

## Reconstructive Proctology: A Narrative Review of Flap-Based Anoplasty for Aesthetic and Functional Optimization in Grade Iv Hemorrhoidal Disease

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### ABSTRACT

Hemorrhoidal disease is one of the most ubiquitous benign anorectal conditions. While early disease is largely able to be controlled and treated in the office, Grade IV hemorrhoidal disease (i.e., permanently prolapsed and irreducible hemorrhoidal cushions) requires radical surgery. The gold standard for advanced disease is excisional hemorrhoidectomy. These extremely aggressive excisional procedures are very painful and can sacrifice much of the normal anoderm. The resultant healing by secondary intention often causes an iatrogenic anatomical anal stenosis. As a result, the field of contemporary reconstructive proctology has moved towards flap-based anoplasty. Pliable and well-vascularized perianal skin is brought into the anal canal by a set of techniques such as V-Y advancement, Diamond, and House flaps to restore the reconstructive principle of like with like. These techniques are used prophylactically during primary excisional hemorrhoidectomy and reactively to reconstruct the anal canal. The pathophysiology of Grade IV hemorrhoidal disease and postoperative anal stenosis, as well as geometric issues of modern flap anoplasty, are discussed in this review. The clinical outcome is compared with the more effective one by keeping the functional continence intact and the aesthetic satisfaction.

**KEYWORDS:** Grade IV Hemorrhoids; Reconstructive Anoplasty; V-Y Flap; Anal Stenosis; Aesthetic Proctology.

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### INTRODUCTION

Hemorrhoidal disease has a massive global health and economic burden that affects a large fraction of the adult population. The clinical severity of internal hemorrhoids is stratified according to the Goligher classification system based on morphological and tissue-folding structure (1). Grade I and II diseases can be treated with dietary changes and surgical interventions. Grade IV hemorrhoidal disease is the last stage of the disease spectrum, where the hemorrhoidal prolapse is always present and completely irreducible and is often accompanied by acute thrombosis and extensive circumferential rectal mucosal prolapse.

The treatment of hemorrhoidal disease is set by the Goligher grade and subjective severity of symptoms. Clinical practice guidance (2) and the updated 2024 recommendations from the American Society of Colon and Rectal Surgeons (ASCRS) have long recommended a step-up approach to treatment. Low-volume treatments are not adequate for Grade IV disease, and surgical treatment of it by radical excisional hemorrhoidectomy (i.e., intra-ocular hemorrhoid removal) is the only treatment available for advanced and irreducible hemorrhoids.

## Pathophysiology and the genesis of Iatrogenic Anal Stenosis.

The transition from physiological anal cushions to pathological hemorrhoidal disease is driven by the progressive degradation of the supportive connective tissue framework, driven by mechanical stressors such as chronic constipation and prolonged straining (3). In terminal Grade IV disease, the sheer volume of the hypertrophied vascular tissue, combined with the total failure of the suspensory ligaments, leads to a massive, permanent prolapse.

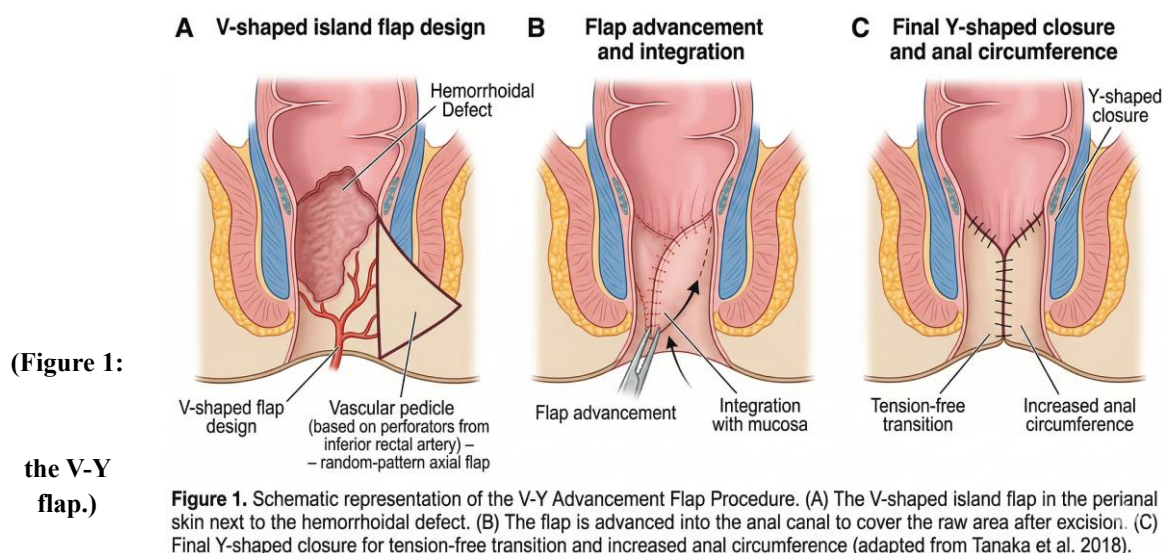
Because minimally invasive methods such as stapled hemorrhoidopexy (PPH) or laser hemorrhoidoplasty (LHP) fail to address the extensive external fixed skin tags and fibrotic pathology of Grade IV disease, conventional radical excisional hemorrhoidectomy (Milligan-Morgan or Ferguson) remains the gold standard (4, 5).

