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Comparative Assessment of Healing After Labial Frenectomy Using Conventional Scalpel Technique and Electrocautery Method- A Randomised Clinical Trial

Dr. Rohit Prasad, Dr. Ashwini Shivananje Gowda, Dr. Mahantesha S, Dr. Saagar Bhargava, Dr. Minnu Joe Ida, Dr. Sophia T. Johnson*

Corresponding Author: Dr. Sophia T Johnson, Post Graduate, Department of Periodontology, Faculty of Dental Sciences, Ramaiah University of Applied Sciences, Bangalore, 560054

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Abstract

Background: The frenum is defined as a mucous membrane fold which attaches the lip and the cheek to the alveolar mucosa, gingiva, and underlying periosteum. The frenum may hamper gingival health if it is attached too closely to the gingival margin, which can interfere in plaque control or induce a muscle pull. The management of such an aberrant frenum is treated by performing a frenectomy.

Aim: The aim of this study was to assess and compare healing after frenectomy using the scalpel technique and the electrocautery technique.

Methods: Twenty patients were selected from outpatient Department of Periodontology at Faculty of Dental Sciences, Bangalore, Karnataka. Patients were then randomly allotted to group 1 (Scalpel technique), group 2 (Electrocautery Technique). The clinical parameters were assessed at baseline and 1 month. **Results:** Clinically, both groups showed improvement in healing post 1 week and 1 month postoperatively. Though intra operative bleeding was higher in scalpel technique, better healing was seen at 1 week. However, both the groups showed similar healing during 1 month follow up.

Conclusion: Both groups showed positive results, intra operative bleeding was higher in scalpel technique. Better healing was seen in scalpel technique and wound healing was delayed in electrocautery technique.

Keywords: Frenectomy, Electrocautery, Scalpel, Healing Index.

Introduction

A frenum is an anatomic structural entity created by a fold of mucous membrane and connective tissue and at times muscle fibres that connect the lips and cheeks to the alveolar mucosa and/or gingiva and the underlying periosteum [1]. Depending upon the extension of attachment of fibres, frenum has been classified [2] as mucosal, gingival, papillary and papilla penetrating frenum. Clinically, papillary and papillary penetrating frenum are considered to be pathological and have been found to be associated with loss of papilla, recession, diastema and plaque accumulation [3,4]. The irregular/aberrant frenum is detected visually by application of tension over the frenum to see papillary tip blanching or movement due to ischemia or tugging of fibres in the region [5]. In such cases, it is advised to perform a frenectomy for functional reasons and addressing the aesthetic concerns of the patient. There are numerous surgical techniques for excising the labial frenum. Since the procedure of frenectomy was first proposed, a number of variations have been developed. In

most of these procedures, outcomes in terms of aesthetics, haemorrhaging, operative and post-operative comfort to the patient, duration and quality of healing was not considered and these procedures resulted in higher patient discomfort and scar formation [6-8].

A better approach to make the procedure more aesthetically fruitful and less cumbersome for the patient and the dental surgeon, the electrocautery method was introduced. The purpose of this study was to assess and compare healing after frenectomy using the scalpel technique and the electrocautery technique.

Materials and Methodology

Twenty patients were recruited from the Out Patient of Department of Periodontology, Faculty of Dental Sciences, Ramaiah University of Applied Sciences, Bangalore. The patients received oral prophylaxis at the first visit and were recalled after 1 week. The patients were allotted randomly into two treatment groups group A and group B, using the coin flip method. Ethical Clearance and written informed consent from the patients were obtained. The group A and group B underwent frenectomy procedure using scalpel technique and electrocautery method respectively. The subjects underwent frenectomy for periodontal or orthodontic reasons. A frenum was considered abnormal when it was unusually broad or there was no apparent attached gingiva in the midline or the interdental papilla could be stretched by the frenum.

