

exocad

Instruction Manual

Creating Stock Abutment Libraries

Instruction Manual by exocad GmbH

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1 Introduction

This document covers the process of creating a stock abutment library from previously generated STL files and gives instructions for all necessary steps.

The exoImplantEditor is an editor for exocad's `config.xml` implant library format, with an additional mesh analysis functionality. In order to use the exoImplantEditor, you need an exocad dongle which is activated to work with exocad DentalCAD Engine Build 4652 or later.

After creating a stock abutment library, we strongly recommend to have it signed by exocad (see Chapter 13). This ensures the correctness and compatibility of the library.



INFORMATION

This instruction manual only describes how to create stock abutment libraries. It does not cover the process of creating a multi-unit abutment library. This library type will be covered in a separate instruction manual.

2 Input Data and Requirements

You need a complete set of suitable stock abutment geometries as STL files to be able to use the exoImplantEditor. Please see the document *Instruction Manual – Creating Implant Geometries for exocad* (customer.exocad.com/exocad_Instruction_Manual_Creating_Implant_Geometries-en.pdf) for details on requirements for the stock abutment geometries.

If you have problems generating suitable geometries using your industrial CAD software, the exoImplantEditor will not solve these for you. However, the exoImplantEditor's automatic mesh analysis / reporting functionalities can help you troubleshoot and understand what exactly are the issues.

2.1 Filename Conventions for STL Meshes

Only the following characters are allowed in filenames of STL meshes:

- small/capital Latin letters
- numbers
- _ and -
- . (points)

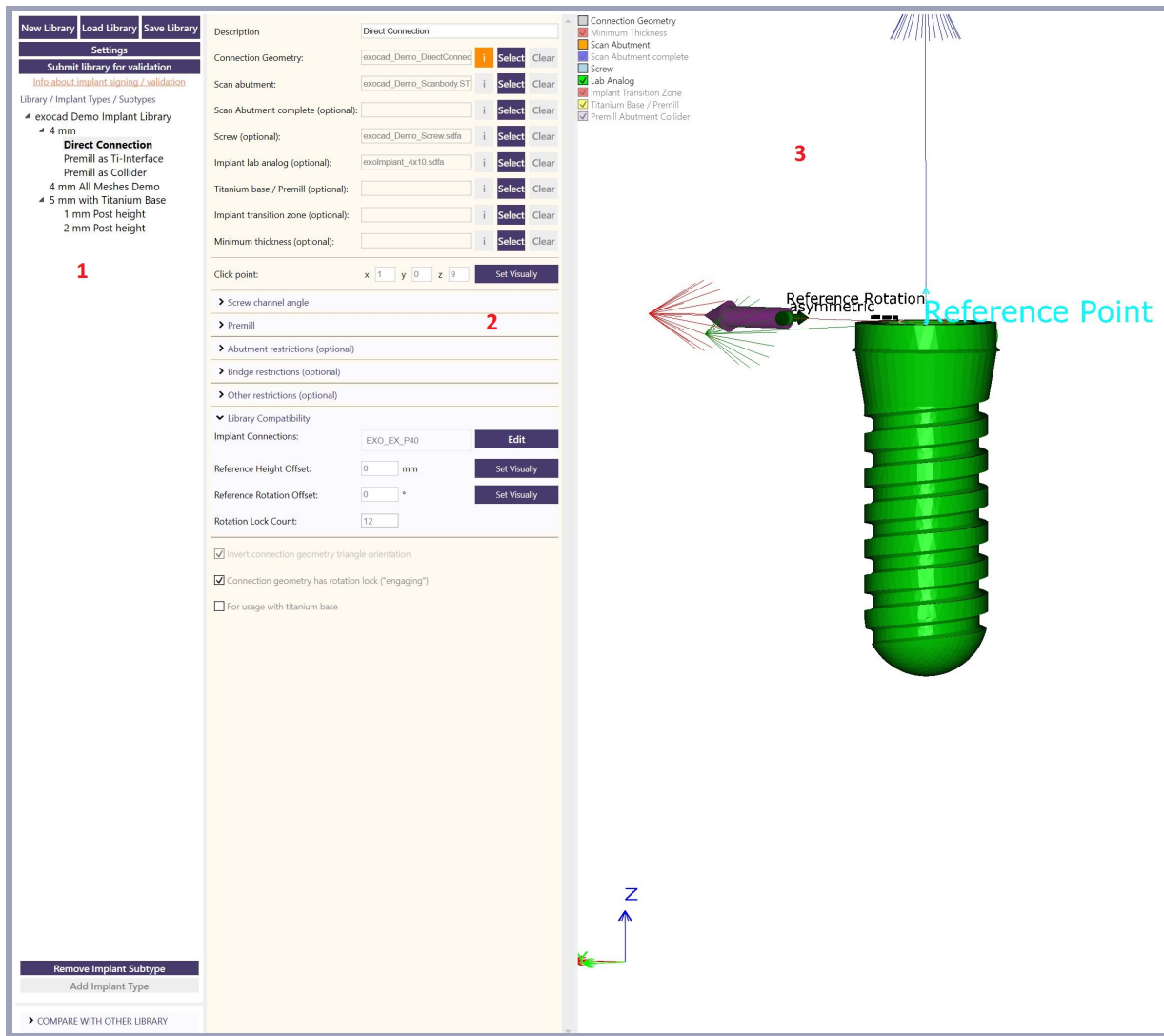
All other characters are NOT allowed and will lead to the library not being signed!

3 Using the exoImplantEditor

3.1 Launching the exoImplantEditor

- Step 1:** Download the exoImplantEditor from the Documentation&Tools section in the Secure Area of our website [exocad.com/secure-area/documentation-tools](https://www.exocad.com/secure-area/documentation-tools).
- Step 2:** Unpack the exoImplantEditor zip file in a directory of your choice.
- Step 3:** Run the ExoImplantEditor.exe file.

3.2 The exoImplantEditor Window



The exoImplantEditor window consists of three parts:

- **Actions/Hierarchy Section [1]:** Action icons and library structure
- **Information Section [2]:** Section to enter and display information/parameters
- **View Section [3]:** Display of objects, e.g. geometries

3.3 Navigating in the View Section

Function	Description
Scroll mouse wheel	Zoom in/out (zoom center = mouse position).
Hold right mouse button and drag	Rotate the view around the rotation center (object center by default).
Right-click outer frame and drag	Rotate the view using the view axis around the rotation center (object center by default).
Click middle mouse button / mouse wheel	Center the view and set a new rotation center.
Hold both mouse buttons and drag	Move the view freely.
Num1, 2, 3, 4, 6, 8 (Numpad activated)	Set view to top, frontal, etc.

3.3.1 Showing/Hiding Geometries

In the upper left corner of the View Section, available objects for display are listed, each with a checkbox in the color of their visual representation (see Figure 1). Show/hide objects by checking/unchecking the corresponding checkboxes.

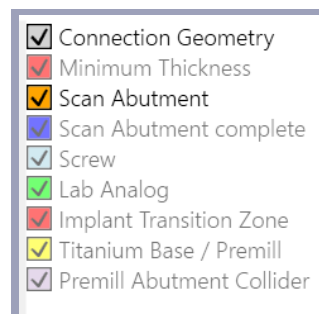


Figure 1: Show/hide checkboxes in View Section

3.3.2 Context Menu

Access the context menu by right-clicking an object.

