



COMPARATIVE STUDY OF EFFECT OF AGNIKARMA WITH TAMRA SHALAKA AND PIPPALI ON PAIN MANAGEMENT IN VATAKANTAKA WITH SPECIAL REFERENCE TO PLANTAR FASCIITIS: A RANDOMIZED CONTROLLED TRIAL

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ABSTRACT

In the world of modernization, due to fast changing lifestyle; the majority of mankind acquired busy and hectic work schedule it includes continuous standing and walking type of work, which having greatly contributed to overall health of society. Presently large number of people suffering from painful Musculo-skeletal disorders; plantar fasciitis is one of them. Plantar fasciitis is painful condition of heel. *Vatakantaka* is painful condition of heel due to vitiated *Vatadosha* can be correlate with plantar fasciitis which is mentioned in context of *Vatavyadhi* by many *Acharya*. Now a days increased the use of long-term NSAIDs for pain management, but along with pain reliving property its hazardous effect on body should not be neglected. *Agnikarma* is the ancient treatment procedure done by using heat in various painful condition. is mentioned in Ayurveda for such painful condition and it can be performed by various instruments (*Dahanopkarna*) which is mentioned in *Samhita* and it is said to be most superior among all para-surgical procedure.

Methodology- In this comparative study total 64 diagnosed patients of *Vatakantaka* was selected all patients (plantar fasciitis) were equally divided into two groups and *Bindu* shaped *Agnikarma* done with *Pippali* and *Tamra Shalaka* in single sitting if required 2nd was done and assessment was carried out on 1st, 4th and 7th day after each sitting.

Result- Based on this study it was observed that, *Agnikarma* with *Pippali* and *Tamra Shalaka* was found equally effective in reduction of pain and tenderness and statistically there was no any significant difference noted.

Conclusion- Both the materials used were cost wise affordable, easy to handle and effective in pain management of plantar fasciitis without any hazardous effect on body.

Key Words: *Agnikarma*, *Pippali*, *Tarmra Shalaka*, *Vatakantaka*, Pain, Tenderness, Plantar Fasciitis

INTRODUCTION: Plantar fasciitis is one of the troublesome conditions and most common musculoskeletal pathology of Painful heel that accounts for about 80% of cases of heel pain.¹ Typical feature is pain in heel that is more in the morning or after rest and decreases after walking a few steps². More commonly seen in women, military recruits, older athletes, dancers, the obese, and young male

athletes.³ Various conservative as well as surgical management available for Plantar Fasciitis in modern medicine. Clinically plantar fasciitis simulates with *Vatakantaka* described by *Acharya Sushruta*, which results due to vitiated *Vata dosha* cause by long standing or walking on uneven surfaces. It has mentioned in *Snayu Asthi- Sandhigata Vata Vyadhi*⁴ Snehana (oleation), *Upnaha*

(poultice), *Agnikarma* (therapeutic burning) and *Bandhana* (bandaging) and *Unmardana* have been indicated as treatment measures in *Ayurveda*. *Agnikarma* is a unique ancient treatment modality invented by *Ayurveda*, that has been practiced since many years. *Agnikarma* is superior over all other parasurgical treatment modality because of, those diseases which are not curable by medicine, surgery, *Kshar Karma* can effectively be treated by *Agnikarma* and if it is done perfectly then disease can't be reoccur.⁵ Various instruments (*Dahanopkarana*) and different shapes has been mentioned in *Samhitas* like; for *Twakadagda* - *Pippali* (*Piper Longum*), *Aja Shakrut* (Goat Excret), *Godanta* (Gypsum), *Shara* (Arrow), *Shalakra* (Metal Rod). *Mamsadagda* – *Jambhavsta Shalakra* and other metals like Gold, Silver, Copper, Iron etc. *Sira*, *Snayu*, *Sandhi and Asthi Dagda* - *Kshaudra* (*Honey*), *Guda* (*Jaggery*), and *Sneha* (*Oil*)⁶ **Shape of Agnikarma** : According to *Sushruta*, *Valaya*: (round shaped), *Bindu*: (dotted), *Vilekha*: (linear cauterization) and *Pratisarana*: (irregular shape) and according to *Vagbhata* three more types *Ardha Chandra*, *Swastika* and *Astapada*.⁷ Considering the limitations, side effects and complication of modern treatment modality *Agnikarma* is safe, effective, economic, easy to perform therapy for pain management musculoskeletal disorders like plantar fasciitis. *Vatakantaka* considered as *Snayugata vyadhi* and *Pipali* mainly indicated for *Twakdagda*. Previously many research works was done on *Pippali* and It was found effective. But in this study attempt was made know the pain-relieving effect of *Pippali* on *Vatakantaka* which is *Snayugata vyadhi* and it was found effective. When comparing the result, pain relieved immediately after *Agnikarma* with

Tamra Shalakra mostly after single sitting and *Pippali* was also found effect but pain gradually relieved and almost 2 sittings were required for pain relief.

