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The role of Micropulse laser in DME management in the Anti-VEGF era

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No financial disclosures

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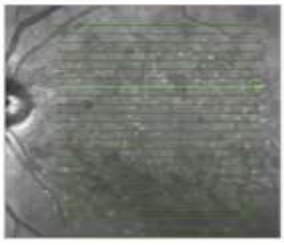
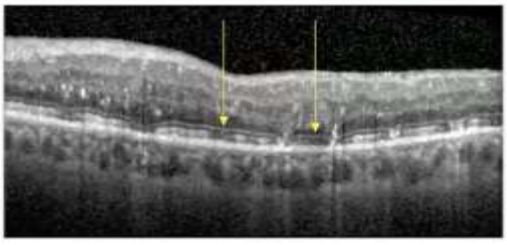
Potential complications of conventional laser

- Scotoma
- Accidental foveal burn
- RPE atrophy
- Scar expansion
- CNV
- ERM





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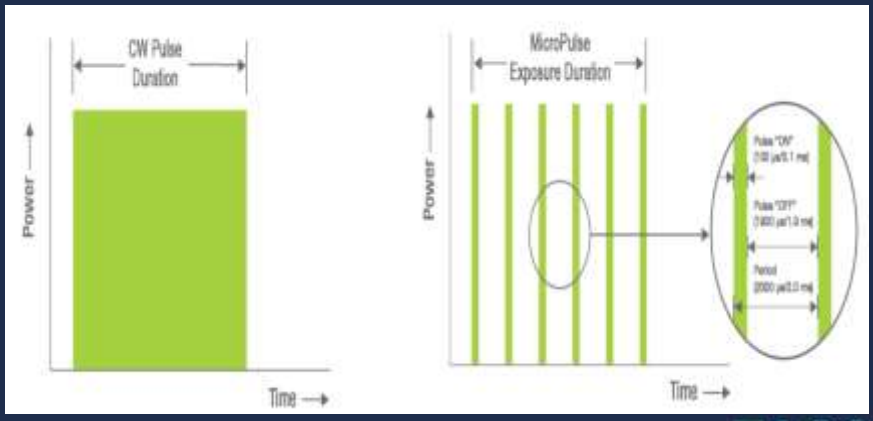
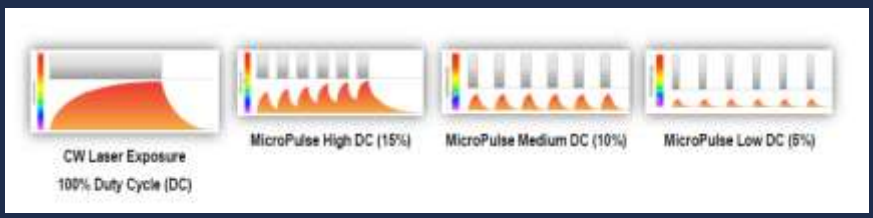
What is micropulse technology?



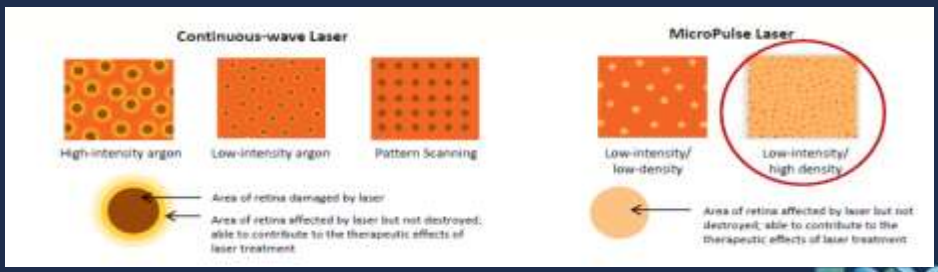
What is micropulse technology?

- MP technology avoids the destructive thermal effects of CW laser. (No visible retinal effect)
- Series of repetitive very short pulses. Each pulse has a short on and a longer off duration (**duty cycle**). This allows target tissue to cool down before receiving the upcoming pulse.



How does micropulse work?

