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PROMADENT
Quality Dentalware

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2 LOCATE

Creating individual bite registrations and support pin registrations is a breeze with LOCATE. Developed in collaboration with dental technicians and dentists, this module focuses on the essential steps relevant to bite registration design. The result is a well thought-out and streamlined workflow that guides you step by step to the finished bite registration and support pin registration.

BiSS Dental Software Suite relies on numerous automatisms that bring you to your goal as quickly as possible. However, due to the numerous optionally adjustable parameters, maximum flexibility is ensured so that even the most specific customer requirements can be implemented.

This user documentation explains all the important functions of LOCATE incl. Plugin "Pointer" so you can get started right away.

LOCATE can be optionally upgraded as a *network multi-user license*.

Have fun with LOCATE! :)

All digital to a bite registration

FAST · EASY-TO-USE · INTUITIVE

3 Installation

3.1 System Requirements

The system requirements listed below must be fulfilled:

- ✓ Windows 64 Bit
- ✓ At least 500 MB free file system memory, recommended 2 GB
- ✓ Processor with at least 2 cores at 2 GHz, recommended 4 cores at 2,5 GHz
- ✓ Free working memory at least 8 GB, recommended 16 GB working memory
- ✓ Free USB-2.0 connection
- ✓ Minimum display resolution 1200 x 900 Pixel
- ✓ Graphic card: e.g., HD Graphics 3000 DX10.1 (we recommend not to use AMD/ATI RADEON graphics cards)

3.2 Installation Notes

The installation of the program BISS is done with the provided installation file *BISS-5.X.X-setup.exe*. Run the file and follow the installation instructions.

To start BiSS you need a *dongle license*. Make sure that your license dongle, with a valid BiSS license, is connected to your computer before you start the program.

If you have a *BiSS multi-user network license*, please refer to the following section:

3.2.1 BiSS multi-user network license

In order for the network dongle to be recognized within your network, the following settings must be set before BiSS can be started the first time:

- ✓ Install BiSS
- ✓ Insert the network dongle into the device
- ✓ Open the installation directory of BiSS (on the same device)
- ✓ Run *DinkeyServer.exe* as Administrator
- ✓ Under *Startup Modes* on the left, select *Windows Service*
- ✓ Under *Network Configuration* on the right, select *Automatic*
- ✓ Click Start

Your firewall must recognize and allow Dinkey Server. Therefore, select *Automatically Configure Windows Firewall* when prompted to do so.

Dinkey Server now runs as a background service and doesn't need to be restarted manually after rebooting the device.

> ***Note:*** *If you remove the dongle or add another dongle, a restart of Dinkey Server may be required.*

BiSS can now be started from all devices of your network, according to the number of purchased licenses.

3.3 Control

The software can be controlled with a commercially available mouse as a selection tool in the menu navigation and for rotating, moving, and zooming the model. Input via the keyboard is required for individual functions. The basic options for controlling the software are described in table 1. Below

you will find a complete summary of the possibilities for navigation with an explanation of the function.

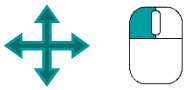
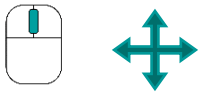
	Selection Tool	Move the cursor to the desired position and click the left mouse button.
	Rotate Model	Hold down the right mouse button and move the mouse.
	Move Model	Hold down the mouse wheel and move the mouse.
	Move Model	Hold down the right mouse button and shift key and move the mouse.
	Zoom Model	Rotate the mouse wheel to zoom in or out of the model's representation on your working surface.
	Set Rotation Center	With a center click on any point you can set the center of rotation.

table 1: Short overview: control of the program – overview mouse functions.

3.3.1 Overview of General BiSS Short Cuts

Shortcut	Description
Ctrl + F	Reset view to frontal view.
Ctrl + S	Save (attention: the step "align" must first be exited, otherwise the position change will not be saved").
F10	Clean memory.
Drag mouse with right mouse button	Rotate view.
Drag mouse with middle mouse button	Move view.
Rotate mouse wheel in 3D area	Zoom in / zoom out view (direction can be selected in the settings).
Mouse wheel rotates over a spinner	Change value (a spinner is a field for setting numbers with two small buttons on the side).

Middle click on a part of the model	Focus view on the clicked point.
Right click on a part of the model	Open context menu.
Right-click in 3D area	Open context menu.
Right-click in a list of elements	Open context menu.
Restart User-Interface	Change the language in the settings (or select the selected language again).

table 2: General BiSS shortcuts.

3.3.2 The Cube

Left clicking on the cube rotates the view as indicated by the black arrow. Depending on where you click:

Left click on cube	Description
On the side that does not face forward	This side is rotated to the front.
One edge while one side faces forward	This edge is rotated upwards while the side continues to face forward.
The center of the side facing forward	The back side is rotated to the front. The direction of rotation depends on whether you click above, below, left, or right of center.
A corner pointing upwards	The corner is rotated forward.
Edge that belongs to a corner that faces forward	The edge is rotated forward.
Corner that belongs to an edge that points forward	The corner is rotated forward.
Edge pointing forward	The edge is rotated 90° to the left or right, depending on which half of the edge you click on.
Double click on the cube, one side facing forward	The side is rotated to the front and aligned that the label is right side up.
Triple click on the cube	Reset the view to frontal view.

table 3: The navigation cube.

3.3.3 Repair-Tool

Navigation	Description
← *during manual repair*	Reverse.
→ *during manual repair*	Restore.
+ during manual repair	Enlarge tool radius.
- during manual repair	Reduce tool radius.
Spacebar during manual repair	Initiate repair of the marked area.
Ctrl + left mouse button during manual repair	The previous selection is not deleted but extended.
Shift + left mouse button in Repair mode	A polygon can be drawn.
Ctrl + mouse wheel when applying, removing, smoothing or filling is selected	Increase or decrease intensity
Shift + mouse wheel when applying, removing, smoothing or filling has been selected	Increase or reduce tool radius
C	Repair
Del	Trigger removal of the marked area
Q or U	Apply
W or I	Remove
E or O	Smooth
R or P	Fill up
A or J	Fading in and out of the upper jaw
S or K	Fading the lower jaw in or out

table 4: Navigation in the repair tool.

3.3.4 Attachments, Align

Navigation	Description
Ctrl + drag left mouse button	Rotate selected object.
Shift + drag left mouse button	Move selected object.
Double click on a curved arrow	Rotate 90° (in the Alignment tool).
Ctrl + left click when aligning	Select first point for aligning or connecting two components (some modes only).

table 5: Navigation for attachments, alignment.

3.3.5 Editing Curve Points

Navigation	Description
Del	Delete selected curve point.
Double click on curve point	Delete clicked curve point.
Space bar during editing curve points	Focus view on the selected curve point.

table 6: Navigation for editing curve points.

3.4 Launch the Program

When you have started BiSS, the window shown in image 1 appears. Here you get an overview of the available modules for BiSS Dental Software Suite. These are PRINT, MILLING, TRAYS, LOCATE, PUZZLE, FREEFORM and EDIT.

You can see from the green checkmarks, which modules are enabled according to your license. You can now select which application you want to launch. To start LOCATE, click on the green button *start software.*

Furthermore, you have the possibility to be forwarded directly to your retailer via the button *visit shop*, but also to purchase further BiSS modules. This button only appears if there is an existing internet connection.

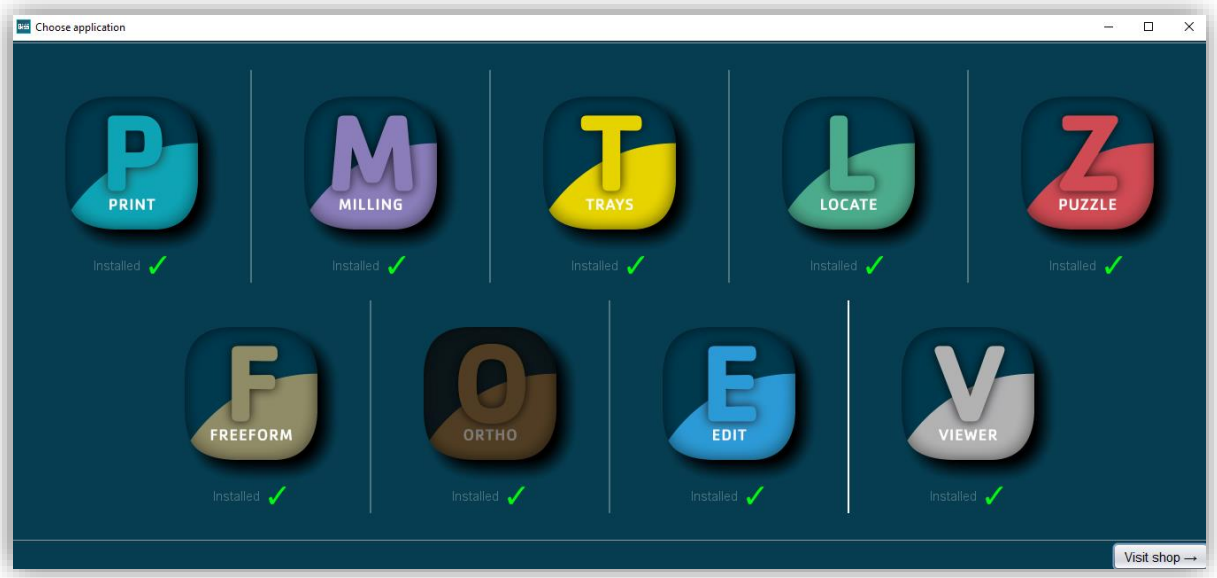


image 1: Welcome window after program launch.

4 The Workstation

4.1 Overview

Familiarize yourself with your BiSS workstation. The user interface is divided into the three main areas: navigation - action - model view

- ✓ You can access the *menu (burger)* via the navigation bar at the top. The < and > buttons navigate you step by step to the finished model. The individual processing steps of your workflow are displayed in the center. You can use the status bars to track the progress of your work. You can also select the buttons individually and go directly to the desired design step. You can recognize the currently selected design step by the darker coloring.
- ✓ On the left you will find the action window. Here you adjust the settings specific to each design step.
- ✓ The 3D model you are working on is displayed on the right. Via the text window you will receive messages and notes that support you in your work.

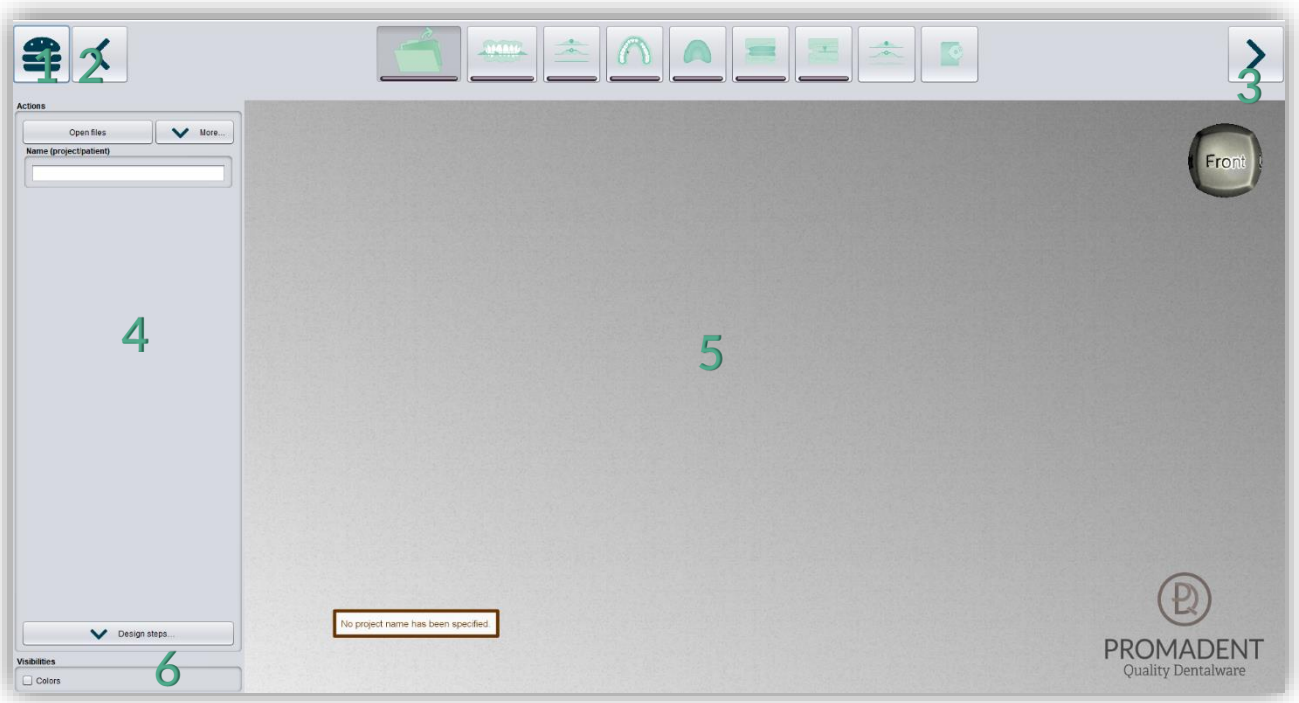


image 2: The BiSS program after launch 1) Menu: Contains settings, about us, other applications, new project. 2) Back: get back to the step before. 3) Next step: Complete the current processing step and proceed to the next step .4) Action window: Individual for the respective work step. Here: Load file and define the work steps. 5) Work surface. 6) Visibility switch: Visible after loading the scans.

4.2 Closing the Program

To close the program, select the *X icon* at the upper right corner of the program window and choose *close* under the *menu* button.

There is a query whether to close despite unsaved changes. Changes are both changes made by the user and calculation progress.

4.3 Settings

Under the *menu* button you will find the *settings tab*, see image 3. If you select settings, a new window opens with four tabs: appearance, load & save, control, updates and advanced.

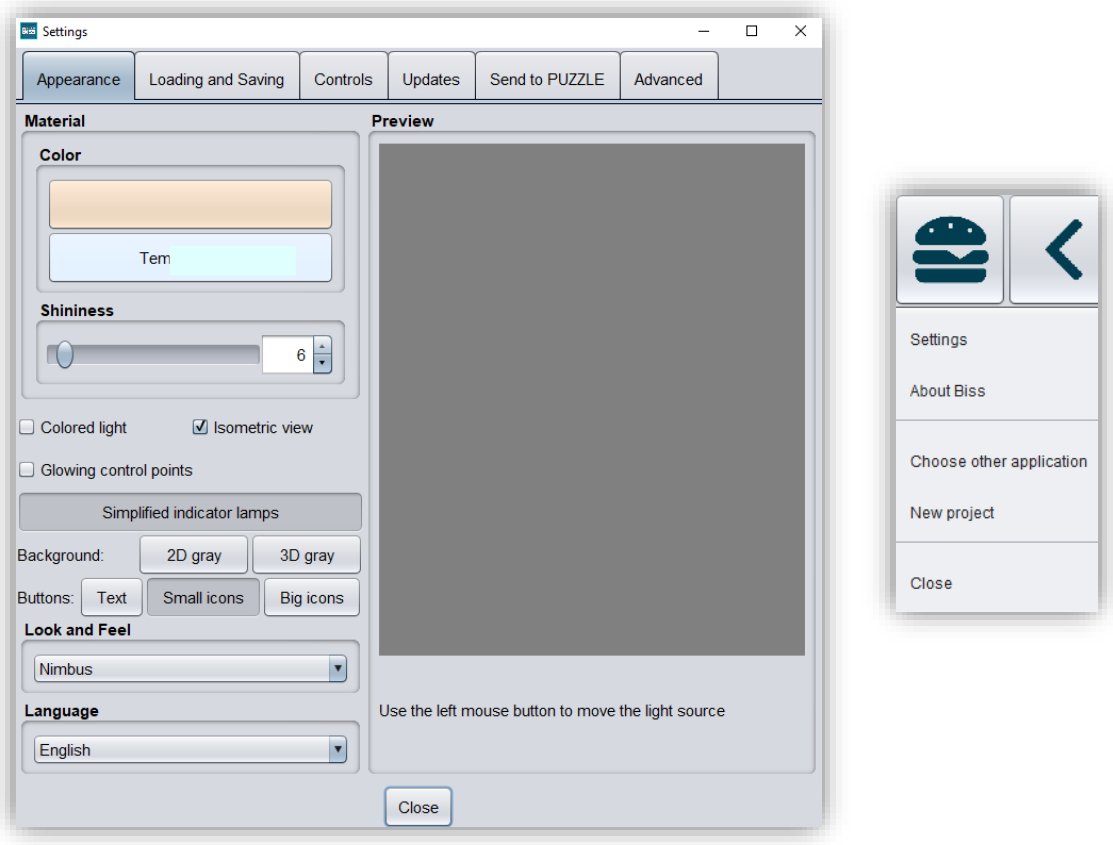


image 3: Changing the appearance of the model and the working environment.

