

Topical Phytotherapy is the Nobel Approach for Revision of Total Knee Replacement: A Unique Case Study

Abstract

Knee-osteoarthritis (KOA) can only be treated by total knee replacement (TKR), which is a well-known surgical intervention in the globe. But in some cases, TKR failed in the operated knee-joint as well as non-operated knee-joint may pose risk of KOA. In general, patients are advised to undergo revision of TKR when two prostheses of femoral and tibial compartments are prolapsed or loosen or such other reasons as well as non-operating knee-joint needs to be operated urgently. The phytotherapy with Indian medicinal plants are well-established. The present case study was aimed to determine the efficacy of topical phytotherapeutic treatment for 90 days in order to prevent the revision of TKR, improve the pain and functional performance in daily activities in four Indian patients. After 90 days of topical phytotherapy treatment, the results were observed a significant decrease in pain in both the legs and lower back under visual analogue scale ($p < 0.05$), improvement of pain ($p < 0.05$), stiffness ($p < 0.05$) and physical function ($p < 0.05$) under WOMAC Index, a significant improvement in the Kamofsky scale (< 0.05), reduction of obesity confirmed by body mass index ($p < 0.05$) and normal radiological features. In conclusion, failed TKR can be treated by phytotherapy without further revision evidenced by normalization of above-mentioned parameters.

Keywords: Knee osteoarthritis; Total knee replacement; Topical phytotherapy; Revision of knee-joints by phytotherapy

Introduction

Total knee replacement (TKR) is a common and ultimate treatment of knee osteoarthritis (KOA) in India and other parts of the globe. Basically, the concept of TKR is mainly to relief pain and improvement of performance in daily activities [1,2]. However, TKR is done on the basis of different prostheses design such as cruciate retaining, posterior stabilized and high flexion posterior stabilized prostheses [2-6]. According to Julin J et al. there is a risk of prosthesis failure in young age groups of <55 years old due to infection, obesity, physical activity, loosening, osteolysis, etc. and needs revision for further prosthesis [7-9]. In an earlier study, surgical outcome revealed dissatisfaction in patients [10]. In the present report, it was aimed to detect efficacy of topical phytotherapeutic treatment for preventing the revision of TKR with normalization of daily functional activities without pain, reduction of body weights and also improved the damaged knee-joints in four Indian patients.

Case Study

Four female patients aged 65, 73, 55 and 64 years old respectively advised to further revision of unilateral TKR because they suffered with severe pain on weight-bearing, impaired function, and limitations of daily activities. They were treated at OPTM Healthcare (P) Ltd., India, from January 2016 to July 2016. The study protocol was evaluated and approved by the OPTM Research Institute Ethics Committee. An institutional review board-approved consent form for physical examinations and bilateral knee-joint images (X-rays) required for the study was signed by all four patients. Baseline demographic characteristics of four patients are shown in Table 1. The said four



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patients were not being treated by oral medications; injections; massage with any type of herbal gels; and any type of alternative interventions or treatments for diminishing pain or inflammation, for muscle relaxation, or to improve of the skeletal muscles during the last four weeks prior to the treatment of 90 days. The radiological features were observed bone erosion and revision for further prosthesis needed in the post-operated knee joint and required surgical intervention in the non-surgical knee joint as the patients were suffering with severe pain, stiffness and physical functional disabilities in both the knee-joints (Table 1) (Figures 1A,1B, 2A,2B,3A,3B,4A and 4B). Four pair of radiological images (before and after) is depicted in Figures 1-4.

Different types of prostheses in the tibia compartment have been used during TKR in order to get successful results but in the present report of the four patients have shown the further revision of TKR required and have risk of secondary knee osteoarthritis and non-operated knee-joint needs surgical intervention as shown in Figures 1A,1B,2A,2B,3A,3B,4A and 4B. All the four patients decided not to go for surgery. Hence, author has taken as challenge to recover them with the help of topical phytotherapeutic treatment protocol.



