A BASIC PROTOCOL FOR FUNCTIONAL ASSESSMENT OF DED.
TO EVALUATE NEW ASSESSMENT TECHNIQUES.
TO INVESTIGATE THE EFFICACY OF TREATMENTS.

DRY EYE DISEASE (DED)
Dry Eye Disease is a multifactorial pathological condition that involves lacrimal dysfunction and ocular surface alterations and causes important subjective symptoms, visual disturbances, tear film fluctuations and ocular surface damage and inflammation.

The level of severity and discomfort for the patient and the causes may be different.

DED may be caused by poor tear production or by excessive evaporation with or without Meibomian Gland dysfunction (MGD).

This condition is getting more and more common among pc users and residents of big polluted cities. Symptoms are in a wide range but it is important to detect also mild diseases especially in case of patients scheduled for cataract or refractive surgery. Results and symptoms may be conditioned and become much worse after surgery.

First of all my personal approach is to grade the severity of disease letting the patients answer to a subjective questionnaire like Ocular Surface Disease Index (OSDI)(Pic 1).

This allows me to know how the disease affects daily patient life and after therapy how important it is the improvement.

After that it is crucial to check the quality and quantity of tear film. The first exam that we usually do is the osmolarity test using the Tear Lab device. Tear osmolarity means solute concentration in liquid and gives us some important informations: hyperosmolarity (higher than 320 mOsm/l) or with a difference between the two eyes greater than 8 mOsm/l) may be caused by poor tear production by lacrimal gland or excessive aqueous evaporation with or without MGD. In case of normal osmolarity (low 310mOsm/l) and symptomatic patients these data may be predictive of a future worsening disease or may be associated to other paraphysiological or pathological conditions like Epithelial Bowman Membrane Dystrophy (EBMD), allergic conjunctivitis and so on.... In any case (also if the values are borderline from 310 to 320 mOsm/l) it is mandatory to deepen the data in order to screen the exact type of DED we are evaluating.

The quality of tear film may be effectively detected doing NIBUT (Non Invasive Break Up Time) test, lipid layer thickness evaluation, Meibomian glands functionality evaluation thorough a Meibography and the ferning test.

Quantity of tear film production is checked by Schirmer test and lacrimal meniscus measurement and the impact of DED on ocular surface may be evaluated by staining and inflammation dry test.
Due to the large number of patients referring to our center I think that it is very important and useful to have screening and diagnostic devices easy and comfortable to handle and that provide precise and reliable results very quickly.

In our Dry Eye Center we have been using for over one year I.C.P. devices to make the proper diagnosis and provide the patient with the right and individualized therapy.

We have evaluated more than a thousand patients this year using ICP MGD analyzer (Pic 3 with table of features), an infrared camera, to evaluate Meibomian Gland functionality, ICP tearscope (Pic 4 with table of features) to analyze lipid layer thickness and Non Invasive Break Up Time (NIBUT) and ferning test (5 with table of features) to check the mucus and indirectly the tear film stability.

The infrared camera is very easy to use and provide auto-analyzed images that allow us to have standard and repeatable results as well tear scope is comfortable to handle and the acquired images and values are realistic and very precise. In our practice 68% of Dry Eye patients have a tear film with a lipid layer 30nm or less thick and 85% of patients with lipid layer thickness within 80 nm. That means that the majority of Dry Eye patients have a Dry Eye Disease due to excessive evaporation and a Meibomian Gland dysfunction.

These patients treated with artificial tears with fat acids, warm compresses, omega 3 dietary supplements and Intense Regulated Pulsed Light (IRPL by E-Swin Technology) show, during follow-up visits, an important improvement of lipid layer thickness (thicker than 80nm), NIBUT and a significant decrease of osmolarity; a multifactorial therapy shows good results and provide a significant improvement in patient comfort.

The connection of these diagnostic instruments with an Apple or Windows platform (through an I-Pad or a PC) (creates graphs, that can be shown and explained to our patients, and generates a PDF file that can be printed or sent by e-mail (Pic 8).

The combination of all these data (OSDI, NIBUT, MGD functionality, lipid layer thickness, osmolarity, ferning values) with Schirmer test data and staining values give us the possibility to decide the right therapy or if other exams (like blood examinations for immunological diseases) are needed to find out the precise etiology of Dry Eye Disease.

Explaining the patient the grade of severity, showing him the Pdf file with colored graphs, makes us easier to give a therapy and to have the right patient compliance and satisfaction during the first consultation and follow-up visits.

Appropriate therapy is our goal that we can achieve only with good, precise, reliable diagnostic instruments. The choice of using a combination of different approaches (topical, systemic, pharmacological or mechanical) depends on DED severity and on the whole data that we got with our diagnostic tools.

Dry Eye Disease is nowadays a common condition, with multifactorial etiology and that sometimes requires a multidisciplinary approach, that is the reason why to find the effective therapy it is mandatory to perform the right diagnosis evaluating local and systemic conditions.
ABSTRACT

AIM
Dry Eye Disease is a multifactorial pathological condition that involves lacrimal dysfunction and ocular surface alterations and causes important subjective symptoms, visual disturbances, tear film fluctuations and ocular surface damage and inflammation.

METHOD
Evaluated more than a thousand patients, between 2016 and 2017 using different diagnostic tools like Tearscope, MGD, OSA (by Sbm Sistemi) to make a proper diagnosis and to give them an individual specific and effective therapy.

RESULTS
During the study period 1052 exams were carried out. The standard protocol was employed in 100% of the cases. The median number of investigated dry eye disease was 68%: 11% of the Dry Eye affected was symptomless, between 68-80% was borderline and used Eye Drops, 79% had some lacrimal dysfunction
Only 21% of the patient had a correct lacrimation.

CONCLUSION
The use of the standard protocol procedure leads to detect more patients suffering from dry eye disease and may also improve the long-term outcome for patients.