DentiqGuide

Implant planning and surgical guide design software

User manual v1.3.05

Contents

Contents 2
1. Introduction 5
2. Product Installation 6
2.1 PC System Specification 6
2.2 DentiqGuide Installation 6
2.3 Implant Library Installation 7
3. Product Overview 8
3.1 Main Function 8
1) Implant Planning Simulation 8
2) Surgical Guide Design 8
3) Temporary crown design 9
4) Model base generation 9
3.2 Screen Layout 10
4. Common 12
4.1 Program Control Menu 12
4.2 Mouse Operations and Shortcuts 12
4.3 Panel Operation 15
4.4 Workflow Progress Bar 17
4.5 Save Case 18
4.6 Redo/Undo 19
4.7 Visualization Options 20
4.8 Cross-sectional Setting 24
4.9 Screen Capture 27
1) Image Capture 27
2) Captured Image List 28
4.10 Use of Measurement Tool 30
5. Dental Manager 35
5.1 Manage Patients 36
5.2 Manage Cases 41
5.3 Settings 43
1) Program Information 44
2) Users 45
3) Updates 46
4) Database 47

5) User Log 49
6) Help 50
7) Common 51
8) Implant Planning 53
9) Surgical Guide 55
10) Temporary Crown 57
11) Report 60
12) Library Update 62
13) DentiqLink 63
14) PMS 63
6. Surgical planning for tooth supported type 65
6.1 Case Setup **65**
6.2 Data registration **67**
1) Import/Remove Data 68
2) Checking Data 70
3) Scan Data Direction Setting 71
6.3 Data Settings **72**
6.4 Curve Drawing **74**
6.5 Nerve Setting **77**
6.6 Alignment **80**
1) Alignment Type 80
2) Points Alignment 81
3) Manual Alignment 82
6.7 Tooth Removal **85**
6.8 Crown Placement **88**
6.9 Implant Placement **91**
1) Tools 91
2) Implant, Sleeve, Abutment, Anchor pin Placement 92
3) Edit Implant, Sleeve, Abutment and Anchor pin 92
4) Library 95
5) Implant Grouping 99
6) Setting Implant custom safety zone 101
7) 3D Implant Clipping 102
8) 3D Measurement Instruments 103
9) 2D Image Tools 104
10) Analyzing pre and post-operative data 107

6.10 Guide Generation **111**
6.11 Crown Design **121**
1) Detailed Work Process 121
2) Set Bridge/Pontic 122
3) Set Margin Line 123
4) Set Cement Gap 126
5) Create Crown 129
6) Edit Crown 130
7) Set Bridge 134
6.12 Result **135**
6.13 Model base generation **139**
7. Edentulous case planning 145
7.1 Case Setup **145**
7.2 Import Data **146**
7.3 Data Settings **147**
7.4 Alignment **149**
7.5 Gingiva Settings **149**
7.6 Drawing Curve **152**
7.7 Nerve Setting **152**
7.8 Implant Placement **152**
7.9 Guide Generation **153**
7.10 Result **156**
8. DentiqLink 157
8.1 Sign in **157**
8.2 New Order **158**
8.3 Data upload **160**
8.4 Data download **160**
9. Appendix 163
9.1 Terminology **163**
9.2 License **164**
9.3 FAQ **176**
9.4 Cybersecurity **178**
9.5 External License Notification **179**
9.6 Revision History **181**
9.7 About 3DII **182**

1. Introduction

DentiqGuide is a dental implant surgery guide software to perform implant simulation and design surgical guides using CT image and 3D oral scan data.

DentiqGuide provides workflow stages that can be adapted to suit user's purpose and supports fast and accurate implant simulation and guide designing using high quality 3D image, high accuracy alignment and virtual crown.

Please fully read and understand this manual before using DentiqGuide.
It might be inconvenient to use the program without fully understanding the basic functions.

1. Use of this software requires professional experience on dental implant and dental surgery.
2. Federal law restricts this device to sale by or on the order of a physician.
3. Before using the software, the user should receive sufficient training and be familiar with operation of the software.
4. In order to use this software, your computer must comply with the system requirements described in this manual.
5. The following table describes warning and information signs used in this manual.

Sign	Description
	General caution for users
	Instruction that requires specific action from users
	Instruction that provides specific information to users

2. Product Installation

2.1 PC System Specification

The following specification should be met to use DentiqGuide.

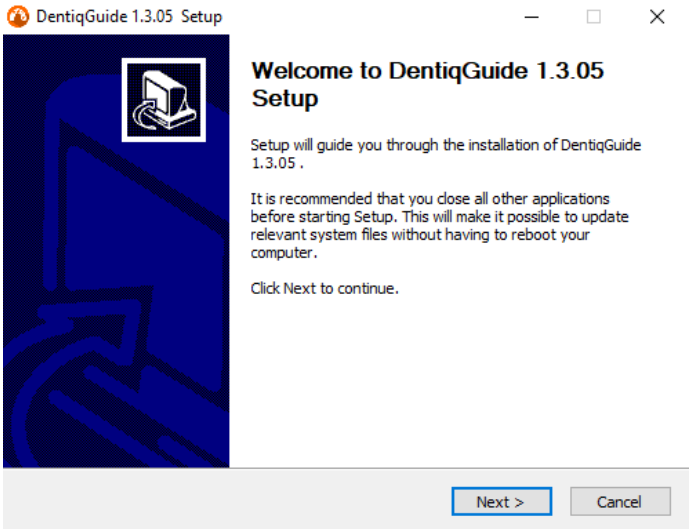
Component	Minimum Requirements	Recommended Specifications
OS	**Windows 10, 11 (64bit)**	**Windows 10, 11 (64bit)**
Memory	16GB	16GB or more
Graphics	Graphics card that support DirectX 11	High performance graphics card that support DirectX 11 or higher with 2GB video RAM
CPU	Intel i3 Dual Core	Intel i5 Quad Core or higher
Resolution	**1600*900**	**1920*1080**
Storage	5GB available hard drive space	5GB available hard drive space

To check your computer's system specification, go to Control Panel > System > Device Manager.

2.2 DentiqGuide Installation

The installation process of DentiqGuide follows the following steps.

① Double click "Setup_DentiqGuide" file to run.

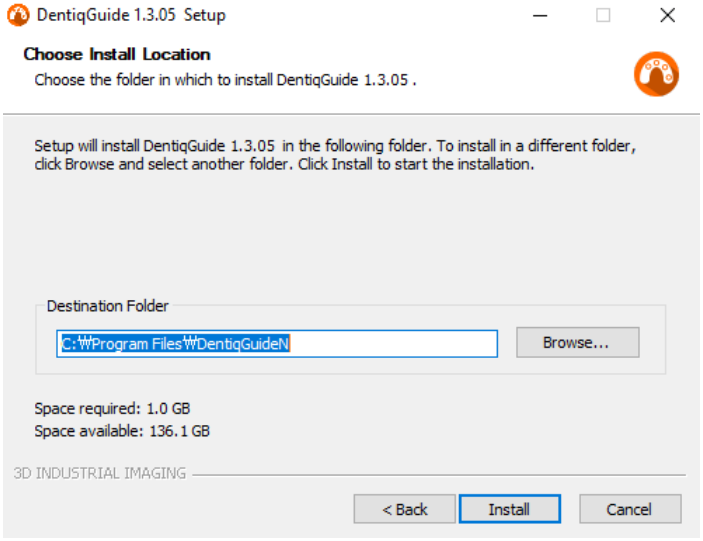


[Install Shield Wizard]

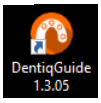
② Click [Next>] to continue

③ when Install Shield Wizard window appears.

④ Select directory to install DentiqGuide and click [Install] button to start installation.



[Install Location Selection]

⑤ When completed, run DentiqGuide with the shortcut icon created. 

2.3 Implant Library Installation

The installation process of Implant library follows the following steps.

① Double-click "Setup_ImplantLibrary" file to run.

② Click the [Install] button to start installation when Install Shield Wizard appears.

③ Click [Done] to finish installation when the installation completion message displays.

	**DentiqGuide install file is available to download from our website (www.dentiqsolution.com → Support → Download). You can download Implant library in the program. Otherwise, please email to service@3dii.net.**

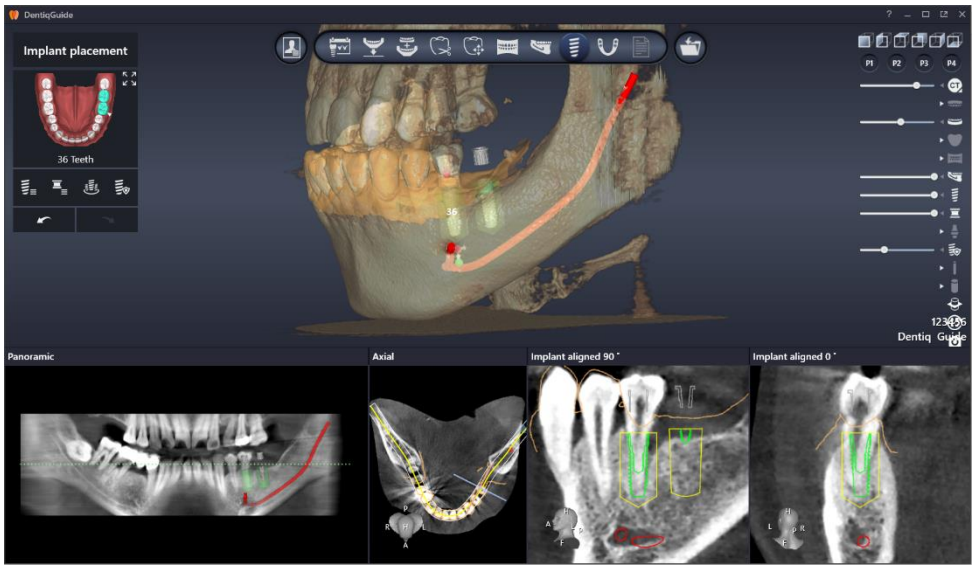
	**Installation can take some time depending on PC specification.**

3. Product Overview

3.1 Main Function

1) Implant Planning Simulation

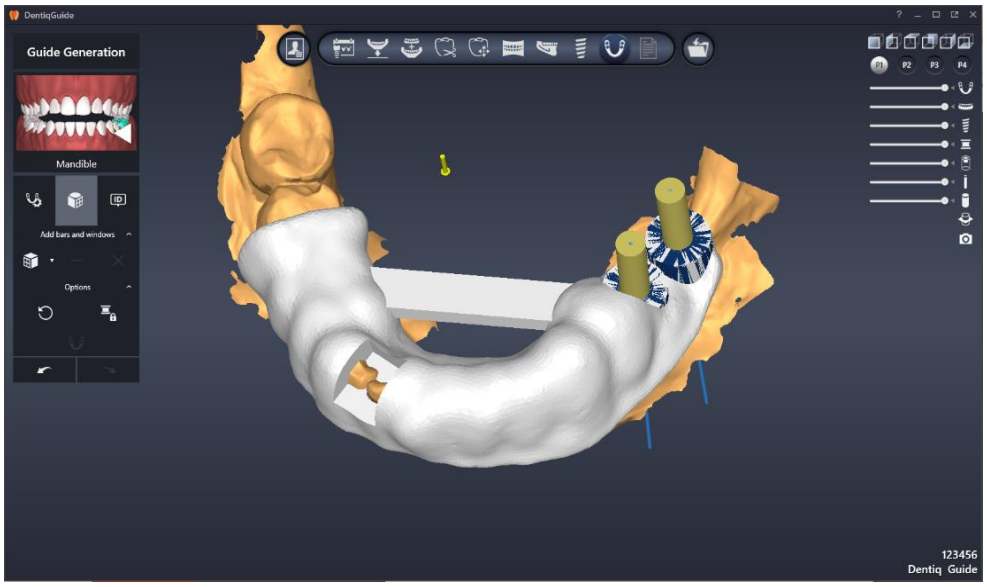
The user can plan the position of implant placement through simulation using fixture and crown model after checking the shape of alveolar bone on CT image.



[Implant Planning Simulation]

2) Surgical Guide Design

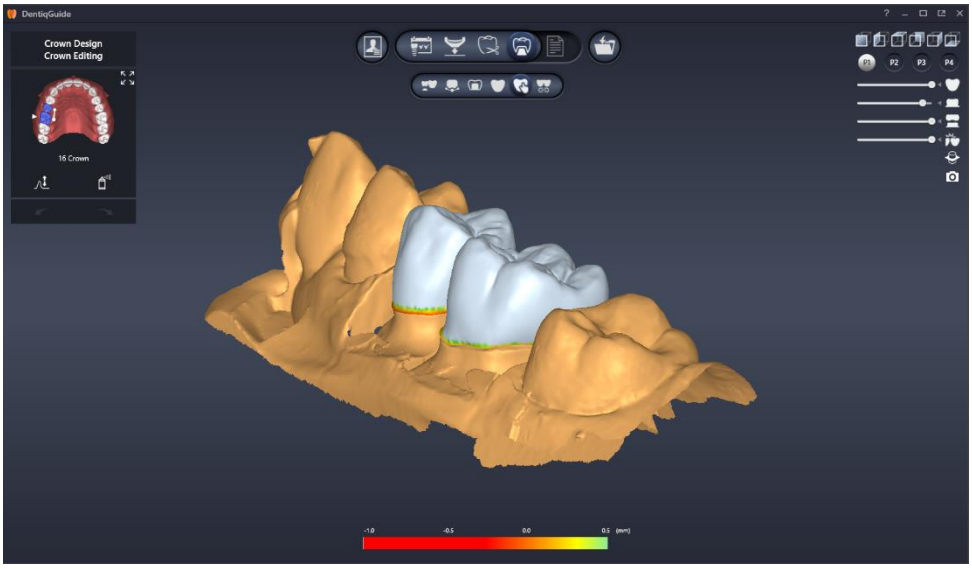
The user can design surgical guides to help actual implant surgery based on implant simulation.



[Surgical Guide Design]

3) Temporary crown design

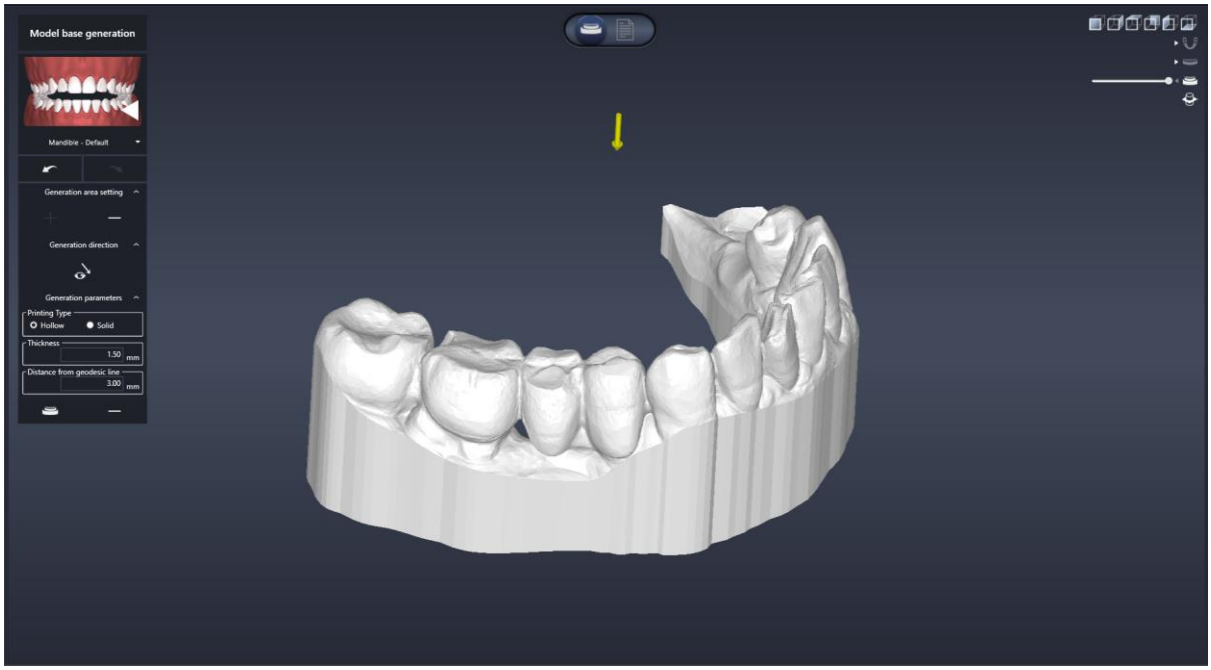
The user can design temporary crown which is used before the permanent crown is placed.



[Temporary Crown Design]

4) Model base generation

You can create a model base that can be output to a 3D printer to utilize as a second model.

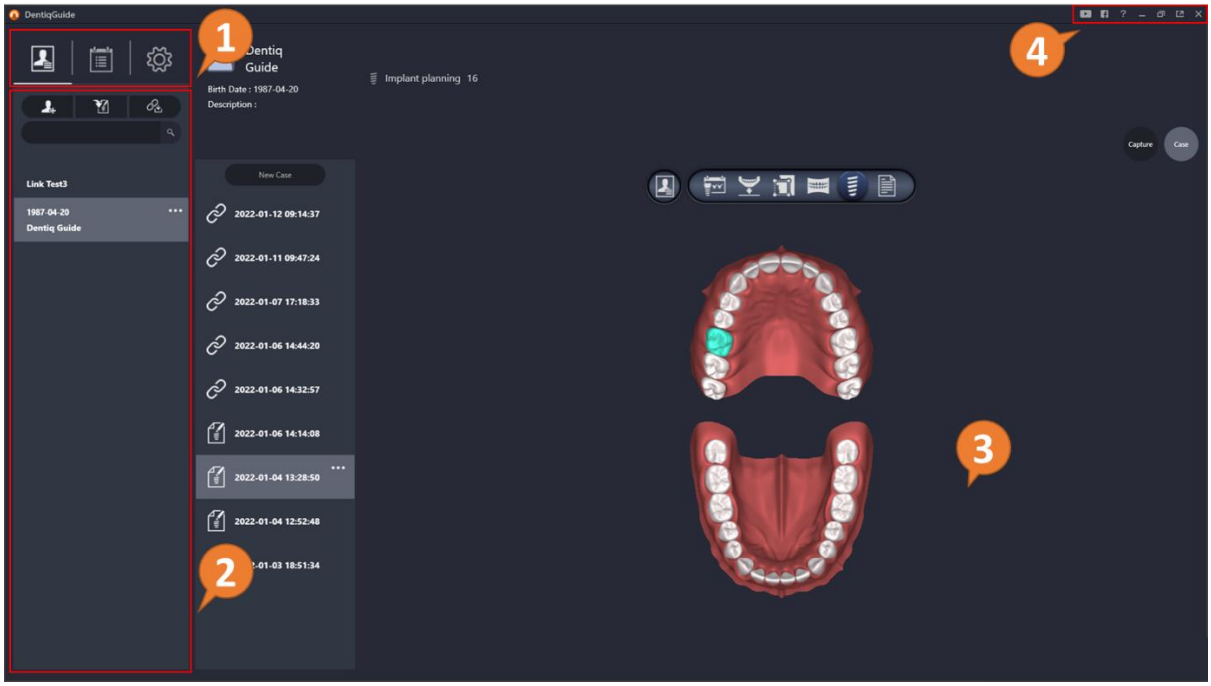


[Model Base Generation]

3.2 Screen Layout

1) Dental Manager

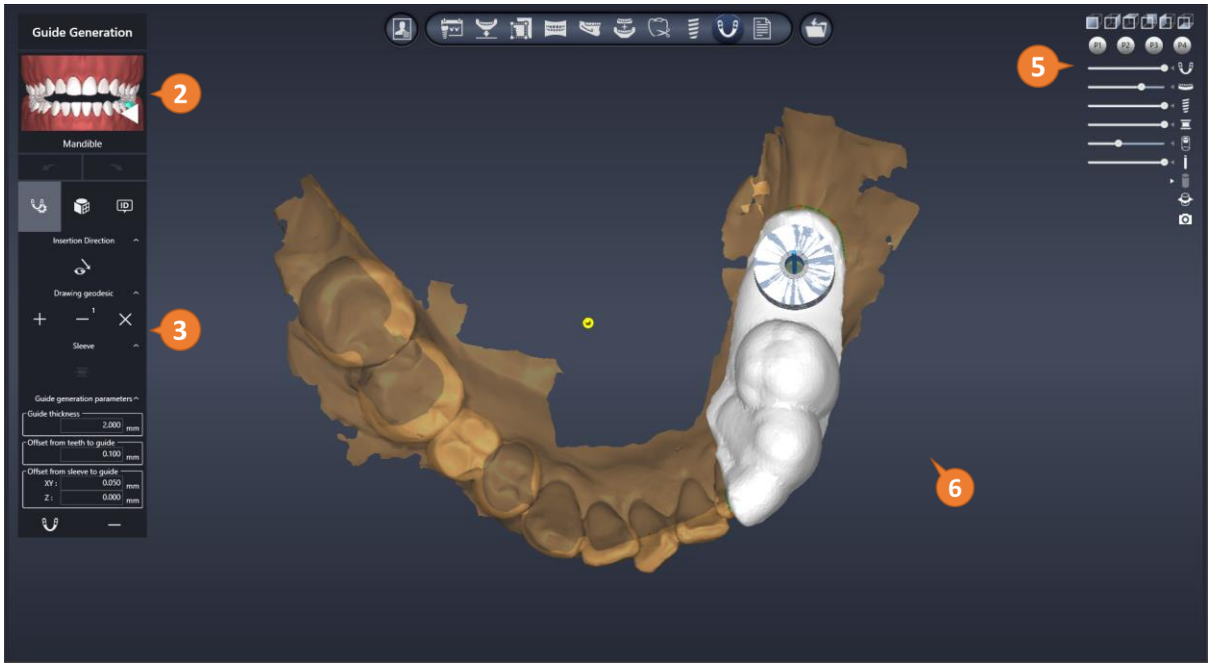
The user can manage the list of patients/cases and provide environment settings menu.



No	Title	Description
1	Menu	Display available menu for Dental Manager
2	Sub-menu/Category	Display sub-menu or categories of selected menu
3	Details	Display detailed information for sub-menu or category
4	Program Control Menu	Display help/minimize, maximize/close icons

2) Workflow

The program provides case workflow stages and tools.



No	Title	Description
1	Case Workflow Title	Display title of current workflow stage
2	Select Area	Select and displays the area to work on
3	Tools	Provide toolbar required in the stage
4	Case Workflow Stage	Display possible workflow stage and move to other stage
5	Visualization Options and Additional features	Provide data visualization options and additional features
6	Data Display	Displays currently used data

4. Common

4.1 Program Control Menu

Icon	Description
	Help: provide a program manual
	Minimize
	Maximize (except task bar)
	Restore (except task bar)
	Maximize (including task bar)
	Restore (including task bar)
	Close
	Connecting to a 3DII's YouTube Link
	Connecting to a 3DII's Facebook Link

4.2 Mouse Operations and Shortcuts

1) Mouse Operations for Image Browsing

	2D	3D
Pan	Drag mouse wheel	Drag mouse wheel
Zoom in/out	Right click and drag	Scroll mouse wheel
Change image slice	Scroll mouse wheel	-
Rotate	-	Right click and drag

2) Shortcuts

Common	
Help(Manual)	F1
Undo/Redo	Ctrl + Z / Ctrl + Y
Save case	Ctrl + S
Save case as	Ctrl + Shift + S
Close pop up window	ESC

Preset for Display options P1/P2/P3/P4	1/2/3/4
Show and Hide 2D Overlay Control Panel	Enter
Change Axis Display (2D<->3D)	Shift
Data Configuration	
Initialize image location	P
Alignment	
Sync setting of camera status	C
Delete all points	Place mouse cursor in the image to delete + D
Display grid in 2D image	G
Measure length in 2D image	L
Display 3D object in 2D image	M
Display object fine-tuning tool	R
Move scanned data in 2D image	Place mouse cursor + Arrow keys (↑/↓/→/←)
Rotate scanned data in 2D image	Place mouse cursor + Ctrl + Arrow keys (→/←)
Initialize image location	P
Tooth Removal/Crown Arrangement	
Select/Unselect multiple crowns	Ctrl + Select tooth with mouse
Curve Setting	
Delete curve	R
Initialize image location	P
Nerve Change	Space bar
Nerve Setting	
Delete nerve	R
Initialize image location	P
Implant Placement	
Display library	L (Available only when changing inserted objects)
Display implant grouping	X
Display implant custom safety zone	Z
Use 2D image as clip surface	Place mouse cursor in the image to use + C

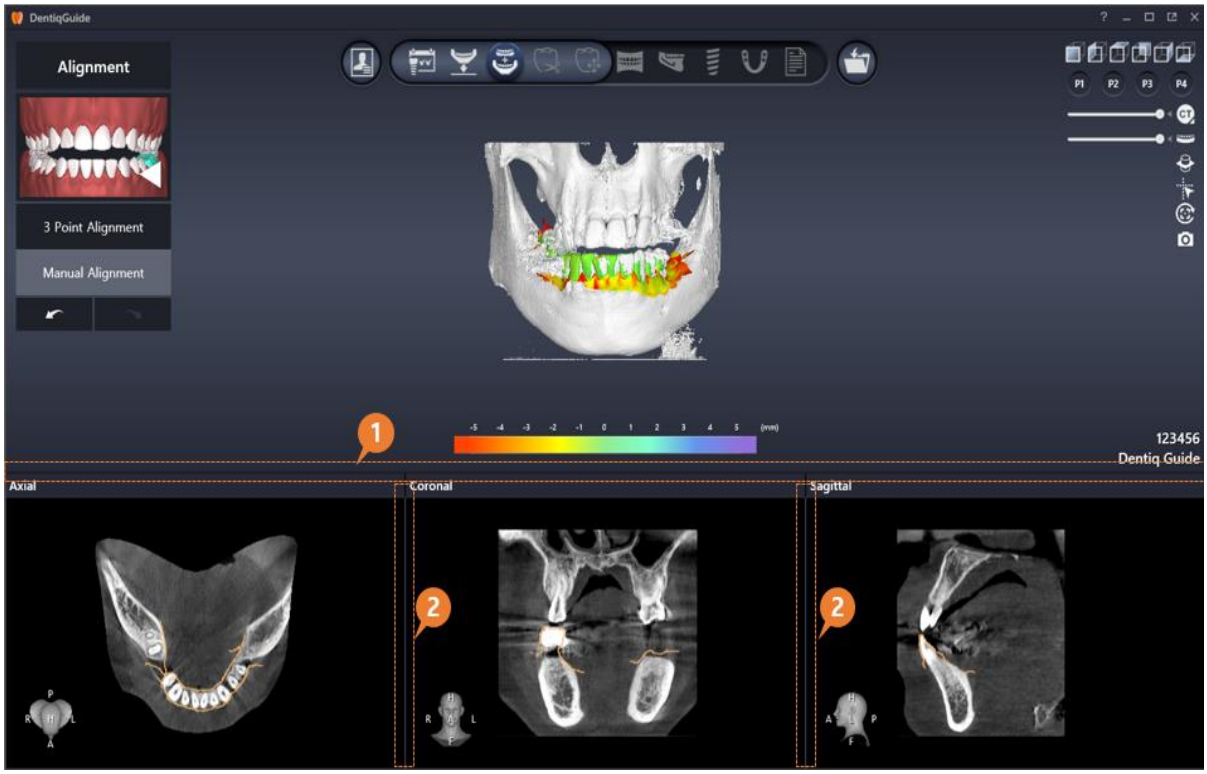
Display 2D image based on implant	Select an implant + F
Line/Length on 2D image	Place mouse cursor in the image to measure + L
Angle using two lines in 2D image	Place mouse cursor in the image to measure + A
HU value of 2D image	Place mouse cursor in the image to measure + H
3D implant clipping	0
Dist. of both side implants on 3D	7
Axis angle of both side implants on 3D	8
Dist. of implant to nerve on 3D	9
Move implant in 2D image	Select an implant to move + Arrow keys (↑/↓/→/←)
Rotate implant in 2D image	Select an implant to move + Ctrl + Arrow keys (→/←)
Initialize image location	P
Result	
View surgical report	P
View drilling protocol	D
Save and export case	S

4.3 Panel Operation

Screen layouts can be configured by the user for their specific application.

1) Adjust Height/Width

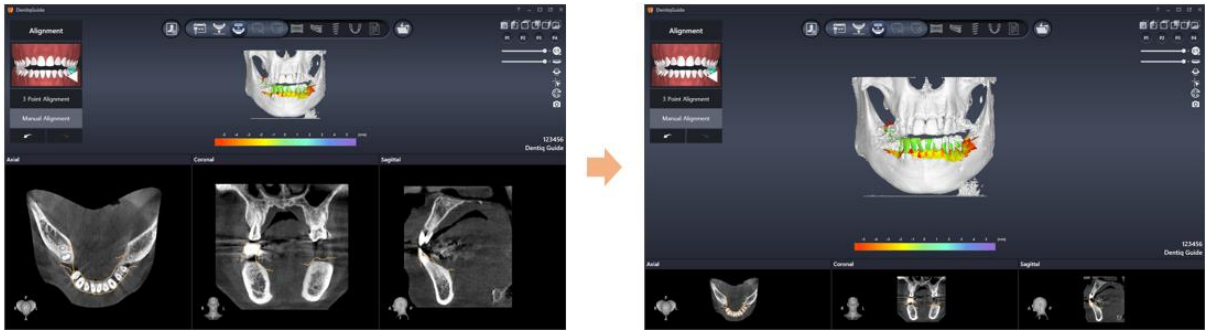
Adjust the width and height of image panel by clicking and dragging boundary lines.



No	Title	Description
1	Horizontal boundary line	Adjust height of image area
2	Vertical boundary line	Adjust width of image area

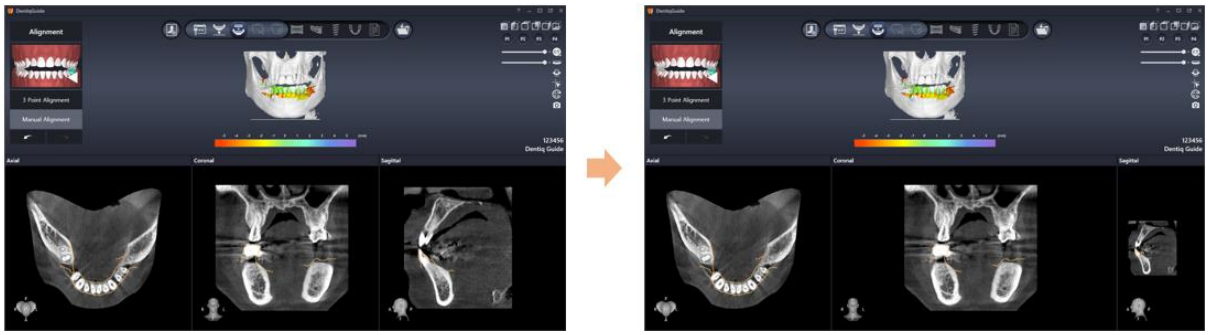
Horizontal Boundary Line

- Adjust height of image panel by clicking and dragging horizontal boundary line



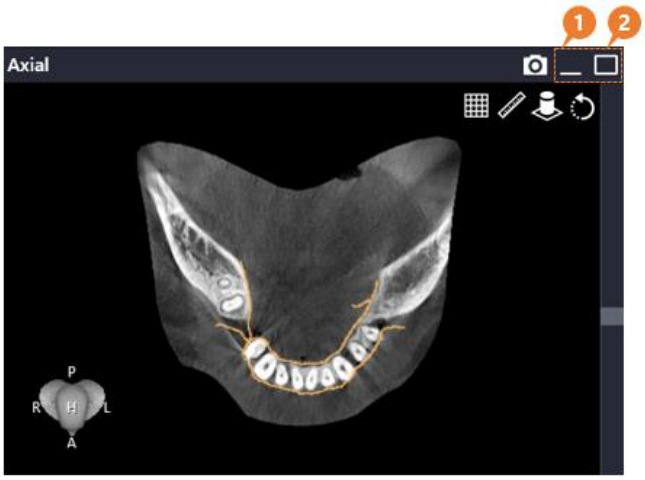
Vertical Boundary Line

- Adjust width of image panel by clicking and dragging vertical boundary line.



2) Maximize/Minimize

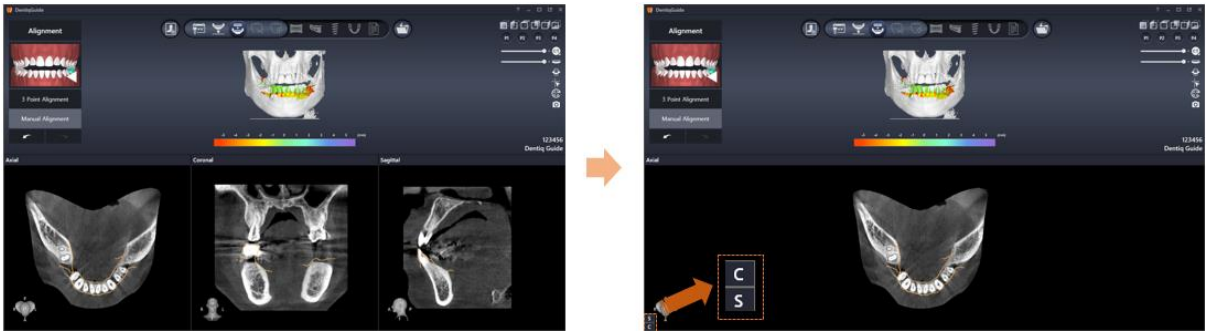
Maximize/Minimize the size of image area using the maximize/minimize buttons on the right of title bar.



No	Title	Description
1	**Minimize**	Minimize the image panel
2	**Maximize**	Maximize the image panel

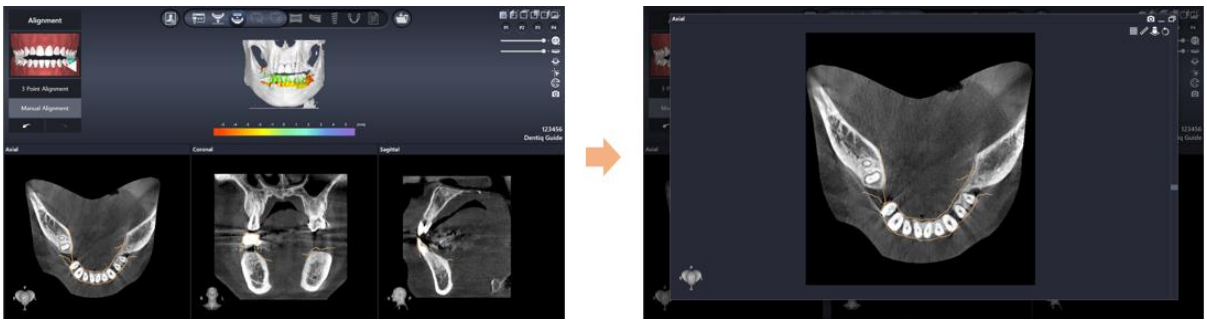
Minimize

- When Minimize button  is clicked, it minimizes image panel and displays restore button in the lower left side of screen. The minimized image panel can be restored by clicking the restore button (ex: Coronal ).



Maximize

- When Maximize button  is clicked, it displays maximized image panel in a new window. The maximized image panel can be restored by clicking the restore button  .



	**Maximized image area can be restored to the original size using ESC key. Please see 4.2 Mouse oprations and shorcuts for more details.**

4.4 Workflow Progress Bar

Workflow progress bar displays currently enabled workflow stages as set in the Case Setup stage.

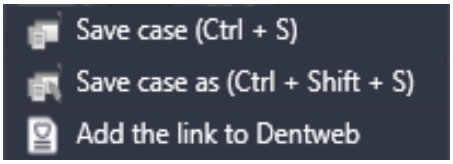
- Clicking icons for each stage leads to the page of corresponding stage.

	**Each stage can start only when the completion criteria of the previous stage is satisfied. Please refer to 6. Case Workflow Stages for more details about each stage.**

4.5 Save Case

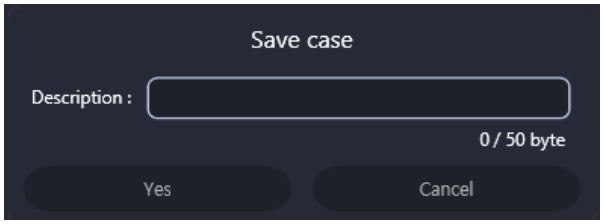
Current case can be saved in every stage of work progress.

- Click Save button  on the right side of progress bar to open save menu.



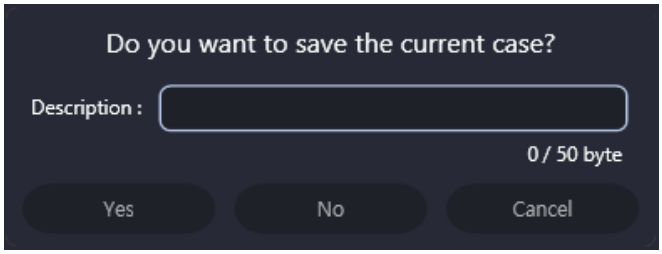
Save	Overwrite existing case
Save as	Save as a new case and maintain existing case
Add Link to Dentweb	After saving the planning, send a link to the surgical plan you are working on to the dentweb. The transmitted link can be found in the electronic chart of the dentweb. 5.3 14) It can be used after setting up PMS. It is only available in planning for patients designated on the dentweb (taking pictures on the dentweb > sending patient information via DentiqGuide).

- The following confirmation message appears when clicking the desired save menu.



- Click Description field  to enter memo for the case if needed.

- The following confirmation message appears when moving to the Dental Manager stage



by clicking dental manager button  on the left side of work progress bar.

- **Yes (or Enter key)**: save case and move to the Dental Manager stage
- **No**: go back to Dental Manager without saving current case
- **Cancel**: stay in current stage without saving current case

	If the Auto Save option is set in Preferences, the surgical plan is automatically saved as you move through the job step. **More details for Automatic save functions, please refer to the 5.3 Settings -> Automatic save functions.**

	'Save case' basically overwrites the previous case. The user can only save a new case by creating an initial case or using 'Save case as' function.

	If the user terminates program without saving, a dialog asking to save the changes appears. When not saved, the changes cannot be restored. Also, data deleted from database cannot be restored.

4.6 Redo/Undo

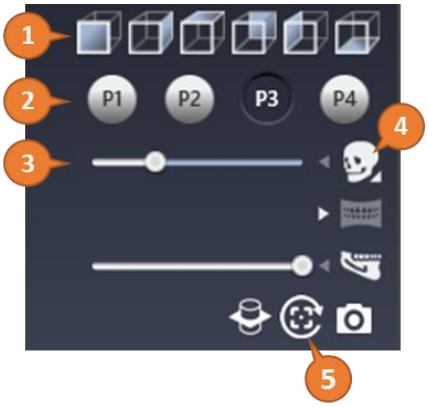
Each stage provides  buttons on the left side of screen to redo or undo previous work.

	Saved work history is managed separately on each stage. **In the Alignment stage, work history for maxilla and mandible are managed separately as well.**

	When saving a project, it saves only the latest work history for Guide stage and Crown Editing step of Crown designing.

4.7 Visualization Options

The user can set show/hide or transparency, and presets for the data displayed in image panel.

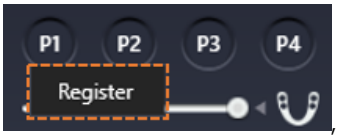


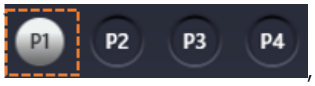
No	Title	Description
1	Camera Orientation Alignment	Set orientation of 3D data
2	User Preset	Manage current visualization option as a preset
3	Visualization Options	Display and adjust visualization options that can be set in each workflow stage
4	CT Image Setting	Set OTF/brightness/contrast of CT image
5	Restore Camera Orientation	Restore camera orientation of 2D/ 3D image

1) Camera Orientation Alignment

- The icons represent front, left, up, back, right, down directions in the order they are placed. Clicking each icon changes the direction of 3D image to the corresponding direction.

2) User Preset

- Right click on a button where preset is not registered to show Register menu 

, and click Register to save current visualization.
- Once a preset is registered, the button is enabled in grey 

, and clicking the button applies the preset to image panel.
- Right click on a button where preset is already registered. Register/Delete menu

enables users to re-register or delete preset.

	By default, some commonly used visualization states are stored and provided for each step. Users can re-register and delete as needed.

	Basically, some frequently used visualization states are stored and provided at each stage. Users can re-register and delete as needed.

3) Visualization options

Visualization options provided throughout all work flow stages are listed in the below table.

Icon	Title	Icon	Title
	CT		Maxillary Scan
	Mandibular Scan		Damaged Tooth Scan
	Facing Tooth Scan		Extracted Damaged Tooth Scan
	Extracted Facing Tooth Scan		Crown
	Activated Crown		Inactivated Crown
	Panoramic Plane		Canal
	Implant		Sleeve
	Implant Safety Zone		Abutment
	Drilling Cylinder		Implant Axis
	Gingiva		Partial Surgical Guide
	Occlusion Guide		Edentulous Surgical Guide
	Anchor pin		3D Implant Bone Density
	Bar/Window		Sleeve Offset Cylinder
	Abutment tooth		Undercut Removal Mesh

	Cement Gap		Border Mesh
	Distance Map		Connector Mesh
	Additional Scan data		Upper Model base
	Lower Model Base		

- Opacity can be adjusted by dragging each slider  displayed on the left side of each icon.
- Each item can be set as Show/Hide by clicking the icon.

4) CT Image Setting

- The following screen for CT image setting is shown when right clicking  button.

No	Title	Description
1	OTF Graph	Set HU value to be applied to 3D image areas
2	Brightness/Contrast	Set brightness/contrast to be applied to 2D image areas

- By clicking the Save as Default button  , you can save the currently set OTF graph and brightness/contrast as default. The stored value is automatically applied to the next step, and the CT image is set to the default value that has been changed even when other files are opened.
- When you click the Load Default Setting button  , the CT image is set to the currently saved default value.
- If you press the reset  button, the CT image setting is initialized to the initial setting value.

OTF Graph

- **HU range adjustment**: drag Bone/Skin/Enamel slider side to side
- **Opacity adjustment**: drag Bone/Skin/Enamel slider up and down

⚠	**When opacity, color of 3D volume is not properly set, the user can reset the settings by using Reset button on OTF screen.**

Brightness/Contrast

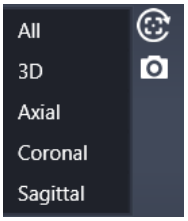
- **Brightness adjustment**: Drag the slider next to  option side to side. The more to the left, the darker the image is.
- **Contrast adjustment**: Drag the slider next to  option side to side. The more to the left, the higher the contrast of the image is.

5) Restore camera orientation/ Initialization ROI

Initialization ROI

- When clicking Initialization ROI button  in the Data Setting stage, ROI of CT data will be restored to the initial value.

Restore camera orientation

- When the Restore Camera Orientation button  is clicked, it displays the list of images that can be restored. 

- Clicking the desired image to restore the orientation of the image.

