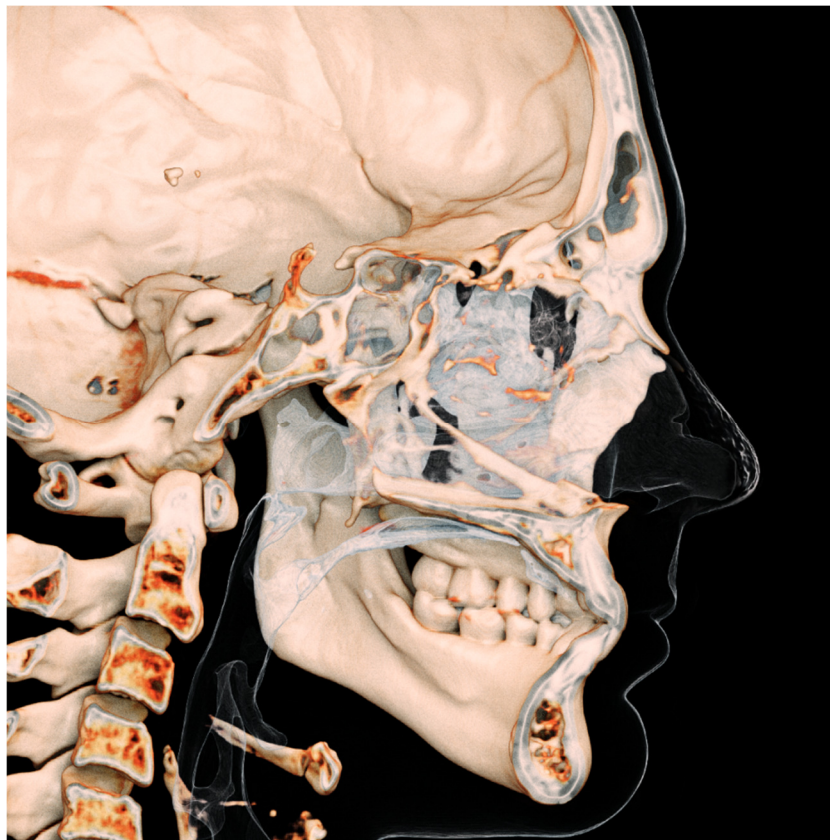


InvivoLight

InvivoLight 6.0 Reference Manual English



Anatomage

Anatomage, Inc. 3350 Scott Blvd #29, Santa Clara, CA 95054, U.S.A.
Tel) 408.885.1474 Fax) 408.295.9786 www.anatomage.com

Warranty Statement

There are no warranties, express or implied, with respect to the contents of this document, and all information provided herein is provided “as is.” Anatomage reserves the right to periodically change the information that is contained in this document; however, Anatomage makes no commitment to provide any such changes in a timely manner or at all.

Limitation of Liability

In no event shall Anatomage or its affiliates be liable to any party for any direct, indirect, special, or consequential damages in connection with your use of this document, including, without limitation, loss of business revenue or earnings, lost data, damages caused by delays, lost profits, or a failure to realize expected savings, even if Anatomage was expressly advised of the possibility of such damages.

End of Life Statement

InvivoLight software is dependent on its hardware requirements. The life-cycle is limited only by the availability of the required hardware.

Trademarks

Anatomage and related marks, images, and symbols are the exclusive properties of, and trademarks of, Anatomage Inc. All other brands and marks are the properties of their respective owners.

Copyright

Documentation for InvivoLight and the operating software are copyrighted with all rights reserved. Under the copyright laws, this documentation may not be reproduced, transmitted, transcribed, or translated into any human or computer language in whole or part without the prior written permission of the copyright holder.

About Anatomage and InvivoLight Software

This version of InvivoLight was released as an update to the original InvivoLight software from Anatomage, Inc. In this document, InvivoLight refers to the latest version of the Anatomage InvivoLight software. To learn more about Anatomage, access the Anatomage website (www.Anatomage.com).

Intended User

InvivoLight is designed to be used by medical and dental professionals who have been appropriately trained to use 3D CT imaging devices and read the image data generated by the devices.

Language

The original language of this manual is English. Other versions are available. Please contact Anatomage for other language versions.

Caution: Federal law restricts this device to sale by or on the order of medical and dental clinicians.

Indications for Use

InvivoLight is a software application used for the display and 3D visualization of medical image files from scanning devices, such as CT, MRI, or 3D Ultrasound. It is intended for use by radiologists, clinicians, referring physicians, and other qualified individuals to retrieve, process, render, review, store, print, assist in diagnosis and distribute images, utilizing standard PC hardware. Additionally, InvivoLight is a preoperative software application used for the simulation and evaluation of dental implants, orthodontic planning, and surgical treatments.

This device is not indicated for mammography use.

General Precautions



Warning: The software provides tools for dental prosthetics creation and design but is dependent on the user to determine and use the appropriate parameters. Incorrect parameters may affect the quality of the final milled products or otherwise to surgical delays or complications.



Warning: Please ensure all hardware devices with the software are password-protected from unauthorized use and all patient information is secure.

Table of Contents

Table of Contents.....	4
Introduction.....	7
System Requirements.....	8
Installing InvivoLight.....	9
About the License Type.....	9
Perpetual Licenses	9
One-year Licenses.....	9
Website Installation Instructions.....	9
InvivoLight Setup Wizard	9
Validating the Installer File.....	11
Feature List.....	12
Software Layout	13
InvivoLight Preferences	14
Display Preferences	14
Volume Rendering Preferences.....	16
File Manager Settings	17
Basic Features	18
DICOM & Invivo File Loading with the File Manager.....	18
Invivo/DICOM File Saving.....	20
Invivo.....	20
DICOM.....	20
Custom Saving Dialog.....	21
Saving As an Invivo Project File.....	21
Lay Egg	21
Export to CD	22
Send File.....	23
Anatomage Cloud.....	23
Upload for Service.....	24
Case Information Display.....	25
Image Capture to File.....	25
Image Capture to Gallery	25
Image Capture to Clipboard.....	26
Image Navigation	27
Slider Scroll.....	27

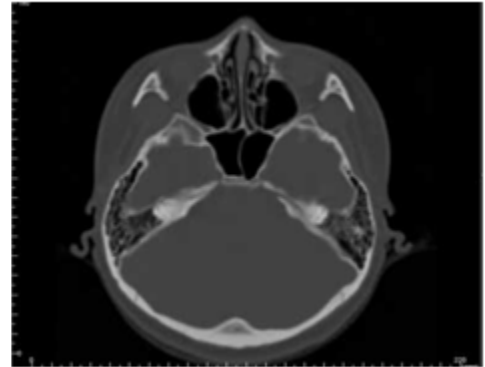
Zoom In/Out.....	27
Pan (Shift)	27
Free Rotate.....	28
Free Rolling.....	28
Increment Rotate	28
Increment Roll.....	28
Anatomical Plane Clipping.....	29
Scroll Slice.....	29
Full Screen Mode.....	30
Switching to Full Screen Mode	30
The View Tabs:.....	31
ArchSection View Features	31
ArchSection: Toolbar	32
ArchSection: Control Panel.....	34
ArchSection: Rendering Window	36
ArchSection: Creating A Nerve Pathway.....	37
ArchSection: Custom Layouts.....	38
Implant View Features	39
Implant: Toolbar	40
Implant: Control Panel.....	42
Implant: Rendering Window	44
Implant: View Preset Setup.....	44
Implant: Model Visibility	46
Implant: 3D Implant Widget	46
Implant: 2D Implant Widget	46
Implant: 3D Implant Planning.....	47
Implant: Pano Implant Planning	48
Implant: Bone Graft Simulation	49
Implant: Check Sleeves	50
Implant: Settings and Preferences.....	51
Detailed Implant Settings	52
Preferred Implants Settings.....	52
Update Implant Library.....	53
Density Profile Control.....	53
Gallery View Features	55
Gallery: Toolbar	56

Gallery: Control Panel.....	56
Gallery: Rendering Window.....	57
Gallery: Adding Images to the Gallery.....	58
Gallery: 2D Image Options.....	60
Common How-to Tasks	61
How to Trace a Nerve.....	61
How to Create Reports in Life Size	62
InvivoLight6 Software Troubleshooting.....	63
Keyboard Shortcuts	65
Index.....	66

Introduction

InvivoLight Imaging Software

Anatomage, Inc. is a medical imaging company composed of a cross-functional team consisting of the most elite researchers, mathematicians, engineers, software developers, business analysts, industry leaders, academic faculty, and dental specialists. We believe that InvivoLight software will enable the profession to initiate a revolution of unimaginable scope and magnitude. Ultimately, our mission is dedicated to developing simple and refined software specially designed for dentists to utilize the most advanced cutting edge software and technology to better serve their patients. With InvivoLight software, doctors can create 3D volume renderings on their own computers, get cross sections, trace nerves, place implants, print images, save images, and many more functions. The software is designed to reconstruct these 3D volume renderings from DICOM files generated by CBCT, Medical CT, and MRI radiography machines. InvivoLight is intended for use as a planning and simulation software in the placement of dental implants, orthodontics, and surgical treatment.



This manual is intended to provide supplementary information to your direct training with the Anatomage support team. For correct and safe use, training is available to all InvivoLight users and is highly recommended. In this document, InvivoLight refers to the latest version of the Anatomage InvivoLight software. Previously released versions of this manual are available. For more information on how to access previous versions of the InvivoLight Reference Manual, please contact the Anatomage customer support team at (408) 885-1474 or email support@anatomage.com

System Requirements

Below are the minimal and recommended system configurations.

Having an adequate computer system is essential to using InvivoLight efficiently and generating the highest quality images possible for enhanced analysis and presentation for your patients and colleagues. The most important element is the video card (3D graphics chip or GPU). If your system does not have an appropriate video card, you can purchase and install video cards for desktop computers.

InvivoLight has minimal system requirements; however, Anatomage recommends the following configurations to fully utilize all the features within the InvivoLight Software. The following recommendations have been updated in September 2017:

Summary

	Minimum	Recommended
CPU	Intel Core i5 2400	Intel Core i7 4000 series or comparable multi-core processor
RAM	4GB	8GB
GPU / Graphics Card	Intel HD 4000	AMD Radeon RX 580 or comparable
Hard Disk	100 GB	500 GB
OS	Windows 7 64-bit	Windows 7 64-bit, Windows 8* 64-bit, or Windows 10* 64-bit

Mac Users

	OS	Hardware
Not Compatible	Apple OS, Parallels	iPad
Fully Compatible	Apple Bootcamp (requires a full license of Windows)	MacBook Air, iMac, MacBook Pro (15in), Mac Pro

Note: For optimal visualization, the monitor display scale should not exceed 150 percent.

Graphics Cards / GPU Details

Brand	Model Series	Low-End Options	High-End Options
Intel	Intel HD 4000 – Intel Iris Pro	Intel HD 4000	Intel Iris Pro
AMD	Radeon HD 4600 – RX 580	Radeon RX 550	Radeon HD 7970 Radeon RX 580
Nvidia	GeForce GT 430 – GeForce GTX Titan	GeForce GTX 1030	GeForce GTX 1060 GeForce GTX 1060 Ti

Installing InvivoLight

About the License Type

The authorization code provided for activation should be one of the two license types below. If the license type is not known, please contact the distributor of the license, which can be either Anatomage or a partner CBCT scanner manufacturer that bundles InvivoLight licenses.

Perpetual Licenses

- This is a single-use license for one computer. Internet connection is required for the initial installation but not during subsequent use of the software. If Internet access is not available, the license can be manually activated by the distributor's tech support.

One-year Licenses

- This is a single-use license for one computer. This license provides the same functionality as for the perpetual version for one year. For license renewals, please contact the license distributor's tech support.

Note: Please ensure each code is entered on the desired computer. Once a code has been activated, you must contact the distributor of the license to transfer the license.

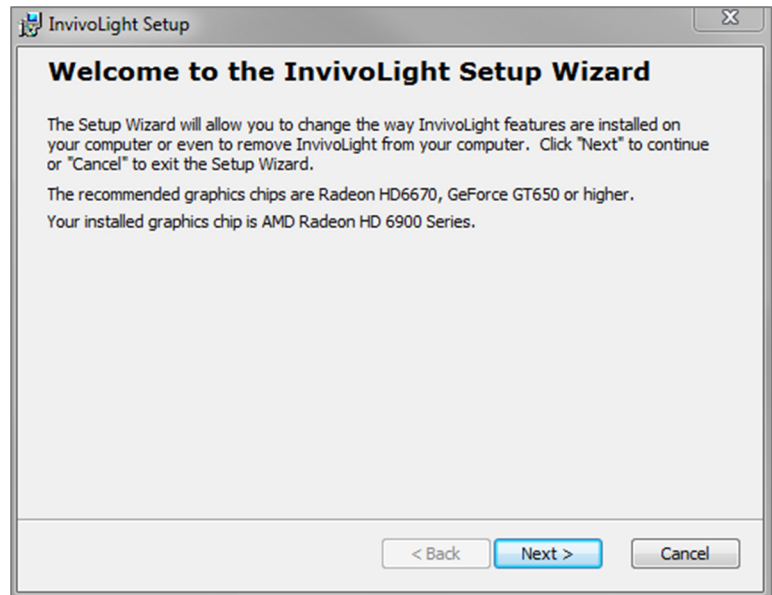
Website Installation Instructions

1. Go to www.Anatomage.com
2. Select "Dr. Login."
 - Contact your license distributor for login information.
3. Click on the InvivoLight Installer.
4. Click "Save File."
5. Run File.

InvivoLight Setup Wizard

Before proceeding, please ensure the computer is connected to the Internet.

Click **Next** to continue.

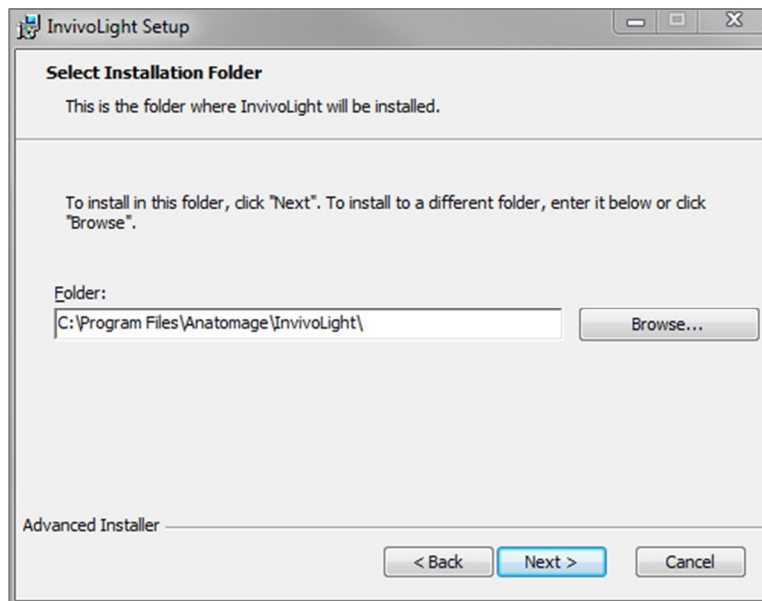


Enter the numerical authorization code. If you have an alphanumeric license key, click **Advanced** and put in the key in the blank provided.

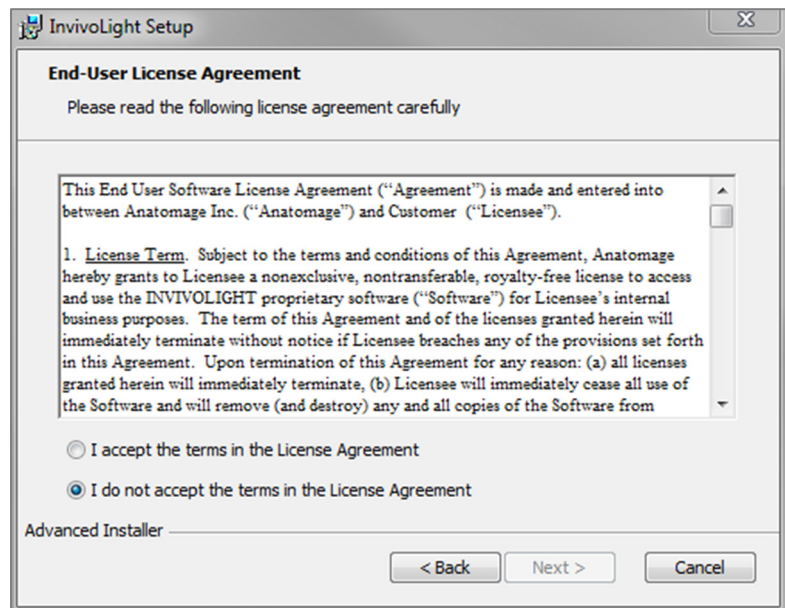
Please enter Authorization code.

Click **Next** to continue.

Installation Preferences: The user can specify the folder for software installation as well as the level of functionality with which the software initially opens.



Review the End-User License Agreement and accept the terms if desired to proceed with the installation.

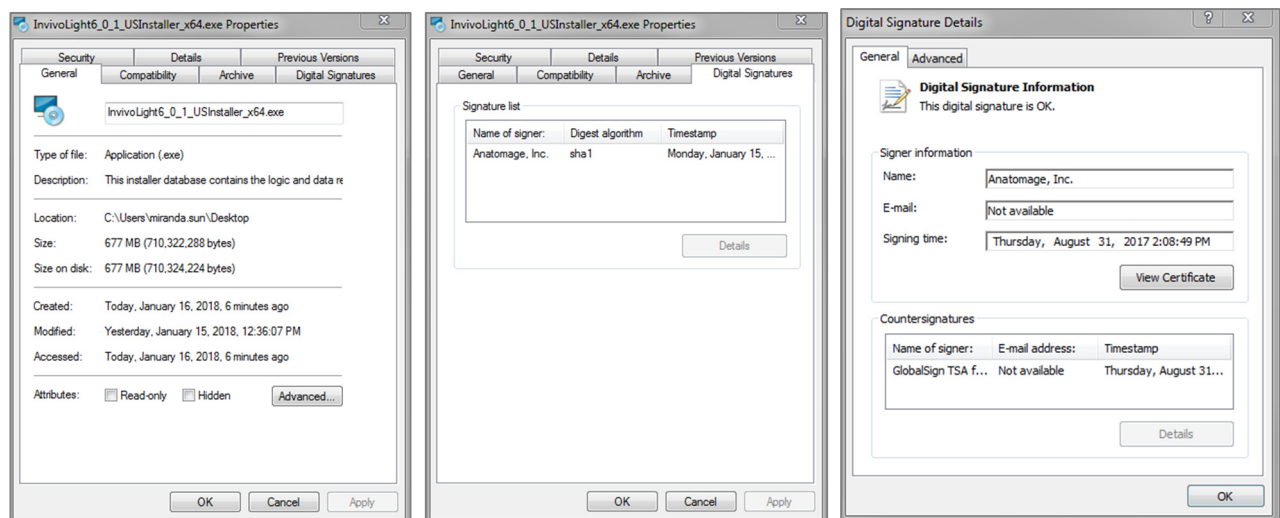


Click **Next** to continue. The program proceeds with installation until completed. Click **Finish** to close the wizard.

