

## CLINICAL TECHNIQUES AND TECHNOLOGY

# Endoscopic “crossover flap” technique for nasal septal perforations

Shirley Pignatari, MD, PhD, João Flávio Nogueira, MD, and Aldo Cassol Stamm, MD, PhD, São Paulo, Brazil

*No sponsorships or competing interests have been disclosed for this article.*

**A** nasal septal perforation is a defect in any portion of the cartilaginous or bony septum with no overlying mucoperichondrium or mucoperiosteum on either side. In the perforation, the mucosal edges epithelialize, preventing closure of the defect. Although some patients may be completely asymptomatic, symptoms can arise from altered nasal laminar airflow, and they may be severely disturbing to patients.<sup>1</sup>

Symptoms tend to be related to the size and location of the perforation. Most symptomatic perforations are large and anterior. Posterior perforations tend to be less symptomatic than others because of humidification from the nasal mucosa and turbinates.<sup>1</sup>

Small perforations can cause a whistling sound with inspiration. Other symptoms include crusting, bleeding, nasal discharge, parosmia, and neuralgia. Larger perforations can lead to atrophic rhinitis. Long-standing large perforations may even result in a saddle-nose deformity from a lack of dorsal nasal support.<sup>1,2</sup>

Several techniques for repairing septal perforations have been described over the years, yet no standardized surgical protocol has been established. Repair techniques still present high failure rates and include prosthetic devices, local mucosal flaps, two-stage procedures, and free-flap repair.<sup>2,3</sup>

Currently, nasal flaps are used for numerous purposes, such as choanal atresia (CA) repair, frontal sinus approach, and skull base reconstruction.<sup>4</sup> Now, in this article, we present our endoscopic technique using bilateral mucosal flaps in a crossover interposition for the closure of septal perforations, and its results.

## Methods and Results

After Hospital Professor Edmundo Vasconcelos institutional review board approval, the surgical technique was

performed with the patient under general, controlled, hypotensive anesthesia. A topical vasoconstriction was done with adrenaline soaked cottonoids, and with a 4-mm, 0-degree endoscope, the nasal septal perforation was visualized (Fig 1A) at both sides of the nasal cavity. It was of paramount importance not to touch the borders of the nasal septum perforation with sharp surgical instruments, because they provide the vascular supply to the mucosa that repair the nasal septal defect.

Infiltration with a solution of lidocaine and adrenaline 1:100,000 was performed at the nasal septal mucosa 10 minutes before the beginning of the procedure.

With a small surgical blade, the incisions were made on both sides of the nasal septum: one quadrangular or semi-circular incision above the perforation, leaving intact the inferior border; and on the other side of the nasal septum, a quadrangular or semi-circular incision under the perforation, leaving intact the superior border. A subperichondral dissection was made on both sides following the incisions, and two mucosal flaps were created.

The flaps were crossed to the opposite side through the nasal septal perforation, and a complete closure was achieved (Fig 1B and Fig A1, available online at [www.otojournal.org](http://www.otojournal.org)). Fibrin glue was positioned in some cases in order to hold the flaps and seal the perforation. Nasal packing and splints were positioned, to help the stabilization of the flaps, and were removed at discharge, which occurred the day after the surgical procedure. Patients were examined postoperatively every week for nasal toilet until crusting subsided.

We used this endoscopic technique in six patients—five females and one male—with ages ranging from 18 to 54 years (mean, 33.5 yrs). The causes of the perforation were idiopathic for one patient and iatrogenic for the other five. Patients were followed for a minimum of 10 months. In five cases (83.3%), a successful closure of the nasal septum perforation was achieved. In one case (16.7%), the nasal septum perforation remained with the same preoperative size.

---

Received May 22, 2009; revised July 28, 2009; accepted August 21, 2009.

