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Case Report **Dentistry**

Improving Oral Aesthetics and Function: Laser Therapy for Mucogingival Deformities

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Abstract

Mucogingival deformities encompass a range of soft tissue abnormalities affecting gingival tissues and their relationship with surrounding oral structures. These conditions, including gingival recession, insufficient attached gingiva width, high frenal attachments, and gingival excess, can lead to aesthetic concerns, oral hygiene challenges, functional problems, psychological impact, and long-term oral health risks. This paper presents two cases of mucogingival deformities and their aesthetic correction using diode lasers. The use of diode lasers offered advantages such as precise tissue removal, reduced bleeding, faster healing, and minimal postoperative pain.

Keywords: Mucogingival deformities, Gingival recession, Gingival enlargement, Frenum attachments, Aesthetic concerns, Diode laser.

INTRODUCTION

Mucogingival deformities encompass a range of soft tissue abnormalities that affect gingival tissues and their relationship with surrounding oral structures (Cortellini & Bissada, 2018). The diverse nature of mucogingival deformities poses a challenge in creating a unified definition of gingival and alveolar mucosal abnormalities. It may show a range of clinical features with defects in the gingiva or oral mucosa, such as gingival recession, insufficient attached gingiva width, shallow vestibule, high or prominent frenal attachments, gingival excess, altered passive eruption with excessive gingival coverage of the anatomical crown, and conditions such as gingival pigmentation (Allen, 1988). These conditions may have significant implications such as:

1. Aesthetic concerns: Gingival excess and pigmented gingiva may be perceived as unattractive, thereby creating an unpleasing smile.
2. Oral hygiene challenges: High frenum attachments can interfere with proper brushing and flossing, and gingival enlargement may create areas that are difficult to clean, with an increased risk of plaque accumulation and subsequent periodontal issues.
3. Functional problems: High frenum attachments may limit tongue movement or cause speech difficulties and excessive gingival enlargement can interfere with proper occlusion
4. Psychological impact: Visible deformities may lead to self-consciousness; Patients may feel embarrassed to smile or speak in social situations and may suffer from reduced self-esteem and confidence in personal and professional interactions
5. Long-term oral health risks: Difficulty maintaining oral hygiene can increase the risk of periodontal disease and untreated conditions may lead to further complications

Early diagnosis and intervention can help prevent progression and minimize complications associated with these conditions. Addressing these mucogingival deformities through appropriate treatment can help improve oral health, aesthetics, and overall quality of life (Allen, 1988). Successful treatment can boost self-esteem, enhance social interactions, and promote better oral hygiene. This paper presents two cases of mucogingival deformities and their aesthetic correction using diode lasers.

Case 1:

A 15-year-old female patient presented to the dental clinic with her mother with complain of a gummy smile and bleeding gums while brushing her teeth. She started noticing bleeding a year ago and felt it had become more pronounced lately. The patient expressed self-consciousness about her gummy smile and sought treatment to improve her oral health and aesthetic appearance. The patient had no significant medical history and was not taking any medication. Oral examination revealed plaque and calculus with bleeding on probing. The patient exhibited gingival enlargement, with a flattened gingival contour in the upper anterior region (Fig 1A). The gingiva exhibited deep melanin pigmentation. A high frenal attachment in upper anterior region was also observed. Based on the patient's age, clinical presentation, and the absence of other contributing factors, pubertal gingival enlargement was diagnosed. The blood counts were within normal limits, ruling out any systemic involvement.

The treatment plan consisted of two phases:

1. Phase I therapy: Informed consent for the treatment was taken and thorough scaling was done to remove plaque and calculus. The patient was educated and motivated for oral hygiene maintenance at home and explained the role of hormones on gums and how her compliance is important in maintaining and preventing the disease. After phase 1 therapy, the patient was reviewed and further surgical therapy was planned.
2. Surgical intervention: Gingivectomy and frenectomy of upper labial frenum and depigmentation as shown in Fig 1B in upper anterior were performed in the same sitting position with a diode laser (Zolar Photon plus 980 nm- Fig 3) in predetermined settings under local anesthesia. A periodontal pack was placed on the exposed wound. Postoperative instructions were provided, and the patient was advised to use analgesics and anti-inflammatory drugs for 3 days and a chlorhexidine mouthwash for 2 weeks.

Follow-up and Outcomes:

The postoperative healing was good, and no complications were reported. The patient's gingival appearance improved significantly, addressing both functional and aesthetic concerns (Fig 1C).

