

Treatment Guidelines for Diabetic Macular Edema

It is important to note that all information contained herein has been compiled based on results of various generic clinical studies and investigations, and intended to serve as general guidance only. While the LIGHTLas 532 with SP-Mode® Microsecond Laser Technology provides a highly effective and minimally invasive treatment, LIGHTMED strongly recommends that all physicians new to this technique seek professional peer training, and gain proficiency of current peer recommended treatment methods prior to commencing treatment.

Q: What is SP-Mode® Microsecond Laser Technology?

SP-Mode® Microsecond Laser Technology divides the laser power into two envelopes —ON and OFF— which allows enough time for the RPE or Retinal Pigment Epithelium to cool without causing any evidence of a burn. This treatment in the interim induces photo-stimulation of the tissue instead of photocoagulation[1].

Note: The Green 532nm laser offers a better treatment outcome when macular thickness is 400µm or less; however, due to tissue penetration limitations of the green laser, the Yellow 577nm laser can be better in some cases, as it has greater potential to penetrate deeper for thicker edemas[3].

Indications for using SP-Mode® for Treatment of Diabetic Macular Edema (DME):

The indications for using SP-Mode® do not differ from conventional focal/grid laser treatment, but SP-Mode® has a safer profile and is clinically proven to be more fovea friendly. VEGF blockade agents have been proven for their efficacy and safety; and as a result, the role of the laser becomes a secondary treatment of therapy and can never replace intravitreal VEGF blockade agents or steroids[2]. However, there is still a very prominent role for laser in selected DME cases. SP-Mode® excels more than conventional laser treatment in terms of safety, especially when it comes to scar formation and the ability to repeat treatments[4].

SP-Mode® is indicated to be effective:

1. In non-central clinically significant macular edema as defined by ETDRS, where SP-Mode® may offer the stability of the edema, without progressing it to the center and without causing retinal scars[5].
2. Whenever a patient refuses to use injections, SP-Mode® can be a great option to stabilize the edema. SP-Mode® achieves a modest reduction of central retinal thickness without causing central scarring from photocoagulation like the conventional laser.
3. Whenever there is a contraindication to intravitreal injection, such as high-risk patients to stroke, myocardial infarction, or glaucoma in case of steroids.
4. After 24 weeks of intravitreal injections, the laser can be added as a combined treatment[6]. If the edema is non-central, laser treatment can offer temporary relieve from intravitreal injections. SP-Mode® excels in both cases of central or non-central edema due to its safety profile when comparing it to the conventional laser

How to Perform Laser Treatment with SP-Mode® for DME:

1. Set the single spot laser with: Power to 600mW, Duty Cycle to 5% (100 microseconds ON, 1900 microseconds OFF), Duration at 0.2s, Interval at 0.2s using 532nm SP-Mode® and Spot Size at 125µm using an area centralis contact lens.

Treatment Guidelines for Diabetic Macular Edema

2. Aim at a peripheral non-edematous nasal to the optic disc and make several laser applications in the same focal area and assess if there is any tissue reaction.
3. If there is no tissue reaction, then add some power until a very mild tissue reaction is reached.
4. If the laser applications caused a small burn, then reduce the power until a small mild tissue reaction is achieved.
5. Record the power when a small mild tissue reaction is seen, and divide it into 2.
For example: if the energy needed to make a mild laser reaction after several applications on the same area using 5% Duty Cycle is 640mW, then reduce it to 320mW.
6. After dividing the power in half, apply laser shots several times on non-edematous area to make sure tissue reaction is not induced.
7. Once confirmed that laser is not causing a tissue reaction, apply high-density sub-threshold SP-Mode® laser application spots next to other spots (confluent, or no spacing in painting fashion) covering the whole area of edema several times, reaching up to 500 SP-Mode® sub-threshold laser applications[7].

