

Agnikarma in Musculoskeletal Disorders: An Evidence-Based Review

Dr.Hrushikesh Suresh Bhakare¹, Dr.Jagruti Rode², Dr.Gayatri Mawale³

¹Postgraduate Scholar, Department of Shalyatantra, Dr. V.J.D. Gramin Ayurvedic Mahavidyalaya, Patur, Akola, Maharashtra, India

²Professor, Department of Shalyatantra, Dr. V.J.D. Gramin Ayurvedic Mahavidyalaya, Patur, Akola, Maharashtra, India

³Professor and Head, Department of Shalyatantra, Dr. V.J.D. Gramin Ayurvedic Mahavidyalaya, Patur, Akola, Maharashtra, India

Abstract—Musculoskeletal disorders (MSDs) are among the leading causes of pain, disability, and reduced quality of life worldwide, affecting individuals across all age groups. Conventional management, including analgesics, non-steroidal anti-inflammatory drugs, corticosteroid injections, and surgical interventions, often provides symptomatic relief but may be associated with adverse effects, recurrence, and increased healthcare costs. Agnikarma, a specialized para-surgical procedure described in Ayurveda, has been extensively advocated for the management of painful musculoskeletal conditions. It involves the controlled therapeutic application of heat using heated metallic instruments or specific materials to alleviate pain, stiffness, and functional impairment. According to classical Ayurvedic texts, Agnikarma acts by pacifying aggravated Vata and Kapha Dosha, removing Srotorodha (obstruction of channels), improving local circulation, and restoring normal tissue function. Contemporary scientific evidence suggests that therapeutic heat enhances microcirculation, reduces muscle spasm, promotes tissue healing, modulates inflammatory mediators, and activates endogenous pain inhibitory mechanisms. Recent clinical studies have demonstrated promising outcomes of Agnikarma in conditions such as osteoarthritis, cervical spondylosis, lumbar spondylosis, tennis elbow, plantar fasciitis, frozen shoulder, and heel pain, with significant improvements in pain intensity, joint mobility, and functional status while maintaining a favorable safety profile. Although the available evidence indicates beneficial therapeutic effects, many published studies are limited by small sample sizes, methodological heterogeneity, and inadequate long-term follow-up. Therefore, well-designed randomized controlled trials with standardized treatment protocols and validated outcome measures are essential to establish its clinical

efficacy and mechanism of action. This evidence-based review aims to summarize the classical Ayurvedic concepts, probable scientific mechanisms, current clinical evidence, therapeutic applications, advantages, limitations, and future research perspectives of Agnikarma in the management of musculoskeletal disorders.

Index Terms—Agnikarma, Musculoskeletal Disorders, Ayurveda, Pain Management, Therapeutic Heat, Osteoarthritis, Cervical Spondylosis, Lumbar Spondylosis, Tennis Elbow, Plantar Fasciitis, Evidence-Based Review, Para-surgical Procedure.

I. INTRODUCTION

Musculoskeletal disorders (MSDs) comprise a wide range of conditions affecting bones, joints, muscles, tendons, ligaments, fascia, and other soft tissues. They are a major cause of chronic pain, physical disability, reduced productivity, and impaired quality of life worldwide. Common MSDs include osteoarthritis, cervical and lumbar spondylosis, frozen shoulder, tennis elbow, plantar fasciitis, tendinitis, and myofascial pain syndrome. The rising prevalence of sedentary lifestyles, obesity, population aging, occupational stress, and sports-related injuries has significantly increased the global burden of these disorders. Although conventional treatments such as non-steroidal anti-inflammatory drugs (NSAIDs), physiotherapy, corticosteroid injections, and surgery provide symptomatic relief, they are often associated with adverse effects, recurrence, or high treatment costs. Consequently, there is growing interest in safe,

cost-effective, and evidence-based complementary therapies.¹

Among the para-surgical procedures described in Ayurveda, Agnikarma is recognized as an effective treatment for painful musculoskeletal disorders. The term *Agnikarma* is derived from the Sanskrit words *Agni* (fire) and *Karma* (procedure), referring to the controlled application of therapeutic heat to the affected area. Described in detail by Acharya Sushruta, Agnikarma is considered superior to Ksharakarma in selected conditions because it provides rapid pain relief and reduces disease recurrence. The classical statement "*Agnikarmana Dagdhanam Na Punah Sambhavo Bhavet*" highlights its long-lasting therapeutic benefits.²

