

ORIGINAL RESEARCH ARTICLE

A COMPARATIVE EXPERIMENTAL STUDY OF THERMAL RELAXATION TIME AMONG DIFFERENT INSTRUMENTS (DAHANOPAKARNA) USED IN THERAPEUTIC CAUTERIZATION (AGNIKARMA)

Anuja Prabhat Kitturkar^{1*}, Narayan Namdev Kolte², Manjula Madiwalar³

¹Assistant professor, Department of Shalya tantra, ²Intern, ³Professor and Head, Department of Shalya Tantra, SBG Ayurvedic medical college and hospital, Belagavi-591108, Karnataka, India

*Corresponding author: Email address: anujakitturkar28@gmail.com

ABSTRACT

Background: Ayurveda, the ancient system of medicine utilizes diverse therapeutic modalities, among which Agnikarma is a specialized para-surgical procedure that involves the controlled application of heat using different materials (Dahanopakaranas). The materials used for transferring heat, vary in thermal characteristics. Agnikarma employs thermal energy for treating various disorders, but a key challenge lies in maintaining precise and consistent temperature control across different Dahanopakaranas. **Objective:** This study compares the thermal relaxation time (TRT) of various Dahanopakaranas —Pippali (Dry fruit of piper longum), Aja shakrut (excreta of Goat), Godanta (Cow's tooth), Tamra Shalaka (Copper rod), Loha Shalaka (Iron rod), Panchadhatu Shalaka (Five metal alloy rod) after heating them to red-hot condition and Guda (Jaggery) until it melts. **Method:** This research aimed to systematically measure the Thermal relaxation time and develop a standardized module for the temperature range of various classical instruments used for therapeutic cauterization (Dahanopakaranas), when heated on an open flame until they reach a red-hot state, followed by recording the temperature drop at one-minute intervals until the samples return to ambient temperature. **Result:** The temperature decay over time was analysed to determine that Pippali cools down rapidly, reaching near room temperature within 5-6 minutes, Aja shakrut and Godanta show a steep drop in temperature, stabilizing around 30-35°C within 10 minutes, Tamra, Loha, and Pancha Dhatu Shalaka retain heat significantly longer, with Guda having the highest heat retention among selected Dahanopakaranas. **Conclusion:** This study correlates classical indications of Dahanopakaranas with their thermal behaviour using Thermal Relaxation Time (TRT) values, providing a scientific basis for Acharya Sushruta's site-specific Agnikarma recommendations and aiding in tool standardization.

KEYWORDS: Agnikarma, Dahanopakarna, Para surgical procedure, therapeutic cauterization, Thermal relaxation.

Submitted date – 12.04.2026

Revised Date – 10.05.2026

Accepted Date – 05.06.2026

INTRODUCTION

Ayurveda, the ancient system of medicine emphasizes a holistic approach to health and well-being. Ayurveda utilizes diverse therapeutic modalities, among these Agnikarma is a specialized para-surgical procedure that involves the controlled application of heat using various instruments (Dahanopakaranas) and diseases cured by Agnikarma are known to have no recurrence¹ Likewise, Thermo therapy is used as a mode of treatment in various ailments as well as different specialties of medicine utilise heat as a source of healing as per their basic principles. Agnikarma is a thermal therapy in the Indian system of medicine that treats various musculoskeletal and neurological disorders by transferring heat through specific materials, it is indicated in vata related disorders and pain management². The materials used for transferring heat, known as Dahanopakaranas, vary in thermal characteristics and indication, these materials are believed to differ in their ability to retain and transmit heat, thus influencing their indication and mode of use. Sushruta Samhita advocates for the appropriate selection of the cauterizing instrument based on the disease condition, patient's constitution and desired therapeutic intensity.³ The study attempted to bridge classical indications with thermal behaviour and explored the

rationale behind site-specific recommendations by Acharya Sushruta. Clinically Dahanopakaranas are heated on various sources of heat and used as required. It is believed to offer relief, especially in diseases of Mamsa (Muscle), Asthi (Bone), Snayu (Tendon) and Sandhi (Joints).⁴

The materials used for Agnikarma are not chosen illogically; classical texts provide site-wise indications. However, the scientific basis behind these selections remains inadequately explored. One key parameter that could shed light on the clinical reasoning is the Thermal Relaxation. Thermal Relaxation Time (TRT) refers to the time taken by a heated object to cool down from a high temperature (usually after being heated to a certain point like "red hot") to a lower temperature, often close to ambient, in the absence of external heating. High thermal conductivity materials cool down quickly, whereas those with lower conductivity retain heat longer, these factors directly impact therapeutic outcomes in procedures like Agnikarma. Hence TRT plays a critical role in controlling the extent of tissue penetration and heat diffusion, thereby ensuring therapeutic precision and avoiding collateral damage.

