

CT Cardiac Functional Analysis – Multi Chamber Workflow

VPMC-15958 E

CT Cardiac Functional Analysis

Overview:

- ▶ The Cardiac Functional Analysis option provides a variety of tools for working with clinical CT images of the coronary arteries, heart and surrounding tissue. The Functional Analysis workflow is for single chamber or multi-chamber. This application automatically segments and displays the left ventricle or 3 chamber view with 10 phases loaded. These phases may be viewed and examined with the heart in motion. All views may be edited, measured, captured and exported.
- ▶ Select a Study
- ▶ Choose Protocol and Preset
- ▶ Perform Analysis
- ▶ Review the Study
- ▶ Edit the Short Axis Sector Indicator
- ▶ Edit the Mitral Valve Plane
- ▶ Edit the Contours
- ▶ Enter Patient Information
- ▶ Take Snapshots
- ▶ Examine cine of the Heart
- ▶ Distribute Findings

CT Cardiac Functional Analysis - Load the Study

Select the Patient.

Double click to select the application or single click on thumbnail and click on the open button.

OR

The series are located below the applications. Choose the desired series. Double click the **Multi Chamber Functional Analysis** Application.

Tip: Hold the CTRL key and select multiple phases.

Icon	Study Name	Gender	UA	Modality	Count	Date	Protocol	Ref	Age	Icon
	CARDIAC CACS PROSP PLAQUE	M	UA1G-CV-382	CT	54	28 Sep 2018 ...	GEN_CHEST	RSNA 2019		
	CARDIAC CFA 15YO FIRST	F	UA1G-PCV-137	CT, SR	7046	05 Feb 2018 ...	GEN_PEDS	RSNA 2019 CANON CFA MINOR EDITS TO SEG...	38y	
	CARDIAC CFA PIQE	O	IA1P-CV-500	CT	8046	01 Jan 2000 ...	PRISM_CARDIAC	PIQE		
	Cardiac Coronary Subtraction	M	EA1G-CV-017	CT	847	14 Jun 2016 ...	GEN_CARDIAC		66y	
	CARDIAC CTA PIQE 117 BPM	F	AA1P-CV-179	CT	1123	10 Aug 2022 ...	PRISM_CARDIAC	PIQE HIGH HR		
	CARDIAC CTA PIQE DLP 39	F	AA1P-CV-181	CT	1123	08 Aug 2022 ...	PRISM_CARDIAC	PIQE		

Last updated: 335m ago Total results: 311 |

Applications Results Study Algorithm Processing

Pinned Cardiac CT

Multi Modality Viewer Carotid Gallery VScore Cardiac Analysis Multi Vessel Cardiac Analysis Cardiac Functional Analysis **Multi Chamber Functional Analysis** TAVR Planning EP Planning Myocardial Perfusion Coronary Subtraction Coronary CTA Vascular Aorta

CARDIAC CFA 15YO FIRST UA1G-PCV-137 (F 38y) CT,SR 05 Feb 2018 15:00 RSNA 2019 CANON CFA MINOR EDITS TC Tools | List Images

CFA C_10.000000% 321/640 CFA C_10.000000% 321/640 CFA C_20.000000% 321/640 CFA C_30.000000% 321/640 CFA C_40.000000% 321/640 CFA C_50.000000% 321/640 CFA C_60.000000% 321/640 CFA C_80.000000% 321/640 CFA C_90.000000% 321/640

Open

Note: Load 0 – 90% phases.

CT Cardiac Functional Analysis - Load the Study from Gallery

Select the **Cardiac Functional CT** protocol.

Pick **3 Chamber Function Analysis**.

The screenshot displays the software interface for CT Cardiac Functional Analysis. On the left, a 'Protocol' list is visible, with 'Cardiac Functional CT' highlighted. A red arrow points from the text 'Pick 3 Chamber Function Analysis.' to the '3 Chamber Functional Analysis' dropdown menu in the bottom right corner of the main view. The main view shows a 2D axial CT scan of the chest and a 3D reconstruction of the heart. The '3 Chamber Functional Analysis' dropdown is currently set to '3 Chamber Functional Analysis', and a red arrow points to the 'Pick' button next to it. The 'LV Functional Analysis' dropdown is also visible at the bottom left of the main view.

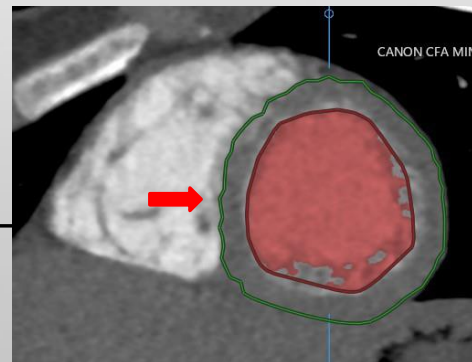
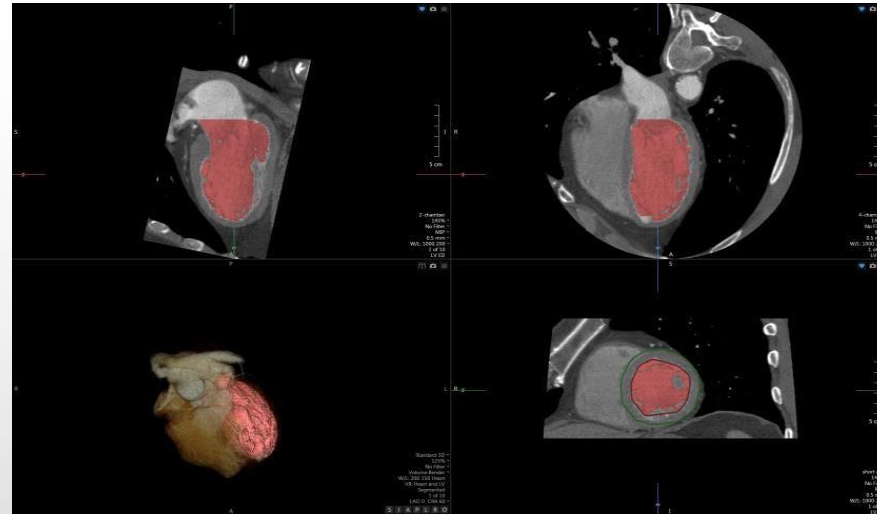
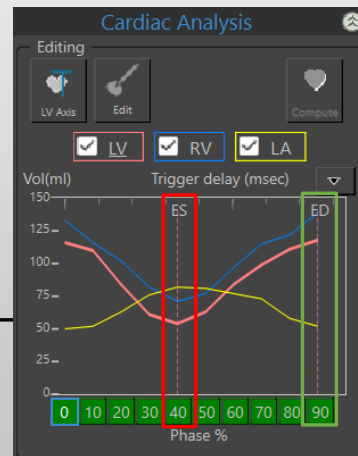
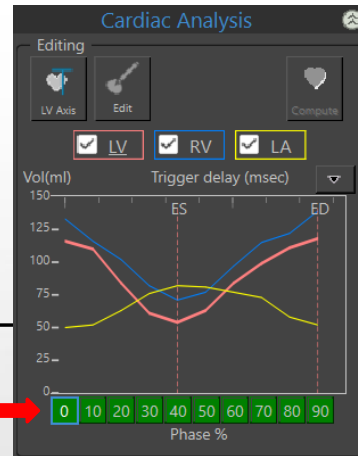
CT Cardiac Functional Analysis - Verify ED and ES Phases

Wait for the phase boxes to turn green.

Select each phase by clicking on the phase percentage and review the images.

