



Review Article

ROLE OF AGNIKARMA IN PAIN MANAGEMENT OF VARIOUS MUSCULOSKELETAL DISORDERS: A REVIEW STUDY

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ABSTRACT

Agnikarma is one of the important Para-surgical procedures described in Ayurveda, which has been widely used in the clinical practice now days. *Sushruta* has given detail description about *Agnikarma*. Superiority of *Agnikarma* over other the treatment modalities are timely described by our ancients because of its *Apunrabhavatva* i.e., no recurrence property. Pain (*Ruja*) is the cardinal feature of most of the musculoskeletal disorders and it can affect the quality of life. In modern lifestyle, patient needs instant relief from pain. Treatment available in modern medicine commonly NSAID's (Nonsteroidal anti-inflammatory drugs) but it has some hazardous effects on body. This review is an attempt has been made to study various research article, analyzed the role of *Agnikarma* and its applicability on various painful disorders which help to gain best knowledge about *Agnikarma*. In this article total 15 research works from various journals have been studied conducted on *Agnikarma*. *Agnikarma* was found very important tool in pain management of many musculoskeletal disorders. It was found safe, easy, cost-effective and OPD level procedure.

INTRODUCTION

The word *Agnikarma* is combination of two words i.e., *Agni* and *Karma*, it means procedure done by the *Agni* to treat the disease. Application of heat directly or indirectly to the affected part of body. *Sushruta* mentioned the superiority of *Agnikarma* among all the para-surgical procedures and its importance explained in separate chapter in *Sutrasthana*. It has ability to cure the chronic diseases, which can't be cured by the *Bheshaja* (medicine), *Shastra* (Surgical interventions) and *Ksharakarma* (alkaline cauterization). It is mainly indicated in the disease caused by *Vata* and *Kapha Doshas*. Diseases of *Twacha*, *Mamasa*, *Asthi* & *Sandhi* with severe pain caused due to vitiation of *Vata*. Also, in *Shiro Roga*, *Netra Roga*, *Vartma Gata Vyadhi*, *Granthi*, *Arsha*, *Bhagandar*, *Arbuda*, *Shlipad*, *Charmakeela*, *Tila Kalaka*, *Antra Vrana*, *Nadi Vrana*, and in the diseases of the joints.^[1] According to *Sushruta*, if *Agnikarma* is performed in above diseases, will be less chances of recurrence and successful in curing the diseases.^[2]

Acharya Charak has not described details about *Agnikarma* but mentioned as one of the treatment measures in different *Vatavyadhi* such as *Gridhrasi*.^[3] In *Sushruta Samhita* different *Dahanopkarnas* and shapes are mentioned for *Agnikarma* as follows; *Twakadagha - Pippali* (Piper Longum), *Aja Shakrut* (goat excreta), *Godanta* (gypsum), *Shara* (arrow), *Shalakha* (metal rod) *Mamsadagha- Jambhavsta Shalakla* and other metals. For *Sira*, *Snayu*, *Sandhi* and *Asthi Dagdha - Kshaudra* (honey), *Guda* (jaggery), and *Sneha* (oil).^[4] Shape of *Agnikarma*: According to *Sushruta*, *Valaya*: (round shaped), *Bindu*: (dotted), *Vilekha*: (linear cauterization) and *Pratisarana*: (irregular shape)^[5] and according to *Vagbhata* three more types *Ardha Chandra*, *Swastika* and *Astapada*.

OBJECTIVES

1. To review the research work related to *Agnikarma* for pain management on different musculoskeletal disorders.
2. To analyze the collected data and study the efficacy of *Agnikarma* on pain management in various musculoskeletal disorders.

MATERIALS AND METHODS

The related data was collected from various dissertations, published research articles and from search engines like Google Scholar, PubMed and from the classical texts of Ayurveda.

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OBSERVATION AND RESULT

Dr Shrikant Patel has conducted RCT *Agnikarma* with two different *Dahanupkarnas* in *Gridhrisi* (Sciatica) as a PG dissertation. In this study total 30 patients were divided into two groups of two different *Dahanupakarnas* i.e., instruments *Loha shalaka* and *Pippali*. Follow up taken on 7th and 14th day and assessment was done immediately after the treatment. Results shown in *Shalaka* group mean score of pain which was BT-2.07 reduced to AT- 0.73, after first follow up reduced to 0.67 and last follow up was same with 64%, 67.6% and 67.6% improvement respectively. Mean score of tenderness which was BT-1.60 reduced to 0.47 with 70.6% improvement which was same after first and last follow up. there is marked improvement observed in 9 patients (60%), moderate in 6 patients (40%) and there are no patients with mild improvement was found. in *Pippali* group mean score of pain which was BT-1.93 reduced to 1.00 after treatment, after first and last follow up was same reduced to 0.87 with 48%, 55% and 51.8% improvement respectively. mean score of tenderness which was BT-1.93 reduced to 0.87 with 55% improvement after treatment which was same after first and last follow up, which is statistically significant ($P \leq 0.0001$). There is marked improvement found in 4 patients (26.66%), moderate in 9 patients (60%) and mild improvement was observed in 2 patients (13.33%). So, conclusion made was *Agnikarma* with *Loha Shalaka* shows better result specially in reducing the pain than *Pippali* in all parameter in the *Gridhrasi*.^[6]