Figure 1: Radiological images for before and after the treatment.

Table 1: Demographic data and baseline characteristics of patients.

Parameters	Patient-1	Patient-2	Patient-3	Patient-4
Age (years)	65	73	55	64
Gender	Female	Female	Female	Female
Period of suffering (years)	10	15	8	12
Under gone TKR (right or left knee)	Right knee	Left knee	Left knee	Right knee
TKR done at the age	62	70.5	53	62.5
Weight (kg)	87.94	82.13	76.94	70.6
Height (m)	1.64	1.58	1.52	1.49
BMI (kg/m ²)	32.3	32.9	33.3	31.8
Indian ethnic group	Bengali	Punjabi	Marathi	Gujrati
Dietary habit	Non-vegetarian	Non-vegetarian	Vegetarian	Vegetarian
Work status	Self employed	Housewife	Employed full time	Retired
Marital status	Single	Married	Widow	Separated
Classification of KOA (K-L system)				
Right knee	Prolapsed prostheses	≥Grade 4	≥Grade 4	Stucking the fixed pin of the tibial prosthesis at the edge
Left knee	≥Grade 4	Completely narrowed the gap between the prostheses	Prolapsed prostheses	≥Grade 4
Pain under VAS (mm)				
Right leg	45	90	89	89
Left leg	98	55	56	53
Lower back	61	42	62	65
Under WOMAC Index (%)				
Pain	19.75	18.75	19.79	20.83
Stiffness	7.29	4.17	6.25	8.33
Physical function	68.75	66.67	67.7	68.75
Multiple complaints				
Constipation	Present	Present	Not present	Present
Acidity & reflux	Not present	Present	Not present	Present
Insomnia	Present	Present	Present	Present
Varicose vein	Not present	Present	Present	Present
urinary incontinence	Present	Not present	Present	Not present
Crepitus during knee flexion	Present	Present	Present	Present
Morning stiffness (<30 min)	Present	Present	Present	Present
Measures taken to diminished pain & inflammation				
Knee-cap (right or left)	Bilateral	Right knee	Bilateral	Bilateral
Paracetamol and NSAIDs	Paracetamol	NSAIDs	NSAIDs	Paracetamol and NSAIDs
Corticosteroid injection	6 times in 6 months	2 times in 2 months ago	8 times in 4 months	12 times in 3 months
Walking support	Stick	Wheel chair	Sketches	A walker
Physiotherapy done (years)	3	2.5	2	1.5
Undergoing alternative treatment	Homeopathic	Ayurvedic & gels	Acupuncture	Ayurvedic & Homeopathic
Supplements taken to reduce pain or improve fitness	Calcium & vitamin D	Glucosamine	Calcium & vitamin D	Glucosamine & Chondroitin

The main objectives of the treatment are: to reduce pain, inflammation and stiffness of muscles without dependence upon any types of pain killers or corticosteroid injection or arthrocentesis; to increase the muscular strength without using supporting belt on the waist or knee joints and the gaps between the bones/ vertebrae; to rectify calcifications/degeneration of bones, and to normalize the varus/valgus deformities (Figures 1-4) [10-12].

The treatment involves topical application of phytoconstituents from the extracts of six Indian medicinal plants namely *Cissus quadrangularis* (whole plant), *Heliotropium indicum* (whole plant), *Rosemarinus officinalis* (leaves and flowers), *Calotropis gigantea* (root and leaves), *Boswellia serrata* (resin) and *Curcuma longa*

(rhizome) mixed with virgin sesame oil (extracted from seeds at room temperature) and beehives wax to make viscous phyto-based oil without using any preservatives or chemicals in order to preserve the phytochemical properties of plants intact. The virgin sesame oil is acted as bio-preservative and beehive wax helps to reduce joint pain, to relieve stiffness, to stimulate circulation and to moisturize skin [11-18].

