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# EVALUATION OF THE OCHSENBEIN-LUEBKE FLAP TECHNIQUE IN PERIAPICAL SURGERY AT PUNJAB DENTAL HOSPITAL LAHORE PAKISTAN

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**Background:** There have been no direct studies comparing the Trapezoidal flap with the Ochsenbein-Luebke flap in endodontic surgery. The present study is aimed to provide an insight into the relative performances of these two procedures. **Methods:** This comparative study, carried out at Punjab Dental Hospital Lahore Pakistan from May to October 1998, involved 120 patients (60 in each group). Evaluation of technique(s) involved assessment of intra-operative technical considerations as well as postoperative morbidity, healing and cosmetic results. **Results:** It was found that O-L flap is easy to reflect, has good visibility, less bleeding duration and is easy to handle during surgery. Stitches are less time consuming, there is less tearing, better cosmetic result and no recession of gingiva. However more studies should be done to evaluate the procedure in larger number of patients.

**Key Words:** Flap design, Apicectomy, Trapezoidal Flap, Ochsenbein-Luebke Flap

## INTRODUCTION

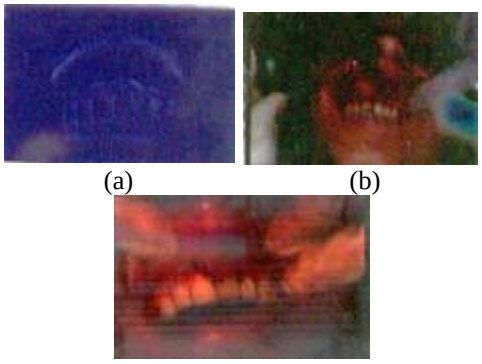
Apicectomy is always a technique-sensitive procedure for oral surgeons and endodontists.[1] They always desire to improve methodology of this procedure by means of instrumentation, materials and different approaches to have better success rates. The visibility of the area during the procedure is the key step for an improved postoperative healing and to reduce the complications occurring during surgery due to improper visibility. To attain this task, many surgical flaps have been designed and practiced since decades.[1] A review of these flap procedures resulted in gingival and subgingival flap designs. These are classified as:

1. Gingival Flaps: Triangular and Trapezoidal
2. Subgingival Flaps: Semilunar and Ochsenbein – Luebke (O-L) Flap.

These flaps have distinct indications, advantages and disadvantages, but it is more the experience and the choice of the operator according to the situation and need of the apicectomy case that determine the final outcome of the procedure. Many studies have been done on selection of the appropriate flap design,[1-3] but since the introduction of Ochsenbein-Luebke flap, some surgeons prefer this design of flap.

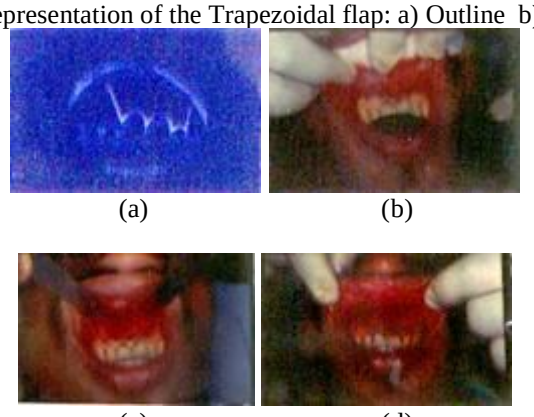
The two most commonly used Flap procedures currently in vogue are a) Trapezoidal Flap and b) Ochsenbein-Luebke Flap, because of their specific advantages. However the Ochsenbein-Luebke procedure offers additional advantages such as sparing of the marginal gingival, non-exposure and minimal loss of crestal bone and ease of reapproximation of the flap.[2,3]

The Trapezoidal technique involves two vertical releasing incisions and one horizontal intra-sulcular (gingival) incision (Figure 1). This is a marginal incision, as opposed to the O-L flap, which is a submarginal incision.[2,3]



(a) (b) (c)

Figure 1: Diagrammatic representation of the Trapezoidal flap: a) Outline b) Exposure and c) Stitches



(a) (b) (c) (d)

Figure 2: Diagrammatic representation of the O-L flap: a) Outline. b) Incision Line. c) Exposure and d) Stitches

Briefly the O-L technique involves a scalloped horizontal incision in attached gingiva and two vertical releasing incisions (Figure-2).[2,3] Incisions correspond to the contour of the gingival. There must be an adequate band of gingiva present (3–5 mm). This requires an analysis of attachment level along the entire length of the horizontal incision.

