Splints

Version 1.0 (July 2022)

Medit Splints

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Getting Started

Medit Splints Overview

Welcome to Medit Splints, a quick and easy way to create splints in just a few short steps.

Speed up your workflow by using the **Auto Creation** which harnesses AI power for fast splint creation. Then if required, you can use the suite of editing tools to make any fine adjustments.

There is also **Manual Creation** mode which will guide you step by step through the creation process.

Medit Splints can be run from both Clinic and Lab Accounts in Medit Link.

Intended Use and Disclaimer

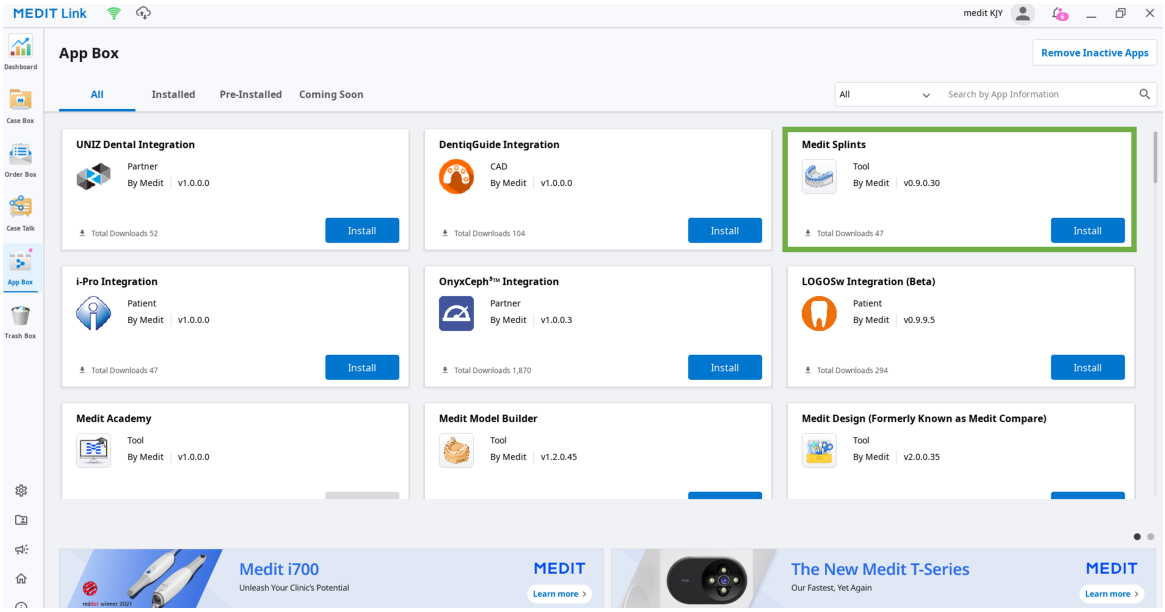
Medit Splints is a software application designed solely for the purpose of creating splints using scan data and cannot be used for other purposes.

System Requirements

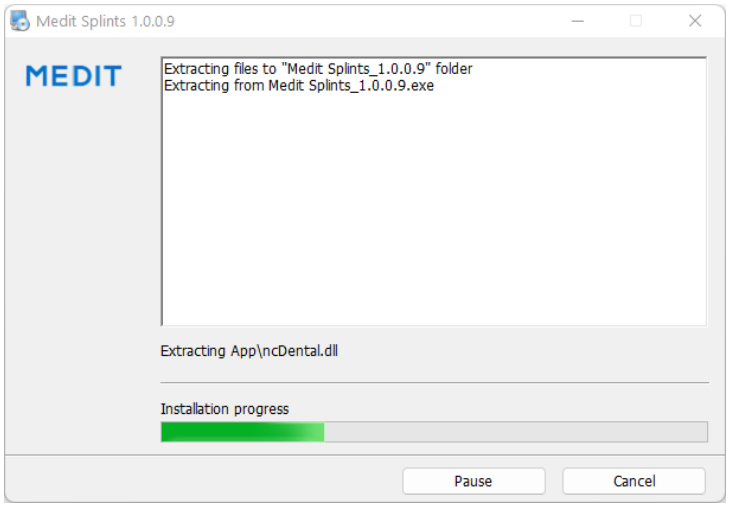
CPU	Intel Core i5 2.6 GHz or higher
RAM	16 GB or higher
Graphics	NVIDIA GeForce GTX 1060 (2 GB) or higher
OS	Windows 10 64-bit, Windows 11 64-bit

Installation Guide

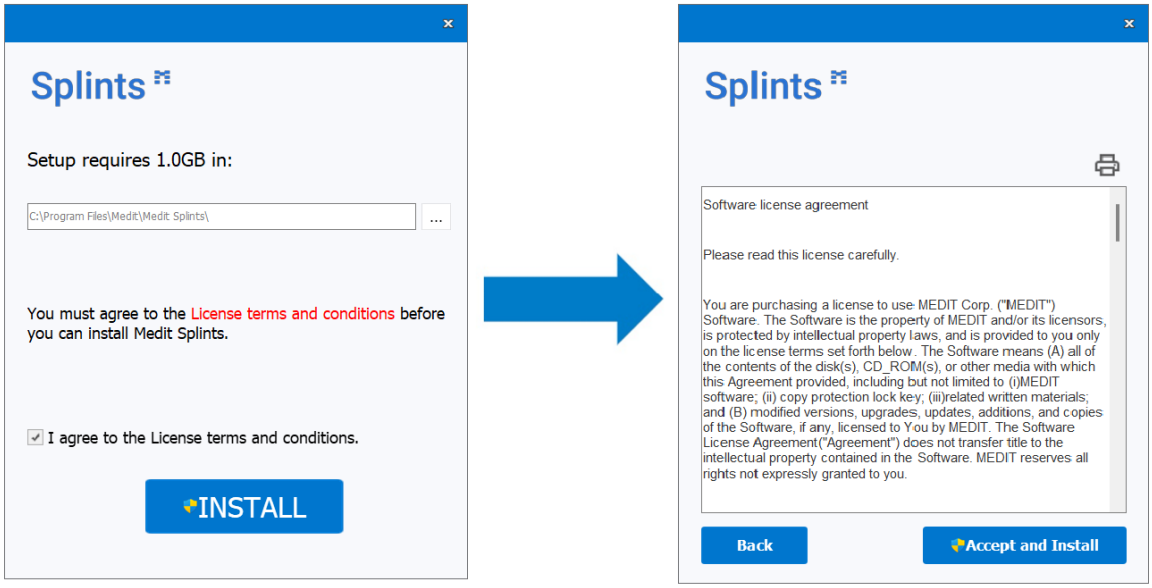
1. Log in to your Medit Link Account and go to the App Box.
2. Find the Medit Splints app and click “Install.”



3. When the download is complete, the Medit Splints installer will run automatically from your PC.



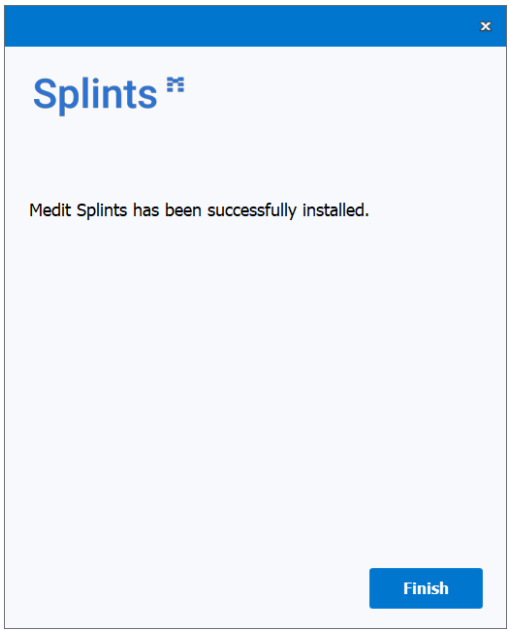
4. Read and agree to the License Terms and Conditions to continue.



5. It may take several minutes to complete the installation process.

> ⚠ Do not turn off the PC until the installation is complete.

6. Click “Finish” to complete the installation.



7. Restart Medit Link.

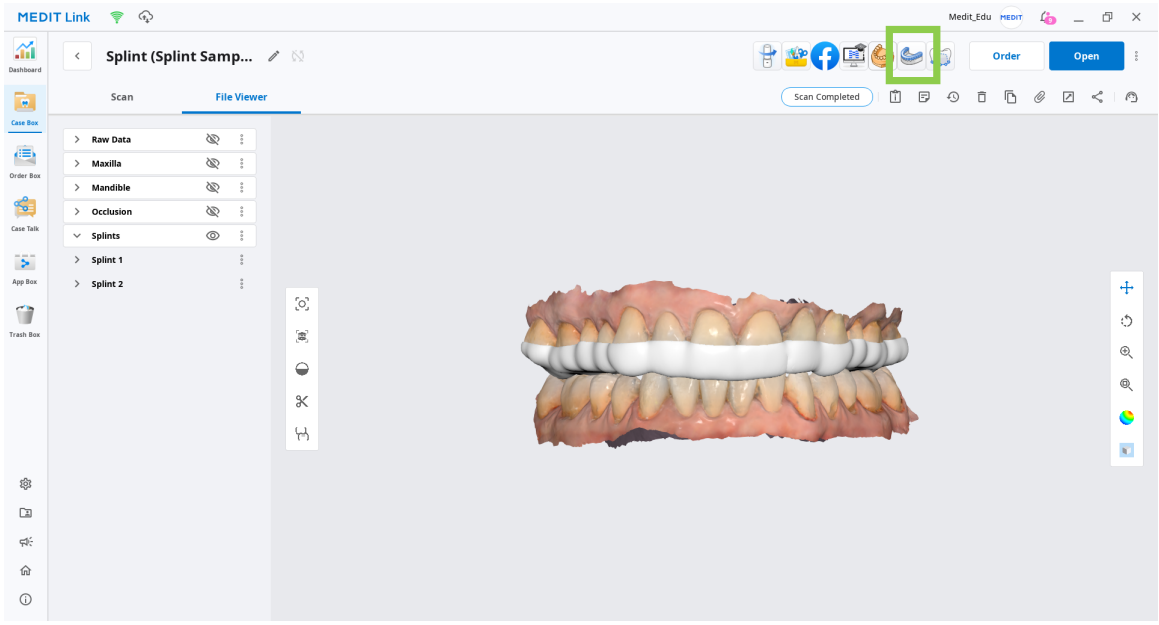
Running Medit Splints from Medit Link

Follow these steps to run Medit Splints from Medit Link.

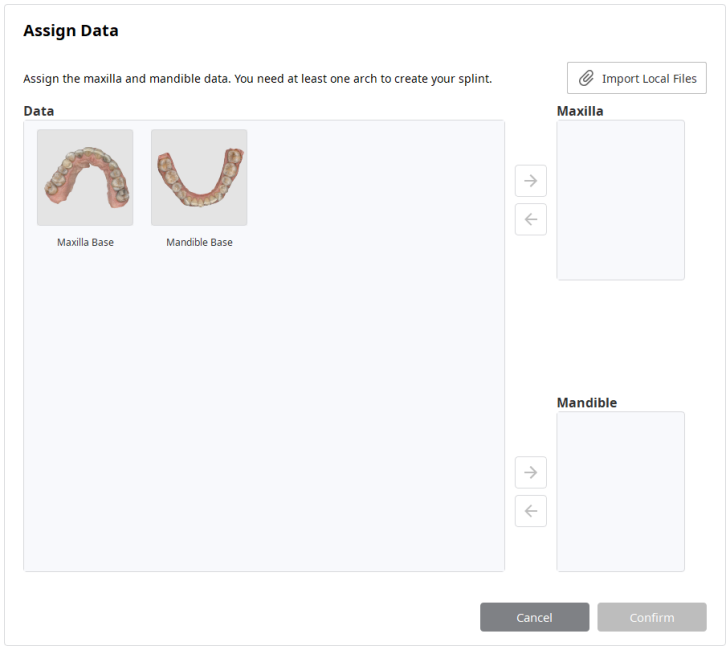
1. Go to Case Box (Clinic Account) or Work Box (Lab Account) and select the case you would like to open in Medit Splints.

> Check the scan data. Make sure it is clean and includes some gingiva data.

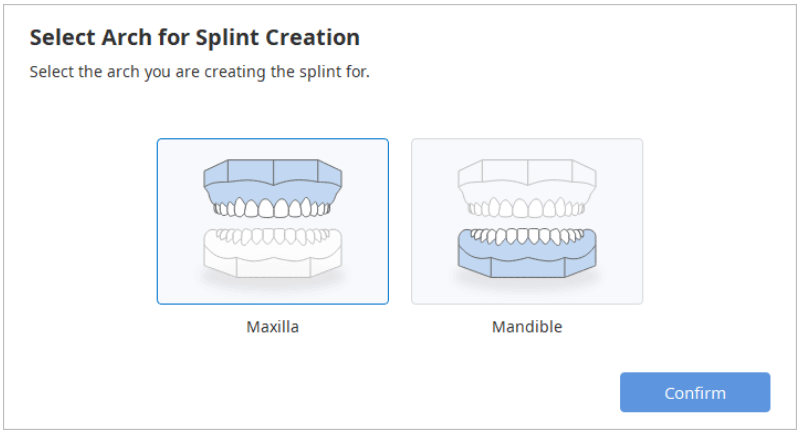
2. Click the “Medit Splints” icon in the top right corner of the Case Detail window in Medit Link. The icon will automatically appear once you have installed the app and restarted Medit Link.