Validating the Installer File

1. Right-click the Installer file and select "Properties" to open the Properties window.
2. Open the "Digital Signatures" Tab.
3. Select "Anatomage, Inc." and press **Details**.
4. Verify that the Digital Signature Information is "OK."

The following pictures are for demonstration purposes only. The name of the installer and Digital Signature Information is dependent on the release version and may change accordingly.



Feature List

An overview of the various features provided by InvivoLight.

- **Directly Opens DICOM Data from Any CT Machine**
- **Invivo File Compression**
- **Section and Multislice View Operations**
- **Volume Rendering of Scan Data**
- **Linear, Angular, Circumferential, Area, and Volumetric Measurements***
- **Image Capture and Export**
- **AVI (Movie) Capture and Export**
- **Implant Treatment Planning**
- **Restoration and Abutment Visualization**
- **Bone Density Evaluation**

*All measurements are performed with the metric system.

Software Layout

The following is a description of how InvivoLight is organized by Menu Bar, Toolbar, View Tabs, View Control Panel, and Rendering Window.

Menu Bar

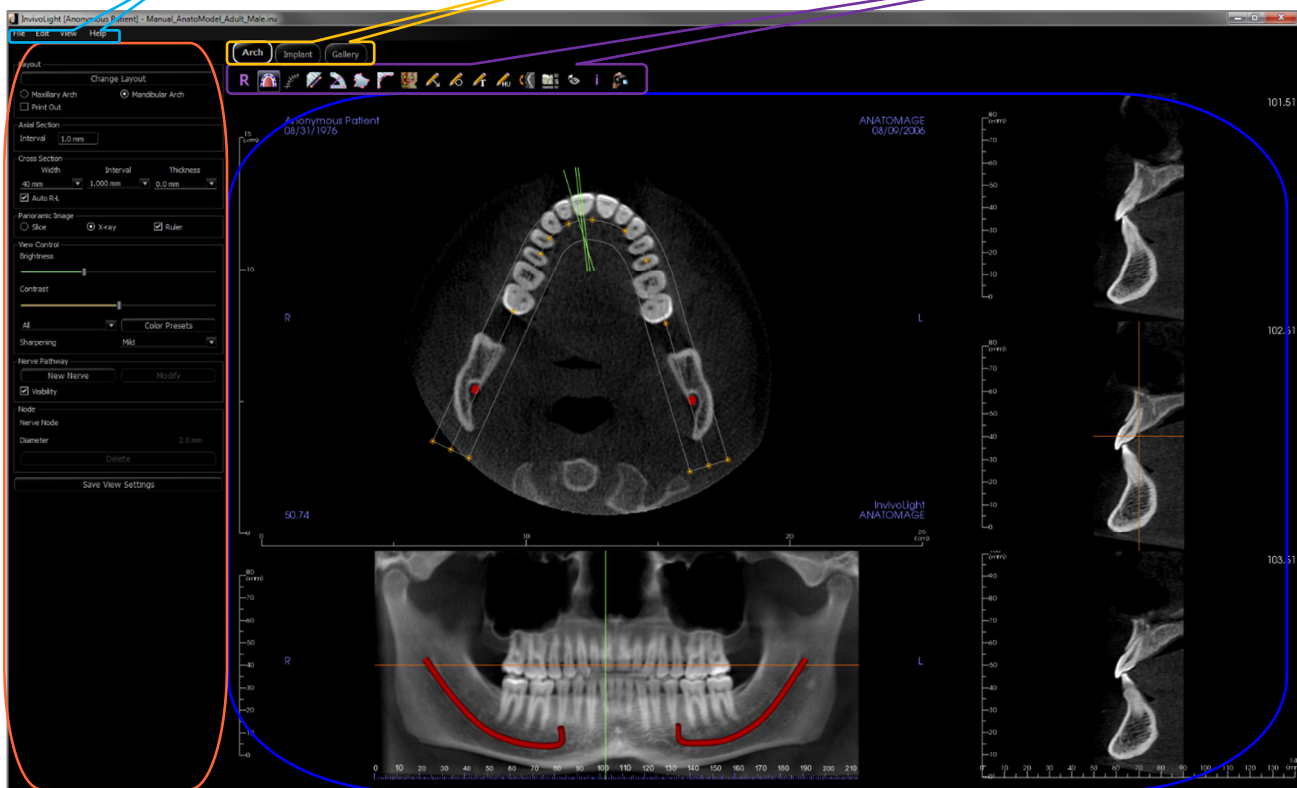
The **Menu Bar** contains application operations such as open, save, close, print, capture, etc.

View Tabs

The **View Tabs** perform specific tasks or look at specific subjects of interest by adjusting the **Toolbar** and **View Controls**

Toolbar

Tools can be accessed to perform certain functions on patient images. Sets of tools are associated with a specific **View Tab**.



Control Panel

The **Control Panel** is the region where patient images can be manipulated and controlled. The **Control Panel** is associated with a specific **View Tab**.

Rendering Window

Rendering Window is the region where patient images are displayed. This window can be customized within many of the **View Tabs** by using the **Toolbar**.

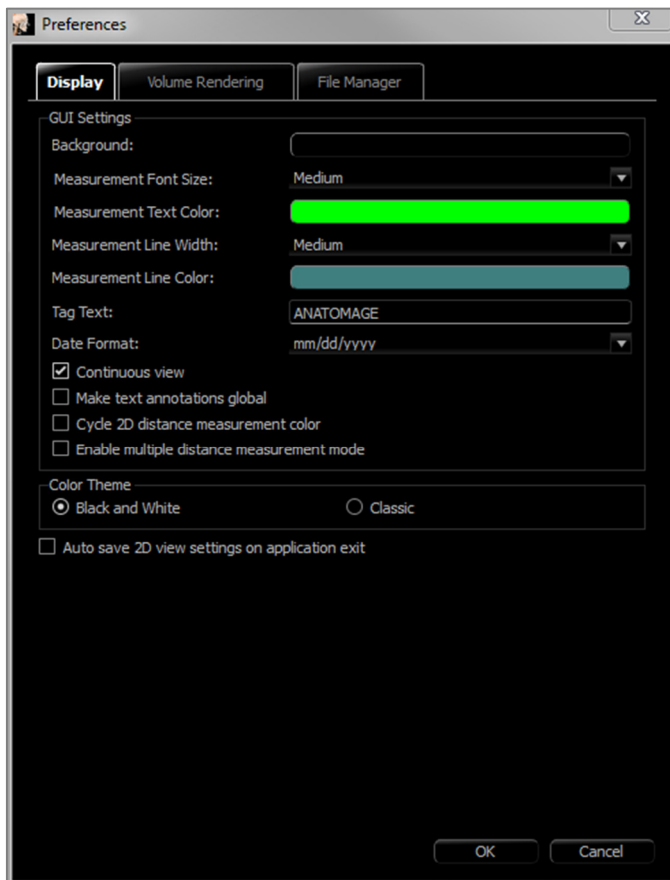
InvivoLight Preferences

This section explains the different options within the Preference window of InvivoLight. The InvivoLight preferences include options for Display settings, Volume Rendering settings, as well as File Manager settings.

Accessing the InvivoLight Preferences:

- In the Menu bar of the InvivoLight, select “File.”
- Select “Preferences...” from the “File” drop-down.

Display Preferences



GUI Settings

- **Background:** Sets the background color for the rendering window.
- **Measurement Font Size:** Sets the measurement font size to a size preset: small, medium, or large.
- **Measurement Text Color:** Sets the text color for measurement notations.
- **Measurement Line Width:** Sets the width for measurements.
- **Measurement Line Color:** Sets the color of the measurement lines.
- **Tag Text:** Provides an additional label to the right-hand corner of the rendering window.
- **Date Format:** Current date format for case information display.
- **Continuous view:**
 - Checked – Switching between view presets for volume renderings shows intermediate volume positions.
 - Unchecked – Switching between view presets does not show intermediate positions; the volume “jumps” to the final position.

- **Make text annotations global:** When checked, previously placed or new text annotations added to any 2D slice view will be visible when scrolling past the slice the measurement was placed on.
- **Cycle 2D distance measurement color:** Measurement colors cycle with every measurement that is added.
- **Enable multiple distance measurement mode:** Distance measurement becomes a toggle on/off button for measurement mode. Toggling “on” this mode continuously picks beginning and end points for linear measurements with each click after the first measurement has been created until toggled “off.”

Color Theme:

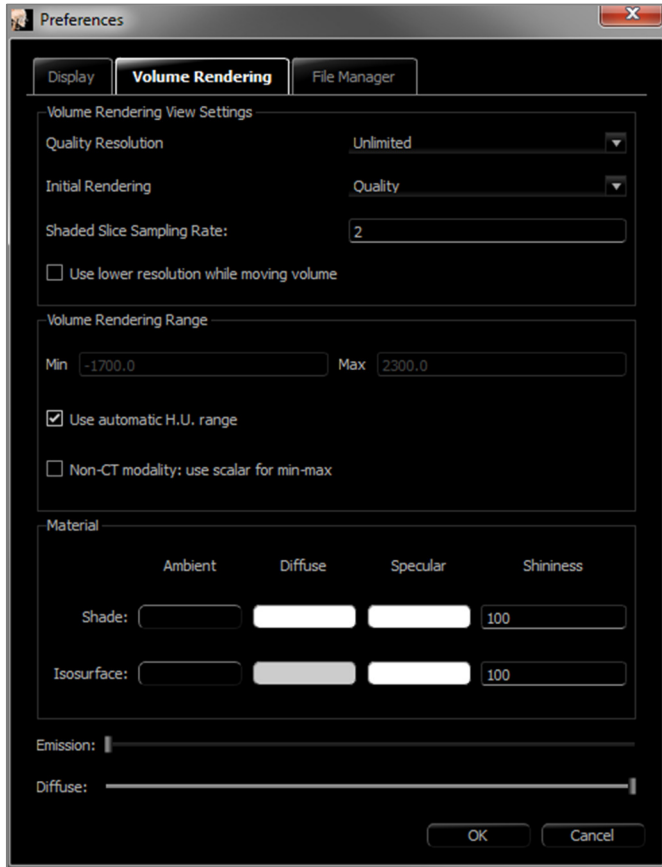
- Two color themes are available for the software.
- The software images in this manual are in Black and White mode, but the overall functions are shared between the themes.

Auto save 2D view setting on application exit

- This setting determines if 2D view settings made in each of the applicable tabs are saved automatically upon program closure and be reloaded with the next opened case. If left unselected, the user has to manually save the configuration by clicking Save View Settings in the working tab. The specific 2D view settings that are saved in each tab are given in the table below:

ArchSection	Slice Interval, Cross Section Width/Interval/Thickness, Auto R-L, Pano Image Type, Pano Ruler Enabled, Brightness/Contrast mode, Layout (including Axial vs. Cross Series and Print Layout), Sharpen Filter, Color Preset, Nerve Diameter, and Nerve Visibility
Implant	Planning Layout, Restoration Lock, View Preset, Brightness/Contrast, Sharpen Filter, Volume Clipping, and Remove Crown

Volume Rendering Preferences



Volume Rendering View Settings

- **Quality Resolution:** Sets the limit for the resolution of the image. This can be set to either a user-defined number or set to Unlimited.
- **Initial Rendering:** Sets the rendering quality upon opening InvivoLight.
- **Shaded Slice Sampling Rate:** Accepts a numerical value that sets the sampling rate to improve image quality at the cost of performance.
- **Use lower resolution while moving volume:** Positional changes of the volume are rendered at a low-quality resolution while maintaining the quality resolution setting in the final position.

Volume Rendering Range

- The user can define the range of Hounsfield Units that are rendered. This cannot be set when “Use automatic H.U. range” is checked.
- Checking “Non-CT modality: use scalar for min-max” allows the user to define the minimum and maximum scalar units that are rendered.

Material

- Various properties can be adjusted to change the appearance of a volume rendering. Ambient, Diffuse, and Specular effects can be rendered in different colors.
- The degree of Emission and Diffuse can be adjusted with the respective sliders.
- Shininess is set to a number – higher numbers denote less shininess.

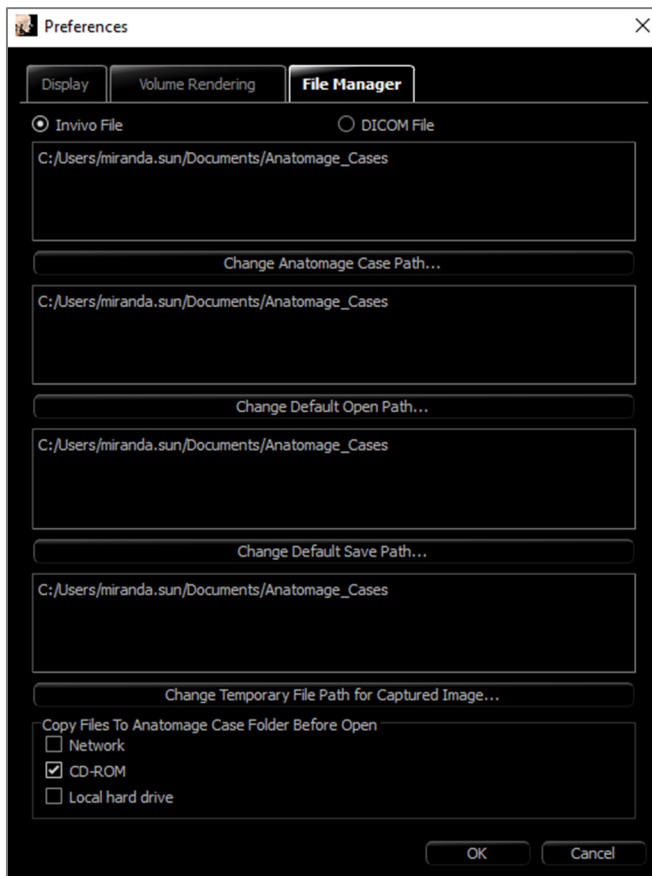
File Manager Settings

File Type-Associated Folder Paths

Folder paths can be set for each of the Invivo and DICOM file type options. When one mode is selected, the program uses the file paths associated with that file type mode, but the user may still save or open either file type at any time.

File Path Preferences for Different Users

In the situation that there are multiple users on a single computer with InvivoLight installed across multiple user accounts, the file paths for all new accounts initially take on the preferences defined by the user administrator account. Non-admin accounts may redefine their file path settings, but they will be overwritten the next time the settings are changed on a user administrator account.



File Paths

- **Anatomage Case Path:** Starting the program will open a window showing a list of cases within this location.
 - Can also serve as a backup folder for all opened cases.
- **Default Open Path:** This is the starting location for attempting to open a case through File → Open in the Menu bar.
- **Default Save Path:** This is the starting location for saving a case file in InvivoLight.

Copy Files to Anatomage Case Folder Before Open

- This section allows the user to save a copy of a case that is to be opened in the Anatomage Case Folder if it is in any location besides this folder, such as on a different location on a network, on a CD-ROM, or in a different folder on the local hard drive.

DICOM Advanced Settings

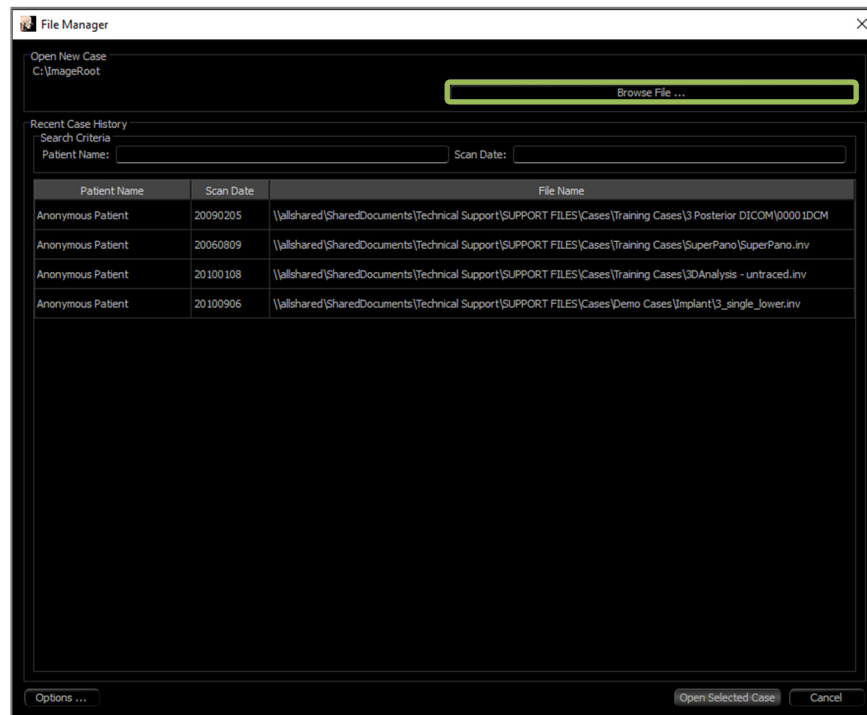
- This option is only available if the DICOM File option is selected.
- **Saving Character Set:** If checked, this sets the value for the Specific Character Set DICOM tag (0008, 0005).

Basic Features

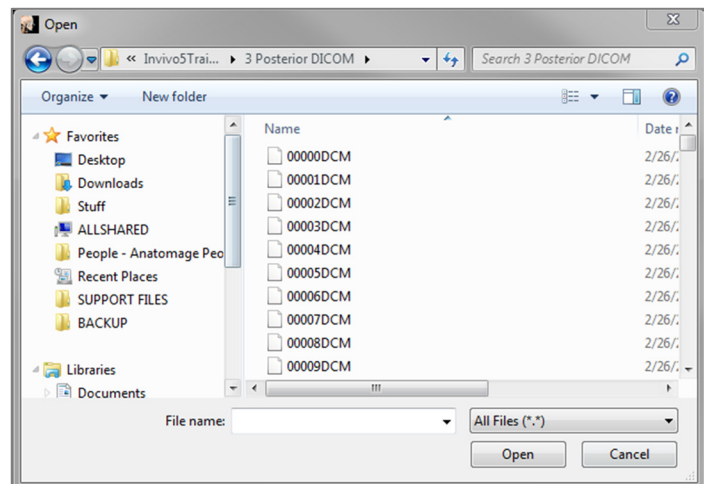
The following is a detailed explanation of the various features provided by InvivoLight.

DICOM & Invivo File Loading with the File Manager

To open a DICOM data set or InvivoLight-associated file type (.inv, .amg, apj), first launch the InvivoLight software. The File Manager appears upon startup for loading the scan data.