MATERIAL AND METHOD

INCLUSION CRITERIA:

- Clinically diagnosed Patients of *Vatakantaka* (plantar fasciitis)
- Age group more than 18 years.
- Patients of irrespective of gender, religion, and socio-economic status.

EXCLUSION CRITERIA:

- Uncontrolled systemic diseases like diabetes mellitus, hypertension etc.
- Immuno-compromised Patients.
- Fracture of calcaneum.
- Other pathologies like osteomyelitis of calcaneum

Material

- **Tamra Shalakra**: - Metal- *Tamra Dhatu* - length of *Shalakra*- 25 cm
Diameter of the tip of the *Shalakra*- 4 mm.
- **Pippali**: Dry and healthy medium size *Pippali* (*Piper longum*).
- **Infrared industrial digital thermometer**: To measure the temperature of red-hot *Tamra Shalakra* or *Pippali*.

Methodology: After institutional ethics committee clearance on 15/03/2019 This study was registered in The Clinical Trials Registry- India (CTRI) with CTRI NO. CTRI/2019/08/021010. For this study clinically diagnosed 64 patients of plantar fasciitis randomly selected and equally and divided in two groups of *Agnikarma* with *Pippali* and *Tamra Shalakra* (32 in each group). Selection was irrespective of gender, religion, economic status, education, occupation. *Agnikarma* done in single sitting and follow up done on 1st, 4th and 7th day. Second sitting done on 8th day if required.

Procedure

Necessary equipment's

- Pippali/Tamra Shalaka.
- Artery forceps (To hold Pippali)
- Sponge holding forceps
- Sterile water
- Gauze piece
- Butane gas burner
- Goghrita
- Infrared industrial thermometer.
- Sterile surgical gloves.

- All necessary equipment's are collected.
- Maximum tender point on heel region marked.
- Tamra Shalaka /Pippali was heated till red hot appearance.
- Bindu type Agnikarma (single dot) by was done till appearance of 'Samyak Twaka -Dagdha Lakshanas'.
- Go-Ghrita was applied at the site of burn wound, immediately after Agnikarma.



Image No1

Agnikarma with Tamra Shalaka

Study Duration

- Total duration including follow up - 7 days
- Agnikarma - Procedure done in single sitting if required 2nd sitting was done on 8th day
- Follow up – 1st, 4th and 7th day after each sitting.

Assessment of Results:



Image No. 2

Agnikarma with Pippali

Assessment done on the basis of relief of sign and symptoms and the result of study was recorded in form of qualitative data. Criteria for assessment for pain and tenderness as follows;

A. SUBJECTIVE CRITERIA: PAIN

Pain assessed by VAS (Visual Analog Scale):

Image no 3: showing Visual Analog Scale

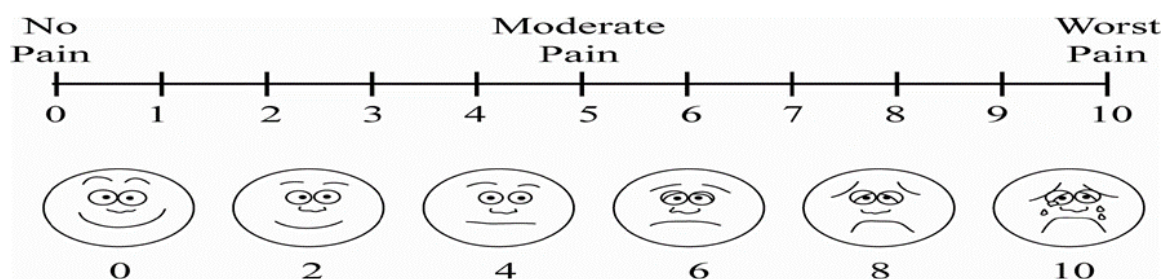


Table no.1: Showing pain rating and grading

Sr.no.	Rating pain level	Rating	Grading
1.	No pain	0	0
2.	Mild pain (Annoying interfering in daily activities)	1 to 3	I
3.	Moderate pain (Interferes significantly with regular activities) which last for 1 to 3 hrs	4 to 6	II
4.	Severe pain (Disabling unable to perform daily activities). which last more than 3 hrs.	7 to 10	III

