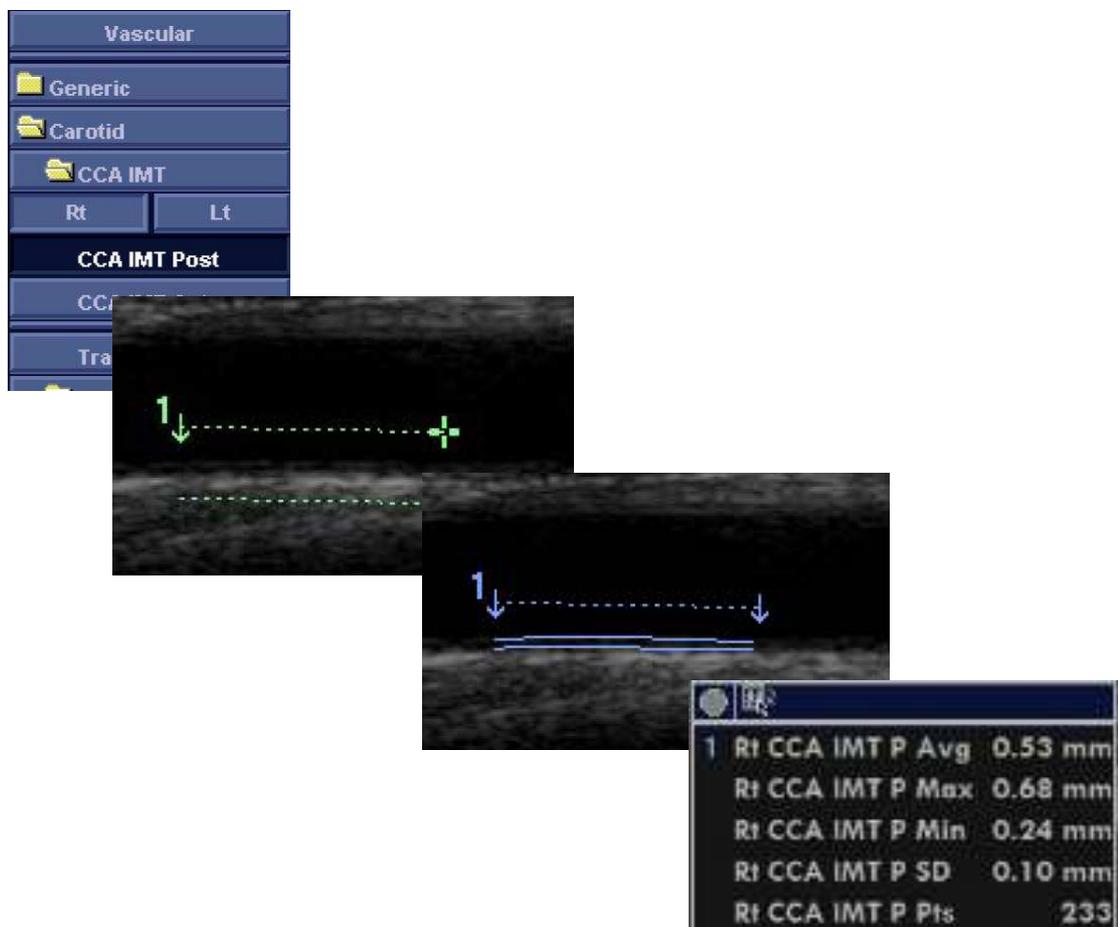


Application News



Measurement of the intima media thickness



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NOTE

This hand out is additional training material.
For more information please refer to the user manual and/or reference manual.

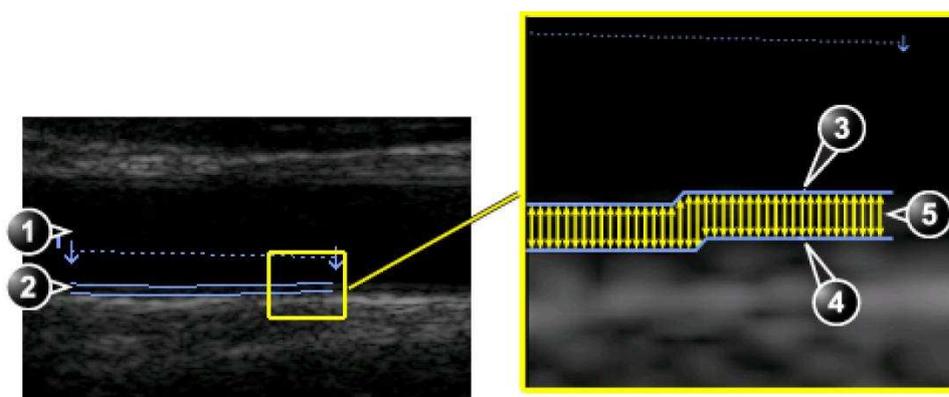


General Information

Intima-Media Thickness

The Intima-Media Thickness (IMT) is calculated based on automatic contour detection of the Intima and Media layers on a user-defined search region along the vessel wall.