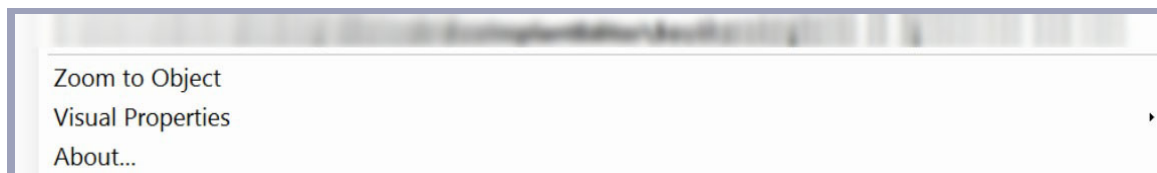


Figure 2: Context menu

Function	Description
ZOOM TO OBJECT	Zoom to the selected object.
VISUAL PROPERTIES	Set visual properties for the object: <ul style="list-style-type: none"> ● HIDE THIS OBJECT: Hides the object. ● WIREFRAME: Shows the triangle grid of the object. ● POINT CLOUD: Shows the object as point cloud. ● FLAT SHADING ONLY: Activated by default to visualize the flat areas of a geometry. Deactivation changes the illumination angle, allowing a more realistic visualization of round objects. ● OPAQUE VALUES: Transparency settings. ● LINE THICKNESS: Only available if WIREFRAME and/or OUTLINE is activated. Allows you to define the thickness of lines.
ABOUT...	Displays software information (version, engine build, copyright information). You can also access this information by right-clicking the background.

4 Library Structure

In the exoImplantEditor, a library is organized in a hierarchical structure with three levels: library, implant type, and subtype. Figure 3 illustrates the structure.

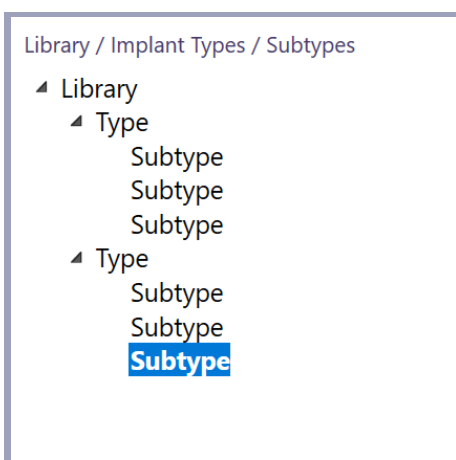


Figure 3: Library structure

A library's top level is automatically created when you set up a new library. To add a type, select the library level in the hierarchy list and click **ADD IMPLANT TYPE** at the bottom of the Actions/Hierarchy Section. To add a subtype, select a type and click **ADD IMPLANT SUBTYPE**.

<div style="background-color: #D3D3D3; padding: 5px; margin-bottom: 5px;">Remove Implant Type</div> <div style="background-color: #333366; color: white; padding: 5px;">Add Implant Type</div>	<div style="background-color: #333366; color: white; padding: 5px; margin-bottom: 5px;">Remove Implant Type</div> <div style="background-color: #333366; color: white; padding: 5px;">Add Implant Subtype</div>
--	---

Parameters are automatically transferred from higher levels to lower levels in the library hierarchy. If you set a parameter on type level, it will be applied for all subtypes within this type that do not overwrite the parameter. If you set a parameter on subtype level, it will only be set for this subtype.

You can type in an identifier for a library structure item in the corresponding DESCRIPTION field of the Information Section (see Figure 4). For library identifiers (top level), there are naming conventions, see Chapter 5.2.1.

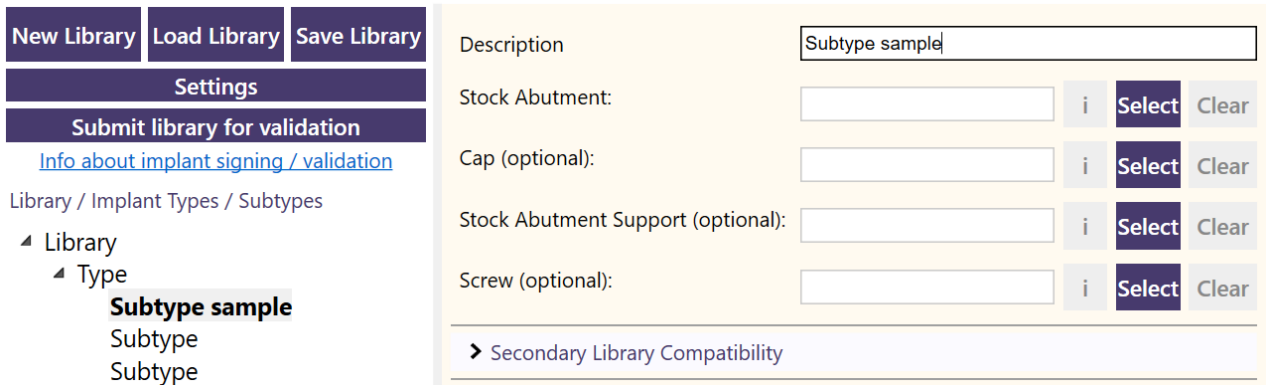
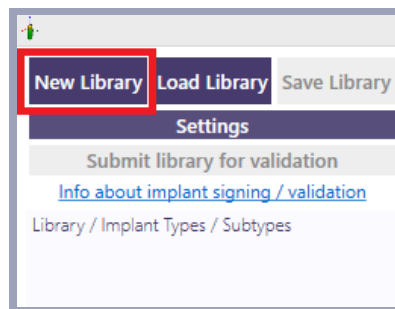


Figure 4: Entering identifier for library structure item

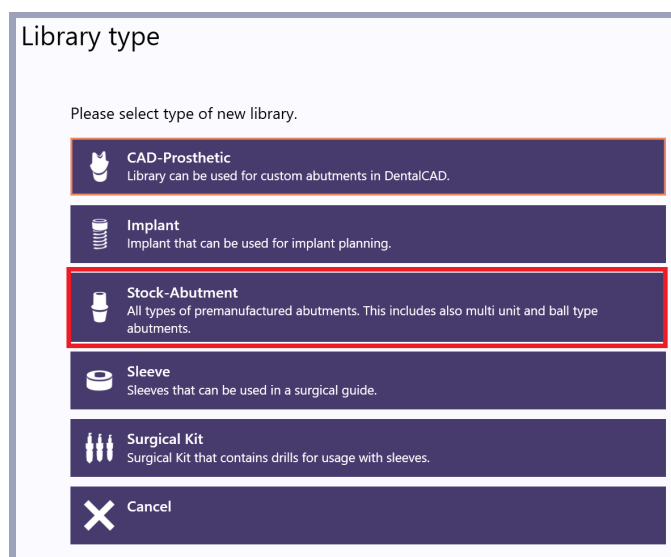
5 Setting up a Stock Abutment Library

Step 1: Launch the exoImplantEditor as described in Chapter 3.1.

Step 2: Click NEW LIBRARY.



Step 3: Select the library type STOCK ABUTMENT.



Step 4: In the now appearing file explorer window for saving the `config.xml` file, create a new folder for the new library in a directory of your choice.

Step 5: Save the file `config.xml` in the library folder. Do not change this filename!

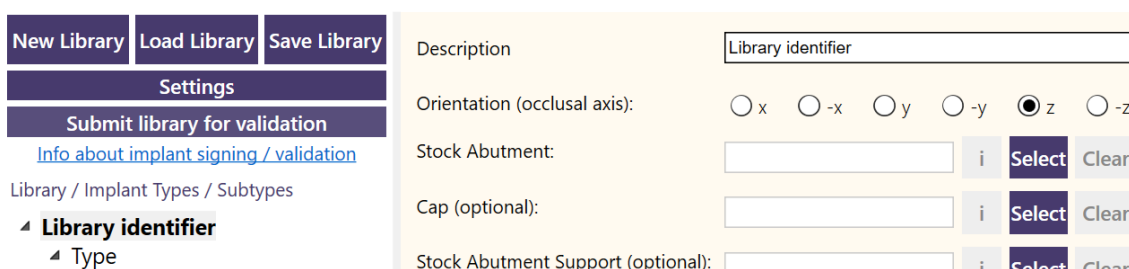
5.1 Naming Conventions for Stock Abutment Library Folders

- The folder name must contain the manufacturer and the name of the stock abutment system. If applicable, you can also add the stock abutment system subtype.
- The folder name must be machine-readable (no special characters, no umlauts, max. 120 characters, etc.).
- Do not use any filling words (e.g. *System, Type, Body*).
- The folder name must not contain any blankspaces. For separation, use underscores `_`.
- Do not add any body or platform diameter information to the folder name.
- Do not add version information to the folder name. You can include version information in the library description.
- Add `_stock` at the end of each library folder name

Example for a stock abutment library folder name: `exocad_Demosystem_stock`
 (*manufacturer*_name of abutment system*_stock)

5.2 Entering the Library Identifier

Enter a library identifier in the DESCRIPTION field on library level (top level).



