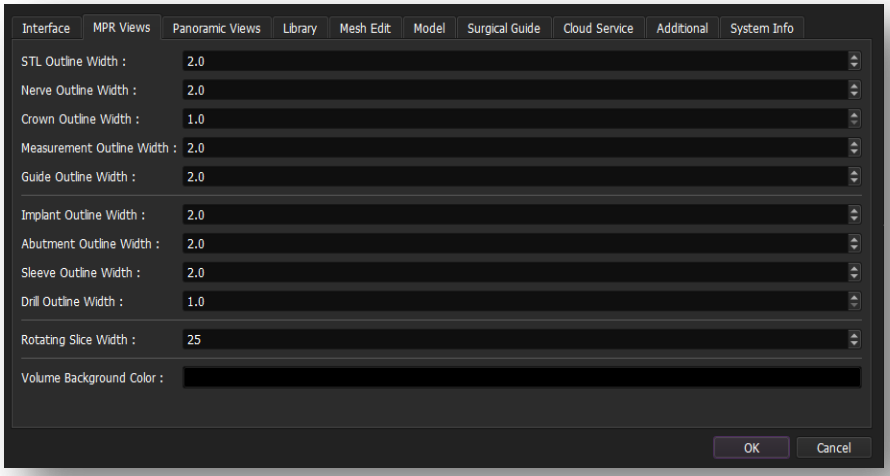
Note!	When collision function is selected, the software checks the collisions of the objects automatically. If collision is detected, the triangular sign "Attention" will appear



2. MPR View

Set:

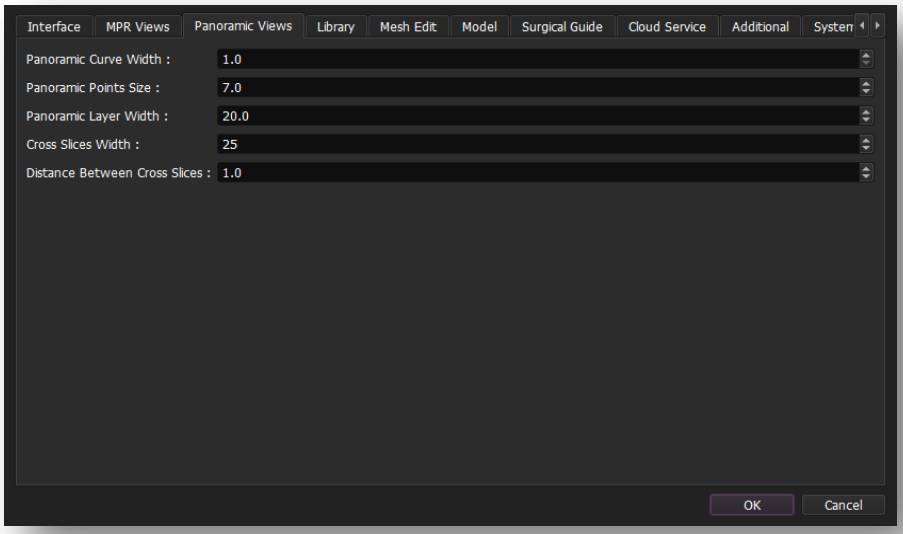
- outline thickness of elements in MPR mode;
- slice width adjustment in Rotation Slice Window mode;
- default background color of 3D window.



3. Panoramic Views

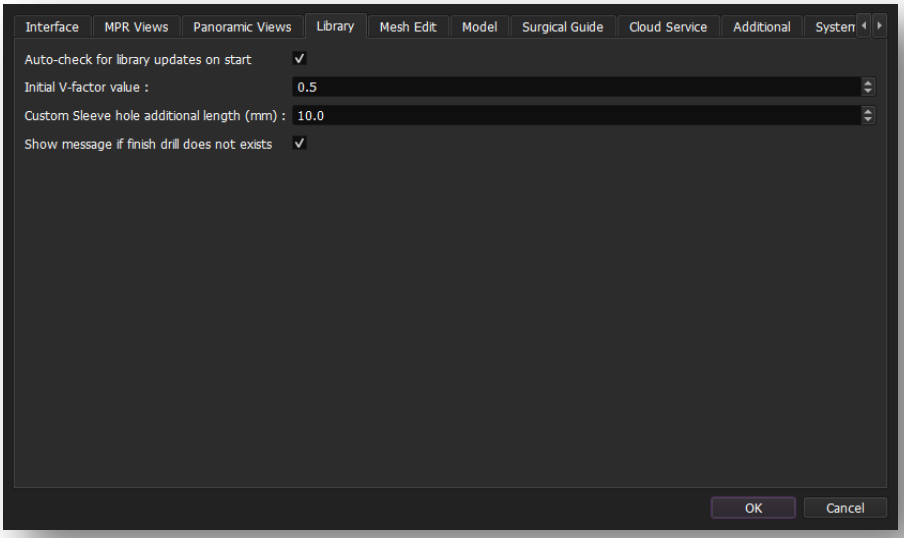
Set:

- size of panoramic points;
- outline thickness of Pano mode elements;
- distance between cross slices adjustment.



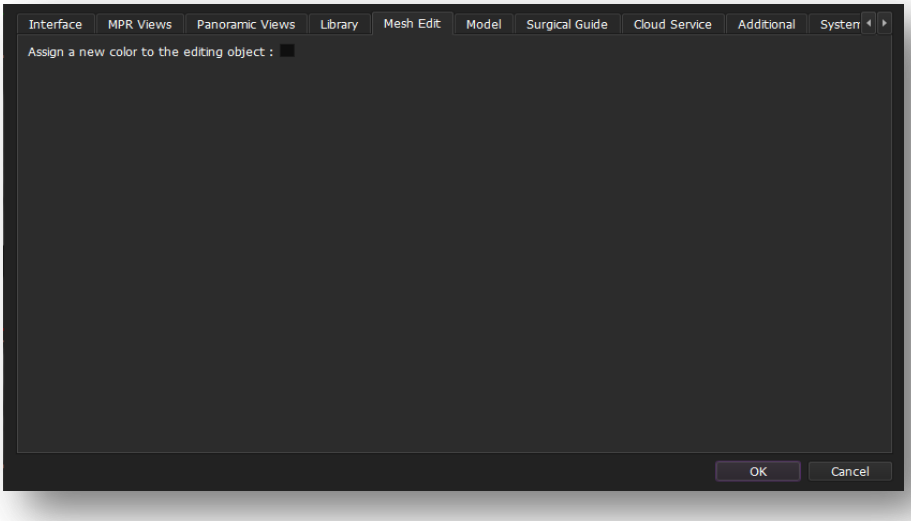
4. Library

Set:
- Library auto-update mode
- Initial V-factor settings
- Custom sleeve hole deepness
- Notification “original finishing drill is not loaded in the local library” settings



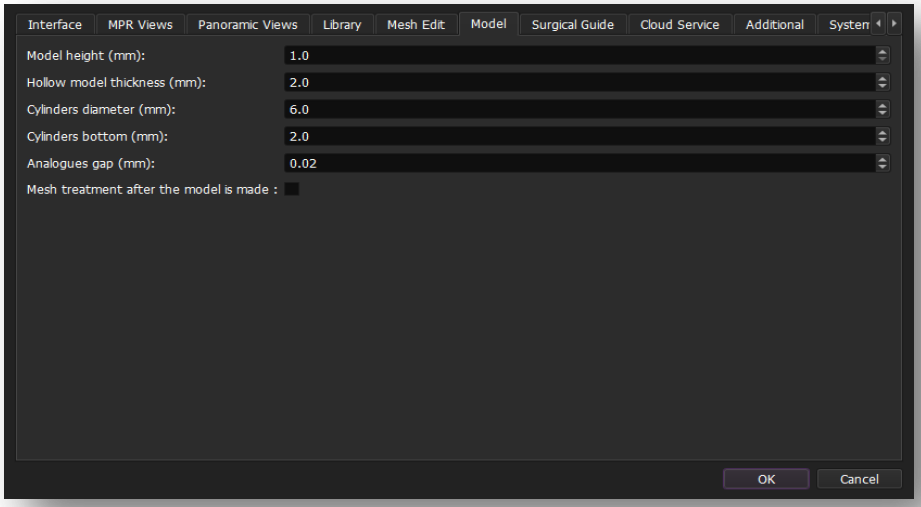
5. Mesh Edit

Mesh Edit setting has the checkbox "Assign a new color to edit object". When it is selected, it determines the color of the newly edited STL file. If the checkbox is not selected, the color of the original STL file is duplicated in the edited version.-



6. Model

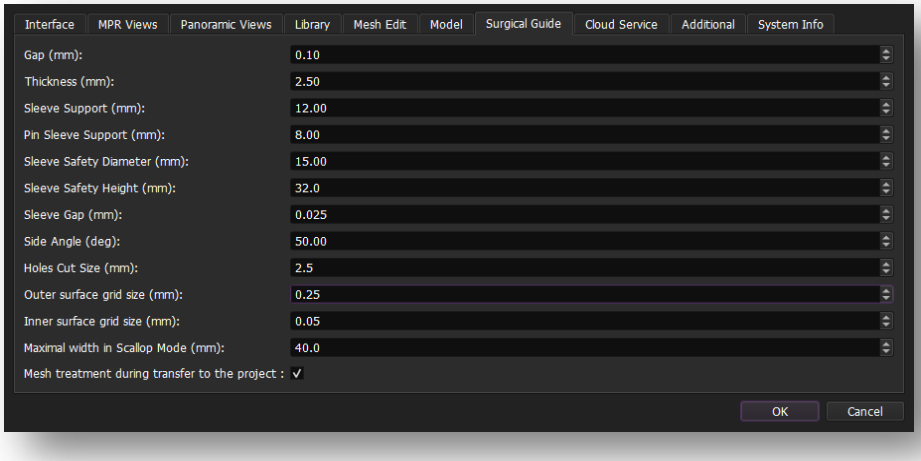
Set default values of the model that will be automatically applied when the Model Builder is accessed.



7. Surgical Guide

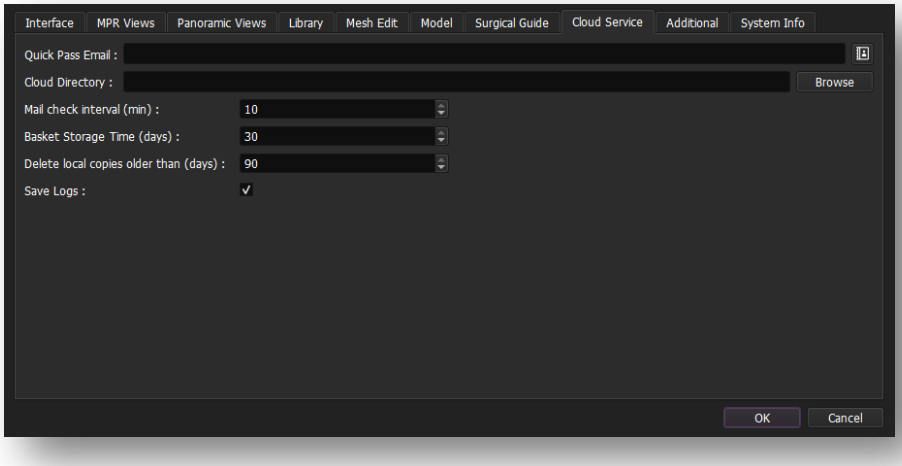
Set:
- Surgical guide default settings;
- Defaulf settings of guide surface mesh grid size.

See chapter "Surgical Guide" for a more detailed explanation.



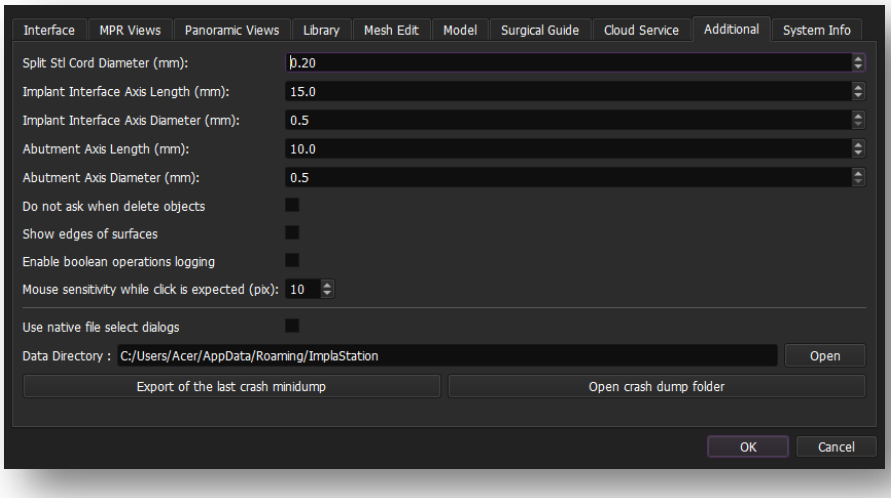
8. Cloud Service

Set:
- e-mail for Quick Pass Email;
- Cloud directory;
- Duration for Cloud Basket Storage, mail check and local copied files;
- auto save logs.

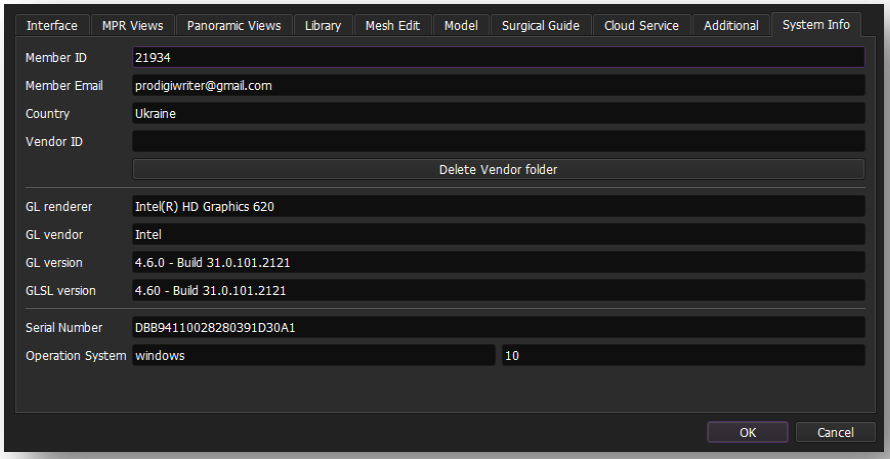


9. Additional

Set:
- Implant and Abutment Axis parameters
- Split cord default diameter
- Data directory
- Additional parameters checkboxes

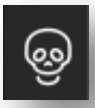


10. System Info



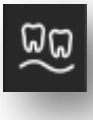
TAB PANEL

Tab panel helps users navigate through the patient's case

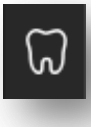


DICOM management

STL surface management



Nerve tracing



Crown design

Digital Implant, Sleeve, Drill, Abutment management

Anchor Pin management

Surgical Guide design

Modeling

4. INPUT DATA (DICOM)

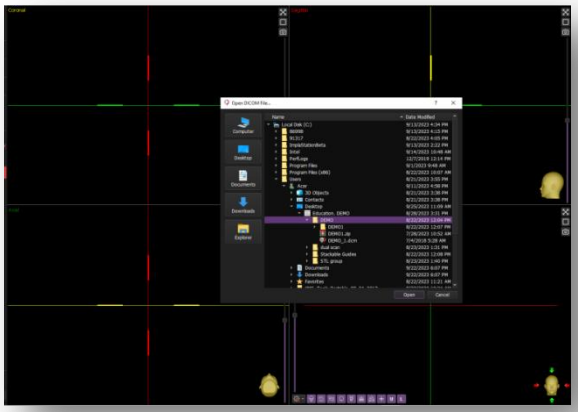
Step 1

Click the New Project / Load DICOM button which is a way either to import a dataset from a selected source

Step 2

In the appeared window to download data, select any object from the following:

- FOLDER WITH DICOM DATA
- MULTI-FRAME DICOM FILE
- SINGLE-FRAME DICOM FILES SET, ONE FROM THE SET
- DICOMDIR FILE
- ZIPPED DICOM FILE



Step 3

Click on "Open"

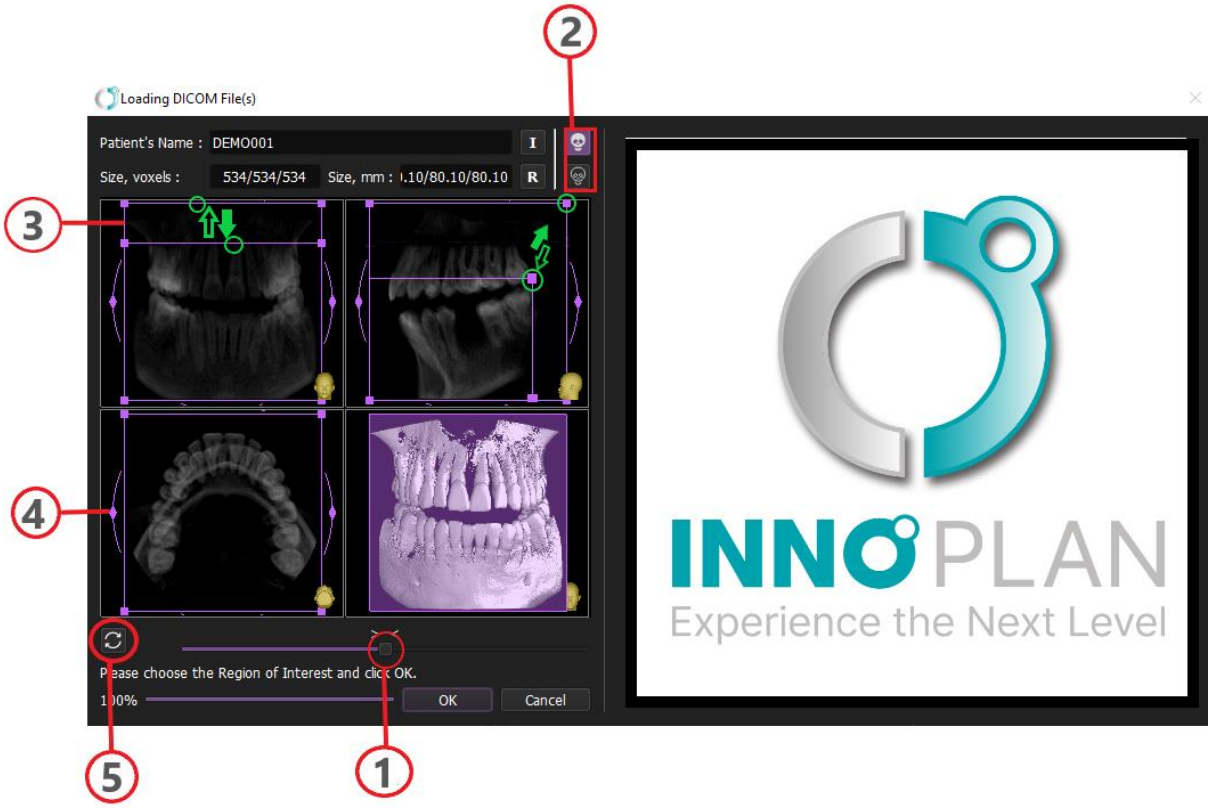
Hint	To see DICOM-files without extension choose "All files" option. Ensure to select the correct study and series by comparing them with the patient name in the CT/CBCT data selection dialog. After you have uploaded the relevant dataset, it is displayed in the processing window.

Step 4

Process the uploaded CT/CBCT dataset:

- adjust the image opacity threshold by dragging the corresponding slider;
- with the cropping tool, remove disturbing or unrelated parts of the CBCT/CT scan by left-clicking, holding and dragging the purple cropping box inside the windows and area outside the box will be deleted.
- In case of DICOM is displayed with an incorrect orientation upside down, turn it so that the Maxilla is on top and the Mandible is on the bottom using rotation slider.
-If necessary to reload image in other contrast quality, apply changes and click Reload button.

Then click "OK".



1 Image opacity threshold slider

2 MIP mode (Maximum Intensity Projection) and ISO mode (Isosurface) switching buttons

3 Cropping box

4 Rotation slider

5 Reload button

4.1 DICOM "Cutting"

The 3D and 2D visualization of the CT/CBCT scan of the patient may be "cut off" by an overlay of the dark mask on a selected area of the DICOM. Created masks can be turned on and off to hide and display fragments of CT/CBCT. This feature is most in demand for working with 3D rendering.

Step 1

Setup the 3D image position.

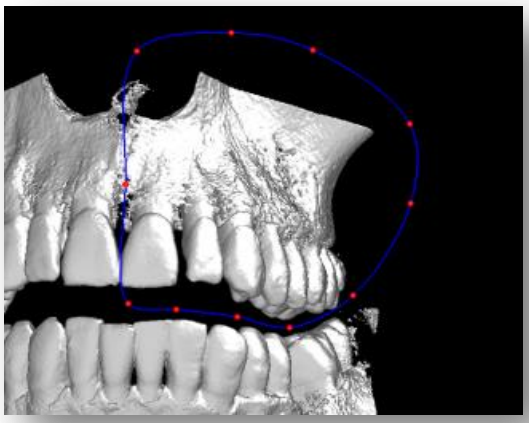
Step 2

Click on the "Cut" button in DICOM directory in the right part of the screen.

Step 3

Identify the area on which the DICOM mask is going to be cut:

- draw the borderline by placing points one after another around the cutting area. Continue to draw the curve that goes back to the starting points and then double-click to finish selection.



Step 4

Either click on the "Cut inside selected area" button to cut inside

OR

"Cut outside selected area" button to "cut" outside.

Step 5

Press the "Save" button to save the created DICOM mask and mask name will appear in the list in DICOM directory on the right part of the screen. Optionally, it is possible to change the name of the saved DICOM mask by pressing the "Edit Title" button. During the design process choose any saved DICOM mask by left-clicking on it.

4.2 DICOM to STL Conversion

Step 1

Adjust 3D rendering, using optical density threshold. Click on the "Convert to Surface" button to start the conversion process of the DICOM file to STL surface.

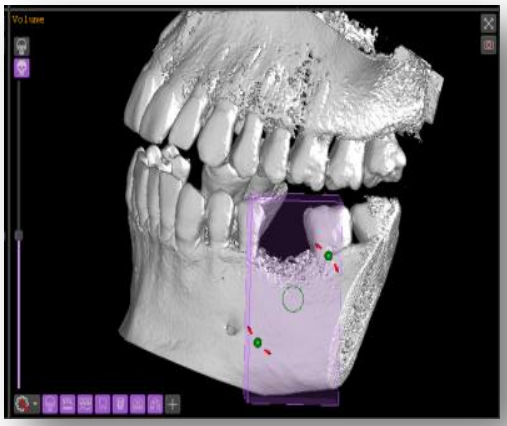
Step 2

Adjust, if necessary, 3D rendering optical density threshold by clicking "+" and "-" (C) buttons on control panel.

Step 3

Adjust the size and position of the working area which is outlined by a purple *cube lines.*

Expand or compress the working area by left-clicking, holding and dragging the purple converting box of the working area.
To rotate the whole working area left-click, hold and drag the red, yellow and green marks.
To move the whole working area left-click, hold and drag the square dot in 2D or circle in 3D, located at the central part of the converting box.

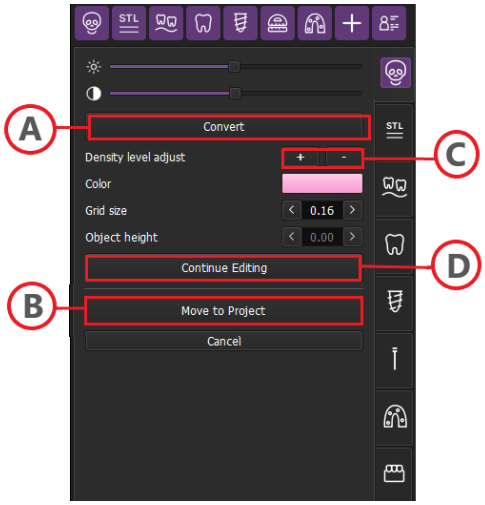


Step 4

Click on the "Convert" (A) button

Step 5

If the quality of the created surface is acceptable, click on "Move to Project" button (B). If no, click Continue Editing (D) button to continue editing.



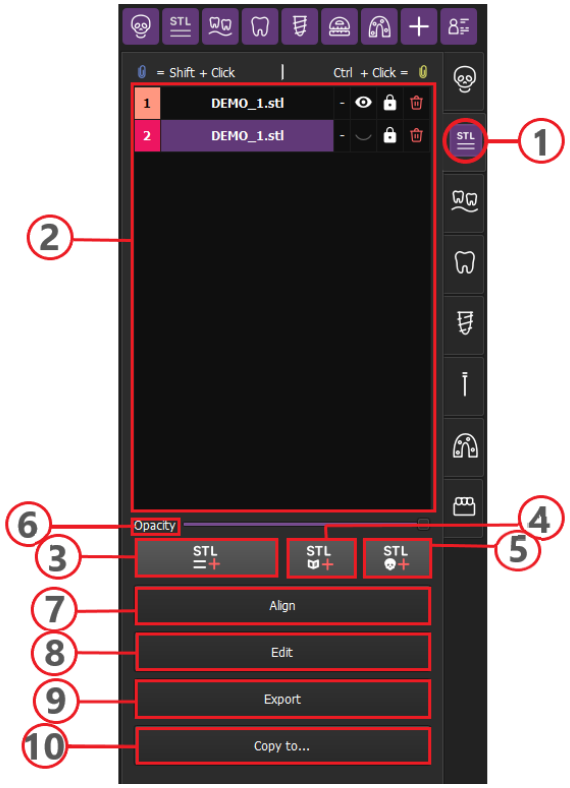
Hint	Clicking on "Continue Editing" (D) opens the segmentation editor (see Annex H)

Note!	The final view of the converted surface depends on the pre adjusted 3D rendering threshold

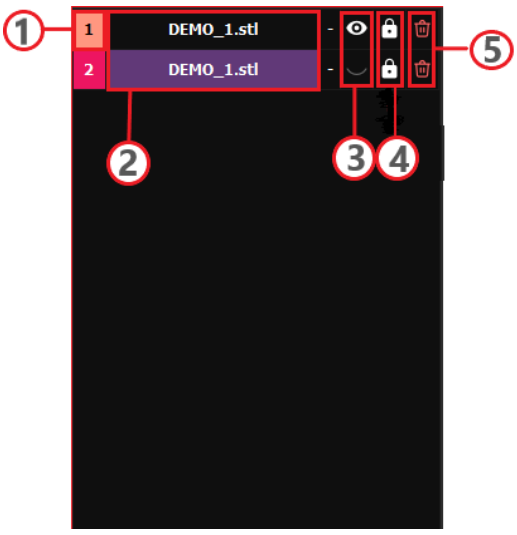
5. INPUT DATA (STL)

Surface files in .stl or .obj format can be imported and implemented into the project. Jaw surface scans can be obtained using third-party intraoral or laboratory optical or laser scanners.
Alternatively, a plaster model of the patient's jaw can be scanned with a CT/SBCT scanner and the obtained DICOM file can be converted to an STL surface (see APPENDIX B - Dual Scanning Technique). The accuracy of the dual scanning technique is in doubt.

STL TAB MENU



1 STL tab button
2 STL surfaces list
3 Load surface from file button
4 Load surface from library button
5 Load surface from DICOM image button
6 STL Opacity threshold
7 Align button
8 Edit button for opening Editor menu
9 Export to file button
10 Copy to button



1 Color indicator: click on it to change color of STL surface
2 Name of STL surface: right click to change name of STL surface.
3 Toggling visualisation button
4 Lock on/off button
5 "Delete STL surface" button

STEPS OF IMPORTING .STL-FILE:

Step 1

Click the STL Surfaces button in the tab panel on the right part of the screen.

Step 2

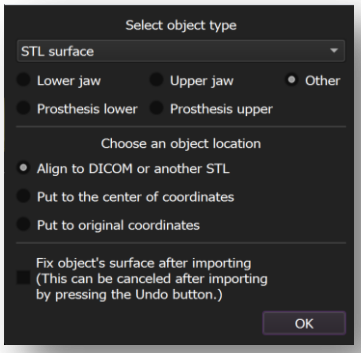
Click on "STL+" button on control menu
Select the appropriate STL file on your computer and Press OPEN

Step 3

In modal window select:

- Object type

- Object location
  "Align to DICOM or to another STL file" checkbox
  OR
  "Put to the center of coordinates" checkbox to place the STL model at the center of coordinates
  OR
  "Put to original coordinates" checkbox to place STL model at the original coordinates.



Hint	The "Put to original coordinates" is the most convenient mode to import several STL surfaces previously aligned together in the third party CAD programs.

- If necessary, select "Fix object`s surface after importing" checkbox

Press OK.

Step 4

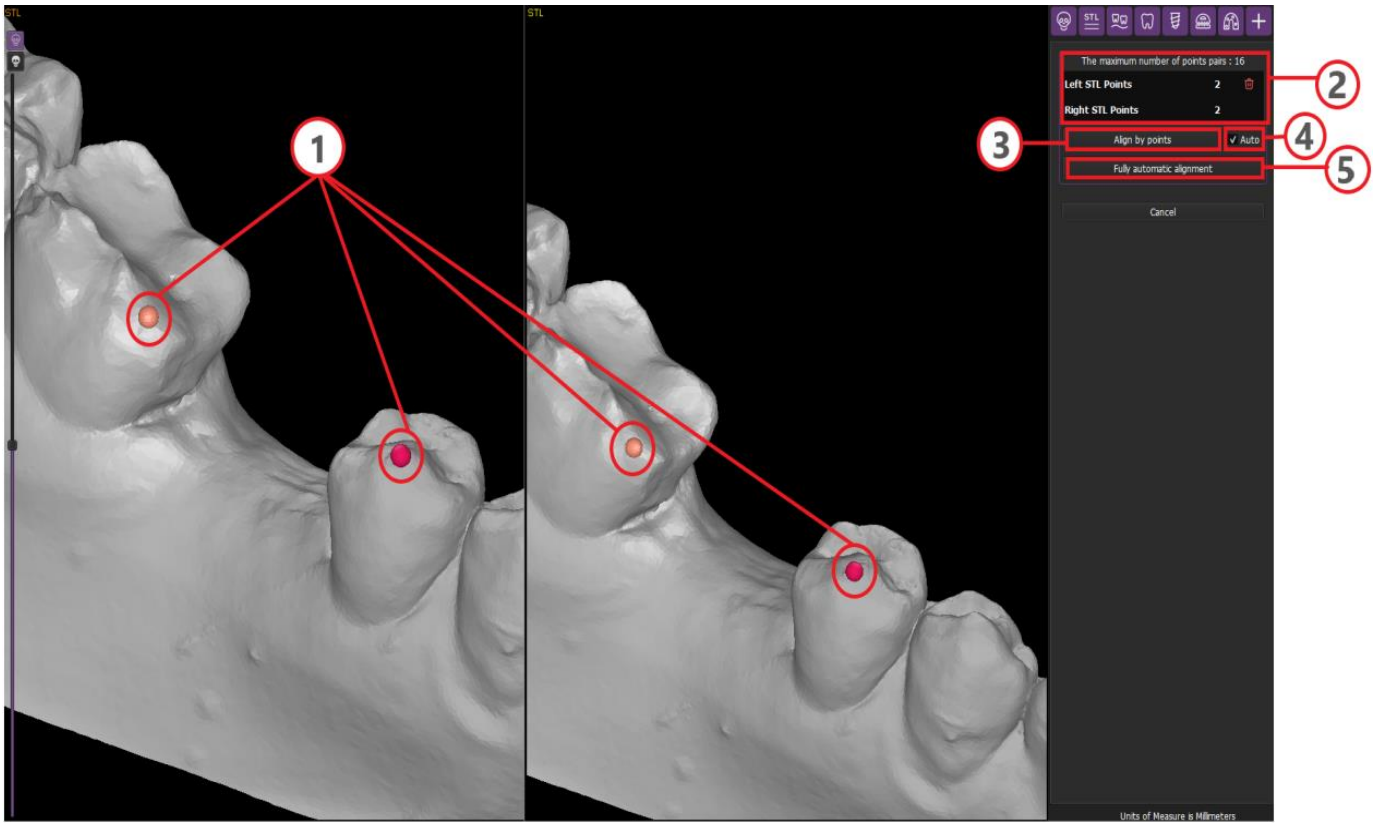
Make an Alignment of uploaded file, If necessary.

Note!	If the amount of triangles in an STL file is exceeding a threshold (400000 triangles on default, may be adjusted in the settings menu), the software would propose to reduce the number of triangles in the file

Hint	Click on the "Group" button in the STL list and select two or more STL file in the appeared window to group them for further design and alignment and press "OK". The main purpose of this feature is an ability to move selected and grouped up STL objects together. The mutual position of the grouped up STL surfaces remains unchanged.

5.1 Alignment

ALIGNMENT MENU



1 Pairs of points

2 List of pairs points numbers

3 Align by points button

4 Auto checkbox

5 Full automatic alignment for STL surfaces

ALIGNMENT PROCESS

Step 1

Mark:
"Align to DICOM or to another STL file" checkbox in modal window after importing STL
OR
Click “Align” button on workpanel

Step 2

Select the surface with which you want to align. Bring the two images into view so that they are similar. The alignment can be used to DICOM or to another STL file.

Step 3

At opened alignment window align objects using the possible instrument depending on type of data.

The alignment of DICOM to STL can be achieved manually (Align by Points)
Pick a point on DICOM surface as a landmark by left-clicking, then click a point on the corresponding region of the STL surface.
Select at least 3 equal regions and click on the "Align by Points" button.

Hint	Using the Auto checkbox the program achieves the highest possible accuracy in matching based on the selected points.

The alignment of STL to STL can be achieved manually (Align by Points), automatically (Fully Automatic Alignment), and in mixed ways.

Use the “Fully Automatic Alignment” button to automatically operate. *This tool can work when the surfaces have similar parts or similar mesh. When the surfaces are different use mixed alignment: first manually and in the end fully automatic.*

Note!	Note! “Fully Automatic Alignment” button is not available in Windows 7 operating system.

Step 4

Check and adjust the result of alignment manually:
On MPR mode click on STL surface center (the square point which is marked in color of corresponding STL surface) and drag it or click on the STL surface borderline and tilt it.

To realign STL files or STL and DICOM files press on "Align" button on control panel of STL tab.

IMPORTING AND ALIGNING A GROUP OF PRE-ALIGNED IN EXTERNAL SOFTWARE STL FILES

Step 1

Click “Align” button on workpanel

Step 2

Select the required group of STL files.

Note!	The selected group of STL files will automatically be positioned in their original coordinates.

Step 3

In the STL file list group the uploaded files.

Hint	To group imported files, hold down Ctrl and click on the names of the STL files in the list. Use Shift to group imported files into the second set of STL files

Step 4

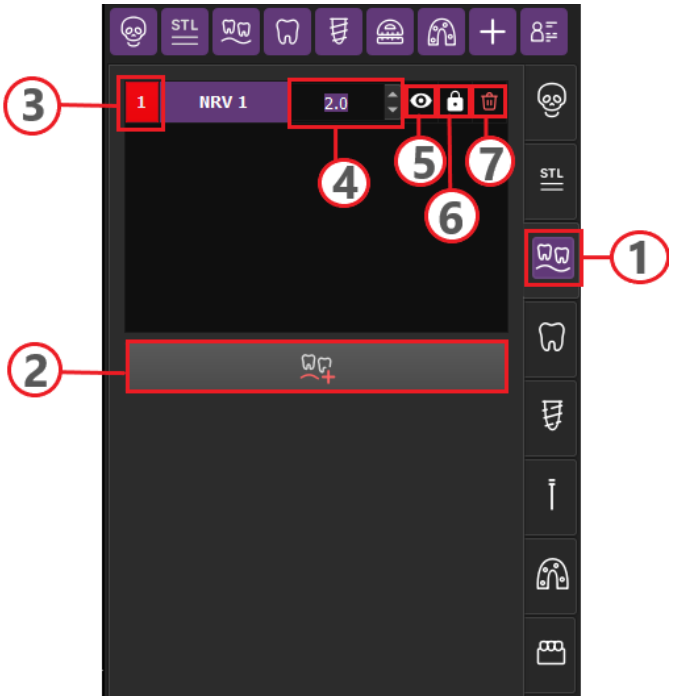
Turn off visibility for all but one STL file from the group, using the dedicated button in the STL files list.

