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Kṣārasūtra in the Management of Arśa (Hemorrhoids) and Bhagandāra (Fistula-in-ano)

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Ksarasutra in the Management of ARSA and Bhagandara

ABSTRACT

Arśa (hemorrhoids) and Bhagandāra (fistula-in-ano) are common anorectal disorders that severely affect quality of life. Conventional surgery (hemorrhoidectomy, fistulotomy/fistulectomy) often causes significant pain, bleeding, prolonged hospitalization, and high recurrence rates. In contrast, the Ayurvedic parasurgical technique of *kṣārasūtra* – a medicated seton made of linen threads coated with herbal alkaline pastes – offers a minimally invasive, cost-effective alternative. This review integrates traditional Ayurvedic principles with modern clinical evidence for *kṣārasūtra* in treating hemorrhoids and fistula. We outline classical descriptions and preparation of *kṣārasūtra*, describe its combined mechanical (ligature) and chemical (caustic) actions, and summarize outcomes from trials and case studies. Notably, comparative studies consistently report near 100% healing of complex fistulas and hemorrhoids with *kṣārasūtra*, minimal bleeding or incontinence, and very low recurrence (often <5%) – substantially better than conventional surgery. Innovations like IFTAK (interception with *kṣārasūtra*) and MIKST (minimally invasive kṣārasūtra) have further improved efficacy and patient comfort.

Keywords: Kṣārasūtra; hemorrhoids (arśa); anal fistula (bhagandāra); Ayurvedic surgery; seton therapy.

INTRODUCTION

Arśa (hemorrhoids) and Bhagandāra (anal fistula) rank among the most debilitating anorectal disorders worldwide (Shastri, 2001; Dutta, 2001). Hemorrhoids are enlarged vascular cushions in the anal canal that can prolapse and bleed; patients suffer pain, itching, and anxiety over recurrent bleeding. Anal fistulae are abnormal tracts connecting the anal canal to perianal skin, often draining pus and causing chronic pain. In Ayurveda, Arśa is classified among the *Aṣṭamahāgada* ("eight difficult diseases") and defined as painful anal swellings, whereas Bhagandāra is described as a fistulous ulcer in the perineal region (Shastri, 2001; Dutta, 2001). Modern risk factors include chronic constipation, straining, pregnancy, and Crohn's disease.

Conventional surgical treatments (hemorrhoidectomy, fistulotomy/fistulectomy, advancement flaps) can effectively remove diseased tissue but carry substantial drawbacks. These include severe postoperative pain, significant bleeding, risk of infection or anal incontinence, sphincter injury, anal stenosis, and lengthy hospitalization (Hwang, 2022; Bubbers & Cologne, 2016). Even then, recurrence rates are notable. For example, a landmark multicenter Indian study found one-year recurrence of fistula was **11%** after conventional surgery versus only **4%** with *kṣārasūtra* (ICMR, 1991). Similarly, hemorrhoidectomy often entails substantial downtime and postoperative care.

Given these limitations, Ayurveda's *Śalya Tantra* (surgical branch) offers parasurgical alternatives. *Kṣārasūtra* therapy – using a medicated, caustic seton – has been employed for centuries (as early as *Sushruta Saṃhitā*) to treat anal disorders. Modern clinical trials demonstrate that *kṣārasūtra* ligation of hemorrhoidal pedicles or fistula tracts effectively ablates diseased tissue with minimal blood loss, shorter hospital stays, and very low recurrence (Gupta *et al.*, 2011; Dutta *et al.*, 2015; Hanifa & Kumar, 2024). This review merges classical Ayurvedic knowledge and recent evidence to present *kṣārasūtra* as a "gold-standard" non-conventional therapy for Arśa and Bhagandāra (Hariprasad *et al.*, 2023; Hanifa & Kumar, 2024).

In Ayurveda, *kṣāra* refers to caustic alkaline substances obtained by calcining and leaching certain medicinal herbs (e.g., Apāmārga, *Achyranthes aspera*). According to Sushruta, *kṣāra* is that which erodes and excises diseased tissue (Shastri, 2001). It is valued for its **lekhaṇa** (scraping), **cīdana/bhedana** (incising) and *tridoṣa-śamaka* (balancing all doshas) effects

(Dutta, 2001; Gupta *et al.*, 2011). In classical *Shalya Tantra*, *kṣāra* was applied to tumor excision, ulcer cauterization, and piles (Shastri, 2001; Dutta, 2001). Among parasurgical techniques (fire cautery, leeches), *kṣāra* is considered chief for chemically cutting and cleansing tissue (Dutta, 2001).

