Review Article

Tropical Phytotherapeutic Treatment For Achieving Knee Symmetry In Osteoarthritis – A Sustainable Approach

Apurba Ganguly

*Corresponding author:
Apurba Ganguly
1OPTM Health Care 145, Rashbehari Avenue Kolkata – 700 029, India.

Abstract
Throughout the world a large number of patients suffering from osteoarthritis are undergoing knee surgery and knee replacement every year. Though the surgery or replacement methods are expensive, these cannot make both knees symmetrical in all anatomical measurements. The present paper, reports for the first time, a noble method, alternative to knee surgery by topical applications of phytoconstituents. The treatment involves topical applications of phytoconstituents from medicinal plants by manually applied with wooden roller and plus-therapy technique for a period of 42 days. The patients recover completely from osteoarthritis pain and both their knees become symmetrical anatomically, supported by pathological and radiological observations.

Keywords: knee symmetry, knee surgery, phytoconstituents, phytomedicine.

Introduction
By the year 2030 it has been predicted that 3.48 billion primary total knee replacements will be performed annually in the USA. (1) Knee osteoarthritis was historically considered an “asymmetric disease” and most research countries to focus on each joint as a single entity. Cross sectional studies have shown that bilateral knee pain is a frequent problem in the community (2, 3). The aim of arthroplasty (knee surgery) is to make both knees pain free and symmetrical, but such never happens. Various factors have been proposed as possible sources of dissatisfaction, including instability (4-8).

In the present study, it is being reported for the first time that topical applications of certain extracts of Indian medicinal plants are capable of making both knees symmetrical in all anatomical measurements in a period of 42 days in patients suffering from osteoarthritis, in both sexes, ages between 46to 60 years and above. This could be a noble way of treating arthritis patients without knee surgery.

Materials and Methods

Experimental Settings
A total of 105 patients of age group 46-60 years and 60 years and above were physically examined and observations were noted before the treatment protocol starts in support of anatomical conditions such as past treatment histories in order to analyze and justify the present condition of legs and back muscle structure and examining if the knee caps are used or not, whether in past or presently taking the pain killers, interavenous injection etc. Measurement of knee gap between biceps femoris, short head and the level of the bed, diameter of muscles, 4 cm above and below the knee joint and calf muscles are taken and also angles of reflexion in supine, prone and standing positions and angles of extension in supine, prone and standing positions are taken (9,10).

Radiological reports of both the knee joints and lumbo sacral spine (L.S. spine) were examined, pathological examinations like activities of muscle creatine phospokinase (CPK), C - reactive protein (CRP) and aldolase were measured.

The therapy mainly works with the phytochemicals present in leaves, flowers, fruits, stems, barks, roots and seeds of the plants extracted with water.

Phytoextraction of following Indian medicinal plants were made (water extract) at 4 C:
- Cissus quadrangularis
- Heliotropium indicum
- Rose marry
For topical applications the water extracts (powder forms) are solubilised sesame and castor and wax to make paste.

Aims, Principles and Theories
It is a holistic and independent system of treatment with its own philosophy, pharmacy, pharmacopoeia and examination procedures which leads to a permanent solution from pain without use of any oral medicines (pain killers and pain aids) within maximum period of forty two days of sitting in the clinic six days a week subject to physiological manifestation.

The therapy aims to improve the basic cellular and molecular behaviours, the pulsing and impulsing systems, lymph and blood circulatory systems, the digestive and excretory systems of the body by assessing the cause of disorder at the cellular and molecular level, as opposed to the conventional medical approach of treating and suppressing symptoms at the organ level.
The therapy is framed based on well defined principal and theories such as – scientific fomentation theory, connective tissue massage theory, spine and joints manipulation theory, identification of intoxicated food habit theory, enhancement of impaired pulsing and impulsing systems through electronic muscle stimulator operated by 9 volt DC battery, effect of the joint stimuli theory, muscle re-education theory, and counselling.

