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Assessment of treatment outcomes after using electrocautery and scalpel blade in separate patients for minor oral surgical procedure: A randomised controlled clinical trail

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Abstract---Context: Conventionally minor oral surgical treatments are done with the use of Bard Parker handle for incising the tissues. The favourability of B.P. handle is its low cost and no extra equipments. Electro surgery has many applications in oral surgery , but it is not widely used. The presence of varying information on electro surgical wound healing might be the reason. Aims: This study aimed to assess and compare the treatment outcomes in minor oral surgery done by

electrocautery and scalpel blade using clinical parameters: Bleeding intraoperatively, Time taken for incision intraoperatively, Pain postoperatively, Healing of the surgical site postoperatively. Methods and Material: Sixty patients between age group ranging 15 to 65 years who reported to Dept of Oral & Maxillofacial surgery, M.G.S. Dental college underwent electrosurgery or scalpel surgery for minor oral surgical procedures under local anaesthesia, were the study subjects. They were randomly and equally divided into two groups. Statistical analysis used: Mann Whitney U test. Results: The results obtained at mean incision time in group A was 5.17 ± 0.52 while in group B it was 4.88 ± 0.54 showing statistical difference ($p < 0.05$), The average bleeding score was lower in group B as compared to group A (2.00 ± 0.00 and 3.00 ± 0.00 respectively). At the first post operative day, the median pain score in group B was higher than Group A (4.00 ± 1.00). Statistically significant difference was observed between groups ($p < 0.05$). However, no significant difference between groups was observed at 2nd and 7th post operative day. Conclusions: From present study, we concluded that electrocautery is better than the stainless steel scalpel in relation to time required for elevation of mucoperiosteal flap and intraoperative blood loss. But electrocautery is inferior to scalpel in relation to wound healing.

Keywords---electrocautery, wound healing, incisions.

Introduction

Electro surgery has been termed as the intentional passage of high frequency waveforms, or currents, through the tissues of the body to achieve a controllable surgical effect. By alternating the mode of application of this type of current, the clinician can use electro surgery for cutting or coagulating soft tissues. When these waveforms pass through the tissues, which are naturally resistant to this high frequency wave forms, intense intracellular heat is produced within the tissues contacted the active electrode tip. This heat volatilizes cells and it leaves a path of cell destruction in the form of incision or surface coagulation. Conventionally, minor oral surgical treatments are done with the use of Bard Parker handle for incising the tissues. The need for hemostasis in highly vascular areas paved a path for the use of electro surgery. The positive benefits of electro surgery include the decreased blood loss, dry and rapid separation of the tissues and a possible reduction of accidental injury caused by scalpel to operative personnel.^{1,3,4}

After reviewing the advantages and limitations of electro surgery over scalpel surgery, this prospective clinical study was done to compare the efficacy of electro surgery versus scalpel surgery in minor oral surgical procedures. The study was aimed to assess and compare the treatment outcomes in minor oral surgery done by electrocautery and scalpel blade using clinical parameters: Bleeding intraoperatively, Time taken for incision intraoperatively, Pain postoperatively, Healing of the surgical site postoperatively^{2,4},

Subjects and Methods

Sixty patients requiring minor oral surgical procedures were examined and clinical diagnosis was made accordingly

For surgical site undergoing electrosurgery, monopolar diathermy was used. The indifferent electrode is a flat steel plate which is put in contact with the patients back, thigh, or buttocks or arm. The active electrode was used to give incisions so that small bleeders get coagulated as cutting occurs. For surgical site undergoing scalpel surgery, surgical procedure was done with scalpel/B.P. blade no. 15

Inclusion and exclusion criteria

Inclusion criteria

- a) Subjects with unremarkable health history
- b) Age group (15 to 65 years)
- c) Subject willingness

Exclusion criteria

- a) Subjects having electric pace maker
- b) Patients with haematological parameters not within normal limits
- c) Subject with concomitant cardiac and neurological disease or hypertension or relevant systemic disease.
- d) Subject on immunosuppressive drugs.