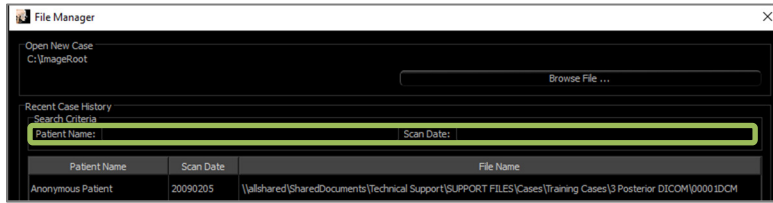


Click the **Browse File** button to search manually for the data to open. For opening DICOM data, as shown to the right, simply highlight one of the .dcm files and click **Open**. **It does not matter which DICOM file is chosen**, as selecting one opens all the files within the data set present in that folder. For opening an Invivo file, select it and press **Open**. Invivo files can also be compressed and opened.



The File Manager automatically stores recently viewed case locations. This allows for quicker access to these cases. By default, files are saved in the “Anatomege Cases” folder, located in “My Documents.” This location can be changed in the Menu Bar → File → Preferences → File Manager.

Quickly search through the recent cases by typing in the Patient Name or Scan Date in the search fields (shown right). The selected cases can be removed from the Recent Case List by selecting the **Options...** button and using the additional buttons (shown below). These options can completely clear the Recent Cases list.



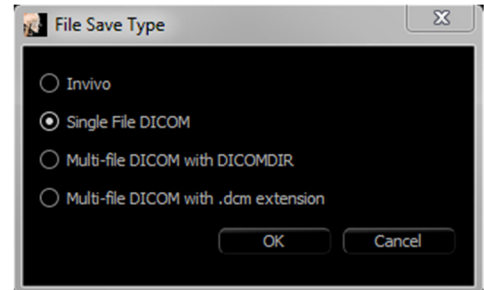
After closing a case, to reopen another one, click on “File” → “Open”, and the File Manager will appear again.

Selecting **Options...** displays additional options to delete the recent case history or to delete select cases from the list. This only modifies the cases that are displayed on the File Manager and does not delete the actual files from where they are saved.



Invivo/DICOM File Saving

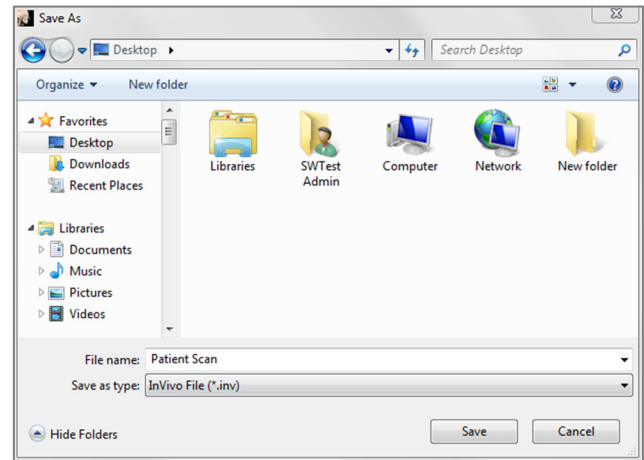
InvivoLight provides four options for saving and each type differs in the size of the saved file and its compatibility with other software. Choosing “File” → “Save As...” for any file presents the dialog on the right. Choosing “File” → “Save” when a DCM file is open saves an INV in the specified location or simply overwrites the same file if it is already in INV file type.



Invivo

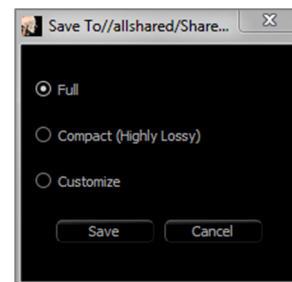
The following work can be saved as an Invivo file (.inv).

- Case Information & Patient Orientation
- Traced Nerves
- Implants & Implant Measurements
- Volume Measurements, Landmarks, and Annotations
- Images captured within the Gallery



Click “File” → “Save As...,” browse to the destination folder, name the file (default is the patient’s name), then click **Save**.

The following save dialog box appears. Select the default “Full” option for saving everything without losing any information.



DICOM

When the DICOM file type is chosen, the output options are either a single lossless DICOM or a multi-file DICOM (with DicomDIR) accompanied with an Invivo workup file containing workup data and a folder of exported Gallery images in DCM format.

For single-file DICOMs (Figure 1), the save dialog asks for a location to save the files. For multi-file DICOMs (Figure 2), create or choose a folder to save the slices and DicomDIR file. The DicomDIR file presents the directory of slices to InvivoLight to accelerate the loading speed.

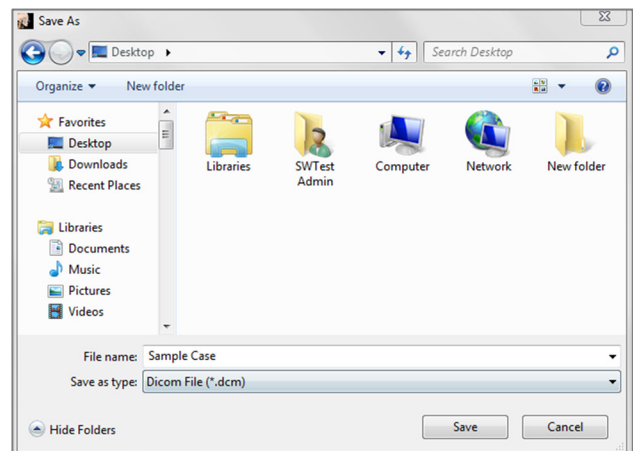


Figure 1: Single-file DICOM Save Dialog

The DICOM File Save Option dialog (Figure 3) presents numerous options for saving the file.

Compression reduces the size of the file at the cost of increased saving and loading speed, “Lossless” or “Lossy” determines the quality (amount of data) of the file that is saved. Resampling changes the resolution by a factor in each orthogonal plane. If “Save additional series” option is selected, the coronal and sagittal DICOM series are also exported along with the default axial series.

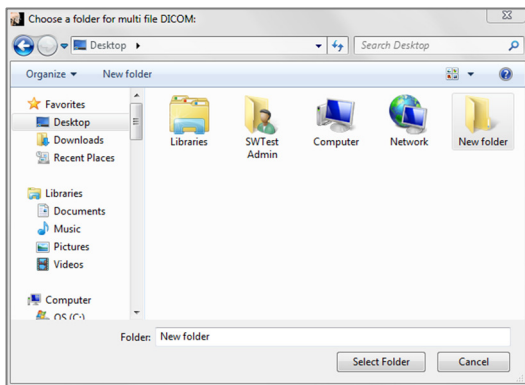


Figure 2: Multi-file DICOM Save Dialog

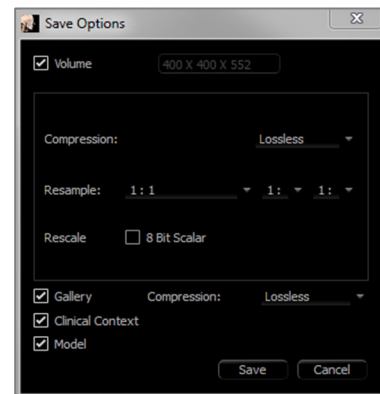


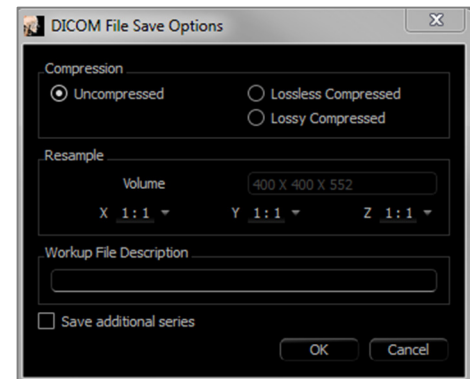
Figure 3: DICOM File Save Options

Custom Saving Dialog

Available for Invivo file saving: By selecting the “Customize” option, the custom saving dialog shows up. In the dialog box are data compression options. For the main volumetric image, “Lossless” or “Lossy” compression options are available. With lossless compression, the volume is compressed to about 1/3rd – 1/4th of the original size. With the Lossy compression option, the file size can be dramatically reduced, but the image is altered. Resampling the data greatly reduces its size by combining voxels to reduce the overall voxel count. Rescaling the image reduces the number of shades of gray in the image. Options to selectively compress images in the Gallery, the clinical content (such as implants and nerve tracings), and the models can be selected.



Warning: Saving files in lossy format degrades image quality.



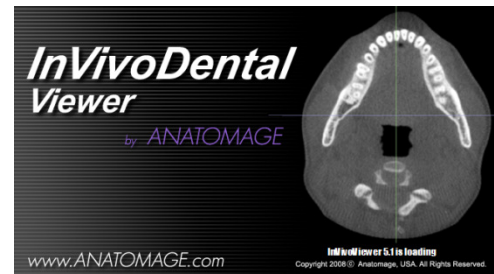
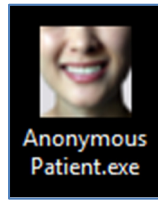
Saving As an Invivo Project File

Click “File” → “Save As Project...” to save the case as an APJ, Invivo Project file. This file **only** saves work up data. It requires a reference data (.dcm scan data or .inv file) when opening. If Invivo cannot locate the reference data, it prompts to locate the data filepath. Because it is saving only the changes to the original, APJ files save much faster than full INV files.

Lay Egg

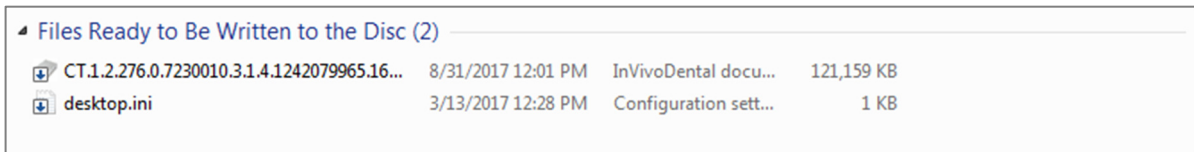
This function creates an executable file containing the 3D volume data from the scan that is currently open as well as a 2D Invivo viewer program. This function is designed to allow the sharing of scan data from an InvivoLight user to a non-InvivoLight user on shareable media such as a CD, DVD, or flash drive. Note that some antivirus programs may detect the file as a virus due to its executable format.

EggViewer: Running this file initializes the viewer program and then loads the embedded scan data. The EggViewer contains some Section, ArchSection, and Gallery functionality.



Export to CD

This function exports the currently opened scan as a compressed or uncompressed DICOM or a full, compressed, or customized setting Invivo file. The exported file is placed in the temporary burn location in the computer.



Send File

Anatomage Cloud

To send the case through Anatomage Cloud, the software prompts the user to sign in to an Anatomage Cloud account. If no account was previously made, click **Create Account** to get started. Toggle on “Remember Me” to retain the username and password that is used. Click **Forgot Password?** to reset the password for an existing cloud account if needed.

After logging in, the user can input the recipient’s name, email, message subject, and notes. This information and the link to accessing the case is sent to the recipient’s email. The recipient can then preview the case through the browser viewer or download it for further use.

A dialog box titled "Sign In" with a close button (X) in the top right corner. It contains a "Sign In" label and a blue link "Create Account" in the top right. Below are two text input fields labeled "Username" and "Password". A "Sign In" button is centered below the fields. At the bottom left is a checkbox labeled "Remember Me", and at the bottom right is a blue link "Forgot Password?".

Sign In

[Create Account](#)

Username

Password

Sign In

☐ Remember Me

[Forgot Password?](#)

A dialog box titled "Send To" with a close button (X) in the top right corner. It contains two text input fields for "First Name" and "Last Name", followed by an "Email" field. Below these is a "Subject" field with a dropdown arrow. A large text area labeled "Notes" is below the subject field. A "Send" button is at the bottom center.

Send To

First Name

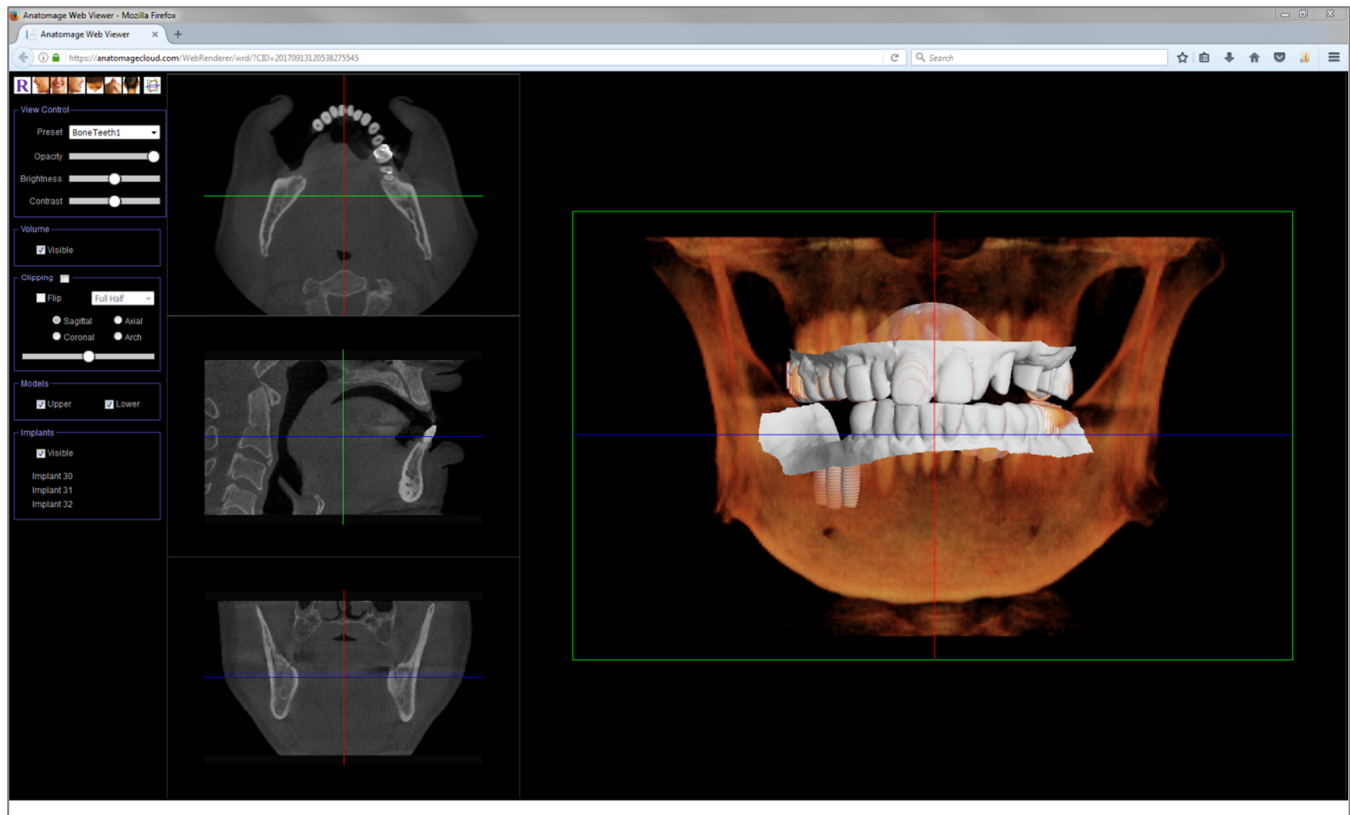
Last Name

Email

Subject

Notes

Send



Upload for Service

To send the case directly to the Anatomage website for the Anatomage service, input the Anatomage login when prompted. Toggle on “Remember Me” to retain the login information, and click **Upload** to upload the case. If further instructions are required for processing the case, please contact the Anatomage department at 408-885-1474 ext. 5.

Note: This function cannot be used for uploading Surgical Guide cases. To do so, please access the Anatomage website.

Case Information Display

To display or hide the Case Information for a specific patient, go to the “File” → “Case Info.” Click **Anonymize** then click **OK** to save the changes.

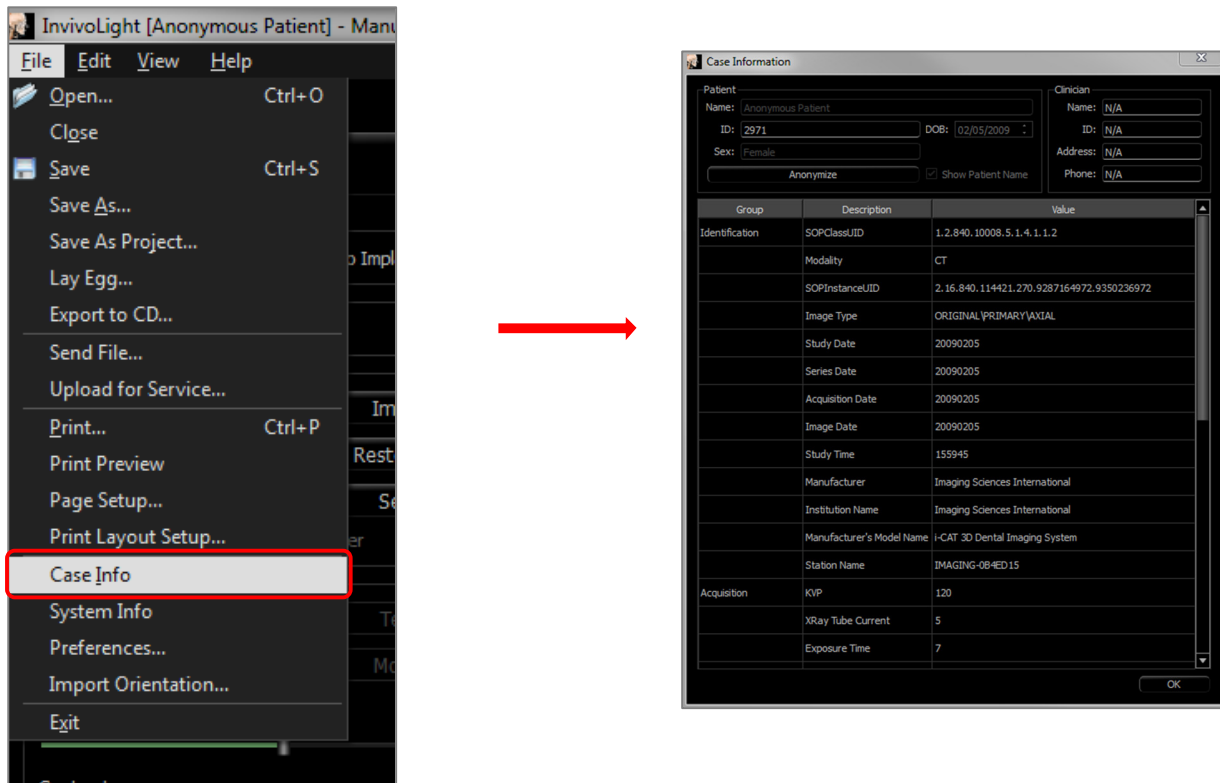


Image Capture to File

To capture an image of the active display to file, click “View” → “Capture to File.” Browse to the location to save the image, type the name of the file, choose the file type on the “Save as type” drop-down, and click **Save**. The file can be saved as bmp, jpg, or png format. Jpg is the most popular file format for images, but there is a small amount of color degradation. Bmp preserves the image, but the file size is big. Png is an effective lossless format that does not degrade the color.

