

## Comparison between Laser, Electrocautery and Scalpel in the Treatment of Drug-Induced Gingival Overgrowth: A Case Report

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Drug-induced gingival overgrowth (DIGO) is a well-recognized, unwanted side-effect associated with three major drug groups - anticonvulsants, immunosuppressants and the calcium channel blockers. The prevalence of this unwanted side effect is 25-80% and is also dependent on other factors such as type of drug, dosage, duration of treatment, genetic predisposition, and patient's oral hygiene maintenance. Three different treatment modalities *viz.*, scalpel, laser, and electrocautery can be used for treating DIGO. Each method carries its own merits and demerits. In the present case report, these three different treatment modalities are used in the same patient in order to compare their handling properties and effect on initial wound healing. Though scalpel remains to be gold standard treatment, use of laser finds some more advantages over the electrocautery for treatment of DIGO.

**Keywords:** Drug-induced gingival overgrowth, Electrocautery, Gingivectomy, Laser, Scalpel

### INTRODUCTION

Drug-induced gingival overgrowth (DIGO) is a well-recognized, unwanted side-effect associated with three major drug groups - anticonvulsants, immunosuppressants, and the calcium channel blockers. The prevalence of this unwanted side effect is 25-80% and is also dependent on other factors such as type of drug, dosage, duration of treatment, genetic predisposition, and patient's oral hygiene maintenance.<sup>1</sup>

Treatment of DIGO consists of phase one therapy (SRP) and drug substitution for 6-12 months.<sup>2</sup> Gingival overgrowth persisting after the drug substitution and hampering with esthetic, oral hygiene maintenance and function requires surgical correction. Different treatment modalities that can be used for gingivectomy includes scalpels, laser, electrosurgery, and chemosurgery.<sup>3</sup> The most commonly used surgical approach for gingivectomy is with the use of a scalpel.<sup>3-5</sup>

Electrosurgery has been used since 1928 in dentistry for soft tissue procedures like gingivectomy, gingivoplasty, soft tissue growth excision, crown lengthening etc., The main advantage of the electrocautery is coagulative effect that provide bloodless area and clear view of the operative field. With any device that creates thermal energy to cut or ablate tissue, heat may be dissipated by diffusion into adjacent tissues (conduction), or into the circulating blood (convection). The resulting lateral thermal injury to tissues may result in delayed healing and increased risk of wound dehiscence.<sup>6</sup>

Recently introduced diode lasers are highly absorbable by melanin and hemoglobin allows soft-tissue manipulations such as gingival recontouring, operculectomy, or frenectomy accompanied by improved epithelization and wound healing.<sup>7,8</sup> The incision depth of laser ranges from 2 to 6 mm.<sup>3</sup> Heat produced during use of laser causes coagulation, protein denaturation, drying, vaporization, and carbonization at the site of the energy absorption. This seal blood vessels and inhibit pain receptors at the incision location.<sup>5</sup> Therefore, using diode lasers might be advantageous because of better control, potentially lower pain and inflammation, and improved wound healing.<sup>5,7,9</sup>

### CASE REPORT

A 46-year-old male patient reported to the Department of Periodontics, Nair Hospital Dental College, Mumbai

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with the chief complaint of swollen and bleeding gums. History revealed that initially the gingival overgrowth was minimal in size, and gradually it increased to reach up to present size. Patient was suffering from epilepsy and was under medication phenytoin sodium (eptoin) since last 10 years. On intra-oral examination, Grade-III<sup>10</sup> generalized diffuse gingival enlargement was seen. History of phenytoin sodium drug, lead to the diagnosis of DIGO.

Phase I therapy was carried out for 2 months consisting ultrasonic scaling biweekly, oral hygiene instruction, and 0.2% chlorhexidine mouthwash twice a day for 2 weeks. Phenytoin was substituted with valproate. 6 months after drug substitution; there was marked a decrease in gingival inflammation and size of overgrowth was decreased to some extent. In spite of the reduction in size of the overgrowth, it was still causing difficulty in oral hygiene maintenance (Figure 1). Hence, surgical phase of gingivectomy was planned.

In order to compare the handling property and initial post-operative healing gingivectomy was carried out on the same day with scalpel in first quadrant (Figure 2), using electrocautery in third quadrant (Figure 3) and with diode laser in fourth quadrant (Figure 4). Periodontal pack was placed (Figure 5) and patient was evaluated after 7 days to assess initial wound healing.

### RESULTS

Healing after 7 days Figure 6 shows that healing with scalpel was best among all three with minimal

inflammation, even healing and well-epithelized surface was seen clinically. Healing with electrocautery was worst among all with uneven healing and incomplete surface epithelization. Healing with laser was better than electrocautery.