Step 5

Press the "Align" button to align the group of STL files with the necessary DICOM or STL.

6. NERVE CANAL TRACING

NERVE MENU



1 Nerve tab button

2 Draw new nerve button

3 Color indicator. Click on it to change color of nerve

4 Nerve diameter window

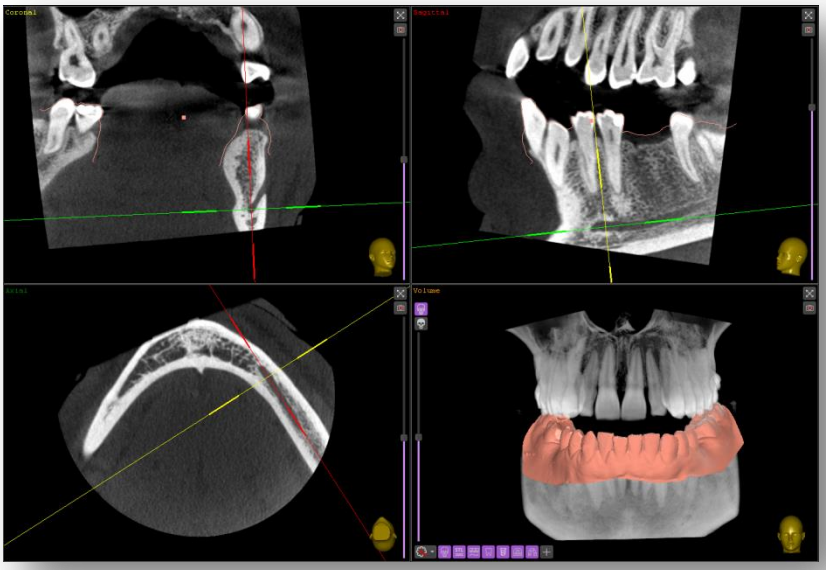
5 Show On/Off button

6 Lock On/Off button

7 Delete button

Step 1

Select MPR mode. Setup the slice planes to visualize nerve canal clearly in axial, cross-sectional and sagittal view.



Step 2

Click on "Nerve" button on tab panel on the right part of the screen and then "Draw new Nerve" button on the workflow panel.

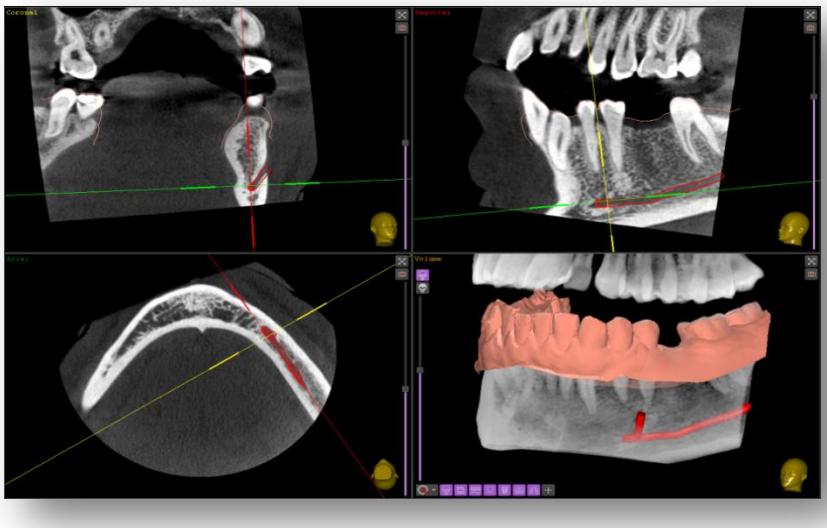
Step 3

Trace nerve canal:

by using the left button of the mouse points one after another from frontal part to distal part in the Sagittal window;

OR

by clicking and scrolling through the Cross-sectional view.



Step 4

Complete the operation:

by double-clicking the left mouse button;

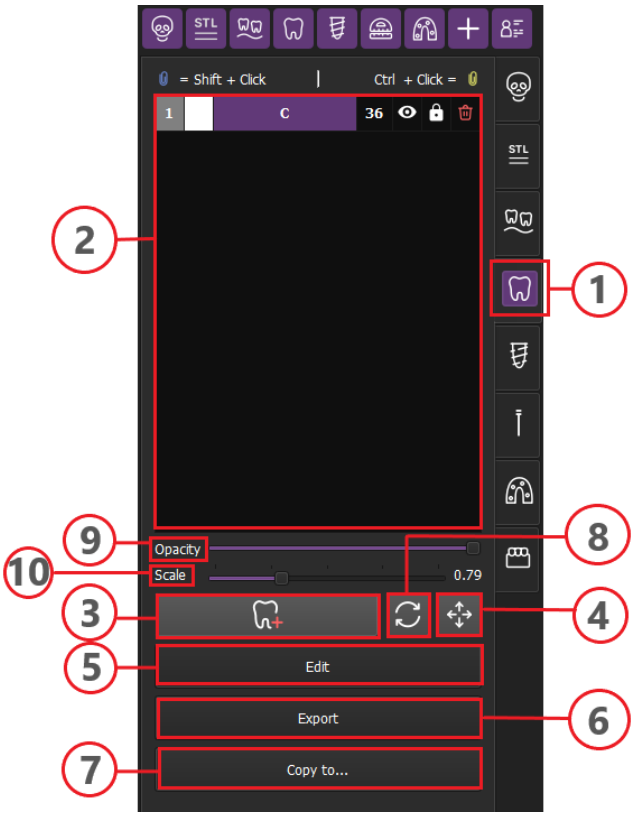
OR

by clicking the "lock" button in the nerve tracing menu panel.

Warning!	Make sure that the nerve is correctly traced. Always maintain an appropriate safety distance to the nerve canal
Warning!	The pathway of imaged nerves is for display only, location accuracy of the traced nerve is not tested, and pathways of imaged nerves can not be used as sole information for the clinician to make clinical decisions

7. VIRTUAL CROWNS PLACEMENT

WORKFLOW PANEL OF CROWN MODE



1 Crown tab

2 Crowns list

3 Place new Crown or Tooth button

4 Move Crown or Tooth Mode button

5 Edit button

6 Export button

7 Copy to button

8 Replace button

9 Opacity threshold

10 Scale slider

Step 1

Select MPR mode. Set up the slice planes to visualize the tooth/teeth position to be planning in axial, cross-sectional and sagittal view.

Step 2

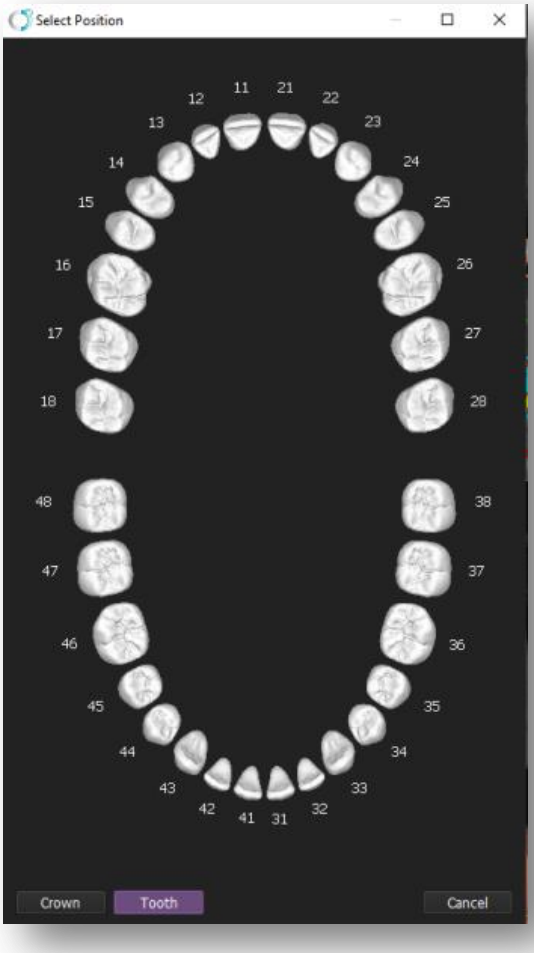
Click on "Crown" button in the tab panel on the right part of the screen then "Place new Crown or Tooth" button on the workflowpanel.

Hint	Click the “Export” button to to export the crown or teeth as stl-file to specified folder on the PC

Step 4

In appeared "Select Position" window select:

- *the crown or tooth mode;*
- *click on the desired tooth in the virtual schem, and the virtual crown or tooth is going to appear in the pre-set area.*



Step 5

Manage the selected crown/tooth:

- *Change the tooth position in axial, cross-sectional and sagittal view by*
  clicking on and holding central square and dragging it
  OR
  clicking on and holding the line tilt it.

- *change the tooth position in 3D mode, by clicking on the tooth. Left-click, hold and drag this green line to tilt the tooth. Right-click, hold and move the mouse forward to increase the tooth size or move the mouse back to decrease tooth size.*

- *Change the size of the tooth/crown using "Scale" slider.*

- *Replace the tooth/**c**rown using the "Place new crown/tooth" button.*

Note!	Use the Shift key for group adjustment of crown opacity and scaling.

- *Reposition the tooth/**c**rown using the "Move Crown/Tooth Mode" button.*

- *Edit a crown/ tooth with the Editor, by clicking the "Edit" button (see Annex G).*

Step 6

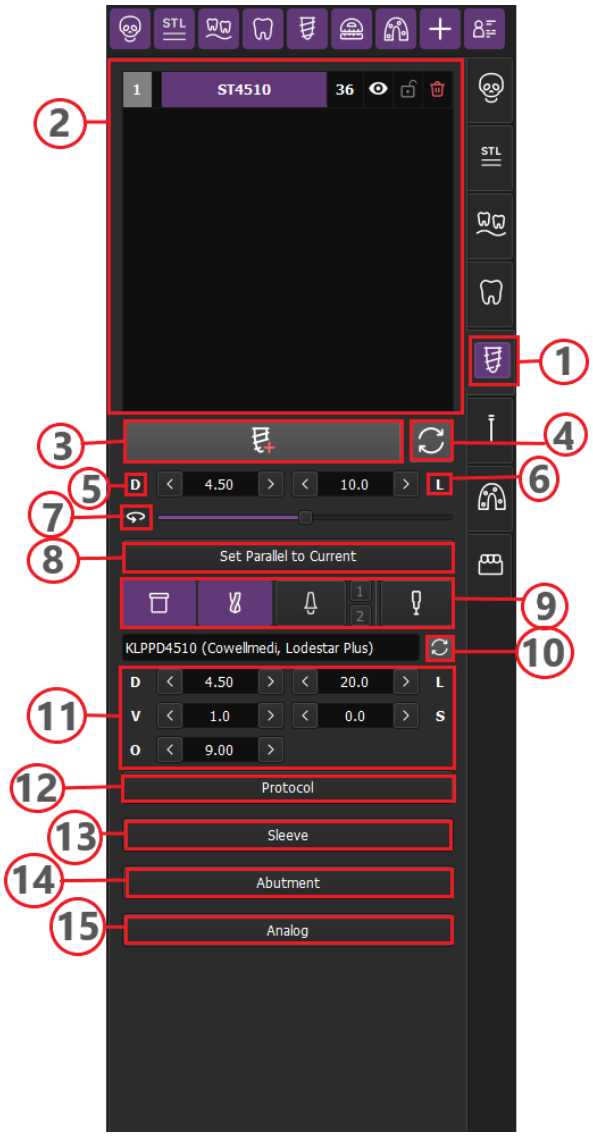
Click on "Lock On/Off" button in the "Crown" tab panel to lock in the required settings.

---

8. IMPLANT PLANNING

The software allows users to perform implant planning using Panoramic, MPR or Rotation Slice mode.
The general idea of the planning concept is: - the implant is the primary object; - the drill tip is connected to the implant apex (with adjustable v-factor shift); - occlusal surface of the sleeve is connected with a drill stopper surface (with adjustable Spacer).
If the drill length is changed, the sleeve position will be changed equally, increasing and decreasing sleeve offset.

WORKFLOW PANEL OF IMPLANT MODE



1 Implant tab

2 Implant list

3 Place new Implant button

4 Replace implant button

5 Occlusal diameter

6 Length

7 Rotation implant slider

8 Set Parallels to Current button to align the parallels of the implants to the desired implant

9 Visualisation of Sleeve, Drill, Abutment, Analog buttons

10 Replace Drill button

11 Drill submenu

12 Protocol menu button

13 Sleeve submenu button

14 Abutment submenu button

15 Analog submenu button

Step 1

Select MPR or Pano mode. Set up the planes-axis to visualize the further implant position to be planning in axial, cross-sectional and sagittal view.

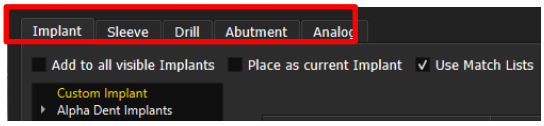
Step 2

Click on "Implant" button in the tab panel on the right part of the screen. Click on "Place new Implant" button.

Step 3

At the appeared window, choose the "implant", "sleeve", "drill" and, if necessary, "abutment" corresponding submenu by left-clicking. Options choosing implants:

- Custom implants
- Implants from library

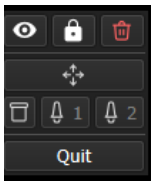


Step 4

Manage implant position:

- in axial, cross-sectional and sagittal view just click on and hold square mark at the occlusal line of the implant and drag it, or click on and hold the implant contour line and tilt it.
- in 3D mode right-click on the implant. In the modal window, click the button The green and blue round lines are going to appear. Left-click into green circle, hold and move implant, or pull green circle to tilt the implant. Left-click, hold and move the blue circle to rotate the implant.
- clicking the Set Parallels to Current button aligns the parallels of the implants to the desired implant. To perform this operation, select the implant to be aligned and then press the Set Parallels to Current button and select the implants to be aligned.

Fill in the value of the Max deflection angle (deg) and confirm the selection by pressing "OK".



Step 5

Manage implant parameters:

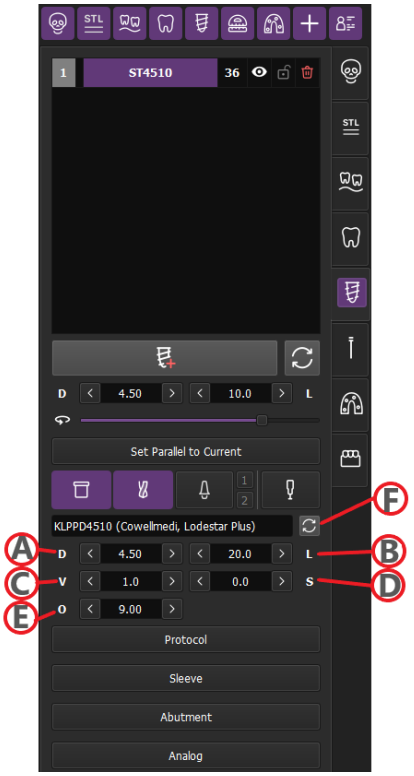
- change the size of the implant in windows 5 (D-diameter) and 6 (L-length) by clicking on the number and scrolling the mouse wheel, or writing the number into the appropriate windows, or using the arrows.
- set the Implant, Drill, Sleeve, and Abutment settings up by clicking on "Replace Implant" button (4).

Click on "Lock On/Off" button in the "Implant" tab panel.

Step 6

In "Drill" submenu set up the drill diameter "D" (A), drill length "L" (B), drill V-factor (C), and offset (E). The drill spacer "S" (D) is an option to add the regulated space between stopper of the drill and contacted surface of the sleeve to change a position of the sleeve and decrease the sleeve offset during digital implant planning.

To reset / rechoose drill, press button Replace Drill (F)

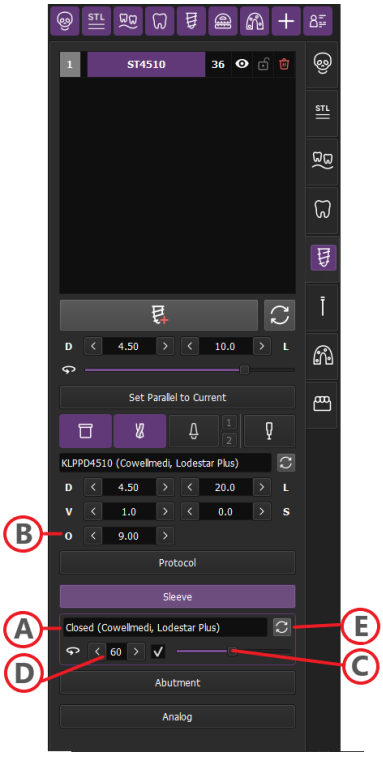


Step 7

Click on the "Sleeve" submenu and check the model of the sleeve (A), offset height "O" (B).

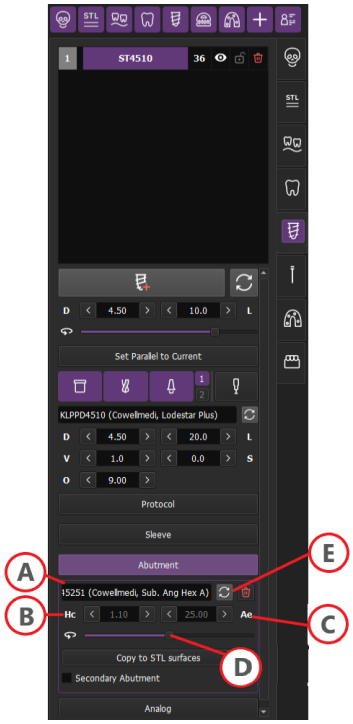
Note!	The initial rotational position of the sleeve is related to the rotational position of the implant

To rotate a sleeve separately from implant, click on the slider and drag it (C) to rotate a sleeve by an angle multiple of 15, 30, 60, 90 degrees, choose the rotation angle checkbox "R" and select one of the four options: 15, 30, 60, 90 (D).
To change the current sleeve, click on the "Replace Sleeve" button (E).



Step 8

Click on the "Abutment" submenu in the right part of the screen and check the model of the abutment (A), collar height "Hc" (B) and extension angle "Ae" (C). The initial rotational position of the abatment is related to the rotational position of the implant.
To make a rotation of the abutment, click on the slider and drag it (D). If library abutment has specified information about rotation grid, its rotation will available with this grid only. Fine rotational adjustment will be available together with the implant.
To change the current abutment, click on the "Replace Abutment" button (E).



Step 9

Click on "Lock On/Off" button in the "Implant" tab panel.

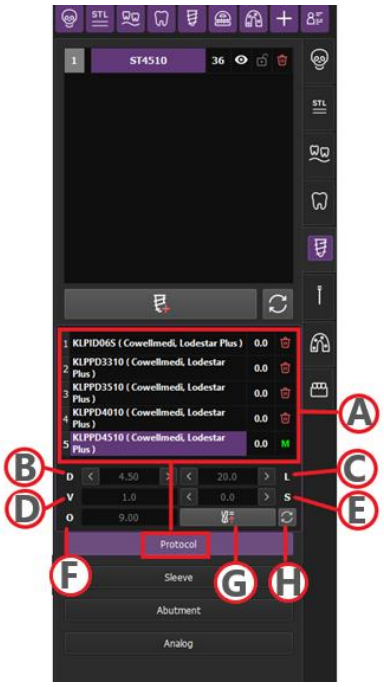
PROTOCOL

The "Protocol" submenu (A) allows to review and control the drilling sequence.

Clicking the Protocol button with the left mouse button:

1) the sleeve positions blocked for current drill. That drill will be marked as a M – master drill. In depending from preferable drilling protocol, the Master drill may be the Final drill in the drilling sequence or intermediate.
2) displays a submenu with drills sequence tab and additional buttons and parameters including drill diameter "D" (B), drill length "L" (C), drill V-factor "V" (D), drill spacer "S" (E) and offset "O" (F). A new drill bit can be added by left-clicking the (G) button. The current drill bit can be replaced with the (H) button.

After adding a drill, its parameters can be adjusted in the value windows. The sequence of drills can be easily arranged by dragging them to the corresponding tabs.



The drilling sequence can either be pre-set within the drilling library and automatically logged in the protocol or can be manually set.

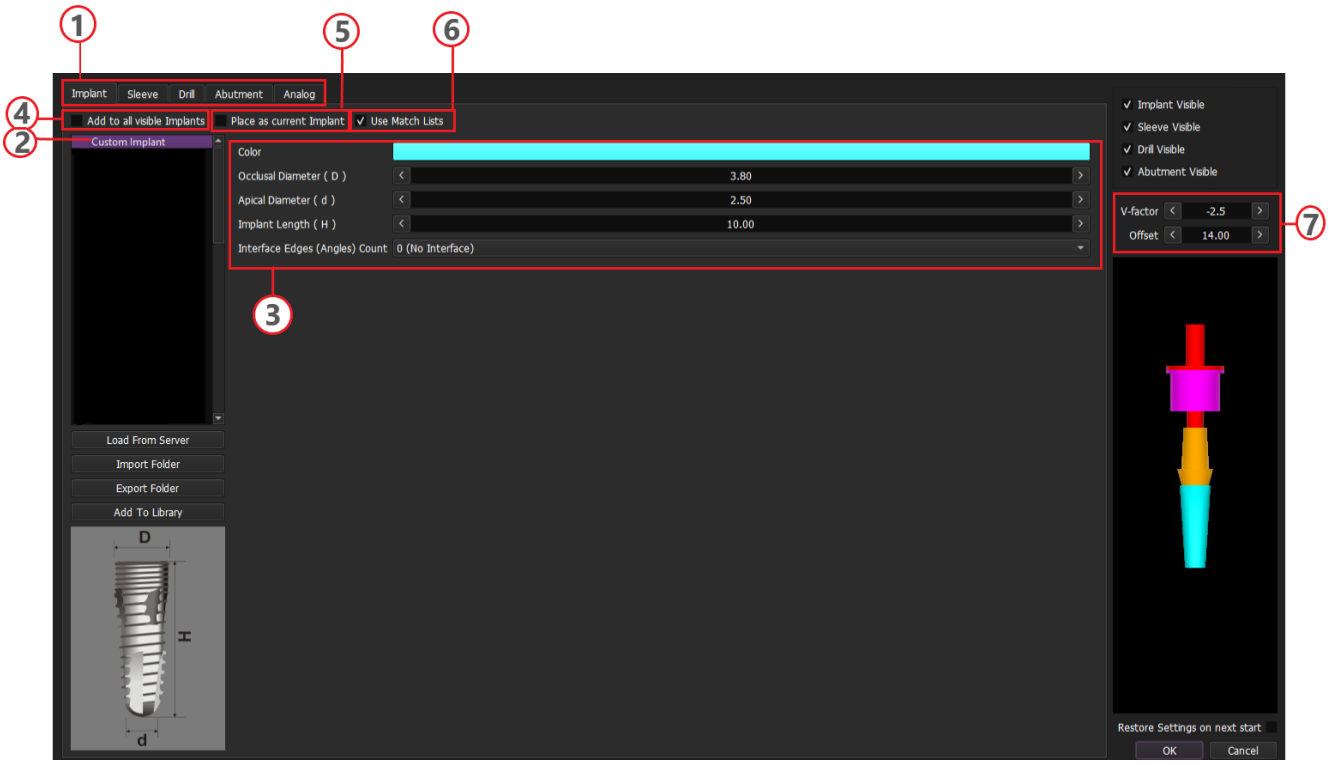
Edit the parameters of each drill in the protocol by selecting the respective drill and setting the values for drill diameter "D," drill length "L," drill V-factor "V," and drill spacer "S."

Use drag`n`drop to change the sequence of drills in the protocol, including the Master-drill.

8.1 Options of choosing implant elements

CUSTOM ELEMENTS

Placing an simplified implant from the constructor of Custom Implants



1	Implant, Sleeve, Drill, Abutment, Analog tabs
2	Custom implant
3	Parameters of Implant
4	Add to all visible implant checkbox
5	Place as current Implant checkbox
6	Use match list checkbox
7	V-factor and Offset inputs

Step 1

Click on the "Implant" submenu and select "Custom Implant" option on the list.

Step 2

Choose the implant color and enter relevant dimensions for "Occlusal Diameter" (D), "Apical Diameter" (d), "Implant Length" (H) and "Interface Edges (Angles) Count".

Step 3

Mark the "Place as a last Implant" checkbox to save settings for the next implant(s) to be placed. To restore settings for the next start of the software, mark the appropriate checkbox in the lower right of the submenu window.

Step 4

Add the V-factor depth by scrolling the mouse wheel, or writing the number, or by clicking on the arrows. Increasing or decreasing the value of the V-factor leads to the drill tip shifts down or shifts up relative to the implant apex.

Step 5

The same can be performed for custom sleeves. Click on the "Sleeve" submenu, select "Custom Sleeve" option, choose the sleeve color and enter required dimensions for "Sleeve Inner Diameter" (d), Sleeve Outer Diameter (D), Sleeve Height (H), Sleeve Edge Diameter (De), Sleeve Edge Height (He).

Step 6

Custom Drills. Click on the "Drill" submenu, select "Custom Drill" option, choose the drill color and enter required dimensions for "Drill Length" (L), "Drill Diameter".

Step 7

Click on the "Abutment" submenu, select "Custom Abutment" option, choose the abutment color and enter required dimensions for "Collar Height" (Hc), "Abutment Angle" (A).

Step 8

Press "OK" and select the tooth position.

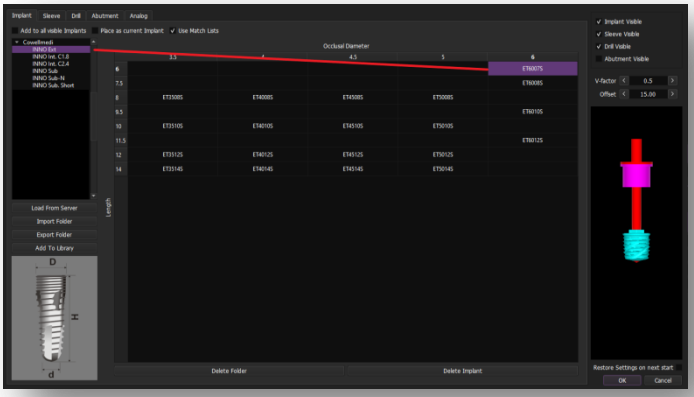
To place preloaded elements

Step 1

Click on the "Place new Implant" button or on the "Replace Implant" button.

Step 2

In the appeared menu choose the implant manufacturer name, implant line name, and implant size.



Step 3

Click on the "Sleeve" submenu, choose the sleeve manufacturer name and sleeve line name.

Step 4

Click on the "Drill" submenu, choose the drill manufacturer name, drill line name, and drill size. Set up "V-factor" depth, then press "OK".

Step 5

Click on the "Abutment" submenu, choose the abutment manufacturer name, abutment line name, and abutment size and type.

Step 6

Click on the "Analog" submenu, choose the analog manufacturer name, analog line name, and analog size and type.

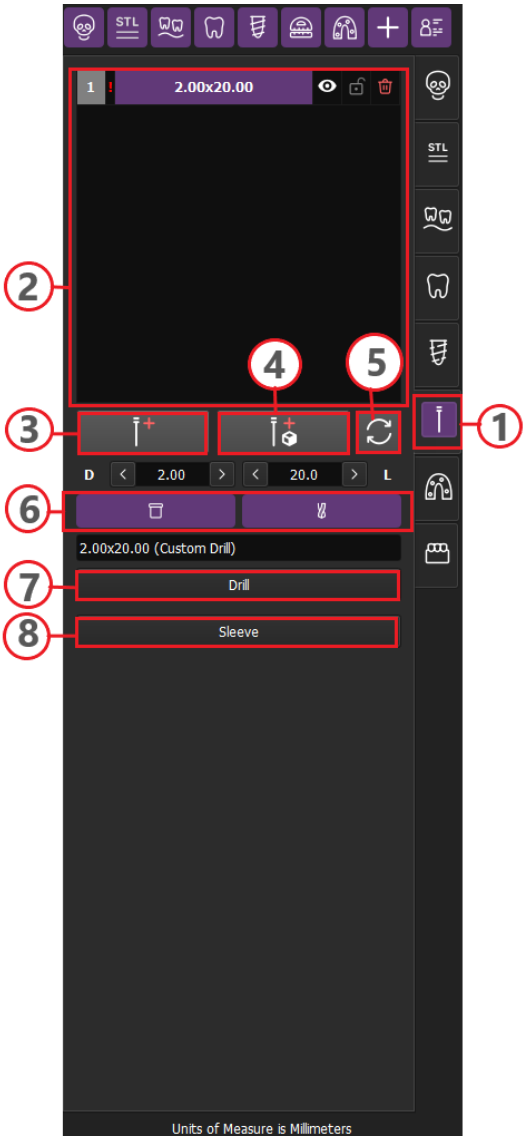
Step 7

Check the implant position and press "Add Drill" to add a final drill to the drilling list.

9. ANCHOR PIN PLANNING

The pin planning using INNO PLAN has the same concept as an implant positioning.

WORKFLOW PANEL OF PIN MODE



1 Pin tab

2 Pins list

3 Place new Pin button

4 Place new Pin in Volume button

5 Replace Pin

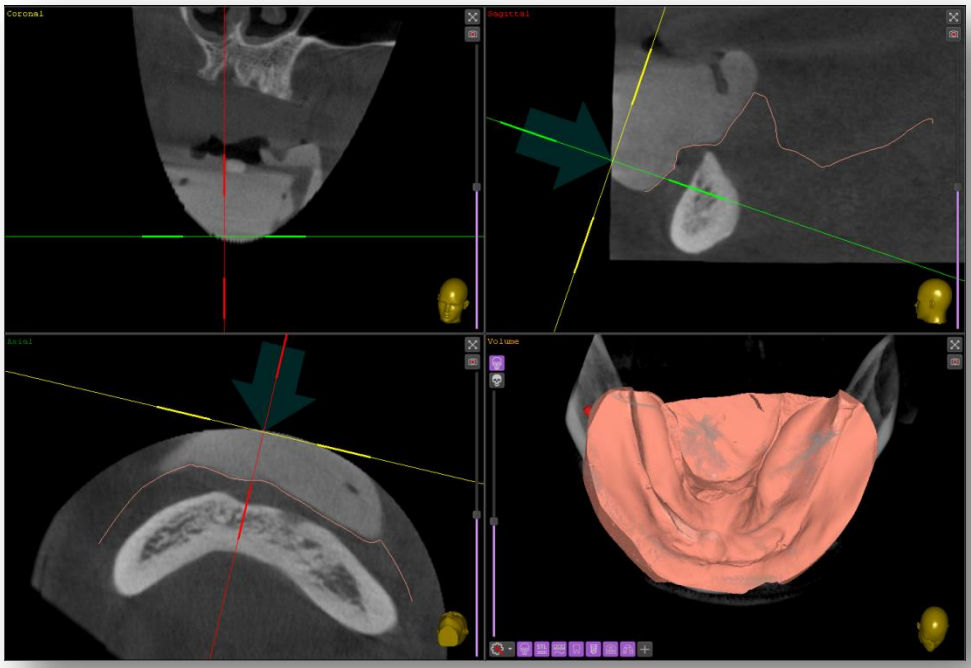
6 Visualisation of Sleeve, Drill buttons

7 Drill submenu button

8 Sleeve submenu button

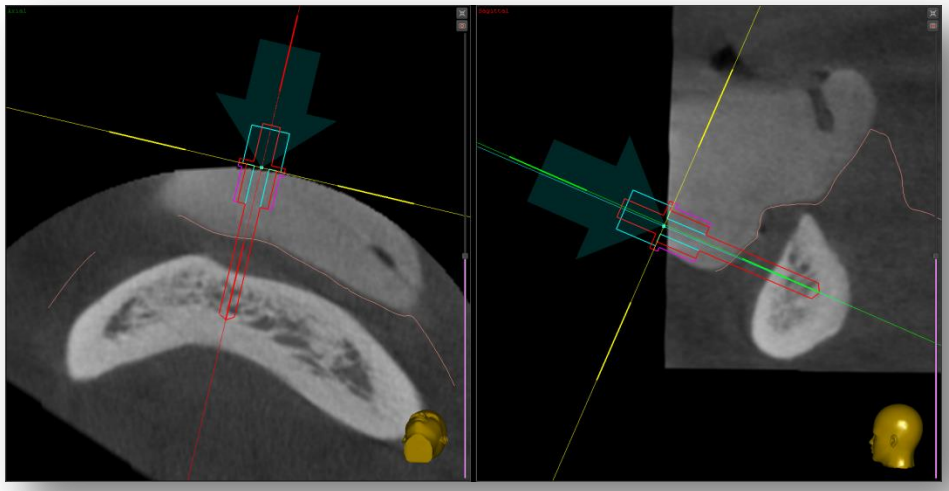
Step 1

Select MPR mode. Setup the slice planes to visualize the further pin position to be planning in axial, cross-sectional and sagittal view.



Step 2

To add a virtual pin click on "Pin" button in the workflow panel on the right part of the screen. Green transparent arrow will appear in Axial and Sagittal windows in an aim to show the position and direction of the pin.

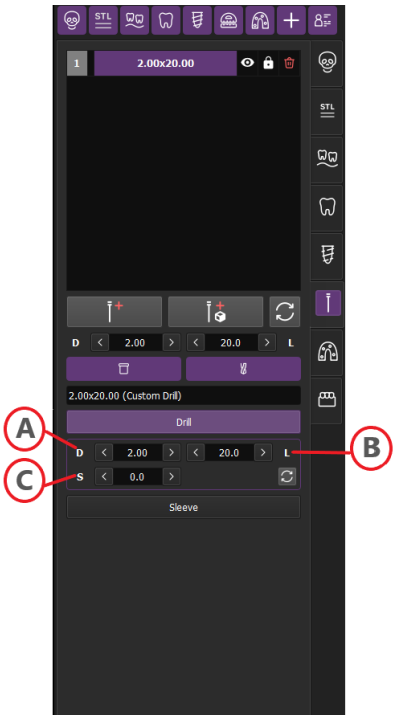


Step 3

Click on "Place new Pin" or “Place new Pin in Volume” button and at the appeared window, choose the "pin", "sleeve", and "drill" corresponding submenu by left-clicking.

Step 4

Click on the "Drill" submenu in the right part of the screen and set up the drill diameter "D" (A), drill length "L" (B), the drill spacer "S" as an option to add the regulated space between stopper of the drill and contacted surface of the sleeve to change a position of the sleeve and decrease the sleeve offset during digital pin planning (C)



Hint	There are pre-set protocol with appropriate drill and sleeve for most of pins in the library. It is recommended to download appropriate drill and sleeve with pins

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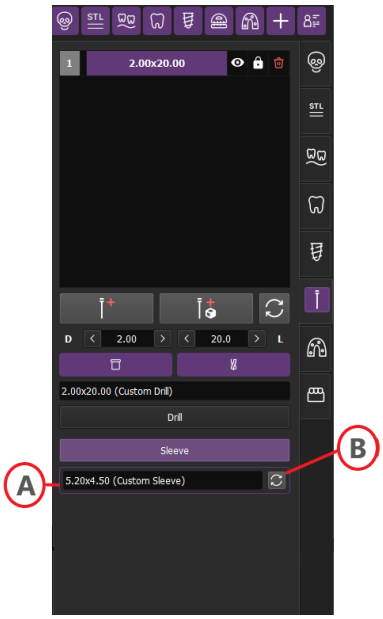
Step 5

Click on the "Sleeve" submenu in the left part of the screen and check the name of the sleeve (A). To change the current sleeve, click on the "Replace Sleeve" button (B).



9.1 Options of choosing implant elements

CUSTOM PIN

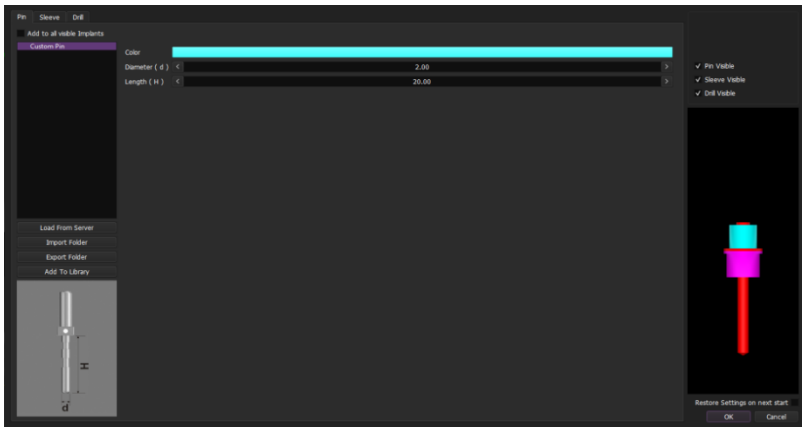
To place a pin that does not available on the pin library list

Step 1

Select "Custom Implant" option.

