

## Clinical and Functional Outcome of Non-Surgical Managements of Knee Osteoarthritis in Very Elderly Patients

Mujtaba Ahmad<sup>1</sup>, Rabindranath Chowdhury<sup>2</sup>, A Md Atif<sup>3</sup>, Samuel Lakra<sup>4</sup>

<sup>1</sup>Junior Resident, Department of Orthopaedics, KPC medical College and Hospital, Kolkata, West Bengal, India

<sup>2</sup>Junior Resident, Department of Orthopaedics, KPC medical College and Hospital, Kolkata, West Bengal, India

<sup>3</sup>Senior Resident, Department of Orthopaedics, Central institute of orthopaedics, VMMC and Safdarjung hospital, New Delhi, India

<sup>4</sup>Senior Resident, Department of orthopaedics, Rajendra Institute of medical sciences, Bariatu, Ranchi, Jharkhand, India

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Corresponding author: Dr Samuel Lakra

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### Abstract

**Aim:** To investigate the clinical and functional outcome of non-surgical management of osteoarthritis knee in very elderly patients.

**Materials and Methods:** The present interventional cohort study was conducted at KPC Medical college & Hospital, Kolkata during the period of Covid Pandemic. A total 50 patients were evaluated for their functional outcome, daily activities with any associated complications and thereby Performa filled for ROM, verbal pain score, WOMAC score and evaluated at the end of six months. Since the questionnaire was in English, the questions were translated to their mother tongue and the response noted.

**Results:** The mean age of the study group was 84.5 years. There were 16 (32%) males and 34 (68%) females. The average pre consultation flexion at knee was 106.720 ( $106.72 \pm 7.51$ ) and it was improved to average of 117.810 ( $117.81 \pm 7.15$ ) at 6 month follow-up. The average pre-consultation extension at knee was 78.330 ( $78.33663 \pm 7.51$ ) and it was improved to average of 39.190 ( $39.198 \pm 7.51$ ) at 6 months follow up. The verbal pain score shows decreasing trend in subsequent follow-ups and 0 in almost every patient at 6 months follow-up. 10 out of 50 patients had persistent pain at 6 months follow up with verbal pain score of 2. There was decreasing trend in WOMAC score on subsequent follow-ups signifying better functional outcome in reference of stiffness and pain.

**Conclusion:** Pharmacological along with ST and PrT programme is the ideal option for patients who are of very elderly age groups and in whom surgery is contraindicated.

**Keywords:** WOMAC score, Knee Osteoarthritis, Elderly Patients

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### Introduction

Osteoarthritis (OA) refers to a clinical syndrome of joint pain accompanied by varying degrees of functional limitations

and reduced quality of life [1]. Most common form of arthritis and one of the leading causes of pain and disability

worldwide [2]. Most commonly affected peripheral joints are the knees, hips, ankle and small joints of foot [3].

The burden of OA is projected to increase, due in part to obesity and population aging. While the prevalence of OA increases with age, there is a growing recognition that OA affects people of younger ages in view of sedentary lifestyle, diabetes mellitus, hypertension, obesity. Recent US data demonstrated that half of people with symptomatic knee OA are diagnosed by age 55. Approximately 25% of persons 55 years or above have had knee pain in a month in last 10 years [4].

Risk factors of osteoarthritis includes genetic factors (heritability estimate for hand, knee and hip OA are high at 40 – 60%, though the responsible genes are largely unknown), constitutional factors (aging, female sex, obesity, high bone density), and more local, largely biomechanical risk factors (joint injury, occupational/ recreational usage, reduced muscle strength, joint laxity, joint mal alignment) [5].

OA of knee can be managed both by surgical and non – surgical treatment. To overcome the burden of cost-effective surgeries it is necessary to research and make aware to the society about the effective non- surgical treatment which could manage early osteoarthritis of weight bearing joints. Non- surgical treatment includes pharmacological and non – pharmacological treatments [6].

Non – pharmacological managements are Life style modification, Exercises and manual therapy, Weight loss, Electrotherapy, Nutraceuticals, Accupuncture, and Aids and devices (13). Exercises like muscle strengthening exercise, isometric, isotonic, stretching, weight bearing, resistant, aerobic exercises, and proprioceptive training. Whereas manual therapy includes, mobilization, manipulation, soft tissue

massage, stretching and passive movements to joints and soft- tissue [7]. Electrotherapy and electro-physical agents include pulsed – short wave therapy (pulsed electromagnetic energy, PEME), interferential therapy, laser, transcutaneous electrical nerve stimulation (TENS), and ultrasound [8].