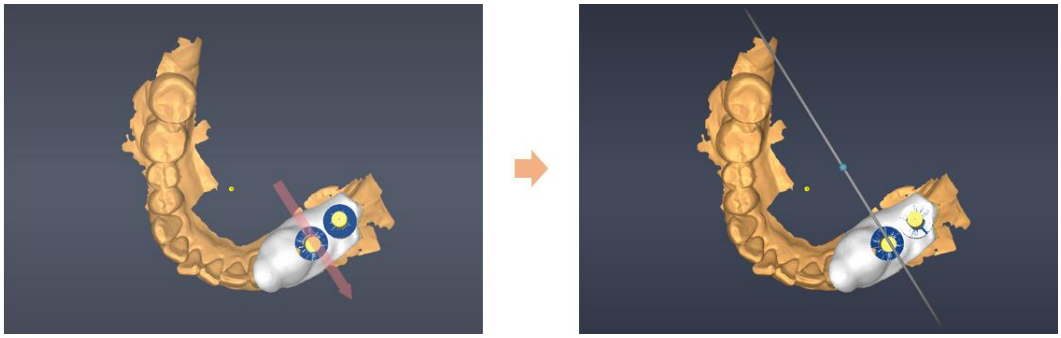
⚠	**When image data is not properly arranged, it can be corrected by clicking Camera Alignment button.**

4.8 Cross-sectional Setting

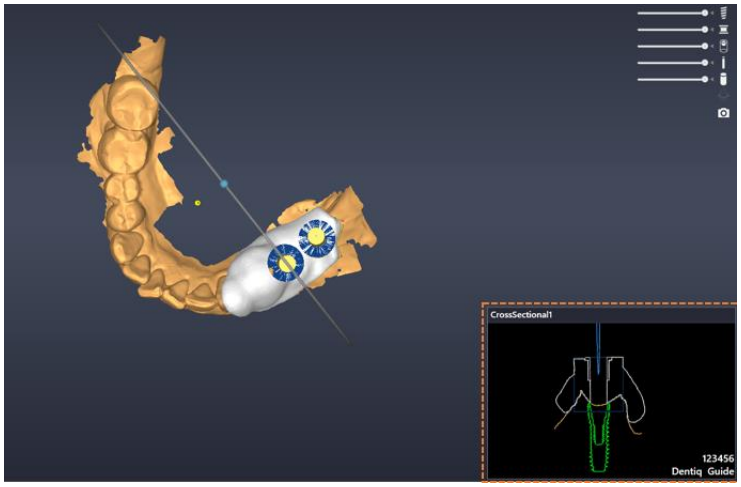
The user can add cross-sections of their choice on each workflow. To add cross-sections, please follow the following steps.

① Click the Add Cross-section Panel button  on the right side of workflow stage screen.

② Click a start point and an end point to view on 3D image panel.

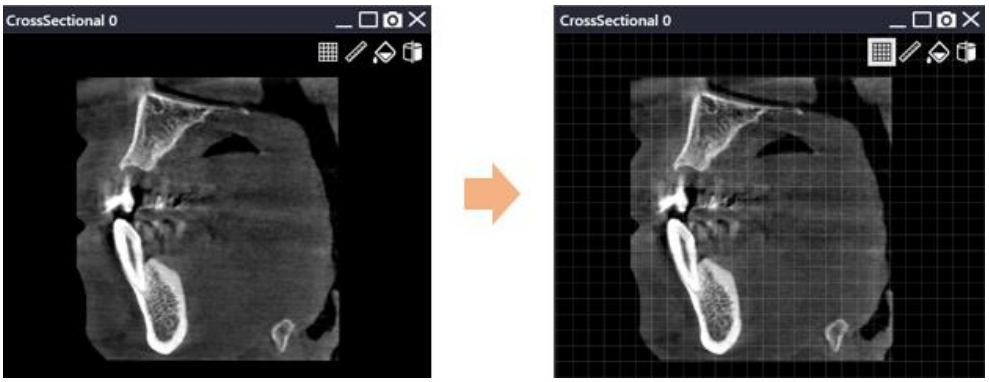


③ As soon as the end point is clicked, cross-sectional image panel is shown on the bottom right of the screen.



Displaying Grid Lines

- Click the Grid button  on the top right of image panel to display grid at 5 mm distance.



[Before (left) / after (right) displaying grid]

Setting Background Color

- Click the Background Color button  on the top right of image panel to display coloring menu.

  - When  is clicked, background color is set to black.
  - When  is clicked, background color is set to transparent.

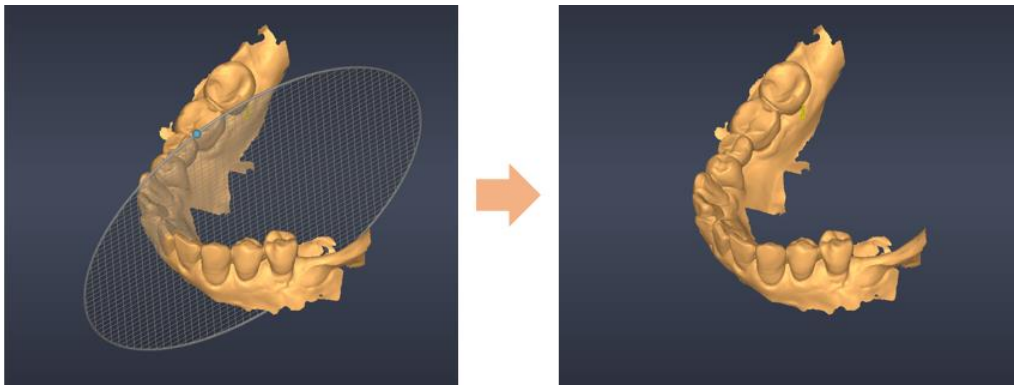
Using as a Clipping Plane

- Once clicking the Using as a Clipping Plane button  on the top right of image panel, 3D Image will be shown to be cut based on the cross-section that is displayed on the current cross-section.

[Set cross-section (Left) / 3D image when using a Clipping Plane (Right)]

Hiding the 3D Sectional Widget

- When clicking the Hiding Sectional Widget button  on the top left of 2D sectional image, the sectional widget on the 3D image can be shown or be deleted.



[Cross-sectional image (left) / Clip surface on 3D image (right)]

	By default, for steps (alignment/curve/nerves/implant) that provide 2D image areas, you can add up to three sections in total, and for the rest of the steps, you can add only one.

	Use the right button click to undo actions after clicking the Add Section Panel button.

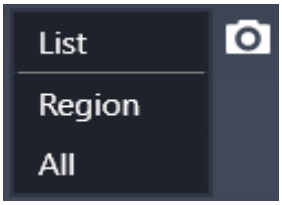
4.9 Screen Capture

The user can capture the image of their choice by using Capture button on the right of workflow stages or Capture button on the title bar of 2D image panel.

[Capture button on workflow progress stages (left) / 2D image panel (right)]

1) Image Capture

- **Capture in 2D image panel**: When Capture button is clicked, only the image in the panel is captured. Also, list of captured images is displayed as soon as captured.



List	Display list of captured images
Region	Capture user defined region
All	Capture full screen of program

- **Capture on the right of workflow stages**: When the button is clicked, the following menu is displayed. Also, captured image list displays after Region/All capture.

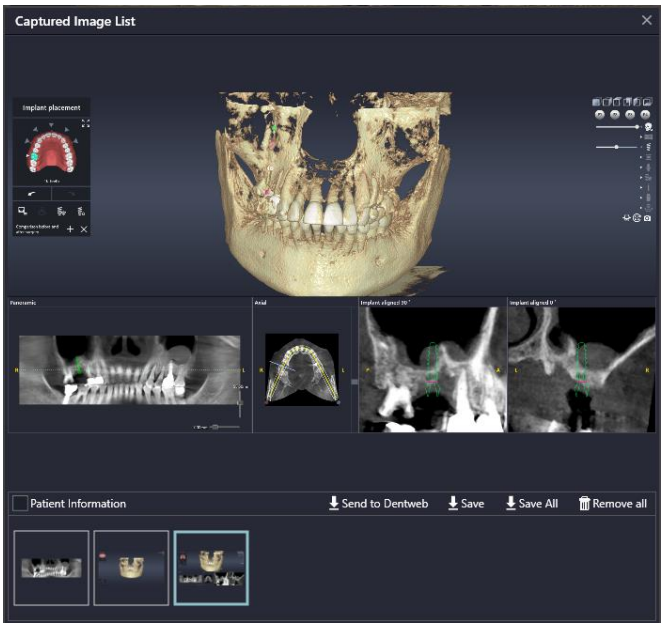
	Right click to undo after clicking the Region button.

2) Captured Image List

In the Captured image list dialog, the user can view/save/delete the captured image and add memo to the captured image if needed.

Patient information can be displayed in the captured image or not by checking or unchecking 

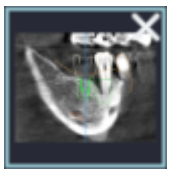
option.



Save/Remove

- **Save**: The user can save only selected images by clicking Save button 

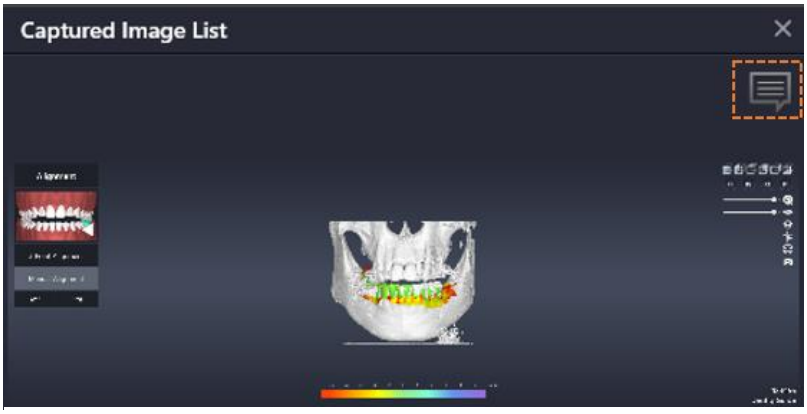
on the list of captured image thumbnails or save all captured images by clicking Save All button 

. Save function only supports JPEG and PNG file formats.
- **Remove:** Click the X button 
that appears when the user hovers over a thumbnail of captured image to remove the selected image, or click Remove All button 

to remove all captured images.
- **Send to DentWeb**: Click to send the captured image to dentweb. 5.3 Configuration 14) Available after PMS setup. It is only available in surgical plans for patients designated on the dentweb (taking pictures on the dentweb > sending patient information via DentiqGuide).

Adding Memo

① Click the Memo button displayed on the top right when the user hovers over the area of captured image preview.



[Memo Button]

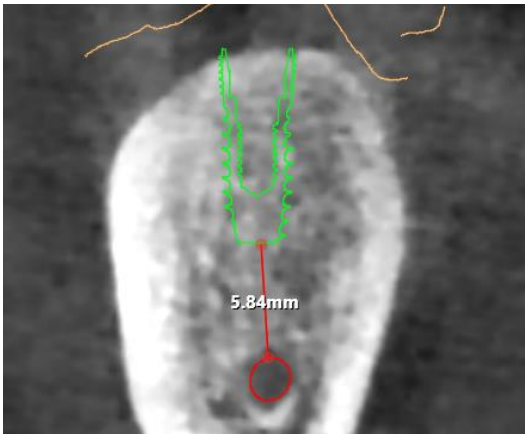
② Click on the location to add memo and double click the "**Double Click!**" position. Then the text input field is enabled to enter memo.

4.10 Use of Measurement Tool

The user can analyze image using tools on 2D image panel. The tools provided on 2D image panel can vary according to workflow stage and type of image.

1) Measurement Tool

Measuring Length



[Length Measurement]

- Click  and measure length by clicking and dragging.

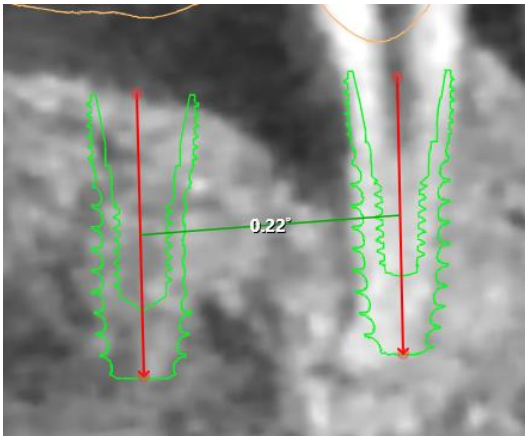
	**Length measurement can fail without dragging after clicking on the start point. Please drag from start point to end point before releasing mouse.**

	**Click and then hold down the Shift key and drag for easy measurement of vertical length.**

	**As measured values in the program can be different form actual values, accurate readings must be made by professionals.**

Measuring Angle

- Click  and measure angel between two lines by clicking 4 points in the image.

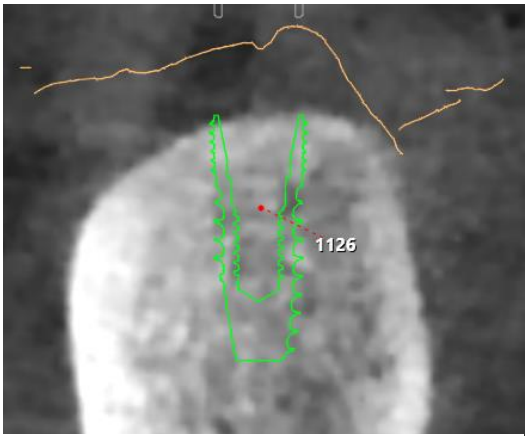


[Angle Measurement]

	**The angle may change depending on the order of clicking the 4 points. Please click points in the same direction for the two lines.**

Measuring HU

- Click  and measure HU value by clicking desired point in the image.

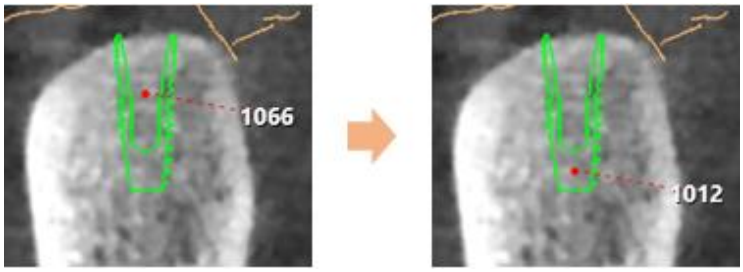


[HU Measurement]

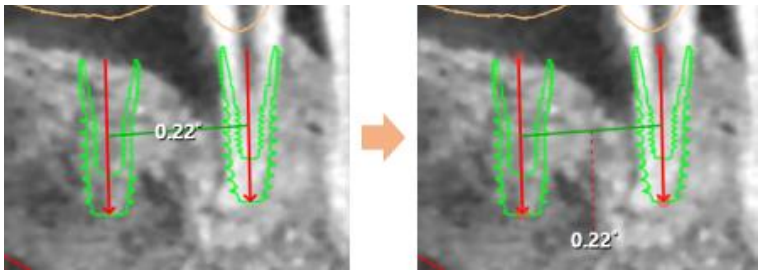
	**Right click to cancel the selected measurement tool.**

2) Move Measurement Value

- **Move measured position (clicked point)**: Click and drag the measured position.

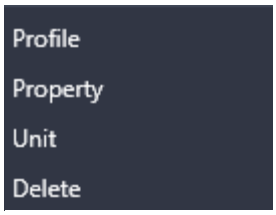


- **Move measured value (number)**: Click and drag where the measured value is displayed.



3) Edit Measured Value

The user can delete or edit property through context menu displayed when right clicking on the measured position or value. The menu may vary depending on measurement tools.



[Context Menu]

Deleting

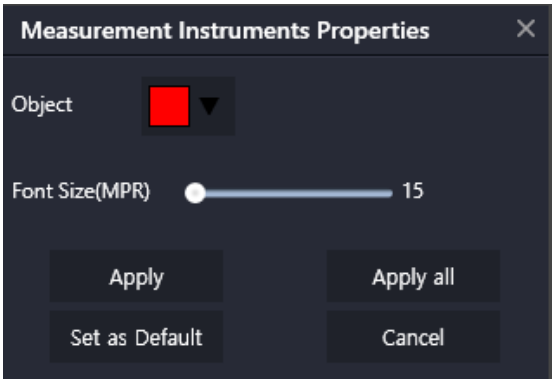
- Click 

to delete the measured value on the image.

Changing Property

- Click 

to change properties for the measured value.



[Properties]

- 

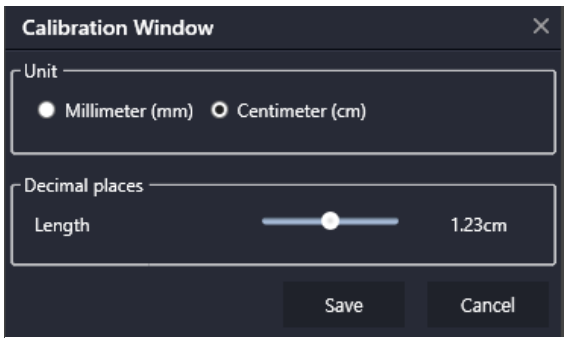
: Change color to display.
- 

: Change font size of value to display.
- **Apply**: Apply changes to the selected value.
- **Apply All**: Apply changes to the all measured values added.
- **Set as Default**: Set changes as default values.
- **Cancel**: Cancel all changes.

Changing Length Measurement Unit

- Click 

to change the unit for length measurement value.

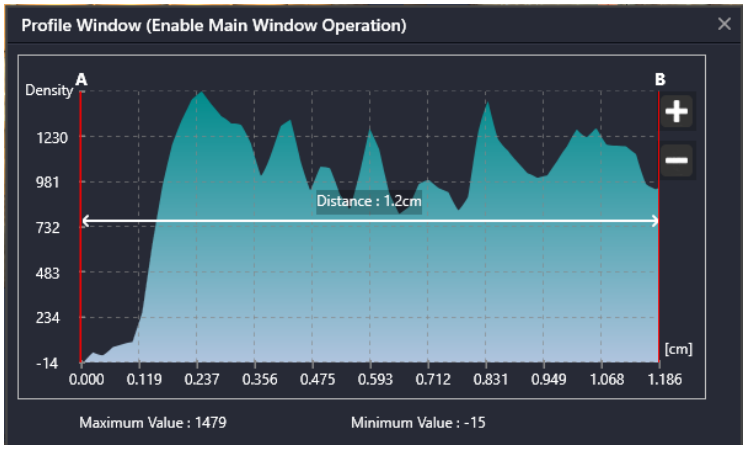


[Length Unit Change]

- **Length Unit**: Selectable between Millimeter(mm) and Centimeter(cm)
- **Decimal places**: Changeable by dragging slider

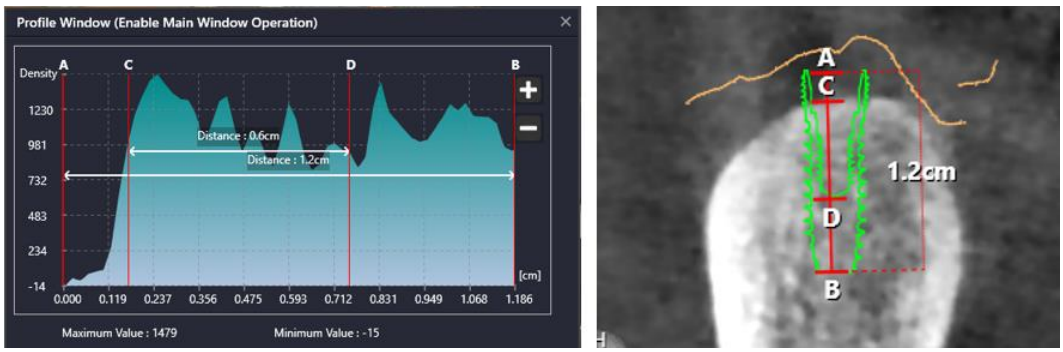
Profiling Length Measurement

- Click Profile to view density for the measured position in a graph



[Profile]

- Y-axis of graph represents density.
- X-axis of graph represents length.
- Detailed length analysis within measured length can be conducted by using +/- button on the right.
- If profile is enabled, location indicator (A, B, C…) appears on the measured length of image.



[Profile (left) / Length Measurement (right)]

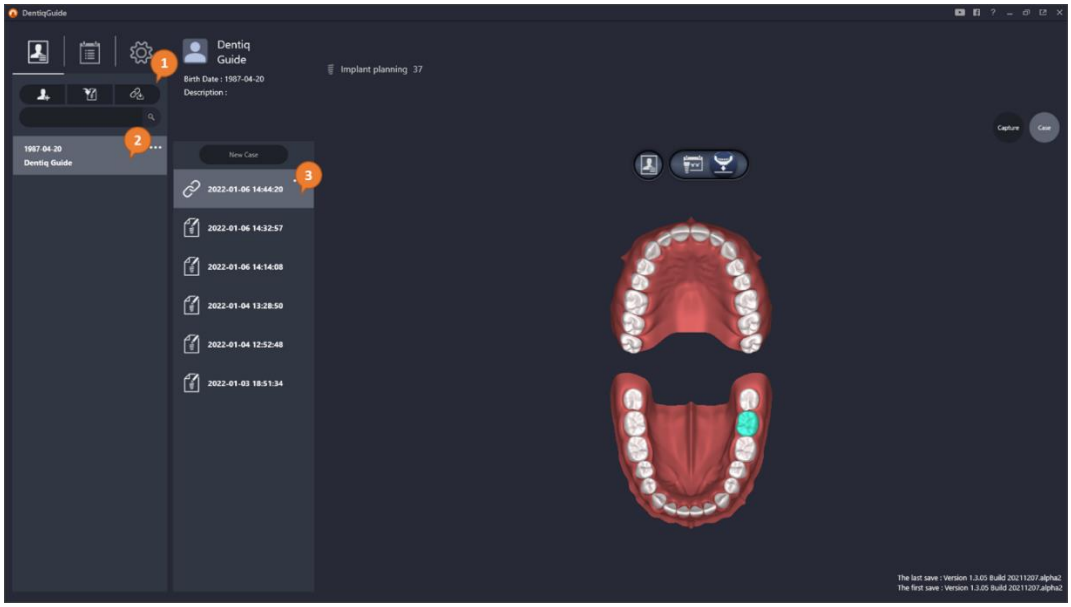
5. Dental Manager

Dental Manager enables users to manage patients/cases and change settings.

No	Title	Description
1	Patient Management	Create and manage patients/cases
2	Case Management	Import and manage cases
3	Settings	Set program environment

5.1 Manage Patients

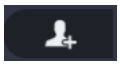
The users can add patients/cases and open previously created cases.

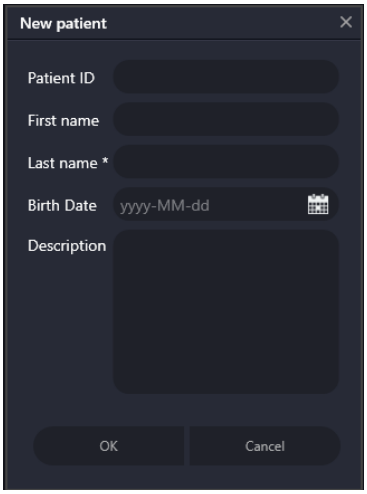


No	Title	Description
1	Patient and Case Management	Import and search patients/cases. Search DentiqLink download list
2	Patient List	Display and edit patient list
3	Case List	Create, display and edit cases
4	Case Info	Display case info

1) Patient and Case Management

Creating a New Patient

- Click New patient button  to display New Patient window.
- Enter patient info and click OK to add the patient to patient list.



[New Patient Window]

	**Last name entries among patient information items are required. (*displayed).**

	**The menu to edit patient information is provided when right-clicking on the patient list.** **Please refer to 5.1 Manage Patient > Modifying Patient Info for more information.**

Importing Case

- Click Import case button  to import an exported case to the program.

	**The surgical plan file that can be registered with DentiqGuide has a ".dqgn" file format.** **Only files that are registered can be exported normally from the program. The folder containing ".dqgn" must contain all files created at the time of export.**

Importing case from DentiqLink

- You can click the Import button  on DentiqLink to see the order items you need to check and download and import the surgical plan file corresponding to that order. This button  is activated after DentiqLink login. Refer to DentiqLink for more details.

Searching

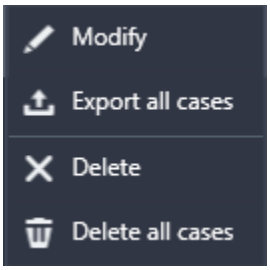
- Enter patient name in the patient search window  to search patient.

2) Patient List

Patient list displays and manages list of created patients.

Modifying Patient Information

- Right-clicking on the created patient list  displays edit menu.



3) Case List

Case list displays and manages the list of created cases

Modify	Modify patient info on New patient dialog
Delete	Delete the patient
Export all cases	Export all data of selected patient
Delete all cases	Delete all cases for the patient

Opening Case

- Double click an existing case to load and display previous work of the case.

Creating Case

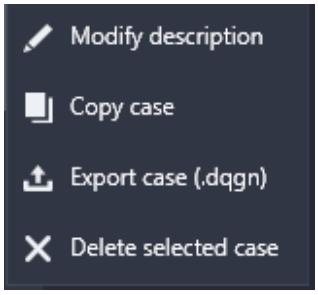
- Click New Case button 

to start workflow and display work space of the case.

	Please refer to 6. Case Workflow Stages for more information about case workflow stages.

Editing Case

- Context menu is displayed when right clicking on a created case  .



Delete selected case	Delete the selected case
Export case	Save the selected case to local drive
Modify description	Modify description of the selected case
Copy case	Copy the selected case to create as a new case

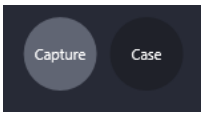
	Exported case can be viewed on another DentiqGuide by imported the case. Please refer to Importing Planning Data for more information.

4) Case Information

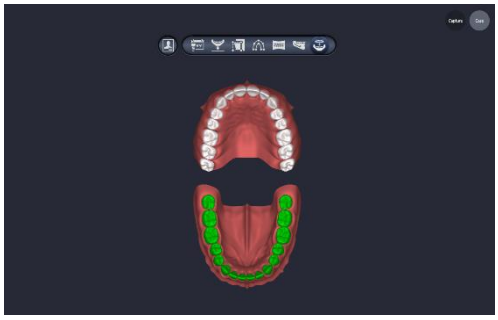
Case Info section displays information such as tooth number, status, order number and date for the selected case.

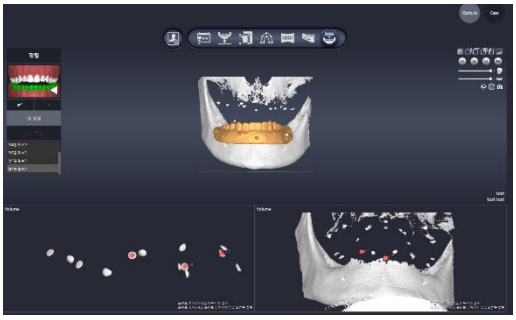
Changing Case Preview

The user can select case preview between Case screen and Capture screen.

- Click preview menu 

on top right. The user can select the desired preview format.





[Capture button click (left) / Case button click(right)]

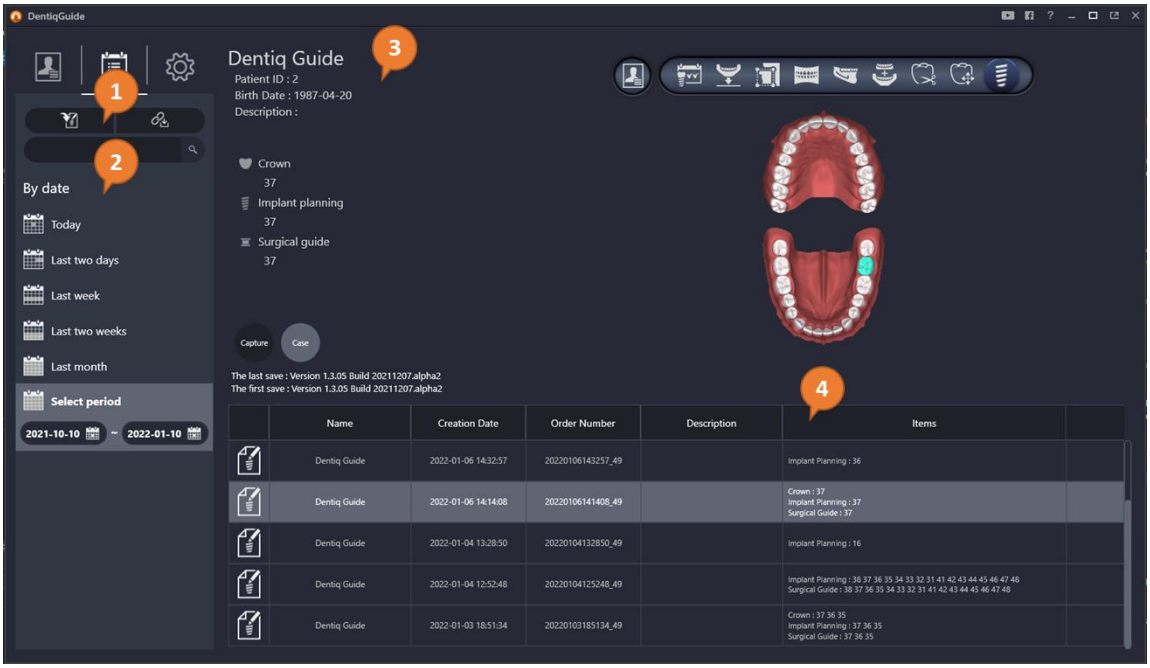
Checking Project Build Version

The user can find the program version of the project when initially created.

	**Old projects might not run on the latest version after program update.**

5.2 Manage Cases

The list of cases searched by period is displayed.



No	Title	Description
1	Manage Cases	Import and search cases
2	Search by date	Search cases by period
3	Case Info	Display the selected case information
4	Case List	Display and edit case

1) Managing Case

Importing Case

- Click Import case  button to import a previously exported case in the program.

	**The extension of the surgical plan file that can be registered in DentiqGuide is. It's ".dqgn" file format.** **Only files that are registered can be exported normally from the program. The folder containing .dqgn file must contain all files created at the time of export.**

Importing case from DentiqLink

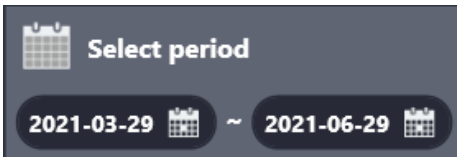
- You can click the Import button on DentiqLink to see the order items you need to check and download and import the surgical plan file corresponding to that order. This button  is activated after DentiqLink login. Refer to DentiqLink for more details.

Searching

- Search patient by entering patient name in the patient search window  .

2) Sort by Period

- Click the desired period to display cases during the period.



3) Case Information

Case Information displays tooth number, status, order number and date for the selected case.

4) Case List

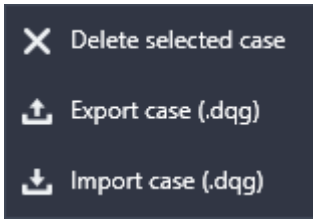
Case list displays the list of created case as sorted.

Opening Case

- When double clicking on a created case, workspace of the selected case displays.

Editing Case

- When right clicking on a case, the following context menu displays.



Delete selected case	Delete the selected case
Export case	Save the selected case to the local drive
Import case	Import the exported case to the program

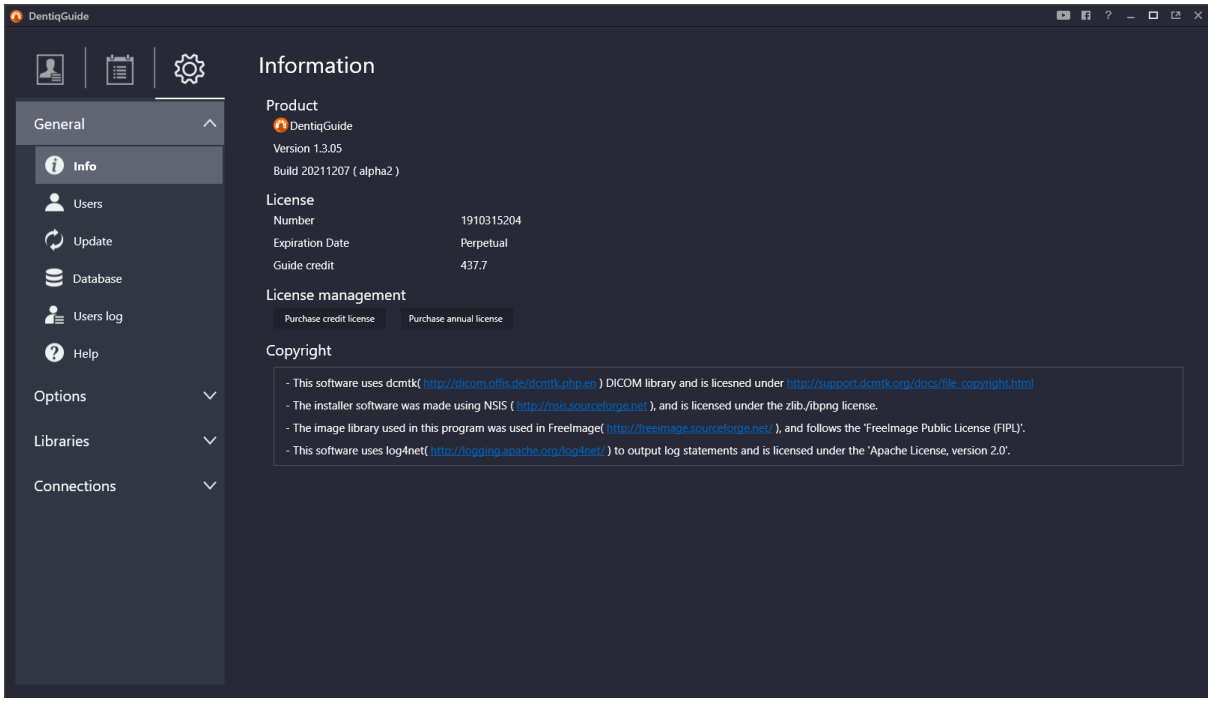
5.3 Settings

The user can set basic environment to use DentiqGuide and options to establish surgical plans. The following table lists configurable items.

General	
Program Information	Refer to 1) Program Information
Users	Refer to 2) Users
Updates	Refer to 3) Updates
Database	Refer to 4) Database
Users Log	Refer to 5) Users Log
Help	Refer to 6) Help
Options	
Common	Refer to 7) Common
Implant Planning	Refer to 8) Implant Planning
Surgical Guide	Refer to 9) Surgical Guide
Temporary Crown	Refer to 10) Temporary Crown
Report	Refer to 11) Report
Library	
Library Upate	Refer to 12) Update Library
Library	
DentiqLink	Refer to 13) DentiqLink
PMS	Refer to 14) PMS

1) Program Information

Program Information page provides product version, license information of dongle key and license information of third-party program.

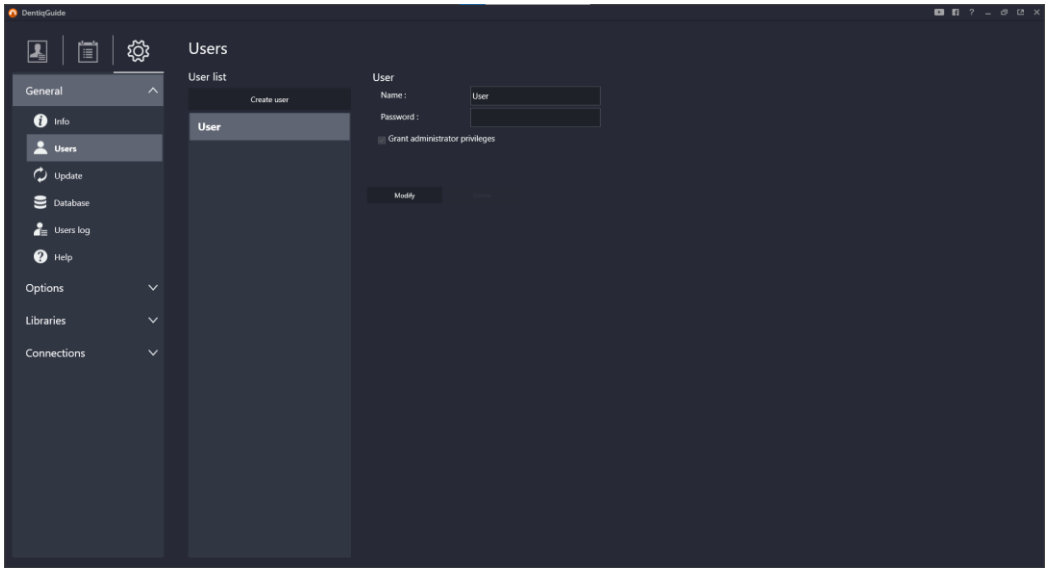


	Using a Web license, please refer 8. Appendix -> 9.2 license.

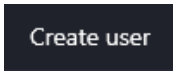
	The recognition of license changes will take effect after the program is shut down and restarted.

2) Users

User accounts required to use the program can be created and managed on Users page.

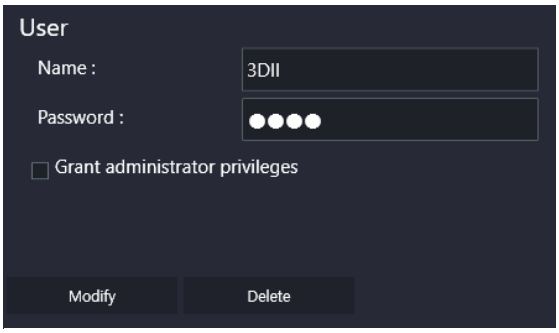


Creating User

- Click the Create user button  to display User creation page.
- After setting user name, password, and admin permission, click Create to add the user.

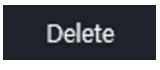
Editing User information

- Select a user to edit from user list.
- Edit user information on the edit page and click Modify button to apply changed.



[User Edit Dialog]

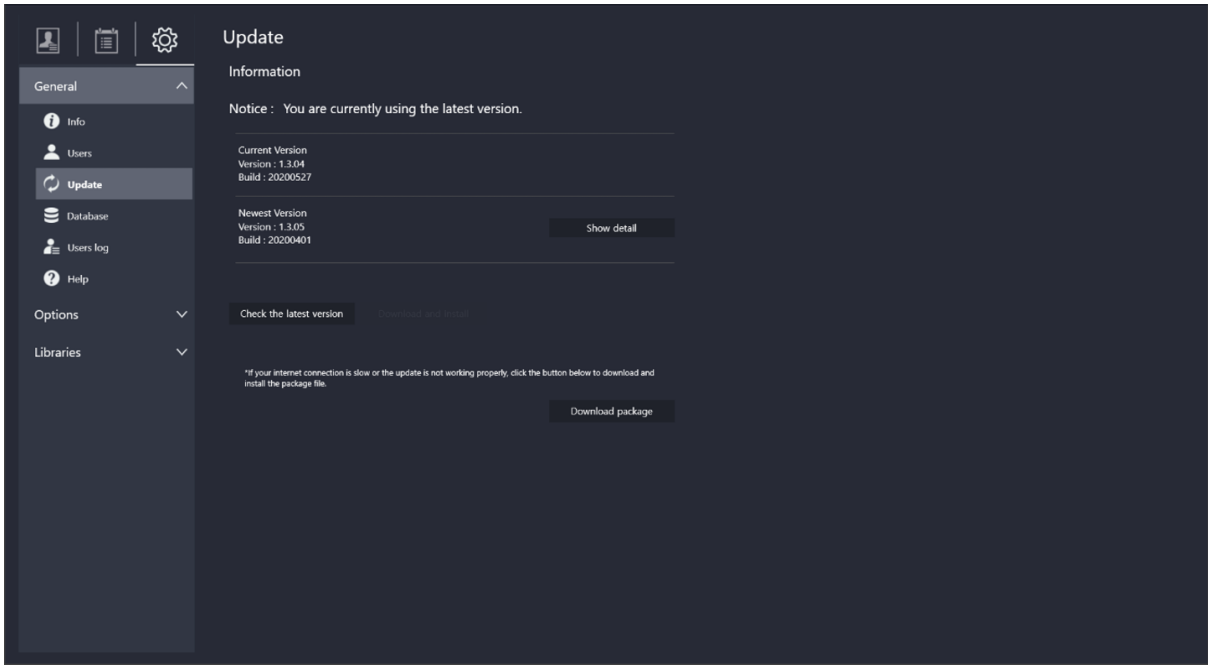
Deleting User

- Click the Delete button  to remove the user.

	Only accounts with admin permission can delete users.

3) Updates

Updates page provides update information and runs update.



Updating

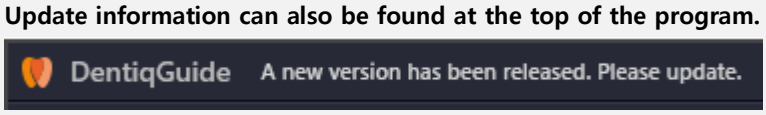
① Click the Check the latest version button Check the latest version to view the version information of current version and latest version.

② Download and install button Download and install is enabled if the user has not yet installed the latest version. Clicking the button updates the program to the latest version.

	Please do not run DentiqGuide while updating. **Updates from the program requires proper network connection.** **Please update in a stable network environment. If update fails, please try again as stated above.**

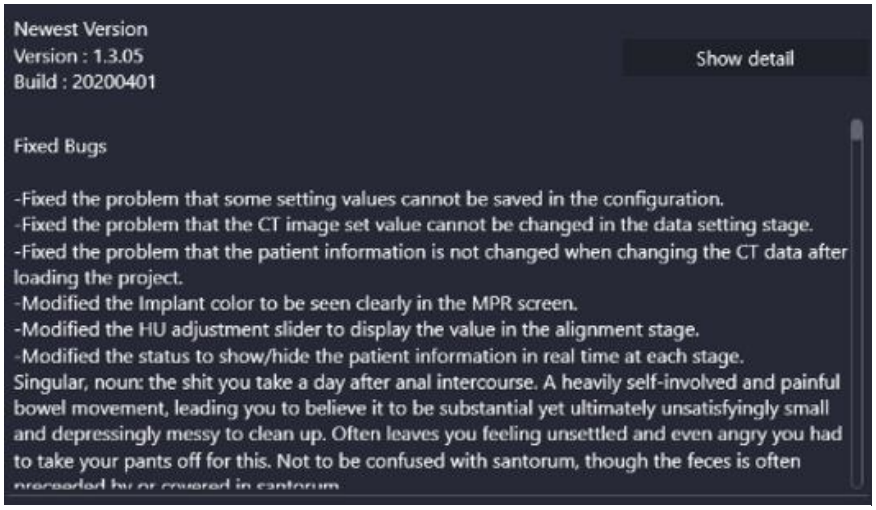
	Update can fail due to unstable server or slow network speed than standard. **Installation file can be downloaded by clicking Download package button** Download package **to run manual update.**

Update information can also be found at the top of the program.



Check for updates

- Up-to-date information When you click the Show detail button Show detail on the right side of the information, the update will be displayed in the bottom pane.



[View details of updates]

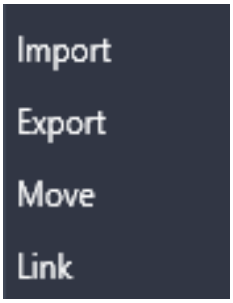
4) Database

In the Database page, the user can view and change database path to save cases.

Title	Description
Path	Display currently set database path
Database Size	Display currently used database size
Space	Free space for currently set data path

The color of bar indicating drive size changes to yellow when the size of top-level folder reaches 80%, to red when it reaches 90% of drive size.

Changing database



Import	Import database from a different directory to current directory. (*All data being used in current directory will be lost.)
Export	Copy current database in a different directory.
Move	Move currently used database to a different directory.
Link	Use database in a different directory.

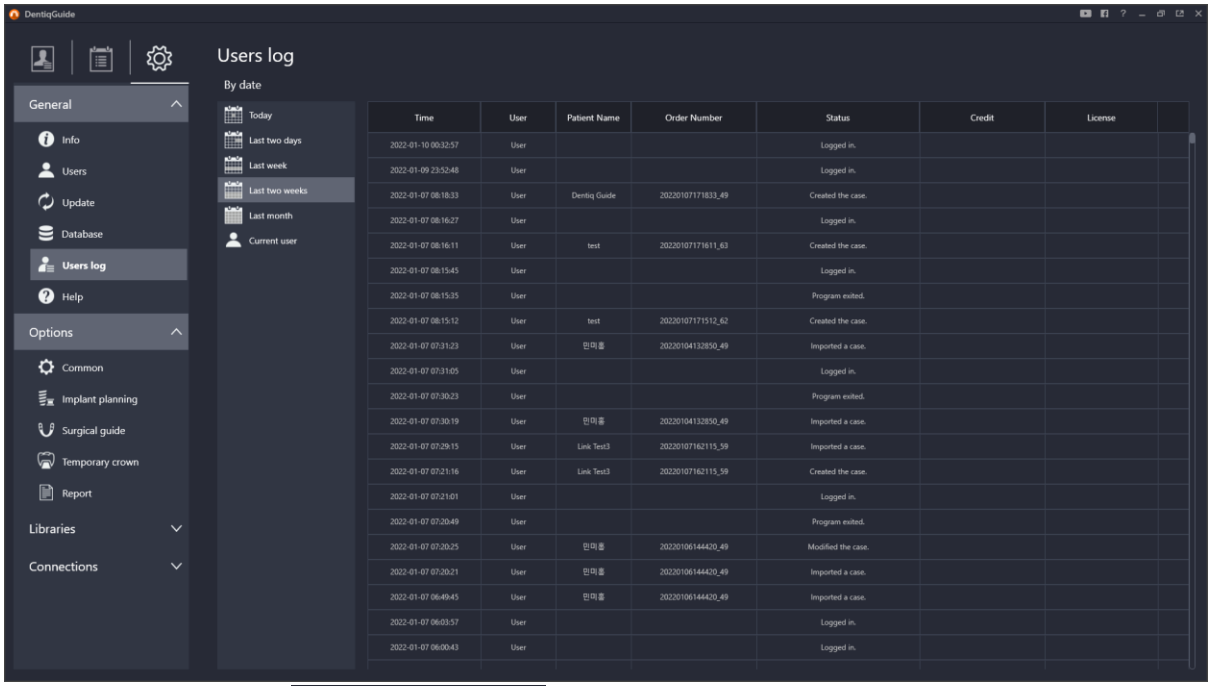
- Click the ... on the right of path option to display context menu to change database folder.