Step 2

Choose the pin color and enter relevant dimensions for "Diameter" (d), and Length" (H). To restore settings for the next start of the software, mark appropriate checkbox in the lower right of the submenu window.

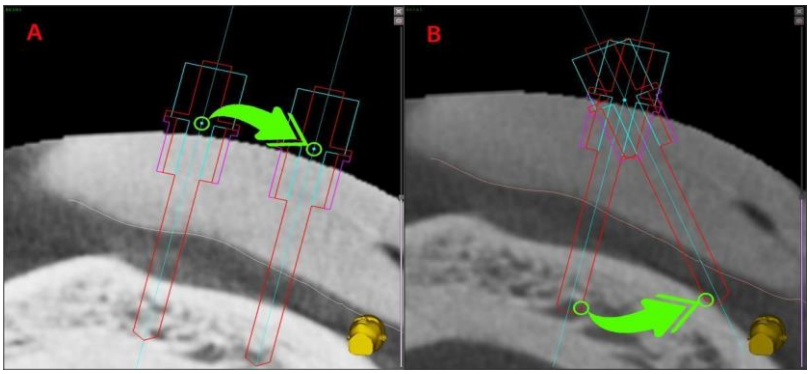


Step 3

The same can be performed for custom sleeves and custom drills (see Implant settings part). Then press the "OK" button.

Step 4

To change the pin position in axial, cross-sectional and sagittal view just left-click on and hold square mark at the stopper-contact surface area of the pin and drag it (A), or click on and hold the contour line and tilt it (B).



Step 5

Click on "Lock On/Off" button in the "Pin" tab panel or go to the next step.

PLACE PRELOADED PINS

Step 1

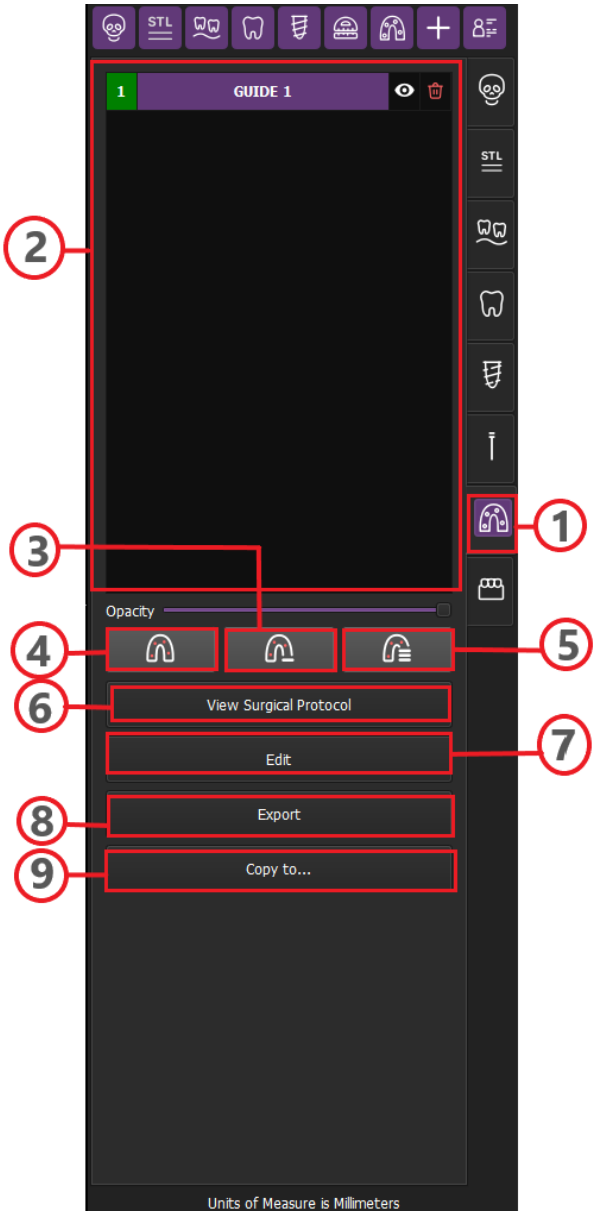
Click on the "Place new Pin" button or on the "Replace Pin" button.

Step 2

In the appeared menu choose the pin manufacturer name, pin line name, and pin size.

10. SURGICAL GUIDE CREATION

WORKFLOW PANEL OF SURGICAL GUIDE MODE



1 Surgical Guides tab

2 Guides list

3 Make Surgical Guide based on Prosthesis button

4 Make Surgical Guide based on Surface button

5 Make Stackable Surgical Guide based on Surface button

6 Surgical protocol button

7 Edit button

8 Export button

9 Copy to .. button

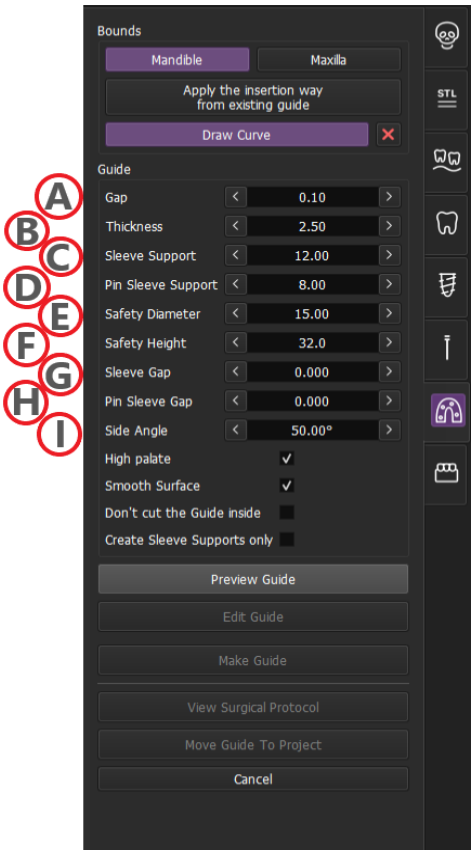
Step 1

To start a virtual surgical guide creation click on "Surgical Guides" button in the workflow panel on the right part of the screen. And click on "Make Surgical Guide based on Surface" button

---

Step 2

At the appeared window check the STL surface position – Maxilla or Mandible.



If direction of the surgical guide suggested by the program incorrectly, select the appropriate Surgical Guide orientation - "Maxilla" or "Mandible" manually.

Set up the Surgical Guide settings for printing:

A Gap (mm) between surgical guide and supporting surface (set up an additional compensation value for the expansion or shrinkage of the guide material during the printing process. The settings of this parameter avoid difficulties during the process of placing and removing the surgical guide, and are necessary to compensate for scanning errors or other aggravating factors.);

B Thickness (mm) (surgical guide wall thickness settings);

C Sleeve Support (mm) (set the diameter of the sleeve support);

D Pin Sleeve Support (mm) (set the diameter of the pin sleeve support);

E Safety Diameter (mm) (set the diameter of the dental handpiece head safety zone around the sleeve)

F Safety Height (mm) (set the height of the dental handpiece head safety zone above and around the sleeve);

G Sleeve Gap (mm) (set the positive radial offset between a sleeve and surgical guide sleeve support);

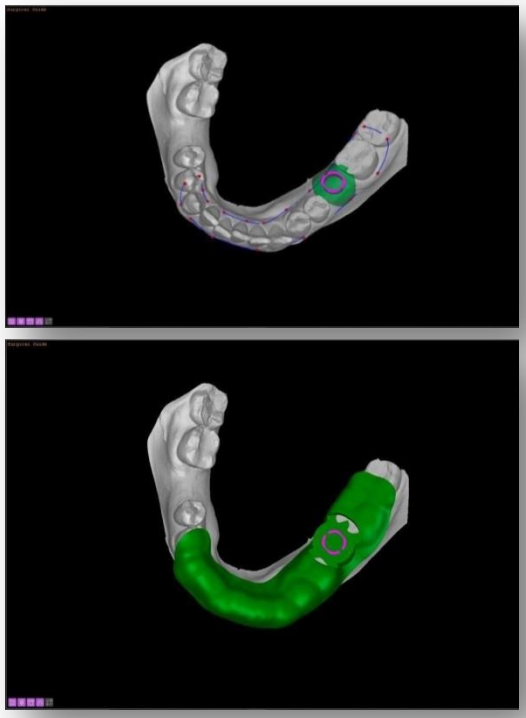
H Pin sleeve gap (mm) (set the positive radial offset between a pin sleeve and surgical guide);

I Side Angle (degrees) (set the value of the angle of the slope of the guide edge).

Hint	Default settings can be changed in the Settings Menu.

Step 3

To identify the area on which the Surgical Guide is going to be supported, draw the guide borderline by placing points one after another around the Surgical Guide area.
Continue to draw the curve that goes back to the starting points and then double-click on this line or click on the “Draw Curve” button.



Note!	Pull placed dots by left mouse button for position editing.

Note!	Before generating the guide, set up the guide insertion path! The path of insertion is a perpendicular to the screen! So, place the STL surface in the appropriate position when you see minimum undercuts

Click on the "Preview Guide" button and software will go ahead and create the preview model of the surgical guide.

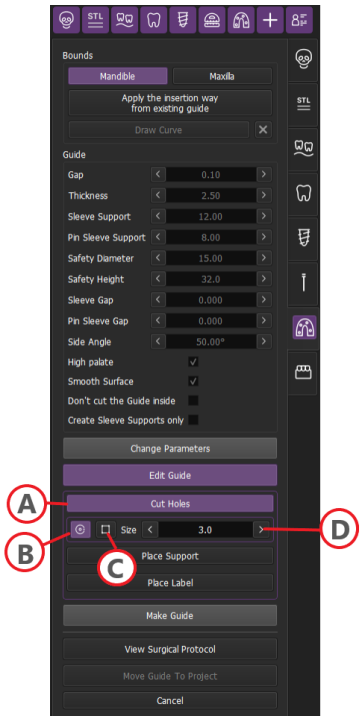
Step 4 (optional)

If necessary, click the "Edit Guide" button to open the Surgical Guide Edit Menu.

Note!	Editing also available after guide creation finishing

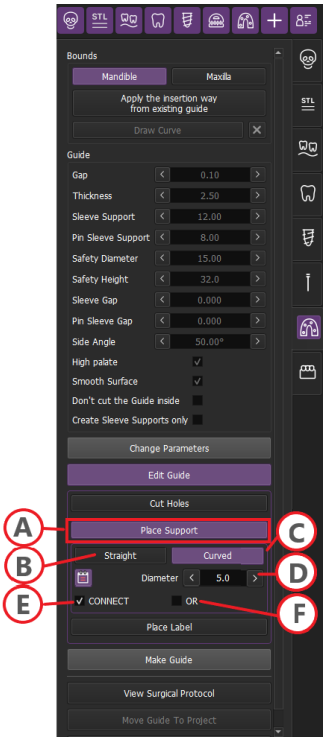
Step 4.1

Click “Cut Holes” button (A).
To cut viewing windows either click on the round window button or click on the square window button, set up the size of the window by scrolling with the mouse wheel (C-D).
The cursor is going to be round or square shape cutter, move the cursor over the STL surface of the generated surgical guide then left-click to make a hole.



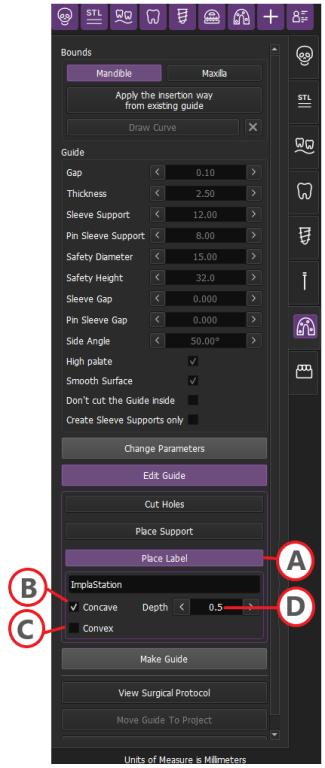
Step 4.2

Click “Place Support” button (A).
To add a straight/curved support bar from the menu either click on appropriative buttons (B-C) or click on the square button, set up the diameter of the support bar (D).
Choose one option of constructing a support bar (E-F):
CONNECT option is used to construct a bar when it does not fully intersect one or more intermediate parts of the object in its middle section. This option is also suitable for building a support bar when one or both parts of the object have thin walls.
INTERSECT option is used when constructing a bar in a way that its middle section fully intersects one or more intermediate parts of the object.
Place a support bar on the guide surface and modify it by using the points for rotation and size adjustment.



Step 4.3

Select the “Place Label” button (A).
Type in the desired text in the label field.
Modify the desired label text depth (D) by scrolling with the mouse wheel.
To add a label to surgical guide move cursor over the guide and left-click where you wish to place tag. Click on the "Concave" (B) or "Convex" (C) checkbox to modify the way a Label imprints on the surgical guide surface.-



Step 5

Check the surgical protocol by clicking the "Surgical Protocol" button in the Surgical Guide menu on the right part of the screen.

Step 6

Check Surgical guide settings and modifications then click "Make Guide" button to achieve the final view of the generated guide.

Step 7

To move created Surgical Guide to the project press "Move Guide to Project", then in the appeared window, click "Yes".

Note!	Paid option. One export credit will be charged from your account

---

10.1 Surgical Guide Based on Prosthesis

Step 1

To start the creation of the surgical guide based on the denture click on the "Surgical Guides" button in the workflow panel on the right part of the screen. Click on the "Make Surgical Guide based on Prosthesis" button.

Step 2

At the appeared window setup the STL surface position.

- Select the Surgical Guide orientation - "Maxilla" or "Mandible".
- Set up the Surgical Guide settings for STL printing.

Step 3

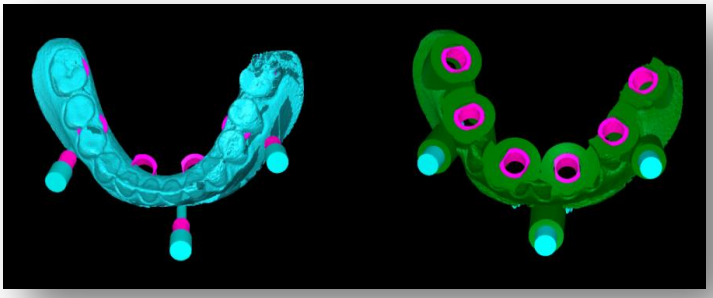
Click on the "Generate Guide" button and software will go ahead and create the surgical guide.

Note!	The pass of insertion is doesn't matter for guides created from dentures

---

Step 4

To move created Surgical Guide to the project press "Move Guide to Project", then in the appeared window, click "Yes".
Click on "Export" button to save guide as STL-file on your computer.
To get file of the Surgical Protocol saved or printed, press "View Surgical Protocol" and chose appropriate option.



Note!	Paid option. One export credit will be charged from your account.

10.2 SURGICAL PROTOCOL

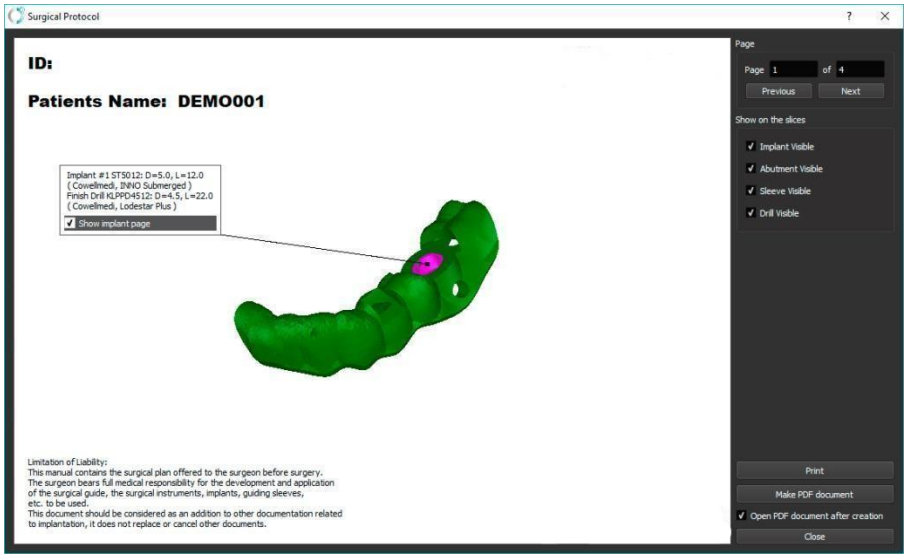
The INNO PLAN creates a surgical protocol together with the surgical guide based on virtual implant planning, sleeve(s) position and selected surgical drill sequence.

Step 1

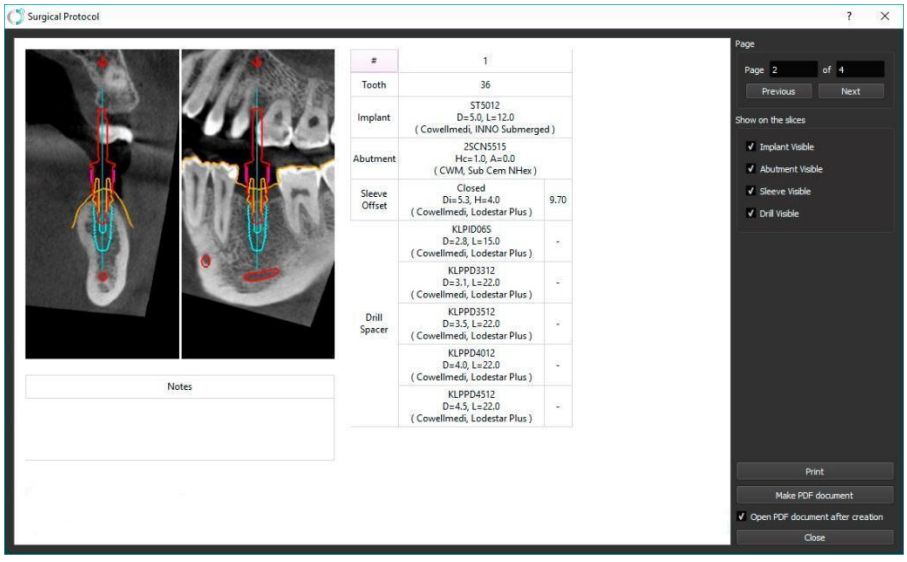
Chose appropriate guide in the list of surgical guides. Click the "View Surgical Protocol" button in the right part of the screen to open the Surgical Protocol Window

---

The following image shows an example of a surgical protocol. Positions of guide and cards with implant info are adjustable by pulling them with left mouse button.



The surgical protocol is available per implant providing detailed information together with the images of the planning view. Adjust the guide position as you need. To get more info select the option "Show implant page".

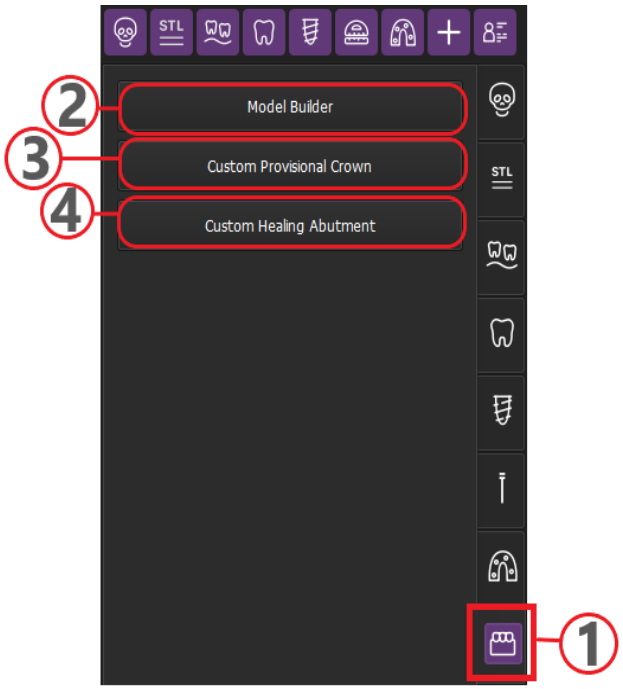


To add a panoramic image to the Protocol select the option "Add to surgical protocol".

11. Modeling

The model design feature within the INNO PLAN software is instrumental in creating models of objects within the field of dental implantation. It plays a crucial role in optimizing the dental implantation process and comprises the following functional tools: the Model Builder, the Custom Provisional Crown, and the Custom Healing Abutment.

WORKFLOW PANEL OF MODELING MODE



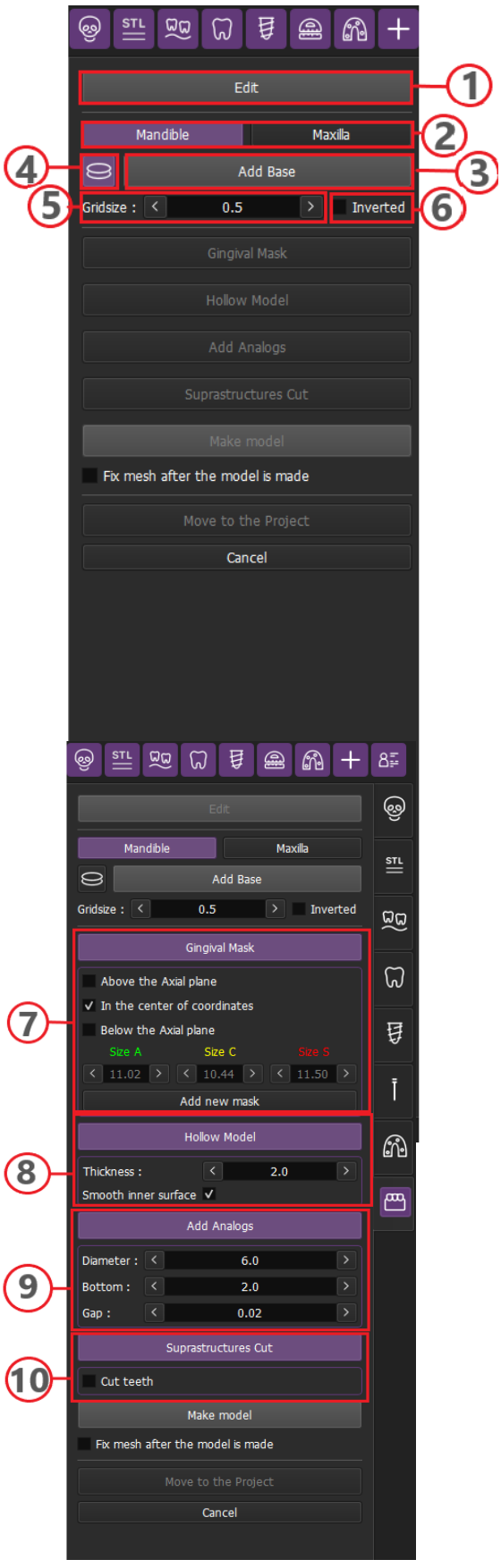
1 Modeling tab

2 Model Builder button

3 Custom Provisional Crown button

4 Custom Healing Abutment button

11.1Model Builder mode



1 Edit button

2 Mandible or Maxilla buttons

3 Add Base button

4 Base boundaries button

5 Gridsize input

6 Inverted checkbox

7 Gingival mask submenu

8 Hollow model submenu

9 Add Analogs submenu

10 Suprastructures Cut submenu

Step 1

Select the desired STL file.

Note!	Model Builder exclusively operates with unclosed surfaces.

Step 2

Click on the "Modeling" section within the workflow panel.

Step 3

Activate the STL editor by clicking the Edit button. If necessary, prepare and correct any defects in the STL surface for modeling.

Step 4

The Mandible or Maxilla buttons are automatically highlighted based on the software's identification of the jaw. You can manually switch them if needed.

Step 5

Rotate the STL surface in the 3D window with respect to the base part's boundaries, represented by the horizontal purple lines:

- Move the cursor over the STL surface while holding the left mouse button to perform arbitrary 3D rotation of the STL.
- Moving the cursor outside the STL surface while holding down the left mouse button allows you to rotate the STL around the vertical axis.
- Use the scrolling wheel anywhere in the rendering window to rotate the STL around an axis perpendicular to the screen plane.

Step 6

Position the Model Base:

- Drag the green circle. between the purple lines while holding the left mouse button to position the base part relative to the STL surface.
- Dragging the purple lines (this is in addition to dragging the green circle) allows you to change the height of the base part of the model's base.

Step 7

Adjust the size of the base triangles by filling in the Grid size in the digital window next to the Add Base button.

Step 8

Click the Add Base button to create the model's base.

If necessary, you can reverse the orientation of all triangles on a surface by clicking the Invert button.

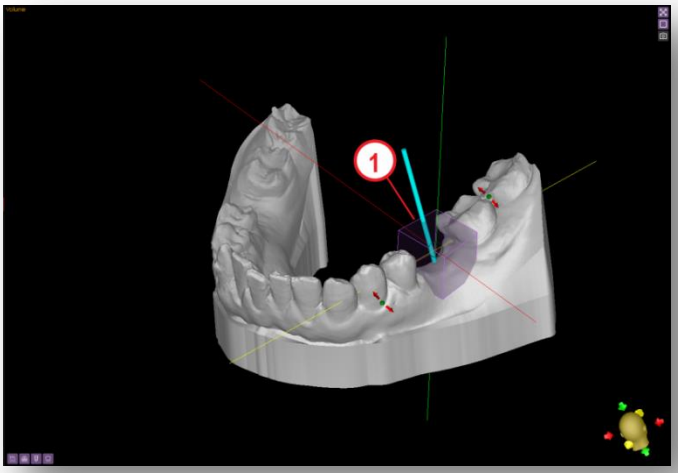
Note!	Clicking the Add Base button after correcting the STL position and base boundaries allows you to reshape the model base.

Step 9

Once the model is created, the model design buttons will become available:

Gingival Mask:

Clicking the Gingival Mask button generates separate STL files for gingival masks, represented as purple boxes in the 3D rendering window (1). Select the box's position relative to the STL surface by checking the relevant checkbox. You can manually resize the box's sides by dragging and adjusting the box's boundaries in the 3D rendering window or by entering the size value in the digital windows. Click the Add New Mask button to create additional gingival masks.



Hollow Model:

Clicking the Hollow Model button creates internal voids in the model with specified wall thickness parameters and optional internal surface smoothing.

Add Analogs:

Click the Add Analogs button to add support for analog implants. You can fill in adjustable parameters on the control panel, such as Diameter, Bottom, and Gap.

Suprastructures:

To remove the model volume from the simplified gingival mask, click the Suprastructures Cuts button . To view the cut teeth area, select the Cut teeth option.

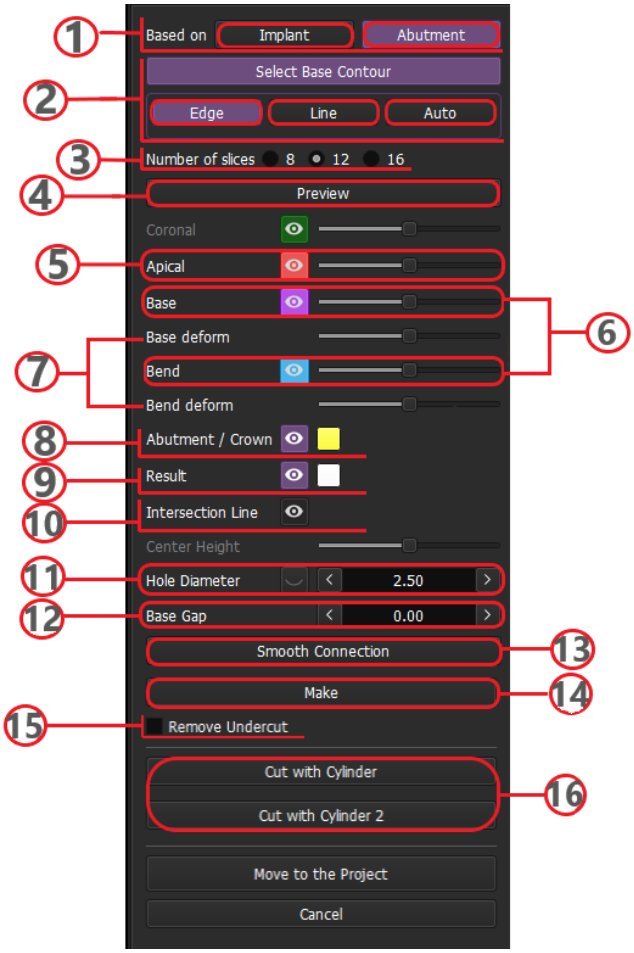
Step 10

Finalize the model creation by clicking the Make Model button.

Step 11

To transfer the model file and gingival mask files (if available) to the STL list, click the Move to the Project button.

11.2 Custom Provisional Crown Modeling



1 Based on

2 Base Contour

3 Number of slices

4 Preview button

5 Apical contour slider

6 Base & Bend contour sliders

7 Base & Bend deform sliders

8 Abutment/Crown visualisation button

9 Result visualisation button

10 Intersection line visualisation button

11 Hole Diameter setting

12 Base Gap setting

13 Smooth Connection button

14 Make button

15 Remove Undercut checkbox

16 Cut with Cylinder buttons

Step 1

Choose the necessary elements:

- relevant STL surface.
- implant.
- suprastructure to be used in conjunction with the chosen implant.
- crown or tooth.

Note!	When opting for a tooth-shaped crown, it must intersect with the selected STL surface. In contrast, if you select a unclosed crown, it doesn't necessarily need to intersect with the STL.

Step 2

Click the 'Custom Provisional Crown' button in the Modeling section.

Step 3

Begin by selecting the location where the provisional crown will be based, either at the Abutment or Implant levels.

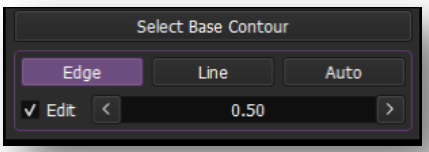
Step 4

Choose the Base Contour using the necessary instrument for shaping the border: Edge, Line, or Auto.

- The 'Edge' tool: The Base Contour will be automatically generated based on the nearest surface edge to the set point. To set the point, left-click at the desired location, and the base contour will be created. It will be displayed as a red line. Double-click the left mouse button to lock the line.
- The 'Line' tool: This tool allows manual drawing of the base contour, which will also appear as a red line. Set contour points by left-clicking at the necessary positions in the rendering window. Right-click can be used to delete points. Complete the contour drawing by double-clicking the left mouse button.
- The 'Auto' tool is designed for the automatic placement of the base contour at any specified point location. To set the point, left-click at the necessary location and double-click to lock the base contour.

Step 5

To adjust the contour, check the 'Edit' checkbox. The line will be represented by a set of points that can be moved using the left mouse button or deleted using the right mouse button. The density of points on the line can be changed in the digital window.



Step 6

Choose the Number of slices by selecting one of the available positions. Slices represent meridian segments used for editing individual parts. The default value is 12. Increasing this value allows for more precise editing.

Step 7

Click the 'Preview' button to create a prototype of the future custom part for further editing. It will be visualized as Meridian slices, divided into three parts:

- Apical
- Base
- Bend.

Each part forms the corresponding contour with specific color-coded points. The Apical contour follows the crown surface, while the Base and Bend contour points are positioned in intermediate locations between the Apical contour and the boundary line.

Step 8

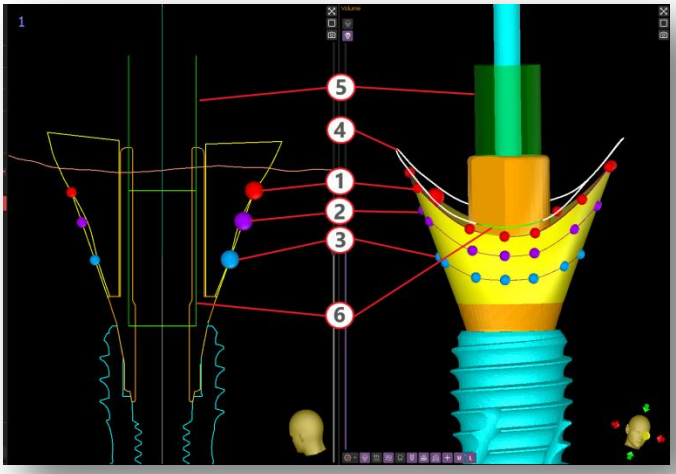
Edit contours of the prototype of the model by moving and changing the curvature of the contours.

The Apical, Base, or Bend contour can be moved in two ways: by adjusting individual points or by modifying the entire contour as a whole.

- Apical Individual contour adjustment: To change the contour individually, move individual points using the left mouse button in the rendering window or in rotating slice window (1).
- Contour adjustment as a whole: Use the respective control in the control panel to modify the entire contour (5, 6).

Changing the curvature of the Base and Bend contours can also be done both collectively and individually.

- Perform individual editing of the curvature of Base and Bend contours in the rendering window by scrolling the mouse while holding the right mouse button or by dragging
  points with the left mouse button pressed in the rotation slice window (2, 3).
- Group editing of Base and Bend contour curvature: You can collectively edit the curvature of Base and Bend contours using the corresponding "Base Deform" and "Bend Deform" controls on the control panel (7).



Hint	It is recommended to edit the Apical contour first and then the Base and Bend contours to avoid losing the editing results of the latter when attempting to edit the Apical contour.

Hint	To determine the part of the edit you're working on, pay attention to the size of the dots. They will be larger in the active slide.

Use the specified buttons on the control panel to toggle specific elements on or off, such as:

- Apical, Base, or Bend contours
- Crown/Abutment
- Result (the intermediate model result before project export)
- Intersection line (the line where the crown intersects with the STL surface)
- Hole diameter (the screw head shaft)

Step 9

Set:

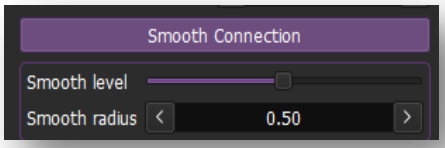
- the diameter value of the screw head shaft In the Hole Diameter digital window.
- The Base Gap size to determines the gap size between the cylindrical portion of the superstructure's base and the crown

---

Step 10

Adjust the Smooth connection by scrolling the mouse wheel or clicking and dragging the slider on the control panel, and set the Smooth radius value

The Smooth Connection button is used to smoothen the transition between the apical and coronal surfaces.

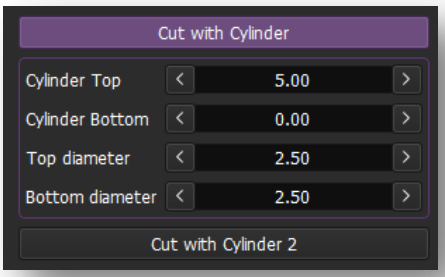


Step 11

Enable the 'Remove Undercut' option to eliminate any undercuts found in the cylindrical section of the superstructure.

Step 12

Activate the 'Cut with Cylinder/Cut with Cylinder 2' buttons to create and cut additional objects of different shapes, which will be subtracted from the crown in the final step . Adjust the desired parameters by either filling in the digital windows or using the scroll.



Step 13

Complete the modeling creation by clicking the 'Make' button to finalize the model creation.

Hint	After creating the model, it is possible to make additional modifications; use the 'Make' button again to refresh the results.

Step 14

Click the 'Move to the Project' button to transfer the model file to the project.

11.3 Custom Healing Abutment Modeling

1 Based on

2 Base Contour

3 Number of slices

4 Preview button

5 Coronal contour slider

6 Apical contour slider

7 Base & Bend contour sliders

8 Base & Bend deform sliders

9 Abutment/Crown visualisation button

10 Result visualisation button

11 Intersection line visualisation button

12 Center Height Slider

13 Hole Diameter setting

14 Base Gap setting

15 Smooth Connection button

16 Make button

17 Remove Undercut checkbox

18 Cut with Cylinder buttons

Step 1

Choose the necessary elements:

- relevant STL surface.
- implant.
- suprastructure to be used in conjunction with the chosen implant.
- crown or tooth.

