

Clinical Crown Lengthening Using Soft Tissue Diode Laser: A Case Series

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ABSTRACT

In Periodontal surgical procedures, Crown lengthening is performed for partial removal of supporting periodontal tissues to increase exposure of tooth structure. Crown-lengthening involves various techniques, including gingivectomy or gingivoplasty, apically positioned flap procedure, which may include osseous resection and forced tooth eruption. Crown lengthening can be performed as external or internal bevel gingivectomy. Diode laser is very safe and useful for esthetic periodontal soft-tissue management because this laser precisely ablates soft tissues using various tips, and the wound healing is more favourable, which leads to minimal thermal alteration of the treated surface.

KEYWORDS: Diode Laser, Crown Lengthening, Biological Width, Gingivectomy, Gingivoplasty

INTRODUCTION

The name 'LASER' stands for "Light Amplification by Stimulating Emission of Radiation".¹ The meadow of restorative dentistry has used lasers, for excavation of caries, soft tissue recontouring and this is where laser therapy evolved from in dentistry.

Lasers have been also used earlier for tooth preparation and also for restoration. Laser assisted tooth Bleaching has gained immense popularity in esthetic dentistry.² Lasers associated gingival and periodontal procedures including mechanical debridement of root surfaces and pockets are being treated with lasers as a substitute. Lasers also are an adjunct in treating soft tissue lesions including treatment of OSMF and Leukoplakia.

Crown Lengthening indicate procedures designed to increase extension of supragingival tooth structure for restorative or aesthetic purposes.³ Dentist often confronts the requisite for crown lengthening in the field of dentistry and also have to make treatment decisions taking into deliberation how to best manage the functional, biological requirements of each tooth. Crown Lengthening was first coined by D.W.Cohen (1962).⁴ The tooth structure should provide biological width to allow tooth preparation and account for an adequate margin placement, thus maintaining good retention for final restoration. The current case series describes three cases of crown lengthening using soft tissue diode lasers, which is a simple, efficient method that produces good results with patient comfort.

CASE REPORT

CASE 1: A 33-year-old male patient visited the

department of Periodontics, I.T.S Dental College for Replacement of clinical crowns. On Clinical examination, tooth number 11 and 21 had short clinical height and uneven gingival zeniths on these teeth in comparison with teeth 12 and 22 (Figure 1 A,B). Sulcus depth was measured with careful clinical probing, and it was found to be 4 mm scalpel, crown lengthening using Laser was planned.



Figure 1: (A and B) Preoperative with Crown and Preoperative without Crown

Oral prophylaxis was carried and instructions were given. Gingivectomy was planned from the distal contact point of right maxillary central incisor to distal of left maxillary central incisor by measuring crown height. A soft tissue Diode Laser Zolar Photon Plus 810-980 nm (wavelength 980 nm) having a 400-micron diameter with a disposable tip with contact mode, power set at 2 W in continuous pulse was used (Figure 2 A,B).

Topical Lignocaine spray was used. The fiber tip was cleaved. Laser therapy was started from the base of bleeding point created by the pocket marker. Light brushing strokes were performed in continuous motion. After Laser application, tissue remnants were removed using sterile gauze with saline. Interdental papilla and marginal gingiva were recontoured to recreate normal contour.

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Figure 2: (A and B) Laser application and Immediate Post-operative

This procedure was repeated until the desired level of marginal tissue removal was achieved. No Bleeding was seen. Patients reported no pain during surgery. Post operative view and Final Prosthesis are shown in Figure 3A,B.



Figure 3: (A and B) 14 Days Post-Operative and Final Prosthesis

CASE 2: A 38 year old female patient reported to the department of Periodontics, I.T.S Dental College for crown lengthening which was referred from Department of Prosthodontics. On Clinical examination, tooth number 15 and 17 had short clinical height and were endodontically restored with 16 missing (Figure 4 A,B).

It was found that inadequate crown height was present for abutment teeth and gingival growth was seen in the edentulous area. Crown lengthening was done. Laser tip in contact mode with 2 W and gingival troughing was done in the region of missing teeth. No pain or bleeding was reported (Figure 5 A,B,C).



Figure 4: (A and B) Preoperative Premolar view and Molar View



Figure 5: (A,B,C) Laser application and Immediate Post-operative Views

CASE 3: A 20 year old female patient reported to the department of Periodontics, I.T.S Dental College for crown lengthening in the mandibular anterior area. Examination revealed inadequate crown height in tooth number 42, 41 and 32 were endodontically restored with 31 missing (Figure 6 A,B,C).

Crown lengthening was performed using Soft tissue diode Laser and 3 mm of gingival tissue was removed around the teeth. No pain or bleeding was reported.



Figure 6: (A,B,C) Preoperative view, Probing depth and Laser application



Figure 7: (A,B) Immediate Post-Operative view and Temporary restoration

DISCUSSION

Numerous conditions are there in which crown lengthening is required such as Unesthetic gingival heights, inadequate crown length, subgingival caries, crown fracture.⁵ Teeth having sulcus depth more than 4mm on facial surface, Gingivectomy can be performed to lengthen the crown.⁶

In all the three cases, no pain, bleeding was reported was reported. From the non-invasive technique, clinicians can expand esthetic surgery to higher limits. For indirect restorations, surgical crown lengthening is more favourable. Scalpel assisted surgical techniques, predispose to unpleasant bleeding during surgery. Soft tissue diode laser causes minimal damage to bone and periosteum and faster rate of healing as compared to the scalpel. Also, laser wounds are sterile and are less likely to become inflamed because blood vessels smaller in diameter are sealed by laser ablation effect.

Laser light at 800 to 980 nm is poorly absorbed in water, but it is highly absorbed in other pigments. Because of its hot tip effect, it produces a thick coagulated layer. No deleterious effect on the root surface is reported by use of diode laser. Thus, it is considered that soft tissue laser surgery can be performed safely with regard to hard tissue.

In a study conducted by Bragger showed periodontal tissue response after crown lengthening. They showed

that six weeks postoperatively, probing depth and attachment level did not change.⁷

The chief advantages are: (1) relatively bloodless field (2) ability to vaporize tissue (3) provide adequate sterilization and (4) minimal post-operative pain and swelling.

CONCLUSION

For esthetic problems, there are a number of alternative procedures that works best for patients.

It can be summarized that diode laser application appears to be a safe and alternative procedure for management of altered gingival contour.

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