Unique herbal fomentation device for the treatment of disease like Spondylosis (cervical & Lumber) Slip disc etc working by applying slow uniform heating upon the affected portion of the body maximum at range of 106 F (41°C) is comprising of two parts, one (section – A) is mainly comprising of electromechanical component and second one (Section – B) is full of herbal poultices, wherein the first one (Section – A) is comprising of different cloths such as thick buckram cloth (i), Two glass cloths (ii), Two soft mica sheets (iii), fine buckram cloth (iv), duly stitched (v) by machine and gaps/channels (vi) between machine stitches are maintained for the insertion of the prepared coil with china glass tube, wherein the second part (Section – B) is comprising of medicated cloth sheet of poultices (vii) like herbal raw juices, salts, powders, gums, sands, oils and others composition. The other aspect of the invention is the process of producing the device.

![Figure-1](image)

Warm gaseous herbal substances from herbal fomentation device (Figure 1) used externally with well defined techniques and that they pass through the cell membranes of the skin and penetrate its deepest layers by diffusion process and travel to the various tissues, glands and organs of the body.

**Highlights of Treatment**

Stiffness of muscles can be reversed, muscular wasting can be repaired, inflammation of joints can be reduced without any chemically composed drugs, calcification / de-generation can be rectified, muscular strength can be increased, supporting belt on waist or knee joints are not required from the day one of the treatment, no bed rest is required, gaps between bones / vertebrae can be increased, reduction of genu varum (an exaggerated bending outward of the legs from the knees down that causes the knees to be spread apart when the feet and ankles are touching) is obtained, extraction of the fluid accumulated in the knee joints is not required and dependence on pain killers or steroid can be withdrawn from the day one of the treatment.

**Treatment Protocol**

In the clinic, with the help of theories of chemical, mechanical, thermal and electrical stimuli – the muscle strength and blood circulation of different organs are enhanced. For the chemical stimulation, the phytochemicals are extracted from medicinal plants (as mentioned before) as ‘water extraction’ and then mixed with oils at 4°C without using any preservatives or chemicals, so that the phytochemical properties of the plants are preserved. This entire process is executed on seasonal basis when the phytochemical components are present in the particular plants at optimal level, as because all the plants do not have medical values throughout, i.e; composition of phytochemicals do not remain in the plants throughout the year, it has specific, time, age, season and environment. The paste of two oils and cream in equal ratio is to be applied on skin from upper part of the back region to down to the toes, with a patient lying on prone position as well as from the groin to toes lying in supine position with circular motion with the help of tip of three fingers - as a result the necessary phytochemicals of the paste can easily penetrate through the enlarged pores of the skin by diffusion process and travel to various tissues, glands and organs of the body and reach up to the bone levels. Again with the help of exothermic exergonic reactions(a type of chemical reaction), architecture and the metabolic processes of contraction of the muscle is achieved by phytochemicals – subject to tetanus(occurs when a motor unit has been maximally stimulated by its motor neuron.) of muscles. Therefore, immediately after contraction is released, the blood flow increases considerably and oxygen supply is greater than in the resting condition of muscle, because muscle converts chemical energy into mechanical energy. For the mechanical stimulation, muscular contraction in the body is usually evoked by nerve impulses arriving at the end – plates i.e; the places in the muscles where the naked axon of motor nerve ends by piercing the sarcolemma of the muscle. Thus, the tetanus in the muscles rise due to the mechanical phenomena.
changes of muscular contraction, heat is produced in the course of muscle activity into two phases i.e; Initial heat (12) which is produced during mechanical response in a single twitch and is composed of heat of activation, heat of shortening and heat of maintenance and recovery heat (12), which is produced after mechanical response is ended at low rate and for a long time. In the absence of oxygen, the heat of recovery is diminished, but in the presence of oxygen, the total recovery heat is equal to sum of total initial heat and work done. Moreover, the total energy liberated in a muscle twitch (E) equal to sum of activation of heat (A), work done (W) and the heat of shortening (ax). This relation is true for the whole of contraction and for any part of it. Moreover, considering the various aspects of stimulation of muscles such as local excitatory state, propagatory excitatory state, accommodation, later addition, chronaxie, frequency of stimulation, respective excitability, wednesday, inhibition and refractory period, the combined stimuli of chemical (paste) and thermal (through designed pads) are applied in order to achieve the optimal functional behaviour of muscles and tissues.