Scalpel technique

The area was anaesthetized, using 2% lignocaine with 1:80000 adrenaline. The frenum was engaged with a haemostat which was inserted into the depth of the vestibule and incisions were placed on the upper and the under surface of the haemostat until the haemostat was made free. The triangular resected portion of the frenum with the haemostat was subsequently removed. A blunt dissection was carried out to relieve the fibrous attachment. The edges of the diamond shaped wound were sutured using 3-0 black silk with interrupted sutures. The area was irrigated with saline solution and covered with a periodontal pack. The pack and the sutures were removed 1 week post-operatively. Patients were followed up for 1 month.

Electrocautery method

The area was anaesthetized, using 2% lignocaine with 1:80000 adrenalines. The frenum was held with haemostat and the electrocautery was used for the excision. Any underlying adhesions to the periosteum was removed, and the remnants of the remaining tissue were removed using sterile gauze dampened with the saline. Sutures, if required, were placed after electrocautery treatment. The sutures and the pack placed were removed 1 week post-operatively. Patients were followed up for 1 month.

Clinical parameters

Swelling of the gingiva [9] was scored as follows:

0 - no swelling,

1 - Moderate swelling,

2 - Pronounced swelling.

The color of the gingiva [9] was recorded as follows:

0 - no redness,

1 - Moderate redness,

2 - Pronounced redness.

Healing index

Landry et al healing index was used to assess the healing at 1 week and 1 month.

1: Very poor

Tissue color (>50% of gingival is red)

Response to palpation- Bleeding

Granulation tissue- Present

Incision margin- not epithelised, with loss of epithelium beyond incision margin

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Suppuration present

2: Poor

Tissue color (>50% of gingival is red)

Response to palpation- bleeding

Granulation tissue- Present

Incision margin- not epithelised, with connective tissue exposed

3: Good

Tissue color (>25% and <50% of gingival red)

Response to palpation- no bleeding

Granulation tissue- absent

Incision margin- no connective tissue exposed

4: Very good

Tissue color (>25% of gingival red)

Response to palpation- no bleeding

Granulation tissue- absent

Incision margin- no connective tissue exposed

5: Excellent

Tissue color (all tissue pink)

Response to palpation- no bleeding

Granulation tissue- absent

Incision margins- no connective tissue exposed

Statistical Analysis

Statistical Package for Social Sciences [SPSS] for Windows, Version 22.0. Released in 2013. Armonk, NY: IBM Corp., was used to perform statistical analyses.Chi square Test was used to compare the presence of gingival swelling, redness and healing index scores between 02 groups at 1 week and 1-month time interval. Wilcoxon signed rank test was used to compare the presence of gingival swelling, redness and healing index scores between 1 week and 1-month time interval in each study group.

The level of significance [P-Value] was set at $P<0.05$.

Results

Swelling of gingiva

In both the groups, there was statistically significant reduction in the swelling of the gingival tissue during 1 week and 1-month post operatively. (Table 1.1). (Graph 1.1)

At 1-week post operatively, the group which received electrocautery method showed high swelling index which was statistically significant. However, there was no statistically significant difference between the two groups at the end of 1-month post operatively. (Table 1.4). (Graph 1.4)

Color of gingiva

In both the groups, there was statistically significant change in the color of the gingival tissue during 1 week and 1-month post operatively. (Table 1.2). (Graph 1.2)

At 1-week post operatively, the group which received electrocautery method showed high color of gingiva index which was statistically significant. However, the colour of the gingiva returned to normal in all the patients at the end of 1-month post operatively. (Table 1.4). (Graph 1.5)

Healing index

Both groups showed statistically significant improvement in the healing during 1 week and 1-month post operatively. (Table 1.3), (Graph 1.3)At 1-week post operatively, the group received scalpel showed better healing which was statistically significant. However, there was no statistically significant difference in the healing index at 1-month post operatively. (Table 1.6). (Graph 1.6).

Discussion

Frenectomy can be performed using various techniques like conventional scalpel technique, with electrocautery or with lasers. In the era of periodontal plastic surgery, more conservative and precise techniques are being adopted to create more functional and aesthetic results [12].

