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RESEARCH ARTICLE

EFFECT OF KOLAKULATHTHADI UPANAHA SWEDA IN JANU SANDHIGATAVATA (KNEE OSTEOARTHRITIS)

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Abstract

Sandhigatavata (Osteoarthritis) is a Vatavyadhi that limits everyday activities among the elderly population. According to World Health Organization, Osteoarthritis (OA) is the second most common musculoskeletal problem among the world population (30%) after back pain (50%). Ayurveda has emphasized various treatment modalities including Upanaha in the management of Sandhigatavata. This single blind clinical study aims to evaluate the effect of Kolakulaththadi Upanaha sweda, which consists of Kola (*Zizyphus jujube*), Kulaththa (*Dolichos biflorus*), Suradaru (*Cedus deadara*), Rasna (*Pluchea lanceolata*), Masha (*Vigna mungo*), Atasi (*Linum usitatissimum*), Tila (*Ricinus communis*), Kushta (*Saussurea lappa*), Vacha (*Acorus calamus*), Shatahwa (*Anethum sowa*) and Yava (*Hordeum vulgare*) in Janu Sandhigatavata. Thirty patients of primary OA in knee, aged between 40 - 70 years fulfilling the diagnostic criteria of the American College of Rheumatology (ACR) for OA knee were randomly selected at National Ayurveda Hospital in Borella. Took 10g of each ingredient of Kolakulaththadi churna and mixed with 50ml of Kanji (Tamarind juice) and 5g of Saindhava Lavana (Rock salt). Paste heated with light flame and applied over the affected part of knee joints followed by bandaging and retained for 12 hours for consecutive 14 days. Subjective and objective parameters were used to assess the results based on clinical observations before and after treatment. The data were analyzed using the Wilcoxon Signed Rank Test and Mann-Whitney U Test. It was observed that 100% relief was found in swelling, 90% relief was found in pain and restricted movement of knee joints. This study substantiates the efficacy of Kolakulaththadi Upanaha sweda in the management of Janu Sandhigatavata.

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Introduction: -

Osteoarthritis (OA) is the most common musculoskeletal condition and major cause of disability among elderly population in globally including Sri Lanka¹. Today an estimated 30.8 million adults have osteoarthritis. As the world's population continues to age, it is estimated that degenerative joint disease disorders such as OA will impact at least 130 million individuals around the globe by the year 2050². The symptoms of OA correlate with *Sandhigataavata*. This condition explained under *Vata vyadhi*³.

Sandhigataavata is first described by Acharya Charaka as *Sandhigata Anila* with symptoms of *Shotha* which on palpation feels like a bag filled with air (swelling) and *Shula* on *Prasarana* and *Akunchana* movements on *sandhi* (pain in flexion and extension of the joints)⁴. Acharya Susruta also mentioned *Shula* and *Shotha* in this disease leading to the diminution (*Hanthi*) of the movement at joint involved⁵. Madhavakara adds *Atopa* (Crepitus in joint) as additional feature of it⁶. *Sandhigataavata* is one of *Vata Vyadhi* that occurs in *Madhyama Rogamarga*⁷. According to Ayurveda *Janu sandhi* (Knee joint) is mentioned as a *Kora Sandhi*⁸. The disease *Sandhigataavata* is more prone to be affected to knee joint because it is most frequently involved joint in daily routine work. Osteoarthritis in knee joint is very common and globally approximately 250 million people have Osteoarthritis in knee (3.6% of the population)⁹. Therefore, this research would be done on patients affected in *Janu Sandhigataavata*.

Other systems of medicine can provide three types Pharmacological, Non-Pharmacological and Surgical treatments which are highly symptomatic and commonly associated with troublesome side effects. When *Sandhigataavata* is considered, as the disease is *Vardhakya Janya Vyadhi* (degenerative) and *Dhatukshayaja Vyadhi* (mal nourishment of *Dhatus*) i.e. pain management is the main aim of treatment to give quality life to the patient. In Ayurvedic classics, Acharyas have mentioned various therapeutic and Para surgical procedures and also many *vatahara yoga* to manage the *Sandhigataavata* like *Snehana* (Oleation), *Swedana* (Sudation), *Agni karma* (Cauterization), *Bandhana* (Bandage) etc¹⁰.