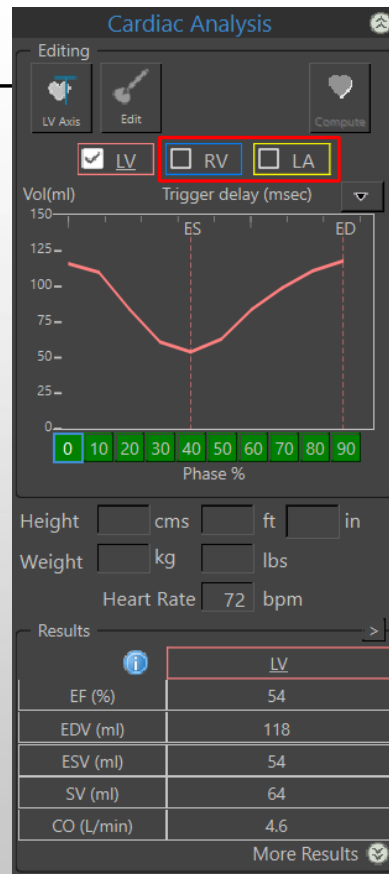
Verify End Diastolic (ED) phase.

Verify End Systolic (ES) phase.



CT Cardiac Functional Analysis - Edit Mitral Valve Plane

Uncheck the RV and LA to avoid confusion.



CT Cardiac Functional Analysis - Edit Mitral Valve Plane



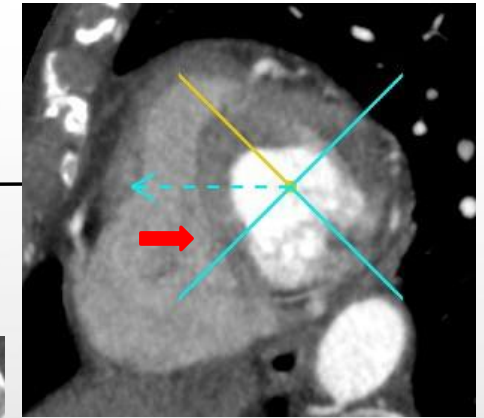
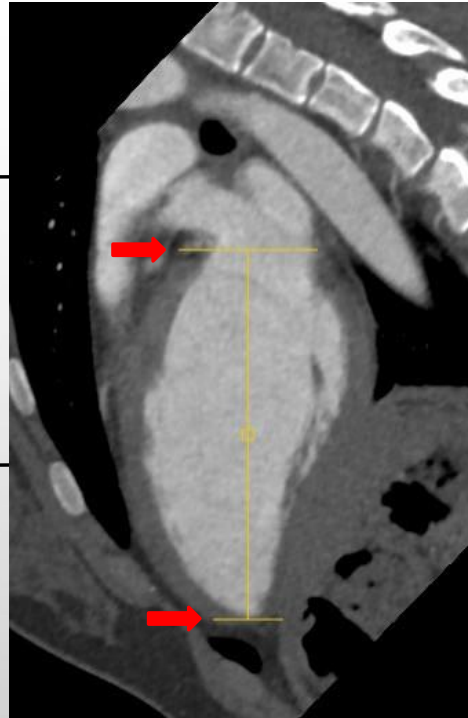
CT Cardiac Functional Analysis - Edit Mitral Valve Plane

In the 2-chamber or 4-chamber view, float the cursor over the horizontal yellow line to adjust the mitral valve plane. Consult the short axis view. It is recommended to show at least 50 % of the myocardium.

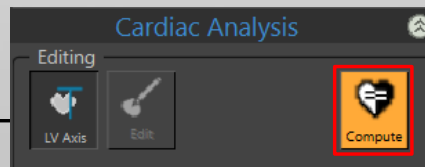
Adjust the bottom horizontal line to rest at the end of the myocardium.

Float cursor over vertical yellow line to adjust the perpendicular axis of the LV.

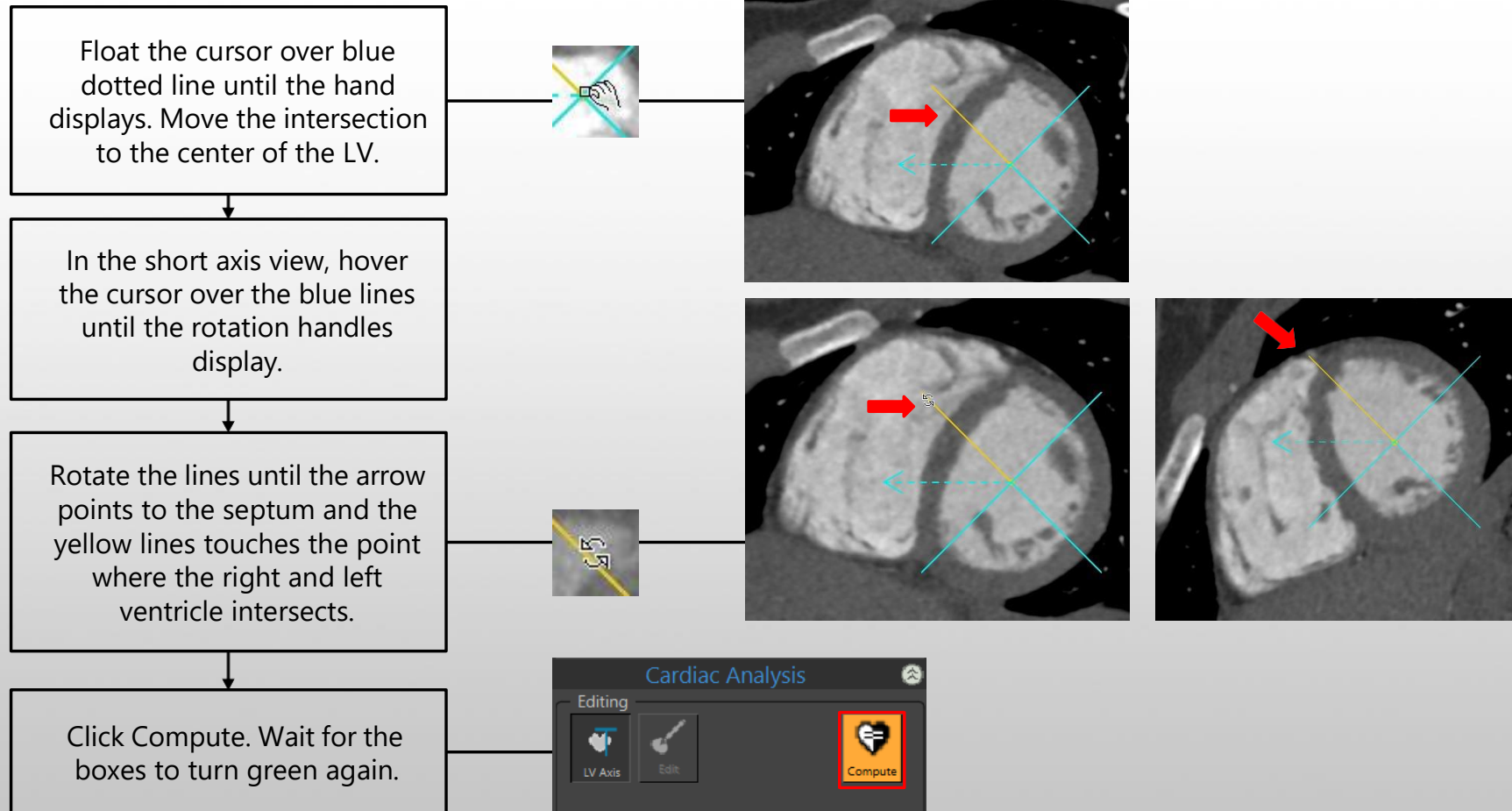
Click **Compute**.



