



Research Article

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MODIFIED AGNIKARMA DEVICE: A BREAKTHROUGH IN STANDARDIZATION OF AGNIKARMA THERAPY

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Received on: 27/07/18 Accepted on: 25/09/18

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DOI: 10.7897/2277-4343.095157

ABSTRACT

Agnikarma is a therapeutic heat burn therapy performed with the help of hot *shalaka* (probe) and it is an effective procedure for management of pain in Ayurveda. The conventional method of *Agnikarma* (Method-1 multiple heat burn) employs use of a metal probe which is preheated till it becomes red hot & then tip of probe is placed at the affected site intermittently to produce multiple post burn scars. Another *Agnikarma* technique is *Dagdhavrana rahit Agnikarm* (Method -2 continuous heat transfer without post burn scar) which requires continuous heat source on the other end of probe. Further, the conventional technique involves risk of iatrogenic burns and fluctuation (unsteady) temperature during procedure leading to unsatisfactory results. Hence, to overcome these limitations, a need to standardize the device and its methodology cropped in. Hence, two modified *Agnikarma* devices were developed which includes Type-1 Electrocautery unit with silver probe (heating coil-loop covered with silver plate cap) which produces adequate heat burn (*Samyak Dagdha Agnikarma*) and Type-2 Temperature controlling unit with *kurchak* (brush) type silver probe which is placed on desired site at once which delivers controlled thermal heat (*Dagdhavrana rahit Agnikarma*) and helps in maintaining the same set temperature throughout the procedure. This article is an attempt to put forward information about innovative *Agnikarma* devices and standardized methodology of *Agnikarma* using these devices. These modified devices overcome the limitation of conventional *Agnikarma* methods, revealing modified devices user friendly (help in swift procedure), time conserving & safe.

Key words: *Agnikarma*, *Samyak Dagdha*, pain management, Electrocautery, Temperature controlling unit

INTRODUCTION

The word '*Agnikarma*' is made up of two terms '*Agni*' and '*Karma*', which implies fire and procedure respectively. *Agnikarma*, also referred as *Dahankarma* (to burn) is a therapeutic heat burn therapy.¹ It was Acharya Sushrut, who embarked *Agnikarma* as supreme in all the parasurgical procedures and advocated for pain management which is done with the help of hot *shalaka* (metal probe). This unique procedure helps in relieving pain in various painful conditions chiefly of musculoskeletal origin such as pain experienced in *Parshnishool* (heel pain- calcaneal spur, planter fasciitis), *Sandhigatavata* (osteoarthritis), *Avabahuk* (frozen shoulder) etc. According to Ayurveda, due to *ushna guna* (hot property) produced during procedure leads in pacification of *Vata-Kapha Doshas* and further helps in increasing the *Dhatvagni* (tissue fire), thereby break pathology and reduces pain. In *Agnikarma*, heat is transferred in to the affected body parts with the help of *shalaka* (metal probe which are good conductors of heat) made up of different metals like *Suvarna* (gold), *Raupya* (silver), *Loha* (iron), or *Panchdhatu* (alloy of 5 metals) as per the disease mentioned in the classical texts.^{2,3}

Nationwide currently, two different method of conventional *Agnikarma* is practiced. Method-1 which can be named as *Samyak Dagdha Agnikarma* (multiple heat burn) with red hot *shalaka* and Method-2 which can be named as *Dagdhavrana rahit Agnikarm* (continuous heat transfer without post burn scar), in which tip of probe is placed at the desired site and continuous heating (with flame on the other end) is given till adequate heat is delivered. Both the conventional methods of *Agnikarma* have varied therapeutic results. On the contrary, method-1 (multiple heat burn with red hot *shalaka*) there is uncontrolled temperature

throughout procedure, the burn- site left with lot of discomfort, post burn ulcer and risk of iatrogenic burn as well, whereas, in method-2(continuous heat transfer without post burn scar), the procedure needs multiple sitting to cover affected site, continuous heat source (flame) which makes the procedure time consuming with variation in temperature throughout the procedure.

