Evaluation of Pain and Numbness after Sub-perichondrial and Sub-periosteal Dissection Rhinoplasty (SSD)

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Abstract

Objective

This study was conducted to find out if the SSD Rhinoplasty induce less pain early post operatively which will play an important role patients satisfaction and to evaluate the numbness after this relatively new procedure and numbness in an important and common side effect of the conventional Rhinoplasty.

Methods

One Rhinoplasty consultant has operated on 30 cases using SSD technique after informed and detailed consent, then the virtual pain score was recorded on the 7th day. And the numbness was evaluated 6 months after surgery. Results

Patients in this series (18 men, 12 women) ranged in age from 23 to 54 years (mean, 24.3 years). 24 were primary Rhinoplasty, and 6 were revision Rhinoplasty; Pain scores: The study revealed that the median: 2.0 mean pain score median: 2.0. Numbness over the nose and nasal tip: 20 (83%) patients with primary Rhinoplasty had no numbness, but 4 (17%) patients had early numbness that improved after six months. However, all revision cases (6 patients) had short and long-term numbness after 6 months. Conclusions

SSD Rhinoplasty shortens the dissection time and makes it faster to raise the envelope even with revision cases. Also, it procured much less pain among all patients. In addition, it induces minimal numbness. However, this study used a small number of patients and did not consider the procedure done after raising the nasal envelope.

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Key Points:

1. The soft tissue envelope of the external nose consists of 5 layers: the skin, the superficial areolar layer, the SMAS layer, the deep areolar layer, and the perichondrial/periosteal layer(1). Traditional Rhinoplasty includes raising the nasal envelope either in the subcutaneous or sub-superficial musculoaponeurotic system (SMAS) plane.
2. Microscopic anatomy of SAMS demonstrated that the nasal SMAS divides into a superficial and a deep layer at the level of the internal valve.
3. Pitanguy’s midline ligament maintain a soft tissue cushion between the domes and the anterior septal angle.
4. SSD Rhinoplasty induces minimal post-operative pain which confirm non stormy pot operative recovery.
5. Long term results with SSD is very satisfactory for the patient who experience minimal numbness

Introduction

The soft tissue envelope of the external nose consists of 5 layers: the skin, the superficial areolar layer, the SMAS layer, the deep areolar layer, and the perichondrial/periosteal layer(1). Traditional Rhinoplasty includes raising the nasal envelope either in the subcutaneous or sub-superficial musculoaponeurotic system (SMAS) plane. Dissection in this plane leads to significant swelling, with prolonged scar remodelling, which takes 12 to 18 months to improve and uncover the final results(2). Destruction of various ligaments and muscles with the subcutaneous or sub-SMAS approach can also compromise nasal function, especially in the internal valve area(3).

The ligamentous connections within the SMAS layer play a critical role in the dynamic interplay of compression and dilation of the nose. In-depth, detailed anatomy of SAMS demonstrated that the nasal SMAS divides into a superficial and a deep layer at the level of the internal valve, with each layer having a lateral and medial portion(4). The superficial medial layer extends caudally above the internal ligament into the columella. In contrast, the deep medial layer runs under the internal ligament into the membranous septum and then downward toward the anterior nasal spine(5). Microscopic anatomy at sub-SAMS revealed a distinct connection between the deep layer of the SMAS and the internal valve present at the scroll junction between the upper lateral cartilages (ULC) and the lower lateral cartilages (LLC). They postulated that the nasal muscles stabilize and help to open the internal valve via this ligamentous attachment.

Another critical ligament in the SAMS is the Pitanguy’s midline ligament and the internal ligament, which maintain a soft tissue cushion between the domes and the anterior septal angle, as well as a 2- to 3-mm “septal extension effect” on the tip projection (6,7). Reconstruction of this ligamentous system helps stabilize the supra-tip skin and prevents the formation of a fluid-collecting dead space, and maintains the desired tip projection and rotation(1).

Given the importance of the SAMS system and sub-SAMS plane, both are of extreme importance for successful Rhinoplasty and a properly functioning nose after Rhinoplasty; these tissues are almost destroyed in Sub SAMS dissection and, contrary, wholly preserved in complete subperichondrial plan dissection. Consequently, postoperative pain, oedema and bruises are expected to be minimal in subperichondrial plane dissection compared to SAMS dissections. In this article, we describe our technique for Rhinoplasty performed entirely in the subperichondrial and subperiosteal plane instead of the classical sub-SMAS plane.
Materials and methods

This prospective cohort study was conducted according to Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for cohort studies. Thirty cases were indicated for open septorhinoplasties that were operated on between 2022/2023 using complete subperichondrial/subperiosteal dissection (SSD); one consultant performed all surgeries in a hospital setting. The study was approved by the Institutional Ethical Committee. We followed check all the study against the STROBE Statement Checklist.

