

PANCHALOKHA SHALAKA – A CRITICAL APPRAISAL OF ITS THERAPEUTIC ROLE IN AYURVEDIC PRACTICE

**Dr. Mukta Gaddi¹, Dr. Sujata B Waddar², Dr. Ishwar Kattewadi³, Dr. Sourabh Lendave⁴,
Dr. Rahil Jalihal⁵**

¹ PG Scholar, Department of Shalya Tantra, SDM Trust's Ayurvedic Medical College, Danigond Post Graduation Centre, Padma Ayurvedic Hospital and Research Centre, Terdal, Karnataka – 587315

² Professor, Department of Shalya Tantra, SDM Trust's Ayurvedic Medical College, Danigond Post Graduation Centre, Padma Ayurvedic Hospital and Research Centre, Terdal, Karnataka – 587315

³ Professor & HOD, Department of Shalya Tantra, SDM Trust's Ayurvedic Medical College, Danigond Post Graduation Centre, Padma Ayurvedic Hospital and Research Centre, Terdal, Karnataka – 587315

⁴ PG Scholar, Department of Shalya Tantra, SDM Trust's Ayurvedic Medical College, Danigond Post Graduation Centre, Padma Ayurvedic Hospital and Research Centre, Terdal, Karnataka – 587315

⁵ PG Scholar, Department of Shalya Tantra, SDM Trust's Ayurvedic Medical College, Danigond Post Graduation Centre, Padma Ayurvedic Hospital and Research Centre, Terdal, Karnataka – 587315

Abstract : *Panchaloha Shalaka* is a traditional metallic instrument described in *Ayurveda* for various Para surgical procedures, including *Agnikarma*, *Kṣāra Karma*, and other therapeutic interventions. Composed of five metals, *Panchaloha* has long been valued for its mechanical strength, thermal properties, durability, and cultural significance. Despite its continued use in Ayurvedic clinical practice, the scientific evaluation of its therapeutic role remains limited. This review critically appraises the classical references, metallurgical composition, physicochemical characteristics, and therapeutic applications of *Panchaloha Shalaka* in contemporary Ayurvedic practice. Classical literature from *Suśruta Samhitā*, *Aṣṭāṅga Hṛdaya*, and other authoritative texts is examined alongside available modern evidence on metallurgy, heat conduction, biocompatibility, antimicrobial potential, and clinical utility. The review also discusses the advantages, limitations, standardization challenges, and safety considerations associated with the instrument. Current evidence suggests that the unique physical properties of *Panchaloha* may contribute to uniform heat transfer, procedural precision, and favorable therapeutic outcomes during *Agnikarma* and related procedures. However, the lack of standardized manufacturing protocols and robust clinical studies limits definitive conclusions regarding its superiority over other metallic instruments. Further interdisciplinary research integrating *Ayurvedic* principles, materials science, and well-designed clinical trials is warranted to establish evidence-based guidelines for its therapeutic application. This critical appraisal highlights the need to bridge classical knowledge with modern scientific validation, thereby strengthening the clinical relevance and standardization of *Panchaloha Shalaka* in contemporary *Ayurvedic* practice.

Keywords: - *Panchaloha Shalaka*, *Ayurveda*, *Agnikarma*, *Anuśāstrakarma*.

INTRODUCTION

Ayurveda, one of the world's ancient systems of medicine, encompasses a wide range of preventive, promotive, and curative therapies aimed at maintaining the equilibrium of *Doṣa*, *Dhātu*, and *Mala*. Among its therapeutic modalities, *Anuśāstrakarma* occupies a unique position by providing minimally invasive interventions that bridge medical and surgical management. Classical *Ayurvedic* literature describes several *Anuśāstrakarma* procedures, including *Agnikarma*, *Kṣāra Karma*, and *Raktamokṣaṇa*, which are indicated for a variety of musculoskeletal, dermatological, vascular, and chronic disorders ⁽¹⁾. These procedures require appropriately designed surgical instruments to ensure precision, safety, and optimal therapeutic outcomes.

The *Shalaka* is one of the most important instruments described in *Ayurvedic* surgery. It is used for probing, cauterization, application of *Kṣāra*, ophthalmic procedures, and various therapeutic interventions depending on its design and the nature of the disease. *Suśruta*, regarded as the father of surgery, emphasized that the success of any surgical or para-surgical procedure depends not only on the physician's knowledge and skill but also on the quality and suitability of the instruments employed ⁽¹⁾. Classical

texts further describe the use of *Shalakas* prepared from different metals, including *Suvarna* (gold), *Rajata* (silver), *Tamra* (copper), and *Loha* (iron), each selected according to specific therapeutic indications ⁽²⁻³⁾.