Note!	When opting for a tooth-shaped crown, it must intersect with the selected STL surface. In contrast, if you select a unclosed crown, it doesn't necessarily need to intersect with the STL.

Step 2

Click the 'Custom Provisional Crown' button in the Modeling section.

Step 3

Begin by selecting the location where the provisional crown will be based, either at the Abutment or Implant levels.

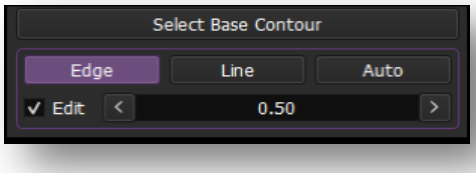
Step 4

Choose the Base Contour using the necessary instrument for shaping the border: Edge, Line, or Auto.

- The 'Edge' tool: The Base Contour will be automatically generated based on the nearest surface edge to the set point. To set the point, left-click at the desired location, and the base contour will be created. It will be displayed as a red line. Double-click the left mouse button to lock the line.
- The 'Line' tool: This tool allows manual drawing of the base contour, which will also appear as a red line. Set contour points by left-clicking at the necessary positions in the rendering window. Right-click can be used to delete points. Complete the contour drawing by double-clicking the left mouse button.
- The 'Auto' tool is designed for the automatic placement of the base contour at any specified point location. To set the point, left-click at the necessary location and double-click to lock the base contour.

Step 5

To adjust the contour, check the 'Edit' checkbox. The line will be represented by a set of points that can be moved using the left mouse button or deleted using the right mouse button. The density of points on the line can be changed in the digital window.



Step 6

Choose the Number of slices by selecting one of the available positions. Slices represent meridian segments used for editing individual parts. The default value is 12. Increasing this value allows for more precise editing.

Step 7

Click the 'Preview' button to create a prototype of the future custom part for further editing. This prototype consists of meridian slices, divided into four parts:

- Coronal
- Apical
- Base
- Bend

Each part corresponds to a specific contour with colored reference points.
The coronal contour, similar to the apical contour, moves along the crown surface

---

Step 8

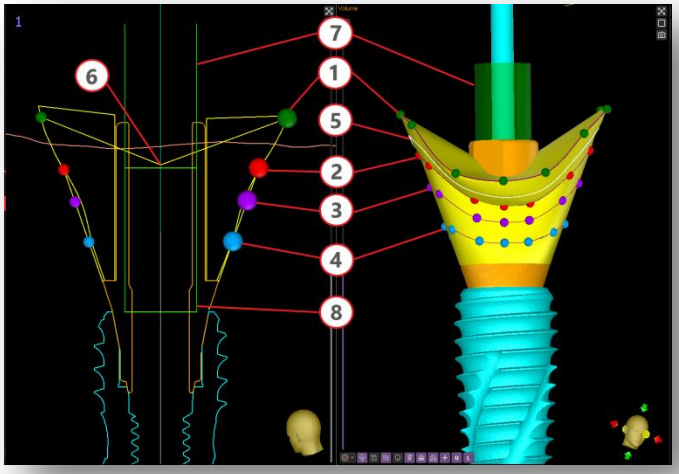
Edit contours of the prototype of the model by moving and changing the curvature of the contours.

- The Coronal, Apical, Base, or Bend contours can be modified in two ways: by adjusting individual points or by modifying the entire contour collectively.

1. Coronal and Apical Individual Contour Adjustment:
To individually change the contour, move individual points using the left mouse button in the rendering window or the rotating slice window (1,2).
2. Contour Adjustment as a Whole:
You can modify the entire contour by using the respective controls in the control panel (5,6,7).

- Changing the curvature of the Base and Bend contours can also be performed both collectively and individually.

Individual Editing of Base and Bend Contours Curvature: This can be done by scrolling the mouse while holding the right mouse button (3,4).
Group Editing of Base and Bend Contours Curvature: Group editing is possible using the corresponding "Base Deform" and "Bend Deform" controls on the control panel or by dragging points with the left mouse button pressed in the rotation slice window.



Hint	It is recommended to edit the Apical contour first and then the Base and Bend contours to avoid losing the editing results of the latter when attempting to edit the Apical contour.

Hint	To determine the part of the edit you're working on, pay attention to the size of the dots. They will be larger in the active slide.

Use the specified buttons on the control panel to toggle specific elements on or off, such as:

- Coronal, Apical, Base, or Bend contours
- Crown/Abutment
- Result (the intermediate model result before project export)
- Intersection line (the line where the crown intersects with the STL surface) (4)
- Hole diameter (the screw head shaft) (5)

Step 9

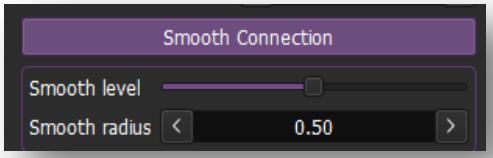
Set::

- diameter value of the screw head shaft In the Hole Diameter digital window
- The Base Gap size to determine the gap size between the cylindrical portion of the superstructure's base and the crown

---

Step 10

Adjust the Smooth connection by scrolling the mouse wheel or clicking and dragging the slider on the control panel, and set the Smooth radius value.
The Smooth Connection button is used to smoothen the transition between the apical and coronal surfaces.).

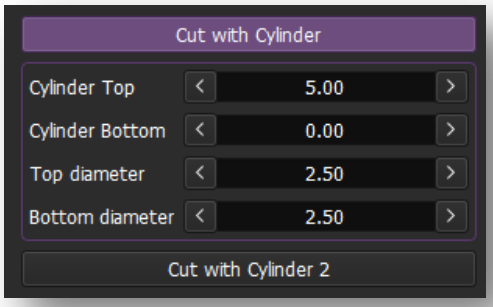


Step 11

Enable the 'Remove Undercut' option to eliminate any undercuts found in the cylindrical section of the superstructure.

Step 12

Activate the 'Cut with Cylinder/Cut with Cylinder 2' buttons to create and cut additional objects of different shapes, which will be subtracted from the crown in the final step . Adjust the desired parameters by either filling in the digital windows or using the scroll.



Step 13

Complete the modeling creation by clicking the 'Make' button to finalize the model creation.

Hint	After creating the model, it is possible to make additional modifications; use the 'Make' button again to refresh the results.

Step 14

Click the 'Move to the Project' button to transfer the model file to the project.

WARNINGS AND PRECAUTIONS

There are no chemical, physical, electrical, mechanical, electromagnetic and biological hazards to the INNO PLAN software.
However, there are several warning functions designed to remind the user of his legal responsibility to verify implant planning stages and results.

INDICATIONS FOR USE

Warning!	The INNO PLAN software must be used in accordance with their accompanying instruction for use
Warning!	This device is not tested on the pediatric patient population
Warning!	Prior to working with software, please make sure to have received appropriate training and instructions in software operation. Cowellmedi offers regular online webinars for INNO PLAN which is open for all users
Warning!	Correct design of the surgical guide lie within the sole responsibility of the user
Warning!	3D manufacturing is out of INNO PLAN software control, depends on many external factors and lie within the sole responsibility of the user
Warning!	The manufactured surgical guides for implant placement are classified as medical devices by the FDA (under 21 CFR 872.3980). Surgical guides are subject to legal requirements such as registration and listing as a manufacturer of medical devices, validation of production equipment, processes and quality system regulations
Warning!	In the US. 3D printed surgical guide is a medical device to be manufactured at an FDA registered and listed manufacturing location

DICOM

Warning!	The user is solely responsible to ensure that the quality of the loaded patient CT/CBCT data is sufficient for proper planning the case
Warning!	The production of CT/CBCT scans lies within the full responsibility of the clinicians or appropriately qualified personnel. The CT/CBCT scanner should be maintained within original manufacturer specifications

NERVE CANAL

Warning!	Make sure that the nerve is correctly traced. Always maintain an appropriate safety distance to the nerve canal
Warning!	The pathway of imaged nerves is for display only, location accuracy of the traced nerve is not tested, and pathways of imaged nerves can not be used as sole information for the clinician to make clinical decisions

IMPLANT PLACEMENT

Warning!	During implant placement, please assure that an implant/pin does not collide with an existing implant/pin, tooth root(s) or nerve canal. A collision of the implant/pin with another implant, nerve, or any other main anatomical structure can cause severe damage
Warning!	The user must be able to recognize the triangular sign "Attention" to detect warnings such as “Collision between implant/pin and implant/pin”, "Collision between sleeve and scan STL surface", and "Collision between implant/pin and nerve canal"
Warning!	Using the STL files of implant and other elements libraries created by reverse engineering are made at the user's risk

SURGICAL GUIDE

Warning!	Make sure that created STL file of the surgical guide or produced surgical guide is intended to be used only by trained qualified dental practitioners

ALIGNMENT

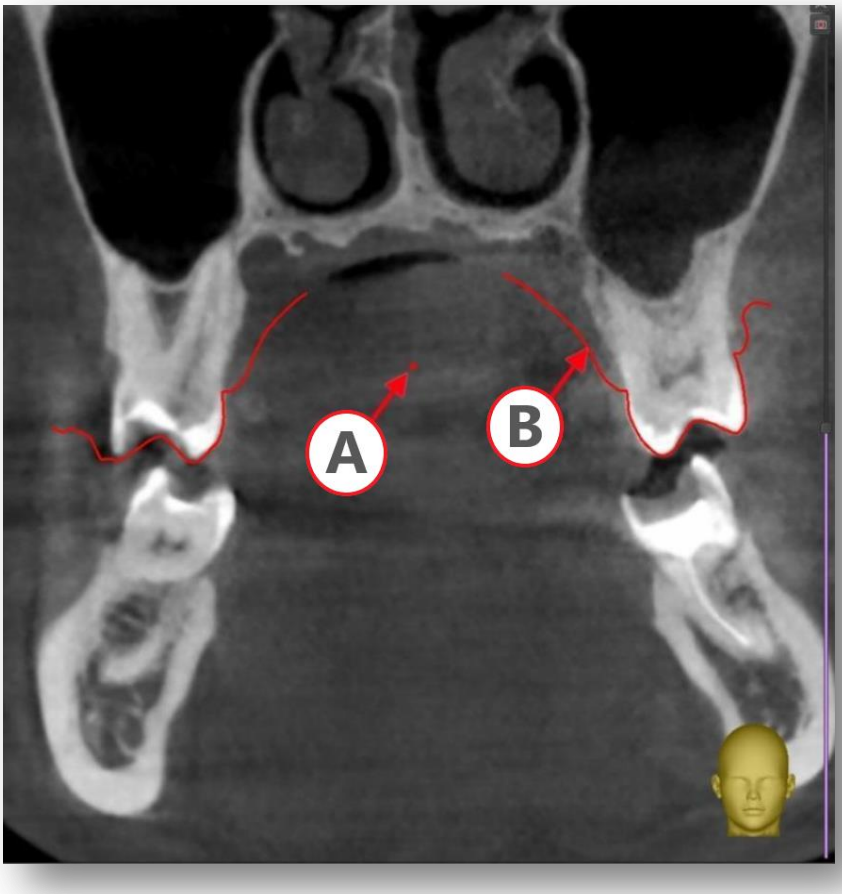
Warning!	Make sure that CBCT/CT and STL surface scans are well aligned in all relevant areas, particularly in the implant placement area

ANNEX A

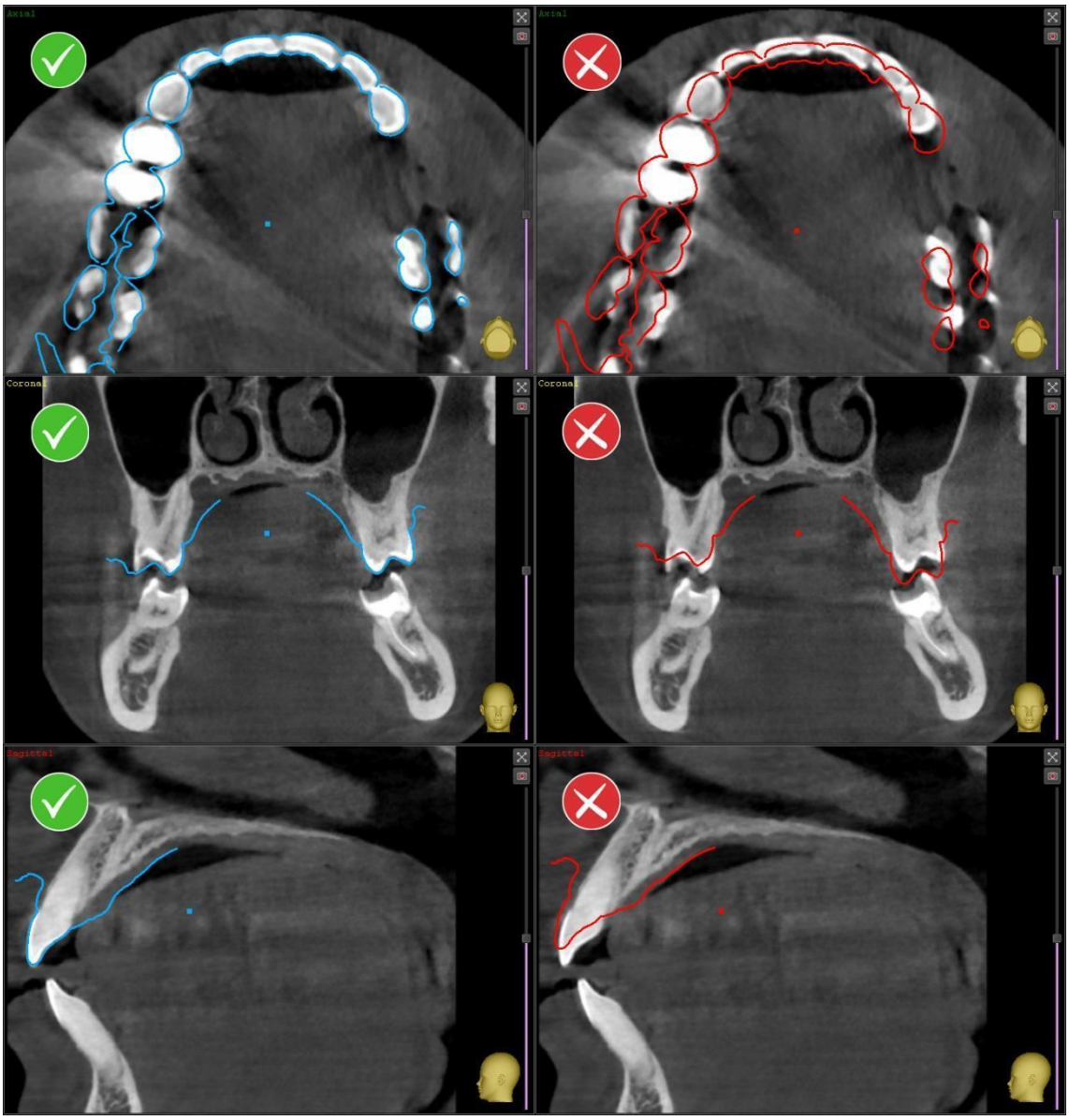
How to evaluate the quality and accuracy of alignment?

The software enables users to overlay and align DICOM visualization to the STL surface by picking points on both surfaces as a landmark (see part 6, p.28).
There is a tool to correct an alignment manually in MPR or Panoramic mode. Dragging the scan with the square point (A) or rotating the scan using the control point on contour line (B) of the scan provides your movement to one dimension in Axial, Coronal, and Sagittal views (see picture).

The aim is to get the contour of the STL surface scan to coincide with the corresponding object on the CT scan. Teeth are a good landmark for alignment.



Examples of the alignment results:



ANNEX B

Dual Scan Technique

Full Digital Workflow for the Treatment Planning of an Edentulous Patient with Guided Surgery using Dual CBCT/CT Scanning Technique.

Hint	Definitions: Dual Scan Technique (DST). The dual scan (dual CBCT scanning technique) is the term used when a dental appliance, such as a set of dentures, is superimposed over the patient CBCT/CT scan. Scan Appliance is a denture with temporary radiopaque markers that are applied directly to the inside and outside of the denture. DST Patient CBCT/CT Scan is a head CBCT/CT scan of the patient wearing the denture prepared with temporary radiopaque markers. The patient's dentures should be in occlusion when the scan is taken.

INNO PLAN DUAL SCAN TECHNIQUE WORKFLOW:

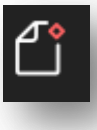
Step 1

Import an existing project (see section 4.6.2 - Tool Panel) or create a new project.

Step 2

Import Patient's CBCT/CT scan data:

Click the New Project / Load DICOM button to upload the patient's DICOM data (see Chapter 5. Input Data (DICOM)).



Step 3

Import Scan Appliance DICOM data:

Click the STL Surfaces button in the tab panel on the right part of the screen.

Click on 

button and select the Scan Appliance DICOM file on your computer.

Press "OPEN" and wait for it to finish loading.

Note!	To use the Dual Scan Technique, you need to import DICOM data of the Scan Appliance(s) with radiopaque markers.

Step 4

Convert the dental appliance to STL

Converted STL is shown in STL list and named "Converted from DICOM".

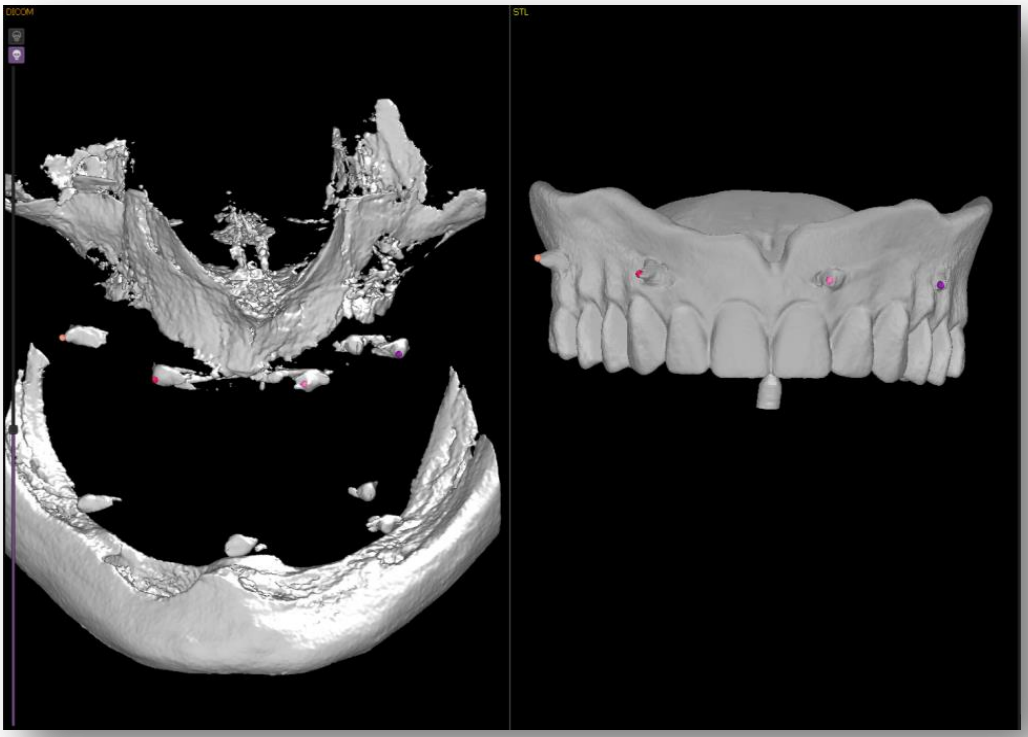
Hint	To convert Dental Appliance scan data, follow the instruction described in Chapter 5.2 "DICOM to STL Conversion" of this User Manual.

Step 5

Align converted STL:

Click Align button on STL workflow panel.

Place points on the radiopaque markers scan in the left 3D pane and corresponding points on the Surface Scan in the right 3D pane. Then click the "Align Surface to selected object" button.



CREATE A SOFT TISSUE SURFACE (SPLIT AND INVERT)

Once the CBCT/CT scans are aligned, you can proceed to the soft tissue surface detection step.

Step 1

Open the STL tab and choose necessary STL.

Step 2

Click the “Edit” button, then open the “SELECT” tool.

Step 3

Click "Line" then click “Dotted” or “Projected”.
Set up the 3D object position, draw the borderline by placing points one after another around the area of interest.

Step 4

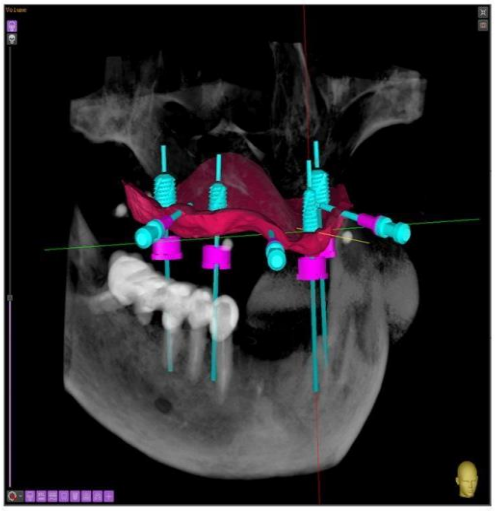
Click “Split” to split an object into two objects with open boundaries along the selection line.

Step 5

Then invert the object you want to use as a guide planning surface (see Annex G – 1.1.4 Invert).

PERFORM IMPLANT PLANNING

Once the soft tissue surface is created, you can proceed to the Implant planning, follow the instruction described in Chapter 9 – "IMPLANT PLANNING" of this User Manual.

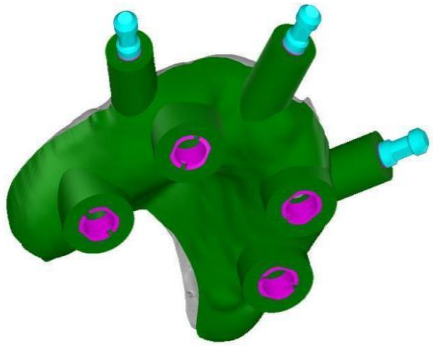


CREATE THE SURGICAL GUIDE

Follow the instruction described in Chapter 11. SURGICAL GUIDE CREATION.

CREATE THE SURGICAL GUIDE BASED ON PROSTHESIS

Optionally you can proceed to the surgical guide creation exactly after the CBCT/CT scans alignment step. (see Section 11.1 Surgical Guide Based on Prosthesis).



ANNEX C

How to anonymize your project file

Step 1

Click the "Save" button located on tool panel.

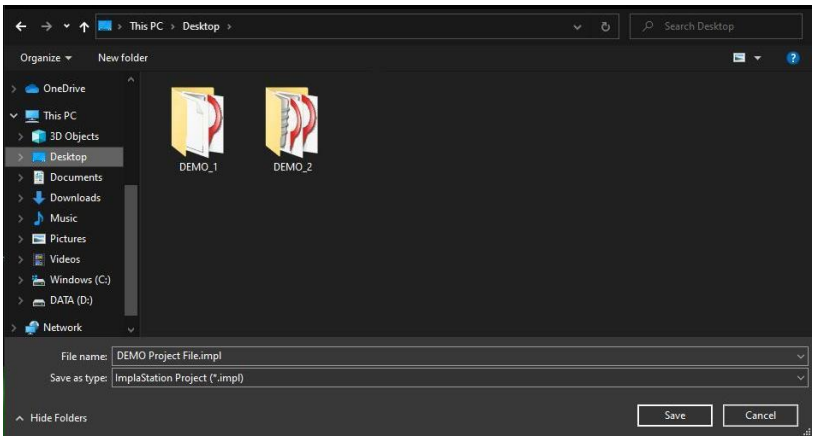
Step 2

Under the "Save File" submenu, decide on your save location.

Step 3

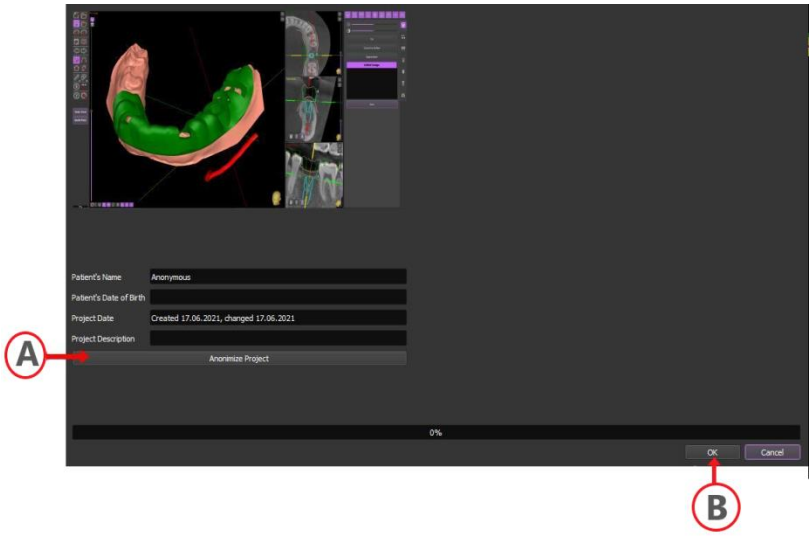
In the "File Name" field, type in your preferred Project file name (do not use patient name in project file name).

Click "Save" to save your file.



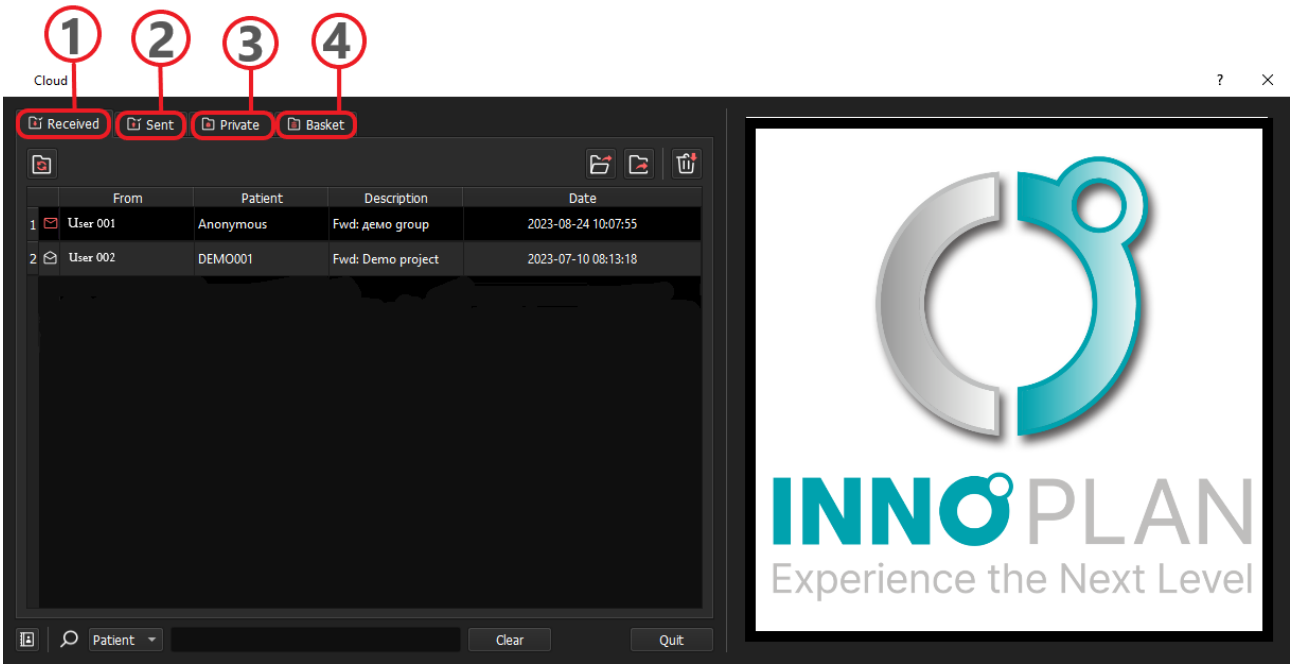
Step 4

Under the next "Save Project" submenu, click "Anonymize Project" (A) .
Click "OK" (B).



Click the “Cloud Service” button in tool panel.

TABS



1. "Received" tab. Double-click a received project file to open the project or select received project file
2. "Sent" tab. Click a “sent” project file to open the project, you sent before.
3. "Private" tab. Click an “Anonymous” project file to open the anonymous project.
4. "Basket" tab. Deleting project files from your inbox doesn't permanently delete them immediately - they'll move to the "Basket" folder where they'll remain for 90 days before being deleted automatically.

BUTTONS

Refresh

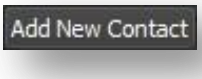
Open project

Forward project file

Delete file

Restore deleted file

Contacts

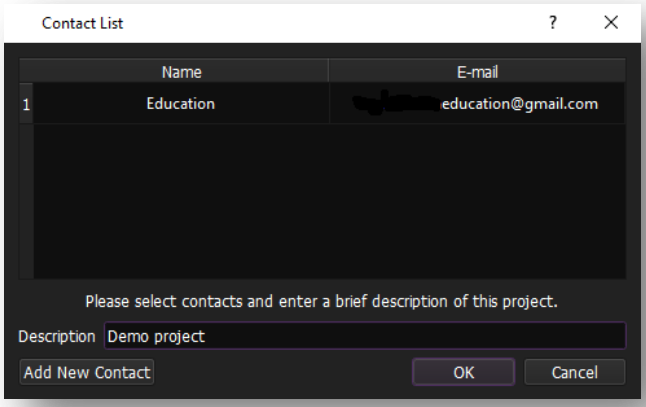


Add new contact

HOW TO SEND A CASE

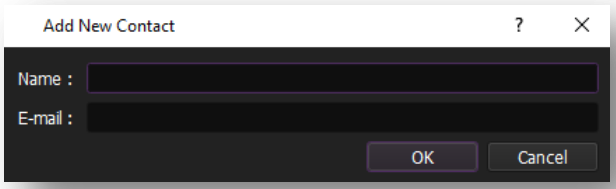
Step 1

Click  on tool panel. Doing so prompts a "Contact List" window.



Step 2

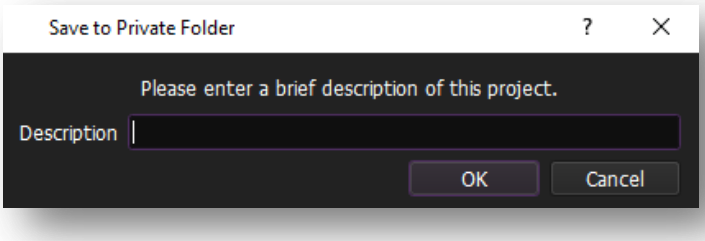
Enter/select your recipient's email address. In the "Add Contacts" text box, type in the email address or select the existing recipient's email in the list.



HOW TO SAVE IN THE CLOUD

Saving your Project File in the cloud lets you access them from anywhere.

To save Project File online with Cowellmedi Cloud, click  make a brief description of the case and click OK.



Warning!	Cowellmedi Inc. uses AWS's utility-based cloud services to process, store, and transmit encrypted Project Files. AWS's utility-based cloud services stores data (Project File) for at least one year after data generation completes. Cowellmedi will send user an alert email one month before removing data from the server.

ANNEX E

Cybersecurity Hygiene

The INNO PLAN software does not store patient personal data, medical information, PII and non-PII data directly. All the data is stored on the user PC. User is responsible for data protection on the user side.

To protect data against loss or unauthorized use, several security mechanisms have been implemented in INNO PLAN:

Restrict user access to the storage media, operating system by setting up a strong user password;

Create a unified way of working. Installation / Upgrade of product security patches and software packages by an authorized user and/or possibly authorized HDO or Dental Lab staff.

Configure the operating system to prevent further access to the system by initiating a session lock after 10 min of inactivity or upon receiving a request from a user;

Configure the operating system to restrict the access to security features of the PC;

Use data encryption to secure Patient data, Project Files, Drilling protocols on your computer system and storage media;

Use the anonymization function to protect patient personal data if required;

Backup your data regularly and always backup before updating or uninstalling the software;

Use anti-virus software, firewall.

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ANNEX F

Implant Libraries for INNO PLAN

INNO PLAN supports COWELLMEDI IMPLANT libraries that let customers precisely plan the implantation.

STL EDITOR (FUNCTIONAL)

The Edit tools within The INNO PLAN software is a comprehensive feature that helps to effectively modify STL surfaces. It grants access to a diverse array of powerful tools and functions, enabling efficient manipulation of STL geometry.

Step 1

Click the "STL" button on the Tab panel (1).

Step 2

Pick the necessary STL object from the list of available STL (2). The selected object will be highlighted in the list.

Step 3

Left-clicking on the "Edit" button (3) beneath the list will initiate editing. After clicking the Edit button, the editing toolbar will open (5).

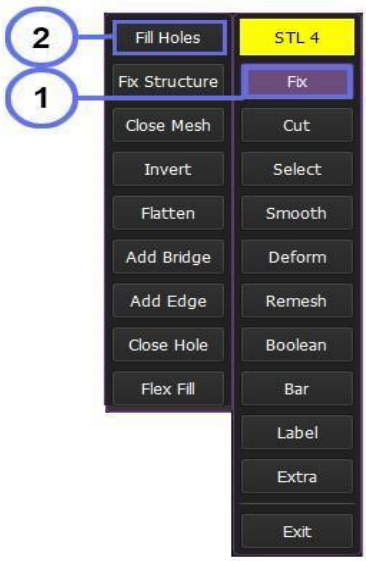
Once the Edit button is clicked, the INNO PLAN will create a duplicate STL object with the same colour (4).

Hint	All changes made during editing will be applied to this copy, and it is always possible to revert to the original object.

FIX TOOL PANEL

Step 1

Click “Fix” (1) to open the tool panel.

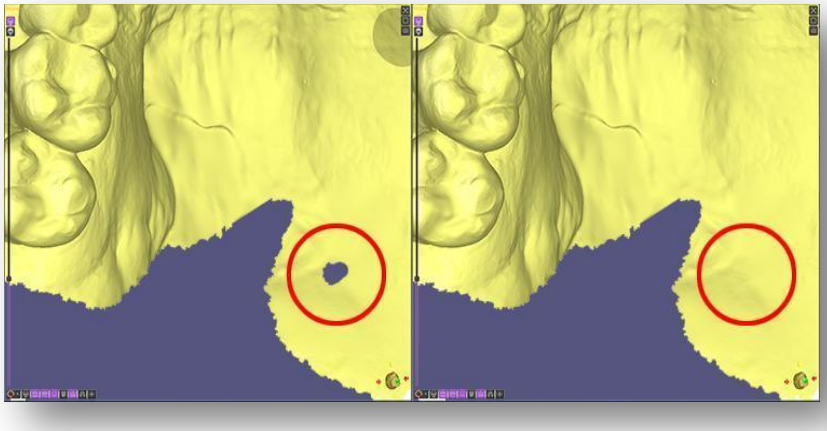


Step 2

Choose necessary instrument:

- Fill Holes

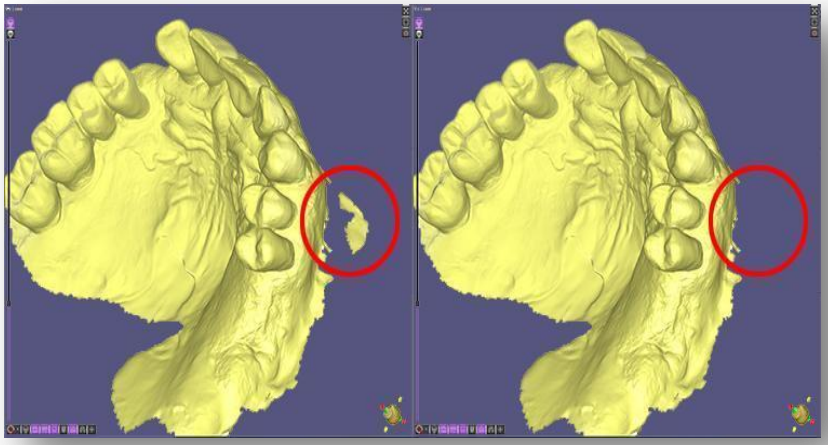
Use "Fill Holes" to fill all holes in the surface mesh and remove all small unrelated to the main object parts.



