

A 10 Year Follow Up of a Case After by Creating “Zenith” With the Use of Laser Following Orthodontic Treatment

Haripriya Ravichandran^{1*}, Chandrasekar R² and Sri Hari J²

¹Final year post year postgraduate, Department of Orthodontics, Sri Ramakrishna Dental College & Hospital Coimbatore, India

²Professor and HOD of orthodontics, Sri Ramakrishna Dental College & Hospital, Coimbatore, India

*Corresponding author

Neelam Andrade, Dean, Professor & HOD, Dept. of Oral & Maxillofacial Surgery, NHDC, Mumbai, India.

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ABSTRACT

Achieving optimal smile aesthetics in orthodontics extends beyond tooth alignment to include considerations of gingival contour and tooth proportions. The American Academy of Cosmetic Dentistry advises that mandibular incisors and maxillary laterals should have a symmetrical half-oval or half-circular gingival shape, while maxillary centrals and canines should display a more elliptical form. The gingival “zenith” “the most apical point of the gingival tissue is positioned distal to the tooth’s longitudinal axis on maxillary centrals and canine and aligns with the axis on mandibular incisors.

Orthodontists can enhance gingival contours in-office using diode lasers. Compared to CO₂ or erbium YAG lasers, diode lasers are portable and cost-effective, making them practical for orthodontic practices. This technology allows for efficient and comfortable removal of excess gum tissue, often without the need for needles, as a topical anesthetic suffices. The procedure can improve bracket placement, assist in the eruption of impacted teeth, and aesthetically recontour the gum line to create a more balanced smile. Patients typically experience minimal discomfort and expedited healing post-procedure.

Keywords: Laser, Esthetics, Zenith

Introduction

Achieving optimal smile aesthetics in orthodontics extends beyond tooth alignment to include the precise contouring of gingival tissues, particularly the gingival zenith—the most apical point of the gingival margin. Lasers have revolutionized dentistry by providing a minimally invasive, precise, and efficient alternative to conventional dental procedures. Lasers work by emitting light at a specific wavelength, which is absorbed differently by target tissues based on their composition (water, hemoglobin, or hydroxyapatite). The interaction of laser energy with tissues leads to controlled cutting, removal, or modification with minimal damage to surrounding areas.

The term LASER is an acronym for ‘Light Amplification by the Stimulated Emission of Radiation’ which was first applied in dentistry by Miaman, in 1960, and has seen various hard and

soft tissue applications. Its use has proved to be an effective tool to increase efficiency, specificity, ease, cost and comfort of the dental treatment. The active medium of the diode laser is a solid-state semiconductor made of aluminum, gallium, arsenide, and occasionally indium, which produces laser wavelengths, ranging from approximately 810 nm to 980 nm.

Diode lasers emit concentrated light energy, enabling accurate sculpting of gingival tissues with minimal discomfort and reduced healing times. Their portability and cost-effectiveness make them practical for use in orthodontic settings. Clinical studies have demonstrated that procedures performed with diode lasers often require only topical anesthesia, with significantly less need for suturing compared to conventional surgical methods. This results in efficient treatment sessions and enhanced patient satisfaction.

We documented a case, following an orthodontic treatment and followed for 10 years, being presented. After orthodontic

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treatment, a diode laser gingivectomy was done with the use of LASER to establish proper zenith contour and improved aesthetic. The procedure involved removal gingival tissue, resulting in a more symmetrical and harmonious gingival contour. Post-operative outcomes showed stable and satisfactory results, significantly enhancing the patient's smile aesthetics.

Case Report

- A 15 years old Female patient came to our department with the Chief Complaint of irregularly paced teeth in her upper front teeth region.

Clinical Examination & Diagnosis

[Figure 1.] It reveals patient having convex profile, posterior divergence with class 2 skeletal base with average nasolabial angle, hyperactive mentalis muscle present [Figure 2.]



Figure 1



Figure 2

- Occlusion: class 1 malocclusion with class 2divi 1 incisor
- Overjet: 3mm
- Overbite: 4-5mm
- No of teeth clinically present: 28 permanent dentition Retained deciduous 51 labial to 11

Treatment

- Extraction of 51
- Fixed appliance, MBT 0.022-inch slot with fully programmed pre adjusted edgewise appliance [1].
- To achieve esthetics by gingivectomy. It was decided to manage the case using diode laser 980 nm
- Create ideal gingival contour periodontically in relation to 11. [Figure 3.]



Figure 3

Procedure

- » After completion of Fixed treatment
- » To create ideal esthetics through gingivectomy

Step 1: Patient Preparation

- The patient was informed about the procedure, and consent was obtained.
- Topical anesthesia was applied to the surgical area,
- A diode laser (980 nm) with 1 W continuous mode was used for precise cutting and coagulation [2].

Step 2: Gingivoplasty on Tooth #11

- A UNC 15 periodontal probe is used for bone sounding or transgingival probing
- Measurements can be used to outline the tissue with periodontal pocket marker
- The laser is activated and tissue is "painted away" with the fiber tip in a light contact mode, varying the angle of the tip to create ideal tissue contours.
- Controlled, layer-by-layer ablation of the gingiva was performed to expose the full clinical crown.
- The laser's haemostatic effect minimized bleeding, reducing the need for suture [Figure 4.]



Figure 4

Step 3: Gingival Contouring for Symmetry

- » laser contouring was done to reshape the gingival margin, ensuring a harmonious gum line [3].
- » The diode laser's precision allowed fine detailing without damaging adjacent tissues.

Step 4: Post-Operative Care

- The patient was given vitamin E gel to apply at the surgical site
- The patient was advised to maintain good oral hygiene and avoid spicy or hard foods for a few days.

Very Minimal discomfort was expected, with complete healing in 1-2 weeks. [Figure 5,6,7]



Figure 5



Figure 6



Figure 7

Discussion

This Case reports, clinical experiences, offering insights into treatment protocols, and demonstrating the effectiveness of various techniques. In the context of laser-assisted gingival recontouring, case reports highlight the advantages of diode laser technology over conventional scalpel methods, particularly in terms of precision, hemostasis, and patient comfort.

In this case, a 16-year-old female patient presented with altered passive eruption post-orthodontic treatment, causing excessive gingival display and asymmetry, particularly on tooth #11 [4]. The diode laser (980 nm) was chosen for gingivectomy due to its minimally invasive nature, reduced bleeding, and faster healing. After treatment gingival recession due to retained deciduous that cause gingival hyperplasia is self-corrected. Case reports like this emphasize how laser technology allows for precise gingivectomy and contouring, improving smile esthetics while minimizing post-operative discomfort. [Figure 8.]



Figure 8

Comparing laser-assisted and scalpel-based procedures, clinical case reports support that laser treatments reduce inflammation, eliminate the need for sutures, and shorten recovery time and we are not so sure [5]. Furthermore, the case report underscores the importance of individualized treatment planning, considering factors such as gingival biotype, smile line, and aesthetic expectations.

From a clinical perspective, documenting such cases provides valuable insights for practitioners by demonstrating step-by-step procedures, challenges encountered, and patient outcomes. Long-term follow-up in case reports also assesses tissue stability and patient satisfaction, reinforcing the diode laser's effectiveness in aesthetic dentistry.

Conclusion

The case reports contribute to evidence-based practice, guiding clinicians in selecting optimal techniques for soft tissue recontouring. The documented success of diode laser-assisted gingival recontouring in cases like this validates its advantages, making it a preferred choice for precise, predictable, and patient-friendly periodontal and aesthetic procedures.

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