OptoYag&SLT M: A Two in One Treatment Solution

Ophthalmologists increasingly have to work within the confines of restricted healthcare budgets, particularly in the EU. Additionally, clinic space is often similarly restricted which in some cases limits the amount of hardware that can be introduced into a practice. The OptoYag&SLT M provides two key technologies in one device - a Q-switched frequency-doubled (532 nm) neodymium-doped yttrium aluminium garnet (Nd:YAG) laser for selective laser trabeculoplasty (SLT), and a Q-switched Nd:YAG (1064 nm) laser for capsulotomies and iridotomies.

Selective Laser Trabeculoplasty

Although medical therapy and invasive treatments such as trabeculectomy and tube shunts have long been considered the gold standard in the treatment of glaucoma, they are often associated with side effects and/or compliance issues which may in turn affect the patient's quality of life. Consequently, many surgeons are turning to safer and less-invasive glaucoma treatments such as SLT.

SLT uses a Q-switched frequency-doubled (532 nm) neodymium-doped:YAG (Nd:YAG) laser which delivers energy in short pulses (4 nanoseconds). The 532 nm light selectively targets and irradiates melanin cells in the trabecular meshwork while preserving the adjacent non-pigmented eye structures. Low-energy laser irradiation evokes a cytokine response which activates macrophages, which in turn remove damaged cells. This increases the porosity of the trabecular meshwork which leads to more effective aqueous outflow and thus lowers intraocular pressure (IOP).

There is growing evidence to show that SLT is an efficacious primary or adjunctive therapy for treating glaucoma.[1] Some estimates suggest that the success rate is between 40% and 70% in adults[2-4], and that the efficacy of SLT is at least comparable to argon laser trabeculoplasty[5]. In a study in which 22 medically-treated open-angle glaucoma patients (mean age, 69.4 ± 5.2 years) received treatment with Optotek's SLT technology, IOP was reduced by at least 30% in two thirds of patients. Specifically, at an average follow-up of 9 months (range, 1-14 months), the mean IOP reduction after SLT was 4.5 ± 3.8 mm Hg from a pretreatment IOP of 24.7 ± 4.1 mmHg.[6]

An additional benefit of SLT is that it is associated with a low complication rate although surgeons should be aware of potential side effects which may include iritis, corneal haze, hyphema, choroidal effusion, foveal burns and macular edema.[7]

Nd:YAG for Capsulotomies and Iridotomies

The YAG mode of the OptoYag&SLT M is used to treat the number one complication associated with cataract surgery - posterior capsule opacification (PCO). It is also used to perform peripheral iridotomies in patients with acute and narrow angle-closure glaucoma. The YAG mode uses a Q-switched Nd:YAG laser with a wavelength of 1064 nm, and the like the SLT mode, delivers energy in 4 nanosecond pulses.

Although Nd:YAG capsulotomy is efficacious with a good safety profile, it may cause complications such as elevated IOP (transient and persistent), retinal tears and detachment, cystoid macular oedema, intraocular lens damage, and iritis. Several studies indicate that side effects are more pronounced when higher single-pulse energy is used; consequently, the YAG mode of the OptoYag&SLT M was designed to enable the best treatment results using lower energy and fewer shots.

A study that included 53 eyes of 44 patients (mean age, 76.49 years; [range, 59 to 89 years]), undertaken at the University Medical Centre Ljubljana, Slovenia, showed that using Optotek technology, Nd:YAG laser match the specific needs of the therapy or the patient. The fine energy setting buttons are conveniently located just next to the joystick, allowing the physician to adapt the energy according to the patient's eye response - capsulotomies could be successfully performed at an energy level of 1.6 mJ. Indeed, the authors reported that all procedures were performed at 1.6 mJ with an average total energy of 104.72 mJ (range, 27.2 mJ to 320 mJ). The average number of pulses used was 65.5 (range, 17 to 200).[8]

OptoYag&SLT M: Key Features/Advantages

Two-in-One Functionality

The SLT mode of the OptoYag&SLT M offers 33 energy levels ranging from 0.2 mJ to 2.6 mJ per pulse. Its red aiming beam (650 nm) allowing precise focusing of the treatment beam, while built-in safety features ensure quick, safe and effective office-based SLT treatment.