5.2.1 Naming conventions for library identifiers

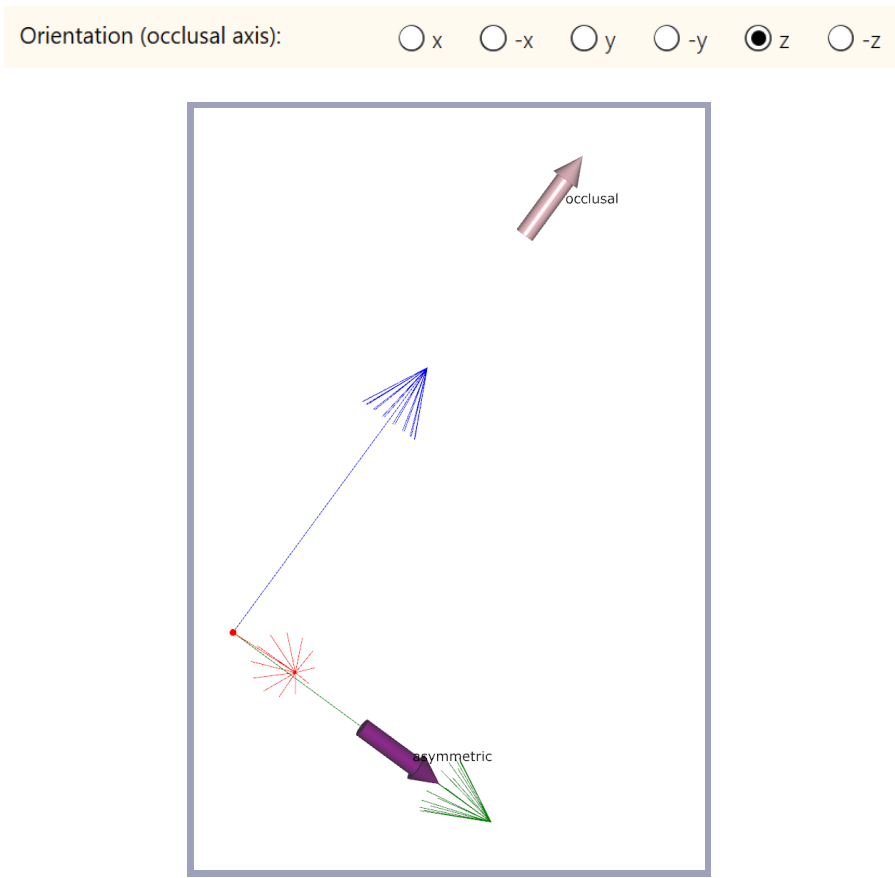
- The library identifier should contain the manufacturer and the name of the abutment system, separated with `-`. If applicable, you can also add the abutment system subtype.
- The library identifier can contain spaces.
- The library identifier must not contain any special characters but the `-` sign (also no underscores `_`), but you can include umlauts and trademark symbols (upper-case letters).
- Do not use all-capitalized words (e.g. EXOCAD).
- If you mention compatible brand names, make sure to respect brand registration and trademarks by including the correct (®™, etc.) symbols with the compatible brand name.
- Use abbreviations for compatible implant systems. exocad provides a list of these abbreviations on request.
- You can include version information, e.g. `exocad - Demo Stock Abutment revA`.

Example for a library identifier: `exocad - Demo Stock Abutment`

5.3 Selecting the Orientation

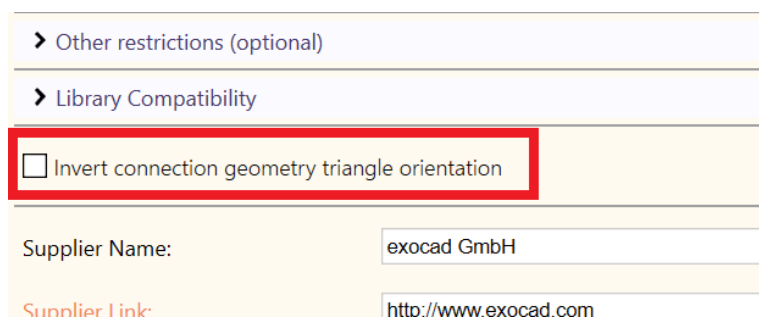
The orientation is selected on library level (top level).

ORIENTATION (OCCLUSAL AXIS) defines the library's general orientation. Select the occlusal axis from the radio buttons. Once defined, an arrow showing the occlusal axis appears in the View Section.

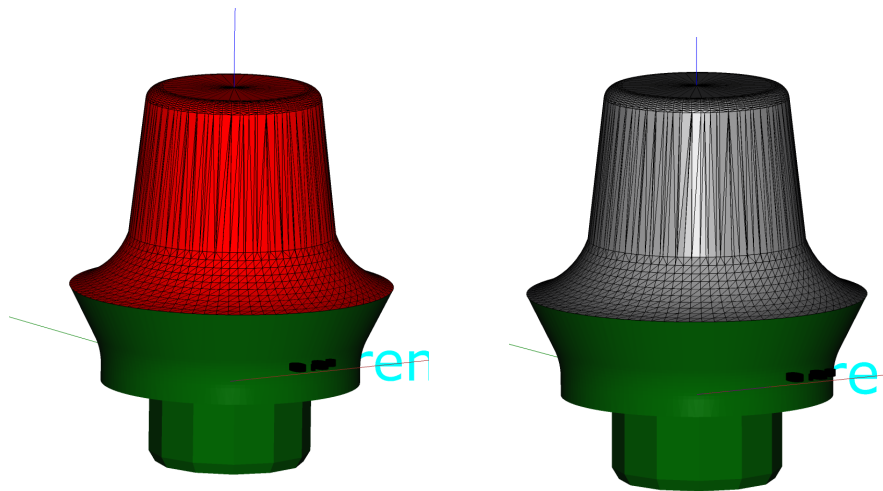


5.4 Checking/Unchecking “Invert connection geometry triangle orientation”

The checkbox INVERT CONNECTION GEOMETRY TRIANGLE ORIENTATION (see Figure 5.4) defines the orientation of the surface normals. It is crucial to set the INVERT CONNECTION GEOMETRY TRIANGLE ORIENTATION checkbox correctly, so that the software knows which part of the mesh is the 'inside' and which part is the 'outside'.



If the outside of the stock abutment support appears red, check the box. If the outside of the stock abutment support appears gray, uncheck the box.



(a) Abutment Support Red - Check Box

(b) Abutment Support Gray - Uncheck Box

5.5 Entering Supplier and Legal Information

Supplier and legal information is entered on library level (top level).

Supplier Name:	<input type="text" value="exocad"/>						
Supplier Link:	<input type="text" value="www.exocad.com"/>						
Legal Information:	<input type="text" value="This is a demo library"/>						
Warranty Information:	<table border="1"> <tr> <td>DISCLAIMER OF WARRANTY</td> <td>Default</td> </tr> <tr> <td colspan="2"> THIS DATA IS PROVIDED "AS IS" AND WITHOUT WARRANTIES AS TO PERFORMANCE, ACCURACY, OR MERCHANTABILITY. THE SELLER'S SALESPERSONS MAY HAVE MADE STATEMENTS ABOUT THIS DATA. ANY SUCH STATEMENTS DO NOT CONSTITUTE WARRANTIES AND SHALL NOT BE RELIED ON BY USER IN DECIDING WHETHER TO USE THIS DATA. </td> </tr> <tr> <td colspan="2"> THIS DATA IS PROVIDED WITHOUT ANY EXPRESSED OR IMPLIED WARRANTIES </td> </tr> </table>	DISCLAIMER OF WARRANTY	Default	THIS DATA IS PROVIDED "AS IS" AND WITHOUT WARRANTIES AS TO PERFORMANCE, ACCURACY, OR MERCHANTABILITY. THE SELLER'S SALESPERSONS MAY HAVE MADE STATEMENTS ABOUT THIS DATA. ANY SUCH STATEMENTS DO NOT CONSTITUTE WARRANTIES AND SHALL NOT BE RELIED ON BY USER IN DECIDING WHETHER TO USE THIS DATA.		THIS DATA IS PROVIDED WITHOUT ANY EXPRESSED OR IMPLIED WARRANTIES	
DISCLAIMER OF WARRANTY	Default						
THIS DATA IS PROVIDED "AS IS" AND WITHOUT WARRANTIES AS TO PERFORMANCE, ACCURACY, OR MERCHANTABILITY. THE SELLER'S SALESPERSONS MAY HAVE MADE STATEMENTS ABOUT THIS DATA. ANY SUCH STATEMENTS DO NOT CONSTITUTE WARRANTIES AND SHALL NOT BE RELIED ON BY USER IN DECIDING WHETHER TO USE THIS DATA.							
THIS DATA IS PROVIDED WITHOUT ANY EXPRESSED OR IMPLIED WARRANTIES							