Multiple IMT measurements are made between pairs of intima and adventitia points along the wall



1. Vessel lumen
2. Wall with measured ROI

3. Lumen-Intima boundary
4. Media Adventitia boundary
5. Multiple IMT measurements (not shown on the system, just for illustration)

Notes

- The IMT can be measured both on the posterior and the anterior walls of the vessel.
- The IMT measurement is available with linear probes only.

Parameters

The following parameters are calculated:

- Average IMT
- Maximum IMT
- Minimum IMT
- Standard deviation of IMT measurements
- Number of successful IMT measurements



The Measurement

Arbitrary

Place the ROI at an arbitrary location selected by the user. The ROI length is also arbitrarily defined by the user.

Protocol defined

Place an ROI with predefined length at a predefined distance (offset) from some vertical marker. Both ROI offset and lengths are predefined by the user according to the user's protocol.

Important Note

The protocol driven measurement is only possible with Vivid S5 or S6, i or q with BT 10 version or higher.

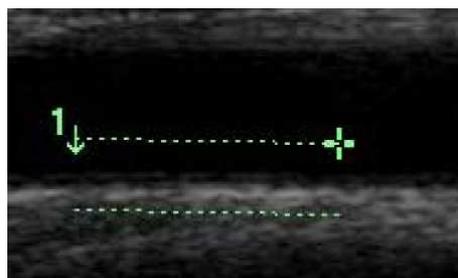
The measurement procedure - Arbitrary

The following procedure describes the posterior IMT measurement.

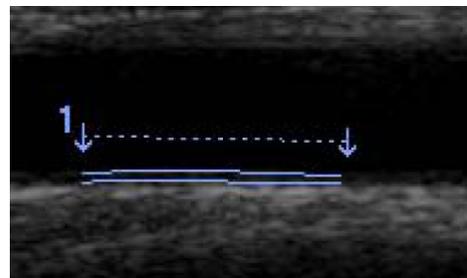
1. Acquire a longitudinal scan of the carotid artery and optimize the image.
2. Press **Freeze**.
3. Scroll to an end-diastolic frame where the intima layer is clearly visible.
4. Press **Measure**.
5. Select the appropriate IMT measurement. If measuring the IMT of the posterior wall of the right common carotid select RT and CCA IMT Post.



6. Place the cursor in the artery closer to the posterior wall and press Select to anchor the start of the search region.



7. Move the cursor parallel to the artery to define the end point of the search region. Make sure the Intima and Media layers are within the search region (indicated by the lower dotted line).
8. Press **Select** to anchor the point. For the posterior wall the contour detector searches for the leading of the edges of the intima and adventitia layers. The detected contours are drawn in the image.



9. The measurement calculations are displayed in the Measurement result table.

1	IMT P Avg	0.53 mm
	IMT P Max	0.68 mm
	IMT P Min	0.24 mm
	IMT P SD	0.10 mm
	IMT P Pts	233

NOTE

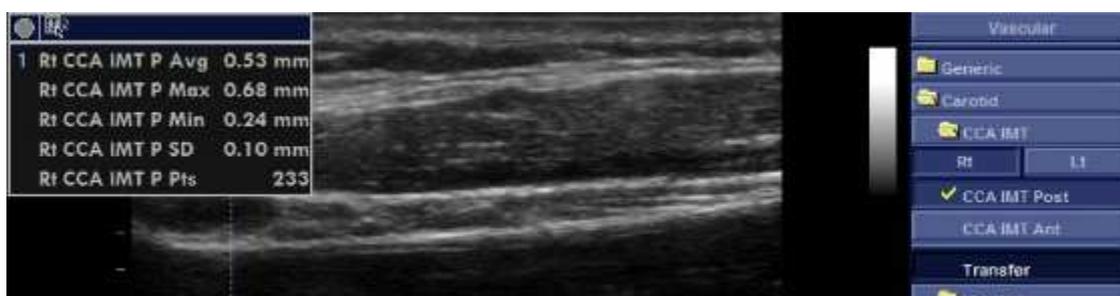
If the Intima and Media layers are not within the search region, the contour is not drawn. Select (double click) and move the anchored points closer to the Intima layer.

10. If the contour is not optimal, adjust Trace Fit to modify the traces according to different threshold values. If the contour is still not optimal, try to perform the IMT measurement on another frame, preferably close to the end diastole.

IMT trace approval

Since the IMT measurements are done semi-automatically, the operator has to approve the detection by visual inspection before storing the results in worksheet and report.

- If the traces fit both layers of the posterior wall, approve the measurement by selecting **Transfer** in the *Measurement* menu.
- Once transferred, the calculations can be viewed in the worksheet and report.



NOTE

Measurements that are not approved will not be saved.

NOTE

Any image adjustments (e.g. Gain or zoom) on approved (transferred) measurements will unassign the measurements. Press Transfer to approve the measurements again.

