

## A COMPARATIVE CLINICAL STUDY ON PATRA PINDA SWEDA AND TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION ON GRIDHRASI WITH SPECIAL REFERENCE TO SCIATICA

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## ABSTRACT

*Gridhrasi* is a *Vata Nanatmaja Vyadhi* characterized by *Ruk* (pain), *Toda* (pricking pain), *Stambha* (stiffness) and *Spandana* (frequents twitching). These symptoms initially affect *Sphik* (buttock) as well as the posterior aspect of *Kati* (waist) and then gradually radiates to posterior aspects of *Uru* (thigh), *Janu* (knee), *Jangha* (calf) and *Pada* (foot). It is dominated by pain that affects the *Kandara* due to morbid *Vata Dosha* and *Kapha Dosha* can also be involved in the clinical presentation. *Snehana* and *Swedana* are considered as the general line of treatment for *Vatavikaras* which can be taken as a line of treatment for *Gridhrasi*. *Patra Pinda Sweda* being one among *Sankara Sweda* is *Sagni* and *Snigdha Ruksha* type of *Sweda*. In this medicinal leaves having *Vata-Kaphahara*, *Shothahara* and *Vedanasthapaka* properties are fried in *Sahachara Taila* and tied into *Pottali*. Thus, by virtue of its *Guna* possess the best *Snehana* and *Swedana* effect and acts in respective *Avasta* of the disease *Gridhrasi*. There are a number of treatments plans available for sciatica. However transcutaneous electrical nerve stimulation (TENS) is a simple, non-invasive analgesic technique that is used extensively in health care settings by physiotherapists for sciatica. The use of conventional transcutaneous electrical nerve stimulation is originally based on the gate control theory of pain and TENS could also raise endorphin levels in the spinal fluid. **Methodology:** A comparative clinical study was done on forty subjects of both sexes, between the age group of 20-60 years who were randomly assigned into two groups, namely group A where *Patra Pinda Sweda* was administered to the subjects and group B where

transcutaneous electrical nerve stimulation was applied to the subjects. After completion of the study, results were assessed using the student 't' test by comparing the data collected during the study. **Result:** Comparatively group A proved to be more effective than group B. Group A overall result is 66.73% and Group B overall result is 47.07%.

**Keywords:** *Gridhrasi, Physiotherapy, Sahacahara Taila, Snehana, Swedana*

## INTRODUCTION

*Snehana* and *Swedana* are considered as the general line of treatment for Vata vikaras<sup>1</sup> which can be taken as the line of treatment for Gridhrasi. Swedana karma comes under Shadupakramas and can be classified as Snigdha, Ruksha and Snigdha Ruksha sweda which helps in treating *Vataja*, *Kaphaja* and *Vata Kaphaja* diseases, respectively. "Pindasweda" is a form of Sankara sweda. The word Sankara suggests the Mixture of different medicines or drugs when used in the form of Pinda/ Pottali it is called Pindasweda. Patra pinda sweda being Snigdha Ruksha sweda and the medicines used in this having mainly Vata Kapha hara properties<sup>2</sup>, by their Ushna and Snigdha guna does Amapachana and Srotoshodhana, in turn relieving stiffness and thereby acting as Stambhagna. Acts as Gauravaghna by relieving heaviness in the body through sweating and by virtue of Ushna and Swedakaraka property causes Sitaghna<sup>3</sup> in the body, in turn removing Srotoavarodha causing normal Gati of Vata. Hence Samprapti Vighatana of disease Gridhrasi can be achieved.

Physiotherapy is a health care profession concerned with human function and movement and maximising physical potential. Electrotherapy is an integral part of physiotherapy, which includes various forms of therapeutic applications using electricity as the primary source of energy. Transcutaneous electrical nerve stimulation (TENS) is a form of peripheral electrical nerve stimulation through the skin, which is used to obtain electro analgesia<sup>3</sup>. Today, TENS is one of the most used electrotherapeutic modalities for pain relief in sciatica. The electro analgesia by TENS may occur as per the endorphin theory or gate control theory<sup>4</sup>. Gridhrasi is one of the painful conditions explained in Ayurveda in the context of Vatavyadhi, where the pain from the Sphik radiates to the Kati, Prusta, Uru, Janu, Jangha and up to Pada<sup>5</sup>. Gridhrasi can be compared to

Sciatica as there is a close resemblance in the manifestation of both the conditions. Sciatica is a common condition with a lifetime incidence varying from 13% to 40%<sup>six</sup>. The corresponding annual incidence of an episode of sciatica ranges from 1% to 5%<sup>seven</sup>. Nowadays the most common disorder which affects the movement of the leg particularly is low backache out of which 40% are radiating pain that affects daily routine work. In the Contemporary system of medicine, they administer muscle relaxants, NSAID corticosteroids etc. and the last option is surgery, which has several complications and may even cause permanent loss of working capabilities. So, research for some cost-effective, non-invasive procedures having minimum complications and better efficacy was needed. Hence "A comparative clinical study on Patra pinda sweda and transcutaneous electrical nerve stimulation" was done and their efficacy was assessed.

