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Corneal Reinnervation after LASIK: Prospective 3-Year Longitudinal Study

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PURPOSE. To measure the return of innervation to the cornea during
3 years after LASIK.

METHODS. Seventeen corneas of 11 patients who had undergone
LASIK to correct myopia from -2.0 D to -11.0 D were examined
by confocal microscopy before surgery, and at 1, 3, 6, 12, 24, and
36 months after surgery. In all available scans, the number of
nerve fiber bundles and their density (visible length of nerve per
frame area), orientation (mean angle), and depth in the cornea were measured.

RESULTS. The number and density of subbasal nerves decreased >90% in the first month after LASIK. By
6 months these nerves began to recover, and by 2 years they reached densities not significantly different
from those before LASIK. Between 2 and 3 years they decreased again, so that at 3 years the numbers
remained <60% of the pre-LASIK numbers ($P < 0.001$). In the stromal flap most nerve fiber bundles
were also lost after LASIK, and these began recovering by the third month, but by the third year they did
not reach their original numbers ($P < 0.001$). In the stromal bed (posterior to the LASIK flap interface),
there were no significant changes in nerve number or density. As the subbasal nerves returned, their
mean orientation did not change from the predominantly vertical orientation before LASIK. Nerve
orientation in the stromal flap and the stromal bed also did not change.

CONCLUSIONS. Both subbasal and stromal corneal nerves in LASIK flaps recover slowly and do not return
to preoperative densities by 3 years after LASIK. The numbers of subbasal nerves appear to decrease
between 2 and 3 years after LASIK. The orientation of the regenerated subbasal nerves remains
predominantly vertical.

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