

 Vitrea Advanced[®]

 Vitrea Workstation[®]

Education and Reference Guide
XA 3D-Angio

VITALU[®]

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VPMC-13231 A VitreaAdvanced XA 3D-Angio Education and Reference Guide

This publication is valid for VitreaAdvanced 6.6, VitreaAdvanced fx 6.6, Vitrea Enterprise Suite (VES) 6.6 and later software versions.

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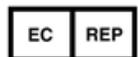
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Safety and Regulatory Considerations

PLEASE REFER TO THE **ABOUT VITAL IMAGES MEDICAL IMAGING SOFTWARE** DOCUMENT BEFORE USING THIS PRODUCT. This document includes important information regarding general Vitrea Safety and Regulatory considerations.



CAUTION: Federal law restricts this device to sale by or on the order of a physician, as directed by 21 CFR 801.109(b)(1).

Contact Us

- For general, non-technical support questions, contact us through our Web site: www.vitalimages.com.
- For customer technical support, contact us:
 - In the U.S., call the Customer Support line at 1.800.208.3005.
 - Outside the U.S., contact your Vital distributor.
 - Send an email to support@vitalimages.com.
- For a printed version of the Release Notes, Education and Reference Guide, or Installation Guides, contact Customer Support at 1.800.208.3005.

Release Notes

Vitrea Release Notes contain late-breaking information not available at the time the Education and Reference Guide was released. This document is available from your System Administrator or from Vital Images.

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Introduction to VitreaAdvanced

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- Vitrea Overview
- Getting Started
- The Study Directory Window
- The Gallery Window
- The Viewer Window
- MPR Imaging
- 3D Imaging
- Image Batches and Movies
- The Report Window

Vitrea Overview

Vitrea® is a medical diagnostic system that allows the processing, review, analysis, communication, and media interchange of digital images acquired from a variety of imaging devices. Vitrea provides visualization of digital images to aid clinicians in their analysis of anatomy and pathology. The Vitrea user interface follows typical clinical workflow patterns to process, review, and analyze digital images.

With Vitrea, you:

- Communicate with configured DICOM (Digital Imaging and Communications in Medicine) devices to retrieve and export patient data
- Load one or multiple volumes for a patient
- Select from a gallery of predefined clinical viewing protocols
- Adjust visualization parameters to enhance images
- Review multiple image files in 2D, side-by-side views
- Measure regions of interest
- Locate and observe points of interest, using a mix of MPR (Multi-Planar Reformatted), 2D, and 3D images
- Trim with 3D and 2D segmentation to focus images on regions of interest
- Fly through or around anatomical images
- Save snapshots highlighting regions of interest for saving to PACS or to a printable, Intranet-ready report
- Capture image sequences in batches to create printed reports or make Intranet-ready digital movies

User Help

Select the Help tab for access to Course Modules, and Safe and Effective Use.



To view the .pdf files, you need to have Adobe Reader.

Vital U

Vital U offers courses in a variety of settings to accommodate multiple learning preferences and schedules. We provide education at the Vital U customer education center, in cities around the U.S., at your facility, and on our Web site.

Learn advanced visualization software in our dedicated classroom or at a traveling classroom in a city near you. You can also bring a program to your facility and customize your education to your specific workflow. Our Website offers distance learning through Vital U Live webinars and eLearning content that's available anytime.

In addition to our standard clinical applications, we offer specialty courses for applications in oncology, neurology, virtual colonoscopy and cardiology. Select courses offer CME and CE credits to U.S. based physicians and technologists.

Call the Vital U education coordinator at 952-487-9559 or e-mail vitalu@vitalueducation.com to register for in-house, on-site, road show, or for any other education-related questions.

Classroom Learning

Fundamentals for Advanced Visualization Software

This three-day post-processing course teaches the fundamentals of Vital's advanced visualization software that creates 2D, 3D and 4D images of human anatomy. Participants receive an overview of the variety of applications and disciplines within the software including cardiac, peripherals, EP Planning, lung, tumor, joint disarticulation, perfusion, pulmonary, and renal. Learn to manipulate 2D and 3D images, including multi-planar reformatting (MPR), maximum intensity projection (MIP) and volumes, through hands-on exercises delivered by experienced Vital U clinical applications instructors. U.S. -based physicians and technologists can earn CME and CE credits from this course.

Each course module reinforces Vital U's standardized learning methodology with step-by-step instruction for image acquisition, protocol assignment, case analysis and image distribution.

Fundamentals for VitreaCore

This one-day post-processing course teaches the fundamentals of VitreaCore software that creates 2D and 3D images of human anatomy. Participants receive an overview of the variety of applications and disciplines within the software including basic 3D, MPR, and Vessel

Probe. Learn to manipulate 2D and 3D images, including multi-planar reformatting (MPR), maximum intensity projection (MIP) and volumes, through hands-on exercises delivered by experienced Vital U clinical applications instructors.

Each course module reinforces Vital U's standardized learning methodology with step-by-step instruction for image acquisition, protocol assignment, case analysis and image distribution.

Distance Learning

Register for a schedule of live webinars demonstrating Vital software, while a physician or clinical applications instructor answers your questions. You can also explore a library of recorded webinars at your convenience. View the schedule of dates and topics or register at vitalueducation.com.

Administrator Education

This course is designed for IT professionals, PACS Administrators, field engineers or anyone who services, installs or supports Vital's advanced visualization software. This course will teach your designated Vital software administrator how to get the most out of Vitrea by fully integrating it with your medical imaging systems. For more information, contact the Vital U education coordinator at 952.487.9559 or e-mail vitalu@vitalueducation.com.

On-site Learning

Any of our educational programs can be brought to your facility. Our experienced applications instructors meet your learning needs by bringing Vital U courses and hardware, if needed, to your site. On-site learning customizes your education program to the specific workflow of your physicians and technologists.

Customized Options

Packages include multi-user and multi-session formats to meet your learning needs. To design your customized education program, contact

the Vital U education coordinator at 952.487.9559 or e-mail vitalu@vitalueducation.com.

Contact Us

- For general, non-technical support questions, contact us through our Web site: www.vitalimages.com.
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Getting Started

Start and Close Vitrea

Start Vitrea for the Windows Desktop after the workstation is turned on.

1. If the Welcome to Windows dialog box displays, press CTRL-ALT-DELETE.
2. Type `vitrea` in the **Username** field.
3. If your institution requires a password, type the password in the **Password** field.
4. Click **OK**.
5. From the desktop, double-click .

 Contact your System Administrator for information regarding registering your Vitrea software and for information regarding user-defined login configuration settings.

- User Accounts (system defaults)

Account	Password
Vitrea Administrator	vital\$
Vitrea User	(none)
Vitrea VIP	vip+

NOTE: If you change passwords, notify Customer Support.

Close Vitrea from any window.

- Click  in the upper-right corner of Vitrea.

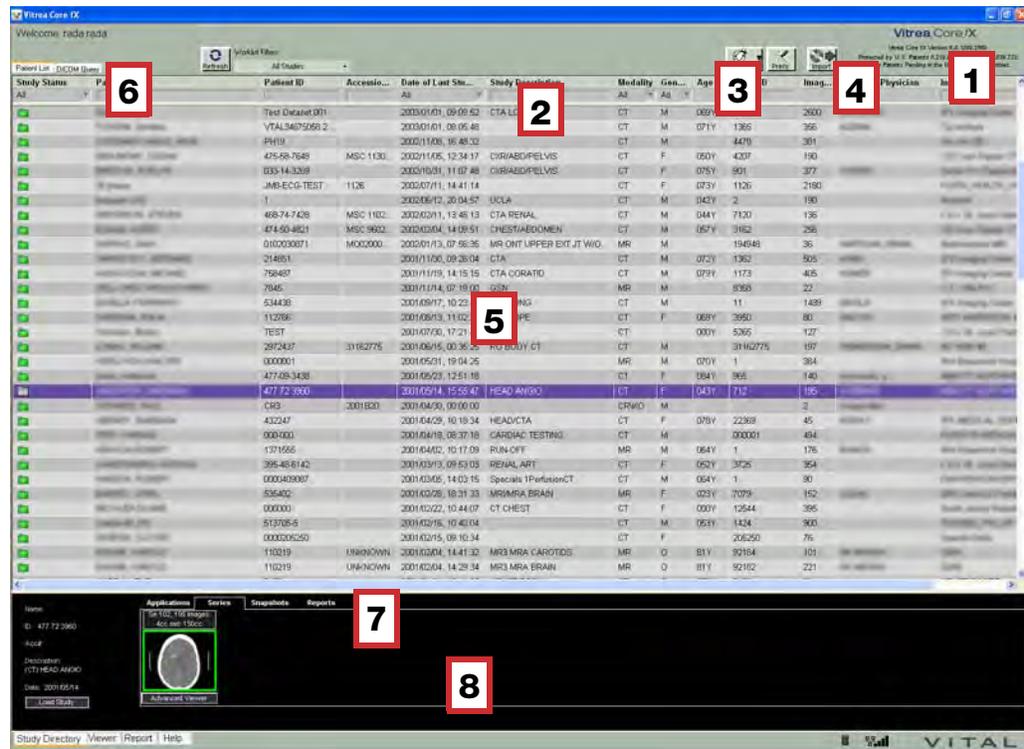
 See your PC operating system's user instructions for information regarding shutting down your workstation.

NOTE: If the Vitrea Workstation is configured to receive DICOM pushes from your organization's network, the workstation only receives data when it is running.

If your Study Directory looks like this, go to VitreaWorkstation Study Directory on page 21:

File	Patient	ST	AEC/Chase	Date/Time	Description	Modality	Images	Price	Billing	COB
101_anta_AUM	TIA	---	---	1/12/08 08:39	ax include base exc AUM	CT	216	---	---	1/12/08
11_Anta_AntaMed M	3441541478	377884 1	---	1/12/08 09:44	Abdominal Anta CT	CT	477	---	---	1/12/08
1_Tumor Abdomen Case	8802203	CT8816726	---	02/02/08 11:36	CT ABDOMEN W/ CON	CT	440	---	---	1/12/08
1_Tumor Abdomen Case	3902081	CT39017940	---	04/08/08 13:41	CT ABDOMEN W/ CON	CT	216	---	---	1/12/08
Abdomen Tumor with Liver Meta	34	205987	---	2/3/08 14:54	CT ANOPHEL W/ CON	CT	350	---	---	1/12/08
Abdomen Soft Tumor	14 2	470704848	---	1/12/08 15:52	CT ABDOMEN W/ CON	CT	190	---	---	1/12/08
Abdomen Liver Tumor	VIA	1235863	---	1/12/07 07:42	Head & Neck	CT	216	---	---	1/12/08
Anta 200 Anta Head	30774	377884	---	6/12/08 11:18	---	CT	174	---	---	1/12/08
B. Body	4012	---	---	1/12/08 07:21	Abdomen COLON STUDY 1	CT	28	---	---	1/12/08
B. Body	4016	---	---	1/12/08 09:37	Abdomen COLON STUDY 1	CT	279	---	---	1/12/08
COLON 9	GE70	367832	---	11/02/02 14:18	VIRTUAL COLON	CT	231	---	---	---
COLON 9	GE70	367832	---	11/02/02 14:18	VIRTUAL COLON	CT	251	---	---	---
Longitudinal Pat. ST	VIA2130042	---	---	02/12/08 09:03	CT Thorax 2.c	CT	250	---	---	1/12/08
Longitudinal Pat. ST	VIA2130040	---	---	01/12/08 09:32	CT Thorax 2.c	CT	267	---	---	1/12/08
Anta 100 Anta Head	VIA2130206	---	---	1/12/10 02:05	CT LIVER W/ CON	CT	247	---	---	1/12/08
Anta 100 Anta Head	VIA2130188	---	---	1/12/10 08:11	CT LIVER W/ CON	CT	718	---	---	1/12/08
Anta 100 Anta Head	VIA2130205	---	---	1/12/10 14:31	CT LIVER W/ CON	CT	42	---	---	1/12/08
Anta 100 Anta Head	VIA2130442	---	---	1/12/08 08:43	CT LIVER W/ CON	CT	369	---	---	1/12/08
Anta 100 Anta Head	VIA2130181	---	---	1/12/07 13:18	CT CAAP COLON CA	CT	180	---	---	1/12/08
Anta 100 Anta Head	VIA2130183	---	---	01/02/02 06:44	Abdomen (ANGIO) SCOUT	CT	424	---	---	1/12/08
Anta 100 LUNG	814	---	---	1/12/10 07:38	CT THORAX W/ IV CONTRA	CT	550	---	---	1/12/08
Anta 100 LUNG	744	---	---	1/12/10 08:30	CT 3D RECONSTRUCTION W/ IV	CT	441	---	---	1/12/08
Anta 100 LUNG	818	---	---	1/12/10 10:36	CT THORAX W/ IV CONTRA	CT	559	---	---	1/12/08
Anta 100 LUNG	804	---	---	1/12/10 11:02	CT THORAX W/ IV CONTRA	CT	494	---	---	1/12/08
Anta 100 LUNG	805	---	---	1/12/10 16:11	CT 3D RECONSTRUCTION W/ IV	CT	139	---	---	1/12/08
Anta 100 LUNG	802	---	---	1/12/10 16:31	Abdomen 1. THORAX ABDOM	CT	240	---	---	1/12/08
Anta 100 LUNG	803	---	---	1/12/10 16:19	Abdomen 2. THORAX ABDOM	CT	119	---	---	1/12/08

VitreAdvanced Study Directory



Callout Number	Description
----------------	-------------

- | | |
|---|------------------|
| 1 | Software Version |
| 2 | Column Headers |

NOTE: Click to sort. Click then type the first few letters to search.

