

# Research of antimicrobial photodynamic therapy (aPDT) according to the HELBO principle

In vitro as well as in vivo aspects, clinical applications and preliminary evaluation

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Although Paul Ehrlich had already discovered and described the principle of photodynamic therapy by 1900, it took almost a century before medical science recognized the use of this form of therapy and attempted to integrate it into its treatment procedures.

\_ Today, antimicrobial photodynamic therapy is used alongside general medical treatments (including the treatment of tumors) and also increasingly in dentistry. At almost the same time in the early 90's, but independently of one another, both Wilson and Dörtbudak described uses of photodynamic therapy (PT) in dentistry. Here, periodontal treatments and periimplantitis are the primary interest. An onset of research and publication activity followed in the field of PT, whereby numerous photosensitizers, laser wavelengths and parameters as well as clinical procedures were indicated as suitable. Substantially responsible for a constantly increasing number of those using the PT principle is a laser manufacturer who simultaneously takes on distribution and training: the Austrian company HELBO not only produces a low-level laser used for PT, at HELBO referred to as "aPDT" (antimicrobial photodynamic therapy), but also offers the photosensitizer also needed. HELBO goes even one step further and offers the aPDT as a "complete module"

for the integration of this concept into dental practice.

## The Idea and foundation of the PT principle

In photodynamic therapy, there is an interaction between the photosensitizer (PS), oxygen, and laser light. The PS absorbs photons, and the result is an unstable state in which reactive oxygen molecules develop, and these in turn are able to kill (pathogen) bacteria. From evidence-based periodontic basic data, biofilm became the focus of interest in periodontology (and periimplantitis), and correspondingly also defines the PT. Compared with conventional therapy approaches for the removal of and/or damage to the biofilms, the HELBO company (and/or PT advisers) has demonstrated a rather sobering conclusion: Even partially highly invasive therapy forms, which are encountering lower acceptance on the part of the patients anyhow, failed to manage the biofilm

Fig. 1–6\_ The Helbo principle, step by step.