Tip: The vertical line should reside down the centre of the ventricle. Hover the mouse over the yellow line to display the hand. Left click and drag the line to the centre of the ventricle.



CT Cardiac Functional Analysis - Edit Short Axis Sector

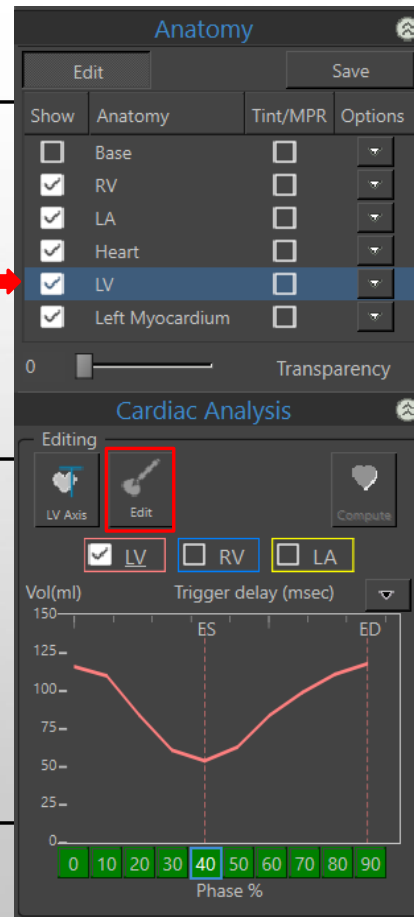


CT Cardiac Functional Analysis - Edit LV Contours

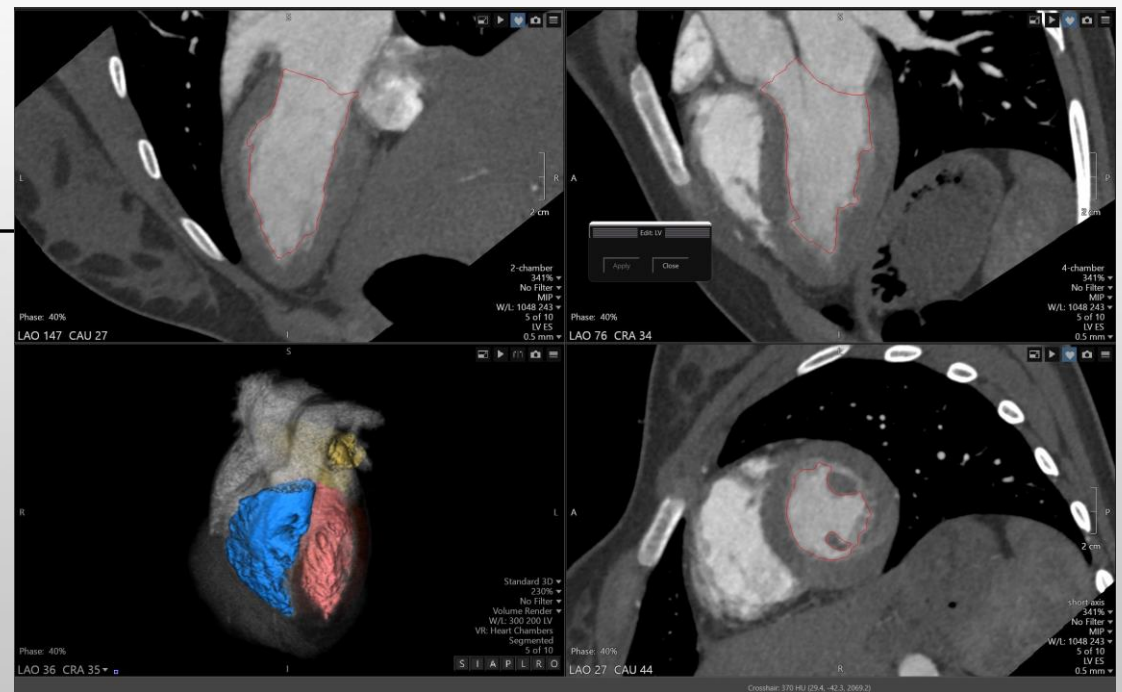
Verify that LV is selected in the Anatomy Management area before Edit is selected.

The selected regions contours will be displayed on the MPR views and can be edited here.

Identify the ED (Highest point on the TDG) and ES (lowest point of the TDG). Click on the **Edit** tool.



Tip: It is recommended that you check the contours of all 3 regions (LV, RV and LA) in both ES and ED.

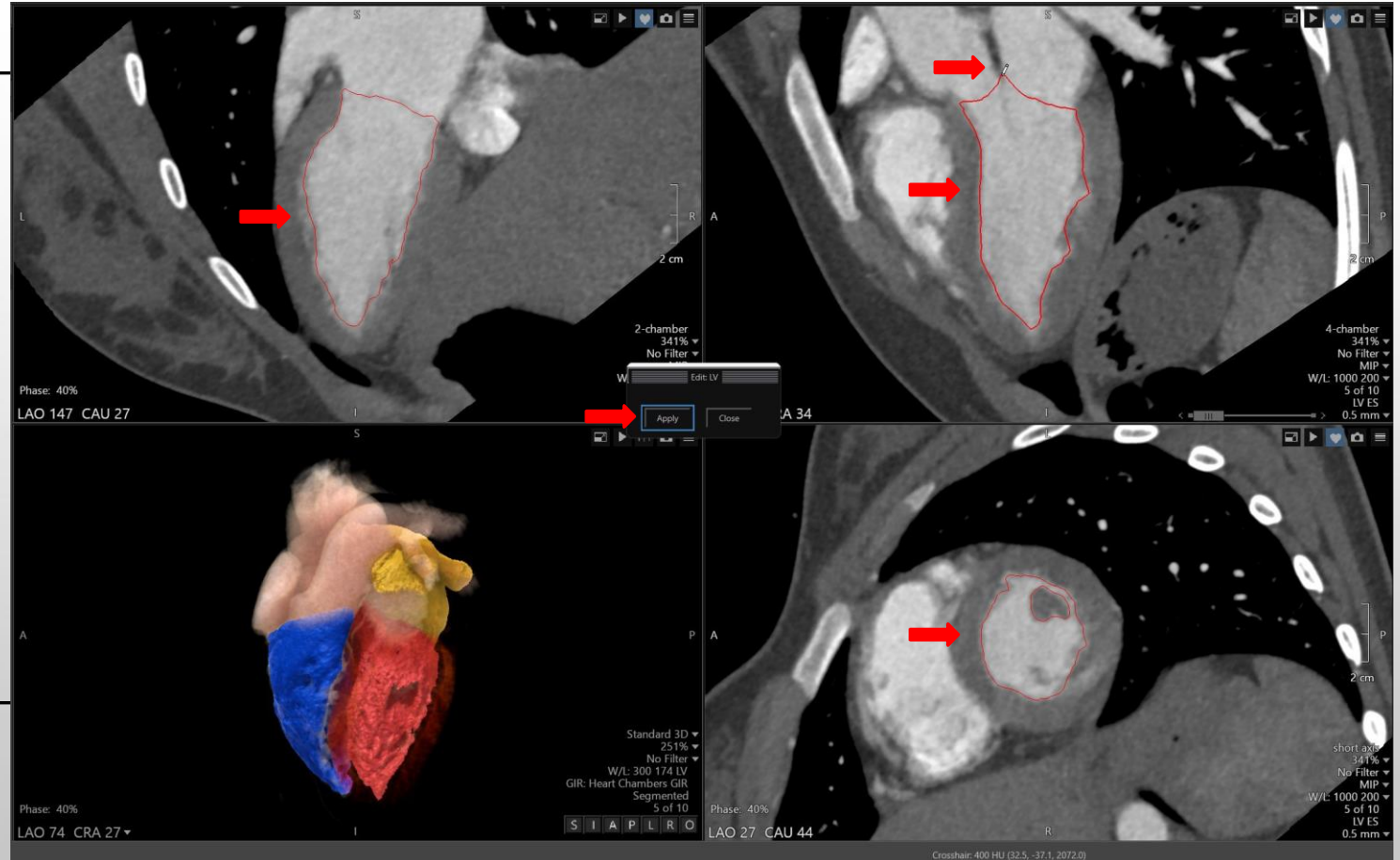


CT Cardiac Functional Analysis - Edit LV Contours

When **Edit** is selected the cursor turns to a pencil.

