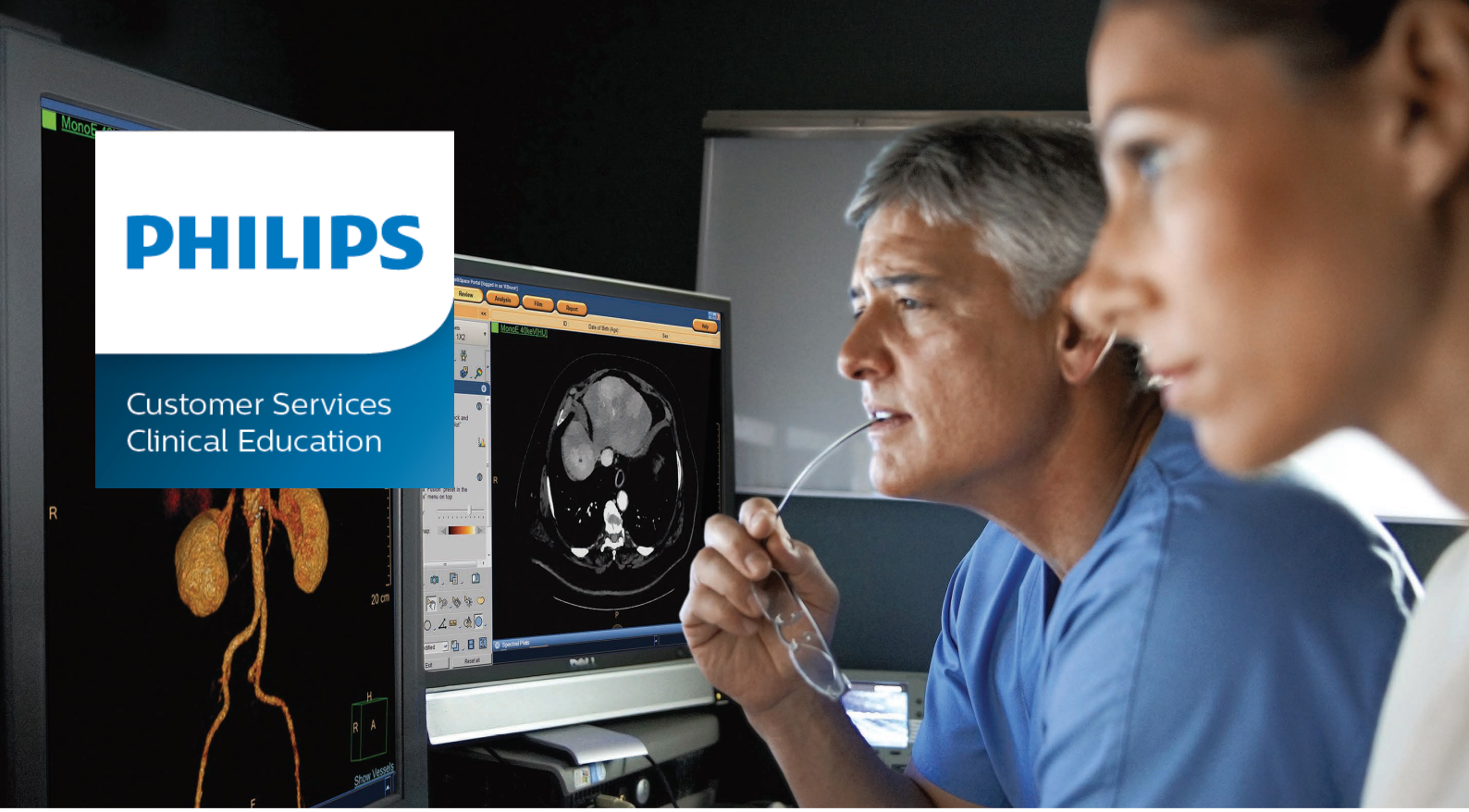


MR Liver Health

IntelliSpace Portal

MR Applications

Quick Step Guides

Application

As Non-alcoholic fatty liver disease are widely diagnosed, measuring the fat fraction and the iron load of the liver tissue has become an important diagnostic tool to identify the early condition of cirrhosis which may lead to HCC.

The special MR sequence **mDixon-Quant** is tuned to assess accurate fat quantification in the liver in a single breath. A simple in-phase and out-of-phase acquisition may be suitable for a qualitative assessment of fat.

Before you begin

T2*-Map

- **mDixon-Quant** uses a 6-echo acquisition for fat quantification.
- Using a higher number of echoes has the advantage of allowing calculation of T2* relaxationtime map (T2*-map).

Fat Fraction (FF)

- The T2 relaxation time is necessary since the T2* signal decay between the in phase and the opposed phase echo influences the relative signal intensity of the fat peaks.
- Accurate fat calculation takes into consideration the T2* relaxation time.
- Accurate fat calculation allows the determination of an accurate Fat Fraction

Workflow

From the Patient Directory, select a study incl. axial mDixon Quant data (generated on a Philips MRI Scanner) and load it to the MR Liver Health Application.

The study should contain the following data types:

– Water

– Fat and Fat Fraction

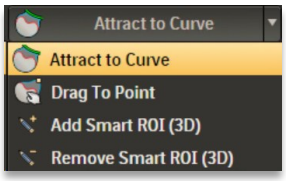
– T2*

Automatic segmentation starts when the data is loaded. The water image and the T2* image are displayed in a 1x2 layout with reference views. All views show the contour of the segmented liver volume. On the water image, the contour is red (meaning that it can be edited) and on all other views, the contour is green (and cannot be edited). A table- and histogram view will be displayed.

