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The logo for AUTOLIGN User Manual. The word "AUTOLIGN" is in a bold, sans-serif font. The letter "A" is red, while "UTOLIGN" is black. Above the "I" and "N" in "AUTOLIGN" are four red circles of varying sizes, arranged in a slight arc. Below "AUTOLIGN" is the text "User Manual" in a smaller, grey, sans-serif font.

# AUTOLIGN

User Manual

Version 1.6







## Introduction

**Autolign** is the world's first 3D orthodontic software that uses tooth auto-alignment technology from data storage to appliance production.

This operation manual explains how to use **Autolign**, and all users are recommended to read the manual carefully before use.

This operation manual and **Autolign** are protected under copyright laws and computer program protection laws of South Korea.

## Symbols used in the manual

	This provides additional explanation, information, and tips.
	This warns about critical information and any action that might cause a problem, such as loss of data or a malfunction.

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## Chapter 1. OVERVIEW

### 1. What Is Autolign?

**Autolign** is the world's first 3D orthodontic software that uses tooth auto-alignment technology from data storage to appliance production.

### 2. Primary Functions

◆ **3D Viewing**

Various functions for 3D model analysis.

◆ **Segmentation**

Easy and fast auto-segmentation.

◆ **3D Setup**

Auto-alignment of all teeth based on collision management technology.

◆ **Aligner**

Using tooth auto-alignment technology, significant reduction in tooth setup time per step.

◆ **IDB**

Production of IDB devices by using bracket guides.

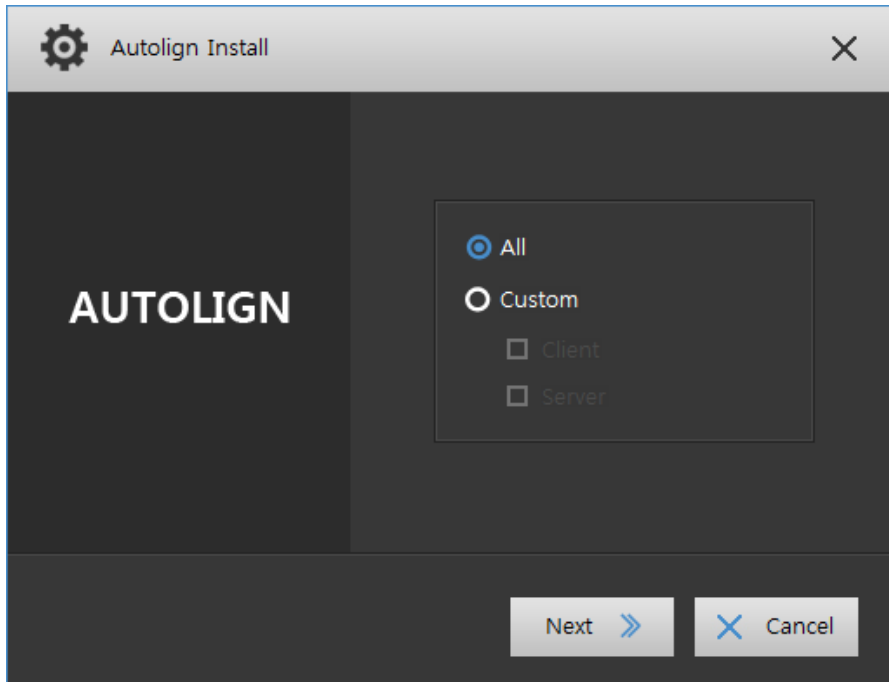
### 3. Recommended PC Specifications

Item	Specifications
Operating System	Windows 7 32/64 bit or over
CPU	Intel i5 CPU 2.5 GHz or over
RAM	Minimum 8 GB or over
Resolution	Minimum 1920 x 1080 or over

## Chapter 2. INSTALLATION

### 1. Install Package

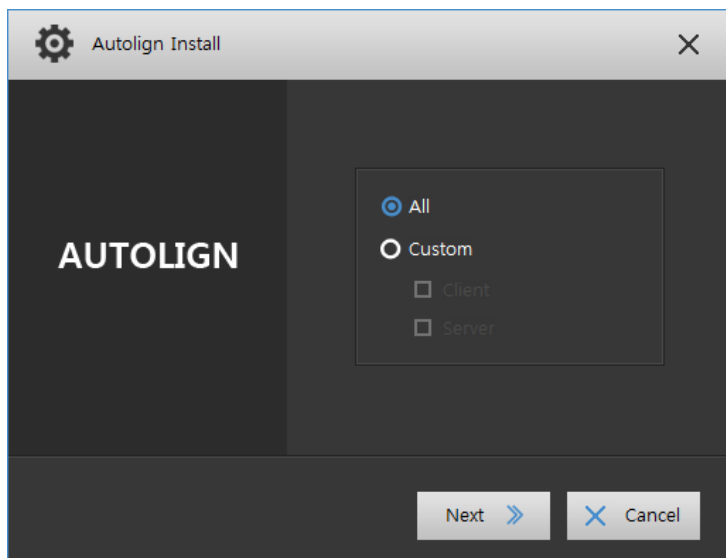
: Running 'Setup.exe' in the Install Package will start installation as below



## 2. Program Installation

### 2.1 Total Installation

- 1) Click the [All] button on the Install Package, and then click the [Next] button.

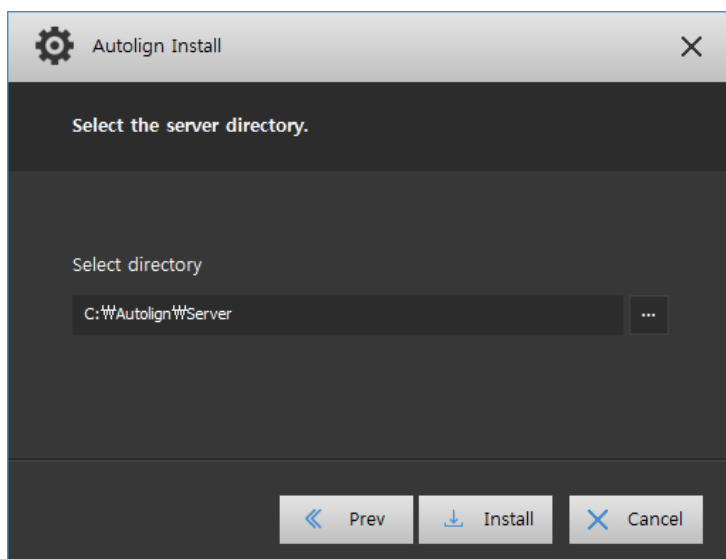


CAUTION

Total Installation is only for the PC that you wish to use as a server.

If a server is installed in multiple PCs, this program might not run properly.

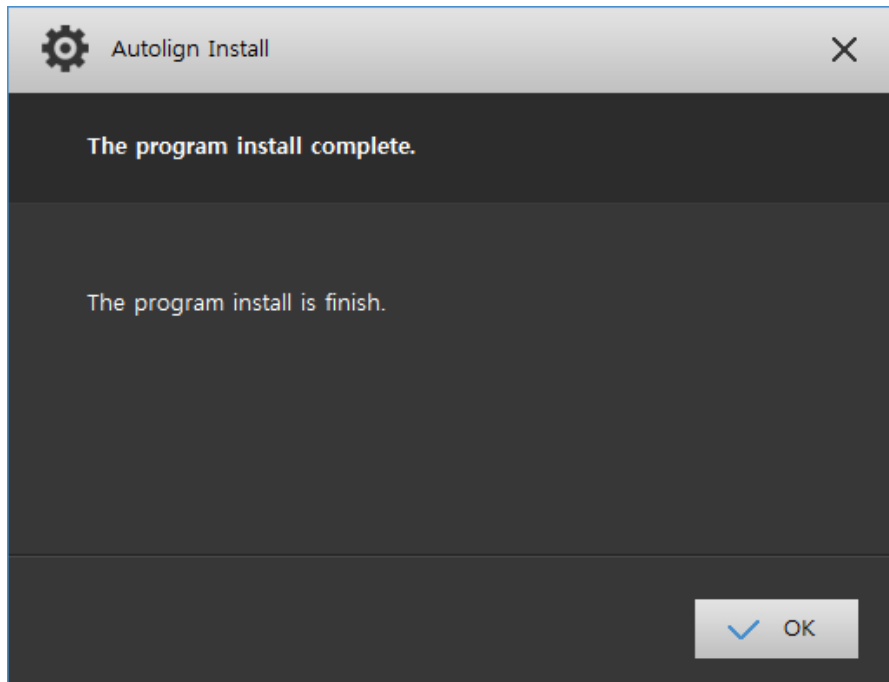
- 2) If the screen below shows up, specify the server directory and click the [Install] button.



Since a server is where patient data are stored, it is recommended that you specify

a folder that has enough hard disk space.

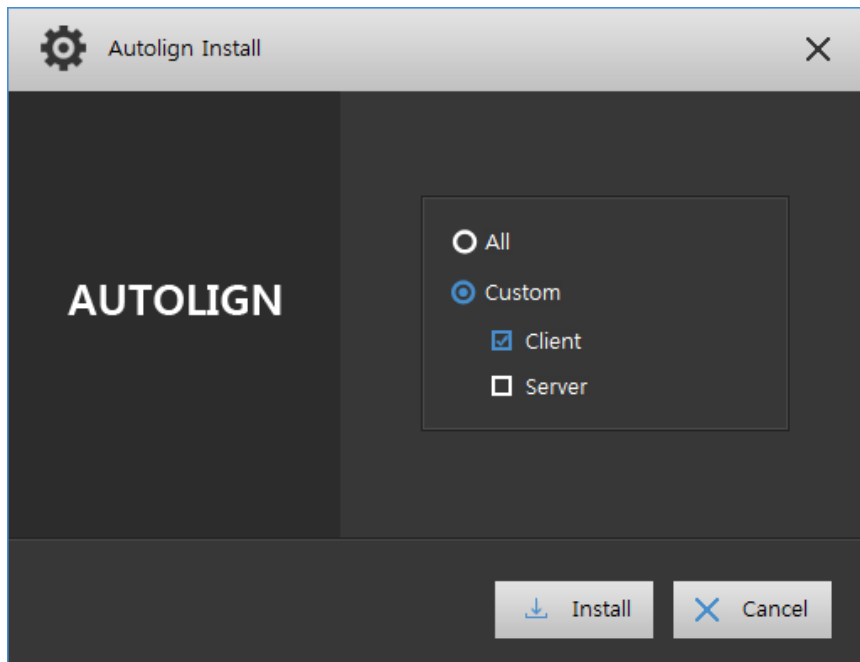
- 3) The installation proceeds automatically in the order of Client, DB Server, and File Server. Installation processes at each stage are the same as those of Custom Installation. (Reference: Chapter 2, 2.2).
- 4) When the installation is completed, the screen below will show up. Click the [OK] button to end the installation.



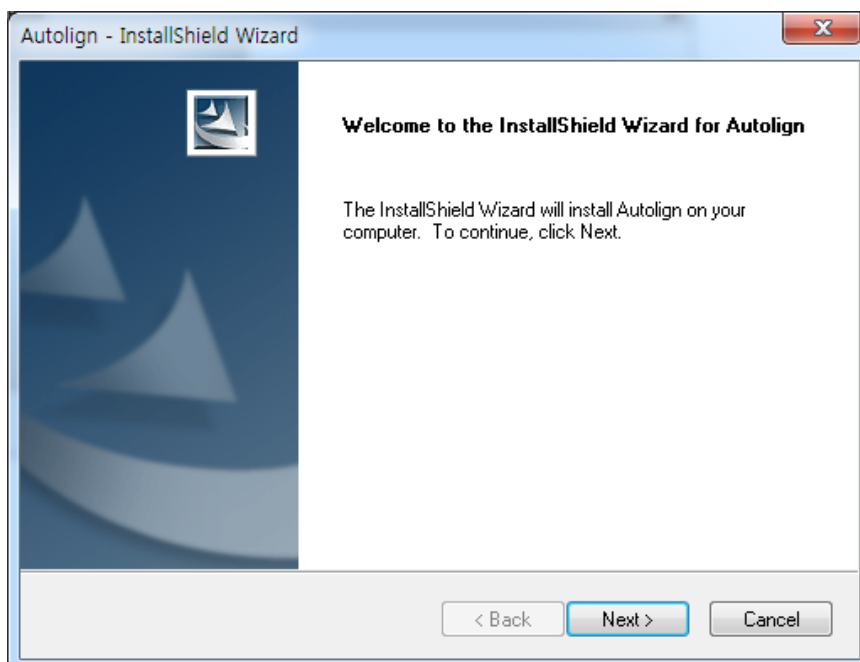
## 2.2 Custom Installation

### 2.2.1 Client Installation

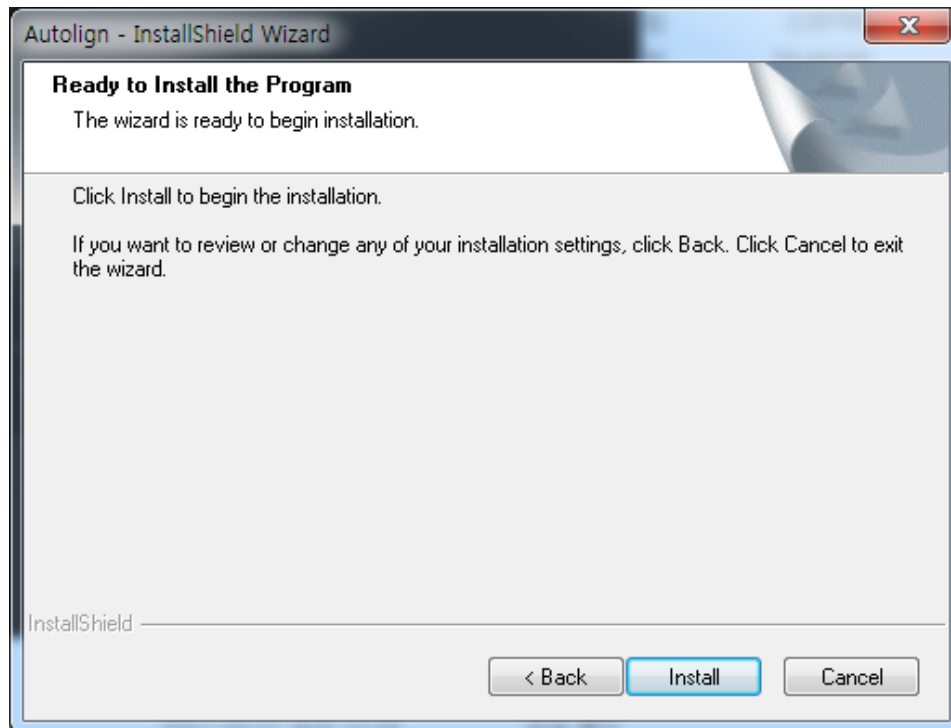
- 1) Click the [Custom] button on the Install Package.
- 2) Once the screen below shows up, check the [Client] box and click the [Install] button.



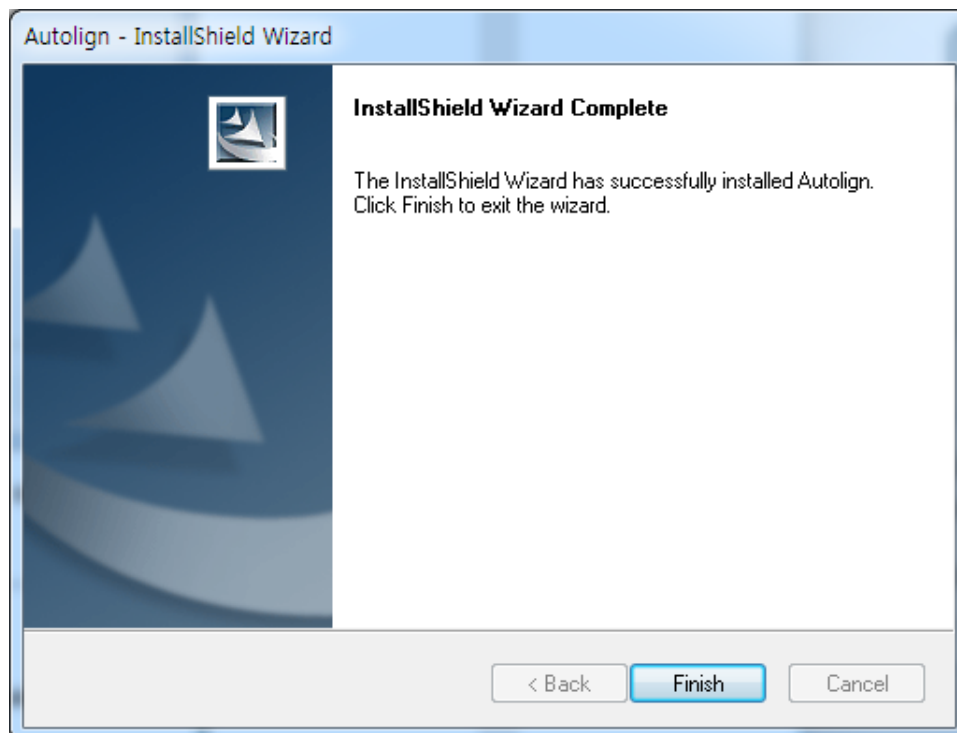
- 3) Click the [Next] button on the Client InstallShield Wizard.



- 4) Click the [Install] button to begin Client Installation.

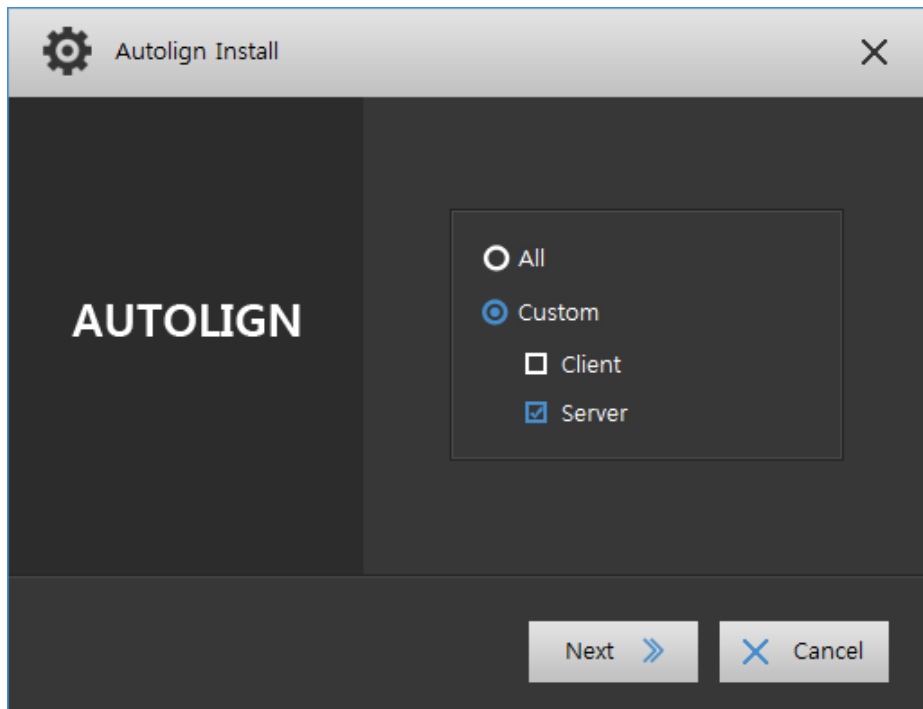


- 5) When the installation is completed, the screen below will show up. Click the [Finish] button to exit.