- | | |
|---|--|
| 3 | Conference Button (also displays at the bottom of the Viewer window) |
| 4 | Preferences Button |
| 5 | Patient List |
| 6 | DICOM Query tab |
| 7 | Series/Snapshots/Reports/Applications Tabs |
| 8 | Thumbnail tray |

Study Status Icons

In the patient list, the Status column contains folder icons. The color represents the state of that study.

Icons	Description
 (Blue with blue arrow)	Incoming/Processing
 (Green with yellow star burst)	Unread
 (Green with yellow star burst and snapshots)	Unread with evidence
 (Red outline with padlock)	Locked study
 (Gray)	Read
 (Gray with snapshots)	Read with evidence
 (Gray with red check mark)	Published

Patient List Column Headers

The Patient List columns allow you to filter and sort the studies to better manage your caseload. Once you identify the desired studies, use the Series Thumbnail area to load images.

Filter the Study List

When you set selection criteria to filter the list of studies, the Patient List displays studies matching the selection criteria and studies that are already open.

TIP: To further filter the Study List, set the selection criteria for multiple columns.

EXAMPLE:

1. Click in the field under the Modality header and select **CT** from the dropdown list.

The Patient List displays only CT studies.

2. Click in the field under the Date of Last Study header and select **<2 days** from the dropdown list.

The Patient List displays only CT studies occurring in the last 2 days.

- 3 Click the **Patient Name** header.

The Patient List displays CT studies occurring in the last 2 days, sorted by patient name in ascending order.

- 4 Click the **Patient Name** header again.

The Patient List displays CT studies occurring in the last 2 days, sorted by patient name in descending order.

Sort Columns in Ascending or Descending Order

- Click the column header.

The list is sorted and an arrow displays to the right of the column header to indicate the direction of the sort. Click again to reverse the order.

Search for Specific Studies in the Study List

- Click in the field below any searchable column header, type a text string, and press **Enter**.

Enter a value for the following columns: Patient Name, Study Description, Patient ID, Accession Number, Study ID, and Institution.

OR

Click in the field below any searchable column header and select an item from the dropdown list.

Select a value from a dropdown list for the following columns: Status, Date of Last Study, Modality, and Gender.

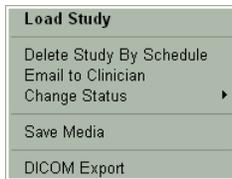
NOTE: The remaining column headers are not searchable.

Adjust the Column Width

- Place the cursor on the line between columns, and drag the line.

Patient List Right-click Menu

When you right-click on a study, a menu displays containing the following options:



Menu Item	Description
Load Study	If there is more than one series in the study, it loads two series in a 2-up 2D viewer in VitreaCore. If there is only one series, it loads the first image into a 1-up 2D viewer. If there are more images in the study, click the forward arrow in the Cine tools area to step through the images.
Delete Study by Schedule	Deletes the study from the server.
Email to Clinician	Sends the images in an email.
Change Status	Changes the status of the study: <ul style="list-style-type: none">• Unread• Read• Published
Save Media	Export data to media (CD/DVD/USB/Local Disk/Network Data).
DICOM Export	Export series to DICOM device.

Mark a Study as Read

The Mark as Read option and the Status column in the Patient List are only available if Enable mark study **as read** check box is selected during server configuration, and if you are logged on with radiologist privileges. For information about configuring the Vital Image Management Server (VIMS), contact your System Administrator.

Use DICOM Transfer

The Vitrea system consists of one or more servers and one or multiple client PCs. The client queries the server at regular intervals to check for new studies. You can export studies to, send queries to, and retrieve studies from other DICOM servers or devices on the network at any time. Manually query and retrieve studies from within the Vitrea server.

When finished working with a study on the client PC, you can export it to other devices or servers on the network. Use the Save as DICOM File option to save a worked-up study to the server. If DICOM forwarding is set up for one or more devices on the network, the study you save to the server exports to the devices set up for forwarding.

Automatic Query

Vitreia contains two automatic query/retrieve features:

- Configuring a scanner to send all studies to the Vitrea server automatically.
- Setting the client PC to query the Vitrea server at regular default intervals to refresh the Study Directory. As soon as the client PC receives them, studies display on the Study Directory screen.

User Types (Vitreia Enterprise)

Loading studies into Vitrea Enterprise depends on your user type. The user types are determined by usernames and passwords. Your organization assigns user types to individual usernames and passwords depending on the role of the user.

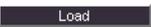
NOTE: Contact your System Administrator for information regarding the usernames and passwords associated with the different user types.

- Clinician
- Diagnostic User
- Advanced Diagnostic User
- Administrator (not covered in this book)

NOTE: See the Vitrea Installation and Administration Guide for information regarding the Administrator user type.

Clinicians

- Access VitreaCore.
- Load and interact in VitreaCore workflows using the **Load** button.



- Restore snapshots for viewing in VitreaCore.

Diagnostic Users

- Access both VitreaCore Viewer and VitreaAdvanced Viewer. The VitreaCore Viewer is the default viewer.
- Load and interact in VitreaCore Viewer workflows using the **Load** button.
- Load and interact in Advanced Viewer workflows by right-clicking and selecting **Load in Advanced Viewer**.
- Restore snapshots into Advanced Viewer.



Advanced Diagnostic Users

- Access both VitreaCore Viewer and VitreaAdvanced Viewer. The Advanced Viewer is the default viewer.
- Load and interact in Advanced Viewer Workflows using the **Advanced Viewer** button.
- Load and interact in VitreaCore Viewer workflows by right-clicking and selecting **Load**.
- Restore snapshots into Advanced Viewer.



	Clinician	Diagnostic User	Advanced Diagnostic User
Load into VitreaCore	Y	Y	Y
Load into VitreaAdvanced Viewer	N	Y	Y
Restore workflow into VitreaCore by default	Y	N	N
Restore workflow into Advanced Viewer by default	N	Y	Y
Send DICOM image	N	Y	Y
Publish to Clinician	N	Y	Y
Delete study	N	N	Y
Vessel Probe	N	Y	Y
DICOM query	Y (if configured by System Administrator)	Y	Y

	Clinician	Diagnostic User	Advanced Diagnostic User
Create evidence (snapshots, batches, movies)	N	Y	Y
Delete evidence (snapshots, batches, movies)	N	Y	Y

From here, skip to the Gallery Window section on page 27.

VitreWorkstation Study Directory



Callout Number	Description
1	Software Version
2	Preview Pane
3	Load Buttons
4	Patient List
5	DICOM/CD/Smart Query Area
6	DICOM/CD/Smart Query List

Callout Number	Description
7	Status Bar
8	Disk Space Indicator

Preview Pane

The Preview Pane displays images of the selected dataset.



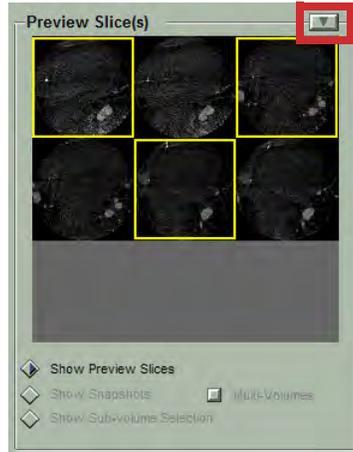
1. Select **Show Preview Slices** to display the middle image of the selected dataset. With multiple series selected, an image from each series displays.

TIP: To adjust the window/level of the preview slice, click and drag in the image.

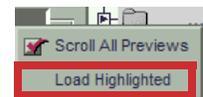
TIP: To scroll through the series slices in the Preview Pane, right-click and drag or roll the mouse wheel.

TIP: With multiple series selected in the patient list:

- a. Hold CTRL and click one or more preview images to select the desired series.



- b. Click the dropdown and select **Load Highlighted** to load only those series.



NOTE: Clicking **Load Volume** loads all series selected in the Patient List.

2. Select **Show Snapshots** to display saved snapshots.

TIP: Select a snapshot then click  to restore workflow.

TIP: The **Multi-Volumes** check box indicates whether the snapshot was taken with multiple volumes loaded. Clear the check box to load only the selected volume.



CAUTION: Load all associated volumes when you restore a multi-volume snapshot. Attempting to restore the snapshot without loading all associated volumes may yield different Vitrea-generated measurements or calculations than the original calculations. If the workflow you are restoring does not include these measurements, this caution does not apply. It is not advisable to restore a multi-volume workflow if you cannot load all associated volumes.

Patient List

The Patient List displays all patient studies loaded in the Vitrea workstation.

A volume is an image file that Vitrea builds from a DICOM dataset.

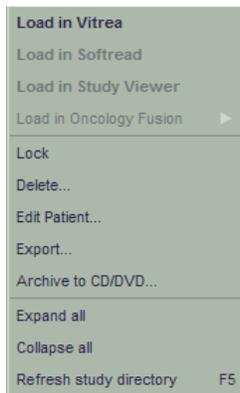
- Study Directory Icons

The patient list displays color coded icons to identify the studies (folders) and volumes (cubes)

Icons	Description
 (Green with yellow star burst)	New study or volume
 (Gray)	Previously loaded study or volume
 (Gray with red check mark)	Reported study or volume

- Right-click Menu

Right-click in the Patient List, then select from the menu to load or manage patient studies.



Menu Option	Description
Load in Vitrea	To load selected study/volume into Vitrea.
Load in Softread	To load selected study/volume into Softread.
Load in Study Viewer	To load selected study/volume into Study Viewer.
Load Oncology Fusion	This option is only enabled if you are licensed for Oncology Fusion.
Lock	To protect study/volume from deletion.
Delete	To permanently delete a study/volume from Vitrea.
Edit Patient	To edit the patient information for a study/volume.
Export	To export DICOM images, snapshots, reports, batches, workflows, etc. to other Vitrea workstations or DICOM devices.
Archive to CD/DVD	To save a study/volume to CD or DVD.
Expand All	To expand all the studies in the patient list.
Collapse All	To collapse all the studies in the patient list.
Refresh Study Directory	To refresh the listings in the patient list.

- Sorting and Filtering Study Information

Use the column headings above the Patient List to sort or search.

1. To sort, click the desired column header.
2. To filter, click in the **Filter** row under the desired column header, then type part or all of the search criteria.

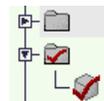
Status	/ Patient	ID
Filter		

NOTE: You can filter the following columns: Patient, ID, ACC#/CKern, Description, Modality.

3.

- Show-Hide Volumes

Use the Show-Hide arrow to the left of the study line to show or hide volumes within a patient study.



- Selecting Multiple Studies or Volumes

Press CTRL then click desired studies or volumes.

TIP: To select several studies or volumes in order, select the first, press SHIFT, then click the last.

TIP: To deselect one or more volumes, hold CTRL and click the volume.

- Reconcile or Edit Patient Information

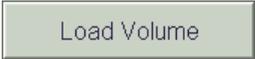
If there are multiple studies with the same ID but different names, VitreaAdvanced alerts you when you try to load the study. Use the Edit Patient feature to reconcile the studies. Edit any study at any time.

1. Right-click the study and select **Edit Patient (or Reconcile Patient)**.
 2. Complete information in dialog box.
 3. Click Submit.
- Locking/Unlocking Studies 

Lock important studies to protect from deletion.

1. Right-click the study and select Lock.
2. To unlock, right-click the locked study and select **Unlock**.

Loading Studies

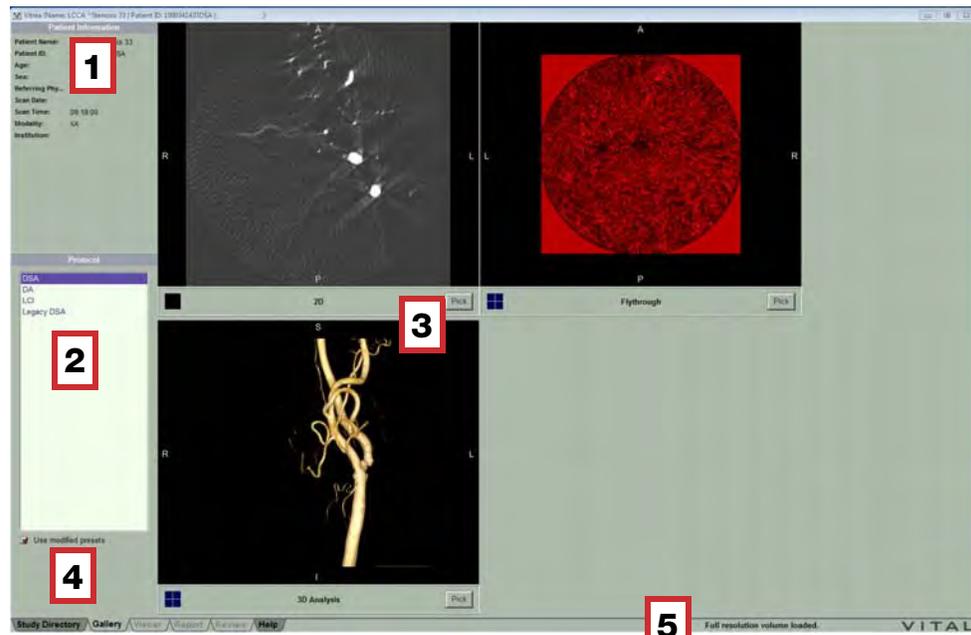
- Select one or more studies/volumes in the patient list then click  .