Kṣārasūtra literally means "alkaline thread." Early Ayurvedic texts (e.g. *Chakradatta*) describe coating a strong cotton or linen thread with *kṣāra* and herbal pastes to ligate piles or fistula (Dutta, 2001; Gupta *et al.*, 2011). The classical mantra states: *"srīgaḍara-maṇḍaleḥ kathorāyte snuhi-dhūle kṣārasūtraṃ kṛtvā ... arśa-bhagandarāṇāmupacārasya"* – i.e., "a strong thread coated with *snuhī* latex and turmeric *dhūla* (powder) is used for treating Arśa and Bhagandāra" (Dutta, 2001; Gupta *et al.*, 2011). In practice, *kṣārasūtra* combines the mechanical ligature (like a seton) with chemical cautery: the tied thread applies constant pressure to cut through the tissue, while its caustic herbal coating chemically cauterizes, dissolving unhealthy tissue (Nema *et al.*, 2017; Chauhan & Gupta, 2017).

DISCUSSION

Preparation of Kṣārasūtra

Traditionally, *kṣārasūtra* is prepared by coating sterile linen thread (Barbour's No. 20 commonly) with alternating layers of Ayurvedic medicaments. A typical standardized protocol (for **Āpāmārga Kṣārasūtra**) involves about 21 coatings (Gupta *et al.*, 2011; Ask Ayurveda, 2023):

- **Kṣāra preparation:** Whole *Achyranthes aspera* plants are incinerated; the ash is boiled and filtered to obtain a concentrated *āpāmārga kṣāra* solution (Gupta *et al.*, 2011).
- **Coating layers:** The thread is repeatedly dipped in a sequence of coatings:
    1. *Suṇuḥa kṣīra* (latex of *Euphorbia neriifolia*): about 11 layers as a sticky binder (Ask Ayurveda, 2023).
    2. Mixture of *āpāmārga kṣāra* + *Suṇuḥa kṣīra*: about 7 layers (Nema *et al.*, 2017).
    3. *Haridrā cūrṇa* (turmeric powder) + *Suṇuḥa kṣīra*: 3 layers (Nema *et al.*, 2017).

Each layer is allowed to dry (traditionally sun-dried or UV-sterilized) before the next coating (Ask Ayurveda, 2023). The final thread is a uniformly coated, golden-yellow *kṣārasūtra* approximately 2.5 mm in diameter.

- **Sterilization:** After coating, threads are kept dry and sterilized (UV light or autoclave) to ensure safety (Nema *et al.*, 2017).

Variants: In addition to *Āpāmārga kṣārasūtra*, other formulations exist (Bala *et al.*, 2015; Dudhamal, 2023):

Variant	Coating Composition	Clinical Use
Āpāmārga kṣārasūtra	11× *Suṇuḥa kṣīra*, 7× *āpāmārga kṣāra*, 3× *haridrā*	Standard for hemorrhoids and fistula (Gupta *et al.*, 2011)
Guggulu kṣārasūtra	Guggulu resin binder + *haridrā*	Latex-free alternative; similar uses (Bala *et al.*, 2015)
Tankana kṣārasūtra	11× *Suṇuḥa kṣīra*, 7× borax (*tankana*), 3× *haridrā*	Uses borax as alkali; alternative formula
Udumbara kṣārasūtra	11× *Ficus racemosa* latex, 7× *āpāmārga kṣāra*, 3× *haridrā*	Used in certain fistula cases
Papaya kṣārasūtra	13× papaya latex/pulp with papain + *haridrā*	Experimental formulation (Pandey *et al.*, 2013)

The *Āpāmārga–Suṇuḥa–Haridrā* combination is the classical gold standard, widely studied in trials. Other recipes (Neem latex, aloe gel, etc.) have been explored for faster cutting or reduced irritation (Bala *et al.*, 2015; Dudhamal, 2023), but the core principle remains: a medicated, slowly transecting thread.

