COMPARATIVE EVALUATION OF FRENECTOMY PROCEDURES PERFORMED WITH SCALPEL, LASER AND ELECTROSURGERY- A CLINICAL STUDY

INTRODUCTION
A frenum is a fold of mucous membrane, usually with enclosed muscle fibers, that attaches the lips and cheeks to the alveolar mucosa and/or gingiva and underlying periosteum. A frenum that encroaches on the margin of the gingiva may interfere with plaque removal, and tension on this frenum may tend to open the sulcus. This condition may be conducive to plaque accumulation and may inhibit proper toothbrushing. In addition to this, the maxillary frenum may present aesthetic problem due to persistence of a midline diastema or compromise the orthodontic result in the midline diastema cases, thus causing a recurrence after the treatment.

The management of such an aberrant frenum is accomplished by performing a frenectomy procedure. This can be accomplished either by the routine conventional scalpel technique or by using electrosurgery. The present article is a compilation of clinical cases performed using scalpel, laser and electrosurgery, with an added note on comparison of the degree of postoperative pain, discomfort and functional complications (chewing and speech), experienced by patients after three frenectomy procedures. Materials And Methods: Fifty four subjects requiring frenectomy were selected and divided randomly into Group A (conventional), Group B (laser) and Group C (electrosurgery). Mean VAS scores of postoperative pain, discomfort and functional complications were recorded on postoperative Day 1 and Day 7. Results: On intragroup comparison, there was reduction in pain, discomfort and functional complications (chewing and speech) from postoperative Day 1 to Day 7. On intergroup comparison, at day 1, Group B subjects experienced less pain, less postoperative discomfort, less chewing discomfort. On day 7, Group C subjects showed less chewing discomfort. Conclusion: Laser showed promising results.

KEYWORDS
Frenectomy, laser, electrosurgery, conventional
The right endpoints of the postoperative pain, discomfort and functional complications (chewing and speech) were designated as “no pain,” “no discomfort” and the left endpoints were marked as “worst pain imaginable,” “extreme discomfort.”

All these parameters were recorded by a single examiner who was blinded for the surgical technique used.

After completion, data obtained was tabulated and subjected to statistical analysis, which included comparison of postoperative pain, discomfort and the degree of functional complications after the three frenectomy techniques. All subjects were instructed to use the same analgesic containing paracetamol if needed, and a comparison of their need for analgesics after the three techniques, was also recorded.

Statistical analysis
Descriptive statistics were expressed as means and standard deviations for each group. Inter group comparisons for the study variables were analyzed using Kruskal Wallis ANOVA. In the above test, p value less than or equal to 0.05 (p≤0.05) was taken to be statistically significant. All analyses were performed using SPSS software version 10.

RESULTS
Results of the study are summarized in (Table 1).

On intragroup comparison, there was reduction in pain, discomfort and functional complications (chewing and speech) from postoperative Day 1 to Day 7 in all the three groups which was not statistically significant.

On day 1, pain and postoperative discomfort were less in frenectomy procedure done by laser (Group B) although the values were statistically nonsignificant, except chewing discomfort which was statistically significant.

On day 7, there was a statistically significant reduction in chewing discomfort values in subjects who were treated by frenectomy procedure done by electrosurgery technique (p<0.05).

More swelling was seen after frenectomy done by electrosurgery but it was not statistically significant (Table 2). More analgesics were consumed after frenectomy by electrosurgery technique. (Table 3)

DISCUSSION
The aim of this study was to compare the postoperative subjective effects of conventional surgical technique, laser and electrosurgery techniques for frenectomy procedures. However, there are studies comparing the postoperative effects of all the three techniques, which can justify their use for frenectomy surgeries.

Conventionally, a frenectomy procedure involves grasping the frenum with hemostat, incising upper and undersurface along the hemostat, creating a large triangular-shaped wound, often with copious bleeding. Patients often experience post-surgical bleeding and pain, and sutures can further increase this when they come in contact with food. The unpleasant taste of blood and unaesthetic appearance of sutures may result in a loss of the sense of well-being during the postoperative period. In addition, suture removal from gingival and labial tissues after 1 week can be painful because the sutures may be buried in the mucosa.

The classical technique leaves a longitudinal surgical incision and scarring, which may lead to periodontal problems and an unaesthetic appearance, thereby necessitating other modifications.