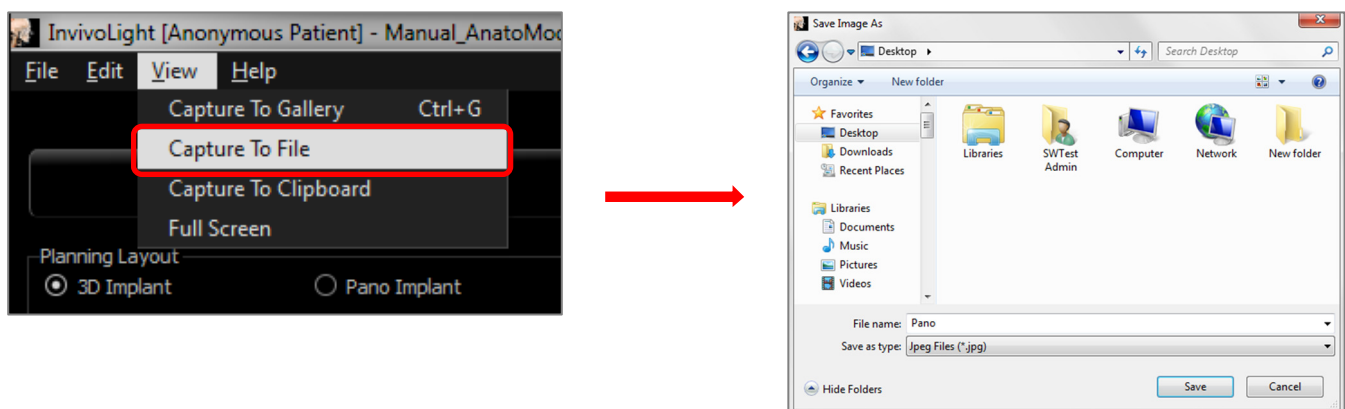


Image Capture to Gallery

Selecting “Capture To Gallery” or pressing Ctrl + G captures an image of the rendering window and save it to the Image List (see Gallery Tab features for additional information, pg 55).

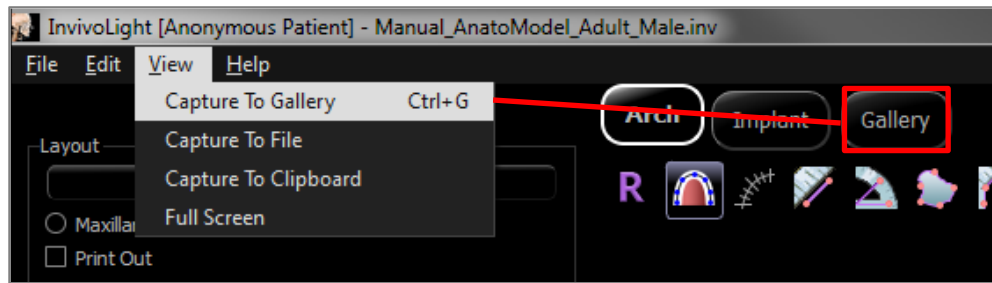


Image Capture to Clipboard

Selecting “Capture To Clipboard” captures an image of the rendering window to the clipboard for pasting in other programs

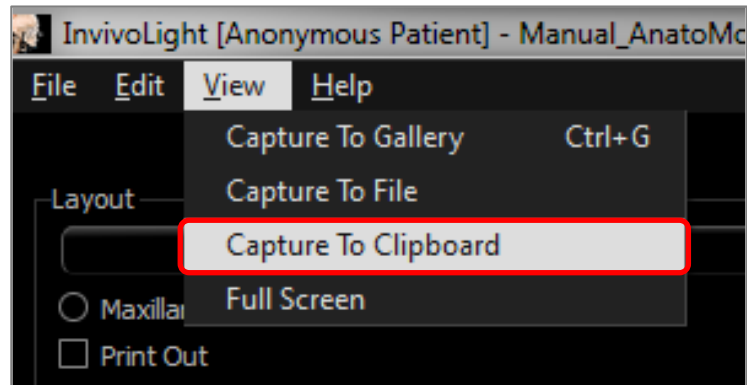


Image Navigation

Below is an explanation showing how to manipulate images in the rendering window with the keyboard and mouse.

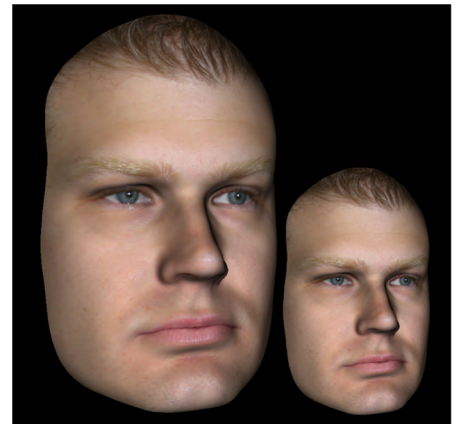
Slider Scroll



- Click the mouse cursor over any slider (e.g. axial slice, brightness, etc.) and move it to adjust the image.
- Click the slider and keep the mouse cursor in the Control Panel before scrolling the mouse wheel forward or backward to achieve the image adjustment you like.

Zoom In/Out

- Place the mouse cursor in the center of the image you want to zoom.
- Hold down the “Control” key + left-button on the mouse.
- While holding down the buttons indicated above, move the mouse up and down on the screen.
- This shrinks/enlarges the image: Down vertically zooms out. Up vertically zooms in.



Pan (Shift)

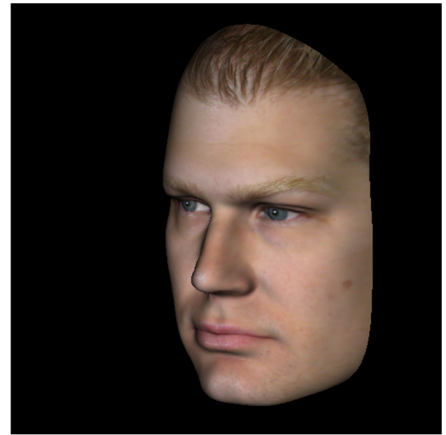
- Place the mouse cursor in the center of the image you want to shift.
- Hold down the “Shift” key + left-button on the mouse.
- While holding down the buttons indicated above, move the mouse any direction to achieve the desired image displacement.



Free Rotate

Applicable only for 3D images.

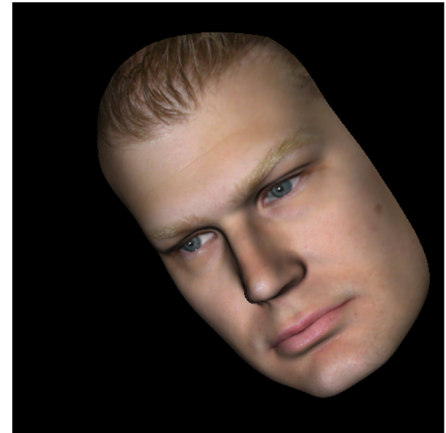
- Place the mouse cursor in the center of the image you want to shift. Hold down the left-button on the mouse.
- While holding down the left-button, move the mouse in any direction to achieve the desired rotational position.



Free Rolling

Applicable only for 3D images.

- Hold down the “Space” key + left-button on the mouse.
- While holding down the buttons indicated above, move the mouse up and down to rotate the image about a central axis.



Increment Rotate

Applicable only for 3D images.

- Use the keyboard arrows ← ↑ ↓ → to rotate the 3D Model 1 degree up, down, right, or left, perpendicular to the computer screen.

Increment Roll

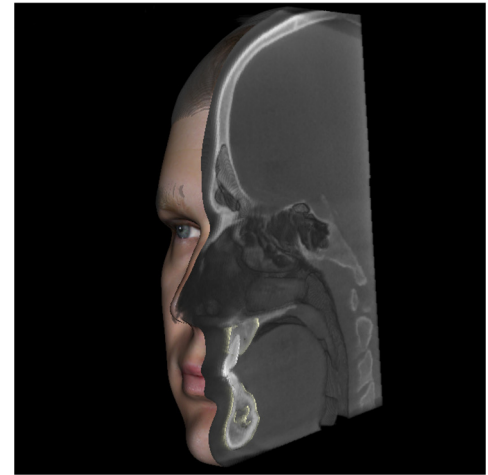
Applicable only for 3D images.

- Hold down the “Control” key and use the keyboard arrows ← → to rotate the 3D Model 1 degree rolling left or right about a central axis. Pressing ← → without the Control key pressed will roll the image left or right. Use ↑ ↓ to roll the image up or down.

Anatomical Plane Clipping

Applicable only for 3D images.

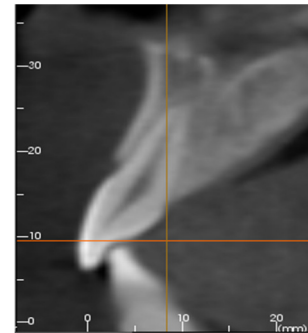
- Place the mouse cursor over the center of the image, then scroll the mouse wheel forward or backward to clip the anatomic plane as you like (after enabling clipping in the Control Panel).



Scroll Slice

Use when you would like to move through the series of sections when in the 2D slice views.

- Place the mouse cursor in the center of the image then scroll the mouse wheel forward or backward to move one section at a time as you advance through the data slices.

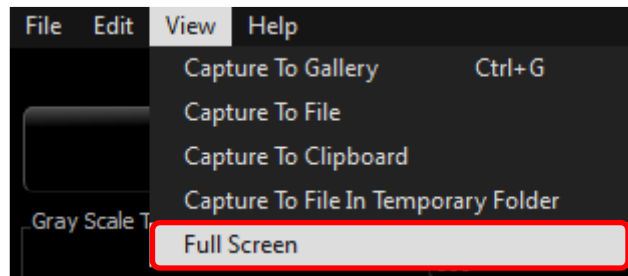


Full Screen Mode

Below is an explanation pertaining to running the software in full screen mode.

Switching to Full Screen Mode

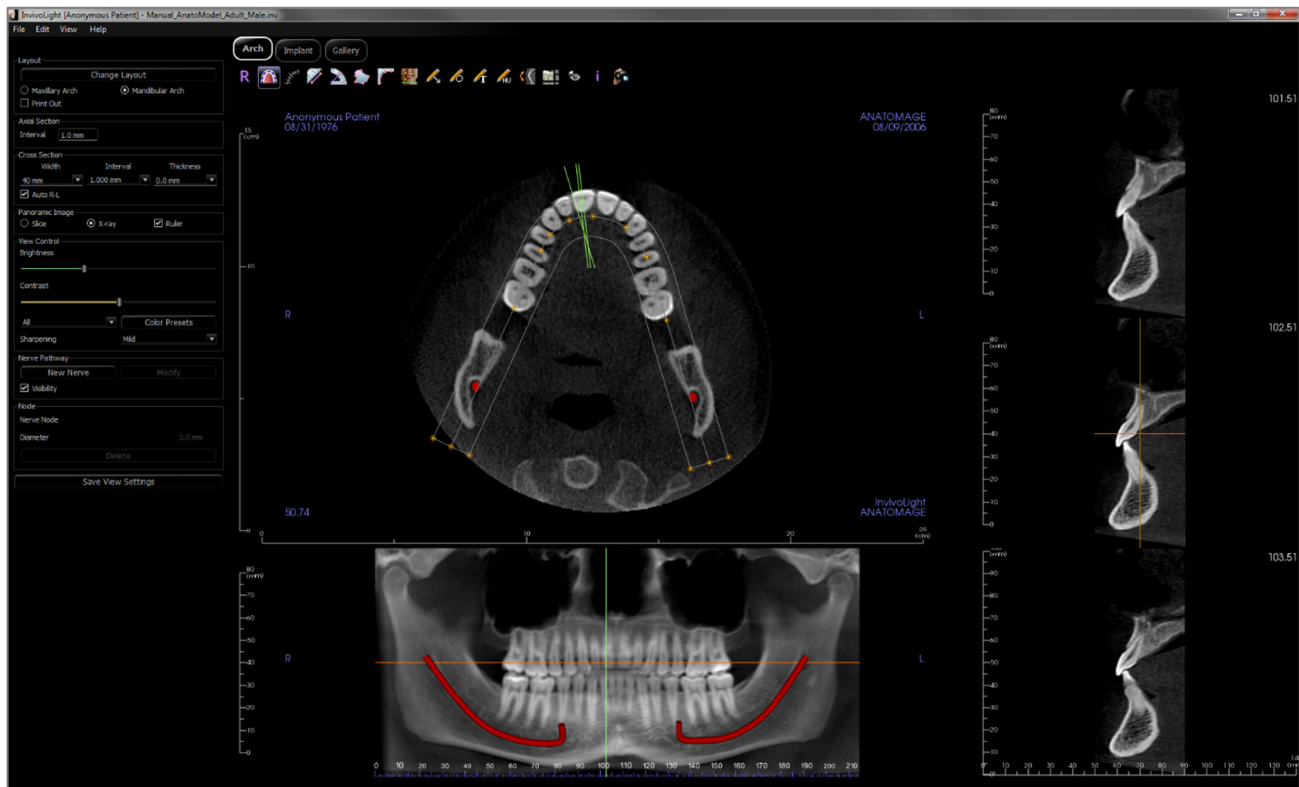
From the software menu, select “View” → “Full Screen.” “Full screen stereo” is only applicable for the stereo display system. To return to the normal screen mode, press the “Esc” key on the keyboard.



The View Tabs:

ArchSection View Features

ArchSection View Tab is a sectional image exploration view. Instead of conventional X-Y-Z sections, this view allows the user to review the image in dentally meaningful perspectives using multiple cross sections, traversing the lengths of the dental arches.



ArchSection: Toolbar

Shown below are the Toolbar and tools that are loaded with the ArchSection Tab:



Reset: Resets the window to the original view.



Create Arch Spline: After selecting this tool, create a new arch spline or edit an existing arch spline. Left-click to place nodes along the arch. Right-click or double-click to finish the arch spline. To modify an existing arch spline, drag the nodes to the desired positions. To move the arch while maintaining its shape, click and drag the central spline.



Arch Spline Ruler: Places ruler along the arch spline for easy reference.



Distance Measurement: After selecting this tool, click two points to mark the desired distance. A number in millimeters automatically displays.



Angle Measurement: Select this option and mark three points on the volume and the angle between them appears. Clicking on their control points and moving the cursor can modify measurements. Click on the measurement and press the “delete” key to delete it.



Area Measurement: After selecting this tool, click multiple points along the boundary of the desired area. Double-click or right-click to end the measurement. A number in millimeters squared automatically displays. Click on the measurement and press the “delete” key to delete it.



Polyline Measurement: Select this option and mark any number of points in the slice view. Right-click to end the measurement, and the total distance appears. Clicking on the nodes and moving the cursor can modify points. Click on the measurement and press the “delete” key to delete it.



Reorientation: Adjusts the patient orientation and the visible range of the scan.



Arrow Notation: Allows an arrow to be drawn on the image.



Circle Notation: Allows a circle to be drawn on the image.



Text Notation: Allows text to be written and edited on the image.



H.U. Measurement: Calculates the HU value of an area within a bounding rectangle, circle, or ellipse. The measurements display alongside the shape and can also be repositioned by dragging. The information updates when the box is moved or if the user scrolls.



Rotate Cross Section: Adjusts the patient orientation in the cross sections.



Layout: After clicking on the layout icon, a list of various layout options appears. Click on the desired layout to apply it. A custom layout can be created and loaded.



Toggle Cursor Visibility: Conceals or displays cursors.



Information Display: Displays or hides case information embedded in the data.



View Sequence: Allows for the creation of custom camera sequences and AVI file movie capturing. Refer to the Volume Render View Sequence (pg. 30) section for additional information and description.



Warning: Any measurement that is incorrect can lead to surgical complications if diagnosis, treatment plans and/or actual treatment is based on the incorrect measurements. It is critical for the end user to learn how to perform measurements correctly and employ proper usage of all measurement tools. Measurement accuracy depends on the image data and the hardware scanner that generated the image data. The measurement cannot be more precise than the resolution of the image. Software reports the value based on user-picked points. Due to the nature of medical imaging, the boundary is not always well defined. The apparent boundary depends on the current brightness and contrast setting. The boundary may shift as the user makes adjustments to brightness and contrast. The user must understand the limitation of the measurement value before applying to the patient. If you notice any inconsistencies or software problems with measurements, or have further questions or concerns about using measurement tools correctly, please contact us at (408) 885-1474 or email us at info@anatomage.com

ArchSection: Control Panel

Layout:

- **Change Layout** adjusts the layout with different numbers of slices and orientations. A custom layout can be configured. (See page 38.)
- Maxillary Arch and Mandibular Arch options allow two different arch splines to be created and saved. Switching between the two options changes which spline is manipulated and used in creating the panoramic and cross sections.
- “Print Out” layout is optimized for printing the image on paper. With Print Out layout, the current view can be printed on the paper in life-size. First, capture to Gallery, then print from Gallery to ensure the image is life size.

Axial Section:

- Interval: Distance between the subsequent axial sections.

Cross Section:

- Width: Cross-section width.
- Interval: Distance between the subsequent cross sections.
- Thickness: Allows for the cumulative thickness of the slices to be viewed in the cross sections.
- Auto R-L: This allows the cross section to be oriented to a consistent R-L orientation on the screen. If turned off, the cross-section orientation is consistent to the arch spline.

Panoramic Image:

- Slice mode displays a single cross section along the panoramic curve (yellow). This mode is used for tracing the nerve.
- X-ray shows the ray sum (reconstructed x-ray) in the focal trough.
- Ruler: Displays a ruler on the bottom of the panoramic image.

View Control:

- Brightness and Contrast can be used to adjust the image.
- The All drop-down allows for brightness/contrast adjustments in different areas independently.
- Different Color Presets can be used to view the images in color.
- Sharpening Filter applies the selected sharpening filter from the drop-down menu to the 2D slice renderers.