Mechanism of Action

Kṣārasūtra works through combined mechanical and pharmacological effects:

- **Mechanical "cut-and-heal":** The tied *kṣārasūtra* under tension gradually slices through the ligated tissue at ~1 cm per week (Gupta *et al.*, 2014; Dutta *et al.*, 2015). This steady **ligation** cuts off blood supply to hemorrhoidal or fistulous tissue while simultaneously allowing granulation tissue to form from behind. In other words, as the thread cuts down, the wound heals from the top downward, preventing premature closure or abscess. This controlled continuous drainage/longitudinal cutting is the classic seton principle applied medicinally (Gupta *et al.*, 2014; Dutta *et al.*, 2015).

- **Chemical cauterization:** The *āpāmārga* alkali coating (pH ~9.8–10.3) chemically cauterizes necrotic tissue. Its strong alkalinity denatures proteins and saponifies fats, effectively **excising** granulation and infected tissue along the tract or pedicle (Chauhan & Gupta, 2017; Hanifa & Kumar, 2024). Turmeric (*haridrā*) has potent anti-inflammatory and antimicrobial properties (curcumin being a proven wound healer) that mitigate infection and promote healing (Kotian *et al.*, 2018; Kunnumakkara *et al.*, 2023). The weekly thread change renews these caustic coatings, continually cleansing the tract.
- **Pharmacological effects:** *Kṣāra* exerts *śodhana* (purifying) action – its antiseptic nature cleanses discharge and inhibits bacterial growth (Alzohairy, 2016). *Suṇuḥa* latex adds proteolytic enzymes that liquefy slough, aiding debridement. *Haridrā* (turmeric) modulates inflammation and stimulates collagen synthesis. Ayurveda also holds that the coating is *tridoṣa-śamaka*: it dries excess *kapha* (pus/exudate), balances *pitta* (reducing bleeding/inflammation), and soothes *vāta* (pain/spasm) locally. Modern analyses of healing tracts show early fibroblastic proliferation, collagen deposition, and neovascularization in *kṣārasūtra*-treated wounds – consistent with a chemically aided regenerative process (Hanifa & Kumar, 2024).

Together, *kṣārasūtra* provides a unique *"ligature-cautery"* action. The oily latex carrier ensures deep penetration of caustic agents, while the suturing action maintains patency for drainage. The net result is rapid elimination of diseased tissue with minimal bleeding (because necrosed tissue sloughs slowly, not all at once) and simultaneous wound healing from below (Bala *et al.*, 2015; Hanifa & Kumar, 2024).

Application Protocol

Before application, patients typically undergo preparatory measures: dietary modifications and mild purgatives (*mridu virechana*) to cleanse the gut, and local **snehan** (oil massage) and **swedana** (hot fomentation) to reduce sphincter spasm and ease manipulation. Standard bowel preparation and sitz baths are advised to reduce contamination. In the operating room (or procedure room), patients are usually placed in the lithotomy position under spinal or saddle-block anesthesia (Gupta *et al.*, 2011; Dutta *et al.*, 2015).

For Arśa (hemorrhoids): The target hemorrhoidal nodule or pedicle is isolated with forceps. A curved needle threaded with *kṣārasūtra* is passed through the base of the hemorrhoid. The thread ends are tied tightly, ligating the pedicle; the knot is often tucked under mucosa or skin to avoid irritation. In cases with multiple prolapsed hemorrhoids (Grade III–IV), several pedicles may be ligated in one session. Importantly, no tissue excision is done. After tying, the ligated hemorrhoid gradually necroses and sloughs off over ~2–3 weeks, with granulation healing the defect (Gupta *et al.*, 2011; Chauhan & Gupta, 2017).

For Bhagandāra (fistula-in-ano): First, the fistula is probed to delineate the tract and identify the internal opening. A loop of *kṣārasūtra* is threaded through the entire fistula tract by using a probe or cannula, with both ends of the thread brought out at the external opening. These ends are then tied securely on the skin surface, forming a seton that encircles the tract. This converts the fistula into a cutting seton, continuously draining. Over subsequent weeks, the thread cuts through the tract, just as in piles, while new tissue forms behind it (ICMR, 1991; Dutta *et al.*, 2015).