The settings window can be closed by clicking the *close* button int the middle below of the window or the *X* in the top right corner. Your settings will be applied and saved.

4.3.1 Appearance

Under the *appearance tab*, shown in image 3, you can adjust the appearance of the loaded scans and the tray to your needs by selecting a color and intensity of gloss. Further setting options are summarized in table 7.

FEATURE	DISCRIPTION	DEFAULT-VALUE
Colored light	Active: Multiple colored light sources from slightly different directions. Inactive: White light source.	inactive
Isometric view	Active: Isometric view. Inactive: Perspective view.	active
Glowing control points	In the "trim edge" step, the currently set curve points are displayed as a light source. Attention: Requires a lot of computing power.	inactive
Simplified indicator lights/ Detailed indicator lamps	Changes the appearance of the status bars that indicate progress within the workflow.	simplified indicator lights (active)
Background - 2D gray/ 2D colored	Selects the background of the windows - gray or colored.	2D colored
Background - 3D gray/ 3D colored	Selects the background of the 3D model - gray or colored.	3D grey
Look and feel	Selects the design of the windows.	Nimbus
Language	You can choose between German and English language.	English, with English system language

table 7: Appearance settings.

4.3.2 Loading and Saving

Behind the *loading & saving tab* (image 4) you can set in which format your model should be exported. The file formats .STL, .OBJ and .PLY are available for selection. You can also activate automatic saving of your project and set a time interval for automatic saving.

> ***Note:*** *When you save automatically, your project file is saved in .LFL format. There is no file export.*

This function is used exclusively to restore the project after an irregular termination of the program. The folder for automatic saving should only be used for this purpose. In addition, if the PUZZLE application has been unlocked, you can decide here in which folder the data for PUZZLE should be exported. This folder must be the same as the monitoring folder of PUZZLE. If you check the box *Ask for additional location to save to*, you can select a new location each time. This must also be the same as the monitoring path of PUZZLE. If you want the data to be sent to PUZZLE automatically with every export, then you must check the box *Send to PUZZLE when exporting*.

Furthermore, you have the option to determine whether color data should be loaded and exported.

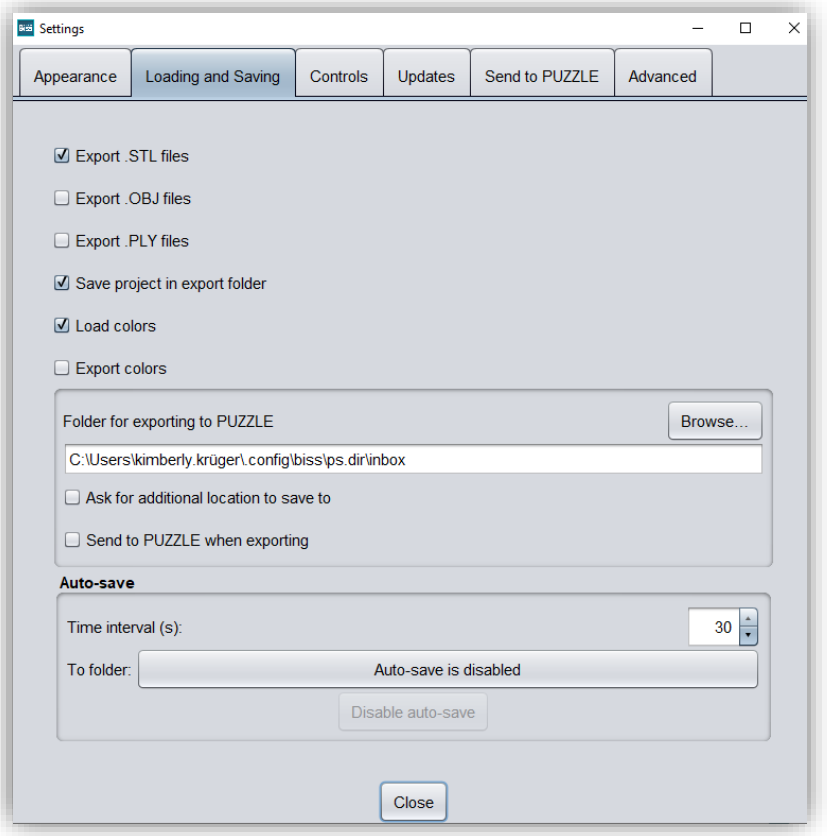


image 4: Loading and saving settings.

4.3.3 Control

In the *control tab*, see image 5, you can adjust the mouse behavior and the message size.

Mouse behavior	Select whether your model is enlarged or reduced when scrolling up.
Message size	Determine the size of the displayed messages on your workstation by entering a factor.

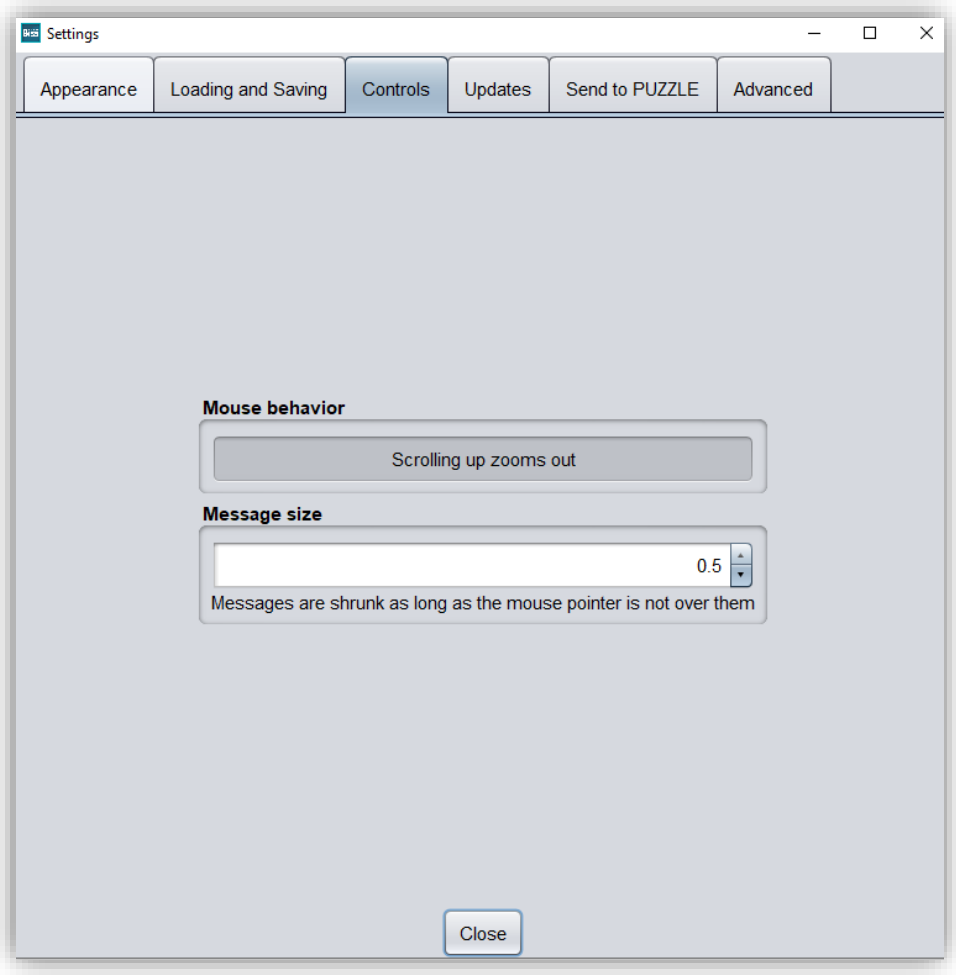


image 5: Custom setting of mouse behavior and message size.

4.3.4 Updates

In the *updates tab* in image 6, you can check if new updates are available for BiSS. To do this, click the button *check for updates*.

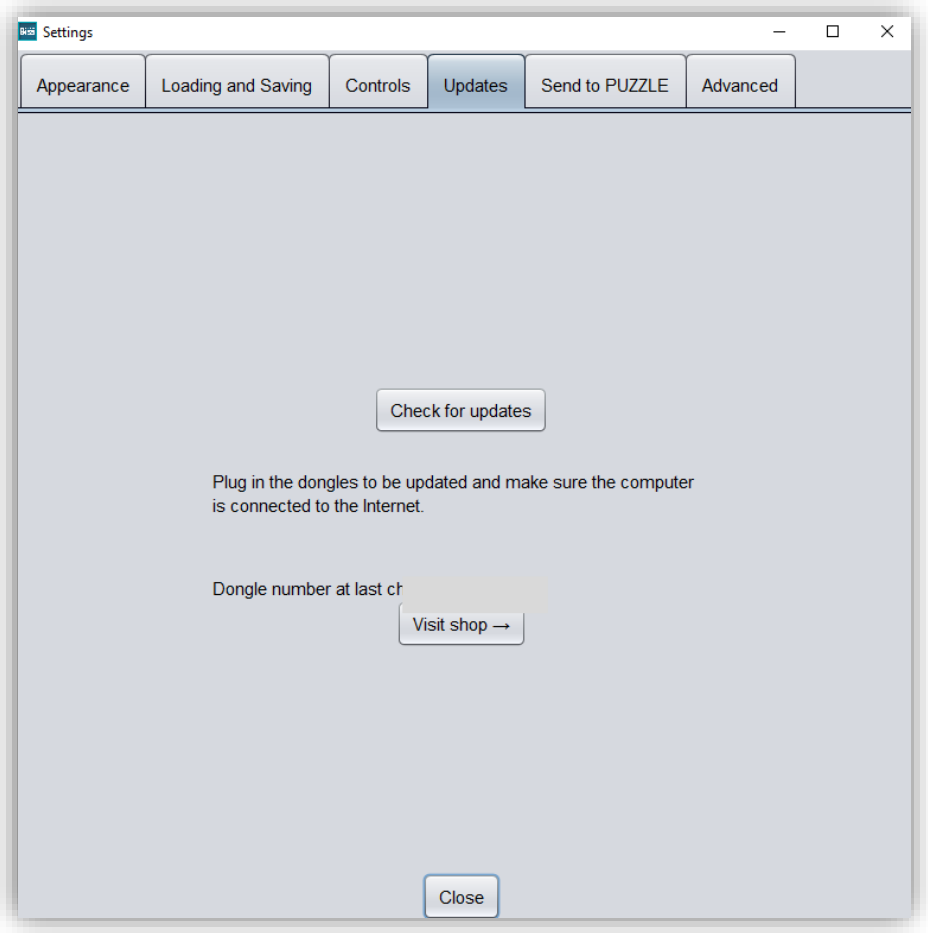


image 6: Update-settings.

Afterwards, a window like the one shown in image 7 opens and informs you about available updates. This can be for example a new software version that is ready for download or a license update for your dongle. You need this function e.g. when purchasing additional modules or extending a license.

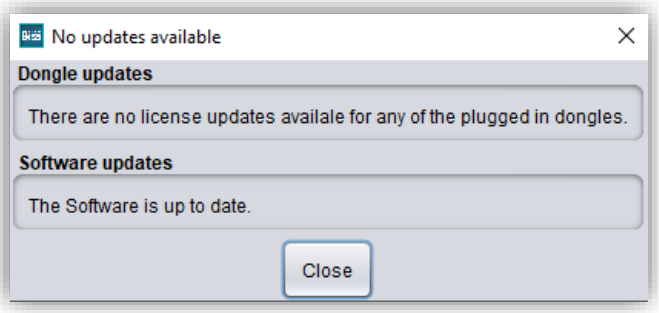


image 7: No updates available.

4.3.5 Send to PUZZLE

Under this tab you can make settings for the coupling with the *PUZZLE* application.

You can select in which file format the finished generated model should be exported. Possibilities are under *into folder* as .GBS project file, .PLY files, .STL files and .OBJ files. You can also specify how much the registration should be tilted so that PUZZLE can place it directly in the correct orientation.

Tip: To guarantee fast work with the PUZZLE connection, you should always select Project file.

Then select a folder where the finished models will be exported automatically. By default, the folder C:\Users\[your username]\.config\biss\ps.dir is selected. You can also select a different file path on Browse.

Attention! If you change the file path, the overgrowth file path in PUZZLE must be the same. Otherwise, PUZZLE will not be able to import data from the newly created folder into the software.

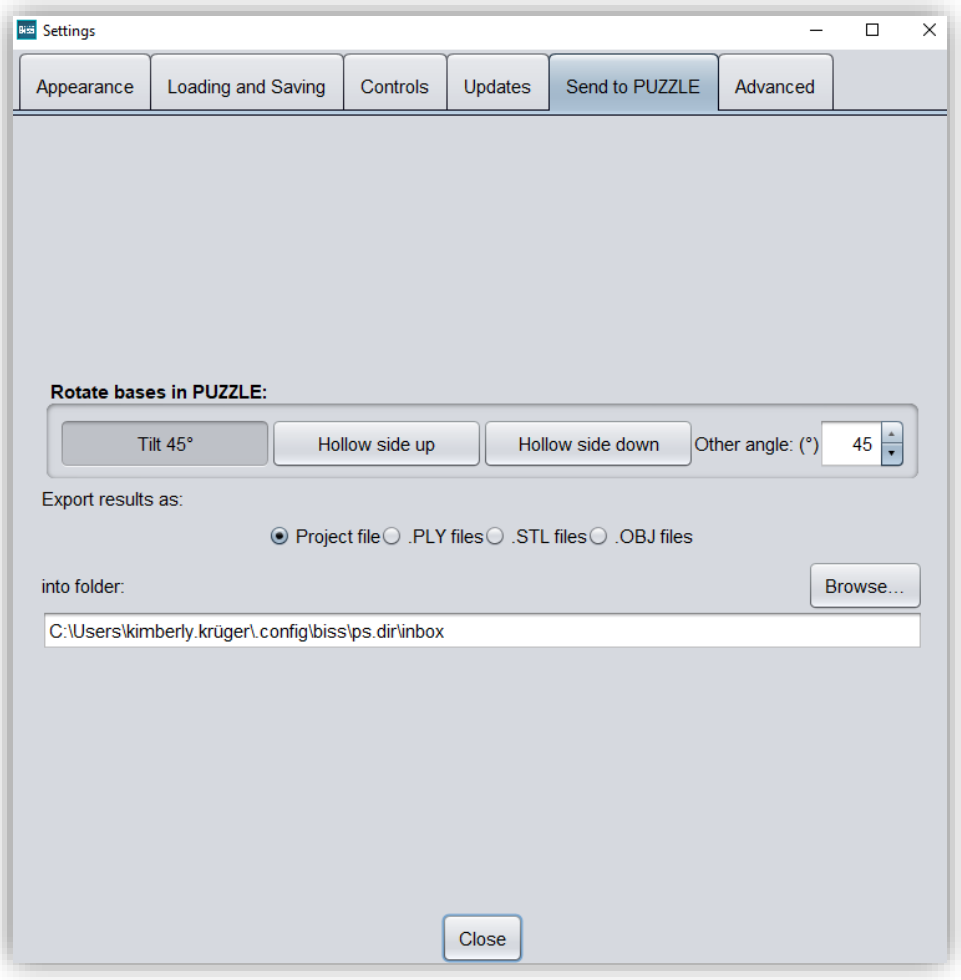


image 8: Background Automatic

4.3.6 Advanced

Under the *advanced tab* you will find advanced settings.

