

“A PROSPECTIVE STUDY OF FUNCTIONAL OUTCOME OF TOTAL KNEE REPLACEMENT IN OSTEOARTHRITIS OF KNEE”

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1. **AIM AND OBJECTIVES:** To evaluate the functional outcomes of Total Knee Arthroplasty.
2. **METHODS:** This is a prospective study of 20 cases who underwent Total knee replacement at Rajarajeshwari medical college and hospital, Bengaluru between June 2019 and May2021. Cases were taken according to inclusion and exclusion criteria. Patients were evaluated using Knee Society Score at regular follow up. In our study we had 28 female patients and 13male patients. Indications were OA in 19, RA in 1.. The average follow-up period was 22weeks.
3. **RESULTS :** In our study, pre-operatively all of our patients had moderate to severe pain, post-operatively 20 cases had mild pain. Preoperative average Flexion of 76 degrees was increased to 95 degrees post operatively. All the 20 knees had poor knee score of <60 preoperatively, postoperatively 42 knees had excellent score (80- 100) and 17 knees with good score (70-79). 38 patients had poor functional score(<60) and 3 patients with fair functional score (60-69) pre-operatively. Postoperatively 21 patients had excellent score (80-100), 11 patients with good score (70-79), 6 patients had fair score (60-69) and 3 patients had poor score(<60).

CONCLUSION: Total knee arthroplasty is now a common and established surgical procedure. The functional outcome of the procedure is dramatic, durable, and satisfactory with high patient acceptance.

KEY WORDS: Total knee arthroplasty; knee society score.

BACKGROUND

Knee is a complex joint and its degeneration is age related, post traumatic and rheumatoid like arthropathies, giving rise to severe disability, severely affecting the overall health and health related quality of life. The most effective treatment for above condition is TOTAL KNEE ARTHROPLASTY. 40%of population above 50years is suffering from arthritis of knee, out of which 80% need arthroplasty for pain, instability, restricted range of movement. The prevalence of rheumatoid arthritis0.75%; over 7 million in India are suffering from rheumatoid arthritis. With increase in the average life expectancy (69.25 yrs) and increased incidence of road traffic accidents the incidence of arthritis of knee secondary to age related degeneration and posttrauma a have also increased and number of patient under going TKR have also increased.

The interplay between the biomechanical studies and clinical experience has resulted in better design prosthesis that allow for near normal function. The Knee Arthroplasty has evolved as the gold standard for the treatment of debilitating arthritis. The goal of Total Knee Arthroplasty includes pain relief, improved range of motion and stability of knee joint.

AIMS AND OBJECTIVES

To evaluate the functional outcomes of total knee arthroplasty. To assess the improvement in- Pain relief post operatively, Stability and mobility of the joint, To assess the correction of deformities. To assess the complications associated with total knee replacement.

STUDY DURATION

Cases satisfying the inclusion criteria admitted in Rajarajeshwari Medical College and Hospital, Bangalore during the study period of October 2019 to August 2021 will be included.

MATERIAL AND METHODS

We did a prospective study on the functional outcome of 20 knees who underwent total knee replacement using cemented posterior stabilizing design at RAJARAJESHWARI MEDICAL COLLEGE AND HOSPITAL, BANGALORE during the year 2019-2021.

The Sample Size is 20 is calculated based on previous studies as well as approximate availability of number of cases in the above mentioned duration satisfying inclusion and exclusion criteria .

Inclusion Criteria

- a) Subjects who have grade 3 and grade 4 (Kellgren Lawrence grading system) osteoarthritis of knee with severe intractable pain and undergoing unilateral total knee replacement
- b). Patients willing to give consent for surgery c). In skeletally matured patients

Exclusion Criteria

- a). Patients with sepsis of the knee joint b). Patients with local skin lesions
- c). Comorbid disease status like:
 - 1). Peripheral vascular disease 2). Malignancy
 - 3). Uncontrolled diabetes, severe COPD, severe cardiac diseases, nephropathies etc
- d). Neuropathic joints
- e). Paralytic joints and neuro-muscular disorders f). Severe osteoporosis
- g). Severe bone defects/deficiency
- h). Poor compliant patients as in- Psychiatric disorders and Severe addict.

