https://africanjournalofbiomedicalresearch.com/index.php/AJBR
Afr. J. Biomed. Res. Vol. 28(2s) (February 2025); 657-662
Research Article

"Agnikarma Procedures in Classical and Present Era"

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ABSTRACT
Agnikarma means application of *Agni* directly or indirectly with the help of different materials to relieve the patient from disease. *Agnikarma* means treatment with the help of *Agni*. *Sushruta* indicated '*Agnikarma'* in various disorders of skin, muscles, vessels, ligaments joints and bones. The disease which are treated with the help of *Agnikarma* therapy, do not reoccur. The approach of *Agnikarma* has been mentioned in the context of diseases like *Arsha*, *Arbuda*, *Bhagandara*, *Sira*, *Snayu*, *Asthi*, *Sandhigata Vata Vikara* and *Gridhrasi*. In *Agnikarma* therapy part or tissue is burned with the help of various special materials called *Dahanopakarana* like drugs, articles and substance used to produce therapeutic burns (*samyakadagdha*) during *Agnikarma chikitsa*.
With the advancements of medical science many techniques have been designed for pain management which work on the principle of *agnikarma* for pain relief e.g. Transcutaneous electrical nerve stimulation(TENS), Therapeutic ultrasound, Pulsed electromagnetic Field therapy(PEMF), Interferential Therapy(IFT) Electrical muscle stimulator (EMS) Radiation therapies like Infra-red therapy Diathermy, Electro cautery, Cauterization.

Keywords: Agnikarma, Dagdha, Dahana, Radiations, Cauterization.

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Received 24/01/2025, Acceptance 10/02/2025

DOI: https://doi.org/10.53555/AJBR.v28i2S.6917

INTRODUCTION

- *Sushruta* has mentioned different methods of management of diseases, such as *Bheshaja karma*, *Kshar karma*, *Agnikarma*, *Shastra karma and Raktamokshana* in medical science.
- *Agnikarma* means application of*Agni* directly or indirectly with the help of different materials to relieve the patient from disease. *Dalhana*, commentator of Sushruta classified *agnikrita* as *karma* or action carried out by *Agni*.
- *Sushruta* indicated '*Agnikarma'*in various disorders of skin, muscles, vessels, ligaments joints and bones.[1] *Sushruta* has also explained that the diseases treated with Agnikarma modality will be not reoccur[2]
- The approach of *Agnikarma* has been mentioned in the context of diseases like *Arsha*, *Arbuda*,

Bhagandara, *Sira*, *Snayu*, *Asthi*, *Sandhigata Vata Vikara* and *Gridhrasi*.

• In *Agnikarma* therapy part or tissue is burned or heat is applied with the help of various special materials called *dahanopakarana*. *Dahanopakarana* arevarious accessories like drugs, articles and substance used to produce therapeutic burns (*samyakadagdha*) during *Agnikarmachikitsa*. *Agnikarma* may be of two typesaccording to *Dravya* used ¯*SnigdhAgnikarma* - performed by means of *madhu*, *grith*, *tailam* used for *Agnikarma* to treatdiseases situated in *Sira*, *Snayu*, *Sandhi*, *Asthi: Ruksha Agnikarma* - performed bymeans of *pippali*, *shara*, *shalaka*, *godanta* used for *Agnikarma* to treat diseases situated in *Twak* and *Mamsa dhatu*. *Agnikarma* is divided in four types on the basis of part involved e.g. *twak dagdha*, *mamsa dagdha*, *sira snayu dagdha* and *sandhi asthi dagdha*.After studying the literature available related to *agnikarma*, it is clarified that various pain management therapies which use heating process as their basic principle are based on the principle as described in Ayurvedic literatures. They are modified and advanced techniques suitable in the context of time. In present time there are various treatment modalities are available which work on the principle of *agnikarma* for pain relief e.g. therapeutic ultrasound TENS, Interferential therapy, Radiation therapies like Infra-red therapy Diathermy, PEMF, Electro cautery, Cauterization.

METHODS

• Present study is literary review emphasizing on procedure of *agnikarma* as described by ancient *acharya*, *Sushruta* in *Sushruta samhita*. The study also includes critical study of various treatment modalities related to *agnikarma* (heat therapy) available as per classical literature of ayurveda and use of the principle of *agnikarma* in present era. Critical study of multiple heat therapies available and effective in the management of arthropathies and musculo-skeletal disorders especially in pain management.