Therefore, for overcoming these limitations of conventional techniques, need of standardization of *Agnikarma* procedure, devices crop up for both the *Agnikarma* methods. Hence, the innovative devices researched for method-1 *Samyak Dagdha Agnikarma* (multiple heat burn) is Electrocautery unit with Silver Probe (heating coil-loop covered with silver plate cap) and other pioneering device researched for method-2 *Dagdhavrana rahit Agnikarm* (Continuous heat transfer without post burn scar) is Temperature controlling unit with *kurchak* (brush) type silver probe. Moreover, both these devices help one to avoid iatrogenic burns hence, turns user friendly and time conserving.

This article is an effort to set forth the standardization of not only methodology of *Agnikarma* procedure but also the innovative devices used to perform the procedure by covering concern of safety and high therapeutic efficacy.

MATERIAL AND METHODS

In this section, description of the two modified devices along with its mechanism and methodology of *Agnikarma* with these devices have been documented. The devices include Type 1- Electrocautery unit with silver probe (heating coil-loop covered with silver plate cap) and Type-2 Temperature controlling unit with *kurchak* (brush) type silver probe (resembling *Trikurchak Shastra*), explained as under:

DESCRIPTION OF TYPE- 1 MODIFIED AGNIKARMA DEVICE

Electro-cautery unit with probe (heating coil-loop covered with silver plate cap)

Electro-cautery, known and used as cervical cautery, refers to a device in which electrical energy is utilized as heat source which is passed through a resistant metal platinum wire electrode, thereby, generating heat.

In this modified device, this wire electrode is covered with silver plate cap thereby, resembling with the *Raupya Shalaka* (Silver Probe). In a nutshell, this Electro-cautery unit consists of 3 parts:

- Machine which consists of push button, switch, five steps Intensity control with separate intensity control for lamp
- Pistol handle with lamp consisting lamp and two holes in which the electrode is placed to follow the procedure
- Electrodes consisting of the platinum wire covered with silver plate cap at the tip which turns red hot with the heat source of cautery, thereby helping to produce *Samyak Dagdha Agnikarma* (Method-1 multiple heat burns) to the patient when placed for 1-2 Seconds at desired site. ⁴



Image 1: Electro-cautery device with modified probe used in Method-1 Agnikarma

DESCRIPTION OF TYPE- 2 MODIFIED AGNIKARMA DEVICE

Temperature controlling unit with *kurchak* (brush) type silver probe

This device consists of the Machine, the handle which consists of coil (it helps in heating) & Probe. Here, Silver probe is used which can be replaced with different metals such as *Suvarna* (gold), *Loha* (iron), or *Panchdhatu* (alloy of 5 metals)). The temperature controller takes an input from a temperature sensor and has an output that is connected to a control element. It compares the actual temperature to the desired control temperature, or set-point, and provides an output to a control element. ⁵

In a nutshell, this device comprises of 3 parts:

- Machine which entails a small display which has set-point and actual temperature intensity controller in it. Machine help in displaying the set desire temperature which maintains the temperature throughout the procedure.
- Handle with heat coil which helps in heating the coil which further heats the *shalaka* (probe) placed in it.
- Specially designed *kurchak* (brush) type Silver probe (resembling *Trikurchak Shastra*) is placed in the handle which becomes hot as per the set desired temperature. This is an unique *shalaka* (probe) having multiple silver micro rods fixed on round silver plate resembling *kurchak* (brush) which produces *Dagdhavrana rahit Agnikarm* (therapeutic heat transfer without post burn scar) at once when placed for 10 Seconds at desired site.



