

Fugo Plasma Blade and its uses in Ophthalmology

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Fugo blade

Fugo blade is a new operating tool that produces "laser like plasma" on the operating blunt metal wire tip. It is an FDA approved device for capsulotomy, iridectomy and glaucoma (Transciliary Filtration).

How does Fugo blade work?

It focuses electro-magnetic waves to one point, i.e. the tip of the instrument and the energy is tuned to the tissues by the process of resonance. The moment a tissue is touched by the activated tip, the plasma energy gets transferred to the molecules of the tissue. When tissue molecules absorb plasma energy, they go to higher energy levels, thereby becoming unstable. The unstable molecules explode in the same fashion as excimer laser explodes corneal tissue molecules. The exploding molecules carry with them water from the tissue and produce a plume, which gives a peculiar aromatic smell. The molecules/tissue split in the line of incision/ablation, without bleeding, since the blood vessels are also ablated from the path. It is obvious that

Fugo blade provides a new cutting energy, the plasma which makes it different from the electrosurgical devices that we are familiar with. Fugo blade makes it possible to ablate surfaces and to create channels/tracks in one or multiple tissues in one single movement. The plasma is surrounded by orange light, the photonic cloud. The cutting power resides only in the plasma cloud. With this kind of plasma cloud, it is possible to make precisely measured filtration channels. The cutting/ablation by Fugo blade is not accompanied by clinically visible collateral damage. This fact is corroborated by microscopic and electron microscopic studies on the lens capsule, cornea and other tissues. Instrument:

Fugo Plasma Blade comprises of:

- Portable table top model
- Autoclavable hand piece & cable
- Power cord & charger
- Foot pedal & cable
- Individually packaged sterile ablation tips

It works on 4 rechargeable battery cells. Total cut time of one charge is 40 minutes. Numerous glaucoma operations can be done after one charge. Cut power and cut intensity can be adjusted from the console. The width and the power of the plasma are controlled from the controls of "power" and "intensity". The plasma width may be kept at 25, 50 or 75 microns.

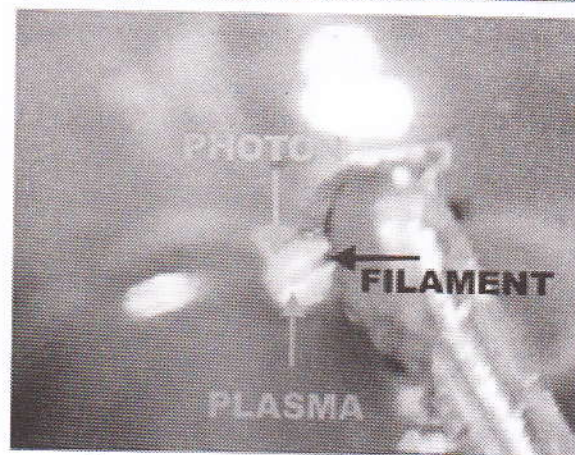


Figure 1: Fugo Blade & Plasma Cloud
Ref: intechopen.com

Uses of Fugo Plasma Blade:

1. **Transciliary filtration (Singh filtration)** with the Fugo plasma blade: The process involves the Fugo Plasma Blade to ablate a small scleral reservoir under a conjunctival flap. Creating a micropore in the posterior chamber allows the aqueous to seep into the reservoir, where it is slowly absorbed. The conjunctival flap is replaced and fastened with a suture. The entire procedure hardly takes a few minutes to perform. It is easy on surgeon and the IOP is lowered with a lower tendency for flat anterior chamber.



Figure 2: Transciliary Filtration with Fugo Blade
Ref: reviewofophthalmology.com



Figure 3: Fugo Plasma Blade Trabeculectomy

2. **Capsulotomy:** Plasma blade capsulotomy² for cataract surgery was first approved by the FDA in 2000, and it has provided a unique ability to manage difficult cases, as well as an ability to surgically manage capsular tears. The resistance-free ablation is invaluable in cases with weak zonules, dense membranes or small

pupils such as in intraoperative floppy iris syndrome. A plasma blade capsulotomy can be performed beneath a penetrating keratoplasty graft, and no postoperative graft decompensation has been reported in more than 10 years with such graft-associated capsulotomies. Fugo Blade can safely and quickly produce resistance-free cuts in corneal tissue in animals, opening additional avenues for use of this device in corneal surgery³. Although performance of an anterior capsulotomy with the Fugo blade was associated with some margin irregularities, the geometry of the centrally directed tags prevented them from becoming the site of radial tear formation.