The O-L technique is basically a modified semilunar or trapezoidal flap in which a scalloped horizontal incision joins two vertical incisions. The vertical incisions are made at least one tooth lateral to surgery side. The horizontal incision is scalloped following the contour of gingival margin 3-5 mm from gingival margin.[2,3]

Overall, the O-L technique appears advantageous for both surgeons and patients. However, very few studies have been done to compare the advantages of selecting one technique over the other. There have been no studies in Pakistan in this regard, and it is not even known to what extent oral surgeons practice one or the other technique. The present study was undertaken to compare both techniques and evaluate the O-L method for selective advantages over the Trapezoid method.

## MATERIAL AND METHODS

The study was conducted at the Punjab Dental Hospital Lahore Pakistan for a period of six months, from May to October 1998. The study involved 120 patients of age 12 years and above, and of both sexes, undergoing apicectomy for a variety of periapical lesions (granulomas and cysts) involving two-thirds of the root. Only those patients who had disease localized to the anterior teeth, were otherwise medically fit and not suffering from any other systemic diseases were included. Patients with periodontal pocketing and class III periodontal mobility were excluded.

Patients were subjected to detailed history, clinical examination, and investigations as needed. Patients were selected for either the Trapezoidal or the O-L technique on a non-random basis; surgery was performed according to standard procedures. All the procedures were done under local anaesthesia in Minor Oral Surgery Department, Punjab Dental Hospital Lahore. Equal numbers of patients were assigned to the two groups (60 each).

Evaluation of technique(s) involved assessment of intra-operative technical considerations as well as postoperative morbidity, healing and cosmetic results.

Duration of surgery was noted by using a stopwatch, timed from the first nick to the last reflection of the flap.

Technical problems related to the surgical procedures of both groups were noted as tearing of the flap or damage to wound edges.

Ease of operation and visibility were assessed by the operator's personal experience during holding of flap by assistant, facilitation of visibility during bone and apex cutting and assistance in lip retraction.

For stitching, 3-0 silk thread and half circle needle at cutting edge was used for both procedures.

Comparison was done immediately, after 24 hours, after 3 days and after 5 days at the time of removal of stitches. The edges were noted after 14 days. Approximation was measured as:

1. + = Maximum approximation
2. ++ = Flap has defect in approximation in one to two stitched areas of flap.
3. +++ = More than two areas of the flap have defective approximation in the stitched area.

Haemorrhage was assessed by the duration of bleeding from the wound edges at the start of incision till the start of bony procedure. Duration was recorded by use of a stopwatch.

Oedema/Swelling was assessed on clinical basis as follows:

1. + = swelling confined to surgery flap.
2. ++ = Swelling involves upper lip as well.
3. +++ = Swelling beyond lip area or in canine fossa.

Findings were noted after 24 hours, 3 days, 5 days and after 14 days.

Statistical analysis was done using SPSS ver 8.0 computer software. The chi square test was used to test for differences of frequencies and the Student's T test was used for differences of means. A $p$ value $\leq 0.05$ was considered significant.

# RESULTS

A total of 120 patients were involved in the study, selected on the basis of involved teeth and inclusion criteria. The sex and age distribution of both groups is given in Table-1.

Table-1: Age and Sex Distribution of both groups (n=60 each)

| Age Groups (years) | O-L Group | | Trapezoidal Group | | Total |
|---|---|---|---|---|---|
| | Male | Female | Male | Female | |
| 12 – 25 | 25 | 10 | 12 | 11 | 58 |
| 25 – 35 | 9 | 7 | 15 | 8 | 39 |
| 35 – 45 | 5 | 4 | 9 | 5 | 23 |
| **Total** | 39 | 21 | 36 | 24 | 120 |

Most patients were in the age group of 12-25 years and the overall male to female ratio was 1.67:1.

Duration of surgery for both groups is given in Table-2. Differences in timings between the procedures were not significant, even though there were more patients with overall quick reflection time in the O-L group.

