

RED LIGHT THERAPY: REAL MEDICINE, MODERN HYPE—OR BOTH?

PART 2 - [PLUS ENTER TO WIN RED LIGHT DEVICE](#)

Your Weekly Newsletter

by Dr. Nick Sieveking

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Last week's newsletter introduced the science behind **red and near-infrared photobiomodulation (PBM)**. We explored how specific wavelengths of light—carefully reproduced from the beneficial portions of sunlight—can stimulate cellular repair, improve mitochondrial function, reduce inflammation, and promote healing while separating legitimate science from marketing hype.

This week we'll answer two practical questions:

- Which medical conditions are actually supported by good clinical research?
- What should you look for when purchasing a red light therapy device?

Where Does the Science Actually Support Red Light Therapy?

The following conditions have the strongest clinical evidence supporting photobiomodulation.

Note: FDA approval requires rigorous clinical evidence proving safety and effectiveness. **FDA clearance** means a medical device has been shown to be substantially equivalent to an existing legally marketed device and can be sold for its intended use, but it undergoes a less extensive review than FDA approval.

1. Acne

FDA Status

✓ FDA 510(k)-cleared for the treatment of acne.

Best Clinical Evidence

Lee et al. demonstrated that combined **415-nm blue light** and **660-nm red light** reduced inflammatory acne lesions by 76% after 12 weeks in a randomized clinical trial.

Take-home message:

Red light works best when combined with blue light for inflammatory acne.

Citation

Lee SY, et al. Journal of Photochemistry and Photobiology B. 2007.

<https://pubmed.ncbi.nlm.nih.gov/17566756/>



2. Male & Female Pattern Hair Loss

FDA Status

✓ Multiple FDA-cleared home-use devices.

Best Clinical Evidence

Multiple randomized, double-blind, sham-controlled clinical trials demonstrate significant improvements in:

- Hair density
- Hair thickness
- Hair growth

A **2021 meta-analysis** including more than **600 patients** concluded that FDA-cleared home-use low-level laser therapy devices significantly improve hair density in both men and women with an excellent safety profile.

Greatest benefit occurs after **24–26 weeks** of consistent use and may be enhanced when combined with topical minoxidil.

Citation

<https://pmc.ncbi.nlm.nih.gov/articles/PMC8675345/>



3. Fine Lines & Wrinkles

FDA Status

✓ One of the strongest FDA-cleared cosmetic indications.

Best Clinical Evidence

A randomized clinical trial using 660-nm red light demonstrated:

- 31.6% reduction in wrinkle volume
- Improved patient quality-of-life scores
- No significant adverse effects

No significant change in hydration or elasticity was observed during the relatively short study period.

Citation

<https://pubmed.ncbi.nlm.nih.gov/36780572/>

4. Skin Texture & Collagen Production

FDA Status

⚠ The FDA generally **does not clear devices with the specific claim of increasing collagen production**, although many are cleared for wrinkle reduction and cosmetic improvement.

Best Clinical Evidence

Lee et al. demonstrated:

- Up to 36% wrinkle reduction
- Up to 19% increase in skin elasticity
- Improved skin texture
- Histologic increase in collagen
- Increased elastic fibers
- Activated fibroblasts => more collagen production
- Excellent safety profile

Citation



5. Wound Healing & Surgical Incision Healing

FDA Status

⚠ This is one area where the research is stronger than the FDA labeling. While most devices are not FDA-cleared specifically for wound healing, the clinical literature is impressive.

Best Clinical Evidence

Recent randomized clinical trials have demonstrated:

- Faster wound closure
- Greater reduction in wound area
- Increased complete healing
- Faster epithelialization
- Improved granulation tissue
- Reduced edema
- Less erythema
- Better cosmetic appearance
- Improved scar quality

No significant safety concerns were reported.

Citations

<https://pubmed.ncbi.nlm.nih.gov/39050995/>

<https://pubmed.ncbi.nlm.nih.gov/39382587/>



6. Scar Improvement

FDA Status

Some devices are cleared for improving the appearance of **fresh surgical scars**, although there is no broad FDA indication for all scar types.

Best Clinical Evidence

A 2024 systematic review and network meta-analysis included:

- 18 randomized trials
- 482 patients
- 671 surgical wounds

Low-level laser therapy demonstrated the greatest improvement in postoperative scar quality among energy-based devices.