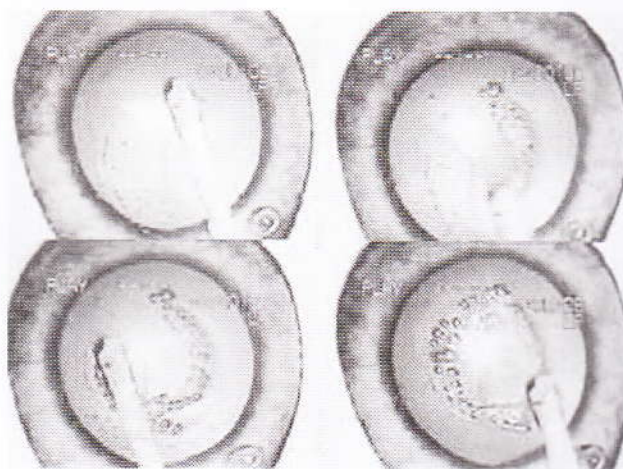


Figure 4: Capsulotomy using Fugo Plasma Blade
Reference: www.ophtalmologymanagement.com

3. **Iridotomy and pupilloplasty:** Iridotomy is performed by placing the ablation tip at the intended site of iridotomy, and the tip is activated for a second or two, thereby creating a bloodless iridotomy. The size of the iridotomy is under surgeon control. Such an iridotomy can be placed far out in the periphery adjacent to the iris root and can be useful in Visian implantable Collamer lens (STAAR Surgical) surgery. The plasma blade is also useful in performing pupilloplasty.
4. **Glaucoma surgeries:** Goniotomy ab interno⁵ using the Fugo Blade was found to be a safe alternative to conventional trabeculectomy,

which safely and effectively reduced intraocular pressure in more than 80% of cases. Besides it has also been found useful in failed trabeculectomy cases to achieve good IOP control. Cases of buphthalmos, resistant forms of glaucoma like neovascular glaucoma has also shown benefits with Fugo Plasma Blade.



Figure 5: Goniotomy ab interno using Fugo Plasma Blade



Figure 6: Ab interno Filtration with Fugo Blade
Reference: eyetube.net

5. Excision of skin and ocular masses: Bloodless excision of lid, conjunctival masses can be easily performed with Fugo Blade. Besides limbal dermoid, hemangioma, cysticercus, nevus have also been successfully removed using Fugo Plasma Blade.

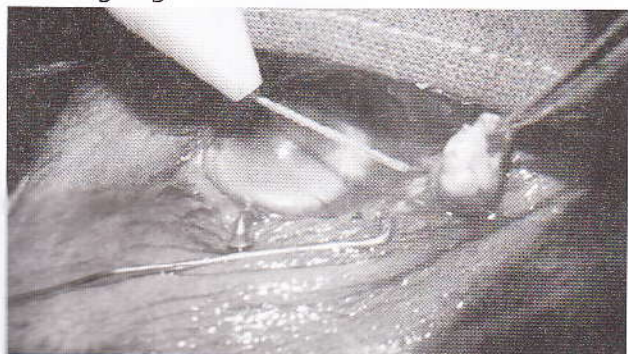


Figure 7: Conjunctival mass excision using Fugo Blade

6. Squint surgery: Distinct advantages for using the Fugo Blade in squint surgery were increased surgeon control, bloodless field and decreased operative time.
7. Entropion surgery, destroying roots of cilia to correct misdirected eyelashes, Pterygium excision, DCR surgery, and vitrectomy with Fugo Plasma Blade have all shown promising results.



Figure 9: Entropion Surgery using Fugo Blade
Reference: youtube.com

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