The YAG mode of the OptoYag&SLT M provides optimized focusing optics, high accuracy and precision of the red aiming beam system, and a clean and stable Gaussian laser beam profile. Like the SLT mode, the YAG mode offers a range of energy levels, i.e., from 0.5 mJ to 10 mJ per pulse, in 30 steps. It also has excellent photodisruptor capability, which enables best treatment results using lower energy and fewer shots.

High Performance

The OptoYag&SLT M with newly-designed laser cavity and optimized system configuration has a repetition rate of 3 Hz. This allows faster, shorter treatment sessions, which not only improves practice productivity, but also increases patient comfort.

Figure 1: The OptoYag&SLT M

High Power LED Illumination System

The device incorporates an e-SlitLight™ LED slit lamp which offers thousands of hours of bright white light originating from the solid state LED light source. The LED illumination enhances color, detail and contrast and therefore significantly improves imaging. Additionally, its minimal heat emission makes the treatment comfortable even for patients with dry eye.

Fine Energy Setting

Advanced technical solutions and sophisticated electronics incorporated into the OptoYag&SLT M allow for a precise adjustment of energy in order to match the specific needs of the therapy or the patient. The fine energy setting buttons are conveniently located just next to the joystick, allowing the physician to adapt the energy according to the patient's eye response - easily and accurately.

Pulse to Pulse Stability

The OptoYag&SLT M also incorporates pulse to pulse stability (PPS™) technology for delivering stable energy that far exceeds current industry standards. Enhancing the accuracy and stability of energy delivery assures the highest levels of safety while facilitating effective and efficient eye treatments.

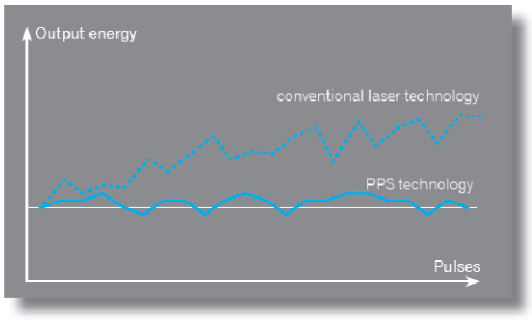

Figure 2: PPS Technology versus Conventional Laser Technology

Portable and Easy to Use

The OptoYag&SLT M is supplied in a convenient portable design that allows the operator to change location with ease. The electronics box is housed underneath the table, which means the system can be moved freely to another worktop and is therefore always ready to use. Moreover, the table height is fully adjustable, which is particularly beneficial when treating wheelchair-bound patients.

The device was designed with ease of use in mind. The fine energy setting buttons are located next to the joystick, thus enabling the physician to adapt energy according to clinical needs, while maintaining continuous control throughout the treatment process.

Mechanical Precision

Most companies that provide YAG/SLT devices hand the production over to third party manufacturers. In contrast, the OptoYag&SLT is designed, developed and constructed in-house. Although Optotek often works in collaboration with suppliers within the EU, the company has the technological expertise to produce high quality optical and mechanical components in-house, which allows them to set the highest standards possible.

Expert Opinion

"The OptoYag&SLT M is a true dual use device with no compromises or weaknesses to either mode. I found the optics to be superb and the adjustable table could even suit wheelchair bound patients. Most importantly, the YAG mode makes peripheral iridotomy and capsulotomy procedures very easy, efficient and safe".

Dan Lindfield, BM, FRCOphth, Consultant Ophthalmologist (Glaucoma) at Royal Surrey County Hospital, UK.

Summary

The OptoYag&SLT M is a two-in-one device that allows surgeons to perform SLT, peripheral iridotomies and capsulotomies with the same instrument. The device incorporates several unique features including PPS and a high power LED illumination system. The OptoYag&SLT M represents an ideal treatment solution for both the glaucoma specialist and the general ophthalmologist.

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