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Narrowing of the middle nasal third in patients with narrow nasal root

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ABSTRACT

Objective. To develop the original method of incomplete osteotomy with subsequent stitching of nasal bones in patients with narrow upper and wide middle nasal thirds.

Material and methods. We used a stabilizing double U-shaped suture during complete lateral and incomplete transverse nasal osteotomies in patients with narrow nasal root.

Results. There were 56 surgeries between May 2021 and September 2022. All patients were female. Mean age of patients was 31 years (range 23-39 years). These patients underwent rhinoplasty via open access.

Conclusion. The presented technique of double U-shaped suture for narrow nasal root provides effective and even narrowing of the middle nasal third and prevents aesthetic complications in postoperative period.

Keywords: *rhinoplasty, nasal bridge, nasal root, osteotomy, double U-shaped suture.*

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In the modern world and new era of beauty industry, people are more and more demanding of themselves and their appearance [1]. Reconstructions of the face and body are practiced, improved and continue to reach new levels throughout the history of medicine [2]. Facial interventions prevail among reconstructive procedures, and nasal corrections are ones of the most common and technically complex operations [3]. Correction of hump and narrowing of the middle nasal third with stable fracture lines, natural appearance and beautiful lines of nasal dorsum without palpable or visible irregularities, especially in long term period, is one of the common and important objectives in rhinoplasty [4, 5].

Surgeons modernize accesses to nasal dorsum in aesthetic rhinosurgery for better visualization and convenience of work [6], offer various combinations of osteotomy of nasal bones [7]. Endoscopic assistance [8, 9] and 3D navigation exoscope [10] were described for atraumatic osteotomy. Piezo device are used [11, 12] for controlled osteotomy of nasal bones, minimization of soft tissue damage, prevention of asymmetric and wide back of the nose in postoperative period. To achieve the maximum positive effect, surgeons proposed various autografts from quadrangular cartilage [13] or auricle [14].

To date, organ-sparing rhinoplasty makes it possible to favorably recreate aesthetics during primary intervention with less injury. It is the most effective surgical treatment preventing complications [15, 16]. At the same time, there are no detailed protocols for organ-sparing rhinoplasty of certain nasal segments. New protocols and individualized techniques for certain nasal components are required to ensure stability and preservation of some structures while correcting other deformities.

The purpose of the study was to develop the original method of incomplete osteotomy with subsequent stitching of nasal bones in patients with narrow upper and wide middle nasal thirds.

Material and methods

We analyzed 56 cases of rhinoseptoplasty using a double U-suture for narrowing of the middle nasal third in people with narrow root between May 2021 and September 2022. The study was conducted in accordance with the ethical principles and the Declaration of Helsinki.

In all cases, we collected data on gender, age, parameters of nose, patency of nasal passages, technical details of surgeries, survey information and images. Patients were followed-up for 14 days after surgery. Subsequent examinations were performed in 1, 3, 6 and 12 months after surgery.

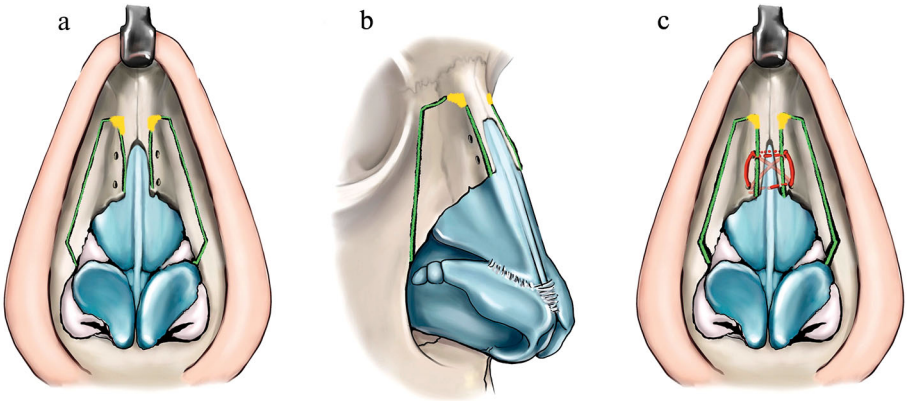


Fig. 1. **Double U-shaped suture. Osteotomy lines (green), nasal bones without osteotomy (yellow), U-shaped suture (red).**
a — full face view; b — three-quarter view; c — bone nasal pyramid with a double U-shaped suture.