- SUPPLIER NAME: Name of the abutment supplier
- SUPPLIER LINK: URL of the supplier's website (or of the website where the abutment can be purchased)
- LEGAL INFORMATION (e.g. copyrights)
- WARRANTY INFORMATION: Default warranty information text (editable)

6 Creating a Stock Abutment Library

6.1 Library Structure

You can structure your stock abutment library by using types and subtypes (see Chapter 4). You are free to decide how to set up your library structure, but we recommend to set one library type for each available stock abutment platform diameter.

6.2 Loading Meshes

Stock Abutment:	<input type="text"/>	i	Select	Clear	mandatory meshes
Cap (optional):	<input type="text"/>	i	Select	Clear	
Stock Abutment Support (optional):	<input type="text"/>	i	Select	Clear	
Screw (optional):	<input type="text"/>	i	Select	Clear	

Figure 5: Stock abutment meshes

Meshes for individual stock abutments are loaded on type or subtype level. To load a mesh, click SELECT next to the corresponding field and navigate to the desired mesh file.

For stock abutment libraries, loading a stock abutment mesh and a stock abutment support mesh is mandatory. The support mesh must be closed at the top and open at the bottom, and must not have a screw channel.

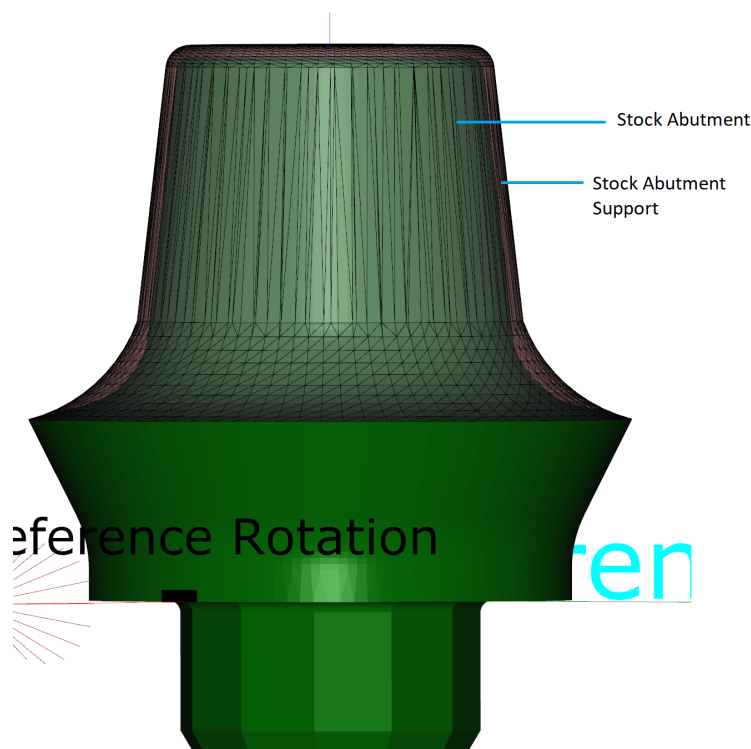


Figure 6: Stock abutment with support

A cap is normally not used with stock abutments (exception: snap-on cap). You can load a screw mesh, which is only used as a visualizer.

6.3 Defining the Secondary Library Compatibility (Angulated Stock Abutments)

You must only define the secondary library compatibility for angulated stock abutments. You must not define secondary connection keywords, as these do not exist for angulated stock abutments.

To generate information about the rotation of an abutment connection, you define a multi unit reference coordinate system at the connection part by setting the values MULTI UNIT AXIS, MULTI UNIT REFERENCE POINT, and OCCLUSAL OFFSET. MULTI UNIT AXIS describes the rotational axis of the connection, MULTI UNIT REFERENCE POINT is the multi unit reference coordinate system's origin, and OCCLUSAL OFFSET defines the angulation start point.

Multi Unit Axis:	x 0	y 0	z 1	Set ▾
Multi Unit Reference Point:	x 0	y 0	z 4	
Occlusal Offset:	4 mm			

Figure 7: MULTI UNIT AXIS and MULTI UNIT REFERENCE POINT values

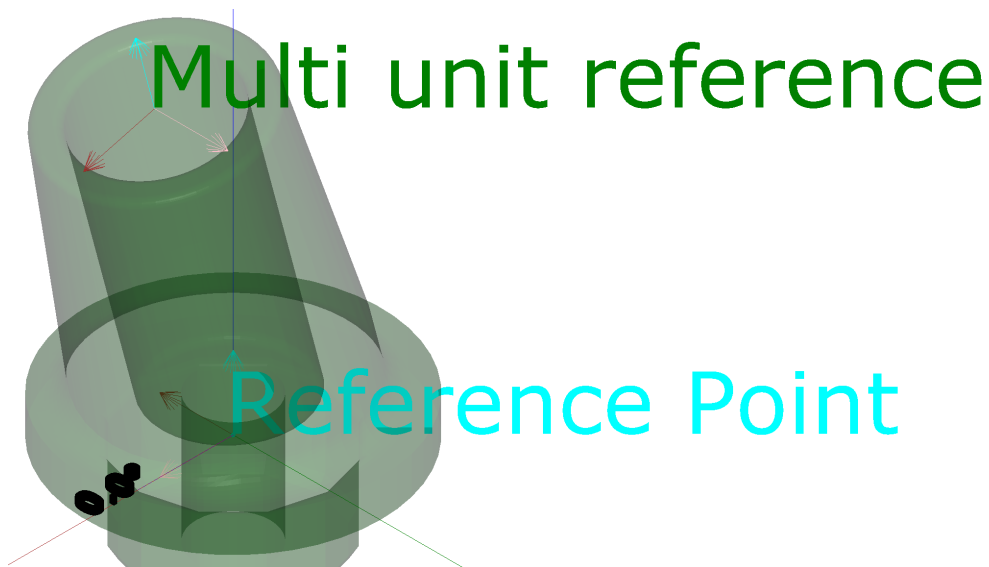


Figure 8: Reference and multi unit reference coordinate systems

To define the values MULTI UNIT AXIS and MULTI UNIT REFERENCE POINT, clicking SET provides different options.

Multi Unit Axis:	x 0,2588	y -0,0000	z 0,9659	Set ▾
Multi Unit Reference Point:				
Occlusal Offset:				
<ul style="list-style-type: none"> ➤ Abutment restrictions (optional) ➤ Bridge restrictions (optional) 				

Set with 3-Point (recommended)

Set Visually

Set by angle

Clear

Figure 9: Options for setting the multi unit reference coordinate system

Select the first option SET WITH 3-POINT (RECOMMENDED), you define MULTI UNIT AXIS and MULTI UNIT REFERENCE POINT by clicking three points in a circle around the screw hole. The reference point will be the center of the circle.