**Figure 1** Endoscopic view (4-mm, 0-degree endoscope) of the right side nasal cavity. **(A)** Anterior nasal septal perforation. Nasal septum indicated by *ns*; *it* indicates inferior turbinate. **(B)** Perforation’s closure. *da* indicates donation area superior to the perforation (this superior flap is crossed to the left side); inferior nasal septal flap from the left side (indicated by *f*) is crossed through the perforation.

## Discussion

Most traumatic or iatrogenic perforations result from mucosal lacerations on corresponding sides of the septum or a fracture of the cartilaginous septum.<sup>1-3</sup> Iatrogenic causes include nasal intubation or nasogastric tube placement. However, prior septal surgery is the most common cause of septal perforations. In our series of patients, we had five cases of iatrogenic perforations. All of them occurred after nasal septal surgery.

One patient did not present any apparent cause of the nasal septal perforation. We classified this patient into the idiopathic category, and the nasal septal mucosa could have had inherent problems prior to surgery—such as vascular alterations, among others—that could have been the cause of the closure’s failure.

Preoperative evaluation is crucial. Systemic causes, malignancy, or any other ongoing process must be excluded prior to repair. Tomography of the paranasal sinuses is indicated to evaluate the nasal septum and the presence of concomitant paranasal sinus disease.<sup>1-3</sup>

Proper nasal hygiene plays a vital role in the procedure’s success and requires patient cooperation. This care includes frequent lavage with saline nasal irrigations or water picks; application of emollients; weekly nasal toilet, including suctioning and debriding of crust; use of nasal steroids; and antibiotic treatment for infection. Topical steroids are important because they have low systemic absorption, and since they may reduce nasal mucosal edema and swelling, they can have an important role in the perforation’s closure.

Follow-up requires routine nasal irrigation and nasal toilet every month until complete healing of the nasal septal

mucosa is achieved. The surgeon should always forewarn patients that constant nasal toilet is required.

## Conclusion

The nasal septal endoscopic crossover technique was already described for the successful treatment of CA, and, with some variations, it can also be a good alternative for small or medium-size perforations. It is relatively easy, safe, and feasible. However, the nasal septum must have a donor area with cartilage. A further follow-up study with an increased number of patients is needed.

## Author Information

From the Department of Pediatric Otolaryngology, Federal University of São Paulo (UNIFESP) (Dr Pignatari), São Paulo, Brazil; and São Paulo ENT Center – Hospital Professor Edmundo Vasconcelos (Drs Pignatari, Nogueira, and Stamm), São Paulo, Brazil.

Corresponding author: João Flávio Nogueira Jr, MD, Rua Martiniano de Carvalho, 1049 – AP 195C, São Paulo 01321-001, Brazil.

E-mail address: [joaoflavioce@hotmail.com](mailto:joaoflavioce@hotmail.com).

## Author Contributions

**Shirley N. Pignatari**, writer, surgery technique, review; **João Flávio Nogueira**, writer, surgery, review; **Aldo Cassol Stamm**, review.