How to Perform Laser Treatment with Hybrid Threshold Laser (Combination of Threshold and Sub-Threshold SP-Mode® Microsecond Laser Technology) for DME:

1. Using the LIGHTLas 532 with SP-Mode® single spot laser, set the Power to 600mW, Duty Cycle to 5% (100 microseconds ON 1900 microseconds OFF), Duration at 0.2s, Interval at 0.2s, and Spot Size at 125µm using an area centralis contact lens.
2. Aim at edematous region and make several laser applications on leaking microaneurysms (identified by fluorescein angiography) and assess if there is any tissue reaction.
3. If there is no tissue reaction, then add some power until a very mild tissue reaction is reached under the leaking microaneurysms.
4. If the laser applications caused a small burn, then reduce the power until a small mild tissue reaction is achieved (at threshold).
5. Treat all leaking microaneurysms identified by fluorescein angiography with a threshold laser, avoiding the foveal avascular zone.
6. Divide the threshold power in half. For example, if the power needed to achieve threshold after several applications using SP-Mode® cycle was 640mW then reduce it to 320mW reaching sub-threshold laser power.
7. Apply high-density SP-Mode® sub-threshold laser application spots next to other spots (confluent, no spacing in painting fashion) covering the whole area of edema several times, reaching up to 500 SP-Mode® sub-threshold laser applications.
8. A 15% Duty Cycle may be used instead of 5% Duty Cycle in cases where edemas are at least 1000µm away from the foveal avascular zone[8].

Conclusion:

Information derived from various ongoing clinical studies indicate when used by qualified physicians following recommended parameters, SP-Mode® and hybrid threshold treatments are very safe with no known adverse side-effects.



About the Author

Ameen Marashi, MD is a Retina Specialist and President of the Marashi Eye Clinic in Aleppo, Syria. Dr. Marashi received his medical degree in 2008 at Chuvash State University in Russia. He completed his Ophthalmology Residency in 2013 at Aleppo Eye Specialist Hospital and his Retina Fellowship in 2015 at Marashi Eye Clinic. For questions, email: ameenmarashi@hotmail.com

Treatment Guidelines for Diabetic Macular Edema

References

1. Scholz P, Altay L, Fauser S. A Review of Subthreshold Micropulse Laser for Treatment of Macular Disorders. *Adv Ther.* 2017;34(7):1528–1555. doi:10.1007/s12325-017-0559-y
2. Crosson JN, Mason L, Mason JO. The Role of Focal Laser in the Anti-Vascular Endothelial Growth Factor Era. *Ophthalmol Eye Dis.* 2017;9:1179172117738240. Published 2017 Nov 21. doi:10.1177/1179172117738240
3. Bressler SB, Almukhtar T, Aiello LP, et al. Green or yellow laser treatment for diabetic macular edema: exploratory assessment within the Diabetic Retinopathy Clinical Research Network. *Retina.* 2013;33(10):2080–2088. doi:10.1097/IAE.0b013e318295f744
4. Luttrull JK, Musch DC, Mainster MA. Subthreshold diode micropulse photocoagulation for the treatment of clinically significant diabetic macular oedema. *Br J Ophthalmol.* 2005;89:74-80
5. Marashi A. Non-central diabetic clinical significant macular edema treatment with 532nm sub threshold laser. *Adv Ophthalmol Vis Syst.* 2018;8(3):151–154. DOI: 10.15406/aovs.2018.08.00291
6. Diabetic Retinopathy Clinical Research Network, Wells JA, Glassman AR, et al. Aflibercept, bevacizumab, or ranibizumab for diabetic macular edema. *N Engl J Med.* 2015;372(13):1193–1203. doi:10.1056/NEJMoa1414264
7. Jenny Wang, Yi Quan, Roopa Dalal, Daniel Palanker; Comparison of Continuous-Wave and Micropulse Modulation in Retinal Laser Therapy. *Invest. Ophthalmol. Vis. Sci.* 2017;58(11):4722-4732. doi: 10.1167/iovs.17-21610.
8. Chhablani J, Alshareef R, Kim DT, Narayanan R, Goud A, Mathai A. Comparison of different settings for yellow subthreshold laser treatment in diabetic macular edema. *BMC Ophthalmol.* 2018;18(1):168. Published 2018 Jul 11. doi:10.1186/s12886-018-0841-z

LIGHTMED USA

1130 Calle Cordillera
San Clemente, CA 92673
USA

LIGHTMED TAIWAN

No. 1-1, Lane 1, Sec. 3, Pao An St.
Shulin District, New Taipei City 238
TAIWAN