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Comparative Evaluation of Laser-Assisted Versus Conventional Surgical Excision in Oral Leukoplakia Management.

Kowlampet Saiteja*

Bachelor in Pharmacy, Vishnu institute of pharmaceutical education and research (VIPER), Narsapur. Telanagana, India

***Correspondence to:** Thomas J. Reynolds, Bachelor in Pharmacy, Vishnu institute of pharmaceutical education and research (VIPER), Narsapur. Telanagana, India. Email: tkaulampet@gmail.com

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Introduction

Oral leukoplakia is recognized as one of the most common potentially malignant disorders (PMDs) of the oral cavity, with a variable rate of malignant transformation depending on clinical and histopathological features. Clinically presenting as a white patch or plaque that cannot be rubbed off and cannot be characterized as any other disease, oral leukoplakia remains a significant concern for early diagnosis and prompt management. Surgical excision of leukoplakic lesions remains a mainstay in treatment, aimed at removing dysplastic tissue and reducing the risk of progression to oral squamous cell carcinoma.

Conventional surgical excision using scalpel instruments has been the traditional method, offering tactile control and ease of histopathological examination of excised specimens. However, it is often associated with greater intraoperative bleeding, postoperative discomfort, and prolonged healing time. In recent years, laser-assisted excision techniques—particularly using diode, CO_2, or Nd:YAG lasers—have gained popularity due to their precision, reduced bleeding through coagulation, minimal postoperative discomfort, and favorable wound healing outcomes. Despite these advantages, questions remain regarding recurrence rates, completeness of excision, and histological artifact introduction in laser-treated specimens.

Comparative evaluation between these two modalities is essential for determining the optimal approach, balancing treatment efficacy, patient comfort, and histological reliability. This discussion seeks to highlight the benefits and limitations of both methods to assist clinicians in evidence-based decision-making for oral leukoplakia management.

Conclusion

Both laser-assisted and conventional scalpel excision techniques have distinct advantages in the surgical management of oral leukoplakia. Laser-assisted excision offers superior intraoperative hemostasis, reduced postoperative discomfort, and a faster healing trajectory, making it particularly beneficial for medically compromised patients or those with bleeding tendencies. However, conventional surgical excision continues to provide superior specimen integrity for histopathological evaluation, an important consideration in high-grade dysplastic lesions. The choice of technique should be guided by lesion size, location, patient systemic health, and the need for precise histological interpretation. Future large-scale, randomized controlled trials with long-term follow-up are warranted to establish standardized protocols for optimal patient outcomes in oral leukoplakia management.

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