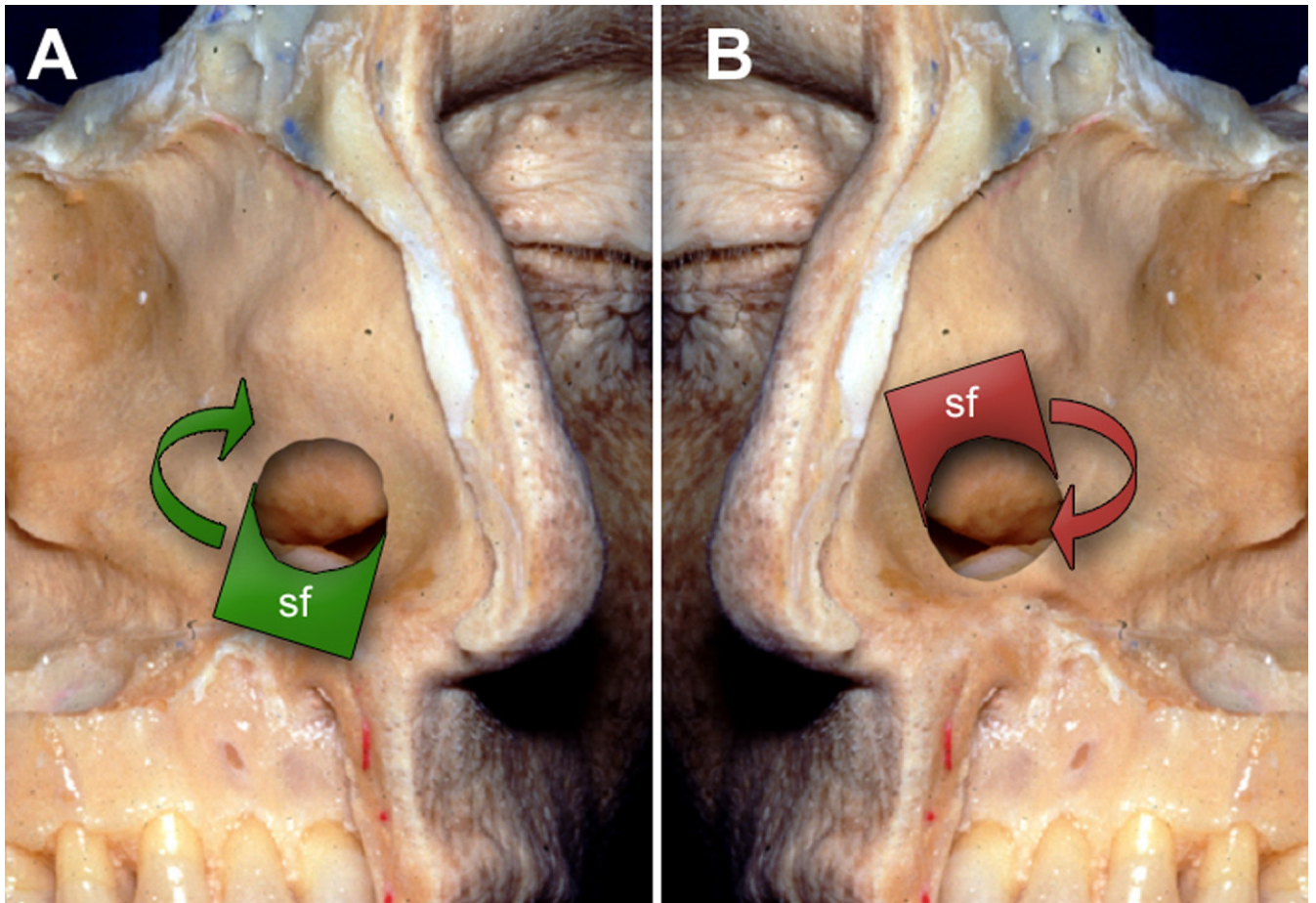
## Disclosures

**Competing interests:** None.

**Sponsorships:** None.

**References**

1. Goh AY, Hussain SS. Different surgical treatments for nasal septal perforation and their outcomes. *J Laryngol Otol* 2007;121:419–26.
2. Tasca I, Compadretti GC. Closure of nasal septal perforation via endonasal approach. *Otolaryngol Head Neck Surg* 2006;135:922–7.
3. Pignatari SS, Stamm AC. Nasal septal cross-over flap technique: a choanal atresia micro-endoscopic surgical repair. *Am J Rhinol* 2001; 15:143–8.
4. Stamm AC, Pignatari S, Vellutini E, et al. A novel approach allowing binostril work to the sphenoid sinus. *Otolaryngol Head Neck Surg* 2008;138:531–2.



**Figure A1** Oblique cadaver dissection piece showing an anterior nasal septum perforation. (A) Right-side inferior septal flap (*sf*), which is rotated to the left side. (B) Left-side superior septal flap (*sf*), which is rotated to the right side.