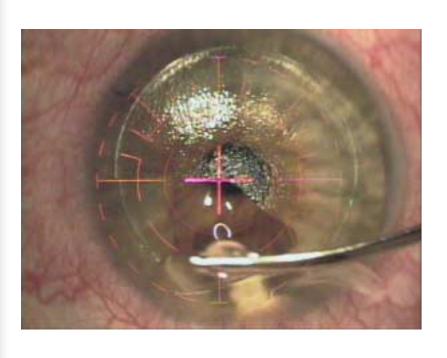
Optisol in Routine and Complicated Lasik Surgery

- 2000 World Refractive Surgery Symposium Oct 21,2000
- Mark E Johnston MD FRCSC

Jones Eye Clinic: Omaha NE, Sioux City IA, Sioux Falls SD

Optisol GS (Chiron)



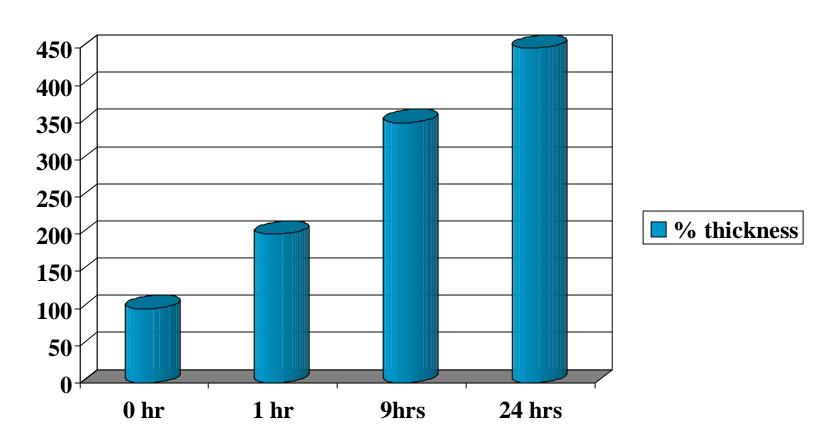
- Corneal Storage media
- Non-penetrating solute/colloidal
- Contains Chondrotin sulfate and dextran
- Can split 20 cc bottle for multiple cases

Optisol: Role in Lasik

- What is corneal swelling pressure and Gel pressure?
- How does corneal swelling cause complications?
- Is Optisol better for routine surgery?
- Is Optisol better for complicated surgery?

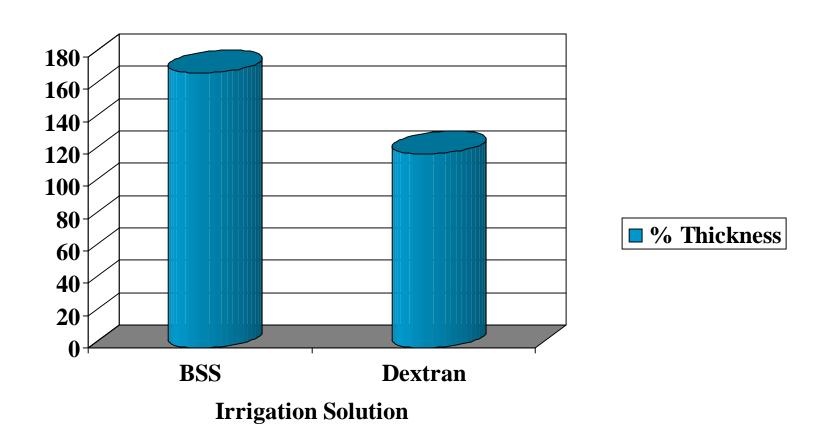
Stromal swelling in isotonic solution: Time dependent

Doughty MJ.Biochim Biophys Acta 1999 Oct 18;1472(1-2):99-106



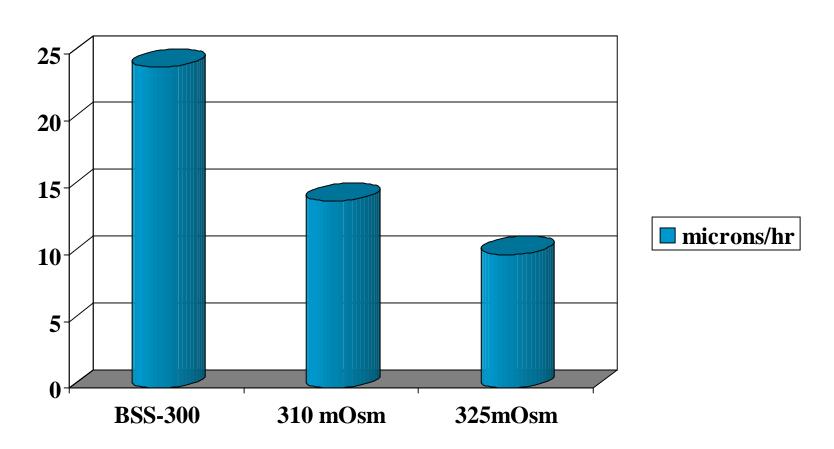
Stromal swelling @ 3 hour: less with non-penetrating solute

