Femtosecond Laser with Multiple Functions for the Anterior Segment Surgeon

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Dr. Ang is a consultant of Bausch and Lomb Technolas Valeant.

History of Technolas’ Femtec to Victus

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>FDA 510(k) clearance and CE Mark for LASIK flap</td>
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<tr>
<td>2005</td>
<td>First ICRS tunnels for keratoconus</td>
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<tr>
<td>2005</td>
<td>First astigmatic keratotomy cuts</td>
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<tr>
<td>2005</td>
<td>First penetrating keratoplasty</td>
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<tr>
<td>2006</td>
<td>First posterior lamellar keratoplasty</td>
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<tr>
<td>2007</td>
<td>First noncircular decagon-shaped KP</td>
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<tr>
<td>2007</td>
<td>First link between femtosecond laser and diagnostic unit</td>
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<tr>
<td>2007</td>
<td>First intrastromal refractive procedures (INTRACOR)</td>
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<tr>
<td>2009</td>
<td>INTRACOR receives CE Mark</td>
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<tr>
<td>2011</td>
<td>VICTUS receives CE Mark</td>
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<tr>
<td>2012</td>
<td>VICTUS is cleared in the US for the creation of a corneal flap in patients undergoing LASIK surgery or other treatment requiring initial lamellar resection of the cornea and anterior capsulotomy during cataract surgery</td>
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<tr>
<td>2013</td>
<td>VICTUS receives 510(k) clearance for the creation of penetrating arcuate incisions in the cornea</td>
</tr>
<tr>
<td>2013</td>
<td>VICTUS receives CE Mark for Corneal Incisions, Penetrating Keratoplasty and Intrastromal Channel Incisions for Intracorneal Ring Segments</td>
</tr>
</tbody>
</table>

VICTUS™: 2-Piece Curved Patient Interface with Flexible Locking

Laser attached to Curved PI & Suction Clip attached to eye. Small enough to fit various eye topologies.
Designed for Patient Comfort & for Avoiding Corneal Folds

- Curved Interface & Intelligent Pressure Sensors

Avoiding corneal folds means the laser beam path is not affected

**VICTUS™ - Curved PI – designed to provide gentle docking**

Evaluation of hemorrhaging of the eye caused by docking the patient interface on 59 patients.

- Hemorrhage grade ranged from grade 0 to grade 3, as shown in images.
- Evaluation observed the average hemorrhage grade was 0.85±1.14
- Data courtesy Dr Pavel Stodulka, Zlin

**Real Time OCT**

Aids positioning, planning & monitoring
Capsulotomy & Lens Fragmentation

- High pulse repetition rates of 80 - 160 kHz result in fast laser treatment times, e.g. for:
  - Capsulotomy: ~ 4 sec
  - Lens Frag (4 quadrant): ~ 6 sec

- User can adjust energy and patterns, e.g. for addressing different grades of cataract

Corneal Incisions

- Up to three independent Corneal Incisions can be created
- Each Incision can consist of up to three planes
- Incisions can be centered either on the pupil or on the limbus

CATARACT GRADING and PHACO ENERGY

<table>
<thead>
<tr>
<th>CATARACT</th>
<th>VICTUS CDE (phaco energy)</th>
<th>CONVENTIONAL CDE (phaco energy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO1</td>
<td>1.61</td>
<td>1.41</td>
</tr>
<tr>
<td>NO2</td>
<td>12.66</td>
<td>13.88</td>
</tr>
<tr>
<td>NO3</td>
<td>11.05</td>
<td>16.17</td>
</tr>
<tr>
<td>NO4</td>
<td>16.75</td>
<td>22.12</td>
</tr>
<tr>
<td>NO5</td>
<td>38.10</td>
<td>42.87</td>
</tr>
</tbody>
</table>

N=133 cataract patients with 3 month follow up
Victus eyes = 128
Conv phaco eyes = 65
Arcuate Corneal

- The diameter of Arcuate Incisions can be up to 12 mm
- Each Arcuate Incision can be planned independently
- Assistance for easy centration on the limbus or the pupil

Victus for Flap Creation

- Easy docking
- Easy to dissect
- Smooth bed
- Minimal opaque bubble layer (OBL): avoid disrupting Iris Registration (IR)
- Minimal subconjunctival hemorrhage
- Consistent flap thickness

Femto Flap Procedure

- Intended flap thickness: 120 μm

*Indications of Software V 2.7 not available in all countries
Comparison of Central Flap Thickness
Intended: 120um Flap

<table>
<thead>
<tr>
<th>Central Flap Thickness</th>
<th>XP Blade</th>
<th>S2BF</th>
<th>Virtus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>141</td>
<td>114.06</td>
<td>139.03</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>26.68</td>
<td>14.81</td>
<td>6.71</td>
</tr>
<tr>
<td>Minimum</td>
<td>92</td>
<td>76</td>
<td>94</td>
</tr>
<tr>
<td>Maximum</td>
<td>178</td>
<td>138</td>
<td>127</td>
</tr>
</tbody>
</table>

Intrastromal Channel Incisions for Intracorneal Ring Segments (ICRS)

Overview of Approved VICTUS™ Procedures - Software V 2.7

- Cataract
  - Capsulotomy
  - Lens Fragmentation
  - Arcuate Incisions
  - Corneal Incisions

- Corneal
  - Lasik Flap
  - INTRACOR

- Therapeutics
  - ICRS Tunnel
  - PKP (circular)

US and ROW

*more pending / coming*
Pearls

- Adequate dilation (>6.5mm pupil)
- Center suction clip on limbus
- Pressure censors neutral position: no folds
- Corneal incisions: avoid arcus, vessels
- Check IOP and pupil before and after
- Forceps for controlled removal of capsulotomy
- Careful hydrodissection

Summary

- We decided on the Victus:
  - Offer cutting edge technology
  - One machine to do multiple procedures
  - Inspires confidence in patients, improves conversion to surgery (cataract and Lasik)
  - Save on maintenance cost
  - Space saving
  - Increased utilization means faster return of investment

Femtosecond Technology That Empowers
The Anterior Segment Surgeon