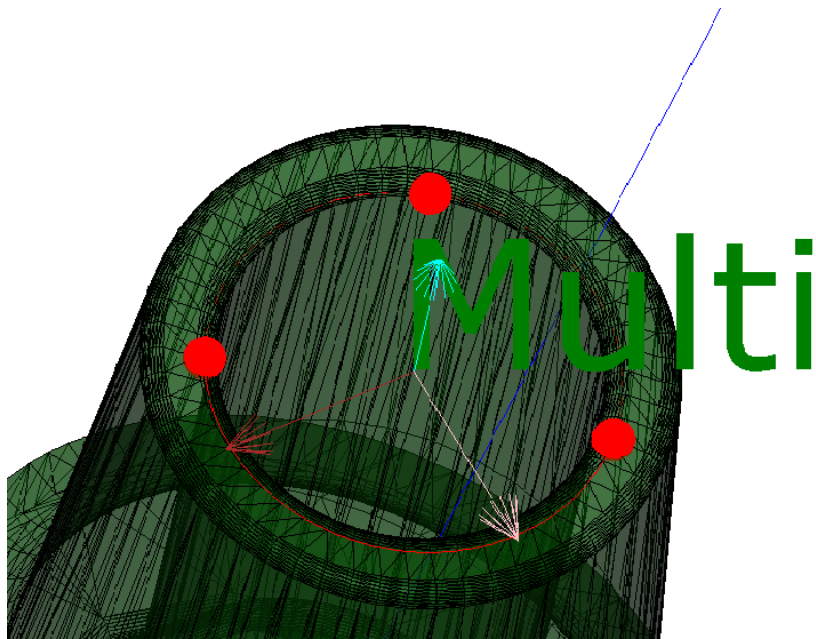


Figure 10: Three points define the multi unit reference coordinate system

There are two further options to define the values, but could result in the origin of the multi unit reference coordinate system being at an incorrect position. This is why it is recommended to use the 3-point option described above.

- **SET VISUALLY:** Clicking the surface will position the multi unit reference coordinate system so that the multi-unit axis is the normal of the clicked surface and the reference point will be defined such that the occlusal offset is 0.
- **SET BY ANGLE:** Choosing the rotation axis and typing in the angle between occlusal axis and screw channel axis will position the multi-unit axis. You must set the reference point manually.

Clicking **CLEAR** deletes all existing multi unit reference coordinate system information.

7 Defining the Library Compatibility

In the library compatibility section, you define the implant connection part of the abutment. All fields are mandatory.

7.1 Defining Implant Connections

The implant connection part is defined through connection keywords. If an abutment and an implant use the same connection keyword, they are considered “compatible” and share the same connection.

Click **EDIT** next to the **IMPLANT CONNECTIONS** field to open the **EDIT COMPATIBILITY KEYWORDS** window.

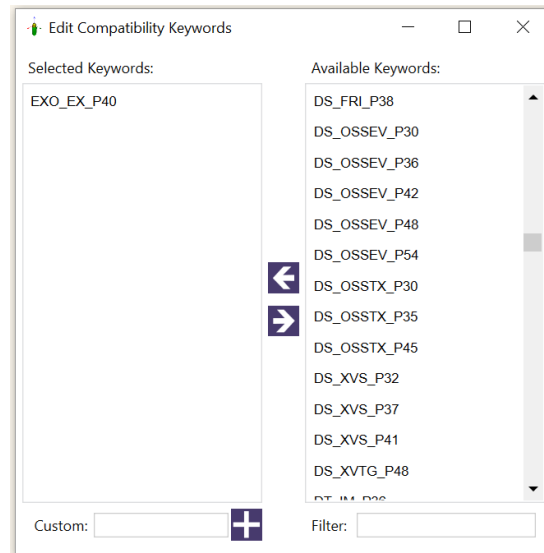


Figure 11: EDIT COMPATIBILITY KEYWORDS window

If implant connection keywords are already available, they appear in the AVAILABLE KEYWORDS list. The SELECTED KEYWORDS list shows the selected keywords for the current library. You can move items from one list to the other using the arrows between the lists. Hold CTRL to mark several entries. You can filter the list of available implant connection keywords by typing the keyword into the field FILTER.

Type in new implant connection keywords into the CUSTOM field and click the + button to add them to the SELECTED KEYWORDS list.



INFORMATION

Ask exocad support (support@exocad.com) for our fully featured official list of abbreviations before you start defining your keywords.

An implant connection keyword consists of three parts, separated by underscore:

manufacturercode*_*connection keyword typecode*_P*platform-size

- Manufacturer code: Abbreviation for the abutment manufacturer, consisting of two or three (sometimes more) capital letters.
- Connection keyword typecode: Abbreviation for the series/system.
- Platform size: Two-digit number, giving the size of the abutment platform in tenths of a millimeter (e.g. 3.5 mm: "35"). You can also add additional platform information (e.g. connection type information). Use a hyphen to separate this information from the platform size number.

Only the following characters are allowed in the connection keyword: 0-9, A-Z, _+-. Avoid using lower-case letters.

Connection keyword example: STR_SYN_P48-RN

refers to

Manufacturer: Straumann

Connection keyword typecode (system): Synocta® System

Platform diameter (two-digit): 4,8 mm

Additional platform information: RN = regular neck

7.2 Reference Coordinate System (Height, Rotation, Marker)

The reference coordinate system defines the position and rotational orientation of the implant connection.



INFORMATION

For height and rotation offset values, small measurement inaccuracies are negligible. Values rounded to two decimal digits are sufficient.

7.2.1 Reference Point

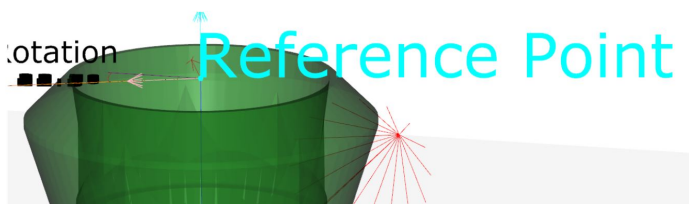
The reference point defines the origin of the reference coordinate system. Depending on the connection geometry type, the Reference Point must be set at different positions of the abutment's implant connection geometry.



(a) External hex



(b) Internal hex



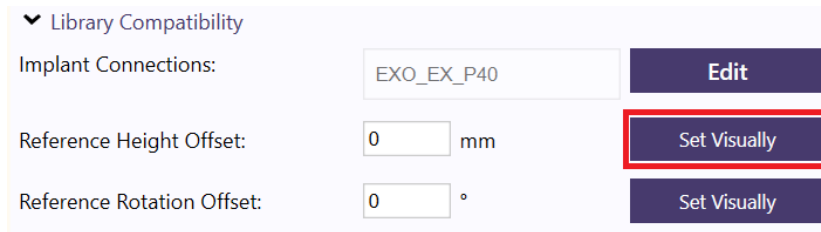
(c) Morse taper

Figure 12: Positions of Reference point for different connection geometry types

7.2.2 Reference Height Offset

Reference Height Offset is the distance between the origin of the abutment’s coordinate system and the origin of the reference coordinate system along the occlusal axis. Depending on the connection geometry type, you must set the Reference Point at different positions.

By default, the Reference Height Offset is 0. To define an offset by setting the Reference Point, click SET VISUALLY next to the REFERENCE HEIGHT OFFSET field.



Click the abutment mesh at the corresponding position (see Figure 12). The Reference Point will be set at this height on the occlusal axis. Alternatively, if you know the exact measures of the connection geometry, you can enter the offset directly into the REFERENCE HEIGHT OFFSET field.

7.2.3 Reference Rotation Offset

This value shows how much the orientation of the implant connection’s anti-rotation lock deviates from the orientation in the reference coordinate system. The orientation of the anti-rotation lock is defined by a vector perpendicular to the occlusal axis. This means, the orientation is located along one of the two not-occlusal axes in the coordinate system.

There are three categories of anti-rotation locks:

- **Category 1 - Regular polygon (or part thereof):** The orientation vector must be located congruent to one of the polygon’s corners. This defines the vector’s orientation for abutments with hexagonal, octagonal, or square anti-rotation lock.

