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Research Article

AYURVEDA MANAGEMENT OF TRAUMATIC ARTHRITIS OF KNEE (*JANU VATA*) WITH SPECIAL REFERENCE TO *ARJUNA KSHEERA PAKA*- A CLINICAL STUDY

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ABSTRACT

In this clinical study 40 Traumatic arthritis patients aged 35-65 years were selected at random in OPD of TTD's S.V Ayurvedic Hospital PG Dravyaguna Dept, Tirupati. In Group I, 20 patients were treated with *Terminalia arjuna* powder TAP (oral intake of *Arjuna* powder boiled with milk). In group II, 20 patients were treated with *Terminalia arjuna Ksheerapaka* powder TAKP (*Arjuna* powder boiled with milk and filtered into semisolid and made into fine powder). The aim of the study was comparative clinical evaluation between group I and group II in the management of Traumatic arthritis.

Guggulu tablets are used for joint pains. But it has *Lekhana* and *Medohara* properties and causes *Vata prakopa*. That's why there is an acute need for safe herbal drug. Therefore *Arjuna*, a *Bhagna sandhanakara* drug mentioned in *Vrindamadhava* is taken for the study. The form of drug is *Arjuna* bark powder by boiled with milk (*Bhagna pibeth tvak payasarjunasya*).

It is observed that there is no significant difference between group I and group II in the mean values of fatigue, Pain radiating to other parts and walking time but significant difference were observed in ESR before and after treatment in group I and group II. Group II showed better results in reducing restricted movement and Group I shows better results in reducing inflammation.

Based on all the observed results it can be concluded that Group II has showed highly significant improvement when compared in between groups, this may be due to *Jeevaniya* and *Sandhaniya karma* of milk which causes synergetic action of *Arjuna karmas*. No complications were observed in the clinical study.

KEYWORDS: Traumatic arthritis, *Arjuna ksheerapaka*, *Arjuna* powder, *Terminalia arjuna* powder (TAP), *Terminalia arjuna Ksheerapaka* powder (TAKP), Ayurveda.

INTRODUCTION

Arthritis is a joint disorder featuring inflammation. A joint is an area of the body where two different bones meet. A joint functions to move the body parts connected by its bones. Arthritis literally means inflammation of one or more joints. Arthritis frequently accompanied by joint pains which is referred as arthralgia.[1] Knee pain is caused by sudden injury, an over use injury or by underlying conditions such as Arthritis. Treatment varies depending on the cause. Symptoms of knee injury can include pain, swelling and stiffness.

Traumatic arthritis of Knee

The knee is not a very close-fitting joint, and much of the knee's stability is provided by the ligaments. Traumatic arthritis of Knee may develop years after a fracture, ligament injury or meniscus tear[2] (a tear in the connective tissue of the knee). The injury could be from sports, a motor vehicle accident, a fall, a military injury, or any other source of physical trauma. Joint injuries cause changes to load-transmission through weight-bearing bones and this may play a role in development of the arthritic condition.[3]

Mechanism

When there is an injury where the bone and cartilage of the knee do not heal properly and leads to extra wear on the joint surface. If the injury is severe enough, the cartilage may completely wear out, leaving the knee painful and stiff. The wearing-out process is accelerated by continued injury and excess body weight. As the cartilage wears and the bones of the joint rub against each other, the pain can become more severe and constant, interfering with daily activities, like walking, climbing stairs or kneeling along with a feeling of weakness or "buckling" of the knee.

The most common symptoms of knee arthritis are[4]

- Joint pain, swelling, fluid accumulation in the joint, and decreased tolerance for walking, sports, stairs and other activities.
- Limited range of motion
- Stiffness of the knee
- Swelling of the joint
- Tenderness along the joint
- A feeling the joint may "give out"
- Deformity of the joint (knock-knees or bow-legs).

AIMS AND OBJECTIVES

➢ To study the effect of *Bhagna chikitsa* in the management of Traumatic arthritis.

- ➤ To develop a single and safe herbal remedy for the management of Traumatic arthritis.
- ➤ To study an effective and simple method of *Arjuna ksheerapaka*.
- ➤ To study the effect of drug in the patients with old injury.

