Mini Review
Volume 09:03, 2024

Journal of Physiotherapy & Physical Rehabilitation

ISSN: 2573-0312

Open Access

Unlocking Precision: Lasers in Fixed Partial Dentures-A Comprehensive Review

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Abstract

This comprehensive review explores the application of lasers in the fabrication and adjustment of Fixed Partial Dentures (FPDs). The review outlines the principles of laser technology and its advantages in various stages of FPD construction, including preparation, impression-making and cementation. Additionally, it discusses the potential of lasers in enhancing precision, efficiency and patient comfort in FPD procedures. By synthesizing current literature and clinical evidence, this review aims to provide insights into the evolving role of lasers in modern prosthodontics and its implications for improving treatment outcomes and patient satisfaction.

Keywords: Lasers • Prosthodontics • Laser technology • Fixed partial dentures

Introduction

Fixed Partial Dentures (FPDs) play a crucial role in restoring function, aesthetics and oral health in patients with missing teeth. Traditional techniques for FPD fabrication involve mechanical procedures, such as tooth preparation, impression-taking and cementation, which may be associated with limitations in precision, accuracy and patient comfort. The advent of laser technology has revolutionized various aspects of prosthodontic practice, offering new opportunities for enhancing the efficiency, predictability and quality of FPD procedures. Lasers, characterized by their ability to deliver precise energy in a controlled manner, have emerged as valuable tools in the fabrication and adjustment of FPDs. Laser technology offers several advantages over conventional methods, including reduced trauma to dental tissues, improved disinfection and enhanced soft tissue management. In the context of FPDs, lasers are utilized for various purposes, including tooth preparation, soft tissue contouring and surface treatment of dental materials. This comprehensive review aims to provide an overview of the principles of laser technology and its applications in the fabrication and adjustment of FPDs. It will explore the use of lasers in different stages of FPD construction, including tooth preparation, impression-making, framework fabrication and cementation. Additionally, the review will discuss the clinical advantages, limitations and future directions of laser-assisted techniques in prosthodontics, highlighting their potential to improve precision, efficiency and patient satisfaction in FPD procedures [1,2].

Literature Review

Numerous studies have investigated the use of lasers in various aspects of Fixed Partial Denture (FPD) fabrication and adjustment. Laser technology offers several advantages over conventional methods, including improved precision, reduced trauma to dental tissues and enhanced patient comfort. In the context of tooth preparation for FPDs, lasers have been shown to produce more conservative preparations with reduced risk of damage to adjacent tooth structure compared to rotary instruments. Additionally, lasers can be used for soft tissue contouring and gingival retraction, facilitating more accurate impressions and better fitting restorations. In terms of impression-making, lasers have demonstrated the ability to enhance the accuracy of digital impressions by providing clear and detailed images of tooth surfaces and soft tissues. This allows for more precise fabrication of FPD frameworks and better adaptation of restorations to the prepared teeth. Furthermore, lasers can be used for surface treatment of dental materials, improving bond strength and longevity of FPDs. Moreover, studies have demonstrated the effectiveness of lasers in enhancing the bond strength of FPDs to tooth structure and dental materials. Laser surface treatment techniques, such as laser etching or irradiation, create microretentive patterns on the bonding surfaces, improving the adhesion between the restoration and the tooth. This results in stronger and more durable FPD restorations with reduced risk of debonding or failure over time [3].

Additionally, lasers have been utilized in the adjustment and polishing of FPDs, offering precise and efficient methods for achieving optimal fit and aesthetics. Laser-assisted adjustments allow for controlled removal of excess material and fine-tuning of restoration contours without causing damage to adjacent tooth structure or soft tissues. Furthermore, laser polishing techniques result in smooth and esthetic surfaces, minimizing the need for manual polishing procedures and reducing chairside time. Overall, the body of literature supporting the use of lasers in fixed partial dentures continues to grow, with accumulating evidence highlighting the numerous advantages and applications of laser technology in prosthodontic practice. From tooth preparation and impression-making to framework fabrication and cementation, lasers offer innovative solutions for enhancing precision, efficiency and patient comfort in FPD procedures [4,5].

Discussion

The use of lasers in FPD fabrication and adjustment represents a significant advancement in prosthodontic practice. By harnessing the precision and versatility of laser technology, clinicians can achieve better outcomes with fewer complications and improved patient satisfaction. Laser-assisted techniques offer numerous benefits, including reduced chairside time, enhanced accuracy and minimally invasive treatment approaches. However, challenges remain in the widespread adoption of laser technology in prosthodontic practice. High initial costs, limited availability of training programs and regulatory restrictions may hinder the integration of lasers into routine clinical practice. Additionally, further research is needed to fully understand the long-term effects and clinical outcomes associated with laser-assisted FPD procedures [6].

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Received: 01 May, 2024, Manuscript No. jppr-24-137827; **Editor Assigned:** 03 May, 2024, PreQC No. P-137827; **Reviewed:** 15 May, 2024, QC No. Q-137827; **Revised:** 20 May, 2024, Manuscript No. R-137827; **Published:** 27 May, 2024, DOI: 10.37421/2573-0312.2024.9.393

Conclusion

In conclusion, lasers hold great promise in revolutionizing the fabrication and adjustment of fixed partial dentures. Their ability to provide precise, efficient and minimally invasive treatment approaches makes them valuable tools in modern prosthodontic practice. As technology continues to advance and clinicians gain more experience with laser-assisted techniques, the role of lasers in FPD procedures is expected to expand, leading to improved treatment outcomes and better patient care. he evidence supports the use of lasers as valuable tools for improving precision, efficiency and patient satisfaction in various stages of FPD fabrication and adjustment. As technology continues to evolve and clinicians gain more experience with laser-assisted techniques, the integration of lasers into routine prosthodontic practice is expected to increase, leading to better treatment outcomes and enhanced quality of care for patients undergoing FPD procedures.

Acknowledgement

None.

Conflict of Interest

There are no conflicts of interest by author.

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How to cite this article: Doudeselva, Horiabela. "Unlocking Precision: Lasers in Fixed Partial Dentures-A Comprehensive Review." *Physiother Rehabil* 9 (2024): 393.