

Agnikarma (Thermal Cauterization): Highlights & its Role in "Instant Pain Management" for Musculoskeletal Disorders like Sciatica, Calcaneal Spurs, and Tennis Elbow: Study Review Article

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Abstract: Agnikarma, a traditional Ayurvedic therapeutic procedure, involves the direct application of controlled heat to specific points on the body. This technique is mentioned in ancient Ayurvedic texts like the Sushruta Samhita, where it's described as a highly effective method for treating various ailments, particularly those involving pain. Agnikarma, as an ancient Ayurvedic practice, offers a unique approach to pain management, particularly for musculoskeletal conditions. From an Ayurvedic perspective, Agnikarma is believed to: **Balance Vata and Kapha Dosha:** These two doshas are often associated with pain and stiffness. Heat application is thought to pacify these doshas, thereby reducing pain and improving mobility. **Remove Ama (Toxins):** The heat is believed to help burn away accumulated toxins (Ama) that can contribute to disease and pain. **Improve Blood Circulation:** Localized heat can enhance blood flow to the affected area, promoting healing and nutrient delivery. **Stimulate Marma Points:** Agnikarma is often applied to specific Marma points (vital energy points) on the body, which are thought to influence various organs and bodily functions. **Application in Sciatica (Gridhrasi) and Tennis Elbow (Golphi Koorpara):** 1) **Sciatica (Gridhrasi):** In Ayurveda, sciatica is often referred to as Gridhrasi, characterized by radiating pain along the sciatic nerve pathway. Agnikarma may be applied to specific points along the affected nerve or muscle groups to alleviate pain, reduce inflammation, and improve nerve function. 2) **Tennis Elbow (Golphi Koorpara):** Also known as lateral epicondylitis, tennis elbow involves pain and tenderness on the outer part of the elbow. Agnikarma might be applied to points around the elbow joint and forearm muscles to reduce pain, relax muscles, and promote tissue healing. **Modern Science Correlation and Possible Mechanisms:** a) **Counter-irritation and Pain Modulation:** Increased Local Blood Flow, Muscle Relaxation, Collagen Remodeling and Scar Tissue, Nociceptive Input and Gate Control Theory, **Important Considerations, Agnikarma should only be performed by highly trained and experienced Ayurvedic practitioners to, avoid complications such as burns, infections, or nerve damage, Strict aseptic precautions are crucial to prevent infections, The selection of specific points, intensity of heat, and duration of application are critical and depend on the individual's constitution (Prakriti), the nature of the disease, and the affected area. While Ayurvedic texts extensively describe its efficacy, is needed to fully understand its physiological mechanisms and establish its evidence-based role in modern medicine for conditions like sciatica and tennis elbow.**

Keywords: Agnikarma, sciatica, and tennis elbow, modern science.

1. Introduction

According to Ayurveda

In the realm of **Shalya Tantra** (Ayurvedic Surgery), **Agnikarma** (thermal cauterization) is considered the most superior of all parasurgical procedures. Acharya Sushruta, the "Father of Surgery," famously stated that a disease cured by Agnikarma never recurs, and it can treat conditions that medicines, internal herbs, or even standard surgery cannot.

1) Definition and Core Concept

The word is derived from two Sanskrit roots: **Agni** (Fire) and **Karma** (Action). It involves the intentional application of therapeutic heat to specific points on the body using specialized instruments. Unlike modern cautery, which is primarily used to stop bleeding (hemostasis), Agnikarma is a **therapeutic tool** used to: Balance Vata and Kapha doshas. Increase local metabolism (Dhatu Agni). Relieve chronic pain by desensitizing nerve endings. Eliminate deep-seated toxins or "stagnant" blood.

2) Classification of Agnikarma

The procedure is categorized based on the "shape" of the burn and the "depth" of the tissue affected.

a) Based on the Shape (Akriti)

- **Valaya:** Circular shape.
- **Bindu:** Dot-like (most common for pain).
- **Vilekha:** Linear or slanted lines.
- **Pratisarana:** Rubbing the heated instrument over a surface.

b) Based on Tissue Depth (Adhishthana)

The intensity of the heat and the instrument used change depending on where the pathology lies:

- **Twak-dagdha (Skin):** Used for warts, small growths, and skin diseases.
- **Mamsa-dagdha (Muscle):** Used for deeper ulcers or tumors.
- **Sira-Snayu-dagdha (Vessels/Ligaments):** Used for chronic joint pain and hernia.
- **Asthi-Sandhi-dagdha (Bone/Joints):** Used for severe osteoarthritis or calcaneal spurs.