Contours can be edited in any one of the 3 MPR planes. Right mouse and scroll through the images and edit contours where necessary.

Click on **Apply** when you are done editing.

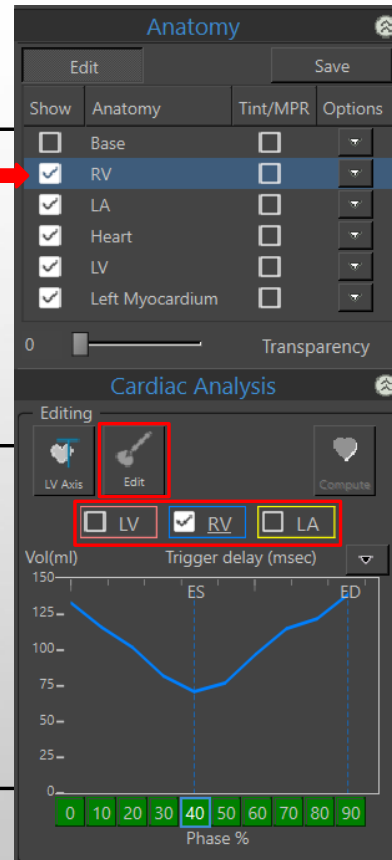


CT Cardiac Functional Analysis - Edit RV Contours

Deselect the LV and LA above the Time density graph. Click on **Edit** tool.

Select the ES or ED phase in the TDG. Double click on the desired plane and proceed to edit the contours where necessary.

Click on **Apply** when done editing. Repeat for other phases.



Tip: When RV is selected above the time density graph, the Anatomy region automatically selects the RV region.



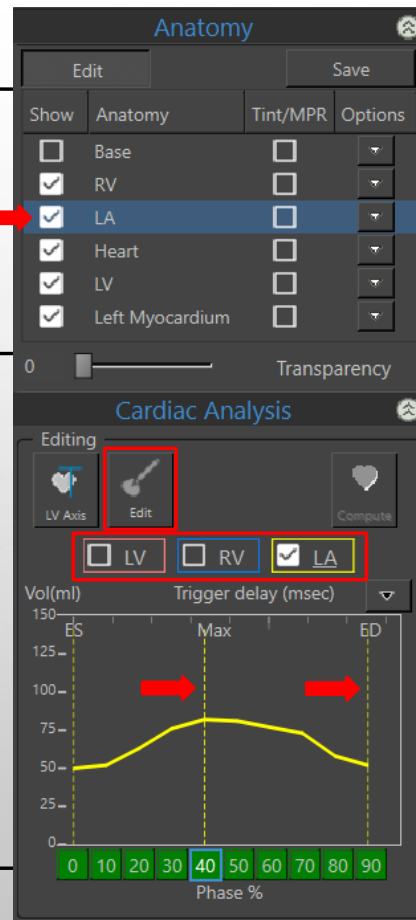
CT Cardiac Functional Analysis - Edit LA Contours

Deselect the LV and RV above the Time density graph.

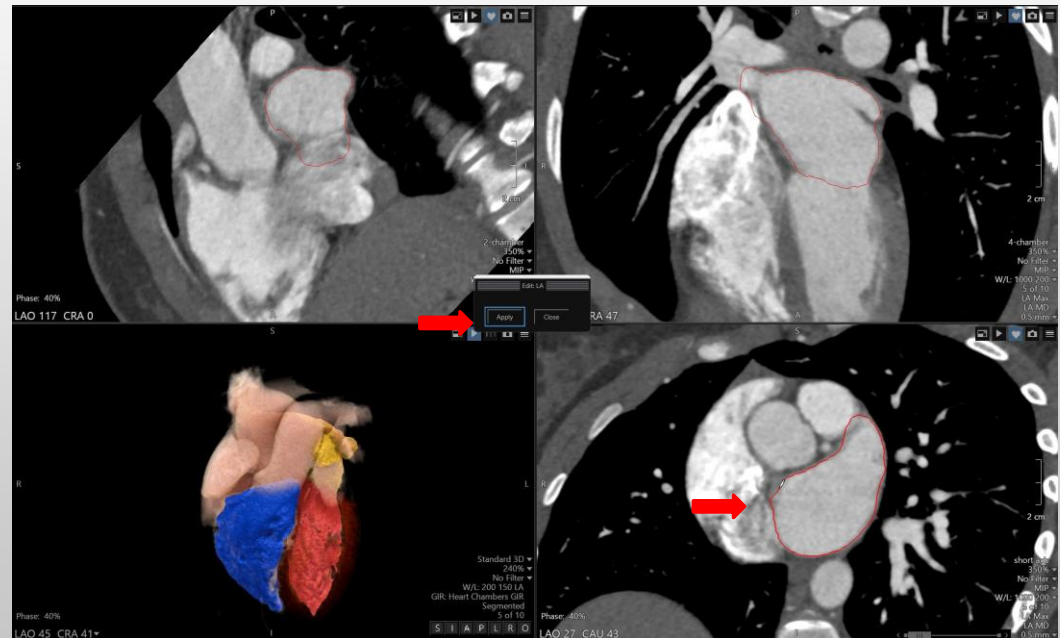
Select the ES, ED or Max phase in the TDG. Double click on the desired plane and proceed to edit the contours where necessary and click on **Apply**.

Left click and drag the Max line to show the MD line. Move the MD line to the highest peak after the Max point.

Click **Close** when done.



Note: LA has an additional phase, Max, that also requires contour editing. Max indicates the maximum volume across all cardiac phases. MD is a local minimum after the max.



CT Cardiac Functional Analysis - Enter Patient Info

Enter patient height and weight.

Height	160	cms	5	ft	3	in
Weight	60	kg	132	lbs		
Heart Rate	72	bpm				

Choose More Results or Less Results.

Results	
☐ Index	LA
EF (%)	3.2
EDV (ml)	52
ESV (ml)	51
SV (ml)	1.7
CO (L/min)	
More Results	

Click the arrow to display the results graph in the 3D Image.

Results	
☐ Index	LA
EF (%)	3.2
EDV (ml)	52
ESV (ml)	51
SV (ml)	1.7
CO (L/min)	
More Results	

Results	
☐ Index	LA
EF (%)	3.1
EDV (ml)	52
ESV (ml)	51
SV (ml)	1.6
CO (L/min)	
Less Results	
LA	
Maximal Volume	81.9 ml
Cyclic Volume Change	31.3 ml
Reservoir Volume	0.0 ml

Tip: Check Index to normalize values to body surface area. (BSA).