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The increased pain perception associated with the scalpel frenectomy might be attributed to the fact that it is a more intrusive surgical procedure involving blood loss, wide surgical wound and suturing. The sutures also contribute to the discomfort postoperatively since they interfere with regular functions such as speech and intake of food [13]. In comparing the handling properties between scalpel 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 anaesthesia, excessive bleeding, inadequate visibility caused by blood in the operating field, non-sterilized incision cut [14].

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, haemostasis is immediate and consistent, the wound is nearly painless and the tip is self-disinfecting. Disadvantages of electrocautery include need of anaesthetic agent for cutting, unavoidable burning-flesh odour, 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 [14].In the present study, the healing pattern of electrocautery wounds after the seventh day and 1 month was found to be delayed as compared to scalpel wound which reached to statistically significant difference. Delayed healing in case of 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 [15]. These results were similar to the studies carried out by Frame et al. and Buell et al. and in contrast to the literature suggesting delay in healing, when electrocautery is used. The result is also in contrast with Devishree et al. where healing was also comparable with the conventional scalpel technique, without any delay [16]. Need to do suturing was eliminated while treating the patient with electrocautery, which also reduced the risk of post-operative infection. Also, the patient treated with electrocautery didn't experience any pain post operatively. Also, when David et al compared mucosal incisions made by scalpel and electrocautery, he concluded that, on subjective evaluation of ease of use, constant-voltage electrosurgery scored highest ($p < 0.05$) on a scale of 0 to 4, followed by Scalpel. The speed of incisions and excisions, measured in seconds, was also faster for electrosurgery unit as compared to Scalpel [17].

Conclusion

Clinically, both the groups showed improvement in healing post 1 week and 1 month postoperatively. Though intra operative bleeding was higher in scalpel technique, better healing was seen in scalpel technique at 1 week follow up. However, both the groups showed similar healing during 1 month follow up suggesting a delay in wound healing with electrocautery technique. Colour and Swelling of gingiva also did not show any statistically significant differences 1-month post operatively.However, there is a need for further longitudinal studies with larger sample size to establish any efficacy of electrocautery technique over the conventional scalpel technique for frenectomy procedure.

References

1. Henry SW, Levin MP, Tsaknis PJ (1976) Histological features of superior labial frenum. J Periodontol 47: 25-28.
2. Placek M, Miroslavs, Mrklas L (1974) Significance of the labial frenal attachment in the periodontal disease

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in man. Part1; Classification and epidemiology of the labial frenum attachment. J Periodontol 45: 891-894.

3. Dewel BF (1966) The labial frenum, midline diastema and palatine papilla: A clinical analysis. Dent Clin North Am 175-184.
4. Diaz-Pizan ME, Lagravere MO, Villena R (2006) Midline diastema and frenum morphology in the **primary** dentition. J Dent Child (Chic) 26: 11-14
5. Gottsegen R (1954) Frenum position and vestibule depth in relation to gingival health. Oral Surg 7: 1069-1072.
6. Coleton SH (1977) Mucogingival surgical procedures employed in reestablshing the integrity of the gingival unit. The frenectomy and the free mucosal graft Quintessance Int 8: 53-61
7. Kahnberg KE (1977) Frenum surgery. I. A comparison of three surgical methods. Int J Oral Surg 6: 328-333.
8. Ito T, Johnson JD (1994) Color Atlas of Periodontal Surgery. Mosby, Wolfe, London.
9. Hagenaars, S., Louwerse, P. H. G., Timmerman, M. F., Van der Velden, U., & Van der Weijden, G. A.
10. (2004). Soft-tissue wound healing following periodontal surgery and EmdogainR application. Journal of Clinical Periodontology, 31(10), 850–856
11. Glenn A et al. The diode laser as an electrosurgery replacement. C.E. article electrosurgery, 2013, 6-13.
12. John Liboon et al. A Comparison of Mucosal Incisions Made by Scalpel, CO2 Laser, Electrocautery, and Constant Voltage Electrocautery. Otolaryngol Head Neck Surg March 1997; Vol. 116; No. 3 -379-385.
13. Jhaveri H. The Aberrant Frenum. Dr. PD Miller the father of periodontal plastic surgery. 2006:29
14. Sachin Funde, Mala Dixit Baburaj, Sandeep K Pimpale (2015). Comparison between Laser, Electrocautery and Scalpel in the Treatment of Drug-Induced Gingival Overgrowth: A Case Report IJSS Case Reports & Reviews, Vol: 1, Issue: 10, Pages: 27-30.
15. Silverman EB, Read RW, Boyle CR, Cooper R, Miller WW, McLaughlin RM. Histologic comparison of canine skin biopsies collected using monopola electrosurgery, CO2 laser, radiowave radiosurgery, skin biopsy punch, and scalpel. Vet Surg 2007;36:50-6.
16. Devishree et al. Frenectomy: A review with the reports of surgical techniques. J Clin Diagn Res. 2012 November; 6(9): 1587–92.