### METHODOLOGY:

The present clinical study entitled "A comparative clinical study on Patra pinda sweda and transcutaneous electrical nerve stimulation on Gridhrasi with special reference to sciatica" was undertaken.

### Source of the data:

Subjects attending OPD and IPD of Shri Jayachamarajendra Institute of Indian Medicine Hospital, Bengaluru were selected.

### Methods of collection of data:

Forty patients fulfilling the diagnostic criteria were selected irrespective of sex, religion, marital status, socioeconomic status and were randomly distributed.

### Diagnostic criteria:

Pain is felt first in the posterior aspect of Kati and radiates downwards the posterior aspect of Uru, Janu, Jangha Pradesha and Pada along with or without Stambha, Toda and Spandana.

## **Subjects with signs and symptoms of Gridhrasi like-**

### **Symptoms:**

- ❖ Presence of kramataha Ruk in Sphik, Kati, Prista, Uru, Janu, Jangha and Pada.
- ❖ Kramataha Toda, Spandana, Stambha in Sphik, Kati, Prista, Uru, Janu, Jangha, and Pada.

### **Signs:**

- ❖ Sakthi utksepa nigrahana (restricted lifting movement of the affected limb).

### **Inclusion criteria:**

- ❖ Subjects fulfilling the diagnostic criteria of Gridhrasi.
- ❖ Subjects aged between 20-60yrs.
- ❖ Subjects indicated transcutaneous electrical nerve stimulation therapy.
- ❖ Subjects indicated for Patra pinda sweda.

### **Exclusion criteria:**

- ❖ Subjects who are diagnosed with congenital anomalies of the spine, Spinal tuberculosis, Neoplasm's, Traumatic fracture, and Epidural abscess.
- ❖ Subjects where surgical intervention was needed.
- ❖ Subjects with other systemic disorders like Cardiac diseases & renal failure.
- ❖ Subjects with abnormal skin sensation, who have an allergic response to gel, electrode, or tape.
- ❖ Pregnancy.

### **Assessment Criteria:**

The subjective and objective parameters in Subjects were assessed before and after the completion of treatment and on follow up.

### **Subjective Parameters:**

- ❖ Ruk
- ❖ Toda
- ❖ Stambha
- ❖ Spandana

### **Objective Parameters:**

- ❖ Walking distance.
- ❖ Straight Leg Raising Test.
- ❖ Braggard's sign.
- ❖ Visual analogue scale.

### **Criteria for assessment of results:**

The Assessment of the result was made based on data collected as per subjective and objective parameters in all patients before and after treatment. Separate grading was given for the assessment of parameters.

### **Statistical analysis:**

The information gathered since observation made about various parameters was subjected to statistical analysis in terms of Mean, Standard Deviation and Standard error (SE). Paired t-test and Unpaired t-test was carried out. The obtained results were interpreted as:

- ❖ Insignificant =  $P > 0.05$
- ❖ Significant =  $P < 0.05$
- ❖ Highly Significant =  $P < 0.01$  and  $P < 0.001$ .

### **STUDY DESIGN: "A RANDOMIZED COMPARATIVE CLINICAL STUDY"**

#### **Sample size and grouping:**

40 Subjects fulfilling the inclusion criteria were randomly divided into two groups as Group A and Group B consisting of twenty patients each.

Group A- Patients of this group were treated with Patra pinda sweda.

Group B- Patients of this group were treated with Transcutaneous electrical nerve stimulation.

Total number of subjects registered for the study – 40

Total number of subjects completed the study - 40

No dropouts or excluded from the study.