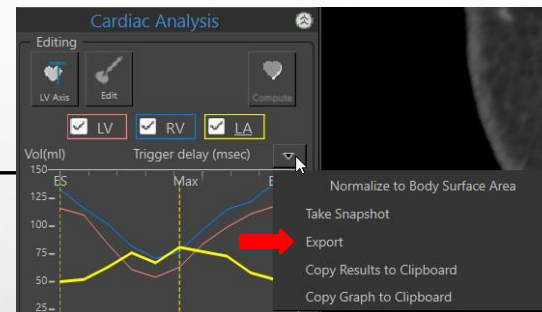
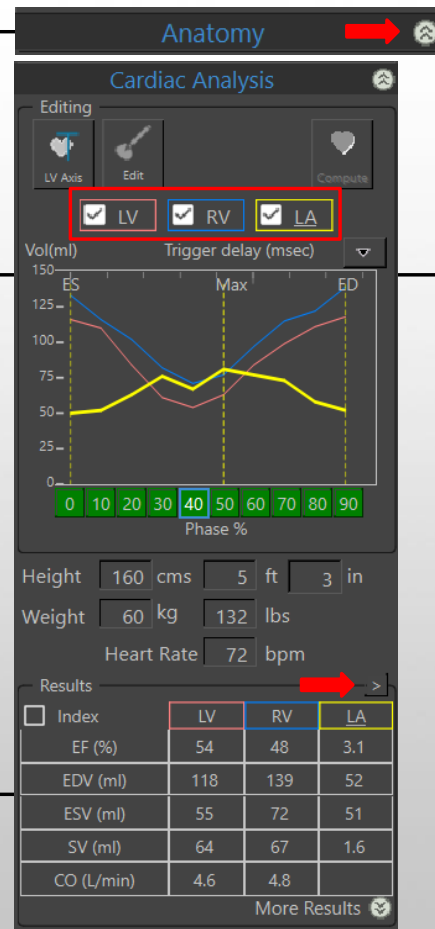
CT Cardiac Functional Analysis - Review the results

Click the chevron in the Anatomy box to display the complete results graph.

Select the LV, RV and LA to display the results below the TDG.

Use the arrow to open the export options. Take a snapshot or select the export option from the list.

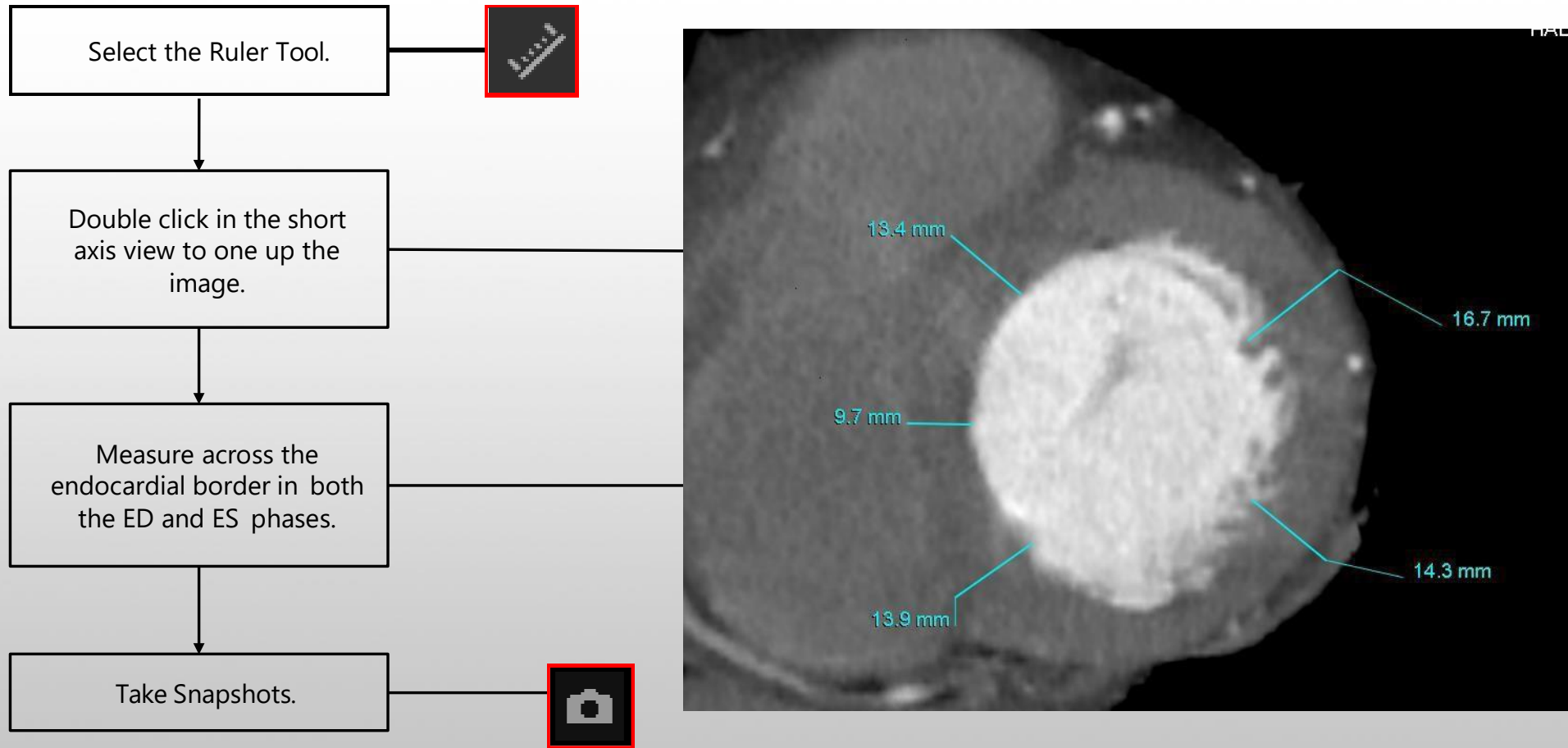
Use the arrow to open the result. Click and drag to any viewport and use the snapshot tool to make a snapshot.