Several researchers had already reported the medical effects (specially on pain, inflammation and stiffness of muscles) on human body of the phytochemicals contained in *Cissus quadrangularis*, *Heliotropium indicum*, *Rosemarinus officinalis*, *Calotropis gigantea*, *Boswellia serrata* and *Curcuma longa* [14-16,19-23].

Each 30 ml of said viscous phyto-based oil is to be applied with the

tip of three fingers in particular technique over the skin three times a day with minimum interval of time two hours for 90 days; lying in six different postural positions such as supine, prone, right and left contralateral and right and left cross (supper) contralateral in different programmed sequences in order to nourished the effected group of badly damaged muscles and nerves in the legs and lumbar regions during KOA [11,13,15,24]. The author had previously discussed

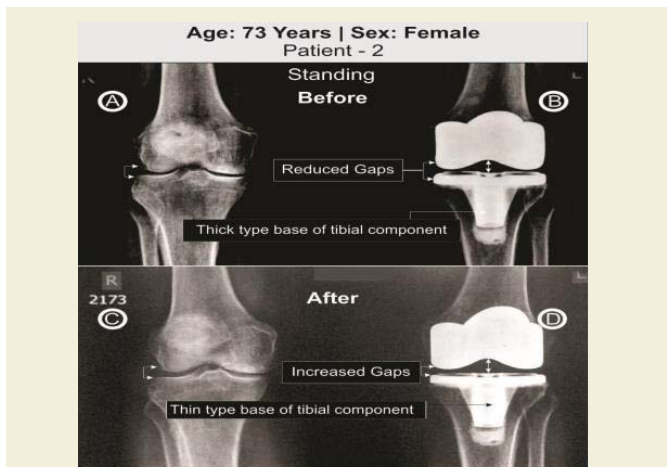


Figure 2: Radiological images for before and after the treatment.

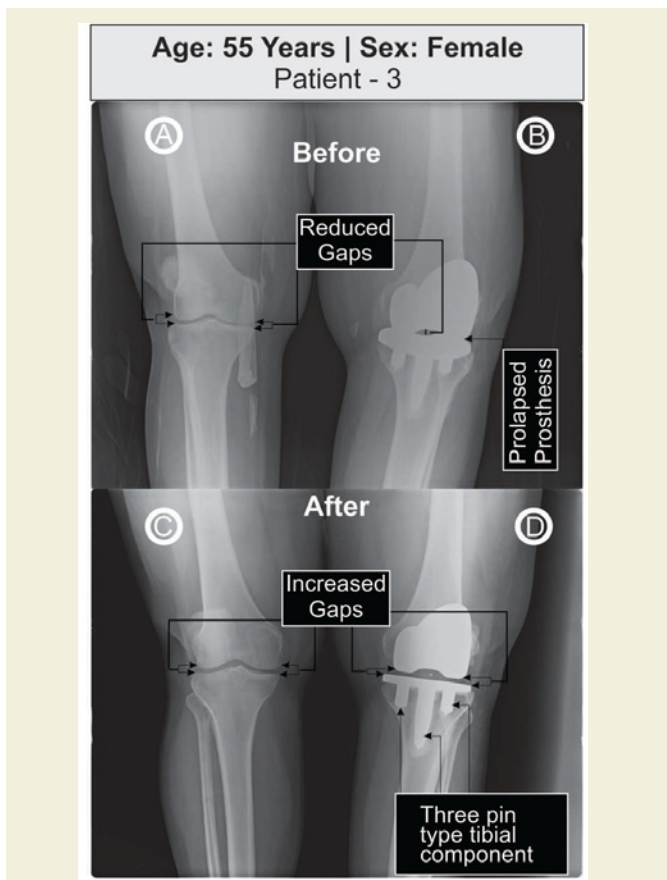


Figure 3: Radiological images for before and after the treatment.