MATERIALS AND METHODS

40 patients were selected at random in TTD's S.V Ayurvedic Hospital PG *Dravyaguna* Dept OPD and grouped into Group I and Group II of 20 Patients each. *Terminalia arjuna* powder (TAP), *Terminalia arjuna Ksheerapaka* powder (TAKP) are taken as Test drug for Group I and Group II patients and compared.

Table 1: Inclusion/Exclusion Criteria

Selection of patient	Inclusion	Exclusion
Age between 30 years to 65 years	✔	✖
Either sex	✔	✖
Unilateral onset	✔	✖
skin allergies/Skin diseases	✖	✔
Patients with Gouty arthritis, Rheumatoid arthritis, Psoriatic Arthritis, SLE	✖	✔
Patients using local Anti inflammatory medicine other than the research drugs	✖	✔
Low back ache with or without radiation to legs	✖	✔
Subjects having any deformity of knee, hip or back	✖	✔
Patients with metallic implants	✖	✔
Bed ridden patients	✖	✔

Dose: The dosage of the drug with *Anupana* is represented in the Table no 2.

Table 2: Drug dosage

Groups	No. of patients	Dosage	*Anupana*
I TAP (*Terminalia arjuna* powder)	20	500mg	Milk
II TAKP (*Terminalia arjuna Ksheerapaka* powder)	20	2 gm	Milk

Parameters of study

1. X-Ray of Knee
2. Blood for ESR
3. Measurements of circumference of knee with tape

Duration of the Treatment: 40 Days

Subjective Parameters

1. Pain (*Sandhi sula*)
2. Stiffness (*Sandhi graha*)
3. Tenderness (*Toda*)
4. Swelling (*Sandhi sotha*)
5. Restricted movement (*Pravartana akshamata*)
6. Crepitus (*Sandhi sphutana*)
7. Inflammation (*Sandhi Sopha*)
8. Pain radiating to other parts
9. Fatigue
10. Walking time

Objective Parameters

1. E.S.R
2. Measurement of knee with tape (in cms)

Gradation

Grade 0: No symptoms

Grade 1: Mild symptoms

Grade 2: Symptoms sufficient to cause distress/Difficulty in performing routine work

Grade 3: Very severe/Patient unable to perform his routine work

Method of Preparation of *Arjuna Ksheera Paka*: (Fig 1)

The form of drug is *Arjuna* bark powder by boiled with milk was taken for the study (*Bhagna pibeth tvak payasarjunasya*).[5] 500gms of *Arjuna twak Yavakuta churna* is mixed in 4 liters of *Gokshira* and 16 liters of water in a stainless steel vessel and boiled it in *Madhyamagni* till the water portion is totally evaporated and portion of milk is left. It should be collected and filtered through clean cloth. The filtered material is again boiled on *Mandagni* upto semi solid state and dried in shade for 7 to 8 hrs and made into fine powder by using *Khalwa yantra*.[6]

OBSERVATIONS AND RESULTS

Statistical Analysis to assess Individual and comparative effects of the groups were done using paired-t test using grades of different symptoms mentioned below.

Relief		Difference in change
No Relief	→	Zero
Mild Relief	→	One
Moderate Relief	→	Two
Complete Relief	→	Three

Statistical observations of the clinical study

Results and observations of Group I (TAP - *Terminalia arjuna* powder)

There is significant improvement in the mean value of Restricted movement, Fatigue, Pain radiating to other parts and Walking time. High significance is observed in Pain, Swelling, Stiffness, Tenderness, Crepitus, Inflammation. It also showed significant improvement in Measurement of knee with tape (in cms), ESR (mm/hr).

