Selecting loops

AutoSTRAIN can analyze 1-3 2D loops with the manual workflow. The manual analysis workflow guides users through 3 steps.

- Labeling
- Tracking revision
- Analysis

1. Select up to 3 2D loops to analyze from review and launch AutoSTRAIN from the touchscreen.

   (If 1 or 2 2D loops are selected, please refer to the “Using 1 or 2D loops” section)

Labeling | Assigning a label template

2. Select a view template from the left side of the screen and apply to the template to the appropriate 2D loop.

3. Continue to apply the appropriate template to the regaining loops.

Tip: Only one view label can be assigned to each loop.

Selecting a cardiac cycle (optional)

The cardiac cycle between the white flags will be used for speckle tracking analysis. The middle cardiac cycle is selected by default.

1. Double click on an image to expand into 1-up view.
2. Use the green arrows to select a different cardiac cycle.
3. If the R-R position is incorrect, adjust the white flags as needed.

Tip: It is possible to move the white flags beyond one R-R cycle. Doing so will result in more than one cardiac cycle being analyzed.
AutoSTRAIN Manual Workflow

Correcting template labels

On the rare occasion where auto labeling incorrectly labels a loop, labels can be removed and reassigned.

1. Click the X next to the incorrectly assigned label template.
2. Re-assign the view labels as needed.

Tracking revision

After reviewing the automated borders, users can edit the contours. It is strongly recommended only to edit the borders when needed.

1. Review the automated contour borders (the green line at the endocardial border) on the ED and ES frames.

Tip: Double click on an image to view in 1-up.

The reference points are on the blood pool / tissue border at the left and right mitral valve leaflet insertion, and the apex.

2. Click on and drag the edit points on the ED frame. Always edit the ED frame first. After edits have been on the ED frame, the ES frame will be updated automatically.

3. If, after editing the ED, the ES needs updates drag the edit points to make the desired changes. Editing the ES will not change the ED.

The reference points are on the bloodpool / tissue border at the left and right mitral valve leaflet insertion, and the apex.

The reference points are on the blood pool / tissue border at the mitral valve leaflet insertion, the LVOT and the apex.
AutoSTRAIN Manual Workflow

Analysis

Strain Results

The strain results are a comprehensive overview of the data, including:

- GLS per view
- GLS average
- Bull’s-eye for Peak Systolic Longitudinal Strain

Tip: Create secondary captures of the results with Acquire 1 or 2.

Global segmental strain waveforms

The global segmental strain waveforms are a comprehensive display of all results, including all 18 segments, demonstrating complete cardiac regional waveforms for pattern recognition.

- Click on the waveform button in the bottom right corner of the bull’s-eye.

Tip: Click on the bull’s-eye button in the bottom right corner of the waveforms to return to the bull’s-eye view.

Segmental Strain Waveforms

1. Switch to the curves display.
2. Click on A4C (or other view) view to make it the active view (highlighted in yellow). Only the AP4 curves are displayed.

Tips:

- Click on the results view or curve to view all 18 waveforms.
- Click on the segmental strain button to view the measurements per segment.

Editing in Analysis

If needed, views can be edited while in Analysis.

1. Move the cursor to the left of a view to show the smart regions (D and S buttons).
2. Click on D (ED) or S (ES) to jump to the desired frame to edit.
3. Edit the frame as need. Remember to edit ED first and then adjust ES if needed.
AutoSTRAIN Manual Workflow

Analysis (continued)

Edit AVC

- ES time (Aortic valve closure time (AVC)) is displayed on the right side of the screen
- The segmental peak systolic strain values are dependent on AVC time includes End-Systolic Strain.
- Editing AVC time has no impact on GLS_Endo_Peak measurements.

To edit the AVC:

1. Click the AVC button in the left panel.
2. Click and drag the ES time marker to the correct position.
   **Note:** The ED marker cannot be edited.
3. Click on the bull’s-eye button to return to the analysis.

Variable Heart Rate

If the difference between the min and max heart rate of the 3 analyzed loops is more than 10%, a message is shown above the bull’s-eye.

The heart rate of individual loops is computed based on the duration of the analyzed cardiac cycles.

Using 1 or 2 2D loops

Workflow differences when using less than 3 loops:

- Loops must be labeled manually
- Speckle Tracking starts immediately after the last label is assigned
- There is no Bull’s-eye view and no GLS average will be computed

1. Choose an A4C loop (and another loop, if using 2 loops).
2. Launch AutoSTRAIN
3. Apply the view template(s) to the view(s).
   Analysis will begin immediately.
4. The waveform(s) will be displayed.
AutoSTRAIN Manual Workflow

User settings

To open the User Settings menu, click on the green gear icon in the bottom right corner of the screen.

Image orientation

The default ROI template can be changed in the User Settings menu. User can set the Up-Down, Left/Right inverse to align with the image orientations. The default settings are highlighted in the image below.

The recommended workflow:

1. Select the loops that do not match the current orientation settings.
2. Change the User Setting.
3. Relaunch AutoSTRAIN or return to the labeling step and select the template for the individual views.

Regional measurement timing

Users can choose between End-Systolic and Peak-Systolic for the regional strain values. The system default is Peak-Systolic.

Please consult the user manual for further information.