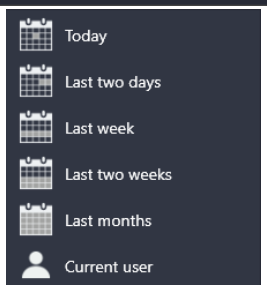
It may take some time to change depending on database size.

The storage space of path to change should be bigger than currently used database size.

5) User Log

Users Log pages shows program use logs such as Time, User, Patient Name, Order Number, Status, Credit and License.



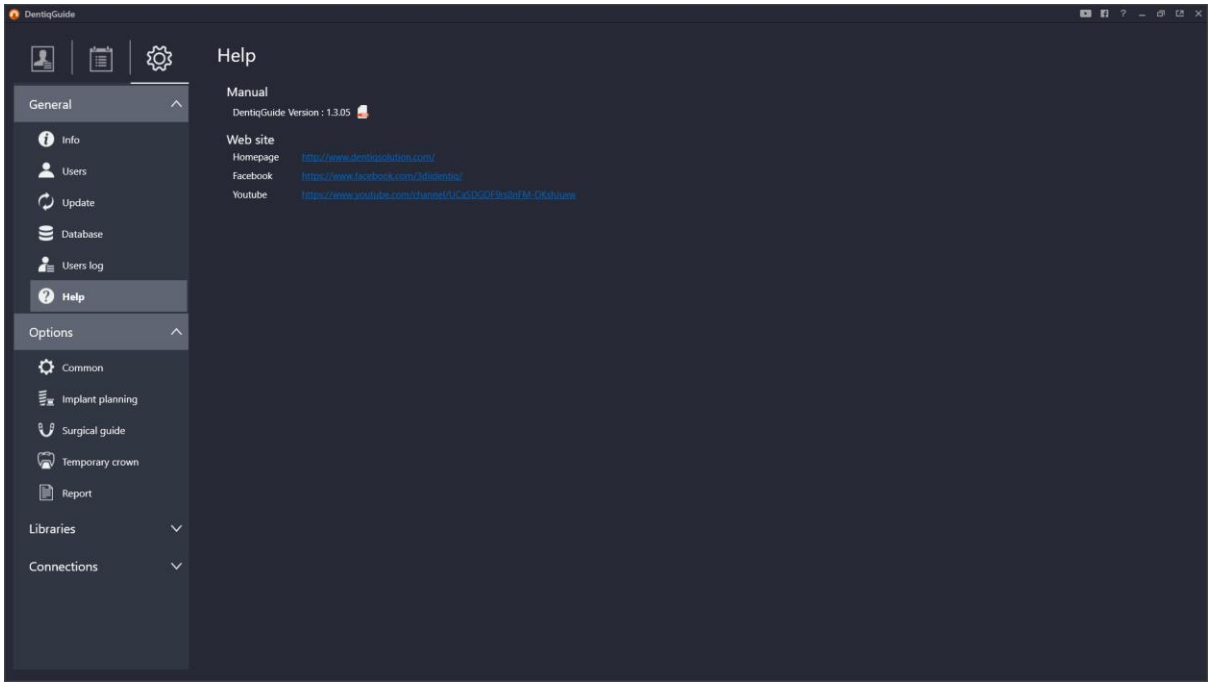
- Filter function 

helps users to search by duration or user.

Users log page displays log data up to two months.

6) Help

Help page provides a user manual of current version.

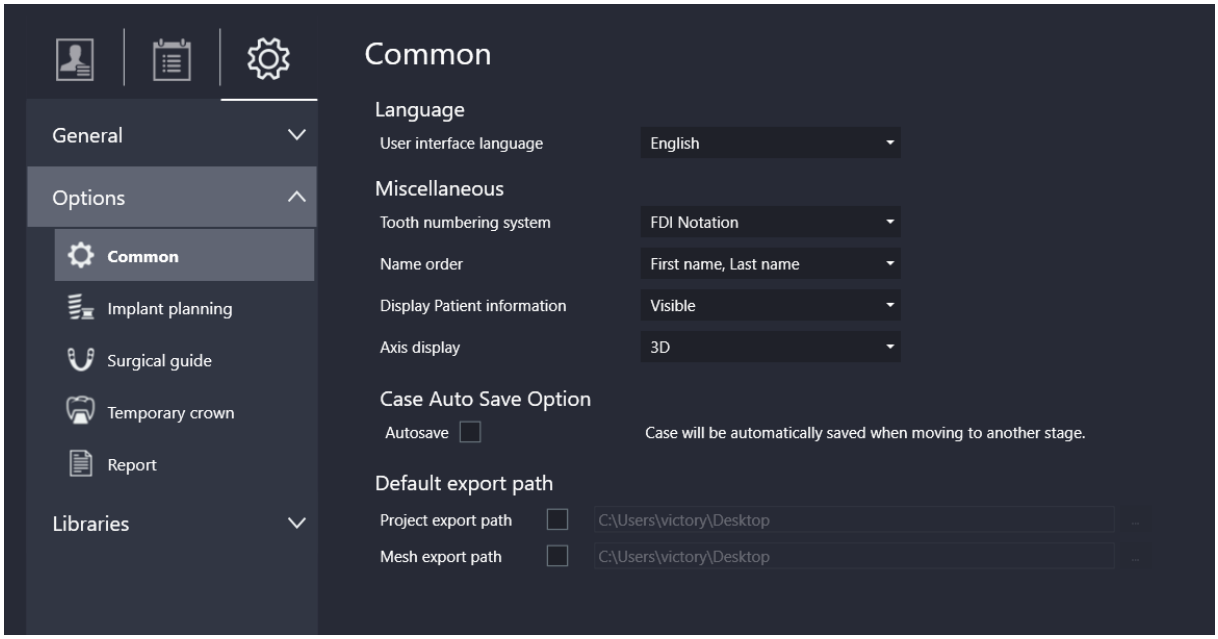


- Clicking pdf icon on the right opens user manual in currently displayed language.
- When you click a link to a website, the webpage is connected.

To run user manual, click ? button on the window title bar or simply hit a shortcut on keyboard (F1).

7) Common

The user can configure basic options such as language and auto save option.



Language

- Click English drop box to select language.
- Select among Korean, English, Chinese and Polish. Changed language will be applied re-start software.

Tooth Numbering System

- Click FDI Notation drop box to select system.
- Select a system between FDI Notation and Universal Numeric Notation.

Name Order

- Click First name, Last name drop box to select order.
- Select an order between 'Last name/First name' and 'First Name/ Last Name'.

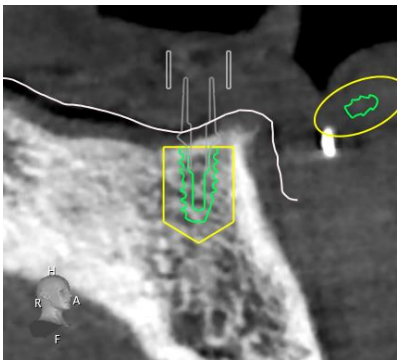
Display Patient Information

- Click Visible checkbox to select display option.
- The user can choose between Visible and Hidden.
- If you select 'Hidden', the patient information does not show on the task screen and report.

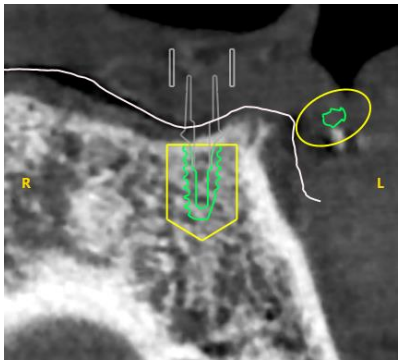
Displaying Axis

- Click 

button to change the axis as 2D or 3D.



[3D Axis]



[2D Axis]

Auto Save Function

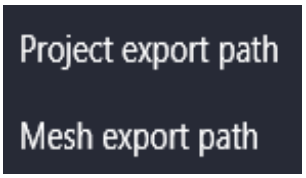
- Click 

checkbox and the surgical plan will be automatically saved when you move the work step.

Default Export Path

- Click 

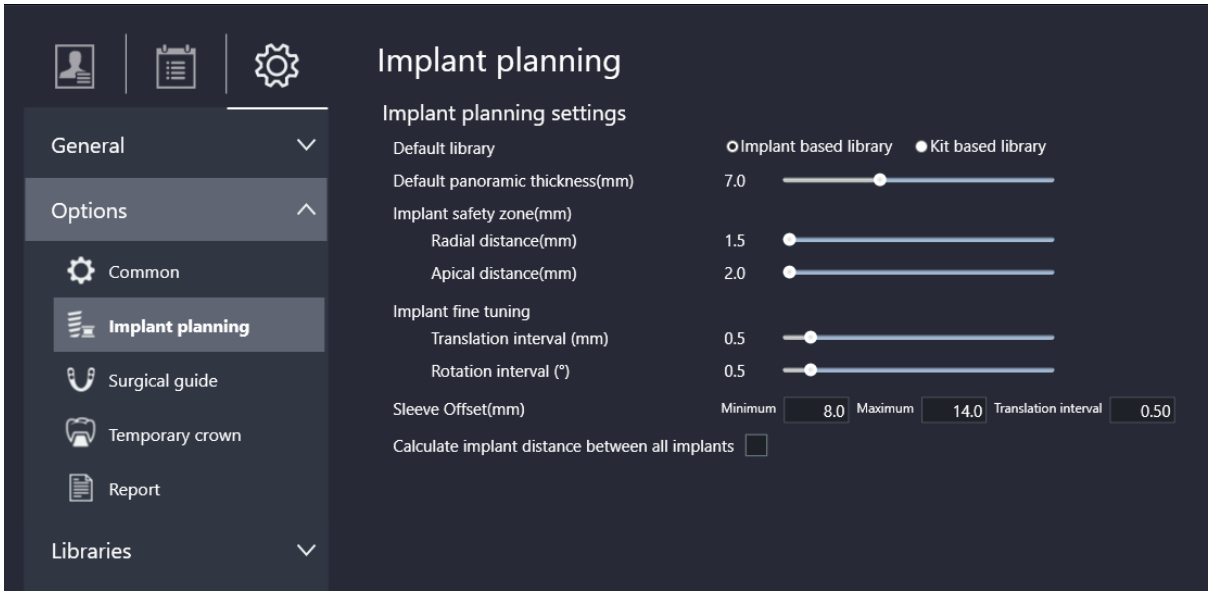
button on the right of path option to display context menu to change basic export path.



Project export path	Set default path to save project when exporting
Mesh export path	Set default path to save mesh when exporting

8) Implant Planning

The user can configure various parameters used in implant placement stage.



Default Implant Library

Set whether to use the library in the implant establishment stage based on an implant or a kit.

For an explanation of the implant-based and kit-based libraries, see the 6.9 implant placement > 4) library.

Default Panoramic Depth

Set default thickness value for panoramic image created in Curve Drawing stage.

- Change value by dragging slider.
- Valid value range is 0~20(mm).

Implant Safety zone

Set default value for implant safety distance.

- Change value by dragging slider.
- Valid value range for Radial distance is 1.5~4(mm) and for Apical distance is 2~5(mm).

Please refer to 6.8 Implant Placement > 6) Custom Sefety Zone function for more information about setting temporary safety zone for a specific implant.

Implant Fine-tuning

Set default interval values for implant fine tuning.

- Change value by dragging slider.
- Valid value range for Translation Interval is 0.1~5.0(mm) and for Rotation Interval is 0.1~5.0(°).

Sleeve Offset

Set default value range to move sleeve.

- Enter Minimum/Maximum and Translation Interval in the text input fields.
- The range of values that can be changed is minimum items 1 to 19.9 (mm)/ maximum items 1.1 to 20 (mm)/ parallel moving intervals 0.05 to 3 (mm).

Generate a warning message when the sleeve offset is set to 5mm or less. Care must be taken to set up the sleeve offset too low as it can have a serious effect on the operation.

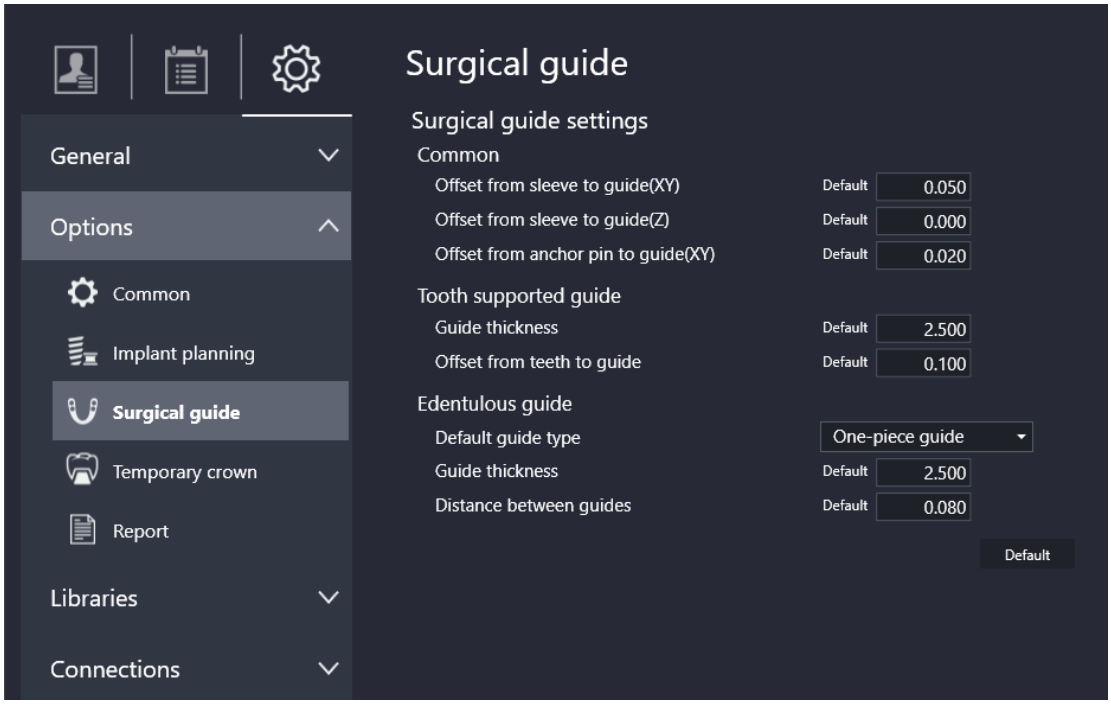
Measure the Distance between All Implant

Select the implant range to be measured when using the distance function between implant and 3D measurement.

- When checking the button, the distance between all implants arranged based on the selected implant will be measured.
- When unchecking the button, the distance between the implants corresponding to both tooth numbers based on the selected implant tooth number will be measured.

9) Surgical Guide

The user can set various parameters user in Guide Generation stage.



Common

- **Offset from sleeve to guide(XY)**
  Set the default offset in the direction perpendicular to the implant insertion direction.
- **Offset from sleeve to guide(Z)**
  Set the default offset in the direction of implant insertion.
- **Offset from anchor pin to guide(XY)**
  Set the default offset in the direction perpendicular to the anchor pin insertion direction.

Tooth Supported Guide

- **Guide Thickness**
  Set default thickness for guide while guide generation.
- **Offset from teeth to guide**
  Set default offset from teeth to guide.

Edentulous Surgical Guide

- **Types of surgical guide**
  You can specify whether the basic guide type within the Edentulous guide stage is an integrated guide or an assembled guide.
- **Surgical guide thickness(only for assembled guide)**

Set the default thickness of the surgical guide when creating the assembled guide.

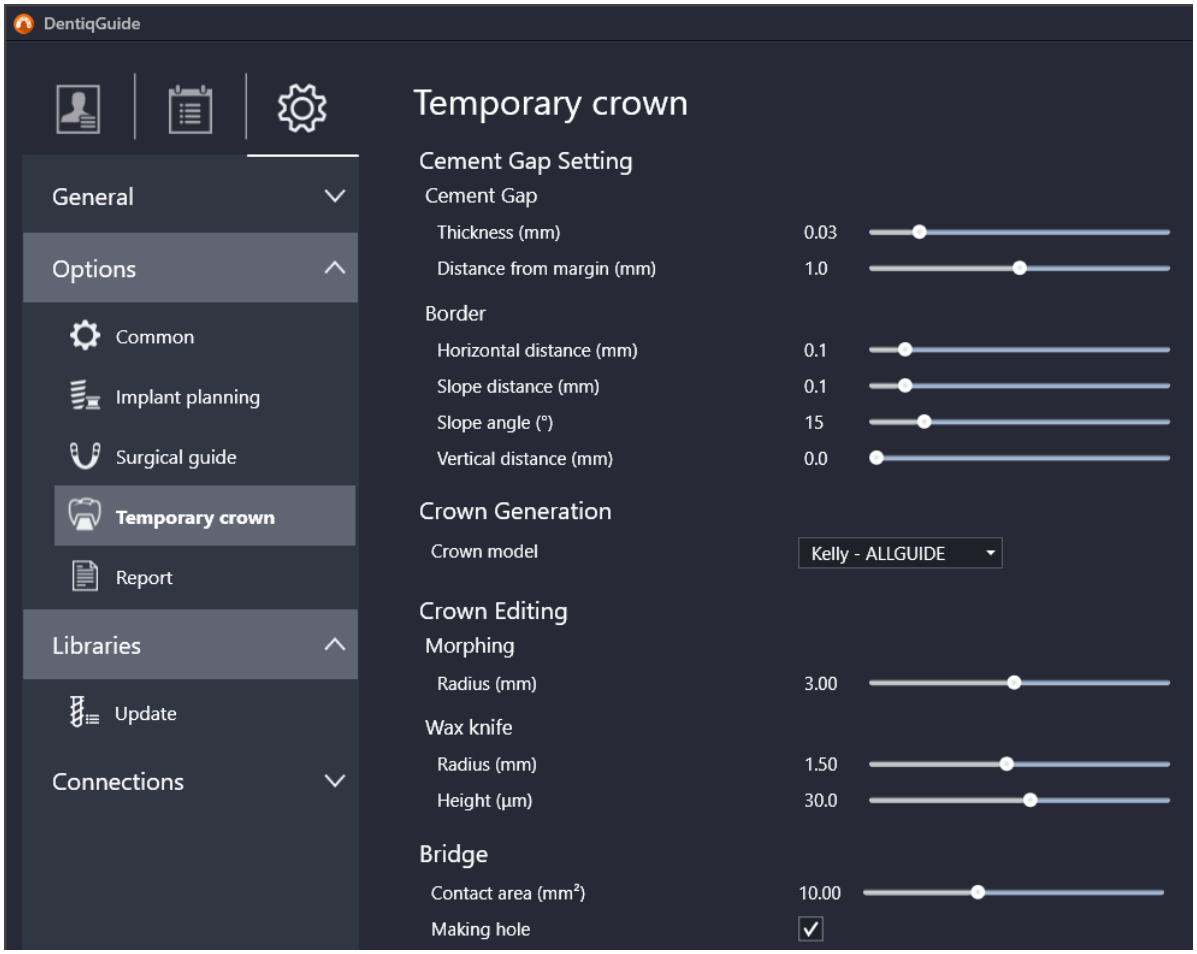
- **Offset between two guides(only for assembled guide)**
  When creating an two-piece guide, you can set the distance between the surgical guide and the occlusion guide.

	**To restore default values the program provides, click Default on bottom right of items.**

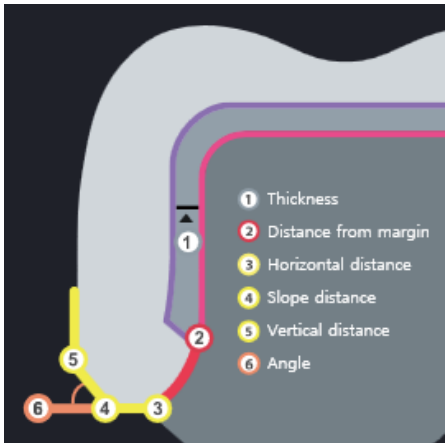
	**Please refer to 6.10 Result > 5) Setting Guide Genertation Options for more information about temporary guide option settings for a specific case.**

10) Temporary Crown

Set various parameters used in Temporary Crown Design stage.



The meaning of each option for Cement Gap is described in the following image.



[Cement Gap and Border]

① Thickness

Set default value for cement thickness created in Cement Gap Setting stage.

- Change value by dragging slider.
- Valid value range is 0~0.20(mm).

② Distance from margin

Set default value for range from margin not to create cement gap.

- Change value by dragging slider.
- Valid value range is 0~2.0(mm).

③ Horizontal distance

Set default value for horizontal distance of temporary crown near margin line.

- Change value by dragging slider.
- Valid value range is 0~1.0(mm).

④ ⑥ Slope distance/Angle

Set default value for slope distance and angle of temporary crown near margin line.

- Change value by dragging slider.
- Valid value range for Slope distance is 0~1.0(mm).
- Valid value range for Angle is 0~90(°).

⑤ Vertical distance

Set default value for vertical distance of temporary crown near margin line.

- Change value by dragging slider.
- Valid value range is 0~1.0(mm).

Crown Library

Set default crown library to use in Temporary Crown Design stage.

- Click 

dropdown menu to select a system.
- Select between 3DII, Kelly – ALLGUIDE, and Adam Nulty library.

Morphing Radius

Set default value for morphing radius in Crown Design stage.

- Change value by dragging slider.
- Valid value range is 0.5~5.7(mm).

Wax Knife Radius/Height

Set default value for wax knife Radius/Height in Crown Design stage.

- Change value by dragging slider.
- Valid value range for Radius is 0.25~3.0(mm).
- Valid value range for Height is 1.0~55.0(mm).

Bridge Contact Area

Set default value for bridge contact area for designing.

- Change value by dragging slider.
- Valid value range is 4.0~20.0(mm).

Making Crown Screw Hole

Set default value for abutment holes creation option for abutment case temporary tooth.

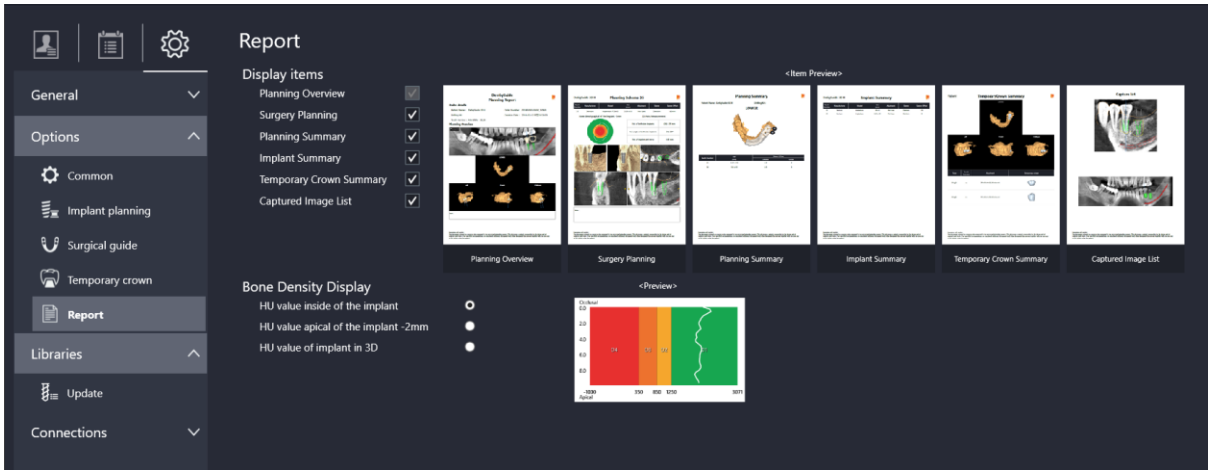
- Click 

dropdown menu to select an option.
- Select between True and False. Basically, it makes a hole when this option is set to true.

	Please refer to 6.11 Crown Design for configuration for specific temporary crown design.

11) Report

Set report options used for surgical report in Result stage.

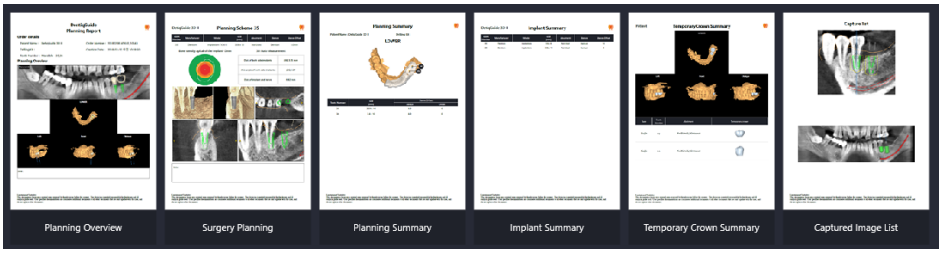


Display Items

Set items displayed in surgical reports. Configurable options are listed in the following table.

Title	Description
Planning Overview	Display general information about patient and case
Planning Scheme	Display detailed case information for each implant
Planning Summary	Display case information based on guide
Implant Summary	Display information of implant used in case
Temporary Crown Summary	Display design information of temporary crown
Captured Image List	Display all captured image

- Check the checkbox on the right to select items to display.



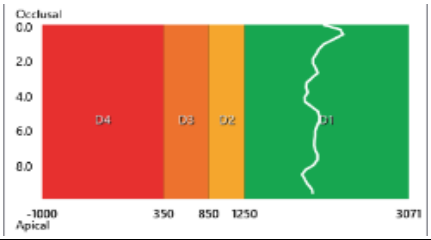
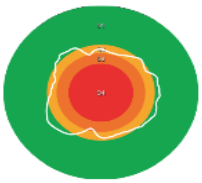
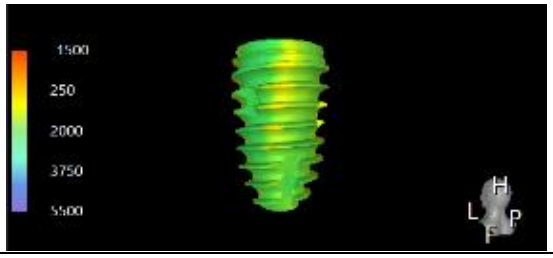
[Preview]

- The checked options are displayed in preview on the right.
- Only checked items are displayed in surgical reports in Result stage.

Planning Overview option is a required option for Report, so it is unable to deselect the option.

Bone Density

Set default value for bone density displayed in surgical report. The following table shows configurable options.

Title	Description
Bone density inside of the implant	Display bone density inside of the implant as average value by depth in a graph. 
Bone density apical of the implant -2mm	Display bone density of 2mm position from the top of implant. 
Bone density of implant in 3D	Display bone density near implant in 3D implant model. 

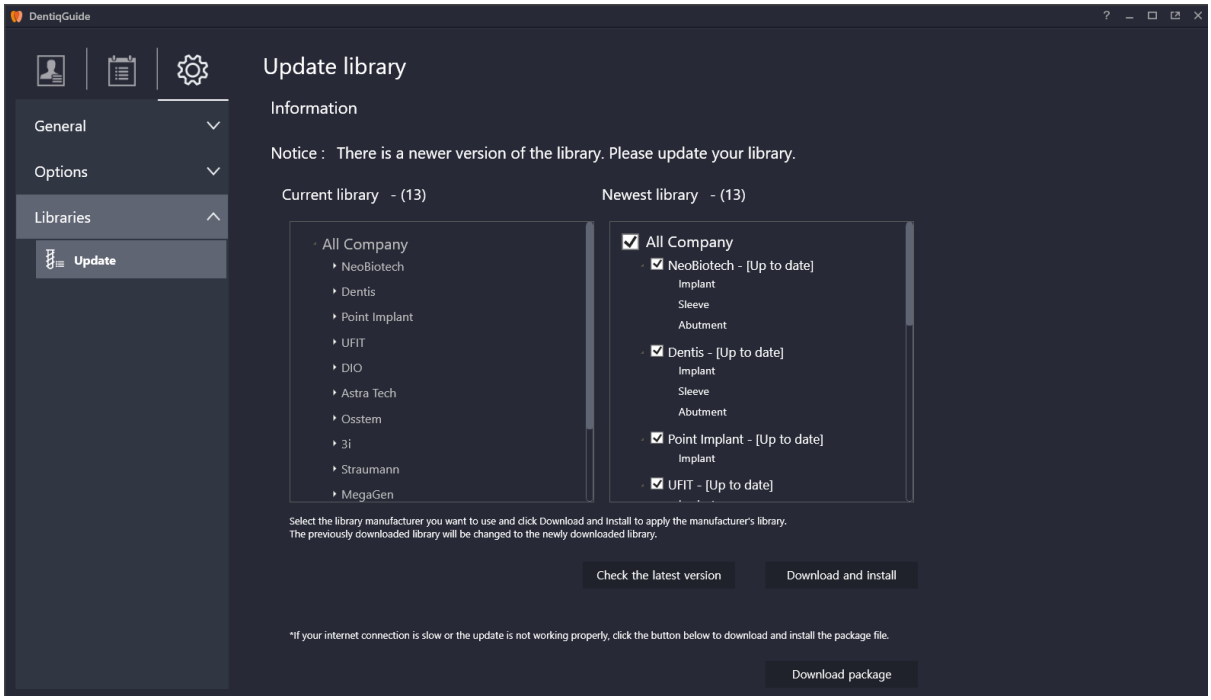
- Select by clicking radio button on the right as an option to display.

Please refer to 6.12 Result > Change Bone Density Display Option for more information about temporary bone density setting for a specific report.

D1~D4 values displayed in data represents bone density levels depending on HU range of CT image. Value closer to D1 means higher bone density.
This data is just for user's reference. Please note that accurate diagnosis should be conducted by professionals.

12) Library Update

Provides implant, sleeve, and abutment update information and conducts updates.



Updating Library

① Click Check the latest version button Check the latest version to view updated information of currently used library on the newest library on the right.

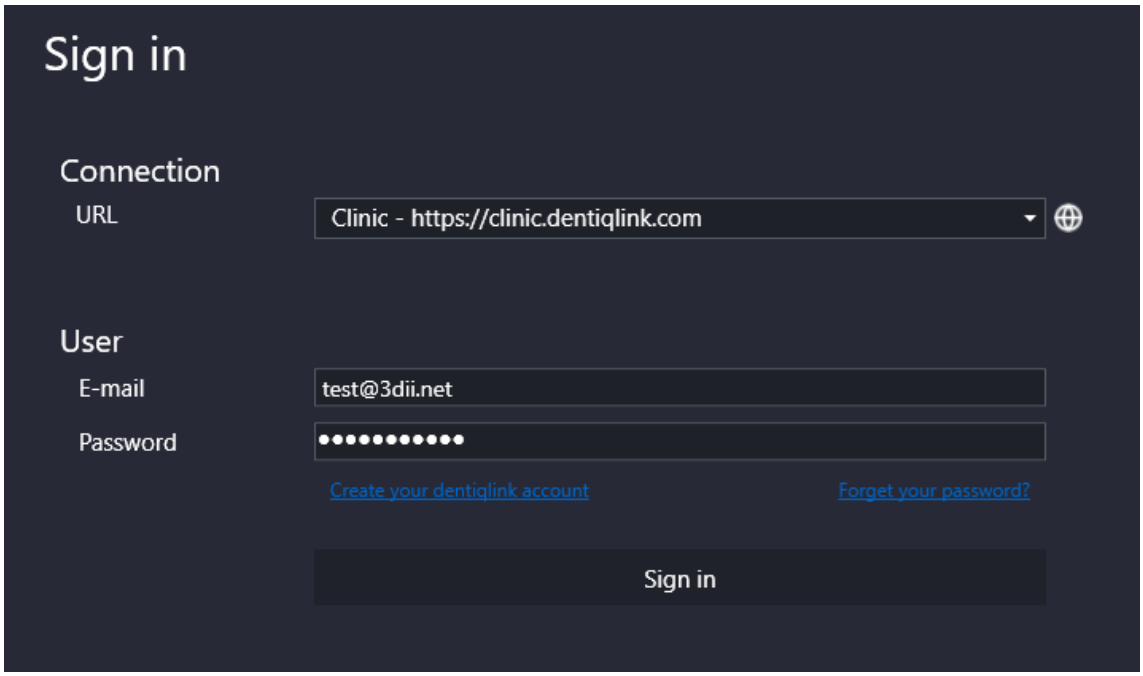
② Check desired options to update in newest library list and click Download and install button Download and install to update the selected libraries.

	**At least one library manufacturer should be selected to update.**

	**Updates from the program requires proper network connection. Please update in a stable network environment.**

	**Update can fail due to unstable server or slow network speed than standard.** **Installation file can be downloaded by clicking Download package button to run manual update**

13) DentiqLink

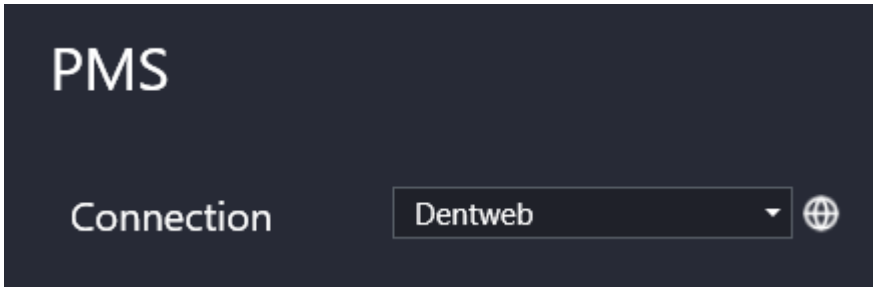


Sign-up is required to use DentiqLink. Click the Connect button or click Create a DentiqLink account at the bottom of the password to access the website and create an account. Enter your email and password and log in. After logging in, you can upload a surgical plan to DentiqLink to place an order or download surgical plan data.

More information can be found at 8. DentiqLink.

14) PMS

User information in the patient management system can be transmitted to DentiqGuide in conjunction with the patient management system. You can also send surgical plan links or captured images to the patient management system.



You can select a patient management system using a combo box. (Only the dentweb is currently supported.)

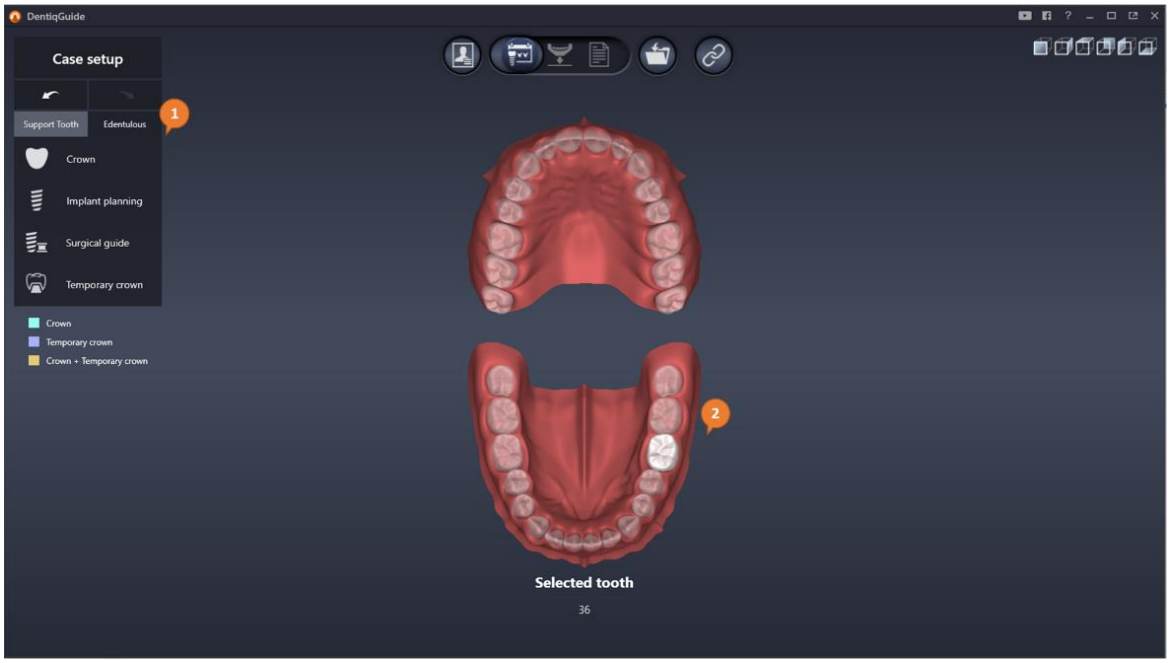
You can connect to the corresponding patient management system website by clicking the Connect button  .

6. Surgical planning for tooth supported type

This stage shows each required stage according to the tooth supported surgical plan.

6.1 Case Setup

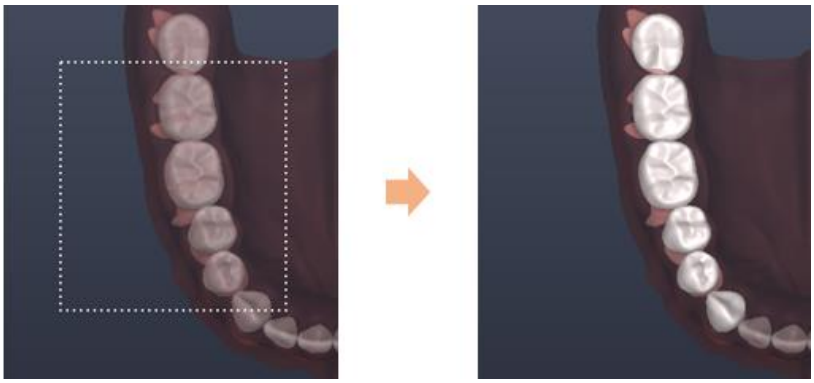
In this stage, you can select the tooth for surgical planning and set the planning item.



No	Title	Description
1	Surgical Plan Items	Select a surgical plan to proceed
2	Select Teeth	Select teeth to work on

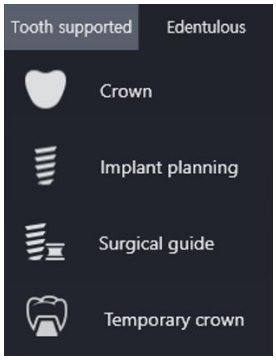
1) Establish Implant Planning

① Select teeth to work on from teeth selection model. Select a single tooth by clicking the desired tooth or select multiple tooth area by clicking and dragging area.



[Example of multiple selection by dragging]

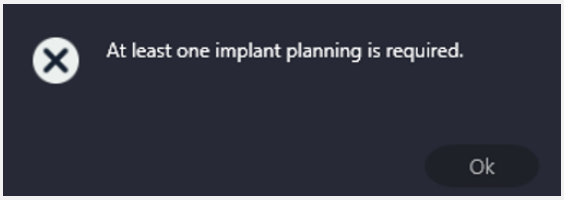
② Select surgical plans from the listed Tooth supported surgical plan items.



Crown	Place crown while implant placement
Implant Planning	Plan implant using CT image
Guide Design	Design surgical guides and export STL
Temporary Crown Design	Design temporary crown and export STL

③ Select surgical plan items and check if next page (Import Data) is enabled on the workflow progress bar.

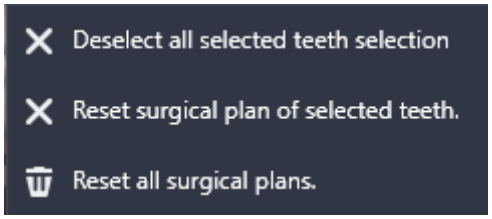
The following dialog appears when only Crown option is selected.



Items displayed on workflow progress bar may vary depending on the selected surgical plan items.

2) Modify Implant planning

① Right click on the selected tooth. The following context menu appears.



Deselect all selected teeth selection	Deselect selected teeth
Reset surgical plan of selected teeth	Reset surgical plan for the selected teeth
Reset all surgical plans	Reset all surgical plans

② Click the desired menu to apply.

Only 'Reset all surgical plans' option is displayed when right clicking without selecting any tooth.

6.2 Data registration

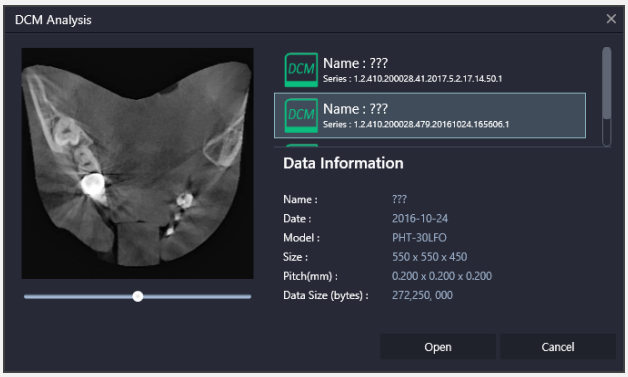
In this stage, patient CT data and maxillary/mandibular scan data can be imported. CT data supports DICOM format and scan data supports STL/PLY/OBJ format.

No	Title	Description
1	Import Data	Import data to the program
2	CT Information	Display imported CT data information
3	Operation Data	Displays data and operation conducted
4	Visualization options and other features	Provides visualization options and additional features

1) Import/Remove Data

- **Import CT/Scan data**: Select designed patient data by clicking from data import option and click open button to import data.

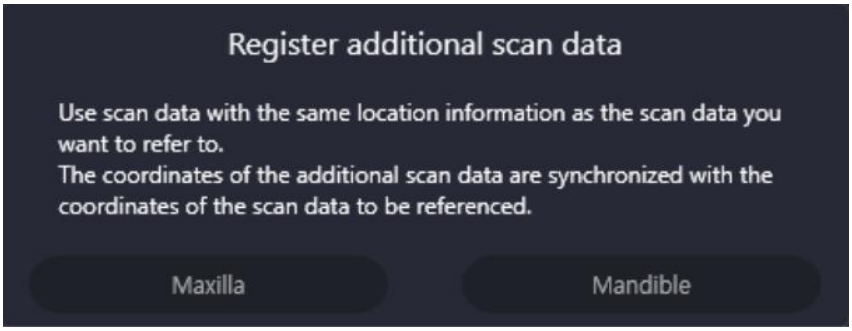
The following DICOM analysis window appears when a folder contains more than 2 series of DICOM when importing CT Data. Click the desired DICOM series and click Open button to proceed.



[DICOM Analysis Dialog]

For the PLY/OBJ scan data, color display may be limited depending on the data characteristics and will be output to the STL file during the guide output process at the result stage.

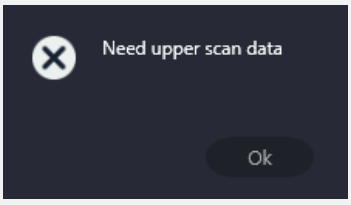
- **Register additional Scan data** : Select the reference site in the window generated when clicking item, then press the Open button after selecting the desired patient's file to register the data.



[Selecting Reference Area Dialog]

	In case of the additional scan data, use the data with the same location information as scan data to reference. It operates and synchronizes with the coordinates of the scan data which is referenced during movement/ rotation/ size modification. (However, if there is no scan data in the reference area, the coordinates unique to the additional scan data are maintained.

