Many plastic surgeons agree that rhinoplasty is the most challenging facial aesthetic surgical procedure. Because the nose is so conspicuous, abnormalities of this structure compel patients to request surgical intervention.\(^1,2\) One of the most disagreeable and traumatic maneuvers in rhinoplasty surgery is the lateral osteotomy, and methods of performing lateral osteotomies remain controversial.\(^3\) The surgeon’s goal is to use a technique that will produce the desired aesthetic result with the least morbidity. It is well known that postoperative edema and ecchymosis have been a persistent problem since the advent of rhinoplasty surgery.\(^4\) Periorbital swelling and discoloration are most distressing to the patient who, 24 hours postoperatively, may have difficulty with vision because of the edema and is quite self-conscious about personal appearance.\(^5\)

In a standard rhinoplasty operation, lateral osteotomies are responsible for a significant amount of periorbital swelling and ecchymosis because of the injury of the angular vessels that cross the osteotomy sites and the trauma of infracturing. If subcutaneous bleeding and swelling following the lateral osteotomies and infracturing were decreased, a marked improvement in postoperative appearance would result.\(^5\)

Several approaches have been advocated to decrease postoperative edema and ecchymosis. Denecke\(^5\) performed lateral osteotomies with an angulated saw through an intercartilaginous incision. This technique has been widely described. A modification of Diamond’s perforating osteotomy technique, using a 4-mm osteotome, resulting in milder ecchymosis and edema, was described by Goldfarb et al\(^2\) in 1987. Wright\(^6\) advocated placing drains in the lateral osteotomy incisions in much the same manner as used to drain any other surgical wound. The drains allow blood and serum to escape from the area and reduce the ecchymosis in the periorbital area.

We were dissatisfied with the severity of ecchymosis and edema resulting from standard lateral osteotomies using saws and guarded chisels. In an effort to decrease trauma and ecchymosis, we used a 2-mm, V-shaped osteotome for lateral and medial oblique osteotomies. With these micro-osteotomies, it was unnecessary to elevate the periosteum, causing less surgical trauma and, to a large extent, leaving the periosteum intact so that it could function as an internal splint.

**METHODS**

Thirty-six consecutive rhinoplasties were studied, involving 20 males (ranging from 18 to 34 yrs of age; mean, 25 yrs) and 16 females (ranging from 18 to 31 yrs of age; mean, 23 yrs). None of these patients had any
history of easy bruising or bleeding, and the preoperative results of routine laboratory data were within normal limits. Routine preoperative and 24-hour postoperative photos were taken. Lateral osteotomies were performed in all patients as the last step of a closed rhinoplasty procedure. The study was undertaken with permission of the medical research ethics committee of Istanbul University and the informed consent of the subjects.

After removing the nasal hump, the nasal bones and the attached upper lateral cartilages separated (to some degree) from the nasal septum. Then, in the micro-osteotome group, a medial oblique osteotomy combined with a slightly curved lateral osteotomy using a 2-mm, V-shaped micro-osteotome was performed (Figure 1). There was no need for preliminary periosteal elevation with the micro-osteotome group and, as one might expect, there was less swelling. Also, there was no need for the traditional transverse osteotomy. The crossover point of both osteotomies was no more cephalic than the intercanthal line; therefore, the formation of the so-called “rocker deformity” was prevented.

The medial oblique osteotomy, starting at the superior edge of the open roof and curving gently 15° to 20° outward to the nasofrontal line, was initially performed with the V-shaped micro-osteotome. Then the lateral osteotomy was performed, proceeding through the soft tissue of the lateral wall of the piriform aperture (just lateral to the anterior end of the inferior turbinate), in order to protect against narrowing of the nasal valve area.

It was not necessary to elevate the periosteum. The lateral osteotomy then proceeded inward as it approached the nasofrontal suture, which was brought medially to meet the upper extent of the medial oblique osteotomy. Once the osteotome was in position, a gentle twist of the osteotome or gentle inward finger pressure was sufficient to complete the fracture and mobilize the bony fragment. After the medial oblique and lateral osteotomies were completed, the mobilized nasal bones were repositioned.

