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Gingival Depigmentation with Sequential Healing Assessment and Electrosurgical Crown Lengthening to Restore Gingival Aesthetics: A Case Study

Abstract

The condition of the surrounding gingival tissues is just as important to an aesthetically pleasing smile as the shape and alignment of the teeth. A combined periodontal strategy is frequently required to obtain the best pink aesthetics since changes in gingival pigmentation and excessive gingival tissue coverage can negatively impact smile harmony. There are still few reports detailing the concurrent use of electrosurgery to treat these disorders. In the maxillary anterior esthetic region, a 23-year-old female patient had diminished clinical crown dimensions and diffuse physiologic gingival melanin hyperpigmentation. Electrosurgical crown lengthening and gingival depigmentation were carried out in one surgical procedure after the initial periodontal therapy was finished. In order to assess healing and the stability of the aesthetic result, the postoperative tissue response was recorded immediately following surgery as well as during follow-up appointments three days, seven days, fourteen days and three months later.

By removing apparent pigmentation and creating more balanced gingival contours with better clinical crown proportions, the combination surgery resulted in a discernible improvement in gingival appearance. Over the course of the monitoring period, there was no clinically noticeable repigmentation, stable gingival margins and increasing soft-tissue maturation. The positive clinical outcome was reflected in the patient's high degree of satisfaction with the final aesthetic outcome.

For patients who report with several gingival esthetic issues, this case demonstrates the therapeutic benefit of combining electrosurgical crown lengthening with gingival depigmentation in a single treatment session. The method showed good healing, predictable soft-tissue stability and significant improvement in pink aesthetics within the constraints of a single-case report, supporting its consideration as a workable therapeutic option in suitably chosen situations.

INTRODUCTION

The harmonic interplay between the teeth, gingiva, and surrounding facial features is more important for a beautiful smile than the teeth's appearance alone. The field of aesthetic dentistry has grown in recent years to acknowledge the significance of the dentogingival complex in producing a beautiful smile, going beyond the restoration of white aesthetics. The gingiva's shape, symmetry, texture and color all have a big impact on how the dentition is framed and how people perceive the overall beauty of a smile.¹

Consequently, the concept of pink aesthetics has become an essential component of contemporary periodontal care. Gingival architecture that is healthy and well-contoured considerably improves dental aesthetics and facial appearance. Two typical causes affecting gingival aesthetics are excessive gingival tissue coverage and diffuse melanin darkening. Excessive pigmentation may be viewed as unsightly, especially in people with a high smile line, even though physiologic gingival pigmentation is a typical observation caused by melanin deposition within the basal epithelial layer. The apparent clinical crown length can also be decreased by increased gingival tissue coverage and changed gingival shapes, giving the appearance of small teeth and upsetting the equilibrium between the teeth and the surrounding soft tissues.²

Comprehensive aesthetic rehabilitation is becoming more and more important in modern periodontal plastic surgery, as opposed to treating specific soft-tissue problems. In addition to increasing clinical effectiveness, treating several gingival issues at once can result in a more harmonious and natural-looking final product. In addition to reducing the number of surgical procedures, this integrated technique makes it easier to construct stable dentogingival architecture with positive biologic and aesthetic outcomes.³

Because electrosurgery can give precise tissue incision, great hemostasis, and better operative vision, it has garnered renewed interest as an effective method for periodontal soft-tissue therapy. Because of these features, it is especially helpful for treatments that call for precise gingival recontouring. Additionally, by carefully removing the pigmented epithelium, electrosurgery can be used to treat gingival depigmentation, enabling both

treatments to be finished in a single surgical session. Its use in periodontal aesthetic operations has been further validated by shorter operating times, positive patient acceptance and excellent healing.^{4,5}

This case study details the utilization of a single-stage electrosurgical procedure to treat a young female patient's diffuse physiologic gingival hyperpigmentation linked to decreased clinical crown dimensions. Gingival depigmentation and aesthetic crown lengthening were done in the same surgical session and postoperative healing was recorded at subsequent follow-up appointments. The positive clinical result in this instance shows how this combination strategy can improve overall smile aesthetics, remove pigmentation and improve gingival architecture while preserving predictable soft-tissue recovery.

CASE PRESENTATION

A 23-year-old systemically healthy female presented to the Department of Periodontology with the chief complaint of dark discoloration of the gingiva and dissatisfaction with the esthetic appearance of her smile. She reported that the generalized gingival pigmentation, together with the relatively short appearance of her maxillary anterior teeth, had become a cosmetic concern and adversely affected her confidence while smiling and interacting socially.

