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Human Donor Fascia Lata for Nasal Septal Perforation Repair

Background

Nasal septal perforation repair has been described in the medical literature for several decades as a technically challenging procedure with variable outcomes. Early studies published in the late 1990s and early 2000s reported mixed success rates using flap-only techniques and a variety of interposition materials, often in small patient cohorts and highly selected cases. As surgical techniques and biologic graft options evolved, more recent publications from the mid-2010s through the early 2020s have increasingly emphasized multilayer repair strategies incorporating fascia-based interposition grafts.

Studies published between approximately 2018 and 2024 describe the use of fascia-based grafts, including donor-derived fascia lata, as structural scaffolds in septal perforation repair across a range of defect sizes, with reported outcomes varying based on patient factors, perforation size, and surgical technique. This paper is intended to provide an informational overview of published approaches and trends in the literature. It does not replace formal surgical training, clinical judgment, or institution-specific protocols. Surgeons and physicians are responsible for determining appropriate techniques, training, and product selection based on their own experience and patient-specific considerations.

Introduction: Nasal Septal Perforations and Repair Challenges

A nasal septal perforation is a full-thickness defect of the nasal septum involving both mucosal layers and the intervening cartilage or bone. Patients with septal perforations often suffer from whistling, crusting, nasal obstruction, bleeding, and dryness due to abnormal airflow between the nasal cavities. Small perforations can sometimes be managed conservatively (saline irrigations, ointments, or obturator buttons), but larger perforations (often defined as ≥20 mm) usually require surgical repair. Unfortunately, surgical closure of septal perforations is notoriously challenging, even for experienced surgeons. Reported success rates vary widely (from ~50% up to 97%) depending on the surgeon and technique. Many ENT and plastic surgeons struggle to achieve consistent, long-term closure, especially for large or complex perforations.

Several factors make septal perforation repair difficult. Limited tissue availability for flap advancement, high tension on suture lines, and poor vascularity at the perforation edges all impede healing. Larger perforations amplify these issues – in one study, patients with failed closures had significantly larger defects (average ~12 mm) than those with successful closure (~8 mm). Patient factors such as smoking (which impairs wound healing) and concomitant rhinoplasty (which disrupts blood supply) further decrease success rates. Moreover, many perforations result from prior septal surgery, meaning the tissue is often scarred and delicate. During repair, raising mucosal flaps without creating new tears is painstaking, and even a small technical misstep can lead to flap necrosis or reperforation. Indeed, some patients endure multiple failed attempts; for example, a case report described a patient with two prior repair failures (using local flaps and temporalis fascia) before a novel graft technique finally achieved closure. These challenges underscore why septal perforation repair has been likened to “squaring the circle” – countless methods have been tried, but no single standard exists.

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Clinical Outcomes with Donor Fascia Lata Grafts (SeptoPatch)

Human donor fascia lata – a graft harvested from cadaveric iliotibial fascia – has emerged as an effective option for septal perforation repair. In practice, fascia lata provides a strong yet flexible collagen scaffold that can be placed between septal flaps to facilitate closure. Surgeons have long used autologous fascia (typically temporalis fascia from the scalp or fascia lata from the thigh) for this purpose, given its low metabolic needs and excellent revascularization potential. Donor (allograft) fascia lata offers the same benefits without donor-site morbidity. A properly processed fascia lata allograft is decellularized and sterile, serving as a ready-to-use connective tissue patch that avoids a second surgical harvest. This addresses issues like scalp scarring or thigh wound complications that accompany autologous fascia harvest.

Success rates with fascia lata grafts have been very promising. A 2024 clinical series by Joo and Jang reported that using a cadaveric fascia lata interposition graft achieved an 88.9% closure success (16 of 18 cases). This was one of the highest success rates among techniques in that series – notably better than outcomes with some traditional methods like local rotational flaps or perichondrial grafts (which had ~42% and 50% success, respectively). Another recent study of large perforations (>2 cm) using a fascia lata–fat *"island"* graft (fascia lata with an attached fat pad) showed 92% complete closure (23 of 25 patients) at 12 months follow-up. These high success rates reflect fascia lata's role as a robust scaffold: the graft is placed to span the defect and is rapidly infiltrated by the patient's tissue. Mucosal flaps on each side can then heal across the perforation with the graft as a supportive layer. As Dr. Genther of Cleveland Clinic describes, fascia lata contains an areolar layer that likely revascularizes quickly, acting "as a scaffold for the mucosa to grow over" so the two sides eventually heal together. When secured in position (often with an absorbable implant or stents for support), the fascia lata graft can maintain separation of the flaps during healing and reduce tension – critical for a durable repair.