OR

- Fix Structure

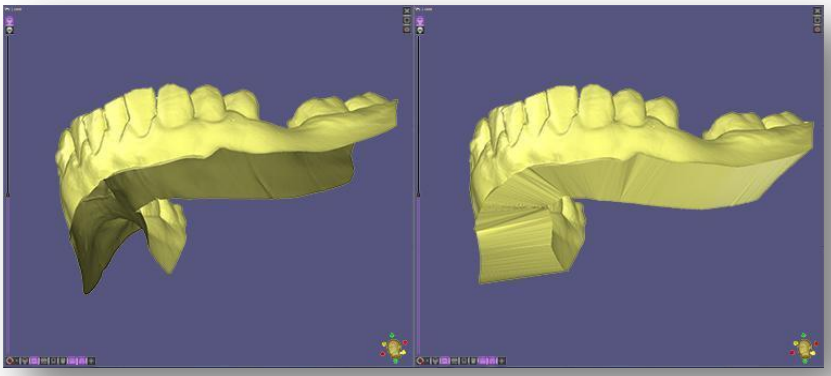
The STL file errors could be intersections between triangles and non-manifold edges.
Use "Fix Structure" to fix the intersections between triangles, and non-manifold edges.
This tool as well removes all small unrelated to the main object parts



OR

- Close Mesh

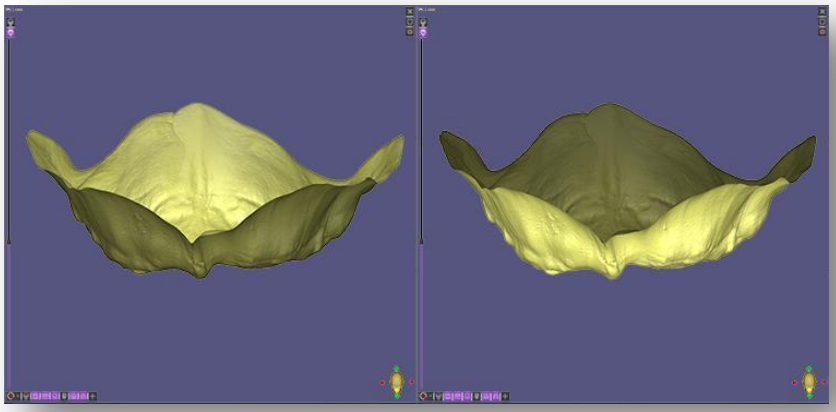
To close an open boundaries use "Close Mesh" and the software will make a new face. Non-closed mesh is detected if some edges of the STL file are not connected to only one face, this essentially means that the model has a hole and does not represent a closed surface.



OR

- Invert

Use "Invert" to reverse the orientation of all triangles on a surface.
This tool flips any triangles with inverted normals on a surface. This is helpful if an entire portion of the model has inverted normals.

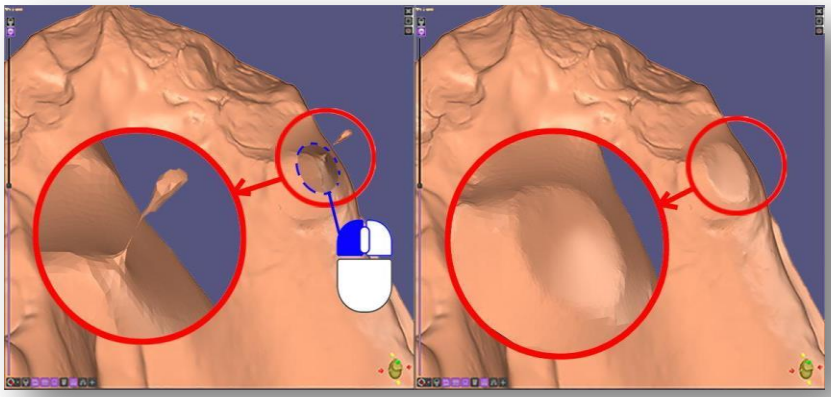


Hint	This tool is more often used when creating a surface from a prosthesis file obtained using the double scan technique.

OR

- Flatten

There are thin areas on an STL that has actual errors in its mesh that are hard or impossible to fix using "Fix Structure" or "Smooth" tools.
Point the cursor (brush) at the error area on the mesh. Change the brush size with the mouse wheel.
Click the left mouse button to blend the improved area completely into the model.



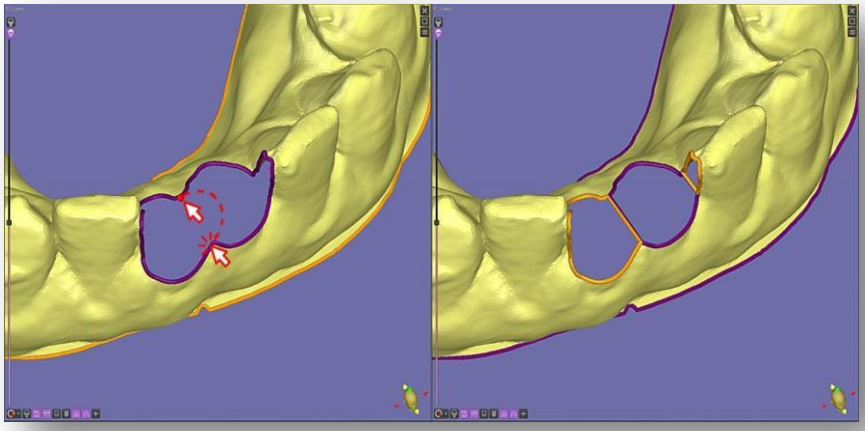
Hint	This action includes selecting, deleting and closing selected open boundaries.

OR

- Add Bridge

In case, there is a need to manually connect the gap (hole) at the surface, the "Add Bridge" tool comes in.

Use "Add Bridge" and gap (hole) boundaries will be automatically highlighted and visualized in the 3D Rendering Window.
Point the cursor and click the left mouse button at the open boundaries of the hole.



Click a position at the desired open boundaries to manually add bridging triangles.
Repeat the "Add Bridge" feature for a few areas around the perimeter of the gap (hole), and then use the "Fill Holes" tool to fill the remaining holes.

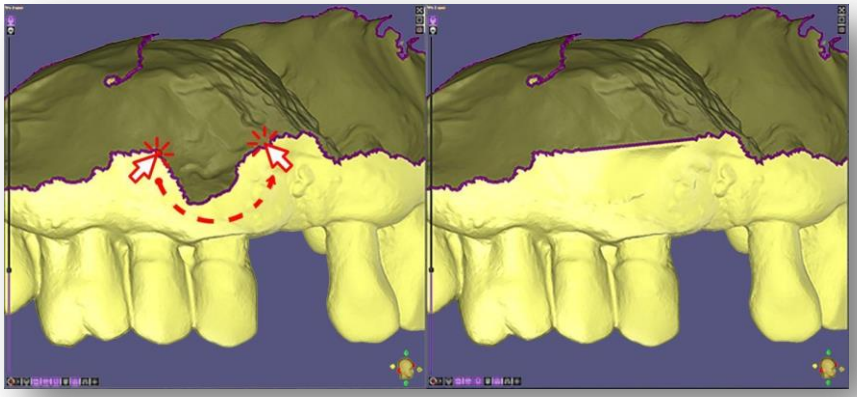
Hint	A good error prevention practice is to use the "Fix Structure" tool before repairs in order to increase and homogenize the triangulation in the area concerned.

OR

- Add Edge

This tool is very similar to the "Bridge" tool, with the only difference being that it works with open edges.

Point the cursor and click the left mouse button at the open edge of the surface
Click a position at the desired open edge to manually add triangles and make a new face.



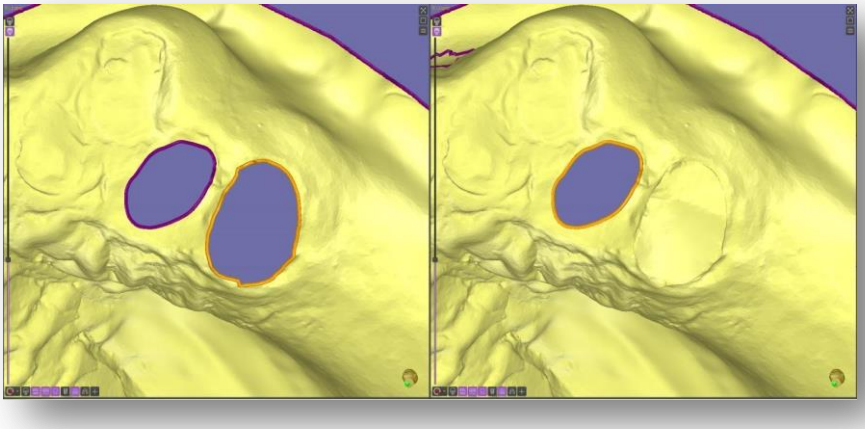
Hint	A good error prevention practice is to use the "Fix Structure" and "Fill Holes" tools before repairs in order to increase and homogenize the triangulation in the area concerned.

OR

- Close Hole

This tool is very similar to the "Fill Holes" tool, with the only difference you can choose which hole to close.

Use "Close Hole". Gap (hole) boundaries will be automatically highlighted and visualized in the 3D Rendering Window.
Point the cursor at the highlighted boundaries of the hole and double-click on it to close the mesh.



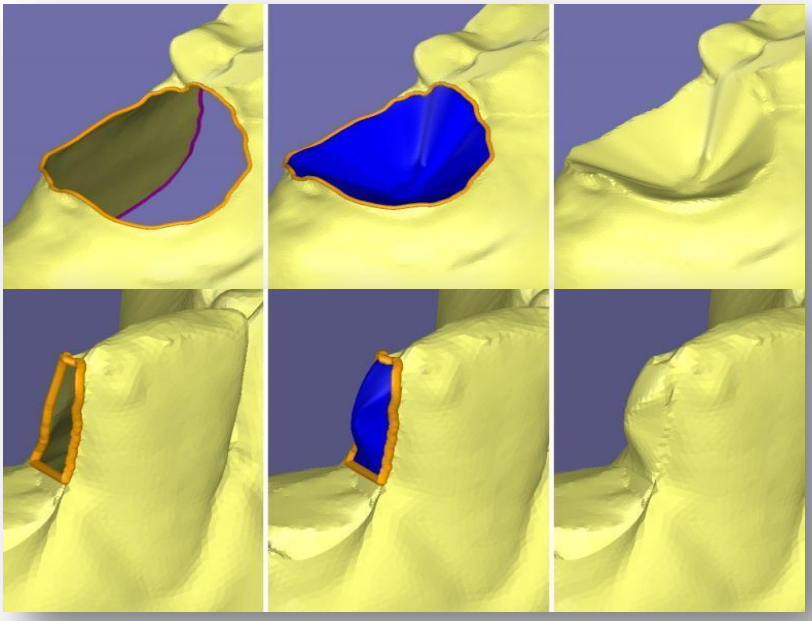
Note!	If a triangle edge does not have a valid neighbour, that edge will be highlighted to indicate a problem.

OR

- Flex Fill

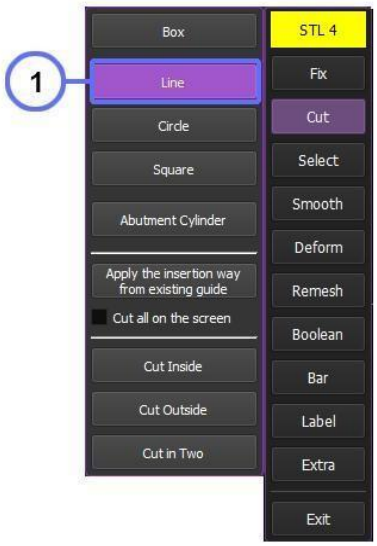
Point the cursor at the highlighted boundaries of the hole and double-click on it.

Then the software should create a blue-colored patch, and you can change the curvature of the patch by scrolling the mouse wheel, making surface concave or convex.. To close the mesh, just double-click on the patch again.



CUT TOOL PANEL

The segment of the object can be cut and split in different ways. You can select segment using Box, Line, Circle, Square, and Abutment Cylinders tools.



Step 1

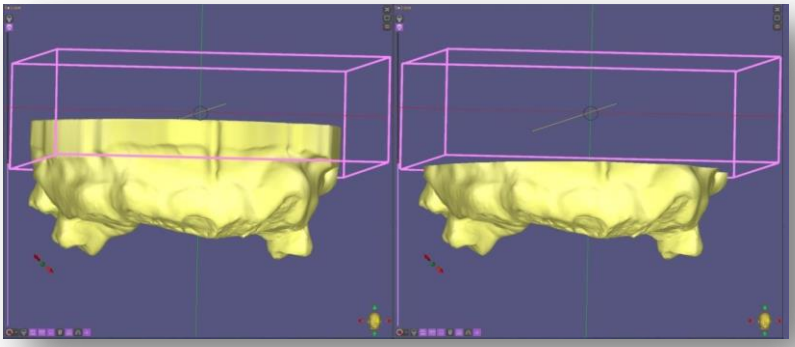
Click "Cut" (1) to open the tool panel.

Step 2

Choose cutting tool:

- Box

Set up the box position by choosing the next options:
"Below the Axial",
OR
"In the Center",
OR
"Above the Axial" to move the box along the X-axis.

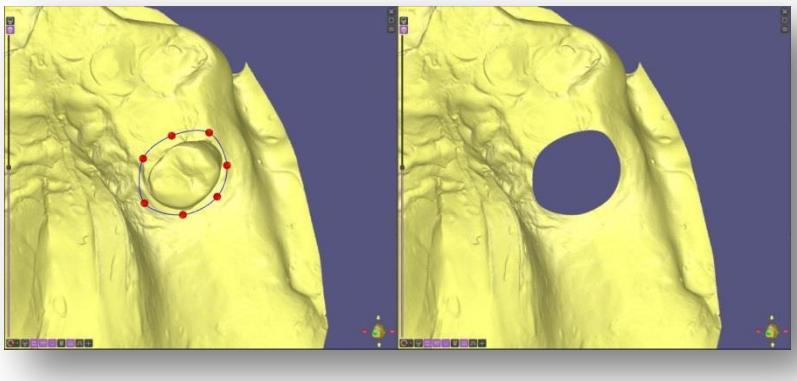


Adjust the box size. The connection between the box and coordinate axes allows adjusting the orientation of the cutting plane either in 2D windows by dragging the center of the intersection of the axes with the left mouse button or in a 3D window by using the red arrows to rotate and adjust the cutting box.

OR

- Line

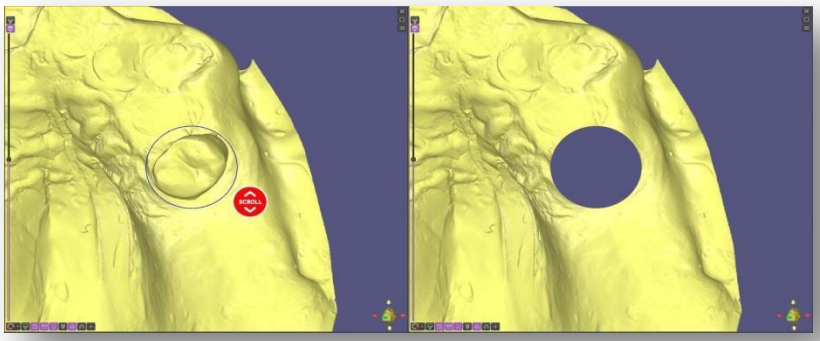
Point a freeform shape around the area you want to select with Left Mouse Button.



OR

- Circle

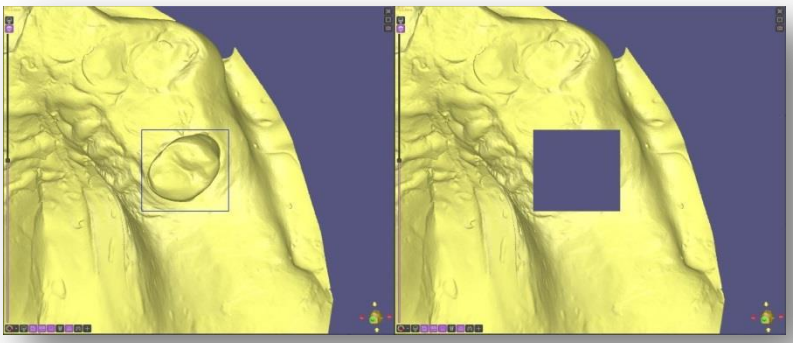
Drag a circle shape to the area you want to select with Left Mouse Button. Adjust the circle size with Scroll Wheel.
Optionally you can now either click arrows up and down or double-click the number and input a specific number adjusting the size of the shape.



OR

- Square

Drag a Square shape to the area you want to select with Left Mouse Button. Adjust the square size with Scroll Wheel.
Optionally you can now either click arrows up and down or double-click the number and input a specific number adjusting the size of the shape.



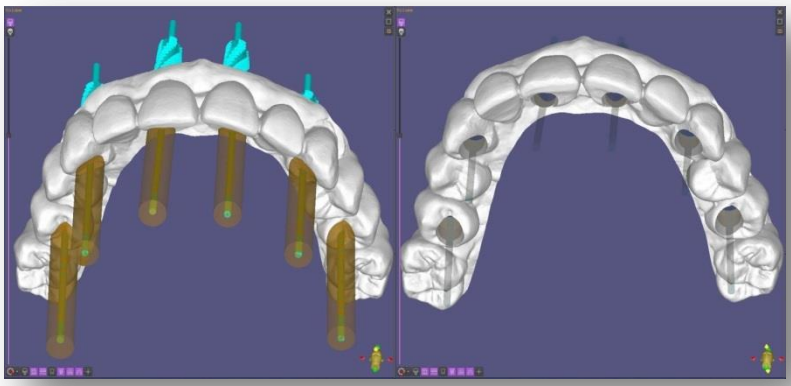
OR

- Abutment Cylinder

The Abutment Cylinder cutting tool can be used to create circular holes along the axes of the abutments.

Click "Abutment Cylinder" to visualize the axes of the implant abutments in the 3D rendering window.

Adjust the diameter and position of all cylinders.
Optionally set up each cylinder



separately - move the cursor to the desired axis and change the diameter by scrolling the Mouse Wheel.

Adjust the position of the bottom of the cylinders in the Cut tool panel.

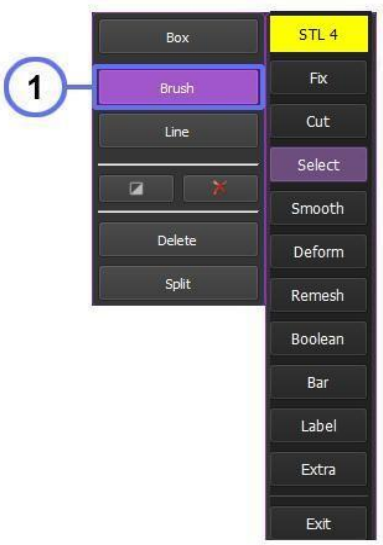
Step 3

Click either
"Cut Inside" to cut a selected segment into the box,
OR
"Cut Outside" to cut an unselected segment of the surface,
OR
"Cut in Two" to split the surface.

The "Cut all on the screen" checkbox applies the cutting shape to all visible objects on the screen.

SELECT TOOL PANEL

In the "Select" section, INNO PLAN offers several tools that can be applied directly to the mesh to select the desired area.



Step 1

Click "Select" to open the tool panel.

Step 2

Choose necessary instrument:

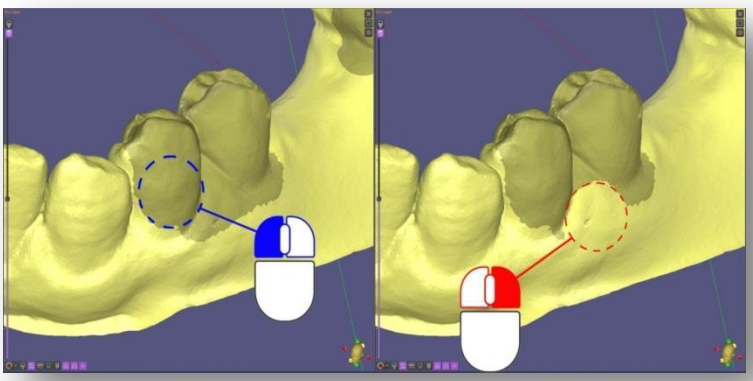
- Box

Set up the box position by choosing the next options:
"Below the Axial",
OR
"In the Center",
OR
"Above the Axial" to move the box along the X-axis.
Adjust the box size. The connection between the box and coordinate axes allows adjusting the orientation of the selecting plane in 2D windows by dragging the center of the intersection of the axes with the left mouse button. The red arrows are used to adjust and rotate the box in a 3D window.

OR

- Brush

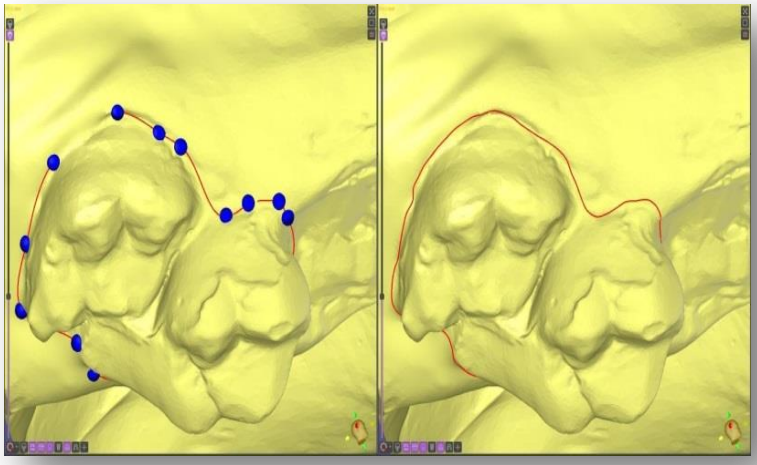
The Brush tool can be used to select an area on the STL surface.
To adjust the diameter of the Brush tool, simply scroll the mouse wheel.
To use the tool, move the cursor in the 3D rendering window, click and hold down the left mouse button while moving the brush to select the desired area. To remove the selection click and hold down the right mouse button while moving the brush.



OR

- Line. Dotted/Projected.

Click "Line" then click “Dotted” or “Projected”.
Point the cursor at the desired area on the mesh and click the left mouse button to place the first point, and then draw a line by dragging the mouse and clicking to place more points.
Double-click to close the line.
Select the Edit mode to adjust the shape of the outline, move the cursor over the line and use the available control points.

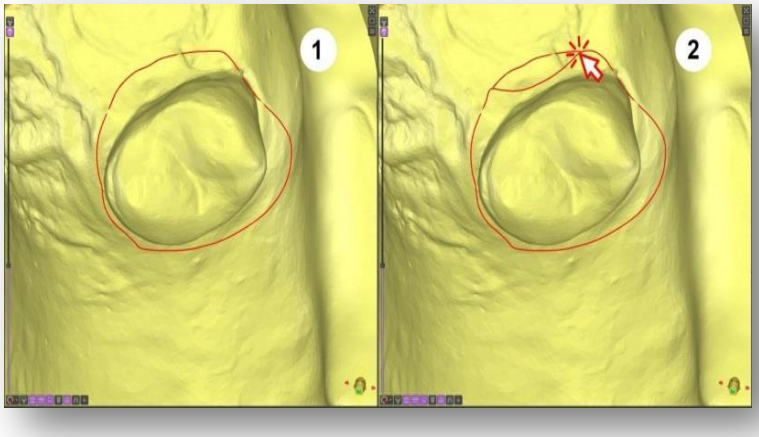


In Projected mode - the line is projected onto the STL surface perpendicular to the screen immediately at the moment of point positioning. For acceptable line drawing, ensure that the surface is parallel to the screen when the point is positioned. The next point is not set if the previous one,
due to the rotation of the STL, becomes invisible.

OR

- Line. Lasso

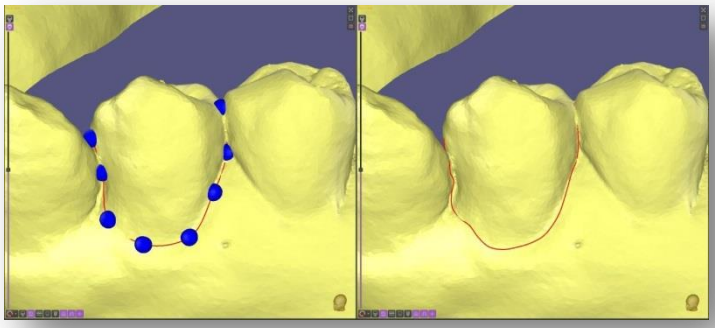
The Lasso tool is a freehand selection tool, it won’t try to predict what you want to select.
Click "Line", then click “Lasso”.
Point the cursor at the desired area on the mesh and click, hold the left mouse and drag to outline the shape of your selection on the STL surface.
Select the Edit mode to adjust the shape of the outline, move the cursor over the line and use the available control points.
Or move a mouse cursor over the line and draw an additional line outside or inside the contour to redraw and adjust the shape of the outline.



OR

- Line. Adaptive

This tool is very similar to the "Dotted" tool, with the only difference being that the software adapts the line to the edges of the triangles.
Click "Line" then click "Adaptive".
Point the cursor at the desired area on the mesh and click the left mouse button to place the first point, and then draw a line by dragging the mouse and clicking to place more points.

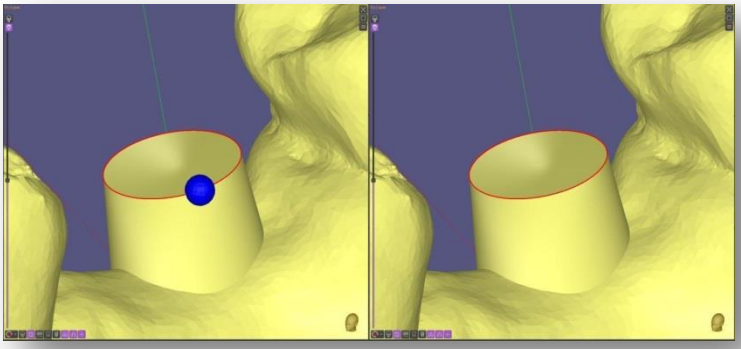


Double-click to close the line.
Select the Edit mode. Now you can move the cursor over the line and use the available control points to adjust the shape of the outline.

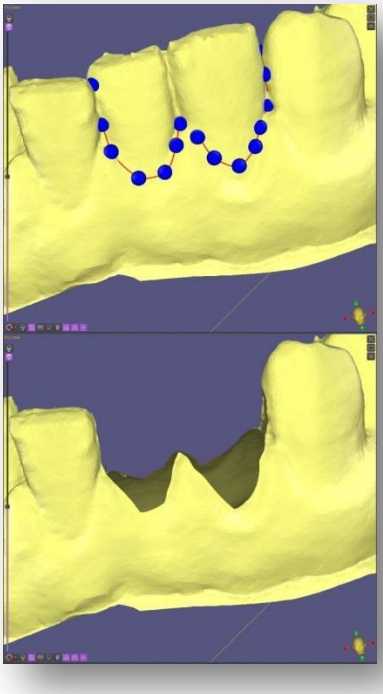
OR

- Line. Edge

The Edge tool is an automated selection tool, which means it would automatically snap to the edge of objects and try to predict what you want to select. INNO PLAN will help complete your shape by connecting small gaps between your starting point and endpoint.
Click "Line" then click "Edge".
Point the cursor at the desired edge on the mesh and click the left mouse button to place the first point, and the software automatically complete the shape.



Double-click to close the line.
Select the Edit mode. Now you can move the cursor over the line and use the available control points to adjust the shape of the outline.



Step 3

After finishing the selection, the next options are available:

- invert selected area >

- cancel the selection >

Step 4

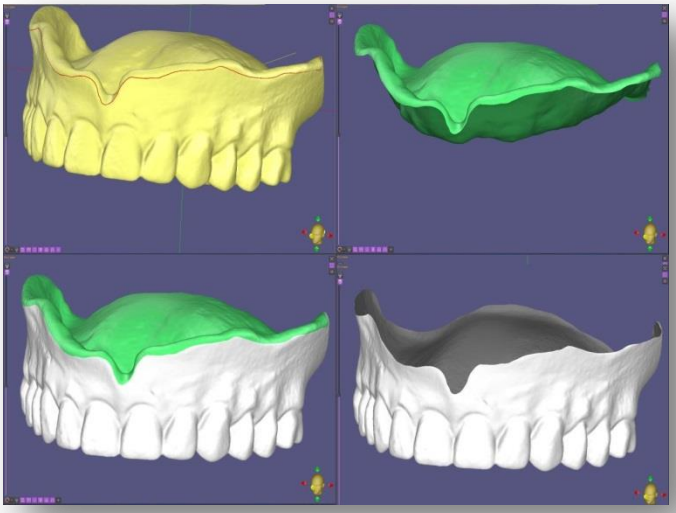
Select. Delete

Click “Delete” to cut off a selected segment of a surface into the selected area.

OR

Select. Split

Click “Split” to split an object into two objects with open boundaries along the selection line.



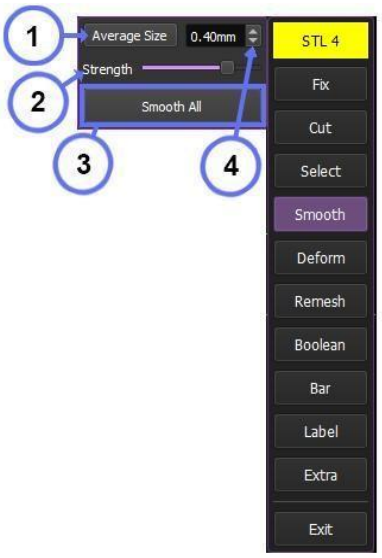
Hint	This tool is more often used when creating a surface from a prosthesis file obtained using the double scan technique.

SMOOTH

The Smooth brush matches the selected area to the curvature of the surrounding area and makes it smooth.

Step 1

Click “Smooth” in the Edit menu.



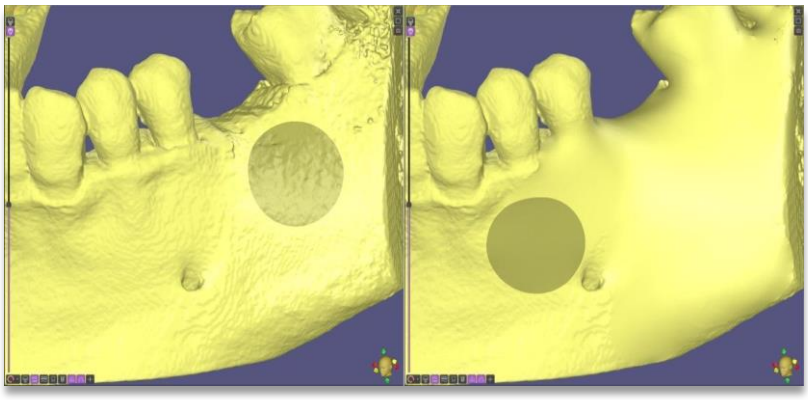
Step 2

Set
“Average Size” to get the average size of the triangle at the smoothed surface. Adjust the size yourself by entering numerical values in the corresponding window.

“Strength” to increase or decrease the smoothing intensity.

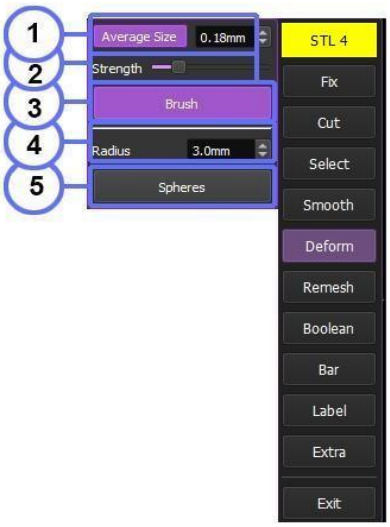
Step 3

Point the cursor and click or click and hold the left mouse button on the area you want to smooth.
OR
Click to "Smooth all" to remesh, optimize triangle count and smooth the whole surface of the object.



DEFORM TOOL PANEL

Use this function if you want to change the mesh curvature locally.



Step 1

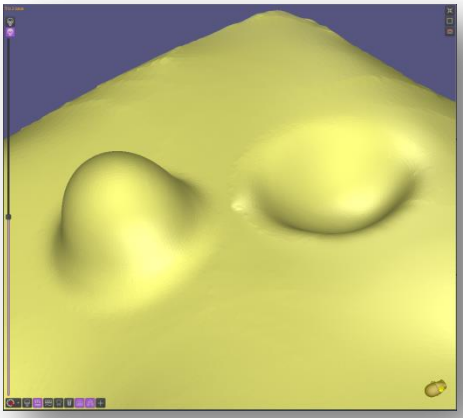
Click "Deform" in the Edit menu.

Step 2

Choose one of deform tool:

Brush

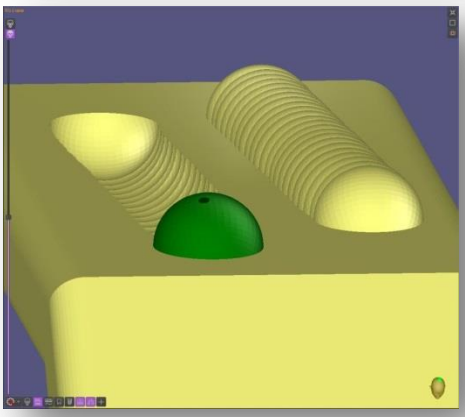
Set “Average Size” to get the average size of the triangle of the surface. Adjust the size of brush by entering numerical values in the corresponding window or adjust the brush size with scroll wheel.
Use the “Strength” slider to increase or decrease the smoothing intensity.



OR

Spheres

The sphere is a very specific brush. The center of the Sphere is always on the surface of the mesh.
Adjust the size of sphere by entering numerical values in the corresponding window or adjust the sphere size with scroll wheel.

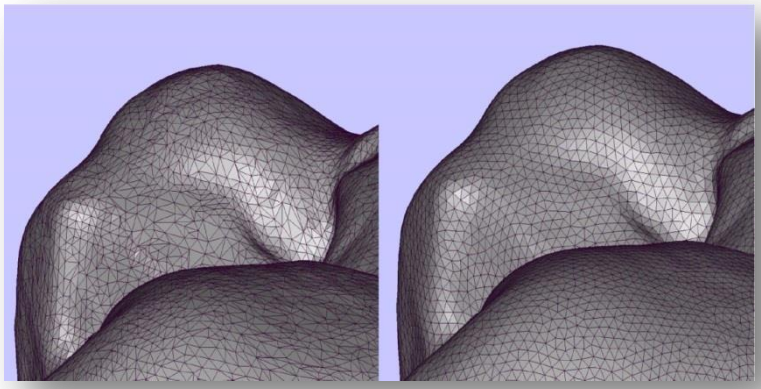


Step 3

Point the cursor at the desired area, click and hold the left mouse button on the area making it convex, or click and hold the right mouse button on the area making it concave.

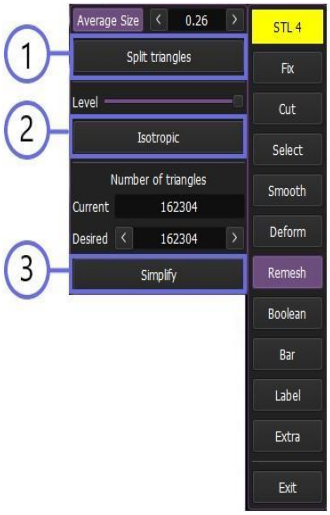
REMESH

Split triangles – is an edge split and it would insert a new vertex which decreases the length of the original long edge if it's longer than high.
The key aim for the Isotropic remeshing is to set all the triangle edge lengths to be the same and all the vertices have perfect valence.
The main benefit of this feature is the simplification of subsequent model editing.



Step 1

Click "Remesh" in the Edit tab.



Step 2

Click "Average Size" to get the average size of the triangle of the surface. Adjust the size of triangles by entering numerical values in the corresponding window.