	Additional registered scan data is available for the alignment.

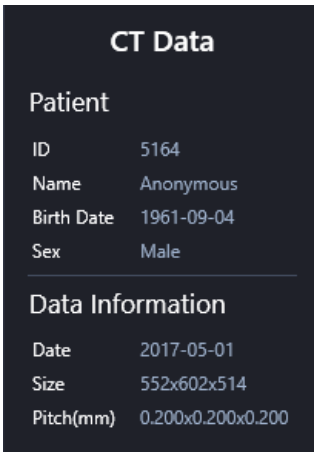
	When crown or implant guide is selected in the Surgery Planning stage, the corresponding upper/lower scan data must be imported. If scan data for the surgical guide is not loaded, the following message appears and the user cannot move to the next stage. 

- **Remove**: Click X button  on the right of each item with imported data.

2) Checking Data

View CT information

Detailed CT data information can be viewed through CT Information option on the bottom left.



[CT Information]

It provides a function of hiding patient information to prevent information from being exposed. You can hide patient information by clicking the CT information panel, and hidden patient information can be displayed by clicking the CT information panel again.

	**Displayed CT information is based on information included in DICOM. Please make sure that the patient information is correct to move on to the next stage.**

View Data Image

The first imported image displays in the main data panel and other imported images display on the bottom right.

- For images on the bottom right, image panels can be minimize/maximize by using exchange image/ maximize button on the right of image title bar.

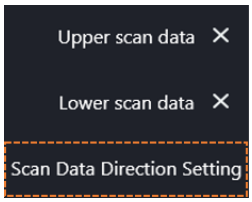
No	Title	Description
1	**Image exchange**	Exchange the image with main image
2	**Maximize**	Maximize image panel

Poor quality of CT image not suitable for surgery planning increases the risk of error in planning. Please check CT image quality and volume are before moving on to the next stage.

Please refer to 4. Common for information about visualization option and other functions.

3) Scan Data Direction Setting

Scan data direction setting menu appears when only temporary crown planning is checked. After importing scan data, the user can align the direction of data if the direction is not correct.

① Click Scan Data Direction Setting option 

under the data import options to display setting dialog.

② Right click and drag scan data on the screen to set direction.

③ - **Apply**: Save changed scan data direction and close direction setting dialog.
- Cancel: Cancel changes and close direction setting dialog.

[Before(left) / After(right) Scan Data Direction Setting]

6.3 Data Settings

In this stage, the user can set ROI (Region of Interest) Area of CT data. After the data setting, image will be remarked only using CT data which was selected at this stage.

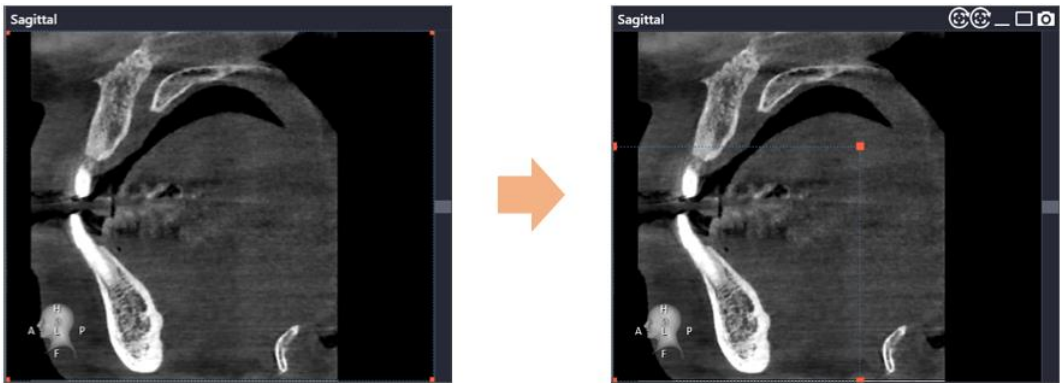
No	Title	Description
1	Select Area	Select area (upper or lower scan data)
2	Alignment Type	Select 3-point alignment/manual alignment
3	Operation Data	Displays data and operation conducted

1) Adjust ROI

ROI adjustment tool will be shown in the MPR (Axial/Coronal/ Sagittal) image area at the bottom of the screen.

[ROI adjustment tool: Square dotted edge red button]

- Mouse click and drag ROI adjustment tool in the area you want to adjust in the Axial/Coronal/ Sagittal Image.



[Before (Left) /After (Right) of Adjusting the sagittal Image ROI]

- The ROI-adjusted CT images can be found in the 3D image area.

[Before (Left) /After (Right) of Adjusting the sagittal Image ROI]

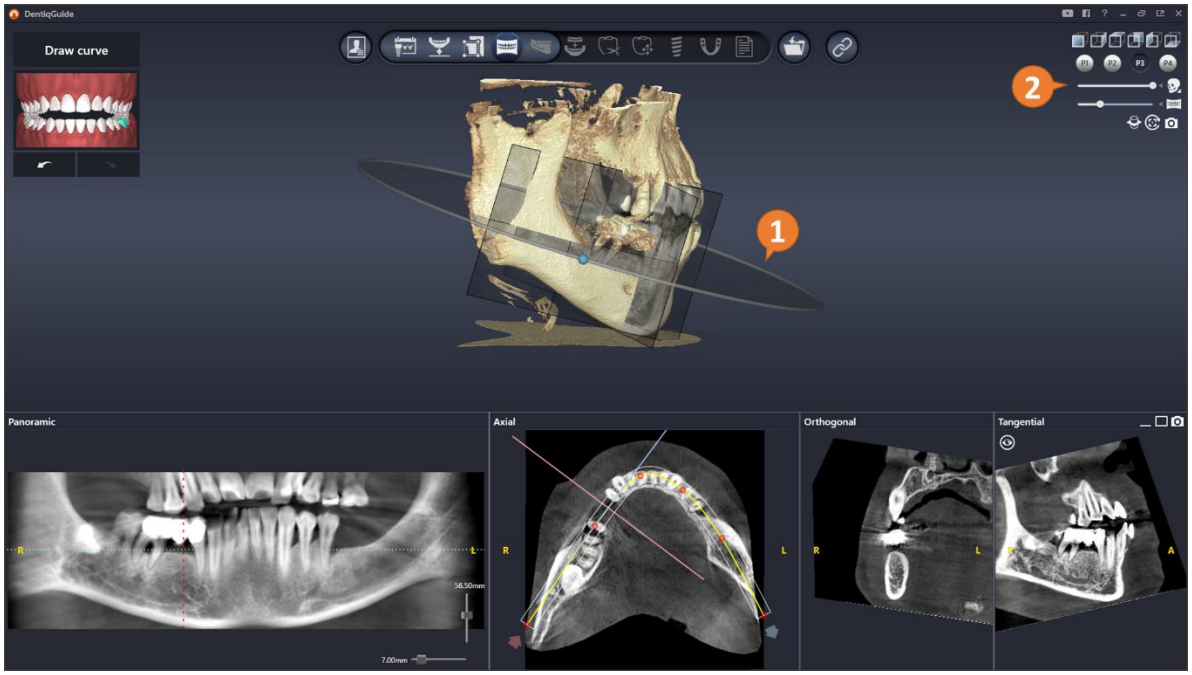
2) ROI Initialization

- All ROI will be initialized when clicking ROI Volume Initialization button  in the right side of work stage screen.

	**If there is work content (alignment, curve setting, etc.) associated with the CT data, all of that work is initialized when the ROI is reset.**

6.4 Curve Drawing

In this stage, the user can create panoramic image by drawing curve along the arch to easily view the surrounding tissues (tooth, tooth root, etc.).



No	Title	Description
1	Operation Data	Displays data and operation conducted
2	Visualization Option and Additional Features	Provides tools for visualization options and additional features

Only 3D and Axial images are displayed when initially entering in Curve Drawing stage, but Panoramic/Orthogonal/Tangential image displays in Axial image after curve drawing.

If the panoramic curve is not drawn well, the panoramic plane will not be visible normally. The Volume Rendering panel shows the orientation direction of the axis and the panoramic curve, so check the location of the panoramic curves.

1) Draw panoramic curve

① Scroll mouse wheel on Axial image, or click and drag blue ball  from Plane Adjustment tool provided on 3D image.

② When the angle of plane needs to be adjusted, mouse over Plane Adjustment tool and

click and drag the green ball  to adjust angle.

③ Create control points by clicking along the arch on axial panel, and double click to complete drawing at the final point.

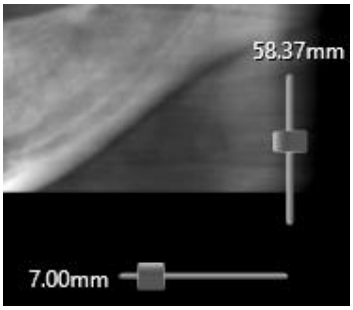
2) Edit panoramic curve

- **Move Point**: Click and drag a control point of curve.
- **Delete Point**: Right click a control point of curve.
- **Delete All Point**: Click Delete All button  which is displayed when hovering over Axial panel to delete all previously set point on the image.

3) Checking the panoramic radiograph

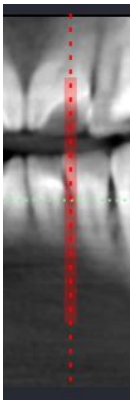
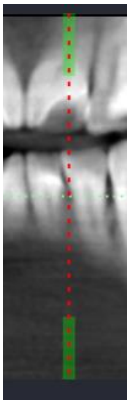
Adjust thickness/height

- Height and thickness of the panoramic radiograph can adjust with dragging the slide.



Vertical Slider	Adjust height of the panoramic radiograph
Horizontal Slider	Adjust thickness of the panoramic radiograph

Watch it with Orthogonal/Tangential Image

- When the mouse overflows in the center of the red dotted line shown above the panorama

image, the corresponding part is activated as a red area. When you click and drag here, the Orthogonal/Tangential image moves in real time according to its location. When the mouse overflows at both ends of the red dotted line shown above the panorama image, the corresponding part is activated as a green area. When dragging the mouse, the Orthogonal/Tangential image rotates in real time according to its location. When you click on a specific point above the panorama image, the Orthogonal/Tangential image moves to that location.

- When scrolling the mouse in the Orthogonal image area, the Tangential image and the red dotted line move in real time according to the location.
- When scrolling a mouse in the Tangential image area, the Tangential image moves in a direction perpendicular to the Orthogonal image.

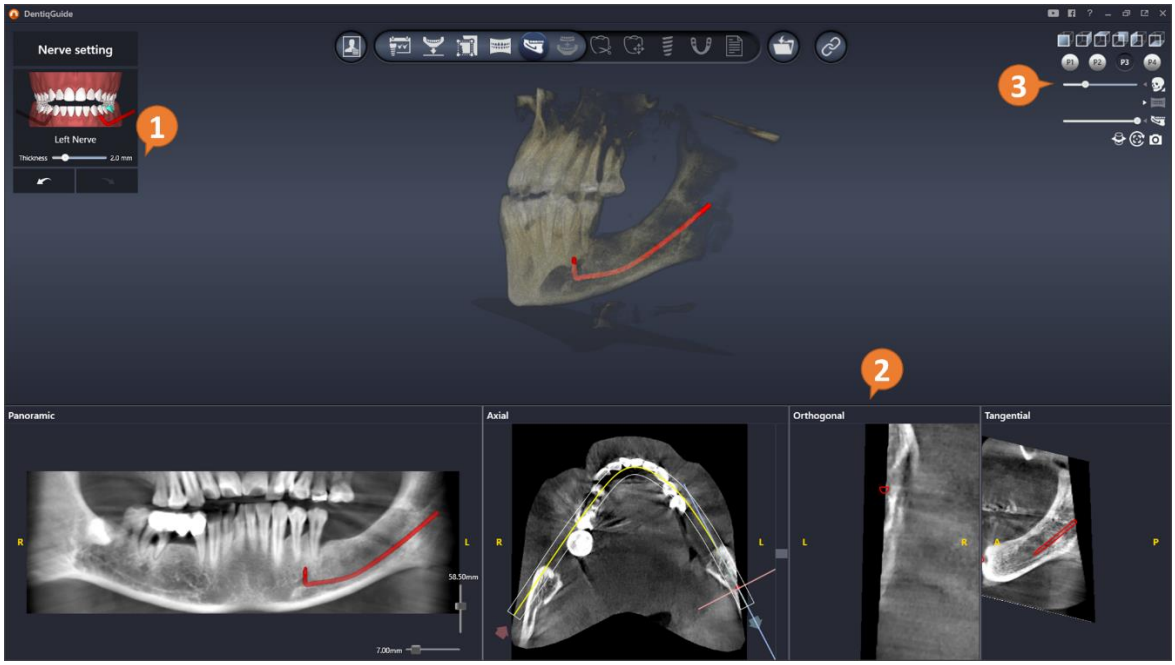
Check it out in 3D Image

- When you click the Hide 3D Panorama Plane button  displayed in the upper left corner of the 2D image area, you can see or remove the image in 3D.

	Refer to the 4.7 Visualization options for more details.

6.5 Nerve Setting

In this stage, the user can set nerve when surgery on lower is planned. Implant placement considering the drawn nerve will help safe implant planning.



No	Title	Description
1	Select Area	Select nerve (left or right)
2	Operation Data	Displays data and operation conducted
3	Visualization Option and Additional Features	Provides tools for visualization option and additional features

1) Draw Nerve

① Click a desired nerve from Set Area menu. 
Or use the space bar to select a nerve.

② Scroll on Orthogonal/Tangential and click along the nerve location.

③ No additional action is required to complete drawing. Run ① to draw nerve on the opposite side.

Drawing Nerve on Panoramic image

① Click Overlay button  on the upper right of panoramic image to disable overlays.

(Drawing is not supported when overlays are enabled.)

② Scrolling mouse wheel and click along the nerve.

③ No additional action is required to complete drawing. Click a desired nerve from Set Area menu draw nerve on the opposite side.

	If you draw left and right Nerves, you can select left or right using the keyboard space bar.

	Recommended thickness for panoramic image is 5~10(mm).

	Please note that nerve drawing on Panoramic image has high error rate while Orthogonal/Tangential image shows high accuracy on nerve drawing.

2) Edit Nerve

- **Adjust Thickness**: Set the thickness using the slider 

.
- **Modify Nerve Tube**: Modify the nerve tube by clicking and dragging the mouse in the nerve tube.
- **Delete Nerve**: Click Delete All button  on the top right of 2D panel to delete all selected nerve.

	Move/Delete nerve control points function is available only for Orthogonal/Tangential image.

3) Additional Features for Panoramic Image

-  **Display on 3D Object MPR**: Click Display on 3D object button on the upper right side of panoramic panel to display nerve as 3D object with the same thickness of panoramic image.
-  **Enable MPR Overlay Widget**: Click MPR overly widget button on the upper right side of panoramic panel to enable/disable MPR Overlay Widget.

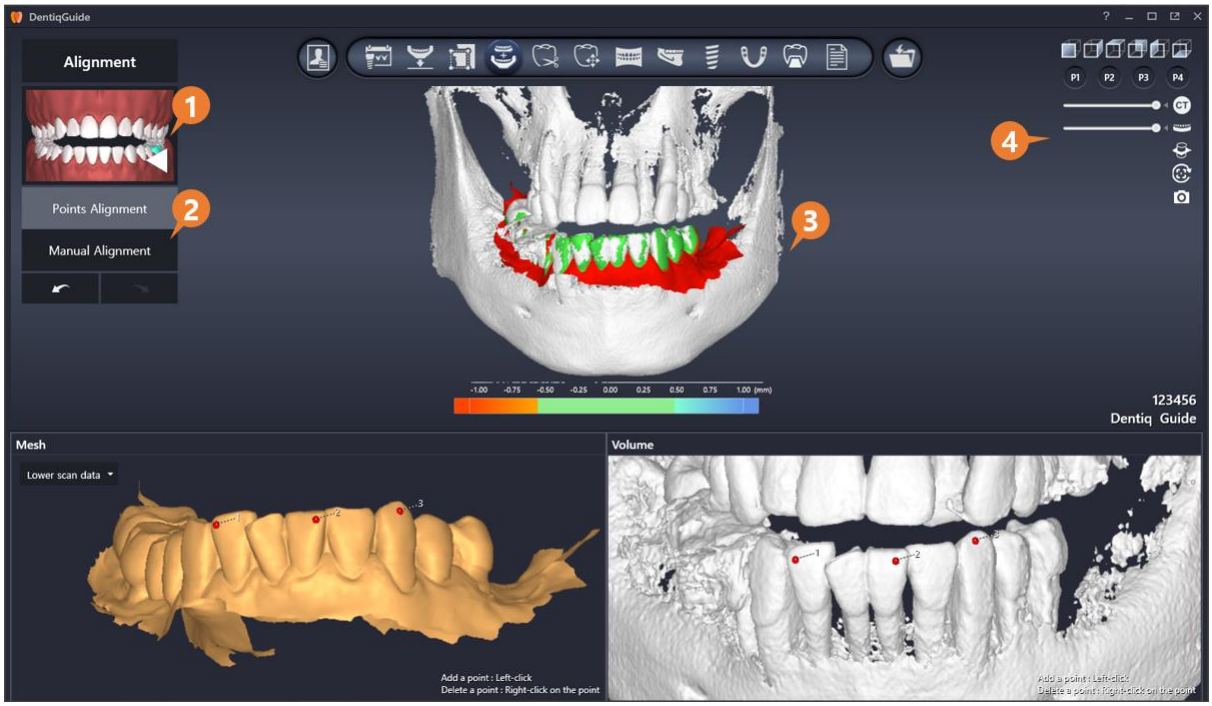
-  **Hide 3D Panoramic Plane**: Click Hide 3D Panoramic button on the upper right side of panoramic panel to display the image on 3D image or not.

	**Visualization options are available for adjusting detailed visualization settings on nerve and 2D image displayed on 3D image.**

	**Please refer to Visualization options for more information about visualization options and additional features.**

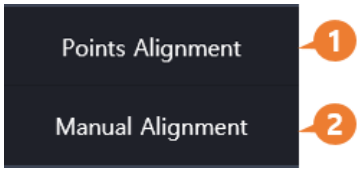
6.6 Alignment

In this stage, the user can align CT data and upper/lower scan data using coordinates. This stage provides 3-Point Alignment which automatically align coordinates of the two data using 3 points and Manual Alignment which enables users to manually align coordinates. Usually the user can use manual alignment after conducting 3-point alignment.



No	Title	Description
1	Select Area	Select area (upper or lower scan data)
2	Alignment Type	Select 3-point alignment/manual alignment
3	Operation Data	Displays data and operation conducted
4	Visualization Option and Additional Features	Provides visualization options and additional feature tools.

1) Alignment Type

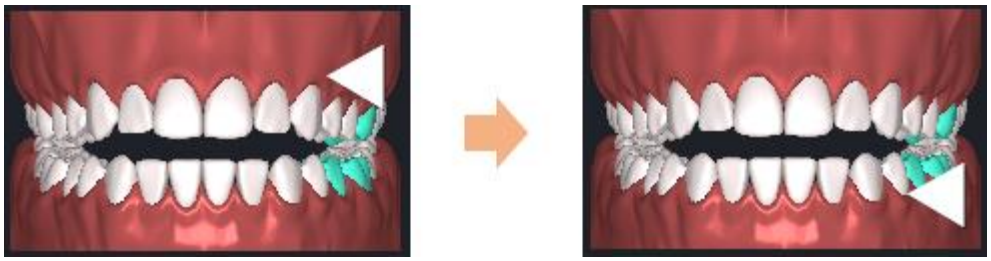


No	Title	Description
1	Points Alignment	Align images by clicking points.
2	Manual Alignment	Align manually by using MPR image.

2) Points Alignment

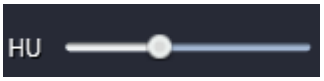
Aligning

① Click area to align from Select Area menu. Arrow is displayed to indicate the selected area.



② Set points for scan data on the bottom and CT data respectively. (The alignment is performed based on the position of the entered point regardless of the order of the entered point.)

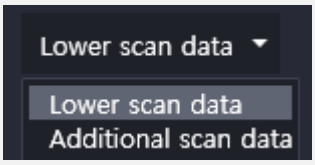
③ A maximum of 15 points can be entered and auto-alignment is performed when three or more points are entered in each data.

④ If it is necessary to adjust the HU value of your CT data, click and drag the HU adjustment tool 

in the lower right CT data area and adjust it to the desired value.

⑤ Aligned data can be found in 3D images on the top screen of the working data.

If the user registers the additional scan data in the Data registration stage, the user can change the scan data to align at the top left of the scan data region.



When aligned by additional scan data, the coordinates of the reference scan data are changed related to the coordinate of the additional scan data. Subsequent steps will reuse reference scan data (either maxillary or mandibular scan data) with changed coordinates.

Editing Points

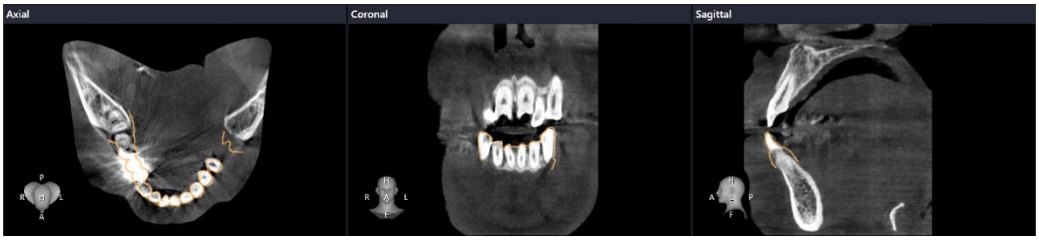
- **Move**: Click and drag input point.
- **Delete**: Right click on input point.
- **Delete All:** Click Delete All button  which is displayed when hovering over scan data and CT image to delete all input points in the image.

Synchronize Image Position

- Click Synchronize button  which is displayed when hovering over scan data and CT image to rotate and move the two images at the same time.

3) Manual Alignment

After 3 Point Alignment, click the Manual Alignment button to display the following MPR (Axial/Coronal/ Sagittal) panel.



[MPR (Axial/Coronal/Sagittal)]

Aligning on MPR

- **Move MPR image**: Scroll mouse wheel or slider on the right on 2D image panel for parallel translation of image location.
- **Move scan data**:

  - Click and drag to move the location of scan data.

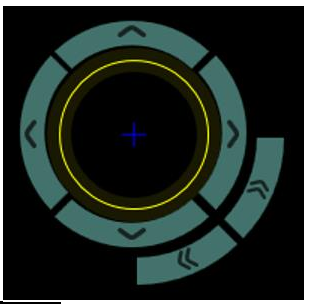
  - Locate mouse cursor on the image to move and move location using Arrow Keys (↑/↓/→/←).

  - Locate mouse cursor on the image to move and rotate scan data using Ctrl + Arrow Keys.

2D Image Tools

Tools located on top of 2D image panel will increase the accuracy.

-  **Fine-tuning object**: The following fine-tuning tools are provided.



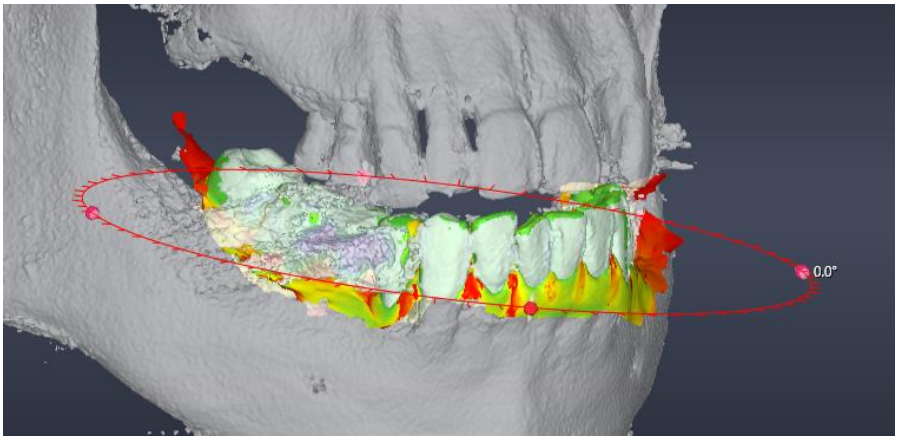
	Move at regular distance to left/right/up/down direction
	Rotate when clicking and dragging (* Double click a location on MPR to move center point of rotation axis)
	Rotate at certain intervals

-  **Display 3d object on MPR image**: Display scan data on MPR as 3D image.

-  **Line/Length**: Measure length by clicking and dragging a desired point on MPR.
-  **Grid Line**: Display grid lines (offset 5mm) on MPR.

Aligning on 3D Image

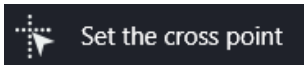
- Click and drag scan data to move the location of scan data.
- The following object adjustment tool appears when clicking scan data on 3D image.



[Scan Data Object Adjustment Tool]

- Click and drag pink ball to rotate scan data.

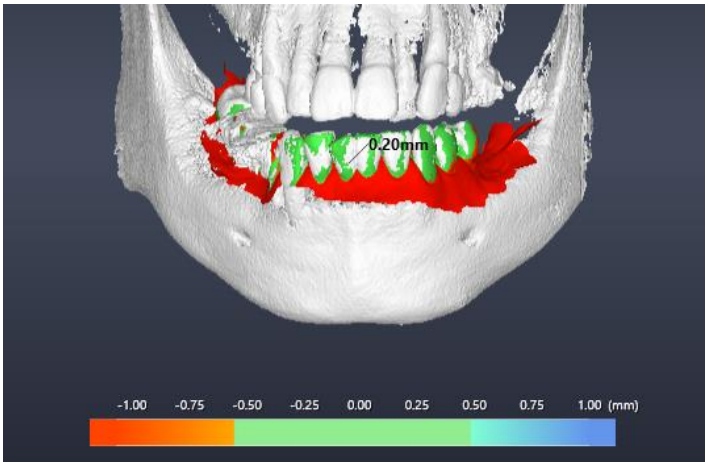
Set the Cross Point on 3D Image

- When Manual Alignment function is activated, it activates Set the Cross Point on 3D image  button on the right of workflow screen.
- Then click the desired position on 3D image data (CT volume or scan data)
- The location of MPR image changes based on the clicked point.
- Also, Set the cross-point menu 

is available when right clicking on desired position of 3D image data (CT volume or scan data).

View Alignment Error Value

Color mapping on scan data shows error value for alignment of scan data and CT. To view the difference value, place mouse cursor on 3D image data (CT volume or scan data). If the color is closer to green, it indicates lower error rate while the color is closer to red it means the error rate is higher.

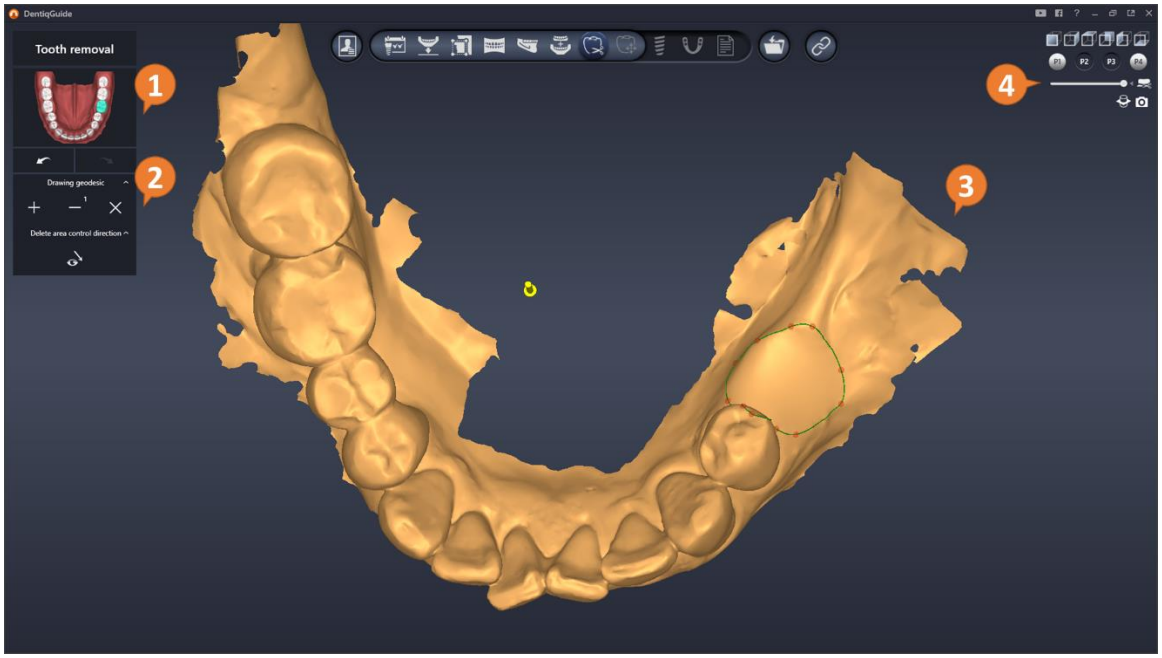


[View Error Value]

Please refer to 4.7 Visualization options for more information about visualization option and additional features.

6.7 Tooth Removal

In this stage, the user can remove unnecessary teeth from teeth scan data. This function is useful to remove teeth from scan data when tooth removal is expected before implant.



No	Title	Description
1	Select Area	Select area to remove (upper or lower scan data)
2	Tools	Tools for tooth removal
3	Operation Data	Displays data and operation conducted
4	Visualization Option and Additional Features	Provides visualization options and additional feature tools.

1) Tools

No	Title	Description
1	Drawing Geodesic	Create/Delete geodesic for tooth removal
2	Delete Area Control Direction	Adjust height of tooth removal surface

2) Remove Teeth

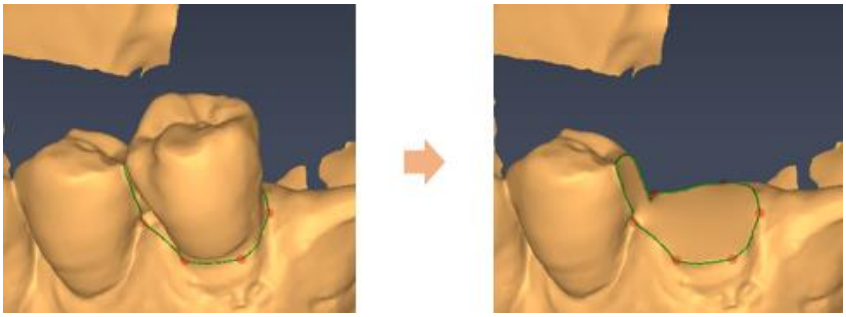
Teeth Removal

① Click area to remove teeth from Select Area menu. If both upper and lower scan data is included, icon to change area displays when hovering over Select Area menu.

② Click Add Geodetic Line button  from tools.

③ Set area to delete by clicking scan data surface.

④ Add Geodetic Line completes when start point (yellow) is clicked and inside of the selected area is automatically removed.



[Before(left) / After(right) tooth removal]

Editing

- **Move Point**: Click and drag control point of geodetic line.
- **Delete Point**: Right click on control point of geodetic line.
- **Add Point**: Click on geodetic line where there is no control point.

	**Teeth may not properly remove when the scan data area includes holes. Avoiding holes while setting area could help to remove teeth.**

3) Restore teeth

Single Tooth Restore

- When Delete Geodetic Line  button is clicked, it deletes currently selected geodetic line and restore the corresponding tooth.

All Teeth Restore

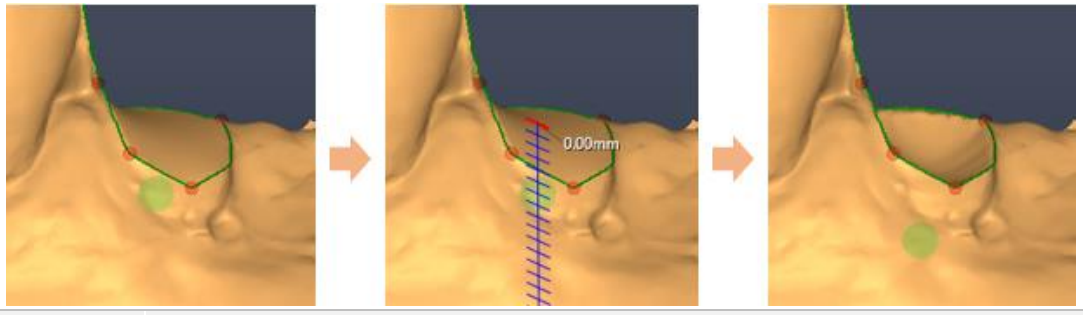
- When Delete All  button is clicked, it deletes all inserted geodetic lines and restores all teeth.

4) Adjust height of tooth removal surface

Tooth removal surface is created as a plane connecting the geodetic lines. The user can adjust height of scan data removal surface with this function if needed. You can set the height of removal surface separately for each deletion surface.

① Select a geodetic line to adjust the height of teeth deletion and then set the direction you want the user to adjust in the direction of view when clicking the Clear Surface Orientation tool  on the work tool.

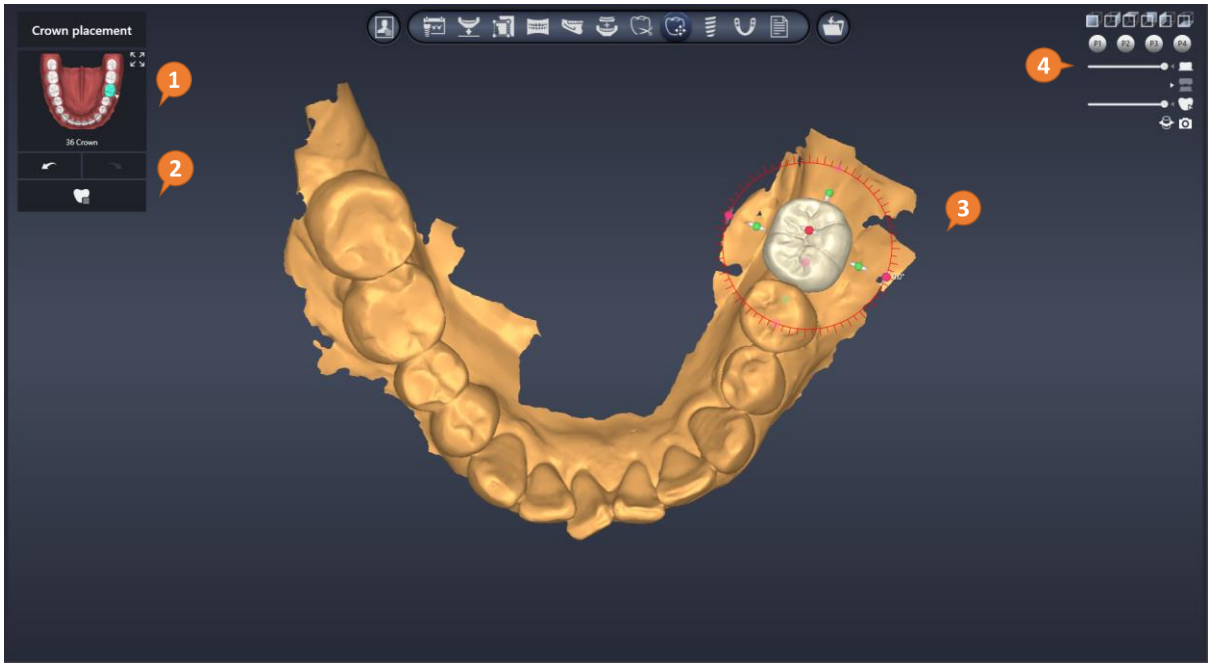
② Click and drag the green ball located on the deleted teeth to adjust the height of removal surface.



	**Please refer to 4.7 Visualization options for more information about visualization option and additional feature.**

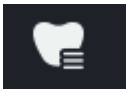
6.8 Crown Placement

When crown option is selected during surgical planning, the user can set size, position and direction of crown in this stage. Based on position information or crown in this stage, the initial position of implant for Implant Placement stage is determined. Accurate positioning considering antagonist tooth and occlusal plane will be helpful for fast implant planning.



No	Title	Description
1	Select Tooth	Select a tooth to place
2	Crown Library	Crown Library that provides basic tooth model
3	Operation Data	Display data and operation conducted
4	Visualization Option and Additional Features	Provide tools for visualization option and additional features

1) Crown Library

- Click Crown Library  menu to select desired library.

When crown library is changed, it initializes all changes made and changes models for all teeth.

2) Edit Crown (Move/Rotate/Adjust Size)

Single Tooth Selection

- Select a tooth from Select Tooth tool, or manually click a crown model on scan data.

Multiple Tooth Selection

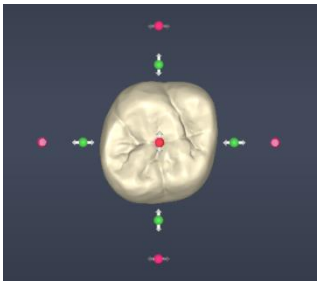
- Click while pressing Ctrl key to select multiple teeth, or set area including multiple teeth by clicking and dragging.

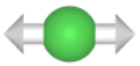
Move Crown

- Click and drag a crown model on scan data.

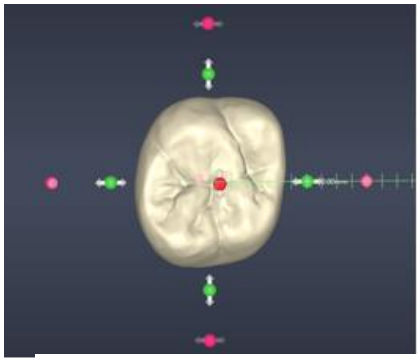
Rotate/Adjust Size

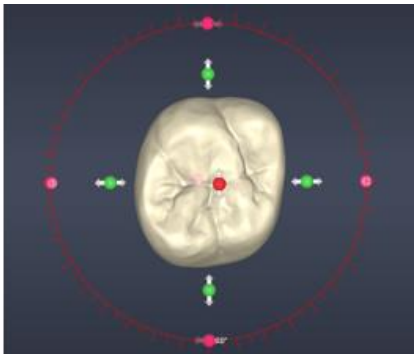
- Hover over the selected crown model to display tools to control crwon objects.



	Adjust size of crown
	Rotate crown
	

- Scale marks and adjustment values are provided to help detailed editing.





[Scale marks and Adjustment values]

	**The selected crown can be moved using the keyboard orientation key.**

	**Please refer to 4.7 Visualization options for more information about visualization options and additional features.**

6.9 Implant Placement

In this stage, the user can set the position and direction of implant.

No	Title	Description
1	Select Teeth	Select teeth for placement or other operations
2	Tools	Library/Implant grouping/Custom Safety Area Setting
3	Operation Data	Displays data and operation conducted
4	Visualization Option and Additional Features	Provides tools for visualization options and additional features

1) Tools

No	Title	Description
1	Library	Implant/Sleeve/Abutment Library
2	Implant Grouping	Synchronize angles between implants
3	Implant Custom Safety Area	Set safety area for individual implants
4	Fixed Implant Position	Fix the implant position. Automatically activated when registering post-operative data.

2) Implant, Sleeve, Abutment, Anchor pin Placement

Placement

① Select the teeth (translucent) or anchor pin (translucent triangle) to be deposited in the working tooth selection tool.

[Tooth selection tool]

② In the library window, select the desired implant, sleeve, and abutment. If you use the kit-based library, implants, sleeves, and abutments are recommended when choosing a kit.

③ When implant, sleeve and abutment are all selected, their information will be displayed on the preview panel and automatically placed.

	**If there is a compatible abutment, it is automatically set when selecting an implant.** **If there is no compatible abutment, it is set as custom abutment.**

	**In the case of anchor pin, sleeves and abutments are not provided.**

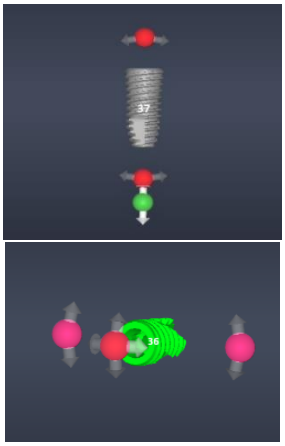
	**Please make sure if implant type is correct. Platform type, length and diameter are selected according to the patient's clinical condition.** **Please consider it particularly when planning implant cases located near main anatomical features such as artery or alveolar nerve.**

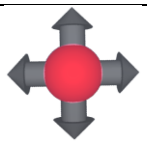
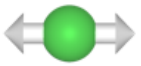
3) Edit Implant, Sleeve, Abutment and Anchor pin

Editing Implant/Anchor pin

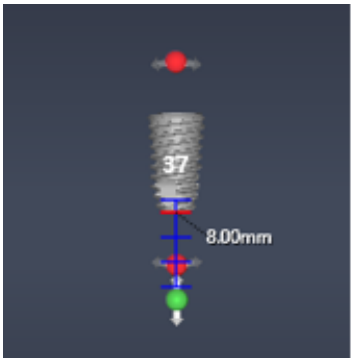
- **Select Implant or Anchor pin**: Select a teeth or Anchor pin from Select Teeth tool, or manually click the model on 2D/3D image.
- **Move**: Click and drag to move a model on 2D/3D.

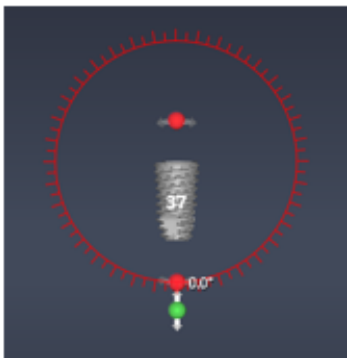
- **Rotate/Length**: Hover over selected crown model to display crwon object adjustment tool.



	Free rotation based on the end of the implant/anchor pin.
	Rotate Implant/ Anchor pin
	Adjust implant length

- While Rotate/Length adjustment, scale marks and adjustment values are displayed to enable detailed editing.





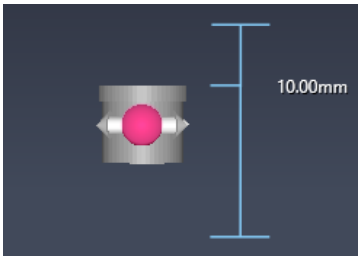
[Scale Marks and Adjustment Values]

	**In case of 2D panel,  button on the top right of image panel should be enabled to display implant length adjustment button.**

	**You can use the keyboard orientation key to move the selected implant or anchor pin.**

Editing Sleeve

- **Select Sleeve**: Click sleeve model on 3D image.
- **Rotate**: Crown Object Adjustment tool is displayed when hovering over sleev model.



	Rotate Sleeve

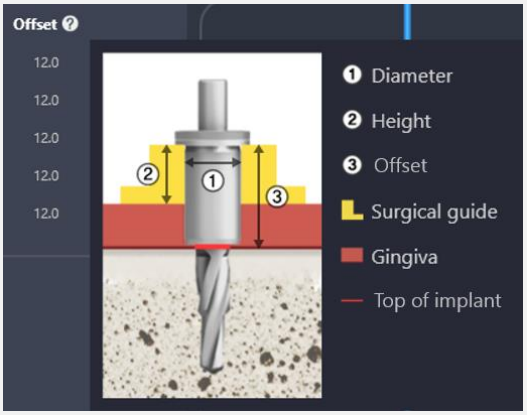
- **Height:** Click and drag sleeve model on 3D image. (Only custom sleeve is provided.)

[Before(left) / After(right) adjusting sleeve height]

The manufacturer's sleeve offset is modifiable by model. Adjustable values can be found in the sleeve library offset item. (*The displayed value is the default offset value that is initially placed.)

[sleeve offset items in the sleeve library]

When you click the help button Offset on the right side of the sleeve offset item, you can see a graphic of each item.