**Table-2: Duration of surgery for the two groups (n=60 each)**

| Groups | Time of Flap Reflection | | Total |
|---|---|---|---|
| | 5–10 minutes | >10 minutes | |
| O-L | 38 | 22 | 60 |
| Trapezoidal | 29 | 31 | 60 |
| **Total** | 67 | 53 | 120 |

Technical problems related to the surgical procedures of both groups are seen in Table-3. The reflection procedure was more difficult with the Trapezoidal flap due to interdental papillae detachment as well as reflecting the attached gingiva.

**Table-3: Damage to Flap in both groups (n=60 each)**

| Groups | Damage to Flap | | | Total |
|---|---|---|---|---|
| | During Reflection | During Procedure | During Stitching | |
| O-L | 4 | 3 | 3 | 10 |
| Trapezoidal | 7 | 2 | 5 | 14 |
| **Total** | 11 | 5 | 8 | 24 |

The same problem was noted during stitching where approximation of the interdental papillae was difficult.

**Table-4: Visibility and Ease of Procedures (n=60 each)**

| Assessment | O-L | Trapezoidal | Total |
|---|---|---|---|
| Easy flap retraction by assistant | 50 | 46 | 96 |
| Visibility during cutting of bone / apex | 48 | 46 | 94 |
| **Total** | 98 | 92 | 190 |

Ease of operation and visibility data are given in Table-4. It was observed that the O-L procedure had both easy lip retraction and better visibility and ease during cutting of bone.

The exact approximation of the flap edges was found most effective in the O-L procedure as compared to the Trapezoidal procedure (Table-5). There was overall better approximation with the O-L technique compared to the Trapezoidal technique.

**Table-5: Wound approximation in both groups (n=60 each)**

| Post-operative Duration | Procedure | | | | | |
|---|---|---|---|---|---|---|
| | O-L | | | Trapezoidal | | |
| | + | ++ | +++ | + | ++ | +++ |
| Day 1 | 42* | 8 | 10 | 30 | 16 | 14 |
| Day 2 | 40 | 8 | 12 | 30 | 10 | 20 |
| Day 3 | 40 | 10 | 10 | 30 | 10 | 20 |
| Day 5 | 40 | 13 | 7 | 30 | 10 | 20 |
| Day 14 | 40 | 17 | 3** | 30 | 15 | 15 |

* $p<0.05$ as compared to trapezoidal group.
** $p<0.001$ as compared to the trapezoidal group.
+ = Maximum approximation
++ = Flap has defect in approximation in one to two stitched areas of flap.
+++ = More than two areas of the flap have defective approximation in the stitched area.

For the first day maximum approximation (+ category) was observed in the O-L group, which was statistically significant ($p<0.05$); the values remained constant till day 14. The same observation was noted for the ++ and +++ categories; however both flaps showed improvement in ++ categories as compared to the +++ categories. In the O-L group, difference in the +++ category at day 14 was statistically significant as compared to the Trapezoidal Group ($p < 0.001$).

The overall duration of bleeding was more in the trapezoidal group (Table-6); it may have been due to more vascular supply in the area of attached gingiva and dental papilla, as well as more reflection of periosteum, but the difference was not statistically significant.

**Table-6: Duration of bleeding for both groups (n=60 each)**

| Duration (min.) | Procedure | | Total |
|---|---|---|---|
| | O-L | Trapezoidal | |
| Up to 5 | 25 | 19 | 44 |
| 5-10 | 13 | 10 | 23 |
| >10 | 22 | 31 | 53 |
| **Total** | 60 | 60 | 120 |

Swelling was observed in both flaps in the first 24 hours up to 14 days (Table-7). The intensity of swelling was maximal after 24 hours and reduced with the passage of time; though more pronounced in the Trapezoidal group, the difference was not statistically significant. After 3 days, however the difference became significant ($p \leq 0.05$) and again after day 5 till day 14, it became not significant. The amount of swelling also depended on the extent of the surgical procedure.

**Table-7: Presence of Oedema/Swelling in both groups (n=60 each)**

| Post operative Duration | Procedure | | | | | |
|---|---|---|---|---|---|---|
| | O-L | | | Trapezoidal | | |
| | + | ++ | +++ | + | ++ | +++ |
| After 24 hrs. | 40 | 14 | 6 | 32 | 18 | 10 |
| Day 3 | 45 | 10* | 5 | 34 | 20 | 6 |
| Day 5 | 48 | 9 | 3 | 40 | 17 | 3 |
| Day 14 | 59 | 1 | Nil | 57 | 3 | Nil |

*$p$ significant ($\leq 0.05$) as compared to the trapezoidal group.

