Dry Eye Disease (DED) is one of the most common problems that we deal with in our clinics. We have seen our dry eye clinic grow exponentially as the baby boomers become older. We completed a 3 year retrospective study showing that over 75% of our dry eye disease patients were over the age of 45. These patients suffer irritation and pain due to their ocular surface disease that compels them to visit their doctor for treatment and relief.

Our clinic provides many treatment modalities that can help patients improve. We also have many tools to objectively measure severity and progress of DED.

One tool that has integrated nicely into our programme is the new OCULUS Keratograph 5M, which is a topographer and DED analyser. The high-resolution colour camera and the integrated magnification changer offer a new perspective to the tear film assessment procedure. In this case study we will show how we use the Keratograph 5M to diagnose and follow a patient after they have had the Toyos Intense Pulse Light Treatment for Dry Eye (Dermamed).

Case study
60 yr old white male complaining of red, irritated eyes for 3 years. He had been seen in several clinics where he tried 100 mg doxycycline, artificial tears, restasis, warm compresse, and lid scrubs. As we knew beforehand that the patient might be a possible dry eye evaluation when he came to our clinic we had our technician screen him using the Keratograph 5M.

The first part of the screening was the Non Invasive Keratograph Break Up Time (NIKBUT). Conventional TBUT requires the placement of a fluorescein drop on the eye and then for a physician to check the eye at the slit lamp to monitor the first break up. This method of measuring can be time consuming for the doctor and often times can lead to inconsistent results.

The Keratograph 5M uses placido ring illumination measuring thousands of points throughout the surface of the cornea. As the margins of the rings become displaced a high resolution camera records the break up in tenths of a second.

A print out will show you graphically where the break up occurred, time of the first break up, and average break up time (Figure 1).

The advantages of using the NIKBUT is that a technician can do the scan, which frees up physician time, no drops are applied to the patient’s eyes, the results are objective and reproducible, and visual representation of the problem is available for the doctor to discuss with the patient.

In this patient it is obvious that he has a poor NIKBUT making it more likely that he has Meibomian Gland Dysfunction causing evaporative dry eye.

Now the technician can measure tear meniscus height which can be used as a measure of tear production (Figure 2). A Schirmer Test can still be done if needed. In our patient the tear meniscus height was normal.

The next test is Meibography (Figure 3) where an infrared light source and video camera are used on the inverted lid to show the Meibomian Glands (MG). This test is useful to record MG dropout. Studies have shown that MG dropout can lead to a poor lipid layer. We have found that lower lid drop out is more common than upper lid drop out. Some doctors have reported that increase tortuosity may also be an indication of poor function. In a patient with evaporative dry eye, poor functioning glands could be the direct cause of their DED. In this patient we see that he has some dropout in the inferior lid.

Dry eye patients consistently complain about bulbar redness. The Keratograph 5M uses a Bulbar Redness classification scale to help us objectively measure one of their chief complaints (Figure 4).
a picture of this lid pathology so that you have a baseline as comparison when the patient undergoes treatment. We have found the picture and video feature invaluable in our practice not only for the clinician but as a tool to help the patient understand their disease and improvement. Here we see the patient shows all the signs of lid margin disease that accompany MGD.

The Keratograph 5M is an incredible piece of technology that has the advantage of being a topographer as well as a specific Dry Eye Disease Analyser. It allows the technician to perform some of the tests in a more objective way freeing up the physician to spend more time with the patient to discuss their disease and treatment options. The Keratograph 5M captures pictures and videos that can be used by the clinician for assessment and to educate the patient. We believe that it has been an invaluable part of our dry eye clinic success.

Once the patient has undergone these tests by the technician then I can begin my exam. If I determine that the patient has a poor tear film I can use the Keratograph 5M to assist me further by performing a lipid layer scan and photographing lid margin pathology. The Keratograph 5M uses white light interferometry and specular reflection to give you a coloured assessment of the lipid layer. I find this lipid view reaffirms my diagnosis.

All of these patients have lid margin pathology whether it is erythema, thickening of the lid, loss of lashes, scurf, scalloping of the glands or telangiectasias. The Keratograph 5M can take

Figure 4: Example of Keratograph 5M Bulbar Redness Scan.

OCULUS Keratograph 5M

Topography in colour for dry eye assessment and more!

Based on several hardware modifications such as high resolution colour camera, new illumination system and an optical magnification changer, many unique and valuable examinations can be performed with the new OCULUS Keratograph 5M.

The enhanced TF-Scan option allows a complete non-invasive measurement of the tear film quantity and quality under infrared light conditions.

Furthermore the assessment of the lipid layer and tear film particles help evaluate the quality of the tear film. The combination of infrared light, sensitive high resolution camera and magnification changer, enables the assessment of the morphological structure of the meibomian glands in the upper and lower eyelid. The meibomian glands dysfunction (MGD) is a major cause for the evaporative dry eye. The ability to evaluate the meibomian glands and the lipid layer is the key for MGD diagnosis.

The automatic detection and classification of the bulbar redness of the eye called R-Scan is another new feature of the Keratograph 5M. The R-Scan is a unique technology for the automatic detection and classification of the conjunctival vessels. This enables user-independent, reproducible and comparable results. Changes on the ocular surface can be documented with the new high resolution colour camera that captures pictures and videos with brilliant quality.

The new OCULUS Keratograph 5M completely differs from other existing placido-based topographers: Thanks to sophisticated technology and the unique colour camera, the Keratograph 5M is not only a versatile topographer but also a helpful tool for patient education.

Please contact your local dealer for more information. www.oculus.de

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