Peripheral CTA

Peripheral CTA – Workflow Overview

Overview:

The Peripheral vessels can be post-processed in various ways. Auto Bone Removal and Vessel Grow provide a quick overview of the peripheral arteries. The Vessel Probe option segments and evaluates contrast-filled peripheral arteries. The software permits you to easily calculate arterial stenosis and plaque burden. A single-click changes the 3D from VR (volume rendered) to MIP. 3D batch rotations and snapshots are easily created for export to PACS.

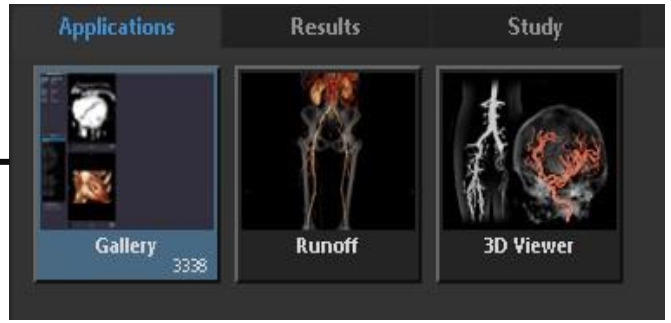
The Steps:

- Load the data, and select the **Vascular: Runoff CT** protocol on the Gallery page.
- Click **Automatically Remove Bone** on the Gallery page.
- Click **3D Analysis** and **Pick** to process. The **Viewer** tab displays the vessels.
- Click **Remove Fragments** to remove background noise.
- Click **Vessel Grow** and manually segment vessels when the HU density is too low for auto segmentation.
- Click **Vessel Probe** to segment and evaluate contrast-filled arteries.
- The **Lesion Tool** easily calculates vessel stenosis.
- **SURE Plaque** provides visualization of vascular lumen, vessel walls and plaque in the vessels.
- Click **Organ** tool to add the kidneys or additional anatomy.
- Create **3D Batch Rotation** with **Semi-Transparent Bone**.
- Create **3D Batch Rotation** in **MIP** rendering.
- Create and **Export** snapshots and batches.

Peripheral CTA – Load the Dataset from Study List

Select Patient

Double-click to select the application or single-click on thumbnail and then choose **open**.



Open

OR

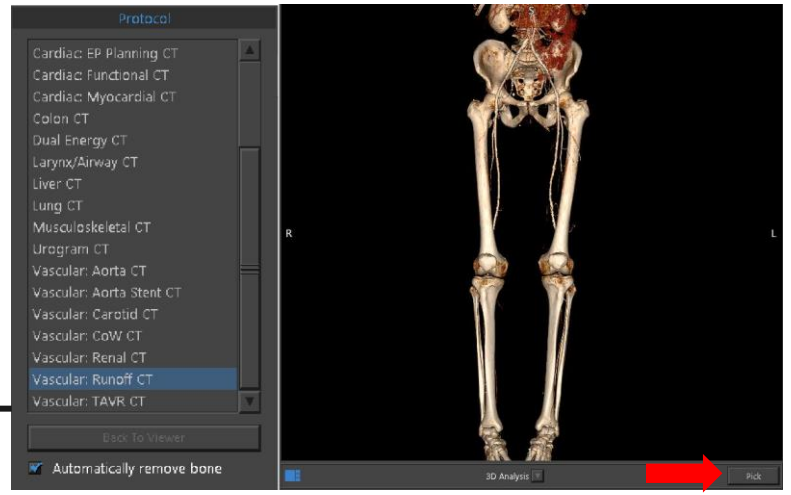
The series are located below the applications automatically. **Choose** the desired dropdown. **Double-click** the Runoff Application thumbnail.

Automatically Remove Bone is enabled.

Peripheral CTA – Option: Load Dataset from Gallery Application

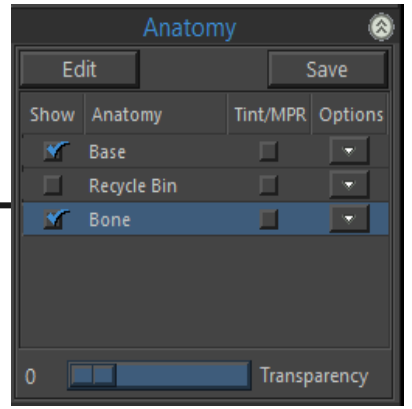
Select Protocol **Vascular Runoff CT**. Ensure Automatically remove bone is checked. Select 3D Analysis. **Click Pick**.

The Anatomy section displays the automatically segmented bone.



OR

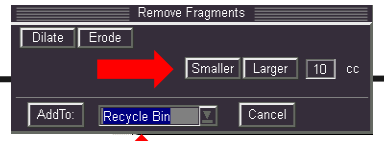
Select **Autobone** in the Segment Anatomy tools section.



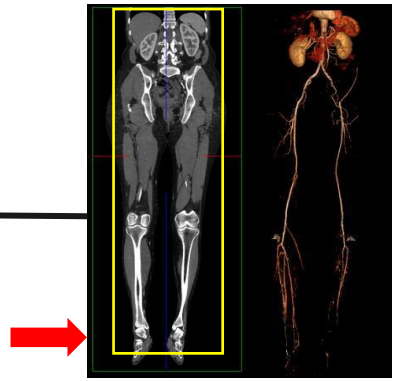
Peripheral CTA – Remove Fragments

Click **Trim**.
Click and hold the mouse on the base of the coronal image. **Drag the trim box** up to remove the lower legs.

Click **Remove Fragments.** To adjust the size of the fragments, click Smaller or Larger. Click **Add To** Recycle Bin.