TIP: The **Load Volume** button changes depending on the selections you made in the Preview Pane or patient list.



The Gallery Window

After you load a patient study, the Gallery window opens. Select the protocol and preset from the Gallery.



Callout Number	Description
1	Patient Information
TIP: If information is truncated, hover over the label. A tool tip with the complete information displays.	
2	Protocol List
3	Gallery of Presets
4	Use Modified Presets
5	Status Bar

Patient Information

Vitrea displays the DICOM header information in the Patient Information section.

TIP: If information is truncated, hover over the label. A tool tip with the complete information displays.

Protocol List

The Protocol List contains the protocols available with the licensed features.

Presets

Before you work with the images in the Viewer window, you must select a preset.

NOTE: It is important that you regard each protocol and preset as a convenient starting point for viewing the data.

Modified Presets

To set your own visualization preferences, create a Modified Preset, which will be available in the Gallery.

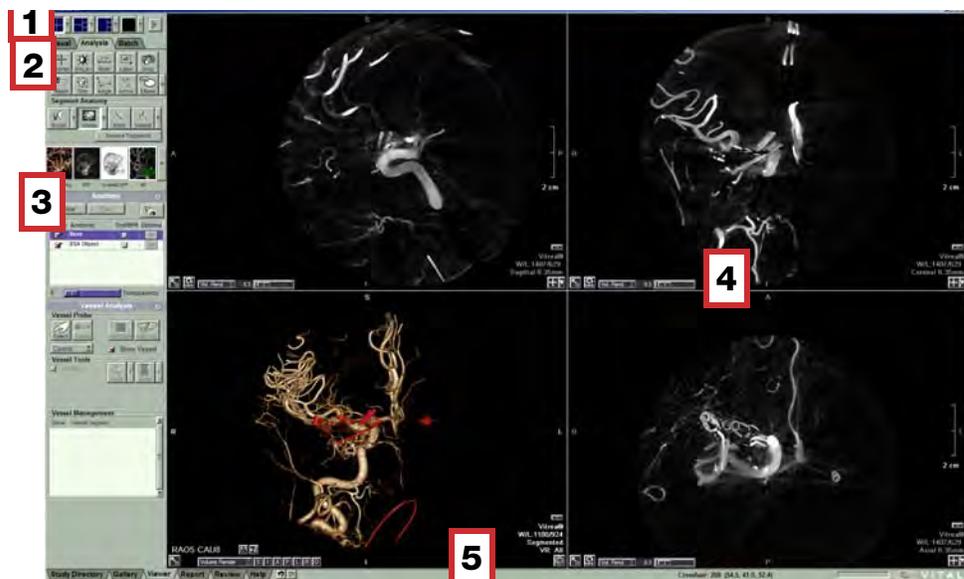
1. Load a study.
2. Select one of the default presets.
3. Change any of these settings on the Viewer window:
 - Viewer window format
 - Imaging controls
 - Display options
 - View options
 - Image appearance
4. When finished, press CTRL-P.
5. Click **OK**.

TIP: This saves the settings as a customized preset. The standard presets are not affected.

TIP: The next time you select the same protocol, the modified preset is available. All modified preset names contain the word (modified).

The Viewer Window

The Viewer window is the main working area in Vitrea and includes the tools necessary to complete your workflow.



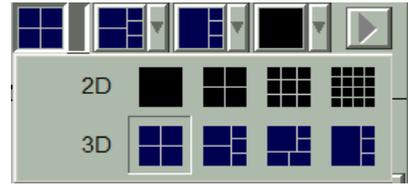
Callout Number	Description
1	Viewer Window Layout Buttons
2	Analysis, Visual, and Batch Tabs
3	Vitrea tools
4	In-view tools
5	Information area and Status Bar

Viewer Window Layout



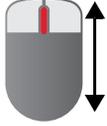
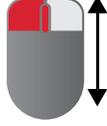
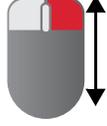
Use the Viewer Window Layout buttons to change the number or kind of views displayed in the Viewer window.

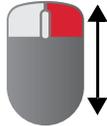
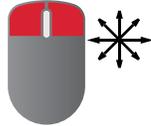
1. To change the Viewer window layout, click one of the Layout Buttons.
2. To access all available Viewer window layouts for the selected protocol, click one of the dropdown arrows next to a Layout button.



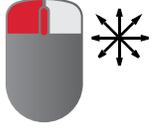
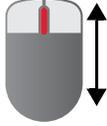
TIP: 2D Montage formats use black layout buttons, MPR/3D formats use blue layout buttons, and special protocol-specific formats use red layout buttons.

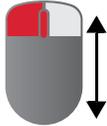
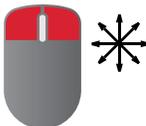
2D and MPR Mouse Functions

Mouse Button	Press to:
 Click	Activate Tool
 Middle-click and drag	Pan
 Left + Middle click and drag	Zoom
 Right-click and drag OR	Scroll
 Roll the mouse wheel	

Mouse Button	Press to:
SHIFT +  Press SHIFT, right-click and drag	Auto-scroll TIP: The speed of the auto-scroll is dependent on the speed you drag.
 Left + Right click and drag	Window/Level

3D Mouse Functions

Mouse Button	Press to:
 Click	Activate Tool Click then pause a moment to activate the tool
 Click and drag	Rotate Click then drag right away
SHIFT +  Press SHIFT, right-click and drag	Auto-rotate TIP: The speed of the auto-rotate is dependent on the speed you drag.
 Middle-click and drag	Pan

Mouse Button	Press to:
	Left + Middle click and drag
OR	
	Roll the mouse wheel
	Left + Right click and drag
	Window/Level

Keyboard Shortcuts

Adjust views and perform other operations using keyboard shortcuts

Key	Function
E	Activate Ellipse tool
F	Activate ROI tool
H	Activate Crshair tool
L	Activate Label tool
A	Activate Arrow tool
R	Activate Ruler tool
S	Activate Snap tool
T	Activate Trim tool
W	Activate Win/Lev tool
CTRL-I	Toggle the patient information on or off
CTRL-Y	Re-do last undone action
CTRL-Z	Undo last action (repeat to undo multiple actions)

3D Keyboard Shortcuts

Some Vitrea systems include keyboard shortcuts, identified with blue keycaps, for certain functions.

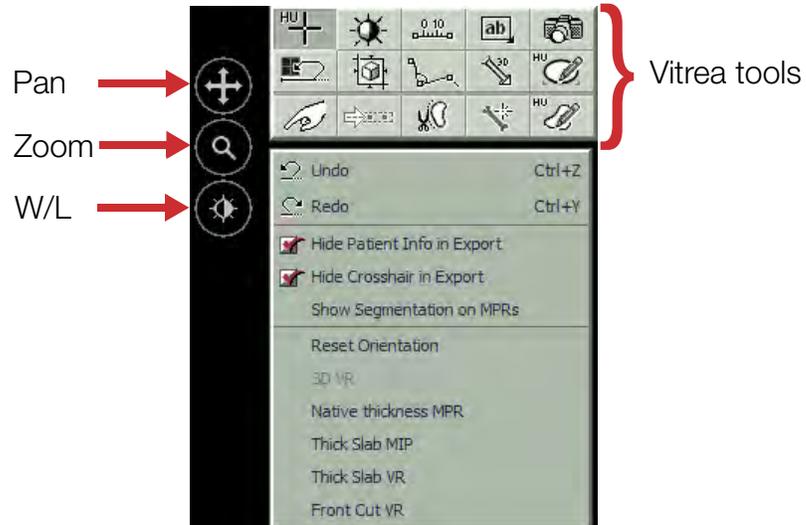


NOTE: If you run Vitrea on a PACS, your shortcuts may differ or you may not have blue keycaps.

Key	Function
S-I [F2]	Rotate volume Superior to Inferior -- 180° azimuth, 90° elevation, 0° twist
I-S [F3]	Rotate volume Inferior to Superior -- 0°, -90°, 0°
A-P [F4]	Rotate volume Anterior to Posterior -- 0°, 0°, 0°
P-A [F5]	Rotate volume Posterior to Anterior -- -180°, 0°, 0°
L-R [F6]	Rotate volume Left to Right -- -90°, 0°, 0°
R-L [F7]	Rotate volume Right to Left -- 90°, 0°, 0°
OBLIQUE [F8]	Rotate volume to oblique orientation -- 40°, 30°, 0°
UNDO [F11]	Undo last action in Viewer window. Press repeatedly to undo multiple actions.
REDO [F12]	Redo last "Undo" in Viewer window.
ARROW	Press an ARROW key to rotate volume by 10 degree increments.
SHIFT + ARROW	Press and hold SHIFT and press an ARROW key to rotate volume by 90 degree increments.

Right-click Menu and Tool Pane

For easy access to common tools used for the selected protocol, right-click within a view.



- Click and drag to use the Pan, Zoom, and W/L buttons.

Panning

Move the image within the viewport by:

- Middle-click and drag.
- Right-click in the image, then click and drag .

Zooming In and Out

Increase or decrease the magnification of the images by:

- Left + middle-click and drag up or down.
- Right-click in the image, then click and drag .
- Click and drag the Zoom icon in the lower right corner of the view.

The zoom factor (in %) is displayed in the lower right corner of the view.



Zoom Presets:

- Right-click in the image and click  multiple times to toggle through a series of preset zoom factors.

- Click the Zoom icon in the lower right corner of the view multiple times to toggle through a series of preset zoom factors.



Adjusting the Window/Level

Adjust the window/level settings of the views.

1. Right-click in the view, then click  .

TIP: Or, from the Analysis or Visual tab, click  .

2. Click and drag in the view.
 - To make the window wider or narrower, drag left/right.
 - To adjust level, drag up/down.
 - To adjust both at once, drag diagonally.

TIP: To specify precise window and level settings, with cursor anywhere in the view, type a number followed by W or L.

OR

- With any tool activated, left + right-click and drag in the view.

OR

- Right-click in the view, then click and drag  .

Using Predefined Window/Level Settings

To select a preset window/level setting, click the window/level dropdown arrow in the lower right corner of the view and select a value.

1. Select the **Visual** tab.
2. Click the dropdown menu in the Window/Level area.
3. Select an option.



Create custom window/level settings:

1. Click the dropdown menu in the Window/Level area.
2. Select **New**.

TIP: Select **Edit** to edit an existing window/level setting.

3. Complete the **Name**, **Window**, and **Level** fields.

TIP: To set the window/level setting as “key,” select the **Key** check box.

4. Click **Save**.

Key window/level settings display as bolded in the Window/Level menu.

Scroll through key settings to quickly view an area of interest at different settings:

- Press INSERT to scroll through the key settings.

Analysis Tab Controls

Tools available on the Analysis tab depend on the protocol and preset selected on the Gallery window.

#	Description
1	Viewer window tabs
2	Vitrea tools
3	Anatomy Segmentation Area
4	Vessel Analysis Area

Crosshairs

Move crosshairs and display coordinates in MPR views.

1. Right-click in the view, then click  .

TIP: Or, from the Analysis or Visual tab, click  .

2. Click in the view to place crosshairs.

TIP: Click in the 3D view to move the crosshairs in the MPR views.

Rulers and Calipers

Add simple rulers to 2D or MPR views:

NOTE: Perform linear measurements in 2D or MPR views only. It is possible to add rulers to 3D images. If you do, be sure to fully rotate the 3D view to be sure the ruler is placed where you want it.

1. Right-click in the view, then click  .

TIP: Or, from the Visual or Analysis tab, click  .

2. Click in the view where you want the ruler to start and drag to where you want the ruler to end and release.

Add calipers to 2D or MPR views:

A caliper is a ruler or angle drawn on one image that continues to display as you scroll through the view.

NOTE: Calipers are not available in 3D views or curved planar reformatted views.

1. Draw a ruler in a 2D or MPR view.
2. Place the cursor on the ruler, right-click and select **Caliper**.
3. Scroll through the view.



Move Between Rulers and Calipers:

1. Press the SPACEBAR to navigate between images with rulers or calipers.

NOTE: When you are navigating to a caliper, Vitrea will display the plane where the caliper was last edited.

Edit Rulers:

1. Click and drag an endpoint to relocate the end of the ruler. 
2. Click and drag the center of the ruler to relocate the entire ruler. 

NOTE: Relocating the entire ruler is only available on single-plane rulers.

Delete Rulers:

1. Right-click the ruler or measurement figure to select it. 

TIP: The ruler turns purple.

2. Select **Delete** or **Delete All**.

Labels and Annotations

Type text directly onto any image in the Viewer window.