Kohlhaas M.Ophthalmologe 1995Aug;92(4):410-3



Epithelial swelling & Anterior Cell Damage: Worse with BSS

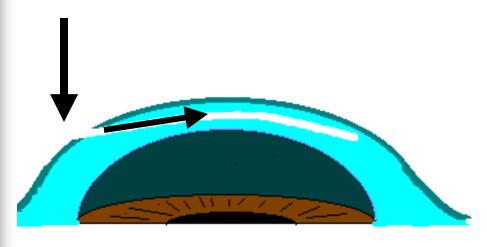
Doughty MJ.Ophthalmic Physiol Opt 1995 Nov;15(6):585-99



Gel Pressure

- That portion of the internal osmotic pressure that can only be offset by external non-penetrating solutes (such as dextran and chondrotin)
- Generated by the potential energy developed by the mutual repulsion of fixed matrix charges on macromolecules (crowding)

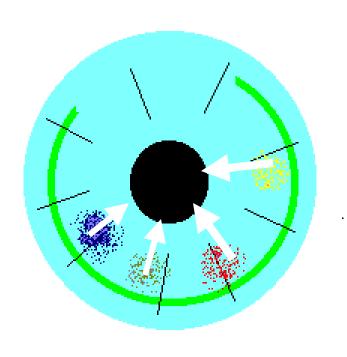
Aspiration of Fluid into the Interface



LASIK creates an epithelial defect that allows fluid and debris to be actively adsorbed into the LASIK interface.

Johnston ME.Highlights ASCRS. Boston:Ophthal Interactive 1999 CD ROM

Aspiration of Debris into the Interface

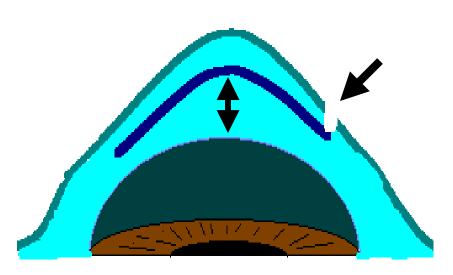


- Peripheral debris and fluid are drawn towards the central cornea by the higher central corneal swelling pressure
- Central cornea able to adsorb more water

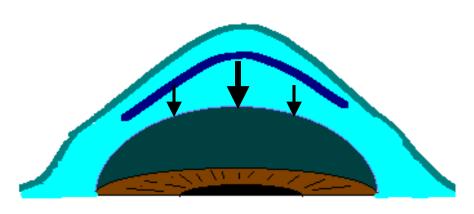
Widening of the Gutter

Johnston ME. J Cataract Refractive Surg 2000, (in press)

- Related to corneal swelling
 - Increased arc length of the stromal base related to preferential swelling of the central and posterior cornea