Surgery was performed under spinal with or without epidural anesthesia. Patient was positioned supine and his operating leg was positioned in flexion. A broad-spectrum antibiotic like cefoperazone, sulbactam combination of 1.5 gm IV was given before tourniquet application. A thorough betadine scrub was given. The part was painted with betadine and spirit. Sterile stockinette was used to drape the limb exposing only the operating area. Sterile drape was used for operative site.

A standard midline approach with knee in flexion was used. Deeper anteromedial dissection was followed for arthrotomy. Medial, lateral, posterior soft tissue release either minimal or extensive was done for soft tissue balancing and correction of deformities. Tibial and femoral osteophytes were excised. Femoral section was done with appropriate femoral rotation with reference to epicondylar line or White slide line. Tibial sectioning was done using extramedullary cutting. We have sacrificed both the cruciates in all knees.. Tibial defects were managed by autologous posterior condylar grafts with screws.

The alignment and soft tissue balance was checked in extension and flexion.. Trial components were

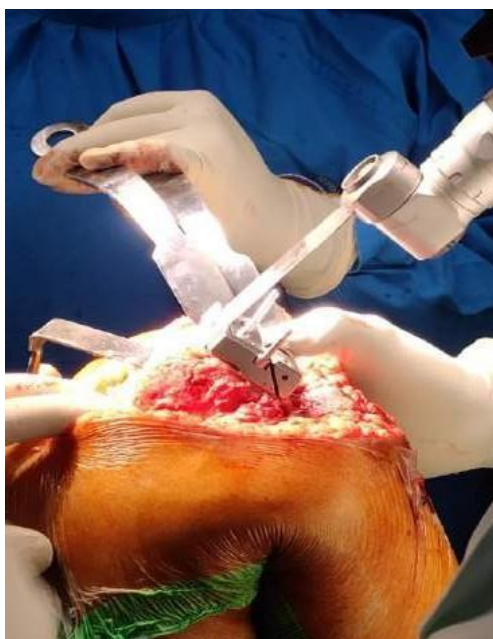
assembled for proper fit and checked for soft tissue tension and balancing in flexion and extension. Patellar tracking was noticed normal in all. Cementing of components was done by using one packet of antibiotic impregnated bone cement. Tourniquet was released, hemostasis was achieved by cauterization. Wound was closed in layers. Antibiotics continued post operatively for 2 days. Standard postoperative protocol was followed to develop quadriceps, to improve the range of motion and early weight bearing ambulation. Sutures removed at the end of two weeks.

Immediate post-operative and follow-up clinical radiological evaluation was done at regular intervals. Final evaluation was done using KSS scoring system. All cases were photographically documented. The follow-up period at 2 weeks, 3 months, 6 months.

STATISTICAL ANALYSIS

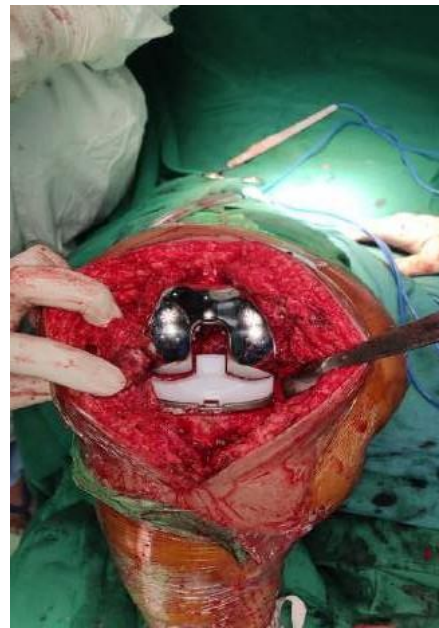
SPSS (Statistical Package For Social Sciences) version 20. (IBM SPASS statistics [IBM corp. released 2011] will be used to perform the statistical analysis

- Data was entered in the excel spreadsheet.
- Descriptive statistics of the explanatory and outcome variables were calculated by mean, standard deviation for quantitative variables, frequency and proportions for qualitative variables.
- Inferential statistics like
 - o Paired t test was applied to compare the quantitative variables between pre and post op time intervals.
- The level of significance is set at 5