Equally important, long-term closure with fascia lata has been excellent. In the above studies, once the perforation was successfully closed at a 3–6 month postoperative exam, late recurrence was rare. Donor fascia lata, like other acellular collagen grafts, becomes incorporated into the septum over time. The graft does not elicit immune rejection; instead it serves as a biocompatible matrix that is gradually populated by the patient's cells and blood vessels. Clinically, patients whose perforations heal with a fascia lata patch report significant symptom relief – reduced nasal crusting, elimination of whistling, and improved breathing – essentially restoring normal nasal function. Taken together, these outcomes suggest that SeptoPatch (a human donor fascia lata graft) can provide reliable septal perforation closure with high success rates and excellent tissue integration.

Comparison of Graft Materials and Techniques for Septal Perforation Repair

Surgeons have explored a wide range of graft materials and techniques for closing septal perforations. Each option has distinct handling characteristics, integration properties, and potential complications. The table below summarizes key graft options and their comparative attributes, based on clinical studies and surgical experience:

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Table: Comparison of graft materials and techniques for septal perforation repair, including typical outcomes, benefits, and drawbacks (compiled from clinical studies and expert reports).

Graft/Technique	Source	Success Rates (Typical)	Advantages	Challenges/Complications
Donor Fascia Lata (allograft) **– e.g. SeptoPatch**	Cadaveric fascia lata (processed allograft)	~85–90% closure in recent series (large perforations)	*No harvest needed* (off-the-shelf); robust collagen scaffold; relatively thick and strong for support; revascularizes/integrates with host tissue; easy to trim and suture when hydrated	Tissue bank cost; theoretical infection risk (mitigated by screening/sterilization); graft resorption rare (generally incorporates); must be rehydrated before use (comes dehydrated)
Autologous Temporalis Fascia	Patient's own deep temporal fascia (scalp)	75–90% in experienced hands (often folded in layers); one series showed ~65% success	*Well-established* graft; thin, pliable tissue that serves as an excellent mucosal growth template; low metabolic requirements; no foreign material	Requires surgical harvest (incision in scalp); risk of donor-site pain, scarring, alopecia; very thin – can be difficult to handle once wet (tends to fold or tear); needs careful placement (can wrinkle or bunch up); limited graft size (may be insufficient for very large perforations)
Autologous Fascia Lata (thigh)	Patient's iliotibial fascia (lateral thigh)	High success (often >90% when used with proper support) for large perforations	Thicker and tougher than temporalis fascia; large graft possible (thigh fascia is extensive); excellent strength and vascularization potential	Requires thigh incision and wound (risk of pain, hematoma, temporary gait limitation); donor-site morbidity (though low, e.g. scar on thigh); similar handling to temporalis fascia (must keep orientation of vascular plane)
Autologous Cartilage Graft (with or without fascia)	Patient's septal, ear (conchal), or costal cartilage	Often used as a *structural support* in combination with fascia or flaps; success ~80–90% in some series when combined. Cartilage alone (without	Rigid support can splint the septum and prevent collapse; diced cartilage in fascia (DC-F) technique provides both structure and scaffold – shown to close ~83% of	Requires harvest (nasal septum, ear, or rib); adding a rigid graft increases complexity – must precisely fit defect; risk of warping or pressure necrosis if cartilage presses on flaps; limited vascularity (cartilage itself

