

Categories: KeratoRefractive, Techniques and Technology, LASIK
Author: Donald R. Sanders, MD, PhD
Number: 38044
Year: 2005
Title: Comparison of Absorption Coefficients Between 213 nm and 193 nm Wavelengths in Corneal Refractive Surgery
Contributing Authors: Gabriel Marin, MD, Jessica Springbett, BSc, Mukesh Jain, PhD, Paul P. van Saarloos, PhD

Purpose: Fluid on the cornea is known to affect the ablation rate with the 193nm excimer laser. Transmission of laser wavelengths 213 nm and 193 nm through various solutions are investigated as well as to compare clinical results where 213nm is ablated through a hydrated vs dehydrated cornea. Methods: The transmission characteristics of the 193nm and 213 nm wavelengths were evaluated at a range of BSS and sodium chloride concentrations to indirectly assess the effect of corneal hydration due to surface fluids with both laser wavelengths. Other comparative studies will be reported including in vitro histological and infra-red thermal imaging. In addition, clinical experience with the Pulzar Z1 213 nm solid-state in terms of the degree of liquid on the corneal surface and clinical outcomes will be reported. Results: The 213 nm wavelength is considerably less sensitive to the absorption of BSS and sodium chloride solution. In comparison to the 213nm wavelength, 193nm absorption is 20 X greater in BSS and 160 X greater in 0.9% NaCl. Clinically, the degree of corneal hydration and the amount of surface fluid during refractive procedures with the 213 nm laser had no affect on laser ablation and predictability. No difference in outcomes was seen between cases where wiping was performed compared to no wiping. Conclusions: The insensitivity of the 213 nm laser wavelength to BSS and sodium chloride solution compared to 193 nm has the potential to offer the refractive surgeon greater control of the ablation rate independent of corneal hydration leading to improved clinical outcomes.