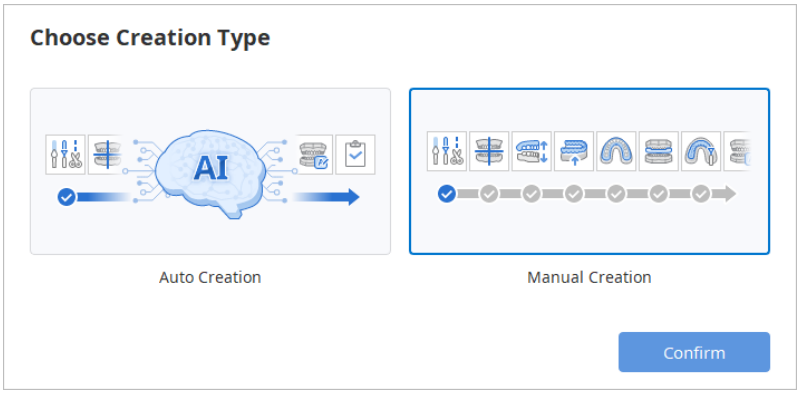
3. Assign the data once the app has opened.



4. Select the arch you are creating the splint for.



5. Choose how you are going to create the splint - automatically or manually.



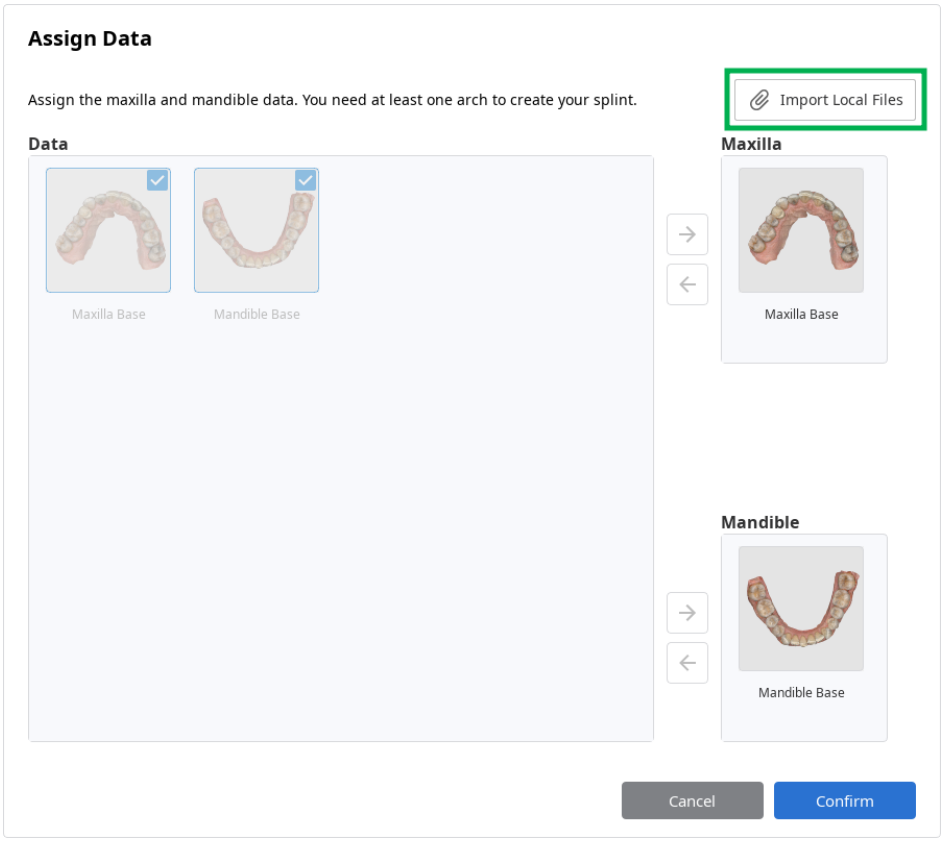
Both options are covered in step by step detail in the “**Splint Creation Type**” chapter.

Data Management

Acquiring 3D Data

There are three ways to acquire 3D data to use in Medit Splints:

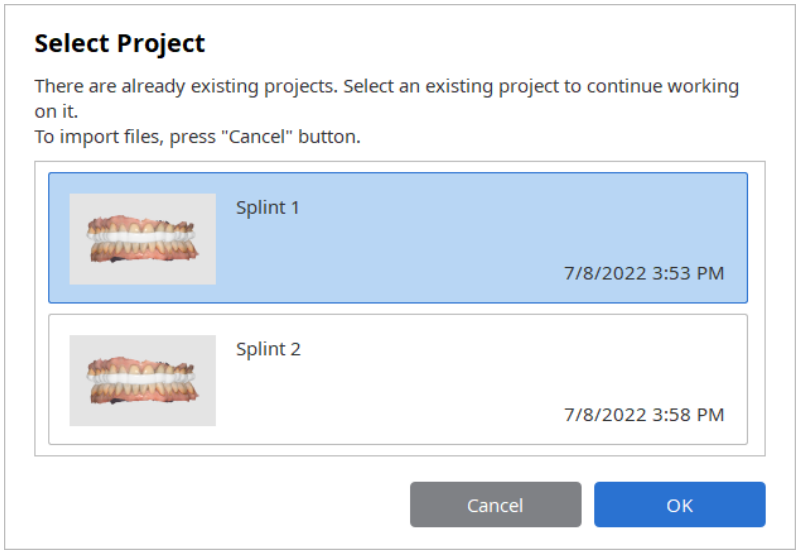
1. Acquire scan data in Medit Scan for Clinics or Labs
   Create a new case and complete the necessary scans in Medit Scan for Clinics or Labs. Scan data will automatically be saved in the patient’s case in Medit Link.
2. Import local files through Medit Link
   Before running the app, you can import data from local files and attach it to a Medit Link case in the Case Detail window.
3. Import local files through Medit Splints
   After running the app, you can import 3D data from local files by clicking “Import Local Files” in the Assign Data dialog window.



Supported file formats for imported data are meditMesh, OBJ, PLY, and STL.

To create a splint, use a single arch data or both maxilla and mandible data.

You can continue working on an existing project if you run Medit Splints from the same case again.



3D Data Control

3D Data Control Using a Mouse:

Button	Action	Use	Image
Left	Click	Select or delete the entities in the view screen when using the polyline selection or polyline trimming tool.	
Left	Drag	Select or delete entities in the view screen when using the brush selection or brush trimming tools.	
Wheel	Drag	Move the data in the view screen.	
Wheel	Scroll	Zoom in and out the data in the view screen.	

Right	Click	Complete the selection or deletion of data in the view screen using the polyline selection or polyline trimming tool.	
Right	Drag	Rotate data in the view screen	

3D Data Control Using Mouse and Keyboard Buttons:

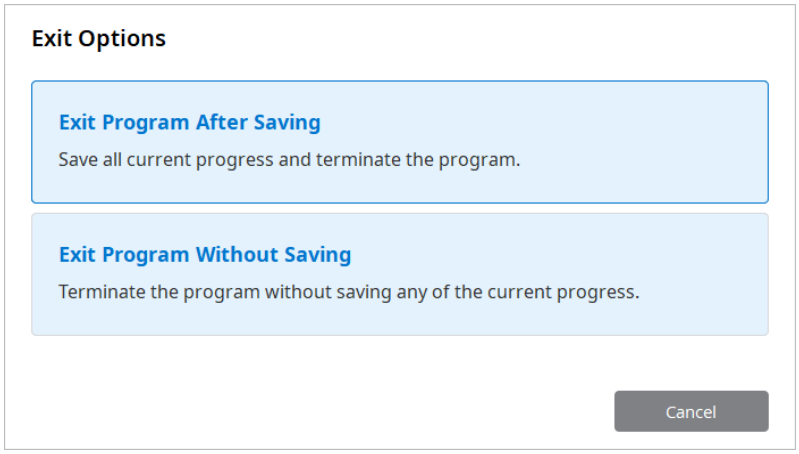
Button	Action	Use	Image
Shift	Left-click and drag	Zoom in and out	
Shift	Up and down keys	Zoom in and out	
Alt	Left-click and drag	Rotate	
Alt	Up, down, left and right keys	Rotate	
Ctrl	Left-click and drag	Move	
Ctrl	Up, down, left, and right keys	Move	

Saving 3D Data

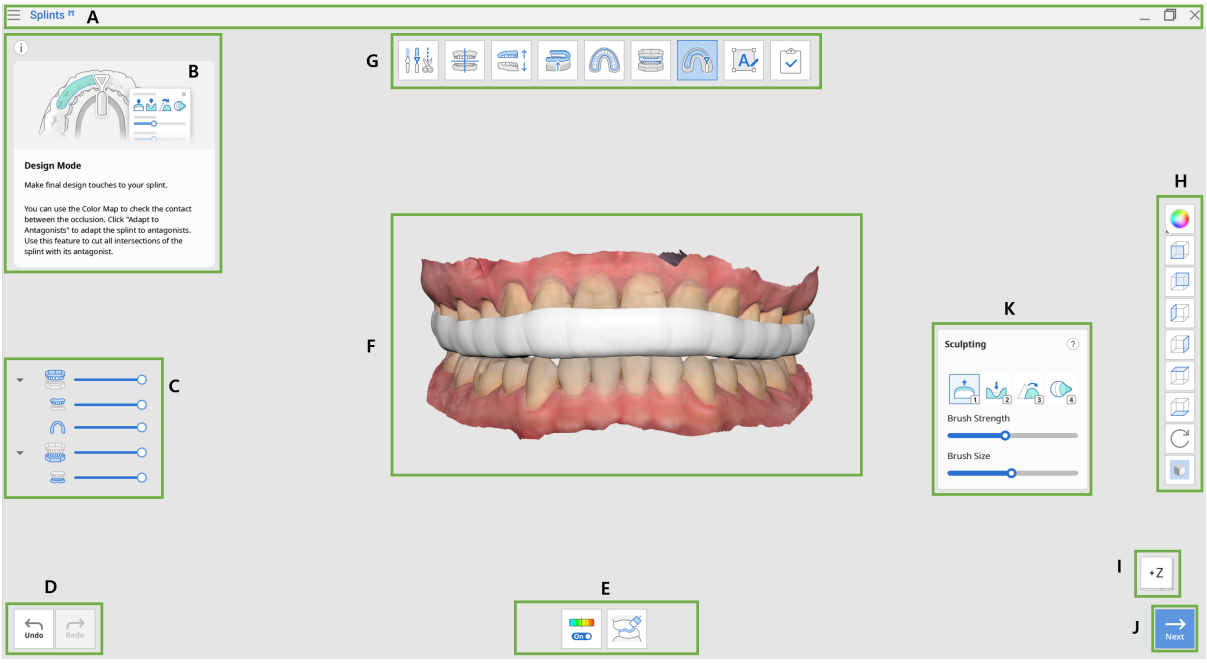
There are three ways to save the completed project:

1. Click “Complete” to finish the project and save it to the Medit Link case.
2. Click “Next” in Label Mode to finish the project and save it to the Medit Link case.
3. Click “Menu” in the Title Bar and select Save As.

You will still have save options if you close the program by clicking “Exit.”



User Interface



A. Title Bar
B. Guide Message
C. Data Tree
D. Undo / Redo
E. Toolbox
F. 3D Data View
G. Modes
H. Side Toolbar
I. View Cube
J. Next
K. Sculpting Tools (* in Design Mode)

Title Bar

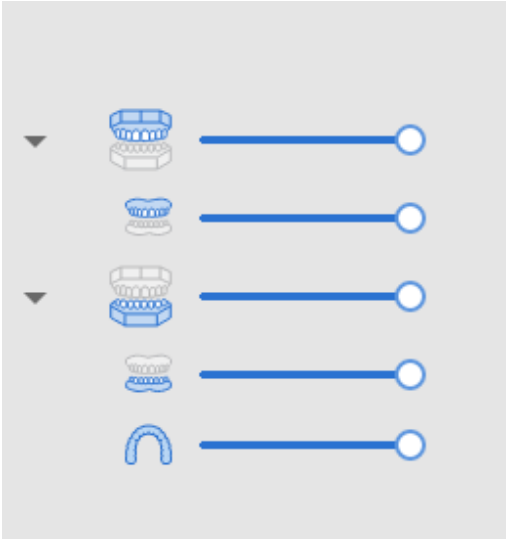
The Title Bar includes the following elements:

Menu	Check the details of the application, use provided assistance resources, and adjust settings.
Help Center	Go to the Medit Help Center page.
Select Video Record Area	Select the area to be recorded for the video capture.
Start Video Recording	Start the video capture.
Screenshot	Capture the screen. You can select the area automatically or manually. The automatic select area captures either the program area or the main 3D area.
Screen Capture Image Manager	Manage screen capture images.
Minimize	Minimize the application window.
Maximize or Restore	Maximize or restore the application window.
Exit	Close the application.

Data Tree

The Data Tree appears on the left side of the window and shows the list of data you are using in groups.

Easily control data by hiding, showing, or changing its transparency one by one or as a group.



Side Toolbar

The Side Toolbar provides two sets of tools for controlling the 3D data display.

Data Display Modes

Icon	Tool	Description
	Textured	See the data with color information.
	Textured with Edges	See the data with color information and edges.
	Monochrome	See the data in a single color.
	Monochrome with Edges	See the data in a single color with edges.
	Wireframe	See the data as edges only.