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Legends Figure and Tables

Table 1.1

Comparison Of Presence Of Gingival Swelling Between 02 Groups At 1 Week And 1 Month Time Interval Using Chi Square Test

Time	Swelling	Scalpel		Electrocautery		P^2 Value	P-Value
		n	%	n	%		
1 Week	No swelling	4	40%	0	0%		
	Moderate	6	60%	4	40%	10.400	0.006*
	Pronounced	0	0%	6	60%		
1 Month	No swelling	10	100%	8	80%		
	Moderate	0	0%	2	20%	2.222	0.14
	Pronounced	0	0%	0	0%		

Table 1.2

Comparison Of Presence Of Gingival Redness Between 02 Groups At 1 Week And 1 Month Time Interval Using Chi Square Test

Time	Redness	Scalpel		Electrocautery		P^2 Value	P-Value
		n	%	n	%		
1 Week	No Redness	4	40%	0	0%		
	Moderate	6	60%	4	40%	10.400	0.006*
	Pronounced	0	0%	6	60%		
1 Month	No Redness	10	100%	10	100%		
	Moderate	0	0%	0	0%	..	..
	Pronounced	0	0%	0	0%		

Table 1.3

Comparison Of Presence Of Gingival Healing Index Scores Between 02 Groups At 1 Week And 1-Month Time Interval Using Chi Square Test

Time	Healing Index	Scalpel		Electrocautery		P^2 Value	P-Value
		n	%	n	%		
1 Week	Very Poor	0	0%	0	0%		
	Poor	0	0%	2	20%		
	Good	4	40%	8	80%	9.333	0.03*
	Very Good	2	20%	0	0%		
	Excellent	4	40%	0	0%		
1 Month	Very Poor	0	0%	0	0%		
	Poor	0	0%	0	0%		
	Good	0	0%	0	0%	0.000	1.00
	Very Good	2	20%	2	20%		
	Excellent	8	80%	8	80%		

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Table 1.4

Comparison Of Presence Of Gingival Swelling Between 1 Week And 1 Month Time Intervals In Both Groups Using Wilcoxon Signed Rank Test

Group	Swelling	1 Week		1 Month		P-Value
		n	%	n	%	
Scalpel	No swelling	4	40%	10	100%	
	Moderate	6	60%	0	0%	0.03*
	Pronounced	0	0%	0	0%	
Electro- cautery	No swelling	0	0%	8	80%	
	Moderate	4	40%	2	20%	0.002*
	Pronounced	6	60%	0	0%	

Table 1.5

Comparison Of Presence Of Gingival Redness Between 1 Week And 1 Month Time Intervals In Both Groups Using Wilcoxon Signed Rank Test