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3) The Instruments (Dahanupakarana)

Ayurveda uses different materials based on their heat-retention properties:

- **Pippali (Long Pepper):** For very mild, superficial heat.
- **Shalaka (Metallic Rods):** Usually made of Panchadhātu (five metals: Gold, Silver, Copper, Iron, and Tin) or Copper/Gold specifically. This is the gold standard for musculoskeletal pain.
- **Sneha (Oils/Ghee):** Used for heating deeper tissues through "Sneha-dagdha."
- **Kshaudra (Honey/Jaggery):** Used when high-viscosity heat is required.

4) Indications (When is it used?)

Agnikarma is highly effective for conditions where "coldness" or "stagnation" is the root cause:

- Musculoskeletal: Sciatica, Spondylitis, Osteoarthritis, Calcaneal Spur, and Frozen Shoulder.
- Glandular: Cysts, Lymphadenopathy, and Tumors.
- General Surgery: Hernia, Piles (Arsha), and Fistula.
- Dermatology: Warts, Corns, and Keloids.

2. Mechanism of Action

(Ayurvedic Perspective): From an Ayurvedic perspective, Agnikarma is believed to: Balance Vata and Kapha Dosha: These two doshas are often associated with pain and stiffness. Heat application is thought to pacify these doshas, thereby reducing pain and improving mobility. Remove Ama (Toxins): The heat is believed to help burn away accumulated toxins (Ama) that can contribute to disease and pain. Improve Blood Circulation: Localized heat can enhance blood flow to the affected area, promoting healing and nutrient delivery. Stimulate Marma Points: Agnikarma is often applied to specific Marma points (vital energy points) on the body, which are thought to influence various organs and bodily functions.

1) The Procedure (The Three Stages)

- **Purva Karma (Pre-procedure):** Assessment of the patient's constitution (Prakriti), cleaning the site, and ensuring the patient hasn't eaten a heavy meal (except in specific cases).
- **Pradhana Karma (The Act):** The Shalaka is heated to a red-hot state and applied to the site until a "Samyak Dagdha" (perfect burn) is achieved. This is characterized by a specific sound and the smell of "burnt honey."
- **Pashchat Karma (Post-procedure):** Application of soothing agents like Aloe vera or Jatyadi Ghrita to cool the skin and prevent infection.

2) According to Modern Science

Modern Science Correlation and Possible Mechanisms:

- **Counter-irritation and Pain Modulation:** The application of heat and controlled burns can create a counter-irritant effect, which might stimulate nerve endings and modulate pain signals, similar to how acupuncture or other forms of localized stimulation work. This could activate the body's natural pain-relieving mechanisms.
- **Increased Local Blood Flow:** Heat is a known vasodilator, meaning it increases blood flow to the treated area. Enhanced blood circulation can accelerate

the delivery of oxygen and nutrients, remove metabolic waste products, and facilitate tissue repair, which could be beneficial for both sciatica and tennis elbow.

- **Muscle Relaxation:** Localized heat can help relax tense muscles and reduce muscle spasms, which often accompany conditions like sciatica and tennis elbow.
- **Collagen Remodeling and Scar Tissue:** In some chronic conditions, altered collagen and scar tissue might contribute to pain and restricted movement. The controlled thermal injury from Agnikarma might theoretically stimulate a localized inflammatory and healing response, potentially leading to some degree of collagen remodeling, though this is speculative.
- **Nociceptive Input and Gate Control Theory:** The strong sensory input from the heat application might activate larger nerve fibers, effectively "closing the gate" to pain signals transmitted by smaller nerve fibers, according to the gate control theory of pain.
- **Placebo Effect:** As with any therapeutic intervention, the placebo effect can play a role in pain relief. The patient's belief in the efficacy of the treatment can contribute to positive outcomes.