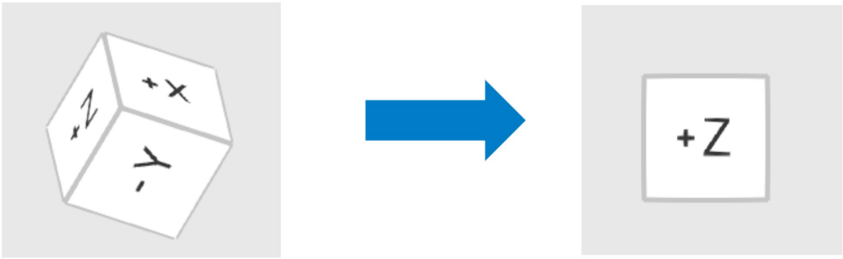
3D Data View Options

Icon	Tool	Description

	+Z Axis View	See the front view.
	-Z Axis View	See the back view.
	-X Axis View	See the left view.
	+X Axis View	See the right view.
	+Y Axis View	See the top view.
	-Y Axis View	See the bottom view.
	Rotate	Rotate data in any direction.
	Grid Settings	Set grid display options. It shows or hides the grid and controls its position in relation to the model. (overlay on/off)

View Cube

The View Cube displays the 3D view orientation, updated in real-time as the view is being rotated. You can align the view to specific directions by clicking on the face of the cube.



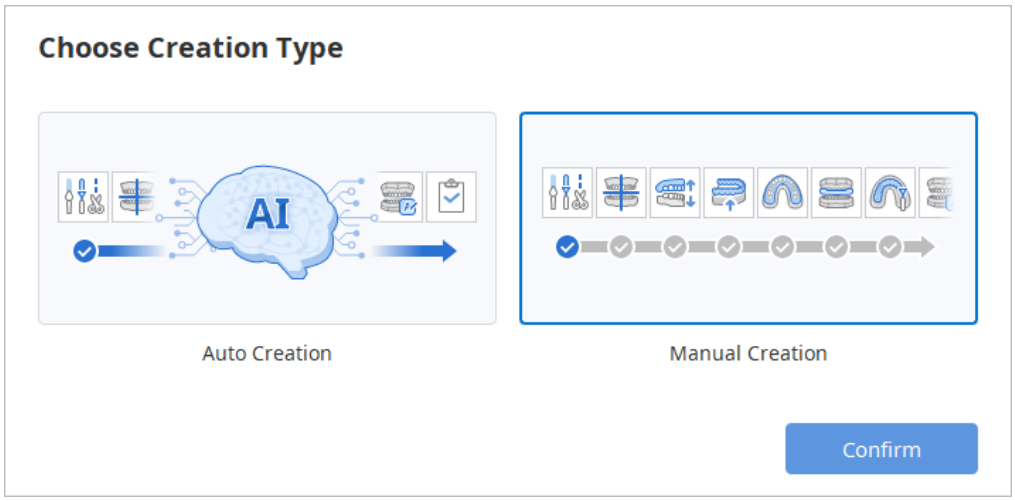
Action Control

There are three buttons that provide action control within each mode. They can be found in bottom corners of the window.

Icon	Tool	Description
	Undo	Undo the previous action.
	Redo	Redo the previous action.
	Next	Apply changes and move to the next mode.

Splint Creation Types

Splints can be created automatically using AI or manually. Choose between the Auto Creation and Manual Creation after assigning the data and selecting an arch for splint creation. Your workflow will be different depending on your choice.



Auto Creation

Auto Creation is an AI-powered automatic splint creation. The app will use your previously set parameters to create the splint.

If you choose Auto Creation when first time running the app, default parameters will be used.

Default Parameters

Mode	Parameter	Default Value
Occlusal Adjustment Mode	Distance to Antagonist	1.50 mm
Inner Surface Creation Mode	Inner Surface Offset Smooth Surface Angle	0.10 mm 4/5 0.1°
Outline Designation Mode	Buccal Side Lingual Side	half the height half the height
Outer Surface Creation Mode	Lingual & Buccal Thickness Smooth Surface	1.50 mm 5/5

The workflow for the Auto Creation is as follows:

Overview Mode → Design Mode → Labeling Mode

Design Mode and Labeling Mode are not mandatory.
If you like the auto-created splint, skip these steps and save your project file.

There is detailed information about each mode in the Modes section.

Manual Creation

Manual Creation is a step-by-step splint creation process that allows you more flexibility if you want to make fine adjustments to the splint.

The workflow for the Manual Creation is as follows:

Overview Mode

↓

Edit Mode

↓

Alignment Mode*

↓

Occlusal Adjustment Mode*

↓

Inner Surface Creation Mode*

↓

Outline Designation Mode*

↓

Outer Surface Creation Mode*

↓

Design Mode

↓

Labeling Mode

Modes marked with a star (*) automatically analyze the characteristics of anterior and posterior teeth. The analysis will be used to automatically suggest results in the current step once you enter it. Review the automatic suggestion, make adjustments if needed, and click “Next”.

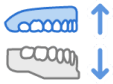
Edit Mode, Design Mode and Labeling Mode are not mandatory and can be skipped.

There is detailed information about each mode in the Modes section.

Modes

The modes indicate the current stage of the splint creation process and are completed in a specific sequence. If the occlusion was scanned in an opened state or there is only one existing arch, you can skip the “Occlusal Adjustment Mode.” After finishing in “Design Mode,” you can go straight to the “Complete” stage and save your results to Medit Link.

Modes

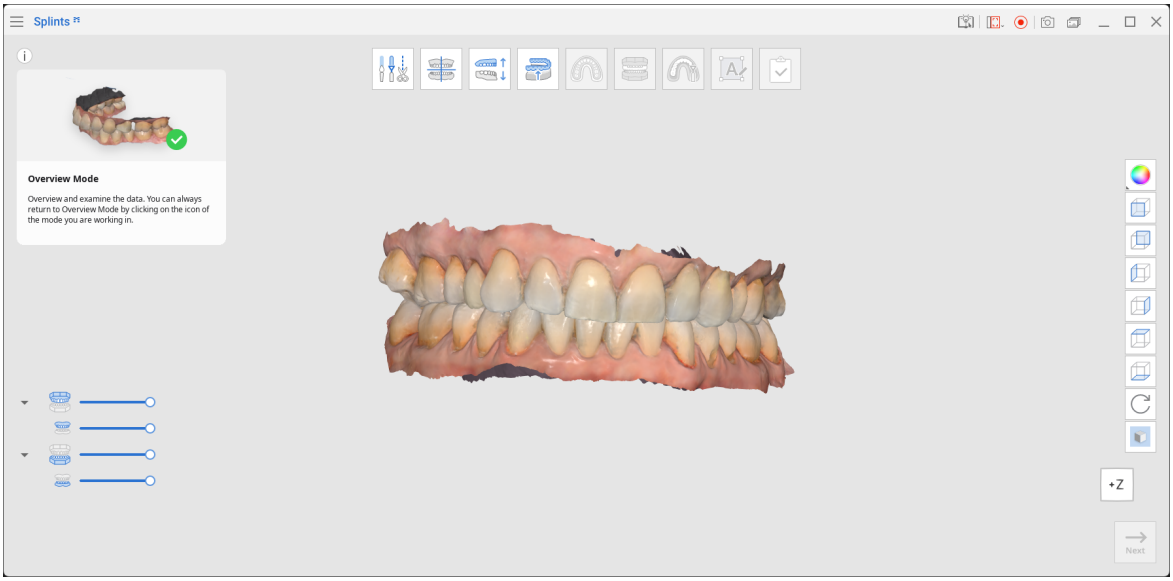
Icon	Mode	Description
	Overview Mode	Overview and examine the data.
	Edit Mode	Edit and trim data using the wide array of functions provided.
	Alignment Mode	Align the data to the occlusal plane.
	Occlusal Adjustment Mode	Adjust the occlusal relationship.
	Inner Surface Creation Mode	Create the splint’s inner surface.

	Outline Designation Mode	Designate the splint area.
	Outer Surface Creation Mode	Create the splint’s outer surface.
	Design Mode	Design the splint using the tools provided.
	Labeling Mode	Label the splint by engraving or embossing the text.
	Complete	Finish creating the splint and save the results to Medit Link.

Overview Mode

Overview Mode is the landing page of Medit Splints, where the imported data is first displayed.

Examine your data and if it needs editing click the “Edit Mode” icon at the top of the screen.



If no editing is required, you can skip the “Edit Mode” and continue to “Alignment Mode.”

Edit Mode

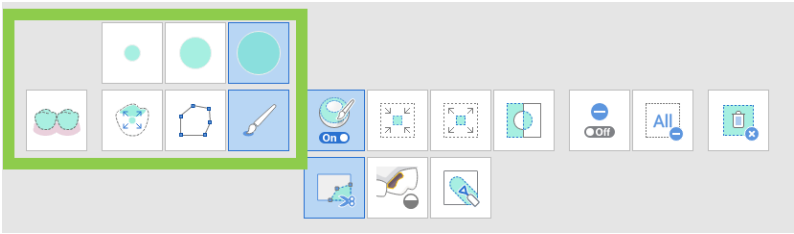
Edit Mode can be used to modify your data before creating the splint.

The toolbox in Edit Mode includes:

Icon	Tool	Description
	Trimming Tool	Use various selection tools to remove unnecessary data.
	Fill Holes	Fill empty spaces in the 3D mesh data.
	Sculpting	Sculpt data by adding, removing, smoothing, or morphing.

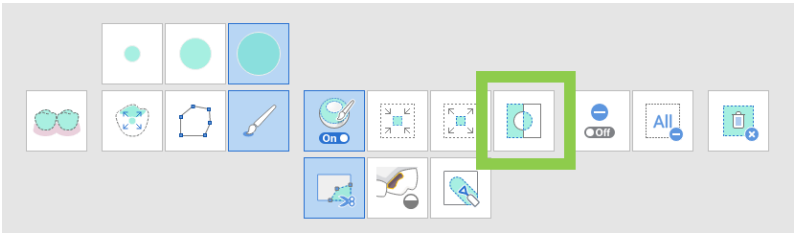
How to Trim Data

Use Smart Selection Tools for the program to automatically select the teeth data or choose between Polyline and Brush Selection to manually designate the trimming area.

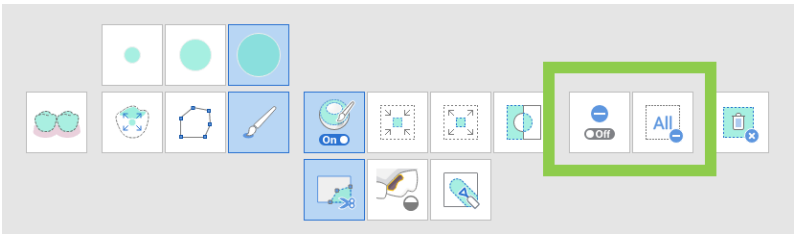


To delete the selected area click “Delete Selected Area.”

You can revert the selection by clicking “Invert Selected Area.”



You can revert the selection tools’ function to deselection by clicking “Deselection Mode”. Or use “Clear All Selection” to remove any selection.



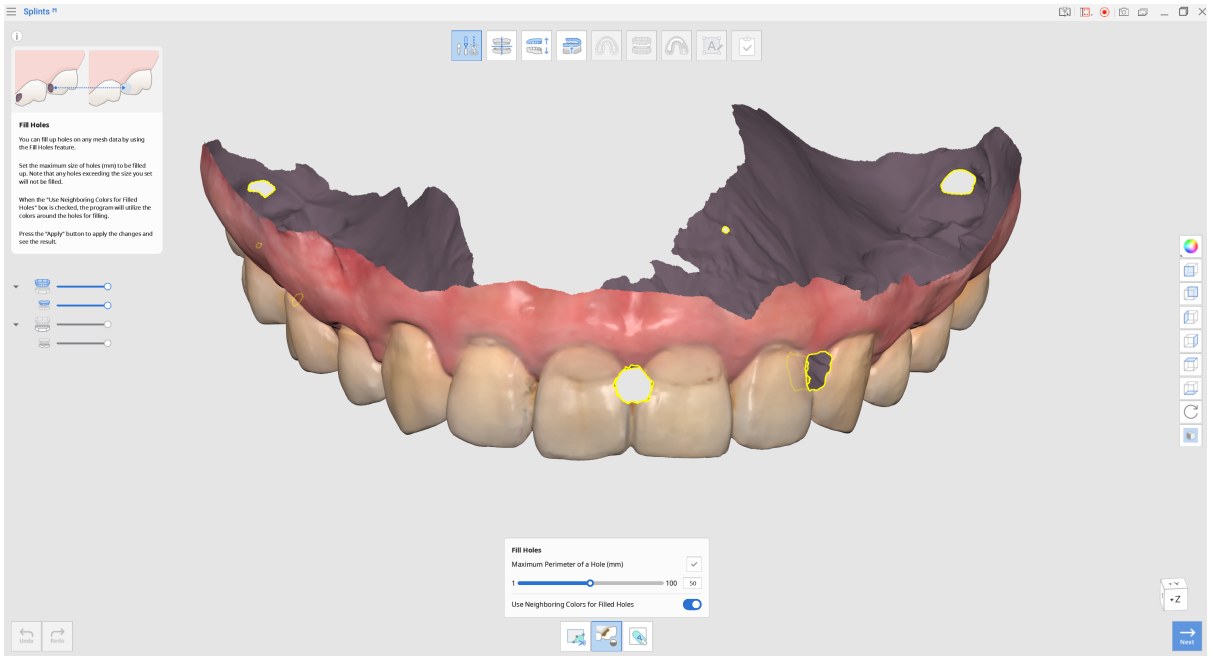
Toolbox: Trimming Tool

Icon	Tool	Description
	Smart Teeth Selection	Automatically select all teeth of the arch, leaving out gingiva parts.
	Smart Single Tooth Selection	Automatically select the area of a single tooth, leaving our gingiva parts. Click, press and drag the mouse on the tooth.
	Polyline Selection	Select all entities within a polyline shape drawn on the screen.
	Brush Selection	Select all entities on a freehand drawn path on the screen. The brush comes in three sizes.
	Autofill Selected Area	Automatically fill in entities of the selected area.
	Shrink Selected Area	Reduce the selected area each time you press the button.
	Expand Selected Area	Expand the selected area each time you press the button.