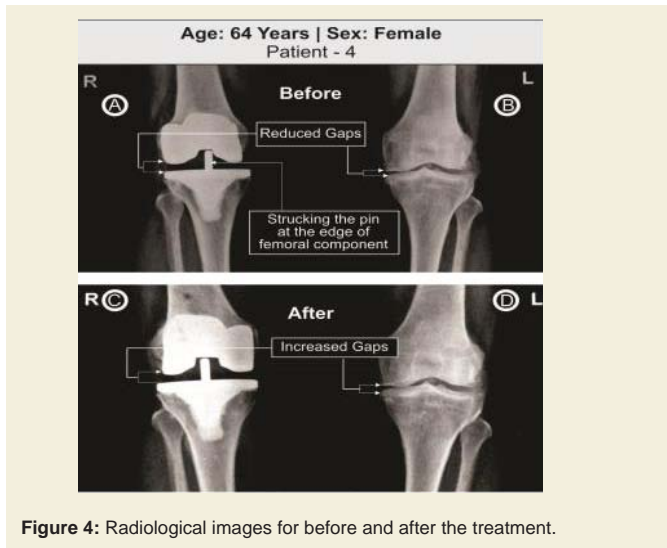


Figure 4: Radiological images for before and after the treatment.

elaborately, the reasons of the programmed sequences with six postural positions, and the purpose of special devices such as medicated pad, wooden roller and bet tarry operated electronic nerve stimulator used during the therapy [11,13,24].

The treatment protocol is based on well defined certain principles and theories and also based on the fundamental properties of all muscles such as excitability, conductivity, contractibility, elasticity and viscosity with the help of well known chemical, mechanical, thermal and electrical stimuli [11,13,24]. In the phytotherapy protocol, viscous phyto-based oil serves the purpose of producing chemical stimulation, manipulation with the tip of three fingers and Wooden roller develop mechanical stimulation, medicated pads with control temperature generates thermal stimulation and 9 volt DC electronic nerve stimulator produces electrical stimulation [11,24,25].

Tables 2 and 3, summarize the pain and performance parameters of four patients. Patients underwent standing X-ray examination to the most important leg joints and lower back: it confirmed knee involvement with large osteophytes, narrowing the joint space, increased density of the subchondral bone, large subchondral cysts in the non-operated knee joints. The joint spaces of the operated knee joint were completely jointed in case of patients 1 and 3, substantially diminished in case of patient 2 and sticking the long fixed pin at the

Table 2: Baseline characteristics of pain for four patients.

	Patient-1	Patient-2	Patient-3	Patient-4
VAS (in mm)				
Right Leg	45	90	89	89
Left Leg	98	55	56	53
Lower back	61	42	62	65
WOMAC Index (%)				
Pain	19.75	18.75	19.79	20.83
Stiffness	7.29	4.14	6.25	8.33
Physical function	68.75	66.67	67.7	68.75
KPS (%)	40	50	40	30

VAS: Visual Analogue Scale; WOMAC Index: The Western Ontario and McMaster Universities Osteoarthritis Index; KPS: Karnofsky Performance Score

Table 3: Analysis of VAS, WOMAC Index, KPS and BMI for four patients.

	Baseline	After end of 90 days	Improvement after 90 days			p-value
	Mean (SEM)	Mean (SEM)	MD	95% CI		
				Lower Limit	Upper Limit	
VAS (mm)						
Right leg	78.2 (11.08)	5.00 (0.41)	73.2	46.06	100.34	0.0006
Left leg	65.50 (10.85)	3.50 (0.29)	62	35.44	88.56	0.0012
Lower back	57.50 (5.22)	2.50 (0.29)	55	42.21	67.79	<0.0001
WOMAC INDEX (%)						
Pain	19.78 (0.42)	1.56(0.30)	18.22	16.95	19.45	<0.0001
Stiffness	6.50 (0.89)	0.00 (0.00)	6.5	4.31	8.69	0.0003
Physical function	67.97 (0.49)	11.98 (0.49)	55.99	54.27	57.7	<0.0001
KPS (%)	40.00 (4.08)	70 (4.08)	-30	-44.12	-15.88	0.002
BMI (Kg/m ²)	32.57 (0.33)	28.24 (0.40)	4.33	3.05	5.61	0.0002