RESULTS

In the last stage of the operation, as we described, we performed right lateral osteotomy with a 2-mm, V-shaped osteotome and left lateral osteotomy with a 4-mm straight Cottle osteotome. Patients were photographed postoperatively after 24 and 48 hours. All patients demonstrated only mild edema and slight yellowish discoloration of the skin on the side of the face in which lateral osteotomy with a 2-mm, V-shaped osteotome was performed. However, on the opposite side, in which lateral osteotomy was performed with a straight osteotome, marked edema and ecchymosis typically developed at the osteotomy region after 24 hours (Figure 2).

DISCUSSION

Ultimately, one strives for the best aesthetic results with minimal complications. Lawson et al described some complications of rhinoplasty, including injury to the lacrimal apparatus resulting in epiphora, “rocker” phenomenon, “staircase” phenomenon, hematoma, edema and ecchymosis secondary to the trauma of osteotomy. Several of these complications were the direct results of lateral osteotomies. Complications resulting from the use
of the technique described here have been virtually absent except for mild edema and ecchymosis, which have been markedly milder than with previously used osteotomy techniques.

Ideally, the proposed lateral osteotomy pathway should be injected with 1% lidocaine and 1:000,000 epinephrine at least 15 minutes before creating the bony cuts. This will provide a reduction in ecchymosis and bleeding associated with trauma of fracture. Another important consideration is to preserve as much of the periosteum as possible. In the case of lateral osteotomy, this is especially important.

Anatomically, the medial canthal ligament passes over the lacrimal sac. Blind subperiosteal tunneling can be deep to the protective medial canthal ligament, which may be disrupted. Furthermore, in both lateral and medial osteotomies, preservation of the periosteum ensures stabilization and alignment of the mobilized nasal bones through a splinting action.

Our experience has demonstrated that osteotomy can be accomplished safely regardless of the type of osteotome. Our preference is a continuous type—versus a “dotted line” type—osteotomy, which is then green-sticked; many surgeons feel that the continuous type is more stable. There appeared to be no difference in the overall results based on the type of osteotome used, although it was felt that narrower osteotomies caused less soft tissue trauma. The challenge is to manage the route of the narrow osteotome, which a skilled surgeon should be able to perform.

Micro-osteotomy using a 2-mm, V-shaped osteotome is recommended because it provides minimal laceration, bleeding, and scarring of the periosteum and subcutaneous tissue. During the course of a lateral osteotomy, the osteotome might accidentally slide sideways, damaging the angular vessels and causing more edema and ecchymosis. The 2-mm, V-shaped osteotome is inserted through the soft tissue to the bone at the piriform aperture. After proceeding cephalically, the osteotome does not slide sideways, but glides through the bone where it meets the medial oblique osteotomy.

CONCLUSIONS
Asymmetry of the bony vault can occur as a result of unequal osteotomies, open roof deformities, and persistent bony ridges. Maintenance of a periosteal layer is critical in splitting mobile nasal bones and camouflaging minor bony irregularities. Two-mm, V-shaped osteotomes reduce the risk of postoperative edema and ecchymosis and can be maneuvered cephalically to the medial oblique osteotomy to achieve the best cosmetic results. We suggest that a low-curved osteotomy line, use of micro-osteotomes, no periosteal elevation, medial oblique osteotomies, and bone cuts (rather than fracturing) should be considered as an alternative, safe, and less traumatic lateral osteotomy when lateral osteotomy is indicated in rhinoplasty.

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REFERENCES

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Reprint requests: Rauf Tahamiler, MD, Tus Ent Center, Sehit Evliya Sok. Güzeli, Apt. No: 22/7, Senezeveler Suadiye, tr-34740, Istanbul, Turkey. E-mail: tahamiler@gmail.com.
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