

FEMTO LDV LASIK

Low pulse energy flap creation results in significantly less post-op DLK¹

Background

For many years, laser assisted in situ keratomileusis surgery (LASIK) has been widely accepted as a procedure to correct visual errors. Diffuse lamellar keratitis (DLK) is a sterile inflammation underneath the flap known to be one of the few complications after LASIK surgery. When the symptoms of DLK are recognized, immediate treatment is necessary in order to prevent its progression. Worsening cases may lead to scarring, stromal melt, haze, hyperopic shift, irregular astigmatism or permanent visual loss. In this study, we classified patients with DLK into five stages and compared two femtosecond lasers, the FEMTO LDV and the IntraLase FS60, which are different in terms of their laser pulse energy as well as other specifications, for the incidence of DLK.

Methods

In this prospective study, 818 eyes received LASIK treatment (514 eyes using Ziemer FEMTO LDV and 304 eyes using the IntraLase FS60), at Shinagawa LASIK Center, Tokyo, Japan in July 2010. All patients had a complete pre-operative ophthalmologic examination that included uncorrected distance visual acuity (UDVA), corrected distance visual acuity (CDVA), manifest refraction spherical equivalent (MRSE), keratometry, corneal topography, specular microscopy, wavefront analysis, measurement of the pupil before and after mydriasis, higher order aberration, anterior eye segment, corneal thickness, and slit-lamp biomicroscopy. The raster energy and side-cut energy were in the nJ range for the FEMTO LDV. For the IntraLase FS60, a bed energy level of 1.0 µJ, and a side-cut energy level of 0.80 µJ were set. After the flap was created with either laser, the flap was lifted and excimer laser ablation was performed. Pre- and post-operation procedures included standard ophthalmic medication to reduce inflammation and limit infection. At their day-1 postoperative follow-up visit, patients were divided into four stages according to the widely known DLK classification system.

Results

At postoperative day 1, in the FEMTO LDV group (totaling 514 eyes), DLK was found in 42 (8.17%) of the eyes, by slit-lamp examination; of these, 35 eyes (6.81%) developed stage 1a and seven eyes (1.36%) developed stage 1b. None of the eyes were diagnosed as stage 2, 3, or 4.

The number of eyes with no DLK was 472 (91.83%) in the FEMTO LDV group. In IntraLase FS60 group (totaling 304 eyes), 114 (37.5%) of the eyes had DLK; of these, 96 eyes (31.58%) developed stage 1a and 18 eyes (5.92%) developed stage 1b. The DLK incidence rate was 8.17% in the FEMTO LDV group and was 37.5% in the IntraLase FS60 group. There were significant differences observed between these two femtosecond lasers when the occurrence of DLK was compared at stage 1a and 1b, at postoperative day 1 (P, 0.0001 [Mann-Whitney's U-test]).

Discussion

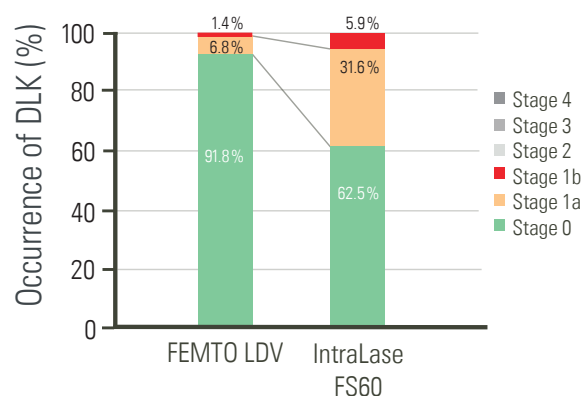


Fig 1. Occurrence of DLK on Post-op day 1. FEMTO LDV n=514; IntraLase FS60 n=304. Significance noted across all groups.

The low pulse energies of the FEMTO LDV produce small and tightly overlapped dissection spots. This overlapped beam delivery makes a stromal flap cut without tissue bridges, and thus, the flap dissection is completed easily, with minimum damage to the corneal tissue. In our study analyzing the incidence of DLK following the use of these two lasers, we showed that the FEMTO LDV induced significantly lower rates of DLK at postoperative day 1. Consistent with previous studies, our findings indicate that both femtosecond lasers excel at LASIK flap creation, however, the FEMTO LDV was significantly better at preventing DLK compared to the IntraLase FS60, perhaps due to the lower pulse energy used.

References:

- Tomita M., Sotoyama Y., Yukawa S., Nakamura T. Comparison of DLK incidence after laser in situ keratomileusis associated with two femtosecond lasers: Femto LDV and IntraLase FS60. Clinical Ophthalmology 2013; 7:1365–1371