1. Right-click in the view, then click  .

TIP: Or, from the Visual or Analysis tab, click  .

2. Click the image where you want to place the label.
3. Select a term from the list.

OR

Type the annotation in the text area.

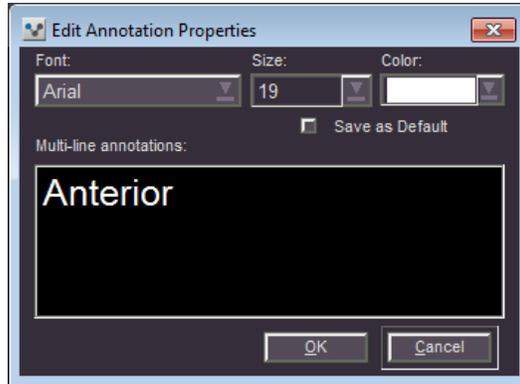
TIP: To remove a user-created listing from the annotation directory, right-click it and select **Delete**. Default listings cannot be deleted.

4. Click OK.



TIP: To add an arrow to the corner of the label, click the label, position the cursor to the corner where you want the label, and drag.

- To edit a label, double-click the label and make font, size, color, or text changes in the dialog box that displays.



- To reset the font size of a 3D label, right click it and select a new font size.
- To delete a label, click it to select, then press DELETE.
- To move a label, click and drag it.
- To add a 2D or MPR annotation to the 3D view, right-click it, then select **Show in 3D**.

NOTE: For MPR views, text created by annotations, measurements, or labels will fully display on the screen without running off the viewport. If the text is too large to fit within the MPR viewport with the font size selected, the font size will dynamically change to a lower setting which does fit.

NOTE: For 3D views, all or part of the text may move or be displayed off the viewport. During rotation or panning of the 3D view, part of the text may be obscured by the volume or overlay views.

NOTE: Undo/redo operations are not available for font changes. Re-edit the text to apply changes.

Snapshots

Capture images to export to PACS, add to a report, or restore workflow.

1. Right-click in the view, then click  .

TIP: Or, from the Analysis or Visual tab, click  .

2. Click in the view.
 - Hold ALT, then click in the view to take multiple snapshots.
 - Hold CTRL, then click in the view to take one snapshot of the whole viewer.

TIP: To hide patient information in the snapshot, right-click in the view and select Hide Patient Info in Export before you click in the view.

Trim

Trim data from an image to isolate areas of interest in 2D and MPR views.

TIP: Trimming MPR views also trims the 3D view.

1. From the Visual tab, click  to display a yellow trim box.
2. Place the cursor on a corner or side of the trim box and drag it to the new location.

OR

- With the **Crshair** tool active, click and drag a colored border around the image.

TIP: To reposition the entire trim box, click inside it and drag it to the new location.

TIP: To undo the trim, click the Reset Trim Limits icon.



Angles

Add multi-line rulers to 2D or MPR views:

1. Right-click in the view, then click  .

TIP: Or, from the Visual tab, click  .

2. Click and release in the view where you want the ruler to start.
3. Move to the next location for the line segment, then click and release.
4. Repeat step 3 as many times as necessary.

TIP: You may scroll in the view between endpoints to make a ruler over more than one plane.

TIP: To move the number associated with the measurement, click and drag the number.

5. Double-click on the last point to end the line.

TIP: To add the 2D or MPR angle to the 3D view, right-click the angle or measurement figure and select **Show in 3D**.

TIP: To set the angle as a caliper so that it continues to display as you scroll through the view, place the cursor on the angle, right-click and select **Caliper**.

NOTE: The Caliper feature is not available on angles created on more than one slice.

Arrows

Add arrows to 2D, MPR, or 3D views:

1. Right-click in the view, then click  .

TIP: Or, from the Visual or Analysis tab, click  . The Arrow tool must be active to use the spacebar to move through the arrows.

2. Click in the view where you want the point and drag to where you want the end.

TIP: All views where the arrow intersects display the arrow.

Delete arrows:

1. Click the arrow to select it.

TIP: The arrow turns purple.

2. Press BACKSPACE or DELETE.

TIP: To temporarily hide arrows, clear the **Measurements** check box on the Visual tab.

To jump between images that contain arrows:

- Press SPACEBAR to jump forward in sequence through images that contain arrows.
- Press SHIFT-SPACEBAR to jump backward in sequence through images that contain arrows.

3D Sculpting

Use 3D sculpting to remove the scanner table or other artifacts from the 3D view.

1. Right-click and select .
2. Draw a contour around the area to sculpt.
3. Click the Add To dropdown and select **Recycle Bin**.
4. Click **Done**.

TIP: Use 3D sculpting to add objects to other regions as well.

Active Volumes

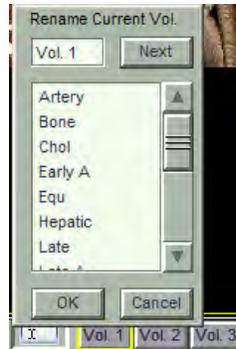
With multiple volumes loaded, switch the selected volume by using the Volume Navigation buttons at the bottom of the Viewer window.



NOTE: The Volume Navigation buttons display when there are two or three loaded volumes.

TIP: To change the label on the button for the currently selected button:

- a. Click  and select a name or type a new one.



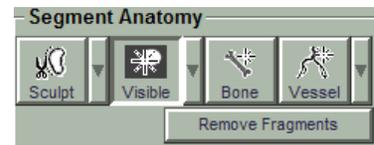
- b. Click  to go on to the next volume, or click  to finish.

Segmentation

Segmentation is a way of highlighting parts and removing other parts of a volume. With Anatomy Segmentation, you assign definitions to various regions and apply visualization settings to each region.

1. Click **Visible**:

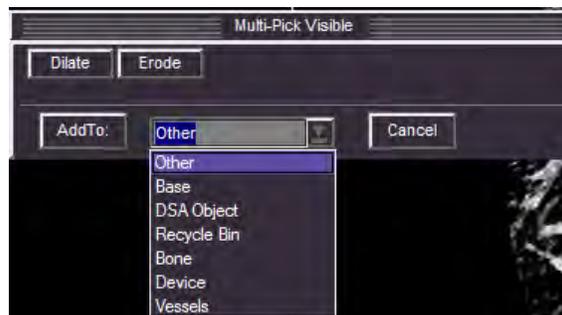
NOTE: The drop down arrow next to the Organ button toggles between Visible and Organ.



2. Click the object in the 3D or MPR view.

TIP: Click more than once to add to the selected region.

3. Look at the blue overlay displayed in the 3D and MPR view to be sure Vitrea has selected the region appropriately and use the controls in the in-viewer Multi-Pick box to adjust the selected area.



4. Click the drop down and choose a region.
5. Click **AddTo**.

TIP: The region name is listed in the Anatomy Management List.

TIP: To change the transparency of the region, drag the Transparency slider.

TIP: To hide the region, clear the check box beside the region name in the Anatomy Management list.

TIP: To delete a region, right-click the region name and select **Delete**.



Multi-Volume Fusion

Create a fused 3D image by combining two series.

1. Load two series, for example: a vessels volume and a device volume.

NOTE: The volumes must have the same frame of reference or be coincident (for comparative viewing).

2. Select a protocol and the **3D Analysis** preset.

NOTE: For the DA workflow, select the **Dual Volume** preset.

3. Perform segmentation and trimming to best display the desired regions in both volumes.

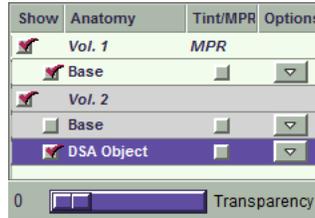
TIP: To switch the currently selected volume, click the volume buttons at the bottom of the viewer window.



4. Select the **Fusion** check box.



A fused 3D volume displays in the selected volume (with “Fusion” indicated in the lower right corner) and region listings for all the volumes display in the Anatomy Management list.



NOTE: When the **Fusion** check box is selected, the 3D image may appear slightly less concentrated than the non-fused image.

5. Use any of the Anatomy Segmentation features (transparency, tint MPRs, preset options, etc.) with any of the regions.

NOTE: Keep the following information in mind while working with fused volumes:

- The crosshair location will be determined by the first visible intersection point in the fused view.
- Regional window/level and visualization settings still apply in the fused view.
- Arrows and rulers placed in a single volume will display in the fused volume.
- Arrows drawn on the fused volume will be associated with the base series (the series that the others are fused into).

Vessel Probe

When you probe a vessel, the Vitrea software traces the vessel, highlighting it with a vessel indicator line. The vessel indicator displays in the 3D view. If you work in Curved MPR mode, the software plots a line through the center of the vessel lumen in one of the views. If you work in Oblique MPR mode, the software displays the best view of the vessel in an oblique plane, along the length of the vessel.

1. From the Analysis tab, click  .
2. Click the vessel.

Vitreia adds a listing to the Vessel Management area.

3. To edit what the probe tool selected:

- a. Click  .

A colored centerline displays in the inset images.

- b. Assess the centerline to verify accuracy.
- c. Move the cursor (pen) to a specific point along the centerline and click to plot a point to modify the path of the vessel centerline.

NOTE: As you plot points, a new red line displays to show you how the centerline displays if you click  . This line displays as a reference line in the 3D view.

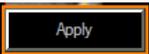
- d. If necessary, move the cursor (pen) to a different point along the centerline and click to plot a point. Continue to plot all additional points. As you plot additional points, the line updates to go through all the user control points.

NOTE: Click and drag the line and it dynamically shows the resulting line as you drag. The point displays after you release the mouse button.

NOTE: Rotate, zoom and scroll the curved view while the line is being created.

NOTE: Hover over a plotted point. The pencil changes to a hand. Click to move the plotted point.

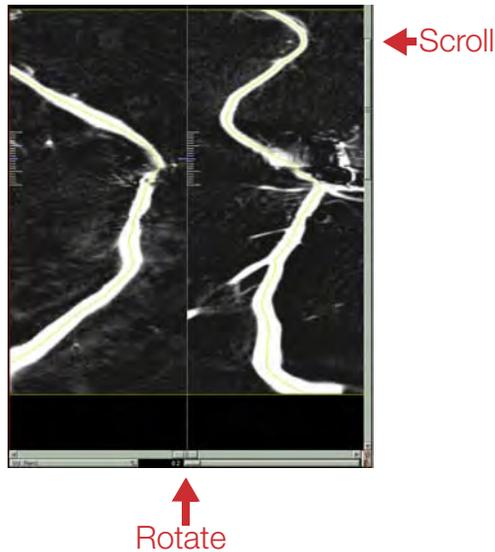
NOTE: Click  if you want to clear the red centerline and start over.

- e. Click  to apply the modified (red) centerline to be the final centerline.



CAUTION: Review the automated centerline for accuracy and correct it if necessary.

4. In the curved reference view, scroll and rotate the vessel.



Vessel Probe Extend

You have the option to extend or refine a probed vessel. The vessel you want to extend or refine must be selected in the Vessel Management list.

To extend a vessel,  and click a point farther along the already selected vessel.

To refine the vessel indicator line, drag the cursor along the vessel indicator line to a desired end point and click.

NOTE: As you drag the cursor, the vessel indicator line disappears. It will not be removed until you click.

Vessel Tools

Define a Lesion

The Lesion tool defines a lesion in the vessel in either of the CPR views.

1. In the Vessel Tools area, click the dropdown for the second button.

The dropdown contains the following tools:



Single – When you draw a lesion using the Single method, Vitrea identifies a point as the reference point. Vitrea displays the area and minimum diameter at the narrowest point and at the reference point, and uses these measurements to calculate the area and diameter stenosis.

TIP: The reference point may need to be moved manually.



Average – When you draw a lesion using the Averaged method, Vitrea calculates the average of the area and minimum diameter for the start and end points. It compares these measurements to the area and minimum diameter at the narrowest point to create stenosis measurements.



Dual – When you draw a lesion using the Dual Reference method, Vitrea calculates the average of the area and minimum diameter for the reference points marked with green lines. It compares these measurements to the area and minimum diameter at the narrowest point to create stenosis measurements.



Landing Zone – Use the Landing Zones option to define specific regions for in-depth analysis.

2. Select a tool.
3. Click in the CPR view just above the start of the lesion and drag to just below the end.



TIP: Vitrea adds an entry in the Vessel Management area.

TIP: Vitrea identifies:

Feature	Identified by
Identified lesion	Cyan lines
Point of maximum narrowing (stenosis)	Red arrows
Lumen diameter at the stenosis point	Number in the curved view with red border corresponding to the red arrows (displays in the two-up curved view)
Reference point(s) for single or dual-reference lesions	Green line(s) <ul style="list-style-type: none"> Be sure to review the locations of each reference line and decide if it is accurate for the identified lesion. If necessary, drag the green line to move it to the nearest normal section of vessel.
Lumen diameter at the reference point	Number(s) in the curved view with green border corresponding to the green line(s) (displays in the two-up curved view)
Stenosis measurements	Table at the bottom of the CPR view <div style="border: 1px solid black; padding: 2px; margin-top: 10px;"> Stenosis: Area: 11% Diam: 12% Length: 88.7mm </div>

Define a Landing Zone

Use the Landing Zone option to define specific regions for in-depth analysis.