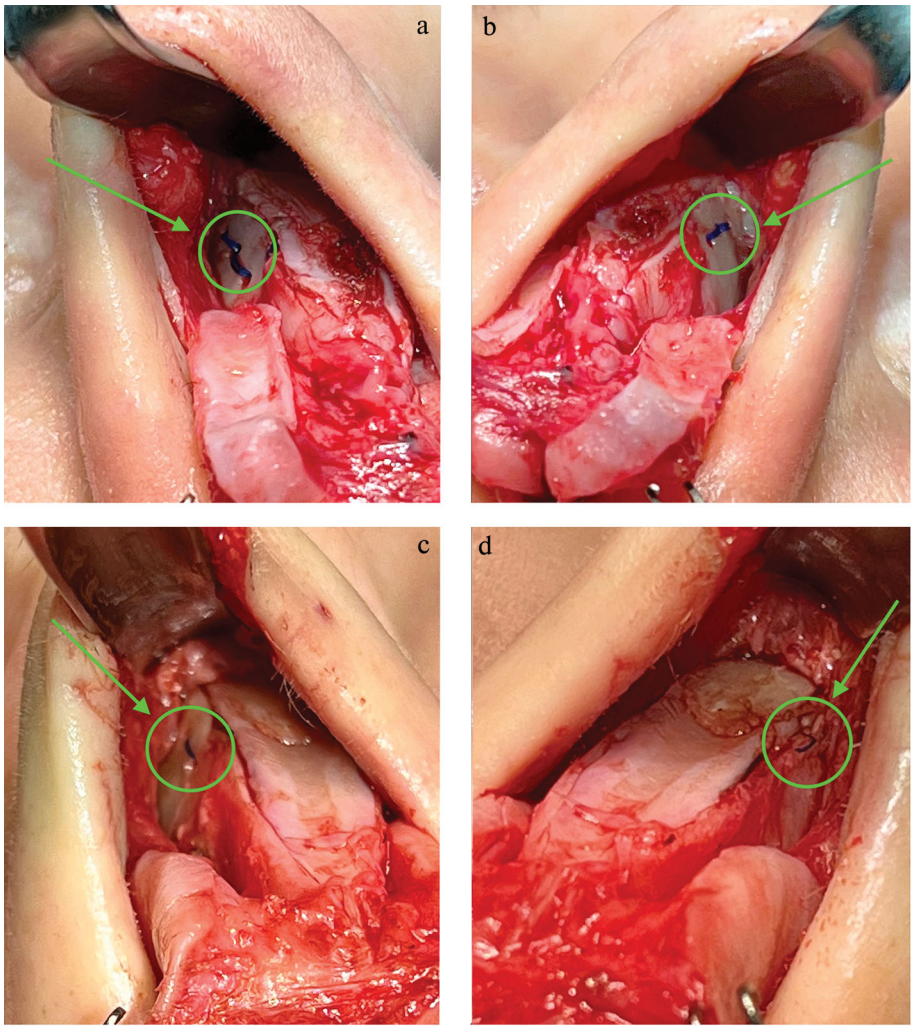


Fig. 2. **Intraoperative image of the U-shaped suture.**
a, c — bone nasal pyramid on the right; b, d — bone nasal pyramid on the left. The arrows indicate U-shaped sutures.