Select **Trim**
Click and hold the mouse on the base on the coronal image. Drag the trim box down. View the Volume Rendered image.

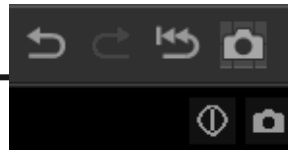


An easy way to remove fragments is to W/L upwards with your mouse.

Tip: Remove fragments could remove smaller vessels in the lower legs. You can prevent this from occurring with the above steps.

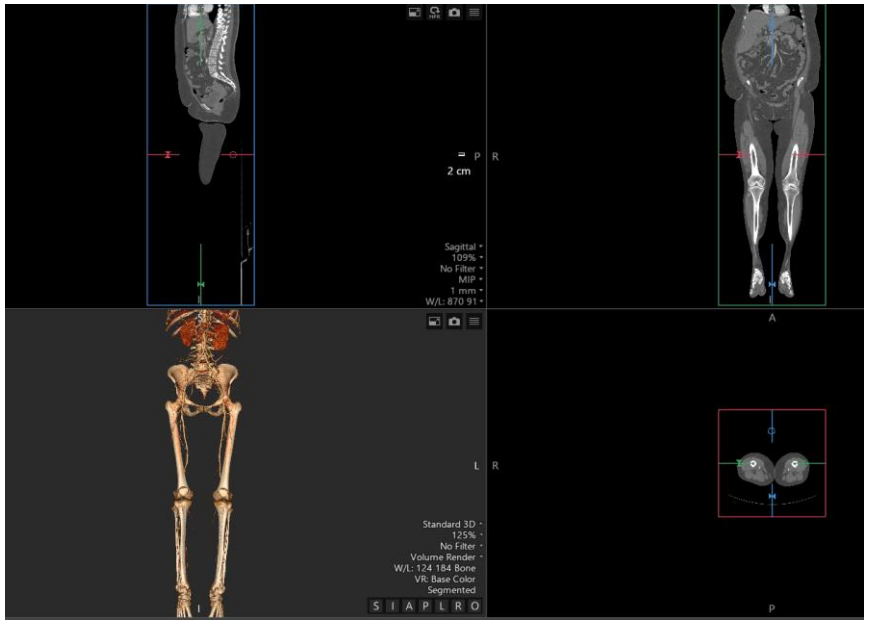
Peripheral CTA – Snapshot

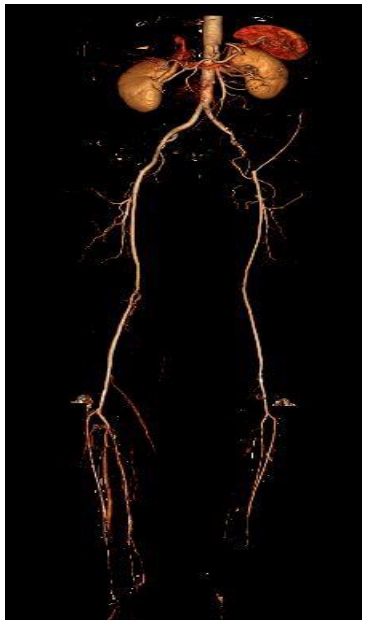
Select one of the **Camera options** at upper right of viewport or page to take a **snapshot.**



Full screen capture

Individual viewport

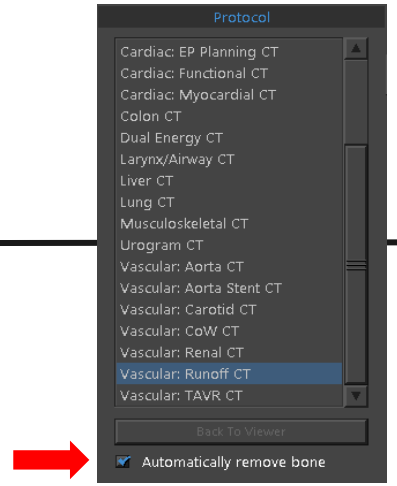


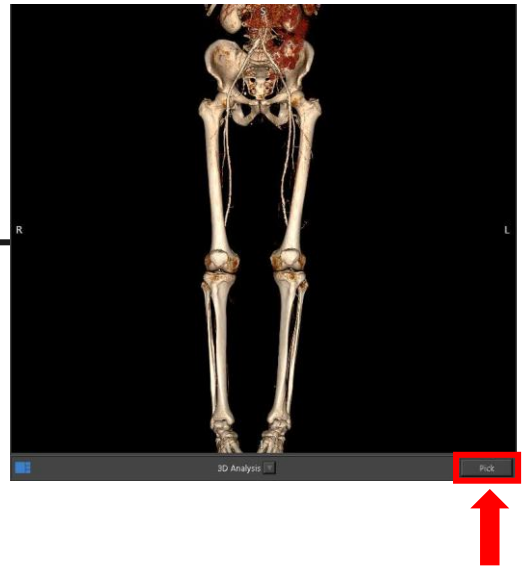


Tip: It is important to remember to take a snapshot. **Only a snapshot can be restored at a later date**. Once a snapshot is restored, you will be able to continue post-processing your image.