Select *edit protected attachments* if you still want to edit protected attachments (e.g., change rotatability and position).

> ***Note:*** *Only activate this function if, you are absolutely sure. Careless editing and subsequent saving of protected attachments can result in a corrupted file and render the attachment unusable. Contact your supplier at any time if you need assistance.*

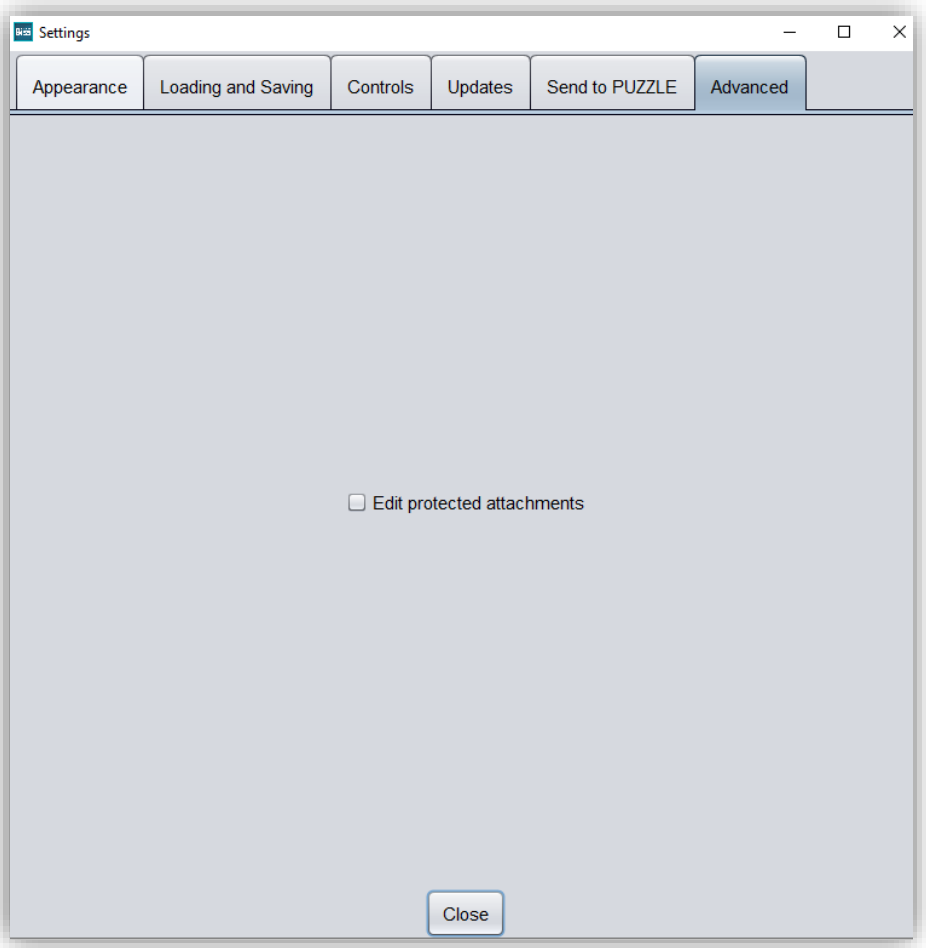
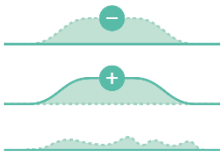
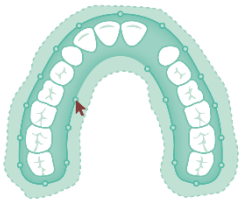
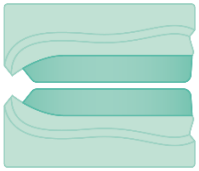


image 9: Advanced settings.

5 From Scan to Printable Registration

5.1 The Workflow

	Load	Import data in .STL, .OBJ or .PLY formats.
	Align	Automatic or manual alignment of upper and lower jaws and modification of components.
	**Repair & Edit**	Add material, remove material, and smoothen.
	**Specify Edge**	Setting the tray shape and automatic determination of the insertion direction.
	Base shape	Defining the tray shape: Spacing of the tray, thickness of the tray material, edge extensions, holes for implant impression, wax walls.
	**Wax walls**	Design pure bite registrations or combination tray bite registrations.

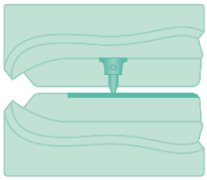
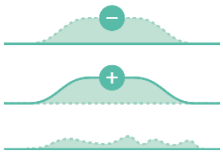
	**Support pin registration**	Design of support pin registrations for maxilla and mandible.
	**Final edits**	Removing, applying and repairing the finished registration
	Save	Export all components to .STL, .OBJ or .PLY formats.

table 8: The Workflow.

5.2 Open File

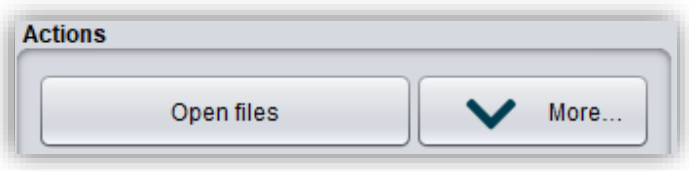


image 10: Open the scan data.

On the left side of the program window, you will find the action menu. Using the *open file* button, you can load your scan data into the program or open an already existing .LFL project file (image 9). After selecting the button, a window will open where you can choose the desired file in the .OBJ, .STL or .PLY format.

> ***Hint:*** *You can load multiple scans at once if you hold down Ctrl, select all the files you want, and then click open. If you click on "More...", you can load and unload individual scans.*

If BiSS cannot recognize what type of scan it is from the file name, a *„could not determine purpose of data“* windows open. Select which type of scan is displayed in the preview (image 10).

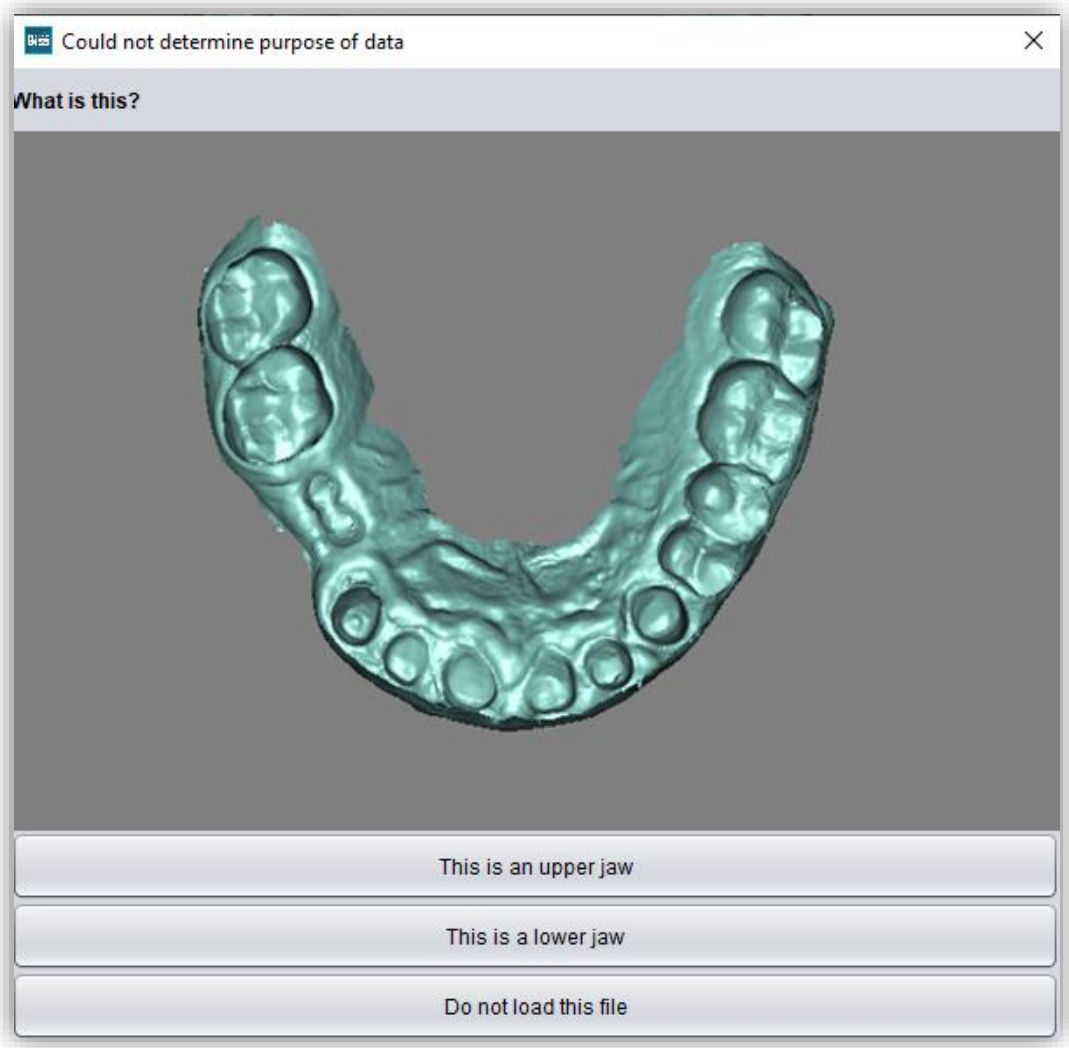


image 11: Assignment of the loaded jaw models.

Hint: *BiSS can automatically detect which type of scan it is. BiSS distinguishes between upper jaw, lower jaw, implant reference scan and no implant reference scan. For this to work, there are certain requirements for the file names (see table 9).*

File Type	Condition
File is upper jaw	✓ contains *mandibel, mandubul, mandible* or ✓ contains *lowerjaw, lower-jaw, lower.jaw, lower_jaw* or ✓ ends with *occlusion_l* or ✓ is *uk*
File is lower jaw	✓ contains *maxill* or ✓ contains *upper-jaw, upper.jaw, upper_jaw* or ✓ ends with *occlusion_u* or ✓ is *ok*

table 9: File name components for automatic detection of the scan type.

After you load your scans, the model is automatically aligned. Note this later when exporting your work, see section Export Registration.

5.2.1 Colored Representation of an Intraoral Scan

It is possible to display intraoral scans in color in TRAYS. To do this, simply load your color scan. BiSS recognizes .PLY files with textures as well as .OBJ or .PLY files with vertex colors. You can also disable the loading of colors under *menu / settings / load and save.*

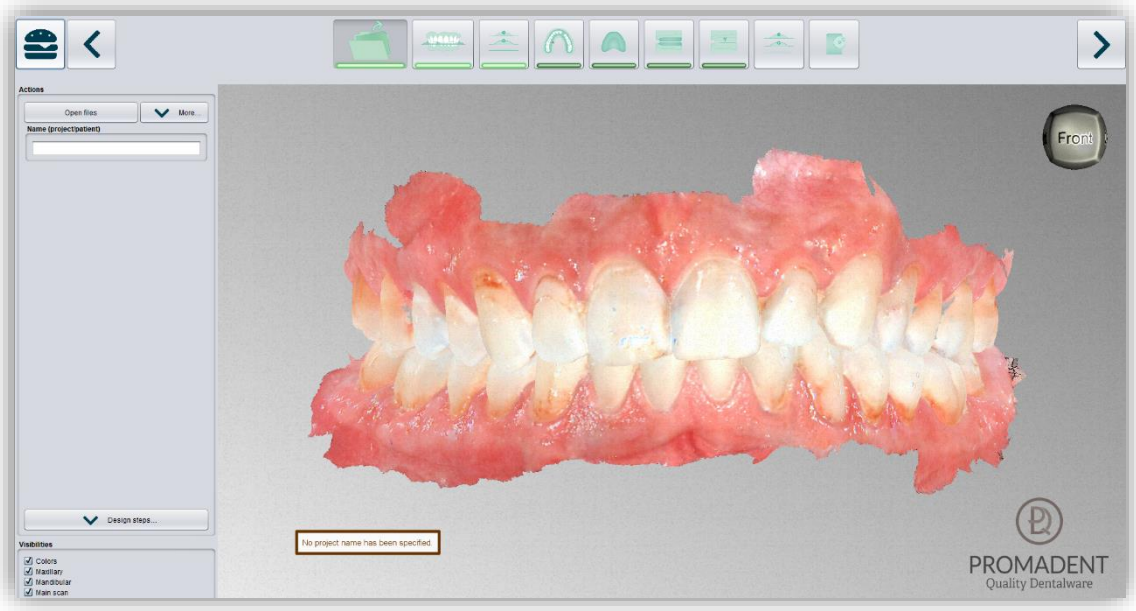


image 12: Color scan with textures.

5.2.2 Unload Model

Of course, you can also unload the loaded models again. To do this, use the *unload upper jaw* or *unload lower jaw* button shown on the action window on the left, see image 12.

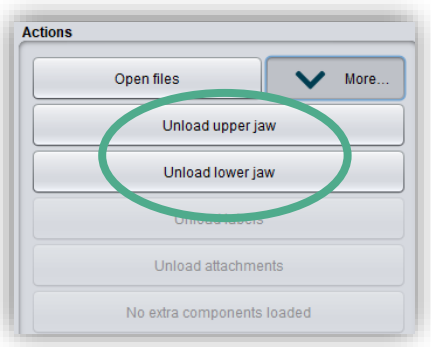


image 13: Unload models.

5.2.3 Assign a Project Name

After loading the scan data, it is possible to assign a user-defined name (e.g., project/patient) to the project (image 13). To do this, enter the desired project name in the *name (project/patient)* field. This name also appears in the top line of the BiSS window. If the project remains unnamed, you will see a corresponding message "No project name was entered". However, it is possible to continue without naming.

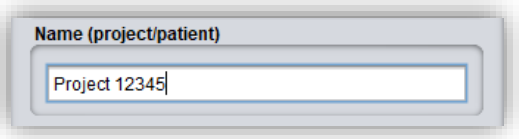


image 14: Enter project name.

5.2.4 Your Personal Workflow

If you don't need one or more of the possible designing steps of BiSS in your machining process, you have the option to deselect individual functions. To do this, simply remove the check mark from the relevant function. These functions will then no longer be displayed in the navigation bar. You will find the function palette shown in image 14 on the left side of the action window when you are in the *load step*. BiSS remembers your setting until the next time you open it, so you don't have to make this selection every session.

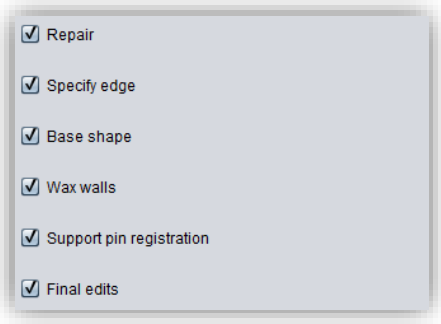


image 15: Design step selection.

Once you have made all the necessary settings, click >, to set the occlusal plane for your scan.

- ✓ Click on "Open file
- ✓ Select the file to load
- ✓ Determine the upper and lower jaw or reference scans
- ✓ Give your project a meaningful name

5.3 Align Object

In this processing step, you can align all loaded components. On the one hand, these are the main scans for the upper and lower jaw free components, if applicable.

You will see the *adjust jaws individually*, *edit components*, and *join pinned components and main scan*. If none of these are selected, then the *align occlusal plane* function is active, see image 15.

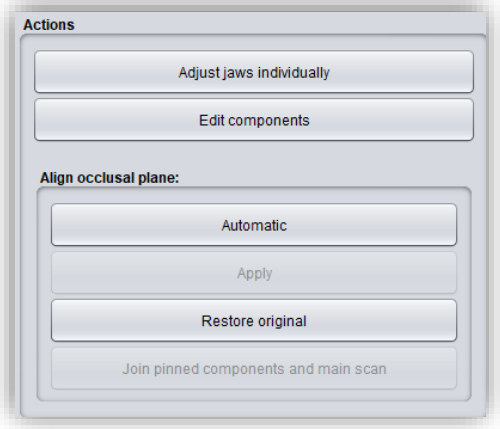


image 16: Action menu – align object.