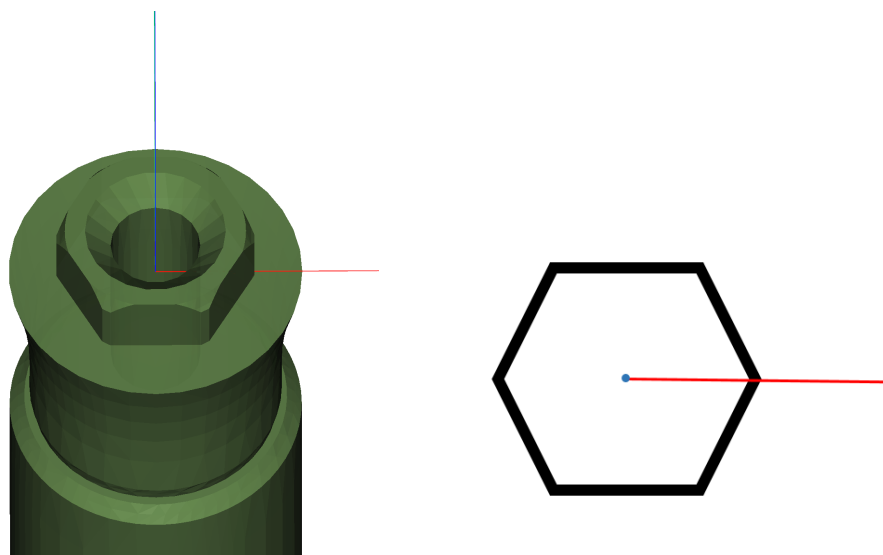


Figure 13: Regular polygon

- **Category 2 - Irregular polygon:** The shape is approximated by a polygon and then treated as in category 1.

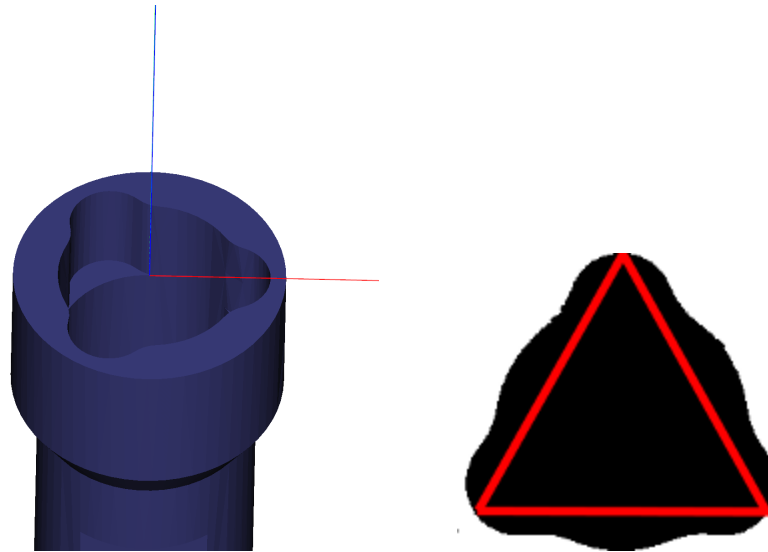


Figure 14: Irregular polygon

- **Category 3 - Morse taper:** The rotation lock is the polygon shape beneath the round shape at the upper side of the implant. The rotation offset definition is based on the polygon shape and treated as category 1.

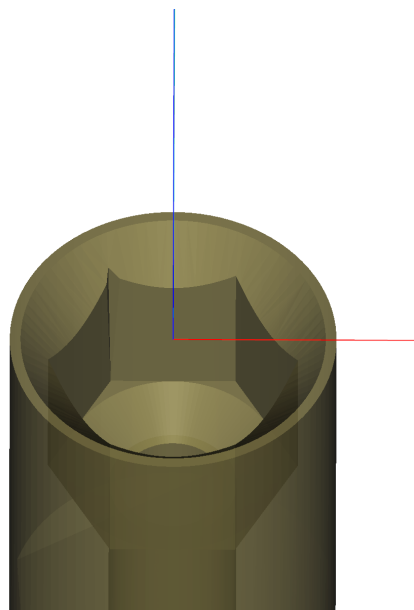


Figure 15: Morse taper

To define the REFERENCE ROTATION OFFSET value:

- Step 1:** Ensure that the REFERENCE HEIGHT OFFSET is defined, and that the reference coordinate system is visible. If necessary, adjust the transparency settings for the abutment mesh (see Chapter 3.3.2) so that you can view the rotation lock's corners clearly.
- Step 2:** Click SET VISUALLY next to the field REFERENCE ROTATION OFFSET. The mouse cursor changes to a hand symbol, and the wireframe is displayed. When you hover the mouse over the abutment mesh, a red dot is displayed.

- Step 3:** For an anti-rotation lock of category 1, move the red dot onto a corner of the anti-rotation lock.
 For an anti-rotation lock of category 2, move the red dot onto a corner of the assumed polygon shape.
 For an anti-rotation lock of category 3, move the red dot onto a corner of the polygon shape beneath the round shape on top of the abutment.

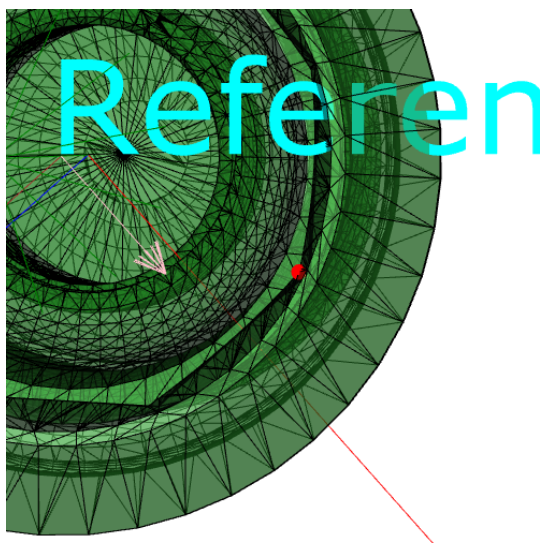


Figure 16: Setting the dot on a corner of the anti-rotation lock

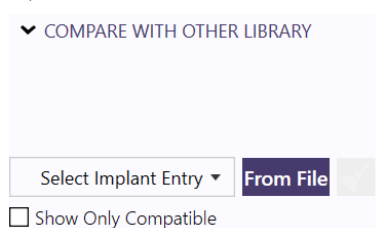
- Step 4:** Click to confirm the dot's position. The reference coordinate system is rotated to fit the defined orientation of the anti-rotation lock. The reference rotation is displayed as a new axis, with a green sphere at the arrowhead. To change the reference rotation, click this sphere and drag it to the desired position.
 The angle measure is displayed between the axis position of the abutment and the reference rotation axis. This value is also displayed in the REFERENCE ROTATION OFFSET field.

Besides defining the rotation offset value visually, you can also type it into the field REFERENCE ROTATION OFFSET. If one of the edges of the rotation-lock lies exactly on an axis of the reference coordinate system, type in 0.

8 Comparing Libraries

Using the COMPARE WITH OTHER LIBRARY function, you can compare a library with other libraries, e.g. implant libraries, to determine if a connection part fits an abutment properly. Furthermore, comparing your stock abutment library to a connection part allows you to determine if the compatibility settings for your stock abutment library are correct.

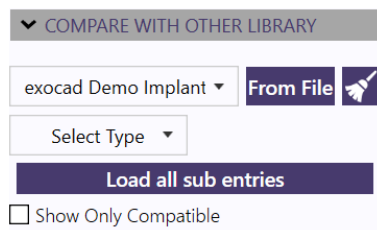
- Step 1:** Expand COMPARE WITH OTHER LIBRARY at the bottom of the Action/Hierarchy Section.



- Step 2:** Click SELECT IMPLANT ENTRY and select a library from the dropdown list. The list shows available libraries within your exocad installation.

Note: In order for these libraries to be available in the list, the directory of your DentalCAD installation must be selected in the SETTINGS. If you want to compare to a library that is not stored within your DentalCAD directory, click FROM FILE and select the `config.xml` file of the library.

Step 3: By clicking SELECT TYPE and, successively, SELECT SUBTYPE, you can select the library type and subtype relevant for your comparison. You can also select to LOAD ALL SUB ENTRIES, which will load all types and subtypes of the selected library.



