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# The Degree of Periorbital Edema after Rhinoplasty Following Osteotomy with Periosteum Elevation

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## ABSTRACT

**Objective:** In this study we try to determine the effects of sub periosteal tunneling before intranasal lateral osteotomies during rhinoplastic operation on periorbital edema and ecchymosis

**Materials and Methods:** In 46 patients we carried out 92 lateral osteotomies which 46 without subperiosteal tunneling and 46 after subperiosteal tunneling in a fashion that in each patient in one side we did sub periosteal tunneling and in the other side not. Then another surgeon compared periorbital edema, ecchymosis and subconjunctival ecchymosis in each patient separately on 3 postoperative day.

**Results:** There was significant increment in preorbital edema, ecchymosis and subconjunctival ecchymosis in the side of patient whom subperiosteal tunneling carried out before intranasal lateral osteotomy.

**Conclusion:** we suggest performing lateral osteotomies without subperiosteal tunneling during a rhinoplasty operation.

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Keywords: Subperiosteal tunneling, Osteotomy, Rhinoplasty, Ecchymosis, Periorbital Edema

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## Introduction

Rhinoplasty is a widely performed surgical procedure. Unfortunately, as with all surgical procedures, there are well known risks associated with the procedure itself such as intraoperative bleeding, pain, periorbital ecchymosis and edema [1].

Lateral osteotomy, a technique used for reshaping the bony nasal pyramid, is a major contributing factor to the degree of ecchymosis and edema. This may not only have psychosocial implications and lead to a delay in resumption to social activities for the individual patient, but may also result in a loss of productivity from a societal level. In addition, depending on the degree of edema, one may also experience difficulties with vision in the early post-operative period (2).

Applying finger pressure to the osteotomy site, dressing the nose with postoperative adhesive, applying a cold compress to and around the nose, and lifting the head while sleeping or lying down are other effective ways to reduce pre-orbital edema & ecchymosis [3],[4]. In studies conducted in international papers and conferences, one study has examined the direct effects of subperiosteal tunneling on peri-orbital edema and ecchymosis [5]. In the method of osteotomy from inside the nose, before osteotomy, the periosteum of the nasal bone can be lifted with a periosteal elevator, and after creating a tunnel and a suitable space for osteotomy, the bone can be cut. On the other hand, lateral osteotomy can be performed without lifting the periosteum. If the periosteum is raised, it can reduce the damage to the periosteum and local bleeding, but lifting the periosteum requires intense and extensive manipulation of the soft tissue around the nose [6].

In this study, we investigated the effects of subperiosteal tunneling before lateral osteotomy on the incidence and severity of edema and periorbital ecchymosis and subconjunctival ecchymosis.

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## Materials & method

Forty six patients who were candidates for rhinoplasty were randomly included in this study. Consent to participate in the study was obtained from each patient. None of the patients had a history of any medical illnesses or utilization of any medications including anticoagulants or antiplatelet drugs. All patients underwent general anesthesia with intravenous drugs including midazolam, thiopental sodium, fentanyl, lidocaine, and N<sub>2</sub>O gas at a given dose. Patients' blood pressure was kept at 80 to 100 mm Hg during surgery. Injection of 1% lidocaine with epinephrine was performed at the site of columella - nasal type - septum, dorsum and nasal passages. All patients underwent open rhinoplasty by a senior surgeon with the following steps:

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Creating marginal and clumsy incisions and lifting the flap of the skin over the nasal dorsum hump resection of the dorsal nose, bilateral lateral osteotomy, nasal alar resection, suture closing of the incisions with adhesive dressing and plastering of the nose and insertion of tamponade with ointment antibiotic.

### Lateral intranasal osteotomy

All patients underwent osteotomy with a special razor. In each patient, a subperiosteal tunnel was created on one side followed by performance of osteotomy, but on the opposite side, an osteotomy was performed without creating a tunnel. At the end of the study, 92 lateral osteotomies were performed on 46 patients, in which 46 subperiosteal tunnel osteotomies were performed on the right side and 46 no tunnel osteotomies were performed on the left side.