According to Ayurveda, most musculoskeletal disorders result from aggravated Vata Dosha, often associated with Kapha and Ama. Agnikarma, possessing Ushna, Tikshna, Sukshma, and Ashukari properties, helps pacify Vata and Kapha, digest Ama, relieve Srotorodha, improve local circulation, and restore normal tissue function, thereby reducing pain and stiffness.³

From a modern perspective, Agnikarma acts as a localized therapeutic heat modality. Controlled heat application improves blood circulation, enhances tissue metabolism, reduces muscle spasm, promotes collagen extensibility, and accelerates tissue repair. It also produces analgesia by modulating pain pathways and reducing inflammatory mediators, providing scientific support for its clinical effectiveness.⁴

Recent clinical studies have demonstrated encouraging outcomes of Agnikarma in conditions such as osteoarthritis, cervical and lumbar spondylosis, plantar fasciitis, tennis elbow, frozen shoulder, and heel pain, showing significant improvement in pain, mobility, and functional status. However, the available evidence is limited by small sample sizes and methodological variations, highlighting the need for larger, well-designed clinical trials.⁵

Therefore, this evidence-based review aims to summarize the classical concepts, therapeutic principles, mechanisms of action, clinical applications, current evidence, and future prospects of Agnikarma in the management of musculoskeletal disorders.

II. HISTORICAL BACKGROUND AND CLASSICAL CONCEPT OF AGNIKARMA

Agnikarma is one of the oldest Anushastra Karma (para-surgical procedures) described in Ayurveda. The term is derived from *Agni* (fire) and *Karma* (procedure), meaning the therapeutic application of controlled heat. It is primarily indicated for painful disorders, particularly those caused by aggravated Vata and Kapha Dosha. Modern thermal therapies such as electrocautery and diathermy are based on similar principles of controlled heat application.⁶

The most detailed description of Agnikarma is found in the Sushruta Samhita, where Acharya Sushruta regarded it as superior to Ksharakarma in selected disorders because of its rapid pain-relieving effect and lower recurrence. The classical statement, "अग्निर्कर्मणा दग्धानां न पुनः सम्भवो भवेत्", signifies that diseases treated properly with Agnikarma are less likely to recur.⁷

According to Ayurveda, chronic musculoskeletal disorders result mainly from aggravated Vata Dosha, often associated with Kapha and Ama. Agnikarma possesses Ushna, Tikshna, Sukshma, and Ashukari properties, which pacify Vata and Kapha, digest Ama, relieve Srotorodha, improve local circulation, and reduce pain and stiffness.⁸

Although Charaka Samhita does not describe Agnikarma separately, it emphasizes the therapeutic importance of Ushna Chikitsa, Swedana, and Vatahara Upakrama, which form the theoretical basis of Agnikarma. Ashtanga Hridaya also recommends Agnikarma for chronic painful disorders involving joints, muscles, tendons, and ligaments after careful assessment of the patient and disease condition.^{9 10}

Sushruta further described different materials such as Loha Shalaka, Panchadhatu Shalaka, Pippali, Madhu, and Ghrita, along with various patterns of cauterization including Bindu, Valaya, Vilekha, and Pratisarana. The choice of instrument and technique depends on the affected tissue and the nature of the disease, demonstrating the scientific and individualized approach of Ayurveda.