#### **Intervention:**

##### **Group A:**

Materials required for the study:

- ❖ Patras used - Eranda, Nirgundi, Sigrum, Karanja (200 gm each) Arka (100gm), were freshly collected from the campus of S.J.I.I.M hospital, Bengaluru.
- ❖ Tila, Kulatta - 50 gm each
- ❖ Grated coconut - 50 gm
- ❖ Sliced lemon - 4 Lemon
- ❖ *Saindhava Lavana* - 5 gm
- ❖ Taila used - Sahachara taila 150 ml per day.
- ❖ Sahachara taila was prepared at Chaitanya ayur formulations, Mundargi, Bellary.
- ❖ Cotton cloth - (45 cm \* 45 cm) two pieces.

**Table 1:** Showing treatment schedule in group A

<ul style="list-style-type: none"> <li>• Poorva karma</li> </ul>	<ul style="list-style-type: none"> <li>• Preparation of the drug: Ingredients were fried in appropriate quantity of Sahachara taila and were divided into two equal parts and Pottali were made accordingly.</li> <li>• Preparation of the patient: Kati and Adhoshakha abyanga with Sahachara taila was done.</li> </ul>
<ul style="list-style-type: none"> <li>• Pradhana karma</li> </ul>	As per the procedures explained for Sthanika swedana in classics, Patra pinda sweda was carried out. Time duration: 30min/day. Total duration: 7 days.
<ul style="list-style-type: none"> <li>• Paschat karma</li> </ul>	The treated area is cleaned and then the patient is asked to take a rest for 15minutes and allowed the patient to take a warm water bath. Diet and the regimen were prescribed accordingly.

**Group B:**

Materials required for the study:

- ❖ TENS Machine- a low-frequency TENS machine, purchased from the electro care Mr Nagaraj, Bengaluru.

- ❖ Conductive gel
- ❖ Cotton swab
- ❖ Surgical adhesive tape

**Table 2:** Showing treatment schedule in group B

<ul style="list-style-type: none"> <li>• Poorva karma</li> </ul>	Electrodes are placed directly over painful sites.
<ul style="list-style-type: none"> <li>• Pradhana karma</li> </ul>	Applied TENS max for 30 minutes (according to patient's tolerance)
<ul style="list-style-type: none"> <li>• Paschat karma</li> </ul>	Diet and the regimen were prescribed accordingly.

The total duration of intervention: 22 days

Treatment Duration: 07 Days

Follow up: 14 days

**Observation period:**

- ❖ Initially on the first day before treatment
- ❖ On the seventh day after treatment
- ❖ On 22nd day

**RESULT:**

**GROUP A:**

- ❖ Statistically, Significant improvement was observed at the level of p-value <0.05 in Subjective parameters Ruk, Toda.

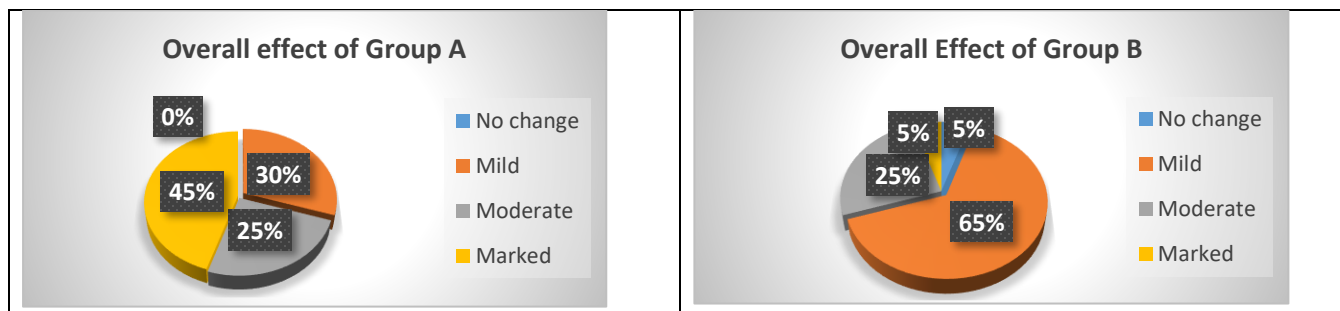
- ❖ Statistically significant results were observed at the level of p-value <0.05 in Objective parameters of walking distance, SLRT Lt, SLR Right, Braggard's Right, Braggard's Left, and visual analogue scale.

**GROUP B:**

- ❖ Statistically Significant results were observed at the level of p-value <0.05 in Subjective parameters Ruk, Stambha, Spandana.
- ❖ Statistically significant results were observed at the level of p-value <0.05 in Objective parameters SLRT Lt, Braggard's Rt., Braggard's left, visual analogue scale.