Procedure:

The open-approach technique began with a marginal alar incision on both sides and dissection, then a trans columnellar "V" incision extending through the subcutaneous tissue until the medial crura were reached. A small sharp Cottle was sued to raise the perichondrium of the medial crura with the columnellar flap then the dissection was extended in the midline into the interdomain area, keeping the perichondrium of the two middle crura in the flap. Furthermore, laterally to expose the LLC and ULL depending on the target of the surgery. The cephalic Pitanguy's midline ligament was elevated with the skin flap, and the caudal end was dissected for the nasal septum. then the periosteum was sharply penetrated. The caudal subperichondrial dissection was continued in the subperiosteal plane over the nasal bones. After finishing the aimed procedure, closure included the repair of the midline ligament with intercom 5/0 PDS sutures and the routine skin closure. In cases without bone work, no splints were inserted.

Results

Patients in this series (18 men, 12 women) ranged in age from 23 to 54 years (mean, 24.3 years). 24 were primary Rhinoplasty, and 6 were revision Rhinoplasty; Postoperatively, the patients were discussed to the grade of postoperative pain score in the first ten days and numbness over the nose after six months.

Pain scores:

All patients discussed the degree of pain they experienced after surgery using a visual analogue scale assessment of pain intensity in the first ten postoperative days. During their first postoperative visit. This revealed that the median pain score was 1. Numbness over the nose and nasal tip:

Numbness is classified as short-term numbness before six months and long-term if more than six months. All patients asked during their 6-month visit for a sense of numbness if Yes or No.

20 (83%) patients with primary Rhinoplasty had no numbness, but 4 (17%) patients had early numbness that improved after six months. However, all revision cases (6 patients) had short and long-term numbness after 6 months.

Discussion

The complication rate in Rhinoplasty is 8–15%, and most of these complications are not life-threatening (8). Acute complications of Sub-SAMS dissection are abnormal swelling, hematomas, local infections and skin necrosis (9). Also, it results in transitory oedema, numbness, and prolonged healing time that leads to stiffness of the nasal skeleton for a few months postoperatively and a sense of coldness at the nasal tip (10). Long-term complications can be atrophy, fibrosis, pain and numbness. Subcutaneous cysts and granulomas may develop(11). In this study, the postoperative pain was minimal, and the patients were satisfied with the results even in revision cases.

Nasal vascular plexuses are lying within or above the SAMS so that dissection through the areolar sub-SMAS plane with preservation of the significant vascular supply to the nasal tip has been shown to reduce postoperative tip oedema and protect against skin necrosis (12). However, latest studies have found that SSD better preserves the structures overlying the perichondrium, including the SMAS and its associated ligaments, and maintains the dynamic tension of the nasal muscles, a significant factor affecting nasal valves, airway patency, and breathing dynamics (13, 14). Dissection at sub-SAMS leads to functional drawbacks due to the destruction of essential ligaments of the nose, especially at the scroll area, which subsequently
leads to damage and narrowing of the internal nasal valve areas and Pitanguy’s midline ligament that results in loss of tip height and projection, loss of tip rotation, changes in the silhouettes of the nasal cartilages, supra tip deformity, and a hanging columella(1). Furthermore, the external nasal nerve and plexus lie below under the nasal SMAS, passing from the bone-cartilage vault junction down to the alar cartilage and nasal tip (15); damage to this nerve is a common complication of the Subsams dissection Rhinoplasty. Nasal tip numbness is a recognized postoperative complication after septorhinoplasty, and rhinoplasty numbness may be short- and long-term (>6 month)(16). Recent studies advise dissecting in the sub-SMAS layer or directly onto cartilage(17) In this study, 83% of patients with primary subperichondrial dissection rhinoplasty had no numbness, while revision cases had some.

Conclusions
Subperichondrial dissection Rhinoplasty shortens the dissection time and makes it faster to raise the envelope even with revision cases. Also, it produce much less pain among all patients. In addition, it induces minimal numbness. However, this study used a small number of patients and did not consider the procedure done after raising the nasal envelope.

Conflicts of interest. No potential conflicts of interest must also be explicitly stated.

Ethical consideration.
Written informed consent was obtained from each participant/patient for study participation and data publication.

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