But radical excisional surgery for severe, circumferential Grade IV disease is a serious surgical challenge. The aggressive removal of large hemorrhoidal columns often requires the removal of muco-cutaneous bridges. Then, when the wounds heal by secondary intention, the body develops

an enormous amount of fibroblasts that fill the body with dense arrays of rigid Type I collagen (6). The cicatricial tissue begins to form a non-elastic fibrotic ring that constrains the anal outlet and leads to the disease of anatomical anal stenosis (6). Patients afflicted by post-hemorrhoidectomy stenosis suffer greatly from the loss of bowel movement and anal pain problems that cause chronic pain and the need to resort to digital evacuation surgery and are very ill (6).

The paradigmatic approach to reconstructive proctology and flap techniques. To bridge the gap between radical excision of Grade IV hemorrhoids and the crippling complications of anal stenosis, the surgical approach now uses reconstructive proctology. This is a surgical field that has turned away from solely excisional surgery and is built on tissue transfer and plastic surgery to ‘replace like with like’ (6) by flap-based anoplasty, which involves the geometric design and elevation of healthy, vascularized perianal skin into the anal canal to restore anatomical compliance.

The V-Y Advancement Flap. The V-Y advancement flap is a classical and widely used technique to achieve mild to moderate anatomical strictures at or just below the dentate line.



(Figure 1:

the V-Y  
flap.)

Schematic and  
intraoperative  
representation of  
advancement

An incision is made across the fibrotic stricture, creating a V-shaped defect. An equivalent V-flap is created next to it. By mobilizing the subcutaneous fat so as to maintain its vascularity, the flap is immediately slipped into the anal canal. The donor site is approximated linearly and the original shape of the donor site is converted to a Y shape (7). Data on clinical trials is generally fast (60 minutes) and there are significant decreases in the Visual Analogue Scale (VAS) pain scores (7).

(Rhomboid) Flap

The Diamond, or modified Rhomboid, island flap is an advanced technique that can overcome the ischemic risks and tension issues associated with simpler flaps, and is perfect for moderate to severe stenosis.

