

CLAT

Corneal Lamellar Ablation for Transplantation

Corneal transplantations have historically been limited to penetrating keratoplasties with their own set of significant risks, complications and moderated clinical results. CLAT is a paradigm shift allowing the surgeon to execute a totally automated custom lamellar transplantation of the cornea. Unlike keratome created lamellar keratoplasties that are currently being tried, CLAT creates a uniform thickness receiving bed to accept the new normal thickness transplant eliminating the residual irregularities of the keratome prepared bed and yielding superior resultant corneal optics.



H1: Keratoconus profile.



H2: Custom ablation referencing pachymetry map creating uniform residual thickness receiving bed.



H3: Receiving bed exhibits membrane characteristics.



D1: Donor is ablated from endothelial aspect, thinned by receiving bed thickness.



D2: Donor is trephined to host site circumferential dimension.



D3: Finished donor ready for transplantation.



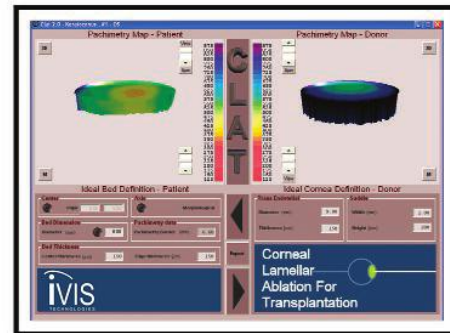
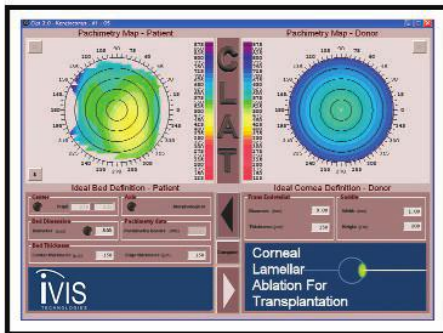
H4: Receiving bed with donor in place, creating new normal thickness cornea.

The Technology

- ▶ The receiving bed (H2) is created by calculating the intersection of the pachymetry map and the ideal corneal bed for the patient. The new receiving bed's (H3) membrane property now obtains no cross sectional rigidity.
- ▶ The surgeon resizes the donor cornea thickness (D1) from the endothelial surface by the amount of the residual cornea receiving bed thickness.
- ▶ A trephine will cut the cornea of the donor (D2) to an equal (or slightly larger) diameter than the diameter of the receiving bed.
- ▶ The donor is positioned on the receiving bed, on which a peripheral pocket may be created, and is then secured with conventional sutures or glued in place.

The Clinical Applications

- ▶ Keratoconus
- ▶ Prior refractive surgery failures
- ▶ Keratopathies
- ▶ Corneal trauma
- ▶ Corneal degenerations

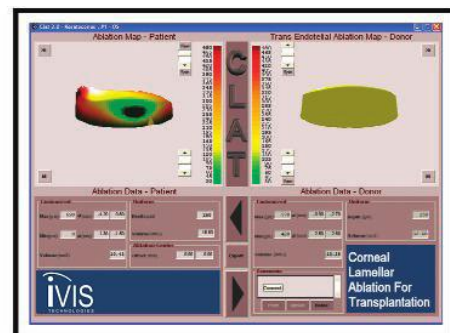
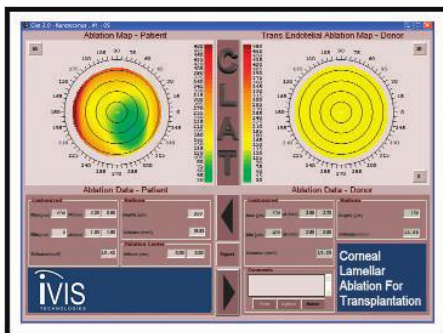


- ▶ Pre-op pachymetry map of intended receiver bed.
- ▶ Image highlights irregular corneal thickness with the warm colors representing areas of minimum thickness.

- ▶ Pre-op pachymetry map of donor*.
- *Donor pachymetry map is a future feature and is simulated.

- ▶ Pre-op 3-D pachymetry map of intended receiver bed.

- ▶ Pre-op 3-D pachymetry map of donor*.

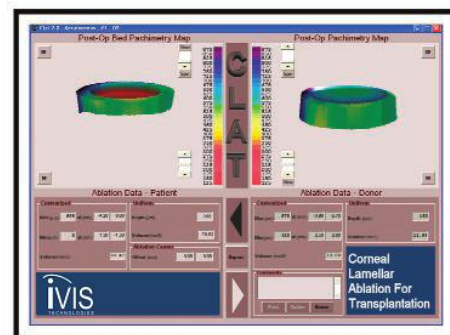
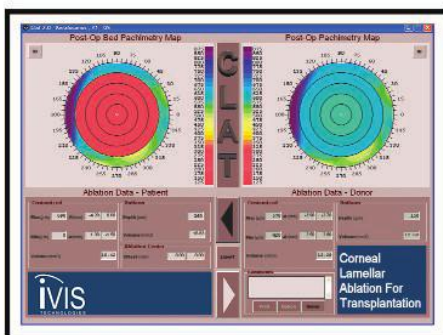


- ▶ Custom ablation profile map.
- ▶ The green area represents the minimum ablation thickness to be performed on the receiving bed.

- ▶ Donor ablation profile map.
- ▶ Ablation thins the donor and is performed transendothelial.

- ▶ Custom ablation profile 3-D map.

- ▶ Donor ablation profile 3-D map.



- ▶ Post-op pachymetry map of receiver bed.
- ▶ Image highlights the new uniform thickness receiver bed, i.e., uniform bed color.

- ▶ Post-op simulated donor* pachymetry map.

- ▶ Post-op 3-D receiver pachymetry map.

- ▶ Post-op 3-D donor* pachymetry map.