Anterior Femoral cut
Tibial cut using extramedullary tibial jig

Checking the Mechanical axis and extension gap



Final positioning of Femoral and Tibial component within insert

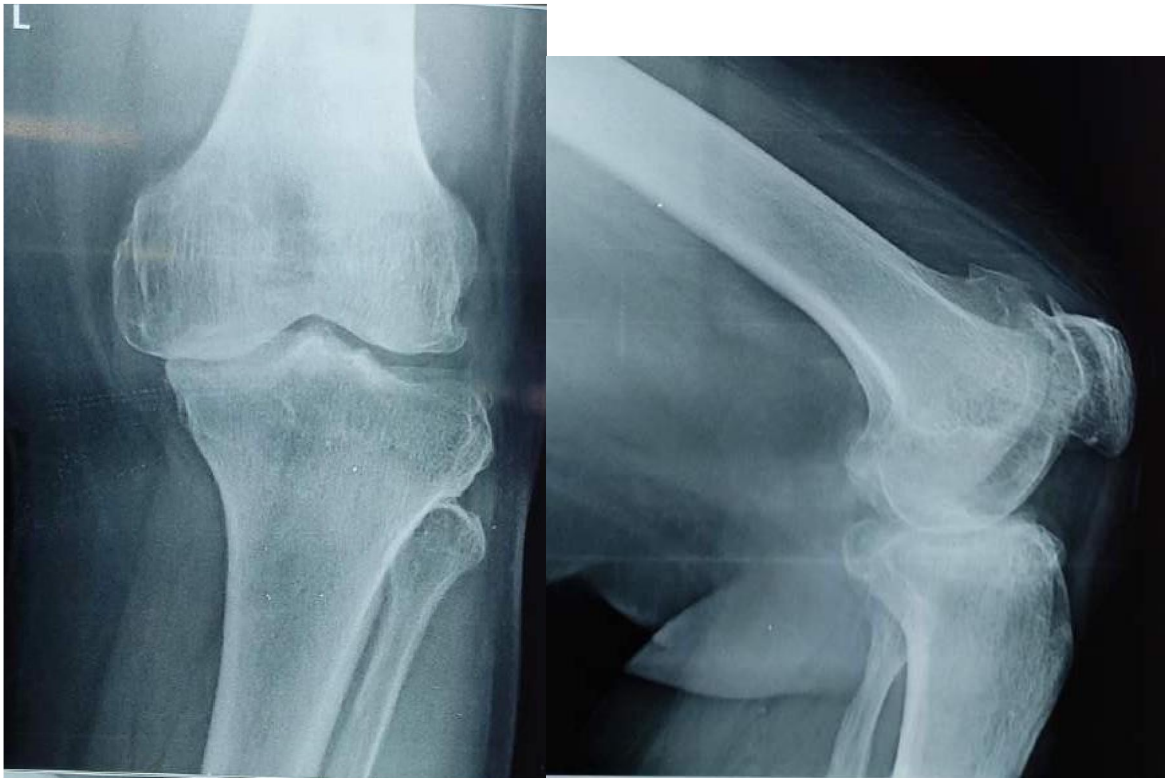
CLINICAL PHOTOGRAPHS



Preoperative varus of 3 degrees



Pre-operative flexion of 70 degrees



Pre-operative A-P and Lateral Radiographs



Post-operative A-P and Lateral Radiographs

Follow up



Flexion of 90degrees



No extensionlag

Results**Table showing mean age distribution of the subjects**

	N	Min imu m	Maxi mum	M ea n	S. D
A g e (i n y r s)	20	44	77	59. 85	8.1 32

Table showing distribution of the subjects based on age groups

Age groups	Frequency	Percent
44 to 50 yrs	4	20.0
55 to 60 yrs	6	30.0
61 to 65 yrs	7	35.0
> 65 yrs	3	15.0
Total	20	100.0