Classical Review:

Classification of *Agnikarma*–

• Though there is no clear-cut description about the classification of *Agnikarma* in *Ayurvedic* literature, still with the help of its applications/use described, *Agnikarma* can be divided as-

According to site

• *Sthanika* (local) - As in *vicharchika*, *kadara*, *arsha*.

• *Sthanantariya* (Distal to site ofdisease)-As in *visuchika*, *apachi*, *gridhrasi* etc.

According to *Dravyas* used[3]

• *Snigdh Agnikarma*: performed bymeans of *madhu*, *grith*, *tailam* used for *Agnikarma* to treat diseases situated in *Sira*, *Snayu*, *Sandhi*, *Asthi*. *Ruksha Agnikarma*: performed bymeans of *pippali*, , *godanta shara*, *shalaka* used for *Agnikarma* totreat diseases situated in *Twak* and *Mamsa dhatu*.

According to *Akriti*[4]

• ***Valaya:*** (Circular shape)

• ***Bindu:*** (Dot like shape) Accordingto *Acharya Dalhana shalaka* should be of pointed tip.

• ***Vilekha:*** Making of different shapesby heated s halaka. *Vilekha* type of by acharta Dalhana into 3 types acc.to the directions of line 1.*Tiryak (*Oblique), 2. *Riju (*Straight) and 3. *Vakra (*Zigzag).

• ***Pratisarana:*** Rubbing at indicatedsite by heated *shalaka* and there is no specific shape.

According to Ashtang Hridya there are 3 more types based on *akriti*[5]

• ***Ardhachandra:*** Crescent shape

• ***Swastika:*** Specific shape of *Swastika Yantra*.

• ***Ashtapada:*** Specific shapecontaining eight limbs in different directions.

According to *Dhatus* affected[6]

• *Twak dagdha*

• *Mamsa dagdha*

• *Sira snayu dagdha*

• *Sandhi asthi dagdha*

***Dahanupakarana*[7]**

• *Dahanopakarana* are various accessorieslike drugs, articles and substance used to produce therapeutic burns or heat therapy during *Agnikarma Chikitsa*. They are classified as follows according to various *Acharya*;

They can be classified as:

Upakarana herbal in origin:

• *Pippali* (*Pipperlongum*),

• *Yashtimadhu* (*Glycerrhiza glabra* Linn.)

• *Haridra* (*Curcuma longa*),

• *Guda* (jaggery)

• *Sneha Taila* etc.

Upakaranaanimal in origin:

• *Ajashakrita*

• *Godanta*

• *Madhoochishta*

Upakarana Metallic in origin :

• *Panchadhatu shalaka*

Use of these materials has been told according the site of use.

• **Superficial diseases**: Diseases involving skin *Pippali*, *Ajashakrita*, *Godanta*, *Shara*, *Shalaaka* areused.

• **Muscular Diseases**: For diseasesinvolving muscle *Jambavaushtha*, *Panchadhaatu Shalaaka Kshaudra* are used.

• ***Sira Snayu Asthisandhi:*** Fordiseases of *Sira*, *Snaayu*, *Sandhi*, *Marma* diseases *Madhu* (*Kshaudra*), *Guda* (Jaggery) and *Sneha* are used.

Modern Techniques

• In the present era there are many new techniques and devices which have been evolved in the field of physiotherapy for chronic pain relief, muscular stiffness and neuromuscular disorders. Among those devices some are-

1. Therapeutic ultrasound

- Therapeutic ultrasound refers generally to any type of ultrasonic procedure that uses ultrasound for therapeutic benefit.
- There are three primary benefits to ultrasound. The first is the speeding up of thermal healing process from the increase in blood flow in the treated area. The second is the decrease in pain from the reduction of swelling and edema[8] and the third is the gentle massage of muscles tendons and/ or ligaments in the treated area because no strain is added and any scar tissue is softened. These three benefits are achieved by two main effects of therapeutic ultrasound -thermal and non-thermal effects. The physiological effects obtained are-Increased collagen extensibility, increased clearance of edema and exudates, increased pain threshold, release of histamine, increased nerve conduction velocities, decreased joint stiffness, and decreased muscle spasm[9]. These changes are the result of the chemical, biologic, mechanical, and thermal effects of the sound waves.
- Ultrasound is a deep heating modality. At an intramuscular depth of 3 cm, a 10-minute hot pack treatment yields an increase of 0.8ºC, whereas at this same depth, 1 MHz ultrasound has raised muscle temperature nearly 4ºC in 10 minutes. Non-thermal effects occur when pulsed ultrasound is applied. Non-thermal effects are useful for decreasing edema and promoting cellular repair. Hence the device is indicated in many musculo-skeletal disorders- Soft tissue injuries, Chronic soft tissue and joint dysfunction, Osteoarthritis Peri-arthritis (Non-specific), Bursitis, Tenosynovitis ,Tendonitis, capsulitis, Myositis ossificans, Nerve entrapment, Chronic sprains/strains, Muscle spasm[10].

