**ORGINAL ARTICLE**

**Effect of Agnikarma along with Panchatikta Guggulu in the management of Janusandhigatavata (Osteoarthritis of Knee Joint)**

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**ABSTRACT:**

**Background:** Vatavyadhis has been mentioned as one of the Ashtomahagada due to its notorious nature. Being a Vatavyadhi, located in Marma Asthi and Sandhi and its occurrence in old age makes it Kasha sadhya. Osteoarthritis is most common degenerative and disabling disorder in majority of people in 5-6th decade of life. There is only conservative treatment giving short term relief in pain and surgical intervention with lots of side effects. Sushruta has mentioned Agnikarma as best treatment for vata Kaphaj Vyadhis. Charaka, has mentioned Basti made up of Tikta Dravya, Ghrita and Kshira in Ashhidhatu Dushhti, Keeping all these things in view Agnikarma and Panchatikta guggulu were selected for the treatment of Janusandhigatavata. To evaluate the efficacy of Agnikarma and Panchatikta Guggulu in management of Janusandhigatavata (osteoarthritis of knee joint). **Methods:** Total 43 diagnosed cases of osteoarthritis were registered out of which 41 patient completed the study. In group A 4 sittings of Agnikarma was done in 21 patients with Panchadhatu Shalaka. In group B 4 sittings of Agnikarma was done in 20 patients with Panchadhatu Shalaka along with Panchatikta Guggulu orally for 1 month. **Result:** The result was assessed by using wilcoxon, paired t test, Mann Whitney and unpaired t test. Significant relief was observed in both groups in all parameters. Clinically and percentage wise group B had shown better results. **Conclusion:** Study was concluded that Agnikarma alone has a definite role in reducing the knee joint pain and tenderness but addition of Panchatikta Guggulu found convincing results in stiffness, swelling and (ROM) of knee joint.

**Keywords:** Agnikarma, Janusandhigatavata Osteoarthritis Panchadhatu Shalaka, Panchatikta Guggulu, Vatavyadhi.

**INTRODUCTION**

The normal functions of the body are carried out by these Tridosha principles (Vata, Pitta and Kapha) co-operating each other to maintain the positive health. Vata-prime among the Tridoshas is the major factor responsible for all activities and manifestation of diseases in the body. 1 If this Vata lodges in Sandhi, it is characterized by pain, swelling, and restriction of joint movements. Commonly this Sandhigatavata is presented in Janusandhi, which is one among the most important weight bearing joint in body and also considered as a Marma. Sandhigatavata stands top in the list in joint disabling conditions. Osteoarthritis (OA) of joint knee comes under the group which is almost identical to Sandhigatavata described in Ayurveda with respect to etiology, pathology, and clinical features. The clinical syndrome of degenerative arthritis is low-grade inflammation of joints, caused by abnormal wearing of the cartilages. Worldwide, O.A. is the most common articular disease of people of 65 years and above. Allopathic treatment has its own limitation in managing this progressive disease. It can provide either conservative or surgical treatment and is highly symptomatic and with troublesome side effects. Even surgery statistically reveals to have a failure rate of 10% in knee replacement. 2 Its a limitation in contemporary science to provide a comprehensive effective management. So research works in Ayurveda has evident scope in this condition. In Shalyatantra different treatment modalities have been described as Bheshaja Chikitsa, Kshara Karma, Agnikarma, Raktamokshan and
Shastrakarma. Agnikarma is said to be superior among all those treatment modalities. Because according to Sushruta, in patients treated with Agnikarma chances of recurrence of disease are least because it cures the disease completely 4. Moreover Acharya Sushruta has described that the best treatment for Vataja and Kaphaja Vyadhies is Agnikarma 5. The symptoms described in Samhitas for Sandhigatavata are Vedana (Joint pain) and Shotha (Swelling).6 While describing the indications of Agnikarma Sushruta explained that Agnikarma can be done when severe pain occurs in Twak, Mansa, Sira, Snayu, Sandhi and Asthi due to Vataprapakopa.7 Hence, in the present work Agnikarma, as an effective treatment modality is selected along with a Guggulu preparation i.e. Panchatikta Guggulu described in Chakradutta in the chapter Kushtha Rogadhikara which is known for its Shothahar and Vedanahar activities (Anti-inflammatory analgesic effects) since centuries. 8 Guggulu (Commiphora wightii Hook exsstocks) contains Tikta, Katu, Kashaya, Madhura Rasas. It is especially helpful for stabilizing Vata and Kapha imbalances without aggravating Pitta. It has a wide therapeutic uses and in combination with other plant products it cleanses and rejuvenates the Dhatus and Srotasas including blood vessels and joints. With that merits it can reverse the degenerative changes that occur in joints and bones. Considering above facts the study has been planned with objective to evaluate the clinical effect of Agnikarma and Panchatikta Guggulu, in the management of Janusandhirgata (Osteoarthritis of Knee Joint).