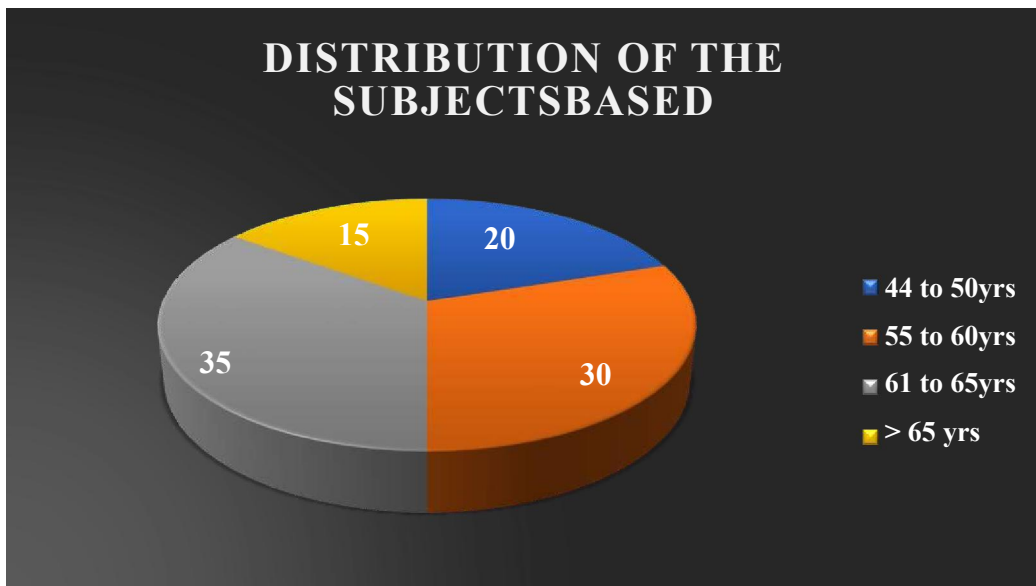


Table showing distribution of the subjects based on gender

Gender	Frequency	Percent
Females	18	90.0
Males	2	10.0
Total	20	100.0

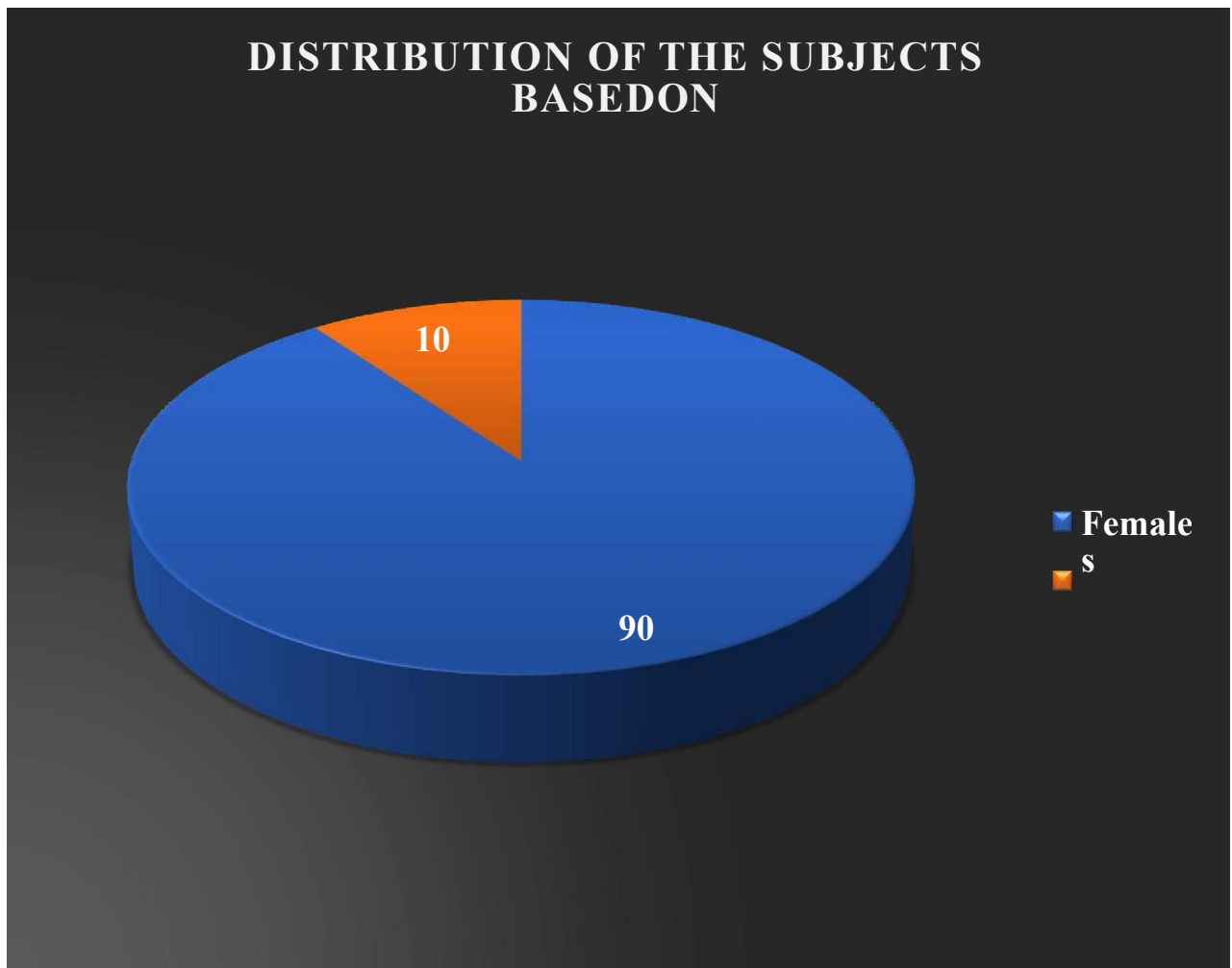


Table showing distribution of the subjects based on associated conditions

Associated conditions	Frequency	Percent
DM	3	15.0
HTN	3	15.0
HTN, OBESITY	2	10.0
NIL	7	35.0
OBESITY	5	25.0
Total	20	100.0

