Journal of Ophthalmology

Hindawi

Special Issue on

Overnight Orthokeratology: Technology, Efficiency, Safety, and Myopia Control

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The moulding of the anterior corneal surface, also known as Orthokeratology, was first noticed as a side effect of using PMMA corneal contact lenses that flattened the radius of the cornea. For a long time, this technique lacked validity from a clinical and healthcare point of view, and almost no scientific evidence was available until it was analysed and approved by healthcare organisations, the US Food and Drugs Administration (FDA) among them. The Corneal Refractive Therapy (CRT®) developed by Paragon Vision Science was approved by the FDA in 2002, so that it could be adapted for the treatment of myopia (up to 6 diopters) and astigmatism (up to 1.75 diopters), and the Vision Shaping Treatment developed by Bausch & Lomb was also approved in 2004. Since then, especially in the last decade, the progress has been colossal. The underlying reasons for such an evolution can be found in the improvement of technology, the increase in the efficiency, the predictability and safety of the technique, and its effects on the progression of myopia.

Presently, the new technologies implemented by the industry, allowing the manufacture of more sophisticated designs, and the development of instruments for the measuring and analysis of the cornea allow carrying out adaptations outside the range approved by the FDA. Thus, cases of astigmatism exceeding 1.75 diopters, as well as farsightedness, presbyopia, and severe myopia (more than 6 diopters) are being currently treated using this technique. However, in these cases, it has not been demonstrated whether their degree of efficiency and/or safety is similar to the cases of low myopia and astigmatism.

Notwithstanding the foregoing, this technique is most currently used in short-sighted babies and teenagers, in an effort to slow down the evolution of their condition. It has been generally accepted that Orthokeratology using contact lenses during sleeping hours (overnight orthokeratology) has a dampening effect on the evolution of myopia, at least in the short term. Long term effects, from both the efficiency and the safety points of view, are being currently studied, as well as the eventual occurrence of a rebound effect when contact lenses are no longer used and the consequences of this technique on the corneal mechanics in the medium-long term. There is controversy among certain eye care professionals, who maintain that Orthokeratology may induce a weakening of the cornea and increases the chances of occurrence of corneal ectasias if the patient undergoes corneal refractive surgery in the future.

Thus, there are currently sufficient lines of research open in this field that justify the printing of a special issue dedicated to overnight Orthokeratology. Among the eventual topics to be covered, the following could be mentioned, without limitation.

Potential topics include but are not limited to the following:

- Known effects on the lachrymal and corneal physiology in the short, medium, and long term
- Swelling: tear markers and changes detected in confocal microscopy
- Corneal rheology: stability and regression of results
- Effects on corneal biomechanics and refractive surgery following the use of overnight orthokeratology
- Lens design: range of application of the technique, depending on the specific refractive error
- Efficiency and predictability and corneal topography
- Astigmatism
- Farsightedness and presbyopia
- Safety, permeability of the corneal epithelium, absolute and relative contraindications, microbial keratitis, and visual and nonvisual complications other than microbial keratitis
- Changes in corneal and ocular higher-order aberrations and quality of vision
- Orthokeratology in the control of myopia: clinical trials and meta-analysis

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Papers are published upon acceptance, regardless of the Special Issue publication date.

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Submission Deadline
Friday, 5 October 2018

Publication Date
February 2019