



RESEARCH ARTICLE

KARNA SANDHANA: A CLASSICAL AYURVEDIC REVIEW OF THE SURGICAL ART OF EAR-LOBULE REPAIR, WITH CORRELATION TO CONTEMPORARY OTOPLASTY AND LOBULOPLASTY

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ABSTRACT

Karna Sandhana, the Ayurvedic surgical procedure for reconstructing a torn or split earlobe, is among the earliest documented examples of plastic and reconstructive surgery in recorded medical history^[1,2]. Described extensively by *Acharya Sushruta* in the *Sushruta Samhita* and elaborated upon by the commentator *Acharya Dalhana*, the procedure embodies a sophisticated understanding of wound classification, flap design, and tissue handling that anticipates principles used in modern otoplasty and lobuloplasty. This review consolidates the classical description of *Karna Vedhana* (ear piercing) and *Karna Sandhana* (ear-lobule repair), including the fifteen classical patterns of lobular deformity (*Panchadasha Karna-Bandha-Vikalpah*), diagnostic criteria, surgical procedure, post-operative care, contraindications, and complications, and correlates them with present-day surgical techniques for earlobe cleft correction. The aim is to highlight the enduring clinical relevance of this ancient technique and to encourage its integration into contemporary reconstructive practice.

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INTRODUCTION

The reconstruction of injured or deformed body parts occupies a foundational place in Ayurvedic surgical science (*Shalya Tantra*). *Acharya Dalhana*, in his commentary on the *Sushruta Samhita*, defines the term *Sandhana* as the union of organs that have become separated due to injury or trauma. This single definition anticipates, by many centuries, what is recognised today as plastic and reconstructive surgery. Modern plastic surgery, in fact, traces its basic purpose to the same three goals that *Acharya Sushruta* articulated for his fifteen surgical procedures of deformity correction: restoration of form, restoration of function, and cosmesis. It is for this reason that contemporary plastic surgeons regard *Sushruta* as the pioneer of the speciality and honour him with the title "Father of Plastic Surgery."^[1,2] Among the various *Sandhana Karmas* described in classical texts, *Karna Sandhana* — the repair of a torn or split earlobe — holds particular significance because it remains one of the most frequently required minor reconstructive procedures even in present-day clinical practice, owing to the widespread custom of ear piercing and the consequent risk of accidental or traumatic splitting of the lobule.

Karna Vedhana: The Traditional Basis of Ear Piercing: Before the necessity for *Karna Sandhana* can be appreciated, it is useful to revisit *Karna Vedhana*, the traditional *Samskara* of

ear piercing performed in childhood. Classical texts state the purpose succinctly: *Rakshabhushana-Nimittam Balasya Karnau Vidhyete* — the child's ears are pierced for the twin purposes of protection (*Raksha*) and ornamentation (*Bhushana*).

Timing and Site

- **When:** traditionally performed in the sixth or seventh month of age, on an auspicious constellation day falling within *Shukla Paksha* (the waxing lunar fortnight).
- **Where:** the piercing is made at the site termed *Devakritya Chidra*, the anatomically indicated foramen of the lobule.

Selection of Instrument and Technique

- Depending on the thickness of the *Pali* (lobule): a thin lobule is pierced with a *Suchi* (fine needle), while a thick lobule requires an *Ara* (a thicker piercing instrument).
- Depending on the sex of the child: the left ear is conventionally pierced first in females and the right ear first in males.
- Following piercing, a *Pichu-Varti* (a wick or thread soaked in medicated oil) is introduced into the track to keep it patent and to promote healthy healing.^[2]

Diagnosing Correct versus Incorrect Piercing

Classical teaching offers a simple clinical checklist to verify that the piercing has been performed correctly:

- **Correct position:** characterised by absence of pain and absence of bleeding.
- **Incorrect position:** characterised by excessive pain and severe bleeding.
- Three named *Siras* (vascular/neural channels) traverse the region of the earlobe, and injury to each produces a distinct clinical picture that the surgeon must be able to recognise:
- **Kalika** — injury manifests as fever, a burning sensation, swelling, and pain.
- **Lohitika** — injury manifests as neck rigidity, convulsions, paroxysmal head pain, and earache.
- **Marmaika** — injury manifests as pain, fever, and swelling.