**Table 3:** The overall effect of Group-A and Group - B

Group - A			Group - B
Class	Grading	No of patients	No of patients
0-25%	No change	0	1
26%-50%	Mild	6	13
51% - 75%	Moderate	5	5
76% - 100%	Marked	9	1



**Table 4:** Comparative results of Group A and Group B

Group A	Group B	Mean Difference	SE (±)	T value	P-value
66.73	47.07	19.66	6.06	3.55	<0.05

Comparative analysis of the overall effect of the treatments in both groups was done statistically with an unpaired t-test. The test shows that the treatment is significant in Group A when compared to Group B. Group A overall result is 66.73% and Group B overall result is 47.07%.

## DISCUSSION

Gridhrasi is a Rujapradhana Vataja nanatmaja vyadhi, dominated by pain affecting the Kandara caused by morbid Vata dosha. Kapha dosha can also be involved in the clinical presentation. These vitiated doshas afflict the Kandara, Snayu, Asthi and Mamsa involving the related Srotases. It manifests with pain in Kati followed by progressive radiation to the distal part of the leg to Prista, Uru, Jaanu, Jangha and Pada. Due to various Nidana when Vata is obstructed (Avruta) by Kapha, it gets vitiated leading to Margavaranajanya Samprapti of Gridhrasi and manifests the Ruk, Stambhadi laxanas in Trika pradesha. So Chikitsa should be based on Avarana concept, the Adhishtana, Avastha and Doshapradhanyata of Vyadhi. In the initial stages, more importance is given to Kapha as there will be dominantly Sama Vata Lakshanas and in later stages to the vitiated Vata.

### a) Patra pinda sweda:

The main and direct reference available on the mode of action of Bahirparimarjana is from Susruta Samhita<sup>8</sup>: It explains that “The branch of body’s peripheral conduction network with their portals in the skin (4 Tiryak dhamanis with its branches) is concerned with

perspiration, perception of cutaneous pleasure and pain sensation, as well as circulation of tissue fluid. Conduction of the activity or potency of the therapeutic drug or agent into the body, after conversion (transduction) in the skin (Virya of the medicines encounters Bhrajaka agni), also forms their attribute.” It can be nearly correlated to the 'Transdermal drug delivery system'.

The probable mode of action of Patrapinda Sweda can be explained under the following headings:

1. Thermal effect
2. Drug effect
3. Procedural effect

#### 1. Thermal effect:

Diffusion through the skin is a temperature-dependent process (According to Kligman), so raising the skin temperature will enhance the Transdermal delivery of various drugs by increasing skin permeability, body fluid circulation, blood vessel wall permeability and drug solubility. External heating will dilate the penetration pathways in the skin, increase kinetic energy & movement of particles in the treated area & facilitate drug absorption.

Heat is having an indirect effect on:

- ❖ Muscle tissue: Increase in temperature - Muscle relaxation - increased muscle action efficiency.
- ❖ Increased activity of Sweat glands - Reflex stimulation of Sweat glands resulting from the effect of heat on the sensory nerve endings.

## **2. Procedural effect:**

Swedana is a procedure where stimulates the body temperature by contact with the external heat source, thereby producing Sweda. The Ushna Guna of Swedana Karma leads to stimulate the sympathetic nervous system & produces vasodilatation, also increasing the circulation of Rasa & Rakta in the body, because of Sara & Suksama guna the Leena Dosha are liquefied and come out through micropores presenting over the skin resulting in more excretion of liquefied Vitiated Dosa from the body. Abyanga is exceedingly beneficial to the skin as it works directly on the lymphatic system. This system is supplementary to the blood vascular system and offers an alternative route for the return of tissue fluid to the bloodstream. By stimulating lymphatic flow and generating heat through friction (rubbing) and application of the oils, massage cleanses and vitalizes the body without causing the build-up of toxins. Thus, oil massage quickens the circulation of blood and lymph and dislodges the toxins and increases the vitality of the tissues.

## **3. Drug effect:**

Sahachara taila<sup>9</sup> contains the drug Sahachara and tila taila. Sahachara is having Tikta, Madhura rasa, Ushna, Snigdha guna, Ushna veerya and Katu vipaka. Because of Madhura rasa, Snigdha, Usna guna and Usna veerya it is Vata shamaka. It is Kapha hara because of its Tikta rasa, Usna guna, Veerya and Katu Vipaka. Sahachara has thermogenic and anti-inflammatory action so it can be successfully used in rheumatologic, lumbago, sciatica etc. Tila taila has properties like Tikta rasa, Guru, Snigdha, Sookshma guna and Ushna veerya and antioxidant property adds to the efficacy of Sahachara taila in alleviating Tridosha. Taila being the type of Sneha and Agrya for Vata shamana, due to its therapeutic and procedural effect acts best in combating Doshas and this aspect is made use in this study to relieve symptoms of Gridhrasi.