- Not entirely understood.
- The target is RPE producing a stress response with anti-angiogenic and restorative factors such PEDF.
- Physiologic “Reset” stimulus to RPE: Activating RPE Heat Shock Proteins HSPs.



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Initial Concerns

- Efficacy: It is effective but slow.
- No end point seen: It is hard to believe that something you can not see is working.
- Foveal treatment: It is safe to treat the fovea.
- Anatomic damage: FAF.
- Functional effect: Microperimetry shows improved sensitivity.

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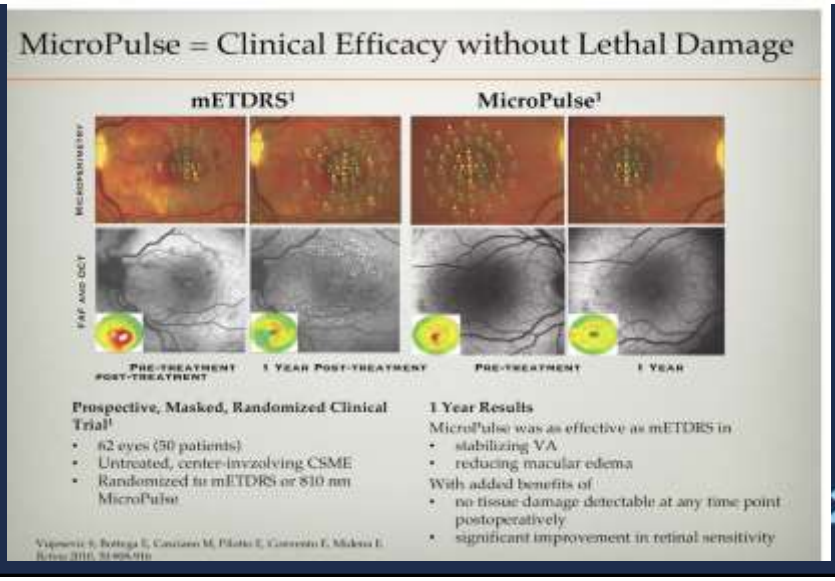
Anatomic and Functional effects



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Treatment Protocol Iridex 577 nm

- 200 um spot size. - 200 ms duration.
- 5% duty cycle. - Mainster focal grid contact lens.
- Power: 400 mw fixed power, no need for titration. (high safety margin in the 5% duty cycle)
- 5x5 confluent grid with zero spacing (better than 7x7 for fixation)
- Cover the entire area of edema and around it, wider is better (including the fovea)

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Subthreshold yellow micropulse laser for treatment of diabetic macular edema: Comparison between fixed and variable treatment regimen

European Journal of Ophthalmology
1–7

DOI: 10.1177/1120672120915169
journals.sagepub.com/home/ejo
SAGE

Maria Carla Donati, Vittoria Murro, Dario Pasquale Mucciolo, Dario Giorgio, Giacomo Cinotti, Gianni Virgili and Stanislao Rizzo

Conclusion: Both regimens are effective. fixed treatment appears more suitable minimizing treatment time and reducing the possible errors due to wrong titration in the switch from continuous to MP mode.

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Treatment Pearls

- **Low intensity / High density** treatment is the key to an effective micropulse session.
- Paint the entire area of edema and around it, almost Panmacular.
- The scanning laser delivery system helps in guiding treated areas.
- Less than 400 um CRT.
- Foveal treatment is safe.

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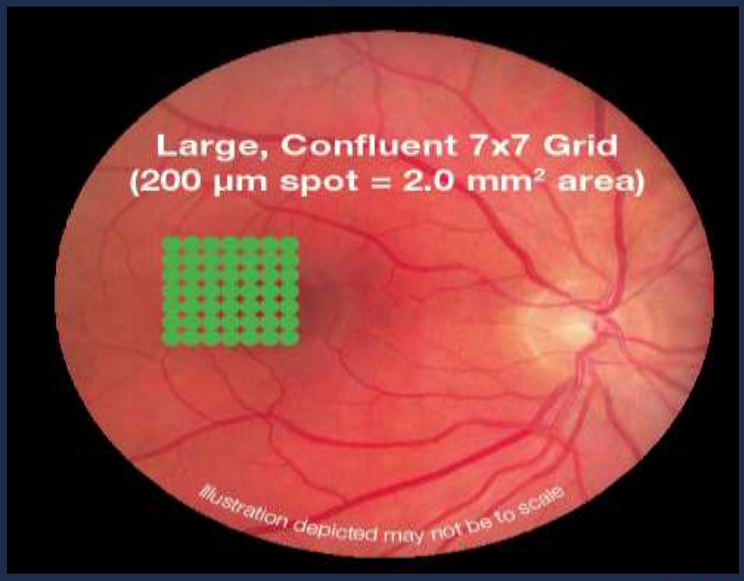