This study compares the thermal relaxation time (TRT) of selected Dahanopakaranas—Pippali, Aja Shakrut,

Godanta, Tamra Shalaka, Loha Shalaka, Pancha dhatu Shalaka after heating them to red-hot condition and Guda until it melts. One of the most significant challenges in the Agnikarma procedure is achieving accurate and reproducible temperature control to ensure proper calibration and consistent measurement across numerous samples. Classical Dahanopakaranas are used for specific disorders until Samyak dagdha laxanas appear.⁵ However it is now extensively practiced in disorders of Vata and Kapha doshas including musculoskeletal pain, neuralgia and localised swellings.⁶ Certain Dahanopakaranas require precise thermal management to prevent excessive tissue damage during heat transfer.

RATIONALE OF THE STUDY

Thermal Relaxation Time (TRT) is a parameter that defines the time required for a heated object to return to equilibrium (ambient) temperature after heating is stopped. It is primarily determined by a material's thermal conductivity, specific heat capacity, density, emissivity and surface area. Despite the availability of thermophysical data on metals from material science literature, there remains a significant research gap in directly applying these concepts to validate Ayurvedic surgical tools. No study till date has comprehensively compared the Thermal Relaxation Time of Dahanopakaranas using standardized heating methods, objective instrumentation and comparative data analysis. Thus, the present study aims to bridge this gap by experimentally measuring and comparing the TRT of various Dahanopakaranas used in Agnikarma therapy. The study seeks to provide scientific validation for classical Ayurvedic descriptions and help optimize the clinical application of heat-based therapies through a modern experimental approach. Recent advances in non-contact thermometry, particularly the use of infrared thermometers and thermal imaging, enable precise recording of surface temperature changes over time.

Few studies have attempted to empirically validate these Ayurvedic practices. However, methodological limitations such as non-standardized heating protocols and limited sample size necessitate more rigorous investigation. A study titled 'Comparative Temperature Study of Different Dahanopakaranas used in Agnikarma Procedure'⁷ in 2020 Compared thermal retention behaviour under parallel conditions but focused only on surface temperatures and their fall over 60 seconds, with limited insight into the thermal behaviour and no theoretical modelling.

OBJECTIVES

- To measure the individual thermal relaxation time (TRT) of Dahanopakaranas explained in Sushruta Samhita.

- To compare the thermal relaxation time (TRT) of Pippali, Aja shakrut, Godanta, Tamra shalaka, Loha shalaka, Panchadhatushalaka and Guda until ambient temperature.
- To verify the concept of site wise indication of Dahanopakaranas

METHODOLOGY

Materials required: Gas stove, infrared non-contact surface temperature detector thermometer, Room analogue temperature thermometer, petri dish, Artery forceps.

Seven Dahanopakaranas were selected for the study:

1. Pippali (*Piper longum*)
2. Aja Shakrut (faecal matter of Goat)
3. Godanta (Teeth of cow)
4. Tamra Shalaka (Copper rod)
5. Loha Shalaka (Iron rod)
6. Panchadhatu Shalaka (Five metal alloy rod)
7. Guda (Jaggery)

For this study we procured raw dry Pippali (*Piper longum*) and Guda from GMP certified pharmacy, Aja Shakrut (faecal matter of Goat) was collected from natural source and Godanta (teeth of cow) was collected from Goushala (Cow barn). Tamra shalaka, Loha shalaka, and Pancha dhatu shalaka were procured from certified authentic sellers.

