ABSTRACT
Managing pain with minimal side effects for osteoarthritis patient is always a challenging situation in front of physician. The most common medications prescribed for osteoarthritis are, at best, moderately effective. In addition, side effects of these treatments can be quite significant, and at times life-threatening. Ayurveda offer a unique perspective on arthritis through the concepts of Agni, Ama and Vata. Due to vitiation of Vata lot of methods are under trial for better results. The present study “Clinical Evaluation of Mustadi Upnaha In The Pain Management of Sandhigat-Vata Vis-À-Vis Osteoarthritis” is also an effort in search of new aspects of pain management for Sandhigat- vata patients.

KEYWORD: Mustadi Upnaha, Sandhigat-Vata.

INTRODUCTION
Sandhigat-vata or osteoarthritis almost remains as a benign disease but in many patients who are more prone to the joint destruction, severe progressive joint destruction is the major cause of disability with profound socio-economic impact in their life. In the modern medical science, the cause of OA are not well understood but biochemical stress affecting the articular cartilage and subchondral bone and biochemical changes in the articular cartilage and synovial membrane are important in its pathogenesis. Osteoarthritis is always characterized by focal and progressive degeneration of the articular cartilage with evidences of accompanying bone response (osteophytosis and sclerosis, osteoporosis may occur). In
modern medicine the current pharmacological management in osteoarthritis includes the administration of analgesics and Non Steroidal Anti-Inflammatory Drugs (NSAIDs), but their continuous use even neither provides adequate pain relief nor deceleration in disease process. In addition, NSAIDs are associated with adverse effects. This is the main cause why Ayurveda shows its significance in management of this chronic disease. Even in Ayurveda also palatability of drugs is a big question in front of Ayurvedic physician. The present study is regarding to use UPNAHA karma in pain management of Sandhigata-vata.

REVIEW OF DISEASE
AYURVEDIC REVIEW
Aetiology of Sandhigata-Vata
Because Sandhigata-Vata is a purely Vatik disorder, so factors responsible for the disease are common as those of Vatik disorders but some of them especially are responsible in the development of the disease. In Vrihat-Trayees (Charak Sanhita, Sushrut Sanhita ans Vagbhat Sanhita) and other Ayurvedic texts, there are following factors responsible for Sandhigata-Vata (Ch.chik. 28/15-18, S.sut. 21/19, A.H. Nid. 16/23)-

1. Rough, cold, little and light foods: These vitiate Vata due to improper digestion (rough and cold foods) and malnutrition.
2. Irregular food habits (Adhyshan Vshmasan): These vitiate Vata due to disturbed physiological/metabolic activities in the body and result into Dosh-vaisamya (disturbed homoeostasis), obesity etc
3. Abnormal postures (Vishamcheshta): It produces abnormal and increased straining on the joints and their adjacent structures.
4. Faulty application of Panchkarma therapy: These faulty applications of Panchkarma therapies vitiate Vata and are responsible for disturbed autonomic nervous system of the body.
5. Suppression of urges (Vega Vidharana): These are responsible for disturbed homeostasis due to absorption of toxic metabolites/matter to be excreted outside from the body.
6. Over-work: This induces Vata-vitiation due to fatigue and causes fatigue fractures in the joints.
7. Altered sleep habits (Nidra Viprya): These induce vitiation of Vata with altered autonomic nervous system due to imbalanced hormones and other secretions.
8. Injuries to the joints (Marmaghat): These cause destruction in the joints which is responsible for remodeling of the joint contour and mal-alignment of the articular bone surface (causes joint incongruity).

9. Occupation (Bhar-Haran etc.): Occupational individuals in which joints are prone to bearing-weight i.e. farm workers, housewives, laborers etc. (due to weight-bearing, there is continuous destruction to the articulations).

10. Ageing (Dhatuksaya): It can be a complication of various diseases or simply due to normal ageing process of the old age. It induces vitiation of vata due to degenerative changes. Dhatuksaya plays a major role in the prognosis and treatment of various diseases as well as Sandhigat-Vata also.