DISTRIBUTION OF THE SUBJECTS BASEDON

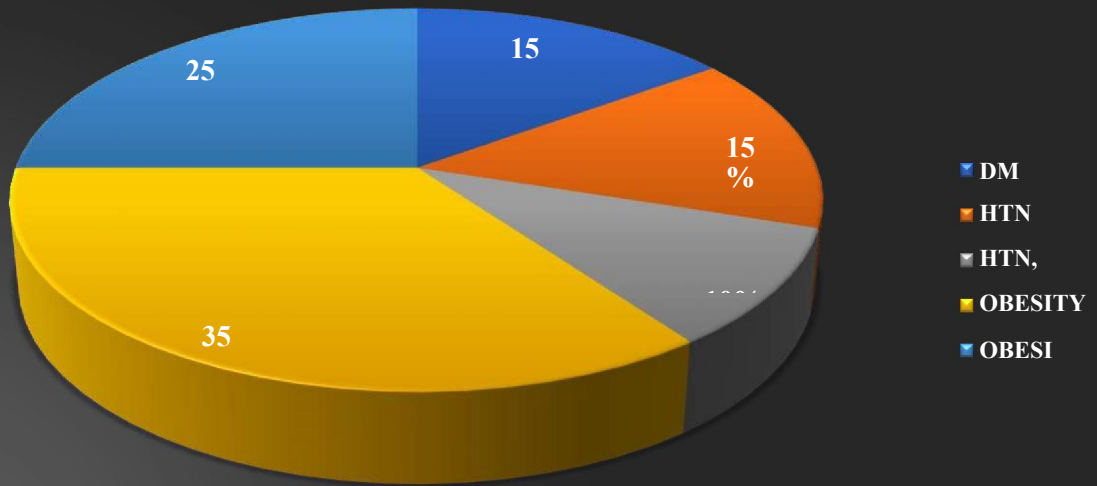


Table showing distribution of the subjects based on indications

Indications	Frequency	Percent
OA	19	95.0
RA	1	5.0
Total	20	100.0

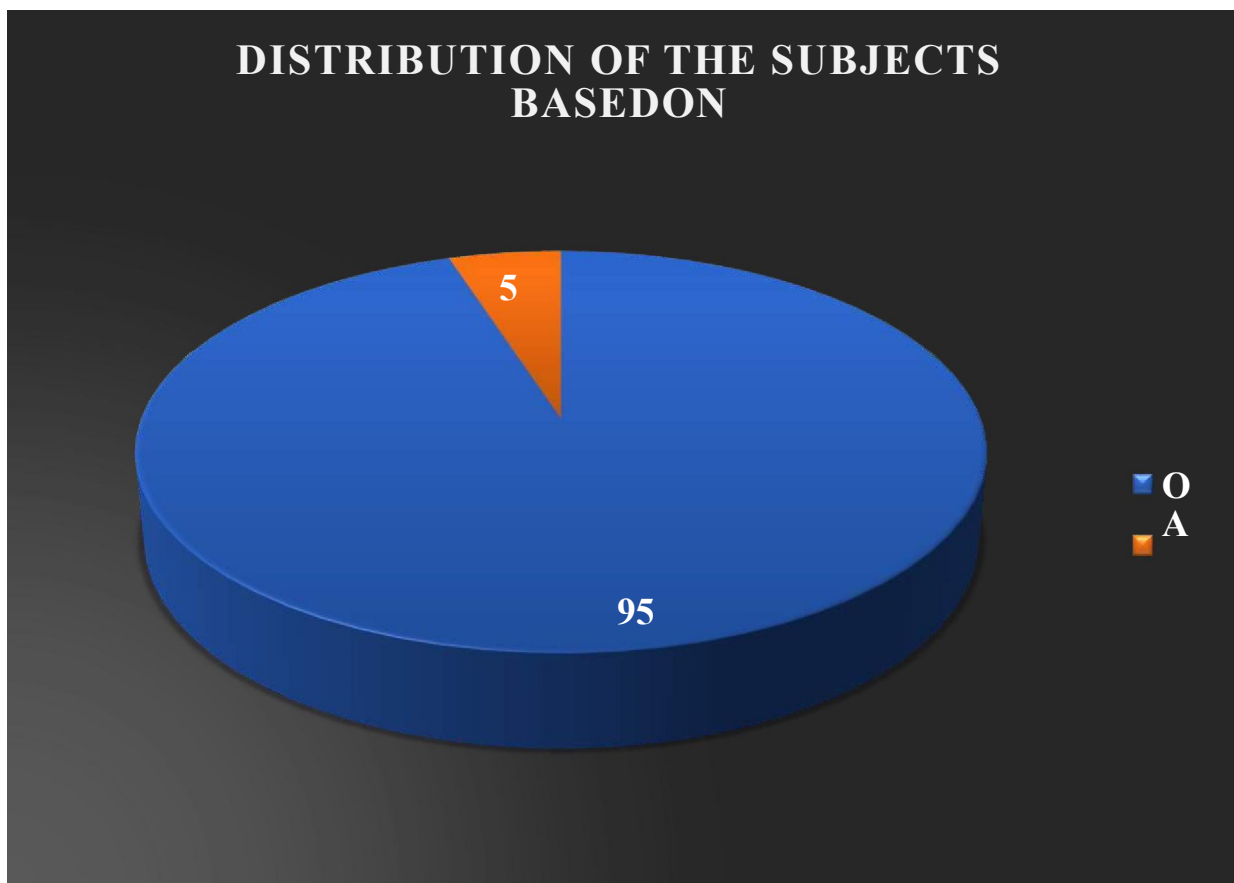


Table showing distribution of the subjects based on side

Side	Frequency	Percent
LEFT	9	45.0
RIGHT	11	55.0
Total	20	100.0

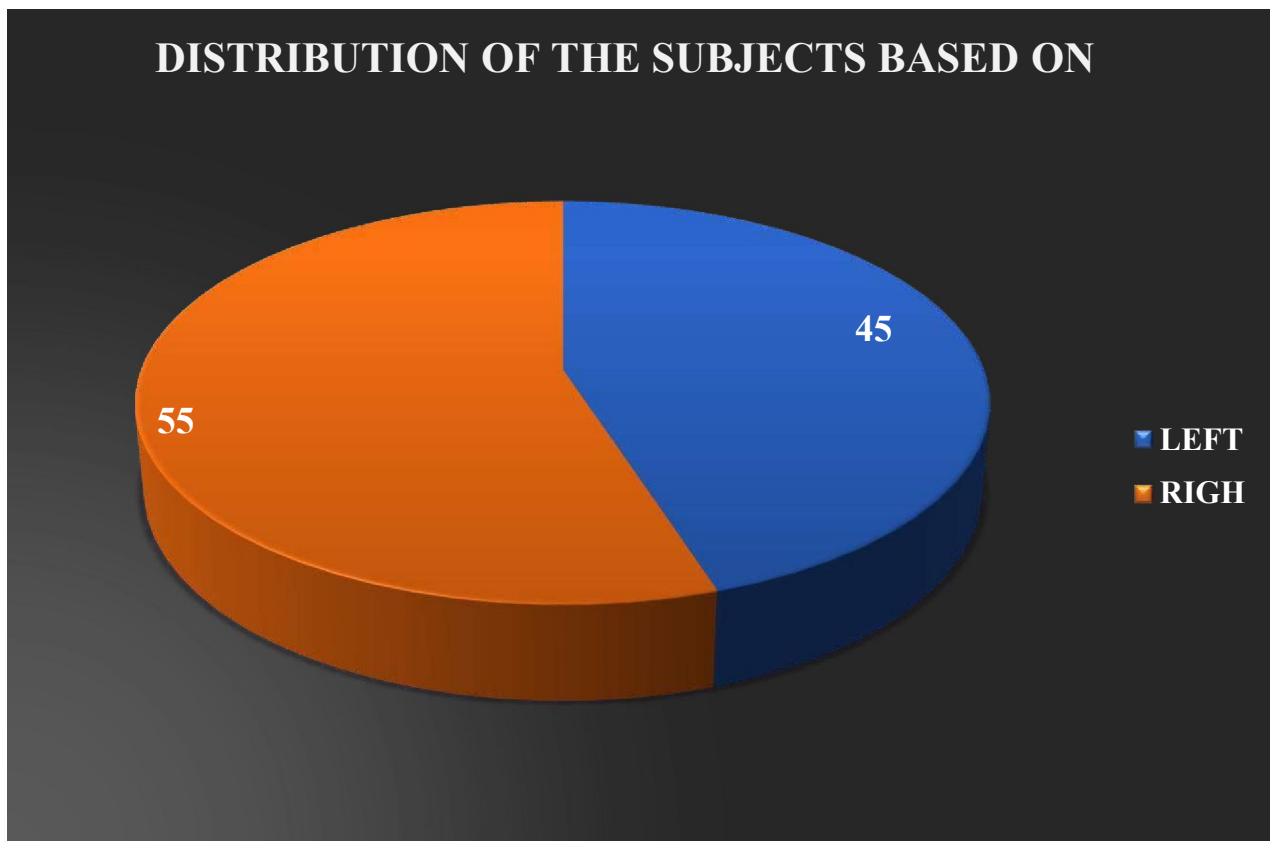


Table showing comparison of the pre and post op scores using paired t test

		M i n i m u m	M a x i m u m	M e a n	S . D	M e a n d i f f	p v a l u e