Osteoarthritis causes pain and impairs functionality of the patient, it places a major burden on individuals, communities, health systems, and social care systems. For the management of Osteoarthritis, patients need to take analgesics for daily and lifelong. In Osteoarthritis, surgical therapy-like knee joint replacement is very costly and even after surgery patient has to continue some medicine for a long duration. Earning losses due to Osteoarthritis cost an estimated \$80 billion per year between 2008 and 2011¹¹. Therefore, no satisfactory, comprehensive & time bound treatment schedule for Osteoarthritis is available at present. Even other treatments have their own limitations in the management of this disease. This study supports the opinion that the administration of *Kolakulaththadi Upanaha Sweda*¹² increases the quality of life in patients of Osteoarthritis based upon the classical references with low cost and minimum side effects.

Table 01 – Ingredients and Properties of *Kolakulaththadi Upanaha*

Herb	Rasa	Guna	Veerya	Vipaka	Dosha Karma
<i>Kola</i>	<i>Katu</i>	<i>Ushna</i> <i>Theekshna</i>	<i>Ushna</i>	<i>Katu</i>	<i>KaphaVatahara</i>
<i>Kulaththa</i>	<i>Kashaya</i>	<i>Laghu</i> <i>Ruksha</i> <i>Theekshna</i>	<i>Ushna</i>	<i>Katu</i>	<i>VataKaphahara</i>
<i>Suradaru</i>	<i>Tiktha</i> <i>Katu</i> <i>Kashaya</i>	<i>Snigdha</i> <i>Laghu</i>	<i>Ushna</i>	<i>Katu</i>	<i>VataKaphahara</i>
<i>Rasna</i>	<i>Tiktha</i> <i>Katu</i>	<i>Laghu</i> <i>Ruksha</i> <i>Theekshna</i>	<i>Ushna</i>	<i>Katu</i>	<i>VataKaphahara</i>
<i>Masha</i>	<i>Madhura</i>	<i>Guru</i> <i>Snigdha</i>	<i>Ushna</i>	<i>Madhura</i>	<i>Vatahara</i>
<i>Athasi</i>	<i>Madhura</i> <i>Tiktha</i>	<i>Guru</i> <i>Snigdha</i>	<i>Ushna</i>	<i>Katu</i>	<i>Vatahara</i>
<i>Kushta</i>	<i>Tiktha</i> <i>Katu</i>	<i>Laghu</i> <i>Ruksha</i>	<i>Ushna</i>	<i>Katu</i>	<i>KaphaVatahara</i>

	<i>Madhura</i>	<i>Theekshna</i>			
<i>Vacha</i>	<i>Tiktha</i> <i>Katu</i>	<i>Laghu</i> <i>Theekshna</i>	<i>Ushna</i>	<i>Katu</i>	<i>KaphaVatahara</i>
<i>Shatahva</i>	<i>Tiktha</i> <i>Katu</i>	<i>Laghu</i> <i>Theekshna</i>	<i>Ushna</i>	<i>Katu</i>	<i>KaphaVatahara</i>
<i>Yawa</i>	<i>Kashaya</i> <i>Madhura</i>	<i>Guru</i> <i>Ruksha</i>	<i>Sheeta</i>	<i>Katu</i>	<i>VataPittahara</i>
<i>Thail Phala</i>	<i>Madhura</i> <i>Katu</i> <i>Kashaya</i>	<i>Snigdha</i> <i>Theekshna</i>	<i>Ushna</i>	<i>Madhura</i>	<i>VataKaphahara</i>

