Summary

Pentacam is a relatively new diagnostic tool that images the anterior segment of the eye by a rotating Scheimpflug camera. This rotating process supplies pictures in three dimensions. The center of the cornea is measured very precisely because of this rotational imaging process.

The measurement process lasts less than two seconds and minute eye movements are captured and corrected simultaneously. By measuring 25,000 true elevation points, precise representation, repeatability and analysis are guaranteed and through this process of imaging we can obtain the following information:

(1) Scheimpflug Image: Single Scheimpflug images from various positions or 3D scans of the anterior segment can be shown.

(2) 3D Chamber Analysis: The Pentacam analyses the complete anterior segment and mainly the anterior chamber through which it may help in diagnoses of glaucoma patient and follow up.

Pentacam is also helpful for patient follow-up post-implantation of a phakic IOL through its three dimensional Scheimpflug image of the anterior chamber. It can be used to evaluate safety distances between the posterior side of the implant and the crystalline lens and from the anterior optic side to the corneal endothelium.

(3) Corneal Topography: Topographic analysis of the corneal front and back surfaces is based on the true elevation measurement from limbus to limbus. Comparison of pre-op and post-op topographies is easy. Both corneal surfaces anterior and posterior can be selected for analysis in axial (sagittal), tangential or elevation representation modes. So, it is easy to detect different corneal pathology such as keratoconus and differentiate it from other diseases such as pellucid marginal degeneration.

(4) Pachymetry: The corneal thickness is displayed as a color image, showing the entire area from limbus to limbus. So, it is very important before doing a refractive surgery such as LASIK surgery as the Pentacam can detect corneal thickness well and select the person who can go for this surgery without any

complication, also it can measure well the flab thickness after surgery and detect any complication such as corneal ectasia after LASIK.

(5) True Net Power: The True Net Power Map considers the influence of the posterior surface of the cornea. Especially having abnormal corneas, like keratoconus or post Lasik, the True Net Power map provides helpful values for the calculation of phakic lenses.

(6) Keratometric Power Deviation: The Keratometric Power Deviation Map represents the difference between the True Net Power Map and the anterior sagittal (axial) topographic Map. Therefore it offers a perfect representation of the influence of the cornea posterior surface.

(7) Comparison Screens: To obtain the optimal impression of any general changes of the cornea or after refractive surgery, the new comparison and difference maps have been added. The difference between examinations is shown as color maps and also numerical values.

(8) Tomography: The Tomography calculates a virtual model of the anterior segment of the eye. It is possible to move, zoom and rotate it to detect e.g. iris defects, cornea incisions e.g. RK (Radial Keratotomy) or size, location and shape of opacifications in the crystalline lens. The slicing function in the three dimensions offers a detailed view of the different layers of the eye. The Tomopgraphy is a helpful tool to explain the patient the individual conditions of his eye**.**

(9) Cataract Analysis: Lens opacification can be analyzed and quantified in this mode beside it also grade the cataract with new software which become available now and so help in cataract surgery through detecting the actual phaco power wanted for this cataract surgery. Also the high quality of the Scheimpflug image allows pre- and post operative monitoring as in the case of an intraocular lens.

(10) Holladay Report: This program was developed to improve the calculation of IOLs for patients which have undergone corneal surgery. This problem is well known and several methods have been tried to get proper k-readings for the calculation of the IOL but no method was precise enough. All those methods

which have been in use so far are assumptions and approximations. The Pentacam is the first and only machine in the market which delivers the necessary values.

So, Pentacam is the optimum analyzer for:

*corneal refractive surgery.

*cataract refractive surgery.

*glaucoma screening.