For Patra pinda sweda, Eranda Patra is used which possess Kapha-Vatahara action and Sigru is known to reduce sever pain. Leaves of Nirgundi plant have analgesic, anti-bacterial and anti-inflammatory properties, also possess anti-histaminic property and is a muscle relaxant. Karanja Patra is having the properties

of Vata-Kaphahara, Shotha hara and is anti-bacterial. Leaves of Arka acts as Vatahara and are known to reduce Shophha. Tila is the best Vatahara drug and Kullatta is mentioned one among Charaka's swedopagana and is best Vata-Kaphahara. Narikela (Grated coconut) possessing Vata-pittahara property acts as Dashamaka and acts as Brimhana. Nimbu (sliced lemon) acts as Vata-Kaphahara and Shoola prashamana<sup>10</sup>.

### **b) Transcutaneous electrical nerve stimulation:**

**Low TENS-** In this low frequency and high-intensity electrical pulses are applied. It gives sharp stimulus and is like a muscle twitch. As the nociceptive stimulus is carried towards the cerebrum, its passage through the midbrain will cause the periaqueductal area of grey matter and raphe nucleus to interact to release the opiate-like substances at cord level. The enkephalin and endorphins released have the effect of blocking forward transmission in the pain circuit.

Mechanism of action of TENS can be explained under the following headings:

#### **i. Endorphin theory:**

- ❖ Tens cause stimulation and increase in circulation of endorphins which are morphine-like endogenous transmitter substances.
- ❖ They occur naturally in the brain and pituitary glands, which circulate and block pain sensation because of tens application.

#### **ii. Mechanism of pain gate control:**

- ❖ Dr Ronald melzack and Patrick wall described the gate control theory in 1965, to explain the mechanism of analgesia. The theme of this theory is pain may be blocked at various gates through which pain impulse travels to the brain. These gates are located at neuronal synapses in the spinal cord. Information leading to pain generation passes through a gate and depends upon the balance activity in large and small afferent nerve fibres and the fibres descending from higher centres. Both thin and large (touch, pressure, vibration) nerve fibres carry the pain signal from the site of injury to two destinations in the dorsal horn of the spinal cord.

- ❖ **TENS and closing of the gate:** stimulation of large nerve fibres by TENS activates SG cell and inhibit the discharge of T cell by its effect via presynaptic or postsynaptic inhibition. This closes the gate and causes analgesia. The duration for which this gate remains closed varies and is directly proportional to the number of noxious impulses in small fibres. So, the larger fibre (touch, pressure, vibration) activity, the less pain is felt<sup>11</sup>.

## CONCLUSION

Gridhrasi is a Vataja nanatmaja disease commonly seen in society as a prominent problem. As observed in this study vataja prakruti persons and middle-aged active working population are more prone to Gridhrasi. Among forty subjects thirty-six were recorded as having vataja type of Gridhrasi. This one cannot be correlated to a single condition but to a Spectrum of conditions of Sciatica, Improper care of the spine and occupation-related trauma to the spine (IVDP) are the major causes observed. Seventy percent of the subjects were suffering from sciatica due to IVDP in the lumbar region which was confirmed by MRI reports. Moreover, intervertebral disc abnormalities are seen in asymptomatic persons and most symptomatic patients, and symptoms can be relieved without changes in the underlying anatomical pathology. Group A overall result is 66.73% and Group B overall result is 47.07%. Patra pinda sweda found an edge over TENS in relieving pain, stiffness, and numbness whereas TENS showed a significant effect in Span-dana. Subjects of group A showed significant improvement even after the treatment and after following up period and there was remarkable improvement in standing and sitting for a long time compared to before treatment, hence Patra pinda sweda was found to reduce claudication of nerves and proved to be more effective for a longer duration. Patra pinda sweda and TENS are external treatment modalities, showed only symptomatic relief but does not revert anatomical deformities. Both are simple, cost-effective, showed an immediate effect, found safe and effective in Gridhrasi, and can be adopted at the OPD level.

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