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Randomized Clinical Trial Evaluating mETDRS versus Normal or High-Density Micropulse Photocoagulation for Diabetic Macular Edema

Daniel Lavinsky,[1] Jose A. Cardillo,[1,2] Luiz A. S. Melo, Jr.,[1] Alessandro Dare,[2] Michel E. Farah,[1] and Rubens Belfort, Jr[1]

	Modified ETDRS	MicroPulse High Density	MicroPulse Low Density
Treatment Intensity	Mild	Low	Low
Treatment Density	Low	High	Low
OCT-CMT (Δ)	-126 µm	-154 µm	-32 µm
BCVA (Δ letters)	+4	+12*	-1
Gain ≥15 letters	23%	48%*	5%

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Expectations with Micropulse

- No visible tissue change during or after treatment.
- Response is typically slower than pharmacotherapy, but more durable.(No **WOW** effect)
- Patients continue to improve over time; Be patient.
- No discomfort, No intraocular or systemic risks, in contrast to intraocular injections.
- Can be safely repeated after 3-6 months.
- Early treatment of mild DME leads to better response.

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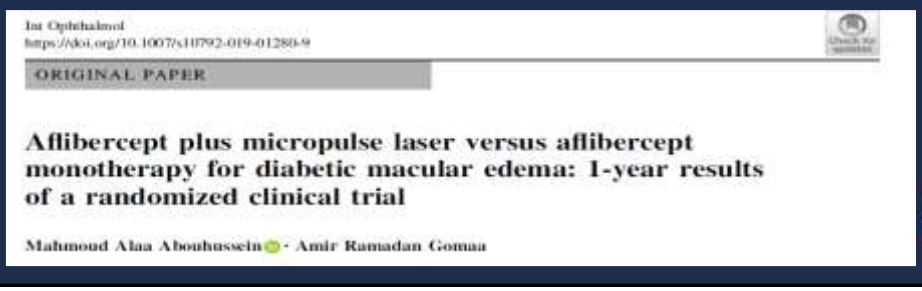
Potential indications in DME

- Ideal indication: Mild DME with good vision and <400 um CRT.
- Patient refusing injections.
- CI to Anti-VEGFs: Recent stroke or MI.
- Not responding well to Anti-VEGFs.
- Adjuvant to Anti-VEGFs to decrease treatment burden: Less Injections needed.


Int Ophthalmol
https://doi.org/10.1007/s10792-019-01280-9

ORIGINAL PAPER

Aflibercept plus micropulse laser versus aflibercept monotherapy for diabetic macular edema: 1-year results of a randomized clinical trial

Mahmoud Alaa Abouhussein · Amir Ramadan Gomaa

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Ophthalmology
Available online 13 August 2022
In Press, Journal Pre-proof

DIAbetic **M**acular **O**edema a**N**d **D**iode **S**ubthreshold micropulse laser (**DIAMONDS**): A randomized double-masked non-inferiority clinical trial

Purpose:

Determine clinical-effectiveness, safety, and cost-effectiveness of SML, compared with SL for DME with CRT <400µ.

Conclusion:

Conclusions: Subthreshold micropulse laser therapy was equivalent to SL therapy, requiring slightly higher laser treatments. *Ophthalmology 2023;130:14-27*

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Take Home Messages

- Safety: Fovea-friendly, no tissue damage, repeatable.
- Efficacy: Clinical studies and practical experience.
- Efficiency: Quick and easy treatment.
- Economics: Very cost effective.

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Thank you

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