1. Click .
2. Click the dropdown for the second button in the Vessel Tools area.
3. Select .



4. Click and drag in the curved view to define the proximal and distal ends of the zone.

TIP: After you define the landing zone, it displays in the Measurements box. Right-click to rename the landing zone.

5. View the diameters for the landing zone.

Measure Centerline Length

The Length tool measures length along the centerline between two points on the vessel centerline.

1. Click  to change the volume view to a 1-up image and display a vessel probe view.

2. Click  located under Vessel Tools.



3. Click and drag to draw a length measurement between two points on the vessel.
4. Click and drag either end to edit the length.

The value of the length displays at the proximal end of the length measurement. It represents the length along the centerline between the two specified points.

Create Centerline Angles

The Angle tool creates an angle along the centerline.

1. Click  to change the volume view to a 1-up image and display a vessel probe view.

2. Click the dropdown for the first button located under Vessel Tools.



3. Select  .
4. In the curved view, click and release to start the angle.
5. Move the cursor to the vertex location on the centerline and click and release.
6. Move the cursor to the end point of the angle and click and release to complete the angle.

Manually Measure a Stenosis

1. Probe the vessel.
2. Scroll until the center cross-sectional inset view displays the stenosed area.

TIP: Use the blue line in the CPR view and the blue dot in the 3D view as a guide.

3. In the cross-sectional inset view, draw the ruler measurement.

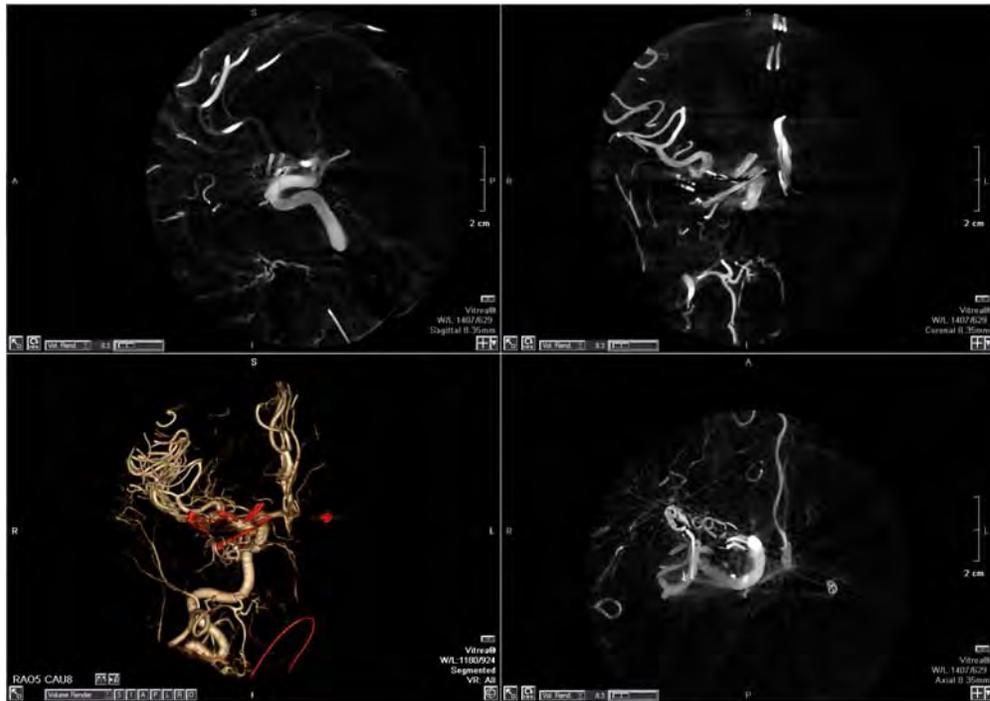


NOTE: In order to get similar stenosis measurements as the Lesion tool, be sure to place the measurement at the place of smallest diameter in the cross-sectional inset view.

4. Scroll until the center cross-sectional inset view display a reference area.
5. In the cross-sectional inset view, draw another ruler.
The stenosis measurement displays in the CPR view.

MPR Imaging

With most 3D view format options, three MPR (Multi-Planar Reformatted) images also display in the Viewer window along with the 3D view.



In Orthogonal MPR mode the three MPR images lie in sagittal, coronal, and axial planes. The border color indicates the plane the image lies in while the colors of the crosshairs indicate the other two MPR views.

Orienta tion	Border	Crosshairs	Label s
Sagittal	Blue	Vertical: Green (coronal) Horizontal: Red (axial)	A-P S-I
Coronal	Green	Vertical: Blue (sagittal) Horizontal: Red (axial)	S-I R-L
Axial	Red	Vertical: Blue (sagittal) Horizontal: Green (coronal)	A-P R-L

Scroll Through MPRs

Scroll through the MPRs to view multiple images within the plane.

- Roll the mouse wheel in the view
- Right-click and drag in the view
- Press LEFT or RIGHT ARROW.

Maximize/Minimize (1-up/Return)

Maximize a view to full-screen size, then minimize to its original size.

1. To maximize the view to 1-up, click  in the lower left corner.
2. To minimize the view to its original size, click  in the lower left corner.

Rotate MPRs

Rotate the placement of the three MPR views.

- Click  in the lower left corner of an MPR view.

TIP: Use this to switch MPR views in 1-up MPR viewing.

MPR Rendering



Select MPR rendering modes to change the appearance of the MPR views.

1. Click the MPR rendering dropdown.
2. Select a rendering option.



MPR Thickness

Create “mini-slabs” of MPR views containing multiple slices.



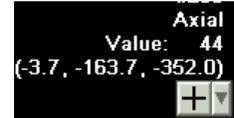
- Click and drag the thickness slider to the desired value.

TIP: If Crshair is active, the MPR views display a dashed line on either side of the crosshairs to indicate the thickness of the slab.

TIP: For best results, verify the MPR rendering is set to MIP.

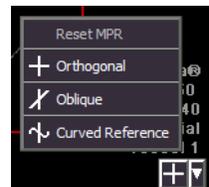
MPR Imaging Modes

There are three imaging modes for MPR views. The MPR views include a button in the lower right corner. The icon on the button indicates the current mode.



Mode	Description
 Orthogonal	The three MPR views display in exactly the sagittal, coronal, and axial planes.
 Oblique	One or more MPR views display in an oblique plane. Useful for features that lie in a plane other than one of the orthogonal planes.
 Curved	Curved MPR mode creates curved multi planar images.

Switch modes by clicking the button, or click the dropdown arrow next to the button and select the mode.



Oblique MPR Mode

In Oblique MPR mode, change orientation of the MPR views by rotating the crosshairs in one or two of the MPR views.

1. Right-click in the view, then click .
2. In one of the MPR views, position the cursor over one of the crosshairs .
3. Drag the crosshair in the view while watching the other views.

TIP: The MPR view where you rotate the crosshairs will not change planes. This action rotates the other two MPR views.

TIP: As you drag, the crosshairs rotate around their intersection point, staying perpendicular to each other.

TIP: You can rotate crosshairs in more than one view.

TIP: To move the crosshair intersection point, click the spot where you want the crosshair to intersect.

3D Crosshairs

To change images displayed in the MPR views, move the 3D crosshairs in a 3D view to a new position. As a result, MPR views update to display slices corresponding to the 3D crosshairs intersection.

1. Select the **3D Crosshair** check box.
2. Click in the 3D image at the new location.

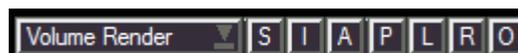
3D Imaging

The 3D volume views can be viewed from the outside or inside. Turn them and view them from any angle, trim them, add arrows and much more.



Volume Render and Rotation

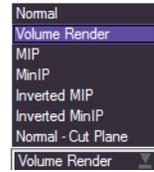
Click the rotation shortcut buttons at the bottom of the 3D view to rotate the image.



- **S**uperior
- **I**nferior
- **A**nterior
- **P**osterior
- **L**eft
- **R**ight
- **O**blique

Use the **Volume Render** dropdown to change the appearance of the 3D view.

1. Click the **Volume Render** dropdown.
2. Select a volume rendering option.



Volume Measurements

To measure the volume of a 3D region, first segment the region and display a surface.

1. Segment the anatomy to measure.
2. Rotate the 3D view to verify the surface is accurately defined.
3. If necessary, edit the region.
4. In the Anatomy Management area, right-click the region and select **Show Volume**.

TIP: The volume measurements display in the 3D view.

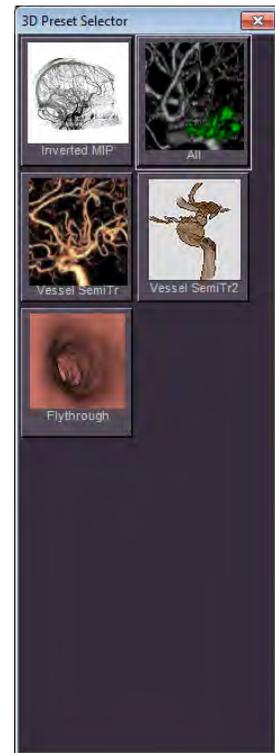
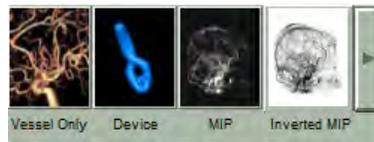
Region Volume (cc)		Average HU
Base	10805.5	-298.0 +/- 446.0

Visibility Settings

Visibility options control how 3D images display in region segmentation. Apply visibility options to all regions or to a single region.

Apply a visibility scheme to all regions:

1. Click one of the preset visibility options, or click the dropdown arrow to display a panel of additional choices.



Change the color of a single region:

1. Select the region in the Anatomy Management list.

2. Click the **Options** dropdown.



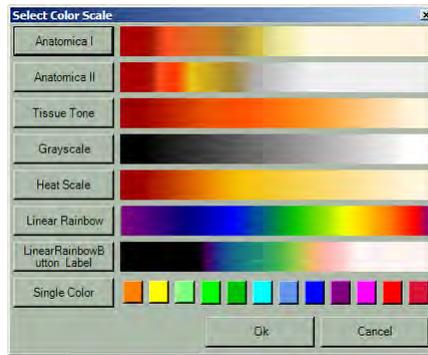
3. Select **Change Colors**.

4. Double-click a preset.

OR



Click  to select from a menu of color gradients or solid colors.



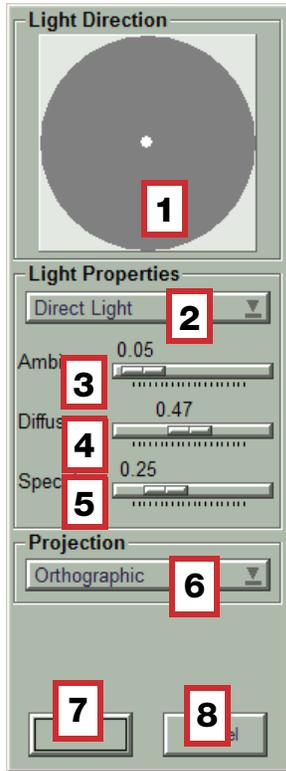
Apply window/level settings to a single region:

1. Select the region in the Anatomy Management list.
2. Right-click in the view, then click .
3. Click and drag in the view to adjust the window/level settings for the region.

Lighting

Lighting illuminates an image to allow you to see it more clearly.

4. Click  to display the lighting menu.
5. To change the background color:
 - a. Select **3D Background Color**.
 - b. Select a color from the color palette.
6. To change the lighting options, select **Lighting Options**.



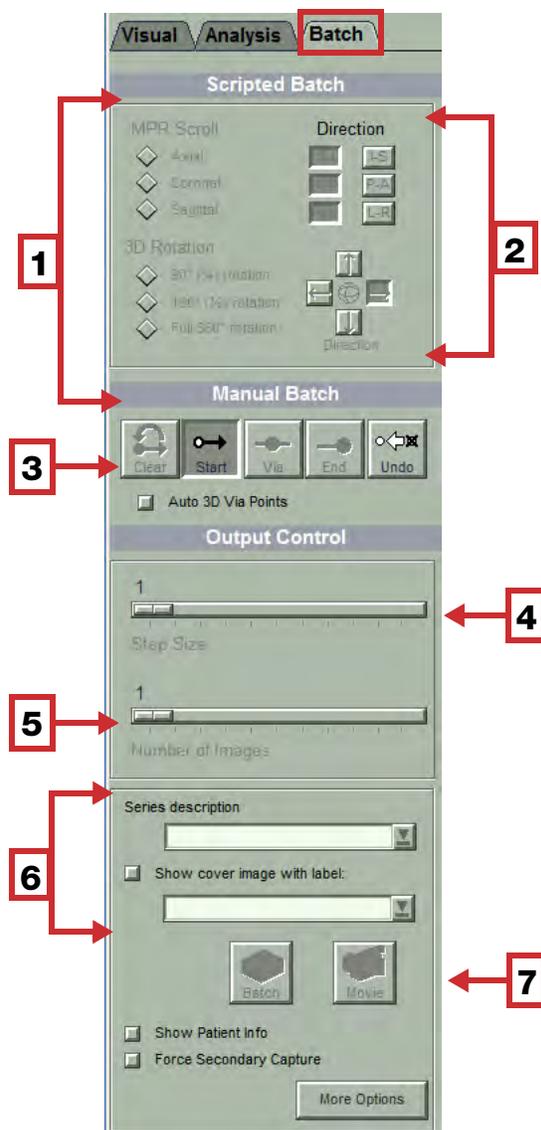
Callout	Description
1	Light Direction control — Drag the white dot to adjust the direction of the light source.
2	Light Properties dropdown menu — Select a light properties option.
3	Ambient slider — Adjust the ambient light.
4	Diffuse slider — Adjust the diffuse light.
5	Specular slider — Adjust the specular light.
6	Projection dropdown menu -- Select a field-of-view option.
7	OK button — Accept the changes.
8	Cancel button — Cancel the changes.