### DISCUSSION

In comparing the handling properties between scalpel, laser, and electrocautery, it was observed that scalpel has advantages of ease of use, precise incision with well-defined margins, relatively fast and uneventful healing, no unwanted lateral tissue damage can be used to bone proximity and economic. Disadvantages of scalpel are need of anesthesia, excessive bleeding, inadequate visibility caused by blood in the operating field, non-sterilized incision cut.



Figure 1: Pre-operative clinical picture after completion of phase 1 therapy



Figure 2: Gingivectomy using scalpel



Figure 3: Gingivectomy using electrocautery

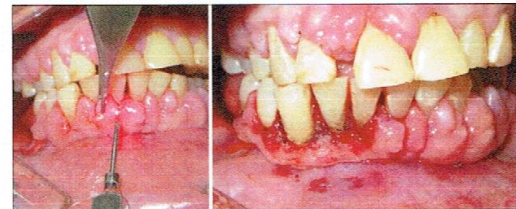


Figure 4: Gingivectomy using laser



Figure 5: Periodontal dressing applied



Figure 6: Initial healing after 7 days

Advantage of electrocautery observed is, the electrode cuts on its side as well as on its tip, angulated electrode meets the clinical need, cuts are made with ease when the device is set correctly, hemostasis is immediate and consistent, the wound is nearly painless and the tip is self-disinfecting. Disadvantages of electrocautery include need of anesthetic agent for cutting, unavoidable burning-flesh odor, low tactile sense, does not allow for their use around implants, bone can be damaged, dangerous in an explosive environment, contraindicated in pacemakers, poor postoperative healing who have undergone irradiation, diabetes or blood dyscrasias.

Laser was found advantageous in that minimal or no anesthetic is required no, harm to dental hard tissues. Their judicious use does not injure the dental pulp, because of low or no heat production and can be used around dental implants. Diode lasers have several advantages when compared to scalpel surgeries. They are compact and portable in design with efficient and reliable benefits for use in soft tissue oral surgical procedures. Laser assisted surgeries are easy to perform with less discomfort, minimal or no bleeding due to sealing of capillaries by protein denaturation and stimulation of clotting factor VII production, shorten healing time with reduced postoperative bleeding and oedema.<sup>11</sup>

Histologically, laser wounds have been found to contain significantly lower number of myofibroblasts,<sup>12</sup> resulting in less wound contraction and scarring, and ultimately improved healing. Diode laser seems promising in reducing postoperative bleeding and pain of patients needing cosmetic surgeries.<sup>13</sup> They are antimicrobial and remove endotoxins from root surfaces. On the other hand disadvantages of laser includes eye damage by laser light, so protective glasses are required. Cutting is slower than that with electrosurgery with burning flesh odor. Working area should free of combustible gases. During

laser use, laser plume requires use of a high-filtration face mask.

Assessment of initial healing after 7 days revealed that healing of the quadrant operated by scalpel was best among all. Laser operated healing was better than electrocautery.

Delayed healing in case of laser and electrocautery can be attributed to damage produced by lateral heat. Lateral heat damage is the area of coagulation necrosis produced around the incision line due to unwanted heat production. Histologically, it was found that lateral heat damage in case of laser is 28.3-98  $\mu\text{m}$ ,<sup>14</sup> and that in case of electrocautery is 0.12-0.31 mm wide.<sup>15</sup> Factor affecting lateral heat damage is as follow. Size and type of electrodes - thicker the electrode, the greater the amount of lateral heat. Type of waveform - the partially rectified waveform - produces much more lateral heat. Cutting time - ideal cutting time should be 7 mm/s and time interval of 10-15 s should elapse to dissipate the heat.<sup>16</sup> Surface tissue condition - tissue surface must be moist to allow heat dispersal. Decrease in lateral heat production will improve the healing.

## CONCLUSION

Laser and electrocautery have the upper hand over the scalpel in relation to hemostasis, but also have demerits like lateral heat damage, delayed wound healing, skill of the operator and higher cost. Laser has advantage over electrocautery such as less lateral heat damage, better wound healing, and can be used in close proximity to bone as compared to electrocautery.

Although advanced treatment modality like laser and electrocautery have advantages over the scalpel, they have many disadvantages in relation to lateral heat damage and delayed tissue healing. Thus, conventional scalpel treatment could be a better option in terms of precise incision line, faster healing at much lower cost and seems to be beneficial for routine surgical procedures like gingivectomy.

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