11. Psychological disturbances (Manasik Bhavas i.e. anxiety, stress etc.): These are responsible for vitiation of Vata and cause fatigue fractures in the articular cartilage.

Samprapti (Pathogenesis) (C.chik. 28/18, A.S. sut. 20/3, S.S. purv 5/25)

All the aetiological factors are independently responsible for the vitiation of Vata. In Ayurvedic classics, there is no clear-cut description of the pathogenesis of Sandhigat-Vata like some other diseases regarding Doshas, Dusyas, Srotas and their Dusti, Adhisthan etc, but there is much description regarding pathogenesis of Vatik disorders (Sandhigat-Vata also is a pure Vatik disorder; Ch. Chik. 28/18). Vitiated Vata develops the diseases by making place in hollow organs as like Asthi and Sandhi. Asthi and Sandhi are also the locations or places of Vata (A.S. sut. 20/3). The occurrence and pathogenesis of the diseases due to Vata is due to Khavagunya (altered physiological changes) of that particular part/place of the body (Sh. Pur. 5/25). Vitiated Vata is transmitted from the Pakvashaya (Pakvashaya is the specific site of Vata) to the joints and bones by the Purishdharakala which is also known as Asthidharakala (Dalhan on Su.Kalp. 4/40) said by Dalhana and accumulation (malfuctioning) of the vitiated Vata in the joint structures particularly due to Khavagunya (altered physiological changes). The degeneration in Sleshak-Kapha (Sleshak-Kapha-Ksray) is responsible for decreased stability (Sthiratva) of the joints, mal-alignment and remodeling of the joint contour due to Sandhibhandhan- Vikriti and decreased lubrication (increased friction in the articular surfaces) due to Asingdhatva. All the above pathology is the end result of degeneration in the articular cartilage and subchondral bone changes. The pathogenesis of Sandhigat-Vata can be summarized as follows-
Factors/causes
- Malnutrition
- Metabolic changes
- Physiological changes
- Straining
- Disturbed ANS
- Toxic influences
- Fatigue
- Trauma
- Degeneration
- Stress

1. Dhatuksay
   - Sleshak kapha ksay.
   - Vata –prakopa.

2. Vata-prakopa;
   - Asthiratva (decreased stability of the joints).
   - Asnigdhatva (decreased lubrication of the articular surface increased friction between them).
   - Sandhi-bandhan hras (weak articulation due to weak muscles, ligaments etc.).
   - Vata-prakopa laksana (altered neuromuscular functioning).
     1. Sankoch (muscle spasm).
     2. Bhed/shool (pain).
     3. Sheet-guna-vriddhi (increase hydration= cartilage destruction).

SAMPRAPTI GHATAK (participating components of the pathogenesis).
- **Dosh** – Vyan Vayu : Vridhi and Vikriti.
  - Sleshak Kapha : Ksaya.
- **Dushya** – Asthi(bone including subchondral bone).
- **Srotas** – Asthivaha.
- **Adhisthan** – Asthi and Sandhi (bones and joints).
- **Sroto-dusti** – Sangi.
**UPNAHA (Poultice)**

Various *Vat-Nashak* drugs can be used in the preparation of *Upnaha*. Application of thick paste of drug preparations on the affected area and wrapping them with the cotton, cloths etc is known as *Upnaha*.

**Actions**
- Improves blood circulation.
- Acts as anti-inflammatory and analgesic.
- Relieves stiffness and swelling.
- Checks the *Vatik* phenomenon (degeneration).
- *Ama Pachan*.

**Uses**
- *Vatik* and *Kaphaj* disorders.
- Muscle spasm and stiffness.
- Various inflammations.
- Swellings.

**Contra-indications**
- Open injuries.
- Haemorrhagic conditions and blood disorders.
- Wound and ulcers.
- Skin disorders.