METHODS

Patients (n=41) suffering from osteoarthritis were selected from O.P.D. and I.P.D. of Hospital irrespective of their age, sex, religion, occupation, etc. Written informed consent had been taken from each patient. Patients were diagnosed on the basis of signs and symptoms as per specially prepared proforma based on Ayurvedic as well as modern texts. The study was started after approval of Institutional Ethics Committee (No- PGT/7/-A/Ethics/2015-16/1490) dated 25.08.2015. The study registered in CTRI/2016/11/007444.

Inclusion Criteria: Patients between the age group 35 to 70 years of either gender suffering from Janusandhirgata (Knee OA.) with symptoms of pain, tenderness, stiffness with restricted joint movements were included in this study.

Exclusion Criteria: Patients below 35 years and above 70 years were excluded. Patients having systemic diseases like uncontrolled diabetes mellitus (DM), Severe Anemia, Rheumatoid arthritis (R.A), Paralysis, Parkinsonism, malignancy were excluded. Patients of knee joint effusion and infectious diseases like Syphilis, Leprosy, AIDS, and Tuberculosis (TB) were also excluded.

Investigations: The investigations were done at baseline and after treatment that are Random Blood Sugar (RBS), Routine haemogram (Hb, TLC, DLC, and ESR), Serum uric acid and Serum Calcium. R.A factor quantitative was done only before treatment to exclude the cases of rheumatoid arthritis. X-ray knee joint Antero-Posterio & Lateral view was done before and after treatment in all patients.

Grouping

Total 41 selected patients of Janusandhirgata (Knee OA.) were randomly divided into two groups namely Group-A (n=21) and Group B (n=20).

Group A: In this group, Agnikarma with Panchadhatu Shalaka was done in 21 patients of Sandhigata (O.A knee joint). In total 15-20 bindu dagdha was applied at most painful site of affected knee joint. After Agnikarma Haridra powder was sprinkled on wound and patient was advised to avoid water contact for minimum 24 hours; and also used to apply madhu and ghrita. Same intervention was adopted at every 7 days interval for 4 times. Components of Pancha Dhatu Shalaka (Innovated by Prof. P. D. Gupta) 9 is made up of Tamra (copper)40%, Loha (iron) 30%, Yashada (zinc)10%, Rajata (silver)10% and Vanga (tin)10%.

Group B: In this group, Agnikarma with Panchadhatu Shalaka was done as previously and Panchatikta Guggulu (500mg two tablets thrice a day) was given orally in 20 patients of Sandhigata.

Follow up: It was carried out for one month.

Criteria for assessment: The improvement of treatment was assessed mainly on the basis of relief in the cardinal signs and symptoms of the disease. To assess the effect of therapy scores under the followings;

A. Subjective parameters

- Vedana (Pain)
- Sparsha asahyata (Tenderness)
- Sandhi sphutana (Crepusit)
- Sandhi graha (Stiffness)

B. Objective parameters

- Girth measurement of the knee joint at three sites (Swelling)
- Angle of the knee joint (ROM)

A. Subjective parameters

Pain: Pain was categorized under the score as follow; 0 = no pain, 1 = mild pain (pain exaggerated by movement but subsided by rest), 2 = moderate pain (not relieved by rest but not disturbing sleep or routine activities) and 3 = severe pain (disturbing sleep & other routine activities but relieved by oral analgesics).