Recognition of these patterns allowed the ancient surgeon to anticipate complications and intervene before a simple piercing progressed to a more serious injury requiring formal *Karna Sandhana*.

Pathway from Injury to the Indication for Karna Sandhana:

The classical texts trace a clear sequence connecting faulty or excessive piercing to the eventual need for surgical repair: an improperly performed (*Asamyak*) *Vedhana* is followed by the application of warm medicated oil (*Ama-Taila Parisechana*), which may in turn require a thick poultice/dressing (*Trihat-Trihat Sthoola Varti*). If healing is incomplete, the oil application is repeated. The lobule may then split along two planes owing either to *Doshic* vitiation or to direct trauma (*Karna Chidyate Dwidha* — *Doshah* and *Abhigata*/trauma), at which point the condition culminates in the clinical indication for *Karna Sandhana*, the surgical reunion of the split lobule.^[1,2]

The Fifteen Classical Patterns of Lobular Deformity (Panchadasha Karna-Bandha-Vikalpah)

Sushruta Samhita describes fifteen distinct patterns by which a torn earlobe may present and be repaired, classically divided into successful (*Sadhya*) and unsuccessful/inoperable (*Asadhya*) categories. The ten *Sadhya* types, together with their literal meanings and clinical indications, are presented in Table 1.

Unsuccessful (*Asadhya*) Patterns: Five further patterns are described as technically inoperable or unsuccessful, generally on account of insufficient tissue, degenerative change, or vascular compromise of the pinna. These are listed in Table 2.

Two additional named varieties recorded in the texts — *Kapata-Sandhika* and *Ardha-Kapata-Sandhika* — describe externally and internally unified repairs resembling, respectively, the full and half panels of a door, distinguished by whether the inner or outer flap is the longer of the two (Table 1, entries 9 and 10).

Surgical Method for Repair of the Torn Earlobe

Principle of Flap Design: The *Sushruta Samhita* (Su. Su. 16/14) lays down a guiding principle for flap design that remains conceptually identical to the buried/everted suturing logic used in modern flap surgery.^[3]

बाह्यायामिह दीर्घायां सन्धिराभ्यन्तरो भवेत्।

आभ्यन्तरायां दीर्घायां बाह्यसन्धिरुदाहृतः ॥(Su.Su.16/14)

When the external (posterior) flap is longer, the suture line is placed internally (medially); when the internal (medial) flap is longer, the suture line is placed externally (posteriorly).

For a lobule that has split into only a single flap rather than two, the *Samhita* (Su. Su. 16/15) recommends a different approach:

एकैव तु भवेत् पालिः स्थूला पृथ्वी स्थिरा च या।

तां द्विधा पाटयित्वा तु छित्त्वा चोपरि सन्धयेत् ॥(Su.Su.16/15)॥

If there is only a single, thick, broad and fixed flap, it should be divided into two, trimmed, and the upper portion joined to it. This single-flap technique, in which the lobule is divided and re-joined, is the direct classical antecedent of the modern Y-V repair used by contemporary plastic surgeons for analogous lobular deformities.^[4]

Wound Preparation and Suturing

ततो व्रणं समुन्नम्य स्थापयित्वा यथास्थितम्।

सीव्येत् सूक्ष्मेण सूत्रेण वल्केनाश्मन्तकस्य वा ॥ (Su.Su.25/20)

The edges of the wound should be elevated, the two flaps brought into accurate apposition, and suturing performed with a fine thread.