B. OBJECTIVE CRITERIA:

TENDERNESS Tenderness was assessed on Dr. Frank Painter's grading for soft-

tissue tenderness grading Scheme as follows;⁸

Table no.2: Showing Dr. Frank Painter's soft-tissue tenderness grading Scheme

Sr.no.	Definition	Grade
1.	No Tenderness	0
2.	Tenderness to palpation without grimace or flinch	1
3.	Tenderness with grimace and/or flinch to palpation	2
4.	Tenderness with withdrawal (jump sign)	3
5.	Withdrawal (jump sign) to non-noxious stimuli i.e., superficial palpation, pin prick, gentle percussion.	4

Overall assessment Criteria

Overall assessment Criteria was based on improvement in subjective and objective parameters after the treatment. The results were categorized in following manner;

- Complete relief - 76% and above.
- Moderate relief- 51% to 75% improvement
- Mild relief- 26 to 50% improvement
- No relief - 25% and Below 25% improvement

Investigations

- CBC, RBS
- HIV and HBsAg
- X-ray calcaneum (if required)

OBSERVATION AND RESULT:

According to this study it was observed that, maximum patients from 15-25 years age group, more Female patients and maximum were housewives. Most of

patients with long standing and walking type of work with Unilateral involvement of foot seen in maximum patients. In this study average mean temperature shown of Pippali was 56.13⁰C and Tamra Shalaka was 194.28⁰C. Number of patients required second sitting is significantly more in group A (Pippali) than group B (Tamra Shalaka).

Second sitting required:

2nd sitting done in both the groups when there was not relief from pain after 1st sitting. Chi-Squar test is carried out for comparison of second sitting required or not in both groups. When comparing both groups, number of patients required second sitting is significantly more in group A (22 patients) than group B (14 patients) as P-Value less than 0.05 and Chi-Square Value 4.063.

Table no.3: showing required second sitting number.

Second Sitting	Required	Not required	TOTAL
Group A	22	10	32
Group B	14	18	32
TOTAL	36	28	64
Chi-Square Value	4.063		
P-Value	0.043		

RESULT:

- **PAIN:** Pain was the subjective parameter of the study which was measured by visual analogue scale (vas) and gradation done according to intensity of pain, i.e. no pain, mild, moderate and sever pain with gradation 0, i, ii, iii respectively.

- **TENDERNESS**

Tenderness was objective parameter of the study. Which was assessed on Dr. Frank Painter's grading for soft-tissue tenderness. The gradation 0, I, II, III, IV are given according to severity of tenderness.

Result after 1st sitting-

Mann Whitney U Test used for comparison between Group A and Group B and following observations are obtained.

When result was compared in both groups, we observed that, P-Values for Pain is greater than 0.05 (0.328). i.e., there was no significant difference observed in Group A and Group B and both *Pippali* and *Tamra Shalaka* was found equally effective on reducing the pain after 1st sitting of *Agnikarma*.

When result was compared in both groups, we observed that, P-Values for Tenderness is greater than 0.05 (0.224). i.e., there was no significant difference observed in Group A and Group B and both *Pippali*

and *Tamra Shalaka* was found equally effective on reducing the Tenderness after 1st sitting of *Agnikarma*.

- **Result after 2nd sitting:**

When result was compared in both groups, we observed that, P-Values for Pain is greater than 0.05 (0.705). i.e., there was no significant difference observed in Group A and Group B and both *Pippali* and *Tamra Shalaka* was found equally effective on reducing the pain after 2nd sitting of *Agnikarma*.

When result was compared in both groups, we observed that, P-Values for Tenderness is greater than 0.05 (0.244). i.e., there was no significant difference observed in Group A and Group B and both *Pippali* and *Tamra Shalaka* was found equally effective on reducing the Tenderness after 2nd sitting of *Agnikarma*.