Acharya Sushruta has explained *Vayu* entrapped in *Snayu*, *Sandhi&Asthi* which should be treated with *Snehana*, *Swedana*, *Upanaha*, *Agni karma*, *Bandhana* and *Mardana*¹³. *Upanaha*, application of medicated poultice is one among four major categories of *Swedana* therapies¹⁴ which relieves pain, restricted movement, and stiffness. *Upanaha* is a mode of fomentation given by applying warm herbal paste over the affected part of the body followed by bandaging. It is an ideal topical treatment and well known Ayurvedic topical application to get evolved and adapt with changing time and easy practice, without changing its efficacy. *Pradeha*, *Sankara/Pinda sweda*, *Bandhana* are three varieties of *Upanaha*¹⁶. It helps in reducing *Vatadosha*, *Sheetha* (coldness), *Shula* (pain), *Sihambha* (stiffness), and *Gowravata* (heaviness). It induces sweating and brings *Doshavilayana*. *Sweda* helps in *GatraVinnamana* (increase the flexibility). It is a local treatment where in a combination of powdered herbs are made into paste using *Sneha* materials such as oil/ghee/muscle fat/marrow and fermented liquid, made hot and applied over the required site and then bandaging is done with thick material.

Objectives

- To study the Effect of *Kolakulaththadi Upanaha Sweda* in *Janu Sandhigatavata*

Materials and Methods

Study Setting - The study has been done in the Ayurveda National Hospital in Borella (Western province).

Study Population -30 Patients with *Sandhigatavata* were registered for the treatment at the OPD and IPD clinics in National Ayurveda Hospital of Borella.

Study Design - This study was a randomized single blind clinical study.

Sampling Technique - Total of 30 cases (40-70 years of age) of either sex was selected by simple random sampling. Selected patients were registered and examined using a standard proforma. They weren't be exposed to other forms of treatment during the trial.

Inclusion Criteria - Male or Female Patients aged between 40 - 70 years.

Persistent Osteoarthritic symptoms for maximum of 15 years and minimum at least 6 months without complications.

Cases of primary Osteoarthritis only.

Patients without any anatomical deformity.

Patients with involvement of knee joint.

Exclusion Criteria - Patients age less than 40 & more than 70 years.

Intra articular injections or systemic application of corticosteroids during three preceding months.

Patients without knee joint involvement.

Patients with secondary Osteoarthritis.

Patients having past traumatic history.

Patients having past history of RA, Gout, Psoriasis arthritis etc.

Clinical Trial - Simple random sampling technique was assigned for the selection of patients for the treatments. The nature and design of the study was explained to the patients, and informed written consent was obtained. The patients who have given their written consent were included in the research & they were admitted to the National Ayurveda Hospital for 14 days. Patient were allowed to withdraw his/her consent for participation in the study at any time without giving any reason.

Criteria for the Assessment - Subjective Parameters - Patient was diagnosed on the basis of *Sandhigatavata lakshana* as described in Ayurveda classics. As well as criteria for diagnosis of idiopathic Osteoarthritis of Knee by American Rheumatism Association (ARA).

Table 02 - American Rheumatism Association (ARA) has developed criteria for diagnosis of idiopathic Osteoarthritis of Knee¹⁶.

Clinical Criteria	Clinical & Laboratory	Clinical & X-Ray
Knee pain + at least 3 of 6	Knee pain + at least 5 of 9	Knee pain + at least 1 of 3
<ul style="list-style-type: none"> • Age > 50 years • Stiffness < 30 minutes • Crepitus • Bony tenderness • Bony enlargement • No palpable warmth 	<ul style="list-style-type: none"> • Age > 50 years • Stiffness < 30 minutes • Crepitus • Bony tenderness • Bony enlargement • No palpable warmth • ESR < 40 mm/Hr • RF < 1:40 Synovial fluid OA- clear/ viscous/ WBCs <2000/ mm	<ul style="list-style-type: none"> • Age > 50 years • Stiffness < 30 minutes • Crepitus +Osteophytes

Criteria for Assessment of Result - The efficacy of therapy was assessed on the basis of parameters before & after treatment. Score were given as follow