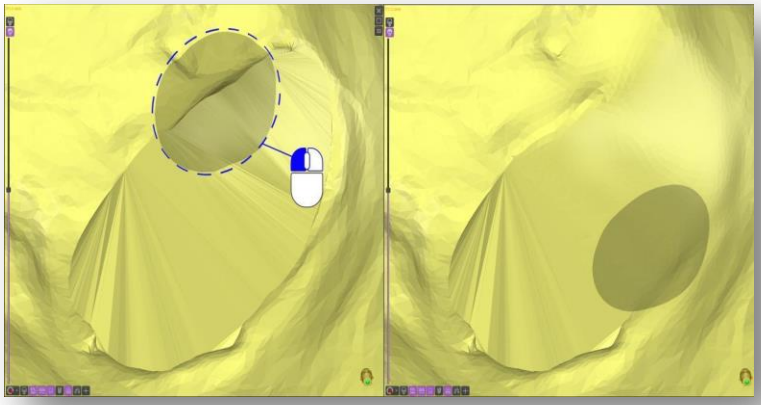
Step 3

Click
"Spit Triangles"
or
"Isotropic" to start remeshing.

Step 4

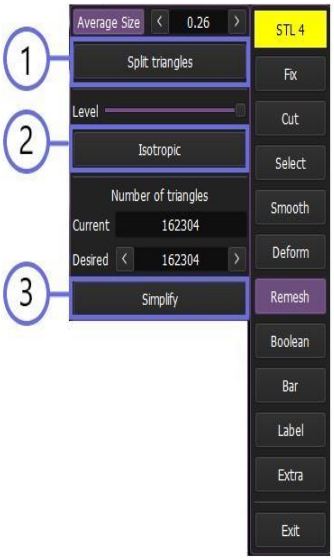
If there is a need for local remeshing, point the cursor and click and hold the left mouse button on the area you want to remesh.

Adjust the brush size with scroll wheel.



Remesh: Simplify

The more triangles in a scanned or converted STL model, the smoother the shapes of the surface will be, but also the larger the file size, the longer the editing time. Conversely, fewer triangles in an STL model means it will fix and edit faster.



Step 1

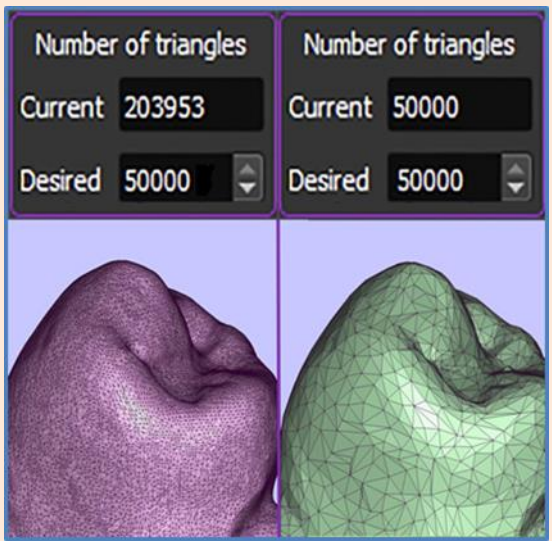
Click "Simplify" to reduce the number of triangles.

Step 2

You can now either click arrows up and down or double-click the number and input a specific number.

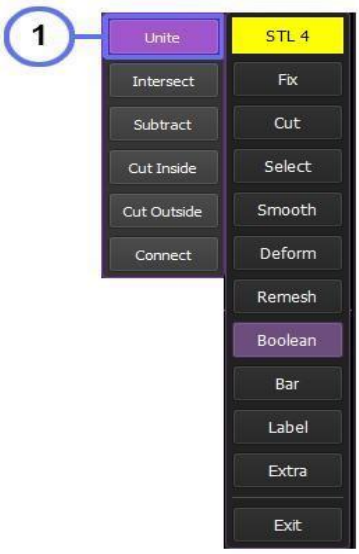
Note!

Look what happens when you drop the triangle number down from 203953 to 50000. You can still make out the basic shape of the STL object, but its smooth curves have been lost underneath a sharply-faceted surface.



BOOLEAN OPERATIONS

In STL Editing, by Boolean operations, we mean creating intersections and unions of objects, as well as subtracting objects from each other.

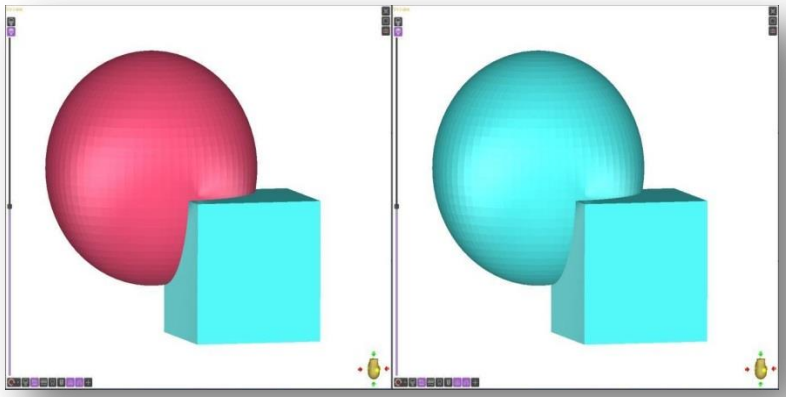


In INNO PLAN next Boolean operations are available:

Unite

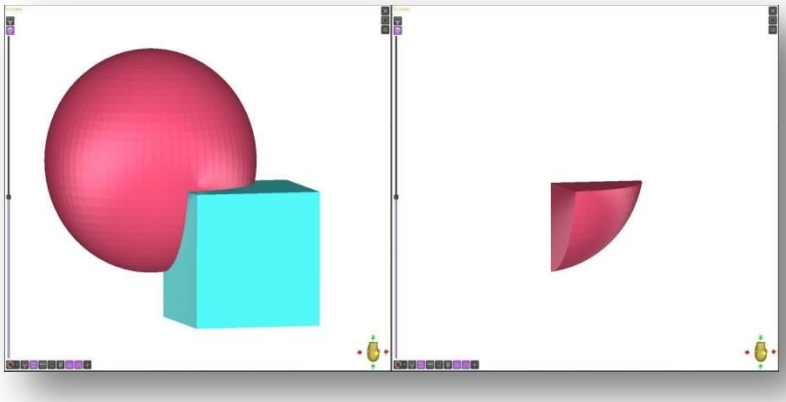
Unite is a complex algorithm that merges two objects into a single mesh.

Click "Boolean" in the Edit menu. Choose “Unite” in Boolean Tool Tab.
And then either click directly on the object you want to attach in the 3D visualization window, or on the object in the list of the STL files.



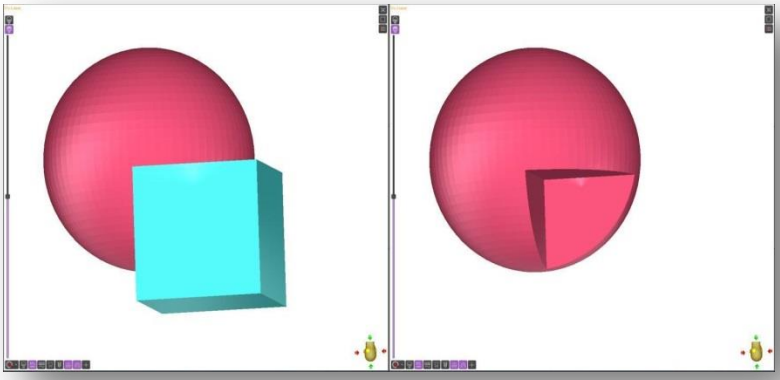
Intersect

The "Intersect" tool creates an STL object from the intersection area between two STL objects
Click "Boolean" in the Edit tab. Choose “Intersect” in Boolean submenu. And then either click directly on the object you want to intersect in the 3D visualization window, or on the object in the list of the STL files.



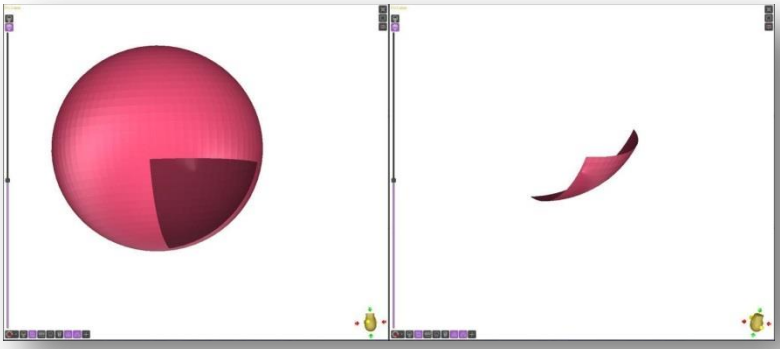
Subtract

The subtraction occurs between two objects - the chosen object is subtracted from the main initial object.
Click "Boolean" in the Edit tab. Choose “Subtract” in Boolean submenu. And then either click directly on the object you want to subtract in the 3D visualization window, or on the object in the list of the STL files.



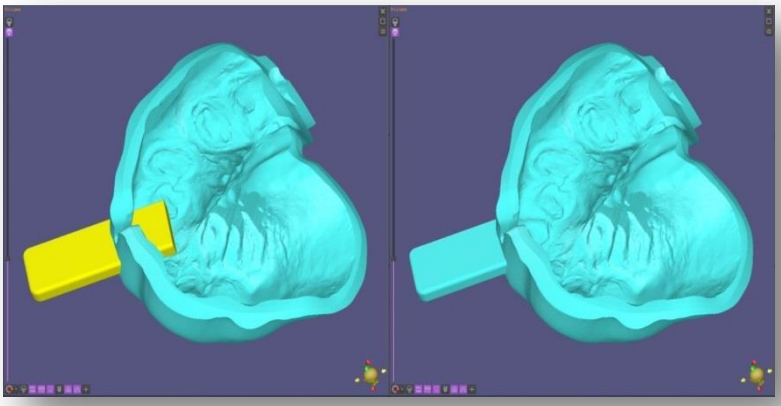
Cut inside/Cut outside

The cutting tool is used to cut the surfaces of STL objects, resulting in an opened STL surface.
Click "Boolean" in the Edit tab. Choose “Cut Inside” or “Cut Outside” in Boolean Tool Tab.
And then either click directly on the object you want to attach in the 3D visualization window, or on the object in the list of the STL files.



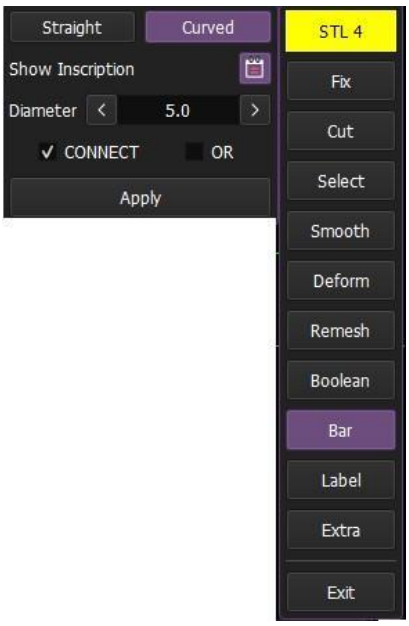
Connect

This tool is very similar to the “Unite” tool, with the only difference being that it connects only the major part of the chosen object (yellow), all intersection and minor parts would disappear.
Click "Boolean" in the Edit tab. Choose “Connect” in Boolean Tool Tab.
And then either click directly on the object you want to connect in the 3D visualization window, or on the object in the list of the STL files.



Step 1

Click "Bar" in the Edit tab.



Step 2

Set:

- Type of Bar

Straight
OR
Curved

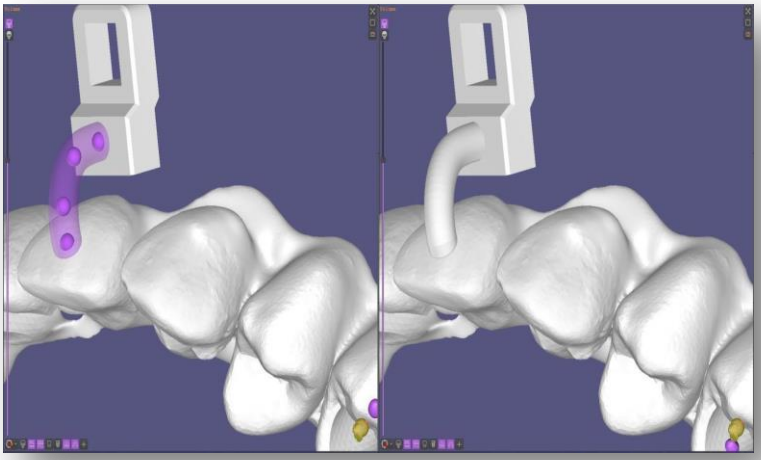
- Adjust the Diameter of bars by entering numerical values in the corresponding window.

Choose one option of constructing a bar:

CONNECT option is used to construct a bar when it does not fully intersect one or more intermediate parts of the object in its middle section. This option is also suitable for building a support bar when one or both parts of the object have thin walls.
OR
INTERSECT option is used when constructing a bar in a way that its middle section fully intersects one or more intermediate parts of the object.

Step 3

Point the cursor at the desired area, click the left mouse button and when you will move your mouse away from this point, a purple solid bar will be displayed between the initial point and the mouse cursor position, then click the left mouse button again and the software will set the bar.



Step 4

Now you can change the shape and diameter of the bar by dragging active points and scrolling the mouse wheel.

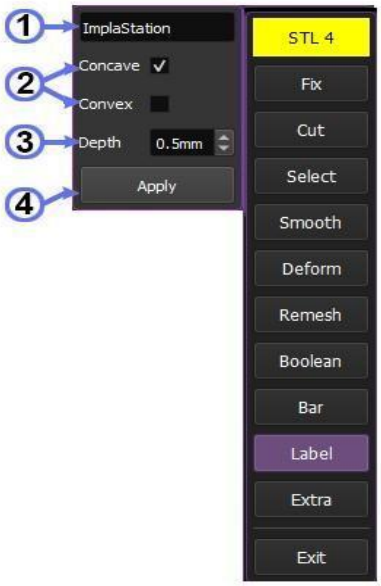
Step 5

Click Apply.

LABEL

Step 1

Click "Label" in the Edit tab.



Step 2

Type the desired text into the text field (1).

Step 3

Set:

- label design:

concave

OR

convex (2).

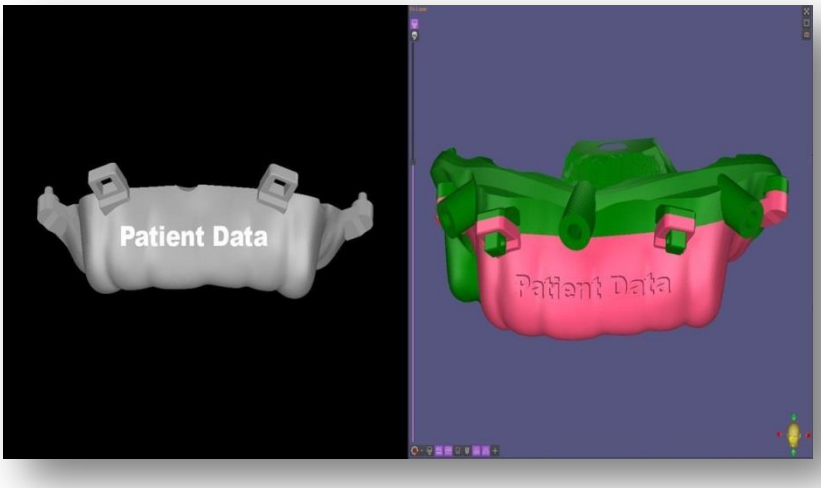
- label depth.

Step 4

Move the text to the desired position on the STL surface and click on it to set the label position.

Step 5

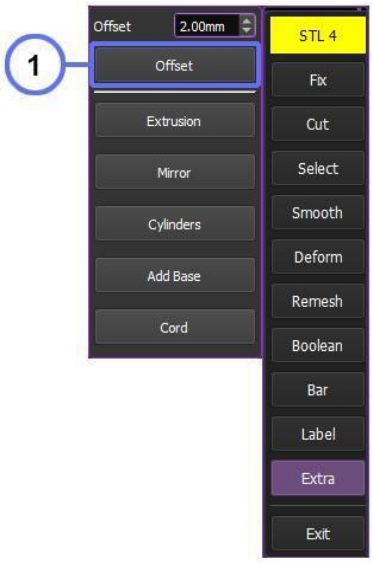
Click on Apply.



Hint	Delete a label by right-clicking on it.

Offset

The "Offset" tool expands or contracts a selected STL object by a specified amount of millimeters.



Step 1

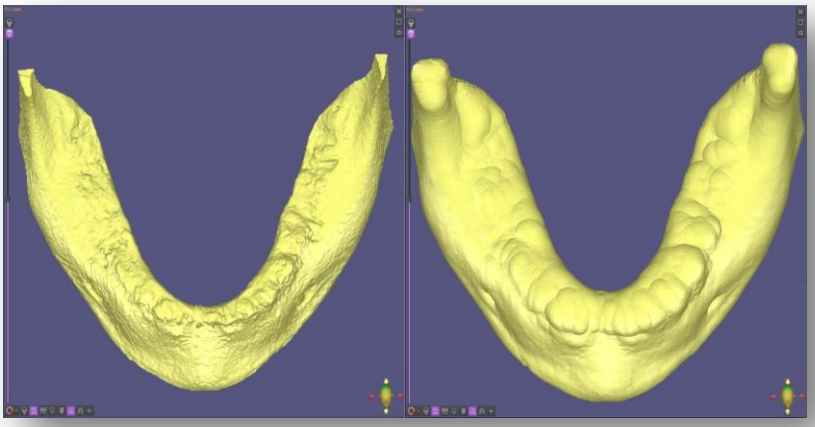
Click "Extra" in the Edit menu..

Step 2

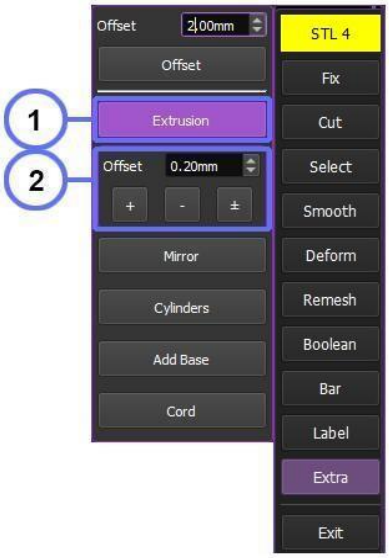
Set the numerical values in the corresponding window.

Step 3

Click “Offset”.



Extrusion



The “Extrusion” tool extrudes selected surface locally.

Step 1

Select desired area on the STL surface using the “Select” submenu.

Step 2

Click "Extra" in the Edit menu.

Step 3

Set the numerical values in the corresponding window.

Step 4

Click either

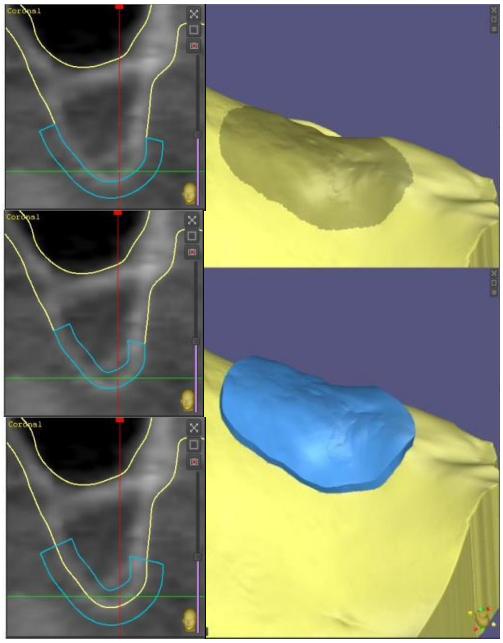
The software creates the extrusion outside of the initial surface

OR

The software creates the extrusion inside of the initial surface

OR

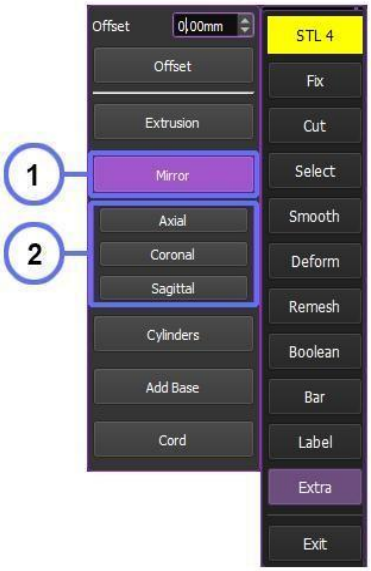
The software creates the extrusion in the middle of the initial surface



The new object will be appeared in STL list.

Mirror

The "Mirror" tool creates a mirrored duplicate of a selected object.



Step 1

Click "Extra" in the Edit menu then click “Mirror” to mirror the object along the axial, coronal, or sagittal axis.

Step 2

Choose one of plane you want to mirror relative to:

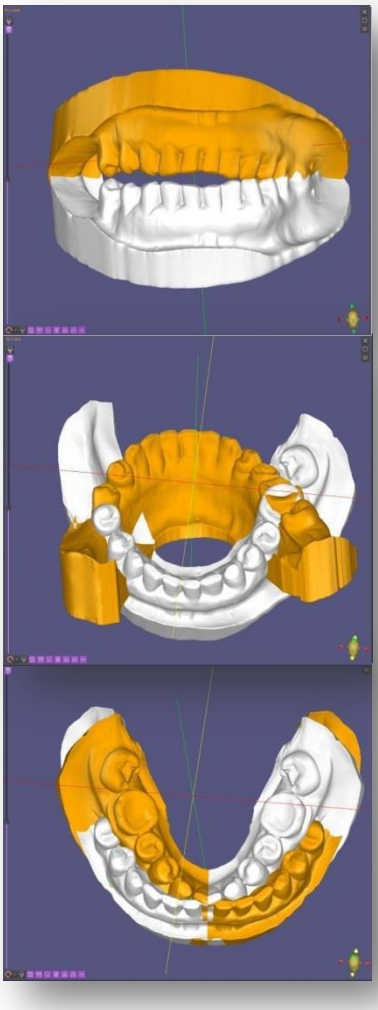
The axial (or transverse plane) is a horizontal plane dividing the object into superior (upper) and inferior (lower) sections.

OR

The coronal plane is a longitudinal plane, dividing the object into anterior (front) and posterior (back) sections.

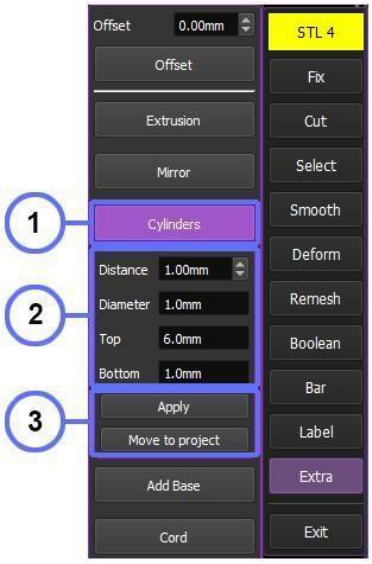
OR

The sagittal plane refers to a vertical plane that divides an object into two parts: the right and left sections.



Cylinders

The “Cylinders” tool creates a single cylinder or a group of cylinders located perpendicular to the surface plane.



Step 1

Click "Extra" in the Edit menu.

Step 2

Click "Cylinder" and set up the settings:

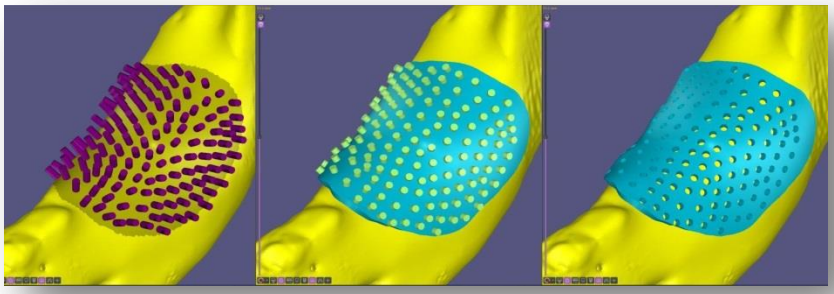
- Distance between the cylinder centers (mm),
- Diameter of the cylinder (mm),
- Top height of the cylinder above the STL surface (mm),
- Bottom height of the cylinder below the STL surface (mm).

Step 3

In the 3D rendering window, point the cursor at the desired area and then click on the STL surface to create a cylinder.

Step 4

Click “Apply” and "Move to Project" and created cylinder/s will be transferred to the project as a separate object.

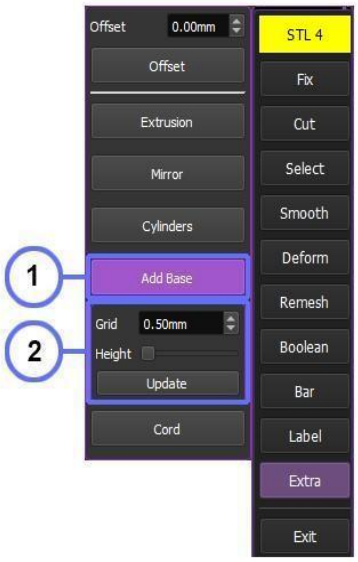


Hint

To create a group of cylinders, use the "Select" tool to select the necessary area on the STL object. After, click “Extra” and select “Cylinders”. Set up the necessary cylinder parameters and click "Move to Project" to generate the group of cylinders.

Add Base

This tool is designed to create digital models of patient scans.



Step 1

Click "Extra" in the Edit menu and Click "Add Base" to add a vertical base under the open STL surface.

Step 2

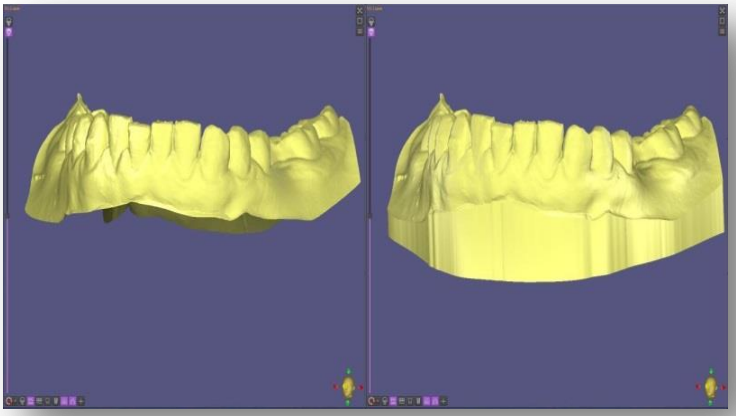
Set the necessary parameters:

- "Grid" parameter is responsible for marking the triangles on the platform. The smaller this value, the smoother the surface of the base.
- "Height" slider adjusts the height of the base.

Step 3

Click the "Update" button.

.



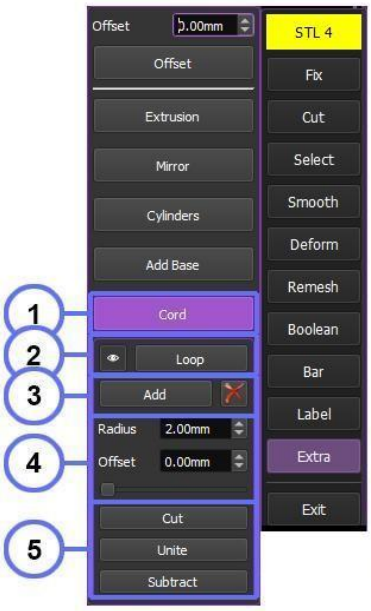
Note!	The result mimics the traditional based plaster dental model in appearance and can be easily 3D printed.

Cord

The "Cord" tool generates a round cord on the selected surface.

Step 1

Click "Extra" in the Edit menu and click "Cord".



Step 2

Set:

- "Radius" adjusts the cord's radius (mm)
- "Offset" adjusts the distance between the cord's center and the object's surface (mm). A positive value moves the cord outward, while a negative value moves it inward.

Step 3

Click "Add" to add cord and click " o delete cord.
To create a closed cord, select "Loop".

Step 4

Point the cursor at the desired area on the mesh and click the left mouse button to place the first point, and then draw a cord by dragging the mouse and clicking to place more points.
You must put at least three dots to make cord visualized in a 3D rendering window.

Step 5

Choose one of the Cord tool.

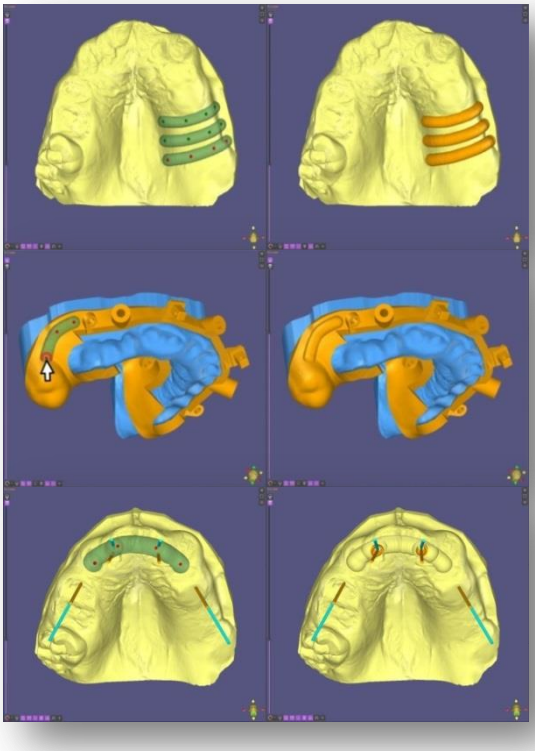
"Cut" to remove the part of the cord located inside the STL object.

OR

"Unite" to unite the cord with the STL object.

OR

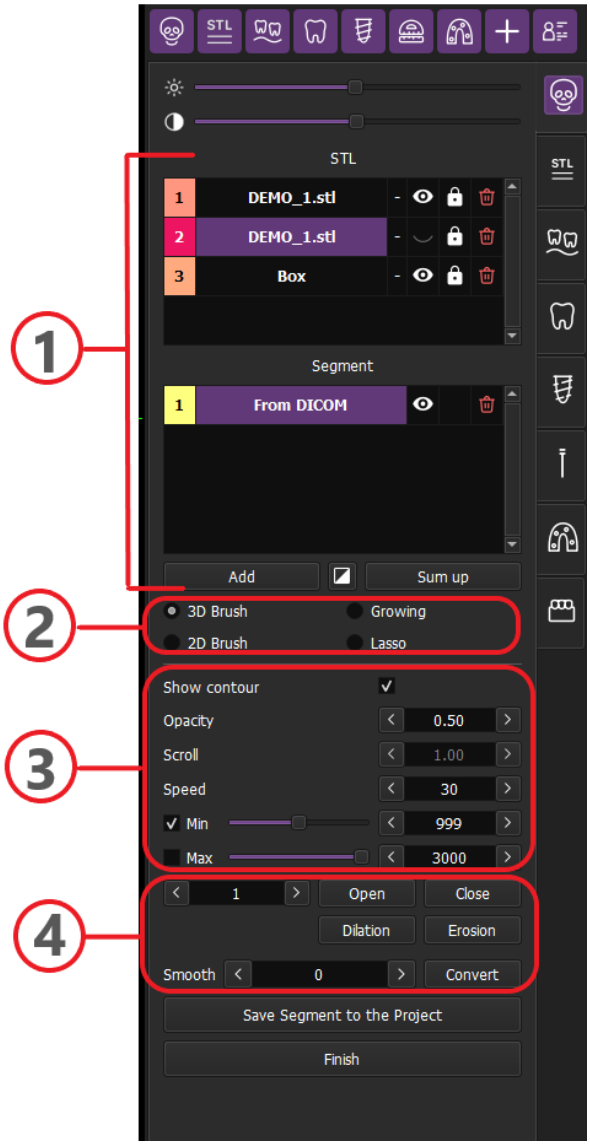
"Subtract" to subtract the cord from the STL object.



ANNEX H
Segmentation tools

The Segmentation tools enable the creation and editing of *textures* based on CT data, followed by STL conversion, which imitates both hard and soft tissue models. All segmentation tools are aimed at editing the matrix (texture).
Essential tools:
- Group control of matrix elements depending on DICOM optical density.
- Local control of matrix elements depending on DICOM optical density.
- 2D and 3D tools for removal of inner and outer shells.

SEMENTATION MENU



1 Data structures

2 Local Editing tools

3 Auxiliary controls

4 General Editing Tools

Step 1

To initiate the process, click on the “Convert to Surface” button in the DICOM tab.

Step 2

Set the region of interest (ROI) (see section 5.3 DICOM to STL Conversion).

Step 3

Click the "Continue editing" button to open Segmentation Editor.

Step 4

Use general editing instruments
Fill in the number of voxel layers to input field and click on necessary button.

Open to reduce and subsequently add selected edge voxel layers by a specified number indicated in the digital window .

OR

Close to involve adding and then reduce the selected edge voxel layers by a specified number indicated in the digital window.

OR

Dilation to add the selected edge voxel layers by the number specified in the digital window.

OR

Erosion to reduce the selected voxel edge layers by the specified value in the digital window.

OR

Smooth to determine the level of surface smoothing applied to the STL texture during its conversion.

Note!	General Editing tools work when the texture is unlocked.
Note!	It`s recommended to star work with General tools first, and continue with Local editing tools

---

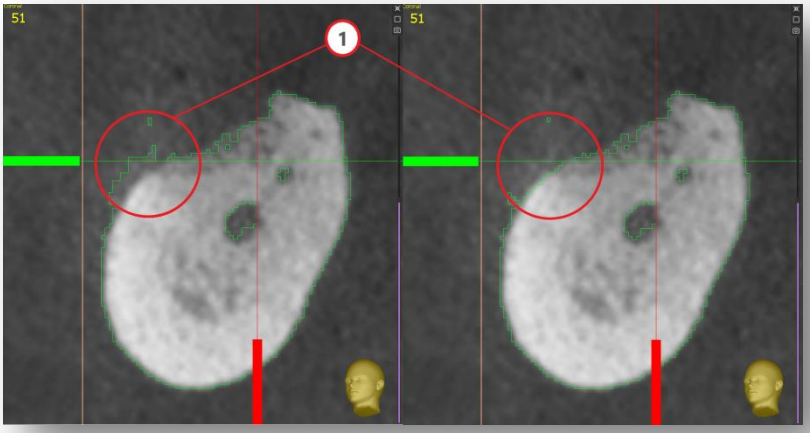
Step 5

Use the local editing tools

3D Brush

The *3D Brush* enables localized (by sphere) adjustments to the ROI threshold level. The cursor is presented as a circle (2D visualization of the sphere), and which diameter can be modified by scrolling while the right mouse button is held.

Left-click to decrease the local threshold within the spherical area, and right-click to increase the threshold.

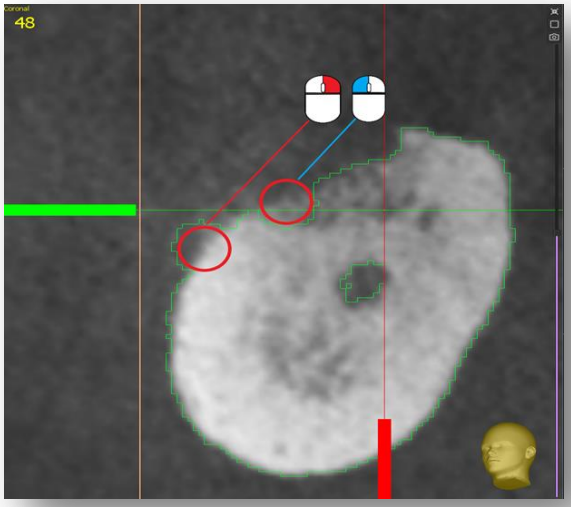


OR

2D Brush

The 2D Brush allows for the local modification of texture within a flat circular area in MPR mode slices. The diameter adjustment functions in the same way as the 3D Brush tool. The texture fill cursor circle appears when the left mouse button is pressed. Actions performed within this circle modify or apply the texture accordingly. The texture within the circle is erased when the right mouse button is pressed.