Among these metallic instruments, *Panchaloha Shalaka* has gained considerable importance in contemporary *Ayurvedic* practice, particularly for *Agnikarma*. *Panchaloha* is traditionally an alloy of five metals, although its exact composition varies according to regional practices and traditional manufacturing methods. The alloy is believed to combine the beneficial physical properties of its constituent metals, including adequate mechanical strength, thermal conductivity, heat retention, corrosion resistance, and durability. These characteristics are particularly relevant during *Agnikarma*, where controlled and uniform heat transfer is essential to achieve therapeutic cauterization while minimizing damage to surrounding healthy tissues ⁽⁴⁾.

Modern materials science has demonstrated that the composition and microstructure of metallic alloys directly influence their thermal conductivity, hardness, corrosion resistance, wear characteristics, and biocompatibility ^(4,5). These properties determine the efficiency and safety of instruments used in thermal and surgical procedures. Therefore, evaluating *Panchaloha Shalaka* from both classical *Ayurvedic* and contemporary scientific perspectives may provide a better understanding of its clinical utility and support evidence-based standardization.

Despite its widespread use in *Ayurvedic* institutions and clinical practice, the available scientific literature on *Panchaloha Shalaka* remains sparse. Most published evidence is limited to classical textual descriptions, small clinical studies, and isolated reports on metallic properties, with few studies comprehensively evaluating its therapeutic role, metallurgical characteristics, and clinical performance. Furthermore, the absence of standardized manufacturing protocols and uniform alloy composition poses challenges in ensuring reproducible therapeutic outcomes and scientific validation ^(4,5).

Therefore, a critical appraisal of the available classical literature and modern scientific evidence is essential to evaluate the therapeutic relevance of *Panchaloha Shalaka*. The present review aims to examine its historical background, classical references, metallurgical composition, physicochemical properties, therapeutic applications, mechanism of action, advantages, limitations, and future research prospects. By integrating traditional *Ayurvedic* knowledge with contemporary evidence, this review seeks to provide a comprehensive understanding of the therapeutic role of *Panchaloha Shalaka* and highlight areas requiring further standardization and scientific investigation.

Aim –

To critically appraise the classical concepts, metallurgical characteristics, and contemporary scientific evidence regarding *Panchaloha Shalaka* and evaluate its therapeutic role in *Ayurvedic* practice.

Objectives –

- To review the classical *Ayurvedic* literature describing *Panchaloha Shalaka* and its therapeutic applications.
- To analyse the composition, manufacturing process, and physicochemical properties of *Panchaloha Shalaka*.
- To evaluate the role of *Panchaloha Shalaka* in *Agnikarma* and other *Anuśastrakarma* procedures.
- To correlate the traditional *Ayurvedic* concepts with modern scientific evidence on metallurgy, biomaterials, and thermal properties.
- To critically assess the available clinical and experimental evidence regarding the efficacy and safety of *Panchaloha Shalaka*.
- To understand Advantages, Limitations and Future scope related to *Panchaloha Shalaka*

Materials and Methods –

This review was undertaken to critically evaluate the therapeutic role of *Panchaloha Shalaka* in *Ayurvedic* practice through a comprehensive analysis of classical *Ayurvedic* literature and contemporary scientific evidence. A systematic literature search was conducted using electronic databases, including PubMed, Scopus, Google Scholar, and Web of Science, to identify relevant publications related to *Panchaloha*, *Shalaka*, *Agnikarma*, *Ayurvedic* surgical instruments, *Anuśastrakarma*, metallic alloys, and biomaterials ⁽⁶⁾.

The search included articles published in English without restriction on study design. Standard *Ayurvedic* texts and their authoritative commentaries were also reviewed to identify classical references pertaining to *Shalaka*, *Agnikarma*, and the therapeutic use of metallic instruments. The search strategy incorporated Boolean operators (AND, OR) with keywords such as "*Panchaloha*", "*Panchaloha Shalaka*", "*Agnikarma*", "thermal cautery", "*Ayurvedic* metallurgy", and "biomaterials" ^(6,7).