Citation

<https://pubmed.ncbi.nlm.nih.gov/38189223/>



7. Oral Mucositis During Cancer Treatment

FDA Status

✓ FDA-cleared for non-surgical treatment of oral mucositis.

Best Clinical Evidence

Multiple randomized clinical trials demonstrate that PBM significantly:

- Reduces incidence
- Reduces severity
- Reduces pain
- Improves healing

Professional oncology guidelines now recommend PBM for selected cancer patients.

Citation

<https://pubmed.ncbi.nlm.nih.gov/31286228/>



8. Knee Osteoarthritis

FDA Status

✓ FDA-cleared for temporary relief of arthritis pain and stiffness.

Best Clinical Evidence

Randomized placebo-controlled trial:

- 60 patients
- PBM + exercise vs placebo PBM + exercise vs exercise alone
- PBM produced significantly greater pain reduction with no serious adverse events.

Citation

<https://pubmed.ncbi.nlm.nih.gov/29733117/>



9. Exercise Recovery

FDA Status

⚠️ Not specifically FDA-cleared.

Best Clinical Evidence

Meta-analysis of randomized controlled trials demonstrated PBM:

- Reduced creatine kinase
- Reduced muscle soreness
- Improved recovery
- Improved subsequent exercise performance

Greatest benefit occurred when treatment was performed before exercise.

Citation

<https://pubmed.ncbi.nlm.nih.gov/24249354/>



10. Chronic Neck & Musculoskeletal Pain

FDA Status

FDA-cleared for temporary pain relief—but not for specific chronic pain diagnoses.

Best Clinical Evidence

Systematic review of 16 randomized trials found PBM:

- Reduced pain intensity
- Increased clinically meaningful pain relief
- Benefits lasting up to 22 weeks
- No serious adverse events

Citation

<https://pubmed.ncbi.nlm.nih.gov/19913903/>

Conditions Showing Promise—but More Research Is Needed

Current evidence is encouraging, but insufficient for strong clinical recommendations.

- Fibromyalgia
- Diabetic foot ulcers
- Peripheral neuropathy
- Tendinopathies
- TMJ disorders
- Burning mouth syndrome
- Mild cognitive impairment
- Depression (transcranial PBM)
- Dry eye disease
- Age-related macular degeneration
- Sleep quality
- Chronic inflammation



Choosing a Quality Red Light Therapy Device

1. Irradiance (Power Density)

Irradiance is the amount of light energy reaching your skin each second (mW/cm²).

Too little light produces little biological effect.

Too much light is not necessarily better and may actually reduce the therapeutic response.

Condition	Recommended Irradiance (mW/cm ²)	Clinical Notes
Skin rejuvenation (wrinkles, collagen production)	20–50	Moderate irradiance promotes fibroblast activity and collagen synthesis while minimizing tissue heating.
Acne vulgaris	30–100	Often paired with blue light (≈415 nm). Red light helps reduce inflammation and supports healing.
Hair loss (androgenetic alopecia)	20–60	Most FDA-cleared laser caps operate within this irradiance range using red wavelengths around 650–680 nm.
Wound healing & surgical incisions	10–50	Lower irradiance appears to optimize cellular repair, angiogenesis, and tissue regeneration.
Musculoskeletal pain & muscle recovery	50–150	Higher irradiance is typically needed to deliver adequate light to larger and deeper tissues.
Tendons & joints	75–200	Near-infrared wavelengths with higher irradiance improve penetration into deeper connective tissues.

For most FDA-cleared applications, effective irradiance at the treatment surface generally falls between 20–100 mW/cm², depending on the condition being treated and the treatment distance.

2. Fluence (Dose)

Fluence (J/cm²) is the **total amount of energy delivered during a treatment session**.

Typical therapeutic doses include:

Condition	Fluence
Skin rejuvenation	3–10 J/cm ²
Acne	10–30 J/cm ²
Hair loss	3–8 J/cm ²
Wound healing	4–10 J/cm ²
Musculoskeletal pain	10–50 J/cm ²
Tendons & joints	20–60 J/cm ²

3. Treatment Distance

The optimal distance depends on device power.

Goal	Distance
Facial rejuvenation	6–12 in
Hair restoration	Contact–6 in
Wound healing	3–8 in
Muscles & joints	4–12 in
Whole-body wellness	12–24 in

4. Treatment Time

Treatment time depends on irradiance, wavelength, treatment distance, tissue depth, and therapeutic goal.

