

Session 2-O: Cataract: Astigmatism, Anesthesia

Title: Use of the IntraLase Femtosecond Laser for Clear Corneal Cataract Incisions

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Purpose: Clear cornea cataract incisions have been implicated by some as associated with an increased tendency for postoperative infection. On the other hand, some reports present differing results. At the core of the issue is corneal wound architecture. Given that there are many variables to free hand cataract wound construction, the incision is unlikely to be reproducible, particularly with respect to the length of the clear corneal tunnel. This is a likely factor in postoperative hypotony and ingress of contaminated fluid from the ocular surface. A preliminary investigation was performed with a commercially available femtosecond laser in an attempt to construct a 90% partial thickness 3.0 mm wide clear corneal tunnel. Using the laser, length of the corneal tunnel is reproducible, but given present software, the laser cannot extend into the anterior chamber. A series of tunnel lengths will be evaluated and tested for self sealing capacity at varied levels of intraocular pressure. The study has two purposes: 1- Determine whether a femtosecond laser can produce a standardized partial thickness cataract incision. 2- Establish the appropriate clear corneal incisional architecture necessary to insure hermetic sealing at given levels of IOP.

Method: A commercial femtosecond laser (IntraLase) was employed in a series of human cadaver eyes to construct cataract pre-cut incisions up to 90% of corneal depth; incisions were then completed into the anterior chamber with standard keratomes and the incision architecture measured with calipers IOP was established manometrically by BSS infusion to test wound closure competence. Fluorescein dye was used to evaluate hermetic sealing.

Results: The commercial laser easily cut reproducible partial thickness clear corneal cataract incisions just inside the limbus. Results of the wound competency testing are pending.

Conclusion: A femtosecond laser can be used to generate 90% partial thickness clear corneal cataract incisions. This may prove very useful for creating reproducible, hermetically sealed incisions for cataract surgery.