5.3.1 Align Occlusal Plane

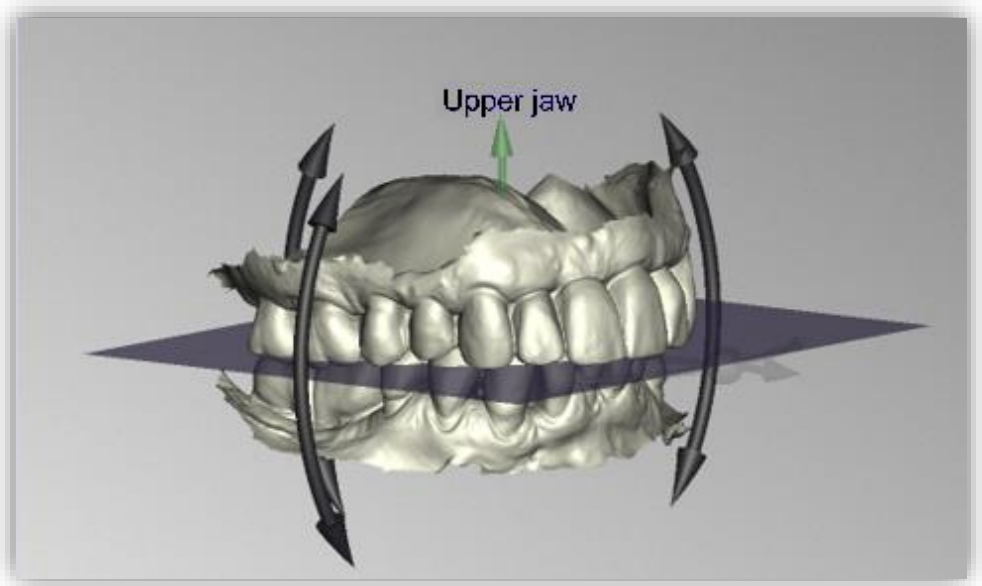


image 17: Automatically aligned occlusal plane. The position of the plane can be adjusted manually.

You can align the occlusal plane automatically or manually on the loaded scan. The simplest method is to first align the model automatically. This is already done automatically in the background or by clicking the *automatic* button in the action window (image 15). The plane is now automatically aligned.

Now you can check the position on the scan by moving, rotating, or zooming in/out with the mouse as described in the *Control* section.

If you would like to readjust the position of the occlusal plane, click on the appropriate direction arrow that shows you the possible change in position of the occlusal plane and thus move the plane while holding down the left mouse button. Double-clicking on the rotation arrows rotates the occlusal plane by 90°. Alternatively, click directly on the semitransparent plane. If you are content with your work, click *apply*. If necessary, you can automatically align your scan again.

Clicking the *restore original* button will undo any alignment.

Click > to move to the next editing step.

***Hint:** If you've made changes to the alignment but have not yet clicked "apply", the button will not say ">" but "apply and continue".*

- ✓ Click on "automatic"
- ✓ Check the position of the plane on the scan
- ✓ Make a manual readjustment
- ✓ Click on "apply"

5.3.2 Single Align

Click the *align individually* button, if you want to align the loaded jaw models to each other individually.

Select the respective individual component with a mouse click. You can now rotate and move these components as you wish.

5.3.2.1 Load Bite Scan...

Via the *load bite scan...* button, you can self-explanatorily load an additional bite scan and align the jaws to the bite scan.

You can choose between automatic *one-point alignment*, *3-point alignment* or *manual alignment* and subsequent fine adjustment via the *automatic fine adjustment* button.

5.3.3 Edit Components

You can load additional components into BiSS as *free components* and edit them in a variety of ways:

- ✓ Delete small components below a selected value limit
- ✓ Load any number of free components
- ✓ Align manually, with one-point alignment or with 3-point-alignment
- ✓ Connect to the scan in a variety of ways

- ✓ Load bite scans to align the main scans to each other

5.3.4 Align – Overview of all Functions

ALIGN OCCLUSAL PLANE	
Automatic	The occlusal plane is automatically aligned. This is the initial state after loading the main scans.
Apply	Accepts the occlusal plane after it has been aligned manually.
Restore original	Restores the original orientation of the scan data in space.
SINGLE ALIGN	
Load bite scans...	Another scan can be loaded into the project.
Automatic fine adjustment	Performs an automatic fine adjustment of the loaded scan.
Select first point (ctrl)	One-point alignment for pre-adjustment of the loaded scan.
3-point alignment: first triangle	3-point alignment for pre-alignment of the loaded scan.
EDIT COMPONENTS	
Load free components	Free components can be loaded into the project, such as (...).
Anchor in upper jaw	The free component is firmly connected to the upper jaw.
Anchor in lower jaw	The free component is firmly connected to the lower jaw.
Join pinned components and main scans	All detached components that touch the scan are added to the main scan.
Unpin all jaw extra components	All components that have already been anchored are detached and broken down into their individual parts. Each detached part can now be deleted or moved as required.
Delete	The selected component will be deleted.

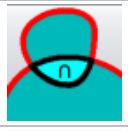
Delete all free components		All free components are deleted.
Delete small free components		Free components that are smaller than a selected limit, are deleted.
Reset transformation		Transformation steps are reversed.
Select first point (ctrl)		Select first and second point for one-point alignment.
3-point alignment: first triangle		Select the first and second points for the 3-point alignment.
Don't align, just select		Activate the checkbox if the free component should not be aligned.
Connect: affix		Scan and component, which approximately touch each other, are glued, i.e. a gap between them is calculated away and they are joined together.
Connect: interspace		The scan and the component are superimposed in at least one place. All surfaces/volumes that are duplicated are now reduced to one surface/volume. All surfaces/volumes that are new are added.
Connect: sew up		The scan and the component touch and are connected.
Connect: union		The scan and the component are joined together. All internal overlaps are calculated away from the component.
Connect: intersection volume		By means of a Boolean operation, all parts of 2 data sets that do not overlap are calculated away.
Connect: difference		The penetrated volume of the free component is subtracted from the scan.

table 10: Align – overview of all functions.

Once you have loaded a component, you can right-click on it and make some settings:

- ✓ you can *delete* the free component
- ✓ you can *pin* the free component to the upper or lower jaw
- ✓ the free component can be *exported* individually
- ✓ with *resize* the file can be enlarged in the whole with + or reduced with -.
- ✓ make a free component *watertight*, i.e., you have a crown, e.g., where the preparation margin is not closed. You can therefore look inside. This can now be closed with a click.
- ✓ you can *reset the transformation or undo the last move*

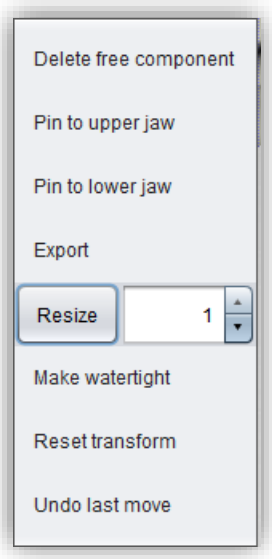


image 18: Extra settings for free components.

5.4 Repair

The repair of data is possible. This may be necessary if there are artifacts in the surface information. The repair trims and smoothes the artifacts and closes holes. In addition, material can be added or removed manually.

> ***Note:*** *It should be noted that this distorts the surface and can lead to inaccuracies. Therefore, it is recommended to regenerate scans with artifacts and other irregularities.*

Furthermore, you can apply material to the surface, remove material or smooth the surface. To do this, select the corresponding option in the action window. You can also select the *tool radius* in millimeters (image 18).

5.4.1 Repair

Activate the *repair button* in case it's not activated yet. For repairing, select the areas of the model you want to edit, with the left mouse button. The repair will be executed when you confirm your selection by pressing the space bar afterwards. If you hold down the ctrl key, you can select several areas at once. Otherwise, the previously selected area disappears when you release the mouse button and restart. If you hold down the shift key, you can draw a *polygon* that indicates the area to be repaired. We can distinguish two cases here. If the marker touches the boundary area of the model, the marked area will be removed. Here we can *smoothly close* the area through holes downright cut with a smooth edge. If the boundary area remains untouched, the data in the area will be removed and the hole will be closed again using extrapolated data.

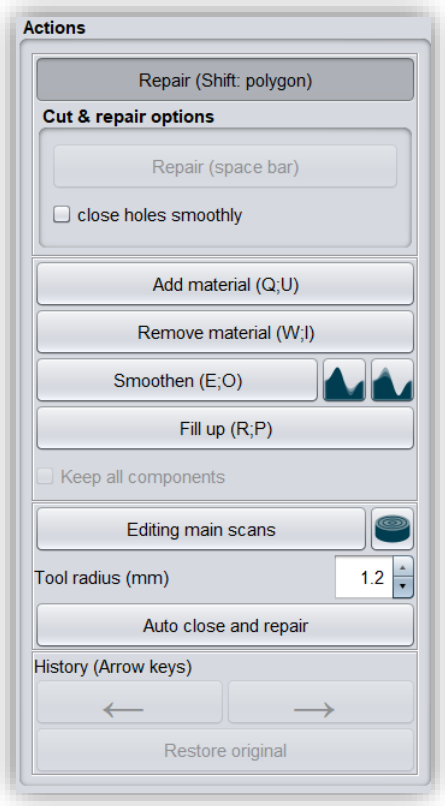


image 19: Action menu – repair.

5.4.2 Application, Removal and Smoothing

The tools *remove*, *apply* and *smooth* (without additional function, with "preserve concave areas" or with "preserve convex areas") are executed immediately, i.e., you do not have to confirm the input with the space bar. The intensity of this processing can be adjusted using the *intensity slider*. You can use the left arrow to undo individual editing steps and continue working on an earlier editing status or *restore original*.

5.4.3 Fill Up

The *fill up* function is particularly suitable for filling holes. This tool works in the same way as *apply*, but is even more fun, see image 19.

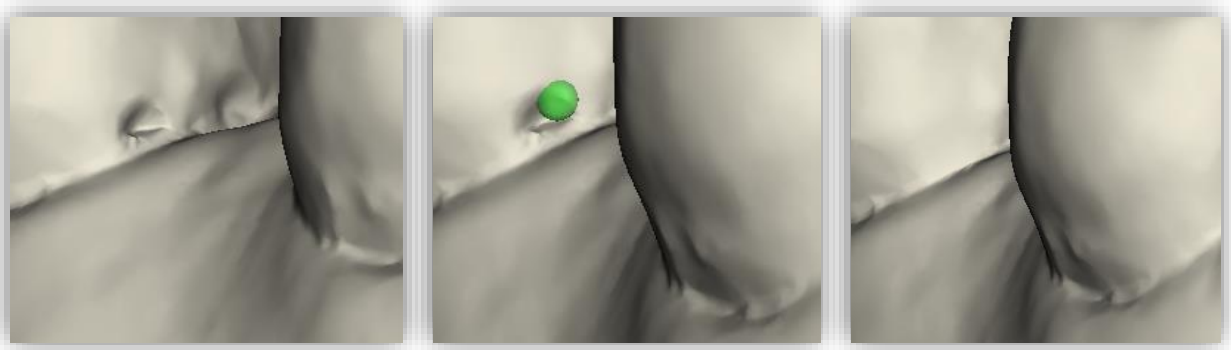


image 20: The fil up tool now makes it even easier to close holes and depressions.

5.4.4 Process Main Scans / Process Extra Components

The *edit main scans/edit extra components* button allows you to choose which scan you want to edit.

5.4.5 Display cross section

The *display cross section* button can be used to drag a cross-section over the scan (image 21). This opens a new window in which the cross-section is displayed. You can move, rotate and tilt the area of the cross-section to the left and right by moving the drawn line or clicking on the displayed arrows.

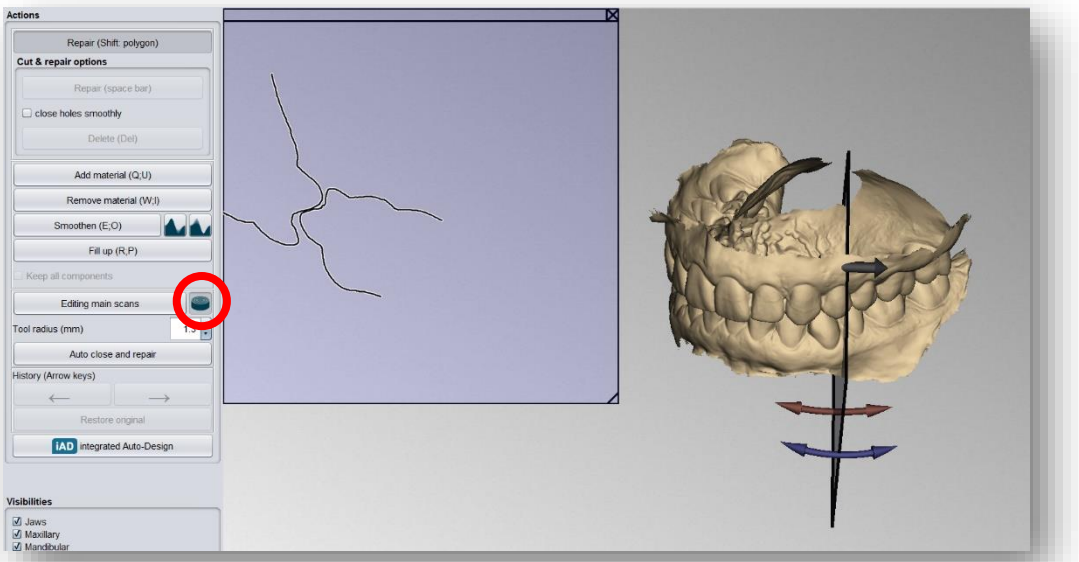


image 21: Use the "display cross section" tool.

5.4.6 Automatic Close and Repair

This function automatically closes possible holes in the scan and repairs scan artifacts by deleting "defective" parts of the mesh (e.g., self-intersections) and then closes the holes.

Click > to move to the next editing step.

- ✓ Select the repair tool
- ✓ Select the radius of your tool and, if necessary, the intensity
- ✓ Select the areas to be edited

5.5 Specify Edge

In this step, the margin of your base shape is determined. To do this, first define the insertion direction automatically or manually. Then define the base margin by defining a margin curve. You can also block out individual areas manually.

5.5.1 Show Upper/Lower Jaw

Click on *show upper jaw* or *show lower jaw* (image 20), to get a top view of the corresponding jaw, see image 21.

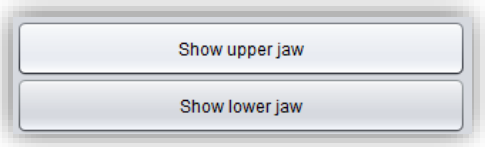


image 22: Show upper/lower jaw.

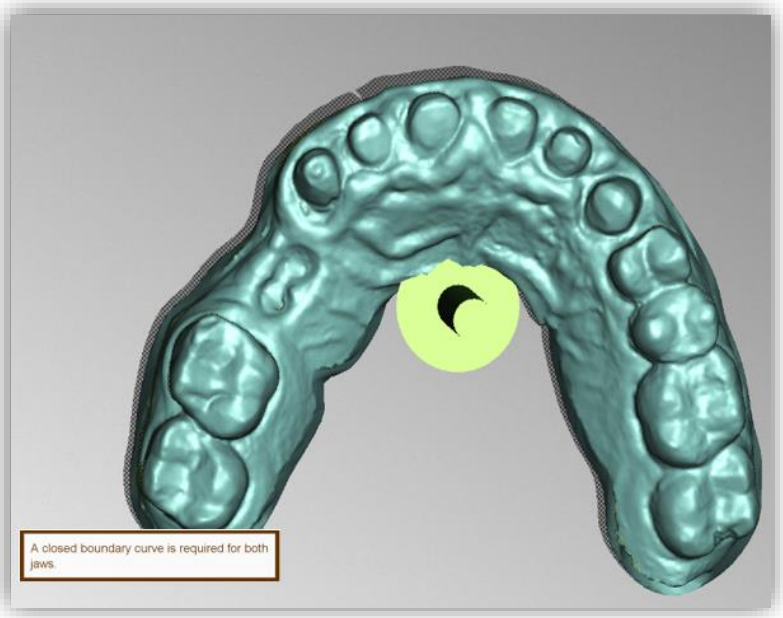


image 23: Display the upper jaw. The green arrow indicates the current insertion direction.