Where the classical text specifies thread made from *Ashmantaka* bark, *Murva*, or *Guduchi* fibre, the modern equivalent in contemporary practice is 6-0 nylon suture, illustrating direct technical continuity from ancient to present-day microsurgical material, adapted to available resources.^[1]

The Graft Technique for Total Loss

गण्डादुत्पाद्य मांसेन सानुबन्धेन जीवता

कर्णपालीमपालेस्तु कुर्यान्निर्लिख्य शास्त्रवित् ॥ (Su.Su.16/16)

A flap of living muscle is raised from the cheek while preserving its vascular connection, turned over to the lobular side after scarifying the recipient area, thereby reconstituting the lobule.

This describes a pedicled local flap, harvested with its blood supply intact and rotated into the defect — the same fundamental principle that underlies the pedicled and advancement flaps used in present-day otoplasty and earlobe reconstruction (e.g., the cheek-based pedicled flap and the V-Y advancement flap discussed in Section 8).^[1]

Step-by-Step Operative Sequence: The complete operative sequence for *Karna Sandhana*, as reconstructed from the classical description, proceeds as follows:

- The patient's hair is tied back and a light, easily digestible meal is given before the procedure.
- *Chhedana* (excision/trimming) of the wound edges is performed to create clean, opposable surfaces.
- The cut surface is examined for the colour and character of blood, which guides assessment of *Doshic* involvement.
- Once bleeding is controlled, the edges of the lobule are sutured together.

Table 1. The ten successful (*Sadhyā*) patterns of earlobe repair described in the *Sushruta Samhita*

Type (Sanskrit)	Meaning	Clinical Indication
<i>Nemisandhanaka</i>	Resembling the circumference of a wheel (circular suturing)	Flaps equal, wide and thick
<i>Utpalabhedhyaka</i>	Resembling a split lotus bud	Flaps equal, wide and round
<i>Valluraka</i>	Resembling dried strips of meat	Flaps equal, short and round
<i>Asangima</i>	Suturing a large available portion when a small portion is unavailable at the same site	Only inner flap long
<i>Gandakarna</i>	Front part of the long outer flap united after excising adjoining cheek muscle	Only outer/distal flap long
<i>Aharya</i>	Cheek muscle from both sides taken and fashioned to resemble the pinna	Both fragments of the cut lobule absent
<i>Nirvedhima</i>	Union achieved through piercing	Both flaps absent from the root; the base of the tragus (Putrika) used for reconstruction
<i>Vyayojima</i>	Pinna fashioned by joining differing kinds of cut surfaces	One flap even and the other uneven/thick
<i>Kapata-sandhika</i>	Union resembling the panels of a door, externally	Long inner flap, short outer flap
<i>Ardha-kapata-sandhika</i>	Union resembling half a door-panel, internally	Long outer flap, short inner flap

Table 2. The five unsuccessful (*Asadhyā*) patterns of earlobe deformity

Type (Sanskrit)	Meaning	Clinical Indication
<i>Sankshipta</i>	Small remnant	Dried, shrunken pinna with one flap raised, the other short; degenerative pinna
<i>Hinakarna</i>	Insufficient	Flaps without a base; muscular atrophy
<i>Vallikarna</i>	Creeping or winding	Thin, uneven, short flaps; microtia with preauricular tags and skin appendages
<i>Yastikarna</i>	Resembling a stick	Small flaps full of knotty, stiffened vessels; keloid-affected, atrophied pinna and lobule
<i>Kakoushka</i>	Resembling a crow's beak	Emaciated flaps with a shortened tip and reduced vascularity; microtia

Table 3. Dosha-specific local irrigants recommended after Karna Sandhāna.