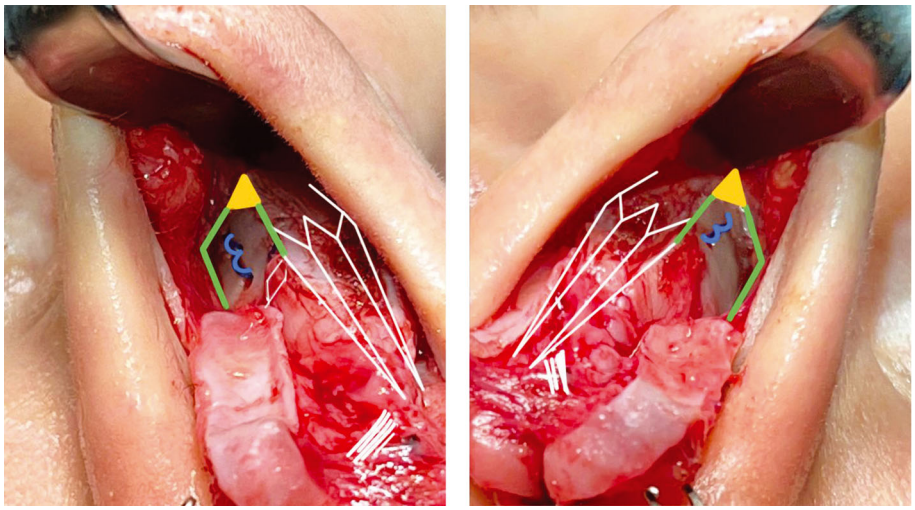


Fig. 3. **Scheme of U-shaped suture.**
Osteotomy lines (green), nasal bones without osteotomy (yellow), U-shaped suture (blue).

Inclusion criteria: patients with narrow root of the nose and congenital / postoperative deformities of osteochondral part of the nose.

Exclusion criteria: patients with severe rhinolordosis, rhinoscoliosis and post-traumatic deformities.

Surgical technique for applying a double U-shaped suture

Skeletonization of nasal dorsum is followed by bilateral partial transverse and complete lateral osteotomies. Piezoelectric device is used for this purpose **(Fig. 1)**.

Then, two holes are created in the lateral nasal bones, through which the latter are sutured by a double U-shaped suture with narrowing of nasal pyramid. The holes allow passing the thread without destroying the nasal bones. You can also adequately tie suture **(Fig. 2, 3)**.

A double U-shaped suture with thread passing in two rounds provides dense fixation of lateral nasal bones to each other like bone bridges and maintaining necessary narrowing with stable nasal bone pyramid. A double U-shaped suture is imposed continuously using non-absorbable monofilament synthetic thread 2/0, 3/0 or 4/0 (for example, polypropylene) depending on necessary rigidity and thickness of soft tissues.

To do this, a needle with a thread is passed from the inside of the right nasal bone outward through the first hole on the right into the first hole on the lateral nasal bone on the left. Then, this needle is passed into the second hole on the left, the first hole on the right, the second hole on the right, the first hole on the left, the second hole on the left, the second hole on the right and the first hole on the right. Threads are tied. Finally, we obtain a double U-shaped suture with the ends of the thread brought out into the right space between the right lateral nasal bone and nasal septum. We tie 4-5 knots, cut off excess threads and immerse the knot into this space.

Thus, a single suture connects the left and right lateral bone slopes of the nose between themselves and septum in the middle. Moreover, we provide dense and stable structure for nasal dorsum, and root of the nose remains intact. Next, we form terminal part of the nose according to anatomical landmarks and close the wound in layer-by-layer fashion. Internal valves are restored by submerged sutures, and resection of the base and / or vestibule of the nostrils is performed if necessary.

Results

We performed 56 surgeries using this method between May 2021 and September 2022. All patients were female. Mean age was 31 years (range 23-39). These patients underwent open rhinoplasty.

There were no early and delayed postoperative complications. Nasal dorsum was evenly narrowed, symmetrical and stable. Necessary aesthetic result was obtained.

Figures 4-6 demonstrate postoperative results after rhinoseptoplasty using a double U-suture for narrowing of the middle nasal third in patients with narrow nasal root.

Clinical example 1

A 38-year-old patient with congenital deformity of the nose came to the clinic. There were no previous interventions on the nose. There was a narrow nasal root expanding towards the point “K” (osteocartilaginous joint). We performed rhinoplasty using ultrasonic osteotomy and double U-shaped suture. No complications were found in early and delayed postoperative period. We achieved stable satisfactory result of narrowing of the middle nasal



Fig. 4. **Images of the patient in full face (at rest, smiling), three-quarters (at rest, smiling), in profile (at rest, smiling), in nasomental and nasofrontal projections before surgery (a, c, e, g, i, k, m, o) and one year after surgery (b, d, f, h, j, l, *n*, p).**

third **(Fig. 4)**. According to rhinomanometry data, the total air flow passing through the left and right nostrils for 1 s during inspiration was 820 ml/s prior to surgery and 835 ml/s a year after surgery. These findings confirm stable nasal passages.