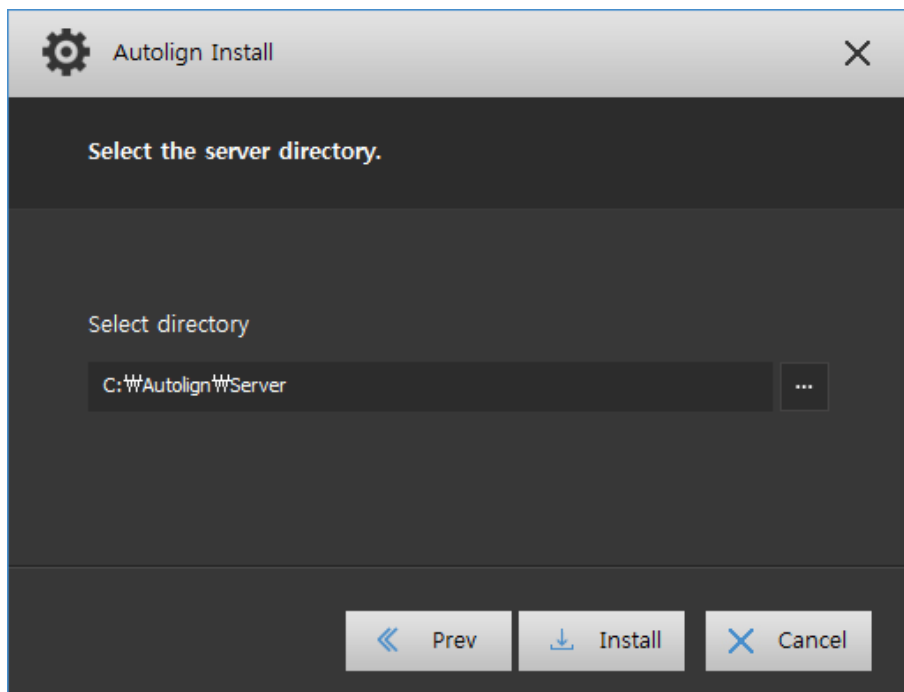


## 2.2.2 Server Installation

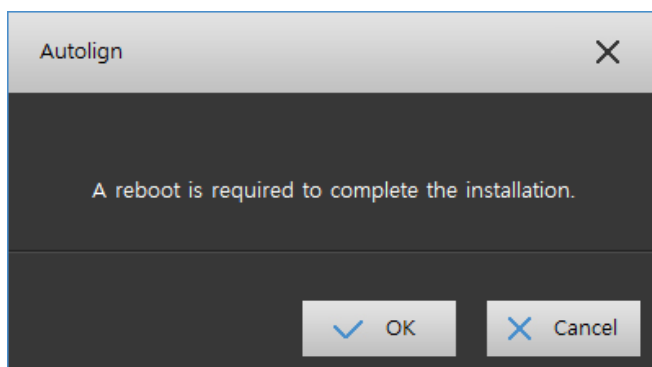
- 1) When the screen below shows up, check the [Server] box, and then click the [Next] button.



- 2) When the screen below shows up, select the server directory and click the [Install] button.



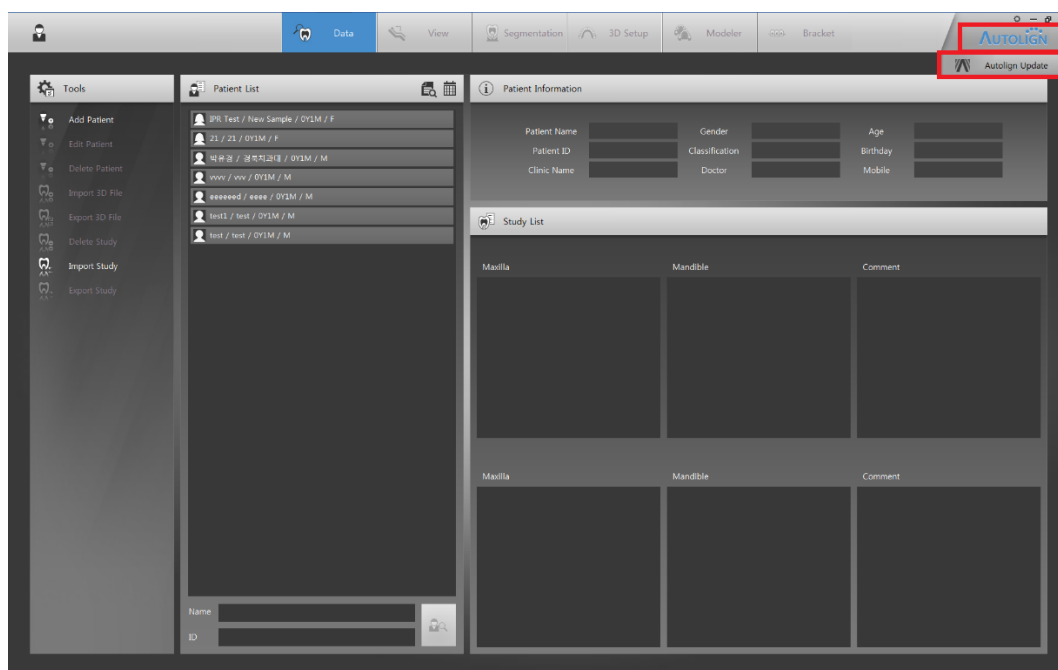
- 3) After Server Installation proceeds automatically and is completed, the screen below will show up. Click the [OK] button to reboot your PC.



The program might not run properly if your PC is not rebooted after the installation.

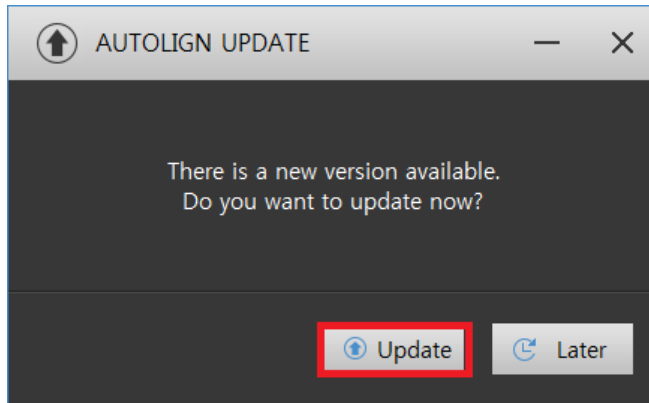
## 2.3 Auto Update

- 1) Click [Autolign] logo on right top corner and click [Autolign Update].



- 2) After Autolign checks for update, Window below will appear then click Update. Autolign will restart to install updates.

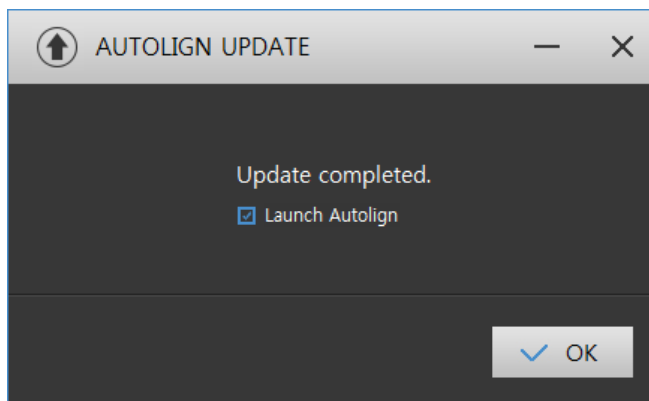




CAUTION

If Autolign is up-to-date, notification will appear.

- 3) After completing the update, press the OK button on the following screen to run the new version of Autolign.

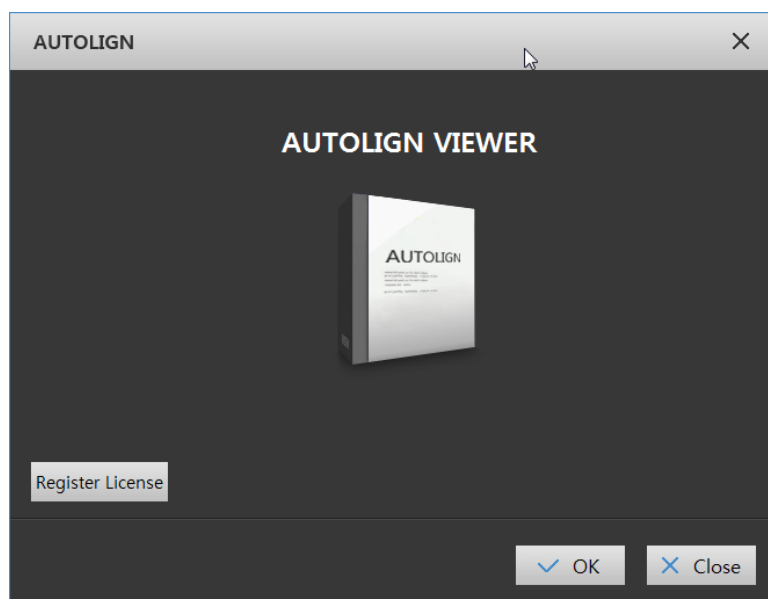


## Chapter 3. Execution and Screen Layout

### 1. License Certification

#### 1.1 Hard lock

- 1) Insert the Hard Lock (USB), provided with this program at the time of purchase, into the USB port on your PC and run the program. It will run without any additional process.
- 2) If the Hard Lock (USB) is not present, the Autolign Viewer window as shown below will appear.



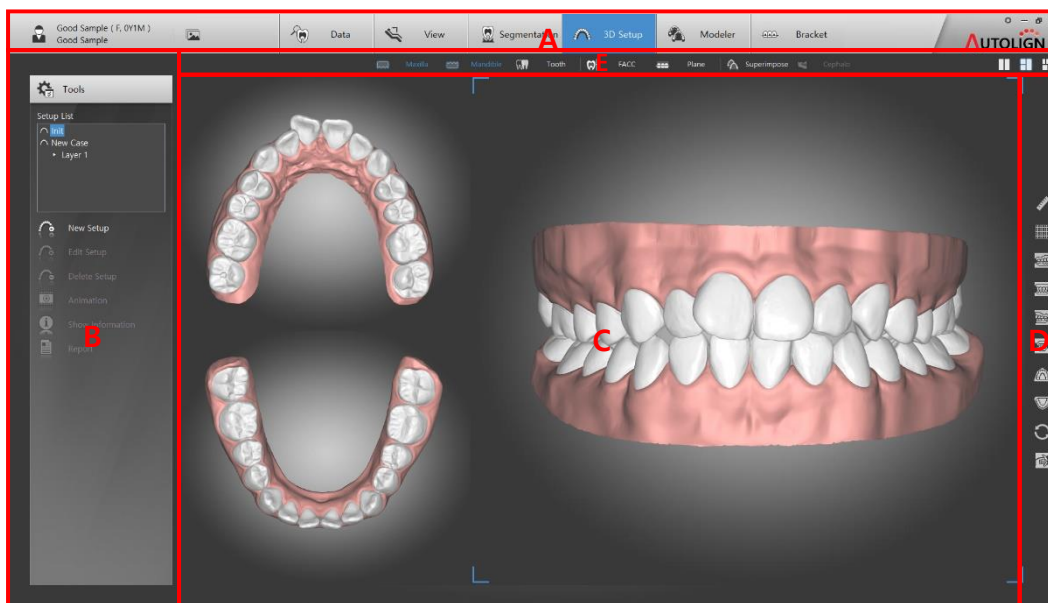
- 3) Click the [OK] button on the window to run the program in viewer mode.



Viewer: As a viewer, you are only allowed to check existing patient data. Registering a new patient and editing data are not allowed.

## 2. Screen Layout

- 1) This program's screen consists of 3 parts in general: The Tab at the top, the Tools on the left, and the main view in the center.



A: Tab – Consists of 6 tabs (Data, View, Segmentation, 3D Setup, Modeler, and Bracket). The necessary functions for each tab are displayed automatically on the left tool bar.





B: Tools – Displays the necessary functions of the selected tab.







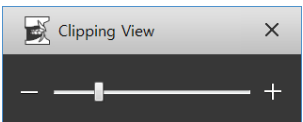
C: Main View - Displays the selected patient's images.

D: Common tool bar –Displays supplemental function buttons.










E: Show/Hide tool bar – Displays show/hide buttons.

### 2.1 Common Tool Bar

	<b>Length:</b> Measures length. If you make two dots, the length between the dots will be displayed.
	<b>Grid:</b> Displays guide lines (horizontal grid, vertical grid) on the main view.
	<b>Right:</b> Rotates a teeth model 90 degrees to the right.
	<b>Front:</b> Rotates a teeth model to the front side.

	<b>Left:</b> Rotates a teeth model 90 degrees to the left.
	<b>Back:</b> Rotates a teeth model to the back side.
	<b>Upper:</b> Rotates a teeth model 90 degrees upwards.
	<b>Lower:</b> Rotates a teeth model 90 degrees downwards.
	<b>Reset:</b> Resets the view to its initial state.
	<p><b>Clipping View:</b> Shows the occlusal plane of the maxilla and the mandible. (You can check the vertical plane along the teeth's arch line by using the control bar as shown below).</p> 

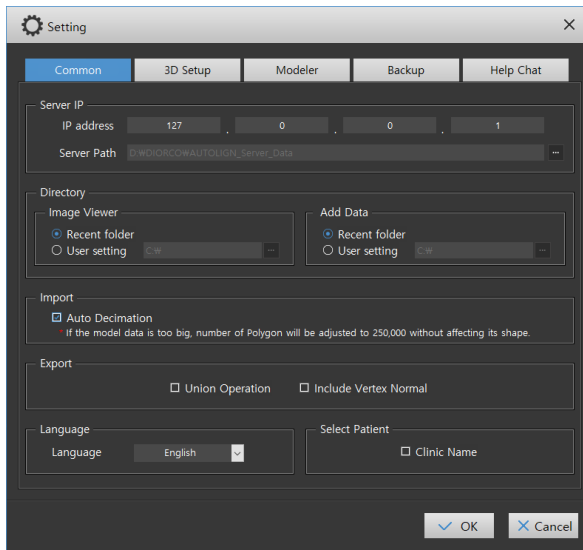
## 2.2 Show/Hide Tool Bar

 Maxilla	<b>Maxilla:</b> Shows/Hides the gums of the maxilla. .
 Mandible	<b>Mandible:</b> Show/Hides the gums of the mandible.
 Tooth	<b>Tooth:</b> Shows/Hides the selected tooth.
 FACC	<b>FACC:</b> Shows/Hides FACC.
 Overlap Info	<b>Overlap Info:</b> Shows/Hides the amount of overlapped teeth.
 Arch	<b>Arch:</b> Shows/Hides arches and lines of symmetry.
 Plane	<b>Plane:</b> Shows/Hides the occlusal plane and the mid-line.
 Init	<b>Init:</b> Shows/Hides initial teeth (pre-movement state).
 Cephalo	<b>Cephalo:</b> Shows/Hides a lateral X-ray image overlapped with a 3D scan image.

## Chapter 4. FUNCTIONS

### 1. Setting

: Server connection and settings can be set through the setting on the right side of the Tab.



#### 1.1 Common


##### 1.1.1 Server IP

: Connect to server on Client Pc by Server Ip address in IP address.



The server Pc automatically given corresponding IP of (127.0.0.1) and does not required to change.

##### 1.1.2 Server Path

- 1) Displays current server directory.
- 2) Click [  Server Change] displays the server change window. Select a folder to change the server location.



If the designated folder is an empty folder, copy all data from the existing server.

### 1.1.3 Directory Setting

- Image Viewer

: Select folder to import your image from 2D Image view.

- Recent folder: Program remembers the folder which the latest image was imported and automatically searches the folder to import image.
- User setting: User chooses the directory folder to import images.

### 1.1.4 Add Data

: Select a folder to import your 3D images

- Recent folder: Program remembers the folder which the latest image was imported and automatically searches the folder to import image.
- User setting: User chooses the directory folder to import images.

### 1.1.5 Import

: Set options related to 3D Data Import

- Auto Decimation: Autolign will optimize data with over 250,000 polygons to save loading time.

### 1.1.6 Export.

: Set options related to 3D Data Export.

- Union Operation: Autolign will union all data (gingival, teeth, attachments, etc) to export.
- Include Vertex Normal: Normal data of Vertex will be included when exported.

### 1.1.7 Tooth Number

: You may choose the tooth numbering system

- Type: FDI/Universal

### 1.1.8 Language

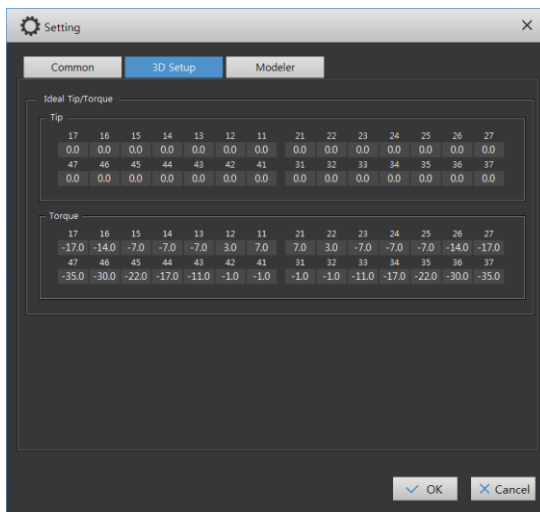
: Choose your language. (Korean/Chinese/Japanese/Spanish)

- UI Language: English/Chinese/Spanish
- Label Language: English/Korean/Japanese/Chinese/Spanish

## 1.1.9 Select Patient

: The Clinic name is displayed in the Patient List in the [Data] tab.

## 1.2 3D Setup



### 1.2.1 Ideal Tip/Torque

: Adjust Tip/Torque values.



Adjusted Tip/Torque values will apply to your default Setup

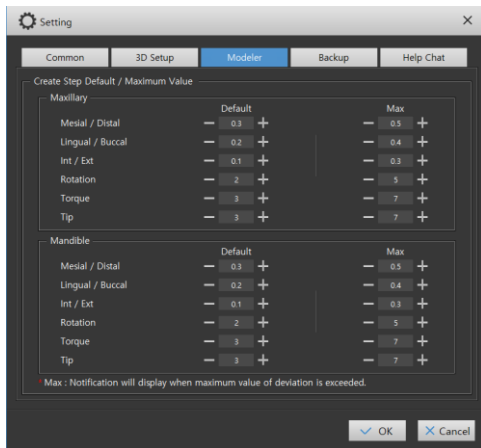
### 1.2.2 Information Show/Hide

- Tooth Variation: Displays simultaneous movement value on the screen.
- Show Value Remaining to Final Layer: Show remaining movement value to reach Final Layer.