Image 2: Temperature controlling unit with modified probe used in Type-2 Agnikarma

MECHANISM OF MODIFIED AGNIKARMA DEVICE

MECHANISM OF TEMPERATURE CONTROLLER

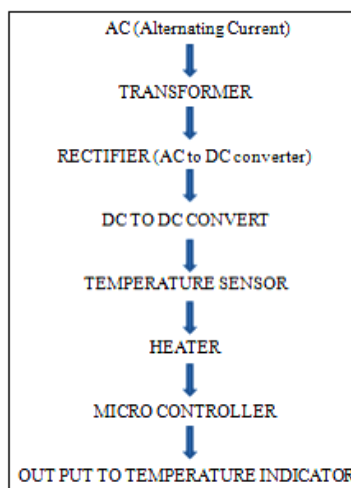
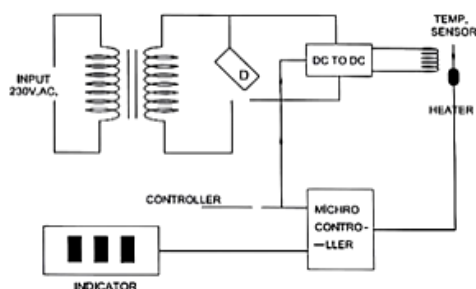


Image 3: Circuit Diagram of the Modified Device of Agnikarma

Temperature Controlling Unit which is common to both the modified devices of *Agnikarma*, is designed in a unique way for regulation of required, fixed and steady temperature. It consists of a Transformer which helps in either increasing or decreasing the voltage of Alternating Current which is 230 Volts as received from the electricity source. This A.C. is converted into Direct Current (D.C.) for unidirectional flow of electricity by the Rectifier. Once converted into D.C., the current passes through the DC-DC Power Converter which converts the source of DC from one voltage to the another. From DC-DC Converter, the current passes into Electric Heater which converts electric energy into heat. Thereafter, this heat energy is passed to the Temperature Sensor which is a Thermocouple made up of two dissimilar electrical conductor forming electrical junctions at differing temperature, basically helping to read voltage into temperature. From temperature sensor the current passes into Microcontroller which is made up of processor, memory and Input / Output Peripherals on a chip followed by its connection to the Indicator. ⁶

Type-1 Electrocautery unit thereafter is connected to the electrode of platinum wire which is covered with silver plate cap to resemble *Raupya Shalaka* (silver probe) for *Samyak Dagdha Agnikarma* (Method-1 multiple heat burns) and the Type-2 Temperature Controlling Unit is connected to specially designed *shalaka* (probe) having multiple silver micro rods fixed on round silver plate resembling *kurchak* (brush) for *Dagdhavrana rahit Agnikarm* (Continuous heat transfer without post burn scar).

AGNIKARMA PROCEDURE WITH MODIFIED DEVICE

The need for standardization of the methodology crops up with the use of Modified devices of *Agnikarma* which is explained as under:

Purvakarma (Pre-procedure measures)

Patient is made aware of the procedure with written/ informed consent. Thereafter, patient is allowed to sit comfortably, and the most tender and painful point is marked with the marker. Before starting the procedure, as per requirement of Type 1 electrocautery with silver probe (heating coil-loop covered with silver plate cap) or Type 2 the temperature controlling unit with *kurchak* (brush) type silver probe, is checked and kept ready. Then, the desired site where *Agnikarma* is to be done was properly cleaned with distilled water allowed to dry.

Pradhan karma (Main procedure)

Type 1 Method- After cleaning the site, the temperature is set on 1.5 volts (55°C), and then with the help of *raupya shalaka* (probe attached to handle with red-hot heating coil covered with silver plate cap) the *Samyak Dagdha Agnikarma* (adequate heat burn with scar) is done intermittently on affected site as marked and thus, *bindu* (dot) type of *Agnikarma* is performed. The *shalaka* (tip of probe) is kept in contact of skin for duration of 1-2 seconds. This is repeated multiple times (10-12 different places) to get desired effect covering affected area.



Image 4: *Agnikarm* demonstration by Electrocautery Unit with modified silver-plated Electrode

Type 2 Method- After cleaning the site, the temperature is set on 60 degree Celsius, and then with the help of specially designed probe (having multiple silver micro rods fixed on round silver plate resembling brush) the *Dagdhavrana rahit Agnikarm* (Continuous heat transfer without post burn scar) is performed on most tender site as marked and *bindu* (dot) type *Agnikarma* is performed. The *shalaka* is kept in contact of skin for duration of 10 seconds. This is done only once as the *shalaka* consist of silver micro rods fixed on round silver plate to obtain desired effect of *Dagdhavrana rahit Agnikarm* (therapeutic heat transfer without post burn scar).



