



Multifunctional device from Topcon

## Chronos: space-saving and user-friendly

Despite, or rather because of Corona, there has been great activity in the development departments of device manufacturers. For this reason, Topcon brought its new device to the market at the end of 2020: “Chronos” is a time and space-saving refraction system that unifies subjective and objective refraction in one device. At the manufacturer they agree that this could lift optometric services to a new level.

Since February, the “Chronos” refraction system from Topcon has been available in the German market. The device unifies subjective and objective refraction along with chart projection. Product developer Hiroaki Okada from Japan explains: “Chronos is a three-in-one device. As a result, customers do not have to move from device to device.” The optometrist can thus

smoothly start the subjective refraction on the basis of the objective measurement data. To the question of why both refractions should be able to be carried out in one device, the expert explains: “Because people see things under binocular conditions, the subjective refraction should be optimised under binocular conditions.” This is seen as the natural state compared to conventional

autorefractometry, which is carried out in a monocular situation. Chronos is therefore equipped with two individual, optical systems and an automatic alignment function in order to allow both objective and subjective binocular refraction.

The measurements are controlled with a tablet that allows contactless distance measurement – completely Corona compliant. “As a result of the measurements being made at one device, the examination can be carried out in a shorter time and a reliable result provided for the refraction within a few minutes”, Okada believes. He confirms that Chronos can also be operated by people with little experience in refraction: “The algorithm only requires minimal entries. We hope that even self-tests will be possible in the future.” The algorithm is based on a combination of the conventional refraction technology and the auto-alignment system from Topcon’s OCT technology.

The operating system from Chronos (the guided refraction system) was developed as web-based software that runs on iOS devices. The SightPilot™ user interface is, however, apparently compatible with all



software versions. All current sight tests for the most important regions are integrated. They made a point of “keeping it simple”: the user does not have to make any decisions, only pressing the appropriate button based on the customer reaction. The refraction runs automatically. The simple operation ensures a determination of the prescription without repetitions and annoying lens changes and with fewer measurement procedures at different devices. Regina Otto, Head of Product Management at Topcon Germany, adds: “An average measurement with Chronos takes about five minutes. With the SightPilot software, a consistent refraction process is made possible.”

## Only one square metre space requirement

The great advantage of the device is additionally the space saving: “Chronos only has a one-square-metre footprint.” The otherwise normal refraction lanes with potential mirror arrangements are thus no longer necessary. The device includes a height-adjustable table and thus simply needs one stool for the customer. In the development, the aim was to make a comfortable position possible for the customer. Therefore, Chronos does not have the standard chin support, but a specially designed cheek support. At the request of some Topcon customers, keratometry was integrated. As a result, the measurement can be used as an orientation aid for the selection of the contact lens base curve. The rotating prism technology, which has proved itself in the Kerato/ Refracto range from Topcon, additionally allows prismatic refractions.

“There will be a minority of patients for whom Chronos is not suitable”, Okada acknowledges. “People who due to problems with posture cannot assume a stable position, and children who are too small to reach the device”. Furthermore, the algorithm was developed for uncomplicated customers and programmed such that where there are complex refractions it will indicate the need for individual refraction.

The idea for the new device from the Japanese manufacturer came from one of their own software engineers and was in development for a total of five years. Apart from the task of incorporating the needs of the customer in the development, the critical issue was verifying the accuracy, repeatability and robustness under varying conditions. The development ran to schedule, but the Corona pandemic accelerated the demand for contactless distance measurement.

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