IOLMaster® Best Practices

This outline is provided for you to take notes during the course.

IOLMaster Technology Review

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Product Overview

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Best Practices Tips

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Lens Database/Backup

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Optimization

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IOLMaster 500 - Quick instructions

WARNING - GENERAL HAZARDS
These quick instructions are intended as an overview. Instructions for the safe operation of the instrument are to be found in the user manual.

Always perform measurements in the correct sequence! All device measurements must be performed before any undertaking any measurements involving direct contact with the eye.

Checking the calibration

- Always check the calibration daily before carrying out measurements on patients!
- Use the test eye (ensure that the test eye is clean).
- Now carry out the measurements on the test eye. The measuring results from the check of measurement functions are saved under patient name [CHECK.DEVICE]. The test eye is ideally suited to practicing operating the IOLMaster.
- If the measured values are not within the tolerance range given on the test eye, remove the device from service and contact the Carl Zeiss service department.

Useful button functions

<N> key: creates a new patient.
<A> key: activates DUAL measurement mode
<D> key: activates anterior chamber depth measurement mode
<M> key: switches between automatic and manual measurement
<K> key: switches between dual, axis length and keratometer measurement modes
... further short cuts can be found in the user manual.

New patient | <N>

- A new patient can be entered manually. Enter the patient’s name and date of birth, separated by points (.). The year of birth should consist of 4 figures, e.g. 07.03.1965 (7 March 1965).
- An existing data record can also be selected from the patient list. The ultrasound tab is used for importing and exporting ultrasound and patient data (only with Sonolink option).
- After entering the data, use the navigation bar or the <Enter> key to change to the Overview mode.

Overview mode | <O>

- Ask the patient whether she/he can see the fixation lamp. Ask the patient to look straight into the yellow light and blink, then to open his/her eyes as wide as possible.
- Center the 6 illumination LEDs around the pupil (Fig. 1). A traffic light display serves as a quick and simple method of obtaining the optimum measurement setting. When the optimum measurement position has been reached, the traffic light will change from red to yellow to green.
- If Automatic is activated, measurement will start automatically using the optimum settings and change to Dual measurement mode.
- If the automatic measuring function has not been activated, press the joystick button, the <A> button or the <space bar> or click on the Dual icon in the navigation bar to change to Dual measurement mode for axial length and keratometry.

Automatic dual measurement mode (Twin technology) | <A>

- The IOLMaster 500 is equipped with the latest twin technology which combines measurement of the axis length and corneal curvature. This is referred to as Dual measurement mode.
- If Automatic is activated, the measurement will start automatically using the optimum settings and change to Dual measurement mode (the eye is measured and the anterior chamber depth shown as the next step).
- In some cases it may be necessary to measure the axis length manually. To do this, press the <M> key. The Automatic display will disappear. It is also possible to deactivate automatic measurement on the Settings - Measurement tab.

Keratometer (corneal curvature) measurement

- Cyclic change of the measurement modes Dual, Axial length measurement and Keratometer measurement is possible by clicking on the <K> key if Automatic is deactivated. Select Keratometer measurement mode.
- Focus the eye so that all six peripheral measurement points are shown sharply in the display. Trigger the measurement by pressing the button on the joystick.
- Three consecutive measurements of the corneal curvature are taken automatically. Keratometer measurements may be repeated as often as desired; however, only the mean value of the last three measurements will be displayed.
- If a measurement point is not correctly identified, a blue flashing dot will appear. A further measurement should be taken as a precaution. (Fig. 2).
- If the system detects any measurement errors (e.g. deviations within the last three measurements), “Evaluation” appears in the display. In this case, check the tear film of the eye being examined and repeat the measurements until the results are within the tolerances.
Axial length measurement

- Cyclic change of the measurement modes Dual. Axial length measurement and Keratometer measurement is possible by clicking on the cKey if Automatic is deactivated. Select Axial length measurement mode.
- Ask the patient to focus on the fixation light and check the tear film of the eye (in case of doubt, ask the patient to blink). Then trigger the measurement using the joystick.
- Five individual measurements of the axis length are made. The overall evaluation curve (blue) is calculated from this and displayed (Fig. 3). If no axial length can be determined after the first five single measurements, further measurements will be required.
- With stronger lens opacities, it may be advisable to defocus the instrument. In this case it is useful to select an area within the circular mark with less clouding (segments 3 and 4 in Fig. 4).
- The Signal Noise-Ratio (SNR) is shown alongside the overall evaluation curve (blue). This value is a gauge of the quality of measurement (Fig. 5).
- If the overall evaluation curve has multiple peaks, it may be advisable to carry out post-processing. Use the left mouse button for automatic positioning above a removed peak. Using the right mouse button you can dispense with automatic determining of the peak and position the measurement cursor manually (always use the zoomed view for this).

Measurement of anterior chamber depth <d>.

- Ask the patient to look straight into the yellow light. Inform the patient that a white light will be introduced from the side, but that she/he should continue to look at the yellow light only.
- The best measurement results will be obtained with dilated pupils and minimum possible reflection from other light sources (darkened room).
- As a rule, the image of the fixation point should lie between the images of the cornea and the crystalline lens. In Automatic mode the measurement is triggered as soon as the optimum measurement adjustment (green traffic light) has been achieved. In Manual mode trigger the measurement by pressing the button on the joystick.
- Clicking on Video help will play a video showing the steps required to set the optimum measurement position.