On the other hand, laser technique offered some advantages, such as relatively bloodless surgical and post-surgical event; the ability to precisely coagulate, vaporize, or cut tissue; sterilization of the wound site; minimal swelling and scarring; no suturing in most cases; little mechanical trauma; reduction of surgical time; decreased post-surgical pain; and high patient acceptance. These results are similar to the findings reported by Aldelaimi TN and Mannmood AS 2014, concluded that subjects in which frenectomy is done with laser experienced less pain and discomfort postoperatively.

Also, Butchi Babu K and Kaur concluded that diode laser provides better patient perception in terms of post-operative pain and function than that obtained by the conventional scalpel technique. Thus, it can be a dependable alternative for frenectomy procedures. Thus, there is abundant evidence confirming markedly less bleeding, particularly of highly vascular oral tissues, with laser surgery.

Among all the approaches for frenectomy procedure which were employed in the present cases, the electrosurgery procedure also offered the advantage of minimal time consumption and a bloodless field during the surgical procedure, with no requirement of sutures. Subjects treated with electrosurgery (Group C) experienced less postoperative chewing discomfort on Day 7 but reported more number of swellings as compared to Group A and B. Also, Group C subjects consumed maximum number of analgesics as compared to Group A and B. This results are similar to reported by Christensen, when diode laser is compared with electrosurgery concluded that laser can be new go to solution for many soft tissue problems.

While an aberrant frenum can be removed by any of the techniques that have been proposed, a functional and an aesthetic outcome can be achieved by a proper technique selection, based on the type of the frenal attachment.

To overcome the problems associated with conventional scalpel technique, electrosurgery and laser techniques were tried. Laser showed promising results. However, these techniques have their own merits and demerits, thus further improvements can still be attempted.
Frenectomy performed with electrocautery (Group C)

Table no.1: Comparison of VAS scores of post-operative patient perceptions after frenectomy using 3 different techniques

<table>
<thead>
<tr>
<th></th>
<th>Scalpel frenectomy</th>
<th>Laser frenectomy</th>
<th>Electrosurgery frenectomy</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain at day 1</td>
<td>3.83 ± 0.75</td>
<td>3.17 ± 0.41</td>
<td>4.33 ± 1.03</td>
<td>0.054</td>
</tr>
<tr>
<td>Pain at day 7</td>
<td>1.67 ± 0.52</td>
<td>1.17 ± 0.75</td>
<td>1.67 ± 0.52</td>
<td>0.328</td>
</tr>
<tr>
<td>Cheewing at day 1</td>
<td>3.50 ± 1.05</td>
<td>2.33 ± 0.52</td>
<td>3.33 ± 0.52</td>
<td>0.034*</td>
</tr>
<tr>
<td>Cheewing at day 7</td>
<td>1.67 ± 0.52</td>
<td>1.00 ± 0.63</td>
<td>0.83 ± 0.41</td>
<td>0.040*</td>
</tr>
<tr>
<td>Speaking at day 1</td>
<td>3.00 ± 0.63</td>
<td>2.33 ± 0.52</td>
<td>2.67 ± 0.52</td>
<td>0.161</td>
</tr>
<tr>
<td>Speaking at day 7</td>
<td>1.33 ± 0.82</td>
<td>0.50 ± 0.55</td>
<td>0.50 ± 0.55</td>
<td>0.103</td>
</tr>
</tbody>
</table>

*statistical significance, p < 0.05

Table no.2: Comparison of post-operative swelling after frenectomy using 3 different techniques

<table>
<thead>
<tr>
<th></th>
<th>Scalpel frenectomy</th>
<th>Laser frenectomy</th>
<th>Electrosurgery frenectomy</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swelling (yes)</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0.119</td>
</tr>
<tr>
<td>Swelling (no)</td>
<td>6</td>
<td>6</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

Table no.3: Comparison of number of analgesics taken after frenectomy using 3 different techniques

<table>
<thead>
<tr>
<th></th>
<th>Scalpel frenectomy</th>
<th>Laser frenectomy</th>
<th>Electrosurgery frenectomy</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Analgesics (mean)</td>
<td>3.33</td>
<td>1.33</td>
<td>4.67</td>
<td>0.063</td>
</tr>
</tbody>
</table>

REFERENCES

1. Bhavini H. The Aberrant Frenum. Dr. Hiral Jhaveri (ed), Dr. PD Miller the father of periodontal plastic surgery. 2006;29-34.