Another RCT as a PG dissertation on *Agnikarma* with two different *Shalaka's* on osteoarthritis of knee joint conducted by Dr. Sucheta Ray. Total 30 patients were equally divided into two groups of *Rajat Shalaka* and *Tamra Shalaka*. Assessment was done after the follow up on 7th and 14th day. After completion of treatment, it was observed that, in *Rajat Shalaka* group mean score of pain was 1.87 before treatment which was reduced to 0.73 after treatment and 0.00 after last follow up with 100% improvement. Mean score of tenderness was 1.27 before treatment which was reduced to 0.20 after treatment and 0.00 after last follow up with 100% improvement. There was complete remission seen in 3 patients (20%), marked in 6 patients (40%), moderate improvement in 6 patients (40%) *Tamra Shalaka* group mean score of pain was 2.00 before treatment which was reduced to 0.93 after treatment and 0.20 after last follow up with 90% improvement. Mean score of tenderness was 1.33 before treatment which was reduced to 0.40 after treatment and 0.13 after last follow up with 90.2% improvement. Results in both groups was statistically highly significant with p value was ≤ 0.0001 and complete remission was seen in 2 patients (13.33%), marked 4 patients (26.66%) and

moderate improvement 9 patients (60%). There was no patient noted with mild improvement and unchanged result in both groups. This study showed *Agnikarma* with *Rajata Shalaka* was better effective than *Tamra Shalaka* in relieving the pain, tenderness and other sign and symptoms of *Janu Sandhigata Vata* (knee joint osteoarthritis).^[7]

Dr. A. Jayashree Prasad has conducted RCT as PG dissertation on *Agnikarma* along with *Yogaraja Guggulu Vati* as internal medicine in *Manyastambh* i.e., cervical spondylosis. In this study total 40 patients equally divided into 2 groups. Group-A *Agnikarma* done with *Panchaloha Shalaka* in single sitting. 2nd sitting was done on 8th day when pain was not reduced there was no change in goniometer reading. Observation was made as before treatment, on 7th, 15th and 21st day and follow up was done once in a month for the duration of 3 months (90 days). In *Agnikarma* group it was observed that pain was 2.05 before treatment it reduced to 0.60 at end of treatment which was same in group B, also reduces other symptoms like tenderness, stiffness etc with p value is less than ≤ 0.0001 which was highly significant. At the end of treatment result shown in *Agnikarma* group was 10 (50%) had good response, 7 (35%) moderate and 3 (15%) poor response. In Group of *Yogaraja Guggulu Vati* there was good response shown in 8 (40%), 11 (55%) moderate and 1 (5%) had shown no response. This study observed that efficacy of *Agnikarma* was found slightly superior in view of instant pain management to *Yograj Guggulu* as internal medicine.^[8]

This was a RCT study of *Agnikarma* on frozen shoulder conducted by Dr. Megha Tyagi as a PG dissertation. In this study total 30 patients equally divided into two groups of *Agnikarma* by mixing *Guda, Madhu and Ghrita* and wax bath therapy on affected shoulder with 2-3 sittings in a day daily for duration of 15 days. Assessment done on 5th, 10th and 15th day and follow up was taken after at end of 1 month treatment. It was observed that after 3rd follow up result almost same in both the groups which were statistically significant. In *Agnikarma* group It was observed that pain was 2.2 before treatment it reduced to 0.4 at end of treatment with the P-value < 0.01 It also reduces other symptoms like tenderness, stiffness etc with p value is less than ≤ 0.0001 which shows that *Agnikarma* is significantly effective to reduce pain and local tenderness. Overall assessment shows that 1 patient had no improvement, 1 had mild, 3 had moderate, 8 had maximum improvement and 2 had completely cured in *Agnikarma* group. Conclusion made on this study was that *Agnikarma* with *Guda, Madhu and Ghrita* shown more effective result compared to wax bath therapy in relieving the pain tenderness and other sign and symptoms of frozen shoulder (*Avabahuk*).^[9]