Table 3: Statistical observations of Group I (TAP)

Name of the Symptoms(Variables)	Mean		SD		p-value
	BT	AT	BT	AT	
Pain	2.9	0.8	0.31	0.89	<0.001
Swelling	1.55	0.45	1.36	0.51	<0.001
Stiffness	2.4	0.75	0.50	0.44	<0.001
Tenderness	2.75	0.7	0.44	0.57	<0.001
Crepitus	2.5	0.9	0.76	0.64	<0.001
Inflammation	1.3	0.5	1.30	0.69	<0.001
Restricted movement	1.95	0.7	0.89	0.73	<0.001
Fatigue	1.4	0.7	0.99	0.57	<0.001
Pain radiating to other parts	1.5	0.55	1.36	0.76	<0.001
Walking time	1.45	2.6	0.51	0.50	<0.001
Measurement of knee with tape (in cms)	30.1	26.35	9.51	7.31	<0.001
ESR (mm/hr)	28.4	19.35	11.64	8.26	<0.001

(n=20, Paired t-test is used for the comparison of before and after treatment means, p value <0.05 is considered as significant and <0.001 is considered as highly significant)

Results and observations of Group II (TAKP *Terminalia arjuna Ksheera paka* powder)

There is significant improvement in the mean value of Fatigue, Pain radiating to other parts, Walking time and Inflammation. High significance is observed in Pain, Swelling, Stiffness, Tenderness, Crepitus and Restricted movement. It also showed significant improvement in Measurement of knee with tape (in cms), ESR (mm/hr) Table 4.

Table 4: statistical observations of Group II (TAKP)

Name of the Symptoms (Variables)	Mean		SD		p-value
	BT	AT	BT	AT	
Pain	2.9	0	0.31	0.00	<0.001
Swelling	2.05	0.25	1.28	0.55	<0.001
Stiffness	2.65	0.3	0.75	0.47	<0.001
Tenderness	2.9	0.35	0.31	0.59	<0.001
Crepitus	2.2	0.45	1.06	0.60	<0.001
Inflammation	1.55	0.3	1.23	0.57	<0.001
Restricted movement	2.45	0.5	0.51	0.51	<0.001
Fatigue	1.35	0.6	1.04	0.50	<0.001
Pain radiating to other parts	1.2	0.3	1.15	0.47	<0.001
Walking time	1.15	2.35	0.59	0.59	<0.001
Measurement of knee with tape (in cms)	38.3	32.55	6.91	4.91	<0.001
ESR (mm/hr)	17.5	13.1	9.39	8.69	<0.001

(n=20, Paired t-test is used for the comparison of before and after treatment means, p value <0.05 is considered as significant and <0.001 is considered as highly significant)

Table no: 5 showing mean difference between two groups

Name of the Symptoms	Group I (TAP)	Group II (TAKP)
Crepitus	1.6	1.75
ESR (mm/hr)	9.05	4.4
Fatigue	0.7	0.75
Inflammation	0.8	1.25
Measurement of knee with tape (in cms)	3.75	5.75
Pain	2.1	2.9
Pain radiating to other parts	0.95	0.9
Restricted movement	1.25	1.95
Swelling	1.1	1.8
Stiffness	1.65	2.35
Tenderness	2.05	2.55
Walking time	1.15	1.2

It is ascertained that Group II (TAKP (*Terminalia arjuna Ksheerapaka* powder) is found more effective. From the above results it can be concluded that Group II is highly significant in between the two group's comparison.

DISCUSSION

Traumatic arthritis is caused from blunt, penetrating, or repeated trauma or from forced inappropriate motion of a joint, bone, cartilage, tendon or ligament. It may be caused by injury to the supporting ligaments or other structures within the joint.

Arjuna is taken up for the study as it has got the mention of *Bhagna sandhanakara karma*[6]. Since the study is in traumatic arthritis, its role is pivotal for the study.

The specific age group of 35-65 years was taken for the study. It is the age where maximum physical injury to the joint takes place because of more usage of vehicles and riding them beyond the limit speed and also degenerative changes occur in bone in old age causing knee joint pain. Knee joint pain with unilateral onset is taken because joint pain caused due to previous injury i.e is mostly unilateral origin and patient complains of severe pain in one side of joint rather than the other side.

Results were encountered by using paired t-test between Group I (*Terminalia arjuna* powder) and Group II (*Terminalia arjuna Ksheerapaka* powder).

In Group I (*Terminalia arjuna* powder (TAP), there is significant improvement in the mean value of Restricted movement, Fatigue, Pain radiating to other parts and Walking time. High significance is observed in Pain, Swelling, Stiffness, Tenderness, Crepitus, Inflammation. It also showed significant improvement in Measurement of knee with tape (in cms), ESR (mm/hr). The reasons may be because of *Kashaya-Tikta rasa*, *Laghu Ruksha guna* and *Sita virya* of *Arjuna* might have reduced the Inflammation. Whereas Group II *Terminalia arjuna Ksheerapaka* powder (TAKP) had little effect. The reason may be that potency of *Arjuna* that is *Kashaya rasa* and *Ruksha guna* are bit nullified by *Ksheera* and its *Gunas*.