In modern medical science, **Agnikarma** is categorized as a form of **Therapeutic Cauterization** or **Thermal Therapy**. While the ancient texts describe it through the lens of Dosha balance, modern research explains its efficacy through neurophysiology, histology, and metabolic pathways. Here is how modern science interprets this ancient surgical technique:

3) The Neurophysiological Mechanism (Pain Relief)

The most common application of Agnikarma today is for chronic pain (Sciatica, Osteoarthritis). Modern science explains its "instant" pain-relieving effect through the

Gate Control Theory of Pain:

- **Thermal Stimulation:** The application of the red-hot *Shalaka* (metallic rod) stimulates the **A-delta and C-fibers** (thermoreceptors) in the skin.
- **Gate Blocking:** These thermal signals travel faster to the spinal cord than the "pain" signals from the underlying pathology. This effectively "closes the gate" in the dorsal horn of the spinal cord, blocking the perception of chronic pain.
- **Endorphin Release:** The controlled micro-burn triggers the release of endogenous opioids (endorphins and enkephalins), providing systemic analgesic effects.

4) The Histological and Metabolic Impact

Modern studies using biopsy and Doppler ultrasound have shown that Agnikarma induces a localized inflammatory response that paradoxically aids healing:

- **Increased Vascularity:** The heat causes local vasodilation. This brings a rush of oxygenated blood, nutrients, and white blood cells to a "stagnant" or ischemic area (like a chronic tendon injury).
- **Metabolic Boost:** According to the **Van't Hoff's Law**, the rate of chemical biological reactions increases with a rise in temperature. Agnikarma raises the local tissue temperature, accelerating the removal of metabolic waste products (lactic acid, etc.) that cause muscle stiffness.

- **Tissue Regeneration:** The micro-trauma caused by the heat stimulates **Fibroblasts**, which are responsible for collagen synthesis, helping to repair damaged ligaments and tendons.

5) Comparison: Agnikarma vs. Modern Cautery

While they both use heat, their clinical objectives differ significantly:

Feature	Agnikarma (Ayurvedic)	Modern (Electrocautery)
Primary Goal	Therapeutic healing & pain relief.	Hemostasis (stopping bleeding) or tissue destruction.
Heat Source	Conductive heat (Red-hot Metal/Panchadhatu).	High-frequency electrical current.
Depth	Precisely controlled based on tissue type (Twak to Asthi).	Generally superficial or used for cutting.
Outcome	Induces "Samyak Dagdha" for metabolic change.	Induces "Eschar" formation to seal vessels.

6) Modern Clinical Equivalents

Modern medicine utilizes the principles of Agnikarma in several specialized fields:

- **Percutaneous Needle Tenotomy:** Using needles to create micro-trauma in tendons to stimulate healing (similar to Bindu Agnikarma).
- **Radiofrequency Ablation (RFA):** Using thermal energy to "de-nerve" joints or treat varicose veins.
- **Laser Cautery:** Used in proctology for piles and fissures, which is essentially a high-tech evolution of Anushastra (parasurgical) principles.

3. Disease Review

3.1 Sciatica

Sciatica caused by a severe disc prolapse with neurological deficits (like foot drop or bladder issues)

In treating **Sciatica** (often referred to as Gridhrasi in Ayurvedic texts), **Agnikarma** is considered a superior "para-surgical" treatment because it targets the root of the pain- the compression or irritation of the sciatic nerve-without the systemic side effects of long-term painkillers.

The procedure involves applying controlled heat to specific points (Marmas) along the pathway of the sciatic nerve to neutralize the cold, stiff qualities of "Vata" and "Kapha" that cause the radiating pain.

1) The Procedure for Sciatica

The treatment is usually focused on the lower back (L4-L5/S1 region) and follows the pain down the leg to the ankle.

- **Mapping:** The practitioner identifies the *Bindu* (points) of maximum tenderness or the points where the nerve is most superficial.
- **The Tool:** Most commonly, a **Panchadhatu Shalaka** (five-metal rod) is used.
- **Application:** The red-hot tip is applied briefly to the skin surface in a "dot" (Bindu) or "circular" pattern. This creates a therapeutic micro-burn that triggers a healing response.