This is RCT conducted by Dr. Nikita Ganjoo on *Agnikarma* in *Kadara* (corn). In this study total 15 patients taken and *Agnikarma* done with *Pippali* in single sitting, assessment done and follow up was taken on 7th and 14th days. After the 2nd follow up on 14th day result found as reduction in pain and tenderness were 86.50% and 93.35% improvement which was found to be statistically highly significant with p value is less than ≤ 0.001 . This study shows that *Pippali* can be used to create superficial burns only. So, the conclusion was *Agnikarma* with *Pippali* is effective for treating superficial *Kadara* lesions and cosmetically better. It can also be performed in superficial hyperkeratosis over the elbows, lateral aspect of ankle, foot and hand.^[10]

Dr. Vyasdeva Mahanta conducted study on *Agnikarma* in cervical spondylosis. Total 33 patients selected for trial and divided into two groups. Out of them 21 completed the treatment in both groups. 11 patients treated by *Agnikarma* with *Panchadhatu Shalaka* and 10 patients treated by *Trayodashanga Guggulu* internally for duration of 1 month. Total 4 sittings of *Agnikarma* were done with follow up at interval of every 7th day. Results are shown as improvement in reducing sign and symptoms of cervical spondylosis. In *Agnikarma* group, 18% patient completely cured without recurrence, 18% had marked improvement and 63% got improved and in *Trayodasanga Guggulu* group 10% patients were cured, 30.00% had marked improvement and 60% got improved. The conclusion was that *Agnikarma* therapy is more effective for instant relief from pain and other symptoms in cervical spondylosis.^[11]

Another study conducted by Dr. Yogesh Badwe on *Agnikarma* and injection therapy in *Vatakantaka* (Plantar fasciitis). In this trial total 60 patients studied, which is equally divided into two groups. *Agnikarma* done with *Tamra Shalaka* in group-A and in group-B Intralesional Steroid injection of Triamcinolone 40mg given deep into the Plantar Fascia. Follow up done on 1st, 3rd and 7th day and assessment done after the treatment. After statistical analysis it was observed that there was significant reduction in Pain and tenderness in both groups with P-value of the two groups which is less than 0.05 so, both the treatment are equally effective. But in *Agnikarma* group pain and tenderness was immediately reduced when compared with injection therapy group. So, it concluded that *Agnikarma* is effective as treatment of *Vatakantaka* with advantage as immediate pain and tenderness reliever and It is cost effectiveness, easy and OPD level procedure.^[12]

Dr. Vinod kumar K. Bhorale conducted RCT on *Agnikarma* in *Greeva Sandhigata Vata* (Cervical spondylosis). In 40 patients *Agnikarma* performed by *Panchadhatu Shalaka* in 3 settings at interval of every

7th day for duration of 3 weeks along with oral Ayurvedic medication. Follow up taken on every 7th day for 21 days after treatment and assessment was done. Total duration of study was 42 days including follow up. After the treatment and follow up it was observed that the mean score of pain and tenderness was 2.05 and 0.57 before treatment which was reduced to 0.62 and 0.25 after treatment with 69.26% and 56.5% improvement which is highly significant ($P < 0.01$) almost in all parameters. The study showed that *Agnikarma* can be used to management chronic degenerative disorders like cervical spondylosis. It is highly effective, affordable an easy-to-handle therapy.^[13]

This RCT on *Agnikarma* in knee joint osteoarthritis was conducted by Dr. Anju Lata and others. Total 60 patients divide in two groups of conductive and direct method of *Agnikarma* with *Tamra Shalaka* on average temperature of 150°C and 50-60°C respectively. Assessment was done as before and after treatment. It was found that the pain, tenderness and swelling was significantly reduced after treatment in both methods with P-value is less than 0.05. But in direct method more effective and satisfactory result than conductive method may be due to high temperature about 150°C. Conclusion was *Agnikarma* showed good results in pain relieving when temperature of *Shalaka* is 150°C and more in conditions like osteoarthritis.^[14]