For electrical stimulation, when a low frequency electrical current of the same quantity as the electric current of the same quantity which flows in the human body is given into the body by a low frequency micro – computerized muscle stimulator run by a battery of DC 9 volt having frequency of 1.5 – 75 Hz,strength of 10⁹ with 6 kinds of stimulations patterns such as pound (heavy, beating sensation), rub, beat, massage, slacken and pound (tapping sensation). The nerves are stimulated, the muscle movements are arisen and blood flow is promoted. Moreover, it is observed that after stimulation, there is a brief period during which muscle is not excitable to second stimulus. Therefore, in the first phase of treatment, the paste of two oils and a cream composition of phytochemicals is applied (produce chemical stimulation) on the skin and mechanical transverse wave by way of vibration with the help of tips of three fingers manipulation and wooden device (produce mechanical stimulation) and wrapping the affected portion with flexible pads which produce thermal stimulation and then wait for sometime for second phase of treatment. In the second phase of treatment, micro – computerised muscle stimulator operated by a small battery cell of DC 9 volts (produce electrical stimulation) simultaneously. Thus the chemical (paste) , mechanical (transverse wave by vibration), thermal (heat) and electrical (micro – computerised muscle stimulator) stimuli are applied on various connective tissues through the skin, simultaneously, in order to stimulate muscles, blood flow etc and to nourish the tissue cells. These also help to disperse coagulated blood or effusion which might be present in the affected area of the patient.

Three times a day, the paste of two oils and cream (combination of phytochemicals) in the equal ratio to be applied in the same manner as applied in the clinic. The interval between the two application should be minimum two hours but the application of the paste should be strictly followed three times a day in prescribed quantity, in case of one sitting is taken in the clinic and the next two
times is mandatory at home or otherwise three times a day is compulsory at home with a minimum interval of two hours.

**Results and Discussion**

**Figure 3:** shows knee gap between short head of biceps femoris and the bed. It is seen from the figure that on 1\textsuperscript{st} day of treatment (0 sitting/day) there are gaps of 5-6 cm of each patient which on subsequent days of treatment, 21\textsuperscript{st} day and 42\textsuperscript{nd} day are reduced. On 42\textsuperscript{nd} day gaps between bed and both knees are markedly reduced and became symmetrical for both knees. The figure represents patients of different age groups of either sex.

**Figure 4:** Diameter of group of muscles connected with Knee joint

Figure 3: shows knee gap between short head of biceps femoris and the bed. It is seen from the figure that on 1\textsuperscript{st} day of treatment (0 sitting/day) there are gaps of 5-6 cm of each patient which on subsequent days of treatment, 21\textsuperscript{st} day and 42\textsuperscript{nd} day are reduced. On 42\textsuperscript{nd} day gaps between bed and both knees are markedly reduced and became symmetrical for both knees. The figure represents patients of different age groups of either sex.
Figure 4: represents diameter of group of muscle connected with knee joint, 4cm above the patella for both knees. Patients suffering from osteoarthritis have difference between diameter of the group of muscles with knee joint for two knees. But with treatment between 0-42 days, improvement of muscles take place and on 42nd day both legs become symmetrical in measurements. The figure represents patients of different age groups of either sex.

Figure 5: Diameter of group of muscles connected with Knee joint

![Graph showing measurements in cm for 4 cm below patella](image)

Figure 5: represents the same measurements for 4 cm below the patella with similar observations.

Figure 6: Diameter of the Calf muscles (Gastrocnemius) in cm

![Graph showing measurements in cm for calf muscles](image)

Figure 6: represents diameter of calf muscle of different patients between 0 day and 42nd day of treatment. It is observed that diameter of calf muscle of both legs which were different at the beginning of treatment become symmetrical on 42nd day; the figure represents patients of different age groups of either sex.
Figure 7: Knee Flexion at Supine position

![Bar chart showing knee flexion at supine position with days of treatment](image)

Figure 7: This represents symmetry of knee joint movement, flexion in supine position with days of treatment. The figure shows marked improvement of knee flexion in supine position from commencement of treatment and become normal after 42 days of treatment. Here normal means person with knee flexion in supine position between 140-145.

Figure 8: Knee Flexion at Prone position

![Bar chart showing knee flexion at prone position with days of treatment](image)

Figure 8: Shows knee flexion at Prone position of Osteoarthritis patients

Total no of 30 patients suffering from Osteoarthritis were treated. Bar represents Mean ± Standard Diameter, * (P < 0.05)
Figure 8: Shows symmetrical of knee joint movement, flexion in prone position with days of treatment. The figure shows marked improvement from commencement of treatment and become normal after 42 days. Here normal means person with knee flexion in prone position between 130-135.