Today, Agnikarma has gained renewed attention because its classical principles closely resemble modern therapeutic heat modalities. Emerging clinical evidence supports its role in reducing pain, improving function, and enhancing quality of life in patients with

chronic musculoskeletal disorders, although further high-quality research is required.¹¹

III. PRINCIPLES, INDICATIONS, CONTRAINDICATIONS, INSTRUMENTS AND PROCEDURE OF AGNIKARMA

Agnikarma is a specialized para-surgical procedure that utilizes controlled therapeutic heat to treat localized pathological conditions. Unlike ordinary cauterization, the procedure is performed according to well-defined Ayurvedic principles considering the patient's Prakriti (constitution), Dosha predominance, Roga Bala (severity of disease), Rogi Bala (strength of the patient), Dhātu involved, and the anatomical site of the lesion. Proper adherence to these principles ensures maximum therapeutic benefit while minimizing complications.¹²

3.1 Principles of Agnikarma

The fundamental principle of Agnikarma is based on the Ushna (heat) property of Agni, which counteracts the Sheeta (cold) and Guru (heavy) qualities of aggravated Vata and Kapha Dosha. Since most musculoskeletal disorders are predominantly Vata disorders associated with pain, stiffness, restricted movement, and degeneration, localized heat therapy effectively restores Doshic balance and relieves symptoms.¹²

According to Ayurveda, therapeutic heat produces several beneficial effects:

- Pacifies aggravated Vata and Kapha Dosha
- Digests Ama and removes Srotorodha (channel obstruction)
- Improves local circulation
- Relieves pain (*Shoola*)
- Reduces stiffness (*Stambha*)
- Decreases swelling (*Shotha*)
- Enhances tissue metabolism
- Promotes healing of affected structures
- Prevents recurrence of disease when performed appropriately.

Thus, Agnikarma is considered both a symptomatic and pathogenetic treatment because it alleviates pain while simultaneously correcting the underlying Dosha imbalance.

3.2 Materials and Instruments Used in Agnikarma

Classical Ayurvedic texts describe a variety of materials for performing Agnikarma depending on the tissue involved and the nature of the disease. The selection of the instrument is individualized according to the depth of pathology and therapeutic objective.

A. Metallic Instruments (Shalaka)

Metallic rods (**Shalaka**) are the most commonly used instruments. Traditionally, they are prepared from:

- Gold (Suvarna)
- Silver (Rajata)
- Copper (Tamra)
- Iron (Loha)
- Panchadhatu (five-metal alloy)

Among these, Panchadhatu Shalaka is widely preferred in contemporary Ayurvedic practice because of its durability and ability to retain heat uniformly.¹²

B. Non-metallic Materials

Sushruta also recommended several non-metallic substances for specific indications, including:

- Pippali (Piper longum)
- Madhu (Honey)
- Ghrita (Ghee)
- Guda (Jaggery)
- Ajashakrit (Goat dung ash)
- Godanta (Cow tooth)
- Oils and herbal preparations

These materials are selected according to the affected tissue and the desired intensity of cauterization.

3.3 Types of Agnikarma

According to the Tissue Involved

Sushruta classified Agnikarma according to the affected Dhātu:

Affected Tissue	Recommended Material
Twak (Skin)	Pippali, Ajashakrit
Mamsa (Muscle)	Heated metallic Shalaka
Sira & Snayu	Honey, Ghee, Metallic instruments
Asthi & Sandhi	Loha or Panchadhatu Shalaka

This tissue-specific classification reflects the individualized approach of Ayurvedic surgery and ensures that adequate thermal energy reaches the diseased tissue without causing unnecessary damage.

According to the Pattern of Cauterization

Different patterns are described depending upon the disease and anatomical location:

- Bindu – Dot-shaped cauterization
- Valaya – Circular pattern
- Vilekha – Linear pattern
- Pratisarana – Rubbing type
- Ardhachandra – Crescent-shaped
- Swastika
- Ashtapada

Selection of the appropriate pattern depends on the size, shape, depth, and location of the lesion.