**MODERN REVIEW**

**Pathogenesis**

The pathogenesis of secondary OA depends on the causative changes in the degeneration. Due to the trauma i.e. fractures etc. there is mal-alignment of the articular bones at their surfaces and incongruity of the joints. Traumas play a important predisposing factor of premature OA. Developmental abnormalities are believed to be of major importance in the aetiology of hip OA. Collagen gene defects have been identified in a few families in whom familial, premature, polyarticular OA is associated with an epiphyseal or spondyloepiphyseal dysplasia. Abnormal articular surface contacts and weight-bearing alignments lead to increased local mechanical stress and wear. Metabolic diseases lead to cartilage degeneration by different mechanisms. Alkaptonuria is with genetic defect of homogenetisic acid oxidase.
and results in accumulation of a pigmented polymer that binds to the collagen, rendering it brittle and prone to mechanical degradation. Crystals of calcium pyrophosphate dehydrate or hydroxyapatite if deposited in the joints there may be altered properties of cartilage matrix. Acromegaly is a consequence of joint incongruity due to bony changes following cartilage outgrowth. Other endocrinal diseases with disturbances in the endocrinal physiology result in a mechanically defective metabolism. Aseptic necrosis due to Paget’s disease, Gaucher’s disease and other various disease results stress on the overlying articular cartilage.

Osteoarthritis is the end result of multiple factors with the following changes.
1. Loss of proteoglycan.
2. Fracture of the collagen mesh network.
3. Metabolic changes and cell loss.

Interleukin-1 (IL-1), tumour necrosis factor alpha (TNF-α) insulin like growth factor –1 (IGF-1) and transforming growth factor beta (TGF-β) have been found to play an important part in the articular cartilage metabolism, and in matrix protein synthesis and degradation.

MATERIAL AND METHODS
A series of 69 patients of Sandhigata–Vata vis-à-vis osteoarthritis were randomly selected for the present study from OPD and IPD of Panchkarma department, Rishikul Govt. Ayurvedic College Hospital, Haridwar. The cases were randomly selected regardless of their age sex and socioeconomic considerations, but fully satisfying the criteria of diagnosis of OA in conventional medicine and clinical features of Sandhigat–Vata as described in Ayurvedic medicine. Out of 69 patients, only 30 cases could complete their follow – up i.e. one month and 39 patients did not turn up for regular follow up. Complete Follow up tenure was divided in three episodes of 10 days. The following exclusion and inclusion criteria were adopted for the selection of cases of osteoarthritis:

Exclusion criteria: Major exclusion criteria was.
- History or active presence of other inflammatory or rheumatic diseases.
- Patients more than 80 years.
- Substantial abnormalities in blood, hepatic, renal or endocrinal diseases.
Inclusion criteria: Major inclusion criteria was;
- Patients fulfilling the diagnostic criteria of osteoarthritis.
- Cases not violating exclusion criteria.
- Patients aged over 30 years.
- Cases of primary osteoarthritis.

Trial drug preparation

Whereas in Mustadi Upnaha contents/drugs used are

(i) Contents of Upnaha

Mustak = 5gm.
Kinva = 5gm.
Tila = 5gm.
Kustha = 5gm.
Devdaru = 5gm.
Lavana = 5gm.
Tagar = 5gm.
Dadhi = 100gm.
Ksheer = 125ml.
Mahasneha = 20ml.

All the above contents were kept on mild flame fire until a good paste formed.

(i) Procedure of Upnaha

The paste of Upnaha was applied on the affected knee joints in a adequate amount as spread upto 4 fingers far from the articulation and wrapped with cotton followed by bandaging it with a crepe bandage. This Upnaha was remain as such for a night followed by clean away by lukewarm saline water at morning and wrapped again with crepe bandage only.

(a) Method of study

Present study has been divided into 2 groups based on the type of therapy to which patients were subjected:

Group 1: Upnaha – this group of patients were treated with Mustadi Upnaha.
Group 2: Bandaging– this group of patients were treated with crepe bandaging only.
<table>
<thead>
<tr>
<th>Group</th>
<th>No. of patients registered</th>
<th>No. of completed follow – ups</th>
<th>Treatment given with duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>28</td>
<td>15</td>
<td><em>Upnaha</em> twice in a day for 1 month</td>
</tr>
<tr>
<td>2</td>
<td>23</td>
<td>15</td>
<td>Crepe bandaging twice in a day for 1 month</td>
</tr>
</tbody>
</table>

(b) Clinical assessment of disease

Clinical assessment of symptoms and severity was objectively done in terms of gradation of pain score and other associated symptoms. The relative extent of all these criteria was recorded according to the rating scale in each patient at the initial stage and subsequent follow – ups.