Typical treatment times range from **5–20 minutes per treatment area**.

5. Treatment Frequency

Consistency matters more than longer sessions.

Typical schedules:

- Acute injuries: daily
- Skin rejuvenation: 3–5×/week
- Hair restoration: 3–4×/week
- Pain management: 3–7×/week
- Maintenance: 2–3×/week

6. Treatment Area

Choose a device large enough to cover the entire target tissue.

Small devices are ideal for:

- Acne
- Scars

- Individual joints

Larger panels are better for:

- Back pain
- Multiple joints
- Whole-body treatments

7. Continuous vs Pulsed Light

Most published clinical studies use **continuous-wave (CW)** devices, making them the current evidence-based standard.

Pulsed devices may offer theoretical advantages—including deeper penetration and reduced tissue heating—but clinical evidence remains inconsistent. At present, there is no convincing evidence that pulsed light is superior to continuous-wave therapy for most FDA-cleared indications.

8. Flicker

Flicker is the rapid fluctuation in light output over time. Although a red light panel may appear to emit a steady beam, many LED devices actually switch on and off hundreds or even thousands of times per second due to the design of their power supply. While this rapid cycling is usually invisible to the naked eye, it can still affect the nervous system.

Excessive flicker has been associated with:

- Increased visual fatigue
- Eye strain
- Headaches
- Reduced visual comfort
- Worsening of migraine symptoms in susceptible individuals
- Triggering seizures in people with photosensitive epilepsy
- Potential autonomic nervous system stress in light-sensitive individuals

A Practical Guide to Flicker Performance

Flicker Percentage	Quality
<1%	★ Excellent
<5%	★ Very Good
<10%	★ Acceptable
>20%	★ Poor
>30–40%	★ Avoid, especially if the manufacturer does not provide independent testing or disclose flicker measurements.

9. Independent Third-Party Testing

One of the most overlooked aspects of purchasing a device is independent verification.

Many manufacturers advertise impressive specifications that are based only on internal testing.

Whenever possible, choose a device that has undergone independent laboratory testing verifying:

- Wavelength accuracy
- Irradiance
- Uniform light distribution
- Electrical safety (UL, ETL, CE)
- Manufacturing consistency

Without independent testing, there is no assurance that the device delivers the therapeutic dose advertised.

Purchasing Devices

1. LMNT.one Micro-Pulse PBM handheld: 633 nm red + 830 nm near-infrared

This device was the subject of a split-face randomized study where 91% reported visible skin improvement and 64% reported reduced fine lines/wrinkles. Don't miss the Enter-to Win giveaway of this device valued at \$700! Details below!

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& ENTER
TO WIN!

\$700
VALUE

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LMNT.one®

Micro-Pulse PBM handheld



633 nm red + 830 nm
near-infrared



Boosts collagen & elasticity
for radiant, youthful skin



A split-face randomized study –
91% reported visible skin improvement
and 64% reported reduced
fine lines/wrinkles.

Giveaway!



REFER A FRIEND FOR YOUR CHANCE
TO WIN THIS AMAZING DEVICE!

NO PURCHASE NECESSARY. SEE OFFICIAL RULES FOR DETAILS.

REFER A FRIEND & ENTER TO WIN

2. Evidence-Based LED Face Masks

Rank	Device	Wavelengths	Best Features	Limitations	Typical Retail Price
9.8/10	Omnilux	633 nm Red830 nm Near-Infrared	Most research-backed anti-aging mask available; excellent physician adoption	No blue light for acne	\$395
9.7/10	CurrentBody Series 2	633 nm Red830 nm NIR1072 nm NIR	Advanced engineering; deeper penetration around the eyes and mouth; strong anti-aging performance	Less long-term published clinical data than Omnilux	\$469.99
9.2/10	Dr. Dennis Gross	RedBlue	Excellent choice for inflammatory acne; proven wrinkle reduction	No near-infrared light, limiting deeper collagen stimulation and tissue penetration	\$455
8.9/10	Therabody	415 nm Blue633 nm Red830 nm NIR	Treats acne while providing anti-aging benefits; includes vibration therapy	Fewer published studies and less physician adoption than Omnilux or CurrentBody	\$649.99
8.6/10	LightStim	Km Multiple red LEDs (handheld)	Proven technology; reliable; excellent spot treatment	Older platform; handheld requires longer treatment times	\$249

