GE Healthcare
VividClub

2015

Application News

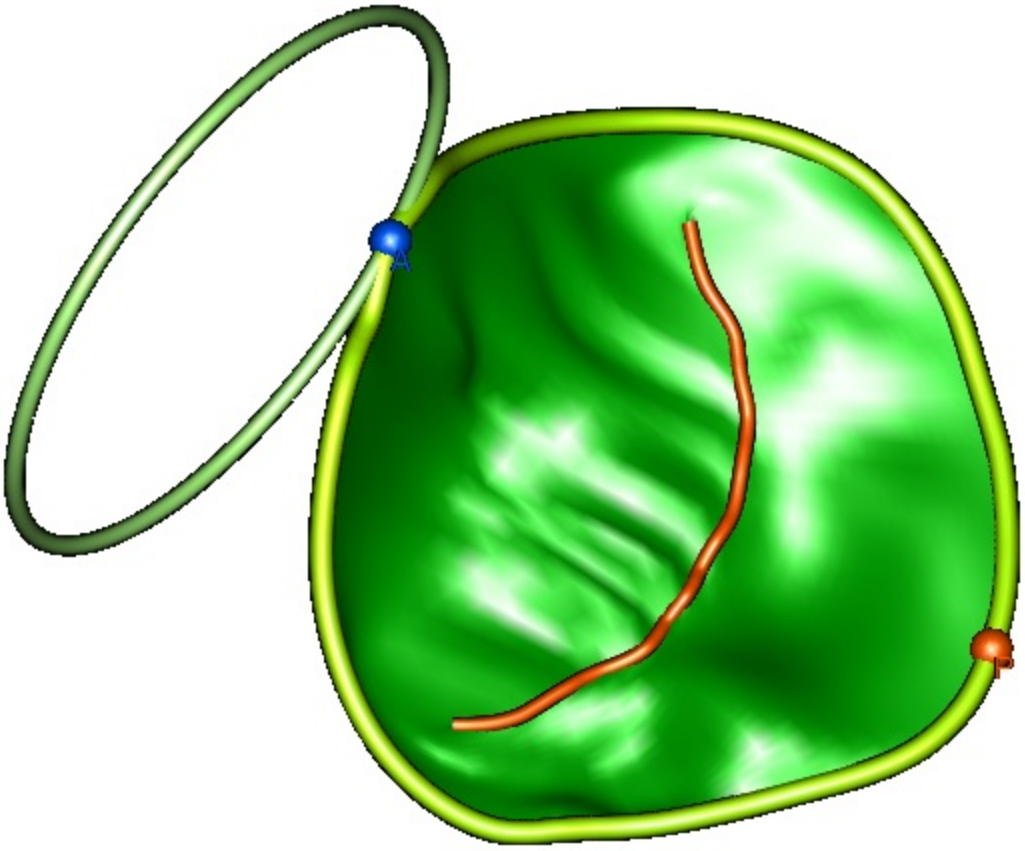
JB27770XX

GE imagination at work

TomTec® MV Assessment

Plug in on Vivid™ products

Version 2.x



Content

NOTE
This hand out is a summary and is not comprehensive.
For more detailed information please refer to the user manual and/or reference manual.

Intended use

TomTec 4D MV-Assessment is intended as software to analyze pathologies related to the mitral valve.
The TomTec 4D MV-Assessment allows a dynamic analysis of the anatomical structures of the mitral valve, annulus and the closure line of the two leaflets. In addition to that, comprehensive measurements enable doctors to quantify pathological findings.

The key features

Dynamic visualization and quantification of mitral valve morphology and function

- prolapse topology
- regurgitant orifice
- coaptation line
- jet origin

General

This step by step description is only showing the main operation that needs to be performed by the operator.
Use the TomTec user manual for more detailed information.

Only images acquired with a Vivid Scanner can be analyzed
Images from other vendors are displayed on Scanner or EchoPAC™ in pure Dicom format and therefore cannot be analyzed with the plug in.

