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Diode Laser Management of Benign Oral Soft Tissue Masses: A Case Series

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ABSTRACT

Benign soft-tissue lesions of the oral cavity are frequently encountered in routine dental practice and may arise from the mucosa, gingiva, lips, buccal mucosa, tongue, palate, and other intraoral structures. These lesions encompass a diverse group of reactive, developmental, traumatic, inflammatory, and benign proliferative conditions, including fibroma, mucocele, papilloma, pyogenic granuloma, irritation fibroma, lipoma, epulis, gingival overgrowth, and other localized soft-tissue masses. Although conventional surgical excision with a scalpel remains the standard approach, the use of diode lasers has gained increasing interest because of their ability to provide precise soft-tissue cutting with simultaneous coagulation. The present case series evaluated the clinical application of diode laser in the management of three commonly encountered benign oral soft-tissue lesions: mucocele, traumatic fibroma, and pyogenic granuloma.

Keywords: Diode laser, oral soft tissue mass, fibroma, mucocele, pyogenic granuloma

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INTRODUCTION

Soft-tissue lesions of the oral cavity are frequently encountered in dental practice are irritation fibroma, mucocele, pyogenic granuloma, papilloma, lipoma, peripheral giant cell granuloma, peripheral ossifying fibroma¹. Conventional surgical excision using a scalpel is a well-established method for the management of these localized oral soft-tissue lesions. However, scalpel surgery may be associated with intraoperative bleeding, impaired visibility of the surgical field, the need for suturing, postoperative pain and edema, and patient apprehension regarding conventional surgery². These limitations have encouraged the development and adoption of alternative approaches that can provide effective tissue removal while improving intraoperative and postoperative outcomes.

Lasers have become increasingly important in contemporary oral soft-tissue surgery because of their ability to interact selectively with soft tissues and provide cutting, ablation, and coagulation³. Among the various dental lasers, diode lasers are particularly useful for soft-tissue procedures because of their compact design, relatively low cost, ease of handling, and strong absorption by pigmented chromophores such as hemoglobin and melanin³. Depending on the wavelength and clinical parameters used, diode lasers can provide simultaneous tissue incision and coagulation, resulting in improved hemostasis and a relatively bloodless operative field⁴.

The clinical application of diode lasers in oral soft-tissue surgery includes excision of benign lesions, gingivectomy and gingivoplasty, frenectomy, operculectomy, management of mucocles, treatment of vascular lesions, removal of soft-tissue overgrowths, and other minor surgical procedures⁵. The use of appropriate laser parameters is essential because excessive thermal accumulation may result in tissue carbonization and delayed healing, whereas inadequate energy delivery may compromise effective tissue removal. Therefore, appropriate case selection, wavelength, power, emission mode, exposure time, and tissue-handling technique are important determinants of clinical outcomes^{6,7}. The present case series describes the clinical use of diode laser for the management of different benign oral soft-tissue lesions.

CASE PRESENTATION

Case 1

A 18-year-old female patient reported to the Department of Oral Medicine and Radiology with a chief complaint of swelling on the inner aspect of the lower lip for the past 4 weeks with positive history of traumatic biting at the same site a few months earlier. On clinical examination, a dome-shaped swelling was observed on the lower labial mucosa, measuring approximately 1 × 1 cm, normal in color, soft, fluctuant, non-tender, and non-pulsatile

(Figure 1a). Based on the patient's history and clinical presentation, a provisional diagnosis of mucocele was made. Diode laser excision was performed with standard safety protocols. Excision was performed using a 980-nm diode laser (Ga-Al-As, DILAS, Germany; model: IndiLase, MEDSOL, Hosur, India), operating in a continuous mode with a power of 2.0W and a flexible 400- μ m diameter optic fiber. Photobiomodulation was performed immediately after surgery to promote healing. The excision site was left open without suturing to allow healing by secondary intention (Figure 1b). The patient was instructed to rinse twice daily with 0.2% chlorhexidine mouthwash for two weeks postoperatively. Analgesics were prescribed for three days, to be taken only if pain occurred. The surgical site got healed in 2 weeks without any recurrences (Figure 1c).

