

THESIS
EFFICACY OF ANTIMICROBIAL PHOTODYNAMIC THERAPY ON
ENDODONTIC DISEASE/
A NARRATIVE REVIEW OF RECENT STUDIES



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SUMMARY

The most common bacteria causing endodontic diseases are *Porphyromonas gingivalis*, *Prevotella nigrescens*, *Fusobacterium nucleatum*, *Bacteroides fragilis*, *Actinomyces naeslundii*, *Pepto streptococcus anaerobius*, *A. actinomycetemcomitans*. Primarily, endodontic infections are caused by those microorganisms which attack and reside in the necrotic pulp tissue. Antimicrobial photodynamic therapy has gained the emphasis of researchers in recent years as a modern treatment approach to enhance the disinfection of root canal. The results of the PDT revealed important satisfactory results with substantial elimination of infectious bacteria in RCS. Recently, several studies confirmed significant findings of using PDT during RCS disinfection, even in very complex endodontic cases. However, there is a lack of consensus & agreement on a standalone procedure regarding the selection of photosensitizer, light source, irradiation time, and other parameters for its use during RCS treatment along with mechanical debridement. Based on these variations and controversies, it is imperative and crucial to summarise the recent and potential disinfection methods in RCS. The objective of this work was to review the results of recent advances in the research of antimicrobial PDT in endodontics, focusing on the elimination of viable microorganisms, selection of appropriate photosensitizer, irradiation time, and to demonstrate the efficacy of PDT. A detailed review of relevant literature was performed using reputed research journals, and data attained were presented under related topics. The antimicrobial potential of PDT in endodontics was the main emphasis of many studies. However, the majority of the research trials could not establish a significant development in disinfection of the endodontic infections about its efficacy in comparison to traditional disinfection techniques for the root canal system.

Although there is inadequate data and sometimes contrary information regarding the single alone use of this treatment, especially in root canal treatment. Several clinical studies suggested that the efficiency of this can be enhanced by following standard mechanical debridement. Additional in vivo and clinical studies are mandatory to generate more authentic data, and to draw solid conclusions regarding the potential therapeutic use of PDT in endodontics concerning its efficacy in comparison to traditional disinfection techniques for root canal system and to standardize the proper parameters for the PS concentration, PS formulations, energy dosage used and the irradiation time. The reviewed data suggested formulating and standardized enhanced protocols based on more research studies to optimize the efficacy of PDT, especially standardization of energy dose, to prove it as a safe substitute to traditional disinfection methods.