

APPENDIX

Surgical Technique

Penetrating keratoplasty (PK)

A Hanna suction trephine (Moria, Antony, France) was used to cut a partial depth, circular incision in the recipient cornea, centered at the geometric center of the cornea, with a diameter of 8.25 mm. Excision of the recipient corneal button was completed with curved corneal scissors. A same size or 0.25-mm oversized donor button was punched from the endothelial side with the Hanna punch trephine. Four interrupted sutures and a single 16-bite 10-0 nylon suture (Ethicon Inc., Somerville, NJ) were placed in all cases.

Anterior Lamellar Therapeutic Keratoplasty (ALTK)

Only patients with corneal thickness greater than 400 microns were included. In brief, a suction ring was applied to the recipient cornea, with an increase of the IOP to over 65 mmHg. A hand-driven microkeratome (Moria ALTK microkeratome, model Evolution 3E, Moria, Antony, France) was advanced in the track until the anterior corneal lamella was completely severed from the underlying recipient stroma. In all cases, the 250-micron microkeratome head was used. The same microkeratome with a 350-micron head was utilized to prepare the lamellar graft from the donor cornea, which had been mounted on the artificial anterior chamber (AC) of the ALTK system. The graft was then trephined using a Hanna punch (Moria, Antony, France). The diameter of the donor graft was set to be 8.5 mm. The quality of the donor lamella was checked under the operating microscope, and if it found unsatisfactory, a new graft was prepared. The lamellar graft was then sutured in place under tension by means of 4 interrupted sutures and a single 16-bite 10-0 nylon suture (Ethicon inc., Somerville, NJ).

Deep Anterior Lamellar keratoplasty (DALK): Deep Lamellar Keratoplasty (DLKP) by intracorneal dissection

Central and peripheral corneal thickness were measured using an ultrasonic pachymeter (Ophthasonic, Teknar, St. Louis, MO). A 4-mm limbal incision was performed at the 10-o'clock

position with a pre-calibrated diamond knife. The knife calibration was set to the value of the thinnest corneal thickness minus 50 microns to spare the endothelium, DM, and a thin deep stromal layer. A cleavage plane was then formed by creating a small stromal pocket with an angulated bevel-up. Subsequently, the pocket was enlarged with a dissector to obtain the deep stroma dissection extending across an area that covered the central 9-mm diameter. The deep stromal pocket was filled with a viscoelastic substance (IAL-F, Fidia Farmaceutici S.p.A., Abano Terme, Italy) to reduce the risk of endothelium perforation during the trephination of the recipient button with the Hanna trephine. The recipient button was set at 8.25 mm in all cases. The donor cornea was trephined from the endothelial side with a Moria punch with a 0.25-mm bigger diameter than the recipient bed. Endothelium and DM were removed from the donor button with dedicated forceps. Four interrupted sutures and a single continuous 20-bite 10-0 nylon suture (NU-1, Alcon Laboratories, Inc., Fort Worth, TX) secured the corneal lamella in the recipient bed.