



Visual Rehabilitation in Keratoconus: The Emergence of a New Era

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Keratoconus is a progressive, non-inflammatory corneal ectatic disease characterized by corneal steepening and thinning, generating a high degree of myopia and irregular astigmatism, thereby severely impairing visual acuity [1]. Traditionally, keratoconus has been managed in first-line treatment with rigid contact lenses, which improved visual acuity in cases of moderate and advanced severity. Corneal transplantation remains an option for patients with very advanced keratoconus, who subsequently achieve mean spectacle-corrected visual acuity of 0.6–0.8 and may also need rigid contact lenses [2]. Today, we use sophisticated diagnostic tools which enable early diagnosis of keratoconus, and we are able to perform corneal cross-linking for stabilization of the corneal conus in relatively early stages of the disease. As a consequence, the need for corneal transplantation

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has decreased significantly [3]. However, an increasing number of patients with keratoconus are identified in a ‘grey zone’, where their contact lens-corrected vision is not great, but it is enough not to consider corneal transplantation. These patients are in need of effective visual rehabilitation, and their expectations are often relatively high.

For the above-mentioned patients, a new era has emerged. A plethora of minimally invasive surgical options have been developed, enhanced and introduced into clinical practice over the past few years. These therapeutic approaches include, among others, the implantation of intracorneal ring segments (ICRS), corneal surface ablation combined with corneal collagen cross-linking (CXL), and implantation of toric phakic intraocular lenses, facilitating effective and, most importantly, safe visual rehabilitation in keratoconus.

The first review article from Sakellaris et al. focuses on the role of ICRS implantation in visual improvement in keratoconus. ICRS represent an effective and safe option for restoring visual acuity in patients with moderate keratoconus, by regularizing corneal shape and thereby reducing keratometric readings, spherical equivalent and high-order aberrations [4]. The authors describe in detail modern implantation techniques and nomograms, patient selection criteria, clinical outcomes and complications, emphasizing the advantages and

disadvantages, as well as controversial issues, regarding this useful therapeutic approach. Zhu et al. provide a thorough update on combined protocols for corneal collagen cross-linking (CXL) with photorefractive surgery for refractive management of keratoconus. Surface ablation treatments combined with CXL result in corneal stabilization and improved visual acuity without compromising the biomechanical profile of the cornea in moderate keratoconus [5, 6]. The authors present current modalities, clinical outcomes and potential complications in an evidenced-based manner, including critical analysis of relevant literature. Finally, Vastardis et al. explore the options of intraocular lens surgery for visual rehabilitation in keratoconus. Nowadays, the use of modern phakic or pseudophakic toric intraocular lenses, alone or in combination with other therapeutic modalities, may correct refractive error in selected patients with keratoconus, demonstrating an excellent safety profile and long-term refractive and keratometric stability [7, 8]. Vastardis et al. report on lens-based solutions for refractive correction, evaluate their clinical outcomes and complications, and most importantly, highlight surgical pearls and pitfalls of this approach.

This new era of 'modified' refractive surgery in keratoconus is evolving rapidly, shifting the management paradigm of the disease. The purpose of this special issue is to provide an in-depth overview of the available refractive procedures for visual rehabilitation in keratoconus and to underscore recent advances in this fascinating field which are revolutionizing modern corneal surgery.

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