### 1.2.3 IPR Method

- Disk Control: Displays virtual stripper when applying IPR.
- Number Input: Directly input IPR value.

## 1.3 Modeler



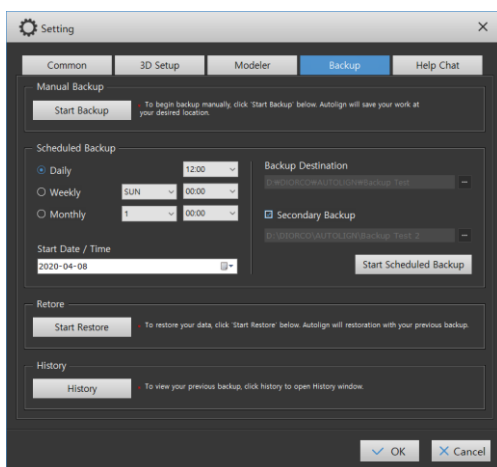
### 1.3.1 Create Step Default / Maximum Value

: Can adjust Default/ Maximum Value of your Steps



Warning message will appear when input item value exceeds your maximum value.

## 1.4 Backup

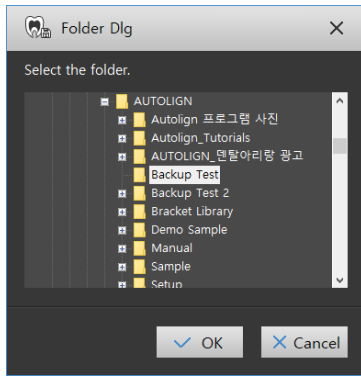


### 1.4.1 Manual Backup

: Manually backup all the data.

- 1) Click [ **Start Backup** ] button to select directory of your backup.





2) Select directory for backup then click [OK]button to start.

## 1.4.2 Scheduled Backup

: Apply automatic Backup according to your appointed schedule.

1) Specify Backup Schedule.

- Daily: Backup every day at appointed time.
- Weekly: Backup once a week on appointed day and time.
- Monthly: Backup once a month on appointed date and time.

2) Start Date / Time

- : Appoint your Backup date.

3) Backup Destination


- : Designate your Backup directory.

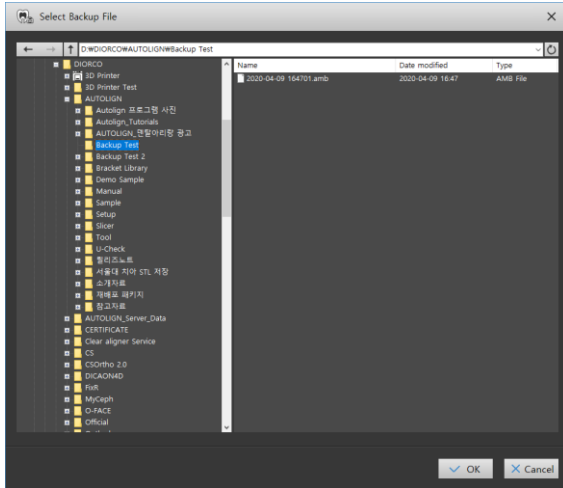
4) Secondary Backup

- : Designate your secondary backup directory.

## 1.4.3 Restore

: Restore from your backed-up data.

1) Click [  ]button to choose your backup file (\*.amd) to restore on current server location.

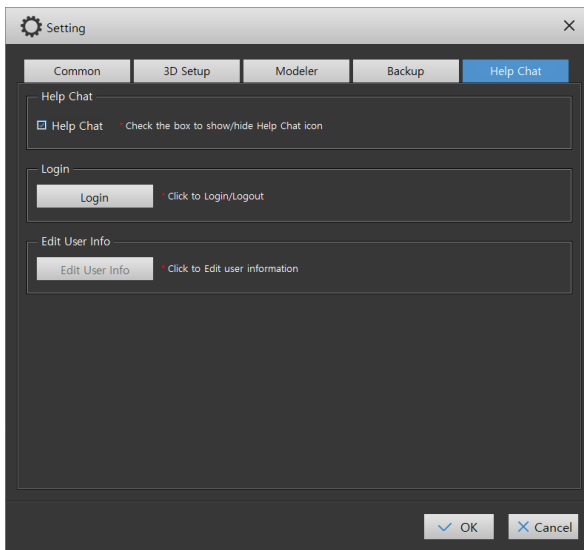


Current data will be deleted when backup is applied. Please save your data beforehand with Export Study function.

### 1.4.4 History

: Displays your backup, restore status

## 1.5 Help Chat



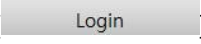
### 1.5.1 Help Chat

- Select your option with the checkbox to activate/deactivate your Help Chat function.




(The icon [ Help ] on the lower right of the screen is displayed or hidden.

### 1.5.2 Login

- 1) Click [  ] button to login/logout your Help Chat account.


### 1.5.3 Edit User Info

- 1) Click [  ] button to display user information and edit user information.

## 2. Image View


: Displays patient's 2D images.

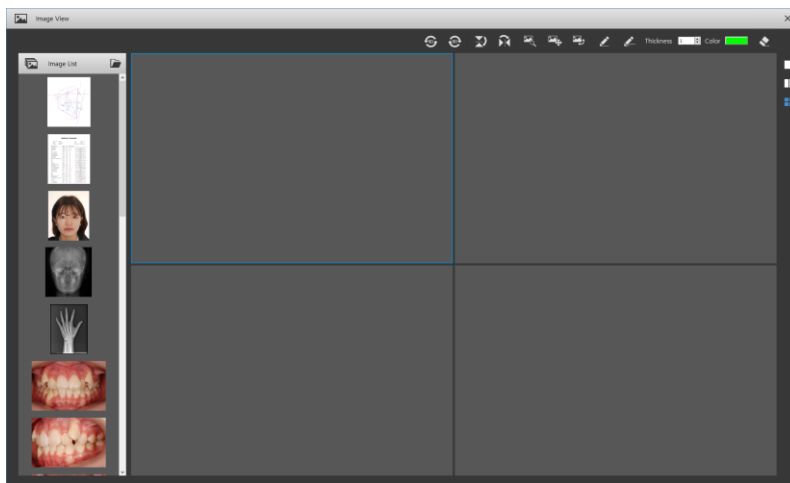
### 2.1 Image Import

- 1) Click Image View [] button on top left of the screen to open viewer window.






On dual monitor, Viewer window will be opened on the sub-monitor to allow patient consultation.

- 2) Click [] button in Image list then select the folder to display images within the selected folder.












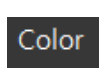

If SmartCeph (Cephalometric Analysis S/W) is installed, the image of selected patient will automatically be displayed.

- 3) Drag & Drop wanted images into left window to enlarge images on the Image List.
- 4) Display multiple images at the same time by selecting the right screen split button.
  - : Displays single image.
  - : Displays 2 split images.
  - : Displays 4 split images.

## 2.2 Edit Image

: Edit the selected image using the Editing Tool on top the top menu.




	<b>Rotate Left:</b> Rotate the image 90 degrees counter-clockwise
	<b>Rotate Right:</b> Rotate the image 90 degrees clockwise.
	<b>Vertical Flip:</b> Vertically flip the image.
	<b>Horizontal Flip:</b> Horizontally flip the image.
	<b>Zoom:</b> Zoom in/out the image. Use left-click drag zoom in/out images. * Use mouse wheel to zoom in/out as well.
	<b>Pan:</b> Pan the image. Use left click drag up, down, left and right to pan images. * Use mouse wheel to pan images as well.
	<b>Rotation:</b> Freely rotate the images. Use left-click drag left and right to rotate images.
	<b>Line:</b> Function to draw a line. Click the start and end point to draw a line.
	<b>Free Draw:</b> Function to freely draw a line.
	<b>Thickness:</b> Select the thickness of your line.
	<b>Color:</b> Select the color of your line.
	<b>Clear All:</b> Clear all lines on the image.

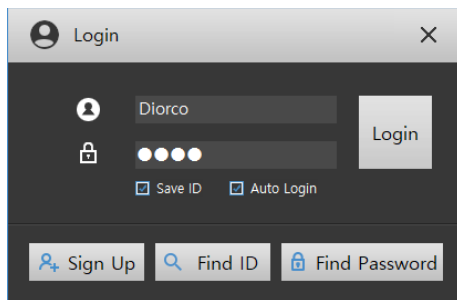
## 3. Help Chat


: Simultaneous communication tool between the user and the support team allow chatting and file transfer (patient data and image files).

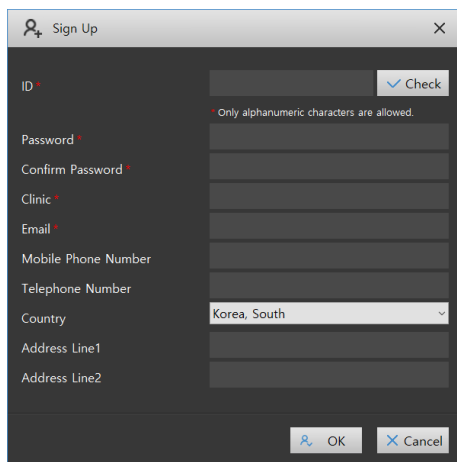
### 3.1 User

#### 3.1.1 Login / User Registration


- 1) Click [  Help Chat] button on right bottom corner to login / register.

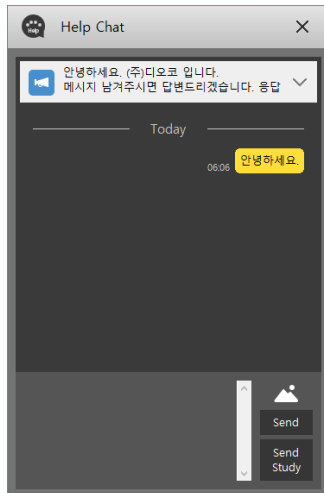




- 2) Current user may login using registered ID / PW and click [  Sign Up ] button to register new user.

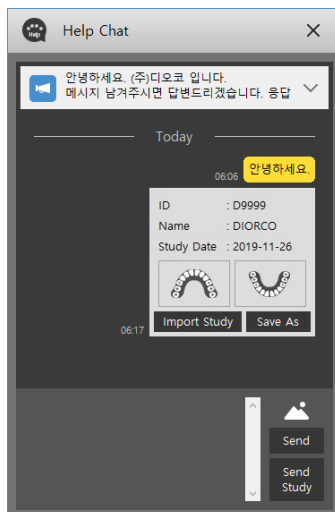


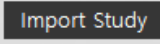

#### 3.1.2 Message / File Transfer

- 1) After login, type in your message on the Help Chat window then click [  Send ] button or press **Enter** to send messages.



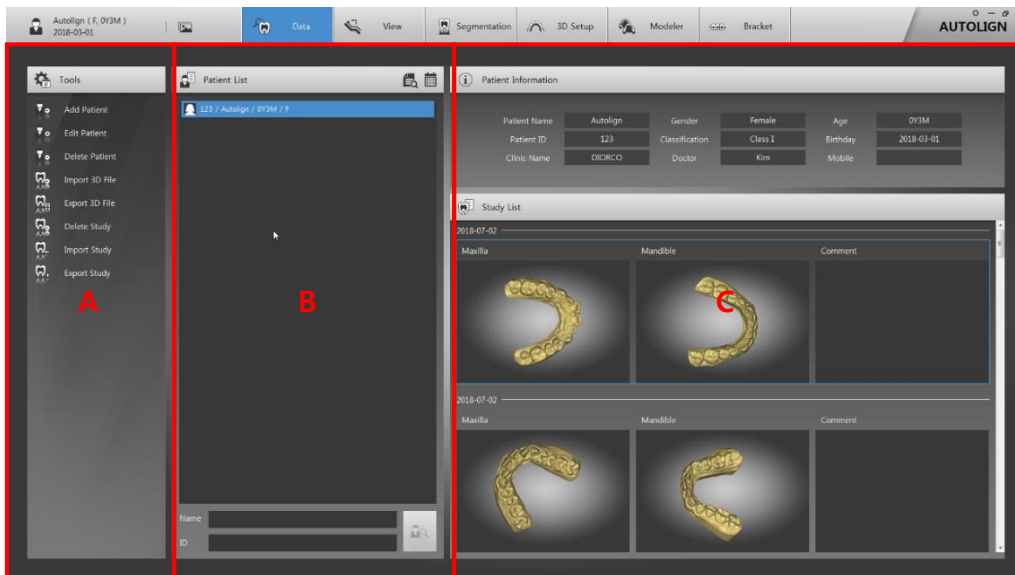
- 2) Click [  ] button to select images to send via Help Chat.
- 3) Select a patient on Patient List then click [  ] button to send Study File via Help Chat.



- 4) Receiver (Admin) can directly download the file by clicking [  ] button into Autolign or save the study file into designated location by clicking [  ] button.

## 4. DATA

### 4.1 Screen Layout



A: Tools - Displays primary function buttons.


B: Patient List - Displays patient lists and search functions.

C: View - Displays a patient's information and images.

### 4.2 Patient Management

#### 4.2.1 Add Patient

: Adds a new patient.

- 1) To add a patient, click the [  Add Patient ] button on the Tools and enter the patient's information on the input window. Once the patient is added, he/she appears on the Patient List and is selected automatically.

The 'Add Patient' dialog box contains the following fields:
 

- Patient ID: [ ]
- Name: [ ]
- Gender:  Male  Female
- Birthdate: [ 2017-11-15 ]
- Age: [ 0Y3M ]
- Classification: [ Class 1 ]
- Clinic Name: [ ]
- Doctor: [ ]
- Address: [ ]
- Phone1: [ ]
- Phone2: [ ]
- First Visit: [ 2017-11-15 ]
- Referred: [ ]

 Buttons for 'OK' and 'Cancel' are at the bottom.




Patient ID and name must be entered.




## 4.2.2 Edit Patient

: Edits the selected patient's information.

- 1) Click the [  Edit Patient] button on the Tools and edit the selected patient's information on the edit window.

## 4.2.3 Delete Patient


: Deletes the selected patient.

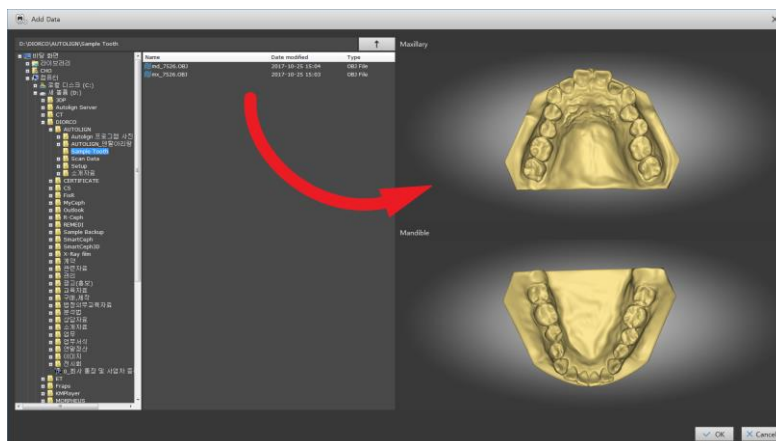
- 1) After selecting a patient, click the [  Delete Patient] button on the Tools. When a message to reconfirm the deletion shows up, click the [OK] button to delete the patient.

## 4.3 Image Management

### 4.3.1 Import 3D File

: Adds a patient's 3D scan images.

- 1) After selecting a patient, click the [  Import 3D File] button to see the Add Data window show up.

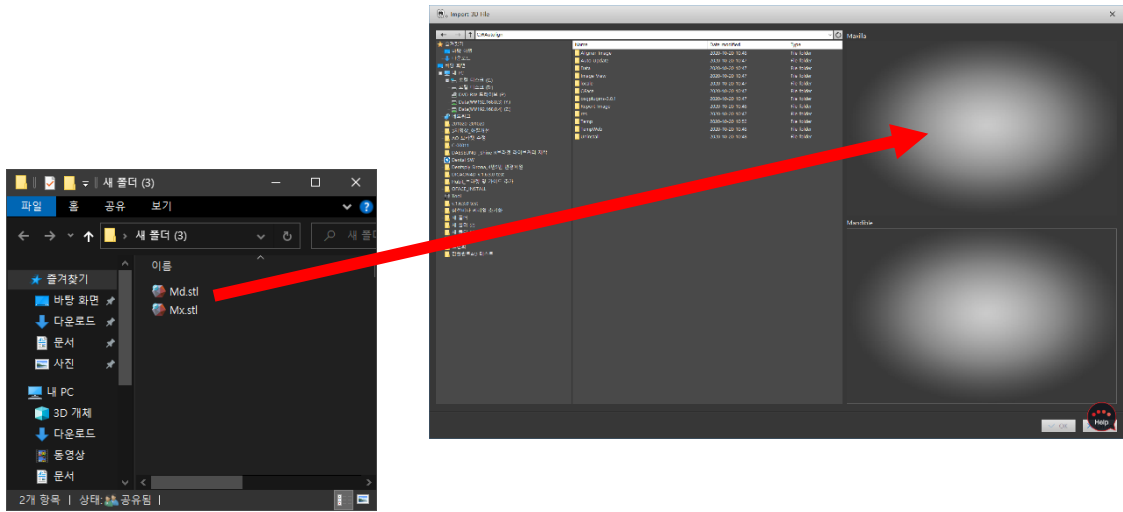


- 2) From the directory path on the left, select the folder where 3D scan images are saved, and drag & drop the images to the Modality on the right to add them.

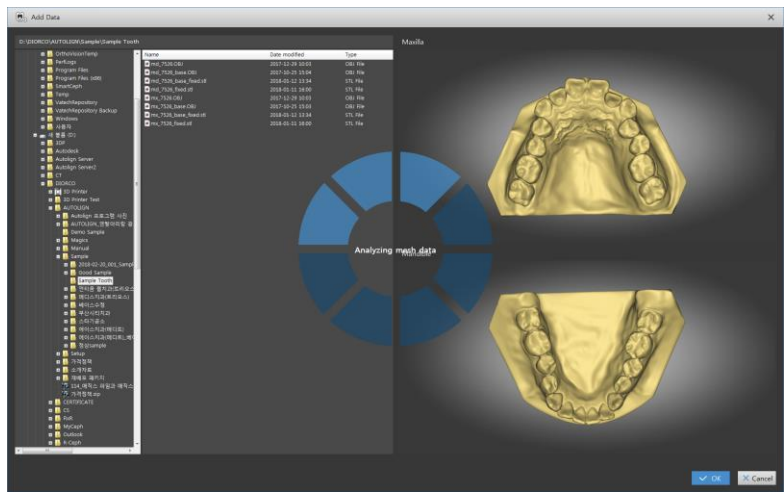


You can import 3D files in an stl, obj, or ply format.