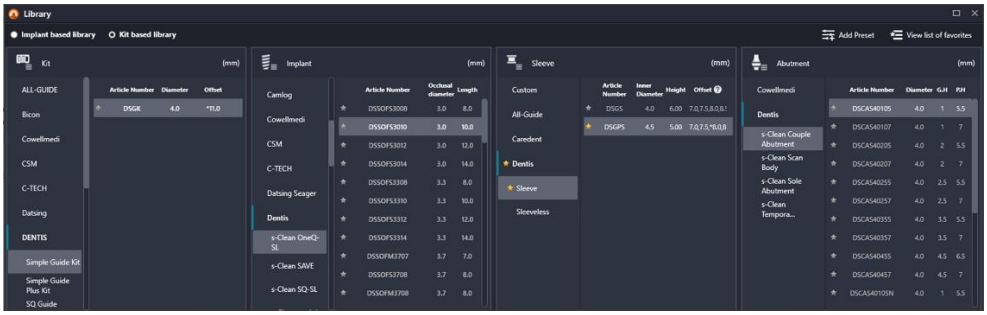
When implant, sleeve and abutment rotate, all objects rotate in sync.

4) Library

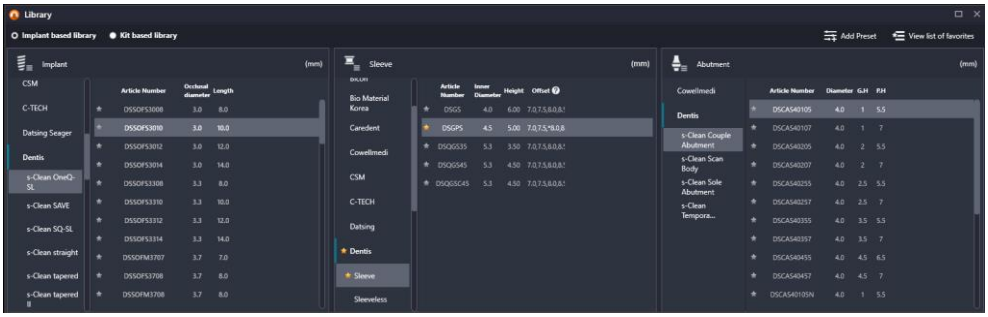
Implant, Sleeve, Abutment library can be managed in Library page.

Viewing Library

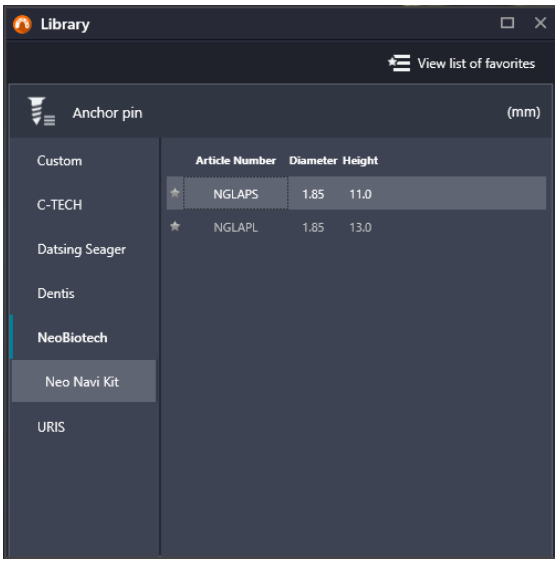
- Click Library button from tools to display library menu.
- If you have selected a working tooth in the Tooth Selection Tool, you will see implants, sleeves, and abutments library and if Anchor pin is selected, only the Anchor pin library will be displayed.
- If it is not an anchor pin library, set whether to use kit-based library or implant-based library.



[Kit Based Library]

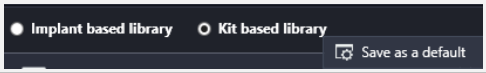


[Implant Based Library]

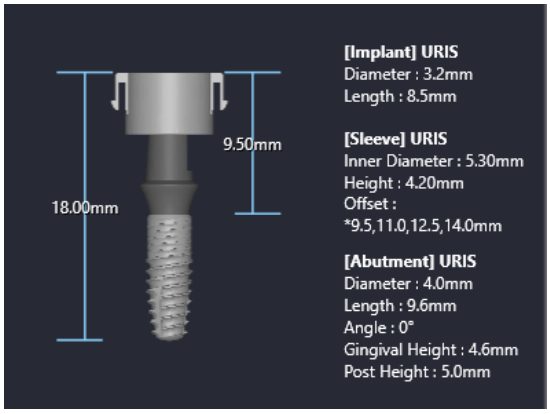


[Anchor Pin Library]

Whether to base a kit-based library or an implant-based library can be set using a right-click on the selected window.



- View list of favorites  or View Full List  option is available on the top left.
- Click detailed item to display preview on the bottom, then check preview for combined result of implant, sleeve and abutment on the right side of screen.



Using the Custom Model

- Click the Custom item at the top of the manufacturer's list to enter your custom information.
- Set the length and diameter of the implant and Anchor pin.
- Set the length, diameter, and sleeve offset information (max/minimum height/adjustment interval) of the Sleeve.

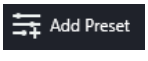
Adding/Removing Library to/from favorites

- To add to favorites, click a grey star icon prior to manufacturer, product line, or product item.
- The start icon turns to yellow when added to favorites.

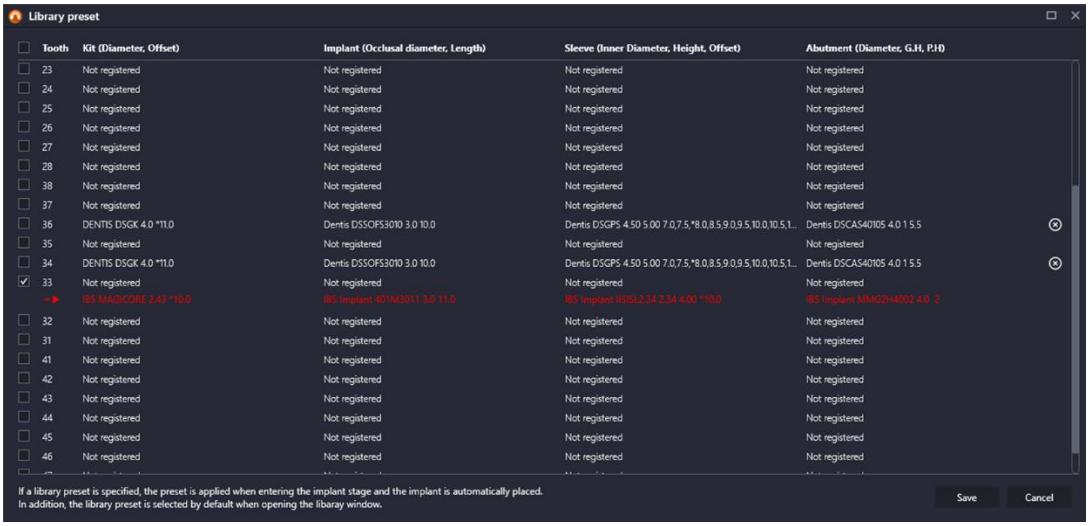
- If click the yellow start again, the item is removed from favorites.
- If click the View list of favorites 

on the upper left, only items added to favorites display.

Library Preset

- If you specify a library preset, the preset will be applied when entering the implant stage, and the implant will be automatically selected. In addition, when placing a new implant, the designated kit, implant, sleeve, and abutment are selected by default from the library preset.
- User can register the library preset by clicking the Add Preset button 

at the top right of the library window.



- If you check the check box on the tooth number you want to set, you will see the kits, implants, sleeves, and abutments that will be applied in red and will be registered as a library preset when saved.
- User can delete the currently registered preset by clicking the Delete button .

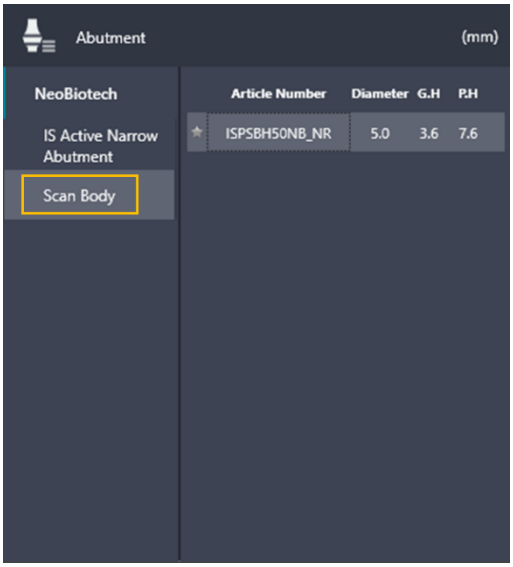
	If you plan to perform a edentulous case, the implant will not be automatically selected when entering the implant stage. Also, if you have read the plan or if you have added a tooth to build an implant due to a change in the surgical case, it is not automatically selected. However, if you click on a tooth that has not been implanted in the working Tooth Selection Tool, if the preset is registered, the set preset is applied and automatically selected.

	If user use a kit-based library and an implant-based library interchangeably, please register the preset using the kit-based library. There is no problem using an implant-based library when the kit is registered in the preset. Conversely, if the kit is not registered, the preset does not apply because there is no kit information when using the kit-based library.

Using Scan Body

When exporting mesh, a file of scan data and scan data is separately exported. This can be used when designing crowns on a different dental prosthetic design program.

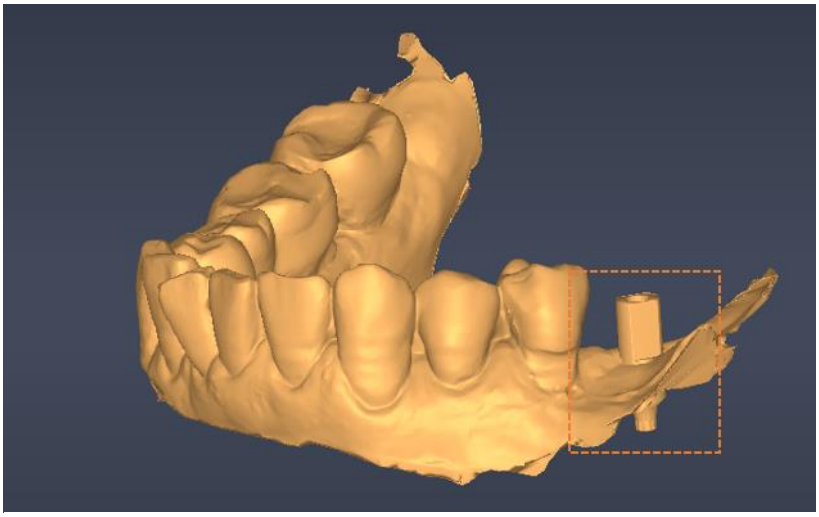
① Click Library button from tools, and select Abutment → Manufacturer → Scan Body option.



[Scan Body]

② When the item is selected, click Apply on the bottom to start implant planning.

③ When exporting mesh file in Result stage, "UNION_OF_SCAN_BODY.stl" is exported together.



[Scan Data with Scan Body]

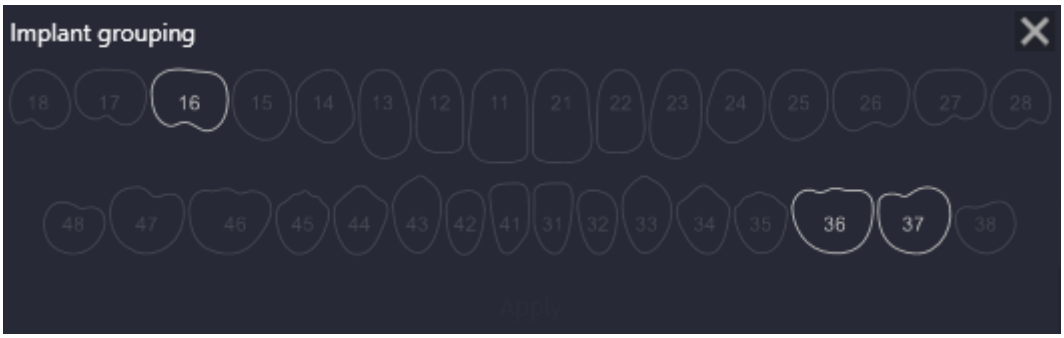
	Scan body is not available for temporary tooth design.

5) Implant Grouping

When placing more than 2 implants, angle of all implants can be adjusted as the same.

Grouping

① Click Grouping button  from tools (or 'G' key) to display grouping menu.



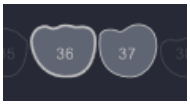
[Implant Grouping]

② Click a tooth as a standard, and then select other teeth to adjust angle based on the standard tooth.

It displays standard tooth in orange  when selected, other teeth to align angle in sky blue. 

③ When selection is completed, click Apply button on the bottom.

④ The created group is shown in the Group List  on the left.

⑤ When hovering over grouped teeth, all teeth in the same group appear transparent. 

	To add an already grouped tooth in a new group, the tooth needs to be excluded from the previous group before adding to a new group.

Ungrouping

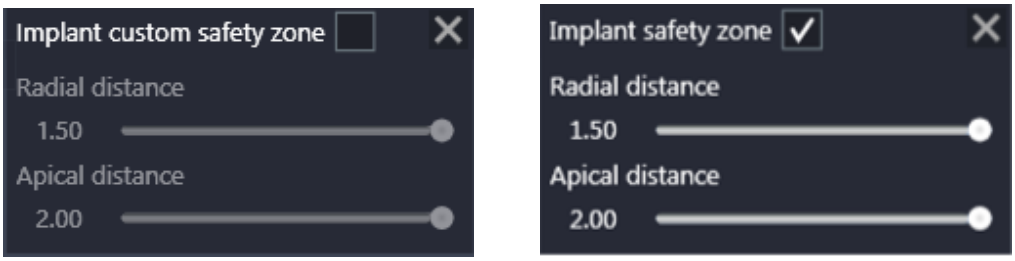
- Right click on grouped tooth from grouping menu to cancel grouping of the tooth. (If the tooth affects grouping condition, it ungroups all teeth in the group. Otherwise, only the selected teeth are ungrouped.)
- To ungroup the whole teeth in the group, click trash bin button  on the right of group list.

6) Setting Implant custom safety zone

The user can change safety zone setting value for each implant.

Changing Safety Zone

- Click Custom Safety Zone button  from tools (or 'Z' key) to display setting menu for custom safety zone.
- Click the check box on the top to activate setting menu.



[Disable(left) / Enable(right) Implant custom safety zone]

- Drag the desired slider to change values.
- While dragging slider, the changing value is shown on 3D image in real time.

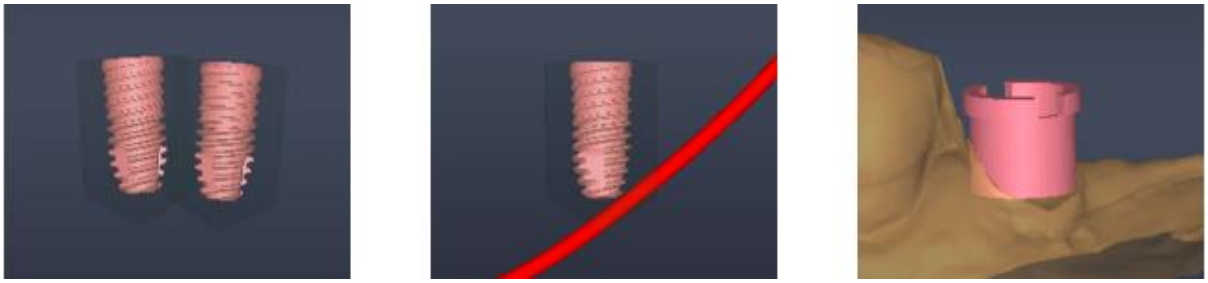
- When the check box is unchecked, the safety zone setting value is restored to default value.

	Default value for implant safety zone can be set in environment settings. Please refer to 5.3 Settings > 8) Implant Planning for more information.

Checking Safety Zone

Warning message appears when collision occurs in the safety zone previously set. Objects detected appears in pink.

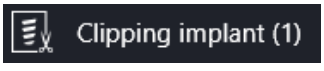
Collision detection is provided for Implant-Implant / Implant-Nerve / Sleeve-Scan data.



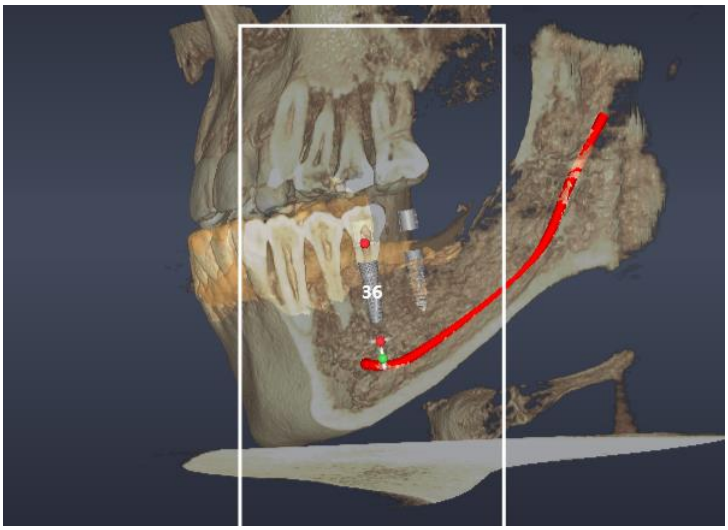
[Collision Warning: Implant-Implant(left) / Implant-Nerve(middle) / Sleeve-Scan data(right)]

	There is no separate zone for Sleeve-scan data, but warning message appears when the two data overlaps.
	Unable to move on to next step when Implant-Implant/ Implant-Nerve collision occurs.
	Please make sure to secure minimum safety zone for implants and mandibular nerves. Collision of implants, implant and nerve, and implant and other main anatomical structures such as nerve or artery can cause severe damage, paresthesia or other complications.
	Please make sure that an implant does not collide with an existing implant or tooth root channel. Also assure that the implant does not penetrate the jawbone border.
	Please make that the chosen implant position corresponds to the intended position and the fixation/mounting method for the prosthesis on the implant.

7) 3D Implant Clipping

- Right click on 3D panel and click Clipping implant button 

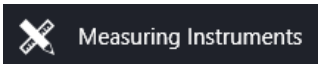
from the context menu. 3D data except the selected implant is cut by implant center plane.
- The selected implant center plane is changing to the direction where user is looking when rotating 3D data.



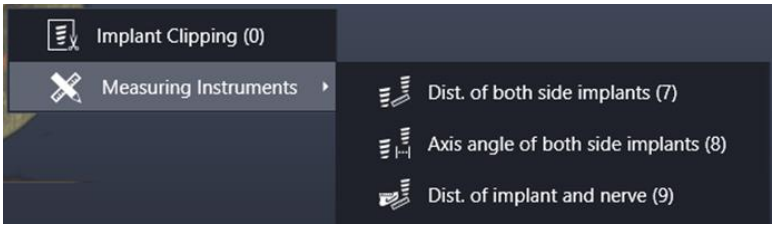
[Enable clipping of #36 implant]

8) 3D Measurement Instruments

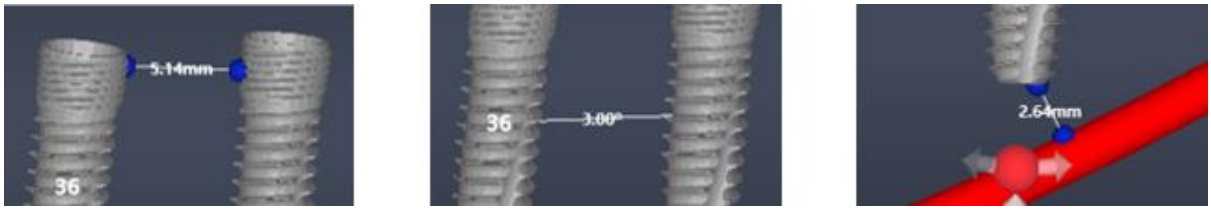
Various measurement information is automatically provided based on 3D data information.

- Right click on 3D image panel, select 

option from the context menu, and select the information to measure.



Dist. Of both side implants	Display distance from the selected implant to the implant on the left or right
Axis angle of both side implants	Display angle between the selected implant and the implant on the left/right
Dist. of implant and nerve	Display the shortest distance between the selected implant and nerve



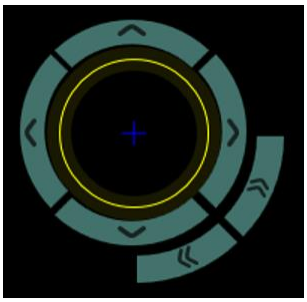
[Measurement Instruments: Distance between implants(left) / Angle between implant(middle) / Distance between implant and nerve(right)]

	Distance between implants function is supported when two implants has consecutive numbers.

9) 2D Image Tools

Implant Fine-tuning

-  : When clicked, the following fine-tuning tools are displayed.



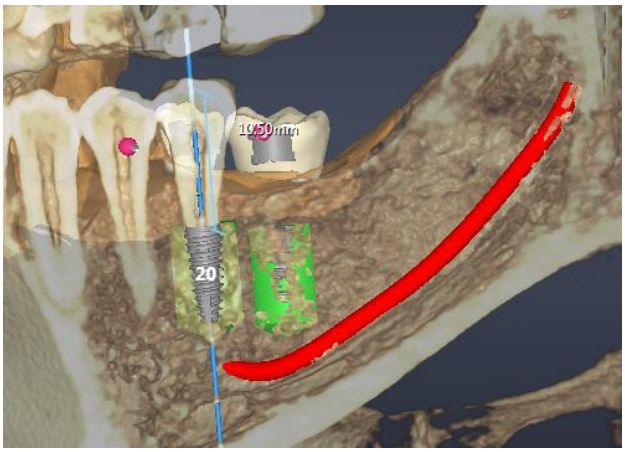
	Move at regular distance to left/right/up/down direction
	Rotate when clicking and dragging (* Double click a location on MPR to move center point of rotation axis)
	Rotate at certain intervals

	Default value for implant fine-tuning can be set in Environment Setting. Please refer to 5.3 Environment Setting 8) Implant Planning for more information.

Use as Clip Surface

-  : Click the icon to cut all 3D data based on currently displaying image.

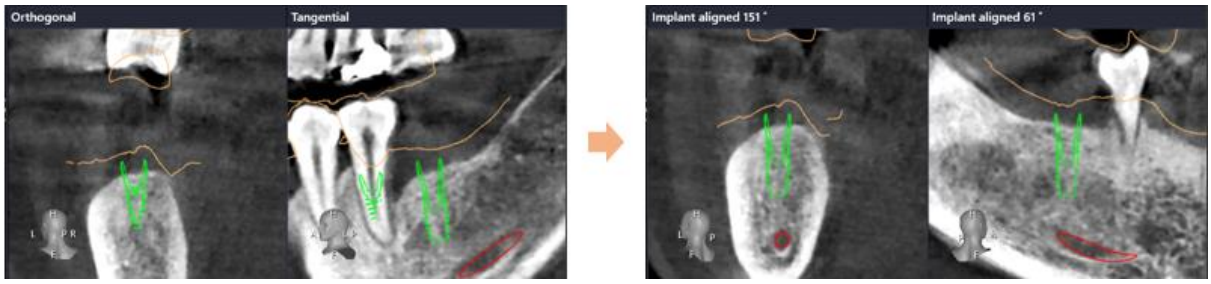
	Implant Clipping is conducted based on implant center axis while Use as Clip Surface is based on the plane image cut by clicking the button.



[Use as Clip Surface]

Moving Camera Orientation based on Implant

-  : When clicked, axis of 2D image changes based on implant.
- Image rotates based on implant axis when scrolling mouse wheel on 2D image panel.



2D Image Measurement Tools

- Click  to display available measurement tools.
- Click  icon, then click and drag to measure length.
- Click  icon, then click 4 point on the image to measure distance between two lines.
- Click  icon, then click the desired position on the image to measure HU values.

	Please refer to 4. Common > 4.10) Use of Measurement Tool for more information about editing measurement tools.

Implant Placement

- Click  to align the selected implant based on crown center axis.

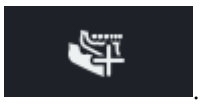
	Please refer to 6.4 Curve Drawing and 6.5 Nerve Setting for more information about tools provided on Panoramic image.

	Please refer to 4.2 Mouse Operation and Shourtcuts for more information about shortcut for each function.

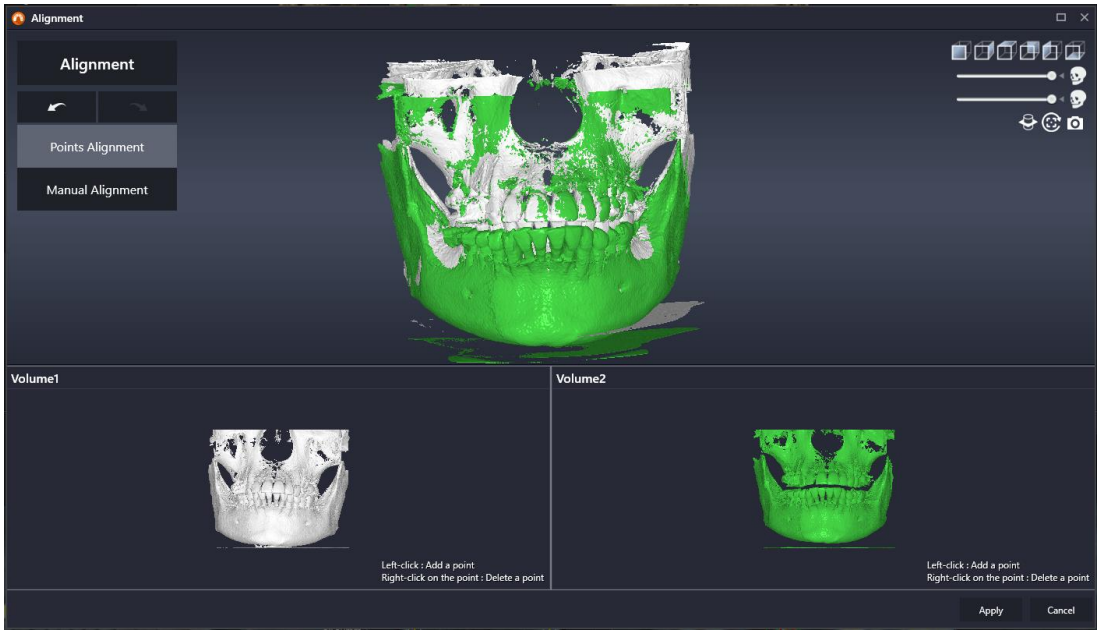
	**Please refer to 4.7 Visualization Options for more information about visualization options and additional feature.**

10) Analyzing pre and post-operative data

Using the postoperative analysis function, you can compare the surgical plan with the actual results.

1. Analysis the data to establish an implant surgery plan and design a guide. When the design is complete, save or export the surgical plan.
2. Perform an implant surgery using surgical guide.
3. After implantation, prepare patient's CT data.
4. Load the planned case and go to the implant placement stage.
5. Load post-operative CT data using the button  .
6. After automatic alignment, you can adjust it in detail using manual alignment if necessary.

-Points Alignment



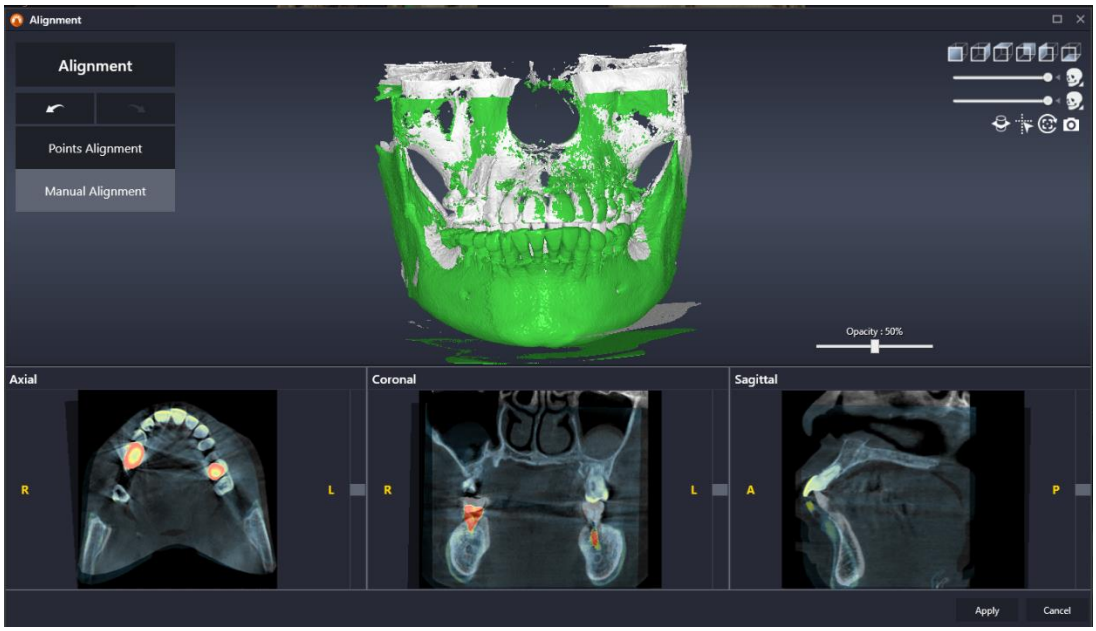
If alignment fails, proceed with points alignment first. During the points alignment process, the visible area can be adjusted by adjusting the HU at the bottom of the Volume1 and Volume2 panels.

Since it is assumed that the acquisition conditions of pre- and post-operative volumes are the same, the HU values of the initial pre-operative volume and the post-operative volume are synchronized. If the conditions for acquiring volume before and after surgery are different, the two volumes may look different. If the volumes are different, press the  button to

release synchronization to adjust each HU value.

	If the patient's opening condition is different from the CT data before and after surgery, the two data cannot be perfectly aligned. It is recommended aligning based on the lower or upper jaw you want to analyze.

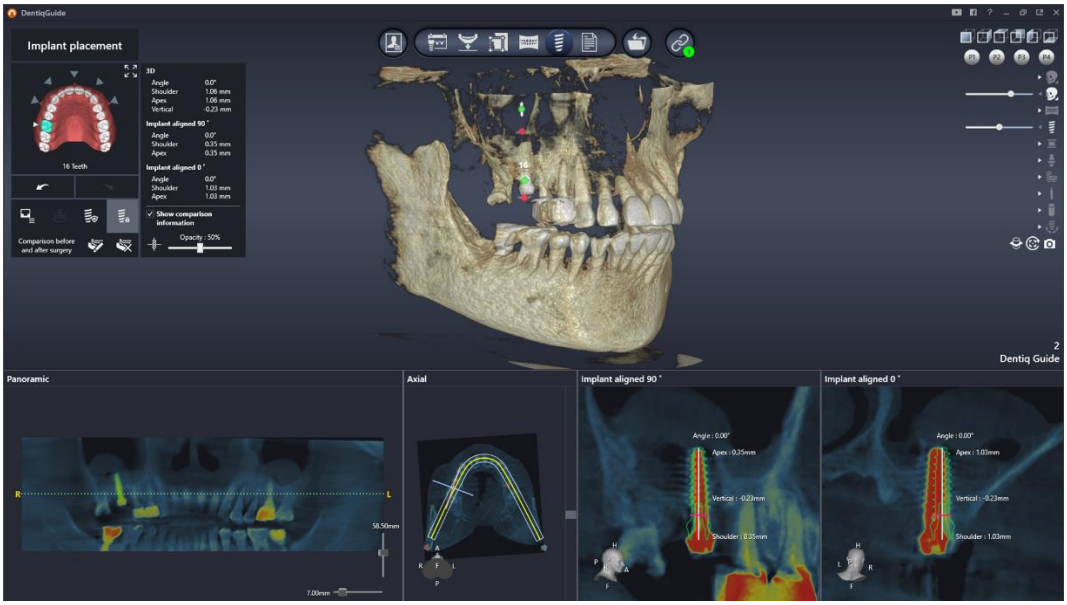
-Manual Alignment



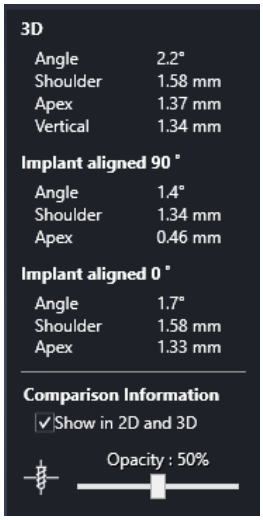
The opacity slider can be used to adjust the opacity of post-operative CT. When the alignment is complete, click the Apply button to apply the postoperative CT data arranged in the implant placement step.

	Refer to the functions provided by analyzing before and after surgery in 6.6 Alignment.

7. When sorting data, the implant axis of postoperative CT data is automatically extracted. If extraction fails, the axis of the implant is set to the axis stored in the surgical plan. CT data after surgery are visible during the implant placement stage, and comparative information before and after implant surgery is also displayed.



- Comparison information between the planned implant and the post-operative implant.



3D	Angle	Angle of the planned implant and the actual implant axis in three-dimensional space.
	Shoulder	The distance between the top of the planned implant and the top of the actual embedded implant in three-dimensional space.
	Apex	The distance between the bottom of the planned implant and the bottom of the actual implant in three-dimensional space.
	Vertical	The distance in the direction of the planned implant's axis between the top of the planned implant and the top of the embedded implant in three-dimensional space. If the embedded implant is placed deeper than the planned implant, it is positive, and if it is shallow, it is displayed as a negative number.
Implant aligned	Angle	Angle of the planned implant and the actual implant axis on the 2D panel.
	Shoulder	The distance between the top of the planned implant on the 2D panel and the top of the actual embedded implant.
	Apex	Distance between the planned bottom of the implant and the bottom of the actual implant on the 2D panel.

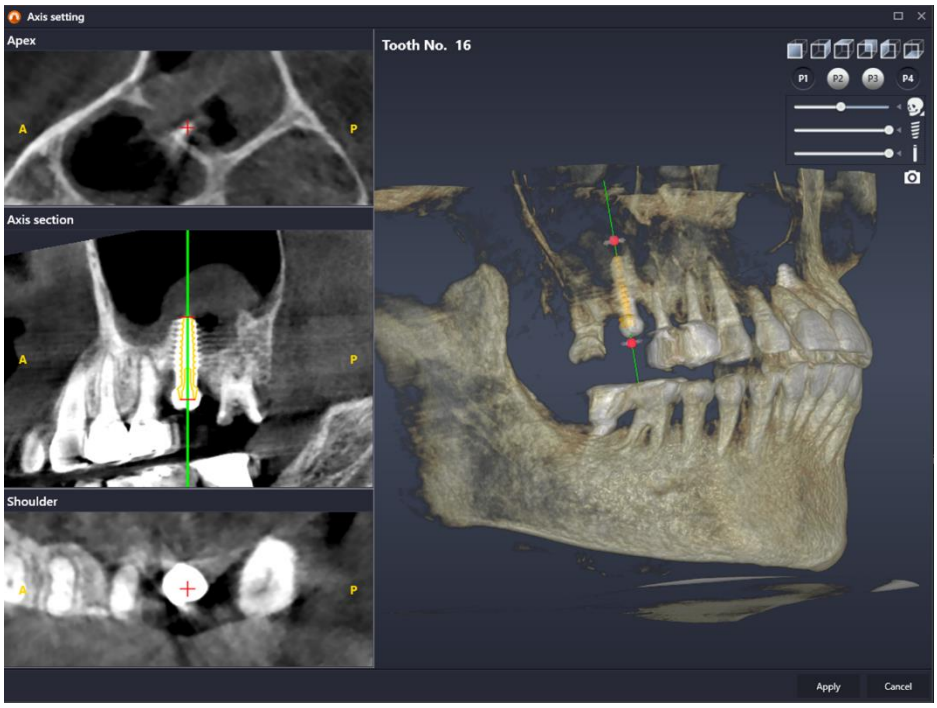
You can decide whether to display comparison information in 2D and 3D using the display checkbox in 2D and 3D 

.

The opacity adjustment slider 

can be used to adjust the opacity of post-operative CT data on the 2D panel.

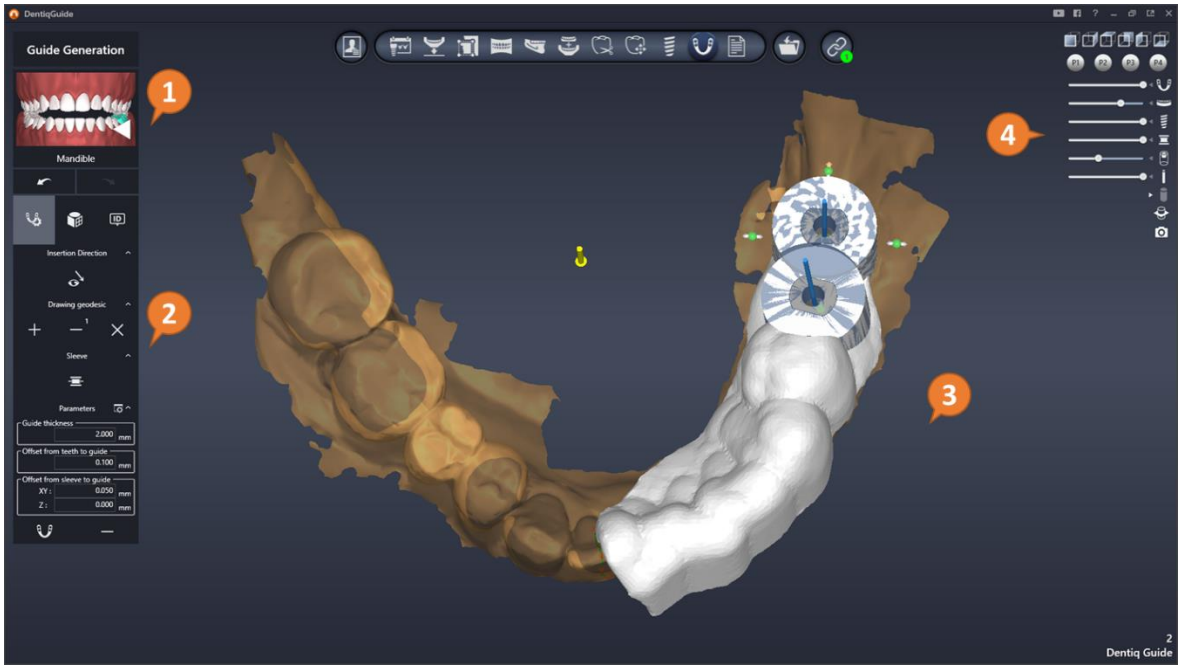
You can change the axis of the implant extracted from CT data after surgery by clicking the axis alignment icon 
.



You can change the axis of the implant on the Axis and 3D panel. After surgery, the implant is displayed in orange to accurately find the implant axis on CT. At this time, the implant uses the implant planned before surgery. The position of the implant is not related to the position of the previously planned implant, it is just for easy setting of the axis. The Apex and Shoulder parts show the top and bottom of the implant you want to set. When you press the apply button, the changed axis is reflected, and the display of comparison information is updated.

6.10 Guide Generation

In this stage, the user can design surgical guide based on implant planning information.

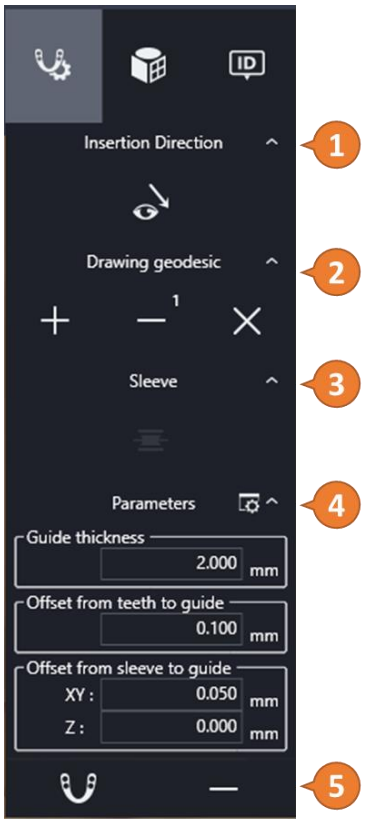


No	Title	Description
1	Select Area	Select area(upper/lower scan data) to design
2	Tools	Tools to use for guide designing
3	Operation Data	Displays data and operation conducted
4	Visualization Option and Additional features	Provides tools for visualization options and additional features

1) Tools

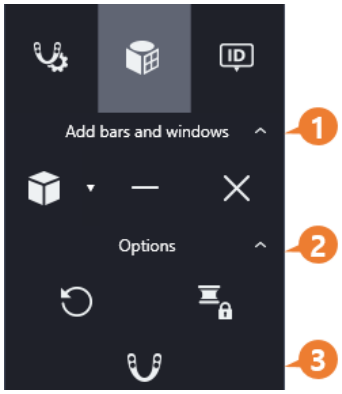
No	Title	Description
1	Guide Generation Tools	Design and create guide design
2	Bar/Window Generation Tools	Design and create bars and windows
3	Engraving Tools	Engrave and create text

Guide Generation Tools



No	Title	Description
1	Insertion direction	Setting the direction of the guide in the oral cavity.
2	Draw geodesic	Generating/deleting lines for setting guide areas.
3	Sleeve	Create a hole to fix the sleeve.
4	Parameters	Set various parameters required to generate a guide.
5	Guide Generation	Create/delete surgical guide

Bar/Window Generation Tools



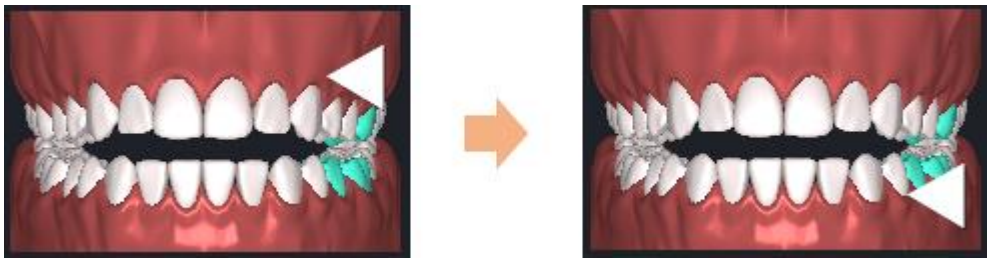
No	Title	Description
1	Add Bars and Windows	Add and delete bars and windows to/from guide
2	Options	Initialize and lock sleeve area
3	Guide Generation	Re-create guide applying bars and windows

Engraving Tools

No	Title	Description
1	Add Text	Add/delete text to guide
2	Options	Set text/font size/engraving type
3	Initialize	Initialize changes
4	Guide Generation	Re-generate guide applying engraving

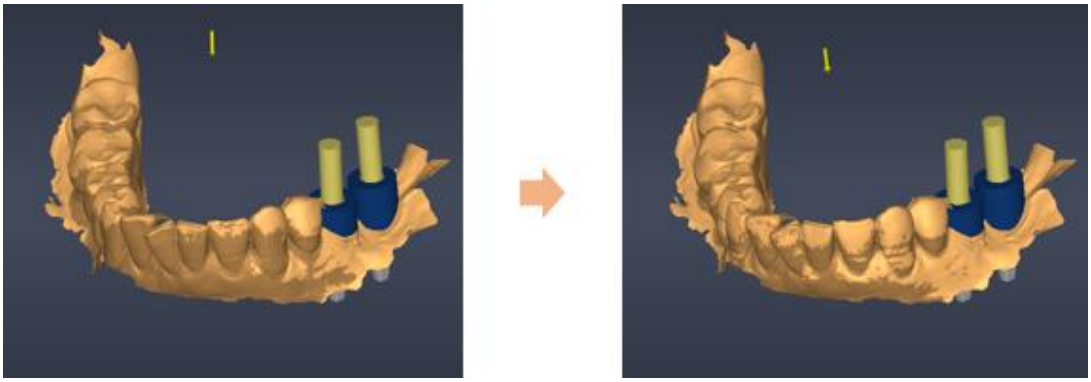
2) Set Guide Insertion Direction

① In the Select Work Area menu, click the part where you want to proceed with the guide design. The area where the arrow is marked is the currently selected area..



② Rotate scan data in the direction in which the guide will be inserted, then set the insertion direction in the direction the users see when clicking the Set Guide Insertion tool  in the Guide Generation Task Tool.

③ Check if the undercut area displayed on scan data changes according to the direction as set.



	Undercut indicates area where no guide is allowed to properly connect the exported guide in the mouth. Please take extra caution as the area set as undercut affects shape of guide.