2. Transcutaneous electrical nerve stimulation (TENS):

- Transcutaneous electrical nerve stimulation (TENS or TNS) is the use of electric current produced by a device to stimulate the nerves for therapeutic purposes. TENS, by definition, covers the complete range of transcutaneously applied currents used for nerve excitation although the term is often used with a more restrictive intent, namely to describe the kind of pulses produced by portable stimulators used to treat pain[11]The unit is usually connected to the skin using two or more electrodes. A typical battery-operated TENS unit is able to modulate pulse width, frequency and intensity. Generally TENS is applied at high frequency (>50 Hz) with an intensity below motor contraction (sensory intensity) or low frequency (<10 Hz) with an intensity that produces motor contraction[12] While the use of TENS has proved effective in clinical studies, there is controversy over which conditions the device should be used to treat[13]TENS devices available to the domestic market are used as a non-invasive nerve stimulation intended to reduce both acute and chronic pain especially chronic musculoskeletal pain[14]it may be useful for painful diabetic neuropathy[15] . People use TENS to relieve pain for several different types of illnesses and conditions.
- They use it most often to treat muscle, joint, or bone problems that occur with illnesses such as osteoarthritis or fibromyalgia, or for conditions such as low back pain, neck pain, tendinitis, or bursitis. People have also used TENS to treat sudden (acute) pain, such as labor pain, and long-lasting (chronic) pain, such as cancer pain[16].

3. Interferential Therapy (IFT)

- Interferential therapy (IFT) is one of various types of physical therapy. It uses a mid-frequency electrical signal to treat muscular spasms and strains. The current produces a massaging effect over the affected area at periodic intervals, and this stimulates the secretion of endorphins, the body's natural pain relievers, thus relaxing strained muscles and promoting soft-tissue healing. Its use is contraindicated if the affected area has wounds, cuts or infections. The basic principle of IFT is to use physiological effects of low frequenc[17].
- Interferential therapy utilizes two of medium frequency currents, passed through the tissues simultaneously, where they are set up so that their paths cross & they literally interfere with each other. This interference gives rise to an interference (beat frequency) which has the characteristics of low frequency stimulation – in effect the interference mimics low frequency stimulation. The exact frequency of the resultant beat frequency can be controlled by the input frequencies. There are 4 main clinical applications for which IFT appears to be used: Pain relief, Muscle stimulation, increased local blood flow, Reduction of oedema[18] In addition, claims are made for its role in stimulating healing and repair.
- As IFT acts primarily on the excitable (nerve) tissues, the strongest effects are likely to be those which are a direct result of such stimulation (i.e. pain relief and muscle stimulation). The other effects are more likely to be secondary consequences of these.

4. Electrical Muscle stimulator (EMS)

- Electrical muscle stimulation (EMS), also known as neuromuscular electrical stimulation (NMES) or electromyo-stimulation, is the elicitation of muscle contraction using electric impulses.
- EMS has received increasing attention in the last few years because of its potential to serve as a strength training tool for healthy subjects and athletes, a rehabilitation and preventive tool for partially or totally immobilized patients, a testing tool for evaluating the neural and/or muscular function in vivo, and a post-exercise recovery tool for athletes.[19] The impulses are generated by a device and delivered through electrodes on the skin in direct proximity to the muscles to be stimulated. The impulses mimic the action potential coming from the central nervous system, causing the muscles to contract. The electrodes are generally pads that adhere to the skin.
- In medicine, EMS is used for rehabilitation purposes, for instance in physical therapy in the prevention of disuse muscle atrophy which can occur for example after musculoskeletal injuries, such as damage to bones, joints, muscles, ligaments and tendons. This is

distinct from transcutaneous electrical nerve stimulation (TENS), in which an electric current is used for pain therapy[20].