Nerve Pathway:

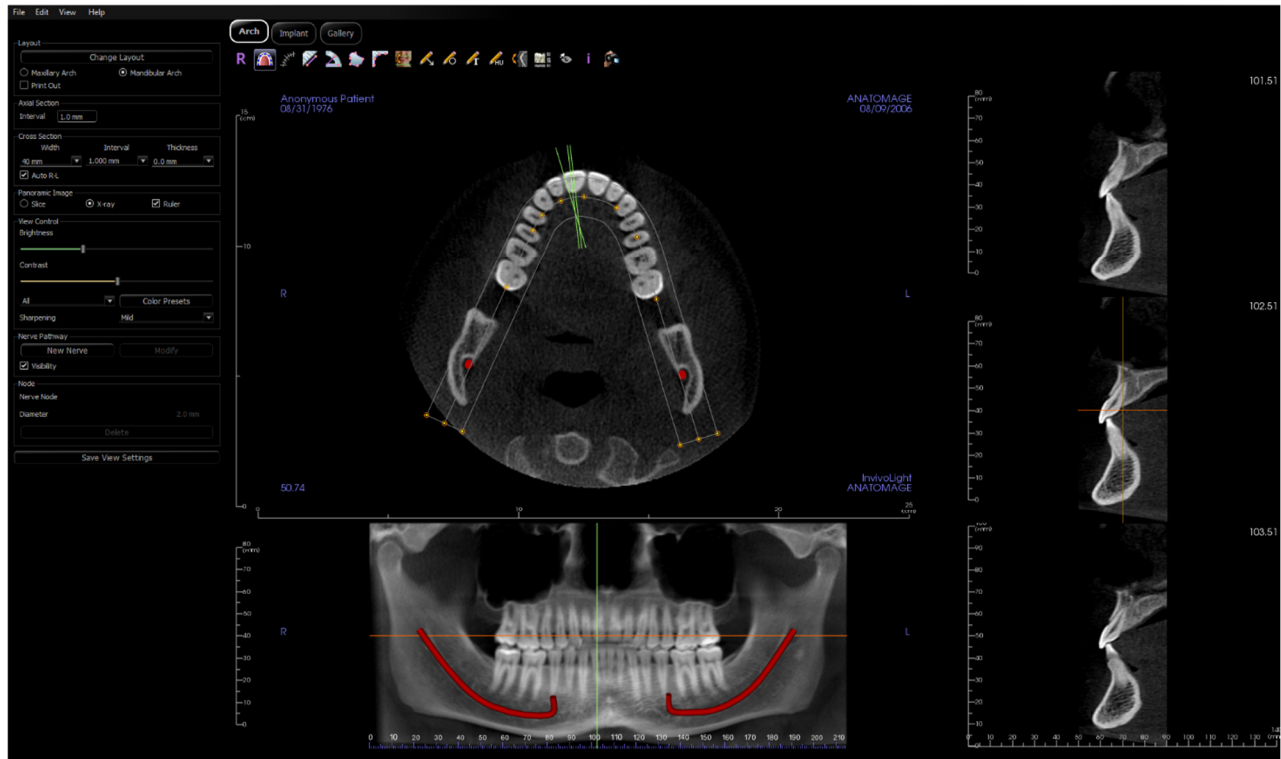
- New Nerve: Starts a new nerve tracing.
- Modify: Allows editing of the selected nerve tracing.
- Visibility: Controls the visibility of the nerve in the section and X-ray renderers.
- Nerve Node: Select a specific node for modification.

- Diameter: Selects the diameter of the nerve that has been traced or a specifically selected node.
- Delete: Deletes the last placed node during the tracing or the entire nerve if Modify is active.

Save View Settings

- Saves the current 2D View settings to be reloaded upon opening any case. See the Display Preferences section in **Preferences** (pg. 14) for more information on which settings are saved for this specific tab.

ArchSection: Rendering Window



Arch Cursor: Notice the green, orange, and brown coordinate indicators. These ArchSection coordinate indicators show the spatial location within the ArchSection modeling window.

- **Cross Section Indicator:** The green lines give the location of the cross sections along the arch spline.
- **Axial Slice Indicator:** The orange line shows the axial coordinate position within the section.
- **Arch Spline:** The brown spline in the center of the arch spline represents the current position where the arch section has moved.
- **Cross Section:** Mouse scrolling within any one of the three sagittal frames advances the slices to the patient's right or left and causes the green coordinate indicator to move anteriorly or posteriorly in the axial and pano sections simultaneously. The up and down keys can also be used to scroll through cross sections by page.
- **Axial Section:** Mouse scrolling within the axial section advances the sections superiorly or inferiorly and causes the red coordinate indicator to move superiorly or inferiorly in the cross or pano sections simultaneously.
- **Pano Section:** Mouse scrolling within the coronal frame advances the slices buccally or lingually and causes the brown coordinate indicator to move buccally or lingually in the axial and cross sections simultaneously.

ArchSection: Creating A Nerve Pathway

Creating a Nerve Pathway (e.g. Inferior Alveolar by following the mandibular canal to its exit).

- Click **New Nerve**.
- Left-click the mouse to start the nerve.
- Move the mouse to the next point along the nerve path and left-click again.
- Click **Delete** to remove the last-placed node if it is mispositioned.
- Repeat this procedure for the entire length of the nerve.
- **2.0mm** is the default diameter of the nerve pathway, but the parameter can be adjusted as desired.
- Press **Done** to finish.

Editing a Nerve Pathway

- Click on a nerve tracing to select it. This highlights the nerve in a brighter red color.
- Click **Modify**. This reveals all of the nerve nodes that are visible in each slice in blue.
- Nodes can be moved by clicking and dragging it across the scan.
- Set the Nerve Node drop-down menu to “All” or a specific node.
- If “All” is selected, the entire nerve tracing’s diameter can be adjusted.
- If a single node is selected, it is located in the slices, and its diameter and position may be adjusted independently. The nerve node diameter is adjusted in the Diameter drop-down menu.

Deleting a Nerve Pathway

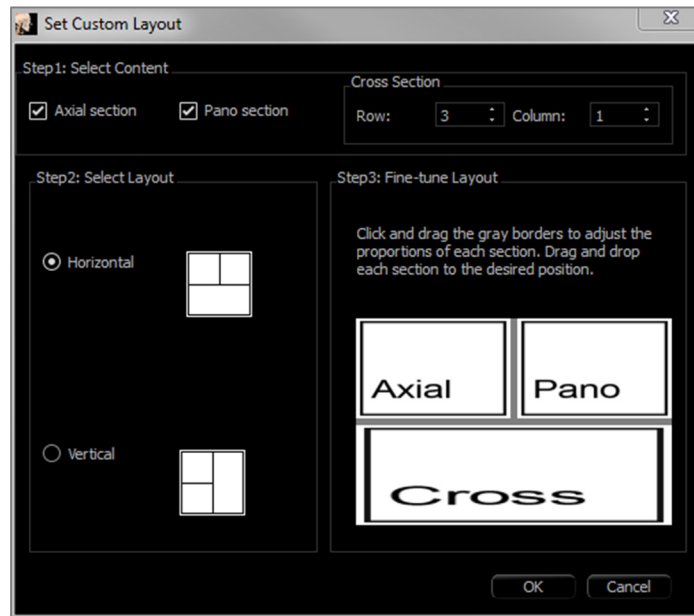
- The **Delete** button can be used if a point was plotted in the wrong spot by deleting the last point added.
- Once a nerve has been completed and **Done** has been clicked, the nerve can be deleted by clicking on it and pressing the “delete” key on the keyboard or the **Delete** button.



Warning: Any nerve that is traced in a way that does not conform to the actual pathway of the nerve can lead to surgical complications if diagnosis, treatment plans and/or actual treatment is based off of the incorrect tracing. It is critical for the end user to learn how to properly perform nerve tracings correctly. If you notice any inconsistencies or software problems with nerve tracing or have further questions or concerns about nerve tracing, please contact Anatomage support at (408) 885-1474 or email us at info@anatomage.com

ArchSection: Custom Layouts

A custom layout can be set by going to the **Layout** tool or **Change Layout**. Click **Set Custom Layout**.



Step 1.

Select whether the axial slice or the panoramic image should be visible. Set the number of columns and rows of cross sections. At least one cross section is always visible.

Step 2.

Select whether the main rendering window division is horizontal or vertical.

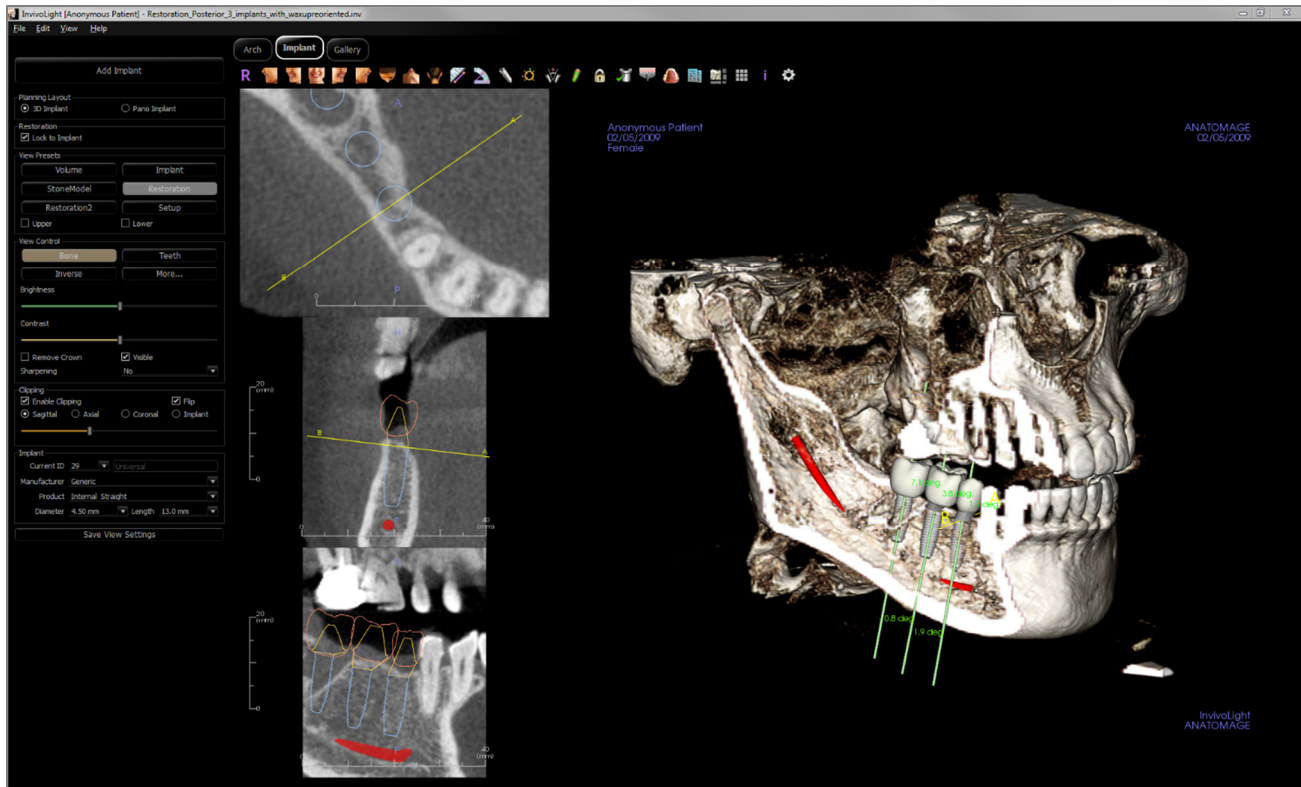
Step 3.

Click and drag the grey dividing borders to adjust the boundaries of each view. This affects the resulting size of each view.

Once **OK** is clicked, the custom layout is applied. If another layout is chosen subsequently, the custom layout can be reloaded by going to the **Layout** tool or **Change Layout** and clicking **Load Custom Layout**.

Implant View Features

The **Implant View Tab** contains the full-featured implant planning module.



Implant: Toolbar

Shown below are the Toolbar and tools that are loaded with the Implant View Tab:



Reset: Resets the rendering window to the original view.



Left: Automatically orients the volume in a left sagittal view.



3/4 Left: Automatically orients the volume in a 45° left view.



Front: Automatically orients the volume in a front view.



3/4 Right: Automatically orients the volume in a 45° right view.



Right: Automatically orients the volume in a right sagittal view.



Top: Automatically orients the volume in a top-down view.



Bottom: Automatically orients the volume in a bottom-up view.



Back: Automatically orients the volume in a posterior view.



Distance Measurement: Select this option and mark two points on the volume and distance appears. Clicking on the point and moving the cursor can modify points. Click on the measurement and press the “delete” key to delete it.



Angle Measurement: Select this option and mark three points on the volume and the angle between them appears. Clicking on their control points and moving the cursor can modify measurements. Click on the measurement and press the “delete” key to delete it.



Add Implant: Select the Tooth ID for the implant, mouse over the implant site, and left-click the mouse to place the implant. Note: specific manufacturers measure the implant from different points, so a measurement in the software might not be the same as the actual measurement of the specific implant design.



Toggle Move Widget: Toggles the implant orientation widget on and off.



Implant Angle Dialog: Opens a window displaying all the angles between placed implants. If an angle is clicked, the volume is rotated to view the angle, and the relevant implants are highlighted.



Density Profile Control: Adjust the settings for the displayed density profile around planned implants.



Treatment Lock: Locks the implants in place so that they are not accidentally moved when viewing the 3D images.



Check Sleeves: The program searches for collisions between the sleeves, instruments, and stone models.



Bone Graft: Simulates a bone graft near the apex of an implant and displays its volume.



Change Model Visibility: Allows various models to be turned on or off from view.



Create Summary: Creates an Implant summary of images that is added to the Gallery. Images contain ID (FDI), implant product, diameter, and length information in the lower right-hand corner of the screenshot. The user is also given an option to print a reference chart which lists the implants placed (including implant site, manufacturer, product name, diameter and radius) for each arch.



Layout: Toggles the rendering window layout.



Grid: Toggles between two different grid layouts for use in the upper two section frames allowing quick assessment of measurements and spatial location.



Information Display: Displays or hides case information embedded in the data.



Settings: Adjust the tooth system type, clipping preferences, collision and surrounding parameters, rendering quality object colors, and implant library settings.



Warning: Any measurement that is incorrect can lead to surgical complications if diagnosis, treatment plans and/or actual treatment is based on the incorrect measurements. It is critical for the end user to learn how to perform measurements correctly and employ proper usage of all measurement tools. Measurement accuracy depends on the image data and the hardware scanner that generated the image data. The measurement cannot be more precise than the resolution of the image. Software reports the value based on user-picked points. Due to the nature of medical imaging, the boundary is not always well defined. The apparent boundary depends on the current brightness and contrast setting. The boundary may shift as the user makes adjustments to brightness and contrast. The user must understand the limitation of the measurement value before applying to the patient. If you notice any inconsistencies or software problems with measurements, or have further questions or concerns about using measurement tools correctly, please contact us at (408) 885-1474 or email us at info@anatomage.com

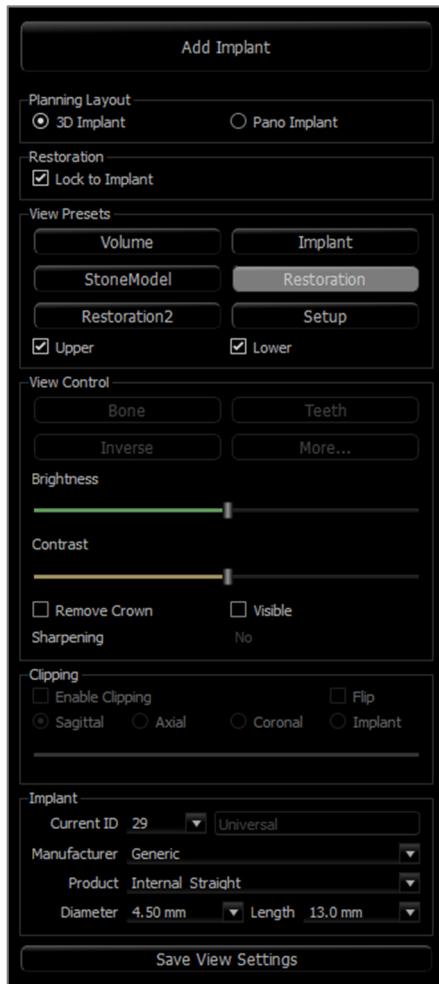


Warning: Any implants and restorations that are incorrectly visualized in Restoration Design Studio may lead to surgical complications or treatment delays. If you notice any inconsistencies or software problems with implant or restoration planning or have further questions or concerns, please contact Anatomage support at (408) 885-1474 or email us at info@anatomage.com



Warning: Any implant planning that is performed incorrectly in any aspect including but not limited to implant location, orientation, angle, diameter, length, and/or manufacture can lead to surgical complications if diagnosis, treatment plans and/or actual treatment is based off of the implant planning error(s) in question. It is critical for the end user to learn how to use the implant treatment planning tools correctly. If you notice any inconsistencies or software problems with implant planning or have further questions or concerns about correct utilization of implant planning, please contact Anatomage support at (408) 885-1474 or email us at info@anatomage.com

Implant: Control Panel



Add Implant:

- Select one or more implants for placement.
- Maxillary and mandibular parallelism can be enabled.
- Place each implant in the 3D volume.
- Adjust the implant orientation and placement using the move widget that appears on the selected implant.

Planning Layout:

- **3D Implant:** Place and adjust individual implants on 3D volume and 2D slices.
- **Pano Implant:** Click and drag implants into the panoramic image. Selective parallelism can be configured in this view.

Restoration:

- Restoration-editing features are disabled in InvivoLight.
- **Lock to Implant:** When selected, the implant and restoration move as a single unit.

View Presets:

- **Setup:** Opens a dialog where the view presets can be configured.
- **Presets:** Preset toggles that display the selected features as configured in the **Setup**.
- **Upper/Lower:** Toggles the visibility of the stone models if present.

View Control:

- **Rendering Types:** Different settings allow for better visualization of certain anatomic structures, soft tissue profiles, hard tissue, etc. This is achieved by displaying specific densities with specific colors.

- **Brightness & Contrast:** Can be adjusted for each of the presets to enhance the image.
- **Visible:** Allows the 3D Volume Rendering to be turned on or off from view.
- **Remove Crown:** Only applicable with surgical guide-related modeling service options.
- **Sharpening Filter:** Applies the selected sharpening filter from the drop-down menu to the 2D slice renderers.

Clipping:

Click the “Enable Clipping” box to slice the image along the predefined anatomical planes (sagittal, axial, coronal, and arch). Scrolling the mouse wheel or moving the slider moves the clipping plane. To switch a view to the opposite side, click “Flip.”

Implant:

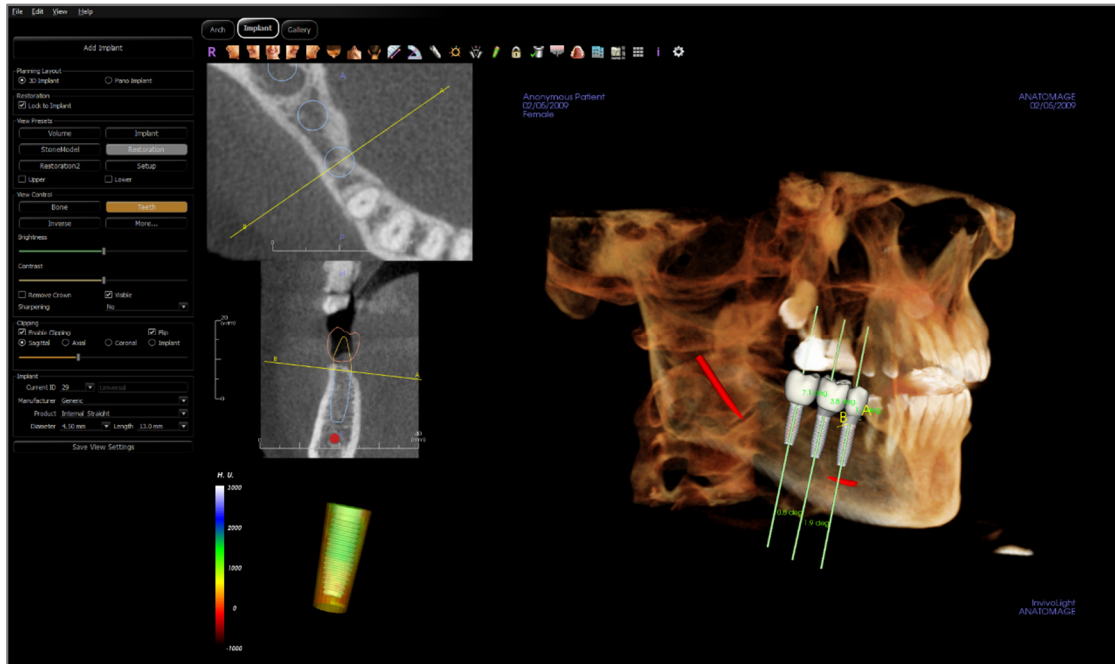
The implant section can be configured to only show specific implants as defined by the user. For more information, look at the Preferred Implant settings further in this section.