Overall effect

In study group Marked improvement was noticed in 11 patients (34.38%), moderate in 13 patients (40.63%) and mild in 8 patients (25%).

In control group marked improvement was noticed in 15 patients (46.88%), moderate in 13 patients (40.63%) and mild in 4 patients (12.5%).

Table no.4: showing effect on pain and tenderness after 1st sitting:

Parameters		N	Mean Rank	Sum of Ranks	Mann-Whitney U	P-value
Pain	Group A	32	30.41	973.00	445.000	.328
	Group B	32	34.59	1107.00		
	Total	64				
Tenderness	Group A	32	29.83	954.50	426.500	.224
	Group B	32	35.17	1125.50		
	Total	64				

Table no.5: showing effect on pain and tenderness after 2nd sitting:

Parameters		N	Mean Rank	Sum of Ranks	Mann-Whitney U	P- value
Pain	Group A	32	33.31	1066.00	486.000	.705
	Group B	32	31.69	1014.00		
	Total	64				
Tenderness	Group A	32	35.02	1120.50	431.500	.244
	Group B	32	29.98	959.50		
	Total	64				

DISCUSSION: Vatakantaka described as *Snayu Asthi- Sandhigata Vatavyadhi*. It is painful condition of heel caused by vitiated *Vata Dosha* due improper placement of foot and constant standing or walking on uneven surfaces⁹. It can be clinically correlated with plantar fasciitis, in which chronic inflammation of plantar fascia and degeneration of fibrous tissue. Pain usually more in early morning or after a period of rest and tenderness is classical sign and symptom of this disease¹⁰. Various treatment modality mentioned for pain relief in *Ayurveda* as well as in modern medicine. Details about *Agnikarma* and its

superiority mentioned by Acharya *Sushruta*¹¹. It has been said that when severe pain occurs at site of *Twaka, Mamsa, Sira, Snayu, Sandhi* and *Asthi* due to vitiated *Vata*, *Agnikarma* is indicated for instant pain relief and *Vatakantaka* is one of them¹². Various *Dahanopkarnas* in different condition mentioned in *Samhita* for *Agnikarma*. *Pippali* has indicated for *Twakagat Dagdha* in many diseases and various studies has been conducted regarding this, but in this study *pippali* used as *Agnikarma* instrument in *Snayugat Vyadhi* i.e., *Vatakantaka* to know the effect on pain management. So, *Pippali*

and *Tamra Shalaka* chosen for *Agnikarma* in *Vatakantaka* and both were found effective but slight difference noted in onset of Pain relief.

Temperature of instrument:

In this study there was huge difference found in temperature of both instruments i.e., *Pippali* (56.13⁰C) and *Tamra Shalaka* (194.28⁰C). Which was measured by infrared industrial thermometer. temperature play important role in pain management and these temperature variations may directly impact on sittings of *Agnikarma*. It can be said that more the temperature more effect on instant pain relief and lower the temperature having slower effect.

Sittings of Agnikarma:

Number of sittings of *Agnikarma* required are depends on relief of symptoms. In this study 2nd sitting done in both the groups only when pain not relieved after 1st sitting. It was observed that

In trial group a (*Pippali*) 22 patients required 2nd sitting and 10 patients required single sitting and in control group (*Tamra Shalaka*) 14 patients required 2nd sitting and 18 patients required single sitting to relieved the pain.

In both groups, total 36 out of 64 patients required 2nd sitting for pain relief. Which was more in trial group (22) and less in control group (14).

This study shows major difference in temperature of *Pippali* and *Tamra Shalaka* and this temperature variation may directly affect the onset of pain-relieving action. It can be said that, the temperature of instrument has directly influence sittings of *Agnikarma*, i.e. Higher the temperature of instrument required less sittings of *Agnikarma* e.g., *Tamra shalaka*. and lower the temperature of instrument require more

than one sitting for pain management e.g., *Pippali*.

Effect of Agnikarma on Pain and tenderness:

In *Pippali* group pain was relieved after 2nd sitting in 22 patients and after 1st sitting in 10 patients. statistically there was significant reduction in pain (P<0.05). also, there was significant reduction in tenderness (P<0.000).