Table 03 - Assessment Criteria¹⁷

	0	1	2	3
<i>Sandhi Shula</i> (Pain)	Absent	Mild (nagging, annoying, interfering little with activity of daily living)	Moderate (interferes significantly with activity of daily living)	Severe (disabling unable to perform activity of daily living)
<i>Sandhi Shotha</i> (Swelling)	Absent	2mm or less: slight pitting, no visible distortion, disappears rapidly	2-4 mm indent: somewhat deeper pit, no disappears in 10-25 sec.	4-6mm: pit is noticeably deep. May last more than a minute. Dependent extremity looks swollen and fuller
<i>Hanthi</i> <i>Sandhi</i> (Restricted Movements)	Can do work unaffectedly	Can do strenuous work with difficulty	Can do daily routine work with great difficulty	Cannot do any work

Drug PreparationTable 04 - Method of Preparation of *Kolakulaththadi Upanaha*

Se. No.	Sanskrit	Botanical Name	Part Used	Quantity
01	<i>Kola</i>	<i>Zizyphus jujube</i>	Fruit	01 part
02	<i>Kulaththa</i>	<i>Dolichos biflorus</i>	Seed	01 part
03	<i>Suradaru</i>	<i>Cedrus deodara</i>	Bark	01 part
04	<i>Rasna</i>	<i>Pluchea lanceolata</i>	Rhizome	01 part
05	<i>Masha</i>	<i>Phaseolus radiatus</i>	Seed	01 part
06	<i>Uma</i>	<i>Linum ustitissimum</i>	Seed	01 part
07	<i>Kushta</i>	<i>Saussurea lappa</i>	Stem	01 part
08	<i>Vacha</i>	<i>Acorus calamus</i>	Rhizome	01 part
09	<i>Satahva</i>	<i>Anethum sowa</i>	Seed	01 part
10	<i>Yava</i>	<i>Hordeum vulgare</i>	Seed	01 part
11	<i>Eranda</i>	<i>Ricinus communis</i>	Seed	01 part

- Place of collecting drugs -Raw materials were collected from authentic private Ayurveda pharmacy in Colombo, Sri Lanka.
- Place of Authentication of drugs -Department of *Dravyaguna vignana* – Faculty of Indigenous Medicine, University of Colombo, Sri Lanka.
- Place of manufacturing the drug –all the drugs were prepared according to the *paribhasha* mentioned in relevant text under the supervision of the Pharmacy of Ayurveda National Hospital, Borella, Sri Lanka.
- Preparation of *Kolakulaththadi Upanaha*

Figure 01 - Preparation of *Kolakulaththadi Upanaha*

According to *Bhaisajja Rathnavali*, took 10g of each ingredient of *Kola*, *Kulaththa*, *Suradaru*, *Rasna*, *Masa*, and oil seeds of *Uma*, *Kushta*, *Vacha*, *Satahva*, *Yava* and *Taila Phala* were in powder form in equal quantity and mixed with 50ml of *Kanji* (Tamarind juice) and 5g of *Saindhava Lavana* (Rock salt). Paste heated with light flame. Warmed paste was applied over the *Janu sandhi* (Knee joint). Then covered with *Eranda Patra* (Castor leaf) and it was firmly bandaged.

Therapeutic Intervention - Patient have been advised to follow the treatment for a period of fourteen days and signs and symptoms were recorded before and after the treatment and weekly during the treatment of fourteen days.

Results: -

Data were collected and analyzed the percentage wise reduction of the signs and symptoms before and after the treatment regimen.