Dosha	Recommended <i>Prakshepa</i> (irrigant)
<i>Vata</i>	<i>Ushnodaka</i> (warm water), <i>Dhanyamla</i> (fermented gruel)
<i>Pitta</i>	<i>Sheetodaka</i> (cold water), Milk
<i>Kapha</i>	<i>Ushnodaka</i> (warm water), <i>Suramanda</i> (fermented liquor residue)

- *Madhu* (honey) and *Ghrita* (clarified butter) are applied over the suture line for their wound-healing and antimicrobial properties.
- A dressing is applied — neither too tight, which risks vascular compromise, nor too loose, which risks dehiscence.

Post-Operative Care

Post-operative management follows a structured protocol intended to reduce oedema, support healing, and prevent infection:

- *Swedana* (fomentation) of the ear.
- *Snehana* (oleation) using medicated oil.
- Application of a paste (*Upanaha*) of *Yava*, *Ashwagandha*, and *Tila*.
- *Abhyanga* (gentle massage) with medicated oil.
- *Apanga-Desha Prachhadana* — covering/protecting the adjoining temporal region.

Dressing is continued with uncooked (unprocessed) oil for three days; on the third day the dressing is changed, and the slit is gradually elongated using a *Bardhanaka* (a dilator instrument) to maintain patency. Failure to follow this regimen is associated with the complications described in Section 9. [3]

Dosha-Specific Local Applications (*Prakshepa*): Where local irrigation is required, classical texts recommend *Dosha*-specific agents, summarised in Table 3.

Abstinences (*Pathya-Apathya*) During the Healing Period

*विघट्टनं दिवास्वप्नं व्यायाममतिभोजनम्।
व्यायामग्निसन्तापं वाक्श्रमं च विवर्जयेत् ॥(Su.Su.16/18)*

The patient should avoid rubbing of the ear, daytime sleep, exercise, excessive eating, sexual intercourse, exposure to fire and sunlight, and excessive talking, during the period of healing.

These restrictions, framed in classical terminology, correspond closely to the modern post-operative advice given after any wound or flap surgery — namely avoidance of mechanical trauma to the operative site, avoidance of factors that raise local blood flow or systemic metabolic load, and avoidance of conditions favouring wound infection or dehiscence.

Contraindications and Diagnostic Red Flags

न चाशुद्धरक्तमतिप्रवृत्तरक्तं क्षीणरक्तं वा सन्दध्यात् ॥(Su.Su.16/19)

Surgery should not be undertaken when the blood is vitiated/contaminated, when bleeding is excessive, or when bleeding is markedly diminished.

Three specific contraindications are recognised:

- Contaminated or vitiated blood — predisposes to post-operative infection.
- *Atipravṛtta rakta* (excessive bleeding) — predisposes to haematoma formation beneath the suture line, itself a potential source of infection and a cause of surgical failure.

- **Kshina rakta** (diminished bleeding) — interpreted in two complementary senses: a generalised reduction in the patient's total blood volume, or a localised reduction in perfusion at the graft/flap site. In either circumstance, the procedure is unlikely to succeed.^[2]

Dosha-Wise Signs of Vitiated Blood at the Operative Site

The classical texts further correlate the character of bleeding and local tissue reaction with *Doshic* predominance, providing the surgeon with intra-operative diagnostic cues:

- **Vata-Dushta Rakta:** tissue appears retracted/puckered even after repeated eversion.
- **Pitta-Dushta Rakta:** associated with a burning, suppurative type of pain.
- **Kapha-Dushta Rakta:** associated with stiffness and itching.
- **Atipravṛtta Rakta (excessive flow):** associated with dusky discolouration and oedema.
- **Kshina Rakta (diminished flow):** associated with poor, slow tissue growth with minimal muscle bulk.

Complications: Improperly managed *Karna Sandhana*, or surgery undertaken despite contraindication, may result in:^[2]

- Redness
- Pain
- Inflammation
- Suppuration
- Burning sensation
- Re-splitting of the repaired lobule into two parts

Indications for *Karna Vardhana* (Stretching/Enlarging the Lobule)

जातरोमा सुवर्त्मा च क्षिप्तसन्धिः समः स्थिरः।
सुरुढोऽवेदनो यश्च तं कर्णं वर्धयेच्छनैः ॥२५॥

Once hair has regrown at the site, the colour is good, the union is well-adhered, the skin is even and stable on both sides of the suture line, and the site is well-healed and painless, the lobule may gradually be stretched/enlarged.