Note: The screen layout can be changed by using the drop-down list in the upper-right corner of the main viewport. The table view and histogram view are always displayed with each layout. At any time, you can double-click a viewport to maximize it. Double-click again to return to the selected layout.

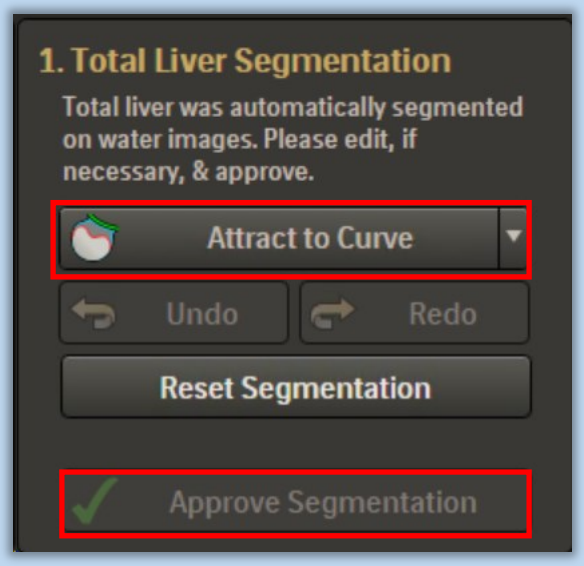
Total Liver Segmentation

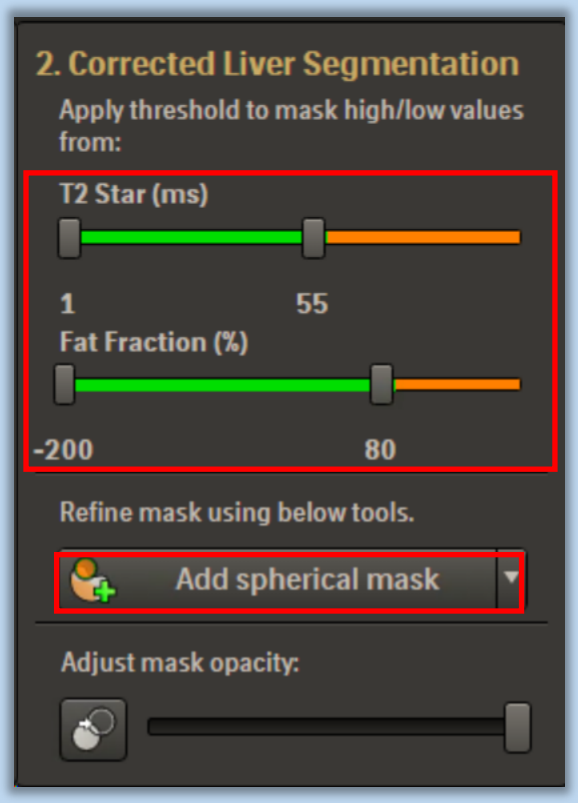
1. To edit the automatic liver segmentation, select one of the available editing tools provided in step 1 of the task guidance panel . Note that editing is only available on the water images. Verify the correctness of the segmentation for all slices!



Note: Several tools are available from the Context menu/wheel when right-clicking on an image. Select a viewing option on the wheel or select a tool. The segmentation can be edited on any slice or orientation of the water image, including the water image reference views.

2. Once the liver segmentation is correct and complete, click Approve Segmentation in the task guidance panel.

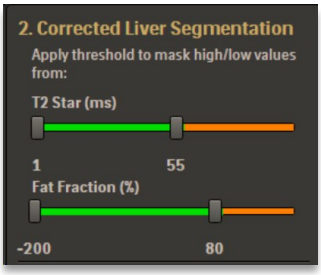




Workflow

3. After approving the segmentation, select the **Threshold** check box in the task guidance panel, step 2 **Corrected Liver Segmentation** (optional). A threshold is applied to the T2* map with a default setting of 1 ms through 55 ms. The threshold masks tissue outside this range. Masked voxels are displayed in orange.

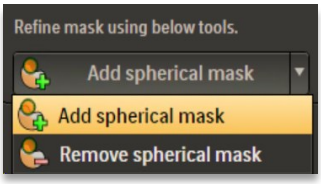
   Note: The T2 image is selected by default when you apply a threshold. To change the image type for each image, click the image type drop-down list at the top of each image and select an image type.*



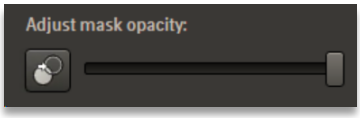
4. To **adjust the threshold**, drag the sliders in the task guidance panel. The table- and histogram view are dynamically updated with the results of the new threshold, excluding the masked voxels.

5. To edit the mask, select **Add spherical mask** in the task guidance panel, move the pointer over the area to be edited and define the size of the mask by holding **<Ctrl>** and rotating the mouse wheel.

   To unmask areas that have been incorrectly masked, use the **Remove spherical mask** tool from the drop-down list in the task guidance panel.



6. To **change the opacity** of the masked tissue, drag the opacity slider in the task guidance panel to either the left or right direction.



7. If desired, **a maximum of 9 ROIs can be added** to the images. Select the ROI tool from the task guidance panel, step 3 **Regions of Interest**. The following tools are available:

   - Ellipse
   - Freehand
   - Spline

Note: ROIs will be propagated to all image types and are displayed in the result table and histogram!

9. To focus the histogram view on a specific set of results or parameters, use the drop-down lists at the top of the histogram view. You can view results for total liver, corrected liver, or each ROI created.

10. To save the results, select one of the save options from the drop-down list in the lower-left corner of the task guidance panel.