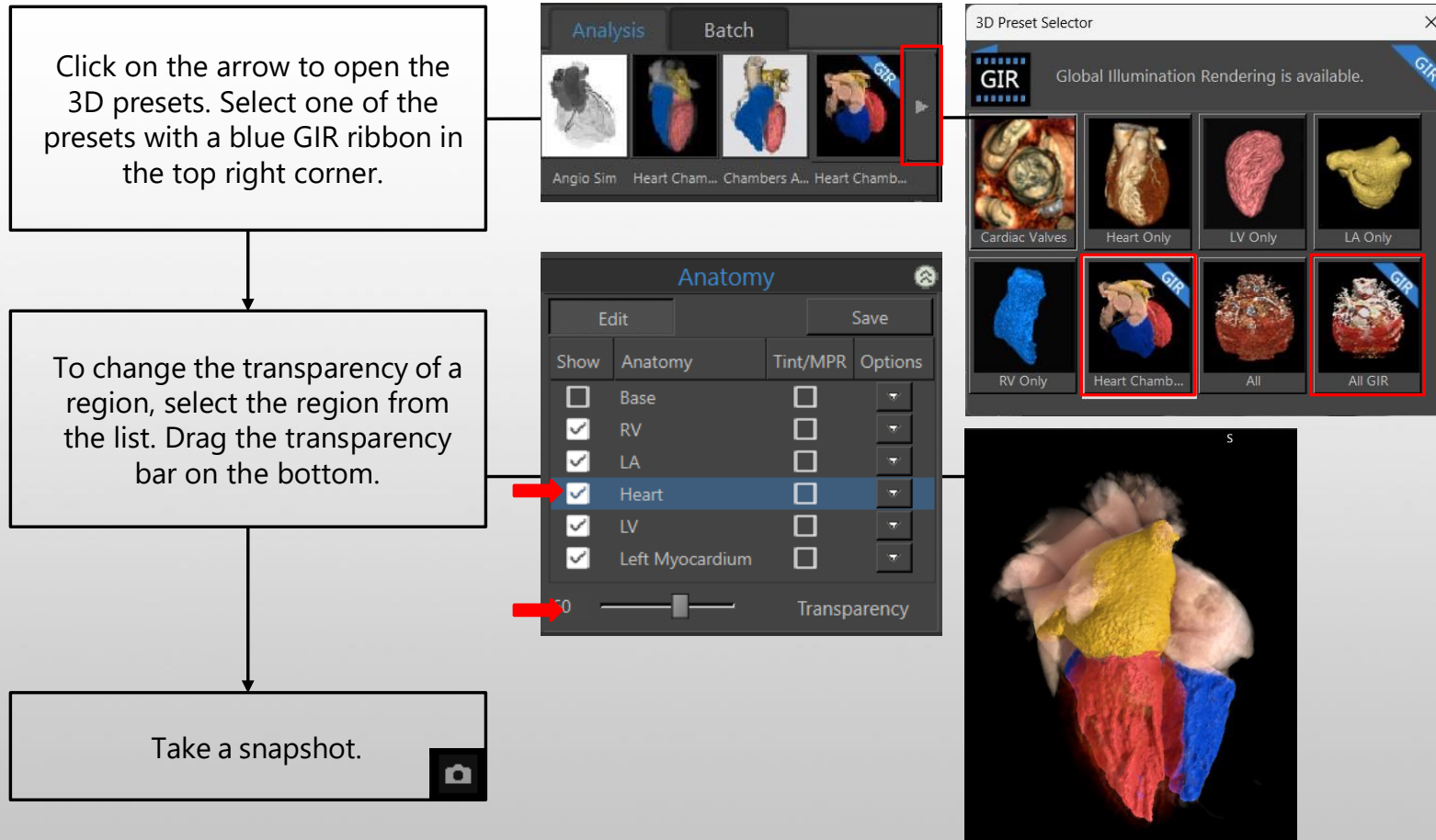
Note: The results values are automatically updates after the changes are applied.

Note: When the Patient's height and weight is entered the user have the option to normalize the values to the BSA.

CT Functional Analysis - Measure the Muscle Wall



CT Cardiac Function Analysis – Apply GIR to 3D View

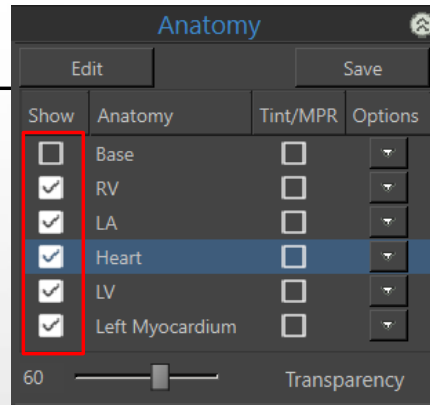


CT Cardiac Functional Analysis - Take Snapshots

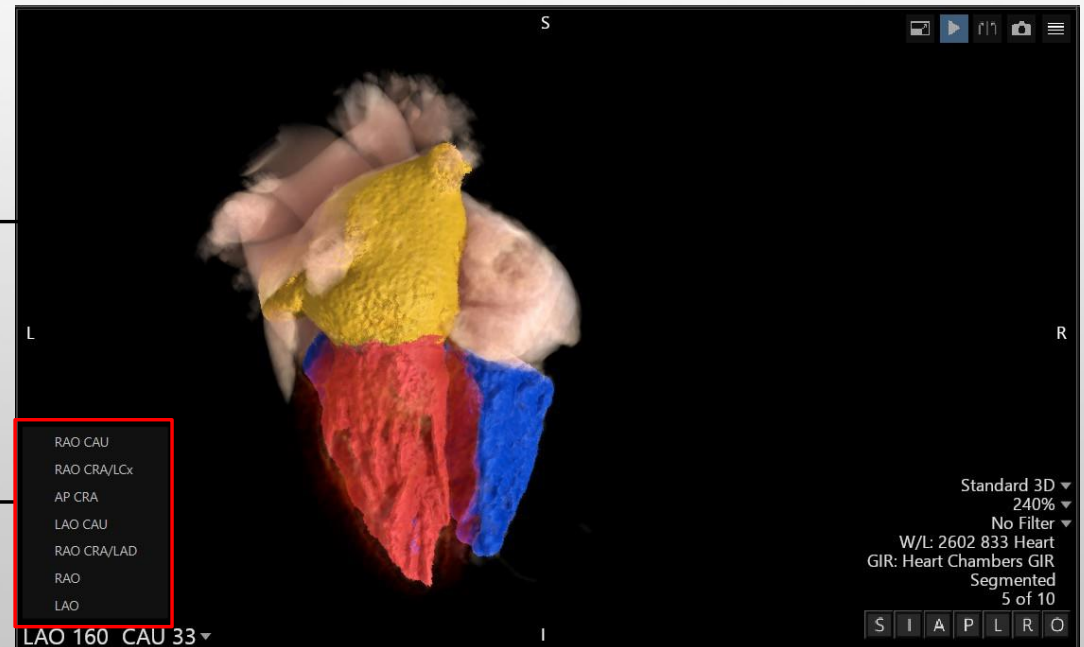
All the regions with checkmarks under Anatomy management will be displayed on 3D.

In the lower left corner of 3D images is standard cardiac options. Click on the arrow to open the list. Select the desired option from the list.