Group	Redness	1 Week		1 Month		P-Value
		n	%	n	%	
Scalpel	No Redness	4	40%	10	100%	
	Moderate	6	60%	0	0%	0.03*
	Pronounced	0	0%	0	0%	
Electro- cautery	No Redness	0	0%	10	100%	
	Moderate	4	40%	0	0%	0.002*
	Pronounced	6	60%	0	0%	

Table 1.6

Comparison Of Presence Of Gingival Healing Index Scores B/W 1 Week And 1 Month Time Intervals In Both Groups Using Wilcoxon Signed Rank Test

Group	Healing Index	1 Week		1 Month		P-Value
		n	%	n	%	
Scalpel	Very Poor	0	0%	0	0%	
	Poor	0	0%	0	0%	
	Good	4	40%	0	0%	0.008*
	Very Good	2	20%	2	20%	
	Excellent	4	40%	8	80%	
Electro- Cautery	Very Poor	0	0%	0	0%	
	Poor	2	20%	0	0%	
	Good	8	80%	0	0%	<0.001*
	Very Good	0	0%	2	20%	
	Excellent	0	0%	8	80%	

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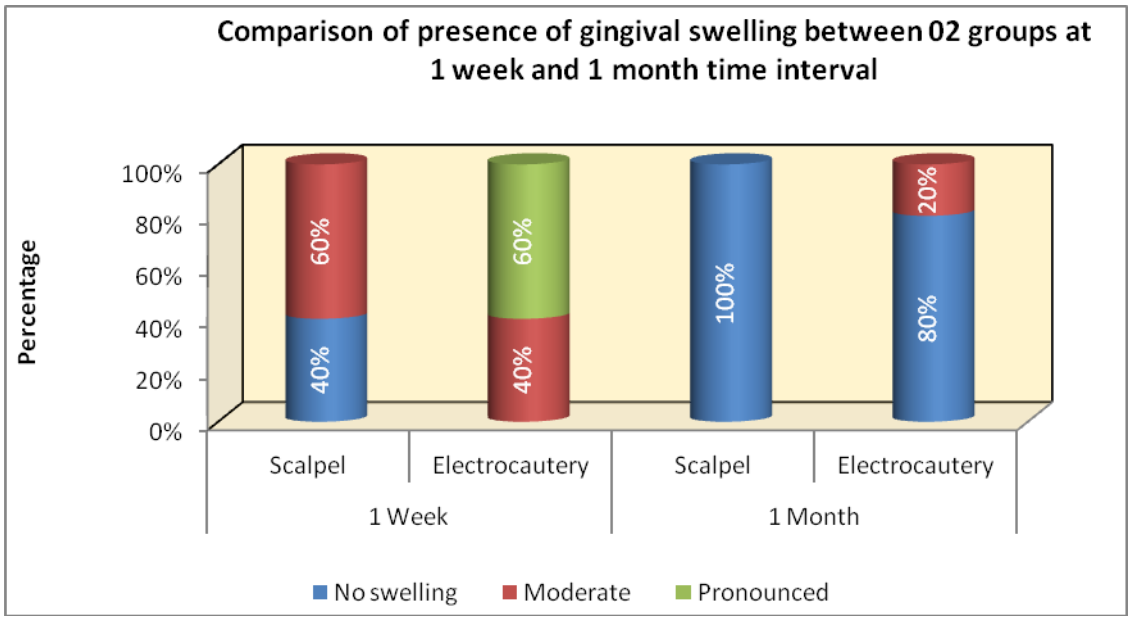
Figure