Figure 9: Represents symmetry of knee joint movement, flexion in standing position with days of treatment. There is marked improvement of knee flexion in standing position from 1st day treatment and become normal after 42 days of treatment. Normally knee flexion in standing position varies between 130-135.

In the following figures (10-16) 6 individual patient’s measurements have been presented giving measurement from commencement of treatment with 7,14,21,28,35,42 days of treatment. The changes are highly distinct showing symmetry in each case.
Figure 10-1

Figure 10-2
Figure 10-3

Figure 11-1
Showing the result of symmetrical effect of muscular improvements of diameter of the group of muscles connected with knee joint, 4cm above the patella (in cm)

Figure 11-3
Showing the result of symmetrical effect of muscular improvements of diameter of the group of muscles connected with knee joint, 4cm below the patella (in cm)

**Figure 12-1**

Showing the result of symmetrical effect of muscular improvements of diameter of the group of muscles connected with knee joint, 4cm below the patella (in cm)

**Figure 12-2**
Showing the result of symmetrical effect of muscular improvements of diameter of the group of muscles connected with knee joint, 4 cm below the patella (in cm).

Figure 12-3

Showing the result of symmetrical effect of muscular improvements of diameter of the Calf muscles (Gastrocnemius) (in cm).

Figure 13-1
Figure 13-2

Showing the result of symmetrical effect of muscular improvements of diameter of the Calf muscles (Gastrocnemius) (in cm)

Patient 3

Patient 4

Figure 13-3

Showing the result of symmetrical effect of muscular improvements of diameter of the Calf muscles (Gastrocnemius) (in cm)

Patient 5

Patient 6
Showing the result of symmetrical effect of knee joint movement during Flexion (Supine) (in degree)

Patient 5

Patient 6

Figure 14-3

Showing the result of symmetrical effect of knee joint movement during Flexion (Prone) (in degree)

Patient 1

Patient 2

Figure 15-1
Showing the result of symmetrical effect of knee joint movement during Flexion (Standing) (in degree)

Figure 16-1

Figure 16-2

Figure 16-3
Figure (17-18) show radiological photograph of 6 individual above patients, showing marked improvements after 42 days of treatment. (Photography by: X-ray machine – BPL-300mA)

**RADIOLOGICAL REPORTS OF SIX PATIENTS BEFORE & AFTER THE TREATMENT**

**Patient 1:**

- **Sex:** F  
  - **Age:** 61 yrs

*Before Treatment*

*After Treatment*

Show marked narrowing of the medial compartments of both the knee joints, along with sclerosis of the opposing articular surfaces, and osteophytic lipping-suggestive of advanced bilateral degenerative osteo-arthroses. Marked genu varum, along relative lateral instability of the right knee joint are also shown.

Show significant opening up of the joint spaces on both sides more on the right side - along with reduction of genu varum and instability of the right knee joint as well - suggesting marked improvement.

**Patient 2:**

- **Sex:** F  
  - **Age:** 57 yrs

*Before Treatment*

*After Treatment*

Show bilateral degenerative osteo-arthroses - particularly in the medial tibio-femoral compartments, and much more markedly on the right side with almost complete obliteration of the joint space of medial compartment on the right side.

Show opening up joint spaces on both sides including of medial compartment on the right side - suggesting considerable improvement.

**Patient 3:**

- **Sex:** M  
  - **Age:** 79 yrs

*Before Treatment*

*After Treatment*

Show advanced degenerative osteo-arthroses on both sides - with almost complete obliteration of the joint spaces of medial compartments on both sides - more markedly on the left side – along with bilateral genu varum as well.

Show opening-up of the joint spaces on both sides, with marked reduction of the bilateral genu varum – suggesting marked improvement.
RADIOLOGICAL REPORTS OF SIX PATIENTS, BEFORE & AFTER THE TREATMENT

Patient 4:

Before Treatment

Sex: F  Age: 46 yrs

After Treatment

Show bilateral degenerative osteo-arthroses - particularly in the medial tibia-femoral compartment - along with genu varum on the right side as well.

Show marked improvement, with opening-up of the joint spaces and reduction of genu varum on right side as well.