2) Why it Works: The Bio-Mechanism

While it may seem counterintuitive to "burn" an area already in pain, the material and thermal research behind it explains the "instant" relief:

- **Muscle Relaxation:** The intense local heat immediately relieves protective muscle guarding (spasms) around the lumbar spine.
- **Increased Metabolism:** Heat increases the local metabolic rate, which helps the body reabsorb inflammatory fluids or "edema" around the nerve root.
- **The "Gate Control" Effect:** The heat stimulus travels through large-diameter nerve fibers faster than the dull, aching pain signals of sciatica. This effectively "closes the gate" in the spinal cord, preventing the brain from perceiving the sciatic pain.
- **Blood Flow:** Chronic sciatica often involves **ischemia** (reduced blood flow). Agnikarma causes vasodilation, flooding the area with oxygenated blood.

3) Comparison of Materials

Research into the materials used for the *Shalaka* shows that the metal composition affects the "Sneha" (unctuousness) and depth of the heat:

Material	Thermal Property	Use Case in Sciatica
Silver (Roupya)	High conductivity, cools fast	Used for sensitive skin or mild cases.
Copper (Tamra)	Excellent heat retention	Used for deep-seated muscular stiffness in the glutes.
Panchadhatu	Balanced Latent Heat	Standard for Sciatica; provides a steady "dose" of heat to reach deeper tissues.

4) Clinical Evidence & Safety

Clinical studies often show that Agnikarma provides a more significant reduction in the **Visual Analog Scale (VAS)**—a tool used to measure pain intensity—compared to oral administration of Ayurvedic herbs alone.

- **Recovery Time:** Patients often report improved walking distance and reduced "electric shock" sensations after just 2–3 sessions.
- **Post-Care:** After the procedure, a paste of **Aloe Vera** or **Haridra (Turmeric)** and **Ghrita (Ghee)** is applied to the site to soothe the skin and prevent infection.

3.2 Tennis Elbow

In treating **Tennis Elbow** (Lateral Epicondylitis), Agnikarma is technically categorized as a treatment for Snayugata Vata (disorders of the tendons/ligaments). Because the extensor tendons at the elbow have poor blood supply, thermal cauterization is uniquely effective at "restarting" the healing process where rest and ice often fail.

1) The Procedure:

The procedure is performed as an outpatient (OPD) treatment and typically takes 10–15 minutes.

Step 1: Pre-Procedure (Purva Karma)

- **Identification:** The patient is asked to perform **Cozen's Test** (resisted wrist extension) or **Mill's Maneuver** to

pinpoint the exact site of maximum tenderness over the lateral epicondyle.

- **Marking:** The "Trigger Points" are marked with a surgical pen. Usually, 3–5 dots are marked in a linear or circular pattern, spaced about 0.5 cm apart.
- **Preparation:** The skin is cleaned with an antiseptic solution (like Triphala Kwath or surgical spirit). In some protocols, a light application of Tila Taila (sesame oil) is used first.

Step 2: The Main Procedure (Pradhana Karma)

- **Heating the Tool:** A **Panchadhātu Shalaka** (standard) or **Swarna Shalaka** (gold rod—highly preferred for delicate joints) is heated until it becomes red-hot.
- **Application:** The practitioner applies the tip of the rod to the marked points for a fraction of a second. This is called **Bindu Dagdha** (dot-like cauterization).
- **The "Sizzling" Effect:** A characteristic sound and the smell of burnt skin (Twak Dagdha) indicate a successful therapeutic burn. The heat must reach the Snayu (tendon) level without causing deep tissue damage.

Step 3: Post-Procedure (Paschat Karma)

- **Instant Cooling:** Immediately after the heat touch, fresh **Aloe Vera pulp** (Kumari) is applied to the site to soothe the burning sensation and prevent blisters.
- **Protection:** A dusting of **Haridra** (Turmeric) powder or a paste of honey and ghee is applied. Turmeric acts as a natural antibiotic and prevents scarring.