Image 5: *Agnikarma* demonstration by Temperature Controlling Unit with modified Silver probe

Pashchat karma (Post procedure measures)

Post *Agnikarma* procedure, soothing *Yastimadhu ghrit* (medicated clarified butter preparation made up of *Licorice* roots) is applied to the patient at the site of *Agnikarma* for relieving post burn discomfort as it has *vednasthapak* (Analgesic) and *vranropak* (healing) property as mentioned in classical text of *Sushrut Samhita*. The site of *Agnikarma* should be water-proofed to prevent wound infection. *Sukshma triphala vati* or *Triphala guggul* supplements are advised. Anti-inflammatory, analgesics and antibiotics may also be used for short course of time if required (depending of the severity of the post burn ulcer in Method 1 *Agnikarma*). For chronic conditions, 3- 4 sittings of *Agnikarma* should be implemented with an interval of 15 day.

OBSERVATION AND RESULT

With these modified devices and the modification of procedures the following observations were made with results pertaining to the same are documented as below:

The Type- 1 Electro Cautery unit was set at 55°C. The probe i.e. silver cap covered on the electrodes turns red hot once the temperature is set. Due to red hot electrode, it helps in immediate transfer of heat and thus one can use this device for intermittent *bindu* (dot) type of *Agnikarma* where *Samyak dagdha vrana* (adequate heat burn) on skin is expected as per Sushrut Samhita. Here, the *shalaka* is kept in contact of skin for duration of 1-2 seconds & this is repeated multiple times (10-12 different places around affected area) to get desired effect.

The Type- 2 Temperature Controlling Unit is connected to specially designed *kurchak* (brush) type silver probe was set to 60°C. Once the temperature is set, the specially designed probe is placed on the skin of the painful site continuously for 10 seconds. It is observed that the skin temperature reaches upto 55°C in 10 seconds with the temperature of the device set to 60°C. This, this modified device helps one to produce multiple *bindu* (dot) type of *Dagdhavrana rahit Agnikarm* (therapeutic heat transfer without post burn scar) at once, using continuous heat source.

Agnikarm is a cure of underlying causes, rather than just treating pain; it not only relieves pain, but also help restore the body to fundamental health by addressing root causes. The efficacy of *Agnikarma* therapy was observed in painful conditions chiefly of Musculoskeletal origin such as pain experienced in *Parshnishool* (Calcaneal spur, planter fasciitis), *Sandhigatavata* (Osteoarthritis), *Avabahuk* (Frozen shoulder), *Manyagat Vata* (Cervical spondylosis), *Katigat Vata* (Sciatica, Degenerative Spine, Slipped Disc) etc. The result of the study thus is documented that, the innovative modified devices helps in swift procedure without consumption of time and without producing the risk of iatrogenic effects. It is user friendly and safe to use and hence, it is more advantageous than the conventional methods of *Agnikarma*.

DISCUSSION

The procedure of *Agnikarma* is basically Thermal transfer through the process of conduction of heat through metal probe to human skin surface.⁷ This conduction of heat is governed by second law of thermodynamics which states that when energy changes from one form to another form, or matter moves freely, entropy (disorder) in a closed system increases. Entropy is a measure of spread of matter and energy to everywhere they have access. In other words, second law of thermodynamics can be simplified by stating that everything tries to maintain the same temperature over time.⁸ When heat is transferred from metal probe to skin surface, it is not the temperature of the probe which is sensed but as per conduction of heat and second law of thermodynamics, heat energy is transferred to the cells. It is the increase in temperature of the cells that is sensed by the body.⁹ In the language of Quantum physics, entangled particles remain connected so that actions performed on one affect the other, even when separated by great distance. In phenomenon so riled Albert Einstein he called it "spooky action at a distance"¹⁰ This can be explained as per the principle of *Panchamahabhut Siddhanta* of Ayurveda, that ; particle of *Agni-mahabhut* (fire element) of the metal probe transfers the thermal energy to the skin by getting entangled with the *Agni-mahabhut* of the biological tissues of human body.