	Invert Selected Area	Invert the selection.
	Deselection Mode	When on, this function deselects the area using various tools.
	Clear All Selection	Clear all selected areas.
	Delete Selected Area	Delete the data from the selected area.

How to Fill Holes in the Data

Use “Fill Holes” to fill in any holes left from scanning or fill in deleted areas.



1. Maximum Perimeter of a Hole (mm)

   Set the maximum size of holes (mm) to be filled up.

   Note that any holes exceeding the size you set will not be filled.

2. Use Neighboring Colors for Filled Holes

   When the “Use Neighboring Colors for Filled Holes” box is checked, the program will use the colors around the holes for filling, otherwise filled areas will be grey.

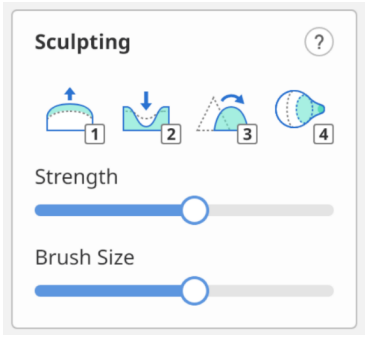
3. Press the “Apply” button to apply the results.

How to Sculpt Data

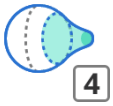
Selecting the “Sculpting” tool to make changes to the data.

The sculpting tools allow you to add, remove, smooth or morph parts of the data.

Toolbox: Sculpting



Icon	Tool	Description
	Add	Use the mouse to add on part of the data. Hotkey: 1
	Remove	Use the mouse to remove parts of the data. Hotkey: 2

	Smooth	Use the mouse to smooth parts of the data. Hotkey: 3
	Morph	Use the mouse to morph parts of the data. Hotkey: 4

Click “Next” when you are done editing.

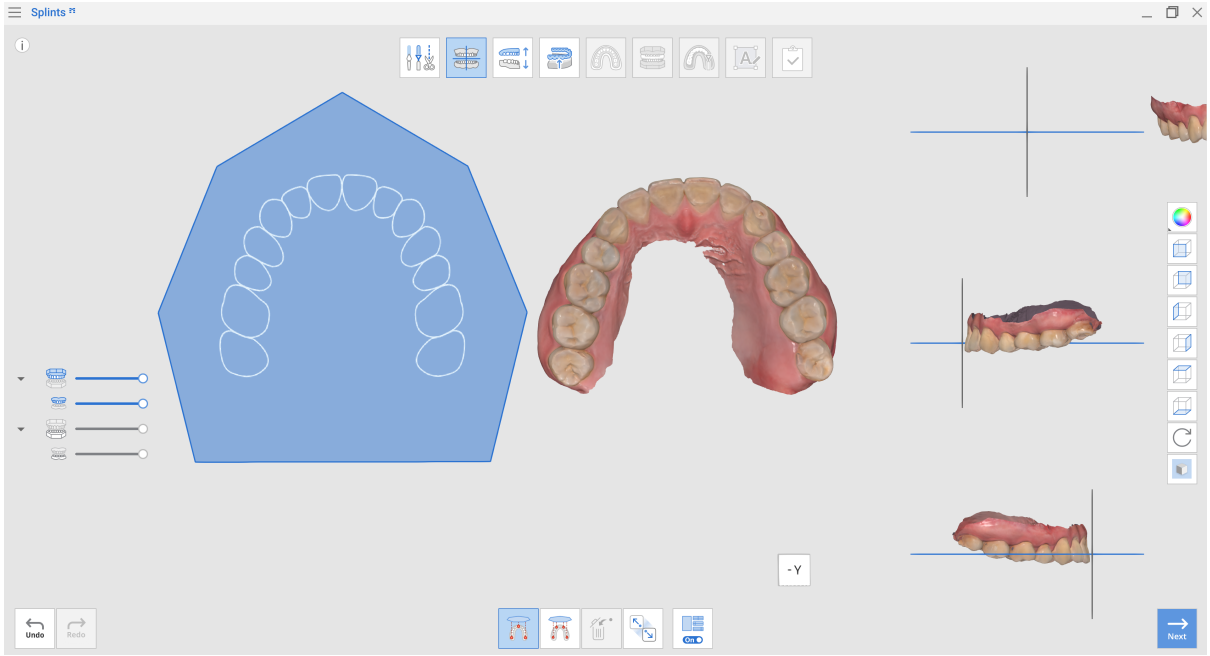
Alignment Mode

This stage will initially automatically align the data to the virtual occlusal plane.

Once complete you can make further manual adjustments if required.

If alignment has already been completed in Medit Scan for Clinics or Labs, you can skip this step.

> It is recommended that you always check alignment at this stage to ensure the proper positioning of the data.

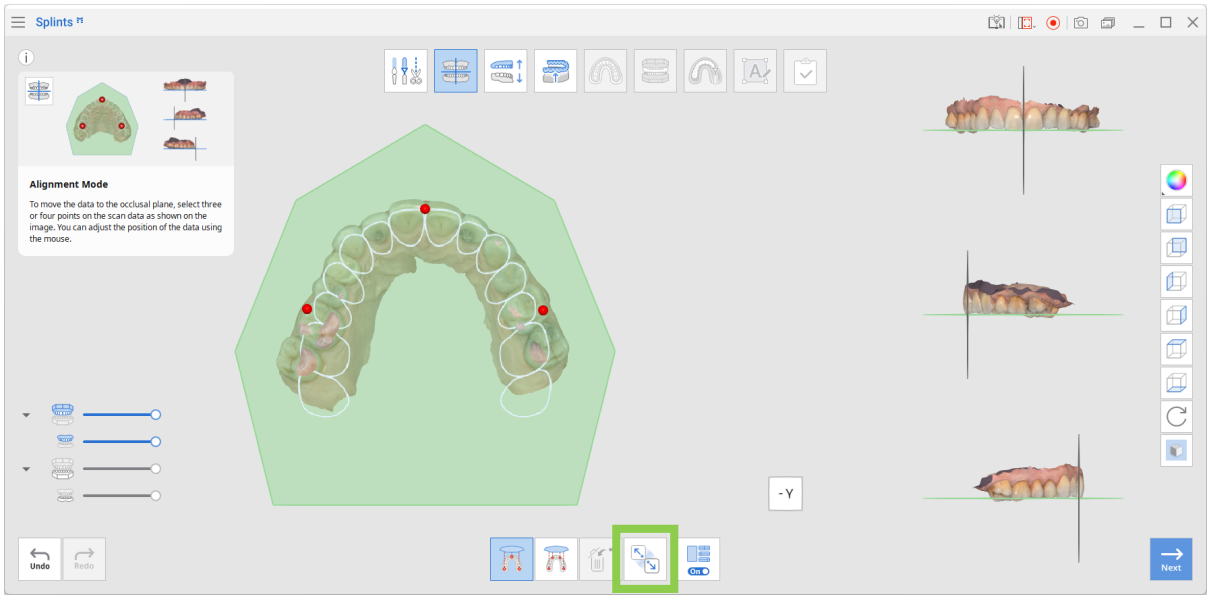


Toolbox

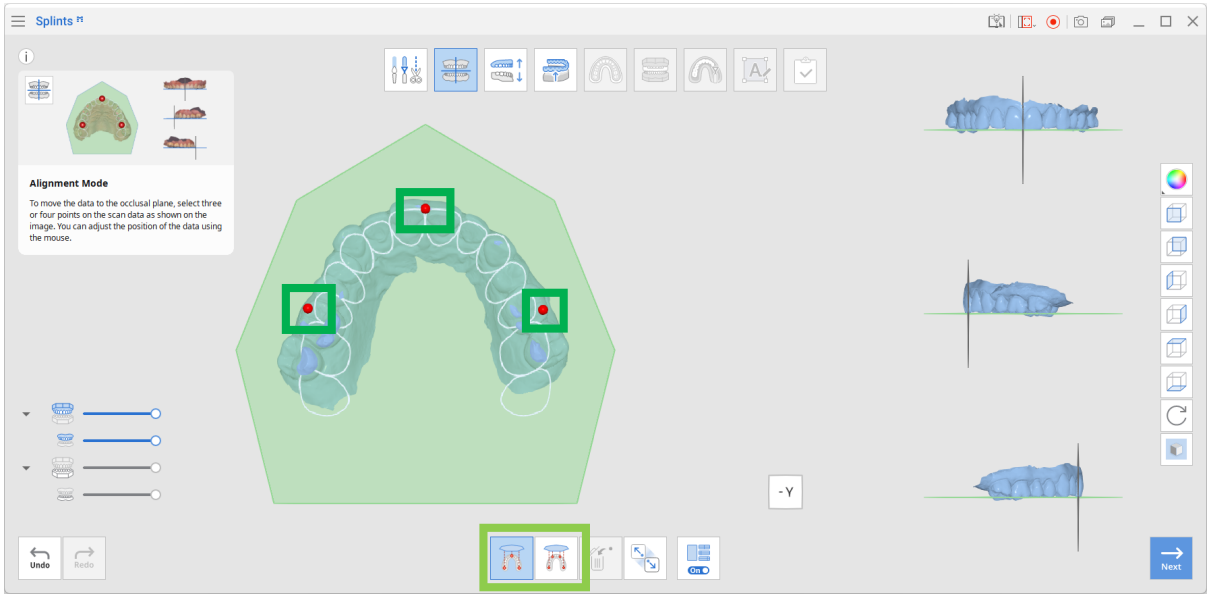
Icon	Tool	Description
	Align with Occlusal Plane by Three Points	Select three points on the maxilla and mandible to align with the occlusal plane.
	Align with Occlusal Plane by Four Points	Select four points on the maxilla or mandible to align with the occlusal plane. It is beneficial when there are no anterior teeth.
	Delete Marker Point	Remove the points selected for alignment.
	Detach Data	Separate the aligned data and move it to the original position.
	Multi-View	When on, this function shows data from four different angles.

To manually realign the data to the occlusal plane, follow these steps:

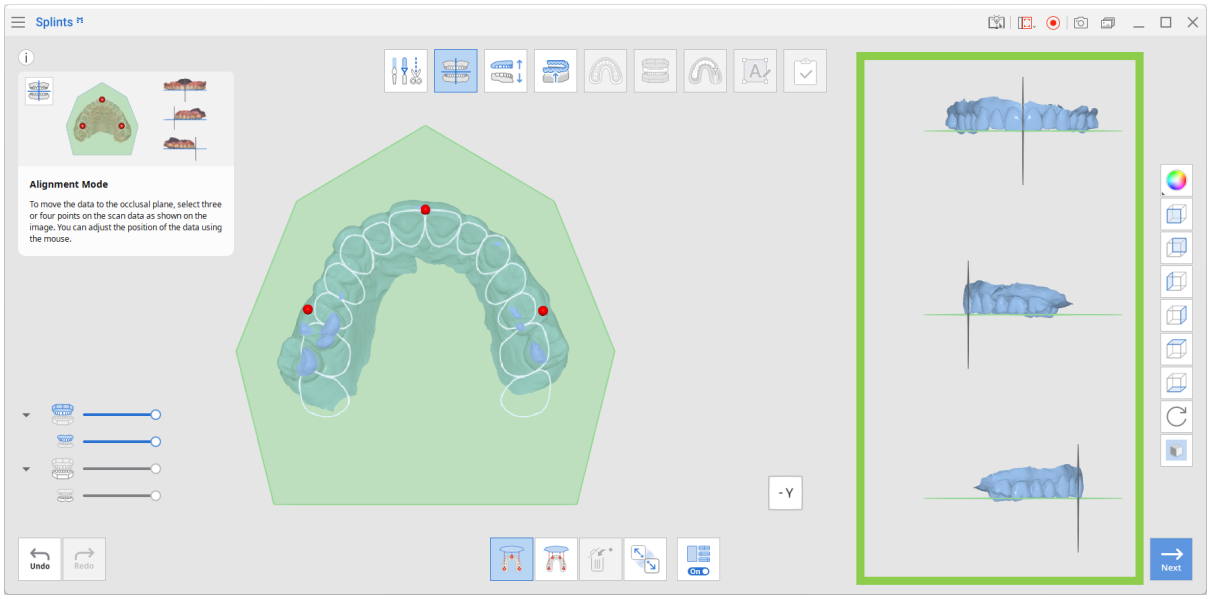
1. After the automatic alignment is complete, click “Detach Data”.