The connected gingiva and interdental papillae of the maxillary and mandibular anterior regions were found to have diffuse physiologic melanin darkening upon intraoral inspection. The maxillary anterior teeth had an unfavorable dentogingival relationship and a shorter clinical crown length due to the increased gingival tissue covered. The overall aesthetics of the smile were impaired by the combination of gingival pigmentation and changed crown dimensions. The patient was a suitable candidate for periodontal aesthetic surgery because the gingival tissues were clinically healthy and showed no symptoms of irritation. Comprehensive pink aesthetic rehabilitation was planned by combining gingival depigmentation and esthetic crown lengthening in a single surgical surgery after the available treatment options were discussed and informed consent was obtained (Fig. 1)



Fig.1:- Diffuse physiologic gingival melanin darkening and decreased clinical crown dimensions linked to excessive gingival tissue covered are seen in the preoperative clinical examination.

After Phase I periodontal therapy was finished, an electrosurgical unit was used to perform surgery under local anesthetic (Fig. 2). The initial phase of treatment involved esthetic crown lengthening to correct the gingival zeniths, establish

harmonious gingival contours and increase the apparent clinical crown length. The pigmented epithelial layer was then meticulously removed using regulated electrosurgical strokes to reveal a homogenous connective tissue surface. This process was known as gingival depigmentation. The clinically noticeable pigmentation was completely removed while taking care to maintain the underlying tissue architecture (Fig. 3)



Fig.2:- Gingival depigmentation and esthetic crown lengthening are accomplished with an electrosurgical equipment



Fig.3:- Clinical image showing electrosurgical tissue recontouring during gingival depigmentation and crown lengthening

Following surgery, the clinically noticeable gingival pigmentation was completely removed and the gingival contours and clinical crown proportions were corrected. Effective hemostasis kept the surgical field dry, enabling accurate soft-tissue recontouring and unobstructed visibility throughout the process. Tissue margins appeared well adapted and the immediate postoperative appearance indicated favorable execution of the combined electrosurgical approach. (Fig. 4)



Fig.4 :- Following electrosurgical crown lengthening and gingival depigmentation, the immediate postoperative appearance showed better gingival architecture and total eradication of the pigmented epithelium

Postoperative healing was assessed through serial clinical follow-up examinations. At the 3-day review (Fig. 5), the surgical site demonstrated satisfactory early healing with fibrin deposition and mild inflammatory changes, findings

consistent with the normal healing process. Epithelialization had advanced by the 7-day follow-up (Fig. 6), with a discernible decrease in tissue inflammation and adequate wound healing. Throughout the healing process, the patient maintained proper dental hygiene and reported little discomfort following surgery. The gingival tissues demonstrated significant maturation at the 14-day examination (Fig. 7), with enhanced tissue texture, a healthy clinical appearance and the restoration of normal shape. Without any signs of infection, delayed wound healing or other postoperative problems, the surgical site showed adequate healing.



Fig.5 :- Three days following surgery, a clinical photo was taken to demonstrate early wound healing and fibrin deposition across the treated area



Fig.6:- Clinical photograph at the 7-day follow-up showing progressing epithelialization and satisfactory soft-tissue healing.



Fig.7:- Fourteen-day postoperative clinical view demonstrating continued soft-tissue maturation with restoration of normal gingival contour.

At the 3-month follow-up (Fig. 8), the surgical site demonstrated stable and satisfactory esthetic outcomes. The gingival tissues appeared healthy, with well-defined scalloping, stable gingival margins, and favorable clinical crown proportions.

The treated areas blended well with the surrounding tissues, resulting in an overall improvement in smile esthetics. Clinical examination revealed no evidence of delayed healing, postoperative complications, or visible gingival repigmentation during the follow-up period. The patient expressed satisfaction with the treatment outcome and reported increased confidence while smiling.



Fig.8:- Clinical photograph at the 3-month follow-up showing healthy gingival tissues, stable gingival margins, improved clinical crown proportions and no visible gingival repigmentation.

Patient satisfaction was evaluated using a Visual Analog Scale (VAS; 0 = completely dissatisfied, 10 = completely satisfied). The patient assigned a score of 10/10, indicating complete satisfaction with the esthetic outcome and a noticeable improvement in smile confidence (Fig. 9)

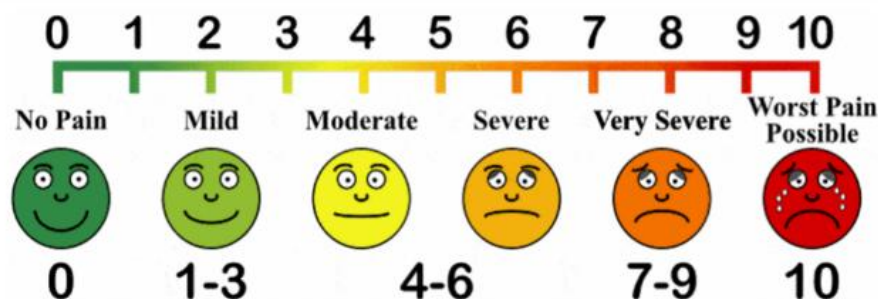


Fig.9:-Visual Analog Scale

Patient satisfaction was evaluated using a Visual Analog Scale (VAS; 0 = completely dissatisfied, 10 = completely satisfied). The patient assigned a score of 10/10, indicating complete satisfaction with the esthetic outcome and a noticeable improvement in smile confidence.