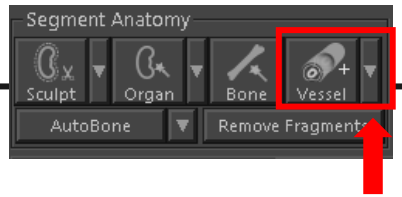
Peripheral CTA – Manual Vessel Segmentation

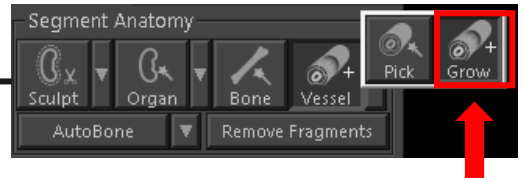
Return to the Gallery tab. Select Protocol **Vascular Runoff CT.** Clear Automatically remove bone. Select 3D Analysis. Click **Pick**.





Click the expand icon next to Vessel and **click Grow**.

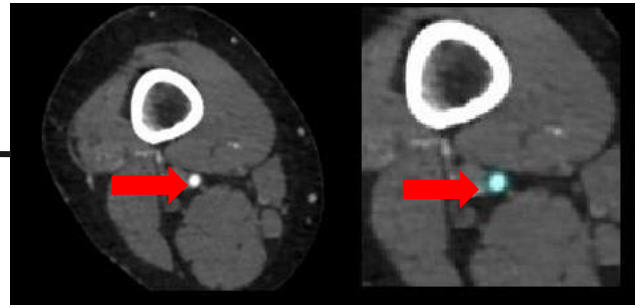




Tip: When the HU contrast density is too low, auto bone segmentation will not adequately display the vessels. You will need to manually segment the vessels.

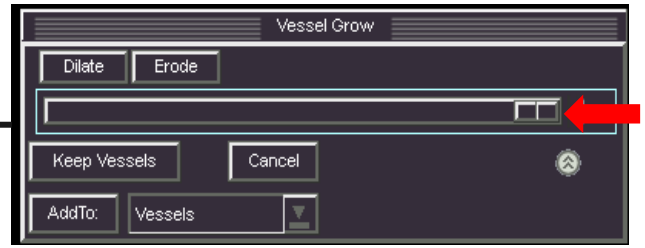
Peripheral CTA – Vessel Grow

Click and hold the circle on a vessel. Watch the selected area trace the vessel. Repeat for other vessels.



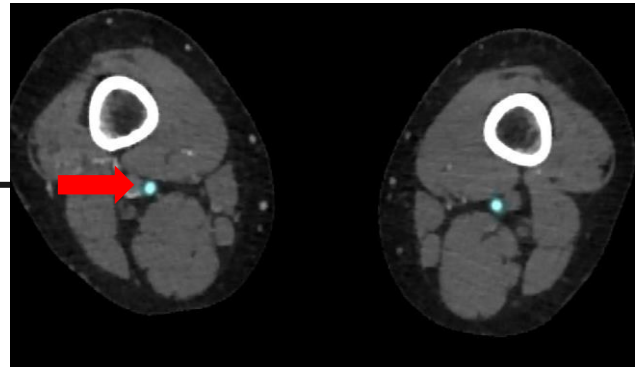
Verify the findings by holding down the right mouse and scrolling through the 2D data.

Click **Keep Vessels** or Add to Vessels.

