Oxygen–Ozone Therapy: A New Frontier in Oral Health

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🌿 A New Paradigm in Dental Care

Oxygen–ozone therapy represents a shift from **disease management → biological regulation**.

- Disease is not just bacterial—it is **biological and systemic**
- The oral microbiome reflects its **environment (terrain)**
- Change the terrain → shift the biofilm → change the disease

This approach aligns with a prevention-centered model:

"Health is not merely the absence of disease, but complete physical, mental, emotional and social well-being."

⚡ What Is Ozone?

- Ozone (O_3) = triatomic oxygen
- Highly reactive, short-lived molecule
- Rapidly converts back to O_2
- Releases **reactive oxygen species (ROS)**
- Leaves **no toxic residue**

👉 Ozone is **activated oxygen**—designed to react, then resolve.

🔬 Mechanisms of Action

1. Antimicrobial Effects

- Disrupts bacteria, viruses, fungi
- Breaks down biofilm structure
- No known microbial resistance

2. Immune Modulation

- Activates innate immune response
- Supports adaptive immunity

3. Oxygen & Metabolic Support

- Enhances mitochondrial ATP production
- Improves oxygen utilization

4. Circulation & Tissue Healing

- Improves microcirculation
- Reduces inflammation and pain
- Supports tissue repair and desensitization

Ozone doesn't just kill microbes - it changes the **environment they depend on**.

What the Research Shows

Biofilm & Antimicrobial Effects

- Rapid destruction of cariogenic bacteria (e.g., *S. mutans*)
- Significant reduction in plaque formation
- Comparable antimicrobial effects to chlorhexidine

Caries Management

- Reduces bacterial load
- Enhances early lesion arrest
- Supports remineralization pathways

Periodontal Therapy

- Reduces anaerobic pathogens
- Modulates inflammatory cytokines
- Improves tissue oxygenation and healing

Wound Healing

- Increases fibroblast activity
- Enhances tissue repair
- Improves post-surgical healing outcomes

💧 Forms of Ozone in Dentistry

Form	Clinical Use
Gas	Deep penetration (caries, perio pockets)
Ozonated Water	Irrigation, biofilm disruption
Ozonated Oil	Home care, sustained antimicrobial effect
Ozonated Glycerin	Gentle, slow-release healing support

Each form delivers **biologic oxidation in a different way**.

⚠️ Safety & Clinical Considerations

- Ozone gas must **NOT be inhaled**
- Ozone gas must be made from medical-grade oxygen
- Use proper suction and delivery systems
- Start low and increase gradually
- Contraindications include:
  - COPD / respiratory disease
  - Pregnancy
  - G6PD deficiency
  - Severe anemia

Ozone is safe **when you respect it**. Be trained in proper oxygen-ozone protocols.

🧠 Beyond Antimicrobial: A Biological Therapy

Oxygen–ozone therapy:

- Supports mitochondrial function

- Enhances nitric oxide signaling
- Improves circulation and oxygen delivery
- Modulates immune and inflammatory pathways

👉 This is why it works across:

- Caries
- Periodontal disease
- Endodontics
- Soft tissue healing

🌎 Clinical Philosophy: Treat the Terrain

- Low oxygen = anaerobic dominance → dysbiosis
- Oxygen restores **balance, not just sterility**
- Healing is **energy-dependent**

“When we improve the environment… biology responds.”

🔥 Key Takeaways

- Ozone is a **biologically active adjunct**, not a standalone cure
- It enhances outcomes in **early disease, infection control, and healing**
- The future of dental hygiene is:
    - **Preventive**
    - **Biological**
    - **Systemic**

📚 SELECTED REFERENCES

1. Nagayoshi M, et al. (2004). *Efficacy of ozone on survival and permeability of oral microorganisms.* Oral Microbiology and Immunology.
2. Domb W. (2014). *Ozone Therapy in Dentistry: A Brief Review for Physicians.*
3. Naik SV, et al. (2016). *Ozone – A Biological Therapy in Dentistry: Reality or Myth?* Open Dent J.
4. Liaqat S, et al. (2022). *Therapeutic Effects and Uses of Ozone in Dentistry: A Systematic Review.*
5. Systematic Review (2025). *Ozone therapy in dentistry with healing and pain outcomes.*
6. Nagayoshi M, et al. (2004). *Ozonated water effects in dentinal tubules.*
7. Randomized Clinical Trial (2023). *Ozone gel vs. chlorhexidine in plaque and S. mutans reduction.*
8. Stübinger S, Sader R, Filippi A. (2006). *The use of ozone in dentistry and maxillofacial surgery.*
9. Clinical Oral Investigations (2017). *Ozone effects on gingival fibroblast wound healing.*
10. FDI World Dental Federation (2021). *Global oral health statistics.*
11. FDA CFR Title 21 (2021). *Ozone regulatory statement.*
12. WHO Definition of Health (1948).

💭 Final Thought

This is not about a product.
This is not about a procedure.

This is about **understanding biology**.

The mouth is not separate from the body.
It is the **beginning of the story**.

Thank you for being curious. Please reach out if you have further questions.

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