The Diamond

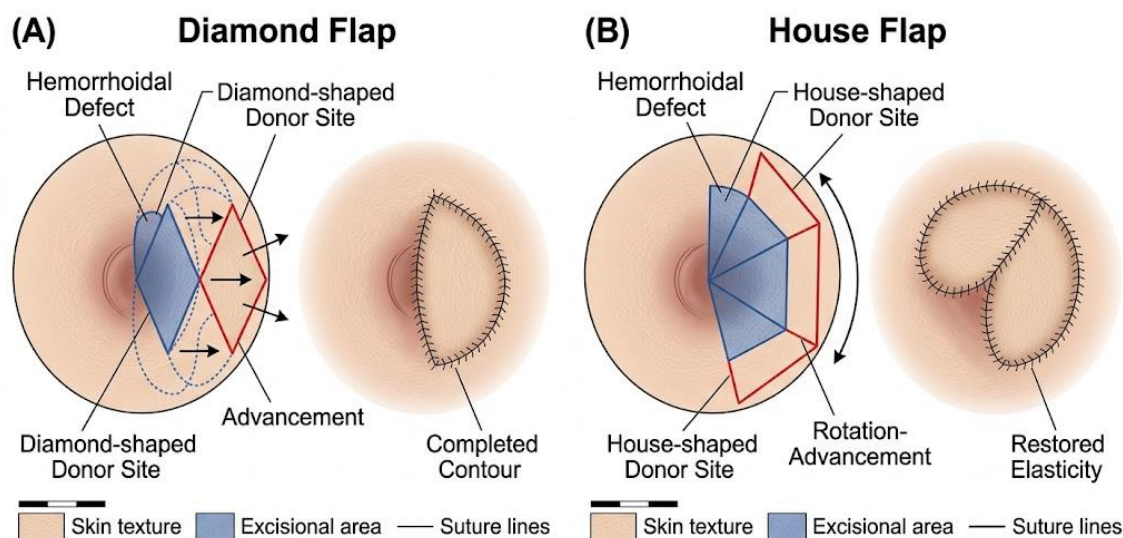


**Figure 2.** Geometric designs for perianal reconstruction. Comparison of (A) Diamond Flap and (B) House Flap showing the orientation of the donor site to the anal verge to achieve aesthetic contour and elasticity.

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Following removal of the scarred tissue, a diamond-shaped flap is mapped on the adjacent healthy perianal skin. It is an island flap; the central pillar of the underlying ischiorectal fat and the vascular pedicle is still attached. The block of tissue is transferred directly into the anal canal without lateral skin drag, which ensures there is no tension on the suture line (8). The Diamond flap has exceptional vascular stability, providing a 100% primary healing rate with near zero necrosis of the flap in severe strictures (6, 8).

**3.3 House advancement flap.** The most catastrophic manifestations of Grade IV disease (especially severe, long segment or fully circumferential anatomical stenosis) are treated with the House advancement flap.

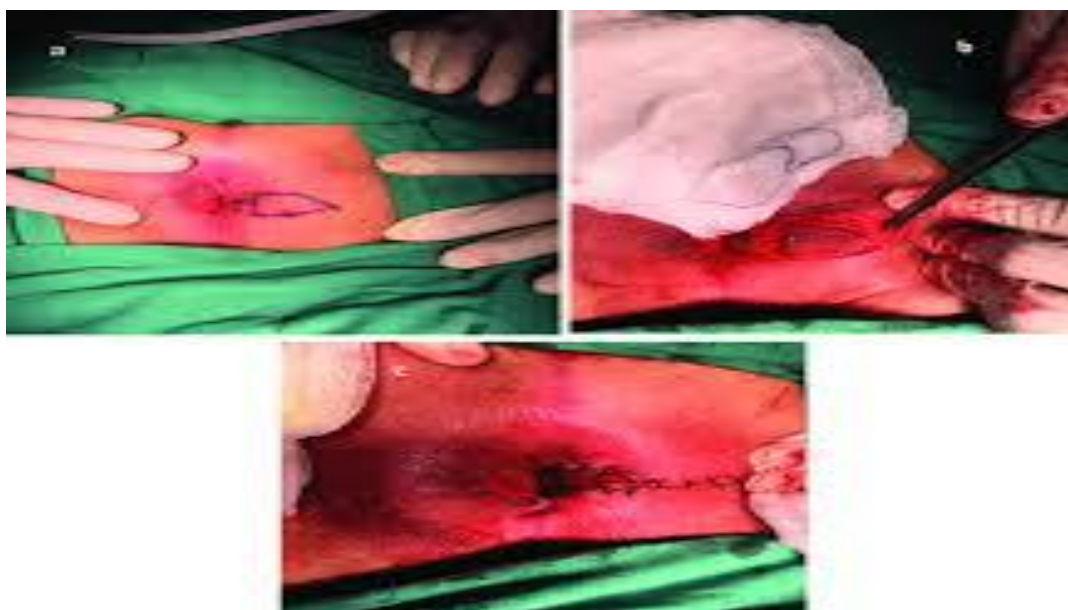


**Figure 3: House advancement flap designed for massive full-circumferential tissue replacement.**

This technique delivers a huge area of fresh, pliable skin into the anal canal. A large, pentagonal flap that resembles a house is designed on the gluteal skin and has a broad base which faces the anal canal, and its total length is about twice the width of the base (9). The large vascular base makes it very resistant to ischemia. Systematic reviews have shown that people with the House flap demonstrate the lowest pooled complications and the highest overall outcomes in clinical improvement compared to other flap variations (10, 11).

## Prophylactic Simultaneous Anoplasty

Historically, anoplasties were reactive salvage procedures. However, recent reconstructive proctology now advocates prophylactic, simultaneous flap anoplasty during primary resection of massive Grade IV disease (12).

