

A Randomized Controlled Trial Examining The Effect Of Laser Disinfection On Peri-Implant Complications

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Abstract

Introduction:

A damaging inflammatory condition that affects the soft and hard tissues around dental implants is called peri-implantitis (PI). It causes problems with osseointegration of the connections between the implant and bone. A major contributing factor to PI is the presence of pathogenic microorganisms, which trigger inflammatory and infectious processes that lead to pocket formation and bone loss[1] Our systematic review's main goal was to thoroughly assess the effectiveness of various laser kinds utilized to treat peri-implantitis in patients. In this sector, we aimed to identify the most efficacious kind of laser therapy[2].

Using databases from scholarly websites including PubMed/Medline, Scopus, and Google Scholar, we carried out a systematic review. We used targeted keywords associated with laser therapy and peri-implantitis in our research procedure. We concentrated on published English human research that included case-control, clinical trials, and case series including laser treatment for peri-implantitis[1, 2].

22 of the 174 articles that our original search produced were reviewed in this edition. However, because of the inconsistent findings reported in the literature, identifying the best laser treatment for peri-implantitis is still difficult. When employing lasers, proper procedures and temperature control are essential to avoid damaging the implant and surrounding tissues.[3, 4].

Lasers have the potential to cure peri-implantitis, but further study is required to develop precise recommendations and procedures for their safe and efficient application. In order to give patients with peri-implant problems with individualized and evidence-based therapies, clinicians should use care and remain up to date on the most recent research.

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Introduction

A major challenge in modern dentistry is peri-implantitis (PI), which poses a serious risk to the durability and efficacy of dental implants. Emerging after implant implantation, PI triggers an inflammatory response that is detrimental to the implant's integrity and health. The purpose of this review is to clarify the distinguishing traits, etiology, and management issues related to this difficult syndrome.

Definition and Significance

A major obstacle in contemporary dentistry is peri-implantitis, which has a substantial effect on the longevity and operational effectiveness of dental implants. It puts the investment and wellbeing of patients undergoing implant-based rehabilitation at risk and presents a real danger to the longevity of implants.

Characteristics

An inflammatory reaction surrounding the implant site, affecting the soft tissues like gingiva as well as the peri-implant hard tissues like bone, is characteristic of PI. The integrity of the implant-bone contact is compromised by this inflammatory environment, which paves the way for ultimate implant failure and increasing tissue damage.

Etiology and Mechanisms

Pathogenic microorganisms in the peri-implant environment play a crucial role in the development of PI. These microbiological attackers trigger a series of inflammatory and infectious reactions that lead to the development of pathological pockets surrounding the implant and the eventual resorption of surrounding bone. Crucially, PI is not only an infectious condition; rather, it is the result of bone morphology naturally adapting to the implant's presence.

Integration of Key Points

Peri-implantitis is a complex clinical entity that includes structural, infectious, and inflammatory elements. Its relevance stems from its ability to jeopardize implant integrity as well as its wider effects on the dental health and overall well-being of patients. The challenge facing researchers and clinicians is creating efficient treatment plans to address the intricate pathophysiology of PI and lessen its unfavorable effects.

Laser Treatment for Peri-Implantitis

The dentistry community has been paying close attention to the investigation of laser therapy as a potential therapeutic option for peri-implantitis (PI) in recent years. This non-invasive method has the potential to promote tissue regeneration in the peri-implant area and treat the inflammatory processes that are intrinsic to PI. Numerous research works have examined the effectiveness of different types of lasers, such as erbium and diode lasers, in reducing the clinical signs and symptoms of PI and improving the health of the tissue around the implant [1, 2, 3].

Even with the increasing amount of studies examining laser therapy for the management of peripheral artery disease, there is still ongoing research to determine the ideal laser modality and treatment settings. Thorough systematic reviews have been crucial in combining the available data and clarifying how laser therapies affect the course of PI therapy. These evaluations provide insights into the relative efficacy and safety profiles of various laser modalities, making them useful tools for researchers and physicians alike [1].

Furthermore, it is crucial to stress how important it is to follow set procedures and carefully regulate laser application temperature. In addition to optimizing treatment efficacy, appropriate method and parameter selection reduce the risk of iatrogenic injury to the implant and surrounding tissues. Clinicians may reduce the risk of thermal injury and improve treatment results by making sure that laser parameters including energy output, pulse length, and tissue cooling mechanisms are precisely controlled [1, 4].