\+ = swelling confined to surgery flap.
++ = Swelling involves upper lip as well.
+++ = Swelling beyond lip area or in canine fossa.

Marginal recession was observed only in the trapezoidal flaps. A total of 20 cases reported with gingival recession, including 6 patients with restoration in anterior segment. Two patients underwent new restoration for aesthetic reasons.

Postoperative pain related to flap only could not be assessed as the nature of endodontic surgery, bone resection and manipulation were also contributory factors to pain.

## DISCUSSION

Success in surgical endodontics depends upon the correct selection of case, proper endodontic procedure, obturation and proper surgical endodontic procedure.[1] The initiation of surgery should be based purely on the selection of flap design, considering exposure of field, ease in surgery, assistance and finally good closure resulting in good healing and aesthetic scar. Many flaps have been introduced, but in gingival flaps, trapezoidal flap is favoured a lot due to its good visibility, easy stitching and handling. But since the introduction of this flap, the approximation of flap back in its original position, maintaining the interdental attachment and prevention of recession of gingiva after healing has not been accomplished. Now other flaps, like Semi lunar or Triangular flaps are considered as good as trapezoid.

Since the introduction of the O-L flap, oral surgeons tried this flap and found it better in many ways, such as ease in reflection of flap (as you have not to reflect the attached gingiva), no recession of gingiva and no fear of exposure of restorative margins,[2,3] ease of stitching[4] and good cosmetic results.[5] In fact both flaps are being practiced in surgical endodontics but no direct comparative study has been conducted.

This comparative study conducted on 120 patients at the Punjab Dental Hospital Lahore Pakistan revealed an increased frequency of male patients of the age group of 12-25 years. The flap surgery duration was more in trapezoidal group (31/60 or 51.7% patients with duration > 10 minutes), compared to the O-L group (22/60 or 36.7% patients, Table 2). This extra time consumption was due to reflection of the interdental papilla and attached gingiva, whereas in O-L flap it is not difficult to reflect the horizontal and vertical portion of the flap as the portion is below attached gingiva. This may also be the reason that tearing of flap was more in Trapezoid flap (14/60, 23.33%) as compared to O-L (10/60, 16.67%) in our study (Table-3). In the Trapezoid group most cases of damage were during flap reflection (7/14, 50%).

Selection of an appropriate surgical procedure by a surgeon involves issues of ease of operation and visibility of the field. Both these criteria favoured the O-L flap procedure over the Trapezoidal one (Table-4) in our study; however the difference found was not significant but the handling of flap during stitches revealed a significant difference (Table-5). It was observed that the adaptation of interdental papilla in trapezoidal flap is difficult, more time consuming, with more tearing of flap and improper cosmetic results. The duration of haemorrhage (Table-6) was more in Trapezoidal flap (31/60 or 51.7% patients with bleeding > 10 minutes) compared to the O-L flap (22/60 or

36.7% patients with bleeding > 10 minutes); this is related to increased duration of operation due to more reflection of periosteum in the Trapezoidal flap as compared to the O-L flap. Oedema was present in both the modalities but was more in Trapezoidal group (Table-7) and the difference between the groups became statistically significant after the third postoperative day. It may be due to involvement of interdental papilla and reflection of more periosteum.

The most annoying aspect observed in trapezoidal flap in our study was the recession of gingival margin in 20 cases (33.33%). Two patients even underwent new anterior crown replacement due to bad aesthetic effect in gingival area as an end result of surgery. No such complaint was received for any of the patients operated by O-L flap.

Pain could not be assessed due to contribution from other bony procedures as well, thus could not be related to flap procedures alone.

## CONCLUSION

O-L flap has distinct advantages over the Trapezoidal flap as it is easy to reflect, has good visibility, less bleeding duration and is easy to handle during surgery. Stitches are less time consuming, there is less tearing, better cosmetic result and no recession of gingiva. However it is recommended that future studies should be done in more numbers of patients. to demonstrate its superiority.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