As a result of this thermal transfer, Action potential within the cells is generated when temperature increases upto 43-45°C which causes signals to release.¹¹ When the probe is applied with a pressure to the skin of affected part, through the

mechanoreceptors and thermoreceptors (A δ fibres and free nerve endings) mask the signals of nociceptors (A δ fibres signaling for pain) which is carried out by ascending spino thalamic tract.¹² It is noted that as per ASTM C1055 (Standard Guide for Heated System Surface Conditions that Produce Contact Burn Injuries), reversible burn process is possible at or below 60°C with negligible damage to underlying tissue subject to time exposed.

Hence, Type-1 is set at 55°C as in Type-1 there is immediate heat transfer producing *Samyak Dagdhavrana* i.e. adequate heat burns (when probe is placed for 1-2 Seconds) and the temperature of the Type-2 device is set at 60°C as it gradually increases the temperature of the skin upto 55°C by placing the specially designed *kurchak* (brush) type silver probe having micro rods, for 10 seconds produces *Dagdhavrana rahit Agnikarm* (thermal heat transfer without post burn scar) which is within the limits of reversible effects of heat burn. This observation of Continuous heat Burn therapy by Type-2 device helps us to standardize the process of Type-2 i.e. *Dagdha Vran Rahit Agnikarma*. This literature thus, helps us to standardize the temperature required for the process of *Agnikarma* procedure.

Locally, it is hypothesized that this heat causes increase in local tissue metabolism leading to increased demand of oxygen and nutrients for the tissues at the site of heat burn. Hence, it excretes the unwanted metabolites and toxins.

Moreover, effect of *Agnikarma* on the blood circulation is hypothesized as after performing the procedure, the superficial, sensory nerves get stimulated. This leads to dilatation of local blood vessels, resulting in an increased blood circulation. Apart from this, it also decreases the viscosity of blood and thus leads to decreased blood pressure. Effect of *Agnikarma* on pain is proposed as due to increased local metabolism, the waste products (metabolites), which are produced, and thrown out. This normalizes the blood circulation, resulting in the reduction of pain intensity. Furthermore, heat burn reduces the excitability (quick response to stimuli) of nerves. Apart from this the Effect of *Agnikarma* on body temperature is conjured as heating affects the vasomotor centers causing a general rise in temperature.

CONCLUSION

This article is an attempt to put forward the information and to standardize the innovative methodology and modified devices of *Agnikarma* which will overcome the limitation of its conventional methods. The conventional technique consists of limitation as it requires pre-heating or continuous heat source on the other side of probe which may involve risk of iatrogenic burns and unsteady fluctuation in temperature during procedure leads to unsatisfactory results. To overcome these limitations, we have standardized the device and its methodology. Further, two modified *Agnikarma* devices were developed which includes Type-1 Electrocautery unit with silver probe (heating coil-loop covered with silver plate cap) which produces adequate heat burn (*Samyak Dagdha Agnikarma*) and Type-2 Temperature controlling unit with *kurchak* (brush) type silver probe having micro rods, which is placed on desired site at once which delivers controlled thermal heat (*Dagdhavrana rahit Agnikarma*) and helps in maintaining the same set temperature of *shalaka* throughout the procedure.

The metal used in the present study is *Raupya* (silver) which can be replaced with other metals which depends on the disease to be treated. Both the modified devices for *Agnikarma* have been found user friendly, safe (without iatrogenic effects) and time conserving.

This article hence, is an attempt to standardize the procedure of *Agnikarma* by standardizing the temperature to be set, required time for placing of *shalaka* upon the skin in both methods and

also gives information about mechanism of action of the two modified devices, further helping in standardization of *Agnikarma* therapy.

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Cite this article as:

Dwivedi Amarprakash. Modified agnikarma device: A breakthrough in standardization of agnikarma therapy. Int. J. Res. Ayurveda Pharm. 2018;9(5):58-62 <http://dx.doi.org/10.7897/2277-4343.095157>

Source of support: Nil, Conflict of interest: None Declared

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