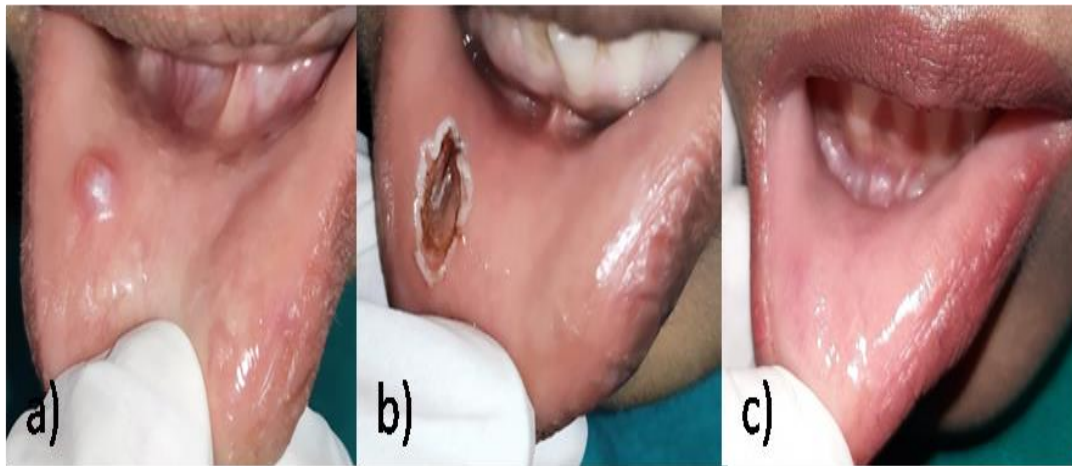


Figure 1: Case of excision of mucocele affecting lower labial mucosa a) clinical view b) Immediate postoperative view c) View after complete healing

Case 2

A 28-year-old female patient reported to the Department of Oral Medicine and Radiology with a chief complaint of swelling on the inner aspect of the left lateral border of tongue for the past 2 weeks. On clinical examination, a small soft tissue growth was observed on measuring approximately 1×1.2 cm, normal in color, firm, non-tender, and non-pulsatile (Figure 2a). Based on the patient's history and clinical presentation, a provisional diagnosis of traumatic fibroma was made. Diode laser excision was performed with standard safety protocols. Excision was performed using a 980-nm diode laser (Ga-Al-As, DILAS, Germany; model: IndiLase, MEDSOL, Hosur, India), operating in a continuous mode with a power of 2.0W and a flexible 400- μ m diameter optic fiber. Photobiomodulation was performed immediately after surgery to promote healing. The excision site was left open without suturing to allow healing by secondary intention (Figure 2b). Postoperative instruction was given similar to case 1. The surgical site got healed in 2 weeks without any recurrences (Figure 2c)

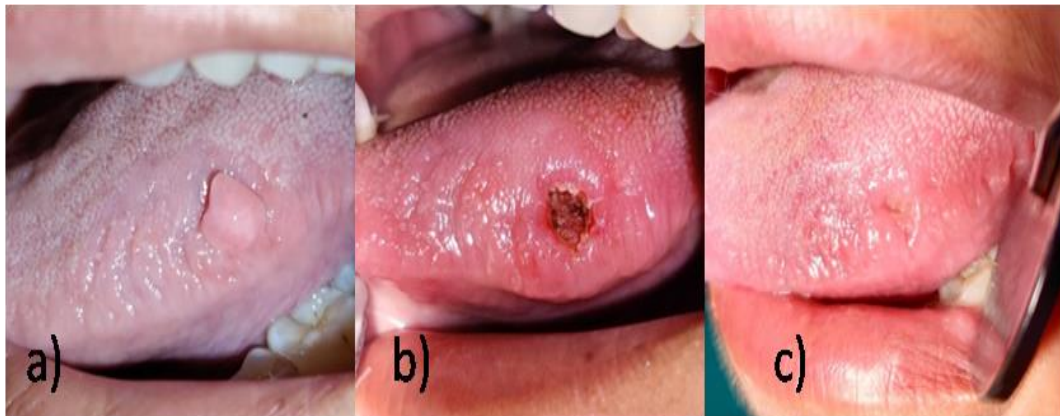


Figure 2: A case of irritational fibroma affecting left lateral border of tongue a) On examination- Elevated nodule of normal color with a smooth surface b) Immediate postoperative view c) View after complete healing

Case 3

A 22-year-old female reported with complaining of a swelling in the lower left gum region since 2 - 3 month which was painless and gradually increased in size. Intraoral examination revealed a pedunculated gingival overgrowth extending on buccal surfaces of 43, 44, 45, reddish pink in color, soft and positive bleeding on palpation. The surgical site got healed in 2 weeks without any recurrences (Figure 3a). A provisional diagnosis of pyogenic granuloma was made. Firstly, Oral prophylaxis was completed. Later diode laser excision was performed with standard safety protocols. Excision was performed using a 980-nm diode laser (Ga-Al-As, DILAS, Germany; model: IndiLase, MEDSOL, Hosur, India), operating in a continuous mode with a power of 2.0W and a flexible 400- μ m diameter optic fiber. The surgical site got healed in 2 weeks without any recurrences (Figure 3b). Postoperatively chlorhexidine mouth rinse and instruction to maintain proper oral hygiene was given. The surgical site got healed in 2 weeks without any recurrences (Figure 3c).