In Group II (*Terminalia arjuna Ksheerapaka* powder (TAKP), there is significant improvement in the mean value of Fatigue, Pain radiating to other parts, Walking time and Inflammation. High significance is observed in

Pain, Swelling, Stiffness, Tenderness, Crepitus and Restricted movement due to the *Ksheerapaka* preparation of *Arjuna* which might have reduced the *Sthambana* property of *Kashaya rasa* and *Sita virya*. The *Ksheera* would have synergised the activity of *Asthi dathu poshana* as milk is said to have higher concentration of calcium in it and is good *Sandhanakara* property. There by improving the movement by strengthening the bones of the joints by healing the fractured site of the bone. It also showed significant improvement in Measurement of knee with tape (in cms), ESR (mm/hr).

When comparing Group I (*Terminalia arjuna* powder (TAP) and Group II (*Terminalia arjuna Ksheerapaka* powder (TAKP), It is observed that there is no significant difference between the mean values of fatigue, Pain radiating to other parts and walking time in Group I (*Terminalia arjuna* powder (TAP) and Group II (*Terminalia arjuna Ksheerapaka* powder (TAKP).

There is significant difference seen in ESR before and after treatment in Group I (*Terminalia arjuna* powder (TAP) is higher than that of Group II (*Terminalia arjuna Ksheerapaka* powder (TAKP). This decrease in E.S.R in both the groups may be due to decrease in Pain and Inflammation.

Based on all the observed results it can be concluded that Group II (*Terminalia arjuna Ksheerapaka* powder (TAKP) has showed highly significant improvement when compared in between groups, this may be due to *Jeevaniya* and *Sandhaniya karma* of milk which causes synergetic action of *Arjuna karmas* (*Terminalia arjuna Ksheerapaka* powder TAKP).

CONCLUSIONS

❖ This study discusses about traumatic arthritis particularly in Knee joint.

❖ There will be tissue discontinuity in arthritis caused by trauma. Discontinuity of any tissue is to be considered as *Bhagna* (Fracture). Hence it is hypothesized that the treatment useful in bone fracture can also be extended to any tissue fracture.

❖ A test drug *Arjuna*, *Asthi sandhanakara dravya* is selected to study the Anti-arthritic action in Traumatic origin.

❖ *Arjuna* powder and *Arjuna Ksheerapaka* powder were used for study, and given to patients with *Janu sula.*

❖ Statistically highly significant improvement is observed in ESR in Group I (*Terminalia arjuna* powder (TAP) than that of Group II (*Terminalia arjuna Ksheerapaka* powder (TAKP).

❖ Group II showed better results in reducing pain, swelling, stiffness, tenderness, crepitus, restricted movement and Measurement of knee with tape than Group I.

❖ To conclude statistically highly significant improvement in reducing the Pain, Swelling, Stiffness, Tenderness, Crepitus was observed in both Groups, but Group I showed statistically highly significant observation in inflammation where as Group II showed improvement in Restricted movements.

❖ *Arjuna Ksheerapaka* powder has shown very promising results in 20 patients. Therefore it is here by concluded that *Arjuna Ksheerapaka* is safe and effective Ayurvedic substitute for conventional and chemical pain killers.

❖ *Arjuna* is very effective drug as it is having *Asthi sandhanakara* property and preparation of *Arjuna Ksheerapaka* powder is innovative and presence of *ksheera* in it facilitates in regeneration of bone and also helpful in healing fracture.

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Fig.1 PREPARATION OF *ARJUNA KSHEERAPAKA*

A. GOKSHIRA

B. ARJUNA YAVAKUTA CHURNA

C MIXING OF ARJUNA&KSHIRA

D. BOILING ARJUNA WITH MILK

E. FILTERING THE ARJUNA KSHERA PAKA

F. BOILING OF FILTERED MILK

G. ARJUNA KSHERAPAKA GHANA