बद्धमात्रं तु यः कर्णं सहसैवाभिवर्धयेत्।
आमकोशी समाध्मातः क्षिप्रमेव विमुच्यते ॥२४॥

If a freshly healed earlobe is suddenly stretched or enlarged, it becomes swollen and breaks open again rapidly.

This is a clinically important caution: premature stretching of an incompletely matured scar predisposes to recurrence of the cleft, mirroring the modern surgical principle that scar maturation must precede any tension-bearing intervention, including re-piercing or gauge enlargement.^[2]

Correlation with Contemporary Reconstructive Surgery

The principles described above map closely onto present-day surgical management of acquired and congenital ear deformities, broadly classified as Otoplasty and Lobuloplasty.^[5]

Otoplasty and Lobuloplasty Defined

- **Otoplasty:** the surgical procedure for reconstructing a defective, deformed, or absent external ear, consequent to trauma or congenital anomalies such as microtia or anotia.
- **Lobuloplasty:** the surgical procedure specifically prescribed to repair a split or torn earlobe — the direct modern counterpart of classical *Karna Sandhana*.

Auricular lobuloplasty is recognised in contemporary practice as a technically simple procedure with a low complication rate and high patient satisfaction; it is generally performed on an outpatient basis. Despite the variety of techniques available, the surgical goal remains constant: a soft, supple lobule with a well-concealed cosmetic scar and a low risk of recurrence. Acquired lobular deformities — caused by piercings, ear-gauging/extendors, trauma, surgery, or age-related changes — are considerably more common in clinical practice than congenital ear anomalies, the latter occurring in approximately 1 in 1500 live births.^[8]

Classification of Acquired Defects

- Partial earlobe cleft — the lobule is incompletely split.
- Total cleft — the lobule is completely separated into two or three free segments.

Cleft repairs are broadly divided into two strategic groups: those that preserve the original piercing orifice, and those that sacrifice the orifice, allowing a new piercing to be made three to six months after the site has fully healed.

Historical Development of Modern Techniques: Several investigators have refined the surgical approach to earlobe cleft repair over the past century. McLaren is credited with the first description of partial earlobe cleft repair using simple linear closure, by de-epithelialising the cleft scar with a scalpel and approximating the margins with a straight-line closure. Miller subsequently described a simple wedge excision to reduce lobular redundancy. Boo-Chai proposed excision of the cleft edges with suturing performed below the original piercing orifice. Kalimuthu and colleagues introduced the "V" flap technique, employing a V-shaped incision with de-epidermisation at the medial edge and a second V-incision at the lateral edge to achieve apposition after suturing. Fatah, Fearon, and Cuadros subsequently presented the related "L" flap technique.^[4]

A Representative Simple-Repair Protocol

- Cleaning and antiseptic painting of the earlobe.
- Infiltration of local anaesthetic into the lobule.
- Excision of the scar tissue circumferentially with a surgical blade.
- Separate suturing of the anterior and posterior aspects of the wound.
- Application of a pressure bandage and dressing.
- For recurrent or enlarged piercing defects, particularly in elderly patients, an additional strip of cartilage (harvested from the auricle) may be placed horizontally in the inferior aspect of the previous hole, with its convex surface oriented anteriorly, to resist the dragging pull that predisposes to recurrence.

• Anaesthesia Technique

To minimise the number of needle pricks required to anaesthetise the lobule, a single injection may be placed in the skin fold attaching the lobule to the face; the nerve supplying the entire lobule can be anaesthetised instantly from this single site.