Standardization of Samples: To minimize variability in heat transfer characteristics, all samples were standardized to the greatest extent possible before experimentation. Metallic shalakas were procured with uniform dimensions and weight (37 grams/6.5 cm cylindrical rods each). Organic materials including Pippali, Aja Shakrut, Godanta and Guda were selected to ensure comparable size and weight among all experimental samples. Pippali specimens averaged 580 mg, Aja Shakrut averaged 3.00 gm, Godanta averaged 4.2 gm, and Guda was portioned into uniform 50 g chunks

Method:

1. Heating Process: Each material was heated to a red-hot state (Depending on the material) and Guda is heated until it melts, using a standardized heating apparatus (Gas flame) at same distance from flame. The classical 'red-hot' endpoint was utilized as a functional benchmark for peak heating across different materials, this was operationally defined as the point of visible incandescence (glowing red) upon the flame. Samples are heated at equidistance from the flame (Approx 5 cm from the burner)
2. Measurement of Temperature: A digital infrared thermometer was used to measure the surface temperature immediately after heating (T_o) and subsequently at one-minute intervals until ambient

temperature ($30 \pm 2^\circ\text{C}$) was reached.

- 3 Replication: The experiment was repeated thrice for each material to ensure consistency.
- 4 Rate of Cooling was measured for each sample and mean TRT was calculated.
- 5 Three “independent” specimens of each Dahanopakarana were used throughout the study. All experiments were conducted under identical environmental conditions using the same heating source and measuring instrument

Control Measures

- Ambient conditions were kept constant (room temperature $30 \pm 2^\circ\text{C}$, humidity controlled).
- All materials were standardized in terms of weight and shape to the extent possible.
- Measurements were taken by the same observer to reduce observational bias.

RESULT

A longer thermal relaxation time indicates that the object retains heat for a longer period.

Hence, the thermal relaxation time tells us how long it takes for the system to significantly approach equilibrium after being heated. Table 1 to Table 8 show temperature drop recorded for each Dahanopakaranas, Table 8 shows temperature at which samples of Dahanopakaranas becomes red hot, Table 9 shows time taken by samples of Dahanopakaranas to become red hot. Table 10 shows obtained values of thermal relaxation time after calculation by both direct and analytical method.

Table 1: surface temperature of 3 Pippali samples during heating to red-hot state and subsequent temperature drop at 1-minute interval to ambient temperature.

Time in minutes	Pippali sample 1	Pippali sample 2	Pippali sample 3	Mean of temperature in degree Celsius
At time of red hot	83	58	77	72.66
After 1 min	38	53	36	42.33
After 2 min	34	38	35.5	35.83
After 3 min	32.4	33	34.5	33.3
After 4 min	32	32.9	33.5	32.8
After 5 min	30	32	33	31.66
After 6 min		31	32	31.5
After 7 min		30	31	30.5
After 8 min			30	30

Table 2: surface temperature of 3 Aja Shakrut samples during heating to red-hot state & subsequent temperature drop at 1-minute interval to ambient temperature.

Time in minutes	Aja Shakrut sample 1	Aja Shakrut sample 2	Aja Shakrut sample 3	Mean of temperature in degree Celsius
At time of red hot	310	320	265	298.33
After 1 min	150	194	126	156.66

After 2 min	41	115	37	64.33
After 3 min	34.5	40	35	36.5
After 4 min	32	35	32.8	33.26
After 5 min	31.3	33.3	32.5	32.36
After 6 min	31.1	32.4	32	31.83
After 7 min	31	31	32	31.33
After 8 min	30	30	31.5	30.5
After 9 min			30	30

Table 3: surface temperature of 3 Godanta samples during heating to red-hot state and subsequent temperature drop at 1-minute interval to ambient temperature.

Time in minutes	Godanta sample 1	Godanta sample 2	Godanta sample 3	Mean of temperature in degree Celsius
At time of red hot	198	199	203	200
After 1 min	136	90	83	103
After 2 min	98	71	55	74.66
After 3 min	51	52	41	48
After 4 min	49	36	37	40.66
After 5 min	49	35	36.5	40.16
After 6 min	43	33.2	33	36.4
After 7 min	40	32	32	34.66
After 8 min	37	32	32	33.66
After 9 min	33	31	31	31.66
After 10 min	31	30.5	30	30.5
After 11 min	30	30		30

Table 4: surface temperature of 3 Tamra shalaka samples during heating to red-hot state & subsequent temperature drop at 1-minute intervals to ambient temperature.