Nutraceuticals term used to cover foods or food supplements thought to have health benefits. The most widely used is glucosamine (sulphate and hydrochloride) [9]. Acupuncture: This was discovered by Chinese about 2000 years ago. This involves treatment with needles, and most commonly used for pain relief [10].

Pharmacological management includes use of drugs like paracetamol- opioids combination, tricyclic drugs, SSRIs, SNRIs, NSAIDS including COX- 2 inhibitors, both oral and topical use of above said drugs [11]. There is paucity in the existing knowledge of Indian literature investigating the clinical and functional outcome of non-surgical management of osteoarthritis knee in very elderly patients.

### **Materials and Methods**

This interventional cohort study was conducted at KPC Medical College & Hospital, Kolkata during the period of Covid-19 Pandemic.

### **Inclusion Criteria:**

- 1) Patients with mild to moderate osteoarthritis of knee.
- 2) Patients of elderly age group (80 or more than 80 years).
- 3) Patients with osteoarthritis knee in whom surgery is contraindicated.
- 4) Patients with osteoarthritis of knee with < 10-degree Varus deformity.

### **Exclusion Criteria:**

- 1) Patients with advanced

- osteoarthritis of knee joint.
- 2) Patient with osteoarthritis of knee > 10-degree Varus deformity.
  - 3) Patients with severe osteoarthritis with laxity.
  - 4) Patient with arthritis other than Rheumatoid Arthritis.

### Methodology

Total 50 patients were evaluated for their functional outcome, daily activities with any associated complications and thereby Performa filled for ROM, verbal pain score, WOMAC score and evaluated at the end of six months. Since the questionnaire was in English, the questions were translated to their mother tongue and the response noted. An informed written consent was taken of all participants who fit into the inclusion criteria.

In each participant, a detailed clinical history and serial functional findings were recorded using pre-designed Performa, verbal pain score and WOMAC Score 27 questionnaire. Each patient was examined on every follow up week and compared with last follow up to assess the clinical and functional outcome after every follow up.

### Data collection

A minimum of 50 patients with osteoarthritis of knee with co-morbid conditions was taken up for study. Patients meeting the inclusion criteria were subjected to clinical examination on the basis of history and examinations like reduced ROM and frequent crepitus with pain & stiffness of the joints and were managed with two drugs (paracetamol and NSAIDs) as pharmacological and non-pharmacological methods like muscle strengthening exercise and proprioceptive training (3 sessions per week) for 8 weeks were given in the Hospital.

Each case meeting inclusion criteria was

taken for study. Diagnosis for Osteoarthritis was made by X-Ray. Patient was prescribed drugs like paracetamol and NSAIDs as pharmacological management.

For non-pharmacological management patient was given a proprioceptive training, in which foot-stepping exercise that predominantly involves knee movement in sitting position were taught.

Participants were asked to make a controlled movement of foot-step (up, down, left, and right) by stepping on the anterior, posterior, left, and right respectively. They were asked to begin with slowest speed and increase their speed after every movement for 15 minutes.

Muscle strengthening programme was conducted in sitting position of the patient comfortably on chair with their back against the back support and their knees at 90 degree of flexion. Both hands were used to grasp the sides of the seat. Then patients were asked to fully extend the knee using a concentric quadriceps action, then the lower leg using an eccentric quadriceps action.

Three Sessions weekly for 8 weeks was conducted. Each session consisting of 4 sets, with 6 repetitions per set. 1 min of rest was given between sets. Both lower extremities were trained, with 5 minutes interval between the training of each side.

A follow up was done on post treatment week 1, week 2, week 4, week 6, week 8 and then after 3 months and 6 months.

### Statistical Analysis

Categorical variables have been presented in number and percentage (%) and continuous variables has been presented as mean  $\pm$  SD and median. Normality of data has been tested by Kolmogorov-Smirnov test. A p value of <0.05 has been considered statistically significant. The results were prepared after intervention done in patients and the

graphical representation of KNEE ROM  
and pain score and joint stiffness along

with WOMAC SCORE analysis.

## Results

**Table 1: Age and gender distribution**

Age (In years)	Percentage
80-84	42
85-89	8
Gender	
Male	16
Female	34
Total	50%

42 out of 50 (84.0%) were in the age group 80-84 years, 8 (16.0%) were above 84 years of age. The mean age of the study group was 84.5 years. There were

16 (32%) males and 34 (68%) females. The sex distribution of the study group showed sex ratio as 1:2.1.