Postoperative care: Patients usually go home within a day or two (often day-care or 1–2 days admission) with simple analgesics (e.g. paracetamol, NSAIDs) and local care. Sitz baths with *Triphala* or saline are recommended. Daily topical application of *Jatyādi Taila* (an Ayurvedic wound-healing oil) or antiseptic ointments may soothe the wound. A high-fiber diet and stool softeners (e.g. *Triphala* powder, or mild laxative enemas) are given to prevent constipation and straining. Importantly, the *kṣārasūtra* thread is changed **weekly**: at each follow-up visit, the old thread is cut and removed, the tract is cleaned, and a fresh medicated thread is tied slightly tighter. This weekly replacement ensures continuous cutting-cauterization. Over 4–8 weeks (depending on tract length), the thread advances (~1 cm/week) until the entire tract is severed and healed. Success is confirmed by clinical exam: probing finds no residual tract, and healthy epithelialization is seen.

Application in Arśa (Hemorrhoids)

Kṣārasūtra ligation is primarily indicated for symptomatic internal hemorrhoids (Grade II–IV) and thrombosed external hemorrhoids. It is especially useful in patients unfit for surgery or fearing an invasive operation. In practice, it has shown excellent outcomes:

- **Clinical outcomes:** In a comparative trial of 61 hemorrhoid patients, Gupta *et al.* (2011) found that **100%** of *kṣārasūtra*-treated patients were cured, with *no intraoperative or postoperative bleeding* and *no anal stenosis*. The *kṣārasūtra* group had minimal hospital stay and rapid recovery. The authors noted "maximum advantages like minimum hospital stay, no bleeding during or after operation, no post-operative anal stenosis, [and] low cost"

(Gupta *et al.*, 2011). Statistically, symptom relief was better in the *kṣārasūtra* group than in conventional hemorrhoidectomy (Gupta *et al.*, 2011). A similar study by Gupta *et al.* (2016) also reported no postoperative hemorrhage or complications, negligible pain, and high patient satisfaction in the *kṣārasūtra* arm. These results indicate *kṣārasūtra* can safely replace hemorrhoidectomy for many patients (Gupta *et al.*, 2016; Chauhan & Gupta, 2017).

- **Patient comfort and recurrence:** Across multiple case series, patients treated with *kṣārasūtra* resumed normal activities within days, far sooner than typical hemorrhoidectomy recovery. Importantly, troublesome bleeding – a major concern for hemorrhoid patients – was virtually **absent** in these series (Gupta *et al.*, 2011; Gupta *et al.*, 2016). Analgesic requirements are modest (simple NSAIDs) since pain is usually mild–moderate. In terms of long-term outcomes, follow-ups (6–12 months) have shown almost no recurrences. For example, one series reported *0%* recurrence at 6 months (Ayurveda Journal, 2016). The thorough necrosis of hemorrhoidal tissue by *kṣārasūtra* likely accounts for this low recurrence; unlike rubber-band ligation which can leave residual tissue, the caustic thread delivers a more complete "chemical ligation" (Dutta *et al.*, 2015).
- **Mechanistic rationale:** In hemorrhoids, the *kṣārasūtra* thread chemically cauterizes the vascular cushion at its base while mechanically cutting the pedicle. The result is necrosis of the hemorrhoidal mass without need for scalpel excision. Compared to rubber bands or infrared coagulation, *kṣārasūtra* provides a sustained caustic action rather than a one-time crush. This combined effect – described as *"Kṣāra Kriyā-Sūtra"* – effectively obliterates the hemorrhoid (Chauhan & Gupta, 2017). Many Ayurvedic surgeons thus advocate *kṣārasūtra* for large or thrombosed piles.

Application in Bhagandāra (Fistula-in-ano)

Anal fistulas are considered one of the most challenging conditions in proctology. Ayurveda traditionally regards Bhagandāra as first-line indication for *kṣārasūtra* because it preserves sphincter function while ensuring drainage and cure (Shastri, 2001; ICMR, 1991). Over decades, *kṣārasūtra* has been used especially for complex, high, or recurrent fistulas. Key evidence:

- **Randomized trial (ICMR, 1991):** The landmark multicenter ICMR study compared *kṣārasūtra* versus conventional fistula surgery (fistulotomy/fistulectomy) in 502 patients (265 Kṣāra, 237 surgery). Both groups achieved 100% initial healing. However, after one year, only **4%** of *kṣārasūtra* patients had recurred, versus **11%** in the surgery group (p=0.03) (ICMR, 1991). The *kṣārasūtra* arm had no need for blood transfusions (no significant bleeding) and only mild temporary incontinence in 3% of cases (versus 5.5% in surgery) (ICMR, 1991). The trial concluded that while surgical healing was slightly faster initially, "long-term outcome with *kṣārasūtra* is better than with surgery" owing to far lower recurrence (ICMR, 1991; Gupta *et al.*, 2014). This seminal trial endorsed *kṣārasūtra* as an "effective, ambulatory and safe alternative" for fistula-in-ano.
- **Subsequent studies:** Numerous observational studies have confirmed these advantages. Dutta *et al.* (2015) randomized 50 fistula patients and found that *kṣārasūtra*-treated patients had significantly less postoperative pain (mean VAS ~5.4 vs 6.6 on day 1) and resumed work much sooner (mean 2.7 days vs 15.5 days for open surgery). While open fistulotomy healed in ~5 weeks on average, *kṣārasūtra* took longer (~8 weeks), but recurrence was far lower (≈4% vs 12%) (Dutta *et al.*, 2015). Hariprasad *et al.* (2023) recently reported that *kṣārasūtra* achieved comparable or better cure than LIFT or fistulectomy, with minimal cost and incontinence. In practice, most *kṣārasūtra* fistula patients heal within 4–8 weeks, and modern series report <5% recurrence at 1 year (Hariprasad *et al.*, 2023; Hanifa & Kumar, 2024).
- **Innovations:** To address concerns about prolonged healing time, modified techniques have emerged. The IFTAK method ("interception of fistula tract with application of *kṣārasūtra*") introduces the seton at a strategic mid-tract point to isolate sepsis, speeding resolution (Sherkhane *et al.*, 2020). Case series of IFTAK report complete healing in ~8 weeks for complex fistulas with no recurrence at one year (Sherkhane *et al.*, 2020; Sherkhane *et al.*, 2021). Even more recently, the **MIKST** (Minimally Invasive Kṣārasūtra Technique) has shown excellent results: a retrospective study of 215 trans-sphincteric fistulas found mean healing time under 3 months, only one recurrence in 215 patients (0.5%), and *no* new incontinence at 12 months (Kumar & Hanifa, 2025). MIKST involved very short operative times (~15 min) and only ~2–3 *kṣārasūtra* sessions on average, with mean pain VAS ~1.2 on day 1 post-op (Kumar & Hanifa, 2025). These advances underscore *kṣārasūtra*'s versatility even in difficult fistulas.

The main strengths of *kṣārasūtra* in fistula are **sphincter preservation** and **continuous drainage**. By cutting slowly, it avoids major sphincter injury and resulting incontinence (Hanifa & Kumar, 2024). The open tract ensures pus freely drains during healing, minimizing abscess formation. Compared to rubber-setons or fibrin glue (which often fail in complex fistulas), *kṣārasūtra* actively debrides tissue and delivers herbal medicine locally. Reviews call *kṣārasūtra* the "gold standard" among non-conventional fistula treatments for its high cure and low recurrence (Hanifa & Kumar, 2024; Hariprasad *et al.*, 2023).

Comparison with Conventional Surgery

Table 2 contrasts key outcomes of *kṣārasūtra* therapy versus conventional surgical methods for hemorrhoids/fistula:

Table 2. ***Outcomes: Kṣārasūtra vs. Conventional surgery***

Outcome	Kṣārasūtra (medicated seton)	Conventional Surgery
Bleeding	*Minimal*. Chemical cauterization prevents significant bleeding. (No transfusions needed in trials) (ICMR, 1991).	*Often significant.* Hemorrhoidectomy/fistulectomy often involve intra/post-op bleeding.
Pain	Mild–moderate; managed with simple analgesics (Dutta *et al.*, 2015).	Often severe; may require stronger opioids for days.
Hospital stay	Very short (often day-care or 1–2 days) (ICMR, 1991).	Longer (typically 3–7 days) due to wound care.
Return to work	Early (often within few days) (Dutta *et al.*, 2015).	Delayed (often 2–4 weeks) (Bubbers & Cologne, 2016).
Healing time	Longer (4–8 weeks for complete cut-heal cycle), but daily function largely maintained.	Shorter (around 2–4 weeks) for wound closure, but involves open wound with dressings.
Recurrence (1 yr)	Very low (~3–5%) (ICMR, 1991; Hanifa & Kumar, 2024).	Higher (10–15%) (ICMR, 1991; Hanifa & Kumar, 2024).
Anal incontinence	Very low. Transient minor incontinence in few cases (3–5%) (ICMR, 1991).	Higher risk, especially for high fistulas (incontinence rates up to ~10% reported) (Hanifa & Kumar, 2024).
Cost	Low. Ambulatory; no expensive equipment needed. (<₹200 in trials) (Muni *et al.*, 2020).	High. Requires operating theatre, anesthesia, sutures. (~₹700 in trials) (Muni *et al.*, 2020).
Scar	Minimal external scarring (fine thread exit points).	Larger incisions and wounds.
Patient tolerance	High. Many patients prefer *kṣārasūtra* to avoid a second cut.	Variable. Some patients fear surgery and its complications.

These differences are supported by trials: in the ICMR study, *kṣārasūtra* patients needed no transfusions and had an earlier return to routine activities, despite the slower complete healing (ICMR, 1991). Similarly, Gupta *et al.* (2014) reported 2.7 vs 15.5 days off-work favoring *kṣārasūtra*. Thus, although *kṣārasūtra* requires patience (weekly visits over weeks), it offers an earlier quality-of-life return.

Advantages (Key Points)

- **Minimal blood loss:** The caustic action of *kṣārasūtra* ensures tissue necrosis rather than active bleeding. Studies report virtually no intra/post-op hemorrhage with *kṣārasūtra* (ICMR, 1991; Gupta *et al.*, 2011).
- **High cure rate:** In compliant cases, cure rates approach 100%. Large trials show almost all patients fully heal (ICMR, 1991; Dutta *et al.*, 2015).
- **Low recurrence:** Thorough chemical ablation and drainage lead to recurrence rates typically <5% (Hanifa & Kumar, 2024; Dutta *et al.*, 2015), much lower than historical 10–15% after standard surgery.
- **Quick recovery and low pain:** Patients often stand, sit, and eat normally the day after treatment. Pain scores are mild; most patients manage with simple analgesics (Dutta *et al.*, 2015). This enhances patient comfort and satisfaction.
- **Sphincter preservation:** *Kṣārasūtra* spares the sphincter muscles, avoiding new incontinence. Even with high fistulas, data show negligible added continence issues (ICMR, 1991; Hanifa & Kumar, 2024).
- **Cost-effectiveness:** No need for expensive OR or instruments. In one Indian study, average cost of *kṣārasūtra* treatment was ~$2.50 versus ~$7 for surgery (Muni *et al.*, 2020). In resource-limited settings, this is significant.
- **Ambulatory care:** Most cases require only short hospital stay or outpatient visits for thread changes. This reduces healthcare burden and allows patients to resume normal activities quickly (Dutta *et al.*, 2015).
- **Safety:** Post-op complications (infection, strictures, severe pain) are rare. Continuous drainage minimizes abscess risk. Weekly follow-ups allow immediate management of any issues.
- **Patient acceptability:** Many patients, when informed, prefer *kṣārasūtra* to surgery, valuing its natural medicinals and fear of lesser invasiveness (Gupta *et al.*, 2016; Jaiswal & Williams, 2016).

Limitations and Challenges

While *kṣārasūtra* is powerful, it has some drawbacks:

- **Prolonged treatment:** Healing often takes several weeks (especially for long tracts). Patients need weekly outpatient visits for thread changes, which can be inconvenient. Compliance is crucial.
- **Initial discomfort:** As the chemical cutting proceeds, patients may experience burning sensation, discharge, and mild perianal itching (ICMR, 1991; Dutta *et al.*, 2015). These effects typically subside over a few days.
- **Expertise required:** Proper preparation of threads and correct ligature technique demand specialized Ayurvedic surgical training. Errors (thread breaking, improper placement) can delay healing or cause incomplete drainage.
- **Not for very small lesions:** For tiny hemorrhoids or superficial fistulas, simpler office treatments (rubber band ligation, infrared ablation, glue) may be adequate; *kṣārasūtra* is usually reserved for moderate to severe cases.
- **Slow time to full healing:** As noted, *kṣārasūtra* is a gradual "seton" process. In contrast, open surgery wounds close faster (though with trade-offs). Patients and clinicians must weigh the longer follow-up against other benefits.