Original research articles, review articles, experimental studies, clinical studies, and relevant textbook references addressing the composition, physicochemical properties, therapeutic applications, and clinical significance of *Panchaloha Shalaka* were included. Duplicate publications, conference abstracts without full-text availability, non-English articles, and studies unrelated to the objectives of the review were excluded. ⁽⁸⁾

The selected literature was critically analyzed and categorized into themes including classical references, metallurgical composition, physicochemical properties, therapeutic applications, mechanism of action, clinical evidence, limitations, and future research

prospects. The findings were synthesized narratively to provide an evidence-based critical appraisal of the therapeutic role of *Panchaloha Shalaka* in contemporary Ayurvedic practice.⁽⁹⁾

Components of *Panchaloha Shalaka* – ⁽¹⁰⁾

Component	Percentage
<i>Tamra</i>	40 %
<i>Loha</i>	30 %
<i>Yashada</i>	10 %
<i>Rajata</i>	10 %
<i>Vanga</i>	10 %

Physical Properties of components of *Panchaloha Shalaka* –

Sr. No.	Metal	Latin name	Chemical symbol	Melting point (centigrade)	Boiling point (centigrade)	Hardness
1	Gold	Aurum	Au	1064.43	1800	2.5-3.0
2	Silver	Argenteum	Ag	961	1955	2.5-3.0
3	Copper	Cuprum	Cu	1083.4	2310	2.5-3.0
4	Iron	Ferrum	Fe	1535	3000	4.0-5.0
5	Tin	Stannum	Sn	213.9	2270	6.7

Medicinal properties of components of *Panchaloha Shalaka* –

Sl.No	Metal	Dosha Shamana	Virya	Therapeutic properties
1	<i>Swarna</i>	<i>Vata & Pitta</i>	<i>Shita</i>	<i>Vataja and Pittaja shoola, Ghridhrasi</i>
2	<i>Rajata</i>	<i>Vata & pitta</i>	<i>Shita</i>	<i>Nadi & Sandhi vata janya shoola</i>
3	<i>Tamra</i>	<i>Kapha</i>	<i>Ushna</i>	<i>Kaphaja & Vatakantaka Shoola</i>
4	<i>Louha</i>	<i>Kapha&Pitta</i>	<i>Shita</i>	<i>Amavata janya sandhi shoola</i>
5	<i>Vanga</i>	<i>Kapha&Vata</i>	<i>Ushna</i>	<i>Sandhi vata janya shoola</i>



Swarna



Rajata



Tamra



Louha



Vanga

Panchaloha Shalaka



THERAPEUTIC INDICATIONS OF PANCHALOHA SHALAKA

1. *Janusandhigata Vata*⁽¹¹⁾
2. *Kadara* (Corn)⁽¹²⁾
3. *Greeva Sandhigata vata* (Cervical Spondylosis)⁽¹³⁾
4. *Vatakantaka* (Plantar Fasciitis)⁽¹⁴⁾
5. *Twakgata Vaata Vikara and Mamsagata Vikara*⁽¹⁵⁾
6. *Ghridhrasi* (Sciatica)⁽¹⁶⁾

Mode of Action of Panchaloha Shalaka Agnikarma in Different Diseases

General Mode of Action

Panchaloha Shalaka Agnikarma works through the controlled application of therapeutic heat. The heated *Panchaloha Shalaka* transfers thermal energy to the diseased tissue, producing local tissue coagulation, destruction of pathological tissue, improved circulation, pain relief, and stimulation of tissue healing. According to Ayurveda, the *Ushna*, *Tikshna*, *Sukshma*, *Vyavayi* and *Ashukari* properties of *Agni* counteract *Vata* and *Kapha Dosha*, remove *Srotorodha* (obstruction of channels), improve local *Dhatvagni*, and restore normal tissue metabolism^(17–20).

Modern research suggests that controlled thermal injury produces:

- Protein coagulation
- Microvascular vasodilatation
- Increased local blood circulation
- Reduction in inflammatory mediators
- Denaturation of pain receptors
- Endorphin release
- Accelerated wound healing
- Controlled fibrosis where required
- Thermal destruction of abnormal tissue^(21–23).

Disease-Wise Examples (Mode of Action)⁽¹⁷⁻²³⁾**1. *Kadara* (Corn)****Ayurvedic Mechanism**

- Pacifies aggravated *Vata* and *Kapha*
- Removes *Srotorodha*
- Burns pathological tissue (*Dushita Mamsa*)
- Prevents recurrence

Modern Mechanism

- Thermal coagulation destroys hyperkeratotic tissue.
- Denatures keratin proteins.
- Seals small vessels reducing bleeding.
- Stimulates healthy epithelial regeneration.