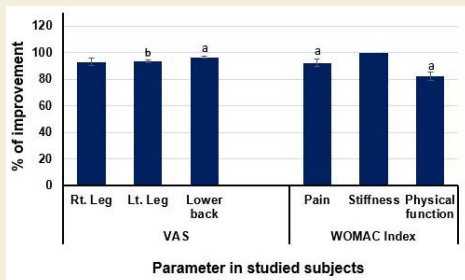


Figure 5: Percentage improvement of parameters under VAS and WOMAC Index of four patients who had undergone TKR (*P<0.001; ^bP<0.05).

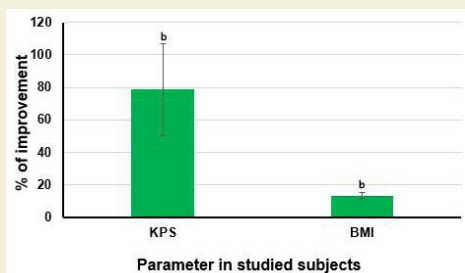


Figure 6: Percentage improvement under Karnofsky performance scale and body mass index of four patients who had undergone TKR (*P<0.05).

corner of the femoral compartment in case of patient 4 (Figures 1-4).

After 90 days of topical phytotherapeutic treatment, improvements were observed in pain under visual analogue scale (VAS) and pain, stiffness and physical function under WOMAC Index with highly significant values (p<0.05); improvements of functional performance under the Karnofsky performance scale (KPS) and reduction of obesity as confirmed by body mass index (BMI) were also highly statistically significant (p<0.05) (Table 3) (Figures 5 and 6). A substantial

improvement of the knee-joints (both non-operated and operated) have also been observed as evidenced by X-ray imaging (Figure 1C,1D,2C,2D,3C,3D,4C and 4D).

Discussion

The present case reports indicate the failure in TKR and osteoporosis after TKR with pain and non-performance of daily activities for which alternative treatment with specialised topical phytotherapy for 90 days would be considered to be best. Generally, the TKR supports to relief pain and improvement of performance in daily activities [1,2]. Further revision on TKR may be stressful, risk and expensive but specialized topical phytotherapeutic treatment after 90 days to the studied patients are suitable therapy where substantial improvement in pain, stiffness, functional and performance abilities, BMI with highly statistically significant values (p<0.05), knee gaps, osteoporosis and osteophytes in non-operated knee-joint and knee flexion were observed (Table 3) (Figures 1C,1D,2C,2D,3C,3D,4C,4D,5 and 6).

Conclusion

The aim of the TKR is to reduce the pain, increase the functional ability and the gap between the femoral and tibial compartments. The present study firmly confirmed with normalization of prolapsed prostheses by increasing the gap between the compartments of the operated and non-operated knee-joints as evidenced by X-ray images and diminishing pain, stiffness and improvement of physical functional and performance abilities and reduction of inflammation as well as obesity confirmed by BMI with the help of topical phytotherapeutic method within 90 days (Table 3) (Figures 1C,1D,2C,2D,3C,3D,4C,4D,5 and 6).

Further researches should be undertaken on:

1. Deranged anatomical and abnormal biochemical features after TKR,
2. Phytochemicals characterization by using Mass Spectroscopy,
3. Measurements of collagen and 4-hydroxyproline (O-Hyp) to show collagen formation, which takes place with the treatment, and
4. Measurements of hyaluronic acid both in volume and chemical compositions before and after the treatment to detect how the phytochemicals changing the chemical compositions of hyaluronic acid.

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