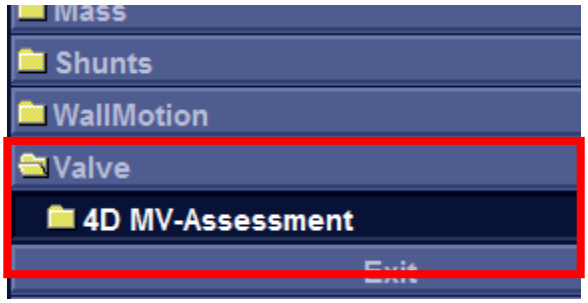
Data acquisition

Preferred image acquisition for MV assessment, should focus on:

- a 4D acquisition that is focusing on the MV
- a 4D acquisition optimized for best viewing on MV
- The complete MV should be present in the dataset, as well as part of the aortic valve.
- If interested in dynamic measurement, the frame rate is recommended to be 10-15 frames per **systole**
- Images from TTE and TEE can be analyzed

Starting the analysis

Recall the 4D dataset that should be analyzed.
Open the measurement package
Select the folder for Valve and click on 4D MV-Assessment

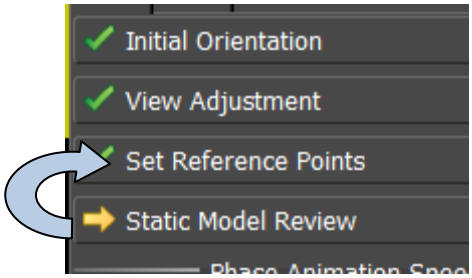


Once the Valve folder is selected the Tom Tec MV application will start.

General information

Inside each step, there is the possibility to undo the last action by using the back arrow on the upper left corner.

To go back from one step to the previous step just highlight the step before.

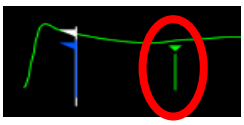


Initial orientation

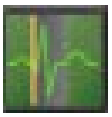
Set Frame of Interest

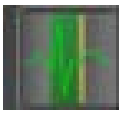
- Use the Stop button to freeze the loop. 

- Use the left / right arrow in the tool bar to go frame by frame through the loop (do not use the arrow keys on your alphanumeric keyboard) 

The green marker on the ECG is indicating the actual frame. 

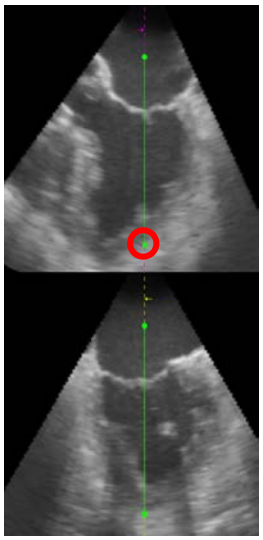
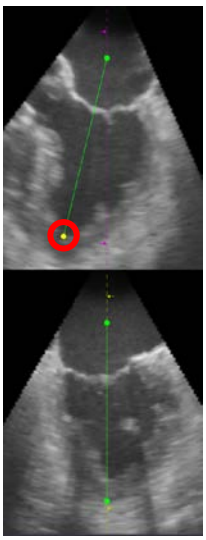
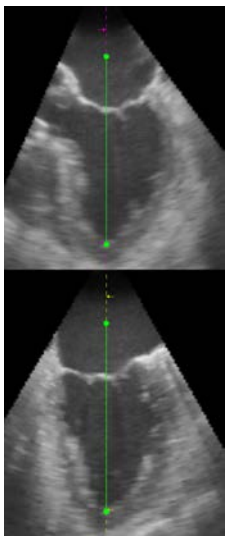
Blue Markers indicate the end-diastolic and end-systolic frame. Check if correct frames are selected otherwise change by using the following icons.

- Select the end-diastolic frame and mark it by pressing the icon (MV has to be closed) 

- Select the end-systolic frame and mark it by pressing the icon (MV has to be closed) 

Align axis on TEE

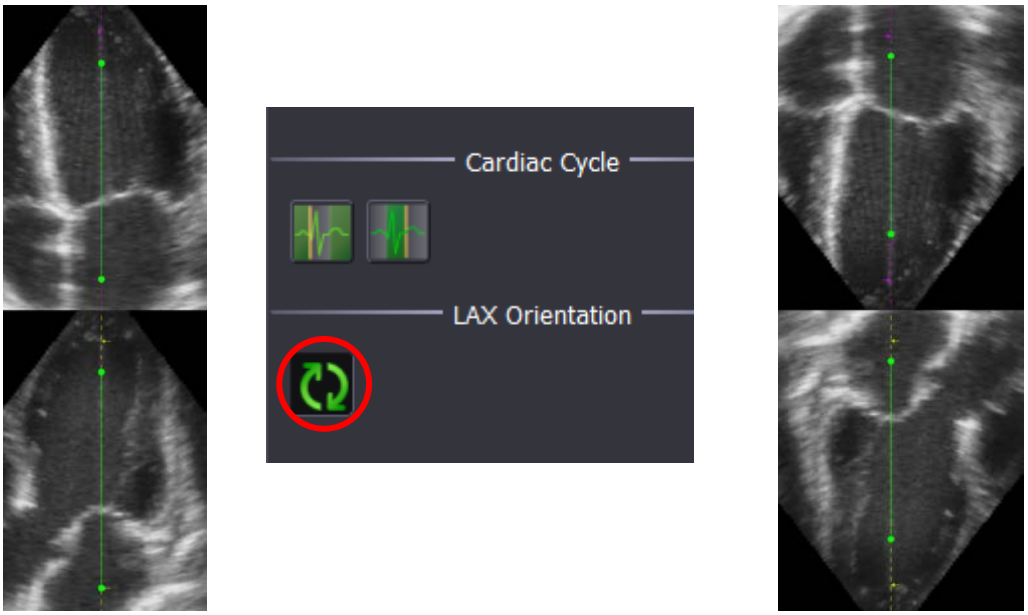
Click on the end of the green line and move the line into the correct axis of the LV from mid MV Ring/Atria towards the Apex. The system aligns the dataset then automatically.