Tenderness: Tenderness was categorized under the score as follow; 0 = no tenderness, 1 = mild tenderness (patient feels pain on pressure but doesn’t withdraw joint), 2 = moderate...
tenderness (patient feels pain and on touch withdraws the joint), 3 = sever pain (patient doesn’t allow to touch the joint)

**Crepitus:** Crepitis was categorized under the score as follow; 0 = no crepitis, 1 = palpable crepitis and 2 = audible crepitis.

**Stiffness:** Crepitis was categorized under the score as follow; 0 = no stiffness, 1 = mild stiffness, 2 = moderate stiffness and 3 = severe stiffness.

### B. Objective parameters

- **Girth measurement of knee joint:** Measurement of the girth of the knee joint was done using a measuring tape around the girth of the knee before treatment and after treatment at three anatomical sites of knee joint, which were as follow;
  1. Middle point of patella
  2. Two inches above middle point of patella
  3. Two inches below middle point of patella.

- **Goniometric measurement of angle of Knee Joint:** Angle of the knee joint was measured using a goniometer in supine position. It was done before treatment and after treatment to assess the progress.

  Normal flexion was considered as in degree; 135 to 150.

  Normal extension was considered as in degree; zero to (-10).

### Overall effect of therapy

| Overall effect     | % of improvement |
|--------------------|------------------|
| Complete Remission | 100%             |
| Marked Improvement | 70 to 99%        |
| Moderate improvement | 50 to 69%   |
| Mild improvement   | 30 to 49%        |
| No improvement     | < 30 %           |

### STATISTICAL ANALYSIS

For nonparametric data, *Wilcoxon-signed rank test* was applied within the groups and *Mann Whitney Rank Sum test* between the two groups. For parametric data, *Paired test* was applied within group and *Unpaired test* between the groups. Mean score, Percentage of relief, ±S.D, S.E, ‘t’value and p value were calculated.

### OBSERVATIONS

Total 43 patients were registered in this work, among them 41 patients completed the treatment and 2 dropped out so observation were made on 43 patients and assessment of result were drawn on 41 patients. Among 43 patients maximum 55.81% patients were belonged to the age group 56-70 years; Females (58.13%); in post-menopausal stage (74.41%) Maximum middle class (79.06%), and over weight (60.46%). Majority of patients were habitual to *Vishamasana* (55.81%) and *Aitraksha ahara* (51.16%) having *Krura Koshtha* (60.46%) and disturbed sleep 65.11%. In maximum patients onset was Gradual (86.04%); with Chronicity (1-5year) in 65.11% having no history of injury in (93.02%). Most of patients having positive family history (53.48%) As far as the chief complaints are concerned *Sandhishula* (joint pain) was found in (100%), *Sandhisphutana* in 95.34%. In 86.04% patients *Sparshaasahyata* (tenderness) and *Sandhigraha* (stiffness) observed. In 72.09% patients *Ajunjana Prasarana Vedana* (difficulty in joint movements), in 37.20% patients *Sandhisotha* (Swelling) were observed. Moderate space reduction was seen in maximum 44.18% cases in X-rays

### RESULTS

**In group-A** (*Agnikarma* alone) among subjective parameter statistically extremely significant results were seen in *Sandhishula* (pain) (86.36%), *Sparshaasahyata* (tenderness) 71.79% and in *Sandhigraha* (Stiffness) 52.77%. Significant result seen in *Sandhisphutana* (crepitus) 27.58%. (Table-1) Among objective parameter in swelling significant results were seen at all 3 sites (Table-2) and in ROM statistically significant results seen in flexion 23.41% and extension 36.36% (Table-3)