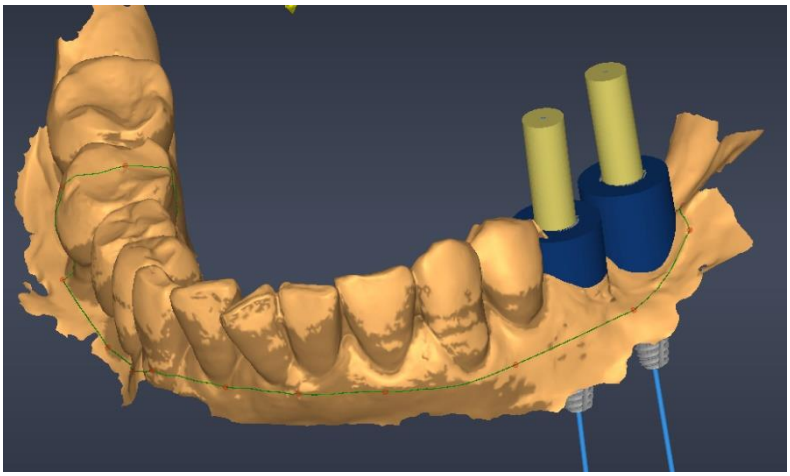
3) Setting the surgical guide area

Drawing Geodetic Line

① Click Add Geodesic Line button  from Guide Generation Tools.

② Set area to create guide by clicking scan data surface.

③ Click start point (yellow) to complete drawing geodesic line.

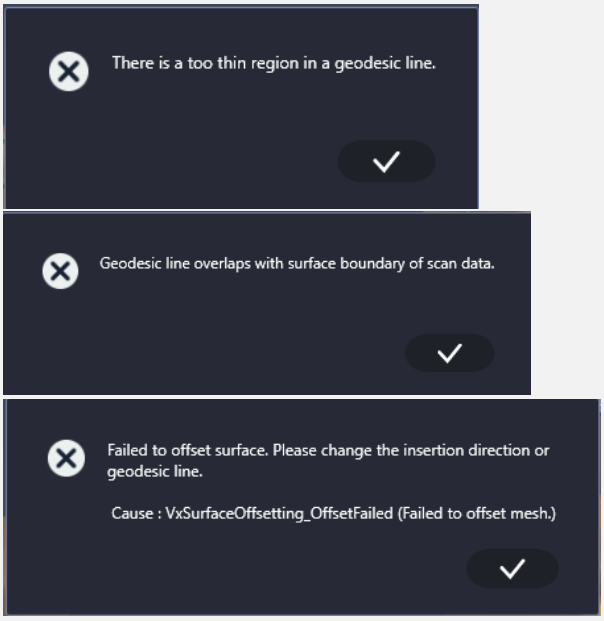


[Drawn Geodesic Line]

Editing Geodetic Line

- **Move Point**: Click and drag control point of geodesic line.
- **Delete Point**: Right click on control point of geodesic line.
- **Add Point**: Click on geodesic line where there is no control point.

If the slope of the guide geodetic line is set sharply or the geodetic line contains the boundary of the scan data, the following message window may appear.



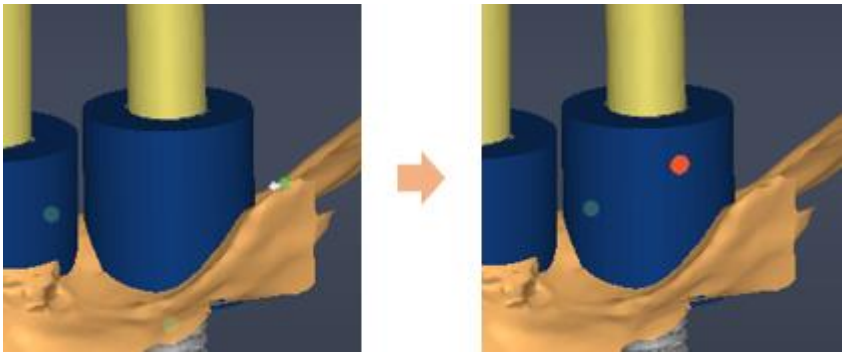
The geodetic line should be adjusted smoothly and the boundaries of the scan data should not be included.

Deleting Geodesic Line

- Click Deleting Geodesic Line button to delete the selected geodesic line.
- Click Deleting All button to delete all geodesic line.

4) Sleeve Options

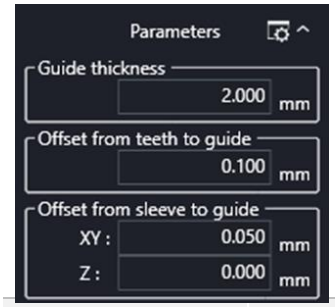
- Click Glue Channel button from Guide Generation tools to add glue channel used to bond a guide to a sleeve.



	Sleeve option is activated only when a sleeve model is selected from data display area. Click a sleeve model to use the function.

5) Setting Guide Generation Options

The result of exporting surgical guide can vary depending on 3D printer properties. To correct this difference, the user can set values of guide generation options.



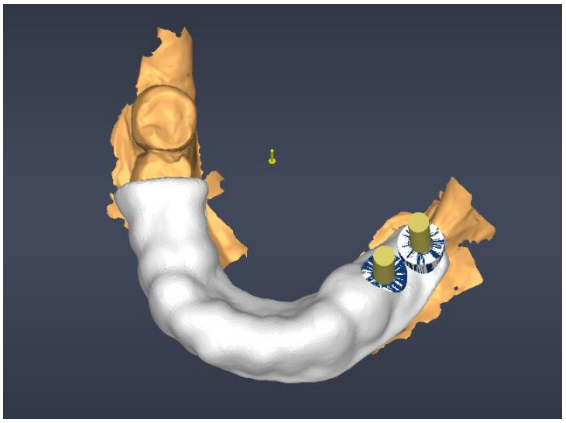
Guide Thickness	Set thickness of guide to be created
Offset from teeth to guide	Distance between guide and teeth surface
Offset from sleeve to guide	Distance between guide (adjacent position to sleeve) and sleeve.

	You can set the currently set value as the default guide creation option by pressing the button. **Please refer to 5.3 Settings > 9) Surgical Guide for more information about default value setting for guide generation options.**

	If there is no specific standard on option values, export result can vary depending on installation condition(amount of light, levelness, life cycle, etc.) even when using the same type of printer.

6) Generate/delete guide

- Click Guide Generation button  from Guide Generation tools to generate guide based on previously set geodesic line, insertion direction and option values.



[Generated Guide]

- Click Delete Guide button  to delete the generated guide.

	**When settings such as geodesic line, insertion direction, option value changes, the guide should be regenerated.**

	**If you change guide parameters or add bars/windows after engraving text, all the text engraving work will be lost.**

	**Please refer to [4.8 Cross-section Setting] function to learn more about the relationship between guide and scan data.** 

7) Add bars/windows

Adding bars and windows

① Click the arrow on Add Bar button  from tools to select a desired option to add.

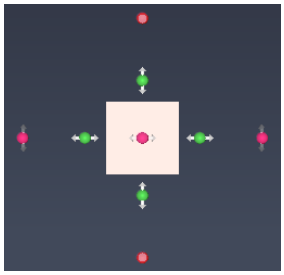
-  **Add Cuboid Bar**: Click to add a bar in a cuboid form.
-  **Add Cylinder Bar**: Click to add a bar in a cylinder form.
-  **Add window**: Click to create window on the guide.

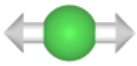
② When selecting cuboid/cylinder bar, click two points on the guide to add a bar.

③ When selecting window bar, click the desired point on guide.

Editing bars and widows

① When a bar or window block is added to the guide, click the block and use the adjustment tools to adjust size and position of the block.

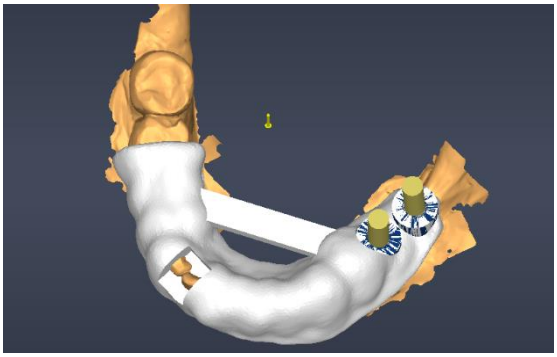


	Adjust Size
	Rotate
	

② When Delete button  is clicked, currently selected block is deleted.

③ When Delete All button  is clicked, all added blocks are deleted.

④ After adding or editing bars or windows is completed, click Guide Generation button  to finally apply bars and windows to the guide.



[Guide after bars and windows are added]

	You can use the keyboard orientation key to move the selected bars or windows position.

Deleting bars and windows

- Click Initialize button  from tools to delete all bars and windows finally applied to the guide.

Locking sleeve area

- When Lock Sleeve Area button  is clicked from tools, no widow is created in sleeve area.

8) Engrave Text

Adding/Editing Text

① Click Add button  from Engraving tools.

② Enter text manually in text input field 

or select a predefined text by clicking the arrow on the right.

③ Adjust Font Size slider 

between 8 and12 as desired.

④ Input or selected text is displayed at the mouse cursor and is temporary engraved when clicking on a desired position of created guide.

⑤ When Delete button  is clicked, currently selected temporary engraved text is deleted.

⑥ When Delete All button  is clicked, all temporary engraved texts are deleted.

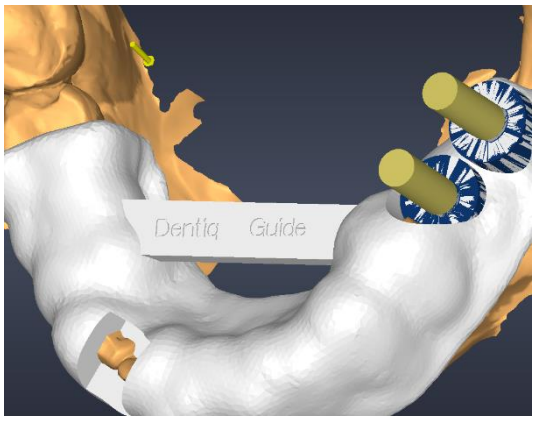
⑦ When Add button  is clicked again after a temporary engraved text is added, a new text can be added.

⑧ Select type between embossed and debossed from 

option.

[Guide after engraving text]

⑨ When the text is located, click  button on the bottom of tools to finally add it to the guide.



⑩

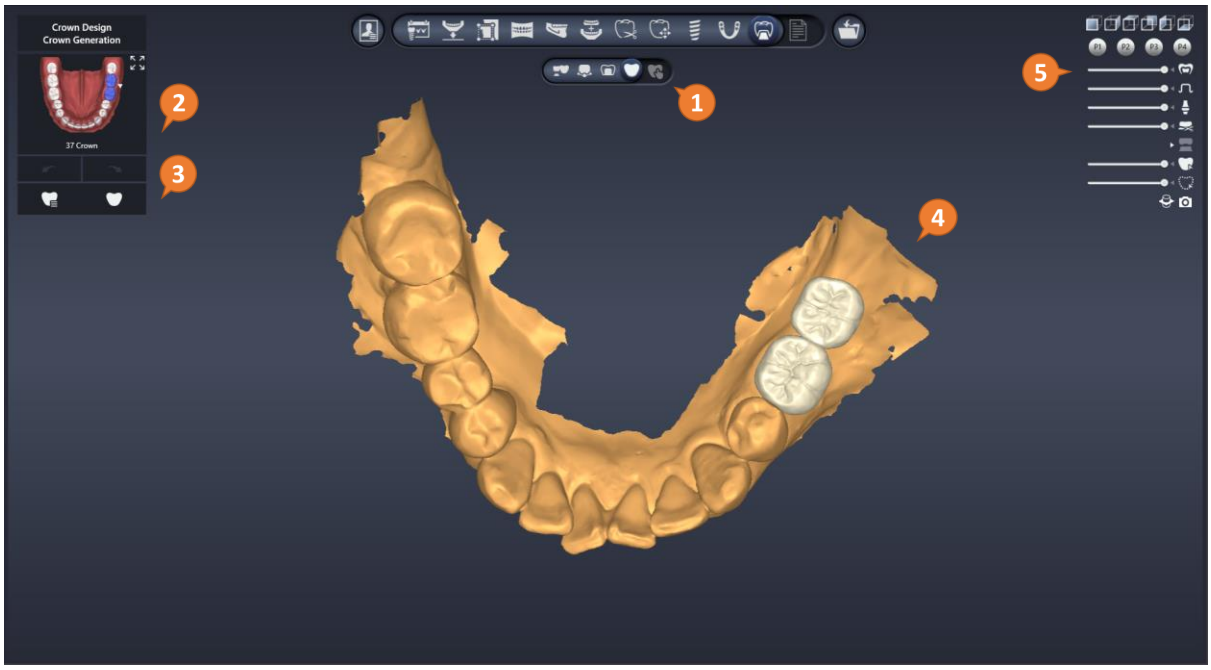
Deleting Text

- Click Initialize button  from tools to delete all texts finally engraved in the guide.

	Please refer to 4.7 Visualization option for more information about visualization options and additional features.

6.11 Crown Design

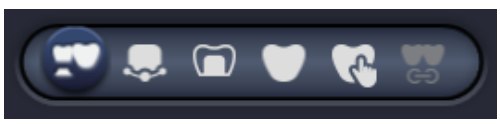
In this stage, the user can design temporary tooth to be used before final prosthesis placement in patient mouth.



NO	Title	Description
1	Detailed Work Process Bar	Detailed work process for crown design
2	Select Tooth	Select a tooth to work on
3	Tools	Tools for guide designing
4	Operation Data	Display data and operation conducted
5	Visualization Option and Additional Features	Provide tools for visualization options and additional features

1) Detailed Work Process

Work process for temporary tooth design is displayed. Clicking an icon for process brings the user to the corresponding process page.



Icon	Description

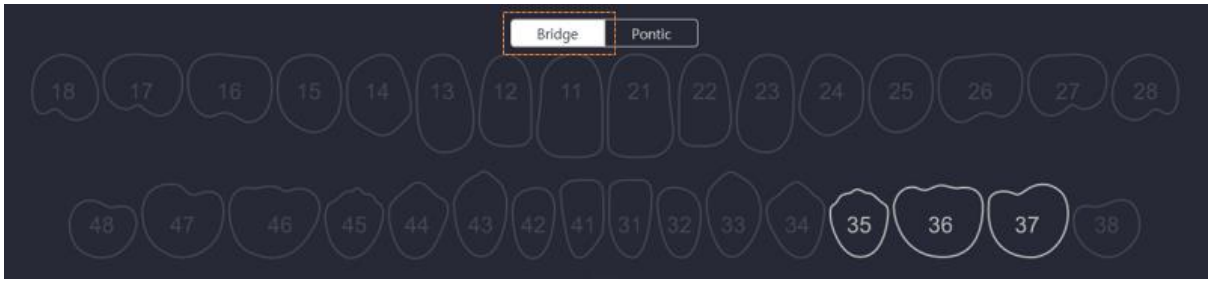
	Set bridge/pontic connection (not displayed for a single tooth)
	Set margin line
	Set cement gap
	Create Crown
	Trim Crown
	Design bridge connection (not displayed for a single tooth)

2) Set Bridge/Pontic

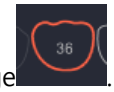
This step is only provided when two or more consecutive teeth are selected in the Surgery Planning stage.

When creating temporary teeth, the teeth set as bridge is created as one connected mesh and the teeth set as pontic are created with closed bottom.

Enabling/Disabling Bridge



① Select a tooth among teeth enabled in light grey from Bridge option to enable as Bridge.

② The selected tooth is displayed in orange 

. Click Apply button on the bottom when tooth selection is completed.

③ The created group can be seen on Bridge List 

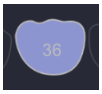
on the left.

④ To disable bridge setting, right click on the bridge tooth from the teeth image or click trash button 

on the right of Bridge.

Enable/ Disable Pontic

① Select a tooth among teeth enabled in light grey from Pontic option to enable as pontic. (If more than 3 teeth are connected as bridge, the teeth in the middle are enabled while the teeth with abutment are not enabled.)

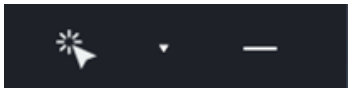
② The tooth turns to purple  as soon as clicked to enable as pontic.

③ If click the tooth enabled as pontic again, the tooth is disabled.

3) Set Margin Line

Set contacting location between temporary tooth and abutment or between abutment teeth. Margin line for temporary tooth is created along the set location.

Margin Line Setting Tools



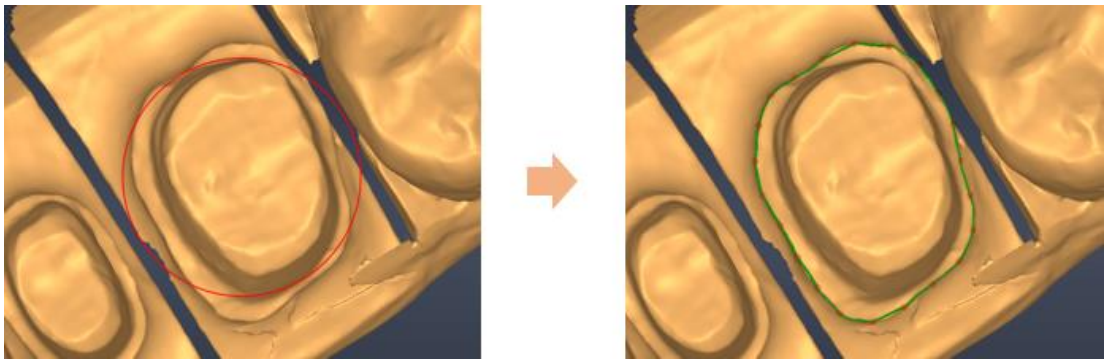
Set Margin Line	Semi-auto/Auto creation/deletion of margin line

Semi-auto Margin Line Setting

Margin line can be set semi-automatically by setting margin area.

① Click Semi-auto Margin button  from Margin Line Setting Tools.

② Click where the red circle created at mouse cursor aligns with margin area.



(Size of red circle created at mouse cursor is adjustable thorough scrolling mouse wheel.)

	Accuracy increases when the red circle is closer to the margin line.

Abutment Case Margin Line Setting

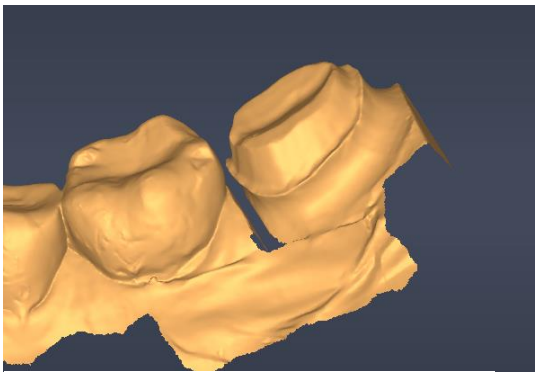
If there is an existing abutment, margin line is automatically created for the abutment. Check the margin line created on the abutment to move on to next step.

[Automatically Created Margin Line on Abutment]

- If multiple teeth exist, change the tooth from Select Tooth tool on the left.

Manual Setting of Abutment Tooth Case Margin Line

When using abutment tooth information of scan data, margin line can be drawn manually.



[Abutment Tooth Scan Data]

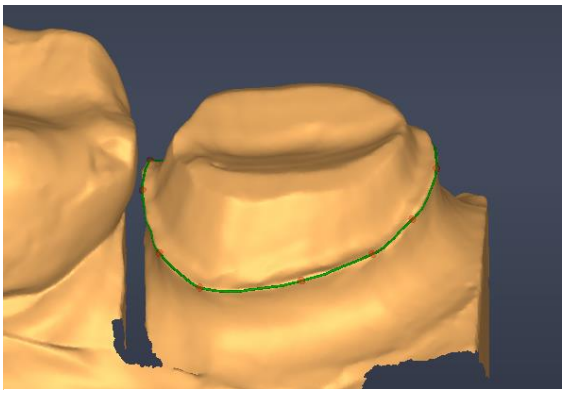
① Select teeth to draw margin line from Select Tooth tools.

[Select Tooth Tool]

② Click Add Margin Line button  from tools.

③ Click on the scan data surface to draw margin line.

④ When the start points (yellow) is clicked, drawing margin line is completed.



[Drawn Margin line]

Editing Margin Line

- **Move Point**: Click and drag control point of margin line.
- **Delete Point**: Right click on control point of margin line.
- **Add Point**: Click on margin line where there is no control point.

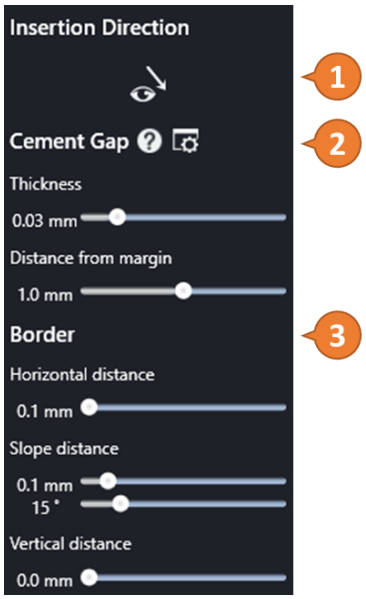
Deleting Margin Line

- When delete button  is clicked, margin line for currently selected tooth is deleted.

4) Set Cement Gap

Cement gap to bond temporary tooth can be set.

Cement Gap Setting Tools

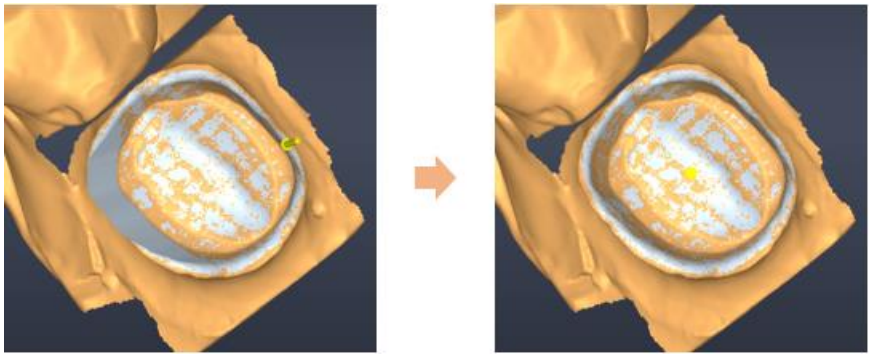


No	Title	Description
1	Crown Insertion Direction	Set direction to insert temporary tooth in the mouth
2	Cement Gap	Set cement gap inside temporary tooth
3	Border	Set shape of temporary tooth near margin line

Setting Temporary Tooth Insertion Direction

① Rotate scan data in the direction where the teeth are inserted and then set the insertion direction in the direction the users see when clicking the insertion direction Setting tool  on the adhesive space setting tool.

② Check if undercut area displayed on scan data is changed according to the set direction.



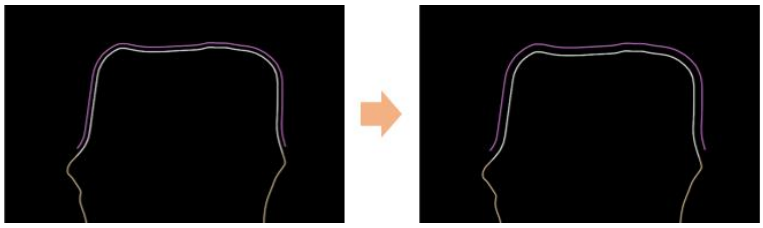
Teeth enabled as bridge has the same insertion direction while teeth disabled as bridge have different insertion direction for each tooth.

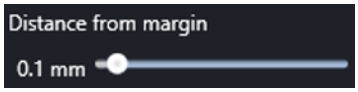
Temporary tooth insertion direction tools are displayed only for abutment tooth case. For abutment case, the insertion direction is automatically set according to abutment direction.

Setting Cement Gap

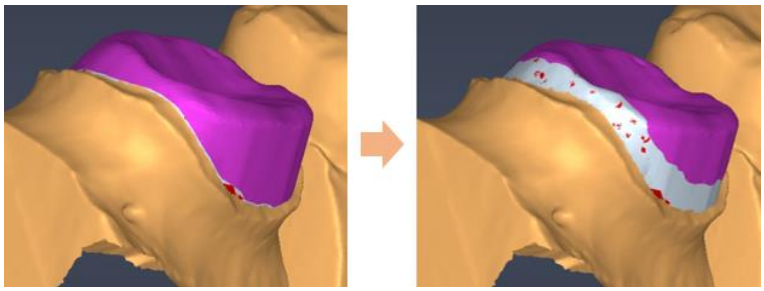
- **Cement Gap**: Drag Thickness slider 

to adjust thickness of cement gap.



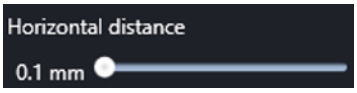
- **Distance from margin**: Drag Distance from margin slider 

to set area not to create cement gap based on margin.

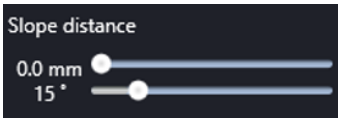


Setting Boarder

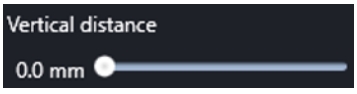
Shape of temporary tooth near margin line can be edited.

- **Horizontal distance**: Drag Horizontal distance slider 

to set outside width from margin line.

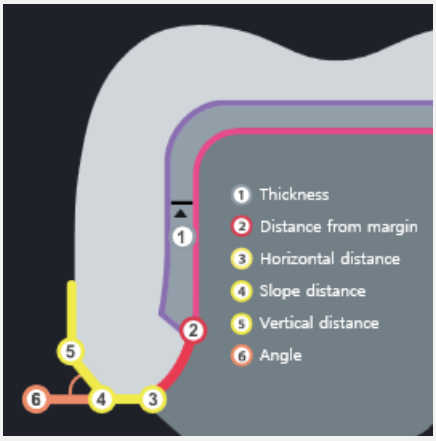
- **Slope distance**: Drag Slope distance slider 

to set distance from the end point of margin horizontal width to connecting point between temporary teeth and external surface of tooth. Also, angle of connection area can be set by dragging angle slider.

- **Vertical Distance:** Drag Vertical distance slider 

to set distance from the connecting point of external surface of temporary tooth to the end point of boarder area.

Click Help icon on Cement Gap button on the right of Cement Gap title to view image to show descriptions for each item. When dragging the slider, title



and area of the corresponding item is highlighted.

You can set the currently set value as the default guide creation option by pressing the button. Please refer to 5.3 Settings > 10) Temporary Tooth for more information.

5) Create Crown

Crown Generation Tools

No	Title	Description
1	Crown Library	Provides crown library
2	Generate Crown	Generate the placed crown as temporary crown for editing

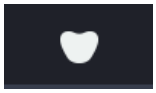
Crown Placement

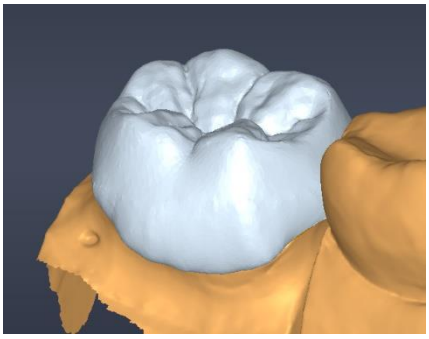
Sized and position of tooth is set to create temporary tooth. The operation to change crown library and place crown is the same as Crown Placement stage.

Please refer to 6.8 Crown Placement for more information about changing crown library and crown placement.

Default value for crown library can be set in environment setting. Please refer to Setting > 10) Temporary Crown for more information.

Crown Generation

- After crown placement, click Crown Generation button  from tools on the left.
- Check temporary tooth for editing which is created on 3D image.



[Created tooth for editing]

	When margin line is set, the teeth are created with empty space inside and downside of it, while teeth are created with closed bottom when pontic is enabled.

6) Edit Crown

Crown Edit Tools

No	Title	Description
1	Morphing	Display mopping tools
2	Wax Knife	Displays wax knife tools
3	Adjust Contacting surface	Automatically adjust crown contacting surface

Using Morphing Tools

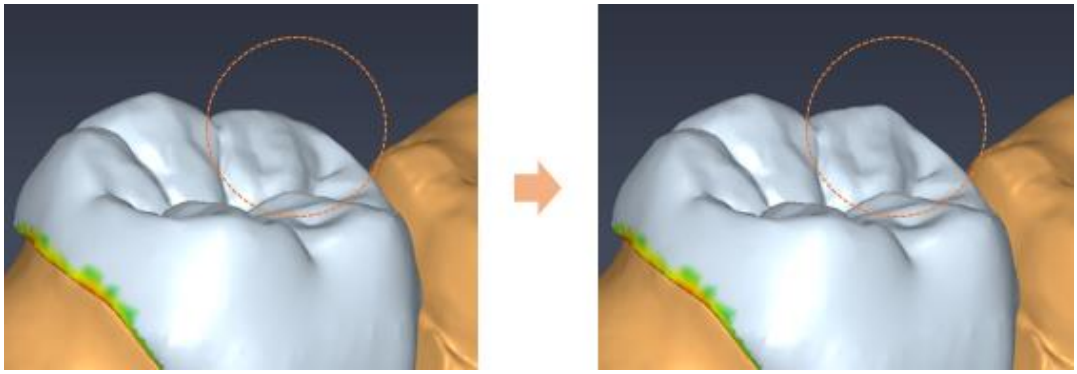
Certain area of crown can be edited by dragging.

① Click Morphing tool  from tools.

② Drag slider 

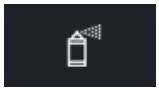
on the bottom to adjust radius of area to edit.

③ Drage crown on 3D panel to edit crwon.

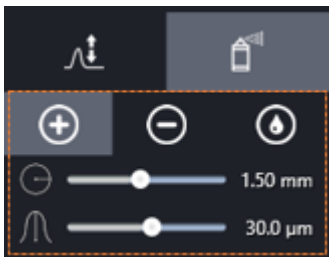


Using Wax Knife Tools

Shape of crown can be edited by adding/delete wax or smoothing.

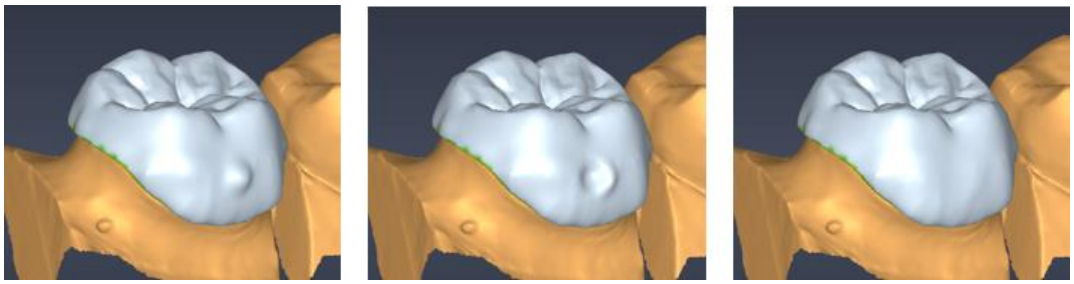
① Click Wax Knife  icon from tools

② Select a detailed tool among Add, Delete and Smooth. Also adjust editing area radius and editing degree by dragging sliders.



	Adjust Editing Area Radius
	Adjust Editing Degree

③ Edit crown by dragging a crwon on 3D image panel.

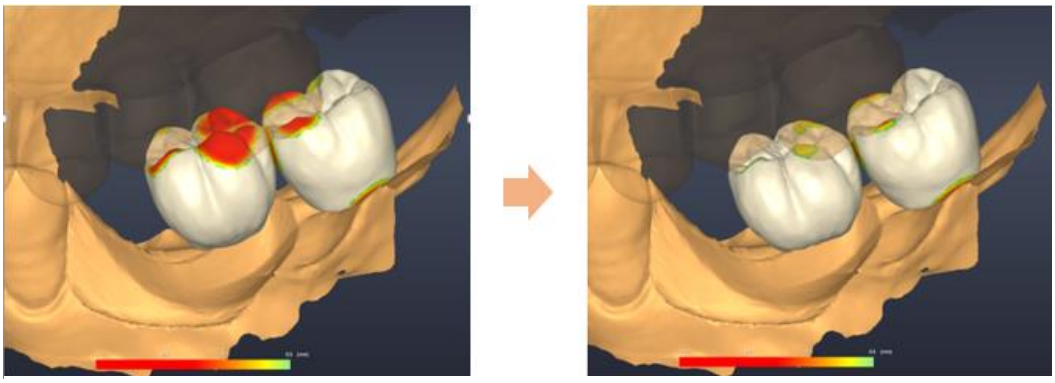


[Add Wax(left)/ Delete Wax(middle)/ Smooth(right)]

	**Default values for morphing/ wax knife adjustment can be set in environment settings. Please refer to 5.3 Settings > 10) Temporary Crown for more information.**

Auto adjustment of contacting area

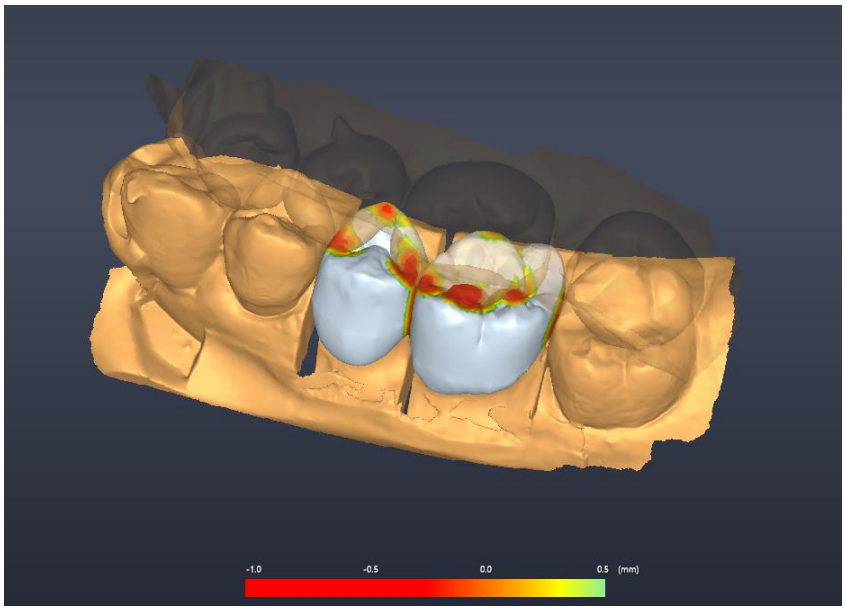
- Click Auto Adjustment of Contacting Area button  to adjust contacting area automatically considering collision of crown and adjacent structures.



[Before(left)/ After(right) adjusting contacting area(left)]

Viewing Collision Distance Map

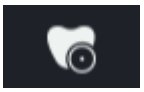
Enable Distance Map Visualization option to view the distance map from abutment teeth, antagonist teeth and surrounding teeth with colors. If the color is closer to green, the shallower the collision depth is, while if the color is closer to red, the deeper the collision depth is.

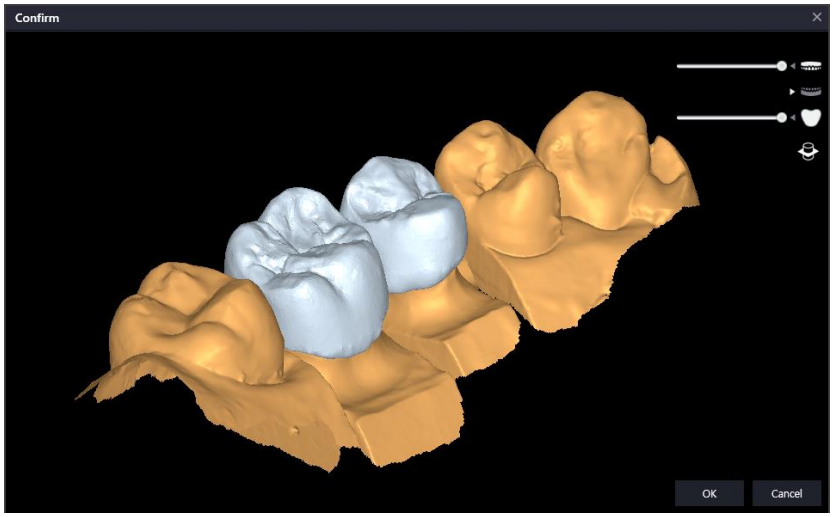


[Collision Distance Map]

Final Generation/Confirmation of Temporary Tooth

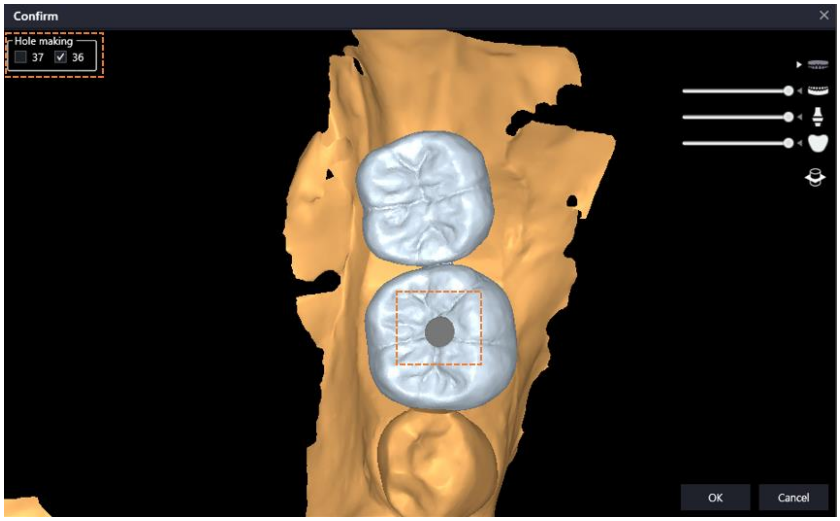
Regenerate temporary teeth reflecting crown editing information and finally confirm it.

- When crown design is completed, click crown generation button  from tool on the left.
- Temporary teeth are regenerated as soon as clicking the button. Finally confirm temporary teeth displayed on popup window.



[Final Confirmation Window]

- In case of abutment case, whether abutment hole is created or not can be set in the final confirmation window.



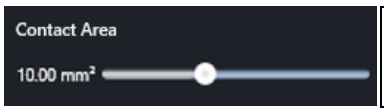
[Created a Hole in Crown]

- **OK**: Finally confirm temporary tooth, close confirmation window, and enable Result stage button.
- **Cancel**: Close confirmation window and continues to design.

	When bride is set, final temporary tooth generation should be conducted in bridge setting stage. Please refer to 5.3 Settings > 10) Temporary Crown for more information.

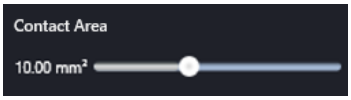
7) Set Bridge

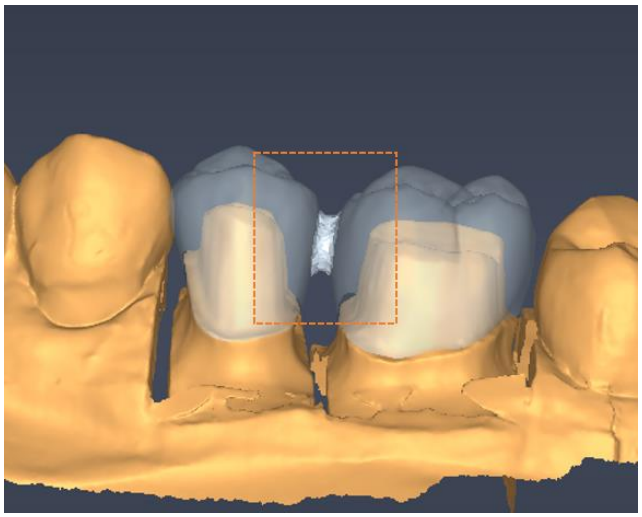
Bridge Setting Tools

	**Contact Area**	Set area of bridge connection

Edit Bridge Contact Area

Contact area between temporary teeth with bridge can be edited.

- Click and drag the position of bridge contact area on 3D panel.
- Drag Contact Area slider  from tools to adjust contact area.
-

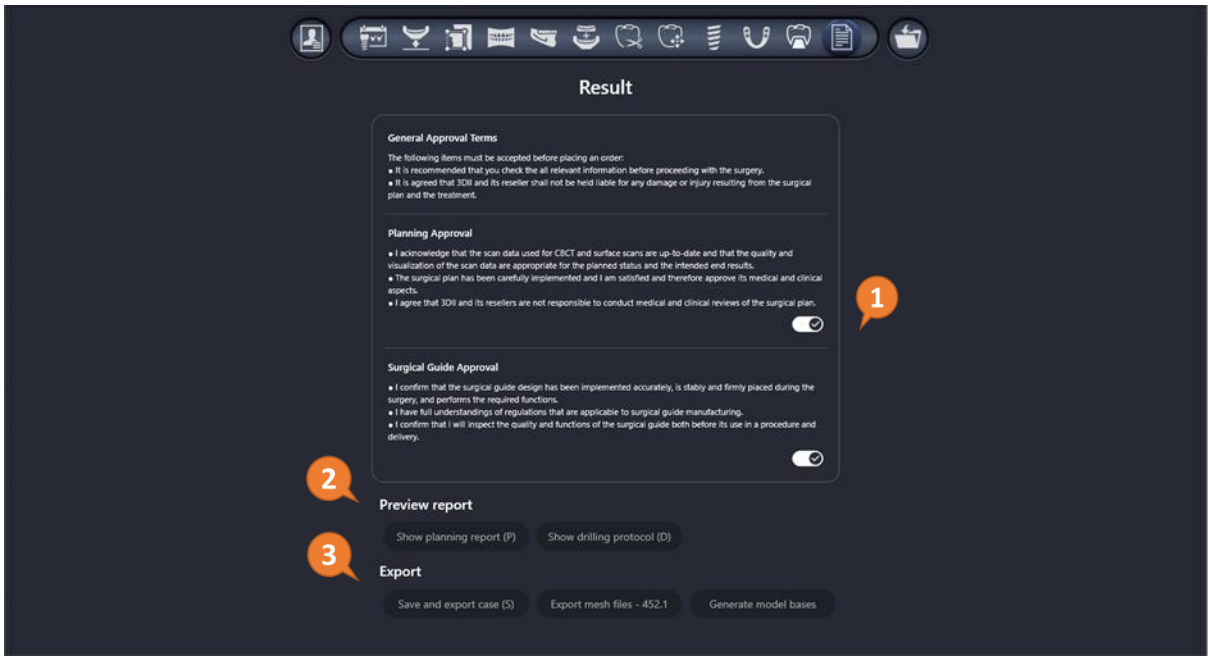


[Bridge Contact Area]

	Default value for contact area can be set in Environment Settings. Please refer to 5.3 Settings > 10) Temporary Crown for more information.

6.12 Result

In this stage, the user can view surgical report with case summary and export report, drilling protocol, guide file (STL). After final approval of surgical plan and guide design, confirm and export menu can be activated.



No	Title	Description
1	Approval	Finally approve planning and guide design
2	Preview	Preview for planning report and drilling protocol
3	Export	Export case, report, and guide (STL)

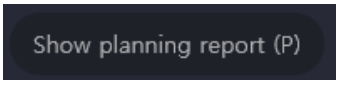
1) Approval

Final approval for implant planning and surgical guide planning is required to created report and export mesh.

- Click  button on the right of each option to complete  approval.

2) Show/Modify/Export Planning Report

Planning report provides information such as planning overview, bone density around implant, and implant model. Memo can be added to the report if needed.

- Click 

button to create planning report page.
- Review the content by scrolling.

- Kit information can be entered directly into Drilling Kit : field.
- The user can add memo directly in the [Note] at the bottom of report page.
- Click Export report button on top right to save current report to the local folder as pdf file format.

Please refer to 5.3 Settings > 11) Report for more information about setting report types to display in the report.