Time in minutes	Tamra shalaka sample 1	Tamra shalaka sample 2	Tamra shalaka sample 3	Mean of temperature in degree Celsius
At time of red hot	324	375	377	358.66
After 1 min	96	99	309	168
After 5 min	88	71.6	106	88.53
After 10 min	70.6	54.2	56.2	60.33
After 15 min	53	43.6	45	47.2
After 20 min	40.6	38.5	38.7	39.26
After 25 min	35	34.1	35.2	34.76
After 30 min	32.4	33	32.9	32.76
After 35 min	30.8	31.7	31.3	31.26
After 37 min	30	31.2	30.6	30.6
After 38 min		30	30	30

Table 5: Surface temperature of 3 Loha shalaka samples during heating to red-hot state & subsequent temperature drop at 1-minute intervals to ambient temperature.

Time in minutes	Loha shalaka sample 1	Loha shalaka sample 2	Loha shalaka sample 3	Mean of temperature in degree Celsius
At time of red hot	490	361	392	414.33
After 1 min	376	281	248	301.66
After 5 min	140	153	106	133
After 10 min	50	64	80	64.66
After 15 min	41	40.5	49.7	43.73
After 20 min	34.5	35	37.1	35.53
After 25 min	32	31.8	34.4	32.73

After 30 min	30.2	30	31.8	30.66
After 31 min	30		31.4	30.7
After 35 min			30	30

Table 6: surface temperature of 3 Panchadhatu shalaka samples during heating to red-hot state & subsequent temperature drop at 1-minute intervals to ambient temperature.

Time in minutes	Pancha dhatu shalaka sample 1	Pancha dhatu shalaka sample 2	Pancha dhatu shalaka sample 3	Mean of temperature in degree Celsius
At time of red hot	456	482	422	453.33
After 1 min	393	350	328	357
After 5 min	143	175	172.1	163.37
After 10 min	107	113	100.3	106.77
After 15 min	74.8	76	70.8	73.87
After 19 min	59.2	61.4	56	58.87
After 20 min	54	58	52.5	54.83
After 21 min	50	54.6	51.9	52.17
After 25 min	39	46.5	44.8	43.43
After 30 min	32	40	38	36.67
After 34 min	30	34.2	33.4	32.53
After 35 min		32.9	33	32.95
After 40 min		30.2	30.9	30.55
After 41 min		30	30	30

Table 7: surface temperature of three Guda samples during melting and subsequent temperature drop at 1-minute intervals to ambient temperature.

Time in minutes	Guda sample 1	Guda sample 2	Guda sample 3	Mean of temperature in degree Celsius
At time of melting.	118	128	105.8	117.27
After 1 min	101.2	112	94.5	102.57
After 5 min	74.9	73.1	71.9	73.3
After 10 min	56	48	55	53
After 15 min	44.6	41.8	46.1	44.17
After 20 min	40	37	41	39.33
After 25 min	35.6	33.8	36.6	35.33
After 30 min	33.4	32.1	33.6	33.03
After 35 min	31.4	31.1	31.4	31.3
After 37 min	30	30.2	30.7	30.3
After 38 min		30	30.2	30.1
After 39 min			30	30

Table 8: Measurement of temperature at which sample becomes red hot.

Material	Sample 1	Sample 2	Sample 3	Average Temperature in Degree Celsius
Pippali	83	53	77	71
Aja Shakrut	265	320	310	298.33
Godanta	198	230	203	210.33
Tamra shalaka	324	375	377	358.66
Loha shalaka	490	361	392	414.33
Pancha dhatu shalaka	456	482	422	453.33
Guda (melts)	118	128	104.8	116.93

Table 9: Measurement of Time at which sample becomes red hot

Material	red Sample 1	Sample 2	Sample 3	Average Time
Pippali	58 s	60 s	62 s	60 s
Aja Shakrut	35 s	40 s	30 s	35 s
Godanta	47 s	50 s	53 s	50 s
Tamra shalaka	3.5 min	4 min	4 .5 min	4 min
Loha shalaka	10 min	9.5 min	10.5 min	10 min
Pancha dhatu shalaka	11.5 min	12 min	12 .5 min	12 min
Guda (melts)	85 s	75 s	80 s	80 s

Initial Observations

- Pippali has the lowest red-hot temperature (~71°C on average) and cools down quickly.
- Aja Shakrut & Godanta reach high temperatures (~298°C and ~210°C) but also cool down relatively fast.
- Tamra Shalaka (Copper), Loha Shalaka (Iron) and Pancha Dhatu Shalaka (Alloy) have significantly higher red-hot temperatures (~358°C, ~414°C, and ~453°C).
- Loha Shalaka and Pancha Dhatu Shalaka take the longest (~10-12 minutes) to reach red-hot, whereas Pippali and Aja Shakrut heat up the fastest (~30-60 sec).
- Guda exhibits rapid heating but demonstrates higher heat retention, cooling down swiftly after reaching peak temperature.

