Evaluation of the Biomechanical Properties of Ectatic Cornea Using Ocular Response Analyzer

Essay

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تقييم النشاط الحيوي للقرنية في حالات بروز القرنية باستخدام محلل استجابة العين

مقدمة من

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✍ ***Haytham El-Saeed Seleem***

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List of Abbreviations

CCT	Central Corneal Thickness
CH	Corneal Hysteresis
CPACG	Chronic Primary Angle Closure Glaucoma
CRF	Corneal Resistance Factor
CXL	Collagen Cross Linking
DM	Descemet's Membrane
DM1	Dystrophia Myotonica
DXEK	Descematorhexis & Endokeratoplasty
DZ	Di-Zygotic
GAT	Goldman Applanation Tonometer
ICRS	Intra-Corneal Ring Segments
INTRACOR	Femto Second Laser Intrastromal Flap
IOL	Intra Ocular Lens
IOP	Intra Ocular Pressure
IOPCC	Corneal Compensated Intra Ocular Pressure
IOPG	Goldman Correlated Intra Ocular Pressure
LASEK	Laser-Assisted Sub-Epithelial Keratectomy
LASIK	Laser in Situ Keratomileusis
MZ	Mono-Zygotic
NTG	Normal Tention Glaucoma
OPA	Ocular Pulse Amplitude
ORA	Ocular Response Analyser
PKP	Penetrating Keratoplasty
POAG	Primary Open Angle Glaucoma
PRK	Photo Refractive Keratectomy
PTK	Phototherapeutic Keratectomy
SBK	Sub-Bowman's Keratomileusis
STCT	Selective Tissue Corneal Transplantation

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Introduction

The cornea as a viscoelastic structure contains a component of static resistance and a component of dynamic resistance, the response of the cornea to an applied force such as tonometry depends on the magnitude of the force and on the rate of change of the force ***(Kotecha et al., 2009).***

The cornea reacts to stress as a visco-elastic material. This means that for a given stress, the resultant corneal strain is time dependent. The visco-elastic response consists of an immediate deformation followed by a rather slow deformation ***(Gunther Grabner et al., 2005).***

It has been suggested that hysteresis may be a measurement, which is the result of the damping of the cornea because of its visco-elastic properties and is derived from the difference of the two applanation measurements during the applanation process. Thus the hysteresis is a measure of visco-elasticity due to the combined effect of the corneal thickness and rigidity ***(Luce, 2005).***

Corneal hysteresis is determined by releasing an air puff from the ocular response analyzer (ORA) that causes inward and then outward corneal motion, which in turn provides two applanation measurements during a single measurement

process, the device utilized a rapid air impulse to deform the cornea, and the shape changes were monitored by an electro-optical system ***(Luce, 2005).***

Thus a new era of knowledge about the cornea was elicited and the ophthalmologists had to take that in considerations. Also in the field of ocular surgeries, ophthalmic-surgeons can get a broader view in prediction of the post-operative state of the cornea and the surgical results ***(Luce, 2005).***