Fig 1(a): Pre-operative picture

Fig 1(b): Post-operative

Fig 2(a): Pre-operative

Fig 2(b): Post-operative picture



Graph 1.1

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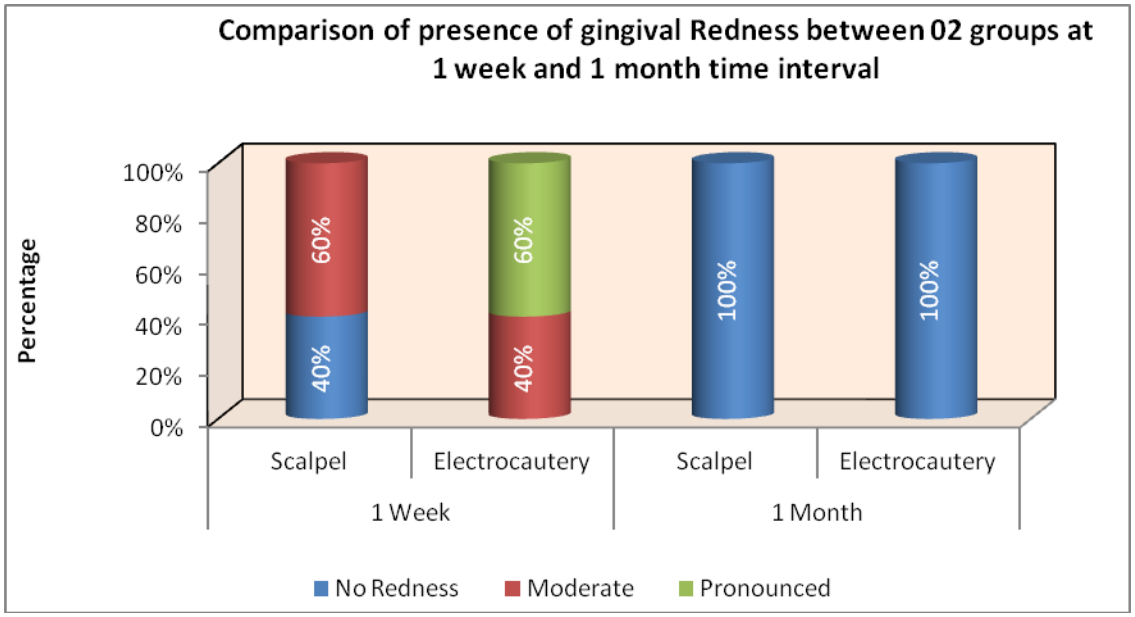
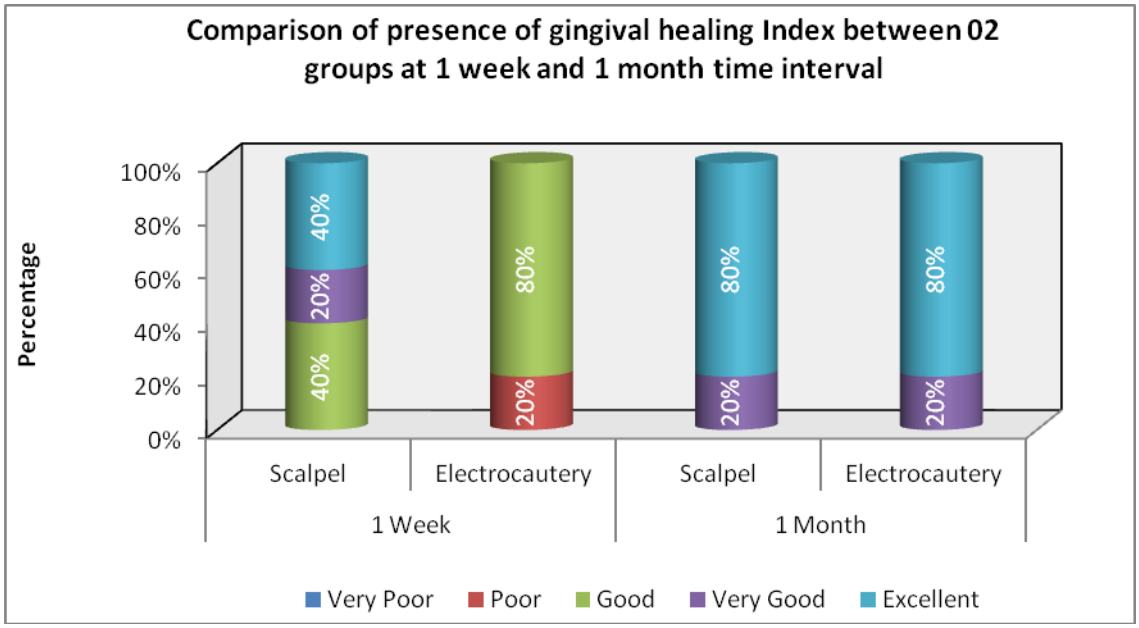