Comparative Analysis of Heat Retention

To determine which material retains heat the longest, we analysed the temperature decay over time.

- Pippali cools down rapidly, reaching near room temperature within 6-7 minutes.
- Aja Shakrut & Godanta show a steep drop in temperature, stabilizing around 30-35°C within 10 minutes.
- Tamra, Loha, and Pancha Dhatu Shalaka retain heat significantly longer:
- Tamra Shalaka: ~60°C even after 10 minutes.
- Loha Shalaka: Still above ~50°C after 10 minutes.
- Pancha Dhatu: Shows great heat retention, maintaining about 50°C for ~25 minutes.
- Guda exhibits high heat retention by maintaining above ~40°C even after 20 minutes.

Table 10: Direct and analytical method based TRT values of Dahanopakaranas.

Name	of TRT by Direct method	TRT by Analytical method
Pippali	6.5	1.29
Aja Shakrut	8	0.8-1.3
Godanta	11	1.2-1.5
Tamra shalaka	38	1.15-2.22

Loha shalaka	32	2.28-4.46
Panchadhatu shalaka	40	6.4
Guda	38	8.3

Calculation of Thermal Relaxation Time (TRT): In this study, Thermal Relaxation Time (TRT) is operationally defined as the time taken for a heated Dahanopakarana to return to thermal equilibrium with its surrounding environment. This was evaluated using two distinct approaches.

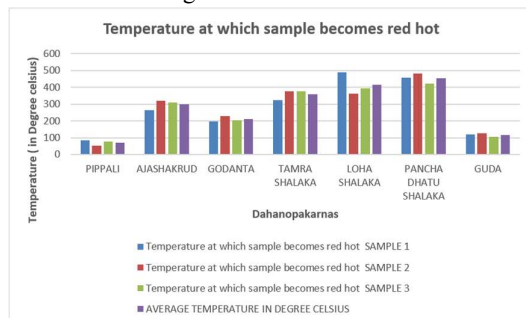
The direct method was defined as the total absolute time (in minutes) required for the object to cool from its peak initial temperature (T_0) back to the ambient room temperature of $30 \pm 2^\circ\text{C}$.

To mathematically isolate the active heat transfer phase and eliminate the prolonged observational lag typical of late-stage cooling, an analytical method was employed utilizing Newton's Law of Cooling, expressed as

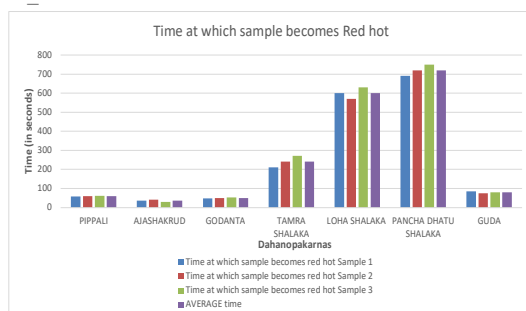
$$T(t) = T_{\text{ambient}} + (T_0 - T_{\text{ambient}}) \cdot e^{-kt}$$

Where:

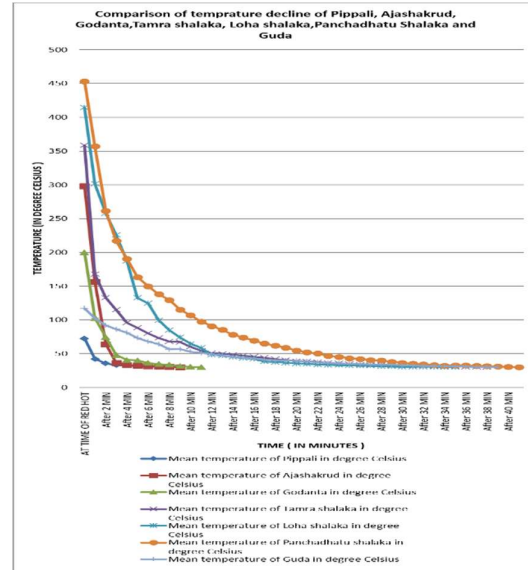
- $T(t)$ = Temperature at time t
- T_0 = Initial temperature of the object
- T_{ambient} = Ambient temperature
- $\Delta T_0 = T_0 - T_{\text{ambient}}$
- e = Euler's constant (approx. 2.71828)
- τ = Thermal Relaxation Time (TRT)
- k = cooling rate constant