3) You may also Drag & Drop to import 3D files directly.



4) Auto Repair: Click the [OK] button so that the program repairs any corrupted information within the images and saves the result automatically.



 The amount of time to complete saving may differ depending on the image.

 **CAUTION** Autolign corrects only basic corrupted information. If any corrupted information is used, it might cause the program to malfunction. Whenever possible, users are recommended to fix all data via repair tools such as Meshmixer prior to using the program.

### 4.3.2 Export 3D File


: Exports and saves 3D images.

- 1) Select a study model to export and click the  [Export 3D File] button. Once the save folder selection window shows up, specify a location and click the [OK] button to save the model as an .stl file.




If you export a study model after creating its base, it will be saved with the base intact.

### 4.3.3 Delete Study

- 1) To delete, select data on the Study List and then click the  [Delete Study] button on the Tools. When a message to reconfirm the deletion shows up, click the [OK] button.


### 4.3.4 Import Study

: Imports a project file (\*.zip).

- 1) Click the  [Import Study] button on the Tools to see the file selection window. Select a project file to import on the window.

### 4.3.5 Export Study

: Exports a project file (\*.zip).

- 1) Select a study model to export from the Study List, and click the  [Export Study] button to see the save folder selection window show up. On the window, specify a location and click the [OK] button to save the model as a \*.zip file.



All works done for the model will be included when saved.

### 4.4 Search List


#### 4.4.1 List Sorting

Patient ID	Name	Birthday	Gender	Clinic Name
------------	------	----------	--------	-------------

- 1) Click each tab (Patient ID, Name, Birthday, Gender) on the top to sort the patient list (Ascending and Descending).


#### 4.4.2 Search All

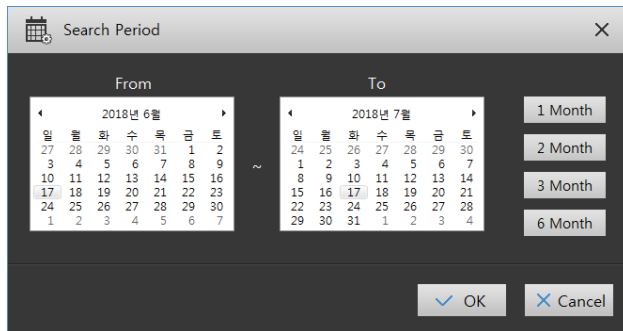
: Searches the entire Patient List.

- 1) Click the [ Search All] button on the Patient List to see all patients.

#### 4.4.3 Search by Period

: Sets a period and searches all patients recorded within it.


- 1) Click the [ Set Search Period] button on the Patient List to see the settings window show up. On the window, set a period you wish to search, and click the [OK] button to get all patients recorded within the period.



#### 4.4.4 Quick Search

: Searches a patient by name or patient ID.

- 1) Enter either a name or patient ID in the search box on the bottom of the Patient List.

Click the [ Search] button to see all searched patients.

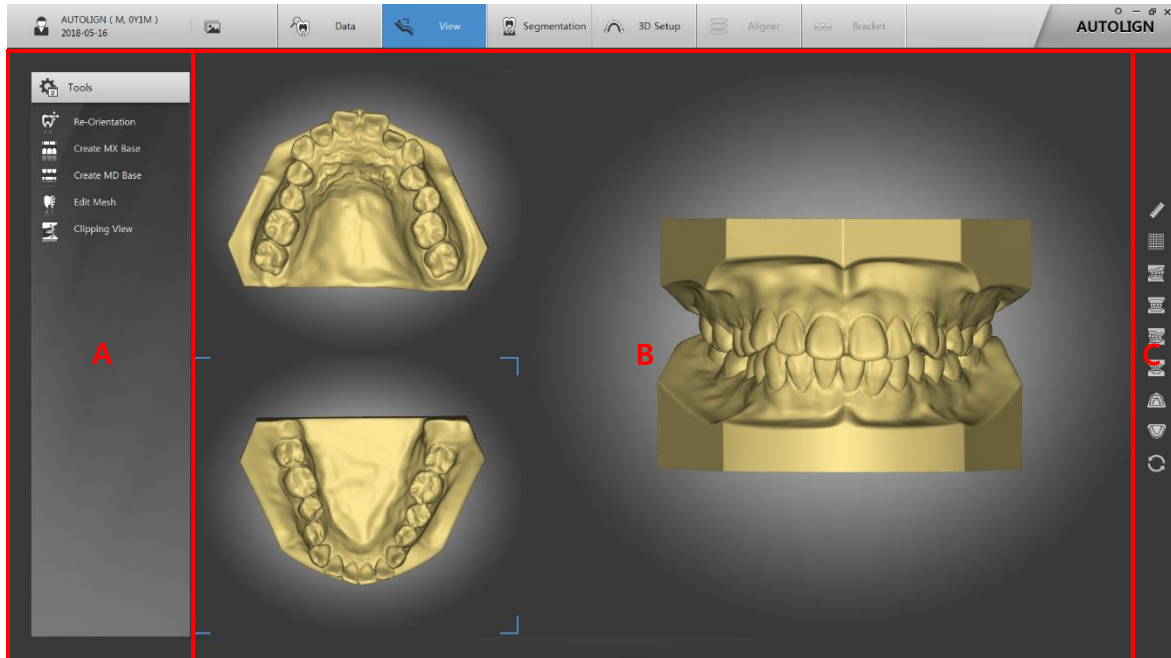


If nothing is entered in the search box, all patients will be searched and appear.

## 5. View

: You can adjust and review saved 3D images on the View.

### 5.1 Screen Layout



A: Tools –Displays primary function buttons.


B: View – Displays images.

C: Common Tool Bar –Displays supplemental function buttons. (Reference: Chapter3. 2.1).

### 5.2 Tools

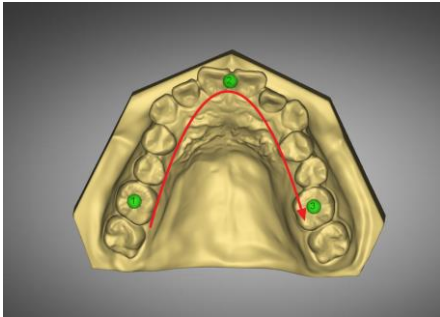
#### 5.2.1 Re-Orientation

: Reorients 3D images.

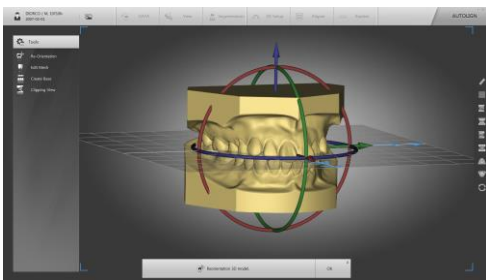
- 1) Click the [  Re-Orientation] button on the Tools to see the Re-Orientation window.
- 2) Put 3 reference points: right molar, central incisor, and left molar.



The reference points must be put in the same order as above.

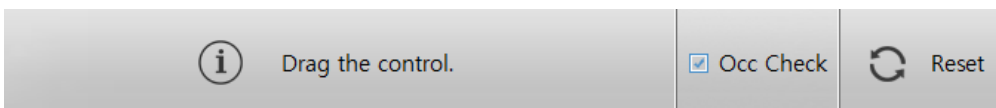


- 3) Click the [Re-Orientation] button on the bottom to make the model reorient automatically to the center. Fine-tune by using movement/rotation tools.

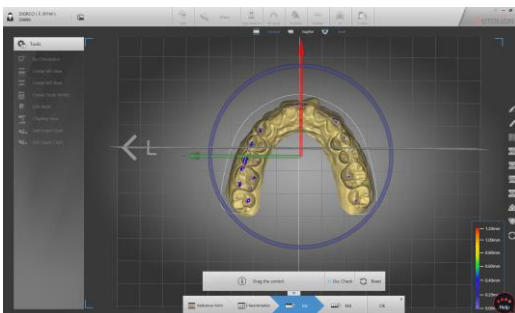


You can control the movement/rotation of the maxilla and the mandible separately by using the [Mx] and [Md] buttons on the bottom.

- 4) Click [Mx] button to fine-tune the upper arch by moving and rotating with gyro-bars.
- 5) Click [Md] button to fine-tune the lower arch by moving and rotating with gyro-bars.




[Occ Check]: Overlapped area of upper and lower arch is indicated by color map.

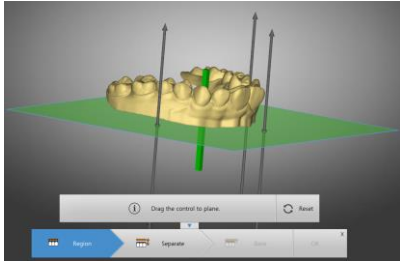


- 6) Click the [OK] button to save the result.

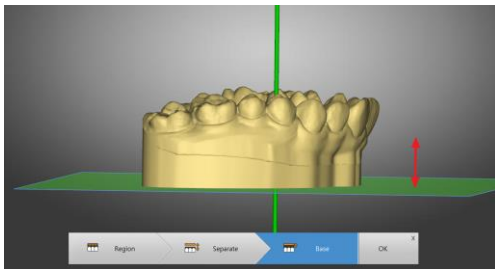
## 5.2.2 Create Base

: Creates the base of a model.

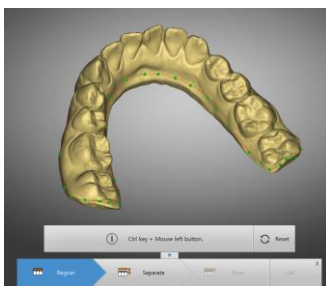
- 1) Click the  [Create Base] button on the Tools.2 options show up: plane and region
- **Plane:** Sets the bottom surface of a model by using a plane and creates the base thereafter.
  - 1) Set the location of the bottom surface by using 4 bars, and click the [Separate] button.



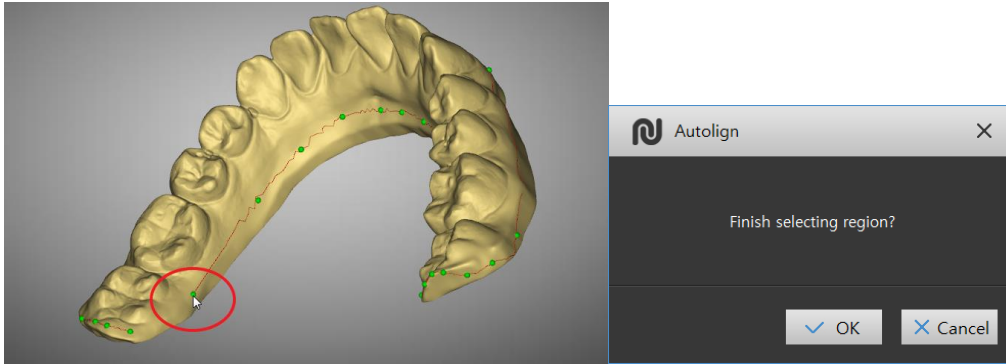
- 2) Once you check the separated surface, click the [Base] button to create the base.
- 3) Confirm the final result by adjusting the height of the base, and click the [OK] button to save it.



- **Region:** Sets the bottom surface with points (line) and creates the base thereafter.
  - 1) While pressing [Ctrl] on your keyboard, set the bottom surface to be separated by marking points with mouse clicks.




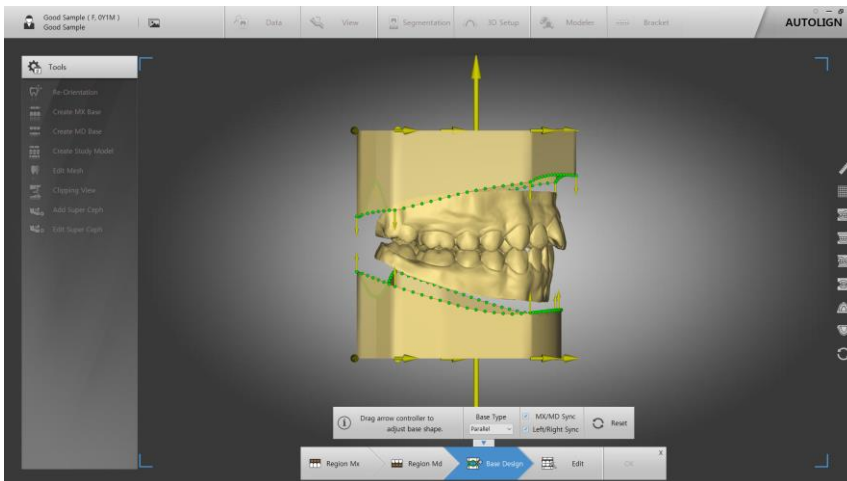
If you click the starting point, all the points will be connected by a line.



- 2) Click the [Separate] button, check the separated surface, and then click the [Base] button to create the base.
- 3) Confirm the final result by adjusting the height of the base, and click the [OK] button to save it.

### 5.2.3 Create Study Model

- 1) Click  [Create Study Model] button on Tools.
- 2) Create base line at [Region Mx, Md] steps.
  - Creating base line is same as "Create Base [Region]" please refer to CHAPTER 4. 5.2.2
- 3) Click [Base Design] button.




- 4) Choose base types between Parallel, ABO, Tweed, Ricketts, ABO2013
- 5) Adjust the size and location of the base by using arrow keys. Adjust the shape of the base by using Control Point (Green Sphere)

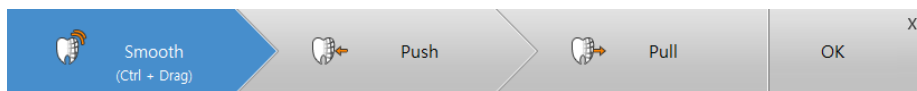


- Click [MX/MD Sync] and move arrow keys to control both bases simultaneously.
  - Click [Left/Right Sync] and move arrow keys to control both bases simultaneously.
- 6) Click [Merge] to complete the Study Model.
  - 7) Click [OK] to save.

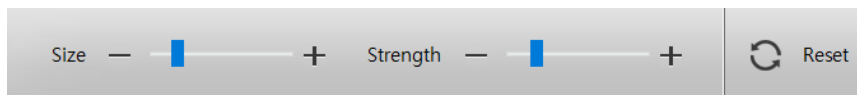
### 5.2.4 Edit Mesh

: Edits a model's images.

- 1) Click the  Edit Mesh] button to see the edit window on the bottom.




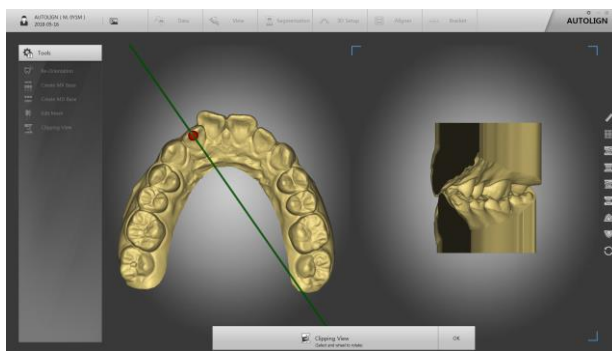
- 2) While pressing [Ctrl], edit by dragging your mouse.
  - Smooth: Smooths out the surface.
  - Push: Pushes in the surface.
  - Pull: Pulls the surface.
- 3) With the size control bar, you can control the size and Strength of the area you wish to edit.



### 5.2.5 Clipping View

: Through a model's cutting plane, you can check the state of occlusion between the maxilla and mandible.

- 1) Click the  Clipping View] button to see the Clipping View window.




- The vertical surface of where the red point sits will be displayed on the right side of the window.

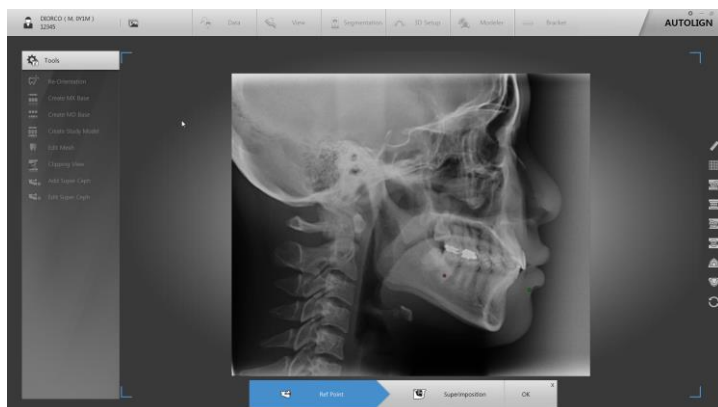
2) You can rotate the direction of the axis by rolling your scroll wheel up and down.

## 5.2.6 Add Super Ceph

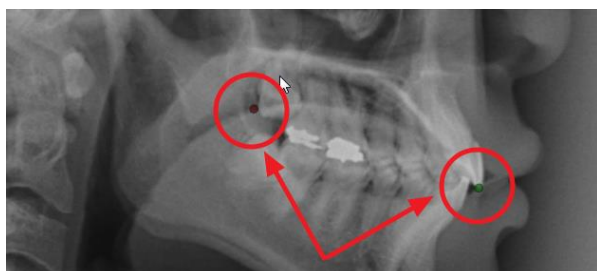
: Superimposes an X-ray image (Cephalo lateral) with 3D scan data.

- 1) Click the  Add Super Ceph] button to display the image selection window.
- 2) Select an image from a folder and click the [OK] button.

- The image and reference points (red and green) will be displayed.



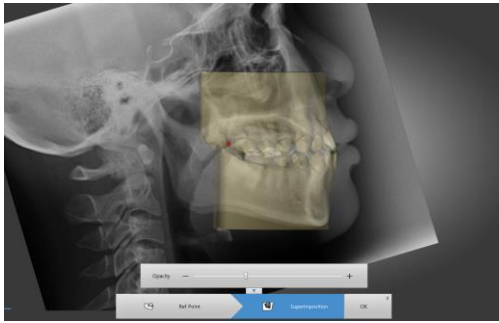
3) Place the green reference point at the incisor, the red reference point at the molar.





After superimposition, you can place the points, which serve fine-tuning functions, at different locations.


- 4) Click the [Superimposition] button to superimpose the X-ray image with the 3D model image. By using the reference points (red and green), move, rotate, enlarge, or reduce the X-ray image so that the images match correctly.



- Green point: Moves the X-ray image.
  - Red point: Enlarges, reduces, or rotates the X-ray image.
  - You can control the opacity of the model through the opacity control bar.
- 5) Click the [OK] button to save the result.