Case Photographs

Group A – Surgical Blade



Fig 1. preoperative intra oral view

Fig 2. incision with flap reflection



Fig 3 suturing

Fig 4 post operative healing

GROUP B –Electrocautery



Fig 1 preoperative intra oral view

Fig 2 incision with flap

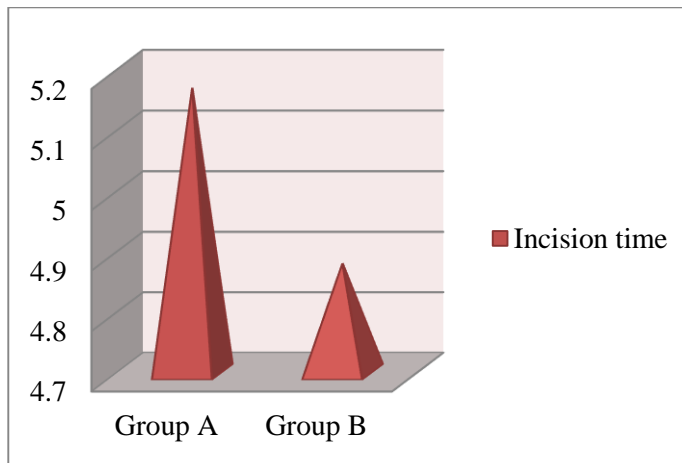


Fig 3 suturing

Fig 4 post operative healing

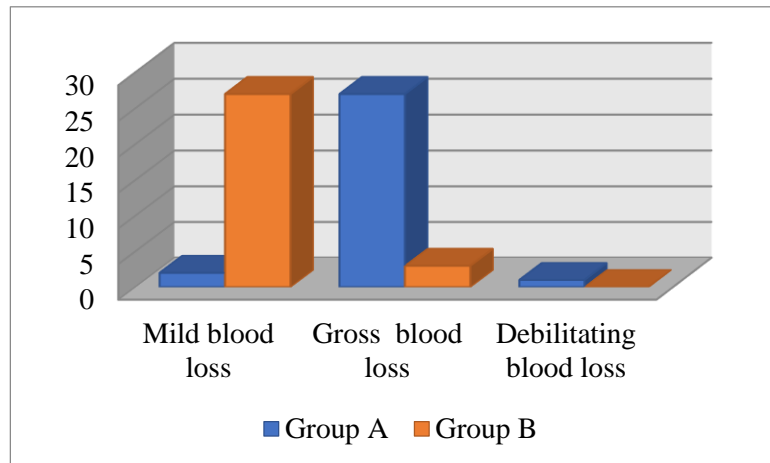
Results

In present study, incision time with flap elevation was assessed. The results showed that the mean incision time taken with flap elevation for electrocautery was less than that of stainless steel. There was statistically significant difference between groups indicating difference in incisional time between the two methods used ($p < 0.05$). The results are in accordance with the study done by Sharma and Sachdeva² who suggested that the mean time taken for incision and elevation of mucoperiosteal flap was less for electrocautery (5.1373 min) than that of scalpel surgery (6.5578 min).



In this study bleeding time was evaluated from the time of incision till the elevation of mucoperiosteal flap. It was measured using WHO bleeding scale which scores from 0-4 with 0 = no bleeding, 1 = petechiae, 2 = mild blood loss, 3 = gross blood loss & 4 = debilitating blood loss. The average bleeding score was

lower in electrosurgery group as compared to scalpel surgery group (2.00 ± 0.00 and 3.00 ± 0.00 respectively). Although electro-cautery couldn't provide complete hemostasis, the bleeding was significantly less ($p < 0.05$) for electrosurgery than that of scalpel surgery. This result was in accordance with Sharma and Sachdeva who reported that the mean blood loss for electrosurgery was less (1.5858 ml) as compared to scalpel surgery (4.1619 ml).

