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Review article

# The effect of keratoconus on the structural, mechanical, and optical properties of the cornea

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ABSTRACT

Keratoconus is an eye disorder wherein the cornea weakens due to structural and/or compositional anomalies. This weakened cornea is no longer able to preserve its normal shape against the intraocular pressure in the eye and therefore bulges outward, leading to a conical shape and subsequent distorted vision. Changes in structure and composition often manifest as a change in shape (or geometry) as well as in mechanical and optical properties. Thus, understanding the properties and structure of keratoconic corneas could help elucidate etiology and pathogenesis, to develop treatments, and to understand other diseases of the eye. In this review, we discuss the changes in structure, composition, and mechanical and optical properties of the cornea with keratoconus. Current treatments for keratoconus and a novel proposed treatment using two-photon excitation therapy are also discussed. The intended audiences are mechanical engineers, materials engineers, optical engineers, and bioengineers.

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Contents

1. Introduction .....	224
2. Structural and compositional changes associated with keratoconus.....	225
3. Mechanical properties .....	225
4. Optical properties .....	228
5. Treatments .....	230
5.1. Contact lenses .....	230
5.2. INTACS.....	231
5.3. Corneal transplant.....	231
5.4. Deep anterior lamellar keratoplasty .....	232
5.5. Corneal collagen cross-linking using riboflavin .....	232

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