Table 1. Sequential Clinical Healing Assessment Following Simultaneous Electrosurgical Esthetic Crown Lengthening and Gingival Depigmentation

Follow-up Period	Clinical Findings
Immediate postoperative	Complete removal of clinically visible gingival pigmentation, improved gingival contours, increased clinical crown dimensions and satisfactory hemostasis.
3 days	Initial healing response characterized by fibrin deposition and a mild inflammatory reaction.
7 days	Continued epithelialization with a noticeable reduction in postoperative inflammation.
14 days	Further soft-tissue maturation with restoration of gingival contour and tissue texture.
3 months	Healthy gingival appearance with well-defined scalloping, stable gingival margins, improved crown proportions and no clinically evident repigmentation.

DISCUSSION

The result in this case underscores the fact that when evaluating smile esthetics, those involved with such assessments should examine the gingiva as a component

of nature smile esthetic rather than simply a supporting structure for the teeth. The smile is an intricate mechanism that includes many related elements including tooth display, gingival contour, soft-tissue symmetry and finally gingival coloration. Thus, successful esthetic rehabilitation needs an approach that simultaneously considers these components instead of treating each individual discrepancy in isolation.⁶

The sequential assessment of soft-tissue healing and aesthetic changes during the postoperative period was a significant aspect of the current instance. Clinical observations showed progressive improvement in gingival appearance and gradual tissue maturation from the immediate postoperative stage to the three-month follow-up. The transition from the initial surgical wound to a stable, well-contoured gingival architecture reflected the normal healing potential of periodontal tissues following controlled soft-tissue procedures.

The esthetic improvement achieved in this patient was associated with the combined effect of gingival depigmentation and esthetic crown lengthening. Gingival depigmentation addressed the concern of excessive pigmentation and improved tissue color uniformity, whereas crown lengthening contributed to better clinical crown proportions, correction of gingival contours and improved gingival zenith positioning. The simultaneous correction of these factors helped establish a more balanced relationship between the teeth and surrounding gingival tissues.⁷

The favorable tissue response observed during follow-up may also be related to the advantages offered by electrosurgical soft-tissue management. The ability to perform controlled tissue removal with effective hemostasis and clear visualization allowed precise gingival recontouring during the procedure. Subsequent healing was characterized by progressive soft-tissue maturation, improvement in tissue appearance and maintenance of stable gingival margins.⁸

Beyond the clinical changes, improvement in smile esthetics may have an important influence on patient perception and confidence. Self-expression and social interaction are directly linked to the smile, and self-confidence can be impacted by gingival appearance dissatisfaction. The patient's total contentment with the course of therapy in this instance indicates that periodontal aesthetic therapies may offer advantages that go beyond quantifiable clinical measures. Therefore, evaluating patient-reported results ought to be regarded as a crucial part of aesthetic periodontal therapy.

The current instance also illustrates the growing significance of periodontology in contemporary aesthetic dentistry. Modern periodontal therapy uses predictable surgical techniques to improve the look of soft tissues in addition to preserving periodontal health. Electrosurgery offered a workable way to improve the overall aesthetic balance of the smile by treating gingival pigmentation and changed crown proportions in a single treatment approach.¹⁰

However, the limitations of this report should be taken into account when interpreting its findings. The findings cannot be applied to all clinical settings because this is a single-case report. Furthermore, it is difficult to

measure long-term stability because to the comparatively short follow-up period and the absence of standardized esthetic assessment indicators. To further demonstrate the predictability of this strategy, greater sample sizes, longer observation times, and objective aesthetic rating techniques are needed in future clinical trials.

Overall, this example shows that careful integration of gingival shape, tissue pigmentation and crown proportions is necessary for successful pink aesthetic rehabilitation. Gingival depigmentation and electrosurgical crown lengthening together produced stable aesthetic improvement, satisfactory soft-tissue healing, and high patient acceptance, indicating that this strategy might be a helpful choice for carefully chosen patients with several gingival esthetic issues.

CONCLUSION

This single-case report offers suggestive evidence that combination electrosurgical esthetic crown lengthening and gingival depigmentation may produce favourable soft-tissue healing and smile esthetics within the limitations of this study. Precision approaches to gingival pigmentation, contour and clinical crown proportions have resulted mostly in better dentogingival relationship and ultimately acceptable esthetic results. Longitudinal clinical follow-up showed progressive tissue maturation with stable gingival appearance, indicating that electrosurgical soft-tissue therapy may be a viable option when managing selected patients requiring extensive pink esthetic rehabilitation.

Conflict of Interest -Regarding this publication, there are no conflicts of interest.

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