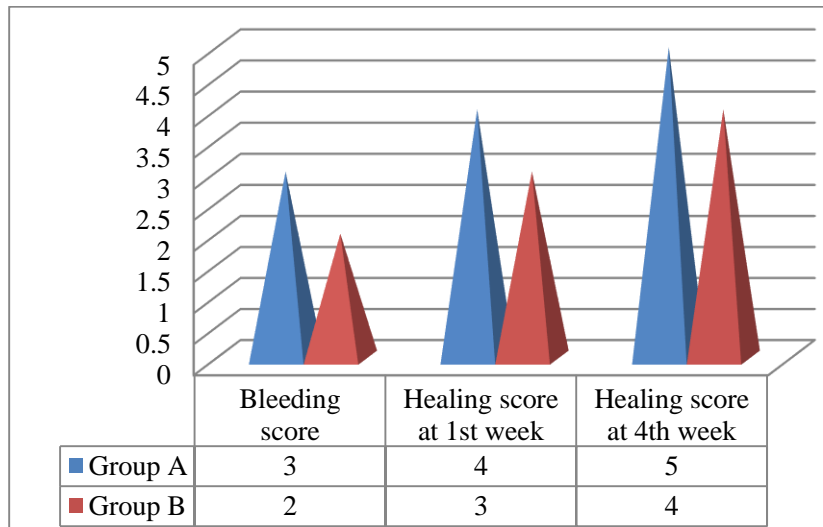


The post operative pain was assessed on first, second, and seventh post operative days, using a Visual Analogue Scale (VAS) which ranges from 0 - 10 in ascending order of pain as it takes little time to describe to the patient and it is easily understood by the patient. The result showed significant difference in two groups on 1st post operative days ($p < 0.05$). However, no significant difference between groups was observed at second and seventh post operative day. At the seventh post operative day, the average pain score was the same in both the groups.

Sharma and Sachdeva in their study found that the postoperative pain values in all the three visits were almost same in both electrosurgery and scalpel surgery sites. The difference in pain in both the groups was not statistically significant at all postoperative visits. Kearns *et al*⁶ in their study found that postoperative pain was significantly reduced on the first ($P = 0.04$) and second ($P = 0.02$) postoperative days in the diathermy group as compared to the scalpel group. There was no significant difference in pain scores between the two groups on the third and subsequent postoperative days. Priya *et al*⁹ in their study reported that there was a significant reduced postoperative pain in the diathermy group as compared to the scalpel group.

The last parameter evaluated in this study was the wound healing using healing assessment index by Laundry *et al* on first and fourth week postoperatively. Considering the average healing scores at 1st and fourth week of the study it was better in the scalpel group as compared to the electrocautery group, and the difference in both groups was statistically significant ($p < 0.05$). Sharma and Sachdeva² reported that the difference in healing in both first week and fourth week postoperatively was not statistically significant for both the sites. Although there was slight more inflammation at the electrosurgical site as compared to

scalpel site in the 1st postoperative week; by the end of four weeks, healing was good at both the sites. Pearlman *et al*⁷ reported that the postoperative wound healing was the same in the scalpel, electrosurgery, and carbon dioxide laser group. Rathofer *et al*⁸ reported that healing occurred at approximately the same rate in both the electrosurgery and blade loop knife groups.



This study indicated that incision time, bleeding, and healing were comparable in both the groups. We observed that the bleeding and time taken for the incision were significantly less in electro-surgery as compared to scalpel surgery. There was no significant difference found amongst the two groups in terms of pain. The inconsistency of reports on the healing of electrosurgical wounds may be attributed to the lack of standardization of the factors involved in electrosurgery. Just as preparation of a tooth with a high speed turbine with adequate cooling spray can devitalize the pulp, use of electrosurgery with optimal control of the relevant factors can produce adverse effects. The factors to be controlled during electrosurgery are wave form, power setting, cutting stroke and surface condition of tissue. The thickness and shape of the active electrodes and the depth of incision are other factors that can also affect outcome. When those factors are controlled, no clinical significant difference can be seen between the healing of electrosurgical wounds and that of scalpel wounds.²

Discussion

This study was conducted in the department of Oral and Maxillofacial Surgery at Maharaja Ganga Singh Dental College and Hospital, Sriganganagar on 60 patients, randomly selected and equally divided into two groups. The purpose of the study was to assess and compare treatment outcomes after using electrocautery and scalpel blade in separate patients for minor oral surgical procedures 60 patients were divided into two groups namely Group A and Group B. Group A patients were operated using stainless steel scalpel blade and the Group B patients underwent electrosurgery for minor oral surgical procedures under local anaesthesia respectively. Intraoperative assessment was time required

to raise the mucoperiosteal flap and blood loss. Postoperative sequelae (pain & healing) were assessed on the 1st, 2nd, 7th day and 1st month for all operated patients.

The result of the study showed difference with respect to time required for elevation of mucoperiosteal flap, blood loss and healing scores. Significant differences were noted and evaluated. From present study, we concluded that electrocautery is better than the stainless steel scalpel in relation to time required for elevation of mucoperiosteal flap and intraoperative blood loss. But electrocautery is inferior to scalpel in relation to wound healing. So, in all surgical procedures stainless steel scalpel cannot be completely replaced by electrocautery. Although electro-surgery can never completely replace the scalpel blade, its benefits may outnumber its shortcomings especially in highly vascular areas. If the clinical electrosurgical procedures are applied in accordance with the recommended principles, electrosurgery is certainly of great value in minor oral surgery. However, due to small sample size and short duration of our study time, further studies are required to be done to validate these results.

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