- **ID:** Use the drop-down menu to select an implant to manipulate. The active implant appears lighter in color than the others.
- **Manufacturer, Product Name, Diameter, and Length:** The default is generic, but the specific implant manufacturer, product, diameter, and length can be selected.

Save View Settings

Saves the current 2D view settings to be reloaded upon opening any case. See the Display Preferences section in **Preferences** (pg. 14) for more information on which settings are saved for this specific tab.

Implant: Rendering Window



Used for more precise control and final detailed touches to implant treatment planning. Use the navigation features discussed below to visualize all aspects of the implant in the 3D volume. For further information on implant position and sizing using the implant widgets, please refer to the next section of the manual.

Axial Section: Top left window. This section is the view from the top of the implant. The yellow line passing through the axis creates the view seen in the sagittal view. Scrolling the mouse wheel after clicking inside the axial window, or clicking and dragging the line changes the cross section seen in the sagittal view as the line rotates about the axis of the implant. Asymmetrical (STL) implants can be rotated about the long axis in this view (see the next section).

2D Section: Middle left window. The A-B line passing through the implant creates the cross-section view that appears in the axial view and is set by default to be positioned at the level of the implant emergence point. Scrolling the mouse wheel after clicking inside the sagittal window, or clicking and dragging the line changes the cross section seen in the axial view. The implant widget in this view allows for quick resizing of implant length and diameter (see the next section).

Density Profile: Lower left window when turned on. Displays a real-time visualization of the volume density immediately surrounding the implant.

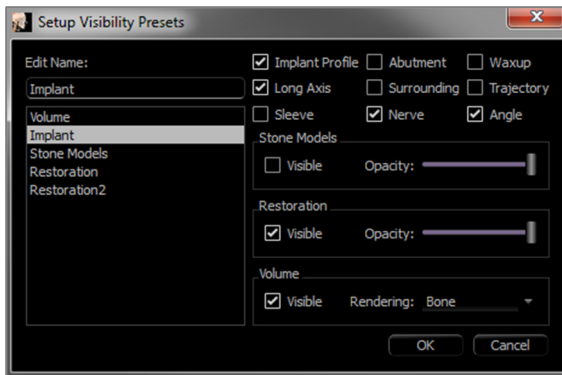
Volume Rendering: Right window. This frame allows user to change the implant position and orientation with the orientation widget within the 3D volume rendering.



Warning: Any implant planning that is performed incorrectly in any aspect including but not limited to implant location, orientation, angle, diameter, length, and/or manufacture can lead to surgical complications if diagnosis, treatment plans and/or actual treatment is based off of the implant planning error(s) in question. It is critical for the end user to learn how to use the implant treatment planning tools correctly. If you notice any inconsistencies or software problems with implant planning or have further questions or concerns about correct utilization of implant planning, please contact Anatomage support at (408) 885-1474 or email us at info@anatomage.com

Implant: View Preset Setup

Visibility presets allow for easy switching between set views during implant planning. To configure these settings, click on **Setup**.

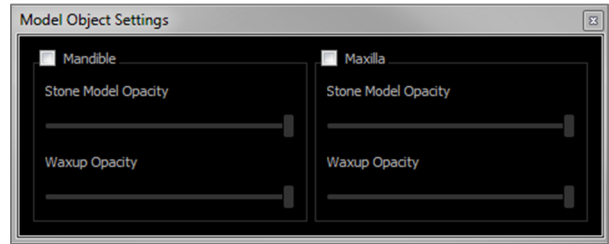


- **Edit Name:** Click on any preset to select it. Type the new name into the field.
- Visibility checkboxes hide or show features in the rendering window.
- **Implant Profile:** Controls the visibility of the solid implant cross section in the 2D renderers. When activated, the currently selected implant has a red profile and the unselected implants have blue profiles. When not activated, the selected implant shows an opaque cross section of the implant, and the unselected implants show as blue profiles.

- **Abutment:** Controls the visibility of the abutment 3D model in the volume renderer or the colored profile in the 2D slice renderers.
- **Waxup:** Controls the visibility of the profiles in the 2D renderers and 3D models on the volume. Option is only available after they have been added by an Anatomage technician as part of a surgical guide case workout.
- **Long Axis:** Displays a colored rod running through the long axis of the implant in the volume render.
- **Surrounding:** Displays the surrounding volume around an implant. The collision zone is determined by the allowance defined in the preferences.
- **Trajectory:** Displays the simulated trajectory of the implant during surgical placement.
- **Sleeve:** Controls the visibility of the profiles in the 2D renderers and 3D models on the volume. Option is only available if the mandibular and maxillary models are available as well as after the Check Sleeve action has been performed.
- **Nerve:** Displays a 3D nerve in the volume render or a cross section of the nerve in the 2D section renderers.
- **Angle:** Controls the visibility of the angle between the long axes of adjacent implants as well as the angles of the abutment for each implant.
- **Model:** Controls the visibility of the stone models. Varying degrees of transparency can be obtained with the Opacity slider.
- **Restoration:** Controls the visibility of the 3D waxup models in the volume renderer and the colored profile in the 2D section renderer. The colored profile of the selected restoration or restoration associated with the selected implant is red while the unselected restorations are pink. Varying degrees of transparency can be obtained with the Opacity slider.
- **Volume:** Controls the visibility of the volume render as well as the rendering type.


Implant: Model Visibility

The  **Change Model Visibility** function opens the Model Object Settings dialog.

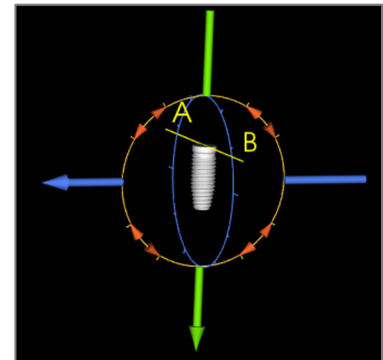


- The “Mandible” and “Maxilla” checkboxes control all of the model visibility options (except Profile Only and Density) and allow the user to turn off the set of models for each jaw independently. *Note: The visibility checkboxes in Model Object Settings do not always match the checked/unchecked status of the visibility checkboxes in the Control Panel.*
- The Stone Model and Waxups Opacity can be adjusted for both jaws.

Implant: 3D Implant Widget

The  3D implant widget is designed to optimize visibility in the renderer and provide a high level of versatility in implant positioning. The linear, colored arrows can be dragged to reposition the implant transversely. These arrows only appear when the camera perspective is close to orthogonal. The implant may also be moved along these directions using the keyboard arrow keys.

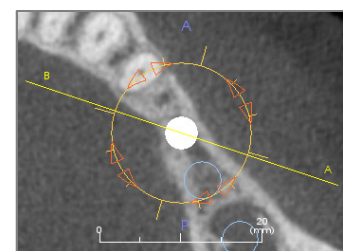
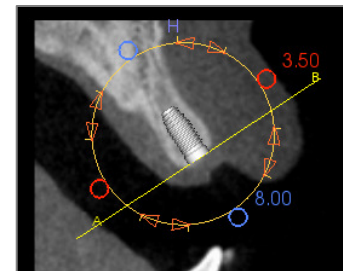
- The yellow arrow (not shown) is parallel to the A-B line.
- The blue arrow is orthogonal to the green and yellow arrows.
- The green arrow runs through the long axis of the implant.
- The rotation circle appears on the same plane as the two arrows that are close to orthogonal to each other and to the camera perspective and features eight handles for rotation.



Implant: 2D Implant Widget

The 2D implant widget is designed to optimize visibility in the slice renderer and provide a high level of versatility in implant positioning and sizing. The implant may also be moved along its long axis or orthogonally with the keyboard arrow keys.

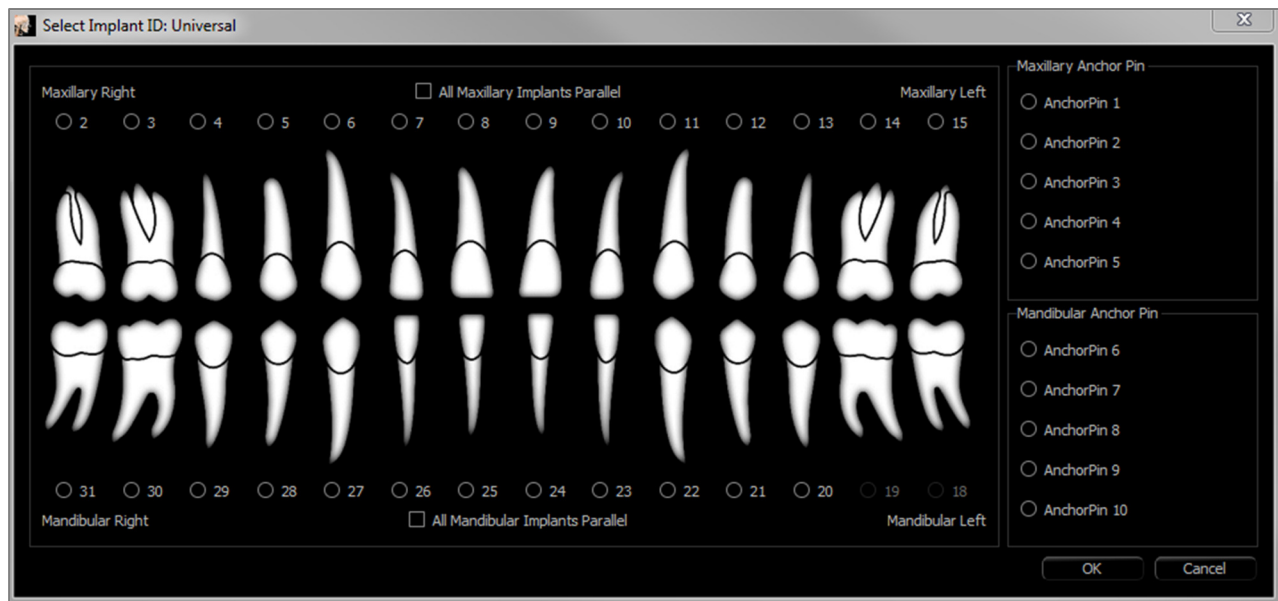
- The rotation circle has eight arrows for implant rotation along the same plane as the currently displayed slice.
- The two red handles can be selected and dragged toward/away from the implant to reduce/expand the diameter of the implant sequentially through any available options for that implant model.
- The two blue handles can be selected and dragged toward/away from the implant to reduce/expand the length of the implant sequentially through any available options for that implant model.
- The implant model itself can be selected and dragged in any direction along the same plane as the currently displayed slice.
- A rotation circle appears when the product cross section is selected that allows for implant rotation about the long axis of asymmetrical (STL) implants in the top left section renderer. Please contact Anatomage for an updated list of asymmetrical (STL) implants.



Implant: 3D Implant Planning

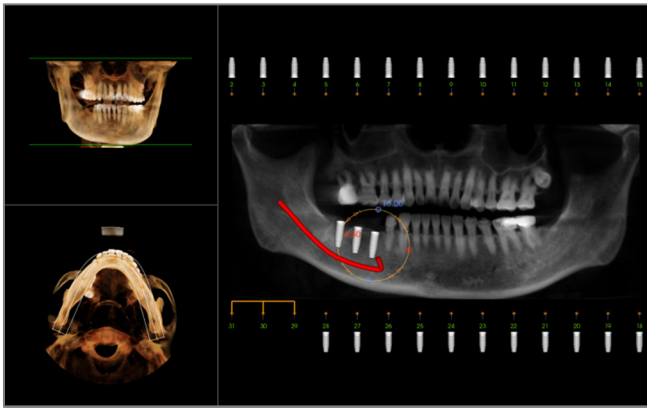
Add Implant

- In the Control Panel, click the **Add Implant** button.
- The implant ID dialog shows up (image below).
- Select the implants to be inserted. Press **OK**, and an implant and its ID appear on the mouse pointer.
- Drag and drop each implant in 3D view onto the surgical site. (It helps to have the volume rotated so that the surgical site is centered.)
- In axial view, align the yellow line such that the lower cross-section view becomes the view along mesiodistal direction.
- In cross-section view, re-orient and position the implant so that its angle is as desired.
- In axial view, align the yellow line such that the cross-section view becomes the view along the buccolingual direction.
- In cross-section view, re-orient and position the implant so that its angle is as desired.
- Review the final implant position in 3D view.
 - To delete an implant, select the desired implant in the 3D view and press the “delete” key on the keyboard. The implant is removed.

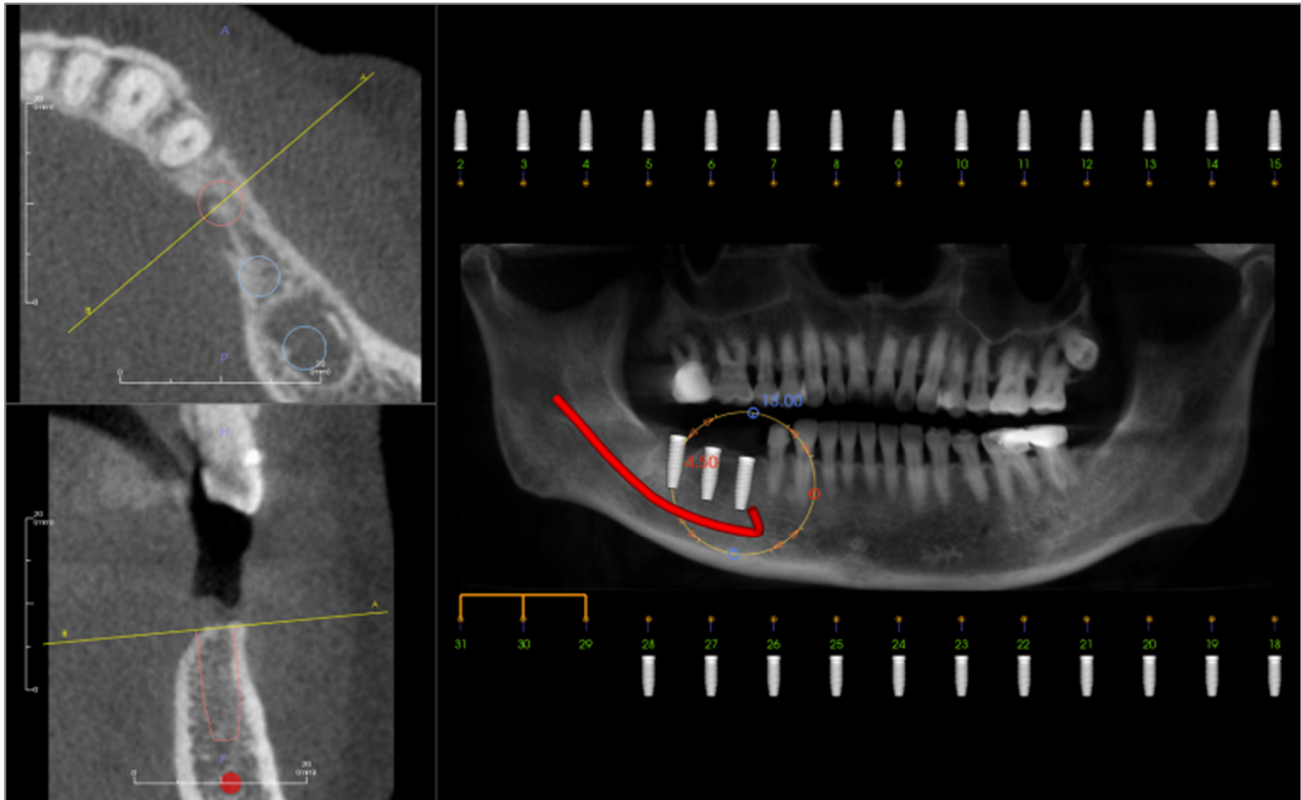


A similar procedure can be done to add anchor pins to the 3D volume. Select which anchor, and follow similar steps for adjusting its position.


Implant: Pano Implant Planning

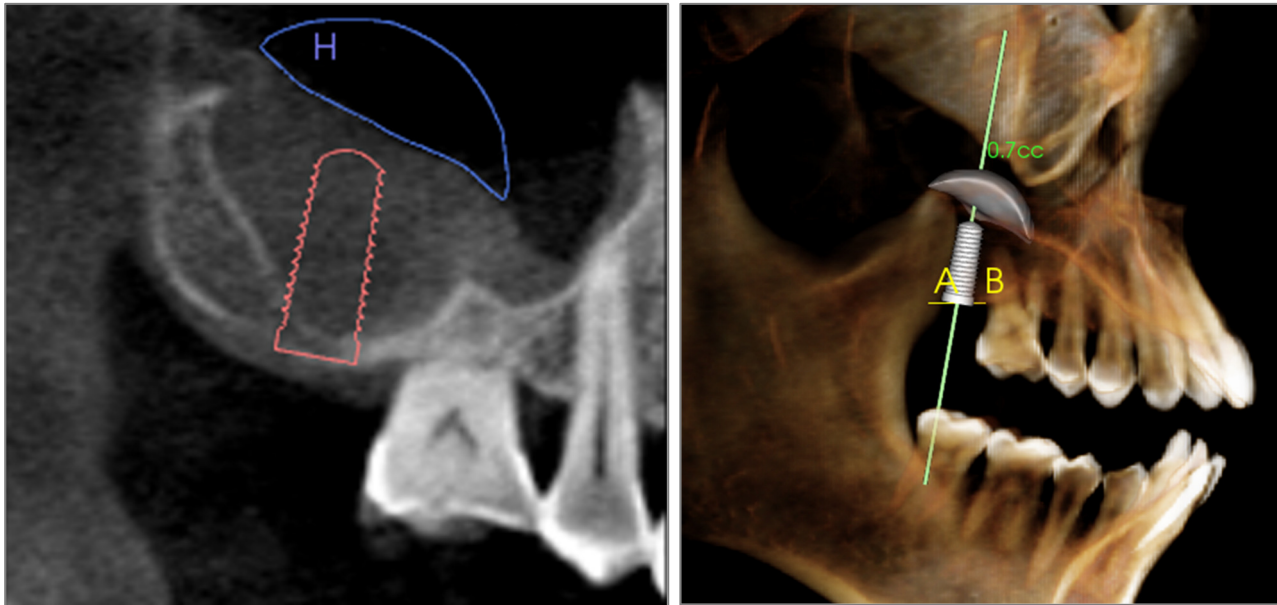


- Select Planning Layout: Pano Implant under the Control Panel in the Implant Tab.
 - Rendering window updates to pano view (left).
 - Adjust the ArchSection focal trough such that the middle profile passes through the dentition.
 - Drag implants to their desired locations and adjust their angles.
 - Click to select implants and manipulate them in the cross sections.
- Click the nodes above the implant identification numbers and drag to connect them with other implants to create parallel implant groups. Remove the implants from these groups by clicking on the nodes again.
 - Repeat for all desired implants.
 - Select Planning Layout: 3D Implant to exit Pano-Mode and further adjust individual implants.



