Editorial

Why a Journal on Keratoconus?

New modalities for the diagnosis and management of keratoconus have been introduced over the last 15 to 20 years which have changed our way of thinking about keratoconus.

Corneal topography has become a must-have device in any refractive surgery center. This technology has gained tremendous popularity and is now commonly used by ophthalmologists and optometrists alike. It has significantly improved our ability to diagnose the disease; moreover, most topographers are supplied with indices that facilitate diagnosis. The improvements in corneal imaging through the introduction of additional systems, such as Orbscan II and Scheimpflug imaging assessment (Pentacam, Sirius, Galilee and TMS 5) and anterior segment OCT, have given our professions a great push toward more accurate diagnoses, especially in borderline cases.

Occasionally, diagnosis of keratoconus remains challenging even with the use of the above-mentioned technologies, whereby additional techniques may provide more information and that can facilitate the task. Higher order aberrations, which increase in keratoconus and cause both degradation of the quality of vision and glare, are utilized for the diagnosis of keratoconus. Another means of keratoconus diagnosis is based on epithelial thickness, as measured by Arthemis VHF digital ultrasound.

Biomechanical decompensation in keratoconus is driving a great deal of attention. For the first time, we have a tool available, the ocular response analyzer (ORA), for measuring corneal biomechanics *in vivo*, such as corneal hysteresis (CH) and the corneal resistance factor CRF) which are lower in keratoconic corneas than in normal corneas, other devices are on their way to the market.

Is the frequency of keratoconus increasing or are we simply better equipped to conduct diagnosis due to these newly developed diagnostic tools? I am indeed astonished by the scarcity of new epidemiological studies (a review is published in this issue), the journal hopes to publish new articles on this topic.

Nomenclature diagnosis and staging of the disease are reevaluated, two articles address these topics in this issue of the journal.

New treatment modalities, such as collagen corneal cross-linking by riboflavin and UVA (CXL), aim to stop the progression of the disease. Since the first report on this modality in 2003, which was introduced by Theo Seiler et al, tens of thousands of patients have been treated by using this new technology. CXL proved not only to stop the progression of the disease but also, in most cases, it improved the uncorrected visual acuity and the best spectacle corrected visual acuity, and reduced myopia, astigmatism, keratometry readings and high-order aberrations.

Early diagnosis is becoming increasingly important, now that there is a way to stop the progression of this disease, which has been—and remains—the main cause for performing corneal graft in the western world. From here on, ophthalmologists and optometrists may be found legally liable for missing or delaying a diagnosis of progressive keratoconus, since proper diagnosis coupled with CXL treatment can prevent further disease progression.

This revolutionary technology, which parallels the anti-VEGF for the treatment of retinal diseases, will continue to progress, as it is currently the only technology available that deals with the cause of keratoconus development, i.e. the weakening of the collagen fibers. New techniques for CXL are emerging, such as using more light intensity 15 to 30 $mWcm^2$ instead of 3 mcm^2 and less exposure time, 3 to 10 minutes instead of 30 minutes. Other methods include creating an intracorneal pocket by femtosecond laser, introducing the riboflavin into this pocket and then exposing the cornea to UVA. The debate continues on whether to remove or not the epithelium and it is still an open question, the journal will hopefully host studies on this issue (one dealing with long-term effect of CXL is published in this issue).

CXL can be used to treat keratitis, Terrien's marginal degeneration, melting and corneal edema (an article on keratitis and melting treatment by CXL is published in this issue).

Performing this procedure on the pediatric population, however, is a hot issue, because we do not know yet if it is best to wait for the progression of keratoconus or if it is better to perform the procedure immediately on diagnosis and not to wait for documented progression, as is done with the adult population. This is because of the fear is of rapid progression of the disease which may occur in this group (in this issue of the journal, two articles on CXL in the pediatric population).

Can we eliminate the keratoconus? Apart from the genetic treatment which seems far away now, we have two options, early diagnosis before the appearance of the disease (Michael Belin at the ESCRS in Vienna 2011 called for early CXL before the appearance of keratoconus on the front surface of the cornea I mean, when the disease is seen at the level of the posterior corneal surface, where he believes it starts), If we are sure of our early diagnosis and CXL reaches high safety,

this goal of eliminating the clinical keratoconus is not unrealistic. I suppose that this is what Joseph Colin intended when he wrote about eliminating the diseases in the introduction of the second congress on keratoconus held in Bordeaux in September 2011.

Fifteen years ago, the only treatment we could offer a contact lens intolerant patient with unsatisfactory visual acuity with glasses was penetrating keratoplasty (PKP).

Despite technological improvements in PKP techniques, the introduction of the femtosecond laser-assisted PKP and the Big Bubble technique for deep lamellar keratoplasty (DALK), we still try to avoid PKP and DALK, keeping them as last resort treatments for advanced keratoconic scarred corneas unresponsive to other treatment modalities.

Now, we can also offer contact lens intolerant patients a variety of contact lenses that are easier to tolerate, such as soft keratoconus lenses, new designs of piggyback (soft contact lenses with a central depression for the RGP contact lens) mini-scleral lenses, etc. These varieties of contact lenses provide options for restoring satisfactory visual acuity (VA) to these patients.

If even these contact lenses are not tolerated by these patients, we may now offer various procedures other than PKP or DALK: Intrastromal corneal rings (ICRS) and anterior lamellar keratoplasty (ALK) even photorefractive keratectomy (combined or not with CXL) has been reported to render positive results in these cases. In addition, phakic intraocular lenses may be used to improve VA in keratoconic patients.

ICRS are widely accepted as a tool for vision improvement in contact lens intolerant keratoconic patients with unsatisfactory VA with glasses, ICRS implantation not only improves the quantitative metrics, such as visual acuity and refraction, but also has a positive impact on the patients' quality of life. Various ICRS are available, such as the Intacs, Intacs SK, Ferrara rings and the Kerarings (similar to Ferrara ring, see relevant chapters). An additional type of ICRS is the Myoring, which is a round ICRS inserted in a corneal pocket created by a special automated microkeratome (one article on Ferrara Rings is published in this issue and one case report on Intacs). The combination of ICRS and CXL may have an additive effect.

The emergence of all of these new diagnostic tools and treatment modalities and the resulting shifts in our approach to keratoconus suggest the need for a journal specializing in publishing the articles arising out of original research, specialized topics, review articles, editorials and descriptions of new diagnostic and therapeutic techniques and technologies, case reports are welcome in this journal. In this way, the journal hopes to provide a forum for discussing and presenting new ideas in its field.

Lastly, I would like to thank all of the authors and coauthors who contributed to the first issue of the journal and my thanks are sent to the distinguished editorial board without whom the project of this journal could not have been completed.

Jaypee Brothers, the publishers of this journal, made an extraordinary effort to publish this journal, to all the administrative and technical team, I send my greetings and thanks.

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Editor-in-Chief

BIBLIOGRAPHY

Textbook on Keratoconus (1st ed), New Insights, Adel Barbara (Ed), Jaypee-Highlights Medical Publishers Inc 2012.