All patients were discharged with oral antibiotics in the morning after surgery and were recommended for special care of cold compresses and head lift. On the third day after surgery, another surgeon, unaware of the site of the subperiosteal tunnel, examined all patients for the extent of pre-orbital edema, peri-orbital ecchymosis and subconjunctival ecchymosis on each side.

## Results

46 patients including 34 females and 12 males with a mean age of 21.3 years and standard deviation of 1.8 were studied and all of them underwent open rhinoplasty. In 6 of 46 patients, subperiosteal tunneling before osteotomy did not show a significant difference in the rate of edema and peri-orbital ecchymosis. In 4 patients, pre-orbital ecchymosis was more on the side where the tunnel was not formed than on the opposite side. In 38 patients, peri-orbital ecchymosis was more common on the site of the subperiosteal tunnel. In comparison with pre-orbital edema, in 3 out of 46 patients, there was no clear difference between the side where the tunnel was created and the opposite side. In 4 patients, pre-orbital edema was more on the side where the tunnel was not formed and in 41 patients peri-orbital edema was more on the site of the subperiosteal tunnel compared to the opposite side. Table No. (1).

Examination of subconjunctival ecchymosis revealed that only 7 out of 46 patients developed subconjunctival ecchymosis. In one patient, subconjunctival ecchymosis was greater in the area where the subperiosteal tunnel was not formed. In 6 patients, subconjunctival ecchymosis was more on the side of the tunnel than on the opposite side (Table 1). Using FISHER test, it was found that all these statistics have significant differences between the two groups ( $p = 0.05$ ).

|                                   | More Peri-orbital edema | More Peri-orbital ecchymosis | More Subconjunctiva ecchymosis |
|-----------------------------------|-------------------------|------------------------------|--------------------------------|
| Side with periosteal elevation    | 41                      | 38                           | 6                              |
| Side without periosteal elevation | 4                       | 4                            | 1                              |

Table 1: Comparison of pre-orbital edema and pre-orbital ecchymosis and subconjunctival ecchymosis after lateral osteotomy in the area where the subperiosteal tunnel was created with the side where the tunnel was not formed.

## Discussion

Peri-orbital edema and ecchymosis are common and unavoidable complications of rhinoplasty. These complications are not limited to the loose skin of the eyelids and extend beyond the pre-orbital adipose tissue, causing subconjunctival ecchymosis [7]. So far, several authors have suggested that creating a subperiosteal tunnel before a lateral osteotomy both makes it easier to cut the bone and by lifting the periosteum, the blood vessels move away from the osteotomy pathway and are not damaged during the osteotomy. As a result, peri-orbital edema and ecchymosis will decrease [8]. On the other hand, some authors believe that the attempt to create a subperiosteal tunnel cause increase in peri-orbital edema and ecchymosis due to the extensive manipulation of soft tissue during tunneling and also due to the creation of a subperiosteal dead space that is a good place for blood accumulation and subsequent leakage to surrounding tissues.[9],[10],[11],[12],[13]. Among the patients in our study, 4 cases of peri-orbital edema and 4 cases of peri-orbital ecchymosis were more common in the area where the tunnel was not formed, which means that factors other than tunnel formation are also effective in the appearance of edema and ecchymosis. Tebbet recommended in his studies that lifting the nasal flap during open rhinoplasty surgery in the Sub-SMAS plan and immediately on the surface of the nasal cartilage can cause reduction in the local swelling and bleeding[14]. In McCarthy and Smith-Wood studies, it has been suggested that High osteotomies can increase the risk of pre-orbital ecchymosis [15]. On the other hand, the duration of surgery, the technique of operation performed and the type of device used for osteotomy are also involved in causing these complications. When we look at the statistics obtained in similar international studies, we find a clear agreement between the results of our study and these statistics. [16].

## Conclusion

In general, using the statistics of this study and similar international studies, we recommend to not create a subperiosteal tunnel in a rhinoplasty surgery

before performing lateral intranasal osteotomies.

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