5.5.2 Set the Insertion Direction

BiSS can set the insertion direction automatically. To do this, click the *automatic* button, see image 22 .

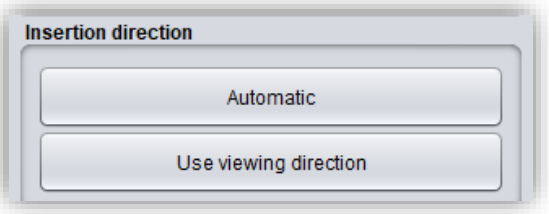


image 24: "Automatic" button for automatic setting of the insertion direction.

BiSS determines the insertion direction in such a way that the undercuts generated are kept to a minimum. The undercuts created are color-coded and blocked out for registration creation.

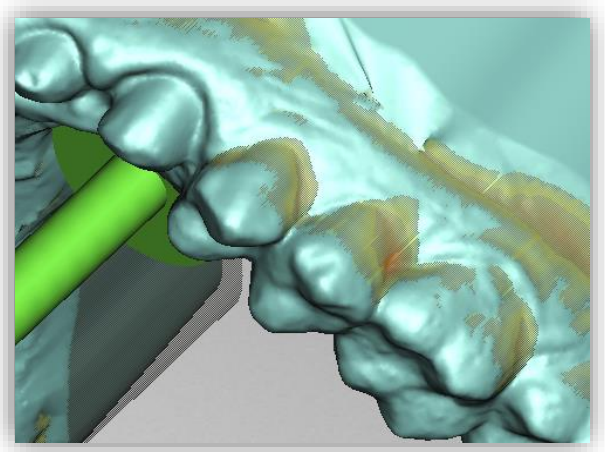


image 25: Representation of the undercuts.

You can also set the insertion direction manually. To do this, move the model to the desired position by holding down the right mouse button. Then click the *use viewing direction* button. BiSS adopts the current viewing direction as the insertion direction.

The *insertion direction* is represented by a green arrow.

5.5.3 Manual Blocking

In some cases, it may be necessary to block out areas manually. For example, in the case of deep fissures that are to be blocked out before the registration model is generated. To do this, select the *block out* button, set the tool radius and move over the corresponding areas of the scan while holding down the left mouse button.

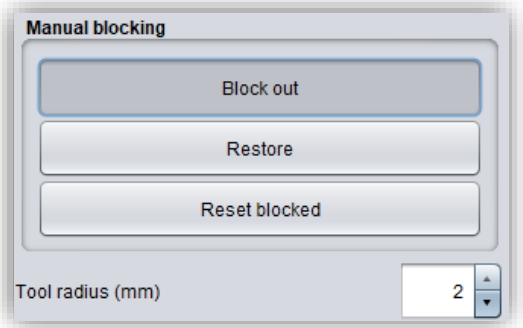


image 26: Manual block out. The tool radius can be adjusted, you can restore or reset everything.

To undo the blocking out, select *restore* button and move over the relevant areas with the left mouse button pressed, see image 25, or reset everything.

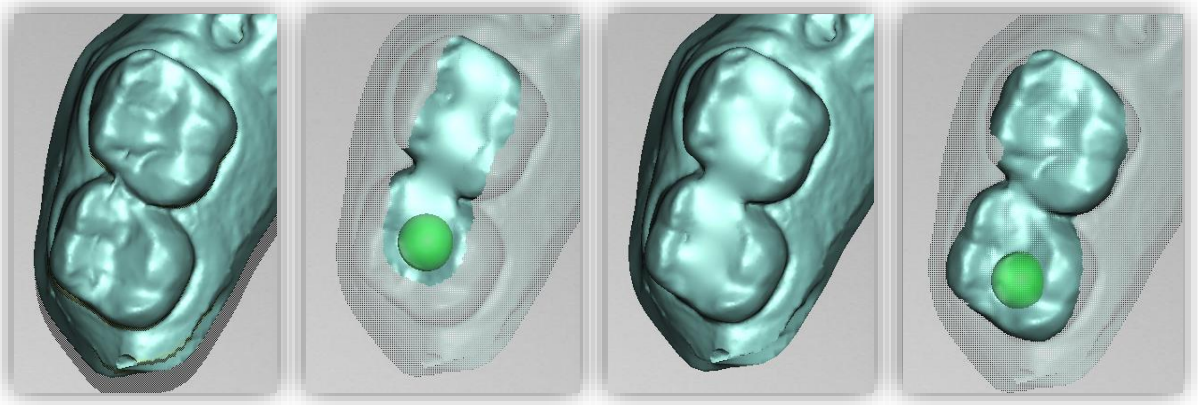


image 27: Before blocking out - block out - after blocking out - restore.

5.5.4 Set Boundary Curve

The *define edge* button is already selected by default in this step (image 26). You can therefore start defining the tray edge immediately. If the button is not active, select it first.

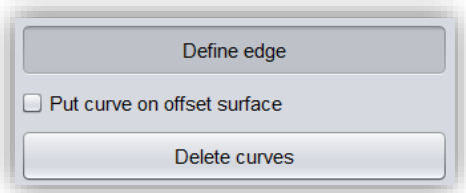


image 28: Buttons for setting the boundary curve.

Now you need to define the boundary curve (spline) of your base shape by setting the appropriate points. To do this, click on your jaw model with the left mouse button and set the starting point (image 27) and all the other points through which the boundary curve should run. You can also hold down the left mouse button and drag the point to the desired position.

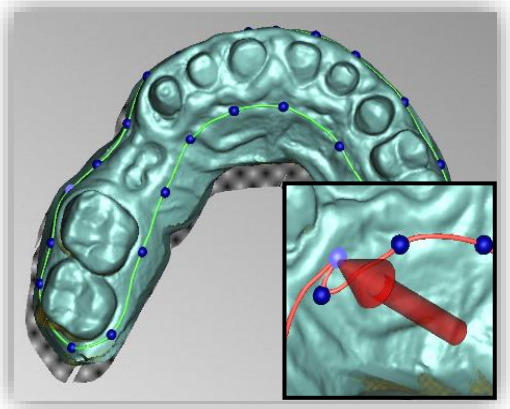


image 29: Closed spline. Indication of problematic location.

The set points are displayed in blue and are connected to a red curve. The start point and the currently set point are highlighted in yellow, see image 27. You can move an already set point of your spline by selecting a point, holding down the left mouse button and dragging it to the desired position. Continue setting further points until you have defined a closed boundary curve.

Close this curve by selecting the first point of the curve again. Individual points can be deleted individually by double-clicking or pressing the remove key.

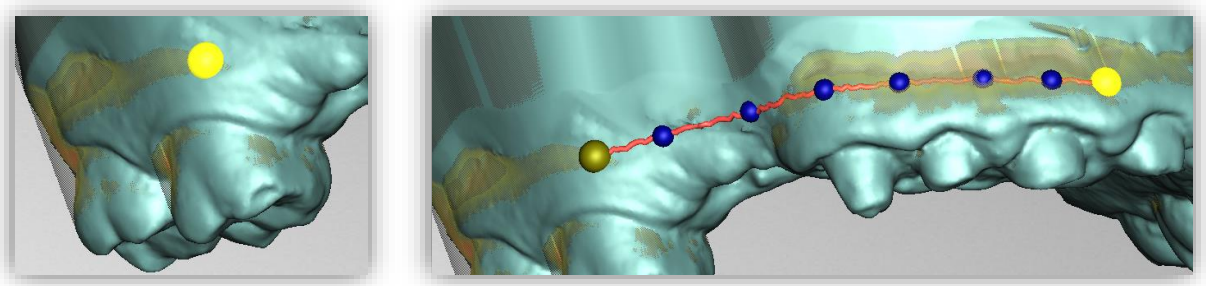


image 30: LEFT - Select the starting point of the boundary curve. RIGHT - Define the boundary curve by setting several points.

> ***Tip:*** *Rotate the view of your jaw model by centering the view on the selected control point by pressing the space bar.*

After closing, the defined boundary curve is displayed in green (image 28), if it is free of self-intersections.

To get a better estimate of the gap between the model and the tray, you can also place a checkmark next to Curve on offset surface. This simulates the gap in blue (image 32). As soon as you have checked this box, the distance (mm) and the thickness (mm) of the tray are also displayed and can already be set here, see image 31.

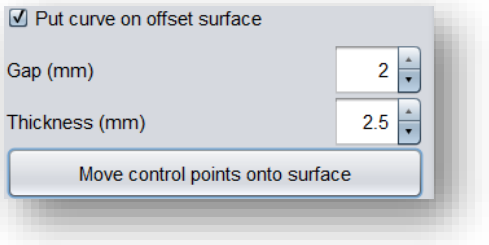


image 31: Offset surface settings

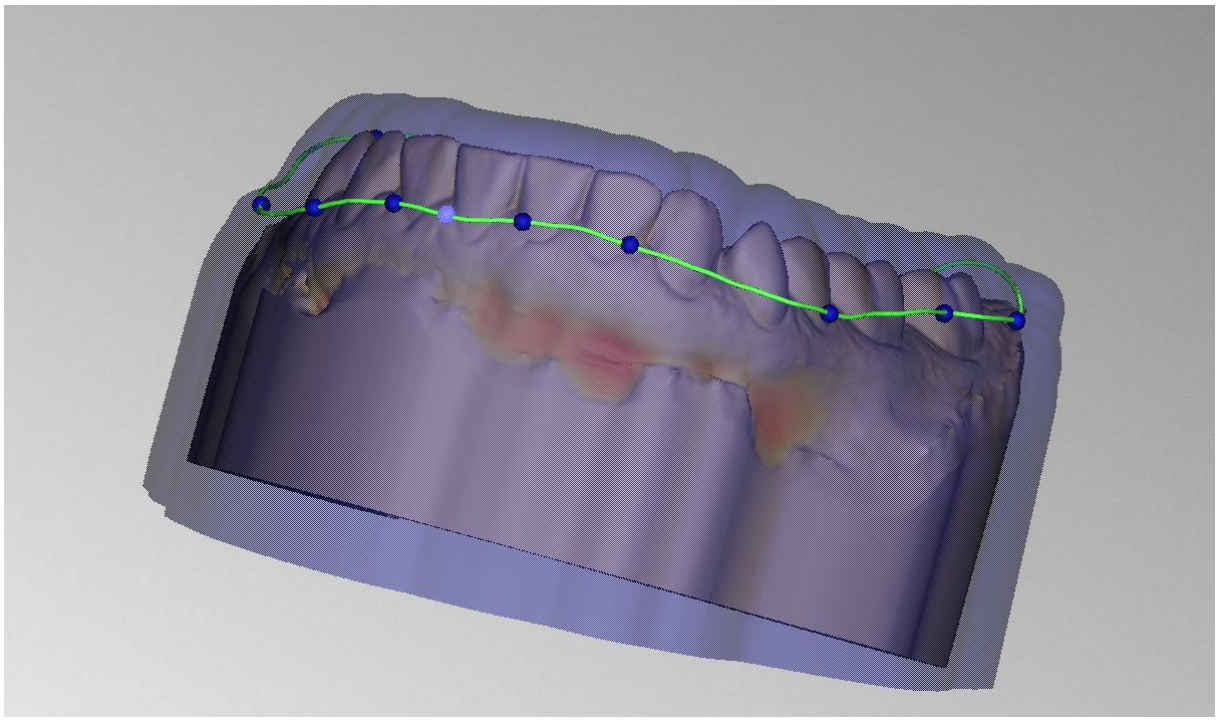


image 32: Spline on the displayed offset surface.

If the curve contains a problematic point, then a red arrow will appear pointing to that point. You now have the opportunity to make corrections by moving individual points or defining additional points along the curve if necessary. If you want to delete the entire spline, then click on the *delete curve* button.

This edge curve now defines the outer edges of the registration.

If you have defined the insertion direction and margin curve, then > to continue. The margin curve is now trimmed, automatic repairs are made, and the medial axis is set.

- ✓ Set the tray shape by defining the boundary curve
- ✓ Set the insertion direction
- ✓ Block out desired areas if necessary

5.6 Set the Base Shape

In this editing step, you can make further settings that define the final tray shape. You can define the spacing and thickness of the registration, extend the rim, create holes, and insert wax walls, see image 29. If you don't want to make such changes to the created tray shape, you can skip this step.

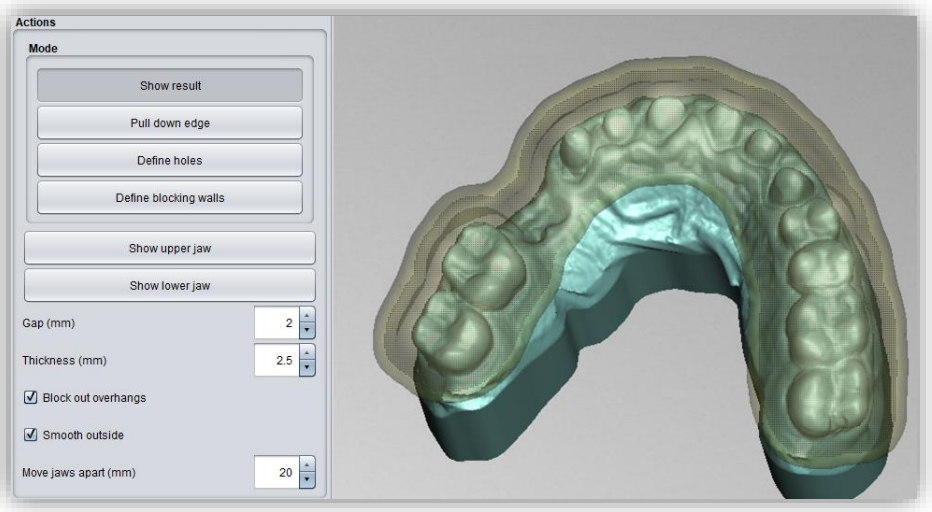


image 33: Result after defining margin and insertion direction.

5.6.1 Distance and Thickness

You can set the distance (in mm), i.e., the gap between the jaw and the base. This allows you to regulate how much impression material is in this gap. The distance is constant over the entire surface of the jaw, considering the automatic and manual block-outs.

The distance and thickness settings specified here will be saved for your next BiSS session.

Note: *If you want to create a bite registration or a support pin registration, set the distance to 0 mm. In this case, no space is desired.*

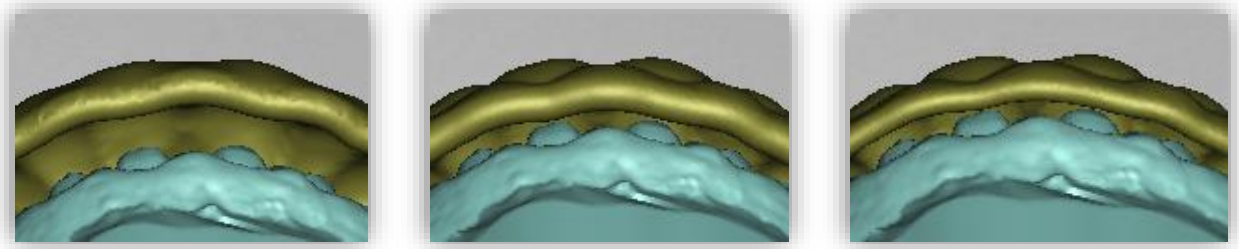


image 35: Effect of setting, thickness and spacing. LEFT - distance 4mm, thickness 3mm. CENTER - distance 2mm, thickness 3mm. RIGHT - distance 2mm, thickness 2mm.

