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Research Article

COMPARING ELECROCAUTERY AND SCALPEL FOR SOFT TISSUE CROWN LENGTHENING PROCEDURE: A CLINICAL STUDY

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A B S T R A C T

Aim: To assess the clinical effectiveness of electrocautery for functional crown lengthening procedure and to compare it with the conventional procedure using the scalpel.
Methods and Methodology: 20 patients including males and females, aged 20- 70 years were recruited and divided into two groups to undergo crown lengthening either with the scalpel or electrocautery. The data obtained was analyzed for intergroup comparison using mann-whitney u test.
Result: Analysis of the intergroup results for healing index between scalpel and electrocautery showcased that there was no statistically significant difference ($P<0.002$) after 1 week ($P<0.8$).
Conclusion: Crown Lengthening is a surgical procedure that requires exposure of adequate tooth structure for restorative procedures. The cases discussed here have been treated with both scalpel and electrocautery techniques and post-operative healing was assessed using healing index given by Landry, Turnbull and Howley. Within the limitations of this present clinical study electocautery can be an alternative to scalpel for an effortless and minimally invasive soft tissue restorative crown lengthening procedure.

INTRODUCTION

Clinical crown lengthening refers to procedures designed to increase the extent of supragingival tooth structure for restorative or aesthetic purposes[4]. DW Cohen (1962) gave the concept of crown lengthening[5]. Clinical crown lengthening is performed to achieve margins on sound tooth structure, maintenance of the biologic width, access for impression techniques, and esthetics[7].

Crown lengthening procedure is accomplished either by the use of a scalpel, electrocautery or more recently by the use of lasers (Allen, Wagenberg, Bashetty, McGuire, & Lagdive, 1993; Kalsi, Hussain, & Darbar, 2015). Based on the biological, functional, and aesthetic requirements of each particular case, best treatment decision has to be made[4]. Excising soft tissue with scalpel is the most commonly used technique for aesthetic crown lengthening[7]. Scalpel has many advantages like ease of use, low cost and relatively fast and uneventful healing[4]. But all the practitioners are aware about the negative effects of the scalpel crown lengthening which include excessive bleeding and obstruction of visibility caused by blood in operative field[4].

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So to overcome these disadvantages, electrocautery has been used routinely in various aspects of medical field including dentistry since 1914[7]. Electrocautery has been defined as the intentional passage of high frequency wave form or currents, through the tissue of the body to achieve a controllable surgical effect[2].

Periodontal wound healing always begins with a blood clot in the space maintained by the closed flap after suturing. In the early inflammation phase of wound healing, inflammatory cells are attracted by platelet and complement derived mediators and aggregate around the blood clot. While polymorphnuclear neutrophil granulocytes (PMNL) dominate initially, monocytes and macrophages emerge within the first days. The blood clot also provides a provisional matrix for cells originating from the surrounding tissues (i.e., gingiva, periodontal ligament (pdl), cementum, and alveolar bone). Thus, gingival fibroblasts, endothelial cells, osteoblasts, and special fibroblast populations originating from the pdl proliferate into the wound area. Wound healing progresses consequently through several phases from inflammation to cell proliferation and matrix formation and repair; then, these stages are followed by remodelling and maturation.

Hence, our present clinical study was designed to assess the clinical effectiveness of electrocautery for functional crown lengthening procedure and to compare it with the conventional

procedure using the scalpel based on healing index given by Landry, Turnbull and Howley.

MATERIALS AND METHODOLOGY

Twenty patients including males and females, aged 20-70 years were screened and recruited who reported to the department of Periodontics, Faculty of dental sciences, RUAS, Bangalore. Systemically healthy patients with adequate attached gingiva and inadequate tooth structure were included in the study. Medically compromised patients, heavy smokers, pregnant and lactating patients and patients who previously underwent any surgical procedures in the same area were excluded from the study. Crown lengthening procedure was properly explained to the patients and a signed informed consent was taken from them. Patients were divided into two groups through a computer generated randomization. Group A-comprising of ten patients who underwent electrocautery crown lengthening procedure and Group B-comprising of ten patients who underwent conventional scalpel surgical procedure. Prior to the crown lengthening procedure, patients received professional cleaning of their teeth and necessary oral hygiene instructions were given for proper maintenance of oral hygiene. Post operative healing index given by Landry, Turnbull and Howley was recorded after a week.

RESULTS

20 patients had completed the follow up who had enrolled for the study. Patients were recalled on the 7th day for evaluation of healing index scores. Intergroup comparison of healing index scores after 1 week between scalpel group and electrocautery group is summarized in Table 1.