Graph 1: Bar graphs showing the Temperature at which samples of Dahanopakaranas becomes red hot



Graph 2: Bar graphs showing the Time at which Dahanopakaranas becomes red hot



Graph 3: Comparative graphs of mean surface temperature decline for Pippali, Aja Shakrut, Godanta, Tamra, Loha and Pancha dhatu shalaka & Guda.

DISCUSSION

The present study evaluated the Thermal Relaxation Time (TRT) of various Dahanopakaranas used in Agnikarma using direct and analytical methods. TRT reflects the time required for a heated material to cool from its red-hot state to near ambient temperature, influencing therapeutic efficacy and safety. The Direct method yielded consistently high TRT values, ranging from 6.5 minutes for Pippali to 40 minutes for Panchadhatu shalaka. In contrast, the Analytical method, which applies Newtons law of cooling to calculate the exponential decay constant (τ /tau), produced values ranging from 0.8 to 8.3 minutes. This discrepancy is attributed to the Direct method including the observational lag of the slow tail end cooling phase, whereas Analytical method mathematically isolates the active heat transfer window. Consequently, the Analytical TRT values are considered a more accurate representation of the effective therapeutic window for each material.

The thermal behaviour observed correlates strongly with the physical properties of the materials. Organic and plant-based materials such as Pippali and Aja Shakrut demonstrated the lowest analytical TRT values. This rapid heat dissipation suggests low thermal inertia, making these material ideal for superficial cauterization [twak Dagdha] where the goal is a momentary flash of heat without risk of deep tissue damage. Among the metallic instruments, distinct variations were observed. Tamra shalaka [copper] exhibited a low analytical TRT, confirming its property as a high efficacy conductor that delivers an intense but short duration thermal shock. In contrast, panchadhatu shalaka showed a significant higher Analytical TRT indicating superior thermal retention compared to pure copper. This supports the use of alloy based shalakas for conditions requiring sustained heat transfer to deeper tissues such as muscle (mamsa) or bone (asthi). Notably, guda (jaggery) recorded the highest TRT across both methods. Despite being an organic material, its semisolid,

viscous nature allows it to act as a heat reservoir with insulation properties. This finding scientifically validates the classical Ayurvedic indication of guda for deep seated pathologies in veins (sira) and tendons (snayu), where prolonged heat penetration is required to achieve the desired therapeutic effect.

Graph 3 shows a comparative evaluation of the decline in mean surface temperature of 7 different Dahanopakarnas- Pippali, Aja Shakrut, Godanta, Tamra shalaka, Loha shalaka, Pancha dhatu shalaka and Guda after they were heated to red hot state. The graph clearly indicates that all materials experience a sharp fall in temperature during the initial few minutes following removal from the heating source which can be attributed to rapid heat loss through conduction to the surrounding environment. Panchadhatu shalaka records the highest starting temperature (above 450) and demonstrates the slowest rate of cooling, maintaining highest temperatures for a longer duration. This behaviour suggests a greater capacity of heat retention. Similarly, loha shalaka and tamra shalaka display relatively gradual and uniform cooling curve indicating their ability to store and release heat steadily, which is advantageous for achieving sustained and controlled thermal application during Agnikarma. In contrast, materials of organic or non-metallic origin namely Pippali, Aja Shakrut and Godanta begin with comparatively lower temperature and show a rapid decline early in the cooling period, reaching near ambient level much sooner. Aja Shakrut loses heat very quickly, suggesting that it provide only short duration thermal exposure and as the cooling process progresses, the rate of temperature reduction becomes slower for all materials. Unlike Pippali, Aja Shakrut and Godanta which show rapid early cooling, Guda maintains its temperature more gradually over time, reflecting relatively improved thermal stability despite being a non-metallic material. Over all the graph demonstrates that metallic shalakas specially Panchadhatu and loha are capable of maintaining therapeutic heat for longer periods, whereas organic and mineral substances deliver heat for shorter durations.