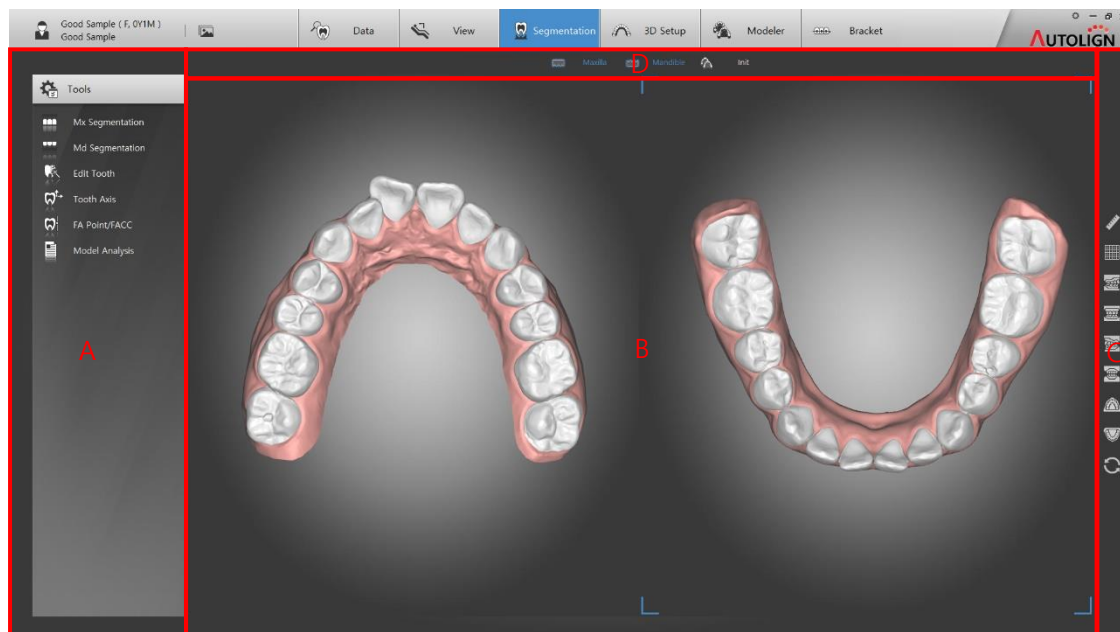
### 5.2.7 Edit Super Ceph

: Edits the superimposed X-ray image and 3D scan data.

- 1) Click the [ Add Super Ceph] button to display the edit window.
  - The method of editing is the same as 5.2.6 4).
- 2) Click the [OK] button to save the result.

## 6. Segmentation

### 6.1 Screen Layout



A: Tools - Displays the Setup List and primary function buttons.

B: View - Displays images.


C: Common Tool Bar - Displays supplemental function buttons. (Reference: Chapter 3.2.1).

D: Show/Hide Tool Bar – Performs show/hide functions through shortcut buttons.

### 6.2 Tools

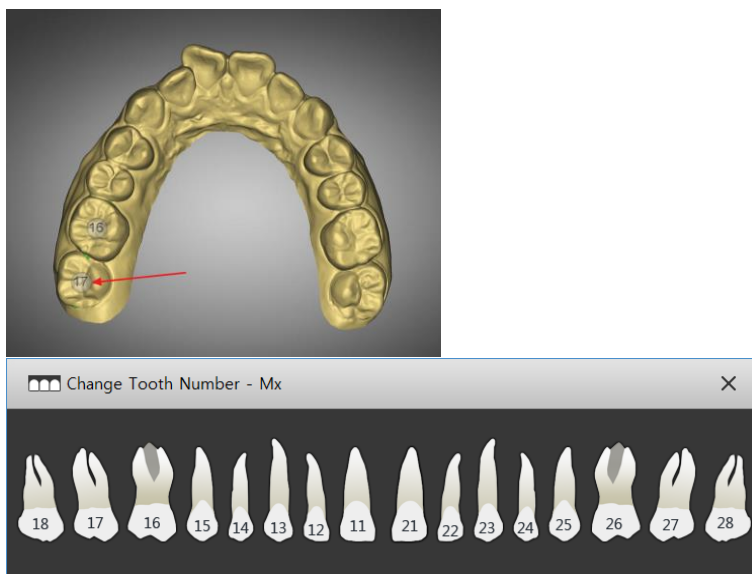
#### 6.2.1 Mx Segmentation

: Segments the teeth on the maxilla.

- 1) Click the [  Mx Segmentation] button on the Tools to see the sub tool bar on the bottom as seen below.

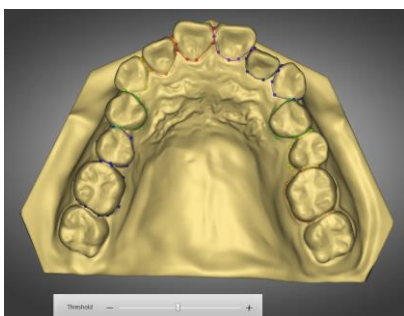


- 2) Click the [Set M/D] and click each tooth's mesial and distal.
- 3) When clicking is completed, each tooth's number will be displayed automatically.



Tooth numbers will be marked automatically from number 7. When you click a certain number, a window that allows you to change the number will show up.

- 4) Click the [Contour] button to see automatically-created contour lines (tooth-segmentation lines).



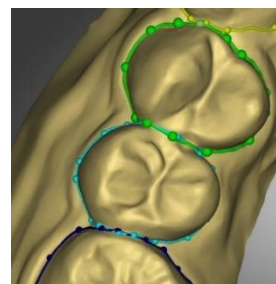
- You can manually adjust the contour lines by moving the points created on them.



You can create/delete a point by right-clicking on the contour lines.

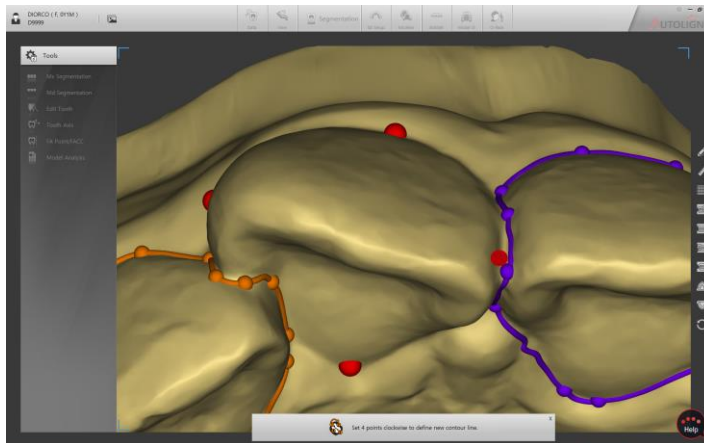


Only when contour lines of neighboring teeth are overlapped with each other can you perform segmentation without leaving any space between the teeth.



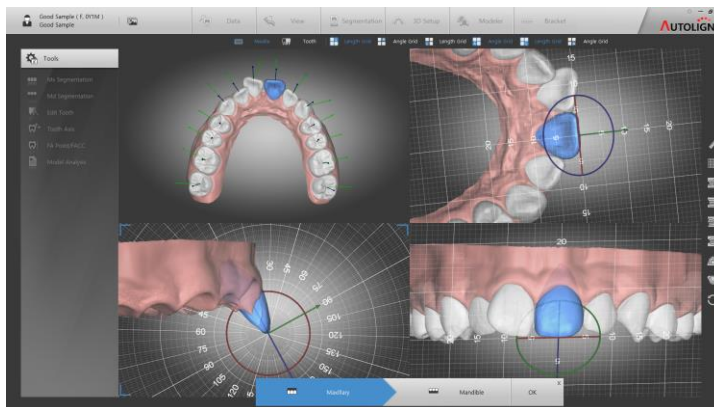
- 5) If the Contour is severely out of place, user can re-contour an individual tooth.
- 6) Click the contour line of a tooth then click [Re Contour] button.

7) Set 4 points on all sides of the gingival line.



8) Click the [Axis] button to set the axis of a tooth.

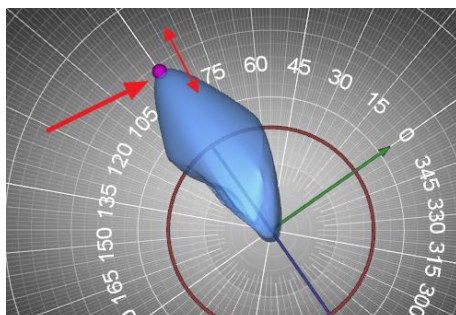
- Once you select a tooth, the screen that allows you to set its axis from multiple directions shows up. (X, Y, Z axis).



9) Set the axis by using movement/rotation tools.



A tooth's center of rotation is marked as a purple dot, which you can change by moving it.




10) Click the [Segment] button to make the teeth get segmented automatically.



11) Click the [OK] button to save the result.

## 6.2.2 Md Segmentation


: Segments the teeth on the mandible.

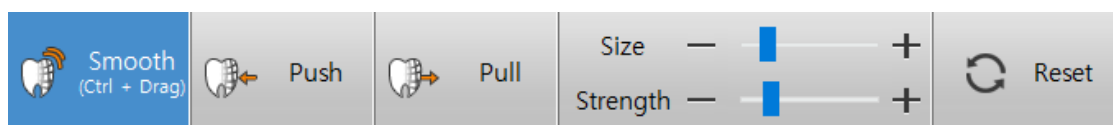
1) Click the  [Md Segmentation] button on the Tools.

- Subsequent steps are identical to those of Mx Segmentation.

## 6.2.3 Edit Tooth

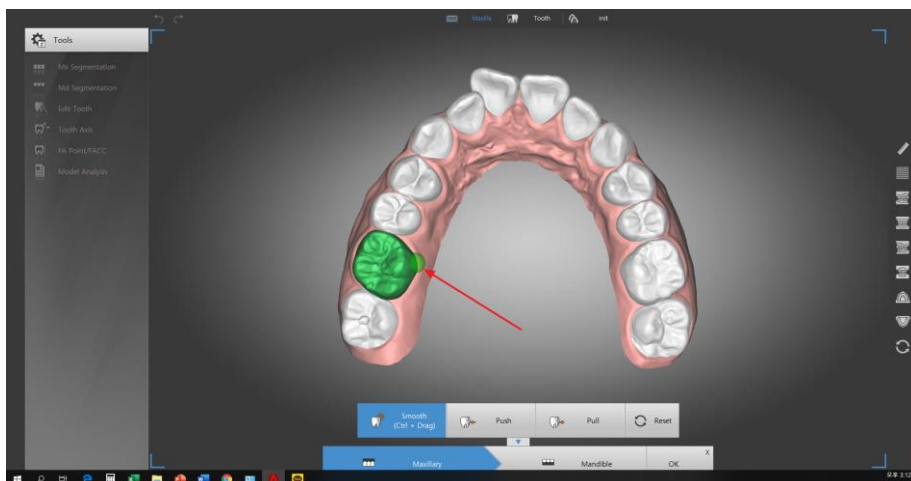
: Edits a segmented tooth.

1) Click the  [Edit Tooth] button on the Tools to see the sub tool bar on the bottom.




2) After selecting a tooth, edit it by dragging your mouse while pressing [Ctrl].

- Smooth: Smooths out the surface.
- Push: Pushes in the surface.
- Pull: Pulls the surface.
- Reset: Resets to the initial state.
- Size: Adjust the brush size. (Keyboard arrow keys [↑: Increase, ↓: Decrease])
- Strength: Adjust the brush strength. (Keyboard arrow keys [→: Increase, ←: Decrease])




## 6.2.4 Tooth Axis

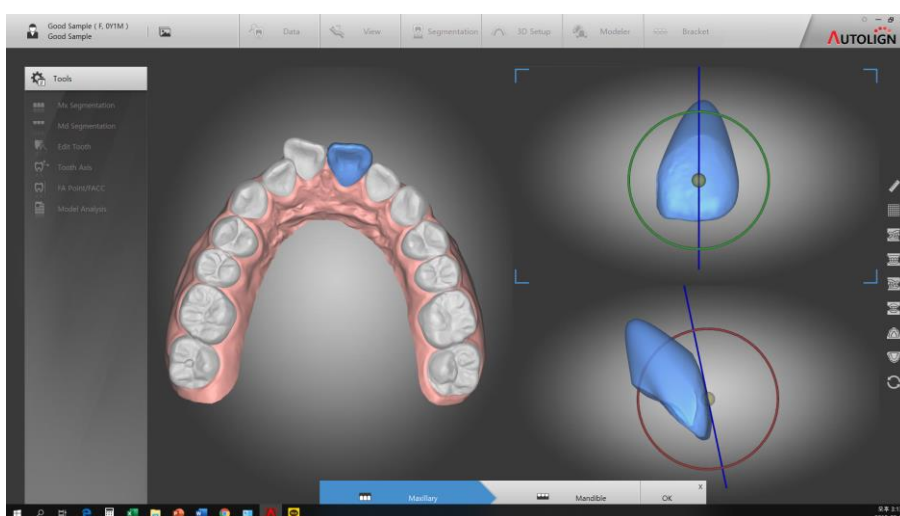
: Sets the axis of a tooth.

- 1) Click the [  Tooth Axis] button on the Tools to see the window for settings.
  - The steps to set the axis of a tooth here are identical to those of segmentation. (Reference: Chapter 4, 6.2.1 8) ~11)).

## 6.2.5 FA Point/FACC

: Sets each tooth's FA point and FACC.

- 1) Click the [  FA Point/FACC] button on the Tools to see the window for settings.
- 2) You can set a FA point and FACC on the right side of the screen once you select a tooth.





### 6.2.6 Model Analysis

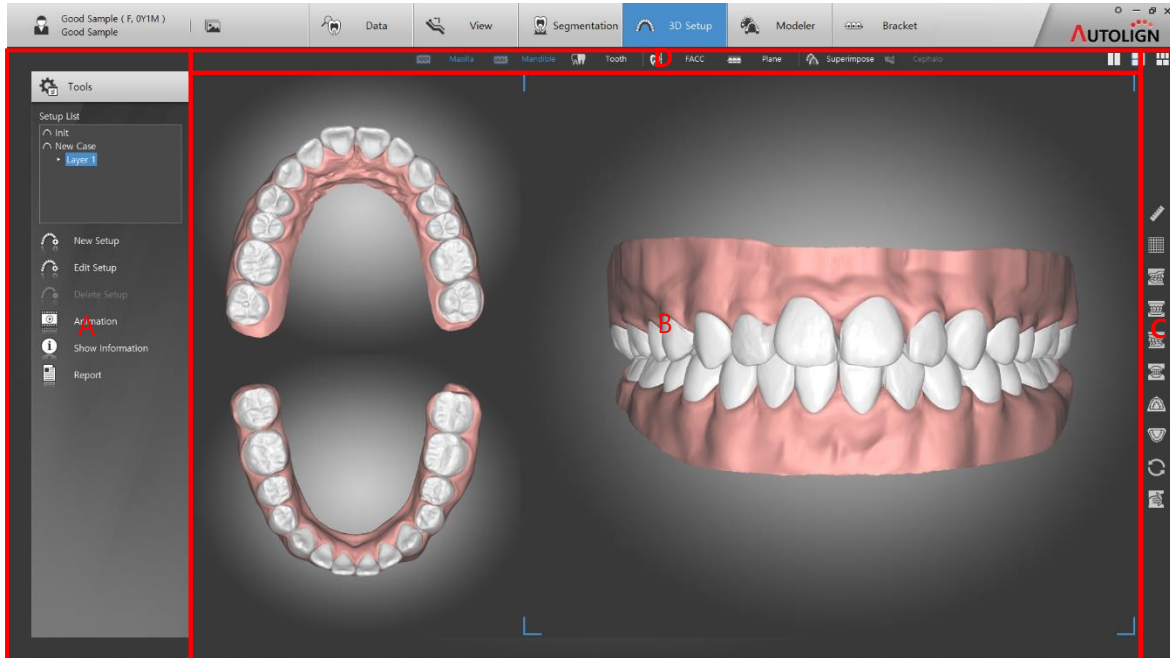


- 1) Click the [Model Analysis] button to see the information regarding a tooth's length and space in the form of a report.
- 2) Click the [Save] button to save the report shown on the screen as a PDF file.

## 7. 3D Setup

: You can virtually set up segmented teeth in 3D.

### 7.1 Screen Layout



A: Tools – Displays the Setup List and primary function buttons.

B: View –Displays images.


C: Common Tool Bar –Displays supplemental function buttons. (Reference: Chapter3. 2.1.1).

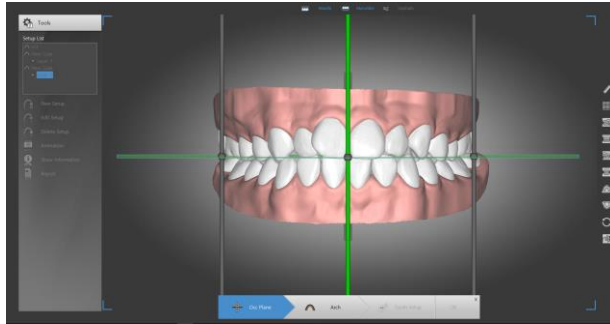
D: Show/Hide Tool Bar – Performs show/hide functions through shortcut buttons.

### 7.2 Tools

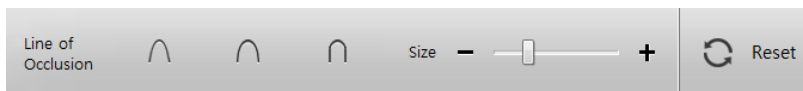
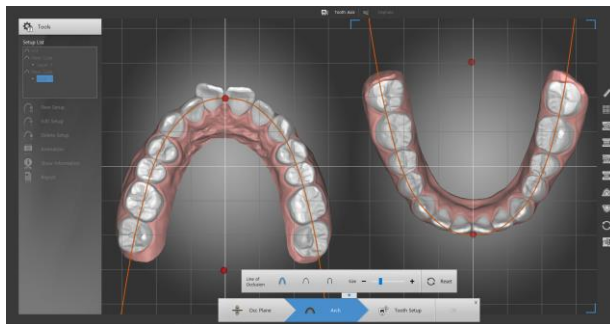
#### 7.2.1 New Setup

: Creates a new setup.

- 1) Click the [  New Setup] button to set the name of a new setup, and click the [OK] button to save it.
- 2) By using 3 movement tools, set the occlusal plane on the [Occ Plane] window.



3) Click the [Arch] button to set the arch of the maxilla and the mandible.



- Select a form, and adjust the size with the size control bar.

4) Click the [Tooth Setup] button on the bottom.

5) Click each tooth to move or rotate it.

- When you click a tooth, a tool shows up, through which you can move or rotate the tooth.