Table 1 Intragroup comparison of healing index scores after 1 week between scalpel group and electrocautery group (intergroup comparison)

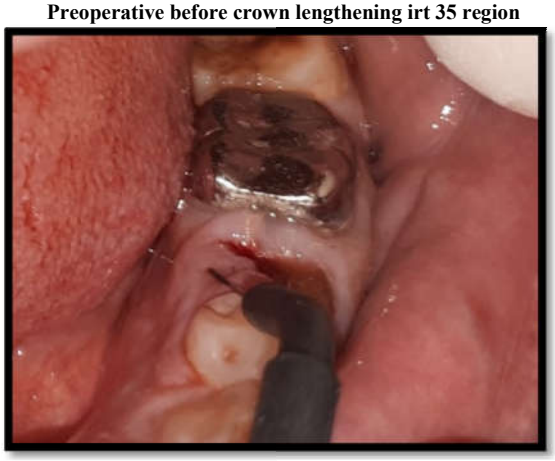
Comparison of healing index scores between 02 groups after 1 week using Mann Whitney U Test					
Time	Groups	N	Mean	SD	P-Value
30 Min	Group A	10	3.5	0.71	0.8
	Group B	10	3.4	0.55	

Pre operative image before crown lengthening irt 11 region

Photograph showing crown lengthening with scalpel irt 11 region

Post-operative image irt 11 region after 1 week

Preoperative before crown lengthening irt 35 region



Photograph showing crown lengthening with electrocautry irt 35 region

Post-operative after 1 week

Post-operative after after crown placement

Pre operative image before crown lengthening irt 16 region

Photograph showing crown lengthening with electrocautery irt 16 region

Analysis of the intergroup results for healing index between scalpel and electrocautery showed that there was no statistically significant difference (P<0.002) after 1 week (P<0.8)

Post-operative irt 16 region after 1 week

Post operative image after placement of crown

DISCUSSION

Our present clinical study was done to assess the effectiveness of electrocautery compared with the conventional technique for a functional/restorative soft tissue crown lengthening based on healing index given by Landry, Turnbull and Howley. To attain the biologic width conducive for restoration and crown placement, functional crown lengthening procedure involving either a gingivectomy or an open flap surgical technique with resective osseous surgery can be performed.

Table 2 Interpretation of healing index scores

Healing index score	Tissue color	Response to palpation	Granulation tissue	Incision margin	Suppuration
1-Very poor	>= 50% of gingiva red	Bleeding	Present	Not epithelialized, with loss of epithelium beyond incision margin	Present
2-Poor	>= 50% of gingiva red	Bleeding	Present	Not epithelialized, with connective tissue exposed	
3-good	>= 25% and < 50% of gingiva red	No bleeding	None	No connective tissue exposed	
4-very good	< 25% of gingiva red	No bleeding	None	No connective tissue exposed	
5-excellent	All tissues pink	No bleeding	None	No connective tissue exposed	

Matter of choice between gingivectomy and an open flap surgical technique depends upon several factors, one of which is the width of attached gingiva (Hempton, 2010). Our study included only those patients who had a sufficient width of attached gingiva requiring a simple gingivectomy procedure either with the electrocautery or the scalpel.

Both electrocautery and the scalpel techniques resulted in sufficient removal of the gingival tissue with adequate exposure of the tooth structure. In a comparative study of electrosurgical and scalpel wounds, it was observed that healing of electrosurgical wounds was delayed. Electrosurgical wound had more inflammatory response and more tissue destruction. But in both kinds of wounds the viability of osteoblasts was the same, and there was no increase in the osteoclasts which would indicate that no bone resorption had occurred[6]. On the contrary, our study didn't show any clinically significant difference when wound healing between electrocautery and scalpel were assessed which was in accordance with study done by Glickman and Imber[6].

Another study showed that although there is loss of tissue soon after ES, 70 to 100% of the lost tissue is regained over a period of months[7]. In a review on healing of electrosurgical wounds, Williams has shown that many of the reports on electrosurgical wound healing have not mentioned the type of electrosurgical (ES) unit, the waveform, size and shape of electrode used, nor the speed at which electrode was passed over the tissue[8]. Therefore, it is not possible to know whether some of the delayed wound healing was reported was the results of the operators' not having an optimal control of the factors involved in ES or whether ES is actually as damaging as it has been portrayed.

CONCLUSION

Electrosurgery can never completely replace scalpel. Although electrosurgery requires more knowledge and skill, advantages outnumber and outweigh its disadvantages. An electrosurgical unit costs only a small fraction of price of laser unit and can be used to perform many of the soft tissue surgical procedures, being carried out with laser. Within the limitations of this present clinical study electocautery can be an alternative to scalpel for an effortless and minimally invasive soft tissue restorative crown lengthening procedure.

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