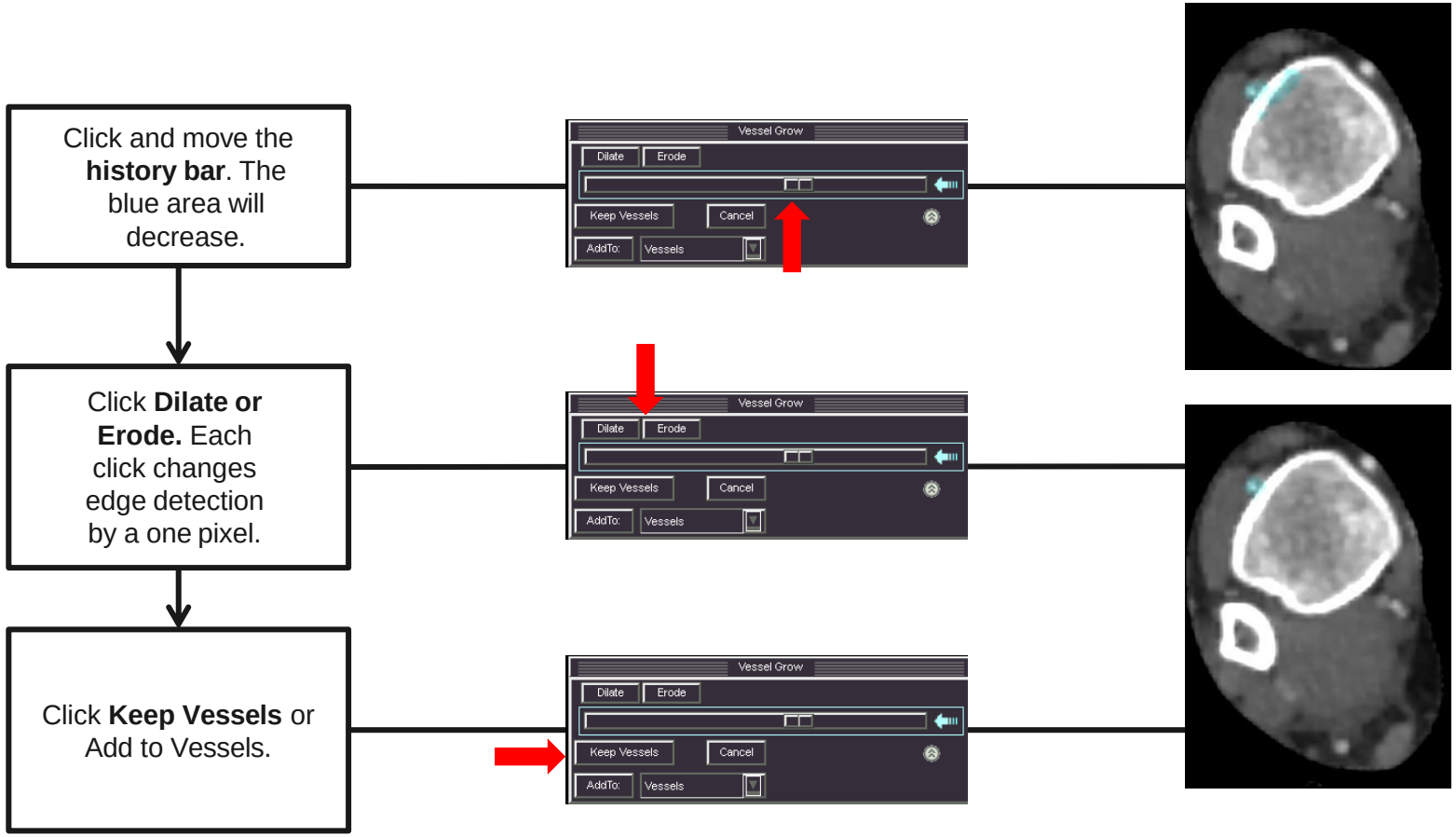


Move history bar to adjust the amount of contrast included.

All the **vessels** you select will be tinted blue.



Peripheral CTA – Vessel Grow Edits



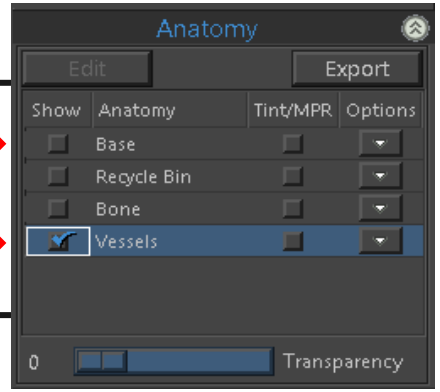
Tip: These steps will help edit the selected vessel area and remove the blue color from the unwanted anatomy. The example above is removing bone.

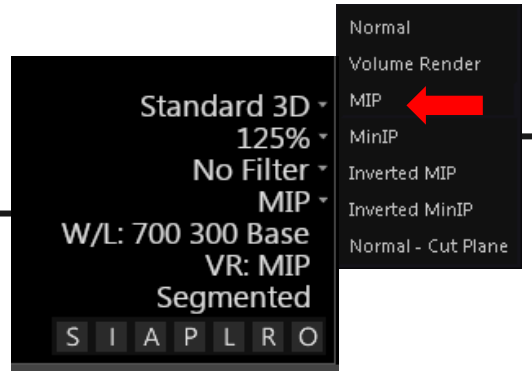
Peripheral CTA – VR and MIP

To view only the vessels, uncheck Show Base.

Click the **Vessels** category displayed in the Anatomy Management area.

To view the vessels in a **MIP view**, select MIP from the 3D dropdown rendering options.

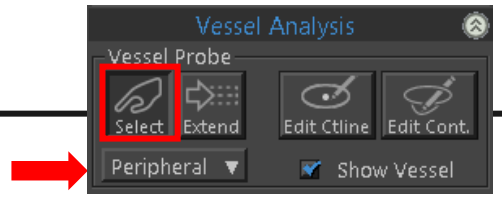


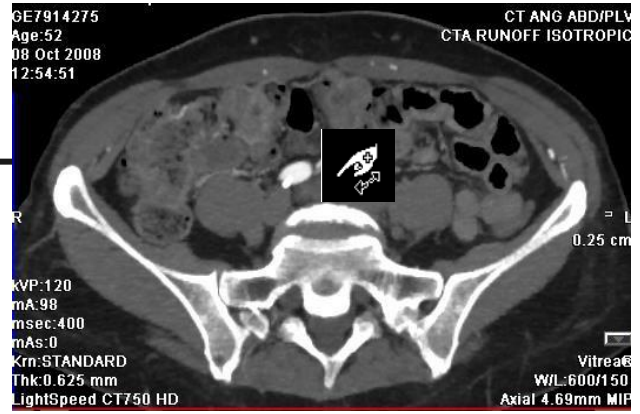


VR MIP

Peripheral CTA – Vessel Probe

Click Select under **Vessel Probe**. Review the correct **vessel type** is selected. Click on the vessel in the 2D or 3D image.

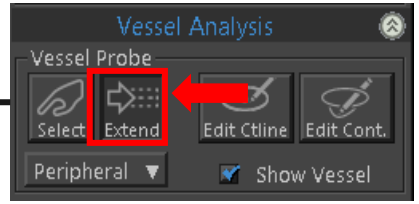




Vessel Probe will generate a centerline.

Click **Extend.**

Click proximal or distal on the 2D or 3D image. This extends the visualized vessel.



Extend will not go beyond the point you select.

Use this process to add any additional vessels.