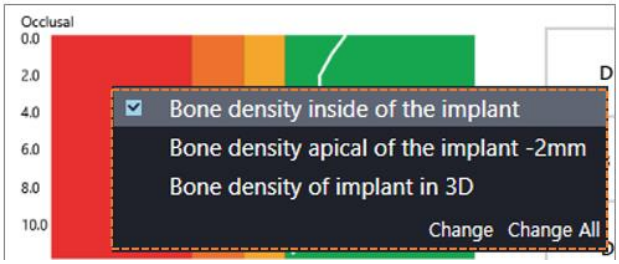
Image Editing

- **Zoom In/Out**: Right click and drag
- **Move**: Drag mouse wheel

Change Bone Density Display Option

Bone density display option for each implant on planning scheme page in report can be selected between Bone density inside of the implant, Bone density apical of the implant - 2mm, and Bone density of implant in 3D.

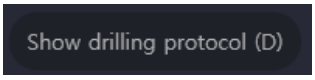
① Right click on bone density to display menu to change.

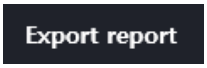


② Click the desired option and click Change or Change All button to apply the change.
- **Change**: Change bone density display option for current planning only.
- **Change All**: Change all bone density display options in the current report.

Changes made to Report is temporary. Please refer to 5.3 Settings > 11) Report about changing default bone density display.

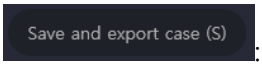
3) Show/Export drilling protocol

- Click 

button to create surgical drilling protocol page.
- Review the content by scrolling.
- Click 

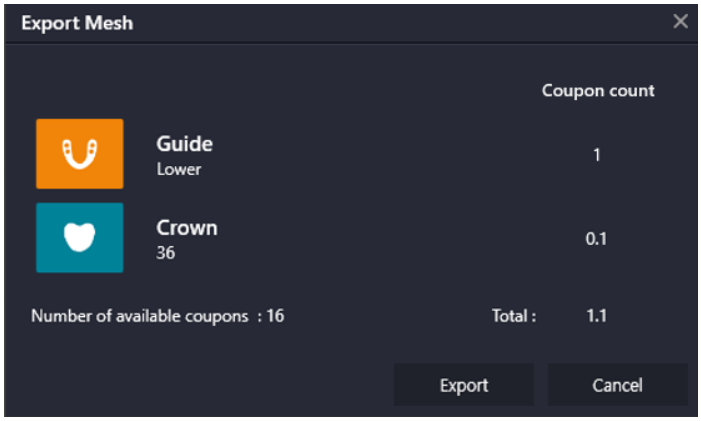
button on top right to save to a local folder as pdf file format.

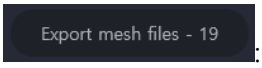
4) Save and export case

- 

: Project file and report for the current case can be saved to local folder by clicking the button.

5) Export mesh



- 

: Export Mesh dialog appears when clicking the button.

- Click the image to select options to export.

[Select / Unselect to Export]

- **Export**: Surgical guide or temporary crown designed by the user can be saved to local folder as mesh (STL file) format. Oral scan data used together is saved as well.

[Export Mesh Dialog]

- **Cancel**: Cancel export.

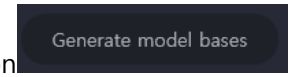
	**As for the case that the mesh has been exported, the credit will not be deducted when re-exporting if the surgical plan/ data registration stage is not changed.**

	**Exporting guide mesh can be limited depending on distribution method of distributor or whether the user owns credits or not.**

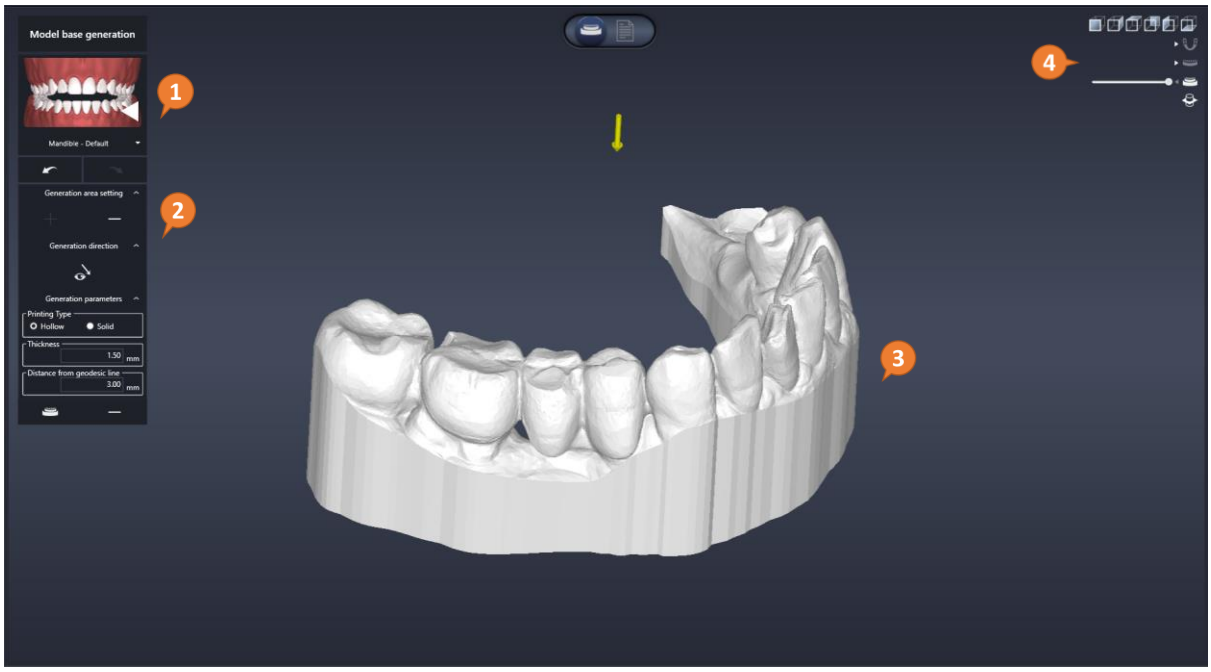
	**The guide deducts one credit each, independent of the upper/lower teeth, and 0.1 credit per tooth for temporary crown.** **If you would like to purchase credit, please contact service@3dii.net.**

6.13 Model base generation

Create a base for printing on the scanned data to allow 3D printing of oral scan data for real fit verification of oral scan data and design data (guides, temporary teeth). Create a base for printing in the scan data so that oral scan data can be 3D printed for goodness-of-fit verification.

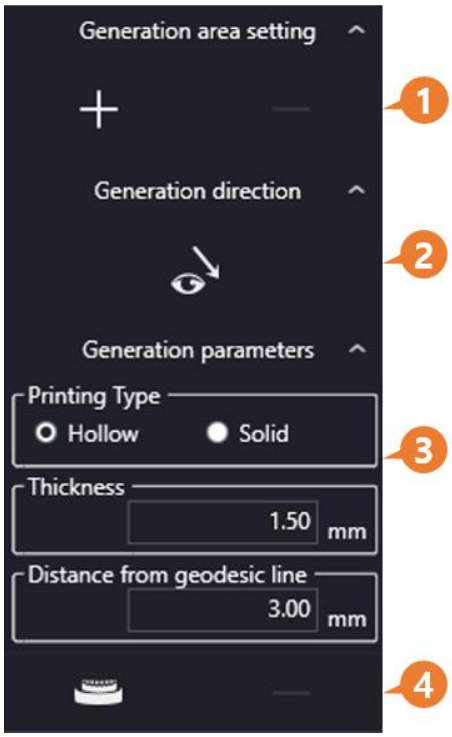
This feature is only available in the dental support surgery planning and temporary dental results stages, and when the Create Model Base button 

is clicked during the result stage, a separate working screen for the Model Base is created.



No.	Title	Description
1	Select Workspace	Selection of the designing portion and the file
2	Working Tool	Toolbar for designing
3	Working Data	Display working data and work
4	Display Options and Extra Features	Provide options for displaying and tool for extra features

1) Working Tools

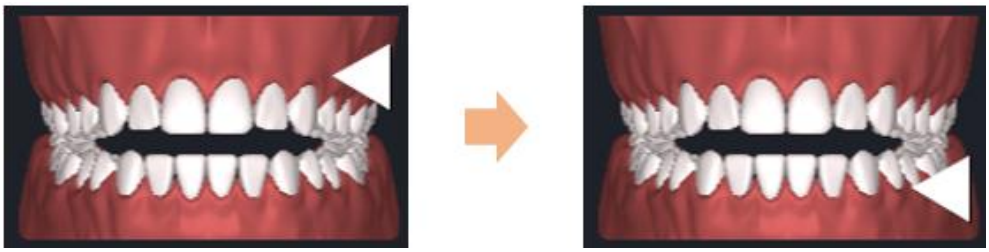


No.	Title	Description
1	Generation area Settings	Create/delete geodetic lines for setting the base generation area
2	Generation direction	Set Base Generation Direction
3	Generation parameters	Set type, base thickness, and minimum distance from geodetic lines
4	Generation base	Base Generation / Removal

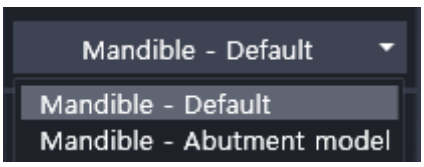
2) Setting the Base Area

Draw geodetic lines

① On the Select Workplaces menu, click the site where you want to create the base. The area where the arrow is displayed is the currently selected area.



② Select the type of scan data you would like to work with at the bottom of the work area if you had both the guide and temporary teeth in your surgical planning.



[Types of Scan data]

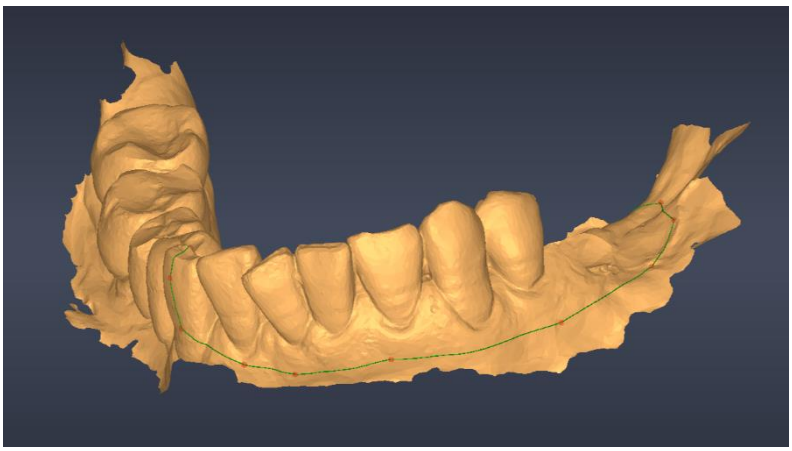
- **Default**: Basic Scan Data Used in Guide or Temporary Teeth Design Work
- **Abutment Model**: After implant planning, temporary dental design proceeds to scan

data including the Abutment model (includes the Abutment model geometry at base generation)

③ In the Action Tool, click the Add Geodetic Line button  .

④ Set the area you want to create the base by clicking on the surface of the scan data.

⑤ Click on the start point (yellow point) to end geodetic drawing.



[drawn geodetic line]

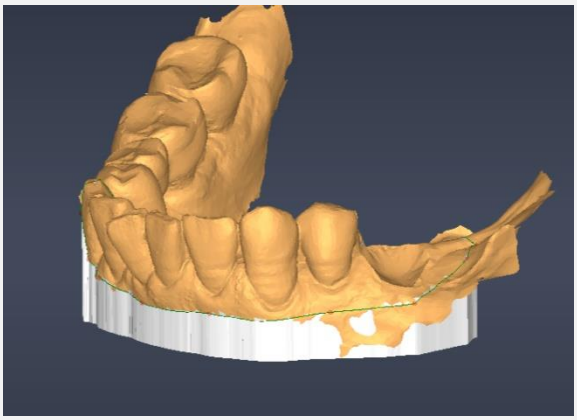
Editing a geodetic line

- **Move point**: Click + drag the control point of the geodetic line.
- **Delete point**: Right-click the control point of the geodetic line.
- **Add point**: Click on the geodetic line without a control point.

Deleting a geodetic line

- The entered geodetic line is deleted when the Delete Geodetic Line button  is clicked.

When you enable the scan data entry in the Visibility option after base creation, the scan data and geodetic lines are displayed together, allowing you to add geodetic lines.

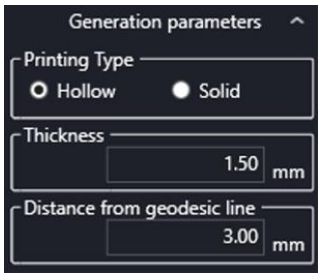


[Scan data visualization options active after base creation]

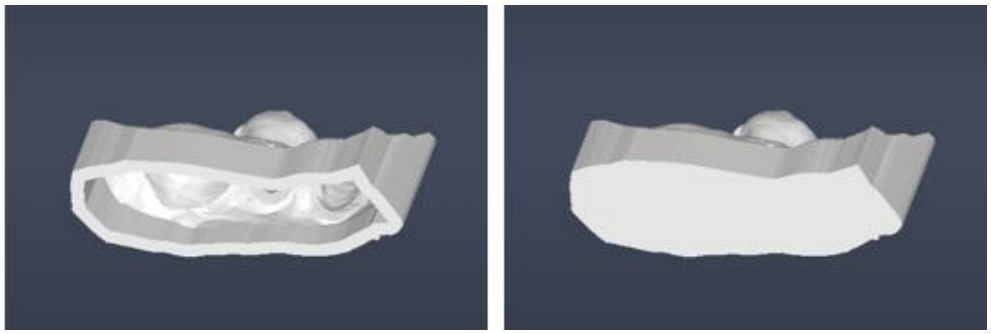
3) Set base generation direction

- Rotate the scan data in the direction in which the base will be created, then set the direction  in which the user sees the creation when clicking the tool.

4) Set base generation options



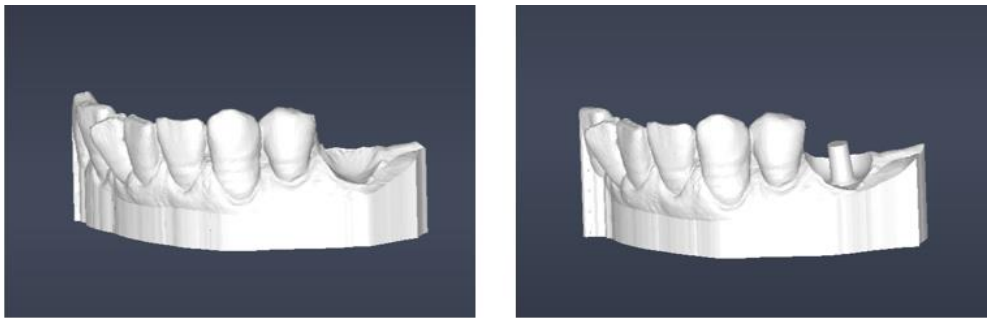
Base type	Model base type setting - Hollow: Emptying inner portion of the model base - Solid: Filling inner portion of the model base
Base Thickness	Set the thickness of the hollow type base model being created
Distance from geodetic line	Minimum Base Length from Geodetic Line



[Hollow Type(Left) / Solid Type(Right)]

5) Model base generation/removal

- When you click the Create Base button  in the Action Tool, the base is created by reflecting the preset geodetic lines, direction of creation, option values, and so on..



[Generated Model Base(Left)/Generated Abutment Base Model(Right)]

- Deletes the created base when the Delete Base button  is clicked.

	**For the Abutment Model base, the Abutment Model feature is included and all crowns and nested scan data areas are deleted.**

	**If you change settings such as geodetic lines, direction of generation, and optional values after base creation, you must recreate the base.**

6) Mesh export

Print out the designed model base file (STL). After final approval for the base design, the output menu is activated.

	**Please refer to the 6.12 Result > 5) Mesh export**

	**The base is deducted from 0.5 credit each for the upper/lower/basic/abutment model.**

	**When the base file is output, the design project is automatically saved. However, if the surgical planning stage / data loading stage / tooth removal stage / temporary tooth final confirmation is changed, the base project will be initialized.**

	**Dental guides are not available when working on base design.**

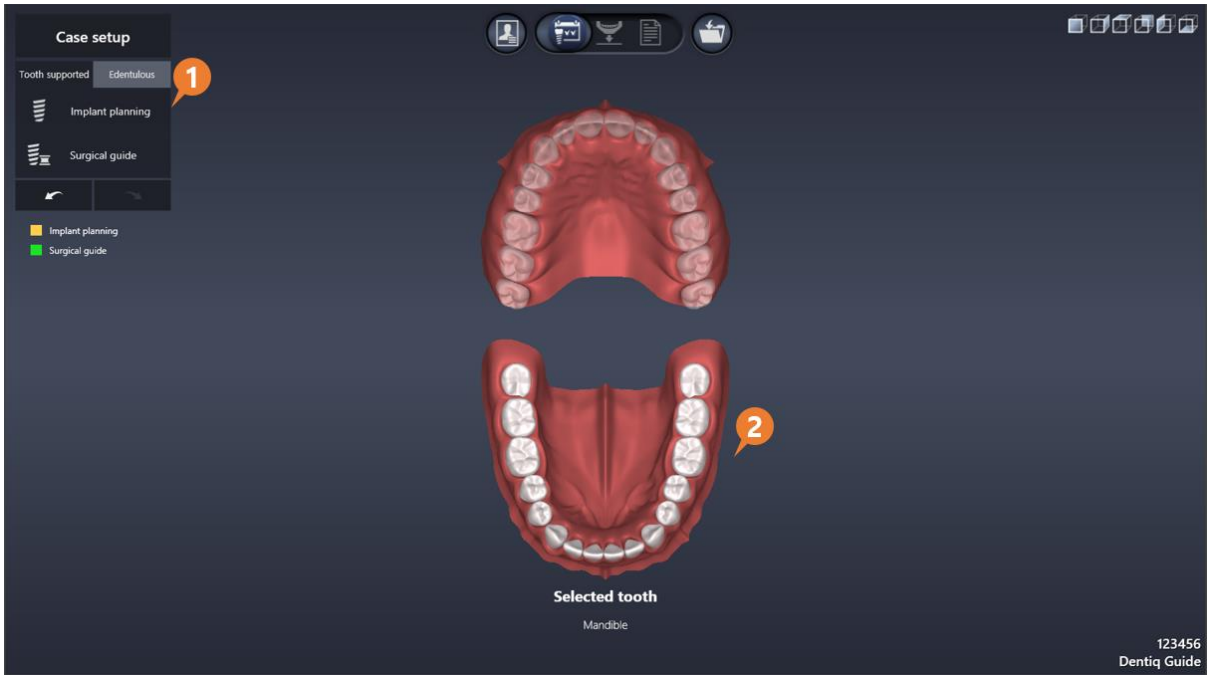
7. Edentulous case planning

Display the steps required for the plan according to the planning of the Support Edentulous Surgery.

	This stage covers only 6. Tooth Support Surgery Plan work. Regarding other common actions, please check out 6. Surgical planning for tooth supported type.

7.1 Case Setup

In this stage, you can select the tooth for surgical planning and set the planning item.

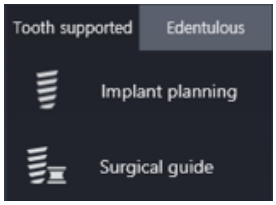


No	Title	Description
1	Surgical Plan Item	Select a Surgical Plan to proceed
2	Select Region	Select a Surgical Region to proceed

1) Make a Surgical Plan

① Select teeth to work on from teeth selection model. (Maxilla or Mandibular)

② Select surgical plans from the listed Edentulous supported surgical plan items.



Implant Planning	Plan implant using CT image
Guide Design	Design surgical guides and export STL

③ Select surgical plan items and check if next page (Import Data) is enabled on the workflow progress bar.

The Edentulous surgery plan does not support simultaneous progress of the upper and lower cases.

The displayed item in the work step bar is changed according to the surgical plan item you set.

2) Cancel Surgical Plan

To cancel the surgery plan, refer to 6. Teeth Support Surgery Planning work → 6.1 Surgical Planning → 2) Cancelling the implant planning.

7.2 Import Data

In this stage, patient CT data and Denture data can be imported. Denture data supports CT data and Scan data. CT data supports DICOM format and scan data supports STL format.

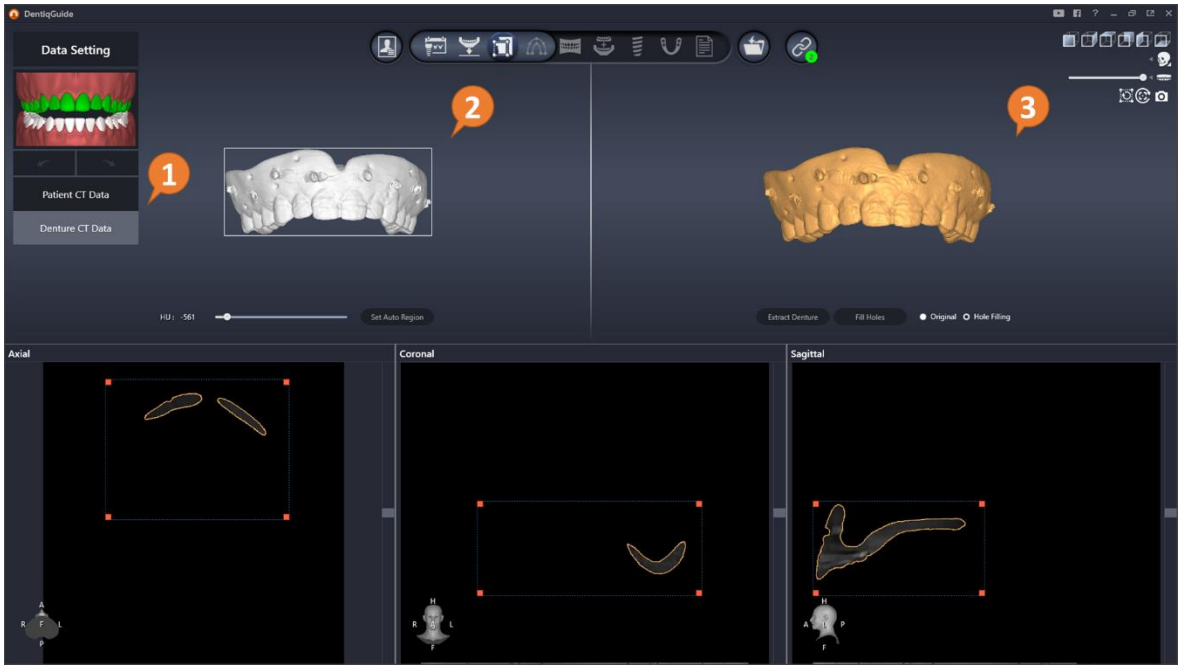
Refer to 6. Surgical planning for tooth supported type → 6.2 Data registration for detailed actions.

7.3 Data Settings

In this stage, the user can set ROI (Region of Interest) Area of CT data. After the data setting, image will be remarked only using CT data which was selected at this stage. If you use dental data in the form of CT data, you convert the CT data to STL data at that stage.

The denture data uses the converted STL denture data in the following steps after the data setup stage.

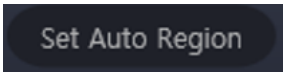
1) Extract Denture STL file from CT denture data



번호	Title	Description
1	Select Area	Select area
2	Denture CT data	Denture CT data 3D image
3	Export Denture STL data	STL data exported from Denture CT data

Auto Denture Region Setting

The ROI of the Denture CT data is automatically set to match the actual Denture area volume. When entering the screen, the ROI is automatically set to match the Denture area.

- When the ROI is manually adjusted and the ROI auto-set tool 

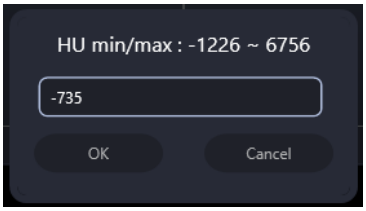
is clicked, the ROI is initialized with the initially set Denture area volume ROI.

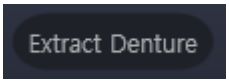
Extract Denture STL

- If the denture data is registered as CT data during data registration, the data setup stage will be added.
- Basically, STL is extracted and displayed as medium-level quality when entering the screen.
- If you need to adjust the HU value of the dental CT data to extract, adjust the HU adjustment tool 

at the bottom of the dental CT data area by clicking and dragging the mouse.
- If you need to adjust the precision of the STL to extract, select the value you want from the precision menu 

at the bottom of the denture STL extraction data area.



- If you have changed the HU value, precision, and ROI, click the Extract denture button 

to re-extract STL with the changed value.

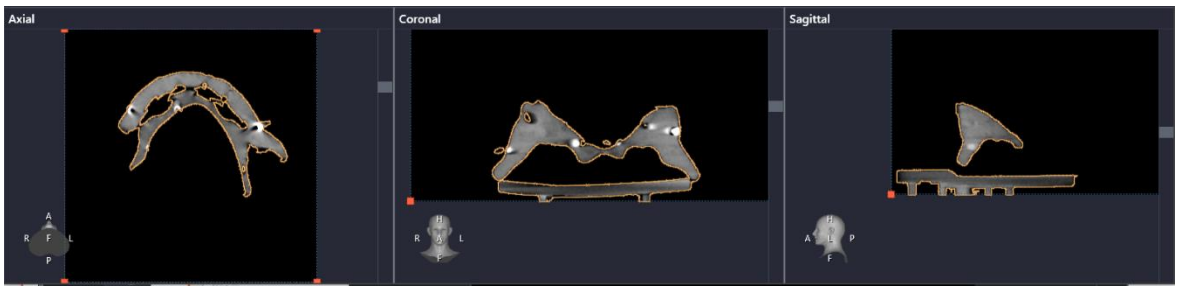
Filling the hole

- If there is an empty space in the extracted STL data, gingival line cannot be set including this part. In this case, click the Filling Hole button 

to modify the STL data.

2) Checking Extracted Denture STL Image

- The extracted STL data is displayed with CT data in the MPR (Axial/Coronal/ Sagittal) area at the bottom of the screen.



[Extracted STL (yellow solid line) in MPR area]

	For other common actions, refer to 6. Surgical planning for tooth supported type → 6.3 Data Settings

7.4 Alignment

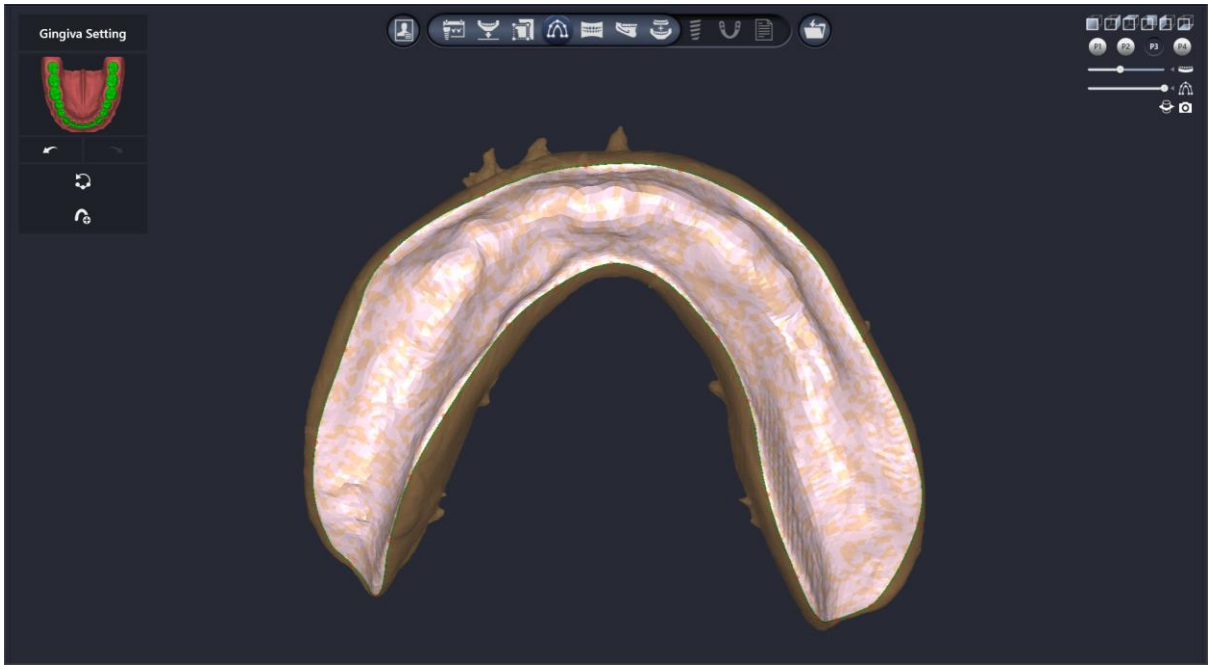
In this stage, the user can align CT data and denture data using coordinates. This stage provides Points Alignment feature which automatically align coordinates of the two data using points and Manual Alignment which enables users to manually align coordinates. Basically, the user can use manual alignment after conducting Points Alignment.

If the CT data format denture data is enrolled, the alignment is proceeding by using the denture CT data.

	6. Surgical planning for tooth supported type → 6.6 Alignment.

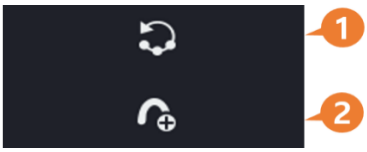
7.5 Gingiva Settings

In this stage, the user can set Gingiva Area of Denture data. Set to include all Gingiva Areas as the Gingiva area set in that step is used as the collision detection area in the implant planning phase and the cylinder creation prevention reference area in the guide generation stage.



No	Title	Description
1	Tools	Provide toolbar to use when setting Gingiva
2	Operation Data	Display data and operation conducted
3	Visualization Options and Additional features	Provide Visualization Options and Additional features

1) Tools



No	Title	Description
1	Initialize Geodesic	Initialize Drawn Geodesic
2	Create Gingiva Area	Set Geodesic Area as Gingiva Area

2) Gingiva Area Settings

Draw Geodesic

① At step 1 entry, the mouse is automatically set to geodetic drawing mode.

② Set the area you want to specify as Gingiva by clicking on the denture data.

③ The geodetic drawing ends when clicking the start point (yellow point).

④ When you click the Create Gingiva Area button  in the Tools after completing the geodetic drawing, the Gingiva Area will be finally applied.

[Before setting the Gingiva Area (Left) / after setting the Gingiva Area (Right)]

Geodesic Editing

- Move Point: Click and drag the control point of the geodetic line.
- Delete Point: Right-click the control point of the geodetic line.
- Add Point: Click on a geodetic line without a control point.

Delete Geodesic

- All geodetic points are deleted when you click the Reset Geodetic button  on the task tool.

	If there is a hole in the scan data, the gingival region may not be create normally. If there is a hole in scan data, you can go to the Data Settings stage and click the filling hole button and reset the gingival area.

7.6 Drawing Curve

In this stage, users can create panoramic images by setting a curve along the arch so that the surrounding tissue (such as teeth, tooth muscles, etc.) of the area you want to perform is easy to identify.

	**Refer to 6. Surgical planning for tooth supported type → 6.4 Curve Drawing.**

7.7 Nerve Setting

In this stage, the users can set up Nerve when planning a Mandibular Surgery. Setting the implant position in consideration of Nerve will help ensure a more secure implant planning.

	**Refer to 6. Surgical planning for tooth supported type → 6.5 Nerve Setting.**

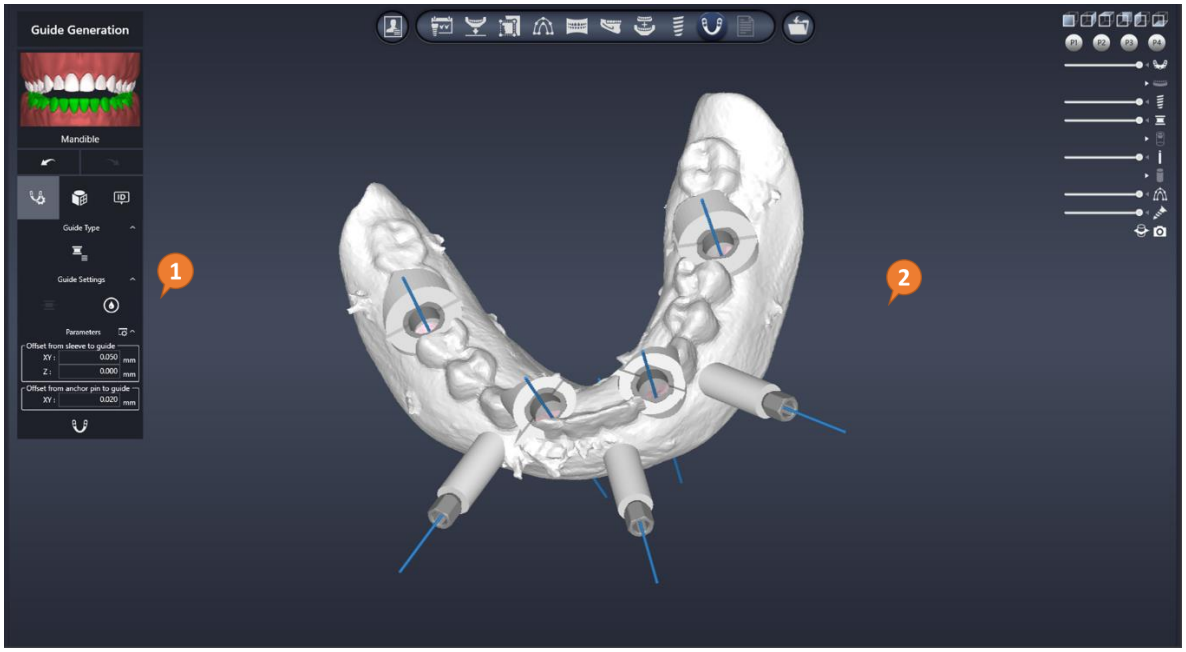
7.8 Implant Placement

In this stage, the user can set the position and direction of implant.

	**Refer to 6. Surgical planning for tooth supported type → 6.9 Implant Placement.**

7.9 Guide Generation

In this stage, the user can design surgical guide based on implant planning information. The Edentulous Guide automatically generates and displays implant planning information and information in the form of denture data when entering the screen.

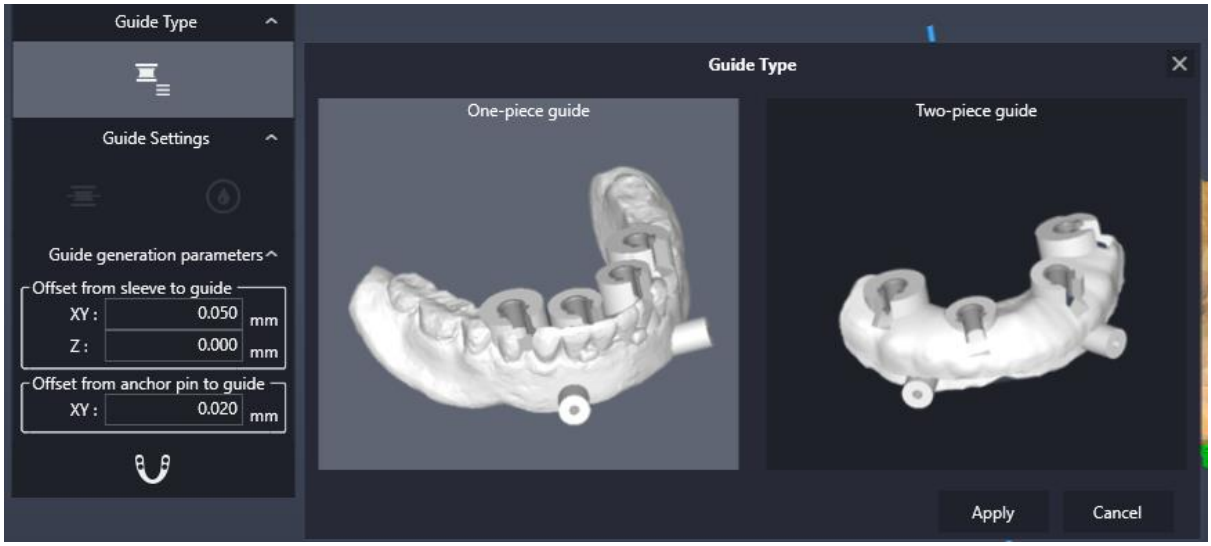


번호	명칭	설명
1	Tool	Provide toolbar to use for Guide Design
2	Surgery data	Display Surgical Guide Design and operation conducted

1) Types of surgical guide

DentiqGuide in edentulous case provides two types of guides that can be used for purposes: an one-piece or two-piece guide.

Select an one-piece or two-piece guide.



- **One-piece guide**

  This is a guide in the form of applying the anchor pin and implant to the dentures. It is more convenient during surgery than an assembled guide because it is integrated, but in some cases, the occlusion may not be confirmed depending on the situation.

- **Two-piece guide**

  Create an occlusion guide and a surgical guide. During surgery, it is necessary to check the occlusion, but it is used when it is difficult to check the occlusion with an all-in-one guide.

  Occlusion guide

  It is used to check occlusion. Use it after assembling it over the surgical guide.

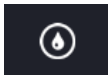
  Surgical Guide

  You can check the anchor pin and implant planning location. It is assembled with the engagement guide and used. During surgery, the occlusion guide is removed and the operation is performed using only the surgical guide.

⚠	**When the guide type is changed, the work details are initialized.**

2) Guide Trimming

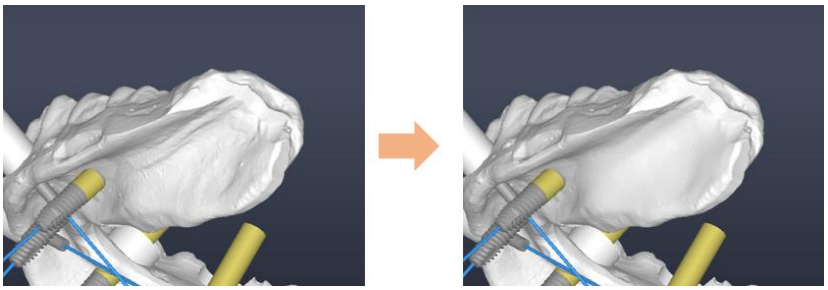
As the Edentulous Guide uses the same form of denture data, there might be many bumps on the surface. If you want to remove it, you can use the trimming tools in Tools to smooth the surface.

① Click Trimming tool  in Tools.

② Drag the slider below to adjust the editing area radius and intensity.

	Adjust Editing Area Radius
	Adjust Editing Strength

③ Edit the surface with the mouse click and drag guide in the 3D image area.



[Before trimming (Left) / After trimming (Right)]

3) Re-generate Guide

If you have changed the glue channel, sleeve model, or offset values between the sleeve and the guide, the Create Guide button  is activated at the bottom. Re-create the Guide by applying the changes when you click the button.

4) Add bars/windows or engraving text

You can add bars/windows or engrave text to each of the two-piece guides. Operation is only possible in the guide shown in the main work data area and can be changed using the image replacement tool  provided in the sub-work data area.

	**For other common actions, refer to 6. Surgical planning for tooth supported type → 6.10 Guide Generation.**

7.10 Result

In this stage, the user can view surgical report with case summary and export report, drilling protocol, guide file (STL). After final approval of surgical plan and guide design, confirm and export menu can be activated.

	**Refer to 6. Surgical planning for tooth supported type → 6.12 Result.**

8. DentiqLink

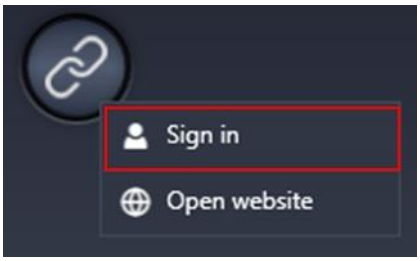
DentiqLink allows you to transmit 3D data information between the dental office and the dental laboratory and share the opinions with clinical information. DentiqLink provides digital dental services such as treatment planning, surgical guide design/printing of dental prostheses to dental office and dental laboratories.

	More information on DentiqLink can be found at https://www.dentiqlink.com.

8.1 Sign in

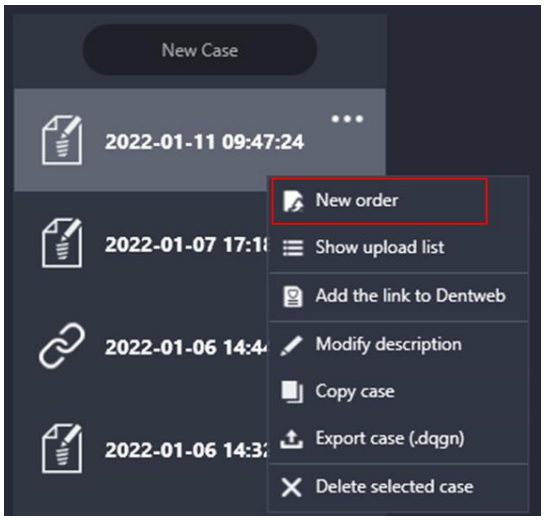
Click the DentiqLink in the settings to log in. For more information, refer to 5.3 Setting > 13) DentiqLink.

You can log in to DentiqLink even while using DentiqGuide. When you click the DentiqLink icon  , the following popup appears, and click Sign in icon to proceed with log in.

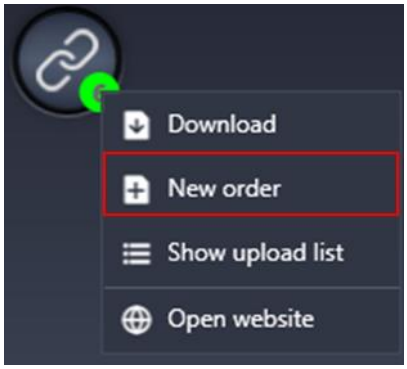


8.2 New Order

You can place new orders in DentiqGuide software. Right-click on the project file in the dental manager stage and click on the new order button to proceed then the data will be uploaded.

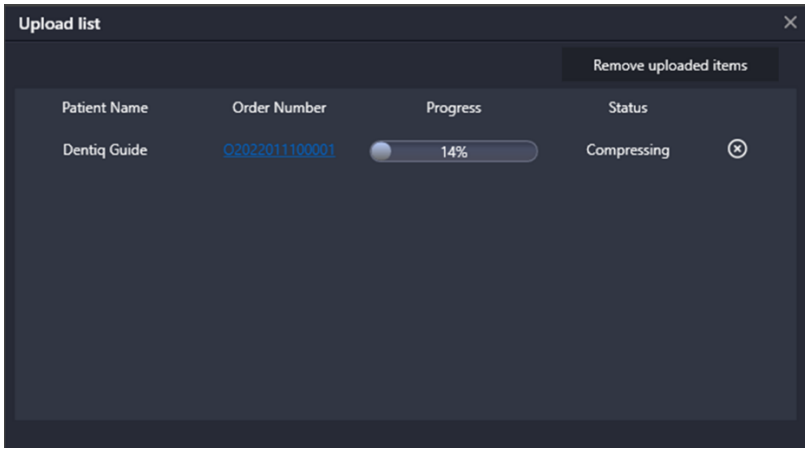


If you are on planning, click the button  to select a new order.

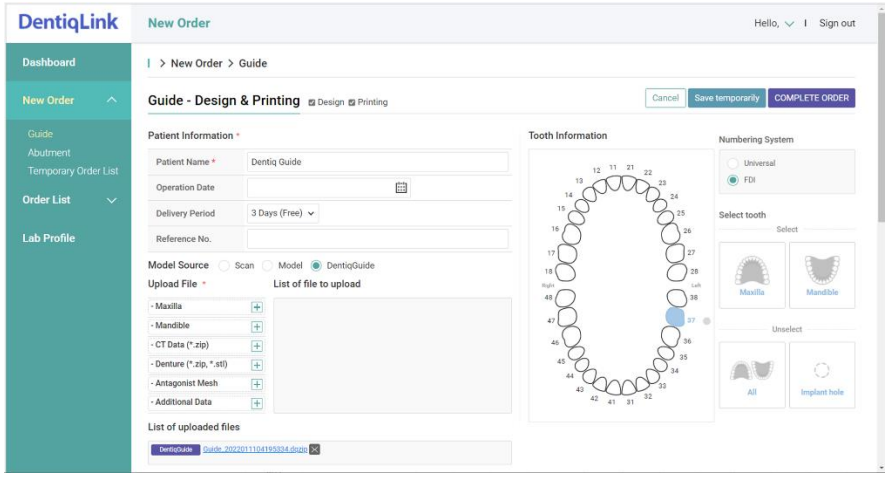


	New orders are only possible if you have all the necessary data such as CT and oral scan data. For example, when the maxillary guide planning is in progress, new orders can be made only when CT data and maxillary scan data are included in the surgical plan.