Graph 1.2



Graph 1.3

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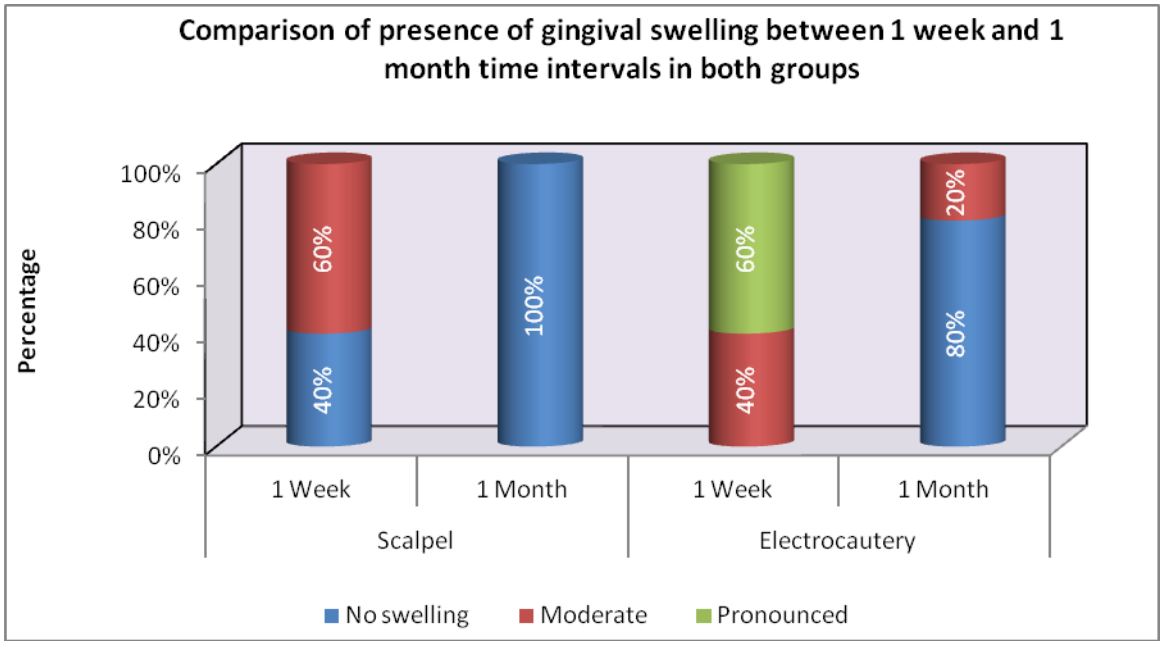
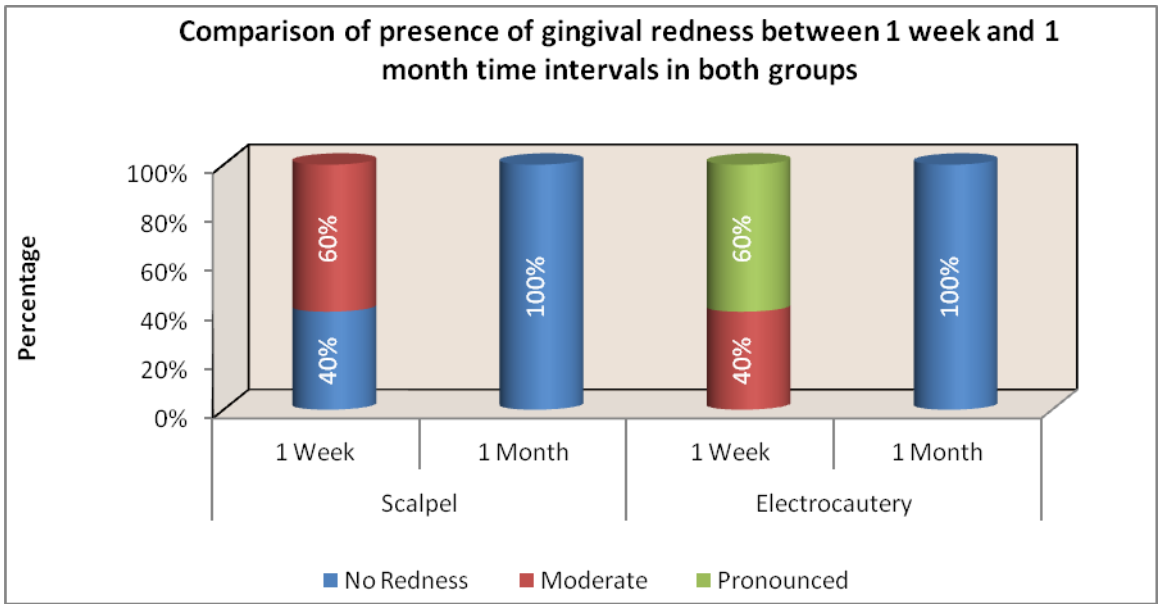


