

Review: Measurement Techniques for Intraocular Pressure

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Abstract

The literature on intra-ocular pressure dynamics is reviewed, including tonometer design and calibration, the influence of corneal-scleral mechanics, and scleral rigidity factors. Drugs that influence the outflow facility of the trabecular meshwork (TM) are discussed. Transmural pressure drop across the lamina cribosa (LC) is an important parameter, in terms of quantifying potential glaucoma damage to the optic nerve.

Keywords:

By comparison, tonographs, a different type of device can be used to measure the outflow facility. Quigley [2] reviewed the world-wide prevalence and incidence of glaucoma. Wang et al. [11-13] discussed ROP (of en associated with rapid juvenile myopia rates) and glaucoma related studies. Direct and remote intra-ocular pressure measuring techniques were reviewed by Downs [14], Nuyen et al. [15], Okaforet

U = uveo-scleral outflow rate [mm³/min]

R (t) = axial myopia [diopters] at age t [yrs]

TM = trabecular meshwork

ROP = retinopathy of prematurity

LC = lamina cribosa ONH = optic nerve head

$w = \sqrt{3(1 - \nu^2)} P a / (E \times h^2)$, corneal indentation, a = radius, h = thickness [70]

$P_{crit} = E * h^3 / (a \times \sqrt{3(1 - \nu^2)})$, corneal buckling (Timoshenko et al. [70])

$S_{crit} = P_{crit} R / 2h$, spherical buckling load for sclera (von Karman [22]), R = radius

1 atm = 760 mmHg = 29.92 inch-Hg = 14.7 lb/in² = 101.3 kPa = pressure conversions\

Conflict of Interest Statement

The authors have no proprietary or financial conflicts of interest.

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