Once you have specified the items for your comparison, the selected geometries are displayed together in the View Section. If both libraries are correctly set up, they are displayed in correct reference to each other. The COMPARE WITH OTHER LIBRARY section is extended and provides more details and options.

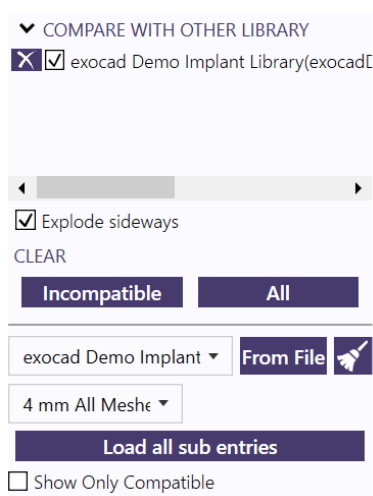


Figure 17: Extended COMPARE WITH OTHER LIBRARY section

- The library you have selected for comparing is displayed at the top. You can select further libraries to be added and can switch from one library to the other in the list. Activate/deactivate the checkbox in front of a library to toggle its visibility. Remove libraries from the list using the x symbol.
- By default, EXPLODE SIDEWAYS is activated and the library geometries are displayed side-by-side in the View Section. If you uncheck, they are displayed at the same location.
- Below the library list are CLEAR options. Clicking INCOMPATIBLE removes incompatible libraries (libraries not matching the parameters defined in the library compatibility settings) from the list. Clicking ALL removes all libraries.
- Check SHOW ONLY COMPATIBLE to show only compatible libraries / library entries. Already selected libraries remain in the list and are not checked for compatibility.

9 Optional: Setting Restrictions

9.1 Abutment Restrictions

You can define abutment restrictions in order to avoid misfitting or damages to implants and/or abutment parts. In the DentalCAD application, the user cannot design abutments beyond those limits. For setting abutment restrictions, the reference point coordinates must be the origin of the coordinate system (0,0,0).

You can define abutment restrictions on any library level, depending on if you want to define restrictions for all types and subtypes (library level) or only for specific types/subtypes.

▼ Abutment restrictions (optional)

Gingival margin diameter limit:	Min: <input type="text"/> mm	Max: <input type="text"/> mm
Gingival margin height limit:	Min: <input type="text"/> mm	Max: <input type="text"/> mm
Abutment height limit:	Min: <input type="text"/> mm	Max: <input type="text"/> mm
Abutment post height limit:	Min: <input type="text"/> mm	Max: <input type="text"/> mm
Abutment Angulation limit:	Min: <input type="text"/> °	Max: <input type="text"/> °
Abutment Angulation taper limit:	Min: <input type="text"/> °	Max: <input type="text"/> °

You can restrict the abutment design by setting minimum and/or maximum values for the following abutment parts:

- Gingival margin diameter limit: Horizontal measure from reference point (origin) to the abutment’s outer edge.
- Gingival margin height limit: Vertical measure from reference point (origin) to the gingiva’s highest point.
- Abutment height limit: Height of the abutment from reference point.
- Abutment post height limit: Vertical measure from the top of the abutment to the abutment shoulder.
- Abutment angulation limit: Possible angulation of the abutment.
- Abutment angulation taper limit: Possible angulation of the abutment post taper.

Figure 18 illustrates these abutment parts. The images are also displayed when you hover the mouse over the corresponding value text.

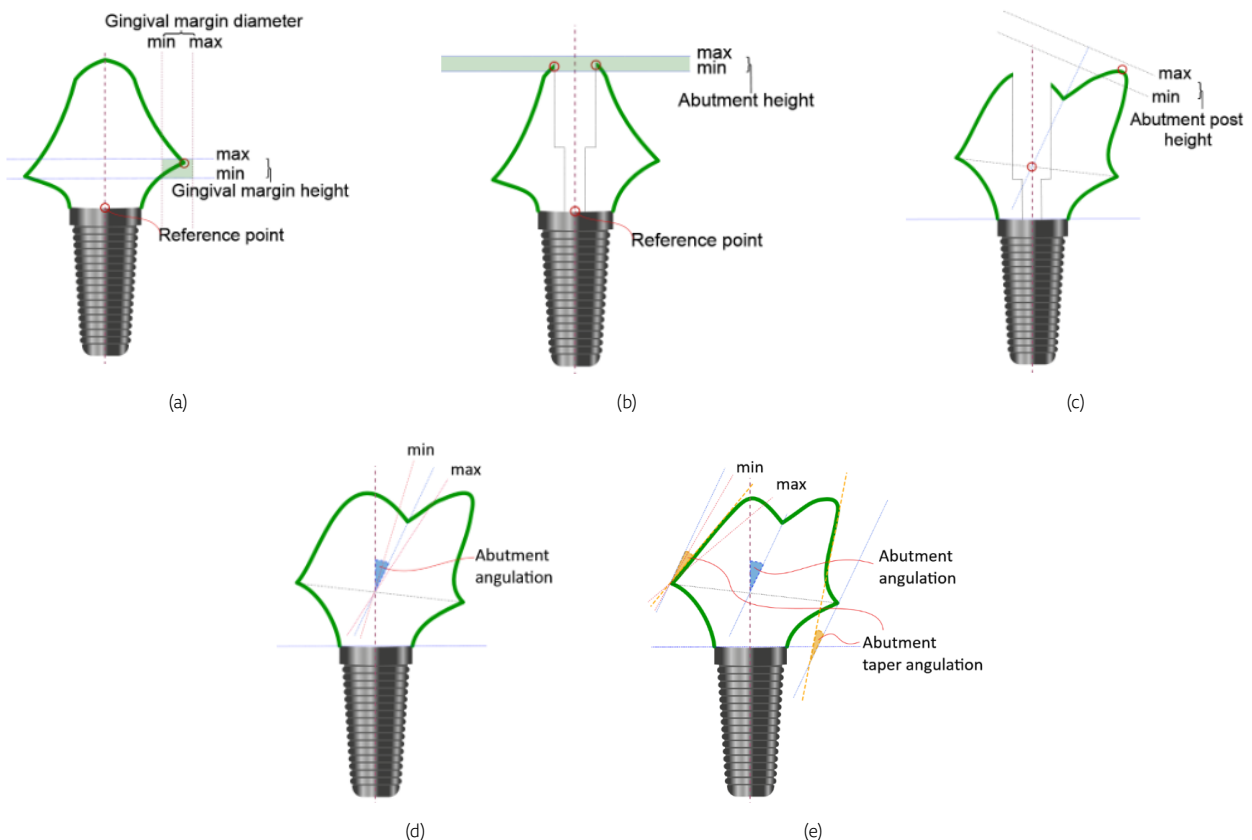


Figure 18: Abutment restriction measures

9.2 Bridge Restrictions

You can define hard limits for bridge constructions. In the DentalCAD application, the user cannot design bridges / bridge parts beyond those limits.

You can define bridge restrictions on any library level, depending on if you want to define restrictions for all types and subtypes (library level) or only for specific types/subtypes.

▼ Bridge restrictions (optional)

Bridge length limit:	Min: <input style="width: 50px;" type="text"/> mm	Max: <input style="width: 50px;" type="text"/> mm
Overall bridge length limit:	Min: <input style="width: 50px;" type="text"/> mm	Max: <input style="width: 50px;" type="text"/> mm
Extension length limit:	Min: <input style="width: 50px;" type="text"/> mm	Max: <input style="width: 50px;" type="text"/> mm
Single unit extension length limit:	Min: <input style="width: 50px;" type="text"/> mm	Max: <input style="width: 50px;" type="text"/> mm

You can restrict the bridge design by entering minimum and/or maximum values for the following aspects of bridges.

- Bridge length limit: Measure from one implant to the next implant in a bridge.
- Overall bridge length limit: Measure of the complete bridge including extensions.
- Extension length limit: Extension length if the bridge is supported by two or more implants.
- Single unit extension limit: Extension length if the bridge is supported by only one implant.

Figure 19 illustrates these aspects. This image is also displayed when you hover the mouse over the value texts.

