

Effect of Mahanarayana Taila Application on Knee Muscle Strength In Janu Sandhigata Vata (Knee Osteoarthritis): A Case Series

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Abstract

Background: Sandhigata Vata (osteoarthritis (OA)) is the commonest condition seen geriatric population prevalent in 22 to 39% of population in India.

Objectives: This case series was conducted to evaluate the efficacy of Mahanarayana Taila on muscle strength through local application (BahyaSnehan) in Janu Sandhigata Vata (OA knee).

Method: Ten patients of Janu Sandhigata Vata (OA knee) receive Mahanarayana Taila for local application for three months. The primary endpoints were changes in muscle strength which was measured by handheld Dynamometer. Secondary endpoints were mean visual analogue scale (VAS) for pain and the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) score.

Result: Therapy showed highly significant ($P < 0.001$) beneficial effect on the symptoms and strength in muscles. At baseline visit Right knee muscle strength was 8.200 ± 2.159 which increased significantly to 11.300 ± 2.943 and Left knee muscle strength was 8.250 ± 2.358 which increased significantly to 10.680 ± 2.721 on day 90. VAS pain score at baseline was 56.500 ± 7.762 , which reduced significantly to 25.000 ± 9.220 on day 90. WOMAC combined score at baseline was 26.500 ± 12.619 , which reduced significantly to 7.100 ± 7.816 (73.20%) on day 90. WOMAC pain score at baseline was 6.400 ± 3.353 , which reduced significantly to 1.900 ± 2.548 on day 90, while, WOMAC stiffness score at baseline was 1.600 ± 1.562 , which reduced significantly to 0.100 ± 0.300 on day 90. WOMAC difficulty score at baseline was 18.500 ± 9.373 , which reduced significantly to 5.100 ± 5.147 on day 90.

Conclusion: The study shows significant improvement in muscle strength by local application of Mahanarayana Taila. The patients also showed good to moderate relief in symptoms of OA Knee.

Keywords

Ayurveda, BahyaSnehan, osteoarthritis, Sandhigata Vata, Dynamometer, VAS, WOMAC

Introduction

Osteoarthritis (OA) is a disorder characterized by progressive joint deterioration in which all the structures of a joint undergo pathological changes. Hallmark of the pathology of osteoarthritis is loss of hyaline articular cartilage accompanied by increasing thickness and sclerosis of subchondral bone plate, outgrowth of osteophytes at the margin of joint, stretching of the articular capsule, and weakness of the muscles bridging the joint. There are numerous pathways that lead to OA, but the initial step is often joint injury in the setting of a failure of protective mechanisms.[1] In India, knee OA is a common condition, with a prevalence between 22% and 39% that gradually increases as per age [2]. OA Knee is a result of the failure of chondrocytes in keeping homeostasis between the formation and degradation of the extracellular matrix.[3]

Two types of therapies are available for OA knee: non-surgical and surgical. When non-surgical treatments are no longer effective, surgical intervention is indicated. Non-surgical measures include nonsteroidal anti-inflammatory drugs (NSAIDs), COX-2 inhibitors, Glucosamine sulphate, moderate exercises those helps in improving muscle strength and weight loss. [4] Options for surgical management are osteotomy, unicompartmental knee arthroplasty (UKA), total knee arthroplasty (TKA) these treatments are chosen in severe cases when conservative therapy is ineffective.[5]

Janu Sandhigata Vata is often compared with OA of knee joint. Sandhigata vata is described by Acharya Charaka for the first time as Sandhigata Anila with symptoms -Shotha (swelling) that feels like an empty bag filled with air on palpation and Shula (pain) during Prasarana (extension) and Akunchana (flexion)[6]. In Ayurveda many medicines are explained for the management of Sandhigata Vata for internal as well as external administration. However, the effect of such remedies though reported in research articles, majority of them lack standardised assessment tools available in current times. In view of limited data available explaining the effect of Ayurvedic local applications in OA Knee, this prospective case series was planned.

Objective

The objective of the current study was to evaluate effect of Mahanarayana Taila application on muscle strength in patients suffering from OA knee on the basis of handheld push – pull dynamometer (Baseline 50 lb Hydraulic Push Pull Dynamometer, USA, Serial No. 29304356).