Clinical example 2

A 36-year-old patient came to the clinic with a diagnosis of postoperative nasal deformity. There was previous rhinoplasty. There was a narrow nasal root expanding towards the point "K" (osteocartilaginous joint). Osseous part of



Fig. 5. **Images of the patient in full face (at rest, smiling), three-quarters (at rest, smiling), in profile (at rest, smiling), in nasomental and nasofrontal projections before surgery (a, c, e, g, i, k, m, o) and one year after surgery (b, d, f, h, j, l, *n*, p).**

the nose was not affected to the full extent that made it possible to use original technique. We performed rhinoplasty using ultrasonic osteotomy and double U-shaped suture. No complications were found in early and delayed postoperative period. We achieved stable satisfactory result of narrowing of the middle nasal third **(Fig. 5)**. According to rhinomanometry data, the total air flow passing through the left and right nostrils for 1 s during inspiration was 736 ml/s prior to surgery and 754 ml/s a year after surgery. These findings confirm stable nasal passages.



Fig. 6. **Images of the patient in full face (at rest, smiling), three-quarters (at rest, smiling), in profile (at rest, smiling), in nasomental and nasofrontal projections before surgery (a, c, e, g, i, k, m, o) and one year after surgery (b, d, f, h, j, l, *n*, p).**

Clinical example 3

A 25-year-old patient came to the clinic with postoperative nasal deformity. There was previous rhinoplasty. There was a narrow nasal root expanding towards the point "K" (osteocartilaginous joint). Osseous part of the nose was not affected to the full extent that made it possible to use original technique. We performed rhinoplasty using ultrasonic osteotomy and double U-shaped suture. No complications were found in early and delayed postoperative period. We achieved stable satisfactory re-

sult of narrowing of the middle nasal third **(Fig. 6)**. According to rhinomanometry data, the total air flow passing through the left and right nostrils for 1 s during inspiration was 675 ml/s prior to surgery and 664 ml/s a year after surgery. These findings confirm stable nasal passages.

Discussion

A differentiated approach to all anatomical components of external nose is essential in achieving the most beautiful and harmonious nose after surgery [17]. In particular, width and projection of nasal root, position relative to the eyelids and eyelashes (slightly in front of the eyelashes), as well as nasolabial angle (115–130°) are important in aesthetic perception [18]. A double U-shaped suture for narrow nasal root ensured a uniform and harmonious narrowing of the middle nasal third with stable nasal root anatomy in all patients.

In baseline necessary width and projection of nasal root, the objective is to maintain stability of this anatomical part [19]. This is achieved through various osteotomies and nasal bone suturing techniques [20]. A double U-suture can be used in people with optimal width of nasal root and height of nasal dorsum, when there is no need for extended mobilization of bone pyramid. This simple technique does not require special equipment and materials. However, this technique is not recommended for correction of pronounced osteochondral hump of nasal dorsum with significant narrowing and lowering of bone pyramid.

There is a known method for narrowing of nasal bone pyramid while maintaining nasal dorsum and complete mobilization of nasal bone pyramid from facial bones using a special method of suturing [21]. According to this technique, complete destabilization of nasal bone pyramid from facial skull is followed by its narrowing throughout. This is unnecessary in people with baseline narrow nasal root. There is a known technique for narrowing of nasal bone pyramid without nasal root using interrupted sutures [12]. In this case, interrupted sutures are imposed by absorbable suture PDS 5-0. This can lead to postoperative changes of nasal shape, and non-submerged nodes can be palpated under thin skin.

The limitations of this study are small sample size and short-term follow-up. To confirm our data, correction in patients with narrow nasal root and deformity of osteochondral part of the nose, as well as long-term postoperative follow-up are required.

Conclusion

Original technique provides uniform narrowing of the middle nasal third with stable fixation and only one submerged node in people with narrow nasal root. We obtain even contours of a uniformly narrowed nasal dorsum and no aesthetic complications (deformations and asymmetries) in delayed postoperative period.

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