Image Batches and Movies

Make batches of 2D, MPR, and 3D images. Batches can be printed or exported to a DICOM server. Like snapshots, they are stored on the Report window. Make image batches into digital movies.

Batch Tab Controls

Make batches and movies on the Batch tab of the Viewer window.



#	Description
1	Scripted batch controls
2	Directional controls for scripted batches
3	Manual batch buttons
4	The interval between images in the batch
5	Total number of images in the batch
6	Controls to add a series description and cover page for the batch
7	Controls for including/hiding patient info, forcing a secondary capture, creating a batch, and creating a digital movie

Manual 2D and MPR Batches

To make batches of 2D images, portions of MPR images, or oblique or curved MPRs, create a manual batch.

1. Set up the 2D or MPR view in the Viewer window the way the images should display in the batch.
2. Select the Batch tab.

TIP: The  button is activated.

3. In the view where you will create the batch, scroll to the starting point.
4. Click in the view.

TIP: A green check mark displays in the view.

TIP: The  button is activated.

5. Scroll to the ending point.
6. Click in the view.

TIP: In orthogonal or oblique MPRs, both of the other views display cross-reference lines showing the slices of the batch.

TIP: If desired, adjust the Step Size or Number of Images sliders.

TIP: To anonymize the batch or movie, clear the Show Patient Info check box.

TIP: If you make a mistake, click  to start over.

7. Click  **OR** .

Scripted 3D Batches

Create a rotating batch of 3D images based on the selected settings.

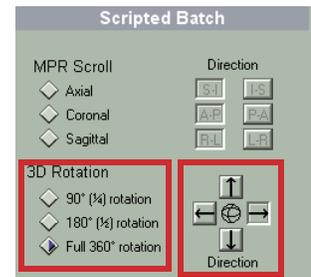
1. Set up the 3D view in the Viewer window the way the images should display in the batch.

TIP: Scripted 3D batches are available in fly-around and POI mode only.

2. Select the Batch tab.
3. In the Scripted Batch area, under 3D Rotation, select the degree of rotation.

4. Under Direction, select a rotation direction.

TIP: To anonymize the batch or movie, clear the Show Patient Info check box.



5. Click  **OR** .

Manual 3D Batches

For 3D rotations in varying directions, or for fly-throughs, create a manual batch. Select starting, intermediate, and ending images, and Vitrea adds images in between to create smooth transitions.

1. Set up the 3D view in the Viewer window the way the images should display in the batch.

2. Select the Batch tab.

TIP: The  button is activated.

3. In the 3D view, rotate or scroll to the starting point.
4. Click in the view.

TIP: A green check mark displays in the view.

TIP: The  and  buttons are activated.

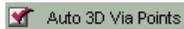
5. For rotation batches, rotate view in desired direction.

OR

For fly-through batches, begin flying.

6. Press ALT and click in the view to capture an intermediate image.

TIP: For fly-through batches, check the Auto 3D Via Points check box

 to capture intermediate images.

7. Repeat steps 5 and 6 until you have captured all intermediate images.

8. Click .

9. Click in the view.

TIP: To anonymize the batch or movie, clear the Show Patient Info check box.

TIP: If you make a mistake, click  to start over.

10. Click  **OR** .

Annotate Batches

Add a series description that displays in the Report window and when the batch is exported.

1. In the **Series description** field, enter a value.

OR

Select a value from the dropdown.

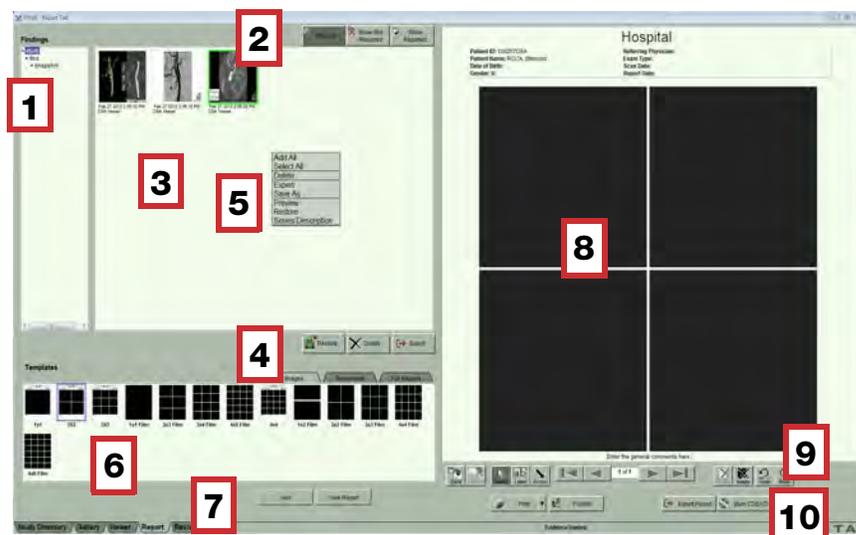
Add a cover page with a label to the front of the batch or movie.



2. Select the **Show cover image with label** check box.
 3. Add a value to the field.
- OR**
- Select a value from the dropdown.

The Report Window

Vitreia Advanced saves snapshots, batches, and movies you create to the Report window. From here, create and distribute reports.



Callout Number	Description
1	Findings list
2	Filtering buttons
3	Findings tray
4	Findings management buttons
5	Findings management right-click menu
6	Template Layouts

Callout Number	Description
7	Templates buttons
8	Report page
9	Report tools and navigation buttons
10	Report distribution buttons

 See the Distribute Findings section of the 3D-Angio Workflow for information on distributing findings.

XA 3D-Angio Overview

The XA 3D-Angio application is used for visualization and analysis of reconstructed 3D X-ray angiography images acquired from X-ray systems. The application includes the following features:

- A standard DICOM XA interface for transfer of 3D images from the X-ray system to Vitrea.
- Automatic study notification (VitreaWorkstation only) when a new study is available for review.
- A Digital Subtraction Angiography (DSA) protocol with preset visualization settings for 3D evaluation of vessels, along with fused views of vessels and device/bone.
- An unsubtracted Digital Angiography (DA) protocol provides preset visualization settings for 3D evaluations of vessels and optimal settings for vascular tool set.
- A Low Contrast Imaging (LCI) protocol to better visualize soft tissue densities in target anatomy or pathology.
- Standard 3D tools for working with the datasets, plus the use of Vessel Probe (separately licensed) on the DSA images for creating centerlines and vessel measurements.
- A display of clinical angles (CRA or CAU, RAO or LAO), which update as you rotate the volume view.
- An ability to transfer, with a single click, these clinical angles back to the X-ray system for C-arm positioning (only for Toshiba Infinix labs).
- Standard archival tools for saving, exporting, and printing the 3D acquisition with movies, batches, and snapshots.

Before you load a volume in VitreaAdvanced, you must use the X-ray angiography equipment to convert and transfer the data. Images are originally acquired as 2D DA Rotation images in the X-ray angiography station and then reconstructed as 3D-Angio volumes. They are identified in the Study Directory with an **XA** modality code.



CAUTION: 3D-Angio is intended for use only as a supplement to standard methods of interpreting radiological images. It should not be exclusively relied upon in arriving at a diagnosis, treatment plan, or other decision that may affect patient care.

Recommended Acquisition Parameters

Refer to Toshiba documentation.

Except for the specifications listed in the Toshiba documentation, no special patient preparation is needed to create angiograms for use in VitreaAdvanced.

Neurovascular studies often consist of multiple scans for images of:

- vessels
- vessels and bone
- implanted devices

3D-Angio receives the reconstructed vessel only or vessel and device images (which are combined to create one fused image). Vessel only visualization or vessel and device visualization are dependent on data transfer mode from the Toshiba imaging system.

VitreaAdvanced verifies the images belong to the same study before combining them.

NOTE: If you have trouble receiving and loading 3D-Angio images, contact your System Administrator.

NOTES:

- Select one study that displays XA in the modality column
- 3D-Angio is not available for any other modalities.
- Load one study at a time for 3D-Angio.

NOTE: You may find that loading fused images provides the best MPR viewing, while loading vessels and device volumes separately and manually fusing them (See “Multi-Volume Fusion” on page 45) provides the best 3D viewing.

The XA 3D-Angio Application is comprised of the DSA/DA Workflow and the LCI Workflow.

DSA/DA Workflow

Contents

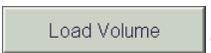
- I** Select Study
- II** Choose Protocol and Preset
- III** Perform Analysis
 - Sculpt Unwanted Data
 - Examine the MPRs
 - Isolate Each Region in the 3D View
 - Examine Areas Using Point-of-Interest View Mode
 - Make Note of the Clinical Angles
 - One-click Export of Clinical Angles
 - Take Snapshots
 - Create a Scripted 3D Batch
- IV** Distribute Findings
 - Export Images to a PACS Device
 - Export Images to an Infinix Workstation
 - Export Images to an Axiom Artis Workstation
 - Save Images to Local Computer - VitreaWorkstation only
 - Create and Distribute a Report
 - Restore Workflow

DSA/DA Lesson

I. Select Study

NOTE: Before you load a volume in XA 3D Angio, you must use the X-ray angiography equipment to convert and transfer the data. Images are originally acquired as 2D DA Rotation images in the X-ray angiography station and then reconstructed as 3D-Angio volumes. They are identified in the Study Directory with an **XA** modality code.

To load a DSA/DA Study:

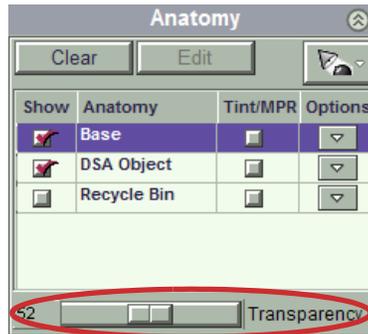
VitreaWorkstation		Vitrea Enterprise
1	From the Study Directory, select a converted study with XA in the modality column.	
2	From the open folder, select a series.	In the Series tab, select a series to load.
3	Click  .	Click  (Advanced Diagnostic users). OR Right-click and select Load in Advanced Viewer (Diagnostic users). 

II. Choose Protocol and Preset

1. On the Gallery window, select the DSA protocol:
 - **DSA** (Digital Subtraction Angiography) — Fused volume
 - **Legacy DSA** — Used for older studies

NOTE: For DA (unsubtracted) vessel studies, select the **DA** protocol.

5. With **Base** region selected in the Anatomy Manager, adjust the **Transparency** slider to better visualize the DSA Object.



6. Remove fragments if necessary:

- a. Click .
- b. Adjust the size of fragments to be removed by clicking or .
- c. In the Remove Fragments dialog box, click .

Examine the MPRs

7. Click in the 3D view to minimize.
8. In an MPR view, adjust the **Thickness** slider to the size of the vessels you want to view.



9. Select the **Tint/MPR** check box for the DSA Object region.
10. Scroll through the MPRs and add labels or rulers as needed.
11. If desired, right-click on label or ruler and select **Show in 3D** to make it visible in the 3D view.



Isolate Each Region in the 3D View

12. Clear the **Show** check box in the **Base** region to display only the DSA Object region.



OR

- Clear the **Show** check box in the **DSA Object** region to display only the Base region.

Examine Areas Using Point-of-Interest View Mode

The POI (Point-of-Interest) View mode shows the volume immediately surrounding the current crosshair position. Use this mode to remove all surrounding tissue, bone, and so on, to reveal the point of interest.

13. Activate the POI mode in one of two ways:



5:1 format — Select the 5 on 1 Viewer window format button.

The upper-left view is the POI view.



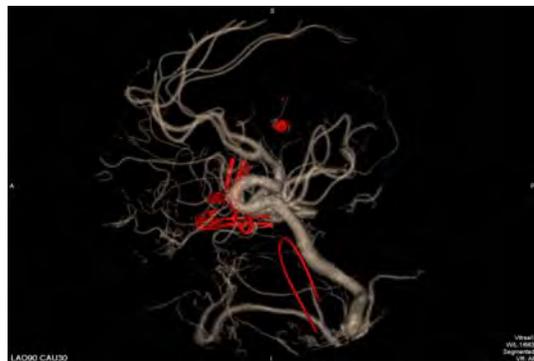
POI Mode — Click the View Mode button in the lower-right corner of the 3D view until it displays the POI mode icon.