Determination of "white-to-white" | <w>.

- Ask the patient to look straight into the yellow light, blink, then open his/her eyes as wide as possible.
- Align the instrument so that the six peripheral light spots are symmetrical to the cross hairs and the iris structure or the edge of the pupil appears optimally focused. The image of the central fixation point will not generally be at the center of the pupil and iris.
- Start the measurement by pressing the joystick button.
- Check the position of the marked edges of the iris. Repeat the measurement if required. The measurements are not valid and cannot be edited until they have been confirmed by clicking on OK (Fig. 6).

Measuring the other eye.

- The system automatically registers when the device is positioned in front of the other eye.
- After each change of side, the Overview mode is automatically activated. Measurements of the other eye must be performed analogously to the previous eye.

Shut-down | <e>.

- When all measurements have been completed, exit the program by clicking on the Exit icon or pressing <E>.
- Then confirm by clicking on OK or pressing <Enter>. The readings for the last patient will be saved automatically.
- Switch the instrument off at the power switch. The instrument may not be switched on again until the switch light goes off.

Give us the benefit of your experience with the IOLMaster 500!

News and regular updates from the independent User Group for Laser Interference Biometry can be found at:

- www.augenklinik.uni-wuerzburg.de/ulb
- www.iolmaster-online.com
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Lens manager
Click on the Settings icon (Fig. 1) and use the lens manager as if adding a new surgeon or a new lens (1, Fig. 2). Enter your password (if necessary) and click OK (2, Fig. 2).

Select surgeon and lens
Then select the surgeon and the lens for which you wish to enter the post-surgery data. On the right you can see the current values for the individual formulae and constants (e.g. Holladay or HofferQ). These are the values you will now optimize (1, Fig. 3).

Select "Optimize"
Once you have selected the desired combination of surgeon and lens, click on the Optimize button at the bottom right (2, Fig. 3).

Load your patients’ data
A new window specifying the name of the surgeon and the lens will then appear. The only data already entered are the current lens constants. Click Load to select patients for which you have post-operative data. Once you have selected Load, a new window opens on the right containing the data of all patients and all the results obtained using the IOLMaster 500.

Select the suitable patients
Click on the name of a patient in the table on the right hand side. Alternatively you can enter the patient’s name in the search field (1, Fig. 4) or scroll through the patient list. Only select patients who have been treated by the selected surgeon and who have also received the selected lens implant. Ensure that only patients are selected who are eligible for the optimization.

Select the specific eye
Only select the eye which has been treated (2, Fig. 4).

Transfer data from the right to the left table
Once you have selected a patient, click OD or OS as described, or both, to identify the eye(s) treated. Then click the icon << (1, Fig. 5) to transfer the patient to the left list of the Patients with lens. Repeat this until all suitable patients have been transferred. Then click Close and return to the optimization window.

Please note the following when optimizing lens constants:
- Only the most recent post-surgical data should be entered for each patient eye.
- Eyes with (pathological or surgical) pre- or post-surgical changes should not be used for optimization.
- Eyes with complications during surgery should not be used for optimization.
- Eyes with a post-surgery BCVA worse than 20/30 should not be used (in Holladay 2 formula not worse than 20/50).
- Sufficient time must have elapsed between the surgery and post-surgery dates.
**Documentation of the post-surgery results**

Click on the patient’s name in the Optimization window (1, Fig. 6). Check the eye for which you have entered data (3, Fig. 6). Add the refractive power of the implanted IOL and the stable post-operative refraction. Further parameters must be inserted for the optimization of the Holladay 2 formula (2, Fig. 6). It is crucial that the post-operative refraction is actually stable - wait at least eight weeks after surgery. Repeat this process for all patients in the list.

**Documentation for all selected patients**

Enter the data for all patients who have been treated by the selected surgeon and have received the relevant IOL (1, Fig. 7).

**Check the axis lengths**

Take of the axis lengths of the patient into account when entering the post-operative refraction. Enter at least ten patients with average values (22 mm to 25 mm) before starting the optimization. It is preferable to have documented between 20 and 30 patients (2, Fig. 7). Click **Optimize** (3, Fig. 7) once you have entered the post-operative values.

**Personalization of lens constants**

On clicking **Optimize**, a new list appears (1, Fig. 8 and 1, Fig. 9) containing optimized lens constants. This is based on the post-operative data entered. Click the >> icons to replace the previous lens constants (under **Basis**). The small >> icons each replace one value (3, Fig. 9). The superordinate large icon >> (2, Fig. 9) replaces all values in a single step. Before transferring the new constants to the **Basis** field, make a thorough check and inform the selected surgeon about the changes you have made. We recommend documenting the original values before making any change.

**Optimization of the Haigis constants**

The values of the a1 and a2 constants of the Haigis formula have not changed in this example (1, Fig. 10).

For optimization of all three constants a0, a1 and a2 of the Haigis formula ten data records are needed for short (14 mm to 22 mm), normal (22 mm to 25 mm) and long (25 mm to 38 mm) eyes, therefore at least 30 data records.

**Save your optimized lens constants**

Click **Save** to secure your changes.

Carry out the following once you have entered the post-operative data:
- click on **Optimize**,
- use the >> icons to transfer the new data,
- confirm with **Save**

- otherwise the optimization is not complete and the program will continue to operate using the original constants.