2. *Charmakeela* (Wart)**Ayurvedic Mechanism**

- Burns abnormal *Mamsa Vriddhi*
- Pacifies *Kapha* responsible for excessive tissue growth
- Removes diseased tissue completely

Modern Mechanism

- Coagulative necrosis of HPV-infected tissue
- Destruction of wart vasculature
- Reduced viral load
- Healing with minimal recurrence

3. *Vatakantaka* (Plantar Fasciitis/Calcaneal Spur)**Ayurvedic Mechanism**

- *Ushna Guna* reduces aggravated *Vata*
- Relieves *Shoola*
- Improves *Snayu* flexibility

Modern Mechanism

- Increased blood circulation
- Muscle relaxation
- Reduced fascial stiffness
- Pain gate modulation
- Enhanced collagen remodeling

4. *Sandhigata Vata* (Osteoarthritis)**Ayurvedic Mechanism**

- Alleviates *Vata*
- Removes obstruction in *Sandhi*
- Restores joint movement

Modern Mechanism

- Vasodilatation
- Reduction in muscle spasm
- Increased oxygen supply
- Reduced inflammatory cytokines
- Improved joint mobility

5. *Gridhrasi* (Sciatica)**Ayurvedic Mechanism**

- Pacifies *Vata*
- Removes *Margavarana*
- Relieves radiating pain

Modern Mechanism

- Thermal stimulation decreases nerve sensitivity
- Improved local circulation
- Reduced muscle spasm
- Endorphin-mediated analgesia

6. *Snayu Gata Vata* (Tendinitis)

Ayurvedic Mechanism

- Reduces *Vata*
- Improves *Snayu Bala*

Modern Mechanism

- Increased collagen synthesis
- Enhanced tendon healing
- Improved microcirculation
- Reduced inflammatory edema

7. *Asthi-Snayu-Sandhigata Vikara* (Chronic Musculoskeletal Disorders)

Examples:

- Cervical spondylosis
- Lumbar spondylosis
- Tennis elbow
- Frozen shoulder

Ayurvedic Mechanism

- Pacifies *Vata*
- Removes *Kapha Avarana*
- Restores *Mamsa* and *Snayu* function

Modern Mechanism

- Local hyperthermia
- Improved metabolism
- Pain receptor modulation
- Muscle relaxation
- Increased tissue extensibility

Proposed Flow Chart-

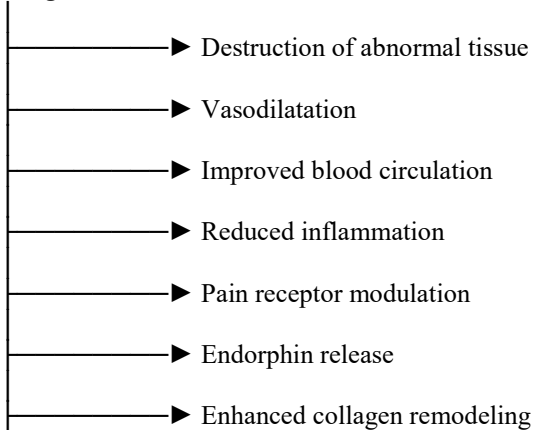
Heating of *Panchaloha Shalaka*



Transfer of Controlled Thermal Energy



Protein Coagulation & Tissue Destruction



Healing with Minimal Recurrence



Restoration of Normal Tissue Function

PROCEDURE⁽²⁴⁾ –

STANDARD OPERATING PROCEDURE –

➤ **Poorva Karma**

- Obtain written informed consent and examine the patient's vitals.
- Identify and mark the maximum point of tenderness (*Atyanta Ruja sthana*).
- Cleanse the target site with antiseptic or herbal decoctions like *Triphala Kashaya* then dry with sterile gauze

➤ **Pradhana Karma**

- Heat the terminal end/tip of the *Panchaloha Agnikarma Shalaka* over an open flame until it is red hot.
- Perform *Bindu Vishesha* (dot/punctiform cauterization) using the tip, or *Pratisaran* (flat/line tracing) using the base, applied precisely to the marked tender points for about 1 to 2 seconds per spot.
- Maintain a 0.5 cm to 1 cm spacing between burn spots to achieve proper therapeutic micro-cauterization (*Samyak Dagdha Vrana*)

➤ **Paschata Karma**

- Immediately apply soothing, cooling agents like fresh *Kumari Swarasa* (Aloe Vera pulp) to pacify local burning sensations.
- Dust the area with healing herbal powders such as *Yashtimadhu Churna* or *Jatyadi Ghrita*

Results –

The reviewed literature indicates that *Panchaloha Shalaka* is an effective instrument for performing *Agnikarma* in the management of various *Vata*-dominant musculoskeletal disorders. Classical Ayurvedic literature emphasizes the importance of selecting appropriate metallic instruments for *Anuśastrakarma* procedures to achieve precise therapeutic outcomes ⁽²⁵⁻²⁷⁾.

