To determine the relationship between epithelial flap vitality and stromal keratocyte proliferation following two epithelial refractive techniques: epi-LASIK and laser epithelial keratomileusis (LASEK). Human corneas were maintained in organ culture and underwent standard -6.00-diopter ablation. Rates of stromal keratocyte proliferation were detected 1 week postoperative using a Ki67 antibody specific to proliferating cells. Images were captured with a laser scanning confocal microscope and analyzed by a masked observer. Epithelial flap vitality was determined with propidium iodide using fresh porcine corneas. Epithelial flaps were created with Gebauer Epikeratome epi-LASIK or alcohol-assisted LASEK method. Flaps treated with 100% alcohol and uninjured corneas were used as controls. The number of proliferating keratocytes was greatest at 1 week in the epi-LASIK corneas (P<.001). Cell vitality was greatest in the epi-LASIK flaps and declined in the LASEK and 100% alcohol flaps (P<.001). In this in vitro setting, epi-LASIK results in an epithelial flap with significantly more live cells. There is also a greater number of proliferating stromal cells following epi-LASIK at 1 week. Based on these in vitro observations, epi-LASIK may result in greater levels of haze compared to LASEK.