**Table 2: Flexion and extension trend**

Duration	Mean	Median	Standard deviation
<b>Flexion</b>			
Pre-Consultation Examination	106.72	107	9.298
Post Consultation week 1	107.63	109	13.43
Post consultation week 2	112.23	112	8.48
Post Consultation Week 4	115.14	114	6.53
Post Consultation Week 6	119.66	120	5.83
Post Consultation Week 8	122.12	122	4.17
Post Consultation (3 month)	122.33	123	4.71
Post Consultation (6 month)	125.6	126	2.46
<b>Extension</b>			
Pre-Consultation Examination	78.33	78	13.66
Post Consultation week 1	69.9	69	12.03
Post consultation week 2	57.12	57	10.07
Post Consultation Week 4	47.51	47	7.911
Post Consultation Week 6	35.13	35	4.39
Post Consultation Week 8	32.59	33	4.68
Post Consultation (3 months)	18.63	20	5.43
Post Consultation (6 months)	13.48	13	3.20

The average pre consultation flexion at knee was  $106.72^0$  ( $106.72 \pm 7.51$ ) and it was improved to average of  $117.81^0$  ( $117.81 \pm 7.15$ ) at 6-month follow-up.

The average pre-consultation extension at knee was  $78.33^0$  ( $78.33663 \pm 7.51$ ) and it was improved to average of  $39.19^0$  ( $39.198 \pm 7.51$ ) at 6 months follow up.

**Table 3: Pre and Post Consultation Pain Score**

Pain Score	Mean	Median	Standard deviation
Pre-Consultation Examination	6.33	6	1.8
Post Consultation week 1	5.34	5	1.74
Post consultation week 2	4.71	5	1.53
Post Consultation Week 4	4.73	5	1.79

Post Consultation Week 6	2.82	3	1.40
Post Consultation Week 8	1.9	2	1.19

The verbal pain score shows decreasing trend in subsequent follow-ups and 0 in almost every patient at 6 months follow-

up. 10 out of 50 patients had persistent pain at 6 months follow up with verbal pain score of 2.

**Table 4: Pre and Post Consultation Joint stiffness**

Joint Stiffness	Mean	Median	Standard deviation
Pre-Consultation Examination	4.66	5	1.5
Post Consultation week 1	4.34	4	1.11
Post consultation week 2	3.80	4	1.44
Post Consultation Week 4	3.43	3	1.21
Post Consultation Week 8	1.59	2	1.07
Post Consultation (3 months)	0.93	1	0.79
Post Consultation (6 months)	0.52	1	0.54

There was decreasing trend in Joint stiffness on subsequent follow-ups

signifying better functional outcome.

**Table 5: Pre and Post Consultation WOMAC Score**

WOMAC Score	Mean	Median	Standard deviation
Pre-Consultation Examination	54.66	57	16.79
Post Consultation week 1	44.07	43	10.63
Post consultation week 2	36.07	36	7.41
Post Consultation Week 4	35.33	34	9.08
Post Consultation Week 6	29.46	29	6.67
Post Consultation Week 8	25.20	26	6.20
Post Consultation (3 month)	19.44	20	3.36
Post Consultation (6 month)	12.06	12	4.58

There was decreasing trend in WOMAC score on subsequent follow-ups signifying better functional outcome in reference of stiffness and pain.

### Discussion

Lower-extremity exercises performed in weight-bearing have the potential to aggravate symptoms in patients with knee OA. This study was designed to investigate the clinical and functional efficacy of pharmacological agents with muscle strengthening exercise and proprioceptive training for patients with OA Knee in very elderly patients in whom surgical intervention is contraindicated.

After 6 months of intervention, we found that combination of pharmacological intervention along with muscle strengthening exercise and proprioceptive training led greater improvements in clinical and functional outcome as compared to pre interventional functional and clinical status of these patients.

Knee extension and flexion strength was significantly increased post-intervention. The improvement in knee ROM and WOMAC Score was significantly effective in this type of patients compared earlier studies done in past.

These results suggest that the ST and PrT program along with pharmacological intervention in this very elderly patient

would result in a clinically meaningful increase in knee ROM and pain relief in people with OA knee.

Conversely, the improvement in pain relief along with knee extension and flexion strength in the post interventional patient was satisfactory and significant. It should be noted that the ST and PrT program performed in this study specifically focused on pain relief and knee extension and flexion strengthening. However, the decrease in WOMAC Score and verbal pain score suggesting with 95% confidence that pharmacological along with ST and PrT intervention leads to a clinically meaningful benefit in this population.

### Conclusion

Our study showed satisfactory post-intervention results which were achieved in the very elderly patients in terms of social function and mental health, and the patients were able to achieve early rehabilitation and return to their previous life activities. Pharmacological along with ST and PrT programme is the ideal option for patients who are of very elderly age groups and in whom surgery is contraindicated.

Further study with large sample size and long term follows up must be taken under consideration in Indian population. A comparative study with pharmacological along with ST and PrT must be done for the younger age group of patients so as to prevent from burden of surgeries and its complications.

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