If you click on the new order, you will see the upload list.



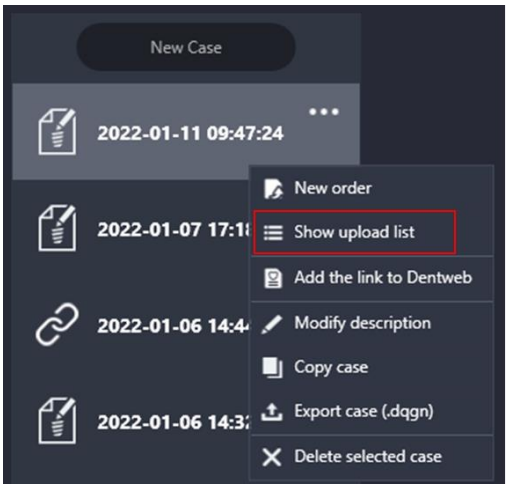
Click the order number to access the order website. Complete the order by entering the details.

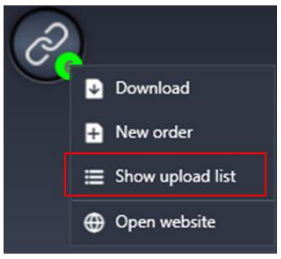


Uploaded items can be removed by clicking the "Remove uploaded items" button.

Items that have not been uploaded can also be deleted by clicking the Delete button.

Even if you close the upload list window, you can check it again using the Show upload list option.





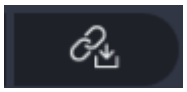
8.3 Data upload

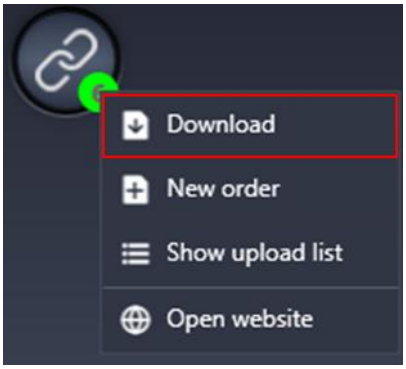
It is used to re-upload the changed surgical plan after a new order. After right-click in the surgical plan item in the dental manager, click Upload Data to proceed with the upload.

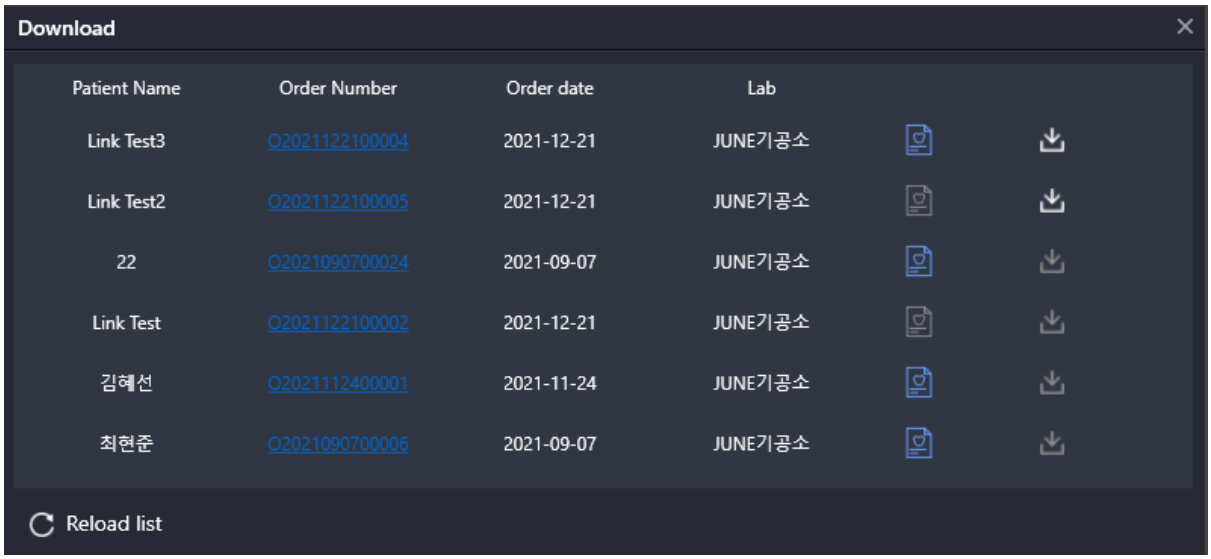
Alternatively, if you are in planning, click the  button to select Upload Data to proceed with the upload.

	The data upload function is activated only on surgical planning with a history of new orders or surgical planning downloaded from DentiqLink.

8.4 Data download

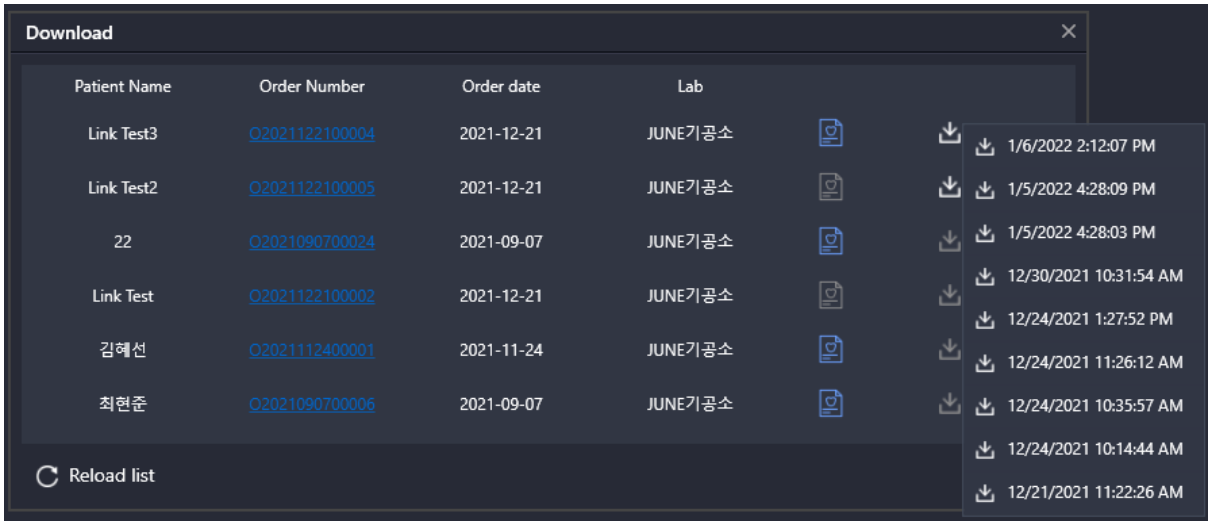
If you click the  button in the Dental Manager or click the  button on planning, you can see Download menu. Click the Download to see the download window.



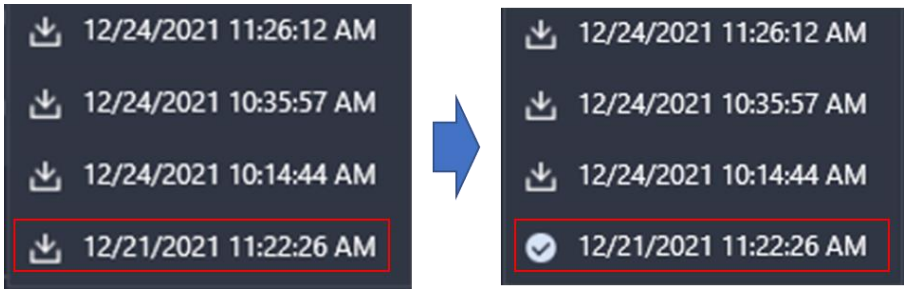


By clicking on the order number, you can find information corresponding to the order number on

the DentiqLink website. You can check the report by clicking the report button  . If there is no report on the order, the report button  is disabled. Press the download button  to see the upload date of the implant planning list corresponding to the order.



After the download is completed, press the Download button again to see a list of implant planning. The downloaded item will change the icon as below.



Click on the downloaded item to go to the Dental Manager and select the implant planning.

	Items displayed in the download list are items that require confirmation. Orders that have been finished are not displayed on the download list.

If you have modified history on the server, you can update the list by clicking Reload list button 

	After the new order or implant planning downloaded from DentiqLink, the icon of the implant planning in the Dental Manger changes.  **If you copy the implant planning or import it back after printing, the icon returns to its original state by recognizing it as a new implant planning.**

9. Appendix

9.1 Terminology

The following table describes terminologies use in **DentiqGuide**.

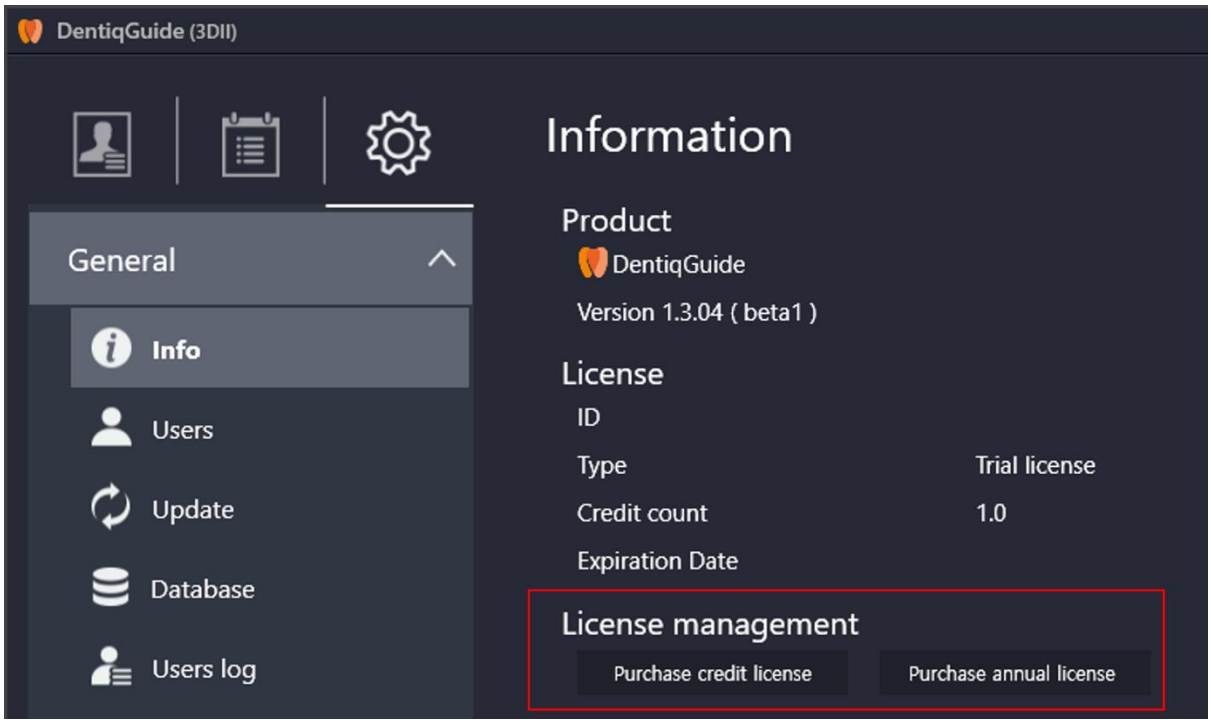
Abbr.	Term	Description
CT	Computerized Tomography	Technique to CT scan human body using X-rays
MPR	Multi Planar Reformation	Reformatted images that are reconstructed into multiple planes from volume data acquired by CT
VR	Volume Rendering	Visualization work of 3demetional Data
HU	Hounsfield Unit	Quantitative scale for describing radiodensity in CT image
ROI	Region of Interest	The Area you want to see in CT Volume
OTF	Opacity Transfer Function	Function to set opacity of 3D image
DICOM	Digital Image Communication in Medicine	International standard for efficient management of medical images and related information
STL	Stereo Lithography	3D modeling data format used as standard for 3D printer.

9.2 License

In order to use DentiqGuide software for commercial purposes, license needed to be purchased. After running the software, purchase the license through the Setting -> General -> Info menu. There are two types of licenses: credit licenses and annual licenses.

A credit license is a license that allows you to purchase a set credit and use the credit you purchased regardless of the period.
An annual license is a license that can be used for a fixed period of time per year without credit limitations.

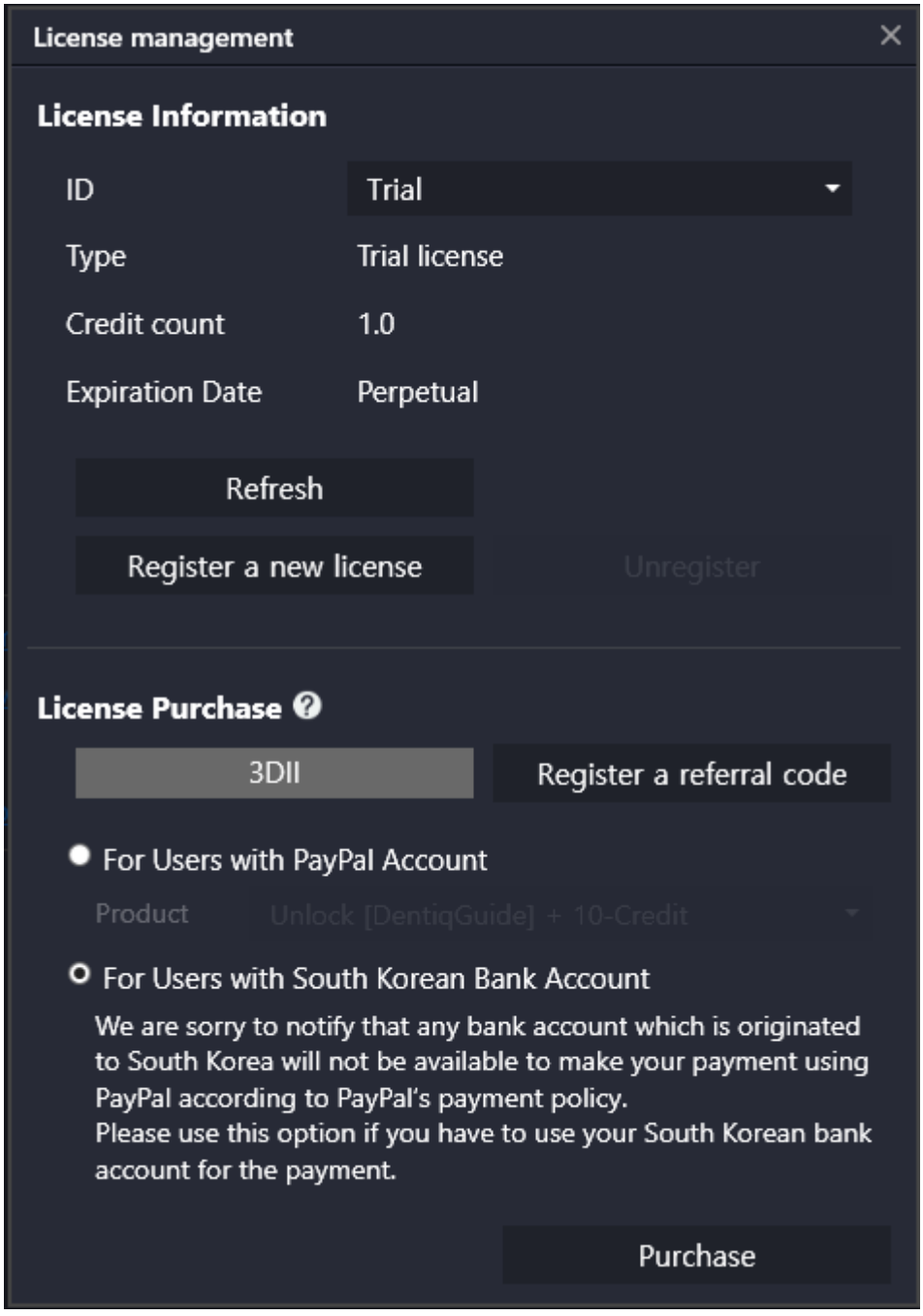
Click the Purchase Credit License or Purchase Annual License button in the Setting -> General -> Infor menu to proceed with the license purchase.



[Purchase License]

If the user runs the program with the dongle key inserted to the computer, press the Purchase Credit License or Purchase annual license button to lead to the purchase webpage.

On the contrary, if the user runs the program without inserting the dongle key to the PC, the following license management window appears when the credit license purchase button is pressed.



[License Management]

	If user do not have a license, it runs as a trial license. **If user are using a trial license, the DentiqGuide watermark will be displayed on the screen of use and two export credits will be provided free of charge.**

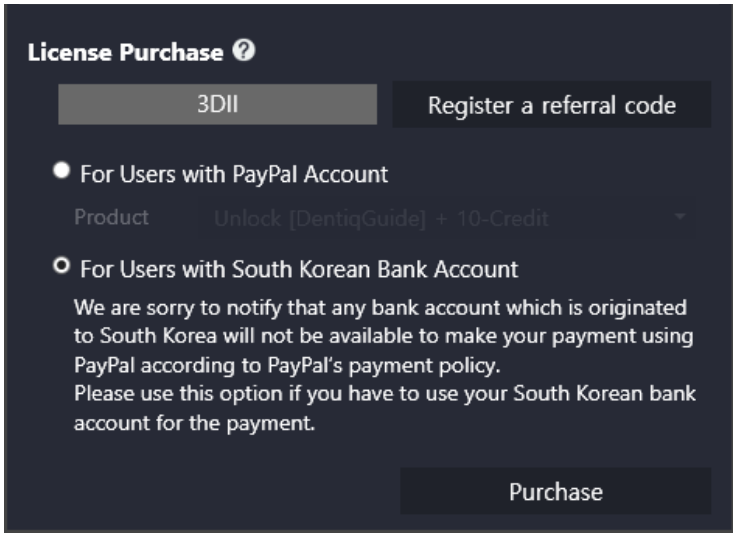
⚠	**In order to design implant treatment plans, surgical guide designs, and temporary crown designs using DentiqGuide, user must purchase and use an official license, not a trial license.** **For inquiries about the DentiqGuide license, please contact service@3dii.net.**

⚠	**When using a web license, you can use the program even if the Internet is disconnected, it is recommended to use it in an Internet-connected environment because of limitations in export.**

1) Purchasing a web license

Ahead of purchasing license, user can select your referrer or distributor for customer service. If you purchase DentiqGuide software from a referrer, he will provide the particular code and you can put a provided referral code. Putting a referral code would not be a mandatory. If customer does not put a referral code, 3DII will be automatically selected. After selecting the trial license, you can put a referral code. If you select a purchased license, you cannot change the referrer because there is referrer information in the license.

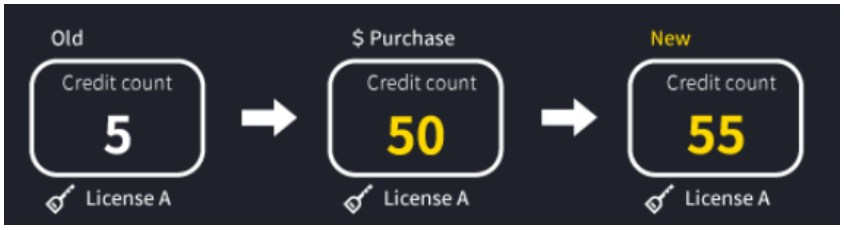
Licenses must be purchased for official use and mesh file export. Licenses are divided into 'buy a new license' to purchase a new license depending on the type of purchase and 'add credits' to existing purchased licenses. And also, payment is divided into account transfers and PayPal.



[Purchasing a License]

Purchase Type

- **Purchase additional credit**: If one purchase additional credits for a credit license that is already in use. The button is activated only if the type of ID selected in the license information is a credit license.
  (ex) If 5 credits remain in the credit license that is ID-1234456 and 50 credits are added, the number of credits in the ID-123456 will be 55)



[Purchase credits]

- **Purchase a new license:** Purchase a new license apart from the one you already own.
  (ex) If you purchase a new license while using a license that is currently ID-123456, a New ID-789012 license will be issued separately from the existing ID-12346. You will have separate two license IDs.

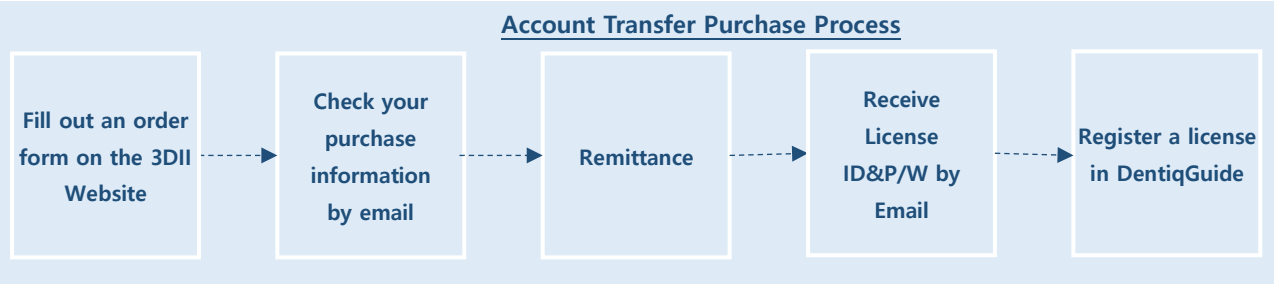
[Purchase a new license]

	Click the HELP button License Purchase **on the right side of the License Purchase Title to see a description of the purchase type.**
	Internet connection is mandatory to purchase a license or credit.
	PayPal is not available for Korean bank account users. Account transfer is available for the present.

⚠	**Internet connection is required for license purchase.**

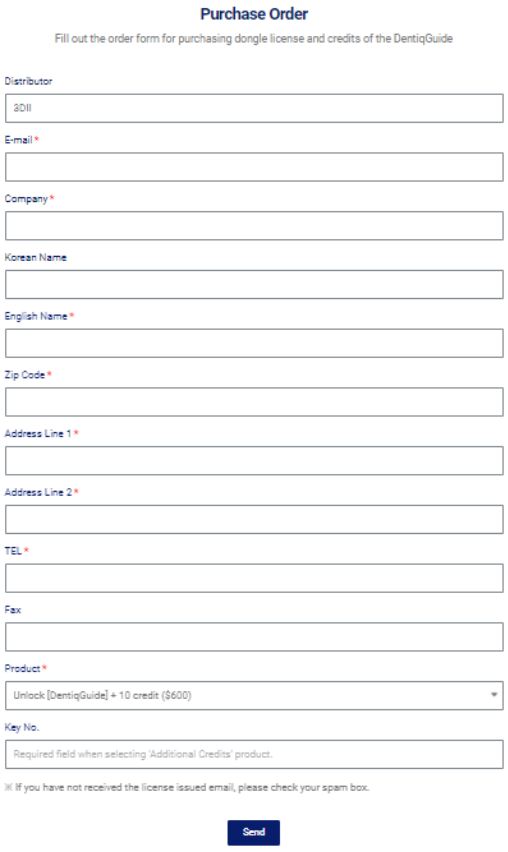
Purchase through account transfer (Korean bank account users)

In the case of payment thorough account transfer, we proceed with the purchase of the license using provided form on the 3DII web page.



① Select an account transfer from the License Purchase menu and click the Purchase button according to the type of purchase you want.

② Complete the DentiqGuide purchase order form from the linked homepage screen.



[Purchase order form]

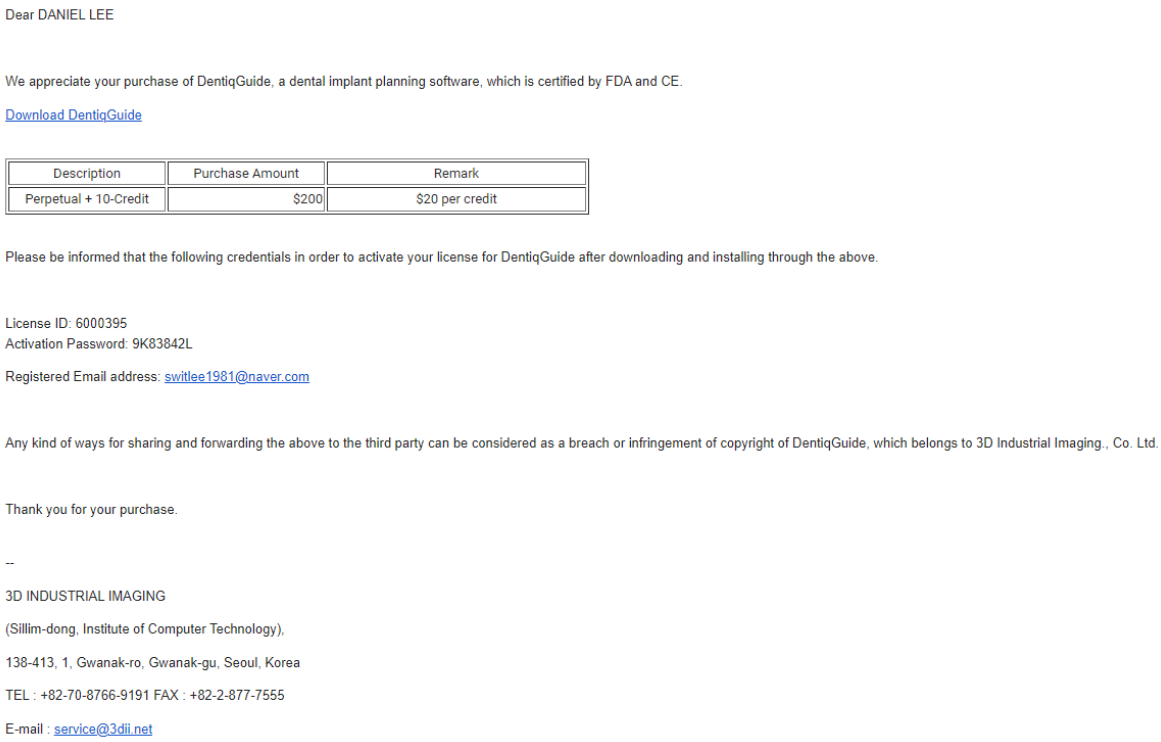
③ When you click the Send button, the purchase order is sent to the email address you

entered on the form.

④ Remittance of deposit amount to deposit account sent by email.

⑤ If you purchase a new license, you will receive the license information issued within one business day of the completion of the transfer, and if you are adding credits, you will receive an additional completion confirmation email.

⑥ You can register your newly purchased license by running DentiqGuide, and if user are repurchasing a credit, it will be automatically added as much as the purchase amount.



Dear DANIEL LEE

We appreciate your purchase of DentiqGuide, a dental implant planning software, which is certified by FDA and CE.

Download DentiqGuide

Description	Purchase Amount	Remark
Perpetual + 10-Credit	$200	$20 per credit

Please be informed that the following credentials in order to activate your license for DentiqGuide after downloading and installing through the above.

License ID: 6000395
Activation Password: 9K83842L

Registered Email address: switlee1981@naver.com

Any kind of ways for sharing and forwarding the above to the third party can be considered as a breach or infringement of copyright of DentiqGuide, which belongs to 3D Industrial Imaging., Co. Ltd.

Thank you for your purchase.

--

3D INDUSTRIAL IMAGING

(Silllim-dong, Institute of Computer Technology),

138-413, 1, Gwanak-ro, Gwanak-gu, Seoul, Korea

TEL : +82-70-8766-9191 FAX : +82-2-877-7555

E-mail : service@3dii.net

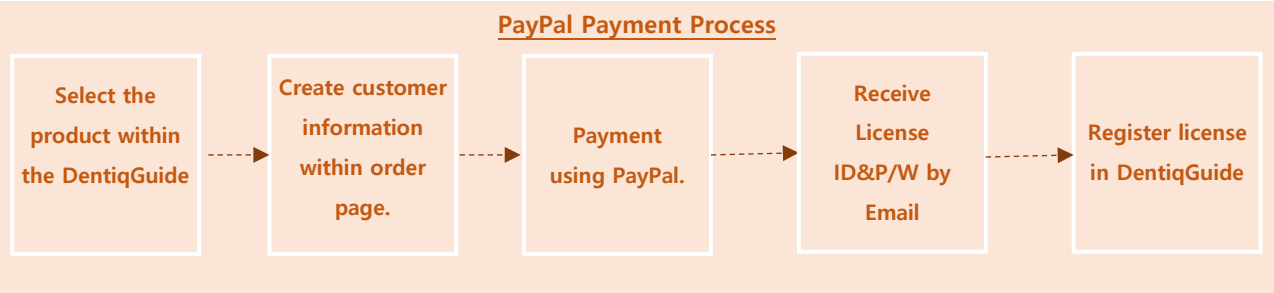
[License Issuing Email]

	**Please enter the correct email when filling out the order. Incorrect input may cause the license issuance process to fail.**
	**To register web license registration, please refer to 9. Appendix -> 9.2 License -> Registering a new License.**
	**The website address of the account transfer purchase is as follows. http://dentiqsolution.com/dentiqguide-credit/**

If you do not receive the relevant mail (purchase order, license issue, credit check) after applying for the license, please check your spam mailbox, and if you do not check your spam mailbox, please contact service@3dii.net.

Purchase by PayPal (Users of overseas bank accounts outside of Korea)

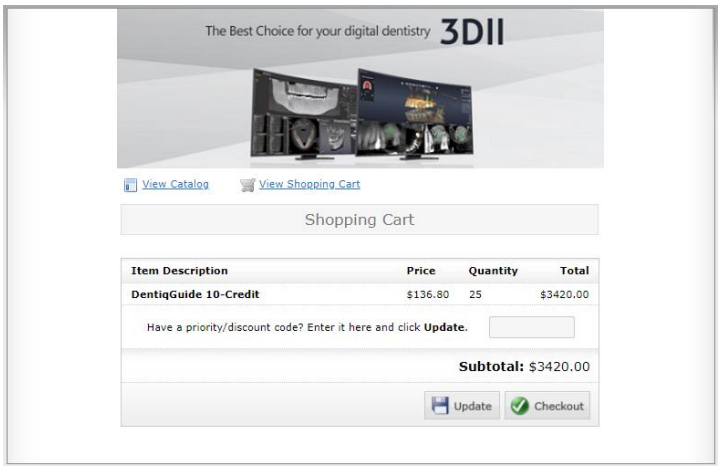
For PayPal payment, select the purchase product within DentiqGuide and proceed with the purchase screen movement and payment.



① Select the product Product Select a product. you want to purchase from the product item in the PayPal payment menu.

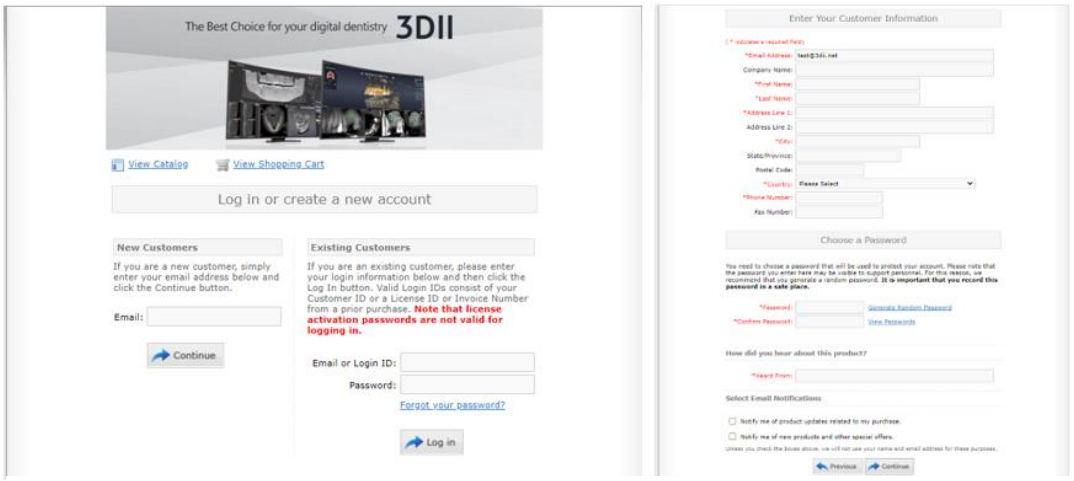
② Click the Add Credits Add more credits or Purchase a new licenses button Purchase a new license depending on the type of purchase you want. (The Add Credits button is active only if the type of ID selected in the license information is a credit license)

③ On the linked purchase screen, check your shopping cart history and click the Check Out button Checkout.



[Shopping Cart]

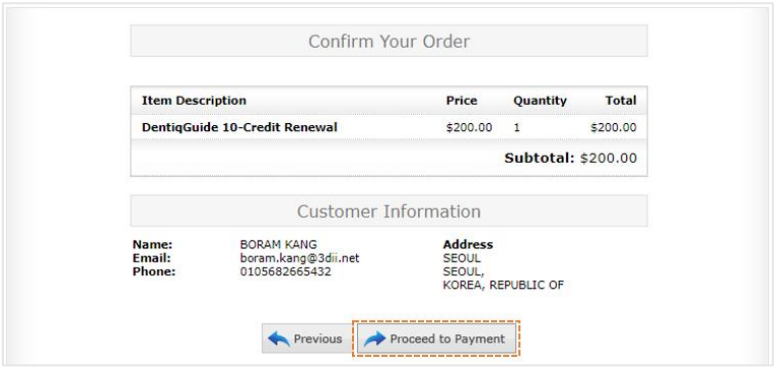
④ For a new license purchase, proceed to create a new account or log in an existing user to enter the purchase customer information.
(In case of credit addition, the customer information input screen will be displayed immediately using the existing purchase details.)



[Create and Login an Account (Left) / Filling up Customer Information(Right)]

⑤ If you continue to click the button 

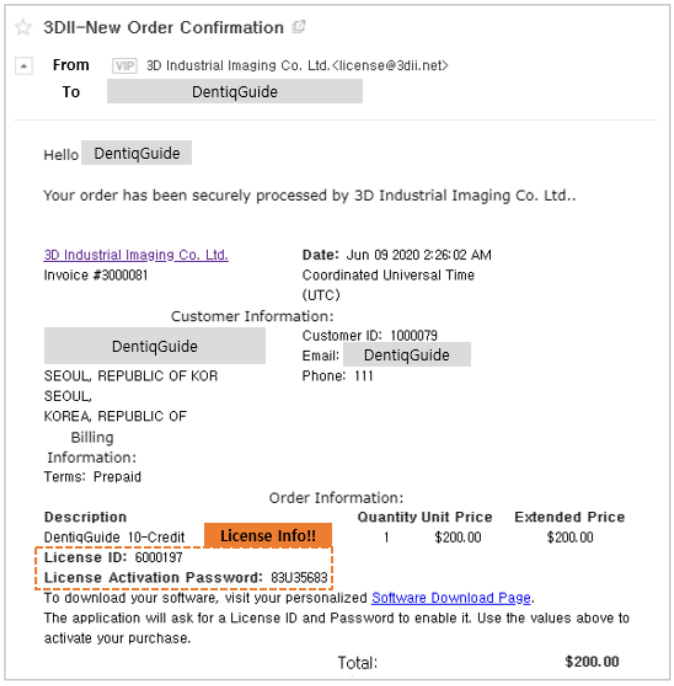
after entering the customer information, the order confirmation screen will be displayed and the PayPal payment screen will be



displayed when you click the Proceed to Payment button 

.

⑦ Upon completion of PayPal payment, you will receive the issued license information via email, and if you are adding credit, you will receive an additional completion confirmation email.



3DII-New Order Confirmation

From 3D Industrial Imaging Co. Ltd.<license@3dii.net>
To DentiqGuide

Hello DentiqGuide

Your order has been securely processed by 3D Industrial Imaging Co. Ltd..

3D Industrial Imaging Co. Ltd.
Invoice #3000081

Date: Jun 09 2020 2:26:02 AM
Coordinated Universal Time
(UTC)

Customer Information:

DentiqGuide
SEOUL, REPUBLIC OF KOR
SEOUL,
KOREA, REPUBLIC OF

Customer ID: 1000079
Email: DentiqGuide
Phone: 111

Billing Information:
Terms: Prepaid

Order Information:

Description	Quantity	Unit Price	Extended Price
DentiqGuide 10-Credit License Info!!	1	$200.00	$200.00

License ID: 6000197
License Activation Password: 83U35683

To download your software, visit your personalized Software Download Page.
The application will ask for a License ID and Password to enable it. Use the values above to activate your purchase.

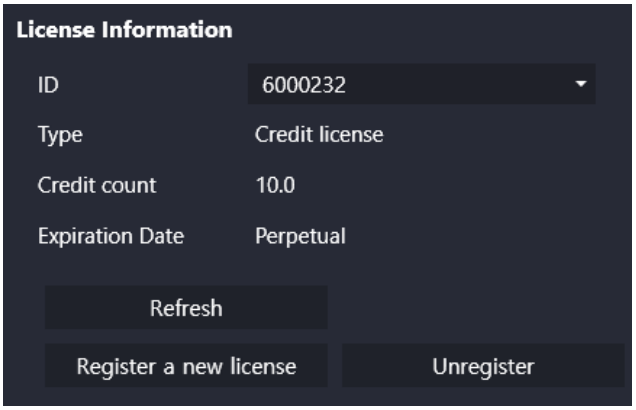
Total: $200.00

[라이선스 발급 이메일 샘플]

⑧ Run DentiqGuide to register a new license or, if adding a credit, check the number of automatically applied credits.

	**Please enter your email correctly when filling out the order form. If the input is wrong, the license issuance process may not be carried out normally.**
	**More information for Web license, please refer to 9. Appendix-> 9.2 License -> Registering a license.**
	**The address of the connected account transfer purchase website is as follows. https://dentiqsolution.com/dentiqguide-credit/**
	**If you do not receive the license mail (purchase order, license issue, credit check) after applying for the license, please check your spam mailbox or please contact service@3dii.net.**

2) License Information

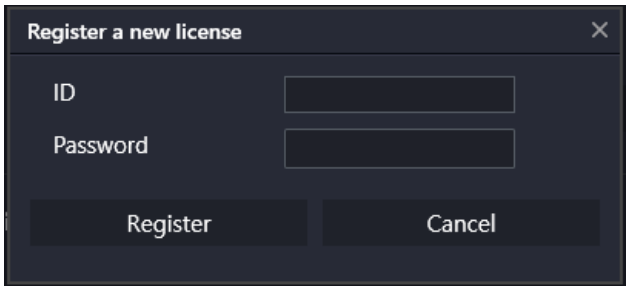


ID	Displays the license number currently registered on your PC (Displays 'trial' if it is a trail version
License Type	Displaying the type of registered licenses - Trial: Temporary licenses available without official license (including both dongle key and web licenses) registered - Credit: Licenses consuming the number of credits purchased without any time limit - Annual: Display the available period.
Credit Quantity	Displays the number of credits available for the selected license
Expiration Date	Display License Availability Date - Trial/Credit: Display as 'Unlimited'
Refresh	Refresh the status of a license to the latest status
Register a new license	Register a new purchase or unregistered license
Unregister	Unregister the selected license and delete it from the ID list

Registering a license

Register and use newly purchased or unregistered licenses.

① Register a new license When you click Register License, an ID/password entry screen will be created.



[Register a purchased License]

② Enter the license ID/password you received by email and click the Register button Register to register the license.

③ Registered licenses are added to the list of IDs in the license information.

⚠	**Duplicate license ID cannot be registered.**

!	**You cannot register a license you are using after registering on another PC, so please unregister it from another PC.**

!	**If the issued license does not register properly, please contact service@3dii.net.**

Unregistering a registered license

Unregister licenses that are registered on your PC. Unregistered licenses can be re-registered and used through the license registration function.

① In the ID list of license information, select the ID you want to unregister.

② When you click Unregister Unregister button, the license is unregistered.

③ Unregistered licenses are deleted from the list of IDs in the license information.

	Unregistered licenses are available after re-registration on the same PC or another PC.

	Unregistering a license supports up to 10 times for one ID.

9.3 FAQ

"This program requires VX dongle key" message appears when running the product.

A. Message 1: The license period for dongle key has expired. Please contact the company in charge for further details.

- For Demo dongle keys, the period of use is set. If the period of use has expired, a corresponding message is displayed.

A. Message 2: The key is not available for DentiqGuide. Please contact the company in charge for further details.

- It occurs when the current external library license used in DentiqGuide is not recognized.

A. Message 3: The dongle key is not recognized. Please make sure the dongle key is inserted and try again.

- It occurs if the dongle key is not plugged in or if the USB-aware driver is not installed. Check the dongle key contact status and USB recognition status.

Please contact DentiqGuide customer service for other questions.
(Kakao Customer Service ID: Add DentiqService and ask questions)

I want to view my work in DentiqGuide installed in a different PC.

A. You can share your work through Export Case function.
Go to **<Dental Manager → Right click on Case List → Export Case>** to export case.
Also, you can copy all exported files into another PC, run DentiqGuide in the new PC, and open .dqgn by importing case to view your work.
(※ .dqgn is a file format only for DentiqGuide)

"Failed to cut surface" error message appears when generating guide.

A. The error message may appear when guide geodesic line has steep slope or when there exists a hole inside scan data area where guide is created.
Adjusting geodesic line into gentle slope or avoiding holes while setting is could help to

create a guide.

I want to know if there is any specification for 3D printers to meet.

A. Please check the following items for your 3D printer.

- **OS** : Windows 10 or higher
- **Input File format** : Standard STL file/
- **Layer Thickness** : 50μm, 100μm/ XY Resolution : 100μm

9.4 Cybersecurity

Before installing **DentiqGuide,** you must follow the instructions below for cyber security. The instructions help to protect the program against cyber security threats such as viruses and malware.

- Prior to installing and using DentiqGuide, scan your computer system with anti-virus and anti-spyware program from a trusted source.
- Install, set up and enable adequate anti-virus software.
- Maintain up-to-date anti-virus software.
- Make sure that your OS has the latest security updates applied.
- Turn on your computer's firewall.
- Online patch and updates are available and online update menu is provided on General setting.
- Release notes will be sent via email when updates are released.
- When an update is available, the program notifies "A new version is released. Please update" when signed in.
- If you have any cyber security-related concern and problem, please contact our customer support on the phone or via e-mail.
-

9.5 External License Notification

1) Open Mesh

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Department of Computer Graphics and Multimedia
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www.openmesh.org

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Department of Computer Graphics and Multimedia
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www.openflipper.org

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9.6 Revision History

Version	Date	Description	Writer
V.1.0.0(Rev.0)	2017.10	Initial	J.S Kim
V1.1.0(Rev.1)	2018.01	Updated changes related to V1.1.0	B.R Kang
V1.2.0(Rev.2)	2018.06	- Updated changed related to V1.2.0 - Changed format of document	B.R Kang
V1.3.0(Rev.3)	2019.04	Updated changes related to V1.3.0	B.R Kang
V1.3.01(Rev.4)	2019.07	Updated changes related to V1.3.01	B.R Kang
V1.3.02(Rev.5)	2019.12	Updated changes related to V1.3.02	J.M Eun
V1.3.04(Rev.6)	2021.01	Updated changes related to V1.3.03	J.T Lee
V1.3.05(Rev.6)	2022.02	Updated changes related to V1.3.04	J.T Lee

9.7 About 3DII

3DII is an application software development service provider. Business field of 3DII ranges from software development/supply/consulting to wholesale/retail destitution of imaging devices/scientific machineries.

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Kakaotalk ID: DentiqService

Model: DentiqGuide

Software Version: 1.3.0

SN Marked on the product.

EC REP Emergo Europe

Prinsessegracht 20 2514 AP The Hague The Netherlands

Tel : (31)(0)70 345-8570

Fax : (31)(0)70 346-7299

Email : EmergoVigilance@ul.com

Rx only   CE 2460

Standard

DentiqGuide complies with the following international standards and regulations

	Manufacturer
SN	Serial Number
EC REP	Authorized representative in the European County
Rx only	Prescription only
	Consult Instructions for Use
	Caution
CE 2460	CE Marking

Unique Device Identification (UDI)

 (01)08800022900096