

Constraining Basal Plane Motion for Gated Studies

Based on MRI and echocardiography data¹⁻³, Corridor4DM assumes that the base of the left ventricle will move between 5mm and 20mm from end diastole (ED) to end systole.

NOTE

Many quantitative algorithms (eg. many planar blood pool programs, some perfusion SPECT quant programs) do not follow this approach. For example, a recent research study⁴ determined that adjusting the basal motion in 4D-MSPECT to 0mm to 6mm produces LVEF estimates that are statistically equivalent to LVEF values from Cedars Sinai quantitative program QGS.

While this has appeal if serial EF assessments are being performed, the accuracy of the estimates is reduced by using the basal range of (0,6)mm rather than (5,20)mm.

Recognizing that many algorithms that may have processed past studies did not follow this model, Corridor4DM allows the user to set the range of motion for the valve plane. To adjust the range of basal motion, the following procedure should be followed.

STEP 1: Access the Setup Screen

Select the Setup button as highlighted and circled in red in Figure 1. This will present the mid-ventricular vertical long-axis (VLA), horizontal long-axis (HLA) and short-axis (SA) images for step 2. Step 6 Step 3

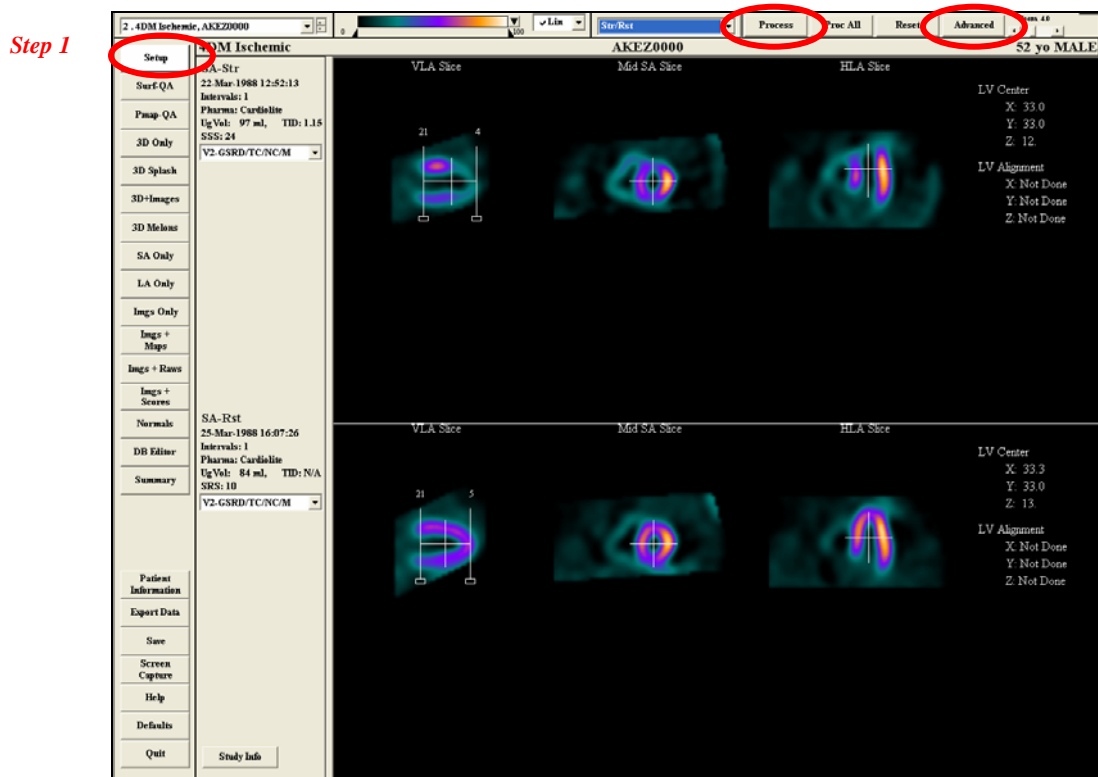


Figure 1. Setup screen in Corridor4DM application.

STEP 2: Reposition LV Center and Limits

If necessary, re-position the LV center and axial limits on the displayed images as instructed in the [Setting the Processing Limits on the Setup Screen](#) help sheet.

STEP 3: Open the Advanced Algorithm Dialog

Select the Advanced button as shown in Figure 1. This button will present the dialog for the Advanced Algorithms Options. The options selected will apply only to the current session of Corridor4DM, they are not saved for future sessions. To save the options as defaults, use the Algorithms page in the Preferences Dialog (See the [Modifying the Default Settings for Specific Review Screens](#) help sheet).

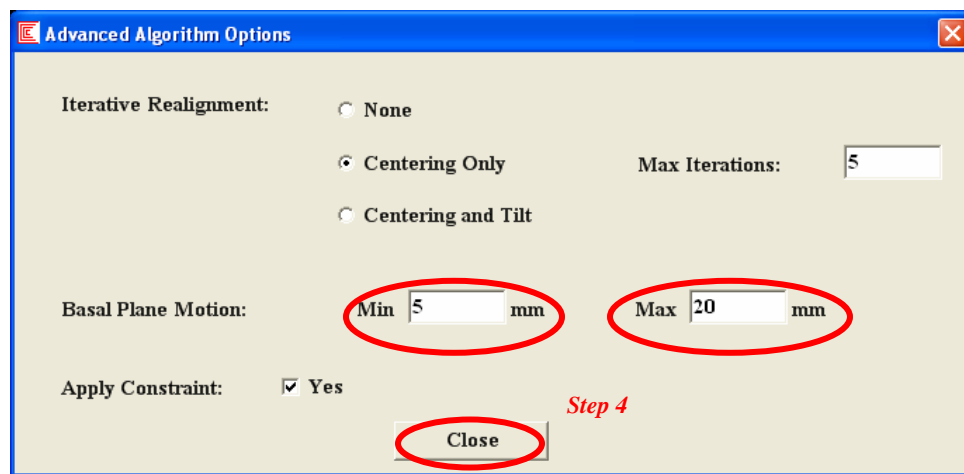


Figure 2 Advanced Algorithm Options Dialog

STEP 4: Set the Basal Motion Limits for QGS-like Results

To produce LVEF estimates that are statistically equivalent to LVEF values from QGS:

- Edit the 5 (mm) in the Min field and replace it with a 0 (zero).
- Edit the 20 (mm) in the Max field and replace it with a 6.
- Click left on “Close” to close the dialog and return to the Setup Screen as shown in Figure 1.

WARNING

Changing the algorithm settings can have a significant impact on the accuracy of the surface generator. Only users familiar with the surface generator algorithm should adjust the values from the default settings.

NOTE: For serial LVEF comparisons to QGS, constraining the basal motion to 0 to 6mm is acceptable. For a more accurate assessment of

LVEF, it is **strongly advised** to use the Corridor4DM default values for basal motion of 5mm to 20mm.

STEP 6: Process the Study

Click left on the **Process** button, as shown in Figure 1, to process the study. When processing is complete, the Surf-QA screen is displayed.

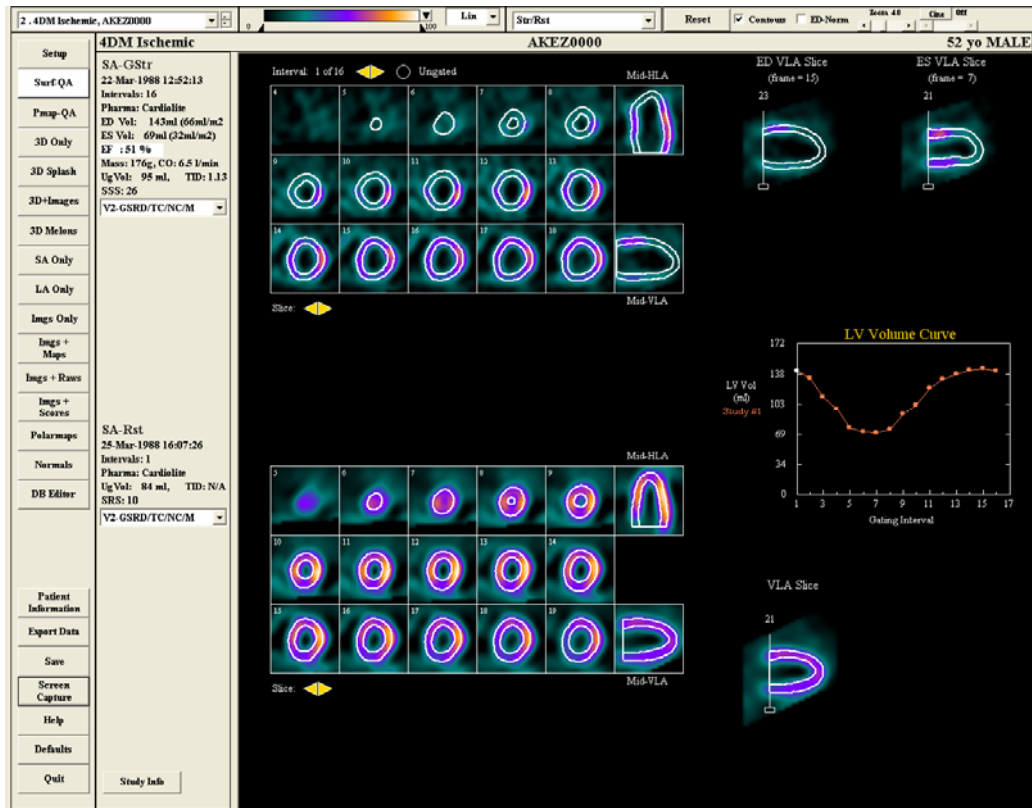


Figure 3 Surface QA (Surf-QA) screen displayed when processing is complete (Splash layout with Diastolic Function option turned off).

References

1. Moore, CC, Lugo-Olivieri, CH, McVeigh, ER, and Zerhouni, EA, *Three-dimensional systolic strain patterns in the normal human left ventricle: characterization with tagged MR imaging*. Radiology, 2000. **214**(2): p. 453-66.
2. Malm, S, Sagberg, E, Larsson, H, and Skjaerpe, T, *Choosing apical long-axis instead of two-chamber view gives more accurate biplane echocardiographic measurements of left ventricular ejection fraction: a comparison with magnetic resonance imaging*. Journal of the American Society of Echocardiography, 2005. **18**(10): p. 1044-50.
3. Maceira, A, Prasad, S, Khan, M, and Pennell, D, *Normalized left ventricular systolic and diastolic function by steady state free precession cardiovascular magnetic resonance*. Journal of Cardiovascular Magnetic Resonance, 2006. **8**: p. 417-426.

4. Ficaró, EP, Kritzman, JN, and Corbett, JR, *Effect of valve plane constraint on LV ejection fractions from gated perfusion SPECT*. J Nucl Cardiol, 2003. **10**(4): p. S23(abstract).