Within the larger framework of managing peri-implantitis, the incorporation of laser therapy into all-encompassing treatment regimens has significant potential to improve patient outcomes and maintain implant longevity. Clinicians can treat PI patients with a multimodal strategy that takes into account both the disease's clinical manifestations and underlying pathophysiology by utilizing the special biological effects of lasers, such as their capacity to modulate inflammatory responses and stimulate tissue regeneration [5, 6]. The dental community is in a position to advance the standard of care for patients undergoing implant-based rehabilitation by gaining new insights into the best way to incorporate laser therapy into the toolkit for managing peri-implantitis. This can be achieved through ongoing research endeavors and interdisciplinary collaboration..

Research Methodology

A thorough systematic review was conducted to offer an extensive comprehension of the effectiveness and safety profile of laser therapy in the treatment of peri-implantitis (PI). This study sought to clarify the possible function of lasers in improving treatment results and maintaining implant health by compiling and synthesizing the corpus of research on their application in PI management.

To find pertinent papers published in English, a comprehensive search approach was implemented using well-known databases including PubMed/Medline, Scopus, and Google Scholar. With a focus on research including laser therapies for PI, the search covered a variety of study designs, such as clinical trials, case-control studies, and case series [1, 7, 8]. The review aimed to capture the range of current data and offer a strong foundation for evidence-based practice in PI management by utilizing a broad scope and a variety of study approaches.

The integrity and validity of the synthesis evidence were ensured by carefully applying the selection criteria for inclusion in the review. Predetermined standards, including research design, participant characteristics, intervention procedures, and outcome measures, were used to evaluate the studies. The evaluation included only studies that satisfied strict methodological requirements and reported outcomes that were clinically meaningful.

After the screening and literature search procedures were finished, the qualifying studies underwent a thorough evaluation and synthesis. A methodical approach was taken to data extraction, and important discoveries and results were carefully categorized and examined. In

order to provide a more nuanced knowledge of the safety and effectiveness profile of laser therapy in the treatment of peripheral artery disease (PI), emphasis was put on detecting trends, patterns, and inconsistencies among studies [1, 7, 8].

The systematic review aimed to give researchers and physicians useful information about the present status of the evidence for laser treatment for PI by combining the results of several studies and evaluating their methodological rigor critically. In the field of implant dentistry, this evidence-based approach plays a crucial role in directing clinical decision-making, establishing treatment regimens, and determining future research avenues.

The systematic review, when combined with the wider discourse on the management of peri-implantitis, is an essential tool for physicians attempting to include laser therapy into all-encompassing treatment plans. Through the utilization of the comprehensive data compiled in the study, medical professionals may make well-informed choices on laser modes, treatment parameters, and supplementary treatments, ultimately leading to improved patient outcomes and the sustained effectiveness of implant therapy.

Results

After a thorough search of the literature using reputable databases including PubMed/Medline, Scopus, and Google Scholar, a preliminary screening procedure was carried out to find relevant papers about the use of laser therapy in the treatment of peri-implantitis (PI). A total of 174 publications were produced after this rigorous screening, demonstrating the depth and breadth of academic investigation into this rapidly developing field of dental research.

After the first screening, each discovered study was subjected to a stringent selection procedure to determine its eligibility for inclusion in the systematic review. Predetermined standards, such as research design, participant demographics, intervention procedures, and outcome measures, were used to assess the studies. After a thorough evaluation, 22 publications were finally determined to be appropriate for the study, making up a representative sample of the body of existing laser literature.

Navigating the complexity of laser therapy in PI treatment remains a tough challenge, even with the wealth of literature on the issue. The varied range of factors impacting treatment results and the complex nature of PI are highlighted by the variability of research designs, treatment procedures, and outcome measures across the included studies. As a result, it is difficult to combine the various results and conclusions from different research, making the best laser treatment plan difficult to determine.

Nevertheless, the integration of the existing data provides insightful information about the relative safety, effectiveness, and practicability of various laser modalities in PI control, making it a useful tool for both researchers and clinicians. Clinicians can get important insights into the present state of evidence and make well-informed judgments about the incorporation of laser treatment into their clinical practice by methodically evaluating the advantages and disadvantages of previous research [6, 7, 8].

Further research efforts are necessary to fill in current knowledge gaps and improve treatment procedures in light of the continuous quest to determine the best laser therapy plan for PI. Enhancing treatment results for patients undergoing implant-based rehabilitation and

expanding our knowledge of laser therapy in PI management require concerted efforts from physicians, researchers, and industry stakeholders. The dentistry community is well-positioned to gain new insights into the therapeutic potential of [9, 10] lasers in PI treatment through ongoing innovation and evidence-based practice, which will improve patient care and the long-term effectiveness of implant therapy.

Source(s)

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