The diagnosis of the tear film and the ocular surface is critical to get a correct classification and definition of dry eye and consequently to its effective solution. Deciding the exact type of dry eye and its etiology are the basis of a correct pharmacological and instrumental therapy. To determine which eye drops, which drugs and which tools can help our patient solve problems related to dry eye, it is therefore necessary to start with a thorough and precise classification of the problem.

For this reason, to achieve an accurate diagnosis, I believe it is appropriate to use technologically advanced tools in addition to our experience gained after years of work. It can make the diagnosis more precise, faster, and comparable over time, especially to evaluate the results obtained after a specific therapy.

For this purpose, I use some tools in my clinic which make my diagnosis more secure, complete and monitorable over time and give me the opportunity to show to the patient the results obtained. This allows the patient to have more confidence in following a prescribed therapy.

During my daily workflow I use more than one device and sometimes I use them simultaneously to verify the reliability of the results, especially in difficult cases or with discordant values.

The device I know best is SBM Sistemi's IDRA; I had the opportunity to develop a diagnostic-therapeutic protocol within this device which I believe is very useful for easily determine the correct diagnosis and possibly also an effective therapy. I also collected the data obtained by examining hundreds of patients with and without tear film problems, before and after pharmacological and instrumental therapies (for example after pulsed light or thermal massage) to verify their reliability, accuracy and validate the results obtained. Together with Professor Giuseppe Giannaccare and his staff I have published two scientific papers on Cornea and Journal of Ophthalmology. From the data obtained, IDRA appears to be a reliable, precise, and complete tool for evaluating the tear film and ocular surface.

By means of Idra it is possible to easily and automatically evaluate the NIBUT (not invasive break up time), the tear meniscus, the thickness of the lipid layer through interferometry and meibography with infrared pictures and 3D representation. It is possible to highlight areas on the ocular surface with suffering from the corneal or conjunctival epithelium and the degree of impairment of the same (Staining test). It is also possible to see for the secretions produced by Demodex at the level of the eyelashes to make a diagnosis of chronic blepharitis and thanks to the possibility of entering the responses of symptomatic questionnaires within the software it is possible to determine the degree of subjective impairment caused by the state of dry eye or of a certain pathological condition.

All these tests can be shown to the patient during the visit, they can be printed, sent by email, or collected within a smartphone application that the patient can keep and compare over time in case of therapy. The updated data within the application is also always visible to the ophthalmologist resulting in an effective way to build and maintain a relationship of trust between doctor and patient over time.

For the above reasons, Idra remains the reference tool for the evaluation of the tear film and for diagnosing dry eye.

Another device I have in the clinic is the E-Swin Tearcheck.

Regarding Tearcheck, I certainly have less experience, there are still no scientific works to validate the values acquired by this instrument because among other things it measures the NIBUT in a different way from how it is normally done using Placido's rings and the analysis of the deformation of the reflection of the same rings between blinks. With the Tearcheck, horizontal lines are used instead of Placido's rings and the integrity and homogeneity of the tear film on the ocular surface is analyzed by means of the stability curve. This system is unique on the market, no other company carries out the analysis in this way and therefore there is still no medical validation and experience to confirm the validity of the results.

The evaluation of the lipid layer is instead completely absent in the Tearcheck instrument since the interferometry test is not implemented. This limits the ability to assess the condition of patients with evaporative dry eye and meibomian gland dysfunction (MGD) with poor or absent lipid layer.

With Tearcheck tear meniscus and normal and 3D meibography can be measured. The presence of alterations due to Demodex in the case of blepharitis can also be highlighted with this instrument and the degree of compromise of the corneal or conjunctival surface can be determined by means of a test called inflammation test but which is equivalent to a staining test with fluorescein. Within the software, you can fill out an OSDI questionnaire that allows you to know the patient's subjective symptoms and determine their severity. All these tests can be stored, shown to the patient, and compared over time; however, there is no application that can archive them together with other therapeutic indications, no system that allows the patient to stay in contact with the doctor, and there is no protocol. Tearcheck is a useful tool for the diagnosis of the tear film even if some information acquired about the NIBUT and the stability curve I believe still need to be validated to better classify the patient with dry eye.

In conclusion, only a sophisticated instrumental investigation associated with a thorough examination and the experience of the doctor makes it easier to arrive at a precise diagnosis in the case of dry eye. The instrumental examinations carried out thanks to precise, technologically advanced (artificial intelligence) and completely automated tools allow a quick screening of patients, even asymptomatic ones, especially in the case of anterior segment surgery (cataract and refractive) and to have reliable, reproducible, and comparable data over time.

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