Implant: Bone Graft Simulation

- Select the implant that requires a bone graft and click the **Bone Graft** tool .
- The graft simulation tool appears as an arc that moves along the central axis of the implant in the cross section.
- Click to place the graft in the desired position.
- The resulting graft appears in the 2D sections in blue and in the volume rendering in off-white.
- The volume of the graft is displayed in the volume rendering.
- The graft can be deleted by clicking on it to select it and pressing the “delete” key on the keyboard.

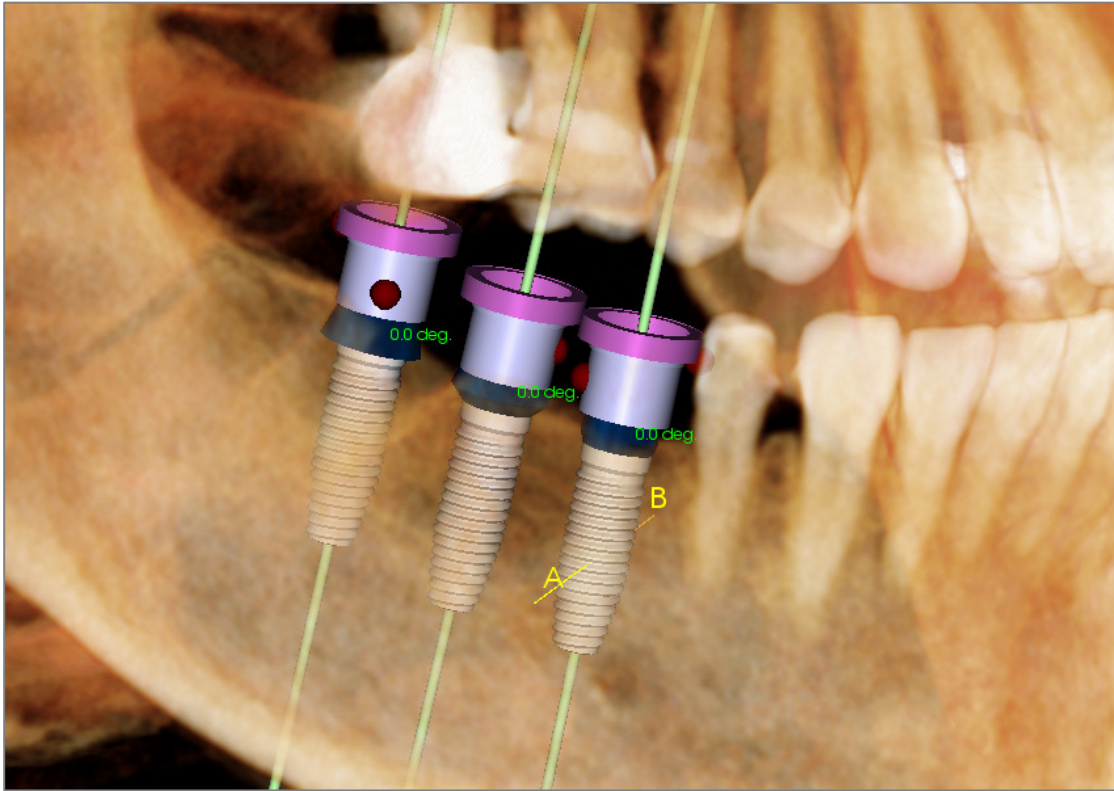


Important: The measurement values may not be true anatomical volumetric measurements. Due to the nature of the imaging, there are imaging artifacts such as white noise, scattering, beam hardening, ring noise or off scale H.U. The software measurement tool cannot distinguish the imaging artifact from the true anatomy. Furthermore, the measurement value depends on threshold values; thus, user must set proper thresholds to get the best estimate of the desired structure. The measurements must not be used as the sole metric for any treatment.



Warning: Any measurement that is incorrect can lead to surgical complications if diagnosis, treatment plans and/or actual treatment is based on the incorrect measurements. It is critical for the end user to learn how to perform measurements correctly and employ proper usage of all measurement tools. Measurement accuracy depends on the image data and the hardware scanner that generated the image data. The measurement cannot be more precise than the resolution of the image. Software reports the value based on user-picked points. Due to the nature of medical imaging, the boundary is not always well defined. The apparent boundary depends on the current brightness and contrast setting. The boundary may shift as the user makes adjustments to brightness and contrast. The user must understand the limitation of the measurement value before applying to the patient. If you notice any inconsistencies or software problems with measurements, or have further questions or concerns about using measurement tools correctly, please contact us at (408) 885-1474 or email us at info@anatomage.com

Implant: Check Sleeves

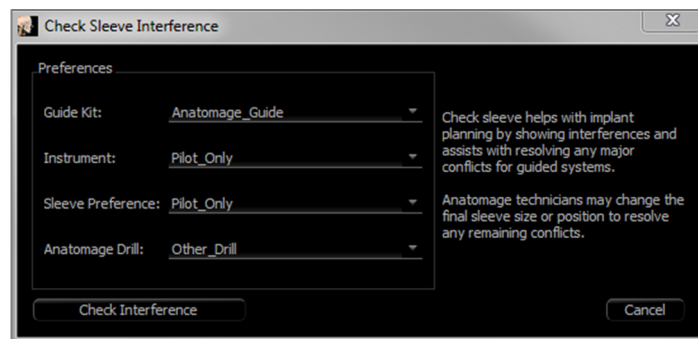


The **Check Sleeves** function can be performed to determine the position of where sleeves would be if a surgical guide was produced for implant placement. This function will simulate possible collisions that may occur between:

- Sleeves and other sleeves
- Sleeves and the instrument
- Sleeves and the stone model
- Instrument and the stone model

Interference: Demonstrated visually by a dark red-colored sphere. **These interference indicators are not updated in real-time and are only rechecked after each instance that Check Sleeves is performed.**

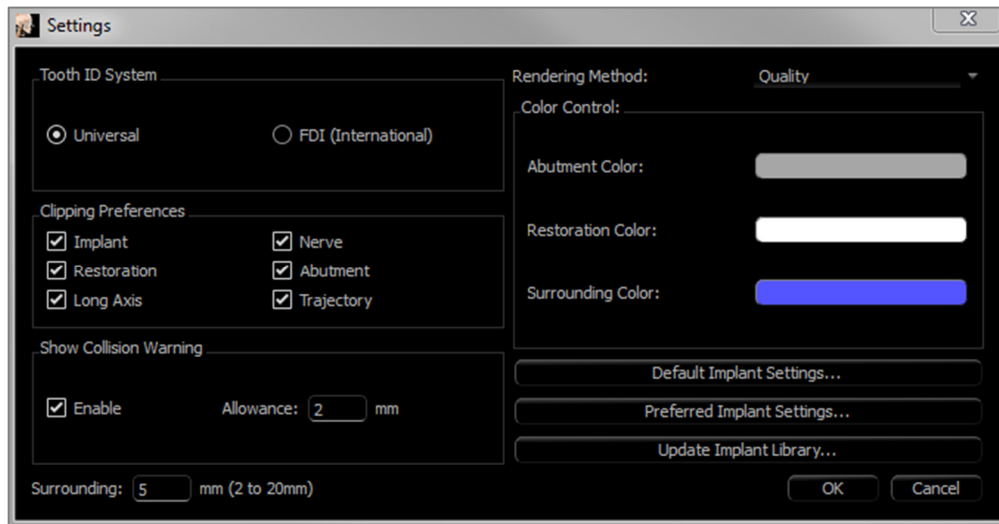
Check Sleeve Interference: The user can change certain preferences to better simulate the actual procedure that will be performed, such as sleeve system, instrument, sleeve size, and drill. Solution options are to change implant planning, change sleeve preferences, or to allow a technician to try to resolve the interference.



The option to check sleeves automatically appears when attempting to save Anatomage Surgical Guide planning files.

Implant: Settings and Preferences

Selecting the **Setting** tool  opens up a customization window within the Implant Tab:



Tooth ID System:

Set the ID to either the Universal or FDI(International) standard.

Clipping Preference:

Options for which models to include in volume clipping.

Show Collision Warning:

Define whether or not to display a proximity warning between implants at an allowed tolerance.

Rendering Method:

Choose which rendering method (Default, Performance, and Quality) you would like to use in the Implant Tab.

Color Control:

Set the various colors for the abutment, restoration, and collision colors.

Detailed Implant Settings:

Adjust default settings for individual implants. See more information below.

Preferred Implants Settings:

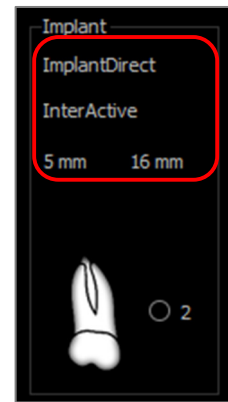
Used to modify which implants will be displayed in the drop-down menus in the Control Panel. See more information in the **Preferred Implant Settings** section (pg. 52).

Update Implant Library:

Check STL implant library update availability and download them directly.

Detailed Implant Settings

In **Detailed Implant Settings**, the default settings of each placed implants can be set.

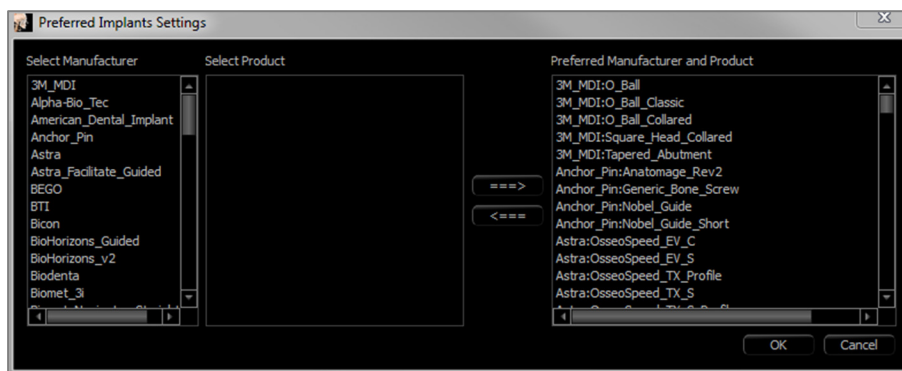


Clicking once anywhere in the region above activates drop-down menus for the various implant characteristics. *Options do not appear for implants not in the preferred list (see below).*

Click **OK** to save these preferences, and the designated implant will be selected automatically when choosing a tooth in the Add Single Implant menu.

Preferred Implants Settings

The user can hide certain implants from populating the lists to simplify the drop-down menus. By default, all implant manufacturers and types are selected as “preferred.” **To remove an implant, select it in the list on the right-hand side and use the left arrow button to remove it from the list.**



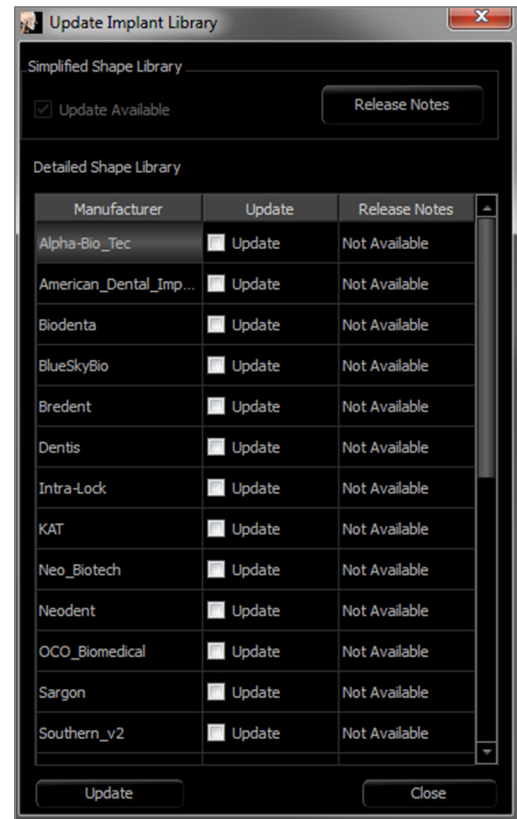
These settings apply to the drop-down menu options for Detailed Implant Settings as well as in the Implant section of the Control Panel. If there is a case open with implants that are not in the preferred list, the implant will still show up correctly in the renderers and the Control Panel. However, the specific settings for this implant cannot be changed and implants of the same type cannot be added.

Adding implants to the preferred list can be accomplished by selecting the implant manufacturer on the list on the left-hand side, selecting the specific product in the middle column, and pushing the right arrow button to add.

Certain manufacturers are divided into guided and non-guided subsets to indicate compatibility with the Anatomage Surgical Guide kits.

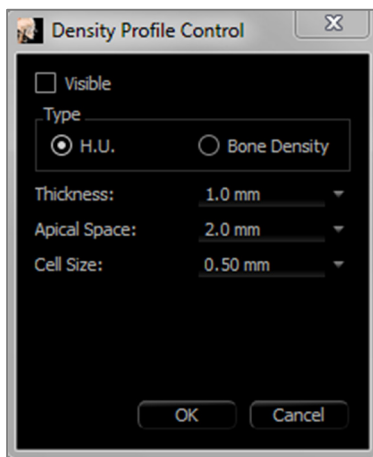
Update Implant Library

Due to the size of STL implants, most implant library updates hosted online or within the installer do not contain these implants. This function allows the user to select specific STL libraries as desired. Available updates for the listed manufacturers are indicated in the Update column. Select the desired manufacturers and click **Update** to download the library into the software. Restart the software to apply the updates.



Density Profile Control

Select the **Density Profile Control** tool  to adjust the settings for the Density Profile.



Visible: Toggles the visibility between the Density Profile and the third cross section.

H.U.: Shows the bone density in Hounsfield units.

Bone Density: Shows the density in Misch's bone density units.

Thickness: Changes the sampled volume located around the implant.

Apical Space: Changes the sampled volume located at the apex of the implant.

Cell Size: Changes how finely the voxels are sampled and displayed in the volume around the implant.



Warning: Any measurement that is incorrect can lead to surgical complications if diagnosis, treatment plans and/or actual treatment is based on the incorrect measurements. It is critical for the end user to learn how to perform measurements correctly and employ proper usage of all measurement tools. Measurement accuracy depends on the image data and the hardware scanner that generated the image data. The measurement cannot be more precise than the resolution of the image. Software reports the value based on user-picked points. Due to the nature of medical imaging, the boundary is not always well defined. The apparent boundary depends on the current brightness and contrast setting. The boundary may shift as the user makes adjustments to brightness and contrast. The user must understand the limitation of the measurement value before applying to the patient. If you notice any inconsistencies or software problems with measurements, or have further questions or concerns about using measurement tools correctly, please

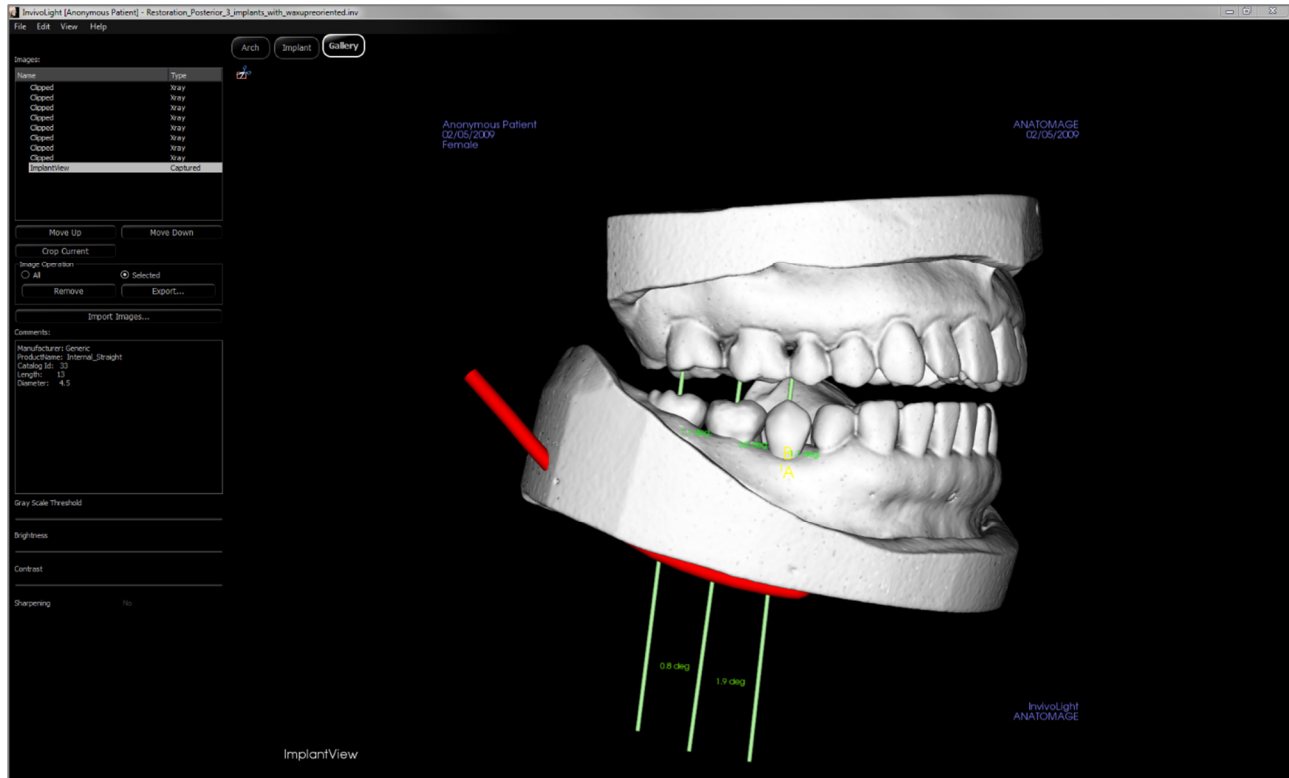
contact us at (408) 885-1474 or email us at info@anatomage.com



Warning: Any implant planning that is performed incorrectly in any aspect including but not limited to implant location, orientation, angle, diameter, length, and/or manufacture can lead to surgical complications if diagnosis, treatment plans and/or actual treatment is based off of the implant planning error(s) in question. It is critical for the end user to learn how to use the implant treatment planning tools correctly. If you notice any inconsistencies or software problems with implant planning or have further questions or concerns about correct utilization of implant planning, please contact Anatomage support at (408) 885-1474 or email us at info@anatomage.com

Gallery View Features

The **Gallery View Tab** archives images that have been captured from other tabs. Additionally, images can be imported into Imvivo or exported to a desired filepath. Comments or notes can be added to describe images that have been captured.



