



**Relevance of Sushruta's Trividha Shastra Karma (Chedana, Bhedana, Lekhana) in Minimally Invasive Surgery (MIS): A Modern Surgical**

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**Abstract**

Sushruta, hailed as the father of surgery, described **Trividha Shastra Karma—Chedana (excision), Bhedana (incision), and Lekhana (scraping)**—as the foundation of all operative interventions. Modern surgery, particularly **Minimally Invasive Surgery (MIS)**, aims to achieve maximal therapeutic benefit with minimal tissue trauma, reduced blood loss, faster healing, and improved cosmetic outcomes. This conceptual shift aligns deeply with Sushruta's principles emphasizing **precision, minimal injury, gentle tissue handling, and doshic balance**.

This review critically explores the relevance of **Chedana, Bhedana, and Lekhana** within MIS practices such as laparoscopy, endoscopy, arthroscopy, laser surgery, and radio-frequency ablative techniques. The article correlates surgical objectives, instruments, tissue handling, postoperative recovery, and preventive strategies described by Sushruta with modern MIS standards. Ayurvedic principles related to wound healing, asepsis, suture materials, and operative ergonomics are also analyzed. The findings demonstrate that the foundational logic of MIS is deeply rooted in Sushruta's surgical wisdom.

**Keywords:** Trividha Shastra Karma, Chedana, Bhedana, Lekhana, Sushruta, Minimally Invasive Surgery, laparoscopic surgery, endoscopic surgery, Ayurvedic surgery.

## Introduction

Minimally Invasive Surgery (MIS) has transformed modern surgical practice, reducing postoperative pain, scarring, infection, hospital stay, and recovery time (1). These principles, though technologically refined today, can be traced back to the detailed surgical doctrines laid down by Acharya Sushruta more than 2500 years ago.

In the **Sushruta Samhita**, *Trividha Shastra Karma*—Chedana, Bhedana, and Lekhana—are considered the primary interventions shaping the field of operative surgery (2).

- **Chedana (Excision)** – complete removal of unwanted tissue or growth
- **Bhedana (Incision)** – precise opening of a cavity or channel
- **Lekhana (Scraping/Curretage)** – meticulous removal of diseased or excessive tissue

MIS, though enhanced by modern tools such as laparoscopes, endoscopes, lasers, and energy devices, retains the **philosophical alignment** of minimal trauma, optimum exposure, accurate enhanced healing described in these ancient principles (3).

## AIM AND OBJECTIVES

To critically analyze the relevance of Sushruta's Trividha Shastra Karma in the context of modern Minimally Invasive Surgery.

## Objectives

1. To delineate the classical descriptions of Chedana, Bhedana, and Lekhana.
2. To explore surgical parallels between Trividha Karma and contemporary MIS techniques.
3. To highlight operative principles common to both systems, including instrument design, tissue handling, and asepsis.
4. To evaluate postoperative outcomes and healing within Ayurvedic-Modern correlation.
5. To establish the scientific relevance of Sushruta's teachings in advancing MIS philosophies.

# CONCEPTUAL REVIEW

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## 1. Sushruta's Trividha Shastra Karma

### 1.1 Chedana Karma (Excision)

Defined as the **complete removal** of diseased tissue, foreign bodies, tumors, or unwanted growth (*Arbuda, Granthi, Mamsa-vridhhi*) (4).

Objectives:

- Remove pathology
- Minimize bleeding
- Prevent recurrence
- Promote healthy granulation

### 1.2 Comparable to: excisional biopsy, tumor resection, removal of cysts or polyps.

Defined as **precise opening** of a cavity, abscess, or channel to drain pus, remove obstruction, or access deeper structures (5).

Indications:

- Abscess drainage (*Pidaka*)
- Opening for surgical access
- Removal of foreign substances

Modern parallels: surgical incision, port placement in laparoscopy, endoscopic access, trocar insertion.

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### 1.3 Lekhana Karma (Scraping/Curretage)

Involves **removal of excessive, necrotic, or contaminated tissue** without damaging underlying structures (6).

Used in:

- Non-healing wounds
- Hypergranulation
- Sebaceous cysts
- Ulcers with slough

Modern parallels: arthroscopic debridement, endometrial curettage, wound curettage, laser ablation, radiofrequency excision.