14. Click the crosshair on the anatomy of interest in 2D.
15. In the POI view, right-click and drag the mouse away from you to decrease the size of the POI cube; move the mouse toward you to increase.

Make Note of the Clinical Angles

16. Rotate the 3D View, making note of the clinical values displayed in the lower left corner of the view.

- The first value indicates Right Anterior Oblique or Left Anterior Oblique.



- The second value indicates Cranial or Caudal.



TIP: Click the Rotation shortcut buttons at the bottom of the view to rotate the image:

- Superior
- Inferior
- Anterior
- Posterior
- Left
- Right
- Oblique

NOTE: A clinical angle value displayed in red indicates that the rotation is out of range for the C-arm.

TIP: To reset the view to a 0-degree twist angle, click .



CAUTION: If patient positioning at the time of acquisition varies from patient positioning at the time of implementing the clinical angle values for intervention, the resulting fluoroscopic view on the Toshiba workstation may not be representative of the angles at the time of acquisition.

NOTE: If the Toshiba Angio system is not calibrated correctly, a 3D “X” will display under the reconstructed image. This indicates that the 3D image may not be properly positioned in space and may not provide accurate anatomical position.

NOTE: You can manipulate a 3D-Angio dataset into an infinite number of global orientations. The angiographic positioner apparatus is not always capable of reproducing the 3D view as displayed in VitreaAdvanced.

EXAMPLE: View an aneurysm in VitreaAdvanced at a cranial angle of 65 degrees. The maximum cranial angle set on the positioner is 50 degrees.

One-click Export of Clinical Angles

Export clinical angles to a pre-defined XA or DICOM device.

17. Click .



VitreAdvanced takes a snapshot of the 3D view that includes the clinical angles, and exports it to the pre-defined XA device.

TIP: To select the device, click the dropdown..



TIP: Contact your System Administrator for information on configuring the export location.

Take Snapshots

18. Right-click in the view and click .

19. Click in the view.



Create a Scripted 3D Batch

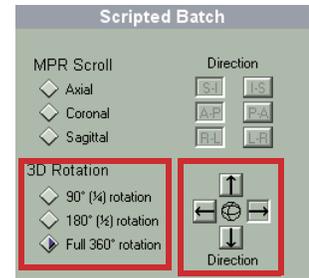
Create a rotating batch of 3D images based on the selected settings.

20. Select the **Batch** tab.

21. In the Scripted Batch area, under 3D Rotation, select the degree of rotation.

22. Under Direction, select a rotation direction.

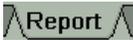
TIP: To anonymize the batch or movie, clear the Show Patient Info check box.



23. Click  OR .

IV. Distribute Findings

The snapshots, batches, and movies you save in the Viewer window are saved to the Report window.

1. Select  at the bottom of the window.

Export Images to a PACS Device

Export snapshots directly to PACS without creating a report first.

2. Press CTRL and select the images, then click .

3. In the dialog box, select a DICOM Server, then click .

Export Images to an Infinix Workstation

NOTE: VitreaAdvanced needs to be configured to export to Infinix workstation. Contact your System Administrator for more information.

1. Press CTRL and select the images, then click .

2. In the dialog box, select the Infinix workstation, then click .

Export Images to an Axiom Artis Workstation

NOTE: VitreaAdvanced needs to be configured to export to Axiom Artis workstation. Contact your System Administrator for more information.

1. Press CTRL and select the images, then click  .
2. In the dialog box, select the Axiom Artis workstation, then click  .

Save Images to Local Computer - VitreaWorkstation only



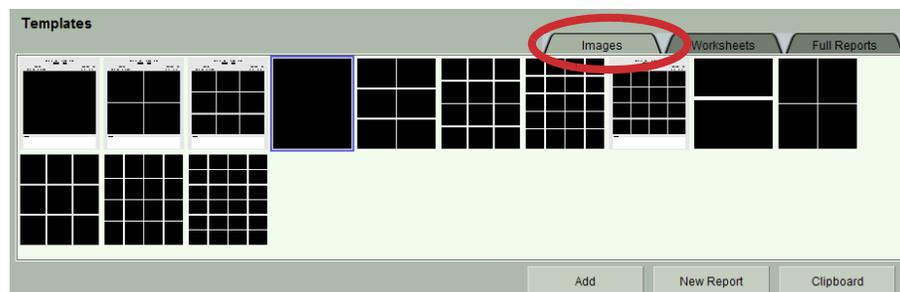
CAUTION: Be careful when saving and working with these types of images. Patient information is not included on the snapshot. It is possible to misrepresent or confuse these kinds of snapshots.

1. Right-click the snapshot thumbnail.
2. Select **Save As**.
3. In the dialog box, indicate the file location, file name, and file type.

Create and Distribute a Report

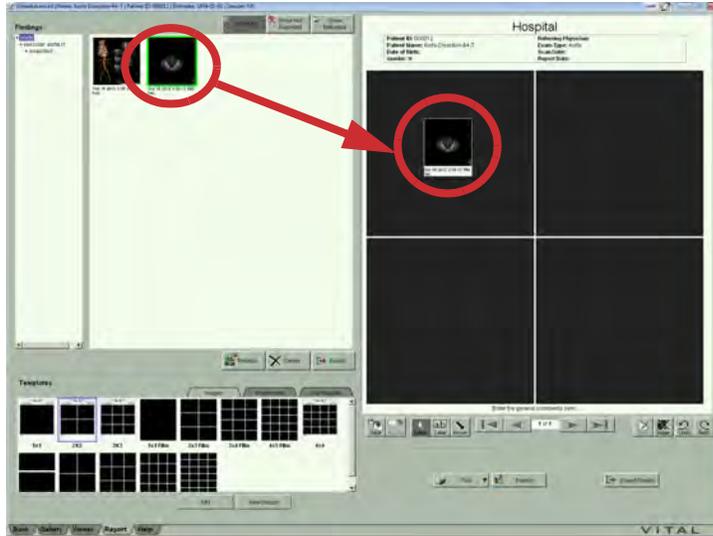
Create a report to print, post to your institution's intranet, or export to a DICOM server.

1. In the Templates section, select the Images tab.



TIP: You may select a worksheet from the Worksheets tab or a full report from the Full Reports tab.

2. Select a template and click **Add**.
3. To add snapshots, batches, or movies, drag the thumbnail to an image area of the report.



TIP: To replace an image in one of the frames, drag and drop a different thumbnail on top of it.

4. Drag thumbnails from the Findings tray and drop into the image panes in the report.
5. Distribute the report:

Click	To
 Print	Print the report to a standard or DICOM printer.
OR	TIP: You may need to click the dropdown arrow to toggle between buttons.
 DCM Print	
 Export Report	Export the report to a DICOM server.
 Burn CD/DVD	Burn the report to a CD or DVD.
	TIP: This feature is only available on VitreaWorkstation.

Restore Workflow

From the Report window, restore a snapshot for the currently loaded volume to the Viewer window. Or, from the Study Directory, restore a Snapshot for an unloaded volume directly from the Preview pane. Use this feature to return to a saved image for further investigation.

When you restore a saved image to the Viewer window, the “workflow” is also restored. The workflow includes images of the patient volume and the state of the Viewer window at the time the image was saved, including:

- Selected protocol and preset
- Visual settings at the time you took the snapshot
- Viewer window format
- 3D or MPR mode(s)
- Any labels, rulers, and arrows
- Any segmentation or calcium scoring results

NOTE: Findings with  in the lower-right corner are not restorable.

NOTE: Batches and movies are not restorable.

NOTE: In order to restore a snapshot saved using a licensed option, a license for that option must be available.

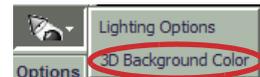
NOTE: Restore workflows from snapshots saved for the currently loaded volume only. If you try to restore a snapshot from a volume that is not currently loaded, you will be prompted to load the volume first.

Additional Procedures

This section addresses some less common procedures you may need to do to complete your workflow.

Change the Background Color of the 3D View

1. Click .
2. Select **3D Background Color**.
3. Select a color from the color panel.
4. Click **OK**.



Sculpting in MPRs

Sculpt in the MPR views to isolate or define anatomical structures.

1. In an MPR view, scroll to find the beginning point of the area to define.

TIP: Maximize (1-up) the MPR view to magnify the view.

2. Right-click and select .
3. Click and drag to draw a closed shape around the area to define.
 - Click, hold, and drag to draw a true freehand contour.
 - Click, release, and drag to draw a contour that attempts to define the edge of the region (based on data values).

TIP: To aid drawing the automatic contour, click along the region to drop anchor points.

4. Scroll a few slices, then repeat step 3.

NOTE: Interpolated contours between automatic contours are truly interpolated and do not necessarily follow the edge of the region. Edit interpolated contours if necessary.

5. Continue to scroll and draw until you reach the last slice displaying the region.

TIP: VitreaAdvanced displays a colored surface on the 3D view.

6. If you had the MPR maximized, minimize it to see the 3D view.
7. Rotate the 3D view to verify that the surface contains the whole area to sculpt.
8. Verify the correct region name is listed in the Region dropdown, then click .

TIP: Click the dropdown to change the region.

Probing Vessels

Examine the vessels and display a curved reference view by performing Vessel Probe.

1. In the Vessel Probe area, click .
2. Click the vessel.

TIP: Vitrea adds a listing to the Vessel Management area.

TIP: If the probe tool did not select enough of the vessel, extend it:

- a. Click .
- b. To extend the vessel, click a point farther along the already selected vessel.
- c. To shorten the vessel indicator line, move the cursor along the vessel indicator line to a desired end point and click.

NOTE: As you drag the cursor, the vessel indicator line disappears. It will not be removed until you click.



See the Introduction to VitreaAdvanced section for more information on Vessel Probe tools.



CAUTION: Review the automated centerline for accuracy and correct it if necessary.

LCI Workflow

Use the LCI protocol for studies when extra bone detail is needed (kyphoplasty, for example).

LCI acquires more projections throughout the same acquisition arc. The additional projection data create a 3D Volume capable of distinguishing down to 10 HU. This allows you to better visualize subtle soft tissue density differences.

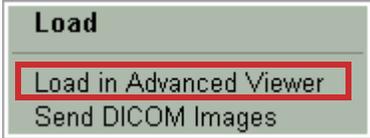
Contents

- I** Select Study
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LCI Lesson

I. Select Study

To load a LCI Study:

	VitreWorkstation	Vitre Enterprise
1	From the Study Directory, select a converted study with XA in the modality column.	
2	From the open folder, select a series.	In the Series Tray, select a series to load.
3	Click  .	Click  (Advanced Diagnostic users). OR Right-click and select Load in Advanced Viewer (Diagnostic users). 

II. Choose Protocol and Preset

1. On the Gallery window, select the LCI protocol.
2. Click  next to the 3D Analysis preset.

III. Perform Analysis

Sculpt Unwanted Data

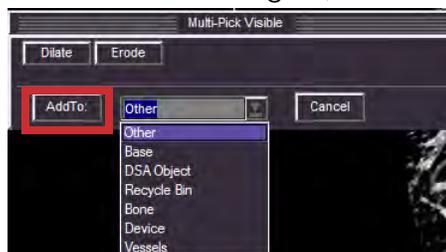
Examine the study in the 3D view and review the clinical angles.

1. Click  in the lower-left corner of the 3D view.
2. Click  .
3. Draw a contour around the area to sculpt.
4. In the 3D Sculpt dialog box, click **Remove**.



Segment Anatomy or Structures Using Visible Pick

5. Click  .
6. Click the anatomy or structure in the 3D or MPR view.
7. Click the drop down and select a region, then click **AddTo**.



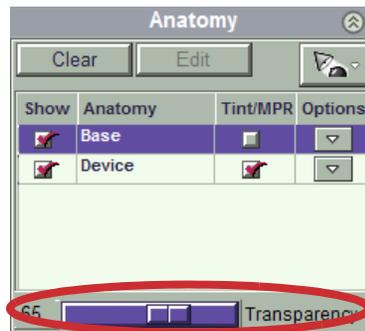
8. Select the **Tint MPR** check box for the region in the Anatomy Management area.



9. Right-click and select .

10. With **Base** region selected in the Anatomy Manager, click and drag in the view to adjust the window/level.

11. With **Base** region selected in the Anatomy Manager, adjust the **Transparency** slider to better visualize the anatomy or structure.



Create a Curved MPR of the Spine

In Curved MPR mode, use one of the MPR views to define a curve and display the reformatted (“flattened”) curve in another view.

12. In the lower-right corner of the sagittal view, click  twice until the icon shows .

TIP: The labels in the lower-right corner change to Reference, Curved, and Transverse.

13. In the lower-left corner of the reference view, click .

14. Roll the mouse wheel in the view until you see beginning point of the curve you want to define.

15. Click the endpoint of the green line and drag it to the beginning point of the curve.

16. Follow the curve by dragging the green line to various points along the center of the anatomy.

TIP: A green X displays where you place the green line.

TIP: Use the mouse wheel to scroll up and down in the view to follow the center of the anatomy.

17. Continue along the entire curve.

18. Click the endpoint of the green line and drag it to the end of the curve.

19. Click  in the lower left corner of the view.

20. In lower-left corner of the Curved view, click .

21. Review the centerline to be sure it follows the center of the curved region.

TIP: If necessary, click and drag the centerline to reposition it.