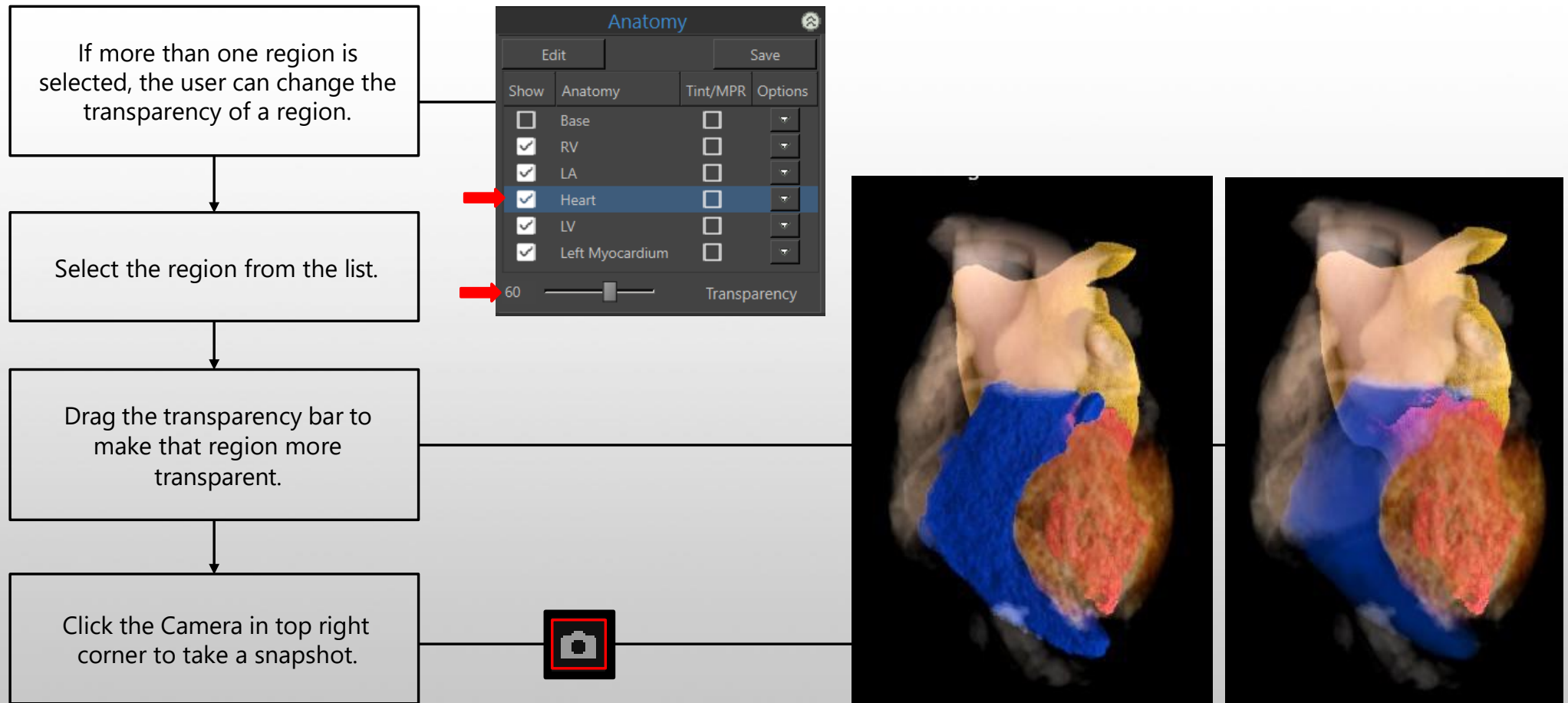
Click the Camera in top right menu to take a full screen snapshot or use the icon in the viewport to capture the individual image.



Tip: The same views can be applied using F2 to F8

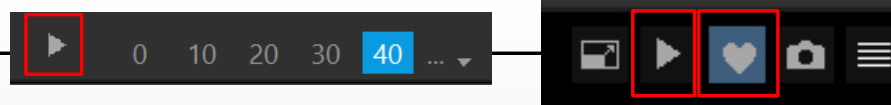


CT Cardiac Functional Analysis - Semi-transparent Region



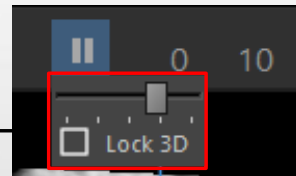
CT Cardiac Functional Analysis - Examine the Heart Motion

Select the Play button on the right side of the global toolbar. This is located before the cardiac phases. Or select the play button in the top right corner of the viewport.

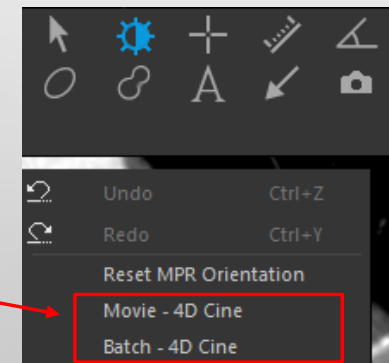
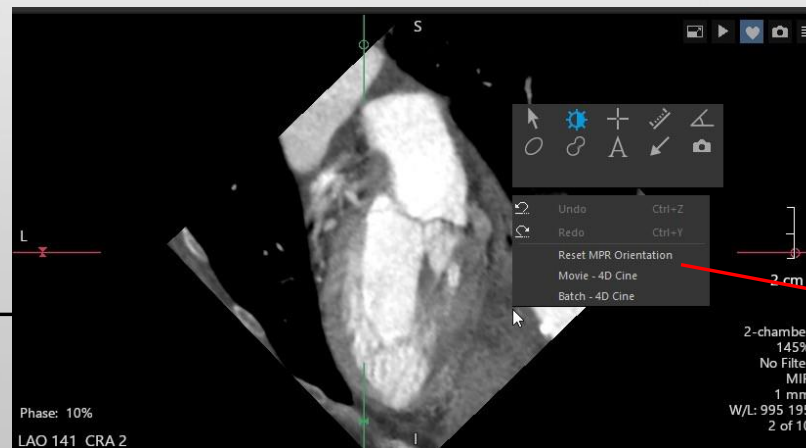


Tip: Select the heart icon for a short axis, 2-Chamber or 4 chamber cine.

Adjust the play speed by using the slide bar. Uncheck the "Lock 3D" to see motion in 3D.



Right Click in an image. Select Batch. 4D Batch for PACS. 4D Cine for Movie.

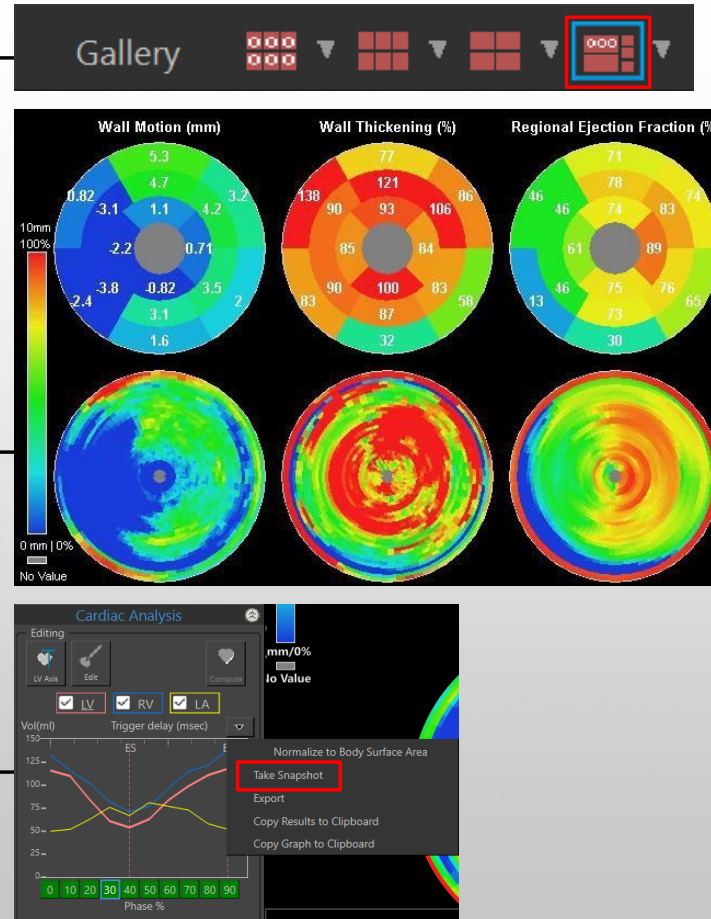


CT Cardiac Functional Analysis - Review the polar maps

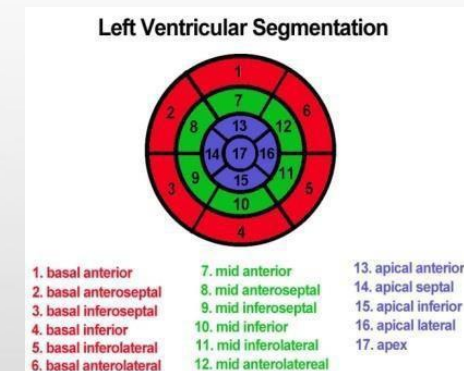
Select Regional Measurements layout (4th Red layout).

Click the crosshair on the Polar Map to view the location in the MPR view.

Click on arrow to take a snapshot of the graph.



