
"Biophotonics" - The Urgently Needed New Discipline in Oral Healthcare Education!

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Oral Healthcare is mainly affected by contamination with pathogenic bacteria. The combined availability of surfaces, nutrients, and wetness are the facilitators. Caries, periodontitis, endodontitis, and peri-implantitis are all generated by pathogenic bacteria. This fact, of course, leads to the clear conclusion that pathogenic bacteria represent the principal "enemy" in daily clinical practice.

Dental graduate education today, of course, includes Microbiology, building the deserved and required knowledge for future clinicians. Identifying bacteria involved in periodontal diseases represents the highest value before any treatment initiation. Successful disinfection in three of the disciplines (Cariology, Periodontology, and Endodontics) is the goal of any treatment. As a central chapter in the treatment process, chemical disinfection is nevertheless mostly to be encountered in Endodontics only, while mechanical disinfection characterizes the other two major disciplines. The proof of bacterial elimination is sadly not an established requirement but a presumed achieved goal.


Magnification using loupes and microscopes is well established and constitutes a pillar in education. While loupes are primarily valued for their ergonomic impact, microscopes are to be encountered mainly in endodontics. The essential requisite for clinical dentistry is, of course, daylight or incandescent light.

Biologic tissues interact with light in different ways. Over the last decades, a variety of light sources found their implementation in dentistry for various applications, lasers and other light sources using diverse

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wavelengths are utilized both in the lab and in practice for both diagnosis and treatment. The science behind it is named Biophotonics. Adequate use in the clinician's hands requires knowledge and understanding. Biophotonics encloses different clinical techniques as Photodiagnosis, Photoablation, Thermal irradiation, Photodynamic therapy, Photoactivated therapy, Photobiomodulation, etc.

Below is a brief list, non-exclusive, of possible Biophotonics applications in Oral Healthcare:

- A. Oral hygiene: Diagnosis – Treatment selection/guidance – Identification of treatment goal achievement – Patient communication – Motivation – Monitorization;
- B. Periodontology: Diagnosis – Treatment selection/guidance – Disinfection – Regeneration – Identification of treatment goal achievement – Patient communication – Motivation – Monitorization;
- C. Oral Surgery: Support with tissue diagnosis/identification – Identification of treatment goal achievement – Patient communication – Motivation – Monitorization;
- D. Diagnosis: Treatment selection/guidance – Identification of treatment goal achievement – Patient communication – Motivation – Monitorization;
- E. Oral Pathology: Oral tumor screening – noninvasive treatment options – photoactivated disinfection – photobiomodulation for regeneration – Patient communication
- F. Implantology: Preoperative diagnosis – intraoperative treatment guidance – postoperative surgical field monitorization - Peri-implantitis diagnosis, trigger factors elimination, disinfection, healing regeneration - Identification of treatment goal achievement – Patient communication – Motivation – Monitorization,
- G. Conservative-Restorative Dentistry: Diagnosis – Treatment selection/guidance – Identification of treatment goal achievement – Patient communication – Motivation – Monitorization,
- H. Prosthodontics: Diagnosis – Shade selection - Monitorization
- I. Esthetic Dentistry: Shade selection – Potential bleaching opportunity - Identification of treatment goal achievement – Patient communication – Motivation – Monitorization and
- J. Endodontics: Crack detection – Infection identification – Identification of treatment goal achievement.

Conclusion

As conclusion, it is possible suggesting this new discipline ("Biophotonics") as a potential booster for clinicians & their results.

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