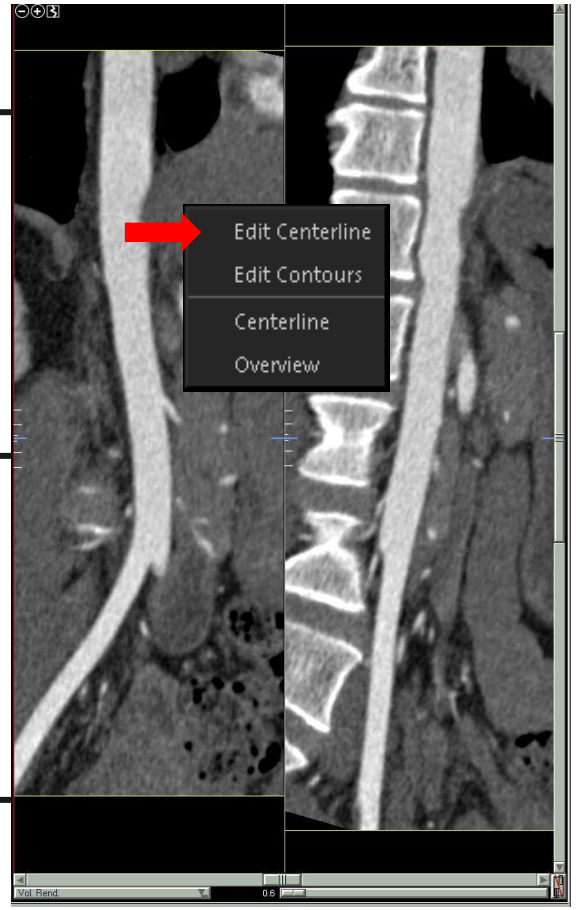
Tip: Vessel Probe provides an option to isolate and analyze the vessel lumen.

Peripheral CTA – Centerline Edits

Right-click in the CPR view. Click on Edit Centerline.

Click and deposit red points to adjust the centerline in either longitudinal view.

Click **Apply** to save the edits. Click **Close** to end.

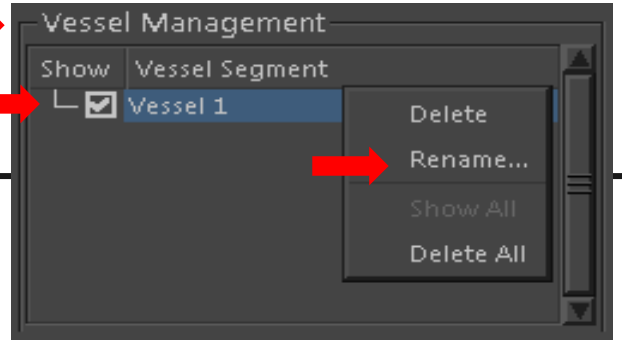


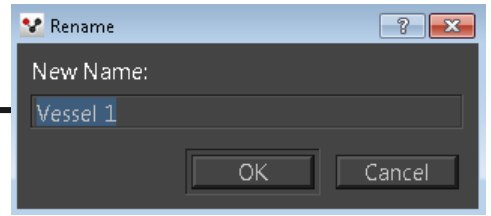
The **green line** is the centerline.

Click and drag the **red** corrected line to edit.

Peripheral CTA – Rename the Vessel

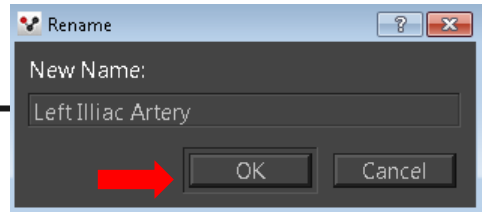
In **Vessel Management** - verify Show Vessel is selected.





Right-click on Vessel Segment. Select Rename. The **Rename** dialog box displays.

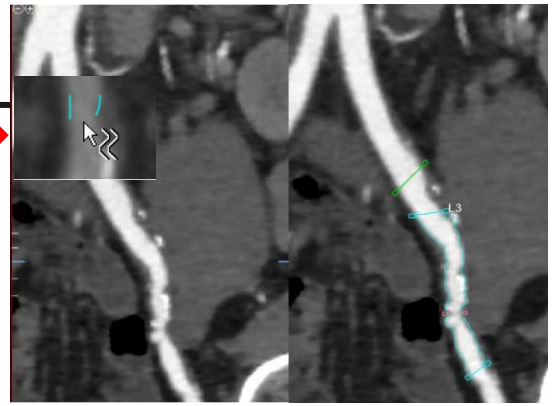
Type a New Name. **Click OK.**



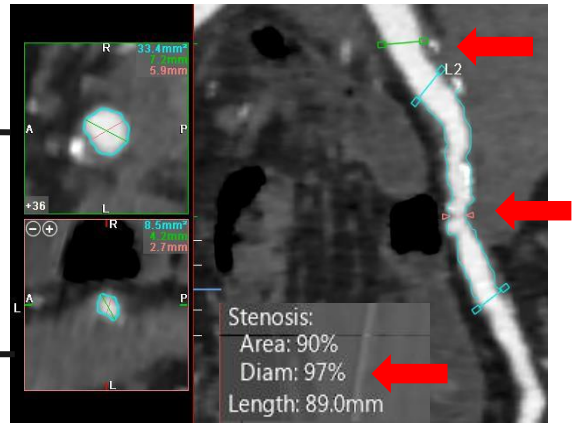
Peripheral CTA – Lesion Tool Analysis

Locate **Vessel Tools**. Select **Single.**

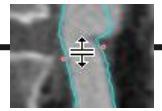
Click and drag on the vessel in the CPR view. Start above the lesion and drag to just below the lesion.



Click and move the green reference line to normal vessel diameter.



Verify the **red arrows** display the stenosis. Click and drag to adjust.

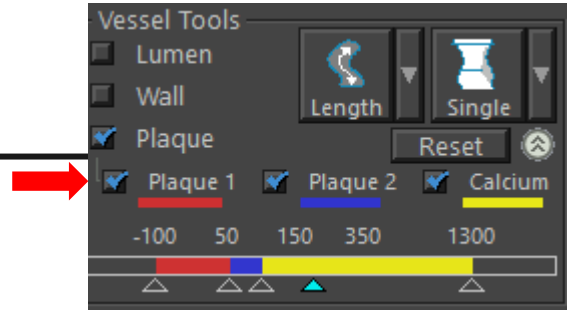


Double-click the 3D viewport to go to 1 up.