This trial conducted by Dr. Vikrant Singh on *Agnikarma* at different temperature with injection therapy in *Vatakantaka* (Calcaneal spur). Total 45 patients divided in two groups. Group A: in 30 patients, *Agnikarma* done by specially designed instrument with average temperature at 100°C to 150°C in 13 patients and 150°C to 200°C in 17 patients. Group B: 15 patients treated with injection triamcinolone acetonide 40mg diluted with 2% xylocaine (2cc) intralesional at the site of maximum tenderness on heel. Follow up taken on 7th day after treatment and it was observed that P-Values for trial group (temp 100-150) is greater than 0.05 hence the effect observed is not significant, while P-Values for remaining two groups are less than 0.05 hence it was found significant. It shows that *Agnikarma* which is done at 150-200°C got relief in pain (76%) and tenderness (75%) which was more than 100-150°C. In injection Group pain and tenderness was reduced upto 82.6% and 82.4%. The conclusion was that Hence *Agnikarma* at higher temperatures is having instant pain relief properties which is helpful in painful conditions like *Vatakantaka* and other musculoskeletal disorders.^[15]

A case study was done by Dr Manorama on *Agnikarma* in 38-year female patient of chronic plantar fasciitis having pain and tenderness over right heel. *Agnikarma* was done with *Panchdhatu Shalaka* in 3

sittings at interval of 7 day along with internally *Rasna Saptak Kwath* 10grams thrice a day. 1st follow up was taken on 7th day after 3rd sitting. It was found that pain, tenderness and stiffness was reduced significantly and after 2nd follow up (after 20 day) there was no recurrence of the above features noted. It shows that *Agnikarma* is safe, effective, economic and an easy procedure for the management of painful condition like plantar fasciitis.^[16]

Another case study was by Dr. Rimpay Sharma on *Agnikarma* in calcaneal spur. A 42-year male patient with pain and tenderness at bilateral heels was considered. Two settings of *Agnikarma* done at interval of 15 days with *Panchaloha Shalaka* in *Bindu* shaped. Follow up assessment was carried out on every 7th day after treatment (7th, 15th, 21st and 30th day). After last follow up It was observed that pain and tenderness reduced and patient walked without any difficulty. Wound completely healed and scar disappeared within 15 days without any complication. Conclusion was, *Agnikarma* is simple, cheap, safe, effective and alternative for pain management in calcaneal spur without any complications.^[17]

Dr. Vyasadeva Mahanta published single patient case study of 38 years old female of tennis elbow managed by *Agnikarma* along with oral medication *Ashwagandha* powder and *Navjivan Ras*. *Agnikarma* done in 3 settings by *Panchadhatu Shalaka* with shape of small multiple dots (*Vilekha Dahan Vishesh*) on every 7th day for 21 days and follow was taken up to 1 month. Result shown that the relief from pain, stiffness and increased the strength of gripping power in affected hand. Burn wounds healed within 5-7 days the scars disappeared within 3-4 weeks without any untoward effect. Study showed that, this type of combination therapy provides considerable relief in pain and restricted movement of the elbow joint and also effective against other musculoskeletal disorder.^[18]

Dr. Archana Maan conducted pilot study on *Agnikarma* in *Avabahuk* (frozen shoulder) along with physiotherapy. In 15 patients *Agnikarma* (*Binduvat*) done by *Gud* with specially designed instrument in single seating on affected shoulder joint. Follow up taken on 0th, 3rd, 5th, 7th and 15th day and assessment done. Pain and tenderness immediately relieved which is 70%, it shows the efficacy of *Agnikarma* on frozen shoulder specially for instant pain relief without any side effect and material i.e., *Gud* is cost effective and easily available equipment.^[19]

Dr. Suresh and Dr. Yogesh Badwe conducted the review study on *Agnikarma* in which detail description of about *Agnikarma* its indication, contraindication given and some research papers were reviewed which showed *Agnikarma* is helpful in *Agnikarma Sadhya Vyadhi* a mentioned in *Samhitas* and it has good pain

relieving effect in management of diseases like plantar fasciitis, frozen shoulder osteoarthritis and other musculoskeletal disorders.^[20]

DISCUSSION

Total 15 researchers studied in this review article, out of this 11 were RCTs including 4 PG dissertations, 3 case studies, 1 review article which was published in various journals. In above studies different types of metal and non-metal materials i.e., *Dahanopkarana* used for *Agnikarma* procedure, *Shalakas* (metal rod) like *Suvarna Shalaka* (gold rod), *Rajat Shalaka* (silver rod), and *Tamra Shalaka* (copper rod), *lauha Shalaka* (iron rod) and *Panchadhatu Shalaka* (rod made of five types of metal). Non-metal materials like *Pippali* (Piper Longum), *Ajashakrut* (goat excreta), *Kshaudra* (honey), *Guda* (jaggery) and *Sneha* are used in various painful disorders. *Agnikarma* were done in Multiple sittings in different articles which was completely depends on remission of mainly pain in various disorders, still 2 to 3 sittings were performed in various studies. Some papers show that heat energy is important to relieve the pain. Metal *Shalakas* seen more potent because of heat retention and transmission capacity is more than 150°C temperature and it can burn epidermis layer (*Twakadagha*) which is important in *Agnikarma*. Non-metals material like *Pippali* found less effective because of its low temperature retention capacity and it burns only superficial layer of skin. Different *Shalaka* were use in various musculoskeletal disorders but result was statistically same in different articles. *Sushruta* has described *Agnikarma* in effective when there is *Atyugraruja* (intense pain) in *Snayu-Sandhi-Ashti* i.e., musculoskeletal disorders.^[21] *Agnikarma* was useful for immediate pain relief and same was observed in above different research papers.