Note: Polar Maps are automatically shown on the Report Page.



Tip: You must take a 4:1 snapshot to include Polar maps and MPR views.

CT Cardiac Functional Analysis – Report

To open the **report page**, click on Report at top Right corner to open **Report Editor tab**.

All the results will automatically populate on the report.

To Publish a report - Click on Publish report at bottom of screen. This will send the report to the **Results tab** on the study list.

Cardiac Function

Parameter	Measured Values	Reference Range	Measured Index	Reference Range
Ejection Fraction	62 - 72 (%)	87 - 155 (ml)	---	---
End Diastolic Volume	---	26 - 54 (ml)	---	---
End Systolic Volume	---	59 - 105 (ml)	---	---
Stroke Volume	---	---	---	---
Cardiac Output	---	---	---	---
Myocardial Mass	---	119 - 177 (g)	---	---

LEFT VENTRICULAR FUNCTION

Trigger Delay (msec)

Vol (ml)

Phase %

Basal Segments

1.basal anterior	---
2.basal anteroseptal	---
3.basal inferoseptal	---
4.basal inferior	---
5.basal inferolateral	---
6.basal anterolateral	---

Mid-Cavity Segments

7.mid anterior	---
8.mid anteroseptal	---
9.mid inferoseptal	---
10.mid inferior	---
11.mid inferolateral	---
12.mid anterolateral	---

Apical Segments

13.apical anterior	---
14.apical septal	---
15.apical inferior	---
16.apical lateral	---
17.apex	---

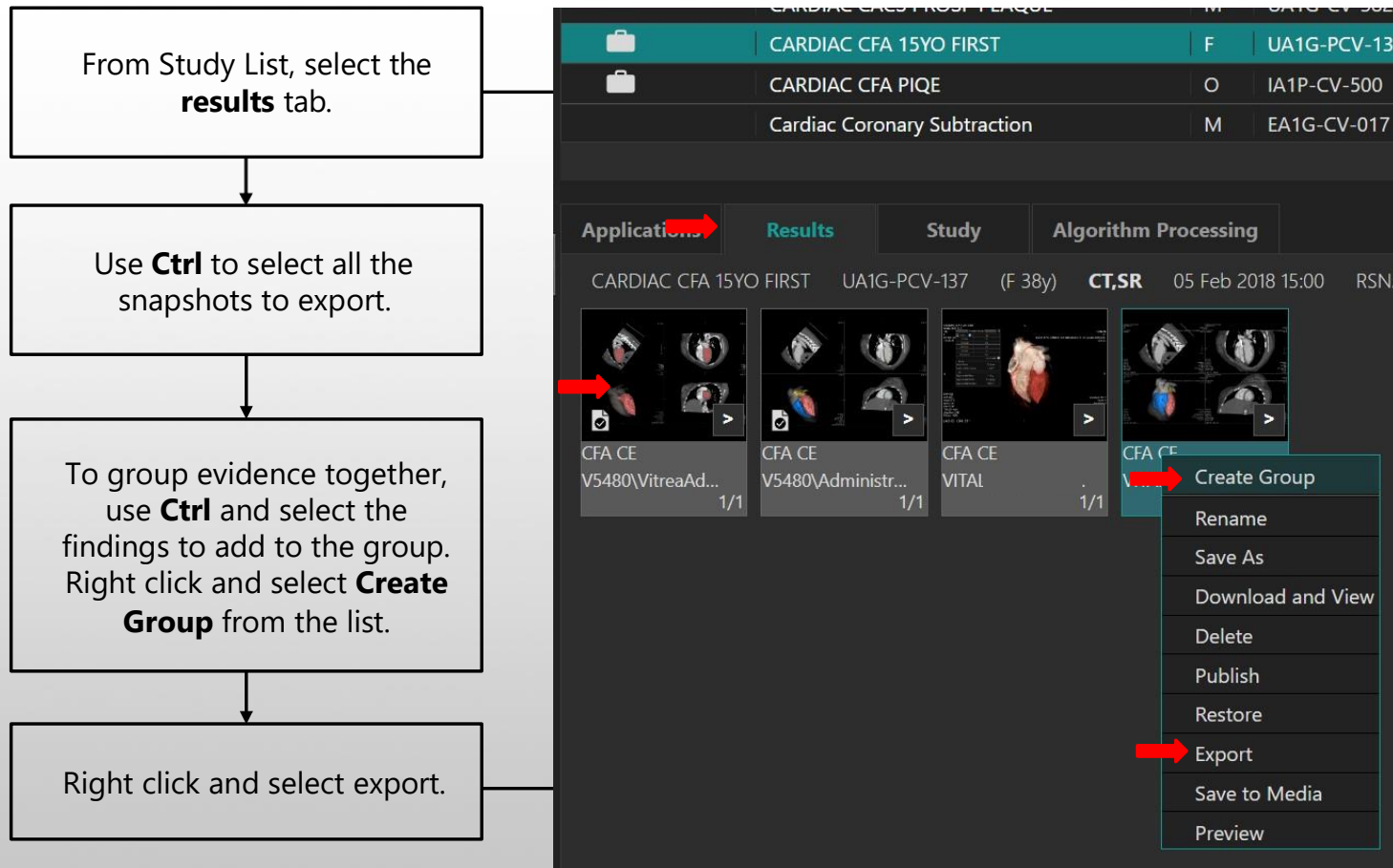
Templates

Full Cardiac Coronaries CFA Aorta Colon C-RADS Nodules General Brain Tumor Ca Score

Full Reports

Publish Report

CT Cardiac Function Analysis - Distribute Findings: Export



Tip: To delete, rename or edit a group description, right click on the group. Hover the mouse over the arrow and select the option from the list.

Grouping	Edit Group Description
Save As	Ungroup All
Download and View	Remove from Group
Delete	Move Up
Publish	
Export Group	
Save to Media	
Preview	

CT Cardiac Function Analysis- Distribute Findings: Export

Select the relevant DICOM destination.

Click on Export.

Export Studies

Content

☒ 1 Results, reports, and groups selected
☐ Add studies
0 Studies | 0 Results | 0 Reports | 1 Groups will be exported

Destination

No destination archives were found in the system configuration

Options

☐ Include annotations on images
☐ Exclude non-dicom results
☐ Exclude all restorable results

☐ Exclude large Vitrea restorable images
☐ Convert to grayscale
Change all series descriptions:

Edit Patient or Anonymize

☐ Edit Patient ☐ Anonymize

Export

Cancel

CT Cardiac Functional Analysis

Summary:

CT Multi-Chamber CFA utilizes CT images of the heart to assist Cardiologists and Radiologists in assessing cardiac function of the heart's individual chambers. With Multi-chamber cardiac analysis, the user can assess the function of the right and left ventricles, as well as the left atrium.

Review the steps for Cardiac Functional Analysis:

- ▶ Select a Study
- ▶ Choose Protocol and Preset
- ▶ Perform Analysis
- ▶ Review the Study
- ▶ Edit the Short Axis Sector Indicator
- ▶ Edit the Mitral Valve Plane
- ▶ Edit the LV Contours and other regions as necessary
- ▶ Enter Patient Information
- ▶ Take Snapshots
- ▶ Examine the Heart in Motion
- ▶ Distribute Findings

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For over 100 years, the Canon Medical Systems 'Made for Life' philosophy prevails as our ongoing commitment to humanity - generations of inherited passion creates a legacy of medical innovation and service that continues to evolve as we do. By engaging the brilliant minds of many, we continue to set the benchmark, because we believe quality of life should be a given, not the exception.

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