Align axis on TTE

The system needs to have the left atrium in the upper part of the image.
In TEE the atria is usually in top, where in TTE the atria is at the bottom.
Therefore one more step in the alignment process is needed.

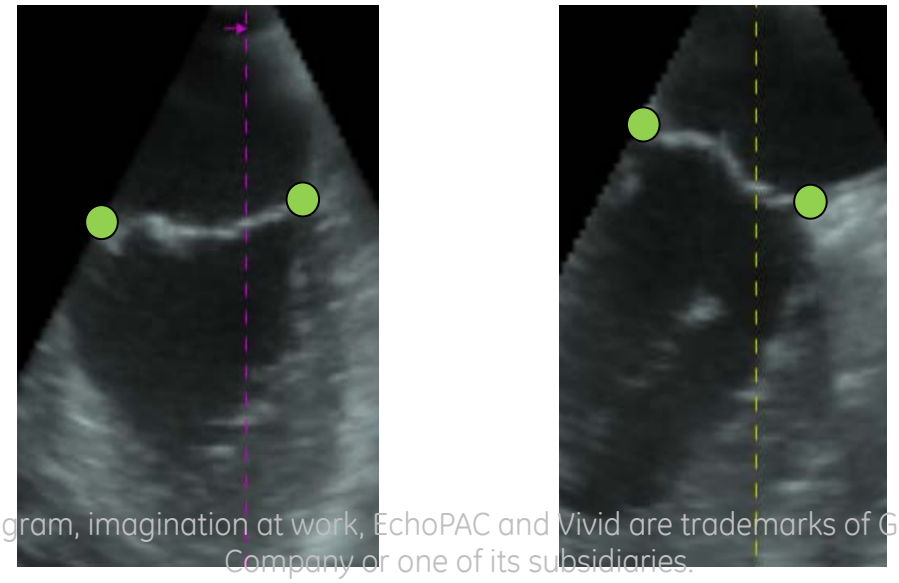
In order to Flip the dataset around to have the left atrium on top of the image press the button for the LAX Orientation in the menu on the right side.



Align the image into the correct axis, by drag and drop of the green line.

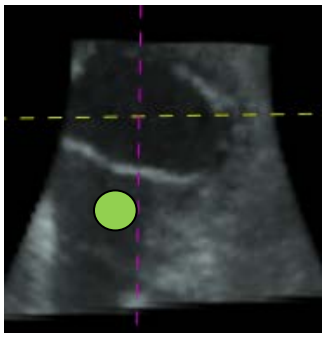
Set MV Annulus Landmarks

Select a frame in **mid systole** to make the analysis.
Define the position of the mitral annulus by setting two landmarks (LM) in the Azimuth plane and two in the Elevation plane



Set LVOT LM

Check in which of the three SAX views (on the left side) the left ventricle outflow track (LVOT) is best seen. In this image **set** a land mark (LM) in the middle of the LVOT in order to define the orientation of the 3CH view.

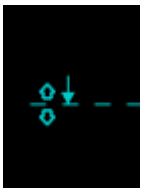


View adjustment

Only if needed you may further adjust the image to have a proper ME Long Axis view.

Set Line of Interest

Keep the left mouse button pressed on a line of interest slice icon in the upper tile and move the mouse to find a level of the SAX plane, where the LVTO/AV can be seen best in the image region below.