Methodology

Ten diagnosed patients of Sandhigata vata (osteoarthritis), affecting knee joints, according to the American college of Rheumatology (ACR)[7] were selected from the outpatient department (OPD) of Kayachikitsa between July 2022 to October 2022. Written informed consent of the patients was sought before commencing the study. Patients enrolled in study were advised to withdraw the use of NSAID's prior Ayurvedic treatment. However, in case of severe pain patients were asked to take tablet paracetamol 500 mg. The patients received local application of Mahanarayana Taila on knee joint thrice or twice daily for 90 days. Patients were assessed at baseline and after of 30th, 60th and 90th day. Strength of knee extensor muscles was measured using Dynamometer. Pain was assessed based on visual analogue scale (VAS) scale, while pain along with stiffness and functional capacity was assessed using Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) score.

Inclusion criteria

1. Patient of either gender within the age group of 40 to 70 years.
2. Diagnosed case of Idiopathic knee osteoarthritis for minimum 1 month and maximum 5 years according to clinical guidelines of American college of Rheumatology (ACR).[7] The guidelines include patient currently experiencing pain in one or both the knees with at least 3 out of the following 6 features:
 - a. Age 40 – 70 years
 - b. Morning stiffness within 30 minutes of walking
 - c. Crepitus
 - d. Bony tenderness
 - e. Bony enlargement
 - f. No palpable warmth
3. Patient having baseline knee joint pain more than 40 mm on Visual Analogue Scale (VAS) either at rest or on weight bearing activities (e.g walking, standing, climbing staircase) during the preceding twenty four hours
4. Patients who have Grade 1 or 2 in knee X-ray according to Kellgren and Lawrence system for classification of osteoarthritis.[8]

Exclusion Criteria:

1. Patient with secondary arthritis related to systemic inflammatory arthritis
2. Patient with uncontrolled diabetes mellitus and hypertension

Study Intervention

Local application of Mahanarayana Taila was done thrice or twice a day for 90 days. Mahanarayana Taila was prepared as per classical Ayurvedic text – Bahishajya Ratnavali, Vata Vyadhi Rogadhikara. The study medicine was prepared in inhouse GMP certified pharmacy associated with the study centre.

Assessment criteria

Improvement in muscular strength was assessed during every follow up and after completion of treatment with Dynamometer.

Pain was assessed using visual analogue scale (VAS) score, for the assessment of stiffness, pain and physical activity WOMAC score was used.[9]

Statistical analysis

Data was analysed using Microsoft Excel version 16.72 by two way ANOVA without replication. The results were tested for 95 percent confidence interval. ($p < 0.05$)

Observations and Result

Total 10 patients were registered for study. In this study, seven patients were between 60 to 70 years of age while the remaining three were between 40 to 55 years of age. Among them 6 patients were male while 4 were female. Two patients were known cases of hypertension while one was type 2 diabetic. Both the patients were on treatment. Majority of patients had Madhyama Koshta ($n = 6$) with regular bowel habit. All female participants had attained menopause.

All the patients showed improved muscle strength. At baseline the mean muscle strength of extensor muscles of Rt knee was 8.2 kg and 8.25 kg in Lt knee. It gradually improved and at the end of 90 days was 11.3 kg in Rt knee and 10.68 kg in Lt knee. ($p < 0.05$) (table 1) The maximum improvement in muscle strength was by 6 kg (92.30 percent as compared to baseline), while minimum improvement was by 2.5 kg (71.42 percent as compared to baseline). It was also observed that muscle strength started to show improvement after day 30, after starting the treatment. Additionally, every patient got relief from pain. At baseline mean VAS score value was 56.5 and at the end of 90 days the VAS score value decreased and reached 25.00 (table 2). The maximum improvement was 83.33 percent as compared to baseline according to VAS score. On the basis of WOMAC, there was 70.31 percent improvement in pain, 93.75 percent improvement in stiffness and 72.43 percent improvement noted in activities. The WOMAC score demonstrated that relief from pain, stiffness, and difficulty in performing activities had significant relief. (table 3)

It was noted that all clinical aspects showed good results even after 30 days of treatment (initial follow-up), but muscle strength showed a substantial result.

Table 1: Effect of therapy on Muscle strength on the basis of Dynamometer

	MEAN $\pm$ SD	
	RIGHT KNEE	LEFT KNEE
AT 0 DAY	8.200 $\pm$ 2.159	8.250 $\pm$ 2.358
AT 30 DAY	10.130 $\pm$ 2.815	9.750 $\pm$ 3.887
AT 60 DAY	11.45 $\pm$ 3.657	10.880 $\pm$ 2.586

AT 90 DAY	11.300±2.943	10.680±2.721
p value	p < 0.05	p < 0.05

Table 2: Effect of therapy on Pain on the basis of VAS score

	MEAN±SD				RELIEF %
	At 0 Day	At 30 Day	At 60 Day	At 90 Day	
VAS	56.500±7.762	51.000±9.434	33.500±11.413	25.000±9.220 (p < 0.05)	44.24±9.04