22. To measure the distance between two points, drag one or both of the perpendicular lines along the centerline to measure.

TIP: The measurement between the two lines and the measurement of the entire centerline display.

23. To rotate the curved view along the centerline, click and drag in the view.

Display the Clinical Angles

24. Rotate the 3D View, making note of the clinical values displayed in the lower left corner of the view.

- The first value indicates Right Anterior Oblique or Left Anterior Oblique.
- The second value indicates Cranial or Caudal.



TIP: Click the Rotation shortcut buttons at the bottom of the view to rotate the image:

- Superior
- Inferior
- Anterior
- Posterior
- Left
- Right
- Oblique

NOTE: A clinical angle value displayed in red indicates that the rotation is out of range for the C-arm.

TIP: To reset the view to a 0-degree twist angle, click .

One-click Export of Clinical Angles

Export clinical angles to a pre-defined XA or DICOM device.

25. Click .



VitreaAdvanced takes a snapshot of the 3D view that includes the clinical angles, and exports it to the pre-defined XA device.

TIP: To select the device, click the dropdown..



TIP: Contact your System Administrator for information on configuring the export location.

Take Snapshots

26. Right-click in the view and click  .

27. Click in the view.



Create MPR Batches

Create MPR batches of all three planes (coronal, sagittal, and axial).

28. Select the Batch tab.

TIP: The  button is activated.

29. In the view to batch, scroll to the starting point.

30. Click in the view.

TIP: A green check mark displays in the view.

TIP: The  button is activated.

31. Scroll to the ending point.

32. Click in the view.

TIP: In orthogonal or oblique MPRs, the other views display cross-reference lines showing the slices of the batch.

TIP: If desired, adjust the Step Size or Number of Images sliders.

TIP: To anonymize the batch or movie, clear the Show Patient Info check box.

TIP: If you make a mistake, click  to start over.

33. Click .

34. Repeat for the other planes if desired.

IV. Distribute Findings

The snapshots, batches, and movies you save in the Viewer window are saved to the Report window.

1. Select  at the bottom of the window.

Export Images to a PACS Device

Export snapshots directly to PACS without creating a report first.

2. Press CTRL and select the images, then click .

3. In the dialog box, select a DICOM Server, then click .

Export Images to an Infinix Workstation

NOTE: VitreaAdvanced needs to be configured to export to Infinix Workstation. Contact your System Administrator for more information.

1. Press CTRL and select the images, then click .

2. In the dialog box, select the Infinix workstation, then click .

Export Images to an Axiom Artis Workstation

NOTE: VitreaAdvanced needs to be configured to export to Axiom Artis Workstation. Contact your System Administrator for more information.

1. Press CTRL and select the images, then click  .
2. In the dialog box, select the Axiom Artis workstation, then click  .

Save Images to Local Computer



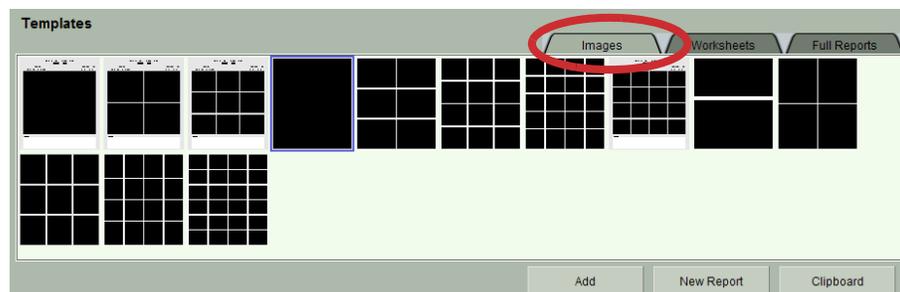
CAUTION: Be careful when saving and working with these types of images. Patient information is not included on the snapshot. It is possible to misrepresent or confuse these kinds of snapshots.

1. Right-click the snapshot thumbnail.
2. Select **Save As**.
3. In the dialog box, indicate the file location, file name, and file type.

Create and Distribute a Report

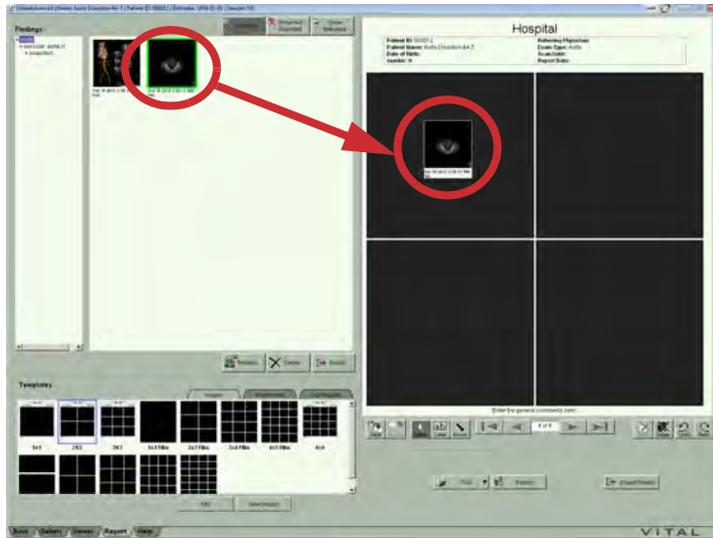
Create a report to print, post to your institution's intranet, or export to a DICOM server.

1. In the Templates section, select the Images tab.



TIP: You may select a worksheet from the Worksheets tab or a full report from the Full Reports tab.

2. Select a template and click **Add**.
3. To add snapshots, batches, or movies, drag the thumbnail to an image area of the report.



TIP: To replace an image in one of the frames, drag and drop a different thumbnail on top of it.

4. Drag thumbnails from the Findings tray and drop into the image panes in the report.
5. Distribute the report:

Click	To
 Print	Print the report to a standard or DICOM printer.
OR	TIP: You may need to click the dropdown arrow to toggle between buttons.
 DCM Print	
 DICOM Export	Export the report to a DICOM server.
 Burn CD/DVD	Burn the report to a CD or DVD.
	TIP: This feature is only available on VitreaWorkstation.

Restore Workflow

Restore your workflow from the point where you took a snapshot.

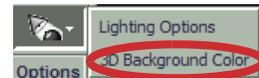
6. Select the snapshot, then click  Restore .

Additional Procedures

This section addresses some less common procedures you may need to do to complete your workflow.

Change the Background Color of the 3D View

1. Click .
2. Select **3D Background Color**.
3. Select a color from the color panel.
4. Click **OK**.



Sculpting in MPRs

Sculpt in the MPR views to isolate or define anatomical structures.

1. In an MPR view, scroll to find the beginning point of the area to define.

TIP: Maximize (1-up) the MPR view to magnify the view.

2. Right-click and select .
3. Click and drag to draw a closed shape around the area to define.
 - Click, hold, and drag to draw a true freehand contour.
 - Click, release, and drag to draw a contour that attempts to define the edge of the region (based on data values).

TIP: To aid drawing the automatic contour, click along the region to drop anchor points.

4. Scroll a few slices, then repeat step 3.

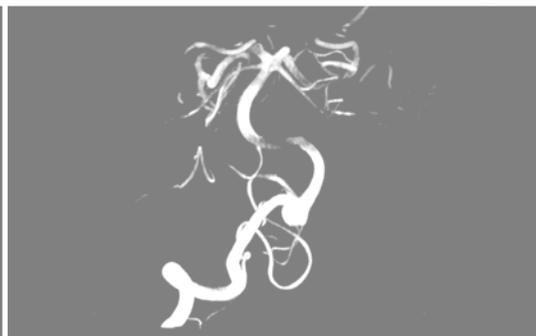
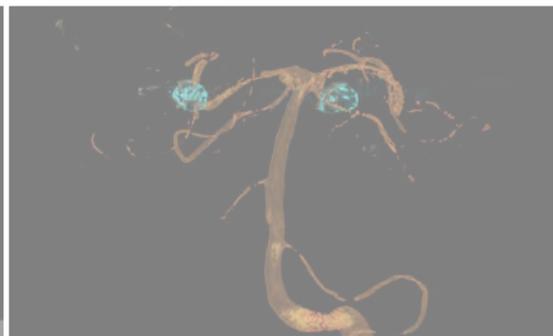
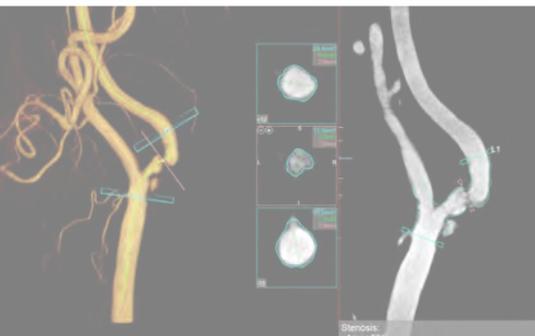
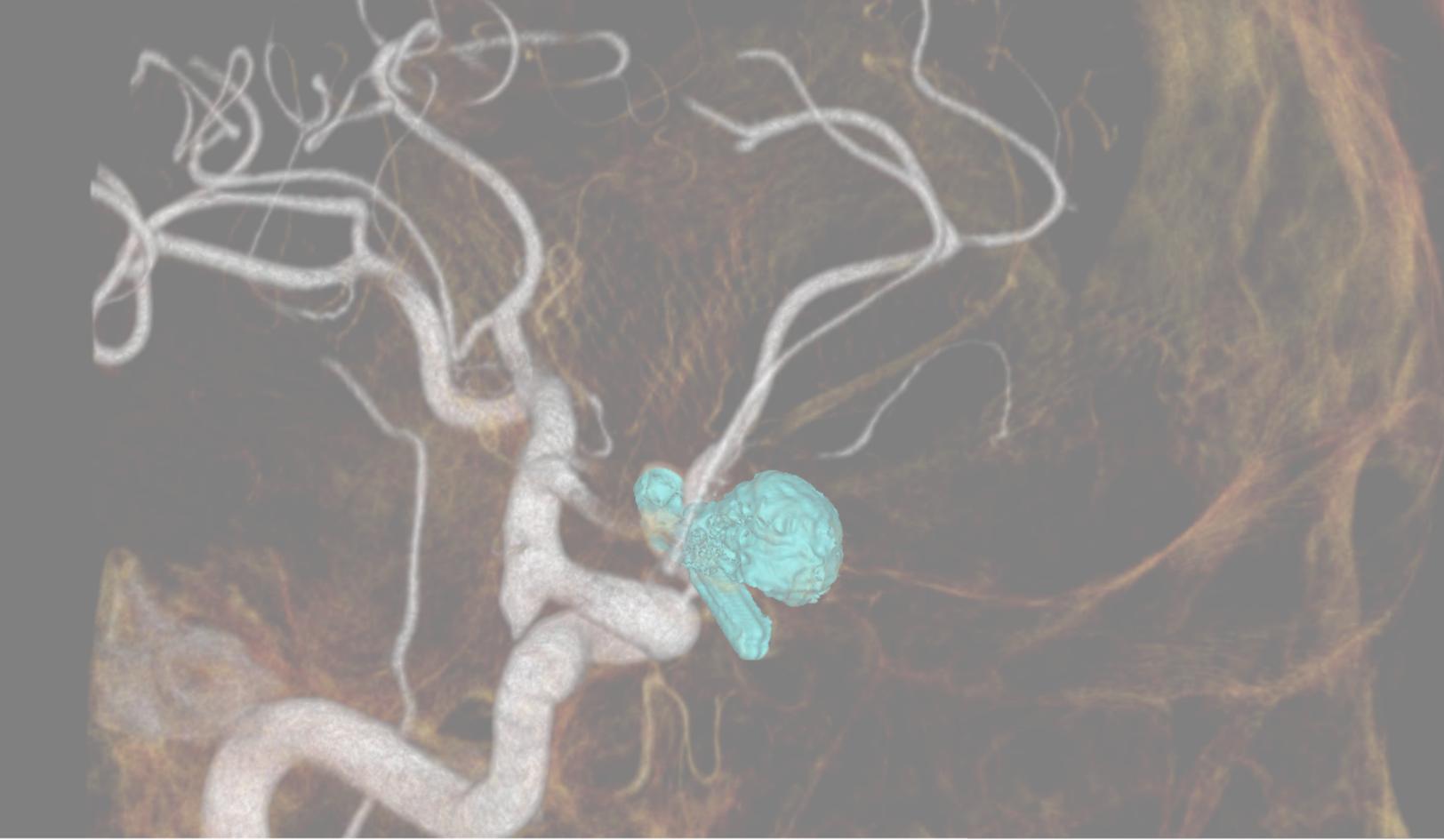
NOTE: Interpolated contours between automatic contours are truly interpolated and do not necessarily follow the edge of the region. Edit interpolated contours if necessary.

5. Continue to scroll and draw until you reach the last slice displaying the region.

VitreaAdvanced displays a colored surface on the 3D view.

6. If you had the MPR maximized, minimize it to see the 3D view.
7. Rotate the 3D view to verify that the surface contains the whole area to sculpt.
8. Verify the correct region name is listed in the Region dropdown, then click .

TIP: Click the dropdown to change the region.



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