2. Then place three or four points on the data for the program to align the data to the occlusal plane.



3. Use the Multi-View on the right to move the data around and control the alignment process.



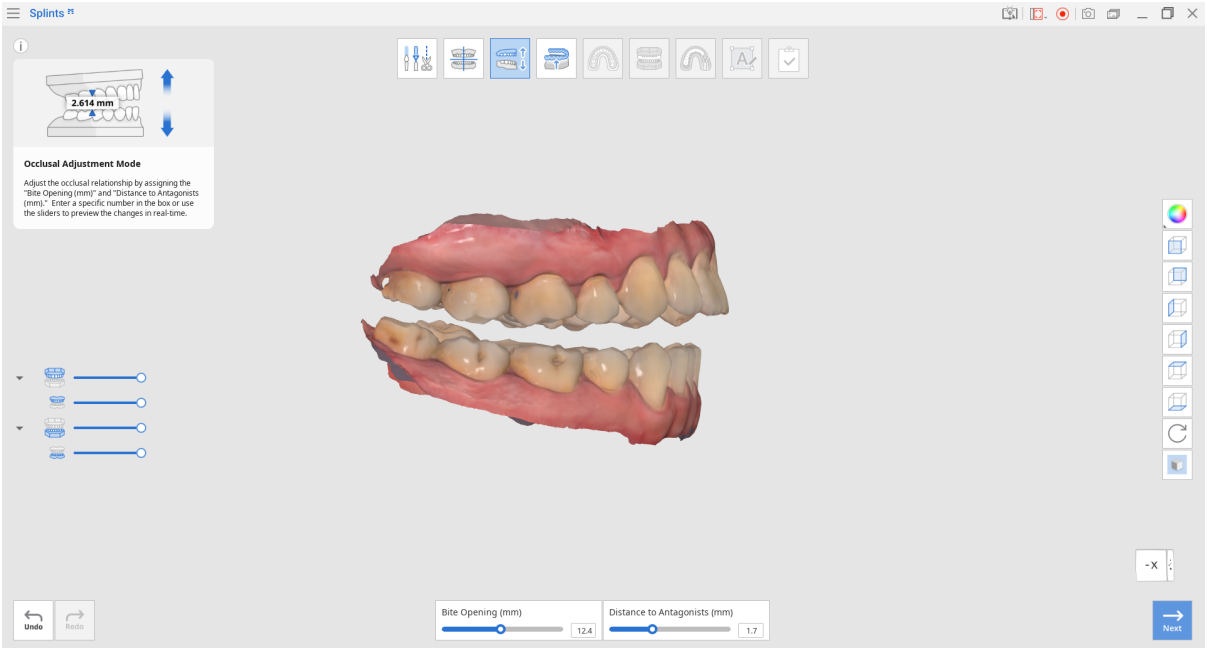
If you turn the Multi-View off, only the occlusal plane will be displayed.

4. Click “Next” when finished.

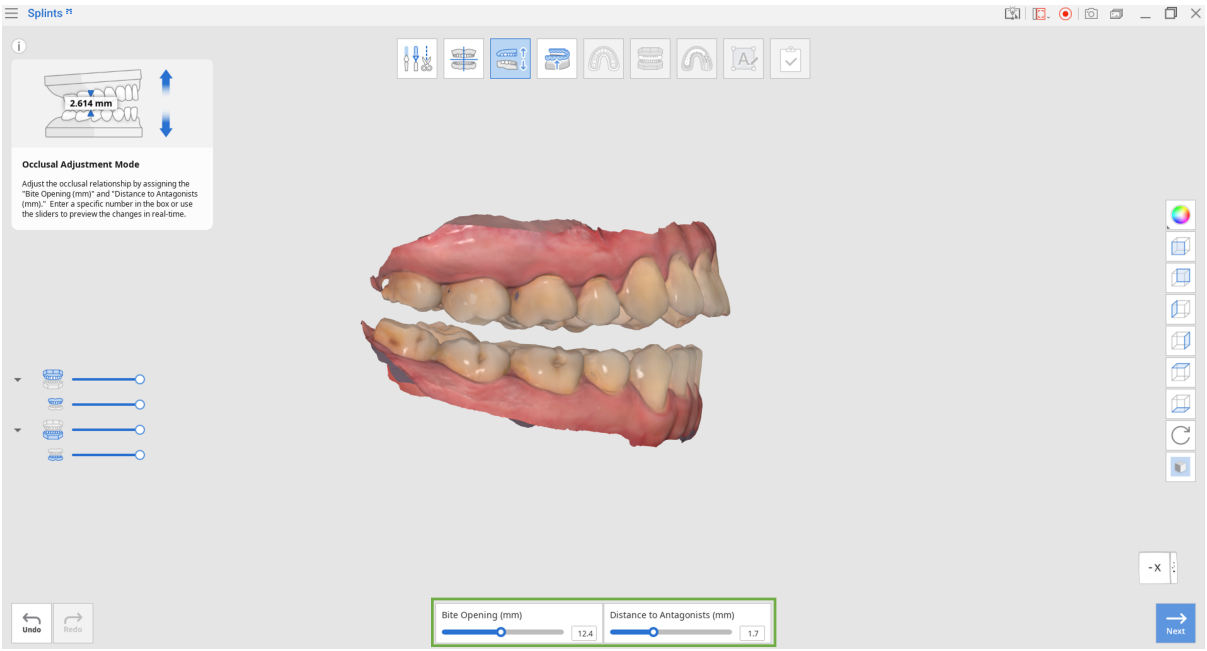
Occlusal Adjustment Mode

In this stage, you will be creating space for the splint by adjusting the occlusal relationship between the maxilla and mandible.

If the occlusion was scanned in an opened state or there is only one existing arch, you can skip the “Occlusal Adjustment Mode.”



1. To adjust, move the slider or enter a specific number in the boxes for the bite opening and distance to the antagonist to adjust the occlusal relationship.



Toolbox

Icon	Tool	Description
	Bite Opening(mm)	Set the degree of bite opening in the virtual articulator.

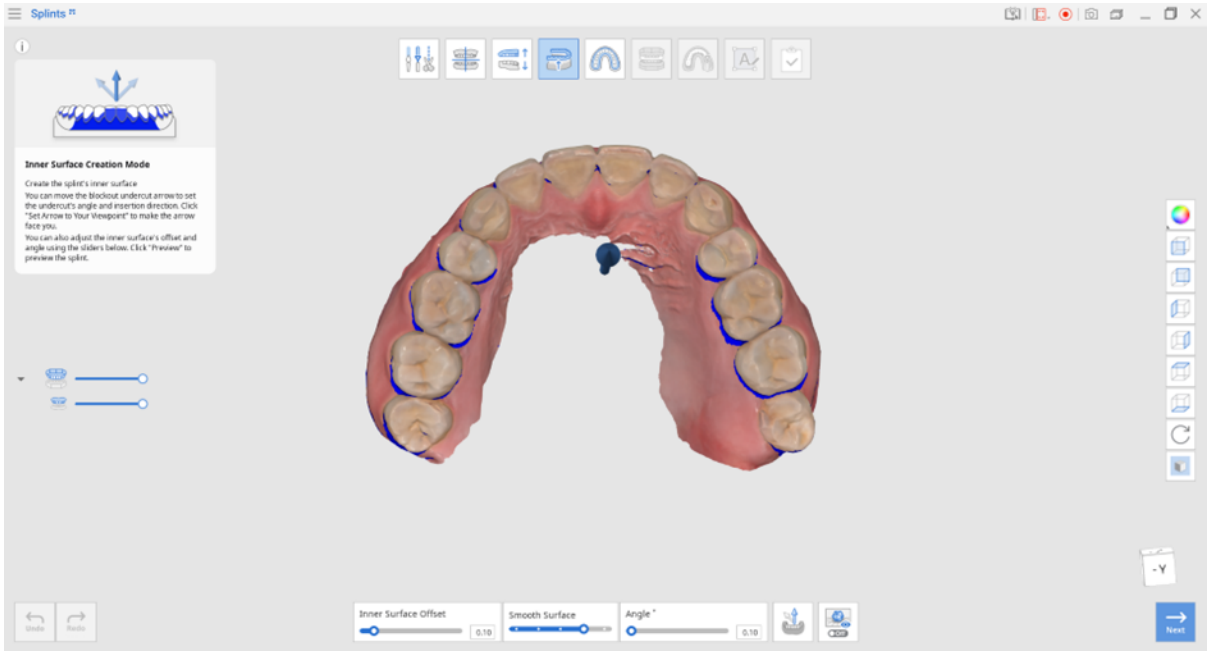
	Distance to Antagonist (mm)	Set the closest points between occlusal surfaces of maxilla and mandible.

The distance to the antagonist must be larger than 0.0.
If it is set to 0.0, there is no space for the splint and you cannot move to the next stage.
Set this parameter to create a splint with sufficient occlusal thickness.

2. Click “Next” when finished.

Inner Surface Creation Mode

In this stage you will create the splint’s inner surface by making adjustments to the inner surface offset, blockout direction, and blockout amount.

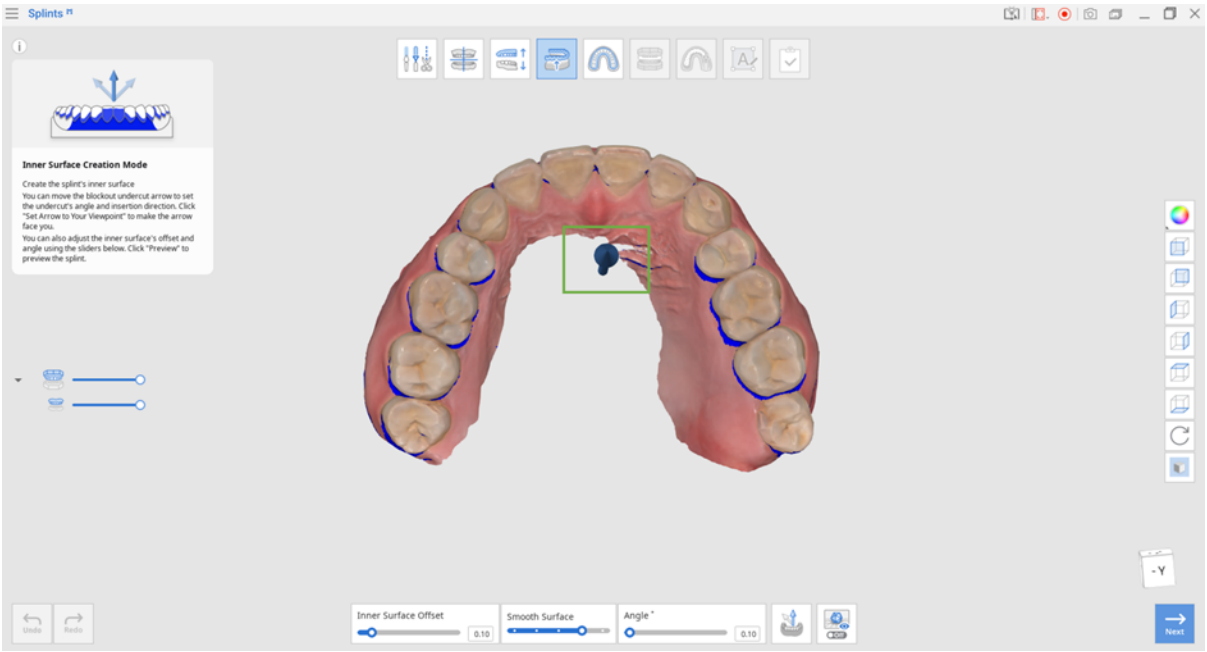


Toolbox

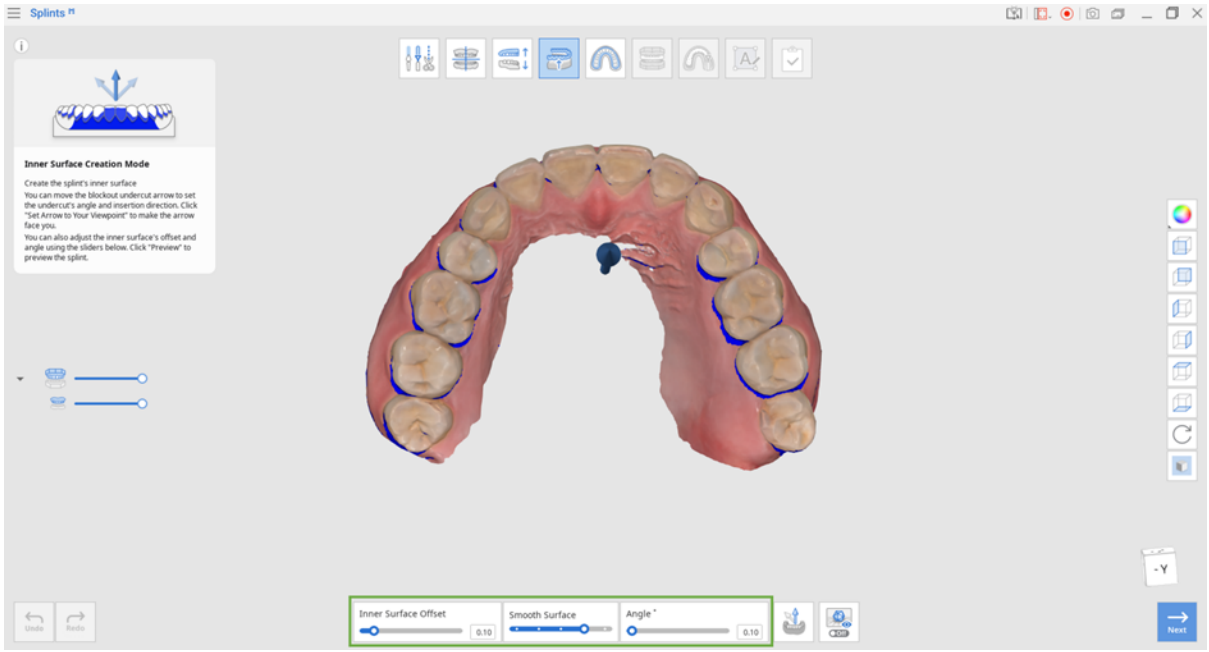
Icon	Tool	Description

	Inner Surface Offset	Set the offset distance from the data to create the splint's mesh.
	Smooth Surface	Smooth out the inner surface of the splint. Move slider to the right to add smoothness.
	Angle	Set the blockout angle.
	Set Arrow to your View Point	Change the direction of the blockout undercut arrow to face you.
	Preview	Preview the data with a blockout undercut.