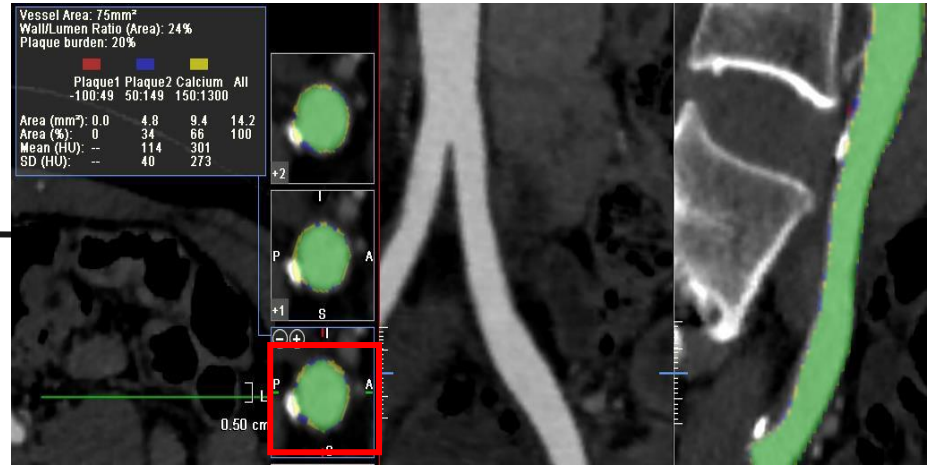
Stenosis value displays on the CPR image.

Peripheral CTA – Plaque Burden

Select **Plaque.** The Hounsfield Unit color- coded areas of the vessel displays on the screen.



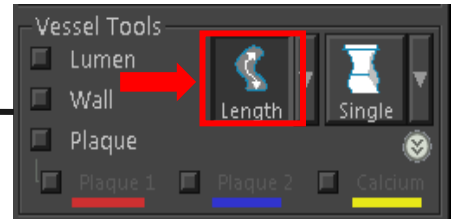
The **cross-sectional** CPR view is the current point of interest. **Roll the mouse wheel** in the CPR view to scroll through the vessel and update the values.



Tip: SUREPlaque provides visualization of the lumen, vessel wall, and plaque characteristics in the vessels.

Peripheral CTA – Length Measurement

Select **the length tool.**



Click and drag the Length tool down the vessel.

The **value** represents the length along the centerline between two specified points and the tortuosity along the length.

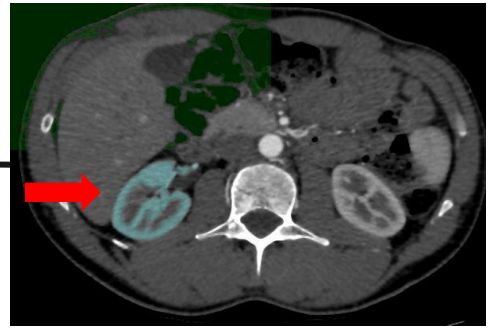
Tip: The Length tool measures length along the centerline or between two points on the vessel centerline.

Peripheral CTA – Organ Tool

Locate Segment Anatomy. **Click Organ**

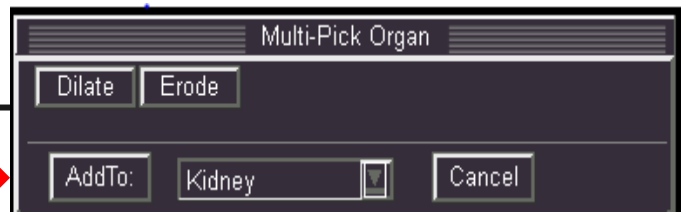
These steps add anatomy to your 3D image.

Click on the anatomy. The area of interest will be tinted blue. Click until the entire organ is included.

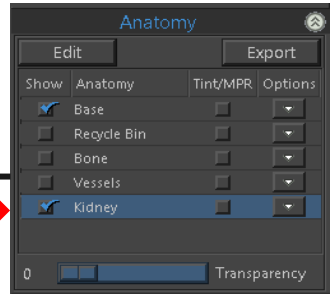


Scroll through the entire dataset.

Create a name in Multi-Pick Organ box. Click the dropdown menu, and choose a name or type a name. Click Add To.



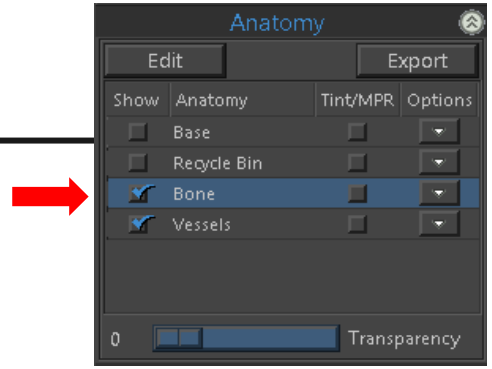
The **Anatomy management** area will display the new folder.



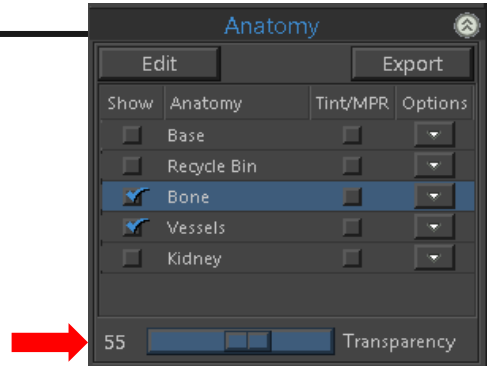
Continue to add additional organs.