5.6.2 Block Out Overhangs

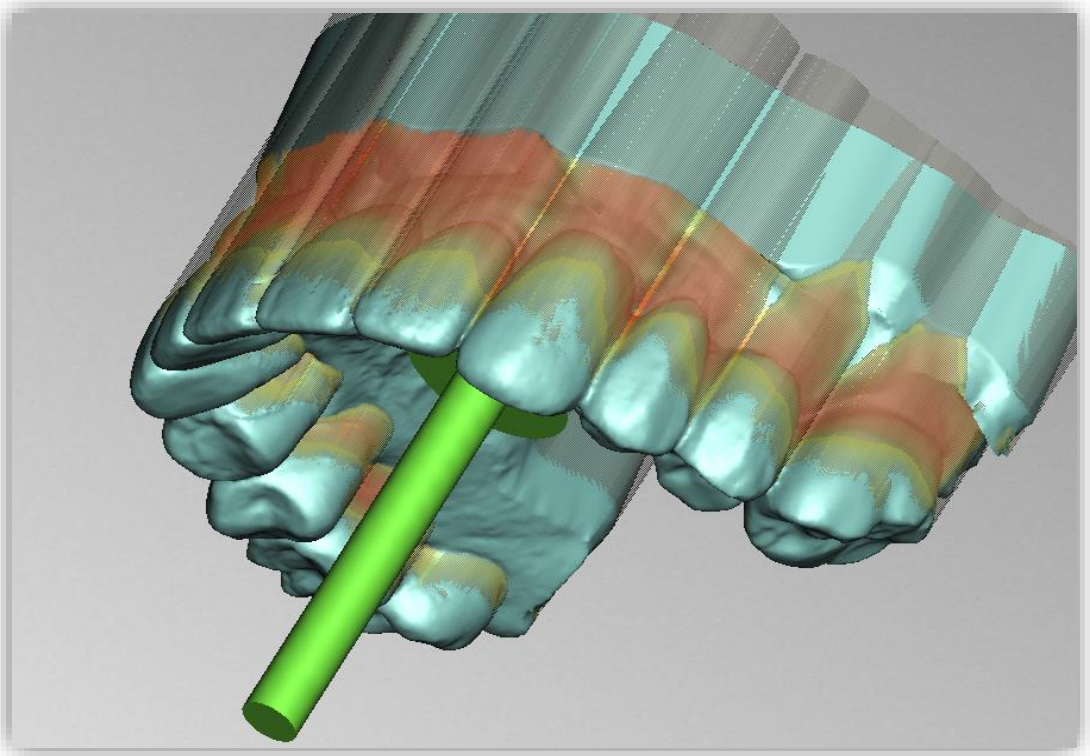


image 34: For this example, the insertion direction was chosen to create particularly strong overhangs.

If this option is activated, then all overhangs due to block outs are ignored. The base is then created everywhere with a constant distance around the tray form, see image 32.

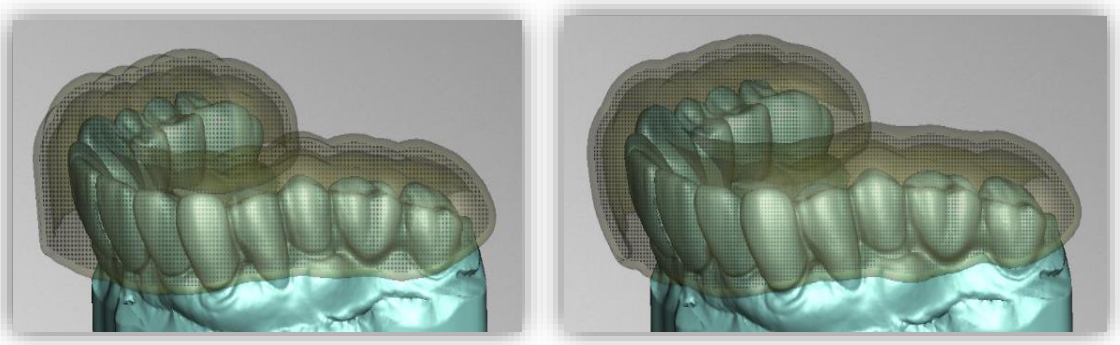


image 36: LEFT - Ignore overhangs - "off". RIGHT - Ignore overhangs - "on".

> ***Warning:*** *Careless use of this function may result in not being able to release the base when doing a try-in.*

5.6.3 Smooth Outside

If you want the outside of the impression tray to be smoothed, check the *smooth outside* option. If the option is not activated, the topography of the inside (with corresponding wall thickness) is adopted on the outside of the tray, see image 33.

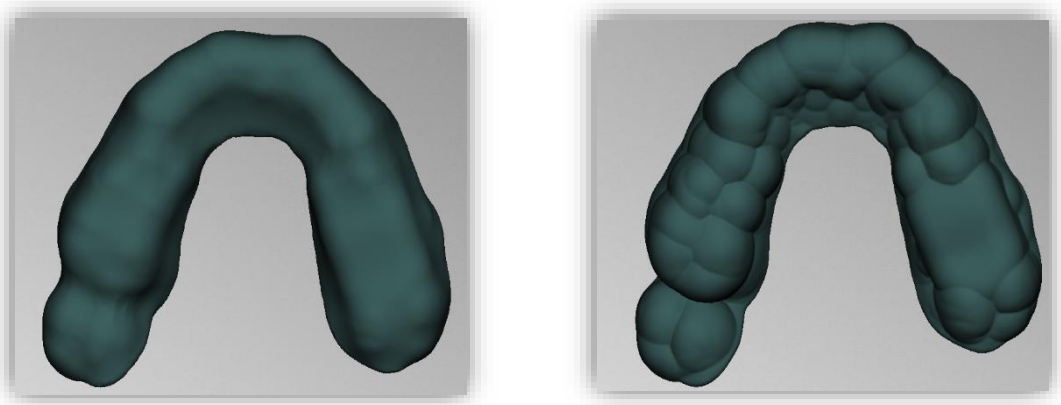


image 37: LEFT - Outside smoothed. RIGHT - Outside not smoothed.

5.6.4 Pull Down Edge

You can extend the edge of the base over the entire edge or in individual places by activating the *pull-down edge* button.

The base is now displayed transparently, and the original edge is highlighted in green. You can now set the desired size of the *displacement (in mm).*

Now move the mouse over the edge areas that you want to extend by holding down the left mouse button, see image 34. The extension is immediately displayed in a gray-transparent color. If you want to extend the margin by a different value in some places, change the value and move the mouse over the corresponding areas again.

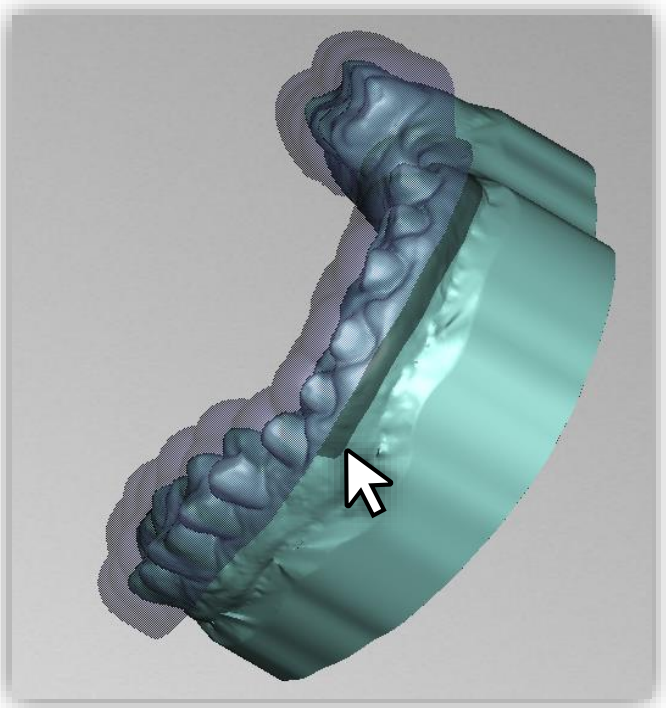


image 38: Selection of the area for edge extension.

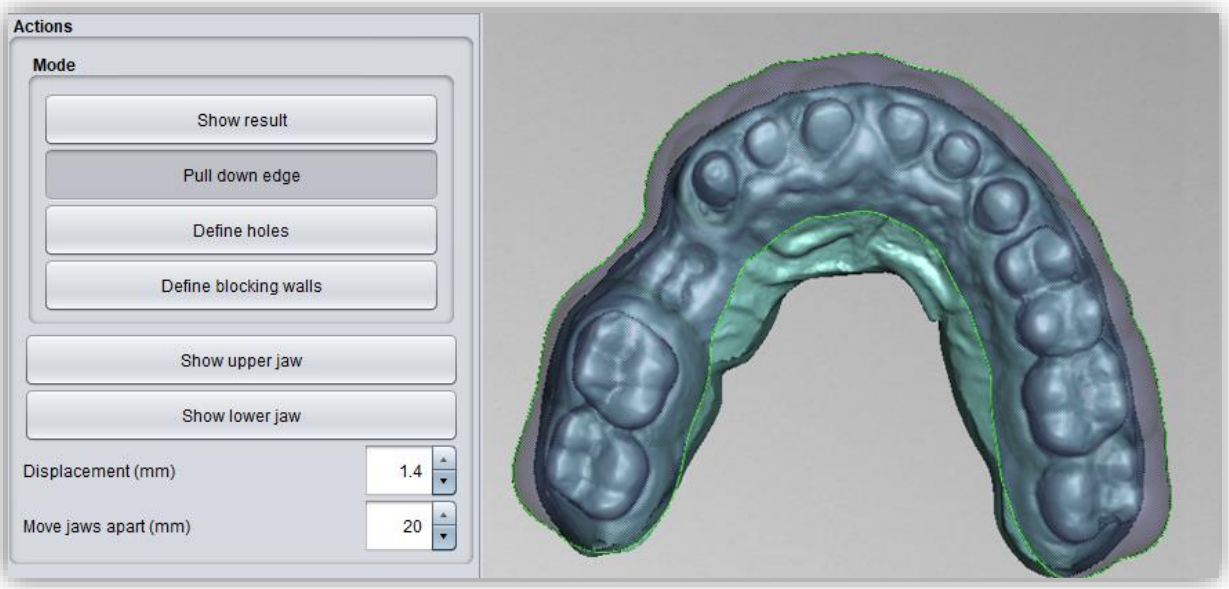


image 39: Selection of the "pull down edge" adjustment tool.

5.6.5 Define Holes

To insert holes, click on ***define holes*** and then click on the corresponding position of the scan. The hole is inserted and displayed as a transparent preview. The hole is displayed in red, the chimney in green, see image 36.

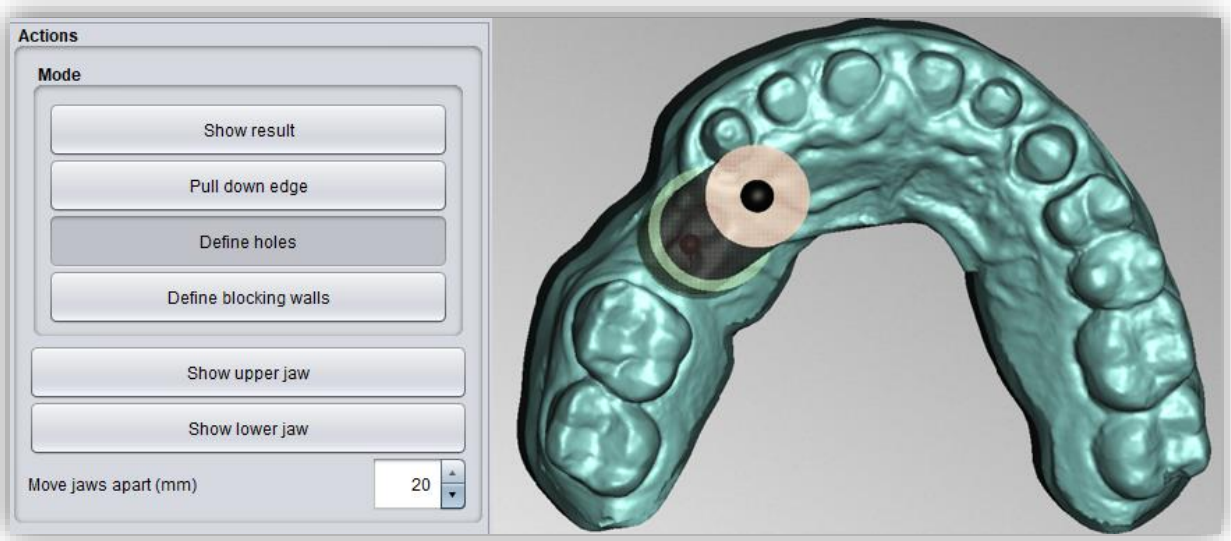


image 40: Edit holes.

The hole is inserted in the insertion direction by default and placed directly above the scan surface. The hole view has two spherical black handles. The lower handle can be used to move the hole, and the upper handle can be used to change the slope.

If you click next to the handle, ***another hole*** will be created. If you right-click on the hole, a context menu appears. You can ***delete*** the corresponding hole or ***align*** it according to the insertion direction.

You can also use the ***in-insertion direction*** button to align the hole again according to the base insertion direction.

Further setting options are summarized in the following table 11:

HOLE SETTINGS	DESCRIPTION
Closed	Activate if a closed hole shall be created.
Wall height (mm)	Sets the wall height in millimeters. The wall is added to the tray and is the "edge" of the hole.
Wall thickness (mm)	Sets the wall thickness in millimeters.
Round	Enable for a round hole. Disable for a rectangular hole.
Diameter (mm)	Specifies the diameter of the round hole in millimeters.
Align with insertion direction	Aligns the selected hole in the insertion direction of the tray.

Delete	Deletes the selected hole.

table 11: Hole setting options. The settings are applied to the next project.

5.6.6 Define Blocking Walls

To fill existing gaps with virtual material, you can create inner block-out walls. Click ***define blocking walls***. Then define the starting point and other points for the wax wall. On the left of the action window, a menu opens with various setting options for the selected wax wall.

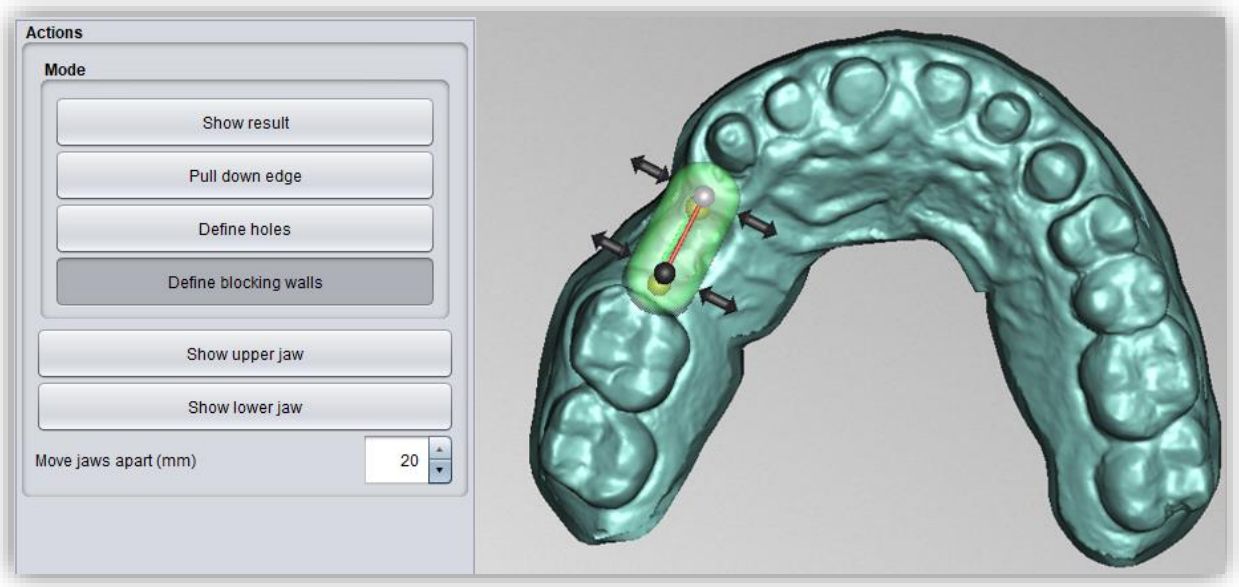


image 41: Edit wax walls.