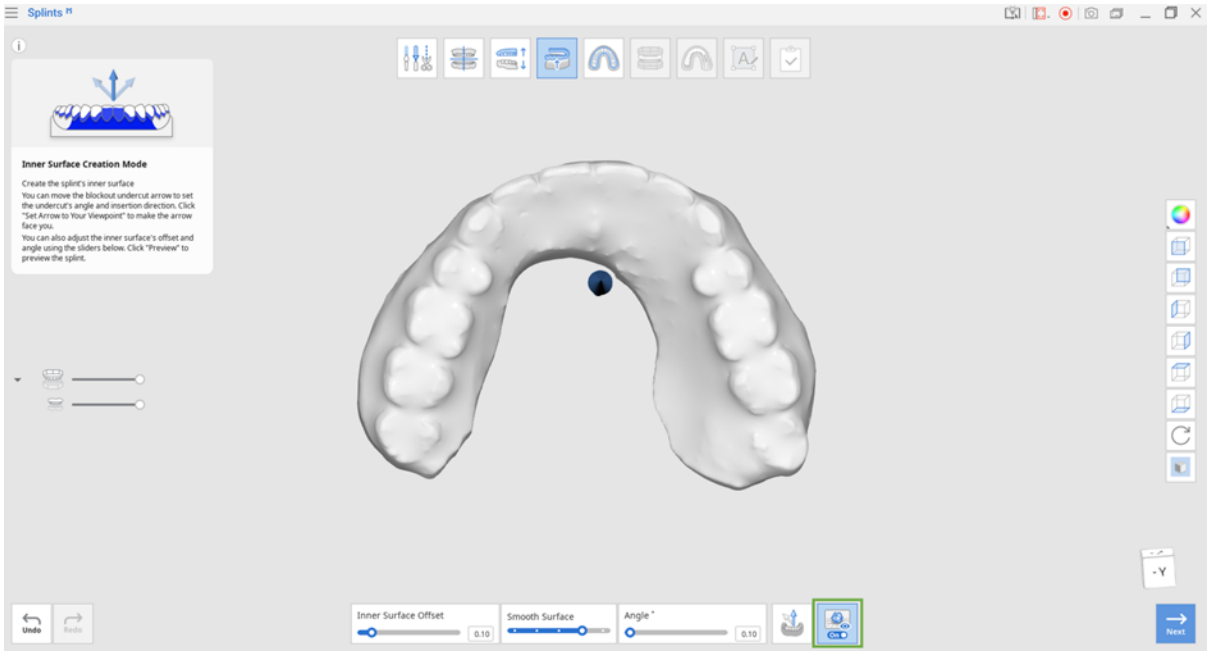
1. Click and hold the arrow to move it freely and set the blockout undercut's direction. The data that is part of the blockout area will be shown in blue.



2. Set the inner surface offset, surface smoothness, and the blockout angle to adjust the splint’s tightness.



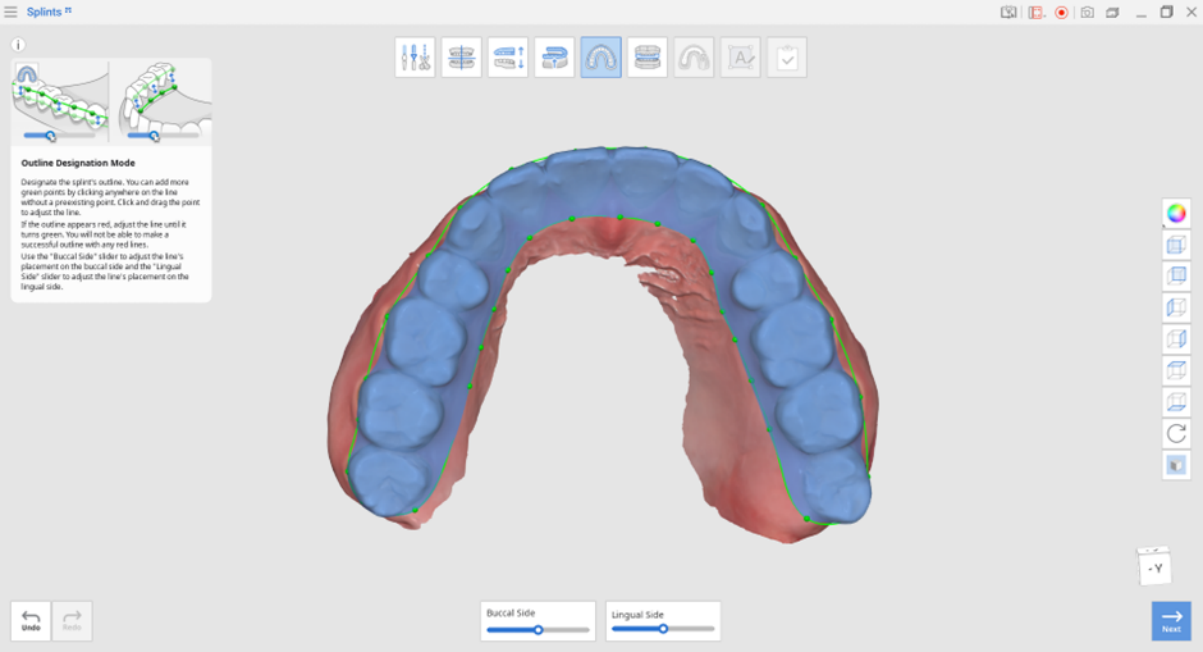
3. Click “Preview” to preview the data with the blockout undercut.



4. Click “Next” when finished.

Outline Designation Mode

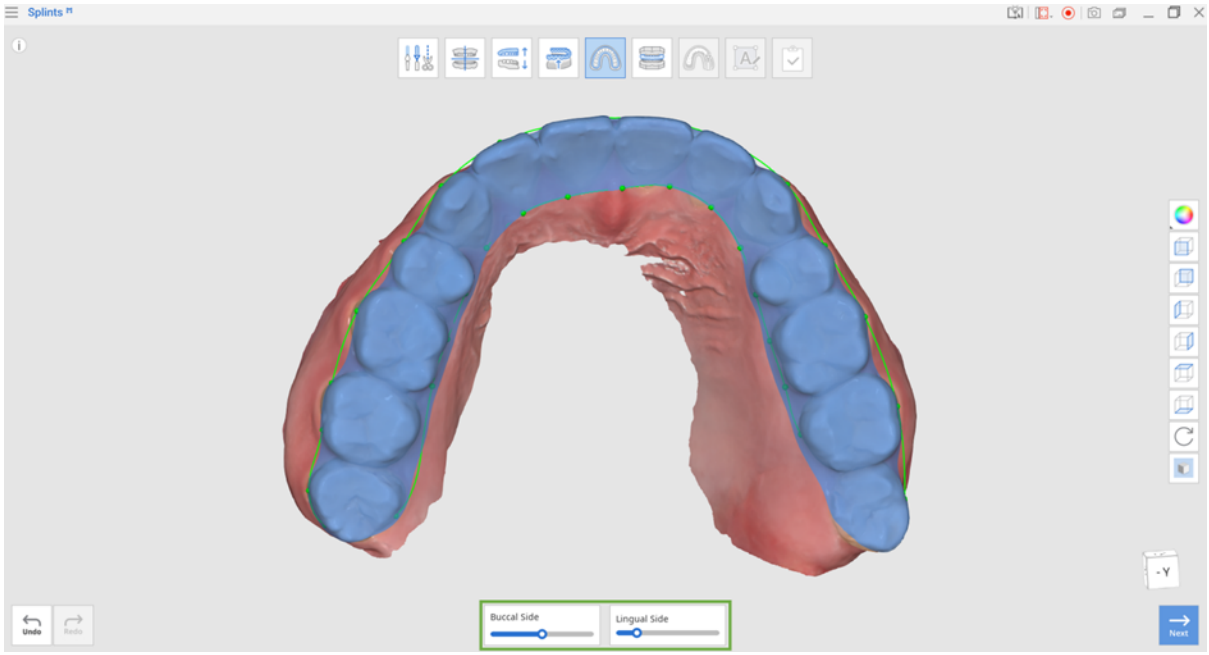
In this step, you will create the outline for the splint on the buccal and lingual sides.

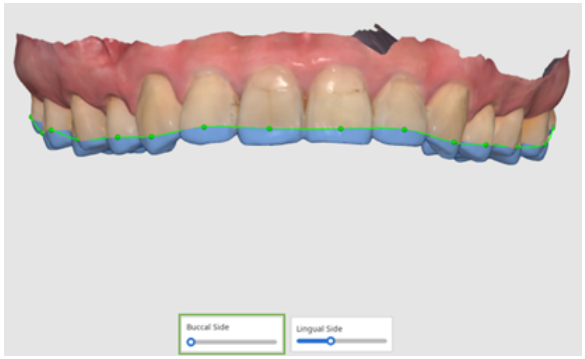


Toolbox

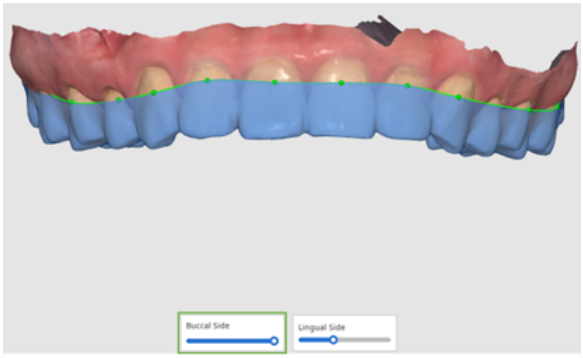
Icon	Tool	Description
	Buccal Side	Adjust the outline on the buccal side. Move the slider to the right to bring the outline closer to the gingiva.
	Lingual Side	Adjust the outline on the lingual side. Move the slider to the right to bring the outline closer to the gingiva.

1. In Outline Designation Mode, an outline will automatically be generated for you. If you need to modify the outline, move the green point of the outline using your mouse or use the “Buccal Side” and “Lingual Side” sliders at the bottom.

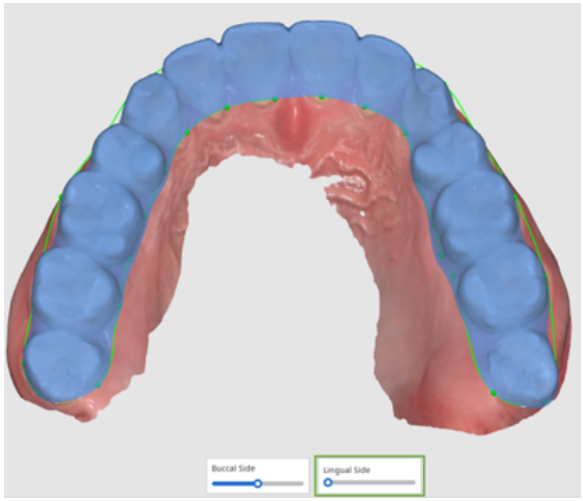




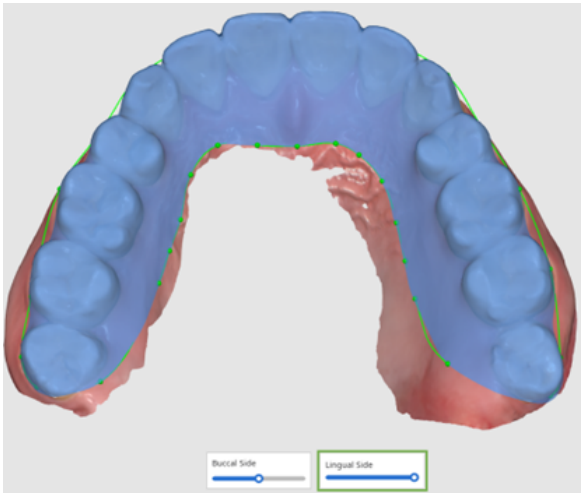
When you slide the **Buccal Side's slider to the left**