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## 2. Trividha Karma and Minimally Invasive Surgery: A Detailed Correlation

Sushruta emphasized:

- *Sukshma Shastra* (fine instruments)
- *Alpa vedana* (minimal pain)
- *Alpa chheda* (smallest possible excision) (7)

MIS mirrors this philosophy by using:

- Micro-instruments
- Robotic arms
- 3–10 mm ports
- High-definition visualization

Thus, MIS = **maximum effect with minimum intervention**, the same as ancient surgical doctrines.

## 2.2 Chedana and MIS Excisional Approaches

Sushruta's Chedana corresponds closely to MIS procedures such as:

- Laparoscopic cholecystectomy
- Endoscopic polypectomy
- Laser excision of lesions
- Robotic tumor resection (8)

Both emphasize:

- Minimal tissue trauma
- Controlled excision margins

## 2.3 Bhedana and MIS Access Techniques

- Veress needle insertion
- Trocar placement
- Endoscopic cannulation
- Keyhole incisions (9)

Sushruta describes similar principles:

- Optimal site selection
- Safe depth
- Avoidance of vital structures
- Maintaining patency

This is almost identical to safe-access protocols in laparoscopy.

## 2.4 Lekhana and Modern Debridement/Ablation

Sushruta's Lekhana maps onto several MIS interventions:

- Arthroscopic shaving
- Laser ablation of polyps
- Endometrial curettage
- RF ablation
- Endoscopic mucosal resection (10)

Both aim to:

- Remove diseased tissue only
- Preserve structural integrity
- Enhance regeneration

### 3. Instrumentation: Sushruta's Shastra and Modern MIS Tools

#### Ancient Tools

Sushruta described over 120 instruments:

- *Mandala Shastra* (scalpels)
- *Karapatra* (saws)
- *Vridhipatra* (sharp knives)
- *Shalaka* (probes) (11)

#### Modern Tools

- Laparoscopic scissors
- Endoscopic blades

- Harmonic scalpel
- Laser and RF probes

Sushruta's insights on ergonomics, grip, sharpness, and sterilization are still applicable (12).

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## 4. Wound Healing: Ayurvedic and MIS Correlation

Ayurveda describes **Shasti Upakramas (60 wound-care strategies)** based on:

- *Shodhana* (cleansing)
- *Ropana* (healing)
- *Sandhana* (union) (13)

MIS improves wound healing by:

- Minimizing wound size
- Reducing infection
- Preserving vascularity
- Reducing scarring

Both systems emphasize **ideal healing with least tissue trauma.**

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## 5. Sushruta's Asepsis and Modern Sterilization

Sushruta advocated:

- Smoke fumigation (*Dhoopana*)
- Alkali cleaning

- Boiling water sterilization
- Disinfection of operation theatre (14)

Modern correlates include:

- Autoclaving
- UV sterilization
- Laminar flow theatre systems
- Chemical disinfectants (15)

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## 6. Preoperative and Postoperative Care

Ayurvedic concepts:

- *Snehana* (unctuousness)
- *Swedana* (fomentation)
- *Shodhana* when required
- *Ahara Vidhi* and *Bala Vardhak* diets (16)

Modern MIS protocols:

- ERAS (Enhanced Recovery After Surgery)
- Prehabilitation
- Early ambulation
- Controlled antibiotics

The synergy between these approaches is significant.

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## DISCUSSION

The comparison of **Trividha Shastra Karma** with MIS reveals striking similarities.

Sushruta's principles emphasize **precision, minimal invasion, safety, and functional**

**preservation**—virtues that MIS has technologically expanded. The classical surgical framework is not only relevant but highly foundational to modern surgical philosophies.

While MIS encompasses robotics, fiber optics, and advanced imaging, its **core objective remains unchanged** from Sushruta's time:

**“Cure with the least possible injury.”**

Ayurvedic surgical principles further complement MIS through better wound healing, systemic detoxification, doshic balance, improved immunity, and enhanced postoperative recovery.

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## CONCLUSION

Sushruta's Trividha Shastra Karma—Chedana, Bhedana, and Lekhana—form the basis of all operative strategies described in modern MIS. Their conceptual alignment demonstrates that the **essence of minimally invasive principles was profoundly understood by ancient Ayurvedic surgeons**. MIS stands today as a technological extension of Sushruta's timeless surgical science.

Further clinical and historical studies can enrich integration between Ayurvedic surgical philosophies and modern minimal-access surgical training.

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