3. Best Home Red Light Panels

Rank	Device	Wavelengths	Strengths	Limitations	Typical Retail Price
9.6/10	PlatinumLED BioMax	630, 660, 810, 830, 850, 1060 nm	Excellent wavelength selection; very high irradiance; low flicker; low EMF; repeatedly independently tested	None of significance	\$659–1,608
9.5/10	Mito Red MitoPRO X	630, 660, 810, 830, 850 nm	Excellent engineering; high irradiance; low flicker; low EMF	Slightly less long-term independent validation than PlatinumLED	\$449–3,799
9.4/10	Rouge G4	660, 810, 830, 850, 1060/1064 nm	Excellent build quality; high irradiance; low flicker; low EMF	Less third-party testing	\$299–1,299
8.9/10	Bon Charge Max	660, 850 nm	Excellent build quality; zero flicker; very low EMF	Limited to two wavelengths	\$299–1,599

4. Best Full-Body Photobiomodulation Beds

Rank	Device	Wavelengths	Major Strengths	Approximate Price
9.8/10	NovoTHOR XL	660, 850 nm	Most clinically studied full-body PBM platform; excellent engineering; numerous published clinical trials involving pain, inflammation, neurological conditions, athletic recovery, fibromyalgia, and traumatic brain injury	\$130,000–150,000
9.8/10	ARRC LED	630, 660, 810, 830, 850, 940 nm	Outstanding engineering; evidence-based wavelength selection; excellent irradiance; targets superficial skin through deep musculoskeletal tissues	ATP RFQ: \$95,000 Elysium: \$150,000
9.2/10	TheraLight 360	633, 810, 850, 940 nm	Large treatment area; excellent LED quality; strong wellness platform	\$75,000–90,000
8.8/10	Prism Light Pod	630, 660, 850 nm	Good construction; excellent LED coverage; emphasizes skin and deep tissue penetration	~\$95,000

My Recommended Buying Guide

Category	Best Overall	Best Value	Best for Acne	Best Research
Face Mask	Omnilux	CurrentBody	Dr. Dennis Gross	Omnilux
Panel	PlatinumLED BioMax	Mito Red	PlatinumLED	PlatinumLED
Full-Body Bed	ARRC LED	ARRC ATP RFQ	—	NovoTHOR XL

Does red light protect against ultraviolet damage?

- A growing body of research suggests that **pre-treatment with red or near-infrared light may reduce UV-induced skin damage**
- photobiomodulation appears to:
 - Increase mitochondrial ATP production
 - Reduce oxidative stress
 - Improve antioxidant defenses (such as superoxide dismutase and catalase)
 - Enhance DNA repair mechanisms
 - Reduce inflammatory signaling
 - Improve survival and recovery of skin cells after UV exposure
- Several experimental studies have shown that skin exposed to red or near-infrared light **before** UV exposure may develop:
 - Less erythema (sunburn)
 - Less oxidative DNA damage
 - Reduced inflammatory response
 - Faster recovery

- This is called “**photopreconditioning**”
- **Red light and near infrared light therapy will not take the place of sunscreen**

Final Thoughts

Red light therapy is neither a miracle cure nor a passing fad—it is an evidence-based medical technology whose benefits depend on using the **right wavelength, the right dose, the right treatment parameters, and the right clinical indication**. For several conditions—including acne, hair loss, skin rejuvenation, oral mucositis, postoperative scar management, and temporary pain relief—the scientific evidence is now substantial. For many other conditions, the early research is promising, but larger, well-designed clinical trials are still needed.

The most effective device is not necessarily the one with the highest advertised power—it is the one that reliably delivers the appropriate therapeutic dose for your specific condition.



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STAY TUNED!

Be on the lookout for next week's newsletter:

METABOLIC HEALTH: THE FOUNDATION OF HEALTH AND LONGEVITY
PART 1 (of 3) — What Is Metabolic Health—and Why Does It Matter?

[Newsletter Archives](#)



Sieveking Plastic Surgery

1200 Old Hillsboro Rd., B2,
Franklin, TN 37069
[info@sievekingplasticsurgery.co](mailto:info@sievekingplasticsurgery.com)
m
615-321-1010

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