Fig. 1A- Preoperative, 1B- Intraoperative showing Gingivectomy, Frenectomy and Depigmentation, 1C- Postoperative after 3 months

Case 2:

A 20-year-old female who presented to the dental clinic with concerns of bleeding gums while brushing and a gummy smile. She reported that the gummy smile had been noticeable for the past 2–3 years, although she was unsure of its exact onset. The patient's esthetics were compromised because of significant gingival display while talking and smiling, and the patient had no significant medical history and reported no known allergies or current medications.

Oral examination revealed plaque and calculus deposits on the teeth. Notably, approximately two-thirds of the teeth crowns were covered by gingival tissue, which appeared primarily fibrotic and exhibited melanin pigmentation as shown in Fig 2A. Gingival overgrowth was consistent with inflammatory gingival enlargement. Blood investigations were conducted and the results were found to be within normal limits. On the basis of the clinical presentation and examination findings, the patient was diagnosed with Inflammatory gingival enlargement. Excessive gingival coverage of the teeth crowns and the presence of plaque and calculus supported this diagnosis.

Therapeutic Intervention:

The treatment plan was divided into two phases:

1. **Phase 1 therapy:** After the written consent of patient, scaling was performed to remove plaque and calculus deposits.
2. **Surgical therapy:** Following a review of the initial therapy, a gingivectomy and depigmentation procedure was planned. The procedure was performed in a single sitting using a diode laser under local anesthesia Fig 2B and 2C. This approach was chosen to address both gingival enlargement and melanin pigmentation contributing to anesthetic smile.

Postoperatively, a periodontal dressing (Coe pack) was applied to the wound. The patient was provided with postoperative instructions and prescribed analgesics and antibiotics for three days.

Follow-up and Outcomes:

The patient returned for a follow-up visit, during which healing was assessed and found satisfactory. The gingival contours showed significant improvement, and the patient reported reduced bleeding during brushing. The aesthetic outcome was also favorable, with a remarkable reduction in the appearance of a gingival display Fig 2D.

Fig. 2A- Preoperative, 2B- Intraoperative showing Gingivectomy and Depigmentation in Upper anterior region 2C- Intraoperative showing Gingivectomy and Depigmentation in Lower anterior region, 2D- Post operative 3 months

Fig. 3: Diode Laser used for surgical treatment

DISCUSSION

Among the various mucogingival deformities, gingival excess, high frenum, and pigmented gingiva were the main concerns in the presented cases. Gingival excess may lead to a small clinical crown and display the gingiva more than the crown of the teeth while talking and smiling, leading to an unaesthetic appearance. A high frenum may lead to midline diastema and tension on the marginal gingiva, resulting in progressive gingival recession (Shirbhate *et al.,* 2024). In addition to

functional and esthetic deformities, these patients have a poor self-image and suffer from low self-esteem, which affects their quality of life.

Gingival enlargement can be caused by various factors, including hormonal changes, medications, systemic diseases (Baptista, 2002) (Trackman & Kantarci, 2004), and local irritants such as plaque and calculus (Beaumont *et al.,* 2017). Pubertal gingival eargement is a specific form of this condition that occurs during adolescence and is often caused by hormonal fluctuations (Jafri *et al.,* 2015). It often resolves with the passage of time and proper oral hygiene measures; however, in cases where functional or aesthetic concerns are significant, surgical intervention may be warranted.

The initial phase of scaling and root planing is crucial for reducing inflammation and preparing tissues for surgical intervention. The use of a diode laser for frenectomy and gingivectomy in case1 and gingivectomy and depigmentation in case 2 offered several advantages, including precise tissue removal, reduced bleeding, faster healing, and minimal postoperative pain (Zeba *et al.,* 2015). By virtues of excellent hemostatis offered by lasers, Frenectomy in Case 1 did not required suturing and depigmentation in case 2 showed minimal bleeding intraoperatively from gingival surface. Additionally, Lasers sterilize as they cut, reducing the risk of postoperative infection (Sarver & Yanosky, 2005). In both cases, the single-sitting approach minimized patient discomfort and reduced treatment time. The patient was extremely satisfied with the treatment because of the drastic postoperative change in aesthetics.

CONCLUSION

Mucogingival deformities can have significant impacts on patients' oral health, aesthetics, and overall well-being. The following case reports demonstrate the successful application of diode laser therapy to address two distinct mucogingival issues, highlighting its versatility and effectiveness in contemporary periodontal practice. Diode lasers have emerged as a valuable tool for correcting mucogingival defects, offering advantages such as minimal bleeding, reduced postoperative discomfort, and faster healing than traditional surgical techniques. The treatment resulted in improved gingival health, reduced bleeding, and an enhanced aesthetic appearance.

Conflict of Interest: Nil

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