Peripheral CTA – Transparent Bone

Check the box next to Bone in the Anatomy management area.



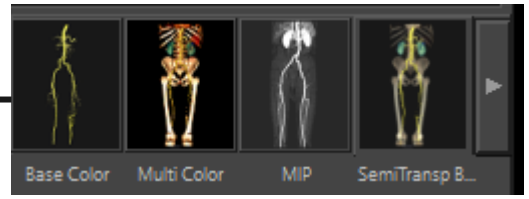
Slide the Transparency bar to the right to adjust Bone transparency to the desired level.



The **result** is based on the percentage of transparency.

OR

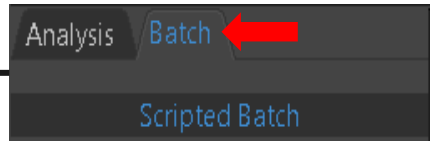
Select the semi-transparent bone option from the VR presets..



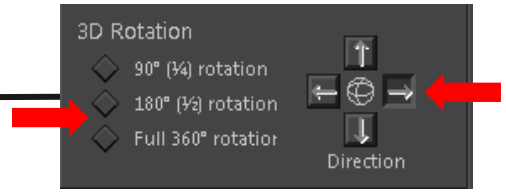
The steps display 3D transparent bone and provides bony landmarks.

Peripheral CTA – 3D Batch Rotation

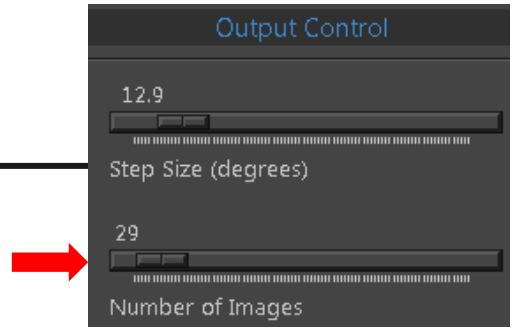
Select **Batch** to create a 3D Batch rotation.



Select the **degree of rotation**, and select the direction of the rotation.

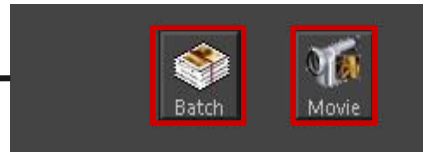


Move the slider bar to the desired number of images or degrees between images.



As you increase number of images the step size decreases.

Click **Batch** for PACS. Click **Movie** to create an .avi file for presentations.