When large circumferential Grade IV hemorrhoids are removed, it is impossible to keep viable muco-cutaneous bridges intact. Instead of leaving open wounds, an anoplasty

flap (like the V-Y flap) is performed immediately during primary hemorrhoidectomy. Randomized controlled trials have so far demonstrated this approach. In a main study, standard Milligan-Morgan as opposed to simultaneous V-Y flap anoplasty is shown to reduce the postoperative prevalence of anal stenosis to 2.5% from 22.5% in the conventional group ( $P=0.017$ ) (12). In addition, the addition of healthy tissue greatly accelerated wound healing (19.02 days vs 23.6 days), proving that disease eradication and stricture prevention can be done in a single operative setting (12).

## Comparative Analysis of Management Strategies

To contextualize flap-based reconstructive anoplasty, Table 1 provides an exhaustive synthesis of the clinical metrics and outcomes distinguishing the primary surgical pathways for advanced hemorrhoidal disease.

**Table 1: Comparative Outcomes of Surgical Management Modalities for Grade IV Hemorrhoidal Disease**

| Clinical Metric           | Conventional Excision (Milligan-Morgan / Ferguson)     | Minimally Invasive Hemorrhoidopexy (PPH)                  | Stapled Radical Excision + Simultaneous Flap Anoplasty |
|---------------------------|--------------------------------------------------------|-----------------------------------------------------------|--------------------------------------------------------|
| Primary Indication        | Grades III - IV (4)                                    | Grades II - III (High recurrence for Grade IV) (4)        | Severe Grade IV with stricture prevention (12)         |
| Mean Operative Time       | Fast (~16 - 25 mins) (4, 12)                           | Very Fast (< 20 mins) (4)                                 | Moderate (~32 - 60 mins) (7, 12)                       |
| Postoperative Pain (VAS)  | High (VAS ~4.7 - 6.2) (4, 7)                           | Low (VAS ~2.4) (4)                                        | Moderate to Low (Rapid VAS decline) (7)                |
| Anatomical Stricture Risk | High (5% - 22.5% in severe cases) (11, 12)             | Low (Primarily high/rectal if it occurs) (4)              | Very Low (1% - 2.5%) (12)                              |
| Long-term Recurrence      | Low (Definitive eradication) (4)                       | High in Grade IV (Fails external fibrotic components) (4) | Low (Matches conventional excision) (11)               |
| Aesthetic Optimization    | Poor (Risk of hypertrophic scarring and skin tags) (5) | Moderate to Poor for Grade IV                             | Excellent (Restores smooth, natural contour) (13)      |

## Aesthetic and Functional Optimization

The true success in modern proctology is measured by Patient-Reported Outcome Measures (PROMs), focusing on functional optimization (continence preservation) and aesthetic satisfaction (5).

**Functional Continence:** Flap-based anoplasties are very sphincter-sparing, because the surgical dissection is kept within the superficial ischiorectal fat, and the deep neuromuscular bundles are completely non-threatening. Hence, for preoperative and postoperative Wexner scores, there is no adverse effect on continence (5, 11). Furthermore, surgeons can permanently repair the neurological sensory

feedback loop by replacing the insensitive scar tissue with tender and highly innervated cutaneous flaps.

**Aesthetic Satisfaction:** The standard excisional hemorrhoidectomy leads to cosmetic problems such as jagged scars and hypertrophic skin tags. Flap-based reconstructive techniques strictly adhere to geometric designs, ensuring a perfectly symmetrical, tension-free closure. This prevents tension-induced hypertrophy and the outward eversion of the rectal mucosa. In a cohort study of double-diamond shaped flap anoplasties, 75% of patients reported "excellent" aesthetic and functional satisfaction (scores of 8–10) and

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21.7% had “good” satisfaction (13), which highlights the effect of functional restoration and aesthetic normalization.

## CONCLUSION

Grade IV hemorrhoidal disease is the most severe and debilitating manifestation of this ubiquitous disease. While radical excisional surgery is still the best option to fully eradicate it, it carries the risk of causing iatrogenic anatomical anal stenosis. Flap-based anoplasties (V-Y advancement, Diamond, and large House flaps) are a new paradigm of anorectal surgery. Whether they are used proactively during the initial hemorrhoidectomy or reactively to salvage a strictured anal canal, these techniques can make an important surgical return of the anatomical caliber of the anal canal. Flaps are able to maintain the deep ischiorectal vasculature and transfer sensate skin completely free of tension and achieve the twin objectives of modern surgery: restoring it to its original state and maximizing the aesthetics of the body.

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