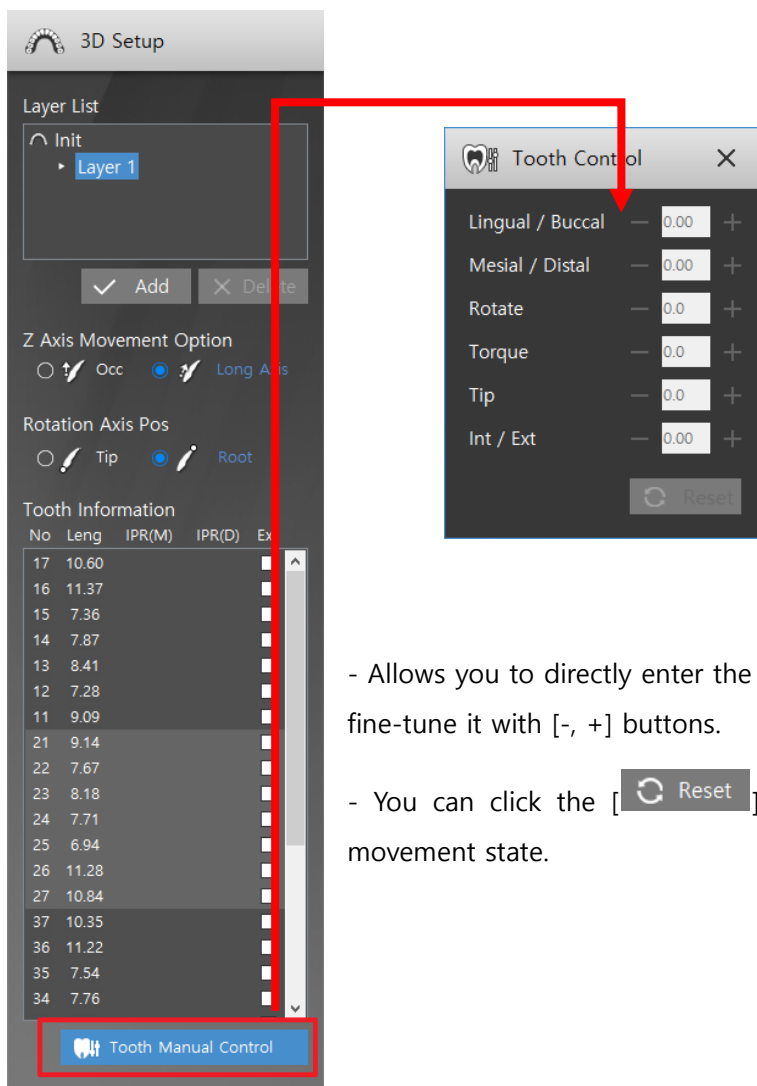
When you move a tooth, the distance of overlapping area with its neighboring tooth is displayed in a red box.

Such distance can be checked for all other teeth in real time.

- Use the shortcut keys to rotate teeth

Shortcuts		Actions
x	↑, ↓	Lingual / buccal, Pro / Ret
	←, →	Mesial / Distal
Ctrl	↑, ↓	Intrusion / Extrusion
	←, →	Rotation
Shift	↑, ↓	Inclination (Torque)
	←, →	Angulation (Tip)
Alt	←, →	Tooth Selection

6) Click the [Tooth Manual Control] on the left to see the [Tooth Adjust] window, through which you can fine-tune





- Allows you to directly enter the amount of tooth movement, or fine-tune it with [-, +] buttons.

- You can click the [Reset] button to return to the pre-movement state.

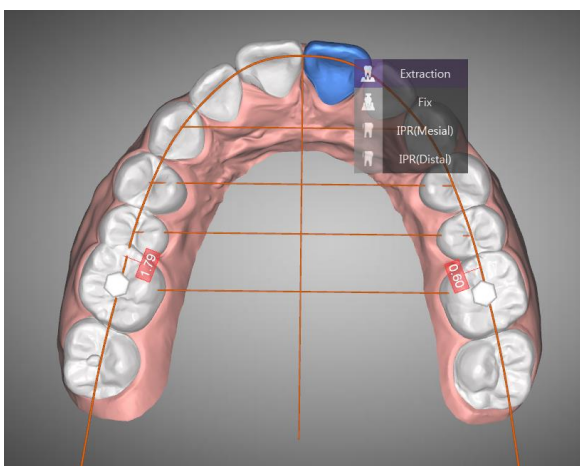
- Z Axis Movement Option: Sets the direction of movement of the teeth up and down (Z axis).
  - Occ: Moves vertically based on Occlusal Plane.
  - Long Axis: Move in the direction of the set Long Axis.
- Rotation Axis Pos: Sets a tooth's center of rotation.
  - Tip: Sets the tip of a tooth as the center of rotation.
  - Root: Sets the root of a tooth as the center of rotation.
- Tooth Information
  - Length: Displays a tooth's width (length).
  - IPR(M, D): Conducts stripping for the selected tooth.
  - Ext: Extracts the selected tooth.

7) Click the [Undo/Redo] button on the top left to cancel your latest action.

 Undo]: Cancels your latest action.

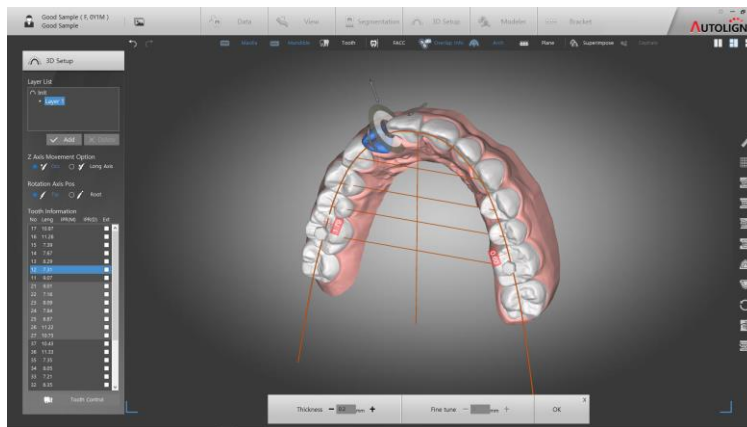
 Redo]: Recovers the latest action canceled by the [Undo] button.

8) When a tooth is selected, you can change its detailed settings by clicking your right mouse button.

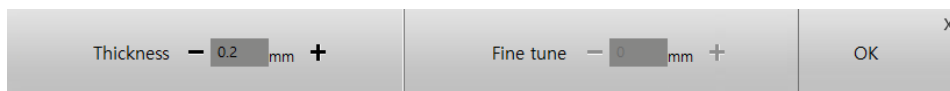


- Extraction: Extracts the selected tooth.

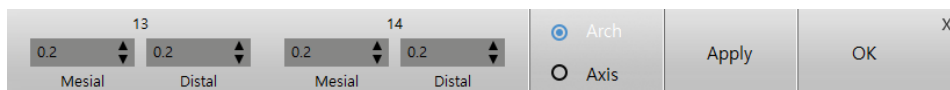
- Fix: Fixes the selected tooth.
  - IPR: Conducts stripping for the selected tooth.
- 9) Select IPR then you can move the location of the stripper.



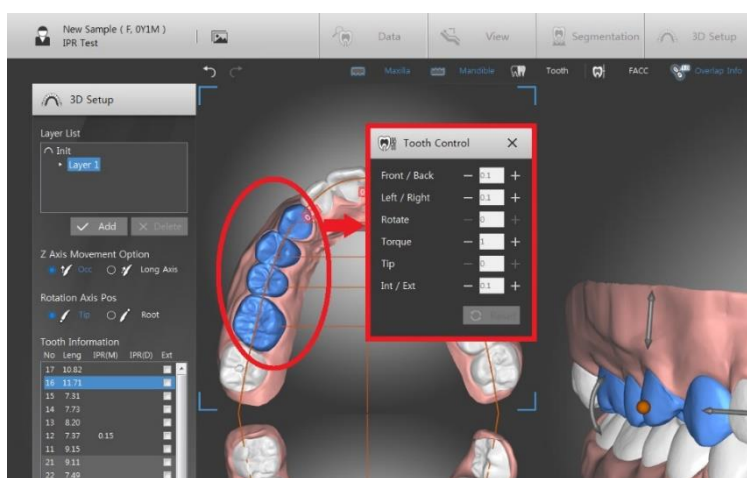
- You can adjust the thickness and location of the stripper at bottom Tool Bar



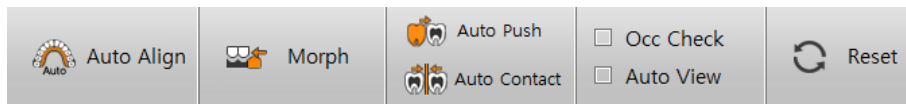
- If [Number Input] is selected, you can input numerical value to apply IPR. Input your IPR amount then click [OK] to apply.



- By holding down the [Ctrl] button and clicking on the teeth, you can select multiple teeth simultaneously (grouping) and move and adjust the torque.



## 7.2.2 Tool Bar

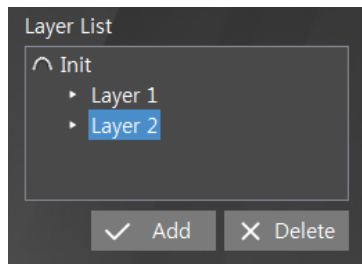


- 1) Auto Align: Auto-aligns the teeth along set arch lines.
  - Auto Align (MX/MD): Auto-aligns the maxilla and mandible with only certain teeth fixed or extracted.
  - Auto Align (MX): Auto-aligns the maxilla and mandible with only certain teeth fixed or extracted.
  - Auto Align (MD): Auto-aligns the mandible with only certain teeth fixed or extracted.
  - Template(incisor): Auto-Align Non-extraction, 4/4 extraction, 5/5 extraction based on incisor.
  - Template(molar): Auto-Align Non-extraction, 4/4 extraction, 5/5 extraction based on molar.
- 2) Morph: Morphs the gum depending on the movement of a tooth.
- 3) Auto Push: When a tooth gets moved, automatically detects any collision with a neighboring tooth and pushes it away.
- 4) Auto Contact: When a tooth gets moved near to its neighboring tooth, automatically aligns them so that they are in contact with each other.
- 5) Occ Check: Overlapped area of upper and lower arch is indicated by color map.
- 6) Auto View: When a tooth is selected, automatically zooms-in on the tooth and shows it on the right side of the screen.

## 7.2.3 Layer

: You can set a midpoint within the whole setup process.

- 1) Click the [Add] button to add a new layer on the Layer List.



- The final setup of the previous layer is displayed, from which you can continue setup processes. (Setup methods are the same.)
- 2) You can save the result via the [OK] button or delete the selected layer via the [Delete] button.




By utilizing layers, you can set different kinds of plans, such as making a change in the direction of tooth movement or moving a tooth after rotating it.

(Example: Layer1: Expansion -> Layer2: Molar Distalization -> Layer3: Arch Aligning)


## 7.2.4 Edit Setup

: Edits the selected setup.

- 1) Select a setup to edit on the Setup List, and click the  Edit Setup] button to start editing. (The steps for editing here are identical to those of 5.2.1. New Setup.)

## 7.2.5 Delete Setup

: Deletes the selected setup.

- 1) Select a setup to delete and click the  Delete Setup] button. When the message window for confirmation shows up, click the [Yes(Y)] button to complete the process.


## 7.2.6 Animation

: Checks tooth movement before and after a setup through an animation.



- 1) You can control a simulated animation with the [Play], [Fw], and [FF] buttons as well as the [Play Bar].



- 2) Save the playback into avi format.
- 3) : Play the video repeatedly.
- 4) Can change the animation speed by (x0.5, x1.0, x1.5, x2.0).

7.2.7 Show Information

: On the bottom of the screen, shows each tooth's angles and distance moved.

7.2.8 Report

: Shows the information regarding each tooth's movement and space in the form of a report.

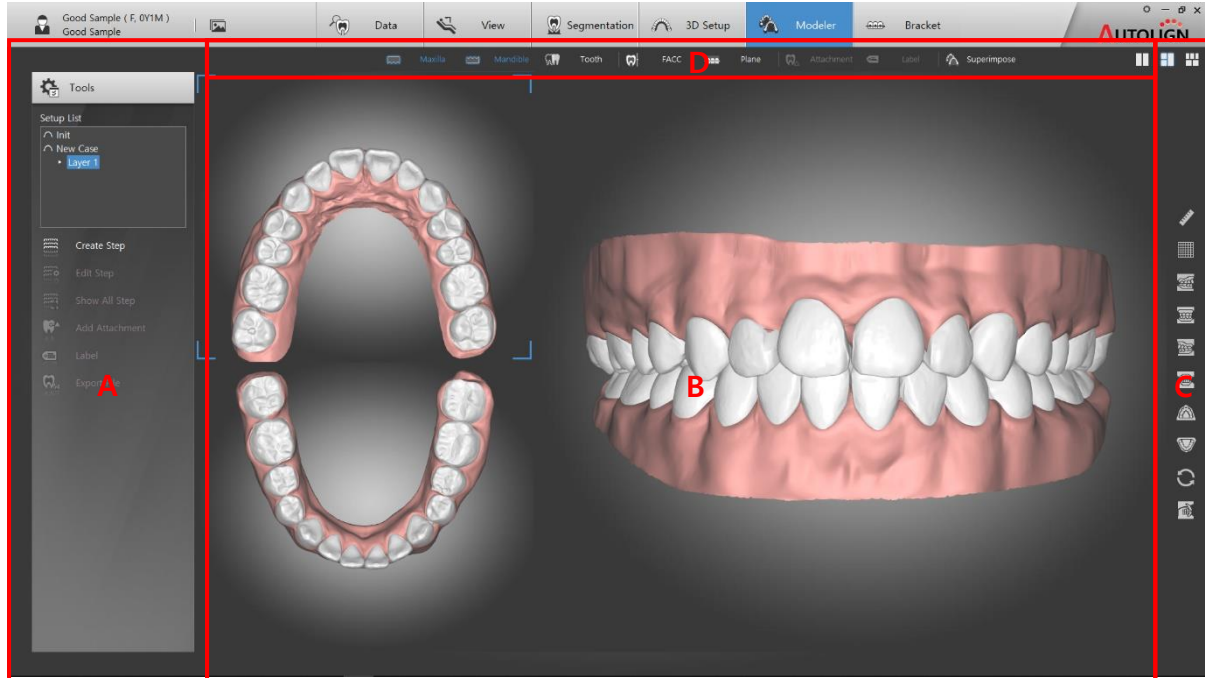
7.2.9 Export File

: Export the completed setup STL files.

- 1) Choose the layer of the model to be exported. Click the [Export File] button to designate file location then click [OK] to export the selected layer into .stl format.

## 8. Modeler

### 8.1 Screen Layout



A: Tools –Displays primary function buttons.

B: View – Displays images.



C: Common Tool Bar –Displays supplemental function buttons. (Reference: Chapter3. 2.1.1).

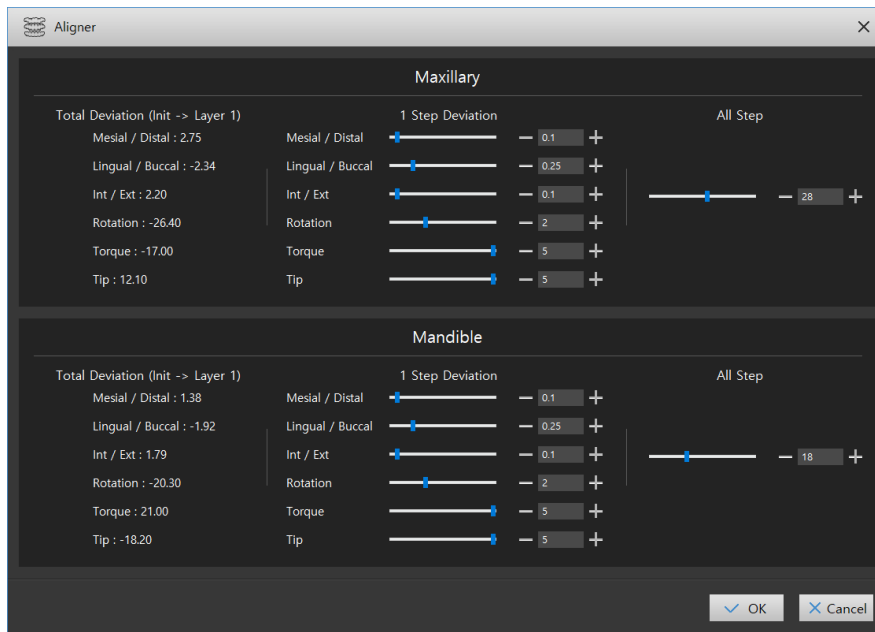
D: Show/Hide Tool Bar – Performs show/hide functions through shortcut buttons.

### 8.2 Tools

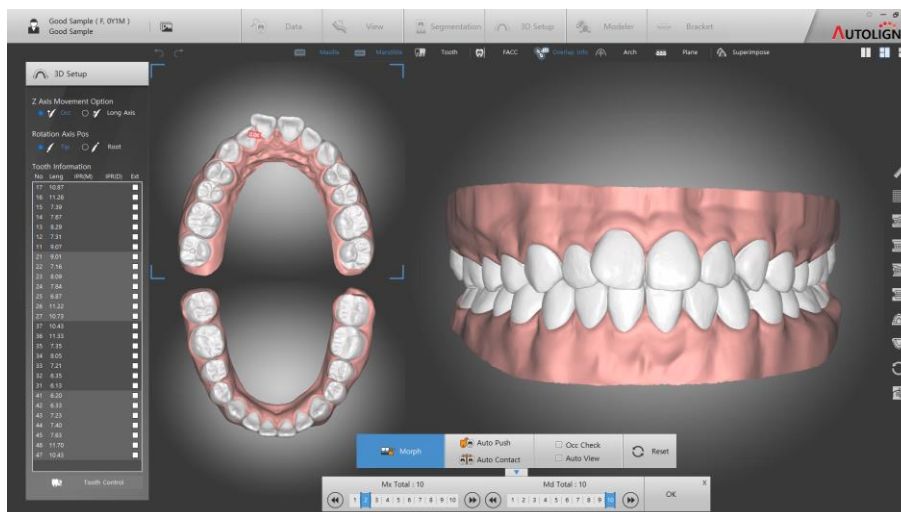
#### 8.2.1 Create Step

: Create step-by-step models required to produce clear aligners.

- 1) In the Setup List, select layer which you want to create step-by-step model click,  [Create Step] button in the tools, and click the  [Normal Step] button to display the Aligner Step Settings window.



- The steps leading to the final setup are set automatically according to the maximum distance and maximum rotation values per step.
- 2) Click the [OK] button to display the set steps on the screen.




- 3) With the step tool on the bottom, click each step to check its model.

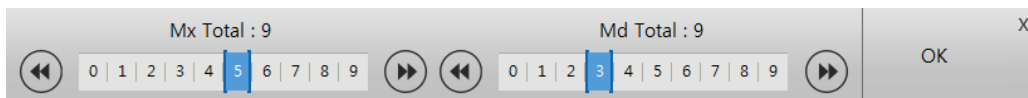


- You can edit each tooth's setup per step. After you finish editing, subsequent steps will be automatically re-calculated and set up accordingly.

## 8.2.2 Edit Step

: Edits a saved step.

- 1) Click the  Edit Step] button on the Tools to switch to edit mode.
- 2) With the step tool on the bottom, select a step and edit it.