Patient 5:

Before Treatment

Sex: F  Age: 76 yrs

After Treatment

Show advanced degenerative osteo-arthroses in both knee joint - involving both the tibia-femoral compartments, and relatively more markedly on the left side - along with lateral instability of the right knee joint, and mild genu varum on the left side as well.

Show marked improvement on both side, with significant opening-up of the joint spaces, and restoration of alignment of the articulating bones.

Patient 6:

Before Treatment

Sex: F  Age: 54 yrs

After Treatment

Show advanced bilateral degenerative osteo-arthroses - particularly in the medical tibia-femoral compartments, with marked narrowing of the joint spaces in this compartments, and relatively more markedly on the left side - along with bilateral genu varum as well.

Show significant opening-up of the joints spaces on both sides, along with marked reduction the genu varum as well suggesting considerable improvement.
Clinical Findings

Patients who were treated for 42 days were also clinically examined. C reactive protein (13), muscle creatine phosphokinase (14), aldolase (15) are three clinical markers to which are increased in their activities during inflammation were decreased to normal level after 42 days of treatment.

Table I represents C reactive protein level of patients of various ages and sex. The increase in activity of C-reactive protein, at the commencement of the treatment was high which was reduced to normal level with 42 days of treatment.

<table>
<thead>
<tr>
<th>PATIENT NO.</th>
<th>SEX</th>
<th>AGE (yrs)</th>
<th>0 DAYS (mg/l)</th>
<th>42 DAYS (mg/l)</th>
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<tbody>
<tr>
<td>1</td>
<td>M</td>
<td>48</td>
<td>8.2</td>
<td>2.4</td>
</tr>
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<td>2</td>
<td>M</td>
<td>55</td>
<td>7.4</td>
<td>2.9</td>
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<td>3</td>
<td>M</td>
<td>58</td>
<td>6.8</td>
<td>2.7</td>
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<td>4</td>
<td>F</td>
<td>59</td>
<td>5.9</td>
<td>2.8</td>
</tr>
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<td>M</td>
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<td>6.0</td>
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<td>64</td>
<td>7.2</td>
<td>2.3</td>
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<td>F</td>
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<td>8.1</td>
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<td>M</td>
<td>48</td>
<td>8.0</td>
<td>5.6</td>
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<td>F</td>
<td>55</td>
<td>7.8</td>
<td>3.9</td>
</tr>
<tr>
<td>10</td>
<td>M</td>
<td>51</td>
<td>4.9</td>
<td>1.7</td>
</tr>
</tbody>
</table>

Normal upto 6 ml/l

Table II represents activity of muscle creatine phosphokinase of patients of different ages and sex. The activity which was high on the commencement of the treatment day was reduced on 42 days of treatment, showing the improvement of knee joint muscles.

<table>
<thead>
<tr>
<th>PATIENT NO.</th>
<th>SEX</th>
<th>AGE (yrs)</th>
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<th>42 DAYS (u/l)</th>
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<tbody>
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<td>M</td>
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<td>124</td>
<td>37</td>
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<tr>
<td>2</td>
<td>M</td>
<td>55</td>
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<td>28</td>
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<td>3</td>
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<td>30</td>
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<td>F</td>
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<td>M</td>
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<td>32</td>
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<td>33</td>
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<td>M</td>
<td>51</td>
<td>105</td>
<td>43</td>
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</table>

Normal upto 29-133 u/l

Table III represents activity of enzyme aldolase of patients of different ages and sex. The activity which was high on the commencement of the treatment day was reduced on 42 days of treatment.

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<td>3.35</td>
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<td>64</td>
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<td>F</td>
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<td>6.59</td>
<td>2.76</td>
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</table>

Normal upto 0.30 - 7.60 u/l

Table IV represents erythrocyte sedimentation rate of patients of different ages and sex. The amounts which were high on the commencement of the treatment day are reduced on 42 days of treatment.

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<tr>
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Normal <30

Conclusion

Topical application of phytoextracts from Indian medicinal plants for 42 days in osteoarthritis, patients can improve markedly the symmetry of both knees with recovery from pain. This could be a noble method for the treatment of osteoarthritis without involving knee surgery.

Declaration

Treatments of the patients were done with full consent of the patients. Blood samples were collected for diagnosis with full consent of the patients. The treatment protocols were duly approved by institutional bioethics committee.
Acknowledgement

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References