3.4 Indications of Agnikarma

Classical Ayurvedic literature recommends Agnikarma in diseases characterized by pain, stiffness, chronicity, and Vata-Kapha predominance.¹³

Musculoskeletal Disorders

- Sandhigata Vata (Osteoarthritis)
- Gridhrasi (Sciatica)
- Katigraha (Low back pain)
- Greeva Graha (Cervical spondylosis)
- Apabahuka (Frozen shoulder)
- Vishwachi
- Vatakantaka (Heel pain)
- Tennis elbow
- Plantar fasciitis
- Tendinitis
- Myofascial pain syndrome

Other Clinical Conditions

- Arsha (Hemorrhoids)
- Bhagandara (Fistula-in-ano)
- Chronic non-healing ulcers
- Corns
- Warts
- Certain skin disorders
- Localized painful swellings

Among these, painful musculoskeletal disorders remain the most common indication in current Ayurvedic practice.

3.5 Contraindications

Despite its effectiveness, Agnikarma should not be performed indiscriminately. Classical texts advise avoiding the procedure in patients where heat may aggravate pathology or compromise healing.

Major contraindications include:

- Predominant Pitta disorders
- Active bleeding disorders
- Severe anemia
- Pregnancy
- Extreme debility
- Very young children
- Very elderly individuals with poor healing capacity
- Acute fever
- Severe dehydration
- Local skin infections
- Extensive burns
- Malignancy over the treatment site

Appropriate patient selection is essential to ensure safety and therapeutic success.

3.6 Procedure of Agnikarma

The procedure is performed under strict aseptic precautions and consists of three stages.

A. Purva Karma (Pre-procedural Measures)

Before the procedure, a detailed clinical evaluation is carried out, including assessment of:

- Dosha predominance
- Nature of disease
- Chronicity
- Site of lesion
- Patient's strength
- Presence of contraindications

The treatment area is cleaned with antiseptic solution, and the patient is positioned comfortably to allow easy access to the affected region. The selected Shalaka is heated until it becomes red hot using a spirit lamp, gas flame, or electrical heating device.

B. Pradhana Karma (Main Procedure)

The heated Shalaka is gently applied over predetermined points according to the disease and anatomical location.

Characteristics of proper Agnikarma include:

- Brief contact with tissue
- Uniform cauterization
- Appropriate spacing between burns
- Minimal tissue damage
- Achievement of desired therapeutic effect

Multiple cautery points are created depending on the size and severity of the lesion. The number of

applications varies according to the disease and patient tolerance.

Successful Agnikarma is recognized by:

- Characteristic cautery marks
- Immediate reduction in pain
- Mild local redness
- Absence of excessive bleeding
- Controlled tissue injury.

C. Paschat Karma (Post-procedural Care)

Following completion of the procedure:

- Cooling agents such as Ghrita, Madhu, or Aloe vera preparations are applied.
- The area is protected from trauma and contamination.
- The patient is advised to keep the wound clean and dry.
- Excessive physical activity is avoided for 24–48 hours.
- Follow-up assessment is performed after several days.

Proper postoperative care promotes rapid healing and minimizes the risk of infection or scar formation.¹³

3.7 Samyak, Ati and Heena Dagdha Lakshana

Classical Ayurveda describes three outcomes of cauterization.

Samyak Dagdha (Proper Burn)

Features include:

- Mild brownish discoloration
- Immediate pain relief
- Minimal inflammation
- Proper wound healing
- No excessive discharge

This is considered the ideal therapeutic response.

Ati Dagdha (Excessive Burn)

Features include:

- Severe pain
- Extensive tissue damage
- Blister formation
- Excessive discharge
- Delayed wound healing
- Scar formation

Management includes cooling therapies, wound care, and Pitta-pacifying measures.

Heena Dagdha (Inadequate Burn)

Features include:

- Insufficient cauterization
- Persistence of pain
- Incomplete therapeutic response
- Possibility of recurrence

Repeat Agnikarma may be required after proper assessment.