5. Pulsed electromagnetic Field therapy (PEMF)

- Pulsed electromagnetic field (PEMF) therapy is effective because time-varying or pulsed electromagnetic fields create micro currents in the body's tissues. These micro currents elicit specific biological responses depending on field parameters such as amplitude, frequency, and waveform. Pulsed electromagnetic field therapy (PEMFT), also called is a reparative technique most commonly used in the field of orthopaedics for the treatment of non-union fractures, failed fusions, congenital pseudarthrosis[21].
- Randomized double-blind, placebo controlled clinical trials using PEMF therapy have shown beneficial effects for chronic low back pain, fibromyalgia, cervical osteoarthritis, osteoarthritis of the knee, lateral epicondylitis, recovery from arthroscopic knee surgery, recovery from inter body lumbar fusions, persistent rotatorcuff tendinitis, depression, and multiple Scerosis. [22,23,24]

6. Electrocautery

- Electrocautery, also known as thermal cautery, refers to a process in which a direct or alternating current is passed through a resistant metal wire electrode, generating heat. The heated electrode is then applied to living tissue to achieve haemostasis or varying degrees of tissue destruction[25] Electrocautery can be used in various minor surgical procedures in dermatology, ophthalmology, otolaryngology, plastic surgery, and urology.
- In electrocautery, the current does not pass through the patient; thus, the procedure can be safely used in patients with implanted electrical devices such as cardiac pacemakers, implantable cardioverter-defibrillators, and deep-brain stimulators[26]
- In contrast, electro-surgery is a group of commonly used procedures that utilize the passage of high-frequency alternating electrical current through living tissue to achieve varying degrees of tissue destruction. Different forms of electro-surgery include electrocoagulation, electro-fulguration, electro-desiccation, and electro section. Electro-surgery produces electromagnetic interference which can interfere with implanted medical devices[27],[28],[29]
- Electrocautery is a safe and effective method of haemostasis during cutaneous surgery. It is also useful in the treatment of various small benign skin lesions, although only lesions that do not require histological review should be treated with electrocautery. Low temperatures can be used for superficial tissue destruction in the treatment of superficial and relatively avascular lesions, including the Seborrheic keratoses, Molluscum Verrucae, Syringomas ,Small angiomas. A dermal curette may be used concurrently to remove the lesion. Higher temperatures are effective in removing thicker skin lesions, such as the following: Sebaceous hyperplasia, Pyogenic granulomas, haemostasis of vessels in surgery[30]

DISCUSSION

- In Ayurveda, treatment by heating of tissue was well known tool as early as the 1500-1000 years BC with the advancement of science techniques of *Agnikarma* improved by introduction ofelectricity. The use of electricity in medicine began in the 18th century.
- *Agnikarma* alleviate all the *Vataja* and *Kaphaj* disorders *as Ushna guna* of *Agnikarma* is opposite to *sheeta* guna of *Vata* and *Kapha dosha*. According toAyurveda, every *Dhatu* (tissue) have its own *Dhatvagni* and when it becomes low,diseases begins to manifest. In this condition, *Agnikarma* works by giving external heat there by increasing the *Dhatvagni* which helps to pacify theaggravated *dosha* and hence alleviate the disease[31]
- All the pain management equipments mainly use heat/energy in some or other form as a basic principle. For example therapeutic ultrasound is most traditionally known as a deep-heating modality. It yields its effect by increased collagen extensibility, increased clearance of edema and exudates, increased pain threshold, decreased joint stiffness and decreased muscle spasm. All these are effects of deep heating system. In the same way TENS (Transcutaneous electrical nerve stimulation is the use of electric current produced by a device to stimulate the nerves for therapeutic purposes.
- The main forms of cauterization used today are electrocautery and chemical cautery. Electro cautery - Electrosurgery has been described as high-frequency electrical current passed through tissue to create a desired clinical effect. Electrocautery is useful in haaemostasis and in the treatment of various small benign skin lesions, although only lesions that do not require histological review should be treated with electrocautery.
- With the use of many new techniques and devices such as Transcutaneous electrical nerve stimulation(TENS), Therapeutic ultrasound, Pulsed electromagnetic Field therapy(PEMF), Interferential Therapy(IFT) Electrical muscle stimulator (EMS) etc. in the pain management and musculo-skeletal disorders have proven to be much beneficial and brought revolution in the field of physiotherapy especially in chronic pain management. Though *Agnikarma* therapy been described thousands years ago yet its principle is being used nowadays in many forms. These ne modern techniques/ equipments described above are need of today's generation. Older *agnikarma* therapy as described in classics are performed using limited *dahaanupkarana*, as it is not possible to use all of them in present era. With these limitations modern techniques are well accepted in the society as they are easy to handle and modernized machines are used.

CONCLUSION

- *Agnikarma* and its uses are described in Ayurveda much earlier than it's utility was discovered by surgeons of rest medicine branches. However the technique and equipments have become advanced and

sophisticated, but the basic principles are still the same as that of *agnikarma* i.e use of energy- heat or current in the management of various diseases.

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