While this laboratory study measures surface temperature decay, the observed thermophysical behaviors offer an in vitro rationale for classical Ayurvedic indications. For example, Guda's high thermal retention supports its traditional use for deeper tissues, though in vivo studies are needed to confirm exact heat penetration and clinical efficacy. All data generated & analysed during this study are included in the article. Data are also available from the corresponding author upon reasonable request.

Statistical Analysis: All experimental measurements were recorded in triplicate form & expressed as mean. Data are reported as the mean to show the general cooling trends. Standard deviation was omitted because calculating variance for a small sample size of three can be statistically unreliable.

Conclusion and future scope: This study has successfully supported the scientific rationale behind the site-specific indications of Dahanopakarnas as described by Acharya Sushruta. The thermal data confirms that the choice of material weather the rapid cooling of Pippali for skin or the heat retaining guda for deep tissues is grounded in distinct

thermophysical behaviours. While these findings provide a foundational scientific rationale, future in vivo studies are necessary to evaluate actual tissue heat transfer.

Moving forward, the quantitative TRT data obtained from this research will be utilized to establish precise protocols for the standardization of Agnikarma tools. This advanced study on the standardization of Agnikarma tools, based on this verified thermal profile is already in process.

Limitations of the Study: The present study was conducted under controlled laboratory conditions using an open flame heat source. Surface temperature alone was measured, whereas internal temperature gradients within the material were not evaluated. Minor variations in natural materials such as Pippali, Aja Shakrut and Godanta cannot be completely eliminated. Future studies larger sample sizes may provide more comprehensive validation.

REFERENCES

1. Ambikadutta Shastri (editor). Commentary: Ayurveda Tattva Sandipika on Susruta Samhita of Maharsi Susruta, Sutrasthana, chapter 12, verse no.3.Reprint edition, Varanasi; Chaukhambha Sanskrit Sansthan; 2021; p.50
- 2.Ambikadutta Shastri (editor). Commentary: Ayurveda Tattva Sandipika on Susruta Samhita of Maharsi Susruta, Sutrasthana, chapter 12, verse no.10.Reprint edition, Varanasi; Chaukhambha Sanskrit Sansthan; 2021; p.52
- 3.Ambikadutta Shastri (editor). Commentary: Ayurveda Tattva Sandipika on Susruta Samhita of Maharsi Susruta, Sutrasthana, chapter 12, verse no.4.Reprint edition, Varanasi; Chaukhambha Sanskrit Sansthan; 2021; p.51
- 4.Ambikadutta Shastri (editor). Commentary: Ayurveda Tattva Sandipika on Susruta Samhita of Maharsi Susruta, Sutrasthana, chapter 12, verse no.10.Reprint edition, Varanasi; Chaukhambha Sanskrit Sansthan; 2021; p.52
- 5.Ambikadutta Shastri (editor). Commentary: Ayurveda Tattva Sandipika on Susruta Samhita of Maharsi Susruta, Sutrasthana, chapter 12, verse no.16.Reprint edition, Varanasi; Chaukhambha Sanskrit Sansthan; 2021; p.53
- 6.Ambikadutta Shastri (editor). Commentary: Ayurveda Tattva Sandipika on Susruta Samhita of Maharsi Susruta, Sutrasthana, chapter 12, verse no.10.Reprint edition, Varanasi; Chaukhambha Sanskrit Sansthan; 2021; p. 52
- 7.Daga H, Toshikhane H, Rao G, Gangawane A, Dhule M. Comparative Temperature Study of Different Dahanopakarnas Used in Agnikarma Procedure. International Journal of Pharmaceutical Research , 2020 Jan-Jun;2(3):1323-1330

Financial Support: Self-financed. **Conflict of Interest:** None

Acknowledgement: "The author acknowledges the use of the ChatGPT Go version (OpenAI) for assistance in calculation of thermal relaxation time (TRT); all interpretations and conclusions remain those of the author."

How to cite: Kitturkar AP, Kolte NN, Madiwalar M. A Comparative Experimental Study of Thermal Relaxation Time Among Different Instruments (Dahanopakarna) Used in Therapeutic Cauterization (Agnikarma) TAIJA – Tatwachintanam - International Journal of Ayurveda. 2026; 2(2):5-10.