Table 3: Effect of therapy on pain, stiffness and activity on the basis of WOMAC

WOMAC	Mean ±SD				
	At 0 day	At 30 Day	At 60 Day	At 90 Day	Relief %
PAIN	6.400±3.353	5.600±3.323	2.900±2.300	1.900±2.548 (p < 0.05)	70.31%
STIFFNESS	1.600±1.562	0.600±1.020	0.100±0.300	0.100±0.300 (p < 0.05)	93.75%
DIFFICULTY SCORE	18.500±9.373	15.000±9.370	6.600±5.181	5.100±5.147 (p < 0.05)	72.43%
TOTAL SCORE	26.500±12.619	21.800±13.197	9.600±7.605	7.100±7.816 (p < 0.05)	73.20%

Discussion

Osteoarthritis is the most common disease of joints in adults around the world. It is not a reversible condition. Pathogenesis of OA still remains unclear. Prevention is the best treatment for OA knee. In this study 70% patients were in 61 to 70 years of age. Sandhigata Vata starts around in forties which is stage of Madhya Vaya. Occurrence of Janu Sandhigata Vata is also found more prevalent in certain occupations such as heavy vehicle driving. [10] In Prakriti wise distribution shows that Vata-Kapha predominance was found in 60% of patients. In the current study, among the chief complaints Sandhishula (pain) was found in all cases. Vata Dosha, which is accountable for all forms of pain (Shoola), will aggravate in Sandhigata Vata. Other symptoms like Akunchana Prasaranajanya Vedana

(pain during extension and flexion) & Hantischigati (restricted movement of joint) which are brought by aggravated Vata Dosha and Kapha Kshaya. In systematic review Ayurvedic managements have shown moderate to good evidence for reducing pain, functional impairment, and joint stiffness in Janu Sandhigatavata.[11] BahyaSnehana (external oil application)'s advantageous effects were also discovered and reported in Janu sandhigatavata.[12]. Reduced strength in the muscles surrounding the joints is significant as it causes a loss of function.[13] And a tool that measures force is dynamometer. To measure the power of specific muscles or their groups, handheld dynamometers are useful. [14]

There are several ways to increase strength of muscles including exercise, massage, and protein supplements. Due to decreasing physical strength and co-existence other health ailments such as diabetes, hypertension, ischemic heart diseases etc. there is limitation to perform exercises or protein intake. Hence, in elderly age, massage is better suited over others. One of the ancient and very effective home remedy for pain management and increasing muscle strength is massage. Muscular architecture is the most crucial factor for muscle function[15] and massage therapy raised the muscle's EMG(electro myography) activity and changed the structure's surface.[16] Similar results are seen with massage therapy, which enhances proprioceptive function.[17]

Mahanarayana Taila is a famous Ayurvedic medicine since many decades and is currently used in management of different health ailments such as hemiplegia, arthritis etc. Its qualities are anti-inflammatory, analgesic, anti-arthritic, and muscle relaxing. It has a well-balanced mixture of substances that are beneficial for osteoarthritis.

In this study, highly substantial effects were discovered in both knee joints for muscle strength, Sandhi Shula (pain in joint), SandhiShotha (inflammation of joint), SandhiGraha (restricted movement of joint), and SandhiSphutana (joint crepitus).

Taila has opposite properties of Vata which are Snigdha, Guru, Mrudu. Mahanarayana Taila is a medicated oil prepared using sesame oil as base and is treated using several medicinal herbs that improves muscular strength, strength of bones and joints. It has about 58 ingredients.[18] Mahanarayana Tail shows significant effect on pain relief and muscle tone.[19] It has remarkable effect on inflammation also on the basis of in vitro study.[20]

The major limitation of this study include study design. Being a case series it communicates only preliminary evidence of beneficial effects of Mahanarayana Taila in management of OA knee. However, based on these observations further studies including many centres, in larger samples and for longer duration can be conducted systematically using standard comparator. Such randomised controlled trial can create robust evidence for the positive effect well known Ayurvedic medicine based on the standard assessment parameters well accepted in current times.

Conclusion

It can be concluded from the present study that Sandhigatavata is manageable by local application of Mahanarayana Taila. This shows the stable efficacy of the treatment. Since Sandhigatavata is Yapya (manageable) in nature, this therapy must be used repeatedly. The management of Sandhigatavata is safe and successful with this therapy. In order to obtain more accurate results, the patient and objective parameters need to be expanded.

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