**In group-B** (*Agnikarma* along with *Panchatikta Guggulu*) statistically extremely significant results were seen in *Sandhishula* (pain) (88%), *Sparshaasahyata* (tenderness) 87.80% and in *Sandhigraha* (Stiffness) 83.87%. Significant result seen in *Sandhisphutana* (crepitus) 36.66%. (Table-4) Among objective parameter in swelling significant results were seen at all 3 sites (Table-5) and in ROM statistically significant results seen in flexion 24.04% and extension 44.44%. (Table-6)

On comparison between the groups non-significant difference was seen in pain tenderness, crepitis stiffness and ROM while significant difference was found in swelling where group B was showing better results. Percentage wise group B was showing slight better results in all parameters. So it can be inferred that *Agnikarma* has potential to combat the symptoms of this disease but if any *Vata Shamaka* drug is added, more convincing results is seen. (Table-7,8,9)

In overall effect in this clinical study none patient achieved complete remission of signs and symptoms in group A while 5% of the patients achieved complete remission of signs and symptoms in group B. In group A marked improvement was noted in 23.80% patients whereas it was seen in 60% patients in group B. Moderate improvement was seen in 57.14% patients in group A and 30% patients in group B. Mild improvement was seen in 19.04% cases in group A while it was seen in 5% of patients in group B. None of the patients were unchanged in either group. This data shows that at least 30% relief has got to each and every patient.
(Table-10) In most of the patients the scar developed due to burn healed completely within two weeks and the skin discoloration disappeared within one month except one female patient in group B Agnikarma sitting was postponed due to pus formation in scar due to improper wound care.

**DISCUSSION**

Majority of participants (55.81%) were found between 56-70 years which, according to Sushruta is the stage of Madhya Vaya. OA is a disorder causes slowly degenerative changes of joints, and is progressive in nature and usually becomes symptomatic after 50 years of age. Among the participants, majority of female (58.13%) were found to be OA which supports the fact of female being a risk factor for OA (citation), due to the lack of estrogen, female hormone that starts between the ages of 45-65 which is considered as premenopausal age group (citation). In this study, 51.16% were found housewives who work long period of time on standing posture. Almost two third (79.06%) were belonged to middle class who had to have excess work load with improper and untimely food habit (citation). In 55.81% of patients were found to be taken Vishkamashana that leads to VataVriddhi that in turn impairs the Agni. Vata Praporn and Mandagni are the chief Nidanas for developing Sandhigatavata(citation). Sleep was disturbed in 65.11% patients. It might be due to the nocturnal pain of the late stage of OA disturbing the patient. Sushruta had clearly mentioned Prajagaranam as a symptom of Kapha Kshaya and Nidranasha as a symptom of Vata Vriddhi. 9 The onset of disease was gradual in 86.04% of patients. Data is supportive of the gradual degenerative process happens in cases of osteoarthritis which showed that 65.11% patients were suffered from OA with duration of 1-5years having no history of injury(citation). It shows chronic degenerative nature of disease not usually related to major joint injury but a slowly progressive disorder (citation). In 53.48% of patients were had relevant family history of OA. As far as the osteoarthritis of knee joints is concerned the family disposition is one of the risk factors mentioned in the classics (citation).

The previous studies show that excess weight while walking is transferred to the knee joints causing more stress to the joint (citation). 44.18% X-Ray, moderate space reduction After treatment though patient got complete remission or moderate improvement in the symptoms of OA but there was no any change in X-Ray findings.

**Probable mode of action of Agnikarma:** According to Ayurveda, basic Dosha responsible for causation of Shula is Vata and pain is cardinal symptom in most of the Vatavyadhis. 10Vata dosha predominantly has Sheeta Guna which is exactly opposite to Ushna Guna of Agni. So according to Samanya Vishesa Siddhant, Agni is capable of producing relief in pain by virtue of its Ushana Guna; and according to conventional therapy due to application of heat at particular part of body blood circulation increases to applied site and reduces accumulation of pain modulators which in turns reduces the pain (Descending inhibitory pathway of pain control) (citation). The gate control theory proposed by Melzach and Wall in 1965 explaining the mechanism of analgesic of pain asserts that non-painful input (like touch, pressure, vibrations) closes the “gates” to painful input, which prevents pain sensation from traveling to the central nervous system(citation). When red hot shalaka is touched to the skin low-threshold myelinated nerve fibres will be activated ie Aβ fibers will be stimulated(citation). The afferent input from these fibres inhibits propagation of nociception carried through unmyelinated fibres developing due to O.A. This results in the closing of gate for by Aδ and C fibers to fire the transmission inter neurons to fire up to the brain (citation). So ultimately perception of pain by brain is blocked. This is how theory of gate control was used in Agnikarma procedure involving inhibition of pain through ascending pathway.