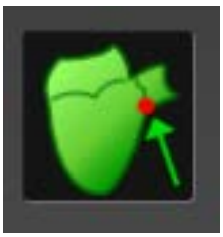


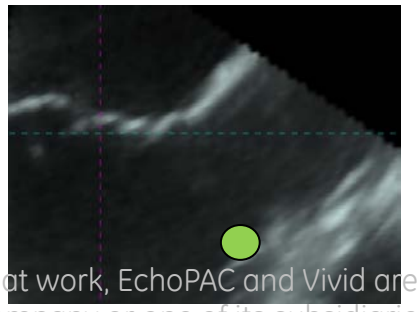
Adjust the 3 CH view

Keep the left mouse button pressed on a line of interest rotation icon in the lower tile and move the mouse to align the line of interest to the center of the aortic valve in order to obtain a true 3-Chamber view in the image region above. If the following step should be skipped please click on the Set Reference Points button.

Set Aortic Annulus (if required)

Click the Set Aortic Annulus button. The display changes from dual tiling to Single tiling and the animation of the phase sequence is stopped. Set a land mark (LM) in order to define the apical Aortic Annulus point. This step is required to get later a ring model of the Aortic Annulus displayed.



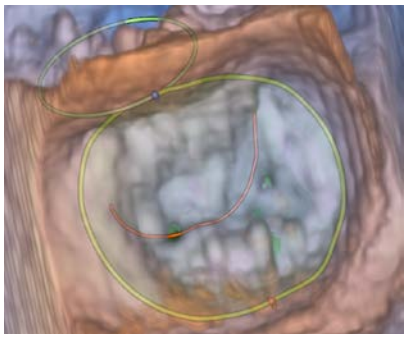


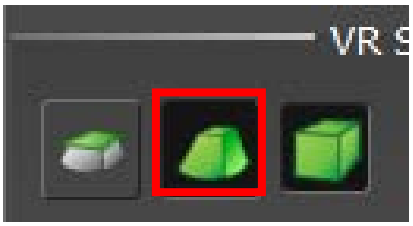
Set Reference Points

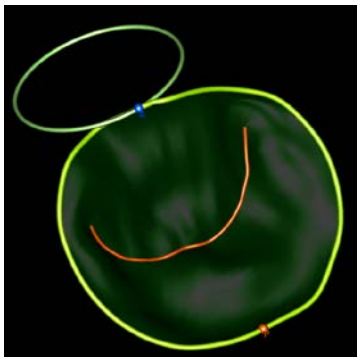
Set Landmark(s) at the end of the coaptation. Watch the animated middle tile and set a land mark (LM) at the upper static tile in order to define the end of the coaptation of the mitral valve. The lateral view of the anterior (blue) and the posterior (red) leaflet are represented by lines.

Static Model Review

The system will show the model inside the render image.
If likely the render image can be completely removed to only visualize the Model.
Use the middle symbol in the VR settings



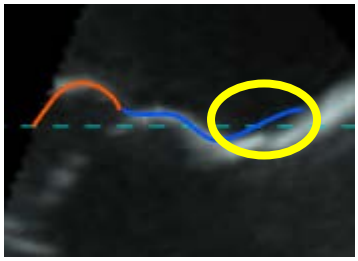
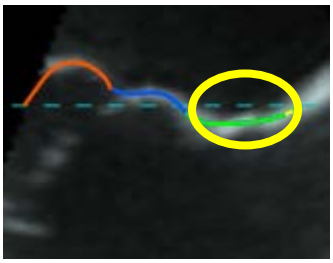
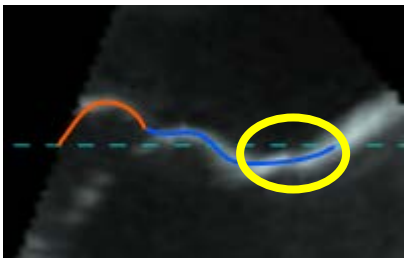




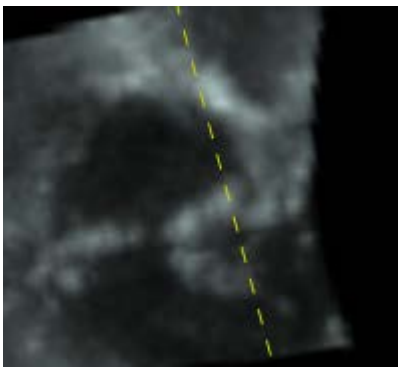
If needed: Click on the 'Edit the position of the commissures' button.

Check, if the closure line ends at the commissures by using the static and dynamic volume rendering view. If adaptions are needed - directly click on the proper commissure points in the left

volume rendering view. Disable the 'Edit the position of the commissures' button to go back to the Static Model Review.
Move the mouse on the contour on the upper right image.
Colors of the detected MV will change from red or blue to a green color. Simply drag and drop the contour line and change it to the accurate position.