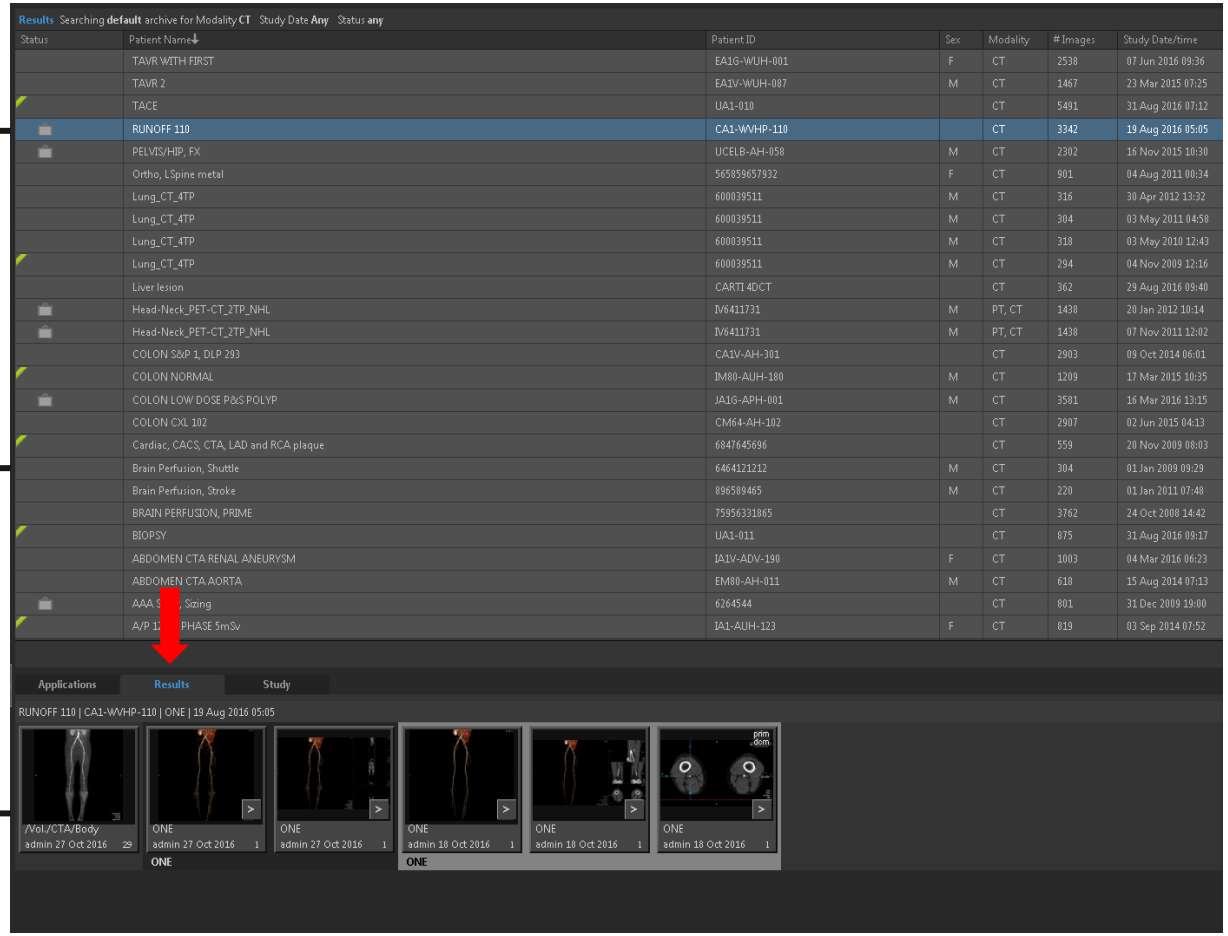


Peripheral CTA – Export

Return to **Study List.** Click on Results tab on bottom.

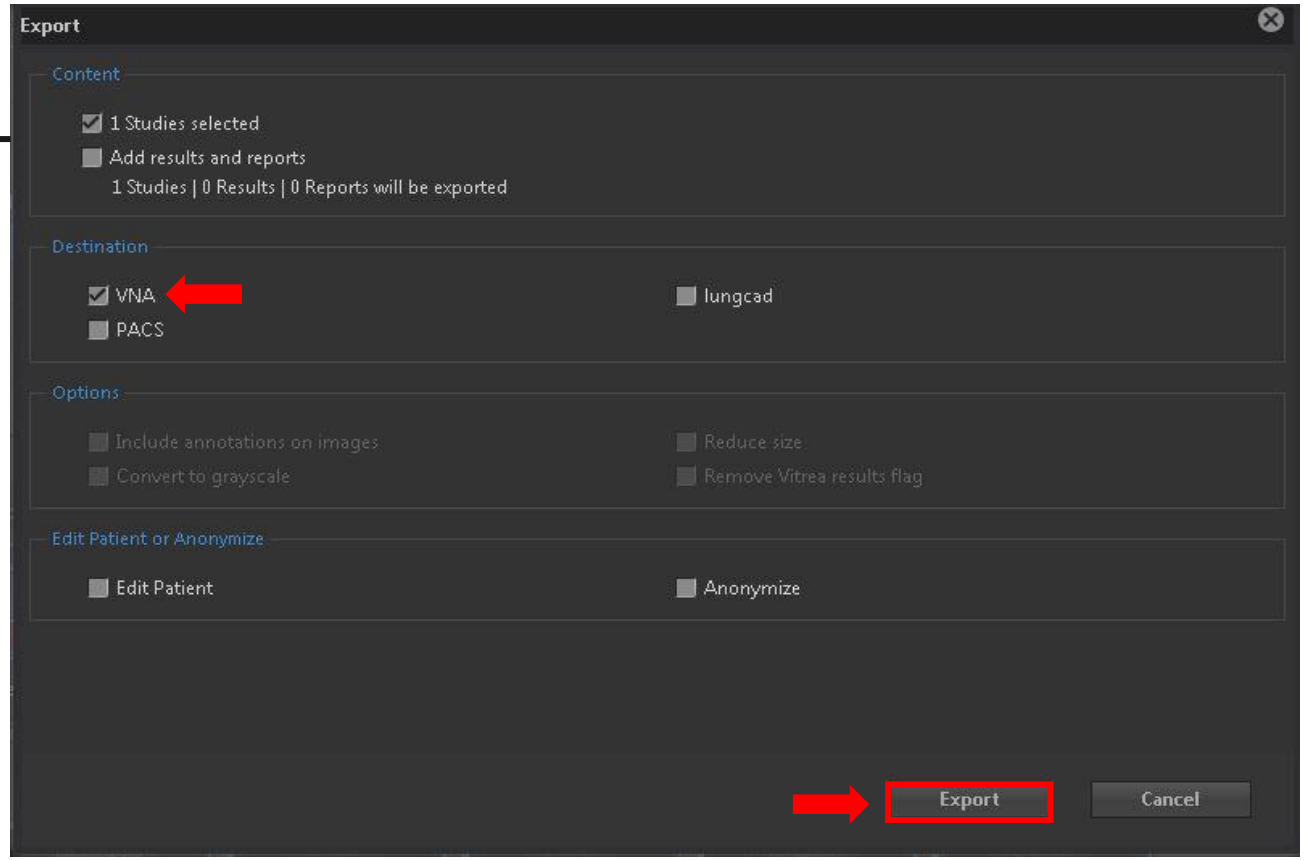
Each Snapshot and Batch displays in the **Results Tab**. Click and hold CTRL to add select images.

Right-click on images to Export to DICOM Destinations.



Peripheral CTA – Export

Export locations are listed in the Destination section. **Choose** desired destinations, click Export.



Peripheral CTA – Workflow Summary

Summary:

Workflow for the Abdominal Aorta and peripheral vessels include a variety of post-processing tools depending on the area of interest.

Most commonly used features:

- **Automatic Bone Removal** provides fast volume rendered images.
- **Vessel Grow** displays vascular anatomy.
- **Vessel probe** displays the vessel lumen.
- **Lesion Tool** will calculate a stenosis value.
- **Organ** tool will add additional anatomy to your volume rendered image.
- **Create 3D Batch Rotation** with **Semi-Transparent Bone.**
- **Create 3D Batch Rotation** in **MIP** rendering.
- **Create** and **Export** snapshots.
- **Export** to multiple destinations.

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