6.3 µm and 6.5 µm, respectively. We agree that there are limitations to all techniques that measure corneal thickness including the Visante OCT. However, we do not agree with the assertion that the resolution of the system is ±12 µm and that standard deviations reported less than this are not valid.

Jason E. Stahl, MD
Daniel S. Durrie, MD
Frank J. Schwendeman, OD
Allen J. Boghossian, DO
Overland Park, Kansas

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Custom Phototherapeutic Keratectomy and Autologous Fibrin-cultured Limbal Stem Cell Autografting: A Combined Approach

To the Editor:

We report the effectiveness of combined custom phototherapeutic keratectomy (PTK) with intraoperative topography and fibrin-cultured limbal stem cell autografting to treat limbal destruction of the left eye of a 67-year-old man due to alkali burn, which occurred 12 years prior to presentation.

Characteristics of both eyes are in presented in the Table. Impression cytology confirmed left limbal stem cell deficiency.[1]

Limbal biopsy was taken from the healthy right eye. Limbal keratinocytes were cultivated onto fibrin substrate[2] and after 20 days the patient underwent a combined procedure.

Custom PTK followed by smoothing was performed with the NIDEK EC-5000 excimer laser (NIDEK Co Ltd, Gamagori, Japan) according to Vinciguerra et al.[3] Manual dissection of the fibrovascular pannus followed, autologous fibrin-cultured limbal stem cells were placed on the prepared corneoscleral wound bed, and partial tarsorrhaphy was maintained for 24 hours.

TABLE

Characteristics of a Patient Undergoing Custom Phototherapeutic Keratectomy and Fibrin-cultured Limbal Stem Cell Autografting

	Right Eye	Left Eye
BSCVA (decimal)	0.9 (+1.75 −0.50 × 70)	0.5 (+1.75 −2.00 × 70)
UCVA (decimal)	0.6	0.05
IOP (mmHg)	15	13
Crystalline lens	N2C1P0	N2C1P0
Endothelial cell count (cells/mm^2)	2832	862
Pachymetry (µm)	526	574
Slit-lamp corneal image	Transparent, clear	Uneven corneal surface, corneal pannus, inferonasal NV
Immunostain positivity		CK3 <2% CK19 = 20%

BSCVA = best spectacle-corrected visual acuity, UCVA = uncorrected visual acuity, IOP = intraocular pressure, NV = neovascularization

The patient recovered best spectacle-corrected visual acuity of 0.65 (+2.00 diopters sphere). The Figure shows keratoscopy and corneal topography of the left eye obtained 13 months postoperatively. The patient's cornea showed a transparent, normal-looking epithelium without vascularization, haze, or epithelial defects (Figs A-C). Impression cytology confirmed that fibrin-cultured limbal stem cells were engrafted and were able to permanently restore the patient's corneal surface (Figs D-F).

Our approach to limbal stem cell deficiency highlights the value of combined use of custom PTK and fibrin-cultured limbal stem cell autografting to achieve successful corneal surface reconstruction and stable refraction.

Autologous fibrin-cultured limbal stem cells allow permanent restoration of corneal integrity in patients with severe limbal stem cell deficiency, avoiding large limbal withdrawal from the fellow eye.

Manual removal of the cicatricial pannus in preparation of autograft leaves an irregularly rough thin stromal surface with consequent persistent inflammation and postoperative astigmatism. These factors are frequently the cause of graft failure because the ocular surface roughness does not allow a proper adhesion of fibrin-cultured limbal stem cells, causing delays in stem cell proliferation and migration over the wound bed, neovascularization, fibrosis, and infections.[4]

In most cases, penetrating keratoplasty is required

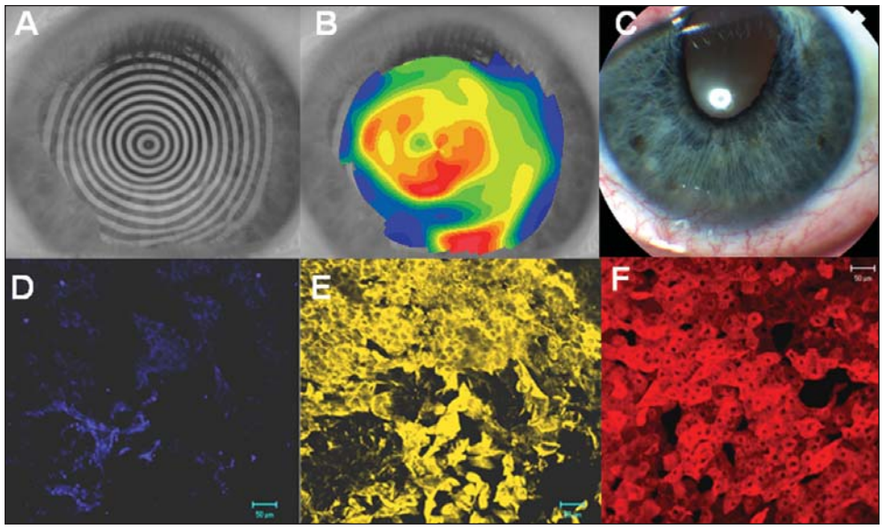

Figure. A) Slit-lamp photograph of the left eye at 1-year follow-up. **B)** 13 months after PTK. **C)** Instantaneous map 13 months postoperatively. **D)** Impression cytology showing keratin 19-positive cells at 1-year follow-up. **E)** Postoperative keratin 3-positive cells. **F)** Impression cytology showing keratin 12-positive corneal epithelial cells.

to allow corneal reconstruction and visual rehabilitation through refractive improvement. Surgeons usually wait between 3 and 7 months after keratolimbal transplantation before performing penetrating keratoplasty to decrease rejection rate and improve prognosis.

Therefore, if limbal stem cell deficiency is accompanied by superficial stromal scarring, custom PTK has advantages over penetrating keratoplasty such as tissue sparing and surgical trauma reduction. The smoother stromal surface achieved by the excimer laser improves surface unevenness of the cornea, increases fibrin-cultured limbal stem cell adhesion, improves postoperative corneal transparency, and decreases postoperative scarring.[5]

Custom PTK with intraoperative topography allows intraoperative visual acuity measurement, refractive correction, and comparison of the treated eye refraction with the fellow eye refraction. In addition, transplantation of tissue-engineered epithelial sheets after excimer laser keratectomy can successfully prevent the development of corneal haze, which may eventually reduce postoperative visual acuity.

P. Vinciguerra, MD
E. Albè, MD
P. Rosetta, MD
Milan, Italy
E. Di Iorio, PhD
Venice, Italy
G. Pellegrini, PhD
Modena, Italy

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