3.8 Scientific Perspective

Modern biomedical science explains the therapeutic efficacy of Agnikarma through several physiological mechanisms. Controlled thermal stimulation produces local vasodilatation, improves oxygen delivery, accelerates removal of inflammatory metabolites, reduces muscle spasm, enhances collagen extensibility, and increases joint mobility. Heat also activates thermoreceptors that inhibit pain transmission through spinal gating mechanisms while stimulating endogenous opioid release. These physiological effects explain the rapid pain relief and functional improvement frequently observed following Agnikarma in chronic musculoskeletal disorders.¹⁴

Furthermore, recent clinical studies have demonstrated significant reductions in pain scores, tenderness, stiffness, and disability indices following Agnikarma in osteoarthritis, cervical spondylosis, lumbar spondylosis, plantar fasciitis, and tennis elbow. These findings support the classical Ayurvedic concept that localized therapeutic heat effectively alleviates chronic musculoskeletal pain while improving functional outcomes.¹⁵

IV. PROBABLE MODE OF ACTION OF AGNIKARMA

Although the exact mechanism of Agnikarma has not been fully elucidated, its therapeutic effects can be explained from both Ayurvedic principles and modern biomedical science. The procedure acts by relieving pain, improving tissue metabolism, reducing inflammation, and promoting healing.¹⁶

4.1 Ayurvedic Perspective

According to Ayurveda, most musculoskeletal disorders are Vatavyadhi, often associated with Kapha and Ama. Aggravated Vata causes Shoola (pain), Stambha (stiffness), and Grahana (restricted

movement), while Kapha produces heaviness and obstruction of channels (Srotorodha).¹⁶

Agnikarma possesses Ushna, Tikshna, Sukshma, and Ashukari properties, which help to:

- Pacify Vata and Kapha Dosha
- Digest Ama (Ama Pachana)
- Remove Srotorodha
- Improve local circulation
- Restore normal tissue metabolism
- Reduce pain and stiffness¹⁷

Thus, Agnikarma not only provides symptomatic relief but also corrects the underlying pathogenesis according to Ayurveda.

4.2 Modern Scientific Perspective

From a biomedical viewpoint, Agnikarma acts as a form of localized therapeutic thermotherapy. Controlled heat produces several physiological effects:

- Vasodilatation and increased blood flow
- Improved oxygen and nutrient supply
- Removal of inflammatory metabolites
- Reduction of muscle spasm
- Increased collagen extensibility
- Improved joint mobility¹⁸

Heat also stimulates cutaneous thermoreceptors, which inhibit pain transmission through the gate control mechanism and enhance the release of endogenous opioids such as endorphins, resulting in analgesia.¹⁹

4.3 Tissue Healing

Localized thermal stimulation enhances cellular metabolism and promotes tissue repair by:

- Increasing fibroblast activity
- Stimulating collagen synthesis
- Enhancing angiogenesis
- Accelerating healing of soft tissues
- Improving functional recovery¹⁸

These effects are particularly beneficial in chronic tendinopathies, ligament injuries, osteoarthritis, and other degenerative musculoskeletal conditions.

4.4 Anti-inflammatory Effect

Experimental studies suggest that controlled heat may reduce inflammatory mediators, decrease tissue edema, and improve lymphatic drainage. These

actions contribute to reduced swelling, tenderness, and pain in chronic inflammatory conditions.²⁰

4.5 Overall Therapeutic Effect

The combined Ayurvedic and modern mechanisms explain the clinical benefits of Agnikarma, including:

- Rapid pain relief
- Reduction in stiffness
- Improved range of motion
- Better functional capacity
- Faster tissue healing
- Lower recurrence of symptoms when performed appropriately

V. CLINICAL EVIDENCE OF AGNIKARMA IN MUSCULOSKELETAL DISORDERS

Recent clinical studies have demonstrated encouraging results regarding the effectiveness of Agnikarma in the management of chronic musculoskeletal disorders. Most studies have reported significant reductions in pain, tenderness, stiffness, and disability, along with improvement in joint mobility and quality of life. Although the available evidence is promising, many studies have small sample sizes and require further validation through multicentric randomized controlled trials.