When you slide the **Buccal Side's slider to the right**

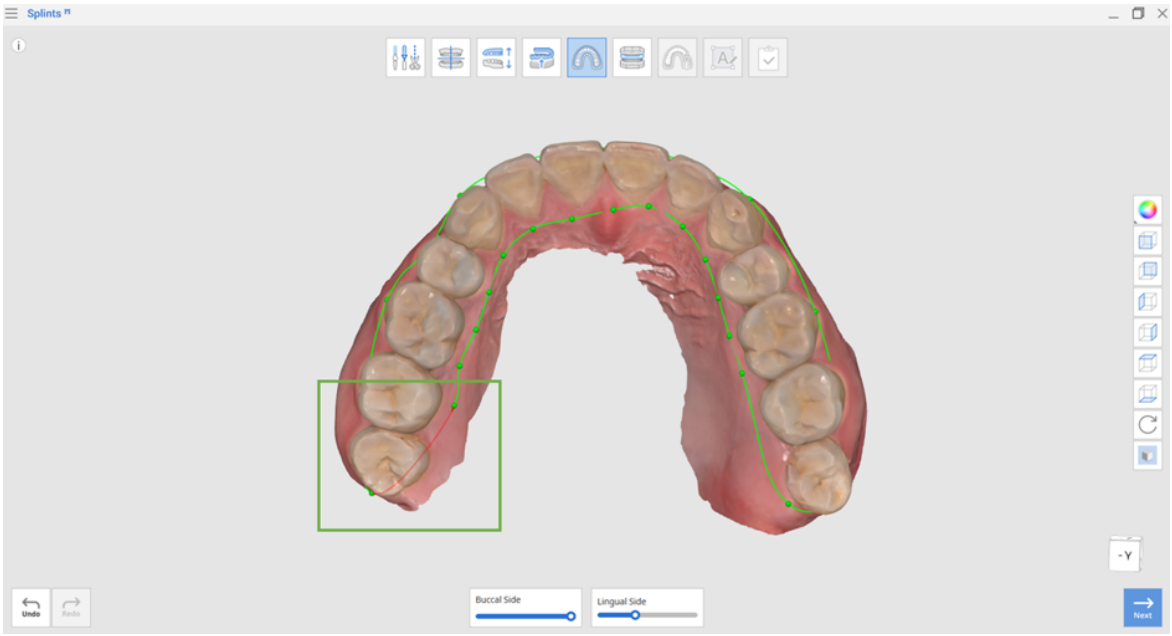


When you slide the Lingual Side's **slider to the left**

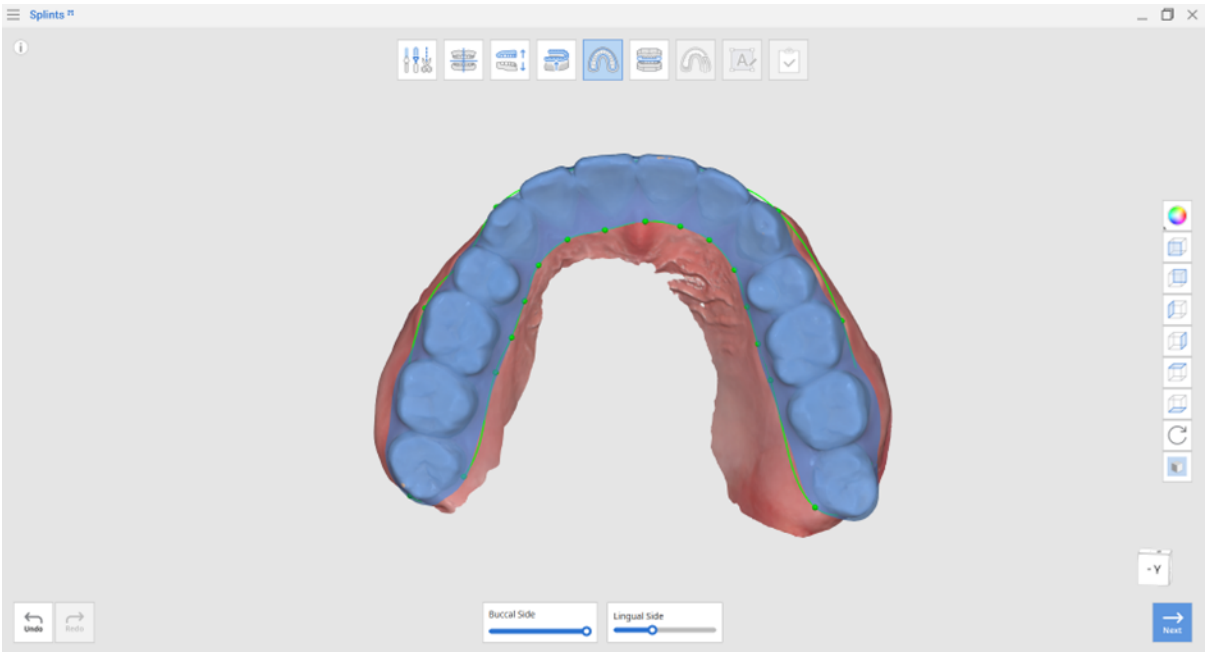


When you slide the Lingual Side's **slider to the right**

2. If any section of the outline is red you will need to adjust the line until it is green. You will not be able to move to the next stage if there are any red sections.



3. When the data has been correctly outlined, the selected area is displayed in blue. Left-click on the outline to create additional green points and right-click to delete the green point.

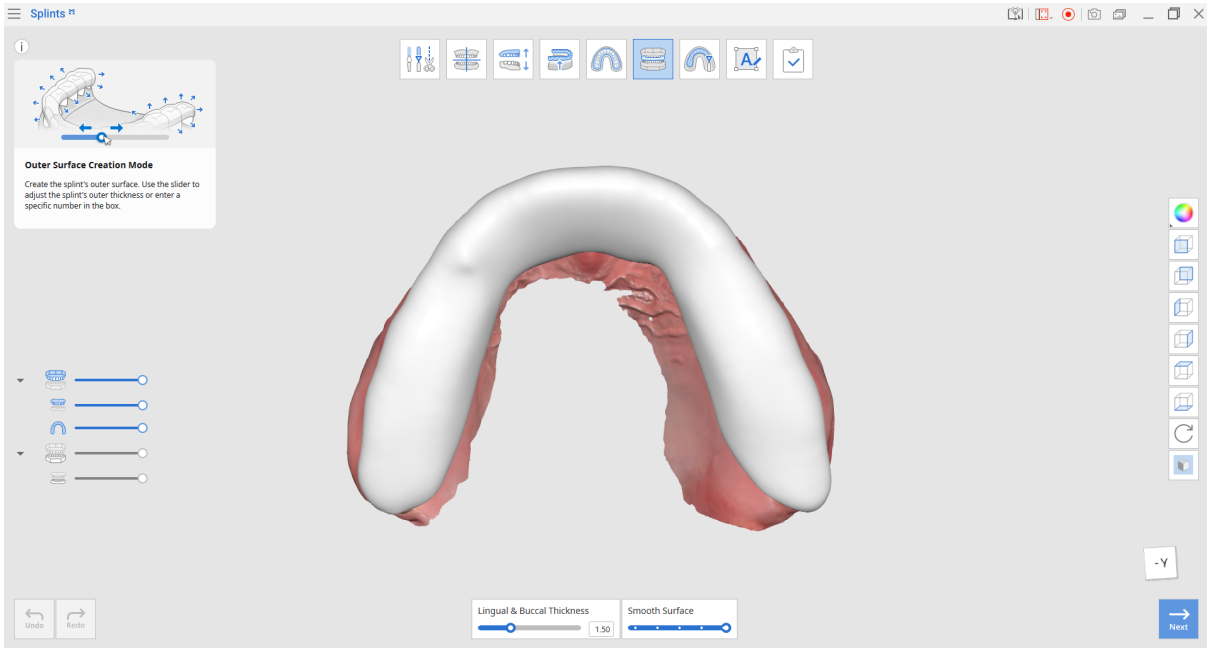


4. Click “Next” when finished.

Outer Surface Creation Mode

In this stage, you will be creating the outer surface of the splint.

1. Move the “Lingual & Buccal Thickness” slider to the right to simultaneously add splint thickness on the lingual and buccal surfaces. Thickness for the occlusal surface will be created automatically based on the distance to the antagonists.
2. Use the “Smooth Surface” slider to remove any roughness in the splint’s outer surface.



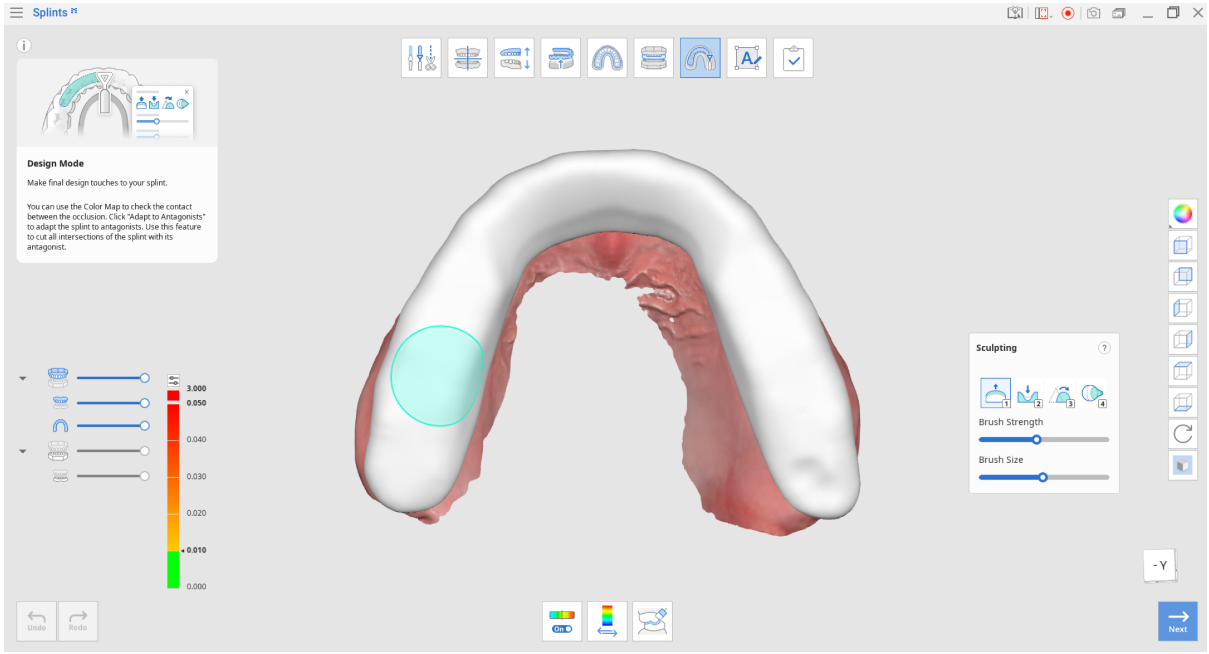
Toolbox

Icon	Tool	Description
	Lingual & Buccal Thickness	Adjust the splint thickness on lingual and buccal surfaces.
	Smooth Surface	Smooth out the outer surface of the splint.

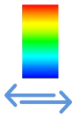
3. Click “Next” when finished.

Design Mode

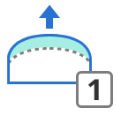
In this Mode, you can make the final design adjustments to your splint. Use the provided tools to analyze the occlusal contact points and cut out intersections of the splint with the antagonist.



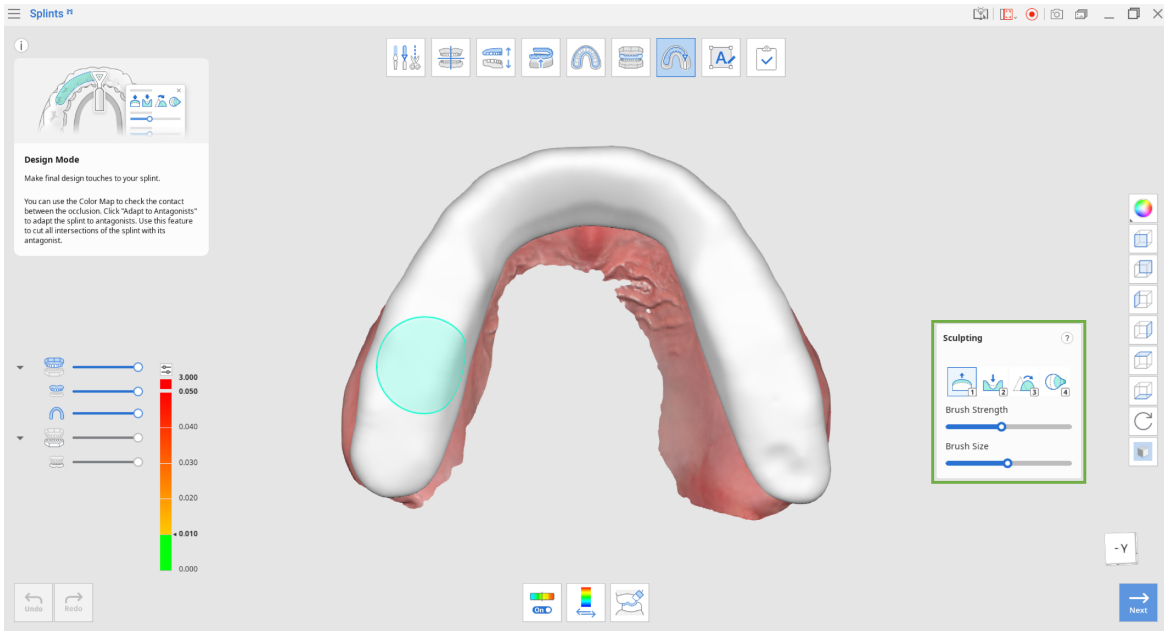
Toolbox

Icon	Tool	Description
	Color Map On/Off	Turn on/off the color map.
	Switch Deviation Display Area	Switch deviation display scale between all data and contact area only.
	Adapt to Antagonist	Adapt the splint to the antagonist.