Clinical evidence suggests that *Agnikarma* performed with *Panchaloha Shalaka* provides significant relief in pain, stiffness, tenderness, and restriction of joint movements in conditions such as *Janusandhigata Vata* (knee osteoarthritis), *Vatakantaka* (calcaneal spur), and *Bahya Arśa*. The therapeutic effect is primarily attributed to localized thermal stimulation, improved microcirculation, reduction of *Vata* aggravation, and enhanced tissue healing ⁽²⁸⁻³³⁾.

A recent case study by Hiremath and Kulkarni reported marked reduction in bilateral knee pain, stiffness, and difficulty in walking following *Agnikarma* with *Panchaloha Shalaka* in a patient with *Janusandhigata Vata*, supporting its role as a safe and minimally invasive therapeutic modality ⁽³⁴⁾.

Similarly, published clinical reports on *Vatakantaka* demonstrated substantial improvement in pain and functional mobility after treatment with *Panchaloha Shalaka Agnikarma*, with no significant adverse effects reported during follow-up ⁽³⁵⁾.

Experimental and clinical evidence further suggests that the alloy composition of *Panchaloha* provides desirable thermal conductivity, heat retention, corrosion resistance, and mechanical strength, allowing uniform heat distribution during *Agnikarma*. These properties contribute to procedural precision and consistent therapeutic outcomes ⁽³⁶⁾.

Despite encouraging clinical outcomes, the available evidence is predominantly based on case reports, small clinical studies, and observational research. Considerable heterogeneity exists regarding the composition of *Panchaloha*, procedural techniques, outcome measures, and follow-up duration. Therefore, adequately powered randomized controlled trials and standardized manufacturing protocols are needed to validate the therapeutic efficacy and ensure reproducibility of results ⁽³⁵⁻³⁷⁾.

Advantages of *Panchaloha Shalaka Agnikarma*

- Versatile therapeutic utility
- Immediate pain relief
- Improved local circulation
- Promotes tissue healing
- Minimally invasive procedure
- Decreases dependency on analgesics

Limitations of Current Research

- Limited high-quality evidence

- Lack of standardized treatment protocols
- Limited disease-specific evidence
- Lack of objective outcome measures
- Insufficient mechanistic studies
- Operator-dependent outcomes
- Inadequate reporting of adverse effects
- Variability in *Panchaloha* composition

Future Scope of Research

- Large multi centre randomized controlled trials
- Standardization of *Panchaloha Shalaka* composition and procedure
- Long-term follow-up studies
- Comparative effectiveness studies with modern therapies
- Exploration of new therapeutic indications
- Integration with physiotherapy and rehabilitation
- International collaborative research

Discussion -

Panchaloha Shalaka is an important instrument used in *Ayurvedic Agnikarma* owing to its favorable thermal and mechanical properties. Its alloy composition provides adequate heat conduction, heat retention, durability, and corrosion resistance, enabling controlled cauterization with minimal damage to surrounding healthy tissues. These characteristics make it suitable for the management of various *Vata*-dominant musculoskeletal and pain-related disorders.

The reviewed literature suggests that *Agnikarma* performed with *Panchaloha Shalaka* is effective in reducing pain, stiffness, tenderness, and improving functional outcomes in conditions such as *Janusandhigata Vata*, *Vatakantaka*, and other chronic painful disorders. The therapeutic effects may be attributed to localized thermal stimulation, improved blood circulation, relief of muscle spasm, and promotion of tissue healing. From an *Ayurvedic* perspective, the procedure helps alleviate aggravated *Vata* and restore normal physiological function.

Despite encouraging clinical outcomes, the current evidence is limited by the availability of only a few clinical studies and case reports. Variations in the composition of *Panchaloha* and the lack of standardized manufacturing protocols further limit the reproducibility of therapeutic outcomes. Therefore, well-designed clinical trials, metallurgical analyses, and standardization of *Panchaloha Shalaka* are required to strengthen the scientific evidence and support its wider application in evidence-based *Ayurvedic* practice.

Conclusion –

Panchaloha Shalaka is a valuable therapeutic instrument in *Ayurvedic* practice, particularly for *Agnikarma*, due to its favorable thermal conductivity, durability, and ease of handling. The available classical literature and contemporary evidence suggest that it plays an effective role in the management of various pain-related and musculoskeletal disorders by facilitating precise and controlled thermal cauterization. However, the existing evidence is limited by a lack of standardized alloy composition and high-quality clinical studies. Further multidisciplinary research, including metallurgical evaluation and well-designed clinical trials, is essential to validate its therapeutic efficacy, establish standard manufacturing protocols, and strengthen its evidence-based application in modern *Ayurvedic* practice.

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