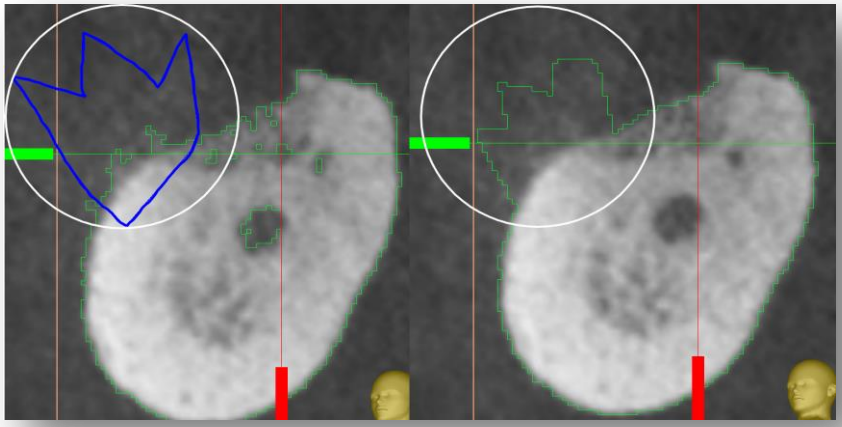
In "Smart" mode, pressing "Ctrl" button smoothly and gradually changes the texture within the specified cursor zone.



OR

Lasso

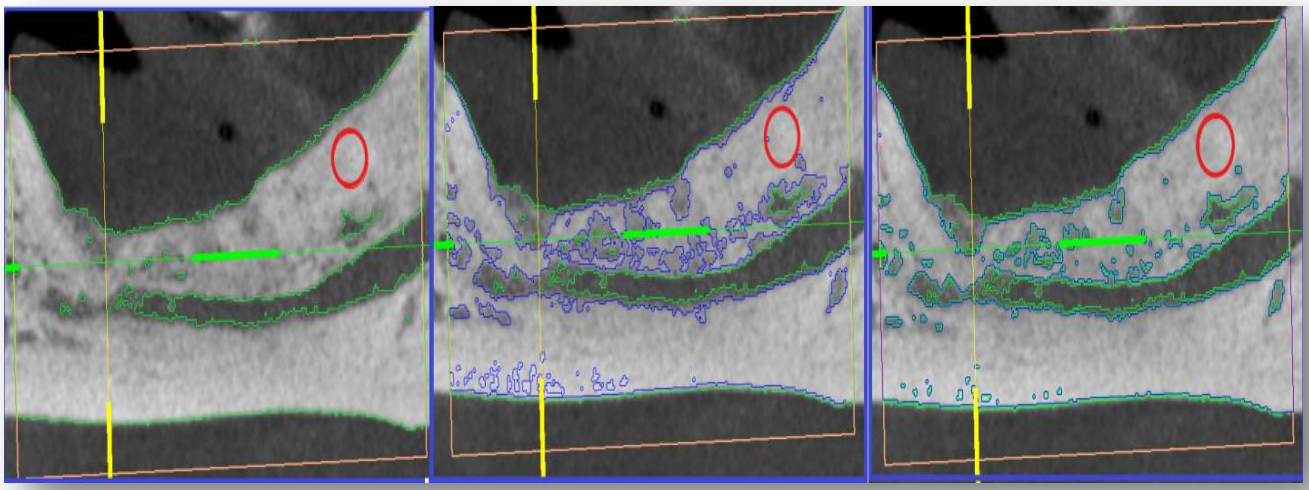
The Lasso tool provides a quick and accurate way to select textures and regions of interest, including any connected closed texture areas outside the captured region, ensuring that the desired areas are included in the selection.



OR

Growing

The Growing mode allows the selection of a volume of voxels with a specific optical density indicated by a circle-shaped cursor, and which diameter can be modified by scrolling while the right mouse button is held.
The left click attaches voxels within the optical density range of the sphere's voxels to the sphere's volume using the bounding principle, marked in blue. The optical density level of the selected area is adjusted by scrolling + Shift, and the volume of the selected area is adjusted by scrolling + Ctrl (use it for unlocked texture). To lock the selected array left-click outside the ROI box. Right-click to reverse the process erases the selected voxels with similar editing capabilities.



Note! Customize the segmentation using Auxiliary controls.

Step 6

Complete the segmentation process using

1 "Convert" button converting the edited texture to an STL surface. If there are multiple volumes in the texture list, the active texture will be converted.

If the texture needs additional editing after conversion, the program applies additional editing and converts the texture again.

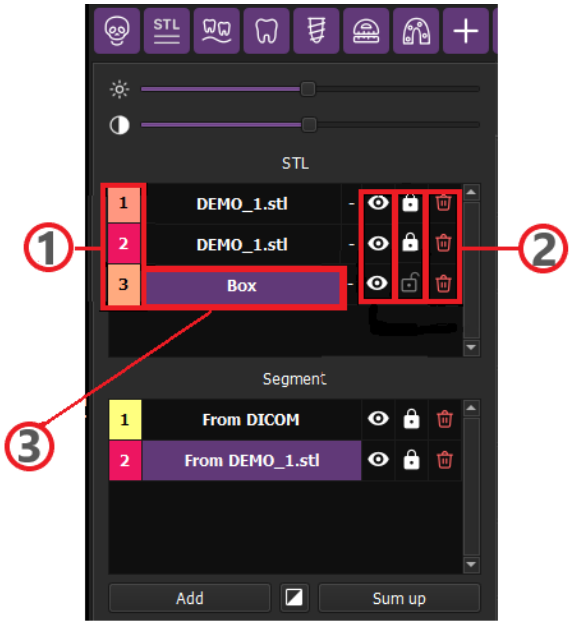
2 "Save Segment to the Project" button transferring the satisfactory result of the conversion to the STL list.

DATA STRUCTURES

Data structures encompass both STL objects and textures organized into lists. There are two lists: one for STL surfaces and another for textures.

1. STL

The STL list includes all project STL objects and the object named “Box”. STL object can be converted to texture by dragging the surface from STL list to Texture list (see Annex H.Hotkeys).



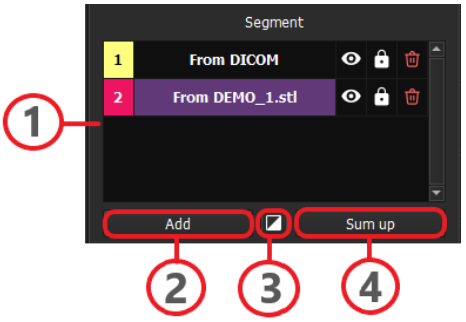
1 Color indicator

2 Buttons for toggling the visualization, locking, and deleting of the STL surfaces

3 The "Box" STL surface visualizes the Region of Interest facets and designed as square visible in MPR

2. Segment list

Segment window includes a list of textures and additional buttons. The list of textures displays all the defined segments that can be edited. Additional textures can be added using the corresponding buttons or by dragging from the list of STL files (See Annex H.Hotkeys). Segments can also be constrained within the STL object (See Annex H.Hotkeys).
To activate a necessary texture, click on its name in the list. The control buttons in the texture list function similarly to the buttons in the STL list.



1 Segments list

2 Add button

3 Invert button

4 Sum up button

Additional buttons

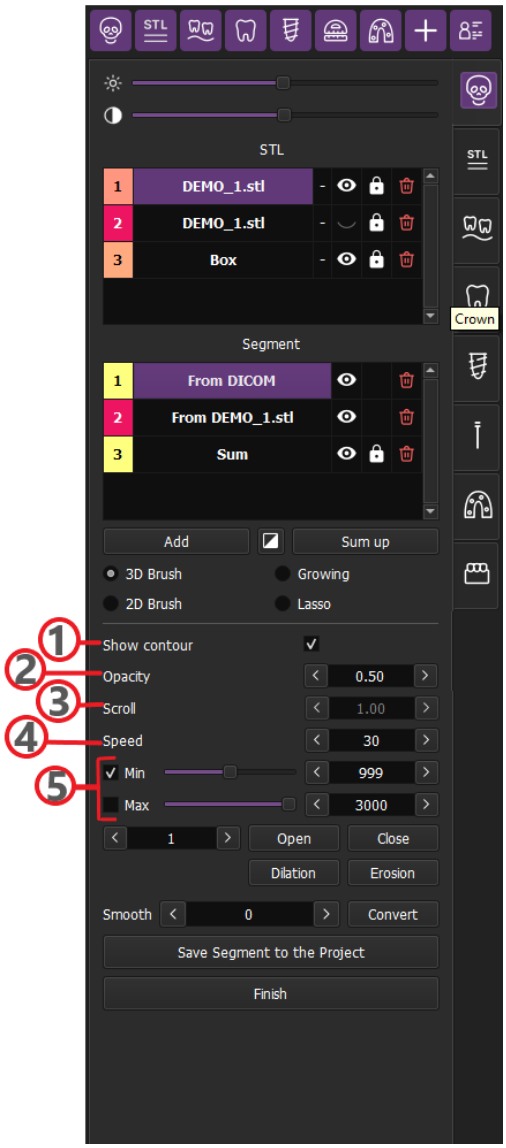
Add
Add tool is used to include additional textures. Left-clicking on the "Add" button initiates the insertion of a new region of interest. Move, resize, or rotate the purple box to define the boundaries of the future texture. Click the "Add" button again when the new area is defined.

Note!	The texture selection will be limited to the original area of interest, regardless of the resulting box's size.

Invert
Invert tool is used to reverse the voxels of an active texture.

Note!	The "invert" works when the texture is unlocked.

Sum up
Sum up tool) is used to sum up or subtract textures. Left-click the “Sum up” button, select the rows of textures involved in the process, and press "+" or "-". The resulting texture will be shown in the texture list as a new line



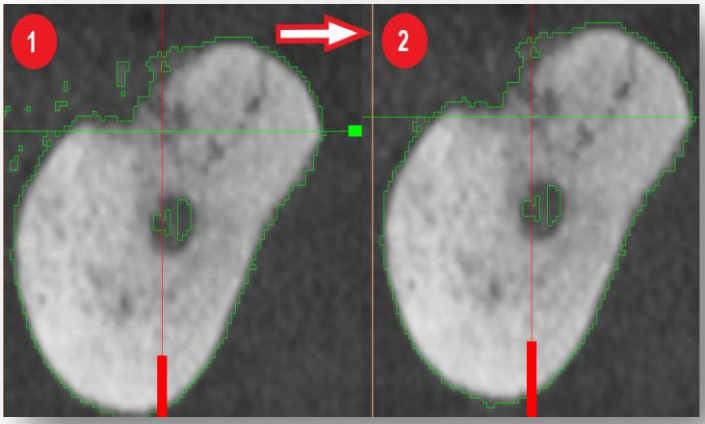
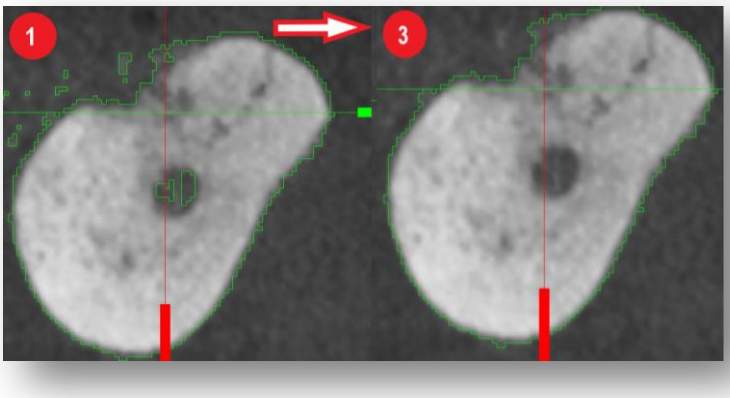
1 Show Contour checkbox toggles the visualization modes for the selected zone in 2D slices. It allows you to choose between two options: displaying the entire array with a color indication or representing the array as a contour. The color indication is shown in the texture table and can be modified if needed.

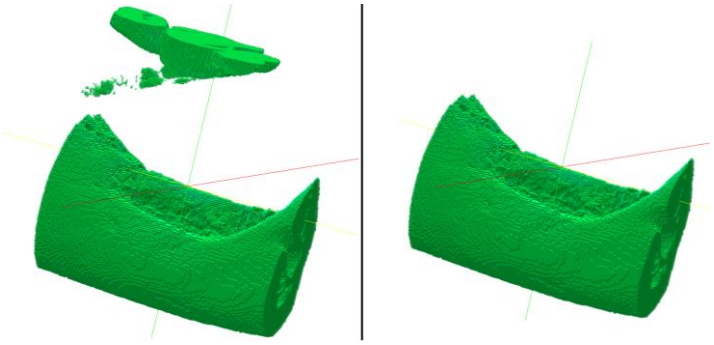
2 Opacity allows for the adjustment of the transparency level of the selected area.

3 Scroll adjusts scrolling discreteness for panorama mode and rotated slices, controlling the level of granularity when navigating through layers and rotated slices. Isn't applicable in MPR mode.

4 Speed allows to adjust the rate at which the optical density level changes. This feature is active in the 3D Brush and 2D Brush modes, specifically in the "Smart" mode. It is also active when adjusting the optical density level of a grown zone in "Growing" mode.

5 "Min" and "Max" controllers are intended for general or local change of the minimum and maximum optical density threshold. Checkboxes of these controllers determine which of the thresholds will be changed when working with 3D Brush, 2D Brush Smart mode, and when adjusting the optical density level of the grown zone in the Growing mode.

Shortcuts	Functions
When the cursor is in the slice window	
Pressing of the needed figure (1-9)	 1 - leaving one largest object. 2 - keeping the two largest objects 3 - the largest three objects are left. 4-9 - leaving the largest objects in the texture volume.
Shift + Scroll	Changing the optical density level of a single slice (with the unlocked texture)
"Enter" button	 Selection of the closed texture areas in the current slice

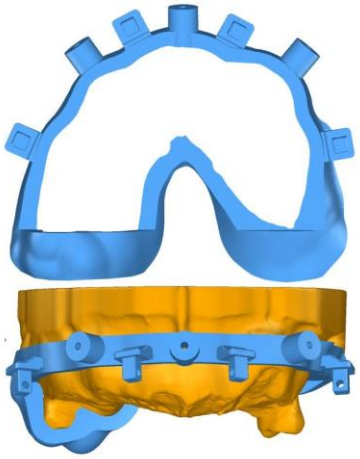
When the cursor is in the rendering window	
Pressing of the needed figure (1-9)	1 - leaving one largest object. 2 - keeping the two largest objects 3 - the largest three objects are left. 4-9 - leaving the largest objects in the texture volume. 
Shift + Scroll	Changing the optical density level of a single slice (with the unlocked texture)
"Enter" button	Selecting the closed parts of the texture in the texture volume.
Modifying operations	
Backspace	Cancellation the operation
Shift + Left mouse button	Rotation of the slice window
Shift + Right mouse button	Scaling the slice window
Ctrl +	Operation of the 2D Brush in "Smart" mode: smoothly and gradually changes the texture within the specified cursor zone.

Alt + function	Optimizing work in MPR mode with local editing tools. After scrolling and locally editing the desired texture layers, pressing Alt + N (where N is a number from 1 to 9) saves the N largest texture parts, including unedited slices of the series, and highlights closed sections.
Dragging the necessary STL line to the empty part of the texture table	Conversion the STL to the texture
Dragging the needed STL line to the necessary texture line	Restricting texture selection to an STL contour. Required condition - the closed contour of the STL, or closed contour of any STL with the ROI box
Slice numbering	The number of MPR slices on each axis depends on the size of the ROI box and the selected Grid Size dispersion.
Buttons to lock the result	
"Convert" button	Converting the edited texture to an STL surface u If there are multiple volumes in the texture list, the active texture will be converted. If the texture needs additional editing after conversion, the program applies additional editing and converts the texture again.
"Save Segment to the Project" button	Transferring the satisfactory result of the conversion to the STL list.
"Finish" button	Exiting from the Segmentation editor. The unsaved segment will be lost.

CHAPTER I STACKABLE SURGICAL GUIDE COMPONENTS

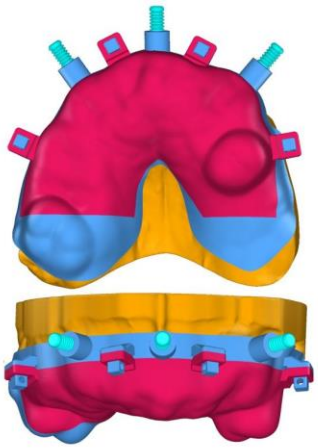
FIXATION BASE

The Fixation Base's initial function is bone reduction. The upper edge of the Fixation Base is created to indicate the level to which the bone needs to be reduced. The second function of the Fixation Base is to support the components: Osteotomy Guide, Carrier Guide, PMMA, Ceramic or (Provisional) Prosthetic.



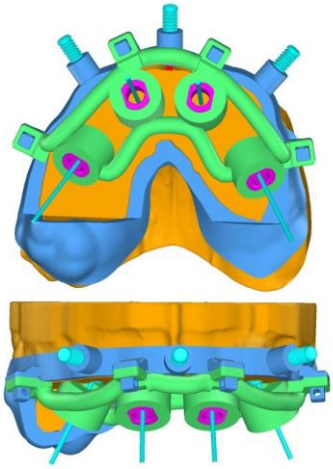
PIN GUIDE

Pin Guide's only purpose is to deliver the Fixation Base and maintain its position while the fixation pins are set.
Dentate Pin Guides seat on the teeth are verified via revision windows and ensure the surgery starts in the correct position. With edentulous patients, the Pin Guide will seat exactly like the denture and verify the bite and ultimate tooth position.



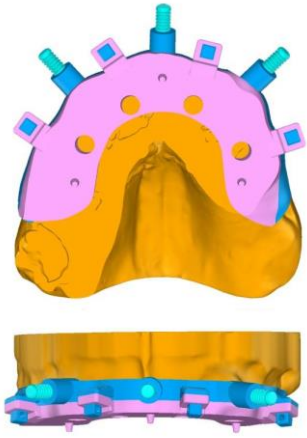
OSTEOTOMY GUIDE

Osteotomy Guide controls the implant depth, trajectory, and indexing (rotation) during osteotomy creation. It seats into the Fixation Base and is fixed using Locks.



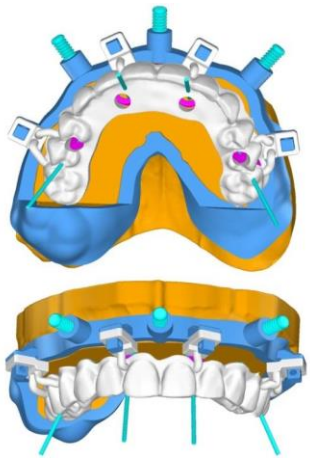
CARRIER GUIDE (OPTION)

One function of the Carrier Guide is to serve as a tissue gap between the top of the bone reduction to the bottom of the Prosthetic. The Carrier Guide remains in the mouth through the prosthetic conversion. The two or three clear plastic pegs on the Carrier Guide deliver the prosthetic in the proper position as planned.



PROVISIONAL PROSTHETIC, PRINTED TRY-IN

The Provisional is a strong and esthetic prototype for the final restoration. It is designed for immediate load and extended use. The Provisional is delivered the day of surgery and remains in use until the final prosthetic delivery.



CHAPTER II

SOFTWARE FUNCTIONAL

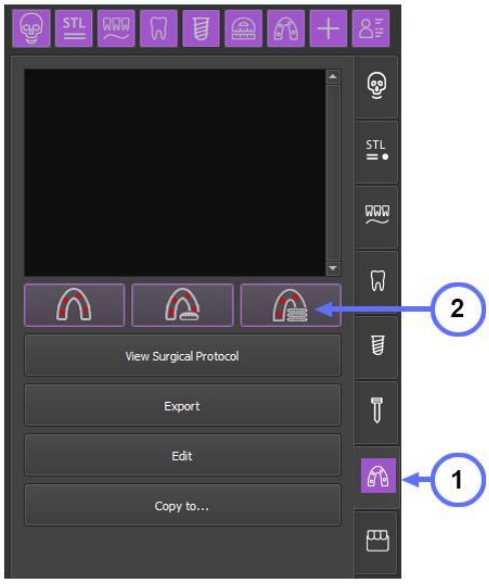
You can create surgical stackable guides with INNO PLAN if the beta version of the software is uploaded and activated on your computer.

This chapter describes how to create a stackable surgical guide using the step-by-step workflow.

Preparation Step

Click "Surgical Guides" (1) in the Tab Panel menu to open the tab.

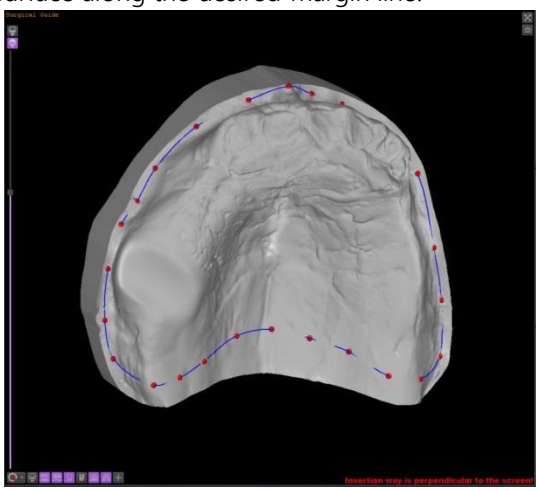
In this window, click "Make Stackable Surgical Guide" (2) to open the surgical guide settings menu.



Step 1

Initiating Surgical Guide Design

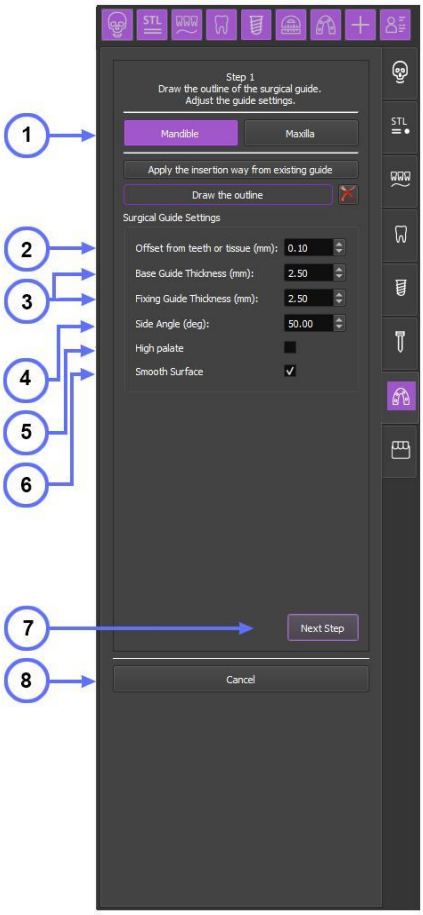
Define the borders of the surgical guide by clicking the scanning surface along the desired margin line.



Then double-click to close a surgical guide margin line.

Now you can move points on a margin line by dragging and moving them with your mouse.

Using the surgical guide settings menu, you can define settings for the surgical guide and its representation in the 3D-rendering view.



Select a surgical guide insertion direction - Mandible/Maxilla (1).

Use the Guide Offset (mm), Thickness (mm), Side angle (deg) settings to define the design properties of the surgical guide (2, 3, 4).

Select "High palate" if the palate is unusually high and narrow (5).

Select "Smooth Surface" for smoothing the top of the guide surface (6).

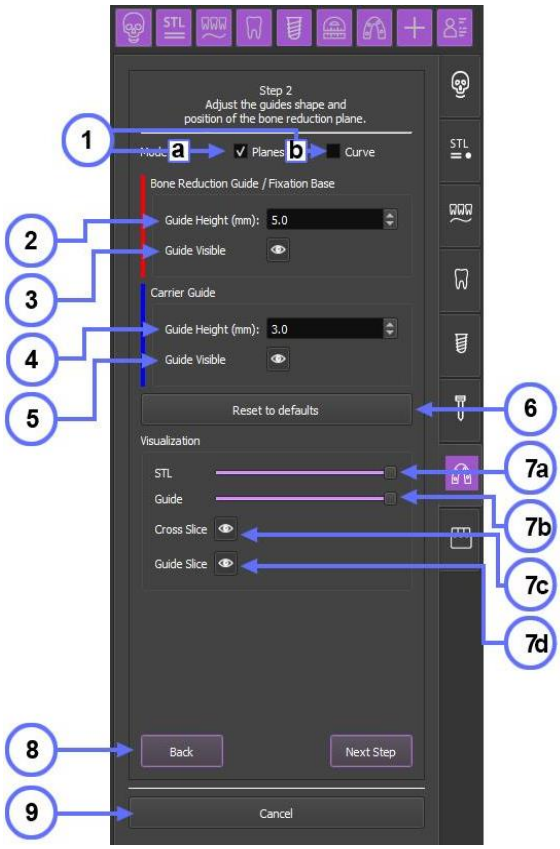
In Step windows, clicking "Next Step" saves the settings for this work step and takes you to the next step (7).

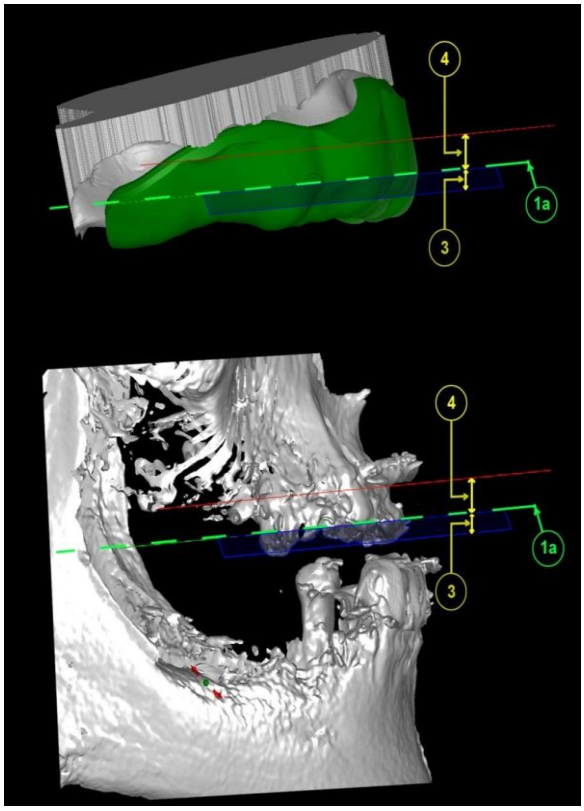
Clicking "Cancel" closes the window but discards all settings specified since you have started the step (8).

Step 2
Plane Settings

Using the Fixation base, Bone reduction Guide, Pin guide and Carrier guide settings menu for the surgical guide:

Select a Bone reduction guide surface design – “Planes” or “Curve” (see Top Figure -1a,b and Down Figure 1a);
Use the “Guide Height” settings to define the height of the Fixation Base (see Down Figure -3 and Top Figure - 2);
Show/hide the Fixation Base plane by clicking the checkbox (see Top Figure 3);
Use the “Guide Height” settings to define the height of the Carrier guide (see Down Figure - 4 and Top Figure - 4);
Show/hide the Carrier Guide plane by clicking the checkbox (see Top Figure - 5);
You can also reset the default values for the Fixation base height (5 mm) and Carrier guide height (3 mm) (see Top Figure - 6);
Use the sliders "STL" and "Guide" transparency to define the STL and Guide surface opacity (see Top Figure - 7a, 7b);
Show/hide the Cross Slice plane by clicking the checkbox (see Top Figure - 7c);
Show/hide the Guide Slice plane by clicking the checkbox (see Top Figure - 7d);
In the Step window, clicking "Back" returns you to the previous step (see Top Figure - 8);
In Step windows, clicking "Next Step" saves the settings for this work step and takes you to the next step;
Clicking "Cancel" closes the window but discards all settings specified since you have started the step (see Top Figure - 9).



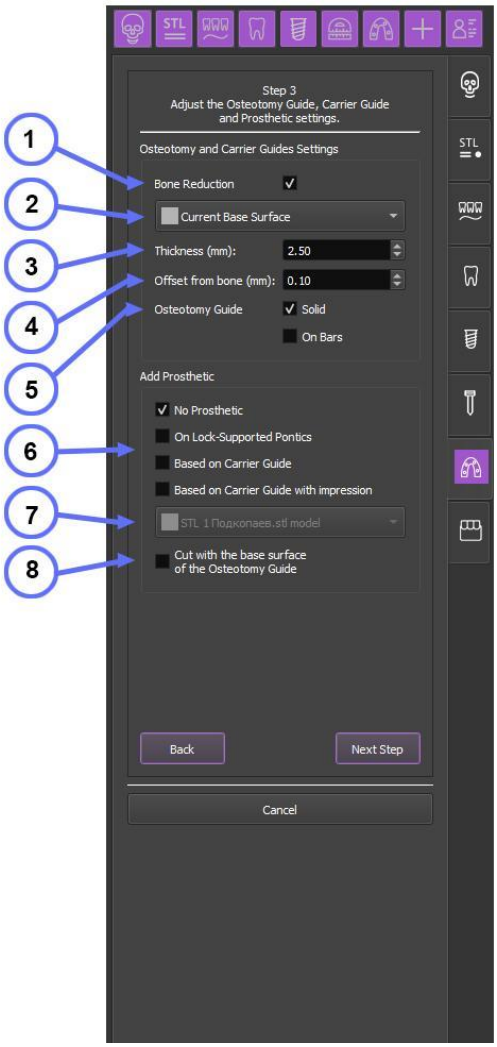


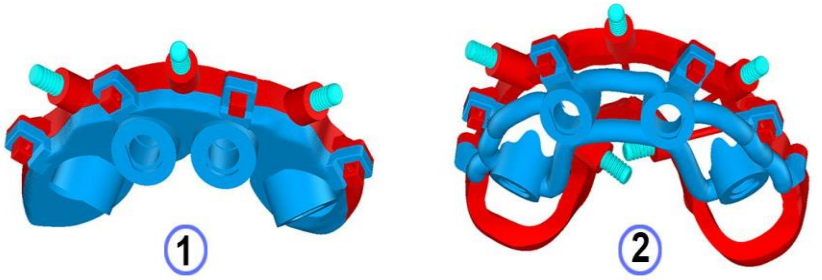
Step 3
Osteotomy guide, Carrier guide and Prosthetic design settings

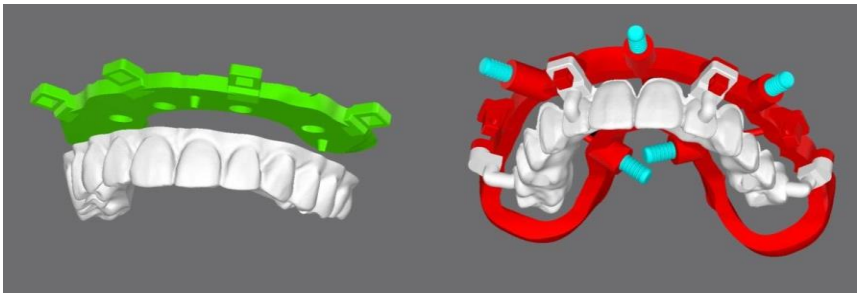
Using the Osteotomy guide / Carrier guide / Prosthetic settings menu for the surgical guide:
If you want to use the bone reduction option select the "Bone reduction" checkbox (see Top Figure - 1);
Select the surface you will use for the osteotomy guide from the list of the STL (see Top Figure - 2);
Use the "Thickness (mm)" settings to define the thickness of the Osteotomy guide (see Top Figure - 3);
Use the "Offset from bone (mm)" settings to define the offset from bone for the Osteotomy guide (see Top Figure 4);
Select the desired Osteotomy guide type using the two checkboxes "solid" (see Top Figure 5 and Down Figure - 1) and "on bars" (on lock-supported pontics (see Top Figure - 5 and Down Figure - 2).

Select the desired Prosthetic type using the corresponding checkboxes (see Top Figure - 6);

Select the surface you will use for the prosthetic from the list of the STL (see Top Figure - 7);
Select the checkbox and the prosthetic will be cut off automatically and will be based on the position and shape of the surface you selected in the Bone Reduction settings, when finalizing the surgical guide design (see Top Figure - 8);
In Step windows, clicking "Next Step" saves the settings for this work step and takes you to the next step;
Clicking "Cancel" closes the window but discards all settings specified since you have started the step.

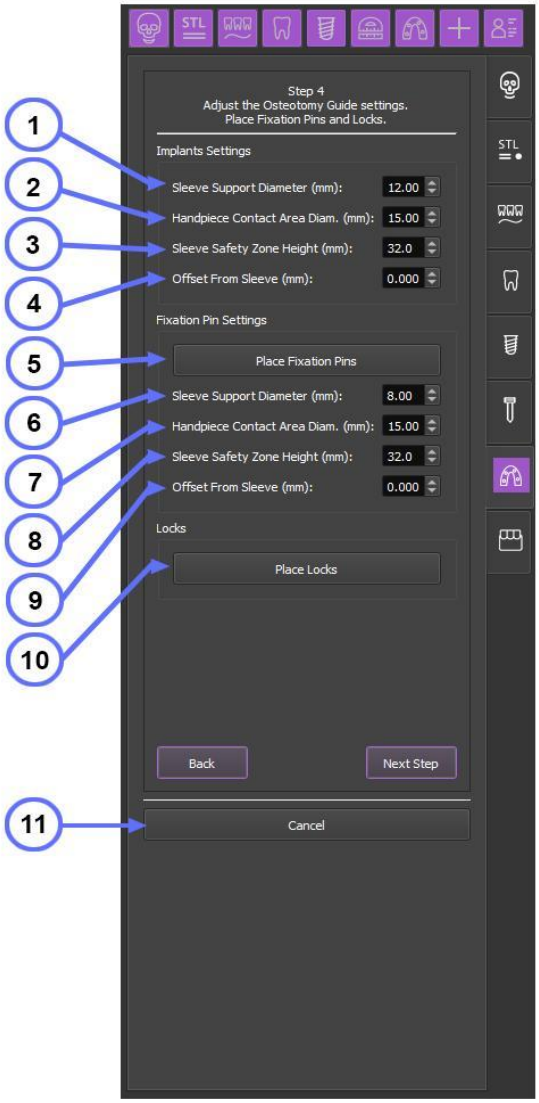






Step 4
Implant-supported and Pin-supported area settings

Using the Implant-supported and Pin-supported area settings menu:



Use the "Sleeve support diameter (mm)" settings to define the diameter of the implant sleeve support (1);

Use the "Handpiece contact area diameter (mm)" settings to define the diameter of the contact area (2);

Use the "Sleeve safety zone height (mm)" settings to define the sleeve safety zone height of the implant sleeve support (3);

Use the "Offset from sleeve (mm)" settings to define the offset between the sleeve and the inner surface of the implant sleeve support (4);

In this step, you define the pin position. (5) Select and refine the pin position by moving and/or rotating the pin (see INNO PLAN Instruction for Use);

Use the "Sleeve support diameter (mm)" settings to define the diameter of the pin sleeve support (6);

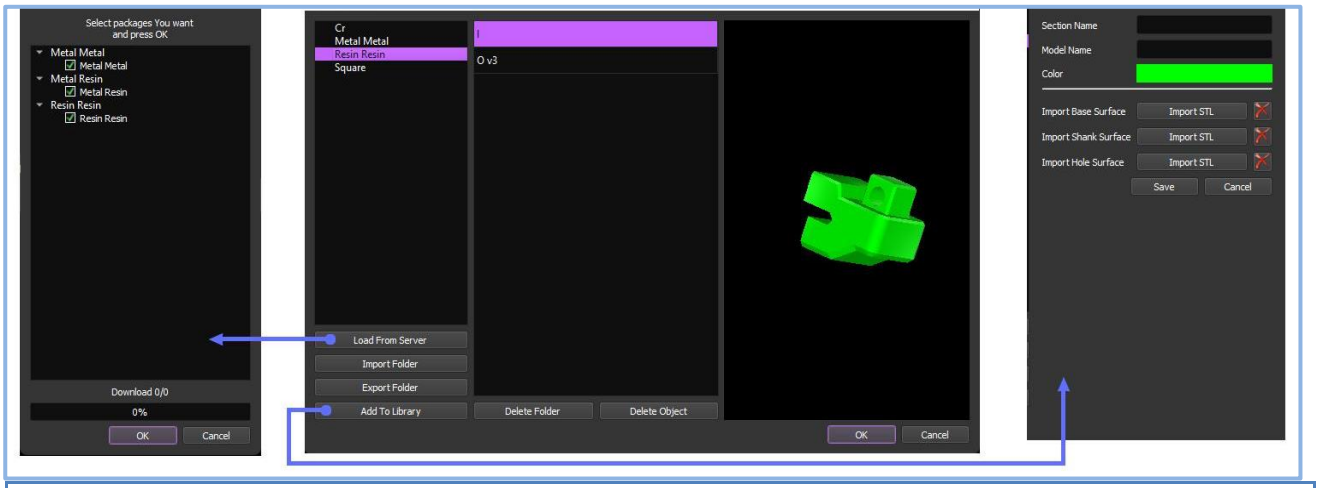
Use the "Handpiece contact area diameter (mm)" settings to define the diameter of the contact area (7);

Use the "Sleeve safety zone height (mm)" settings to define the sleeve safety zone height of the pin sleeve support (8);

Use the "Offset from sleeve (mm)" settings to define the offset between the sleeve and the inner surface of the pin sleeve support (s9);

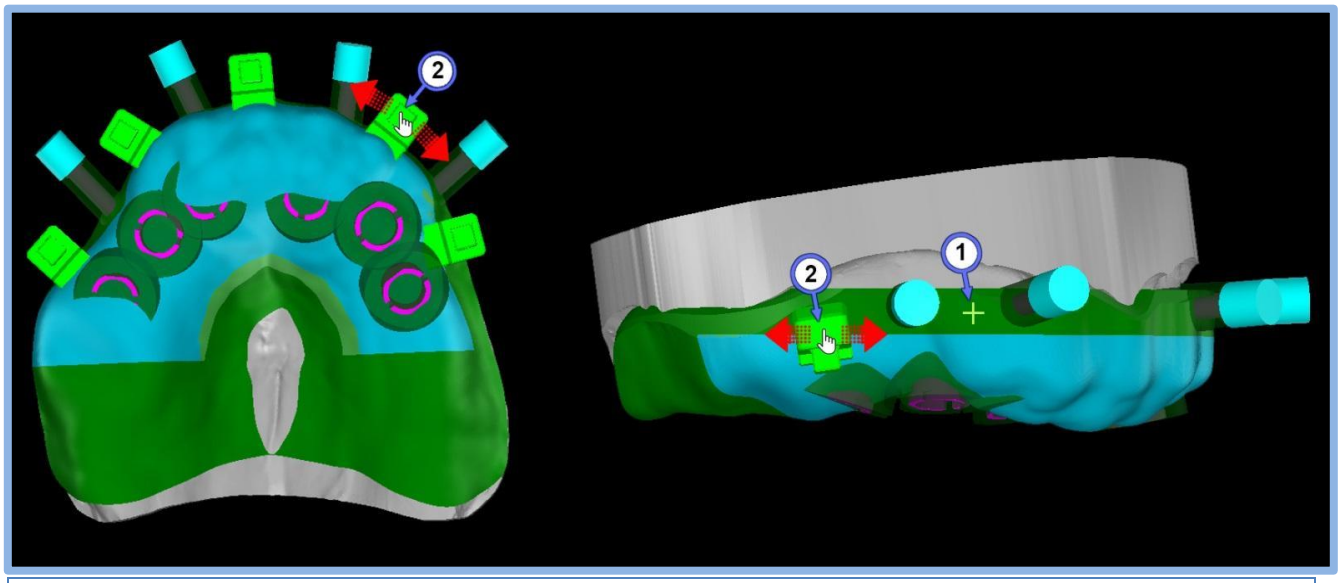
Select (10), place (1) and refine the lock position by moving the lock (2);

Using the "Locks" menu you can load the different types of locks.
Click “Load From Server”, select checkbox and click OK. Use “Add to library” button to add a custom STL file of the lock from your PC.
Enter the section name, model name and you can choose the color of the STL file.
Then import STL files of the base surface, shank surface and hole (the subtraction body) from a selected source using the "Import STL" buttons.