Adjunct Technologies: Skin incision with a conventional surgical blade causes bleeding that obscures the operative field and reduces precision — a particular challenge given the small size, lack of firm support, and delicate vascularity of the lobule. A diode laser, operated at a frequency of 2.5 W and a wavelength of 850 nm, has been used as an alternative to the blade for skin incision in lobuloplasty. Reported advantages of laser incision include a sharp cutting edge permitting precise dissection, superior coagulation, instantaneous sterilisation that reduces local bacterial load, reduced operative and anaesthesia time, minimal discomfort for both surgeon and assistant, improved healing, and reduced scarring.

Tissue Adhesive Technique: An alternative closure method employs tissue adhesive rather than sutures, proceeding through excision of the cleft edges, displacement and apposition of the skin edges, intradermal suturing combined with adhesive bonding using cyanoacrylate, and finally an adhesive-bonded lobule with exposed dressing.

The Adapted "L" Technique

The adapted L-flap technique addresses a lobule with partial cleft and vertical elongation through a sequence of: a triangular incision around the defect; removal of a small rectangular fragment from the proximal half of the defect; the distal half of the lobule is pulled up and forward; and finally, suturing to correct the defect with resultant shortening of the lobule to a natural contour^[7]

V-to-Y Advancement Flap: For defects requiring transposition of adjacent tissue, a V-to-Y advancement flap may be designed to transfer skin from an area of relative local excess to fill a neighbouring defect — a direct technical parallel to the pedicled cheek-flap graft described in the classical *Sushruta Samhita* (Section 5.3).^[6]

Reported Complications of Modern Lobuloplasty

- Hypertrophic scar
- Depressed scar
- Wide/stretched scars
- Recurrence of the cleft
- Surgical wound infection

Notably, this list of modern complications mirrors, almost point for point, the complications enumerated in the classical text nearly two millennia earlier (Section 9), underscoring the continuity of clinical observation across both systems of medicine.

DISCUSSION

The classical description of *Karna Sandhana* demonstrates a remarkably mature surgical framework: a structured method of clinical examination (correlating bleeding character and tissue appearance with *Doshic* state), a detailed taxonomy of

presenting deformities with corresponding flap designs, explicit principles governing the geometry of suture placement relative to flap length, the use of a vascularised pedicled flap for total tissue loss, defined contraindications based on the quality and quantity of bleeding, a structured post-operative regimen aimed at minimising infection and oedema, and explicit behavioural restrictions during the healing phase. Each of these elements finds a direct, recognisable counterpart in the techniques and principles used in contemporary otoplasty and lobuloplasty, from the McLaren linear closure and Kalimuthu V-flap to the V-Y advancement flap and adhesive-bonding techniques. This continuity suggests that *Karna Sandhana* should not be regarded merely as a historical curiosity but as a clinically valid precursor technique whose underlying surgical logic remains directly applicable. Integration of classical adjuncts — such as the use of *Madhu* and *Ghrita* as topical wound-healing agents, and *Dosha*-specific local irrigation — alongside modern instrumentation (fine nylon sutures, diode laser incision, cyanoacrylate adhesives) may offer a genuinely integrative approach to lobular reconstruction, combining the cost-effectiveness and accessibility of classical methods with the precision of modern technology.

CONCLUSION

Karna Sandhana stands as one of the earliest, most systematically described reconstructive surgical procedures in any medical tradition. *Acharya Sushruta's* classification of fifteen patterns of lobular deformity, his principles of flap geometry and pedicled-flap reconstruction, and his structured peri-operative protocol collectively anticipate, by many centuries, the techniques now codified as otoplasty and lobuloplasty in contemporary plastic surgery. A renewed clinical and academic engagement with this classical procedure — supported by modern instrumentation and evidence-based correlation — has the potential to enrich present-day reconstructive practice and to further substantiate *Sushruta's* enduring legacy as the father of plastic surgery.

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