Osteoarthritis

Agnikarma has shown beneficial effects in patients with osteoarthritis, particularly knee osteoarthritis. Clinical studies have reported significant improvement in pain, stiffness, and functional capacity after treatment. The analgesic effect is attributed to increased local circulation, muscle relaxation, and modulation of pain pathways.²¹

Cervical and Lumbar Spondylosis

Several studies have demonstrated improvement in neck pain, low back pain, muscle spasm, and range of motion following Agnikarma. The procedure is considered especially useful in chronic cases where conservative management provides inadequate relief.²²

Plantar Fasciitis and Heel Pain

Patients with plantar fasciitis and Vatakantaka have experienced rapid pain relief and improved walking

ability after Agnikarma. Local thermal stimulation reduces inflammation at the plantar fascia and promotes tissue healing.

Tennis Elbow and Frozen Shoulder

Agnikarma has also been successfully used in lateral epicondylitis (tennis elbow) and frozen shoulder. Clinical improvement includes reduction in tenderness, increased joint mobility, and enhanced functional performance.

Overall, current evidence supports Agnikarma as a safe and effective adjunctive therapy for chronic painful musculoskeletal disorders, although larger high-quality clinical trials are still needed.²³

VI. ADVANTAGES OF AGNIKARMA

Agnikarma offers several advantages over conventional conservative treatment:

- Rapid pain relief
- Minimally invasive procedure
- Outpatient management
- Cost-effective treatment
- Minimal recurrence when properly performed
- Reduced dependence on analgesics
- Improved functional recovery
- Simple instruments and easy applicability
- Generally safe with minimal adverse effects²⁴

VII. LIMITATIONS

Despite encouraging outcomes, Agnikarma has certain limitations:

- Lack of standardized treatment protocols
- Small sample sizes in published studies
- Limited multicentric randomized controlled trials
- Inadequate long-term follow-up
- Operator-dependent procedure
- Variation in instruments and treatment techniques
- Limited awareness among healthcare professionals

VIII. FUTURE PERSPECTIVES

Future research should focus on:

- Large multicentric randomized controlled trials.
- Standardization of Agnikarma instruments and procedural techniques.

- Evaluation using validated pain and functional outcome scales.
- Long-term follow-up studies.
- Comparative studies with physiotherapy and conventional pain management.
- Experimental studies exploring molecular and neurophysiological mechanisms.
- Integration of Agnikarma into evidence-based musculoskeletal rehabilitation protocols.²⁵

IX. CONCLUSION

Agnikarma is a unique para-surgical procedure of Ayurveda with immense therapeutic potential in the management of musculoskeletal disorders. Classical Ayurvedic literature describes it as an effective intervention for painful conditions dominated by Vata and Kapha Dosha, while modern scientific evidence supports its analgesic, anti-inflammatory, and tissue-healing effects. Clinical studies have demonstrated promising outcomes in osteoarthritis, cervical spondylosis, lumbar spondylosis, plantar fasciitis, tennis elbow, frozen shoulder, and other chronic musculoskeletal disorders.

The procedure is simple, minimally invasive, economical, and can be performed on an outpatient basis with a favorable safety profile. Although existing evidence is encouraging, further well-designed randomized controlled trials with standardized protocols are required to establish its efficacy and facilitate wider acceptance in integrative musculoskeletal care. Agnikarma has the potential to serve as a valuable complementary therapeutic modality, bridging the principles of classical Ayurveda with modern evidence-based medicine.

REFERENCES

- [1] World Health Organization. Musculoskeletal health. Geneva: World Health Organization; 2022.
- [2] Sushruta. Sushruta Samhita. Edited and translated by Sharma RK, Dash B. Vol. I. Varanasi: Chowkhambha Sanskrit Series Office; 2018.
- [3] Sharma RK, Dash B, editors. Sushruta Samhita. Vol. I. Varanasi: Chowkhambha Sanskrit Series Office; 2018.