If you want to create another wax wall and not define any more points of the current wall, click ***new blocking wall***. Then set the corresponding points

Right-clicking on the wax wall opens a context menu that allows you to delete the selected control point or the entire wax wall.

5.6.6.1 Control Point Properties

The shape of the wax wall is controlled by the control point position and the control point properties. ***Height and width*** can be set both by moving the corresponding handles on the virtual wax wall and on the left in the action window by setting the absolute numerical values. In addition, ***rounding radius*** and ***taper*** can be defined. If all control points are to be changed by the same value, then the ***change all by same amount (shift)*** button can be activated before the change is made, or you can make the changes while holding down the shift key.

CONTROL POINT PROPERTIES	DESCRIPTION
Height (mm)	Specifies the height of the control point in millimeters above the scan surface.
Width (mm)	Specifies the width of the wax wall at the control point in millimeters.
Rounding radius (mm)	Specifies the rounding radius in millimeters at the ends of the wax wall.
Taper	Specifies the widening of the wax wall towards the bottom.
Change all by same amount (shift)	Changes all properties by the same value.
Edit separately	Changes the property of the selected point.
Set all to same value (Ctrl)	Sets all to the same value regardless of the previously set values.

table 12: Control point properties for wax walls.

When you have finished editing the tray shape (edge, holes, wax walls), click >.

5.7 Bite Registrations

With this step you can create a bite registration or a support pin registration. Optionally, an outer *trench* with undercut can be placed or a wax wall with *notches* - if you want to create a support pin registration.

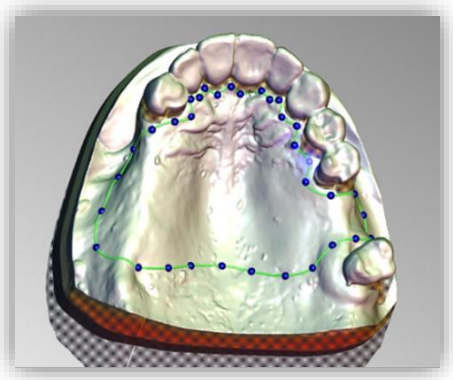


image 42: Define base using spline.

In the previous step you have already defined the tray base and set the distance (mm) to 0, see image 38. Before defining the wax walls, you can optionally display a cross-section to see how much space you have between the upper jaw and lower jaw, see image 40.

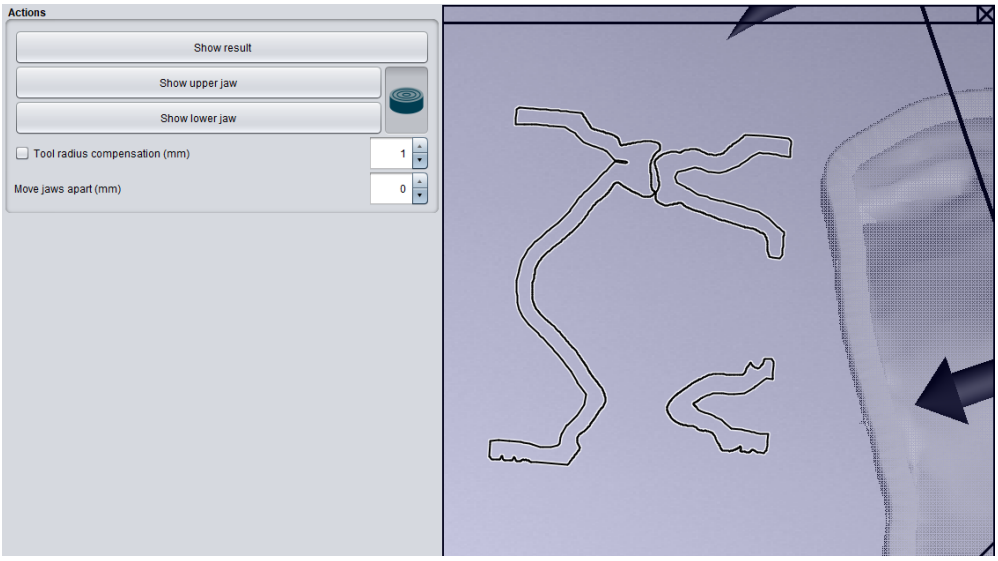


image 44: Display cross section.

In the bite registrations editing step, you first see the tray base. By clicking on the base, you can define the course of the outer wax walls, as in image 39.

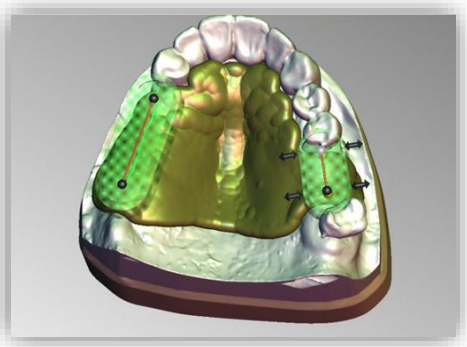


image 43: Define the position and dimension of the outer wax walls. The trench is optional.

By setting the first point, a menu opens on the left in the action window. There, under wax wall actions and control point properties, there are the following setting options:

image 45: Action menu bite registration.

WAX WALL ACTIONS	DESCRIPTION
New wax wall	The next point set is assigned to a new wax wall.
Delete wax wall	Deletes the selected wax wall. Another wax wall is selected by selecting a control point.
Flush wax wall edge to given height	Aligns the wax walls.
Distance to occlusal plane (mm)	Indicates the height of the wax wall over the occlusal plane.
Distance from wax wall top to tray wedge (mm)	Specifies the height of the wax wall above the base.
Make trench	Selection: Creates a trench in the created wax wall.
Trench width (mm)	Specifies the width of the trench.
Trench depth (mm)	Specifies the depth of the trench.
Undercut (mm)	Specifies the depth of the undercut. For a secure hold of the wax.
Make notches	Selection: Creates a wax wall with notches (to prepare for support pin registrations).
Rounded ends	The ends of the wax wall are rounded off.

table 13: Overview - wax wall actions.

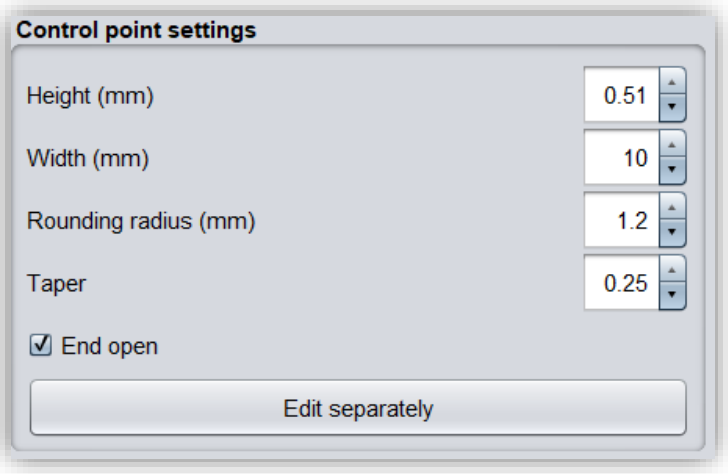


image 46: Control point properties.

CONTROL POINT PROPERTIES	DESCRIPTION
Height (mm)	Specifies the height of the control point in millimeters above the scan surface.
Depth (mm)	Specifies the depth of the control point in millimeters.
Width (mm)	Specifies the width of the wax wall at the control point in millimeters.
Rounding radius (mm)	Specifies the radius of rounding radius in millimeters at the ends of the wax wall.
Taper	Specifies the widening of the wax wall towards the bottom.
Change all by the same amount (shift)	Changes all properties by the same value.
Edit separately	Edits a single control point.
Set all to same value (Ctrl)	Sets all control points to the same value.
End open	For free ends to insert the wax wall.

table 14: Control point properties bite registrations.

Optionally, perforations can be added. However, this is not possible in the area of the wax walls, see the areas marked in red in image 44.

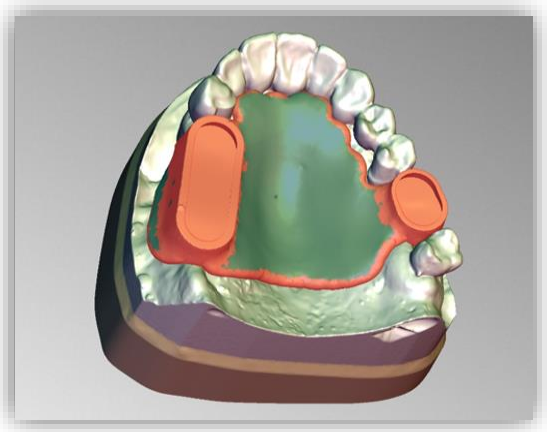


image 48: The bite registration in the "perforation" processing step. The areas marked in red cannot be perforated.

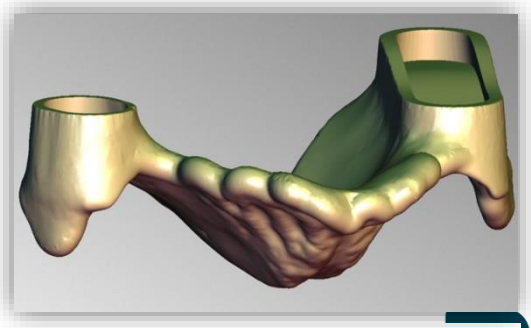


image 47: The bite registration, ready for export.

5.8 Plugin Pointer

In the previous step, you have already defined the tray base and set the distance (mm) to 0 and then placed a wax wall with engraved trenches on the tray base image 45.

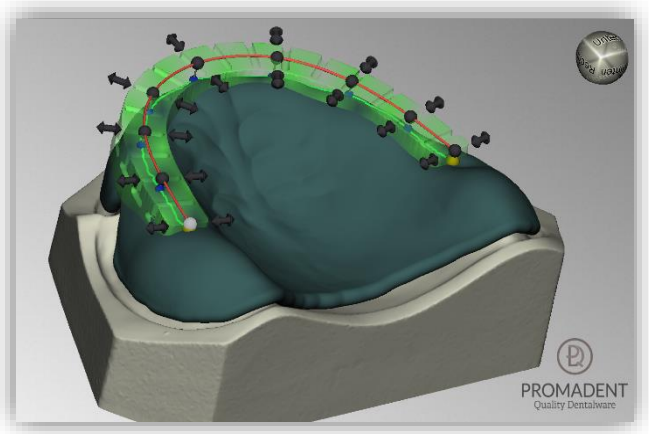


image 49: Define position and dimension of the outer trench.

In the support pin registrations editing step, you can select a jaw that you want to edit first. All design steps can be performed for both the upper jaw and the lower jaw, depending on the patient situation. In our example, we have chosen a support pin in the upper jaw and a plate in the lower jaw.

When you select the jaw to be edited, a menu opens on the left in the action window. There, after setting a check mark at ***hole for pin***, the following setting options are available:

- ✓ Subtract the parts for the other jaw
- ✓ Hole for pin
- ✓ Lateral hole shift (mm)
- ✓ Frontal hole shift (mm)
- ✓ Generate plate
- ✓ Distance to occlusal plane (mm)
- ✓ Auto-compute height
- ✓ Pin hole Ø (mm)
- ✓ Pin hole wall width (mm)
- ✓ Pin hole wall height (mm)
- ✓ Limit stop (mm)
- ✓ Screw hole Ø (mm)

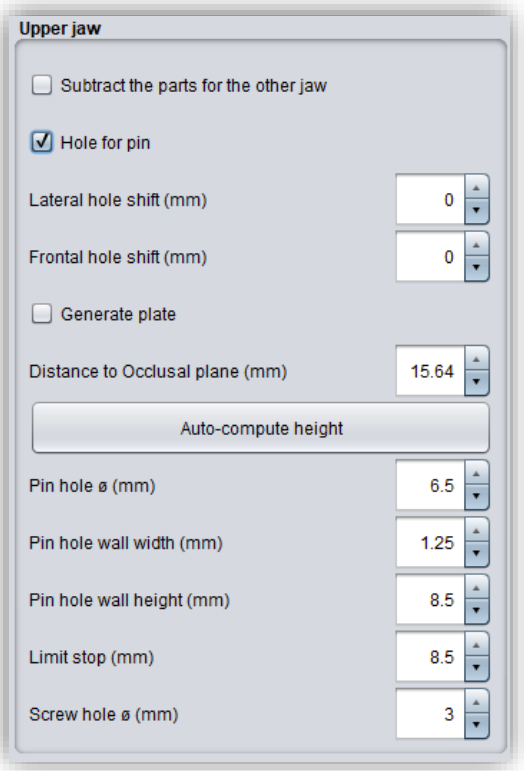


image 50: Action window upper jaw.

ACTIONS	DESCRIPTION
Subtract the parts for the other jaw	If the jaws overlap, something is deducted from the base of the tray of the opposite jaw.
Hole for pin	A sleeve hole for the pin is created.
Lateral hole shift (mm)	The pin hole is shifted laterally.
Frontal hole shift (mm)	The pin hole is shifted forward or backward.
Generate plate	A plate is created.
Distance to occlusal plane (mm)	Indicates the height of the plate or the stop of the pin hole over the occlusal planes.
Auto-compute height	The height of the pin hole is automatically calculated so that the hole is positioned on the tray plate.
Pin hole Ø (mm)	Specifies the diameter of the pin hole.
Pin hole wall width (mm)	Specifies the width of the edge of the pin hole.
Pin hole wall height (mm)	Specifies the height of the edge of the pin hole. The edge is to serve as a guide for the sleeve to be glued in.
Screw hole Ø (mm)	Specifies the diameter of the screw hole. It must be selected to allow the screw of the support pin to be reached from the opposite side.

table 15: Actions after selecting a hole for the pin.

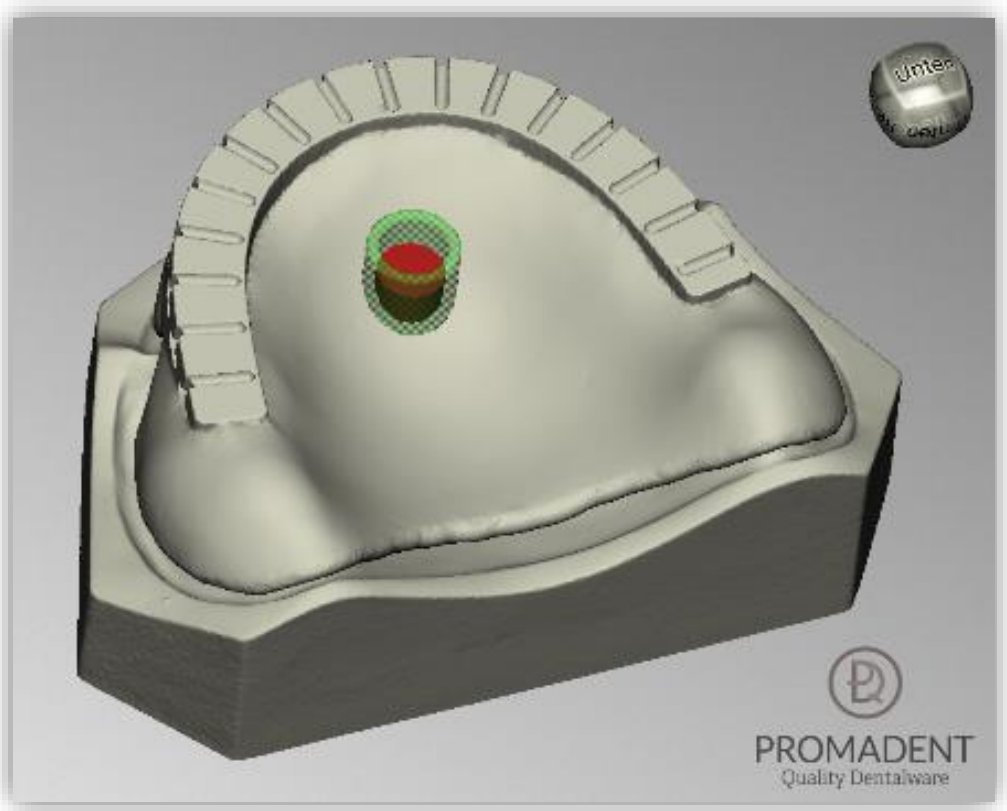


image 51: Positioning of the pin hole on an upper plate.