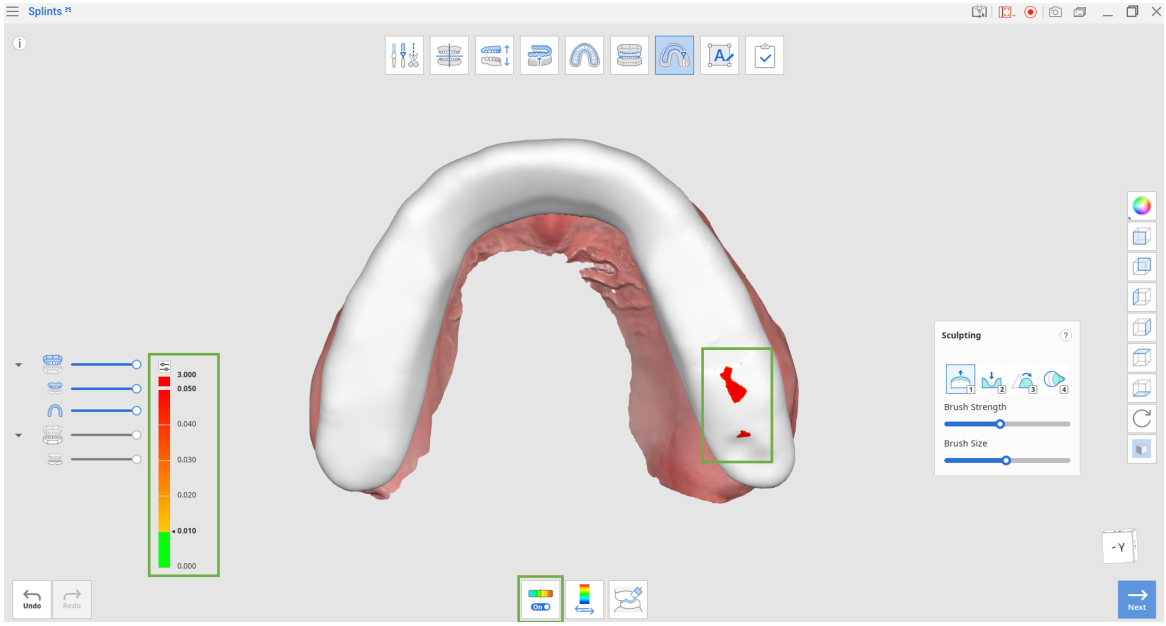
Toolbox: Sculpting

Icon	Tool	Description
	Add	Use the mouse to add on parts of the data. Hotkey: 1
	Remove	Use the mouse to remove parts of the data. Hotkey: 2
	Smooth	Use the mouse to smooth parts of the data. Hotkey: 3
	Morph	Use the mouse to morph parts of the data. Hotkey: 4

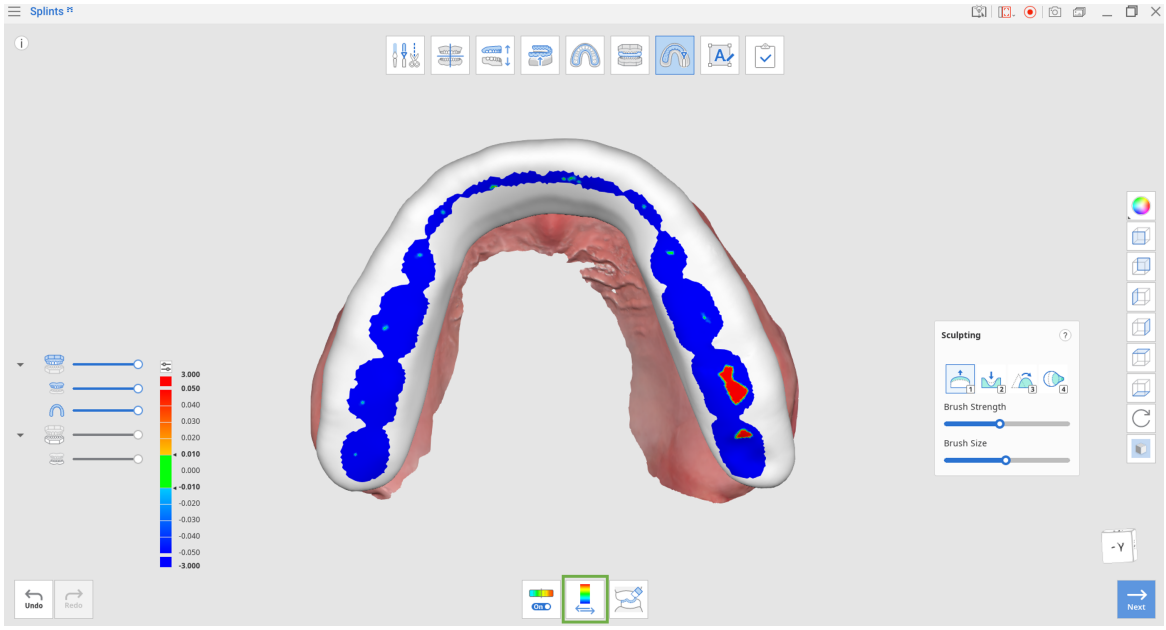
1. The Sculpting Tool will help you add, remove, smooth or morph the outer surface of the splint. Use it to make fine adjustments to the splint's surface.



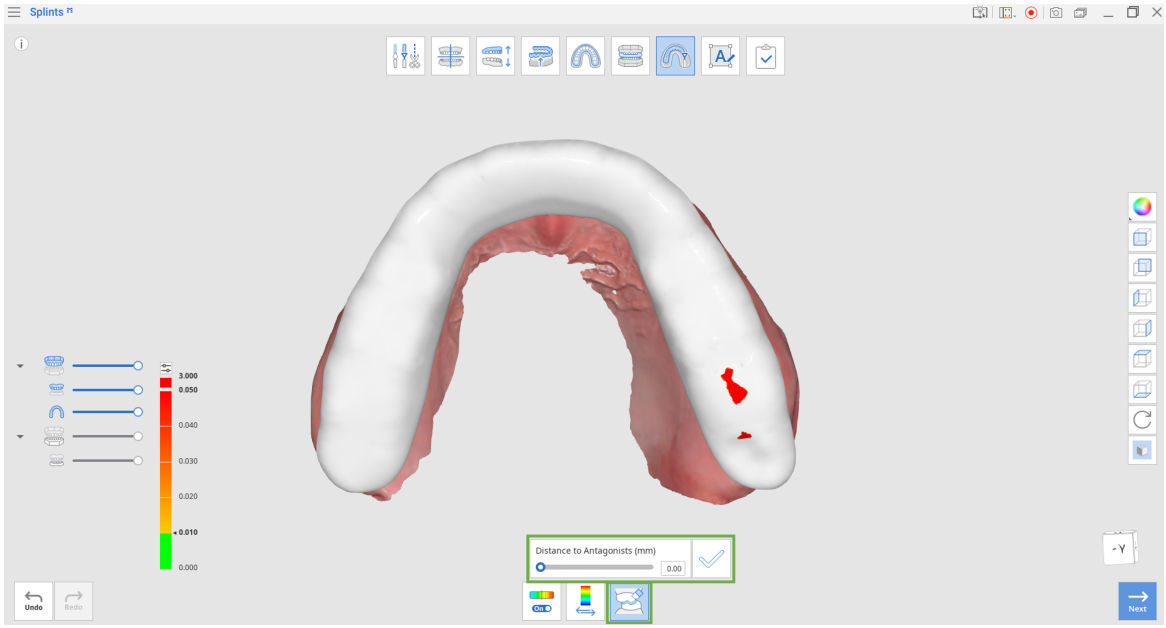
2. When the Color Map is on, the red areas will show you the intersections between the data.



3. Click “Switch Deviation Display Area” to check the distance to antagonists.



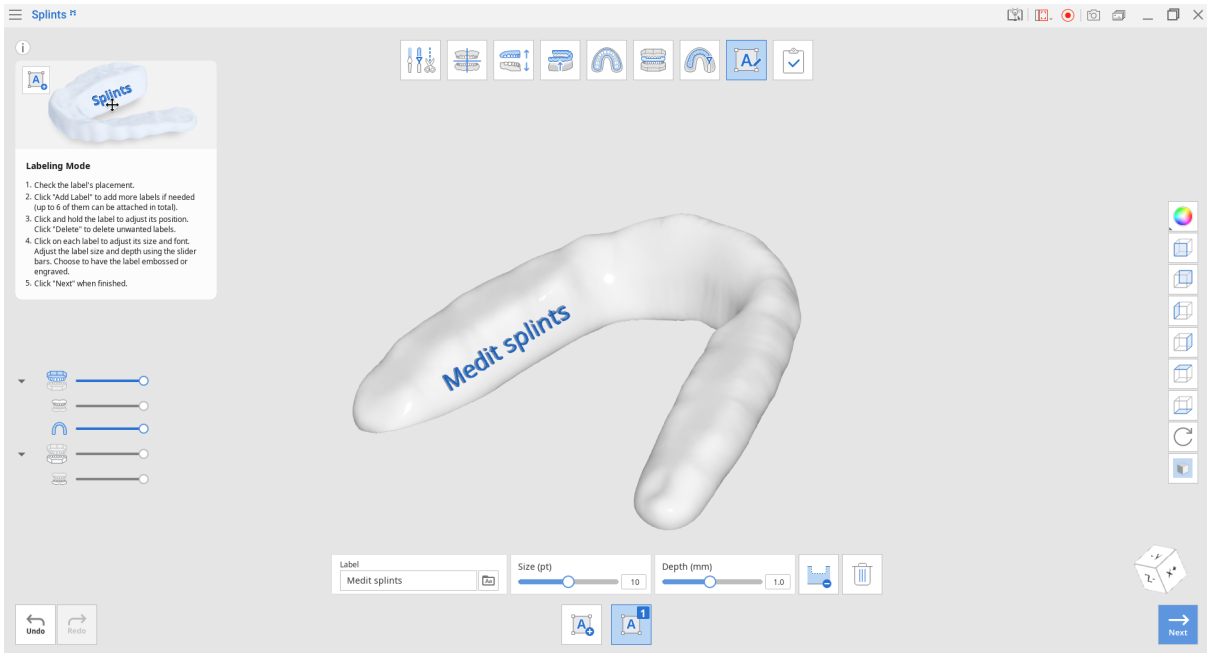
4. To cut all intersections of the splint with antagonists, click “Adapt to Antagonist.”



5. Click “Next” when you're finished designing the splint.

Labeling Mode

Labeling Mode presents a toolbox of functions to add, delete and edit splint labels. The default label (Label #1) will be automatically created on the outer surface of the splint.



Toolbox

Icon	Tool	Description
	Add label	Add a label to the splint.
	Manage Label #1	Edit, emboss, or engrave label #1.
	Manage Label #2	Edit, emboss or engrave label #2.
	Label	Enter the text to appear as a label.
	Font	Choose a font for the label.

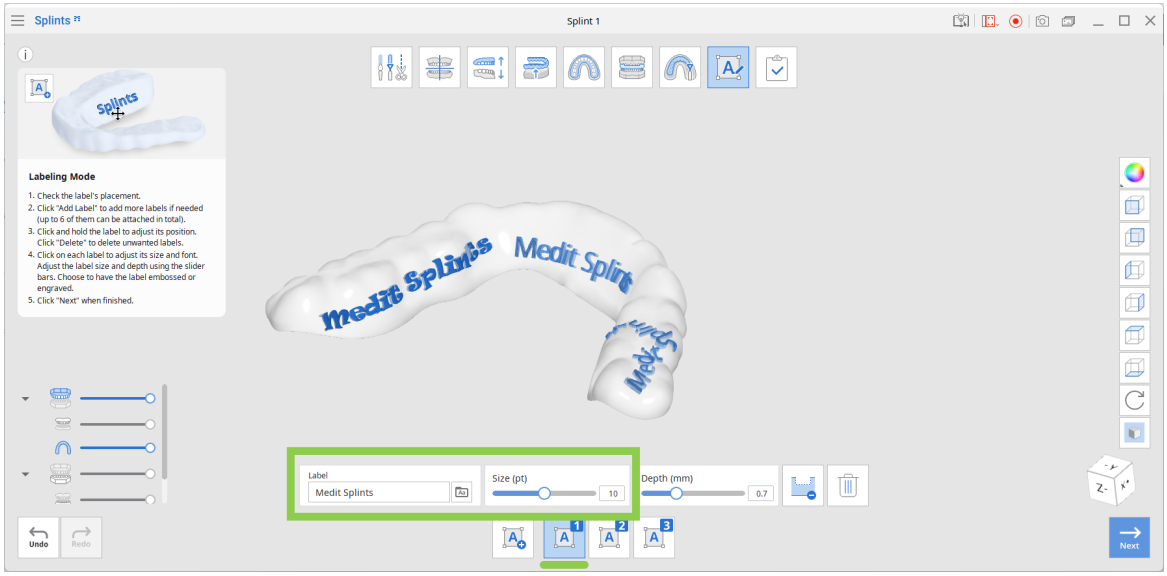
	Size	Set the label size.
	Engraving	Label the splint by engraving.
	Embossing	Label the splint by embossing.
	Delete	Delete the current label.

1. Check the placement of the automatically attached label. If any part of the label is displayed in orange, adjust its position by left-clicking and dragging it until it is all blue.

2. Click “Embossing/Engraving” to change the marking process. You can adjust the default labeling depth parameters.

3. Add more labels if needed by clicking the “Add label” at the bottom. You can add up to 6 labels.

4. Select the label number at the bottom and click “Delete” to delete the label.
5. Select labels one by one to edit their font and size.

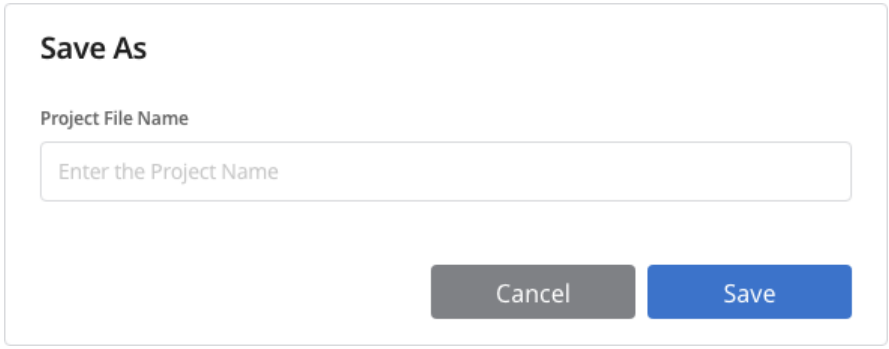


6. Click “Next” when finished.

Complete

Once you finish the splint creation process, click the last icon at the top of the screen to save the results to the Medit Link case.

Enter the project file name and click the “Save.”



Check the data in your Medit Link case.