Graph 1.4



Graph 1.5

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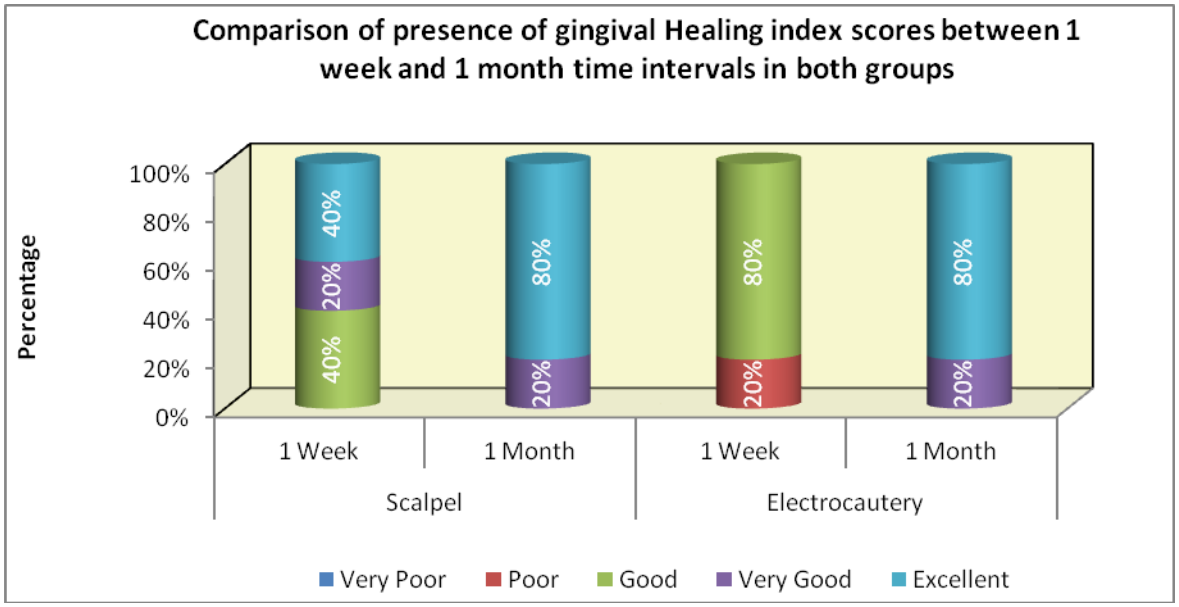

Graph 1.6

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