Now select the lower jaw to define the plate for drawing. The following actions are available, see image 48:

- ✓ Subtract the parts for the other jaw
- ✓ Hole for pin
- ✓ Generate plate
- ✓ Thickness (mm)
- ✓ Drawing plate (Ctrl: erasing, shift: polygon)
- ✓ Distance to occlusal plane (mm)

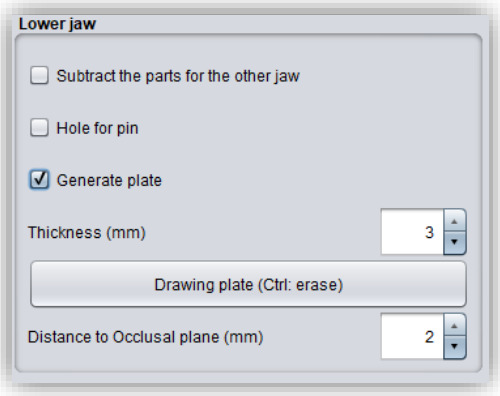


image 52: Action window lower jaw.

ACTIONS	DESCRIPTION
Subtract the parts for the other jaw	If the jaws overlap, something is deducted from the base of the tray of the opposite jaw.
Hole for pin	A sleeve hole for the pin is created.

Generate plate	A plate is created.
Thickness (mm)	Specifies the thickness of the created plate in mm.
Drawing plate (Ctrl: erasing)	A brush can be used to draw a plate.
Erasing Plate (Ctrl: drawing)	A brush can be used to erase a drawn plate.
Distance to occlusal plane (mm)	Indicates the height of the plate over the occlusal planes.

table 16: Actions after selecting a plate.

Tip: If you hold down the shift key while drawing or erasing the plate, you can select points for a polygon. Within the resulting polygon, the surface is either drawn or erased, see image 49.

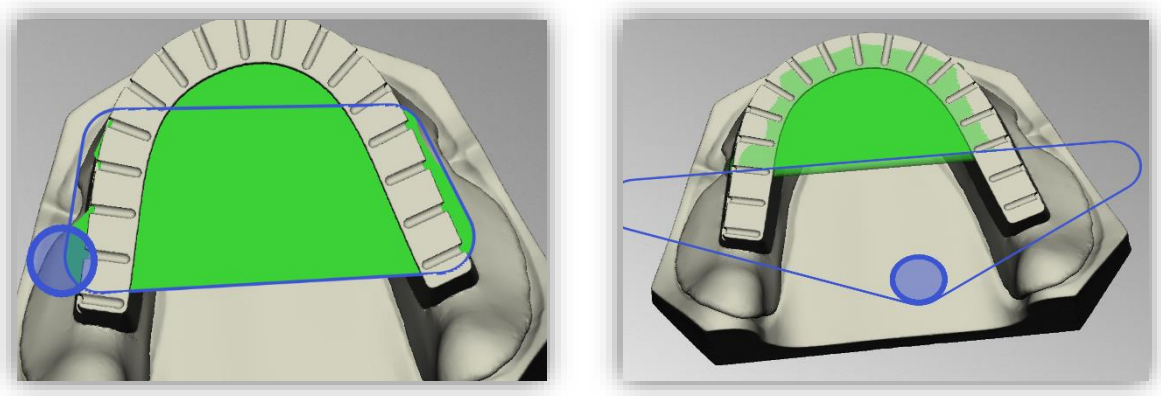


image 53: LEFT - polygon draws; RIGHT - polygon erases.

The punched platelet to determine the position shouldn't be missing. To do this, you can go to *generate platelet* and a new window will open (image 50). The dimensions of the platelet can be set individually by the parameters *thickness*, *diameter*, *hole diameter*, *hole displacement*, *cone angle* and *cone depth*. When you have set the desired parameters, go to *export* and the platelet is ready for printing in a selected folder, see image 50.

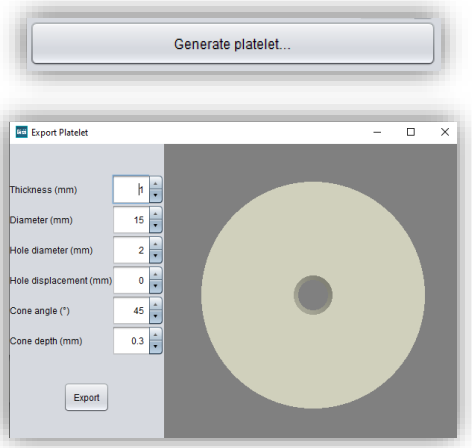


image 54: ABOVE - Create platelet. BOTTOM - Actions to spend a platelet.

Now go to *show result* and your support pin registration will be displayed (image 51).

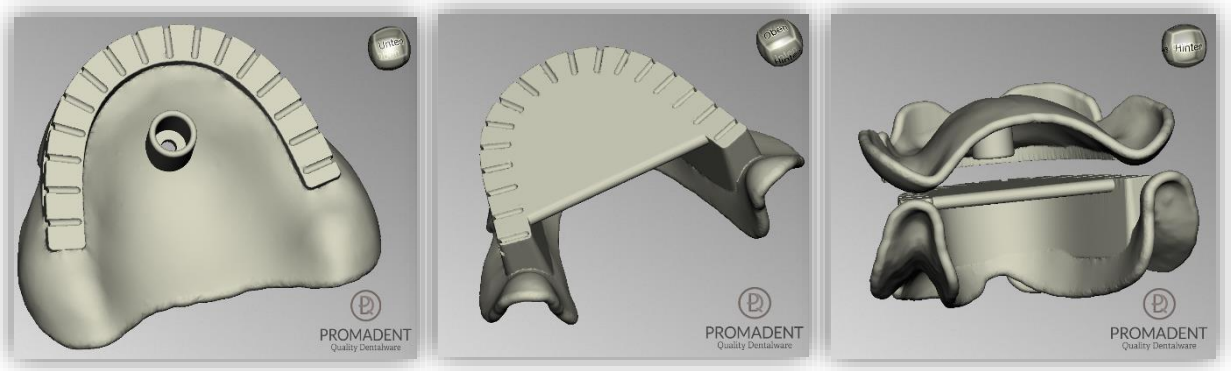


image 55: LEFT - support pin registration upper jaw with pin hole, CENTER - support pin registration lower jaw with plate, RIGHT - support pin registration encoded.

5.9 Final Edits

In this designing step, you have another opportunity to edit your tray model. For example, you can repair areas, add, or remove material and smooth areas.

The functionality is identical to the repairing step and is described in detail in the *Repair* chapter.

5.10 Save the Job

Now you have the possibility to *save* the whole project in a project file .GBS or to *export registration* and all components as .STL, .OBJ or .PLY for further processing. In addition, you can also export individual intermediate states, *export the registration aligned*, start directly with a *new project*, or return to the start screen and *choose another application* (image 52).

5.10.1 Save BISS-Registration-Project

Select *save* to save the project file .LFL. If you have already saved the project or no project name is set, select *save as*.

5.10.2 Send BiSS-Files to PUZZLE

If you have purchased the PUZZLE application, then you can send the data directly to PUZZLE so that they are placed fully automatically. To do this, it is necessary to set the storage path beforehand (see chapter Loading and Saving).

5.10.3 Materials

If you have purchased the PUZZLE application, you can send the data directly to PUZZLE so that it can be placed fully automatically. To do this, it is necessary to determine the material beforehand, as you can create an individual material for each panel in PUZZLE.

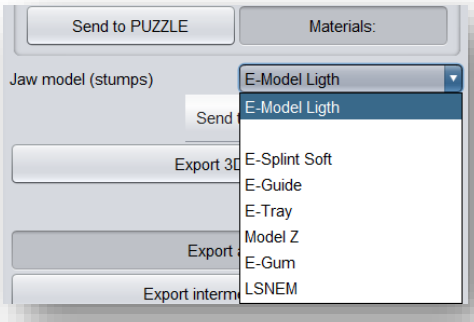


image 56: Materials already created by PUZZLE

5.10.4 Export Registration

Select ***export registration*** in the actions window or ***> Export*** in the top menu bar to export the tray, bite registration or support pin registration as an .STL, .PLY or .OBJ file.

5.10.5 Export Aligned

You can export the data in ***original position***, or already aligned for 3D printing.

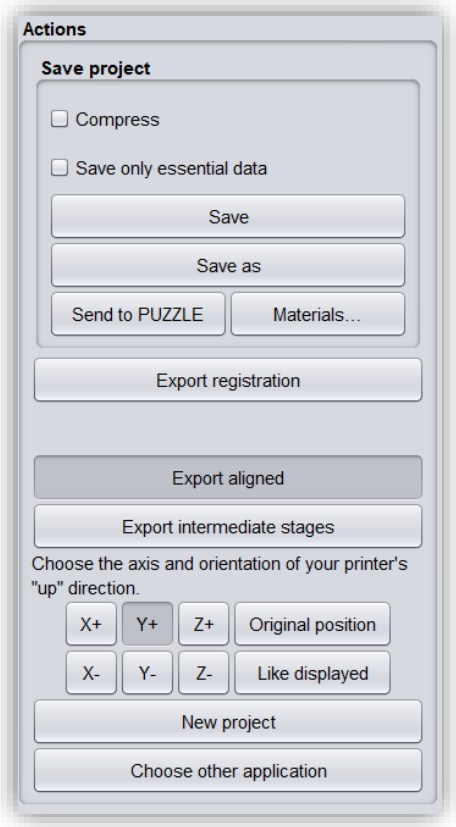


image 57: Selection for saving and exporting.

Therefore, activate the ***export aligned button*** and select the axis and orientation that points upwards for your printer. If ***export aligned*** is not activated, the default is to export in the coordinate system used by BiSS, i.e., the set occlusal plane is the x-z plane. Export in ***original position*** means that the data is exported in the same coordinate system in which the main scans were originally loaded. Export ***like displayed*** means that the data is output exactly as displayed, i.e. including bite blocking by the articulator.

5.10.6 Export Intermediate Stages

To export an intermediate status, select the processing statuses that you want to export and then click *export* (image 53).

The processing statuses and their sequence correspond to the BiSS workflow and are self-explanatory in terms of terminology. Therefore, a description of the individual stages is unnecessary at this point.

5.10.7 New Project

Clicking on *new project* opens a new project. The old project is closed if it was saved before. If it has not been saved yet, then there is a hint about it.

5.10.8 Choose Other Application

Return to the start screen and select another BiSS application.

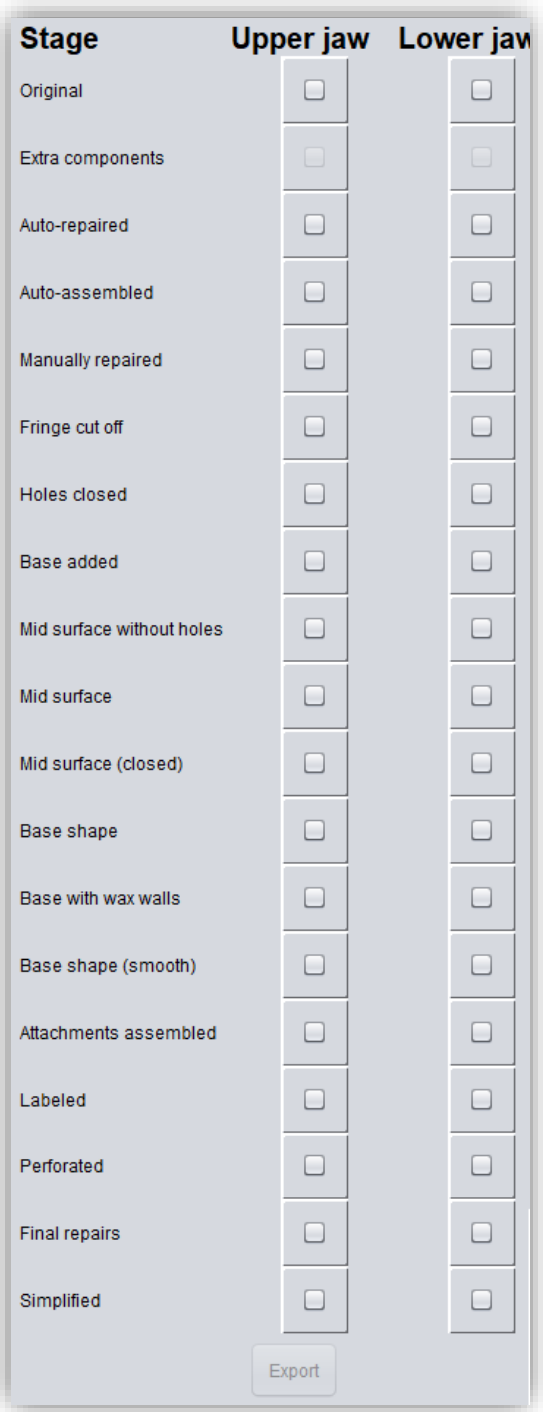


image 58: Export intermediate state. Select the desired intermediate levels and click "export".

6 Software-Updates

6.1.1 Update-Availability

You will automatically receive a message when a new update is available for your software.

Alternatively, you can click the *check for updates* button via Menu - Settings - Updates.

If no update is available, the message shown in image 54 appears.

6.1.2 Install Update

Click on the provided link and download the new software version. Install the software in the desired directory. We recommend uninstalling the old version first. Manually added implant libraries should be preserved.

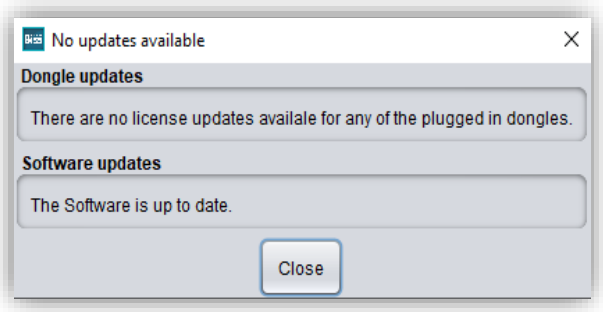


image 59: No software-update available.

7 Dongle-Updates

In some cases, a dongle update is required:

- ✓ Your monthly license has expired, and you would like to extend it
- ✓ You have purchased another BiSS module, e.g., Premium iAW
- ✓ You have purchased another workstation for your multi-user network license
- ✓ For more extensive updates, a dongle update may also be required so that you can benefit fully from the BiSS updates.

7.1 How to know that a dongle update is required?

You will be notified when a dongle update is ready for you:

7.1.1 At Startup

You will automatically receive a message when you start BiSS if there is a new update available for your dongle. The prerequisite is that your dongle has not yet expired.

7.1.2 Via the Menu

Go to the menu and then via settings to the updates tab. Click on the *check for updates button*. If there is an existing license update for your dongle, you will see it.

7.1.3 Execute the UpdateClient.exe

In the installation directory of BiSS is the *UpdateClient.exe*. If BISS does not start anymore, because your license has expired, you can start the update client this way, for updating your dongle or the software.

7.2 Execute Dongle-Update

Make sure that your BiSS dongle is plugged into the PC from which you will perform the dongle update.

Start the update client and follow the instructions.

8 Warning and Notes - Disclaimer

The software does not create dental prostheses and is only suitable for the further processing of digitally produced components in dentistry and orthodontics. Further use outside dentistry and orthodontics is not suitable.

The software leaves behind temporary files if it has not been terminated properly, e.g. in the event of a system crash. The user must then manually delete these files from his temporary files folder to free up disk space.

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