- [4] Sharma RK, Dash B, editors. Charaka Samhita. Vol. I. Varanasi: Chowkhambha Sanskrit Series Office; 2014.
- [5] Murthy KRS, translator. Ashtanga Hridayam of Vagbhata. Vol. I. Varanasi: Chaukhambha Krishnadas Academy; 2016.
- [6] Sushruta. Sushruta Samhita, Sutra Sthana, Agnikarma Adhyaya. In: Sharma RK, Dash B, editors. Vol. I. Varanasi: Chowkhambha Sanskrit Series Office; 2018.
- [7] Sushruta. Sushruta Samhita, Chikitsa Sthana. In: Sharma RK, Dash B, editors. Vol. II. Varanasi: Chowkhambha Sanskrit Series Office; 2018.
- [8] Agnivesha. Charaka Samhita, Sutra Sthana. Sharma RK, Dash B, editors. Vol. I. Varanasi: Chowkhambha Sanskrit Series Office; 2014.
- [9] Vagbhata. Ashtanga Hridayam, Sutra Sthana. Murthy KRS, translator. Varanasi: Chaukhambha Krishnadas Academy; 2016.
- [10] Vagbhata. Ashtanga Sangraha. Murthy KRS, translator. Vol. I. Varanasi: Chaukhambha Orientalia; 2015.
- [11] Singh R, Sharma R, Sharma P. Review on role of Agnikarma in pain of various musculoskeletal disorders. Journal of Indian System of Medicine. 2019;7(1):44–49.
- [12] Sharma A, Sharma P, Gupta SK. Agnikarma: An Ayurvedic parasurgical procedure. AYU. 2015;36(3):245–250.
- [13] Gupta SK, Sharma A, et al. Therapeutic applications of Agnikarma in Ayurveda. Ancient Science of Life. 2016;35(4):201–206.
- [14] Lehmann JF, editor. Therapeutic Heat and Cold. 4th ed. Baltimore: Williams & Wilkins; 1990.
- [15] Hall JE, Hall ME. Guyton and Hall Textbook of Medical Physiology. 14th ed. Philadelphia: Elsevier; 2021.
- [16] Agnivesha. Charaka Samhita, Chikitsa Sthana (Vatavyadhi Chikitsa). Sharma RK, Dash B, editors. Vol. II. Varanasi: Chowkhambha Sanskrit Series Office; 2014.
- [17] Sushruta. Sushruta Samhita, Sutra Sthana (Agnikarma Adhyaya). Sharma RK, Dash B, editors. Vol. I. Varanasi: Chowkhambha Sanskrit Series Office; 2018.
- [18] Knight KL, Draper DO. Therapeutic Modalities: The Art and Science. Philadelphia: Lippincott Williams & Wilkins; 2013.
- [19] Melzack R, Wall PD. Pain mechanisms: A new theory. Science. 1965;150(3699):971–979.
- [20] Nadler SF. Nonpharmacologic management of pain. Journal of the American Osteopathic Association. 2004;104(11 Suppl 8):S6–S12.
- [21] Joshi F, et al. Effect of Agnikarma and Raktamokshana in lumbar spondylosis: A randomized clinical study. AYU. 2020.
- [22] Mishra S, Sharma AK. Clinical evaluation of Agnikarma in the management of Sandhigata Vata (osteoarthritis). AYU. 2018;39(2):87–92.
- [23] Patil V, Kulkarni A. Effect of Agnikarma in the management of tennis elbow and frozen shoulder: A clinical study. Journal of Ayurveda and Integrative Medicine. 2021;12(3):456–462.
- [24] Singh R, Sharma P. Role of Agnikarma in the management of musculoskeletal disorders: A review. Journal of Indian System of Medicine. 2020;8(2):85–91.
- [25] Sharma A, Gupta SK. Agnikarma in pain management: An evidence-based review. Journal of Ayurveda and Integrative Medicine. 2022;13(4):100512.