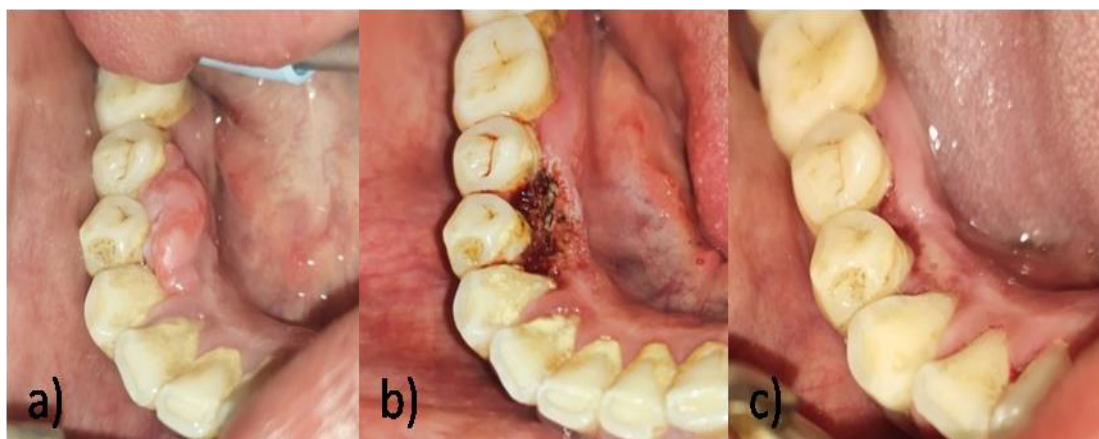


Figure 3: A case of pyogenic granuloma affecting gingiva i.r.t. lingual surface of 43, 44, 45 a) Reddish pink growth, bleed on palpation b) Immediate postoperative view c) View after complete healing.

DISCUSSION

Benign soft-tissue lesions of the oral cavity represent a heterogeneous group of conditions that may arise from traumatic, reactive, inflammatory, developmental, or epithelial proliferative processes¹. The present case series evaluated the clinical application of diode laser in the management of three commonly encountered benign oral soft-tissue lesions: mucocele, traumatic fibroma, and pyogenic granuloma. Although these lesions differ considerably in their clinical presentation and tissue characteristics, their management frequently involves surgical excision¹. The present series demonstrates the versatility of diode laser as a soft-tissue surgical modality across lesions with different clinical and biological characteristics.

Mucocele is a common benign lesion resulting from trauma to or obstruction of minor salivary gland ducts, most frequently affecting the lower lip. Conventional management includes surgical excision of the lesion along with the associated minor salivary gland tissue to minimize recurrence⁵. Diode laser offers several advantages in this region because of its ability to provide precise soft-tissue incision with simultaneous coagulation⁵. Care should nevertheless be taken to completely remove the causative glandular tissue when indicated, as incomplete removal may contribute to recurrence⁵. Traumatic fibroma, also referred to as irritation fibroma, is a reactive connective-tissue lesion commonly associated with chronic local irritation or trauma. Surgical excision with scalpel or diode laser is generally considered the treatment of choice⁸. Pyogenic granuloma is a benign, highly vascular reactive lesion that frequently develops on the gingiva and may exhibit pronounced bleeding even with minor manipulation⁹. The coagulative effect of diode laser can facilitate management of the vascular component and provide improved visibility of the surgical field compared with conventional excision and sclerotherapy^{9,10}.

Laser therapy has emerged as an effective and minimally invasive approach for the management of oral soft-tissue masses. Compared with conventional surgical excision, laser procedures offer several clinical advantages, including reduced intraoperative and postoperative pain and discomfort, improved hemostasis, minimal tissue trauma, and better postoperative healing^{11,12}. The precise cutting and coagulation properties of lasers allow excellent bleeding control while reducing postoperative edema and the risk of scarring¹³. Their bactericidal effects may further minimize the risk of postoperative infection and reduce the need for antibiotics. In addition, most soft-tissue laser procedures require only minimal local anesthesia and often eliminate the need for suturing¹⁴. These benefits contribute to improved postoperative care, greater patient comfort, and better overall patient compliance.

CONCLUSION

Overall, the findings of this case series suggest that diode laser can be a useful and versatile modality for the management of appropriately selected benign oral soft-tissue lesions. Its ability to combine tissue cutting with coagulation, provide good operative visibility, potentially reduce the need for suturing, and facilitate satisfactory postoperative healing makes it an attractive option for minor oral soft-tissue surgery.

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