**Probable mode of action of Panchatikta Guggulu**

Panchatikta Guggulu is dominated by Tikta Rasa and Ushna Virya Dravyas which increases Dhatvagni as well as improves the nutrition so it stabilizes all the Dhatus, especially Asthi and Majja Dhatu(citation). The drug is predominant of Akasha and Vayu Mahabhutas which helps in preservation of normal health of Asthi Dhatu (citation). The Yogavahi Guna of the Ghrita increases the bioavailability of the other drugs. Tikta Rasa possesses Lekhana and Kleda, Meda, Pitta, Shleshma and Shoshana properties. 11 So, along with guggulu which also has Lekhana(citation) (anti hyperlipidaemic) properties helped in the weight control of the patients and thus contributes in the management of osteoarthritis. 12

**Conclusion:** In this study, it can be concluded that statistically highly significant results were found in both groups; however comparatively better relief was found in Group B (Agnikarma along with Panchatikta Guggulu) as compare to Group A (Agnikarma alone) in all subjective and objective parameters. Agnikarma alone has a definite role in reducing the knee joint pain and tenderness; in addition of Panchatikta guggulu was found convincing results in stiffness, swelling and difficulty in flexion and extension of knee joint.

**ABBREVIATIONS:** Not Applicable

**ACKNOWLEDGEMENTS:** Not Applicable

**CONFLICT OF INTEREST:** Author declares that there is no conflict of interest.

**SOURCE OF SUPPORT:** None

**REFERENCES**

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TABLES

Table -1 Effect of therapy on chief complaints in Group:A  

| Symptoms     | Mean score | % relief  | SD    | SE    | W    | t+    | P     |
|--------------|------------|-----------|-------|-------|------|-------|-------|
| Sandhishula  | 2.095      | 0.287     | 86.36%| 0.4024| 0.0878| 231   | 231   | <0.0001|
| Sparshaasahyta| 2.052     | 0.526     | 71.79%| 0.5130| 0.117 | 190   | 190   | <0.0001|
| Sandhisphutana| 1.45      | 1.05      | 27.58%| 0.502 | 0.112 | 36    | 36    | =0.0078|
| Sandhigraha  | 2.000      | 0.944     | 52.77%| 0.4162| 0.098 | 153   | 153   | <0.0001|

Table -2 Effect of therapy on Girth of knee joint (Swelling) in group A  

| Swelling of knee | Mean score | % relief | SD    | SE    | df   | t    | P     |
|------------------|------------|----------|-------|-------|------|------|-------|
| Middle point of patella | 36.85 | 36.23 | 1.67 | 0.497 | 0.108 | 20   | 5.701 | <0.0001|
| 2inch above middle of patella | 40.66 | 40.04 | 1.52 | 0.589 | 0.128 | 20   | 4.812 | =0.0001|
| 2inch below middle of patella | 35.19 | 34.66 | 1.48 | 0.814 | 0.177 | 20   | 2.950 | =0.0079|

Table -3 Effect of therapy on ROM in Group-A  

| Angle of knee joint (ROM) | Mean score | % relief | SD    | SE    | df   | T    | P     |
|---------------------------|------------|----------|-------|-------|------|------|-------|
| Flexion                   | 97.61      | 120.48   | 23.41 | 8.884 | 1.939 | 20   | 11.790| <0.0001|
| Extension                 | -5.23      | -1.42    | 36.36 | 8.047 | 1.756 | 20   | 2.169 | =0.0423|

