

## Crown Lengthening Using Light Amplification By Stimulated Emission of Radiation

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**Abstract:** Gingival tissues have a significant impact on the outcome of restorative therapy. Crown lengthening is a procedure which involves partial removal of supporting periodontal structures, to increase exposure of tooth structure. It is indicated in cases such as inadequate clinical crown height, subgingival caries, fracture, unequal gingival heights. Lasers were introduced into the field of clinical dentistry with the hope of overcoming some of the drawbacks associated with conventional methods. Laser assisted tissue ablation results in adequate exposure of crown with reduced bleeding, thereby allowing the clinician to immediately place the final restoration. This case report describes aesthetic crown lengthening in right maxillary anterior tooth region using diode laser.

**Keywords:** Attached Gingiva, Biological Width, Crown Lengthening, Gingivectomy, Laser.

### I. Introduction

Smile not only depends on the shape size and colour of the teeth but also the architecture of the gingival tissue which plays an important role in determining the final restorative outcome.<sup>[1]</sup> One of the most challenging part in dentistry is the restoration of insufficient crown structure. Prior to restoring any tooth considering the biologic width, which is the space occupied by the junctional epithelium and connective tissue attachment coronal to the alveolar crest is mandatory. If biologic width is not preserved the periodontium may develop problems with respect to plaque control, increase probing depths, a swollen cyanotic appearance and alveolar bone loss.<sup>[2],[3],[4]</sup>

In instances such as inadequate clinical crown length, subgingival caries or fracture, unequal gingival heights crown lengthening procedures become necessary. Clinical crown lengthening is a periodontal resective procedure aimed at partial removal of supporting periodontal tissues to increase exposure of coronal tooth structure. It serves a dual purpose of maintaining function as well as enhancing esthetics.<sup>[5]</sup> The advent of laser (Laser is an acronym for Light Amplification by Stimulated Emission of Radiation)<sup>[6]</sup> technology has become increasingly utilized in various dental procedures. Crown lengthening and other gingival procedures using laser ablation is considered to be an effective, and more reliable in the present times.<sup>[7],[8]</sup>

### II. Case Report

A 48 year old female patient reported to the Department of Periodontics, for crown lengthening in the maxillary anterior area. Examination revealed inadequate crown height w. r. t 11, 12 and 13 ( Figure1 and figure 2). Maynard and Wilson recommended that atleast 3 mm of attached gingiva should be present prior to any restorative therapy.<sup>[9]</sup> On clinical examination the amount of attached gingiva was found to be adequate and 4 mm of tissue was present coronal to the bone crest. Hence only soft tissue reduction (gingivectomy) procedure was planned. Topical lignocaine anaesthetic gel, was applied for five minutes prior to laser surgery. Crown lengthening was performed using Soft tissue diode Laser (wavelength of 810 nm). The procedure was first performed on the labial gingiva w r t 11 12 and 13 region using the laser fibre tip (400 µm in diameter) in contact mode with a power set at 1.2 W, with continuous pulse mode. Ablation was performed using light brushing strokes and the tip was kept in continuous motion. The palatal aspect and the Interdental papilla wrt 11 12 and 13 were simultaneously recontoured to recreate normal contour. Following which a desired architecture of marginal gingival was achieved (Fig 3 and 4). High-volume suction was used to evacuate the laser plume. Patients reported no bleeding or pain during surgery (Fig 3 and Fig 4). One week, post operatively healing was uneventful (Fig 5 and Fig 6).

**Figures**



“Fig 1: labial view : insufficient crown height wrt 11 12 13.”



“Fig 2: palatal view; insufficient crown length wrt maxillary right anterior”



“Fig 3: immediately post laser treatment, labial view”



“Fig 4: immediately post laser treatment , palatal view”



“Fig 5: labial aspect one week post laser treatment”



“Fig 6: palatal aspect one week post laser treatment”

### **III. Discussion**

The concept of crown lengthening was first introduced by D.W. Cohen in 1962. Surgical crown lengthening procedure is done to increase the clinical crown length without violating the biologic width. It includes the removal of either only soft tissue or both soft tissue as well as alveolar bone. Reduction of soft tissue alone (gingivectomy) is indicated if there is adequate attached gingiva and more than 3 mm of tissue coronal to the crest of the bone. In case of inadequate attached gingiva, less than 3mm of soft tissue coronal to the crest of the bone a flap procedure along with bone recontouring is required . In our case since there was adequate amount of attached gingival, only a gingivectomy procedure was planned . The dentist can accomplish tissue excision via gingivectomy by means of a scalpel, an electrosurgery, or a laser. Scalpel assisted surgical techniques, predispose to unpleasant bleeding during surgery.<sup>[11]</sup> Laser was first developed by Maiman <sup>[12]</sup>, a scientist using ruby crystal that emits a coherent radiant light when stimulated by energy. Laser assisted ablation of tissue resulted in adequate exposure of tooth structure along with minimal bleeding.<sup>[13], [14]</sup> . Diode lasers are well absorbed by melanin , hemoglobin and other chromophores and aid in treatment of soft tissues.<sup>[15]</sup> They cause minimal damage to periosteum, bone and underlying structures the rate of healing is faster as

compared to the scalpel. Also, resultant inflammation is less as the ablation effect of laser, seals off blood vessels of smaller diameter.<sup>[11]</sup> Laser aids in achieving hemostasis<sup>[16]</sup> minimal scarring, less operative and post-operative pain.<sup>[17], [18]</sup> increased patient acceptance<sup>[19]</sup> in comparison to conventional scalpel surgeries.

#### IV. Conclusion

The goal of surgical crown lengthening is to provide sufficient clinical crown to permit optimum restoration of a tooth. Since the advent of Laser therapy they have been alternative or adjunctive to conventional techniques for various periodontal surgical procedures. Soft tissue diode lasers are considered to be far more superior in terms of ablation, hemostasis along with less operative and post-operative pain.

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