Probable Mode of Action of *Agnikarma*

Agnikarma act on a multi-factorial level in the body and its importance lies in its action. Exact mechanism action of *Agnikarma* still remains unsolved. Some theories can be adopted to explain these mechanisms but their action varies according to the condition.

According to Ayurveda it acts against *Vata* and *Kapha Dosh* by its *Ushna* (hot), *Tikshna* (penetrating), *Sukshma* (minute), *Laghu* (small), *Vyavayi* (quick acting), and *Vikasi* (quickly spreading) *Guna* and it breaks *Srotoavarodha*, produced due to *Vata* and *Kapha*, results in relieving pain and inflammation at that site.^[22]

The heat therapy, which is given at the local or affected area, increases the local blood circulation by vasodilatation, local metabolic process speedup, waste products get excreted, reduce edema, accelerate repair, and the which resulting in decreased intensity of pain.^[23]

Agnikarma may stimulates the sensory receptor lying in the muscle, by sending a message to the brain which stimulates the pituitary gland to release endorphin which in turn binds with opiate receptors in the pain cells to block the pain stimuli. Endorphin is a naturally occurring neuro peptide and like morphine and other opiates it has a marked propensity for binding on to the “opiate receptors” of the pain cell in the brain.^[24]

The pain receptors in the skin and other tissues are all having free nerve endings, due to hot *Shalaka* there is destruction of the free nerve endings and it causes, closing the “gate” and prevent the sensory transmission of pain.^[25]

CONCLUSION

From this review, it can be concluded that *Agnikarma* procedure can be done by using different materials and different temperature according to various painful conditions to mostly to relieve the pain immediately. It is a potent and minimally invasive Para-surgical procedure. Most of study conducted on musculoskeletal disorders like cervical spondylosis, osteoarthritis of knee joint, painful heel like plantar fasciitis, calcaneal spur, tennis elbow, sciatica, frozen shoulder, corn etc. from this review can be concluded that *Agnikarma* with different kind of *Shalakas* is found significantly effective in pain management in musculoskeletal disorders in almost all the studies. It can be performed combination with other supportive oral medications. It is simple, effective, convenient and economic for the patient with no or minimal complication. More scientific and Molecular studies are required to know the exact action and its applicability on the large scale.

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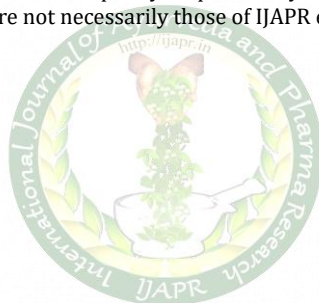
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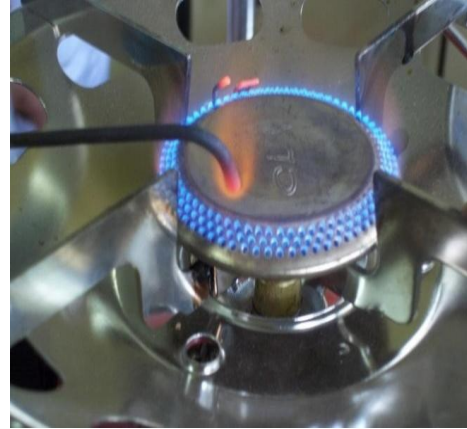
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Agnikarma with Shalaka



Agnikarma instruments (Dahanopkarnas)



Red hot Loha shalaka



Agnikarma with Loha shalaka on Gridhrasi



Agnikarma on knee joint on Sanhigata vata



Agnikarma on Manyastambha



Agnikarma on tennis elbow



Calanium spur-Shalaka



Alovera application after Agnikarma

Agnikarma with Pippali



Heating *Pippali* on flame



Agnikarma with *Pippali* on *Gridhraasi*



During *Agnikarma* with *Pippali* on plantar fasciitis



Agnikarma with *Pippali* with application of *Alovera*



Before *Agnikarma* with *Pippali* on plantar fasciitis



After *Agnikarma* with *Pippali* on Plantar fasciitis