		mucosal flap coverage) is usually insufficient.	perforations; autologous (no immune issues)	doesn't revascularize, so edges must be well-covered to prevent extrusion)
Mucosal Flap Techniques (local tissue only)	Patient's intranasal mucosa (e.g. bilateral advancement flaps, rotational flaps)	Highly variable success – small perforations (<1 cm) can approach 90–100% with simple flap closure, whereas larger perforations often fail (e.g. one technique using a unilateral flap had ~42% success). Overall, flap-only approaches for large holes have ~70–88% success.	Uses native vascularized tissue – ideal for integration; no graft needed; if successful, mucosa-on-mucosa healing restores normal lining (no foreign material)	Often *insufficient for large defects* – limited mucosal slack leads to tension and partial closure; risk of flap shrinkage or necrosis; if bilateral flaps are raised, both sides are wounded (increasing risk of new perforation); *rotational flaps* may leave thin areas prone to re-perforation; requires high surgical skill to avoid creating additional mucosal tears
Acellular Dermal Allograft (AlloDerm®)	Cadaveric dermis (decellularized skin)	~90% in small-to-moderate perforations (Kridel et al. reported 11/12 closed using AlloDerm with mucosal flaps); comparable to autologous fascia outcomes. Some series show 80–85% for larger perforations.	No patient harvest needed; thick, durable matrix – adds substantial volume to repaired septum; easy to handle after rehydration (feels like pliable skin); integrates with host tissue without immune rejection	Requires refrigerated storage and rehydration before use; material cost; if not well-vascularized, graft could theoretically persist as a dead space (infection risk, though low); slightly less tensile strength than fascia lata (dermis is more spongy, can tear if pulled hard during suturing)
Synthetic Implants & Adjuncts (e.g. PDS plate, porous polyethylene)	Man-made materials (absorbable plate, plastics) often used as **support in conjunction with flaps/grafts**	By themselves, synthetics do not "heal" a perforation, but they can bolster repairs. For example, a polydioxanone (PDS) absorbable plate used with flaps/grafts yielded high closure rates (~90% in one series) by stabilizing the repair. Experimental use of porous polyethylene (Medpor) wrapped in fascia achieved 90% closure in animal models.	PDS plates provide temporary rigid support and then dissolve, removing need for a second surgery; porous implants allow tissue ingrowth if covered properly; *septal buttons* (silicone plugs) can immediately alleviate symptoms without surgery (as a non-surgical alternative)	Foreign materials can increase infection risk if exposed; an uncovered implant can fail to epithelialize and may extrude – covering with fascia or perichondrium is necessary for integration; septal buttons often uncomfortable long-term and do not actually close the hole (just a palliative measure); any non-absorbable implant is a lifelong foreign body if left in place

Handling, Integration, and Long-Term Outcomes

Successful septal perforation repair requires not only choosing the right material but also careful handling and technique. Each graft has unique intraoperative considerations. For instance, temporalis fascia is so thin that surgeons often air-dry it briefly to allow easier handling – but once rehydrated by nasal fluids, it can turn almost translucent and floppy. In contrast, donor fascia lata comes dehydrated and must be soaked (usually in saline for a few minutes) until it becomes soft and pliable, but it retains more strength and does not disintegrate when wet. AlloDerm (dermal allograft) also requires a 10–15 minute rehydration; surgeons report that a thicker dermal graft (>1 mm) is preferable for ease of suturing and providing septal substance. Cartilage pieces must be carved to fit the defect and usually need to be wrapped (e.g. in fascia) or wedged in place to avoid pressure points. Meticulous suturing of grafts to any remaining septal edges or fixation with an absorbable plate can help prevent the graft from shifting postoperatively.

Integration of grafts is critical for long-term success. Autologous tissues (fascia, perichondrium, etc.) start with an inherent blood supply and integrate readily as their vessels inosculate with surrounding tissue. Allografts, being acellular, rely on host vessels and cells to infiltrate them. Both fascia lata and dermal allografts have proven excellent integration rates – histologically, they become indistinguishable from surrounding connective tissue after a few months, provided the mucosal cover remains intact. The presence of a well-vascularized mucosal flap on each side greatly aids graft incorporation; this "sandwich" provides nutrients from both sides. Fascia lata's collagen matrix is naturally conducive to capillary ingrowth, and clinical experience shows that if a perforation is fully closed at 3 months, the graft has essentially integrated and the result is durable. Synthetic supports like PDS plates dissolve by 6–12 months, by which time the hope is that the biologic tissues (flaps and any graft) have fully healed together. Permanent synthetics (e.g. silastic buttons) do not integrate into tissue – they simply cover the hole and can be removed or replaced as needed, often accumulating biofilm over time.

Complications vary by technique but generally include: bleeding and septal hematoma in the immediate postoperative period, infection (uncommon, especially with allografts – one series noted infections were rare after perforation repairs), graft or flap necrosis, and reperforation. The most feared failure mode is reperforation, where the repair breaks down and the hole reopens. This can happen early (before full healing) due to excessive tension, poor vascular supply, or infection, or it can occur later from trauma or persistent irritants (e.g. cocaine use or nasal picking). Using an interposition graft significantly lowers the risk of reperforation by providing a robust barrier between flaps. In Joo et al.'s study, the use of any interposition graft improved success odds by a factor of ~6. On the other hand, patients who had concurrent rhinoplasty (extensive nasal reshaping) at the time of perforation repair had nearly 4× higher odds of failure, presumably because the additional surgical trauma compromised blood flow to the flaps. Thus, many experts advise staged procedures – address the perforation first, then cosmetic rhinoplasty later – to maximize the chance of closure.