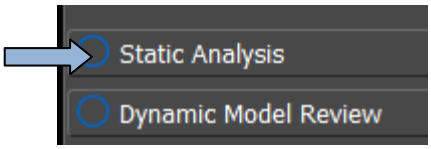
Use the yellow indication Line in the lower image to sweep through different positions

Review the contours in the upper image and adjust if needed.

Static Analysis

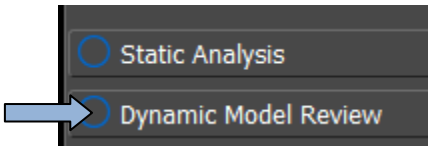
Select the next step from menu on the right side.



Reviews of the MV geometry, associated measurements are displayed.
By selecting one of the measurement parameter, an indication is shown inside the model, to get the correlation to the measurement.
Different layouts are available and the possibility to perform measurements by the user.

Dynamic Model Review

Select the next step from menu on the right side.

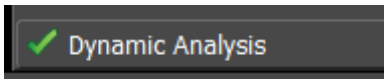


Review the MV geometry in the systolic phase.

Use the tool bar on top, to start/stop the image and go frame by frame.
Adjust the contour lines if necessary.

Dynamic Analysis

Select the next step from menu on the right side.



Reviews of the MV geometry, associated measurements are displayed over the systolic phase.
By highlighting one measurement parameter, a graph is shown how the parameter evolves over the systolic phase.
Different layouts are available and the possibility to perform measurements by the user.

Store images to clipboard

In order to store any images from inside the TomTec application to the EchoPac clipboard, press **Alt** + **P** together. A screenshot of the whole screen (if configured as described above) will be stored.

Store AVI or BMP outside EchoPac

Use the Film icon on the upper left side, to store either a loop or a still frame to some other medium.

The system opens a new window where you can select your storage destination and enter the file name.

Export results

Use the Export icon in order to export **ALL** measurements (containing system measurements **and user** measurements).

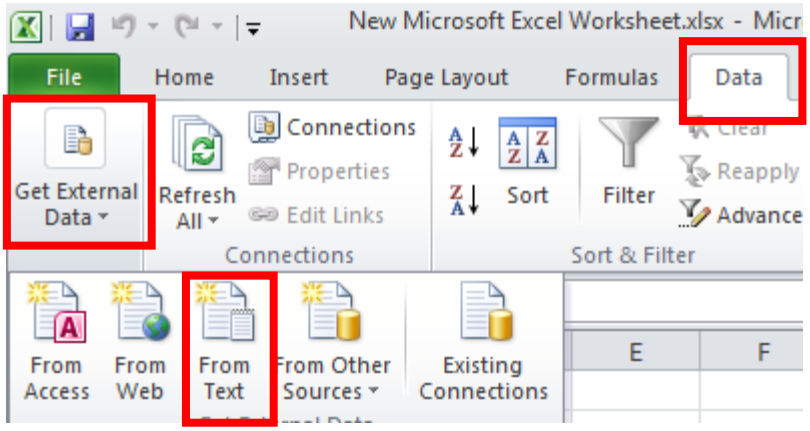
The system will open a new window where you can select the storage destination and file name. The export format is a text file that can be imported into an excel sheet.

Note

When moving the mouse over the Export icon the system indicates an export to .cvs file. In fact the file will be a .txt file but can be imported into Excel easily.

Import .txt file into Excel

Open a blank Excel workbook.
Move to the tab for **DATA**
Click on **Get External Data**
Select to get the Data **From Text**



A new window opens, search and select your Text file and press **Import**.
A dialogue window opens, please select:
Step 1: **Delimited** – then press **Next**
Step 2: Delimiters: uncheck the Tab and make a check mark at **Semicolon** - then press **Next**
Step 3: Leave on **General** – then press **Finish**
In the last dialog box, just press **OK**

Exit the MV application

Click on the X on the upper right corner.
The system will ask if the analysis should be store.
If you would like to save your analysis, enter a name and save or you may leave without saving your data (same procedure as in TomTec LV and RV application).

Measurements in Worksheet

When you Exit the TomTec application the measurements from the static analysis are automatically transferred into the patient's worksheet.
Even if the analysis has not been stored, the measurement will enter the worksheet !!

Note

Measurements from the Dynamic Model Review **and** manual user measurements are not entering the worksheet. These measurements can be transferred with the measurement export in the .txt file.