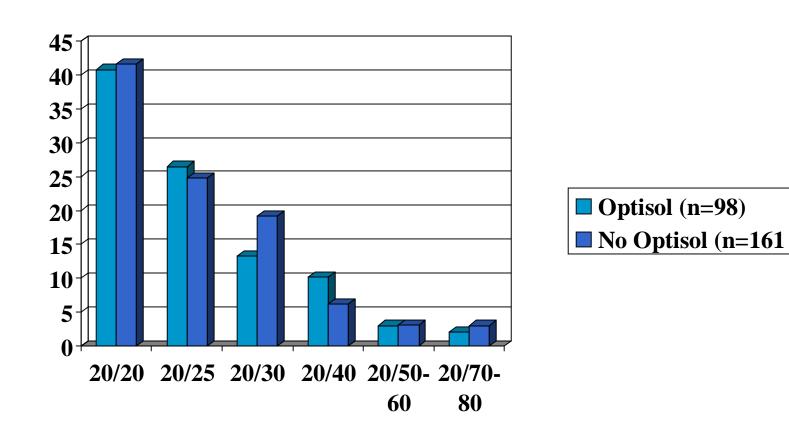


Microstria Formation

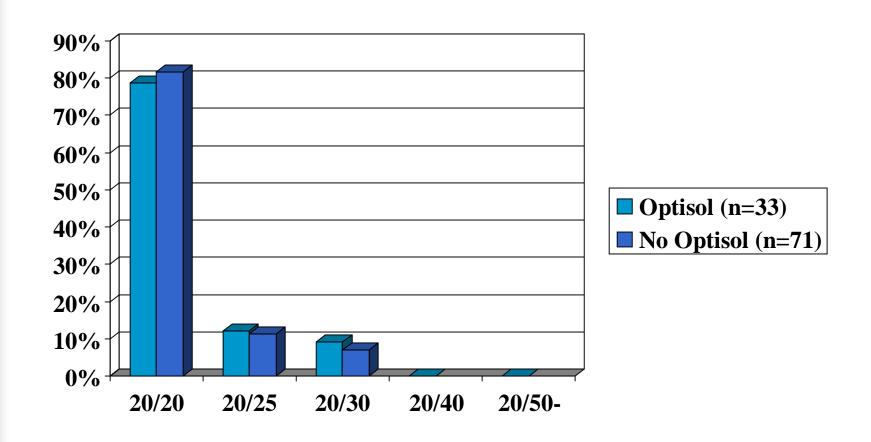


When the epithelium heals, the cornea dehydrates and the excess flap tissue folds in with secondary microstria of the cornea.

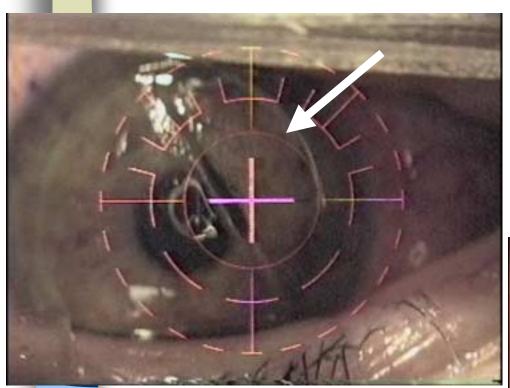
Visual Acuity Day 1: The same with or without Optisol



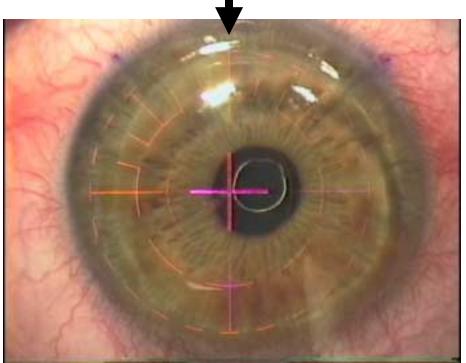
Visual Acuity 1 Month The same with or without Optisol



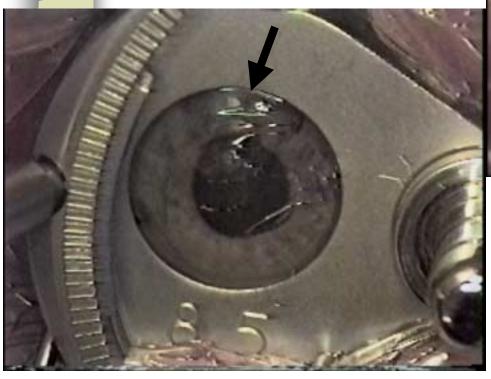
Case 1:Flap slippage with removal drapes



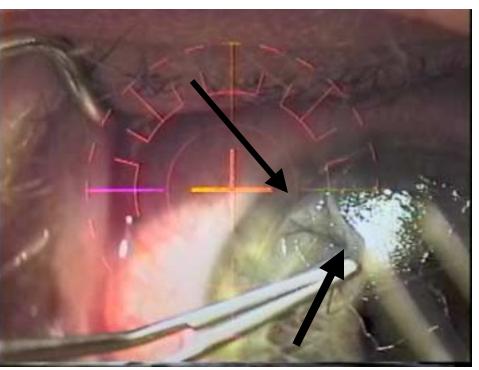
Refloated with copious BSS Widened gutter