Table 05 - Assessment of Pain during the treatment

Parameter <i>Shula</i> (Pain)	Before treatment	After Treatment
No Pain	0%	86.7%
Mild Pain	10%	13.3%
Moderate Pain	26.7%	0%
Severe Pain	63.3%	0%
Total	100%	100%

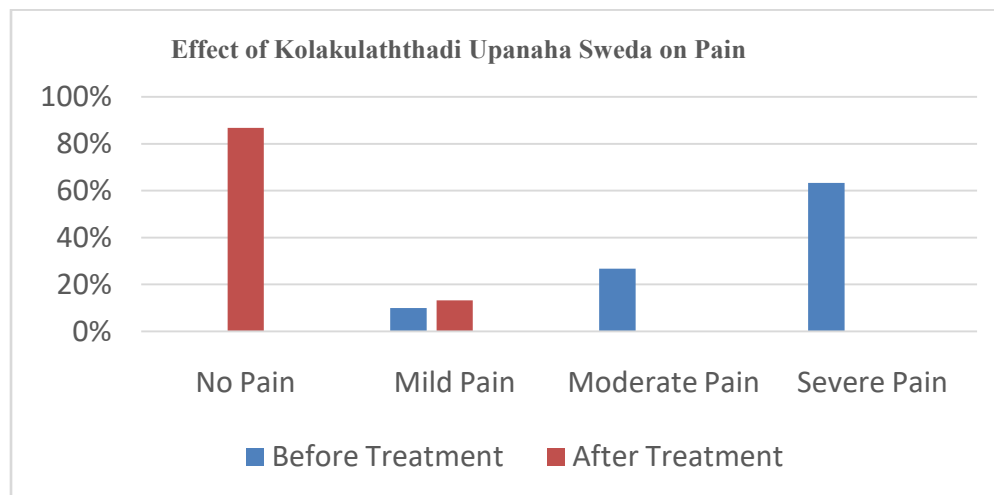


Table 06 - Assessment of Swelling during the treatment

Parameter <i>Shotha</i> (Swelling)	Before treatment	After Treatment
No Swelling	0%	100%
Mild Swelling (<2mm)	10%	0%
Moderate Swelling (2-4mm)	50%	0%
Severe Swelling (>2mm)	40%	0%
Total	100%	100%

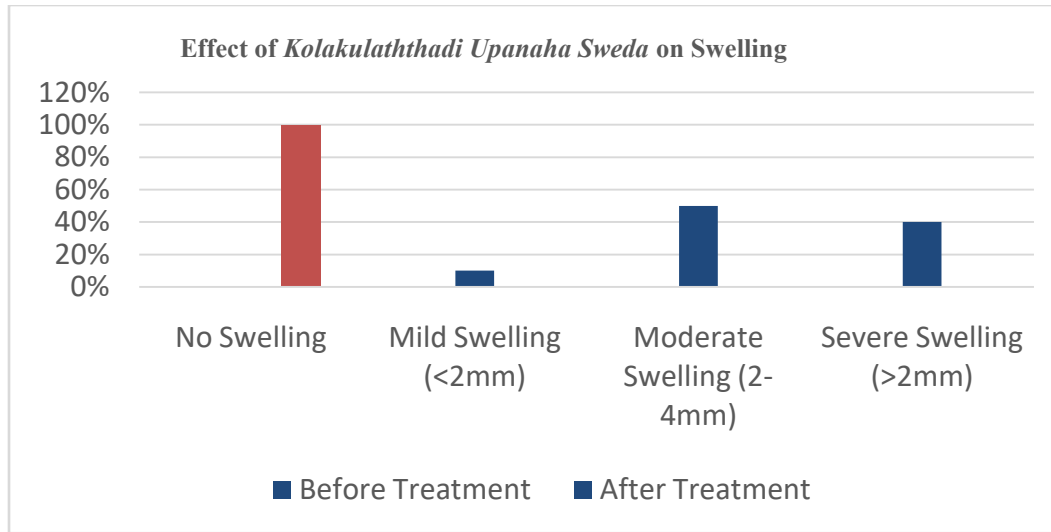
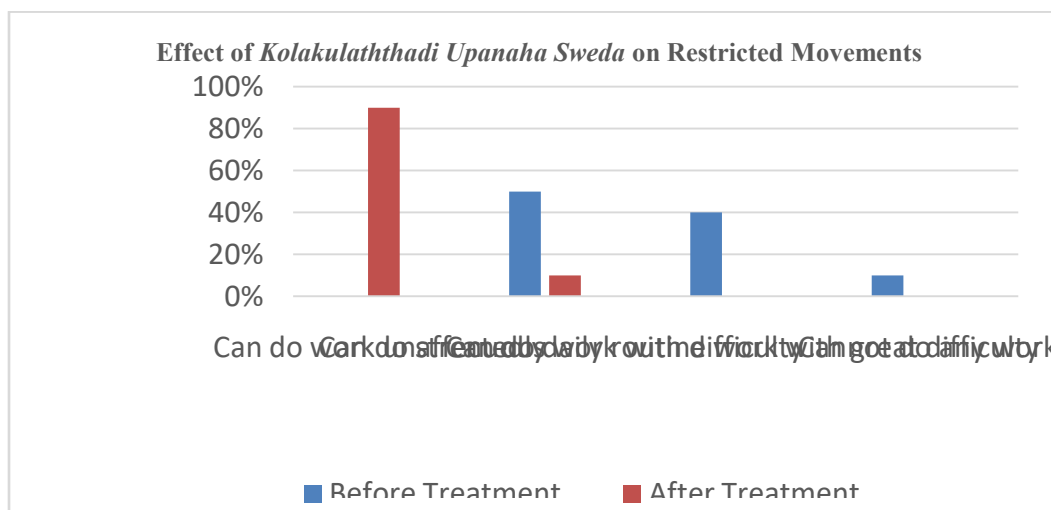