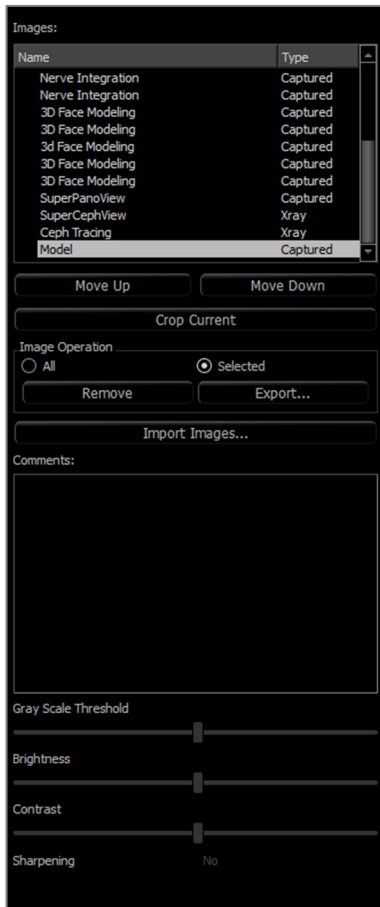
Gallery: Toolbar

Shown below are the Toolbar and tools that are loaded with the Gallery View Tab:



Crop Image: Crop captured images to save as new images or replace the original.

Gallery: Control Panel



Images: Gives a list of all captured images.

- Each of these images has a “Name” and “Type” which can be renamed by double-clicking on the text.
- **Move Up/Down:** Moves the selected image up or down on the list.
- **Crop Current:** Crop the currently selected image within InvivoLight.

Image Operation

- **All/Selected:** Applies operation to all or a subset of the images from the list.
- **Remove:** Removes images from the Gallery.
- **Export:** Export the images in the Image List to a path specified in the dialog box that opens. Local files can be saved as one of the following formats: .jpg, .bmp, or .png.

Import Images:

- Select to import images (.jpg, .bmp, .png) from an external source into the Gallery Tab.
- Using this, patient photographs or 2D DICOMS can be imported into the InvivoLight software for storage within the Invivo file once saved.

Comments:

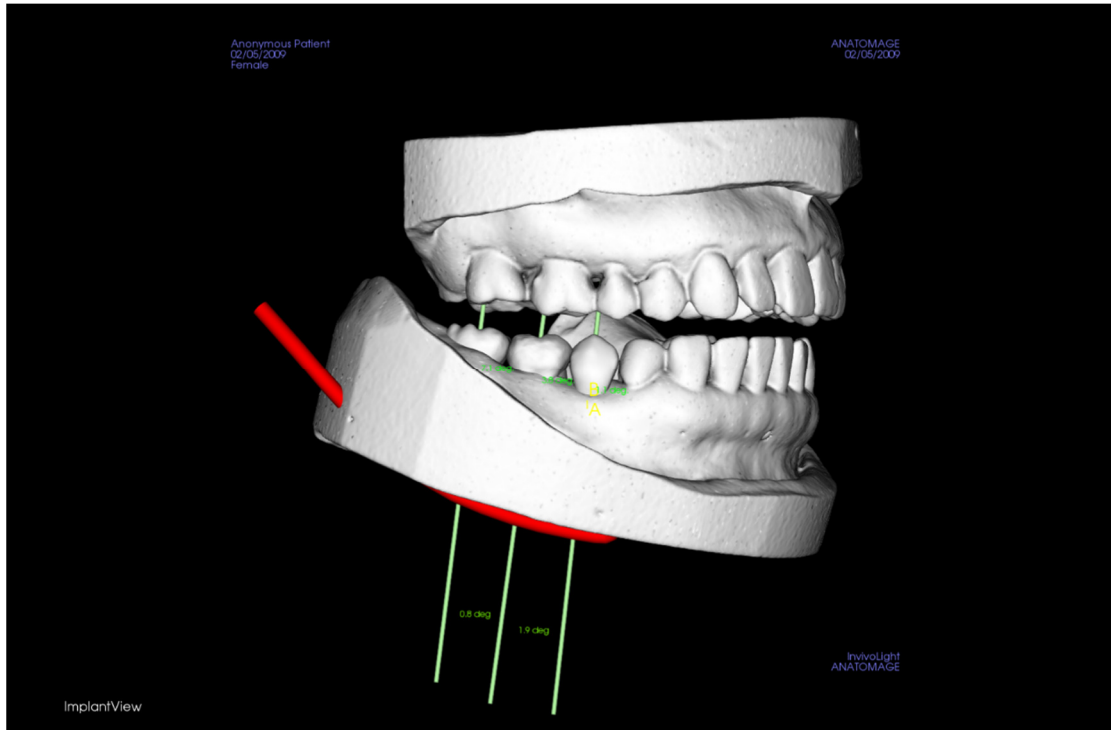
- Text box displays comments about the image displayed in the rendering window.
- Add or change comments by editing the text in the Comments Box.

2D Image Options:

- Controls settings for 2D images. See more information in Gallery: 2D Image Options.

Gallery: Rendering Window

This window allows the viewing of captured and imported images. The Gallery is particularly useful for creating a workup of a particular case. Remember that the Gallery's images are only saved if the file is resaved; otherwise, any captured images will be lost.

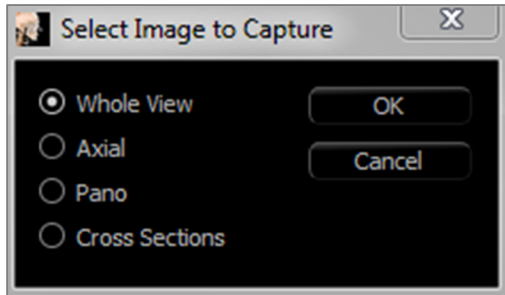


Please refer to **Image Navigation (pg. 27)** for information about controlling and adjusting these images.

Gallery: Adding Images to the Gallery

Capture any single image to the Gallery. A single image within any view can be captured without including the other parts of the rendering window. When the Capture to Gallery function is used, a dialog appears on the screen providing the user with options regarding which parts of the rendering window to capture.

The options provided by each dialog varies according to which InvivoLight tab is currently displayed; the following example is the dialog that appears within the ArchSection Tab:



Ex. ArchSection Capture to Gallery

Capture to Gallery Dialog:

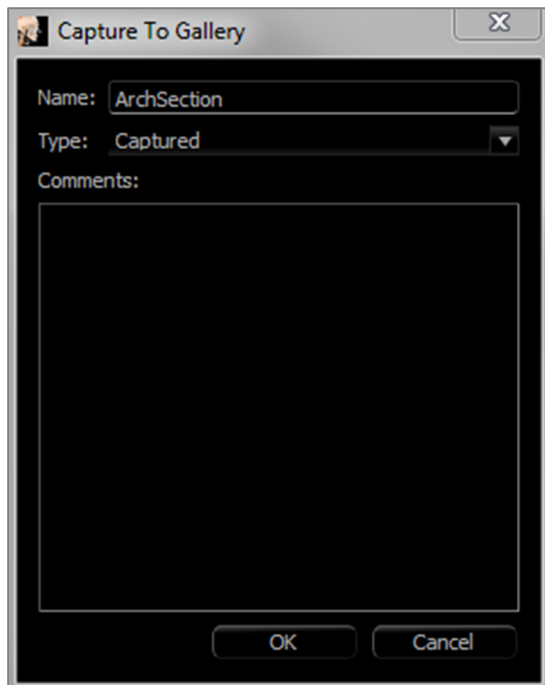
- Whole View – Captures a screenshot of the rendering window
- Axial – Captures the axial slice view and no other parts of the rendering window
- Pano – Captures the pano view and no other parts of the rendering window
- Cross Sections – Captures a series of slices that are within the rendering window

Options within each Select Image to Capture Dialog:

Note: Some options appear gray (disabled) in the Select Image to Capture dialog. The choices available are determined by the specific layout as well as the view tab.

ArchSection	Whole View Axial	Pano Cross Sections
Implant	Whole View Main Volume Axial Cross Section 1 Cross Section 2	Density Pano Arch Volume Front Volume

Capture to Gallery Dialog:



Name: Image label

Note: Image name must be unique from any other captured image in the Gallery and must not contain any special characters.

Type: Image type – can be set from the drop-down to “Captured” or “Photo.”

Comments: Additional comments about the image can be added in this section.

Gallery: 2D Image Options

The Gallery Tab is compatible with 2D DICOM images and has several features that allow it to handle this image format better.

Opening 2D DICOM

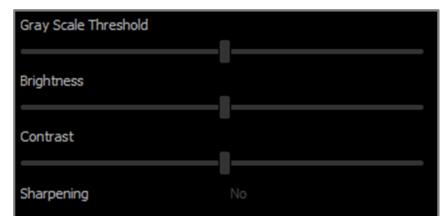
When instructed to open a 2D DICOM image, InvivoLight automatically enters a mode that disables 3D functionality. Only the Gallery Tab is available within the software, and the DICOM appears as a Gallery image.

If a 2D DICOM is associated with a 3D volume as a scout image, opening the volume automatically imports that scout image into the Gallery Tab.

Grayscale Image Options

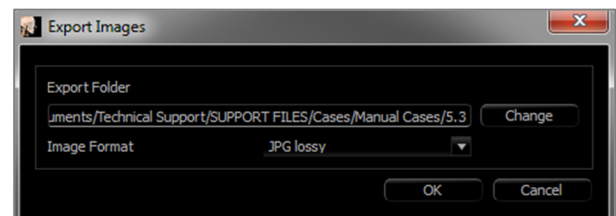
For grayscale images in the Gallery, the user has the option to adjust several settings such as Gray Scale Threshold, Brightness, Contrast, and Sharpening.

The updates to these images are saved and always reflect the updated settings when the image is selected in the Gallery and also after it has been saved/exported and then opened/imported back into InvivoLight.



Export to DCM/JPG/PNG/TIF/BMP

An image in the Gallery can be exported into any of the above formats when using the **Export...** button. When saving individual Gallery images to file, the following image formats are available (JPG, PNG, BMP).



Common How-to Tasks

How to Trace a Nerve

- Go to the ArchSection Tab.
- Make sure the pano is in Slice Mode (not X-ray mode).
- Adjust focal trough such that the nerve pathway is visible in pano image.
- Move pointer to the pano image.
- Review the nerve pathway while using scroll wheel.
- If the nerve pathway is not clearly visible, adjust the focal trough.
- When the nerve pathway is identified through the pano image, press **New Nerve** in the Control Panel.
- Starting from the mandibular foramen, click point by point.
- If the nerve pathway is not clearly visible, use the mouse scroll wheel to find the nerve and continue picking.
- Near the mental foramen, move the mouse to cross-section view.
- Use the scroll wheel to find the exit of the nerve.
- Pick points connecting the nerve exit.
- Press **Done** in the Control Panel to finish the nerve.



Warning: Any nerve that is traced in a way that does not conform to the actual pathway of the nerve can lead to surgical complications if diagnosis, treatment plans and/or actual treatment is based off of the incorrect tracing. It is critical for the end user to learn how to properly perform nerve tracings correctly. If you notice any inconsistencies or software problems with nerve tracing or have further questions or concerns about nerve tracing, please contact Anatomage support at (408) 885-1474 or email us at info@anatomage.com

How to Create Reports in Life Size

- Go to ArchSection Tab.
- Select **Reorientation** button in the toolbar
- Adjust upper and lower limit by dragging green lines and then click **Reorientation** button to exit.
- Adjust focal trough (arch spline) or re-draw arch spline by the clicking the **Create Arch Spline** button.
- Change Layout Mode to “Print Out.”
- Change to a desired layout using the **Change Layout** button.
- Adjust cross-sectional width and interval.
- Move cursor to set cross section in desired location.
- In Print Out mode, user cannot zoom the image since it is set to life size.
- If desired structure is not visible in cross section, adjust axial cursor or focal trough.
- Switch pano image to X-ray mode and turn on the ruler.
- Turn on the **Arch Spline Ruler** and turn off arch spline control points.
- Turn off the cursor if necessary by clicking **Toggle Cursor Visibility**.
- Go to the View menu and choose “Capture to Gallery” or press Ctrl + G
- Go to Gallery Tab.
- See Print Preview in the File menu and print out a test page.
- To change the format, go to “Print Layout Setup” in the File Menu.
- To use a personal logo, replace the “printLogo.bmp” file in installation folder. This folder is typically in “C:\Program Files\Anatimage\InvivoLight”
- If the Print Layout Setup is changed, choose Print Out mode before recapturing the image. Otherwise the image could still be in the previous Print Layout Setup.



Warning: Any measurement that is incorrect can lead to surgical complications if diagnosis, treatment plans and/or actual treatment is based on the incorrect measurements. It is critical for the end user to learn how to perform measurements correctly and employ proper usage of all measurement tools. Measurement accuracy depends on the image data and the hardware scanner that generated the image data. The measurement cannot be more precise than the resolution of the image. Software reports the value based on user-picked points. Due to the nature of medical imaging, the boundary is not always well defined. The apparent boundary depends on the current brightness and contrast setting. The boundary may shift as the user makes adjustments to brightness and contrast. The user must understand the limitation of the measurement value before applying to the patient. If you notice any inconsistencies or software problems with measurements, or have further questions or concerns about using measurement tools correctly, please contact us at (408) 885-1474 or email us at info@anatimage.com

InvivoLight6 Software Troubleshooting

Category	Error	Solution
General	Error Message: <i>InvivoLight Application has encountered a problem and needs to close. We are sorry for the inconvenience.</i>	Click the “Don't Send” button. Check if there are old versions of optional plug-ins: remove them or upgrade them to be compatible with InvivoLight. Launch the InvivoLight application again. Warning: Treatment information can only be manually saved. All information added after last saving will be lost.
	Cannot launch InvivoLight	Open Task Manager and check if multiple instances of InvivoLight are already running. Close other InvivoLight processes. Launch the InvivoLight application again.
	Computer failure	Launch the InvivoLight application again. Warning: Treatment information can only be manually saved. All information added after last saving will be lost.
Installation	Error Message: <i>Server is not Responding</i>	Check Internet connection. If Internet is connected, try again later.
	Error Message: <i>Please run as administrator to activate software</i>	Run the installer/application as administrator.
	Error Message: <i>Failed to verify the license code!</i>	Check the license code and try again. Check Internet connection and try again.
	Error Message: <i>Wrong License Code!</i>	Check the license code and try again.
	Error Message: <i>Invalid Authorization code</i>	Check the license code and try again.
	Error Message: <i>Actual size of the image can't fit to the paper size!</i>	Change printer setting or create an image with smaller size.
File Operations	Error Message: <i>Failed to create process. Please close other applications and try again.</i>	Close all the other applications. Launch the InvivoLight application again.
	Error Message: <i>Error: Unknown file format!</i>	Check if this file is supported by InvivoLight.
	Error Message: <i>Not enough memory</i>	Close all the other applications. Launch the InvivoLight application again.
	Error Message: <i>Can't create temporary save file!</i>	Check if the remaining disk capacity for the temporary folder is big enough.
	Error Message: <i>Failed to read DICOM file!</i>	Check if this file is supported by InvivoLight.
	Error Message: <i>Can't read Dicom's Image Data!</i>	Check if this file is supported by InvivoLight.
	Try to open a file but nothing showing up	Check if this file is supported by InvivoLight.
	Error Message: <i>Cannot save file!</i>	Check if the file is the correct type. Check if the file path is correct and folder is writable.
	Image is distorted	Switch to another view and switch back.

	Warning Message: <i>3D reconstruction may not work!</i>	Check if the DICOM files are exported correctly.
--	------------------------------------------------------------	--------------------------------------------------

For all other issues, please contact Anatomage Inc. Customer Support at (408) 885-1474.

Keyboard Shortcuts

The following keyboard shortcuts are available:

	Hotkey	Description
ArchSection	Ctrl + C/Ctrl + V	Copy/Paste the selected notation
	Up Arrow/Down Arrow	Scrolls through selected slice
	Delete	Deletes the selected measurement/notation/nerve
Implant	0	Changes to Volume preset
	1	Changes to Implant preset
	2	Changes to Stone Models preset
	3	Changes to Restoration preset
	4	Changes to Restoration2 preset
	P	Volume clipping is toggled on/off
	A	Volume is clipped axially
	S	Volume is clipped sagittally
	C	Volume is clipped coronally
	F	Volume clipping is flipped
	Delete	Deletes the selected measurement/implant/airway

Index

This comprehensive list provides a quick and easy way to find the relevant information that you would like to examine.

Apical Space.....	53
Arch Section View Tab	31
Arch Spline	32, 36, 48
Bone Density	53
Bone Graft.....	41, 49
Brightness & Contrast.....	34, 42
Case Information.....	25
Check Sleeves	40, 50
Clipping.....	29
Clipping.....	43
Color Presets	34, 42
Comments.....	56, 59
Control Panel.....	13, 34, 42, 56
Density Profile	40, 44, 53
DICOM.....	18, 20, 60
DICOM & Invivo File Loading.....	18
Export Image	60
Gallery View Tab	55
Grid.....	41
Image Capture.....	25
Implant.....	40, 43
Implant Angles.....	40
Implant Summary	41
Implant Types.....	43, 52
Implant View Tab	39
Import Image	56
Invivo File Saving	20
Keyboard Shortcuts.....	65
Layout	32, 41, 44
License types.....	9
Life Size.....	34, 62
Measurements.....	32, 40
Menu Bar.....	13
Misch's bone density units.....	53
Mouse Navigation Tools.....	27, 36, 44, 46
Move Widget	40
Nerve.....	34, 37, 38, 45, 61
Panoramics.....	36, 48
Patient Info	32, 33, 41
Patient Orientation	34
Rendering Window.....	13
Reset Zoom	32, 40
Software Layout	13

Stone Model.....	46
Toolbar	13, 32, 40, 56
View Sequence	33
View Settings	15
View Tabs	13
Waxups	45, 46

CE 2797



Manufactured by:

Anatomage

3350 Scott Blvd.

Bldg. #29

Santa Clara, CA 95054, U.S.A.

Tel: 1-408-885-1474

Fax 1-408-295-9786

www.anatomage.com



Authorized Representative:

PaloDEx Group Oy

Nahkelantie 160, P.O. Box 64

FI - 04301

Tuusula, Finland

Tel: 358-10-270-2000

Fax: 358-9-851-4048

www.palodexgroup.com



(01)00852060007068(10)6.0.5