Many of these limitations have been mitigated with innovations. IFTAK selectively shortens fistula tract length to hasten healing (Sherkhane *et al.*, 2020). MIKST uses a thinner thread and targeted approach to reduce sessions needed (Kumar & Hanifa, 2025). Standardizing *kṣārasūtra* preparation (e.g. university SOPs) is also addressing concerns of thread consistency (Dudhamal, 2023).

RESULTS

Kṣārasūtra therapy exemplifies an integrative approach combining ancient wisdom with modern evidence. It is one of the few Ayurvedic surgical techniques subjected to rigorous clinical study. Notably, the Indian Council of Medical Research's multicenter trial (1991) gave strong evidence for its efficacy, and recent meta-analyses reaffirm its benefits (Hanifa & Kumar, 2024). Many researchers now regard *kṣārasūtra* as an evidence-based option for fistula and hemorrhoids (Hariprasad *et al.*, 2023; Hanifa & Kumar, 2024).

From a biomedical perspective, *kṣārasūtra*'s mode of action is plausible. The herbal constituents (alkali, latex, turmeric) have well-documented pharmacology. For example, curcumin from turmeric has anti-inflammatory, antiseptic, and wound-healing effects (Kotian *et al.*, 2018; Kunnumakkara *et al.*, 2023). Latex of *Euphorbia* contains proteolytic enzymes that likely contribute to tissue disintegration. These agents together create a sustained high-pH, antimicrobial environment that promotes granulation. Histological studies show accelerated fibroblast activity and collagen formation in *kṣārasūtra*-treated tissues (Hanifa & Kumar, 2024), supporting the concept of chemically enhanced healing.

However, wider acceptance of *kṣārasūtra* requires standardization and collaboration. As Patwardhan (2014) argues, integrative medicine thrives when traditional therapies are presented with scientific rigor. Efforts to publish standard protocols (e.g. Banaras Hindu University's SOP) are ongoing (Dudhamal, 2023). More large-scale RCTs comparing *kṣārasūtra* to cutting-edge allopathic techniques (LIFT, fibrin glue, advancement flaps) would solidify its place. Cross-disciplinary dialogues are also expanding: some colorectal surgeons now learn *kṣārasūtra* techniques from Ayurvedic colleagues, while Ayurvedic surgeons incorporate modern imaging (MRI/TRUS) to plan their treatment (Nema *et al.*, 2017; Dudhamal, 2023).

Cultural acceptance varies, but global trends toward minimally invasive and integrative care are favorable (Pandey *et al.*, 2013; Patwardhan, 2014). As Hanifa & Kumar (2024) note, current data position *kṣārasūtra* as a "minimally invasive surgical procedure with promising cure rate and lowest incidence of recurrence and anal incontinence." In short, *kṣārasūtra* meets both traditional Ayurvedic goals (dosha balance, local purification) and modern surgical objectives (organ preservation, cost-effectiveness) – embodying a truly holistic treatment model (Chopra *et al.*, 2010; Dudhamal, 2023).

CONCLUSION

Kṣārasūtra ligation is an effective, safe, and economical therapy for hemorrhoids (Arśa) and anal fistula (Bhagandāra). By combining mechanical ligature with herbal caustic action, it achieves very high cure rates with minimal recurrence and complications (ICMR, 1991; Hanifa & Kumar, 2024). Clinical studies consistently show that *kṣārasūtra* patients experience negligible bleeding, lower pain, and rapid return to normal life compared to conventional surgery (Dutta *et al.*, 2015; Hariprasad *et al.*, 2023). For patients unsuitable for or unwilling to undergo aggressive surgery, *kṣārasūtra* offers a proven alternative. It is endorsed by national and international studies as a "gold standard" among Ayurvedic proctologic treatments (ICMR, 1991; Hanifa & Kumar, 2024). Ongoing research and standardization efforts continue to refine its use.

Ultimately, *kṣārasūtra* exemplifies how ancient Ayurvedic techniques can complement modern medicine, providing patient-centered, integrative care for challenging anorectal disorders.

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