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### Table -4 Effect of therapy on chief complaints in Group-B

| Symptoms         | Mean score | % relief | SD  | SE  | W    | T+    | P        |
|------------------|------------|----------|-----|-----|------|-------|----------|
|                  | BT         | AT       |     |     |      |       |          |
| Sandhishula      | 2.50       | 0.250    | 88  | 0.523| 0.117| 210   | <0.0001  |
| Sparshaasahyta   | 2.27       | 0.277    | 87.80| 0.594| 0.140| 171   | <0.0001  |
| Sandhisphutana   | 1.57       | 1.000    | 36.66| 0.507| 0.116| 66    | =0.001   |
| Sandhigraha      | 1.70       | 0.300    | 83.87| 0.598| 0.133| 210   | <0.0001  |

### Table-5: Effect of therapy on Girth of knee joint (Swelling) in Group –B

| Swelling of knee | Mean score | % relief | SD  | SE  | df  | T    | P        |
|------------------|------------|----------|-----|-----|-----|-------|----------|
|                  | BT         | AT       |     |     |     |       |          |
| Middle point of patella | 37.65 | 36.50 | 3.05 | 0.812 | 19 | 6.33 | <0.0001 |
| 2inch above middle of patella | 43.10 | 40.65 | 3.36 | 0.759 | 19 | 8.54 | <0.0001 |
| 2inch below middle of patella | 36.00 | 34.95 | 2.92 | 0.825 | 19 | 5.68 | <0.0001 |

### Table -6: Effect of therapy on ROM in Group-B

| Angle of knee joint | Mean score | % relief | SD  | SE  | df  | T    | P        |
|---------------------|------------|----------|-----|-----|-----|-------|----------|
|                     | BT         | AT       |     |     |     |       |          |
| Flexion             | 91.50      | 113      | 24.04| 10.93| 19 | 9.001 | <0.0001 |
| Extension           | -4.50      | -2.50    | 44.44| 4.104| 19 | 2.179 | =0.0421 |

### Table -7 Comparative effect of therapy on subjective parameters of both groups

| Symptoms         | Mean score | % relief | U | p | Significance |
|------------------|------------|----------|---|---|--------------|
|                  | Group A | Group B |    |   |              |
| Sandhishula      | 1.81    | 2.20    | 138 | =0.055 | NS           |
| Sparshaasahyta   | 1.33    | 1.80    | 136 | =0.052 | NS           |
| Sandhisphutana   | 0.40    | 0.57    | 156 | =0.337 | NS           |
| Sandhigraha      | 1.056   | 1.44    | 110 | =0.098 | NS           |

### Table -8 Comparative effect of therapies on Objective parameter of both groups

| Swelling of knee | Mean score | % relief | t  | p  | Significance |
|------------------|------------|----------|----|----|--------------|
|                  | BT         | AT       |    |    |              |
| Middle point of patella | 0.62  | 1.15    | 2.537 | 0.015 | S            |
| 2inch above middle of patella | 0.62  | 1.45    | 3.925 | 0.0003 | ES           |
| 2inch below middle of patella | 0.52  | 1.05    | 2.055 | 0.0466 | S            |

### Table-9 Comparative effect on ROM of knee joint in both groups

| Angle of knee joint | Mean score | % relief | t  | p  | Significance |
|---------------------|------------|----------|----|----|--------------|
|                     | Group A | Group B |    |    |              |
| Flexion             | 22.85   | 22.00   | 0.276 | =0.784 | NS           |
| Extension           | -1.905  | -2.000  | 0.044 | =0.965 | NS           |

### Table-10 Overall effect of therapy

| Overall effect                  | Group A (n=21) | Group B (n=20) |
|---------------------------------|----------------|----------------|
| Number of patients              | %              | Number of patients | %  |
| Complete remission (: 100%)     | 0              | 1              | 5  |
| Marked improvement (: 70 - 99%) | 5              | 12             | 60 |
| Moderate improvement: (50 -69%) | 12             | 5              | 30 |
| Mild improvement: (30 - 49%)    | 4              | 1              | 5  |
| No improvement :(< 30 )         | 0              | 0              | 0  |