In *Tamra Shalaka* group, pain relived after 1st sitting in 18 patients and after 2nd sitting in 14 patients. statistically there was significant reduction in pain (P<0.05). also, tenderness was significant reduced(P<0.000)

When comparing both groups statistical analysis shows, P-value for pain and tenderness was greater than 0.05. it means statistically both the groups were found equally effective, but in control group pain relieved immediately after *Agnikarma* and only one sitting required in maximum patients. in trail group pain was relieved gradually and almost 2 sittings were required in most of patients. Tenderness was relieved earlier with *Tamra Shalaka* than with *Pippali*.

Probable mode of action of Agnikarma:

Analgesic action of Agnikarma:

Vitiated *Vata Dosha* is responsible for Pain anywhere in body. *Vata* is *Shita Guna Pradhana*, *Agni-karma* being *Ushna-Tikshna Guna Pradhana*. It pacifies *Vata* by its antagonistic property and remove blockages (*Strotorodha*) within the channels, thus the pain is relieved immediately after *Agnikarma*.¹³

Vent haff theory: Effect on metabolism

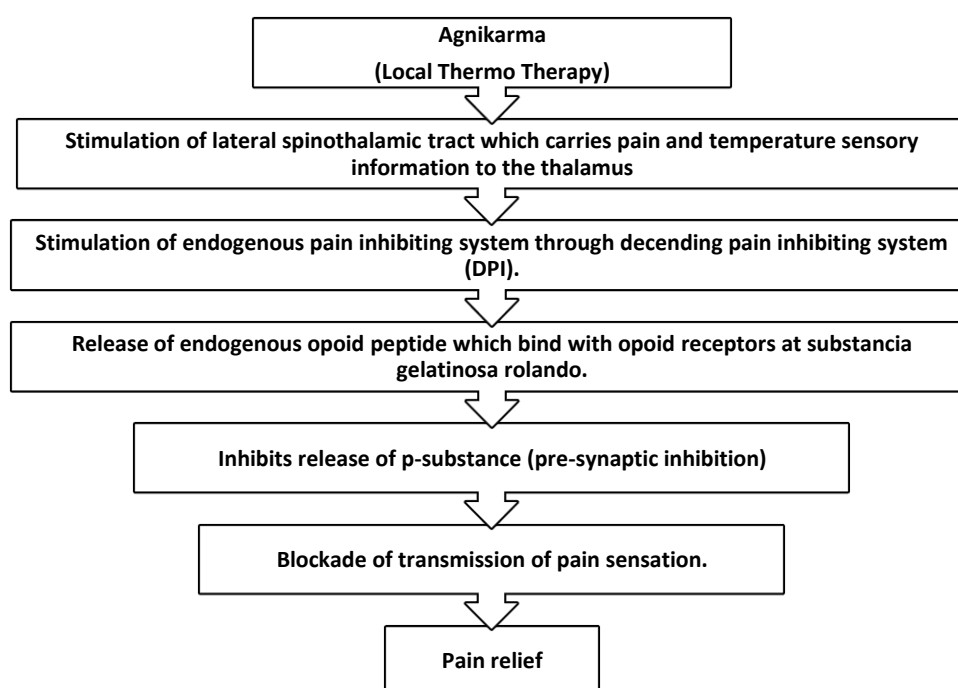
According to Scientist Vent haff theory, the place when therapeutic heat is transferred from heating object to

biological system local metabolic process speedup and various metabolic changes take place at local site where heat burns which leads to increase demand of oxygen and nutrition. by *Agnikarma* superficial sensory nerves get stimulated and increases the local blood circulation by vasodilatation this helpful to excrete metabolic toxins and Pain substances.¹⁴

Counter Irritation Theory:

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.¹⁵

Flow Chart No 1: Showing action of *Agnikarma*



- **Haemostasis by *Agnikarma*** - by *Sirasankochana* property it helps for *Rakthasthambhana* (haemostasis).¹⁶

CONCLUSION: In this comparative study of *Agnikarma*, *Pippali* and *Tamra Shalaka* Both were found effective in reducing pain and tenderness. Number of sittings required for pain relief for *Agnikarma* with *Tamra Shalaka* is less than *Agnikarma* with *Pippali*. Mean temperature of *Pippali* was 56.13⁰C and *Tamra Shalaka* was 194⁰c. hence as per this study we concluded that after *Agnikarma* with *Pippali* and *Tamra*

Shalaka Pain relieved instantly in most of the patients. so, it can be used for such musculoskeletal disorder for pain management.

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