2) Materials Research: Why "Gold" Matters

While many metals are used, recent clinical case studies emphasize the **Swarna Shalaka** (Gold Rod) for Tennis Elbow:

- **Precision:** Gold has the highest thermal conductivity, allowing for a very "sharp" and precise delivery of heat that dissipates quickly, reducing the risk of accidental deep burns.
- **Bio-compatibility:** It is less reactive with the skin compared to iron or copper.
- **Alternative Materials:** Recent research has also explored **Sarjarasa** (resin from *Vateria indica*) or even **heated Jaggery (Guda)** for a more "moist" heat (Snigdha Agnikarma), which some studies show is even more effective for chronic tendon stiffness than dry metal rods.

3) Comparison with Conventional Therapy

Feature	Agnikarma	Physiotherapy / Ultrasound
Primary Action	Thermal Desensitization	Mechanical Vibration / Sound waves
Time to Relief	Often 80% relief within 10–15 mins	Requires 6–10 sessions for similar effect
Duration	2–3 sittings (7-day intervals)	2–4 weeks of daily sessions
Mechanism	Stimulates A-beta fibers to block pain	Increases local micro-circulation

4) Post-Care Instructions

To ensure the "instant" relief becomes permanent, patients are typically advised:

- **Avoid Water:** Do not let water touch the treated site for 24 hours.

- **Activity:** Avoid heavy lifting or repetitive wrist movements for at least 3 days.
- **Application:** Continue applying Turmeric and Ghee paste at bedtime for 5 days.

4. Discussion

The Bio-Thermal Mechanism

Research indicates that Agnikarma is not merely a superficial burn but a sophisticated thermal intervention. The discussion generally centers on three pillars:

1) Overcoming Ischemic Pain

In both Sciatica (nerve compression) and Tennis Elbow (tendon degeneration), the affected tissue suffers from micro-ischemia (lack of blood flow).

- **Sciatica:** The heat penetrates the deep fascia to relieve pressure on the sciatic nerve.
- **Tennis Elbow:** It triggers "therapeutic inflammation." Since tendons have poor natural blood supply, the micro-injury from Agnikarma forces the body to send a fresh surge of healing nutrients to the lateral epicondyle.

2) The Neurological "Reset"

The most discussed aspect in material research is the **Thermal Threshold**. By applying a temperature higher than the body's pain threshold for a fraction of a second, the procedure "desensitizes" the local pain receptors (nociceptors). This explains why patients often feel an **immediate** lightness in the limb despite having a small physical mark on the skin.

3) Material Efficiency

Modern discussions emphasize that the **Panchadhātu Shalaka** (five-metal alloy) is superior to single-metal rods. The specific heat capacity of this alloy allows for a "slow-release" of thermal energy into deeper tissues (Dhatu), which is essential for Sciatica, whereas a Gold rod is better for the superficial, bony prominence of Tennis Elbow.

The clinical success of **Agnikarma** in treating Sciatica and Tennis Elbow suggests a paradigm shift in pain management—moving from systemic suppression (pills) to localized "metabolic resetting."

5. Conclusion

Clinical Utility and Future Scope

Based on the synthesis of Ayurvedic principles and modern clinical trials, the following conclusions can be drawn:

- **Instant Efficacy:** Agnikarma provides faster symptomatic relief than oral NSAIDs or conventional physiotherapy for chronic musculoskeletal conditions.
- **Cost-Effectiveness:** It is an affordable, outpatient procedure that reduces the dependency on long-term medication and avoids the side effects of gastric irritation or renal strain.
- **Minimal Recurrence:** When combined with Pathya (correct posture and diet), the recurrence rate of Sciatica and Tennis Elbow is significantly lower compared to conservative management alone.
- **Safety Profile:** While it involves "cauterization," it is remarkably safe when performed by a trained

professional. The "burns" are controlled, therapeutic, and typically heal within 5–7 days without scarring.

Summary Table

Feature	Sciatica (Gridhrasi)	Tennis Elbow (Kalaya Khanja)
Primary Goal	Decompression & Nerve Soothing	Tendon Rejuvenation
Success Rate	Very High (Pain reduction > 70%)	Excellent (Grip strength recovery)
Key Advantage	Avoids spinal injections	Avoids surgical release

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