Lock library downloading

Move the cursor to the desired position on the fixation base with your mouse and left-click to set the lock (1);
Once you have set a lock position, you can still change its position by dragging it with your mouse. To delete a lock, click the right mouse button on the lock and then delete (2).



Refining the lock position.

Step 5

Osteotomy Guide on the lock-supported bars design settings

This step is only available if you have selected the option "On Bars" in the Osteotomy Guide Settings step (Step 3).

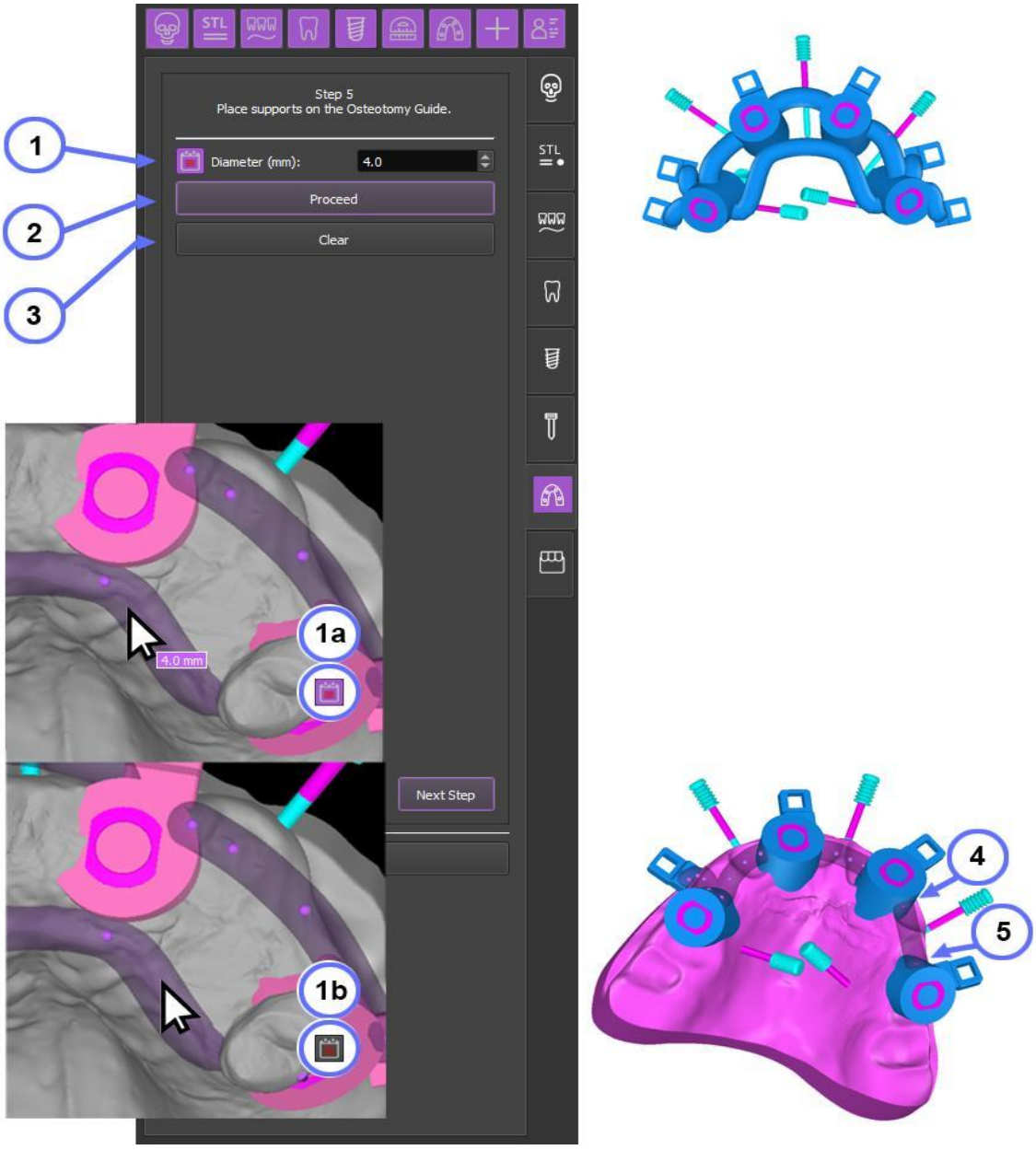
Use the “Diameter (mm)” settings to define the diameter of the lock-supported pontic.

Show/hide the visualization of the numerical value of the pontic diameter by clicking the checkbox (1a, 1b);

Once you have set all pontics for the osteotomy guide you can click “Proceed” and proceed with the workflow (2);

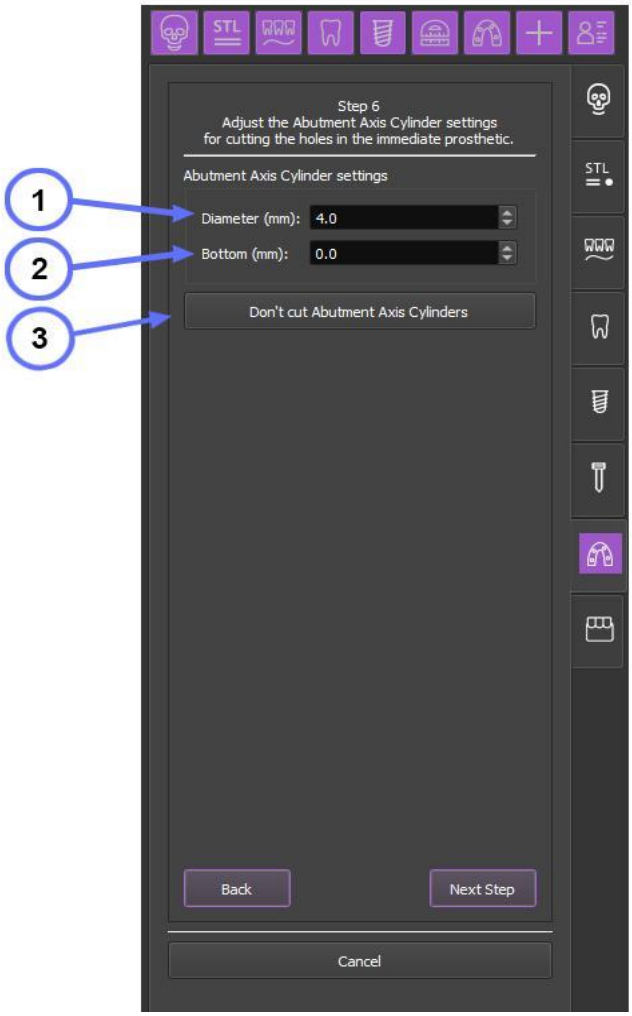
Click “Clear” to abort the support pontic placement step (3);

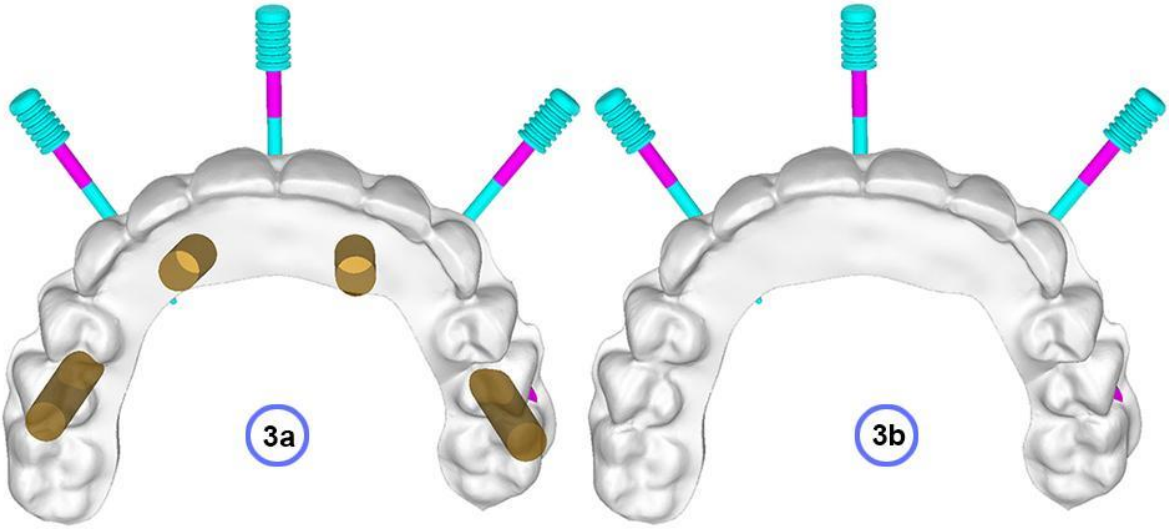
Click a position at the sleeve support area and when you move your mouse away from this point, a purple solid bar is displayed between the pink point and the mouse cursor position. Click a position at the desired surface to set the bar at this selected area (4, 5). Now you can change the shape and diameter of the bar by dragging points and scrolling the mouse will.



Step 6
Temporary cylinder area settings menu

You can select to set up the diameter (1) and bottom (2) of the holes for the Multi-Unit Prosthetic Temporary Cylinders, around the abutment axis. To skip this step, click the "Don't cut Abutment Axis Cylinders" button (3, 3a, 3b).





Step 7
Carrier guide design settings

This step is only available if you have selected the option "Based on Carrier Guide" in the Carrier Guide Settings step (Step 3).
The transparent plastic pegs on the Carrier Guide deliver the Provisional Prosthetic in the proper position as planned.
Move the cursor to the desired position on the carrier guide with your mouse and left-click to set the peg (a);
Once you have set a peg, you can still change its position by dragging it with your mouse. To delete a peg, click the right mouse button on the peg and then delete (b).
Use the "Peg Height (mm)" settings to define the height of the peg (1);

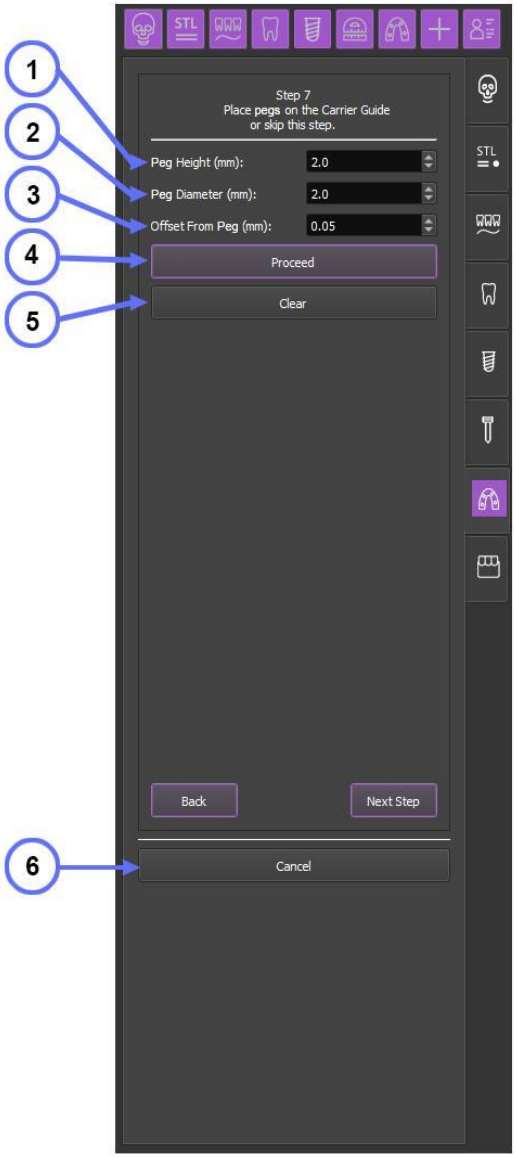
Use the "Peg Diameter (mm)" settings to define the diameter of the peg basis (2);

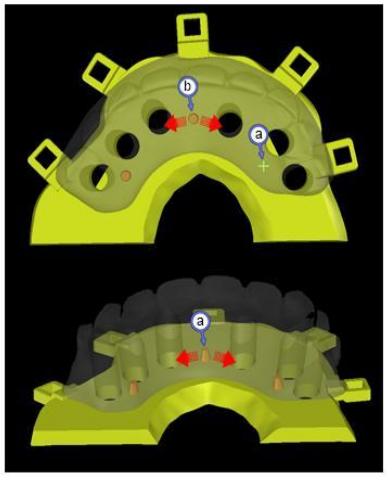
Use the "Offset from Peg (mm)" settings to define the offset between the peg and the inner surface of the Provisional Prosthetic (3);

Once you have set all pegs for the carrier guide you can click "Proceed" and proceed in the workflow (4);

Click "Clear" to abort the peg placement step workflow (5);

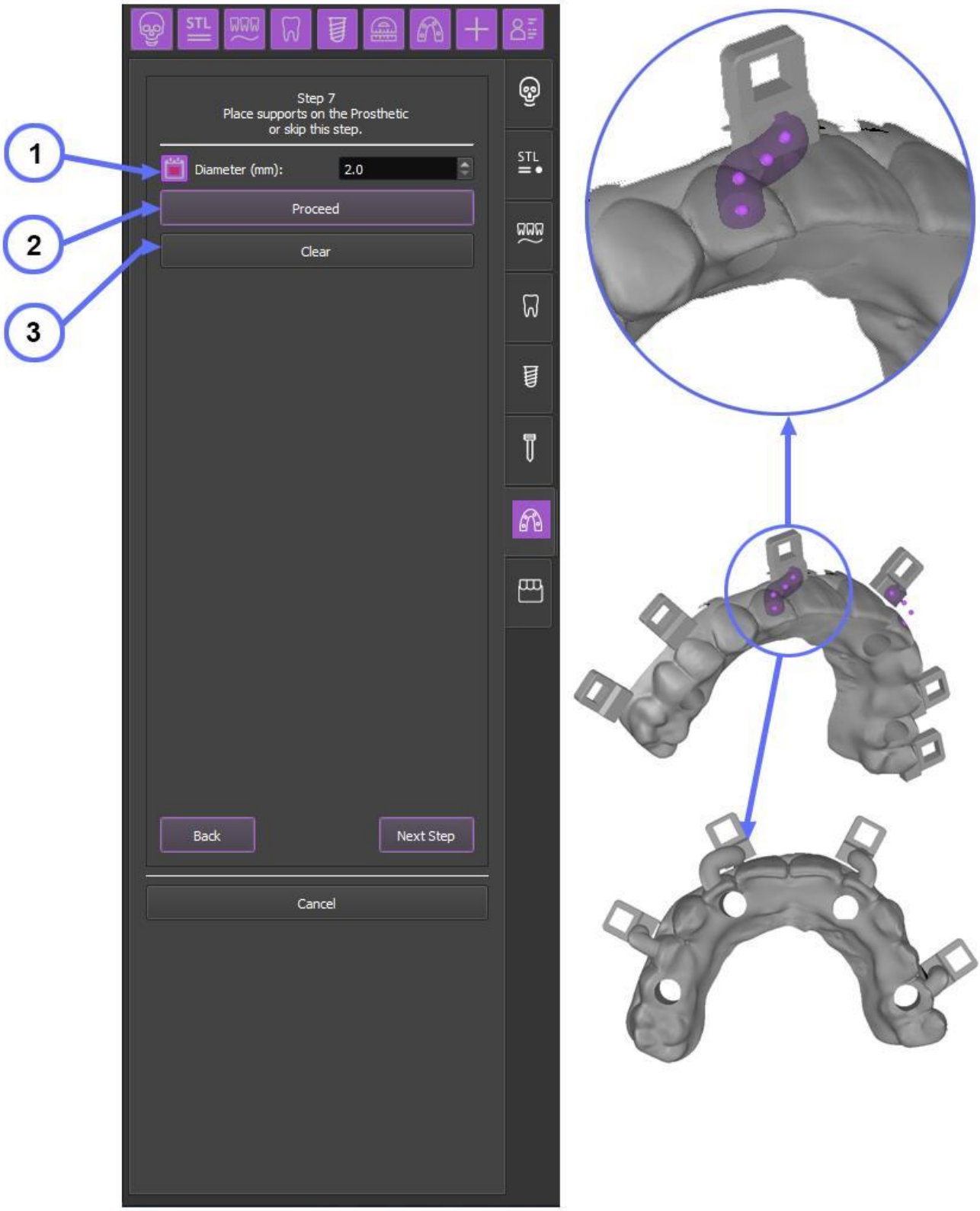
Clicking "Cancel" closes the window but discards all settings specified since you have started the step (6).





Step 7
Provisional Prosthetic on the lock-supported pontics settings

This step is only available if you have selected the option "On Lock-Supported Pontics" in the Prosthetic Settings step (Step 3). Use the same techniques as described in Step 5.



Step 8

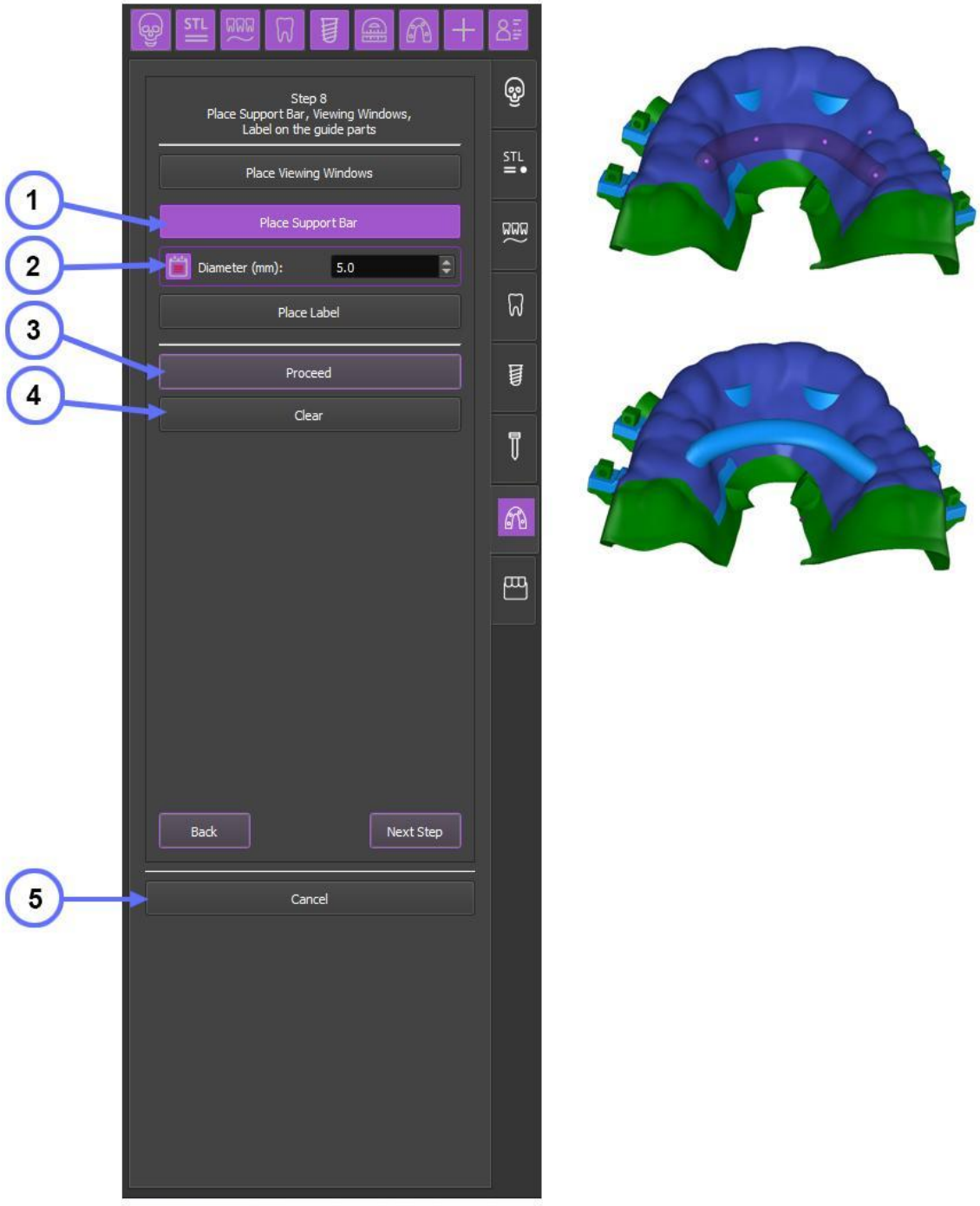
Support Bar settings

You can add a support bar to the surgical stackable guide's surface. Use the same techniques as described in Step 5.

Select "Place Support Bar" in the menu (1);

Click a position to the desired position on the stackable guide and when you move your mouse away from this point, a purple solid bar is displayed between the pink point and the mouse cursor position. Click a position at the desired surface to set the bar at this selected area. Now you can change the shape and diameter (2) of the bar by dragging points and scrolling the mouse will;

To delete a Support Bar, right-click on it and delete.



Step 8

Label text settings

You can add a text label to the surgical stackable guide's surface.

Figure 2.8.1.1 Label text settings.

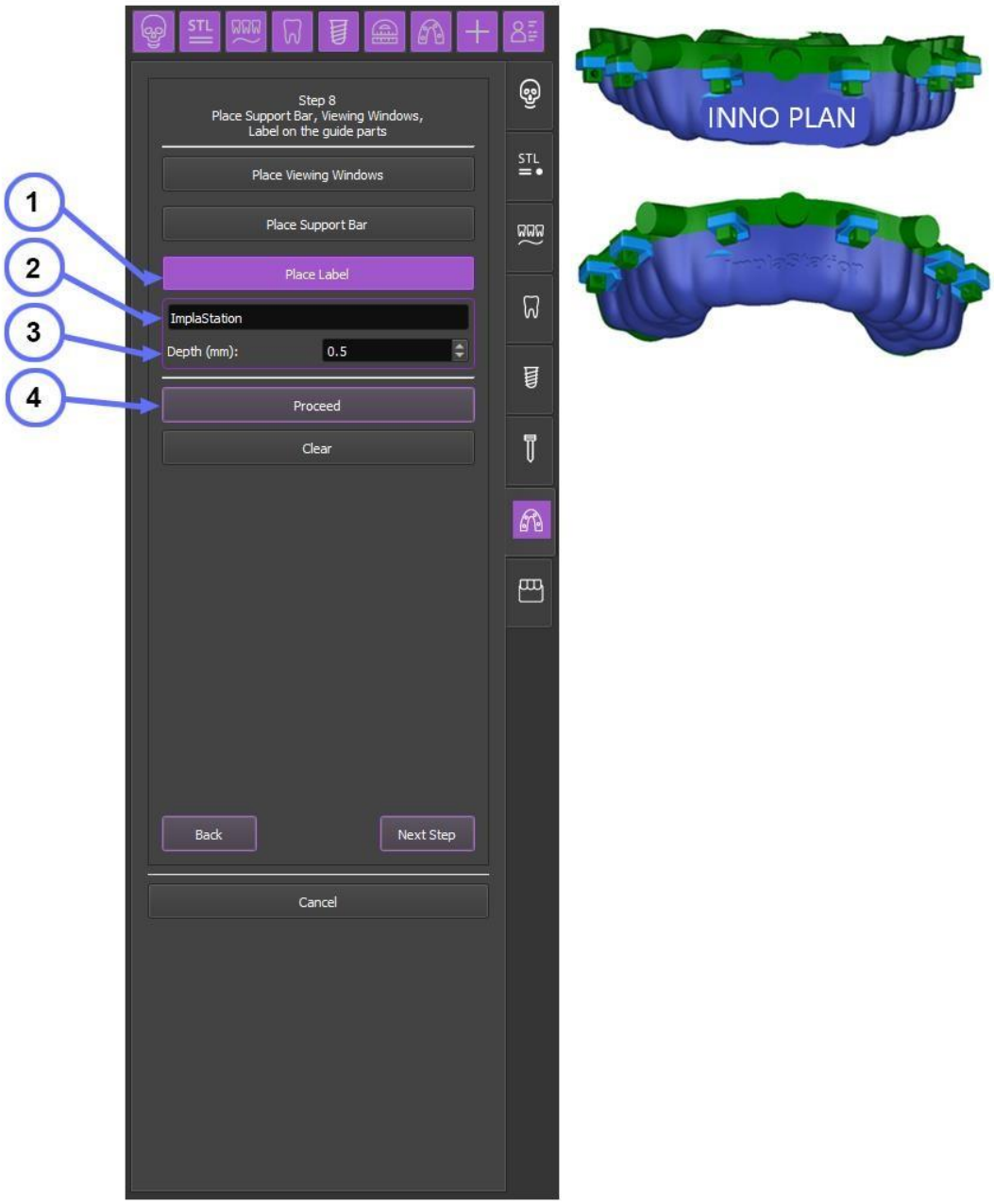
Select "Place Label" in the menu (1);

Type the desired text into the text field (2);

Using the window below the text field, you can change the depth (3);

Move the text to the desired position on the stackable guide surface and click to set it, then proceed (4).

To delete a text, right-click on it and delete.



Step 8

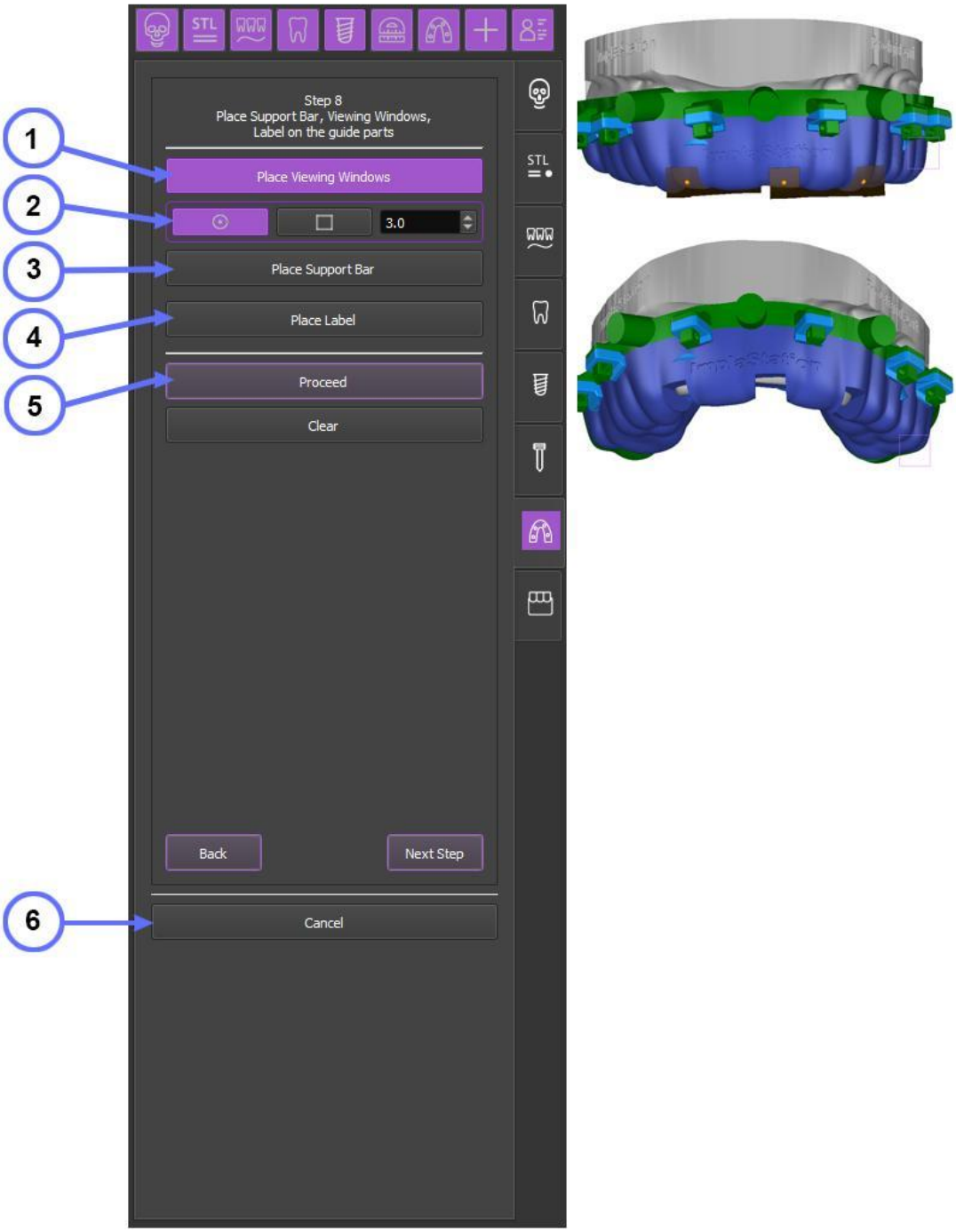
Revision window settings

You can also add a revision window(s) to the surgical stackable guide's surface.

Select "Place Viewing Window" in the menu (1);

Move the window shape (2) to the desired position on the stackable guide surface and click to set it.

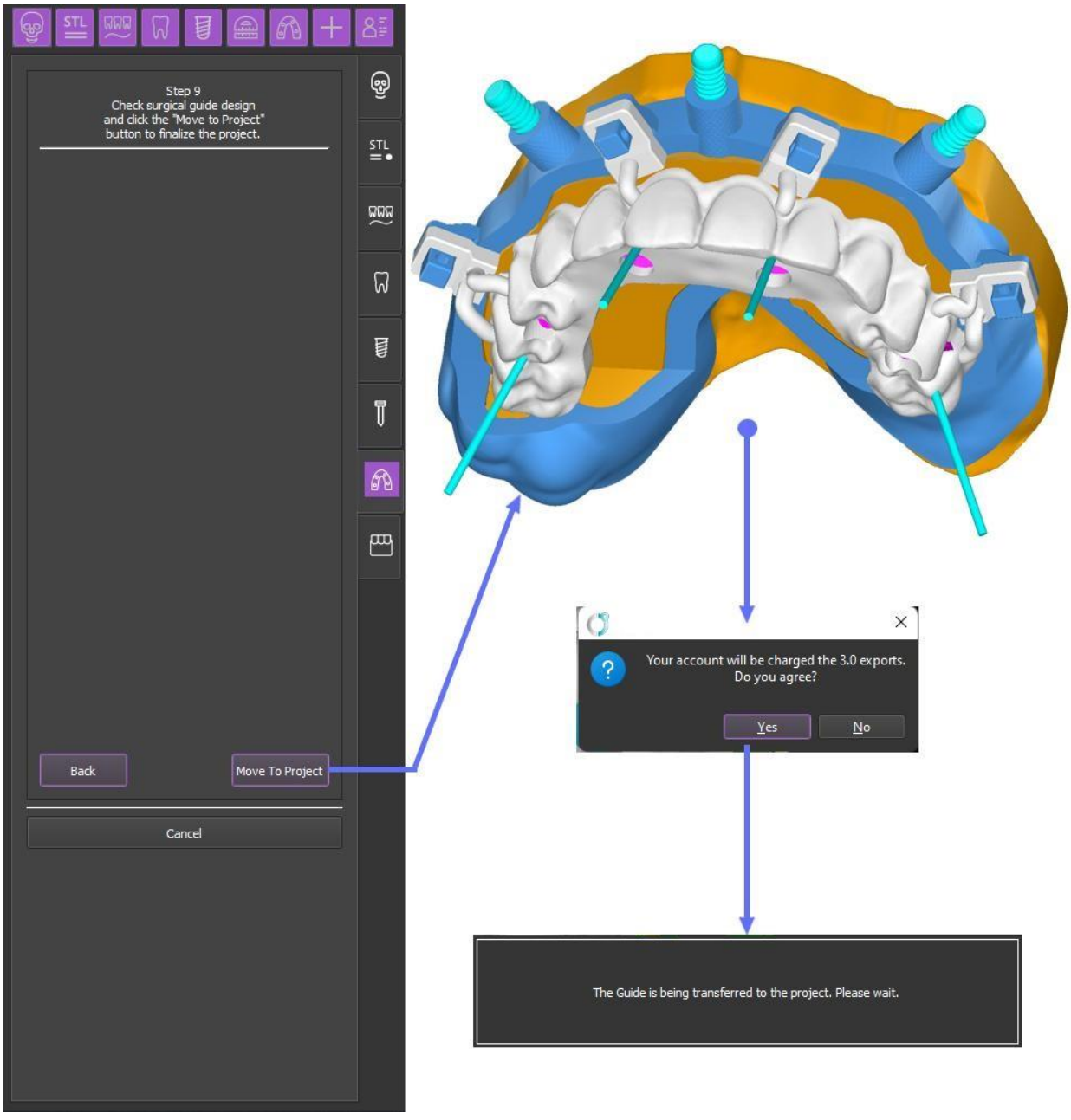
To delete a revision window, right-click on it and delete.



Step 9

Finalizing the Project

Planning result files (STL files and PDF files) are created in the planning result files generation and finalizing step. You can check the result of your planning in the views and finalize the project by clicking the "move to the project" button or clicking "Back" if you are in doubt or not satisfied with the result.



Note!	Your account will be charged the 3 exports.

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