These symptoms and their grading score procedures are as follows:

- **Gradation of pain score**
  0 = nil; no pain in the joints.
  1 = mild pain; pain complained but tolerable.
  2 = moderate pain; pain complained and disturbs routine work.
  3 = severe pain; severe pain completely interrupting routine work.

- **Gradation of swelling of joints**
  0 = nil; no swelling.
  1 = mild; feeling of swelling with heaviness of joints.
  2 = moderate; apparent swelling.
  3 = severe; huge swelling.

- **Gradation of tenderness of joints**
  0 = nil; no tenderness.
  1 = mild; elicited on much pressure.
  2 = moderate; elicited on moderate pressure.
  3 = severe; elicited even on slight touch.

- **Restriction of movements**
  0 = absence of movement restriction.
  1 = 10% restriction of movement.
  2 = 25% restriction of movement.
  3 = 50% restriction of movement.
**Algo Functional Lequesne Index (knee)**

I. Pain or discomfort (0= no pain)

(a) During nocturnal bed rest
- Only on movement or in certain positions 1
- Without movement 2

(b) Duration of morning stiffness/pain after getting up
- Less than 15 minutes 1
- 15 minutes of more 2

(c) Remaining standing for 30 minutes increases pain 1

(d) Pain on walking
- Only after walking some distance 1
- Early after starting 2

(e) When getting up from sitting position without the help of arms - 1

II. Maximum distance walking
- Without limits 0
- More than 1km, but limited 1
- More than 1km, about 15 minutes 2
- From 500-900m (about 8-15min.) 3
- From 300-500m 4
- From 100-300 5
- < 100 m 6
- With one walking stick/crutch +1
- With two walking stick/crutches +2

III. Activities of daily living
- Can you go up a standard flight of stairs? 0-2
- Can you down a standard flight of stairs? 0-2
- Can you squat? 0-2
- Can you walk on uneven ground? 0-2

Point score: easily = 0
With difficulty = 1 (0.5-1.5)
Impossible  = 2  
Total score  = 0-24

Points of scores of handicap

<table>
<thead>
<tr>
<th>Scores</th>
<th>Handicap</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 14</td>
<td>extremely severe</td>
</tr>
<tr>
<td>11-13</td>
<td>very severe</td>
</tr>
<tr>
<td>5-10</td>
<td>severe</td>
</tr>
<tr>
<td>Upto 5</td>
<td>moderate</td>
</tr>
<tr>
<td>0-1</td>
<td>mild</td>
</tr>
</tbody>
</table>

OBSERVATION AND RESULT

Distribution of severity of pain in group-1

<table>
<thead>
<tr>
<th>Severity</th>
<th>BT</th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Absent</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>6.67</td>
</tr>
<tr>
<td>Mild</td>
<td>1</td>
<td>6.67</td>
<td>5</td>
<td>33.33</td>
</tr>
<tr>
<td>Moderate</td>
<td>7</td>
<td>46.67</td>
<td>5</td>
<td>33.33</td>
</tr>
<tr>
<td>Severe</td>
<td>7</td>
<td>46.67</td>
<td>4</td>
<td>26.67</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>100</td>
<td>15</td>
<td>100</td>
</tr>
</tbody>
</table>

The data reveals that the most of the cases were shifting towards reducing severity of pain. After completion of 3rd follow up, maximum shifting is into absent group (60%) whereas other cases shift into mild (26.67%) & moderate group (13.33%) from severe (46.67%), moderate (46.67%) & mild group (6.67%) with decreasing in severity of pain.

Distribution of severity of pain in group-2.