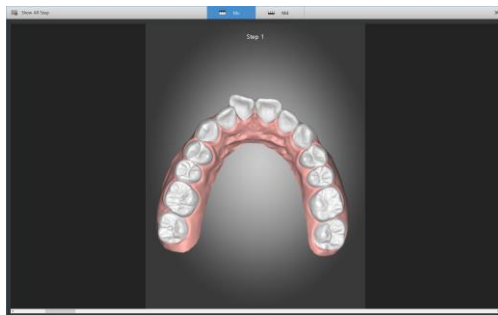
- 3) After editing the step, click the [OK] button to save it.

## 8.2.3 Show All Step

: Checks paths of movement by displaying all steps in a sequence.

- 2D

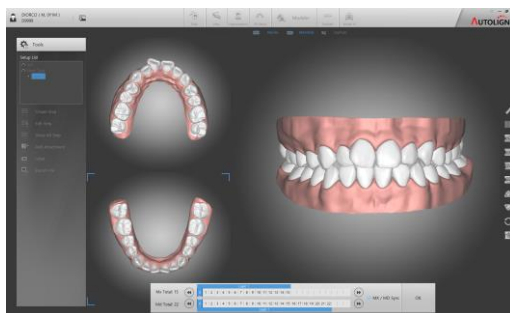
- 1) Click the  Show All Step] –  2D] button to show all steps in 2D image.



- 2) Scroll mouse wheel up / down to display previous / post steps.


- 3D

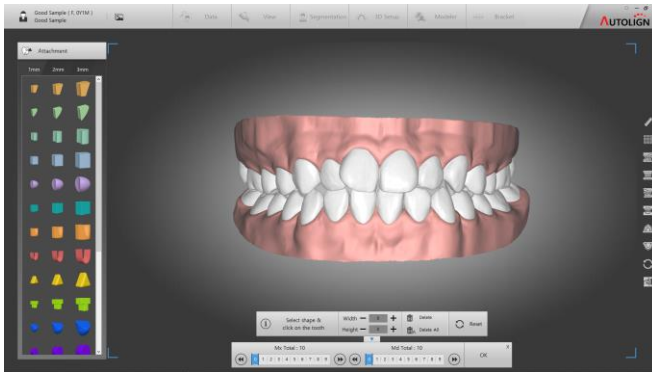
- 3) Click the  Show All Step] –  2D] button to show all steps in 3D model.



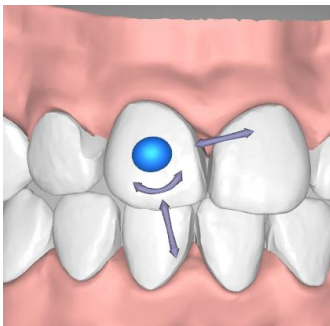
## 8.2.4 Add Attachment

: Adds attachments.

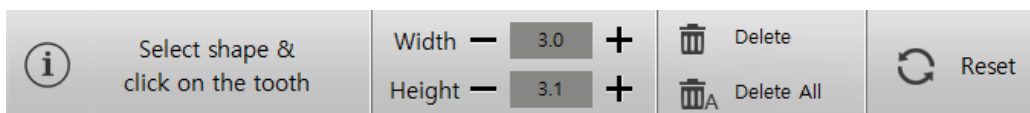
- 1) Click the  [Add Attachment] button to see the Attachment window.





- 2) After selecting an attachment shape, click the tooth you wish to add an attachment to. It will be added as such.
- 3) You may move, rotate, change the size of the placed attachments.



- 4) You may move and rotate with the gyro-bar or use shortcuts
  - Shortcuts - Move: Arrow button Up/Down/Left/Right, Rotate: CTRL + Arrow Button Left/Right



- 5) You can move the added attachment and adjust the size of [Width] and [Height] on the bottom.
- 6) You can delete the selected attachment by clicking the  [Delete] button


- 7) You can delete all attachments by clicking the [  Delete All] button.
- 8) Click the [OK] button to save it.

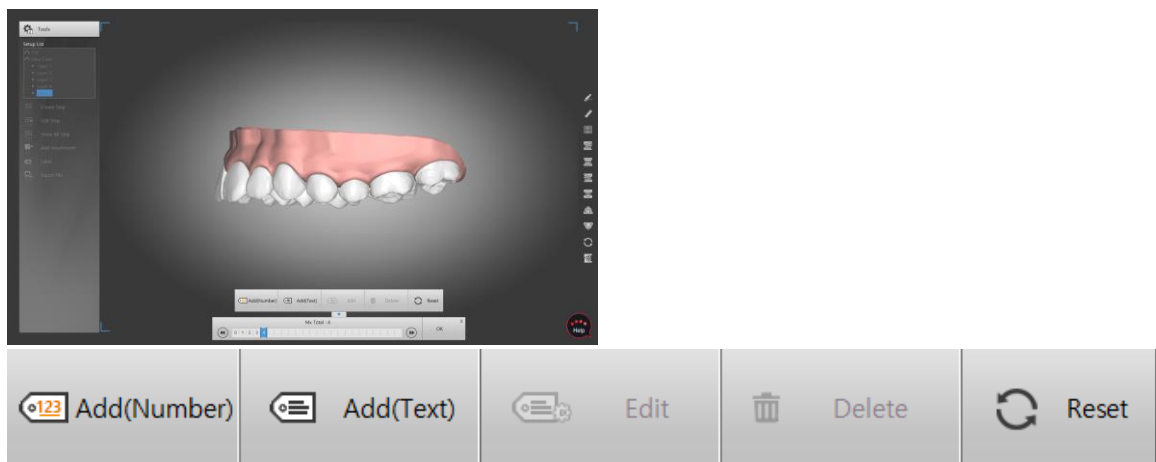
## 8.2.5 Label

: Puts a label on the model.

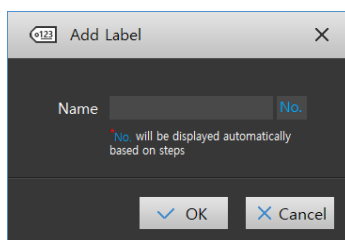
- Mx/Md Label

: Engrave Text and Auto-numbering to your 3D models..

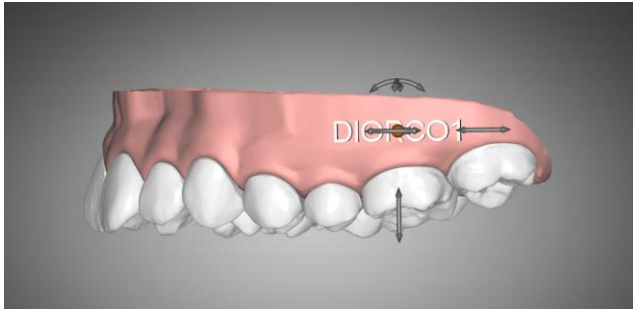
- 1) Click [  Label] button (MX Label/MD Label) of Tools to display the label window.



- 2) Click [Add(Number)] button to enter the text to be engraved.

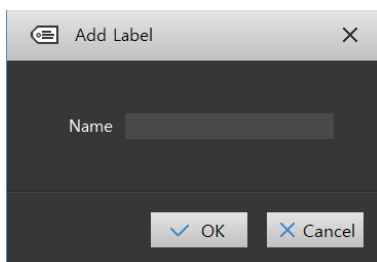


- 3) Click on the location to place your label, Gyro-bar is activated to move and rotate the label.



Corresponding step number is automatically displayed followed by inputted name.

- 4) Click Add (Text) to add extra text only label.



- 5) Click on the location to place your label, Gyro-bar is activated to move and rotate the label.



- 6) Click [OK] button to save your labels.



Language settings can be changed in [gear icon] setting > [Label Language].

Refer to Chapter4. 1.1.8.

## 8.2.6 Export File

: Saves each step's model as a file (\*.stl).

- 1) Click [Export file] button from Tools to open up [Export] and [Base Cutting] windows

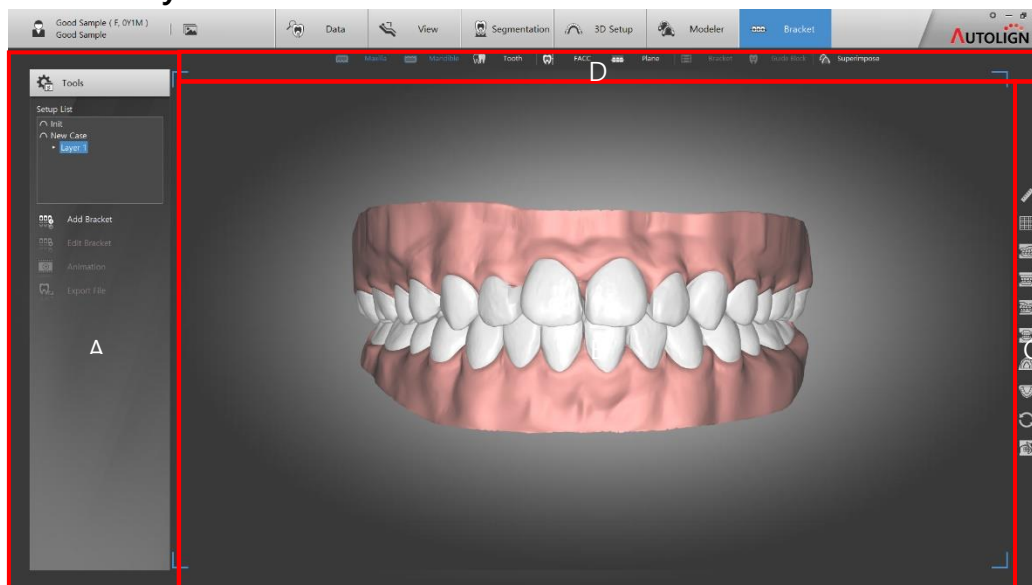




## 9. Bracket

: You can produce IDB devices through bracket guides.

### 9.1 Screen Layout



A: Tools –Displays primary function buttons.


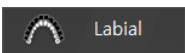
B: View – Displays images.

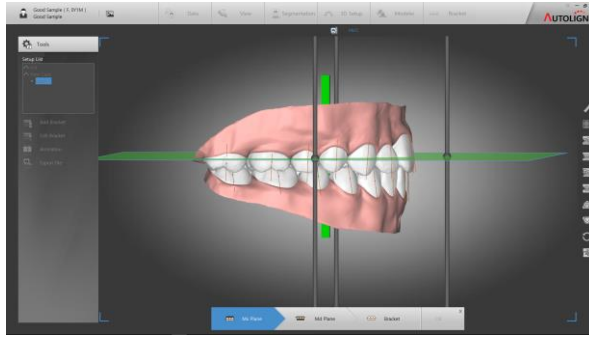
C: Common Tool Bar - Displays supplemental function buttons. (Reference: Chapter3. 2.1.1).

D: Show/Hide Tool Bar – Performs show/hide functions through shortcut buttons.

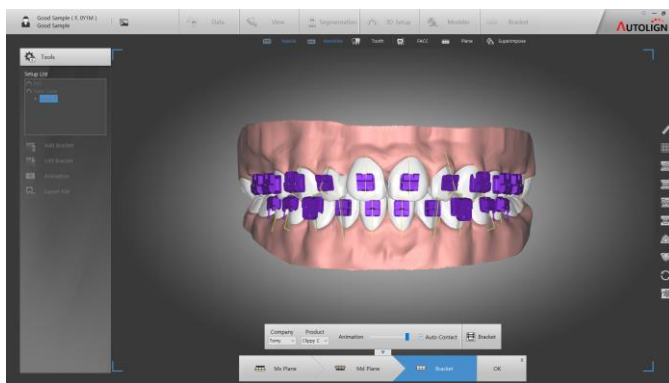
### 9.2 Labial

#### 9.2.1 Add Bracket

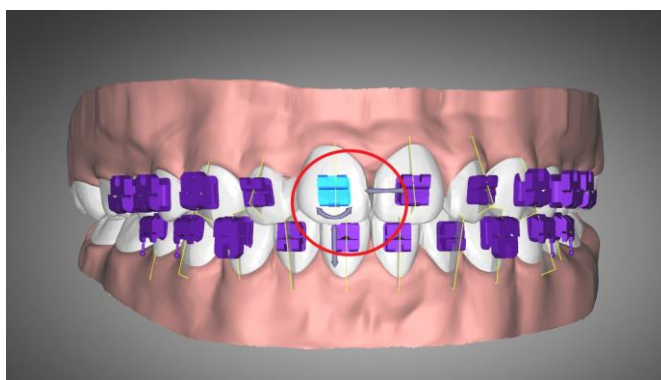
- 1) Select a layer on the Setup List. Click [  Add Bracket] button then click  button.
- 2) Click the [Mx Plane] button to specify the maxilla's surface to put brackets on.



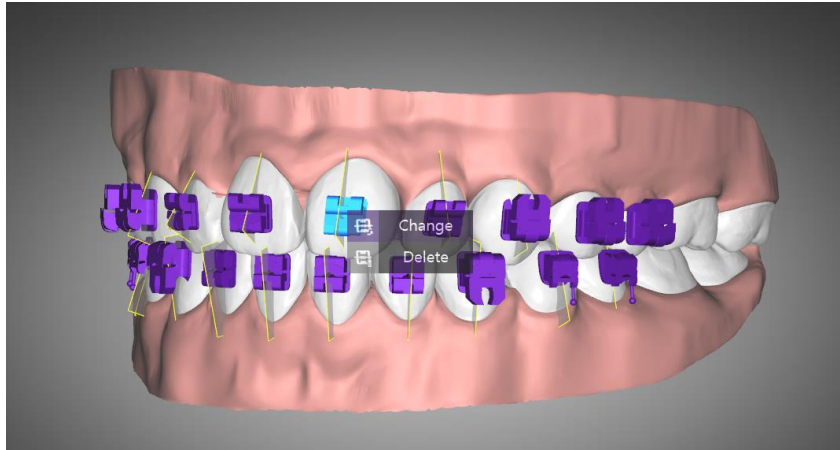
- 3) Click the [Md Plane] button to specify the mandible's surface to put brackets on.
- 4) Click the [Bracket] button and choose a type of brackets from the library window. The selected type of brackets will be attached automatically.



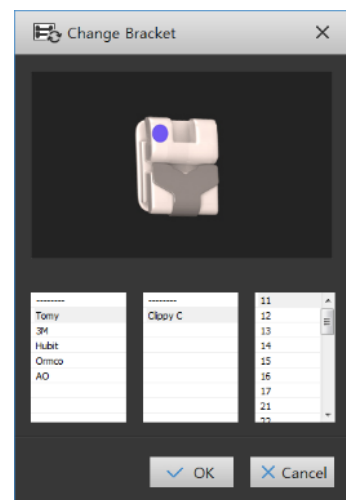
- 5) You can select each bracket, and move or rotate it.



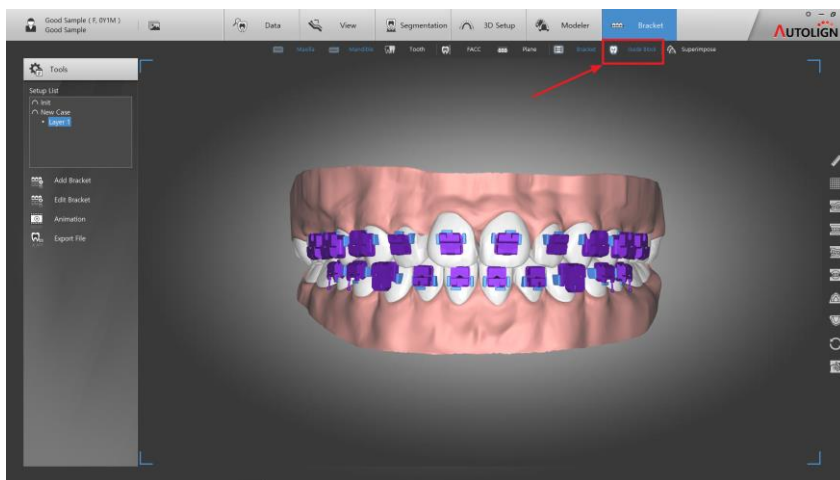
- 6) After selecting a bracket, you can change it by right-clicking your mouse.



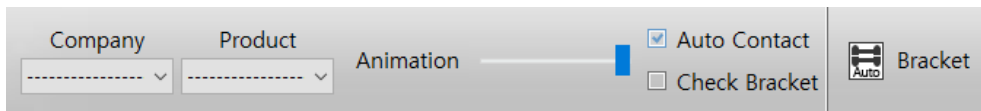
- Add, Change: Adds/Changes a bracket. Once a type of bracket is selected on the bracket selection window, it will be attached.
- Delete: Deletes the selected bracket.



- 7) Click the [Ok] button to save.
- 8) If you click the [Guide Block] button on the Show/Hide Tool Bar at the top, guide blocks will be created at the location where brackets are attached.




## 9.2.2 Tool Bar



- Company: Displays Bracket Manufacturers
- Product: Displays Bracket Product names.
- Animation: Animates Pre / Post Setup bracket movements.
- Auto Contact: Automatically place the brackets with maximum surface coverage between the tooth and the bracket base.
- Check Bracket: Displays Bracket interference with teeth. (Bracket will be displayed in red)
- Auto Bracket: Re-arrange Bracket into initial state.

## 9.2.3 Edit Bracket

: Edits the location of attached brackets.

- 1) Click the [ Edit Bracket] button to switch to edit mode.

(Steps for editing here are identical to those of 9.2.1 Add Bracket.)

## 9.2.4 Animation

: Checks tooth movement before and after a setup through an animation.



Through an animation, you can check whether brackets collide with each other in the teeth's initial state.

## 9.2.5 Export File

: Saves a model with bracket guide blocks as a file (\*.stl).

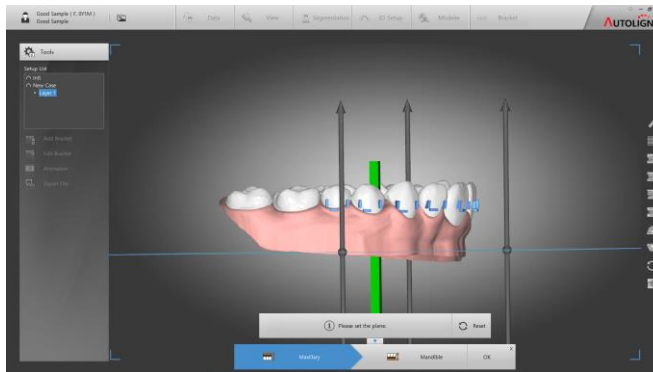
- Export

: Set the path to save files, and click the [Ok] button to save the result.

- Base Cutting

: You can save the model after adjusting the height of its base.


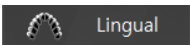
- 1) Set where the bottom of the base should be located by using the 4 bars, and click the [OK] button.