Case 2:Large inferior epithelial tear with Hansatome

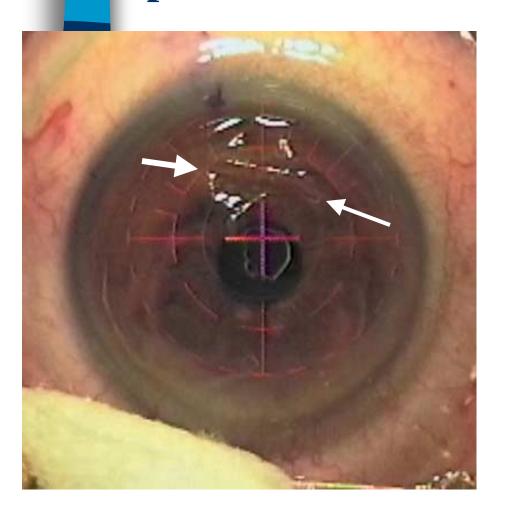


Widened gutter

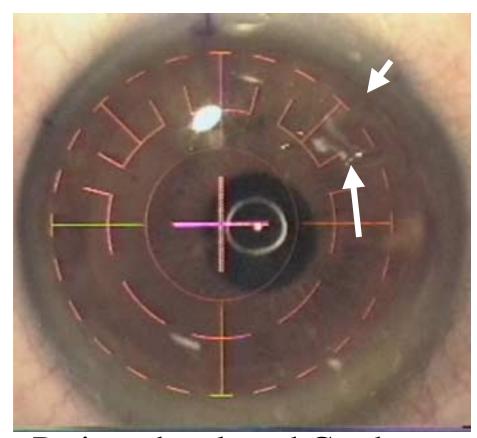


BSS used: Edematous epithelium removed

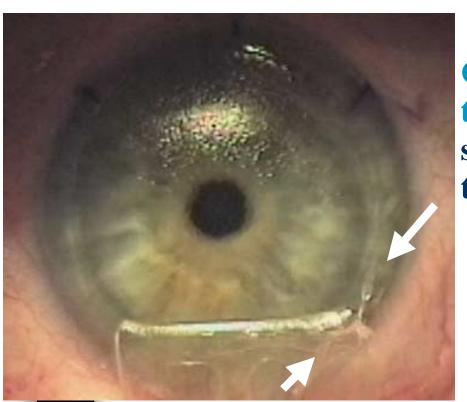
Case 3: Inferior horizontal horseshoe tear epithelium



Residual Epithelial irregularity, edema and widened gutter after refloat with BSS



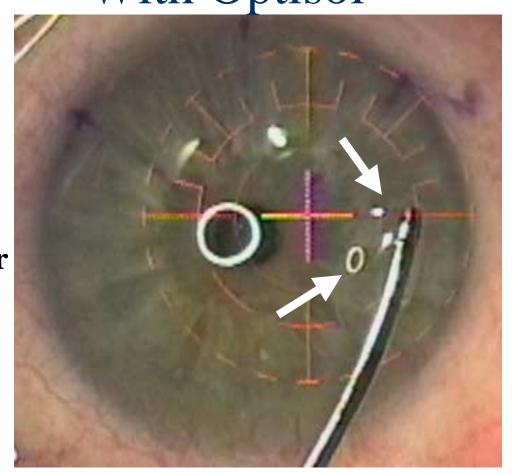
Patient developed Grade I DLK



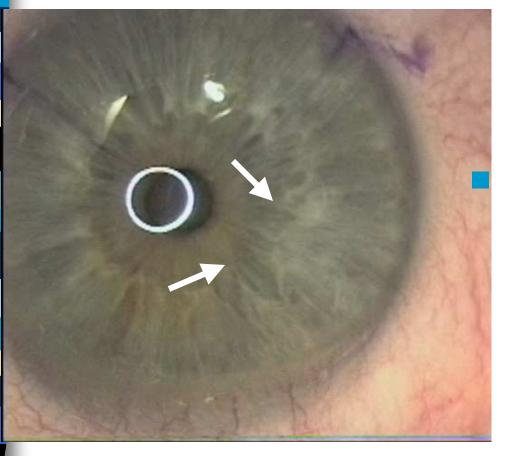
Case 4: Epithelial horseshoe tear on the Superior Flap surface with adhesion onto the Lateral Cornea

With Optisol

After removing the epithelial flap from under the hinge, the tear is repositioned onto the cornea. Note the lack of epithelial edema



Case 4: Optisol & Epithelial tear



 Moderate epithelial horseshoe tear with flap removed from under the hinge

Note minimal epithelial irregularity and no visible gutter

Optisol: Conclusions

- No significant difference in routine surgery
 - May be useful to the beginning surgeon
- Corneal Swelling is time and solute dependent
- Optisol helpful in complicated cases when
 - -Epithelial disruption
 - Repeated irrigation under the flap
 - Insufficient numbers to analyze