The measurement procedure - Protocol defined

The following procedure describes the posterior IMT measurement, by using the Protocol

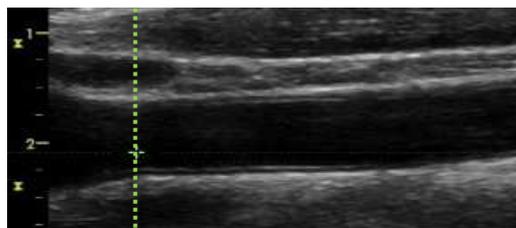
1. Acquire a longitudinal scan of the carotid artery and optimize the image.
2. Press **Freeze**.
3. Scroll to an end-diastolic frame where the intima layer is clearly visible.
4. Press **Measure**.
5. Select the appropriate IMT measurement. If measuring the IMT of the posterior wall of the right common carotid select RT and CCA IMT Post.



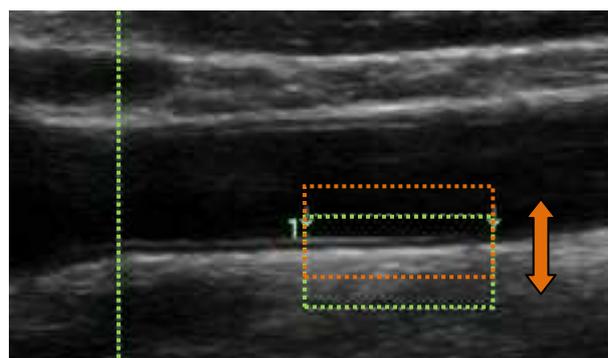
6. Turn the Protocol soft-key on - **Use Protocol**



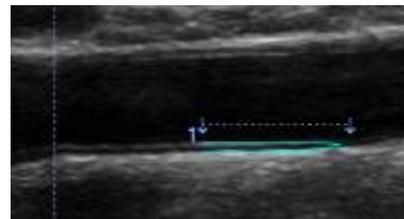
7. Place the vertical cursor on some anatomical reference point on the bifurcation.



8. Press **SET**. This will anchor a vertical cursor on the anatomical reference point, and an ROI box will appear on the right, at a pre-defined offset distance. The length of the ROI box is a fixed length.
9. Move the ROI box **up** or **down** to cover the posterior wall of the carotid vessel.



10. Press **SET** to anchor the point. For the posterior wall the contour detector searches for the leading edges of the intima and adventitia layers.



11. The measurement calculations are displayed in the Measurement result Table.

1	IMT P Avg	0.53 mm
	IMT P Max	0.68 mm
	IMT P Min	0.24 mm
	IMT P SD	0.10 mm
	IMT P Pts	233

Note

If the Intima and Media layers are not within the search region, the contour is not drawn. Select (double click) and move the anchored points closer to the Intima layer.

IMT Measurement Protocol setting

When the IMT Protocol soft-button is turned ON two special controls will appear: "Offset" and "Length", controlling the IMT ROI with predefined length and predefined distance (offset) from the vertical marker.

The user may modify the offset or length while performing the exam, in case these are not set to optimal dimensions.

To modify Protocol defaults

1. Set the Protocol button ON
2. Adjust the Offset and Length values.
3. Press the **Store default** soft-key to store the current settings of Offset and Length, to be used in the future exams.



4. The default settings may be defined differently for the CCA and the ICA.

Note

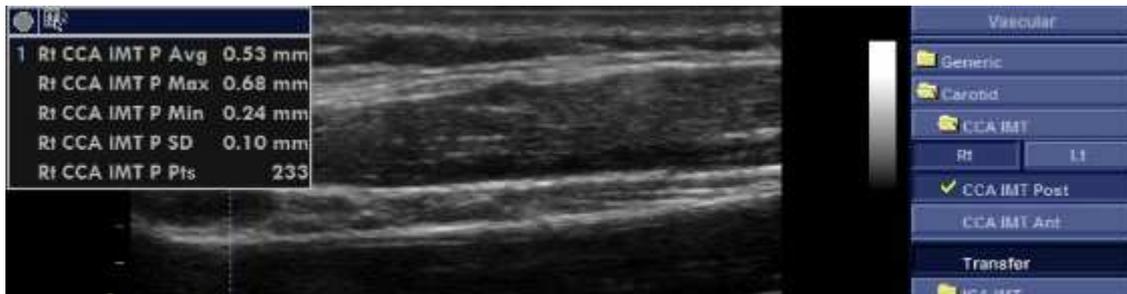
When adjusting the offset for the ICA, the offset values are negative, as the ROI is located to the left of the vertical reference marker.

IMT trace approval

Since the IMT measurements are done semi automatically, the operator has to approve the detection by visual inspection before storing the results in worksheet and report.

If the traces fit both layers of the intima-media walls, approve the measurement by selecting **Transfer** in the Measurement menu.

Once transferred, the calculations can be viewed in the worksheet and report.



CAUTION

Measurements that are not approved will not be saved.