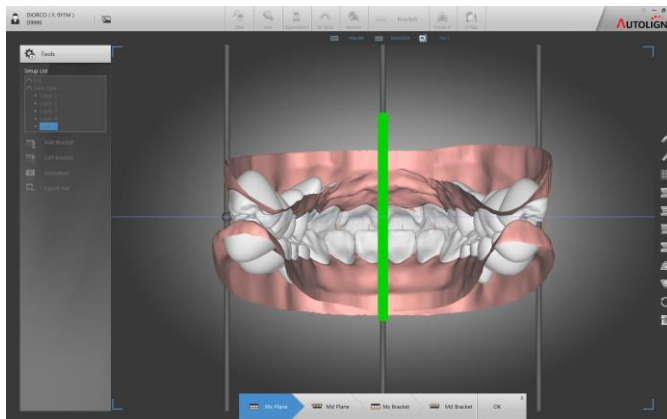


- 2) - Set the path to save files, and click the [Ok] button to save the result.

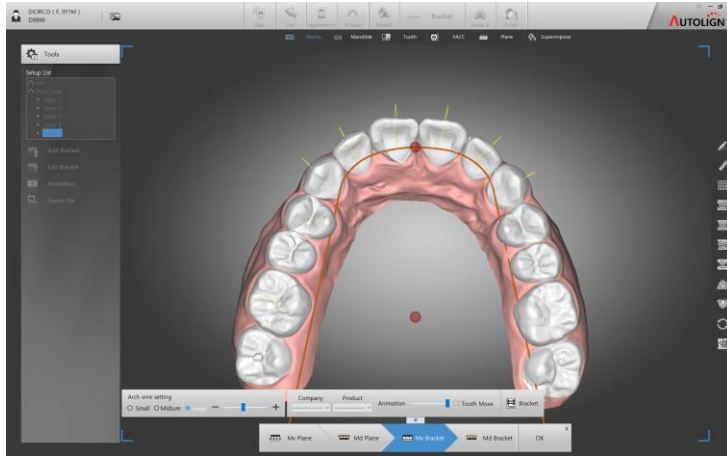
## 9.3 Lingual

### 9.3.1 Add Bracket

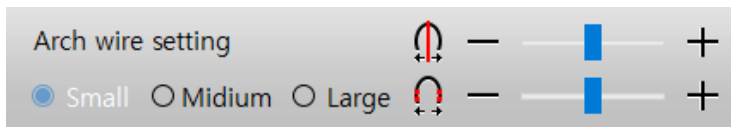
- 1) Select a layer on Setup List. Click [  Add Bracket] button on Tools then click  button.
- 2) Click [Mx Plane] button to adjust Bracket placement plane.



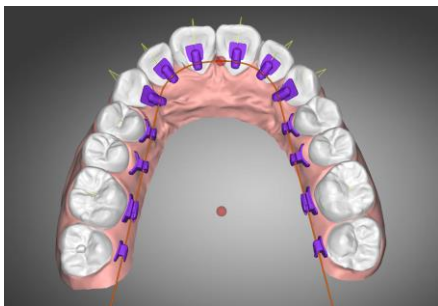
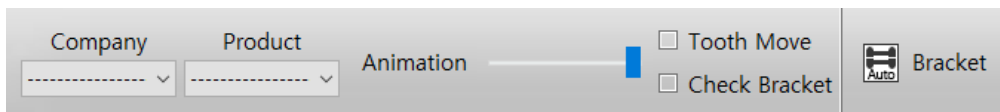
- 3) Click [Md Plane] button to adjust Bracket placement plane.
- 4) Click [Mx, Md Bracket] button to proceed.



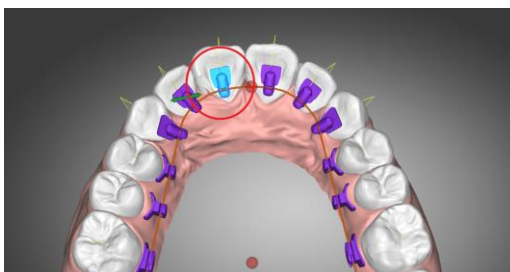
- 5) Adjust wire size on [Arch wire setting] and control 2 red spheres to place the arch wire.



- 6) Select desired Bracket from the Bracket Library Window to automatically place your brackets on your model.

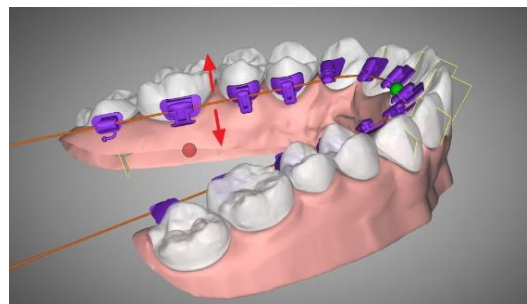


- 7) You may click a bracket to adjust their location.

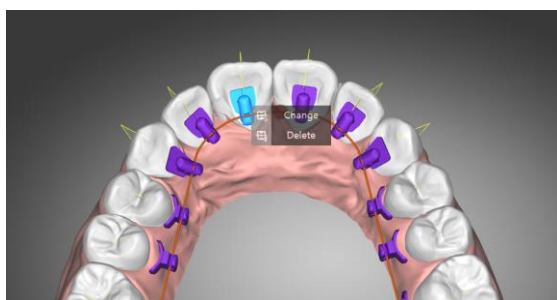




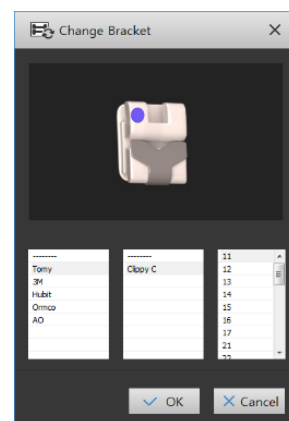
Use Shortcut [Hold Ctrl + Arrow Up/Down] to adjust the plane(wire) height.



8) Select a Bracket then right-click to change your brackets.

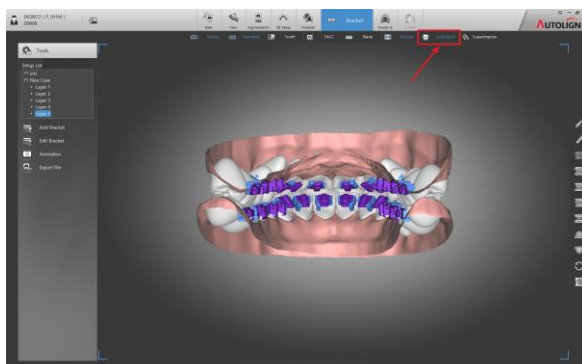


- Change: Add or edit brackets. Select a Bracket from Bracket Library window to place your bracket.
- Delete: Deletes selected Bracket.




9) Click [Ok] button to save your progress.

10) 상단 Show/Hide Tool에서 Click [Guide Block] from Upper Show / Hide Tool to display Guide Blocks based on attached brackets.



## 9.3.2 Edit Bracket

: Edit attached Bracket location.

- 1) Click [  Edit Bracket] button to enter Edit mode.



Methods are same as 9.3.1 Add Bracket.

## 9.3.3 Animation

: Animates Pre / Post Setup bracket movements.



You can check for Pre / Post Setup bracket interference via Animation.

## 9.3.4 Export File

: Export model file (\*.stl) with Bracket Guide Blocks.

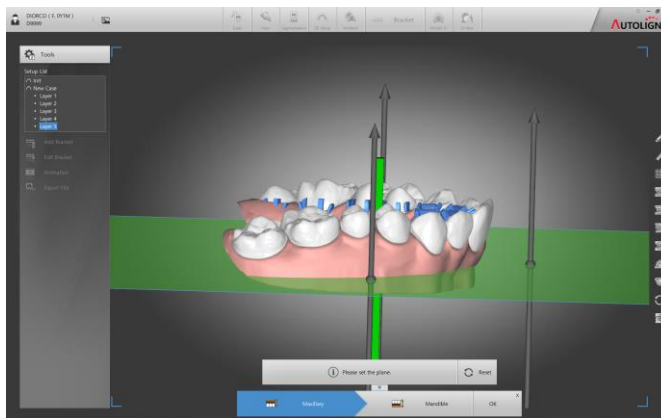
- Export

- 1) Select your file directory then click [OK] to save.

- Base Cutting

: Control the plane to adjust your model base.

- 1) Control 4 Bars to adjust the height of model then click [OK].



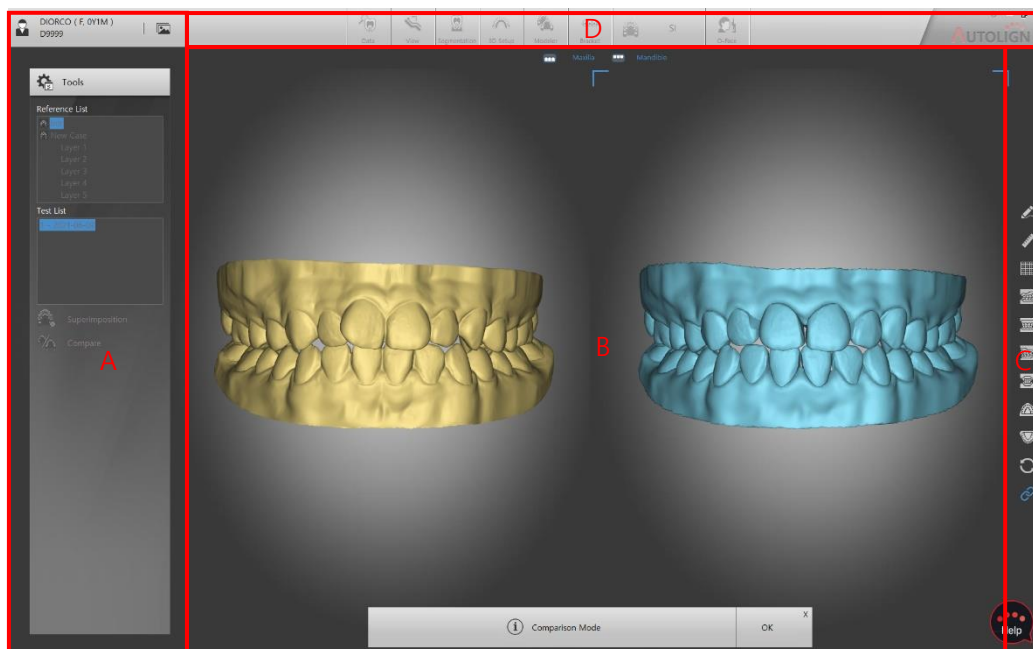
- 2) Select your file directory then click [OK] to save.



## 10. SI (Superimposition)

: Superimpose different 3D models.

### 10.1 Screen Layout



A: Tools – Displays primary function buttons.

B: View – Displays images.

C: Common Tool Bar - Displays supplemental function buttons. (Reference: Chapter 3.2.1).

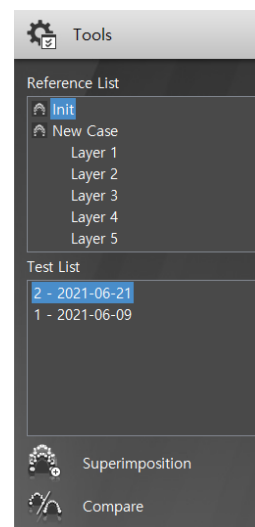
D: Show/Hide Tool Bar – Function to Show/Hide elements

### 10.2 Load Model

- 1) Select the Reference Model and the Test Model to superimpose.

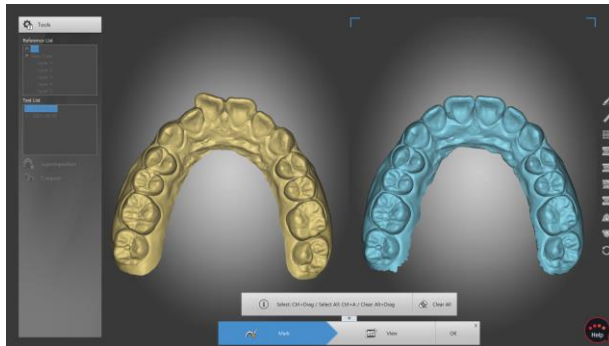


Currently selected Study Model will be the reference model.

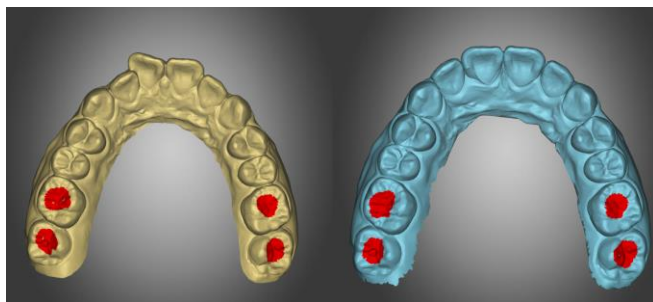


## 10.3 Superimposition

- 1) [Tools]의 [  Superimposition ] button from [Tools].

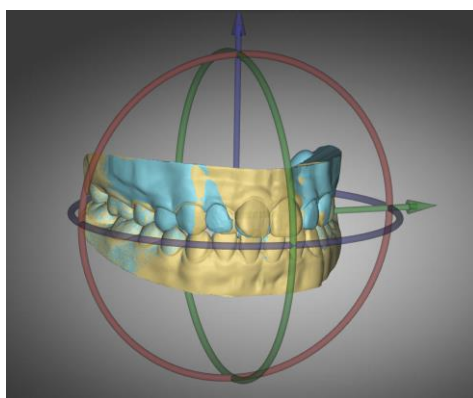


- 2) Use [Ctrl+Drag] to color the overlapping reference area on the Reference and Test models.
  - Select: Ctrl+Drag / Select All: Ctrl+A / Clear Alt+Drag

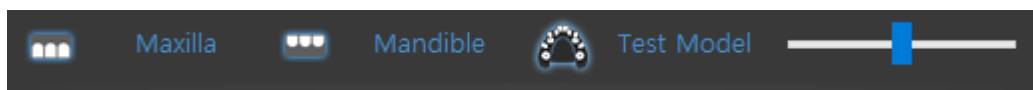


Set your reference areas without any movements for the best result of superimposition.

- 3) Click [View] button to superimpose the Reference Model and the Test Model and you can manually fine-tune them by using the gyro-bars.



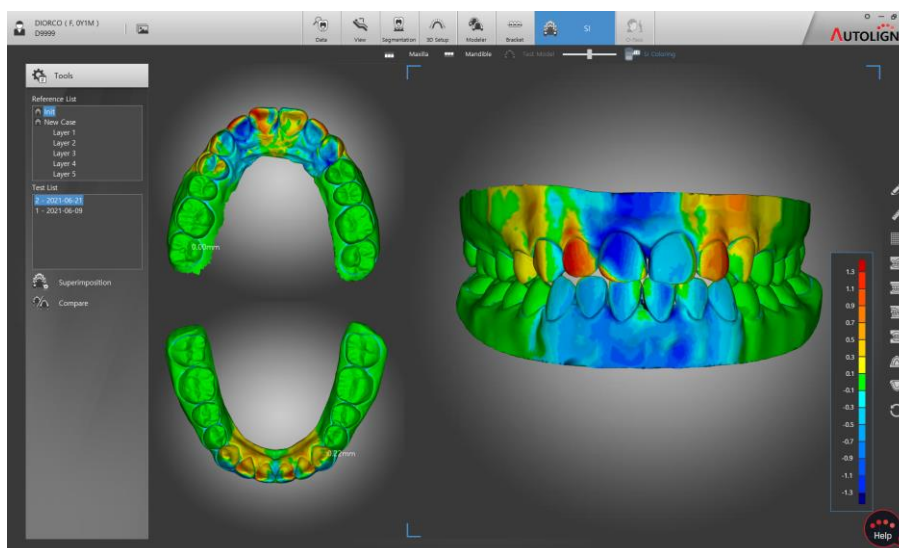
- Adjust to show/hide the arch and opacity with upper menu.



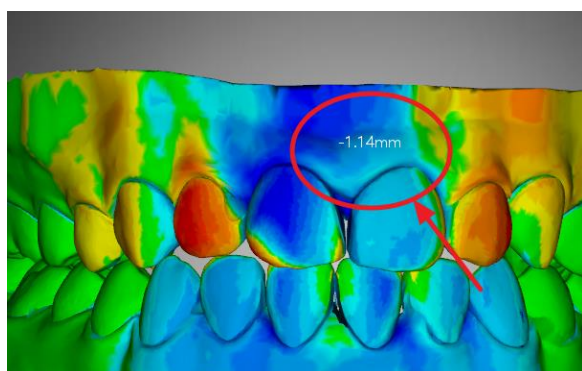
	Maxilla	Show/Hide the Maxilla.
	Mandible	Show/Hide the Mandible.
	Test Model	Adjust the opacity of the Test Model.

- Click [OK] button to display overlapped model.

- Click [ SI Coloring] button at the upper menu to display the color map of the differences.




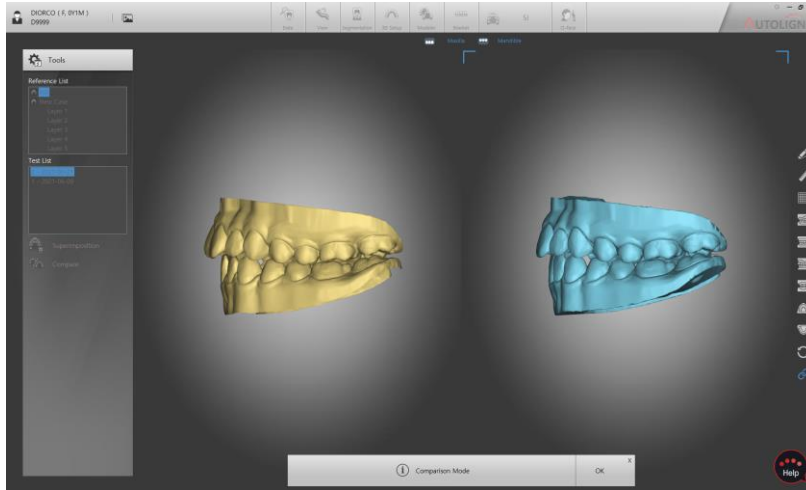
Color map is displayed accordingly to the color table on the right. Hover over the area to check differences between the Reference and Test Models.




## 10.4 Compare

: Reference model and Test model can be compared and checked on 2-screen mode.

- 1) Click [  Compare ] button from [Tools] to display the Reference Model and the Test Model on 2 screen mode.



- 2) Click [  View Link ] button to turn On/Off from the right menu to move & rotate them simultaneously or individually.

## **Chapter 5. Precautions**

### **11. Precautions for Use**

**11.1 Only trained or educated personnel should use this program.**

**11.2 Please note the following before using this program.**

11.2.1 Check if your storage device has enough disk capacity.

11.2.2 Check if the power is on for the client/server PC.

11.2.3 Check if the certification key is put in properly. (The server PC must be operated first).

**11.3 Please note the following while using this program.**

11.3.1 While handling a patient's medical images, do not save or delete them arbitrarily.

11.3.2 Do not use the functions which you do not know precisely how to use.

11.3.3 While using the program, do not turn off the power or forcibly shut down the program.

**11.4 Please not the following after using this program.**

11.4.1 Close all medical images that have been used.

11.4.2 Log off the program after every use.



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