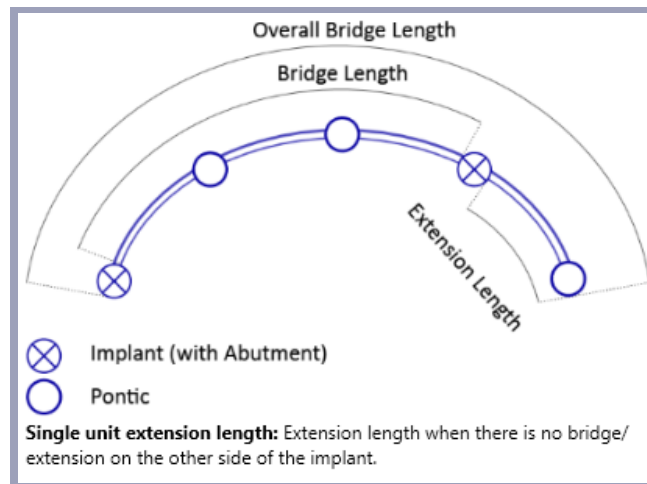


Figure 19: Graphic showing bridge restriction measures



INFORMATION

A bridge extension is the free-hanging part of the bridge which is not supported by an implant on both sides. Free extensions can have a stronger leverage effect on the implant.

9.3 Other Restrictions

You can restrict an abutment to certain teeth. Select the teeth in the tooth bow which appears when clicking SELECT. There are Quick Select buttons available for specific groups of teeth.

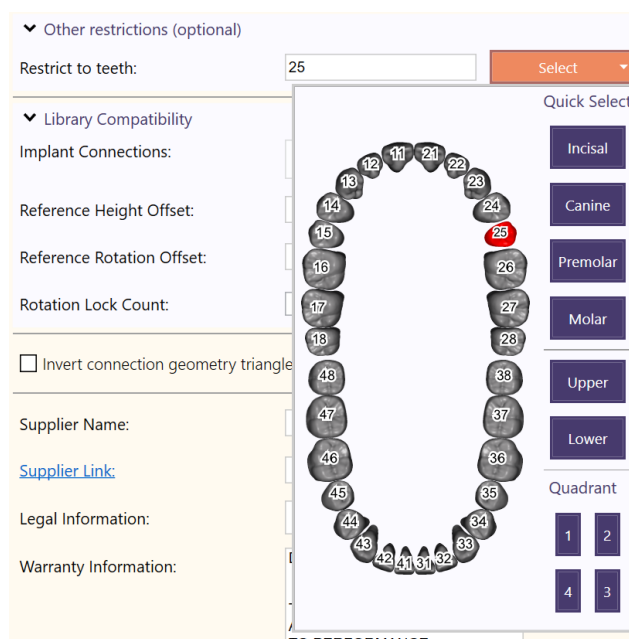


Figure 20: Defining tooth restrictions

10 Creating Libraries with Locators /Snap-On Caps

You can define a locator / snap-on cap directly as a stock abutment library by loading the cap mesh as CAP (OPTIONAL) mesh as well as a corresponding STOCK ABUTMENT SUPPORT (OPTIONAL) mesh.

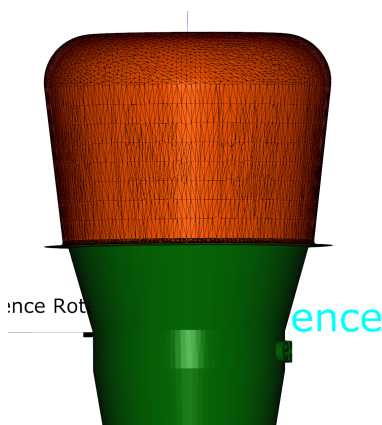


Figure 21: Stock abutment with snap-on cap

11 Creating Part Information

In the part information section, information about the physical stock abutment is captured. For every loaded stock abutment mesh, you must enter the available part information. You must not enter part information for support meshes, as this part does not exist physically.

To add part information, click the **i** button next to where you have loaded a mesh. If part information is already available, this button is displayed in orange and the information appears when hovering over it.

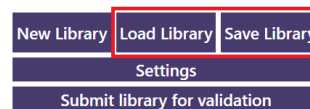
Stock Abutment:	<input type="text" value="stockabutment_geometry_pla"/>	<input type="button" value="i"/>	<input type="button" value="Select"/>	<input type="button" value="Clear"/>
Cap (optional):	<input type="text"/>	<input type="button" value="i"/>	<input type="button" value="Select"/>	<input type="button" value="Clear"/>
Stock Abutment Support (optional):	<input type="text" value="stockabutment_geometry_suj"/>	<input type="button" value="i"/>	<input type="button" value="Select"/>	<input type="button" value="Clear"/>
Screw (optional):	<input type="text"/>	<input type="button" value="i"/>	<input type="button" value="Select"/>	<input type="button" value="Clear"/>

- Language: By default, **all** is selected. This means, the part information is displayed for the user if no language-specific record is available for the user's language. You can add language-specific records by selecting another language and typing in the information for this selected language. Languages with records appear bold in the Language list.
- Manufacturer: Abutment manufacturer.
- ManufacturerID: Abbreviation of the abutment manufacturer. exocad provides a list of manufacturer abbreviations upon request. Must be equivalent to the manufacturer code in the connection keyword (see Chapter 7.1).
- PartNumber: Order number of the abutment.
- PartName: Part information (system, diameter, material, etc.).
- PartComment: Additional comments.
- Url: URL of the abutment manufacturer's website / the website where the abutment can be ordered.
- PartIllustrationFile: You can store an image file, e.g. a realistic image of the abutment, in the library folder and type the image filename into this field.
- Unavailable: If an abutment is not available in specific markets, you can set this field to YES. An example: If an abutment is not available on the German market, select German as language and set this field to YES using the dropdown menu.

From the part information, the exoImplantEditor creates the `.partInfo` file. This file is stored in the library directory. When you send a library to exocad for signing, this file will be part of the validation process.

12 Saving/Loading a Library

To save a library, click **SAVE LIBRARY** in the Action/Hierarchy Section of the exoImplantEditor window. To load a library, click **LOAD LIBRARY** and select the `config.xml` file of the library you want to load. Alternatively, drag and drop the `config.xml` file onto the exoImplantEditor window.



13 Signing a Library



IMPORTANT

We strongly recommend not to use libraries which have not been checked and signed by exocad. If you use libraries which have not been signed, this happens at your own risk. exocad only guarantees the compatibility of signed libraries.

Integrating, signing and encrypting a library leads to it being officially accepted by exocad's software products and being officially available in our online library portal exocad.com/integration/dentalcad-library-integration for download. If you use a library which has not been signed by exocad, a warning message will appear in the application when selecting the corresponding library.

For information, policies and instructions about submitting libraries to exocad, visit exocad.com/implantdata. This website opens also by clicking **INFO ABOUT IMPLANT SIGNING AND VALIDATION** in the exoImplantEditor.

14 Support

exocad provides third-level support to its partners in case of technical questions/issues related to its products, usage of the software, exoportal, or similar. You can also request online demonstrations of new product features from exocad software trainers.

As an ISO 13485-certified company, exocad documents each support case and resulting resolution/outcome. To contact the exocad support team, send an email containing the details of your query to the corresponding email address of your region. Your email will automatically create a ticket in the exocad support system and you will receive an automated confirmation email with a ticket number shortly afterwards. The exocad support team will then contact you by email or telephone to process your query.

A convenient way to chase an outstanding query is to reply to the automated information email sent by exocad. When chasing your query using another form of communication, always have the ticket number ready. exocad cannot handle your request without a ticket number. Thank you for your understanding.



IMPORTANT

To resolve your issue quickly and smoothly, please:

- Send a separate email for each issue. Do not introduce other unrelated topics to an existing email thread!
- Do not modify the subject line of the support reply email!
- Provide all necessary data (project file, scan data, construction files) and additional information (software build number, operating system, etc). Without this data, exocad cannot reproduce your issue (technical or usage) and will reject your request!

To view the support contact details of your support region, visit exocad.com/secure-area/technical-and-software-support.