Table 07 - Assessment of Restricted Movements during the treatment

Parameter <i>Hanthi Sandhi</i> (Restricted Movements)	Before treatment	After Treatment
Can do work unaffectedly	0%	90%
Can do strenuous work with difficulty	50%	10%
Can do daily routine work with great difficulty	40%	0%
Cannot do any work	10%	0%
Total	100%	100%



After 14 days of treatment, it was observed that 100% relief on swelling and 90% relief on pain during extension and flexion and Restricted movements.

Discussion: -

Sandhigatavata is the most common *Vatavyadhi*. Specific etiological factors have not explained the disease, but the common symptoms of *Vatavyadhi* are considered. According to modern science, obesity, excess workload, Age, Sex, Repetitive Stress over joints, etc., are the important causative factors of *Sandhigatavata*. The main treatment goal, increased this study, was curative Treatment for Symptoms.

Kolakulaththadi Upanaha Sweda provided highly significant relief ($P < 0.001$) in Pain, Swelling and Restricted Movements. After a 14–days treatment, an average reduction of 100% in Swelling and reduction of 90% in Pain and Restricted Movements was observed respectively. This positive outcome could be attributed to the anti-inflammatory and analgesic properties of the ingredients present in the herbal formulae of *Kolakulaththadi Upanaha Sweda*. According to Ayurveda *Dosha Karma*, most of the herbs had *Tiktha – Katu - Kashaya rasa, Laghu – Ruksha guna, Ushna Veerya* and *Katu Vipaka* respectively pacified *Vata* and *Kapha dosha*. These characteristics align with Ayurveda principles and may have contributed to the favorable outcome observed in the pain, Swelling and restricted movement reduction.

The pathogenesis of *Sandhigatavata* due to imbalance or vitiation of *Vata* and *kshaya* of *Kaphadosha*, as well as the involvement of *Asthi* and *MajjaDhatu*. The formula of *Kolakulaththadi Upanaha Sweda* possess properties such as *Tiktha – Katu - Kashaya rasa, Laghu – Ruksha guna, Ushna Veerya* and *Katu Vipaka* which have potential to pacify *Vata* and *Kaphadosha*, thereby reducing the clinical features.

Conclusion: -

It can be concluded that *Kolakulaththadi Upanaha Sweda* for 14 days provided a better relief in the signs and symptoms of *Janu Sandhigatavata* mainly in Pain, Swelling and Restricted Movement. Further studies needed to be done on larger sample size to establish statistical significance of present line of treatment. The patients were satisfied with the Ayurvedic way of approach to treating their diseases. They noticed considerable relief in their daily routine activities and also improvement in Quality of life is observed.

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