# DIDACTIC COURSES

**Micropulse Laser Applications in Eyecare**

Babalola Olufemi Emmanuel
*Department of Surgery, Bingham University, Rachel Eye Center, Abuja, Nigeria. E-mail: bablo57@yahoo.com*

The objective of this presentation is to highlight the advantages of micropulse laser in modern ophthalmic practice. The acronym LASER stands for Light Amplification by Stimulated Emission of Radiation. Standard Laser Applications in ophthalmology include:

- Trabeculoplasty for Primary Open Angle Glaucoma (POAG),
- Management of Clinically Significant Macular Edema (CSME) and Wet Age related macular Edema with focal and grid Laser application,
- Pan retinal photocoagulation (PRP) for proliferative diabetic retinopathy, sickle cell retinopathy, and central retinal vein occlusion.
- Management of early retinoblastoma
- Cyclo-photocoagulation which is increasingly being utilized in the overall management of POAG.

By Micropulse, it is meant that only a certain proportion of the overall Laser energy is applied. The proportion of energy applied is called the Duty cycle. This can vary from 5% to 15% depending on the procedure being carried out. The reduction in the overall energy applied means that tissue is protected from thermal injury. The following are some specific areas in which there is an advantage:

- Micropulse (Diode or Argon) Laser Trabeculoplasty has been known to cause a reduction of between 3 to 7 mmHg.[1,2]

The advantage of MDLT over the more traditional ALT is that there are no visible scars in the trabecular meshwork and the procedure is repeatable. While the mechanism for this reduction in intraocular pressure is unclear, it is thought that it may be related to increased stromelysin expression.[3] Results are comparable to Selective Laser Trabeculoplasty.[4] With micropulse pan retinal photocoagulation, there is a protection from thermal injury and burns and there are no visible scars. This protection however does not detract from the effectivity of the laser. The therapeutic effect of LASER photocoagulation is not generated by the necrosis but from biological activity generated around the target spot. Thus the burn mark is not needed. The fact that it is relatively safe means that Micropulse PRP can be applied much earlier that is usually indicated with the EDTRS or DRS criteria.

- Focal and Grid Laser treatment for CSME. Normally one would need to exercise caution around the fovea, and leave a gap of about 500 μ. However with Micropulse settings, usually with a Duty Cycle of 5%, it is possible to apply laser much closer to the fovea. This is especially useful where the edema involves the fovea centralis.
- Micropulse capable lasers can also be used in the full mode, thus making it a flexible machine capable of other general applications. It is therefore more cost effective.

There are two major manufactures of micropulse capable lasers. These are Iridex and Optos. These applications can be in diode or argon mode. The advantages of the diode mode are that it is capable of use for cyclo-photocoagulation and is useful when there is some media haze such as from early cataract and hemorrhage.

**Conclusions:** Micropulse laser has similar applications to standard laser but with significantly added margin of safety.

## REFERENCES

1. Babalola OE. Micropulse Diode Laser Trabeculoplasty in Nigeria Patients. The 15th Annual Faculty Lecture of the Nigerian Post Graduate Medical College. 14th June, 2014.
2. Fea AM, Bosone A, Rolle T, Brogliatti B, Grignolo FM. Micropulse diode laser trabeculoplasty (MDLT): A phase II clinical study with 12 months follow-up. Clin Ophthalmol 2008;2:247-52.
3. Parshley DE, Bradley JM, Fisk A, Hadaegh A, Samples JR, Van Buskirk EM, *et al*. Laser trabeculoplasty induces stromelysin expression by trabecular juxtacanalicular cells. Invest Ophthalmol Vis Sci 1996;37:795-804.
4. Belyea D. Micropulse Laser Trabeculoplasty Versus Selective Laser Trabeculoplasty for Treatment of Open Angle Glaucoma (MLT versus SLT). Available from: http://www.clinicaltrials.gov/ct2/show/NCT01956942. [Last accessed on 2014 May 31].