<table>
<thead>
<tr>
<th>severity</th>
<th>BT</th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Absent</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mild</td>
<td>1</td>
<td>6.67</td>
<td>1</td>
<td>6.67</td>
</tr>
<tr>
<td>Moderate</td>
<td>3</td>
<td>20</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>Severe</td>
<td>11</td>
<td>73.33</td>
<td>11</td>
<td>73.33</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>100</td>
<td>15</td>
<td>100</td>
</tr>
</tbody>
</table>

The data reveal that there is no shifting of any of the case towards any group. After completion of 3rd follow-up, maximum shifting is into absent group (0%) & remaining into mild (6.67%) & moderate group (73.33%) with no decrease in severity of pain.
COMPARISION OF SEVERITY OF PAIN IN GROUP 1 & 2.

<table>
<thead>
<tr>
<th>Group</th>
<th>Comparison</th>
<th>d</th>
<th>SD</th>
<th>SE</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group-1</td>
<td>BT Vs AT</td>
<td>1.4667</td>
<td>0.7432</td>
<td>0.1919</td>
<td>7.6429</td>
<td>0.01*</td>
</tr>
<tr>
<td>Group-2</td>
<td>BT Vs AT</td>
<td>-0.133</td>
<td>0.8338</td>
<td>0.2153</td>
<td>-0.619</td>
<td>0.10**</td>
</tr>
<tr>
<td>Group-1 Vs 2</td>
<td>BT</td>
<td>0.333</td>
<td>1.1751</td>
<td>0.3034</td>
<td>1.0986</td>
<td>0.10**</td>
</tr>
<tr>
<td></td>
<td>AT</td>
<td>1.9333</td>
<td>0.4577</td>
<td>0.1182</td>
<td>16.358</td>
<td>0.01*</td>
</tr>
</tbody>
</table>

*- significant  
** non significant

In the table there is statistically significant difference in Group A but no difference is seen in Group 2. Comparison between groups is not statistically significant in before treatments data but it shows that comparison between groups after treatment has statistically significant.

DISCUSSION

Considering Dhatukshaya and vitiated Vata as morbid factors responsible for the development to Sandhigat–Vata and their associated sign and symptoms. Upnaha therapy namely Mustadi Upnaha (B.R. Vatvyadhi chikitsa and C.S. chik. 28 respectively) has been selected for the present study work. Mustadi Upnaha contents have property to pacify vitiated Vata as locally. The numbers of cases in three groups were 15 each. Comparative analysis has been made in between two Groups viz. comparative analysis between group 1 and 2. The patients of group 1 were treated with the trial drug Mustadi Upnaha, while the patients of group 2 were treated with crepe bandaging only. The differences in response of two groups are assumed to be due to the effect of Vatahar property of Mustadi Upnaha therapy.

The changes in percentage distribution of severity of pain in terms of reducing severity was found to be more in group 2 than group 1. Maximum shifting was found into absent severity group in the 1st group. Any shifting was absent into absent severity in group 2. Differences in the number of patients after each follow – up were statistically analyzed. Better response in group 1 is due to the effect of Upnaha therapy whereas the response in group 2 was nil. This shows that Upnaha therapy is more beneficial over the placebo therapy in reducing pain severity.

The changes in percentage distribution of reducing severity of pain were found to be more in group 1 than 2. No significant results were also found in group 2 which show that drug has its own effect and effectively reduce the severity of pain. Study reveals that there is significant response of Upnaha therapy and it is effective in reducing the severity of pain. On
comparison with application of ‘t’ test, there is no statistically significant difference in between the comparative groups before treatment but after treatment there was significant difference.

SUMMARY AND CONCLUSION

• The ‘Mustadi Upnaha’ therapy exhibit better response in terms of reducing the severity of pain and the action of therapy is due to its medicinal effect rather than mechanical effect.
• Upnaha therapy doesn’t interfere with internal metabolism and highly effective for pain management. No local inflammation or reaction was noted in this pilot study so it may be assumed much safer than any other kind of oral medicine.
• On long term usage of such therapy don’t produce any hazardous effect on other organ.

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