With donor fascia lata grafts specifically, complications are notably reduced in one aspect: no donor site morbidity. Surgeons avoid creating a second wound, which not only spares the patient pain and scarring but also shortens operative time by ~30 minutes (time that would otherwise be spent harvesting graft tissue). Modern tissue bank processing has made allograft use very safe; fascia lata allografts are rigorously screened

and treated (e.g. radiation, chemical sterilization) to eliminate pathogens. Immunologic rejection is not a concern because the graft is essentially a collagen scaffold without foreign cells. The main precautions are to handle the graft with sterile technique (to avoid contamination) and to maintain proper orientation (some surgeons prefer to place the side with remaining areolar tissue facing outward toward the mucosa to encourage revascularization). Long-term, a successful septal repair with fascia (or dermis or cartilage) typically remains closed permanently, restoring a stable nasal septum. As one study noted, no perforation that was fully healed at 3 months went on to break down later unless the patient experienced new trauma or resumed intranasal drug use. In other words, achieving a solid initial closure is the pivotal hurdle – and biologic grafts like fascia lata are proving to be the key to clearing that hurdle.

Why Septal Perforation Repair Remains Difficult (and How SeptoPatch Can Help)

Even with numerous techniques and materials available, septal perforation repair continues to have a steep learning curve. The multilayer nature of the defect (mucosa–cartilage–mucosa) means that a successful repair must recreate each layer to some extent. Many surgeons, especially those who only occasionally encounter perforations, find it challenging to get both septal sides to heal. Lack of standardized training or protocols contributes to variable outcomes. Additionally, each patient's anatomy and perforation etiology can differ: a small traumatic perforation in an otherwise healthy septum is far easier to close than a large iatrogenic perforation in a nose with prior surgeries or vasculitis. Surgeons who have tried and had failures may become hesitant to attempt again, opting for conservative management or referring complex cases to tertiary centers.

This is where SeptoPatch's human donor fascia lata offers a compelling advantage from both a clinical and practical standpoint. By providing a ready-made graft of consistent quality, it removes one variable from the equation. Surgeons can focus on flap mobilization and placement, confident that the interposition material is strong and uniformly prepared. The fascia lata patch effectively expands the envelope of repair – allowing even large, challenging perforations to be closed in a single stage that might otherwise require more drastic measures (such as regional skin flaps or free tissue transfer). Clinical evidence shows that using fascia lata (especially in a sandwich graft technique) makes perforation size less of a determinant of success. In one series, outcomes with a fascia lata sandwich graft were equally high for perforations <2 cm and those ≥2 cm, suggesting the graft mitigates the usual size-related drop in success seen with flap-only repairs.

Surgeons who have adopted fascia lata graft techniques emphasize certain technical pearls: ensure tension-free mucosal advancement, preserve the mucosal blood supply (minimal cautery on flaps), and secure the graft so it doesn't shift during healing. Dr. Genther noted that carefully maintaining the fascia's outer vascular layer is where "other people using similar techniques come up short" – highlighting that attention to graft handling can differentiate success from failure. SeptoPatch comes as a thicker fascia than temporalis fascia, meaning it can be sutured or even bolstered with a dissolvable plate without tearing. This translates to a more stable repair construct. Postoperatively, standard measures still apply (internal silicone splints for 1–2 weeks or longer, saline irrigations to keep mucosa moist, and avoidance of nose picking or strain). When the protocol is followed, patients can expect not only closure of the perforation but also significant relief of symptoms and improvement in quality of life.

In summary, septal perforation repair is challenging due to anatomical and technical hurdles, but the use of human donor fascia lata grafts has markedly improved outcomes. By combining sound surgical technique

with an advanced biologic implant like SeptoPatch, surgeons can achieve high closure rates, robust healing, and lasting results even in cases that were once considered very difficult. This blend of clinical innovation and practical convenience ultimately means better care for patients suffering from septal perforations – a win-win for both surgeons and the patients they treat.

References and Further Reading

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