P a i n	P r e	0	2 0	9 . 0 0	5 . 5 2 5	- 3 2 . 7 5	0 . 0 0 *
	P o s t	3 0	5 0	4 1 . 7 5	4 . 0 6 4		
R O M	P r e	6	2 5	1 5 . 2 5	5 . 6 5 6	- 2 . 9	0 . 0 3 5 *
	P o s t	8	2 5	1 8 . 1 5	4 . 7 9 3		
A - P S t a b i l i t y	P r e	5	1 0	9 . 0 0	2 . 0 5 2	- 0 . 5	0 . 1 6 3
	P o s t	5	1 0	9 . 5 0	1 . 5 3 9		
M - L S t a	P r e	5	1 5	1 1 . 7 5	3 . 3 5 4	- 1 . 2	0 . 0 5

bi lit y	P o s t	5	1 5	1 3 . 0 0	2 . 9 9 1	5	6
F C	P r e	0	1 5	3 . 2 0	4 . 7 2 0	2 . 8	0 . 0 0 6 *
	P o s t	0	2	. 4 0	. 8 2 1		
E L	P r e	0	1 0	2 . 7 5	3 . 0 2 4	0 . 2 5	0 . 3 3
	P o s t	0	5	2 . 5 0	2 . 5 6 5		
A l i g n m e n t	P r e	0	2 0	7 . 6 0	5 . 2 4 6	7 . 6	0 . 0 0 *
	P o s t	0	0	0 . 0 0	0 . 0 0		
K S	P r e	1 5	5 3	3 1 . 4 5	1 0 . 2 3 1	- 4 8 . 0 5	0 . 0 0 *
	P o s t	6 2	9 1	7 9 . 5 0	7 . 6 2 6		
W a l k	P r e	1 0	3 0	2 3 . 0	5 . 7 1	- 1 6	0 . 0

				0	2	.75	0*
	P o s t	3 0	4 5	3 9 .7 5	2 .5 5 2		
St ai rs	P r e	0	3 0	1 2 .7 5	8 .8 0 7	-19.75	0.00*
	P o s t	3 0	4 0	3 2 .5 0	4 .4 4 3		
S u p p o r t	P r e	0	2 0	5 .5 0	5 .5 9 6	2.5	0.116
	P o s t	0	2 0	3 .0 0	4 .7 0 2		
F S	P r e	1 0	6 0	3 0 .2 5	1 3 .7 1 5	-39	0.00*
	P o s t	4 0	8 0	6 9 .2 5	8 .7 7 7		

*significant

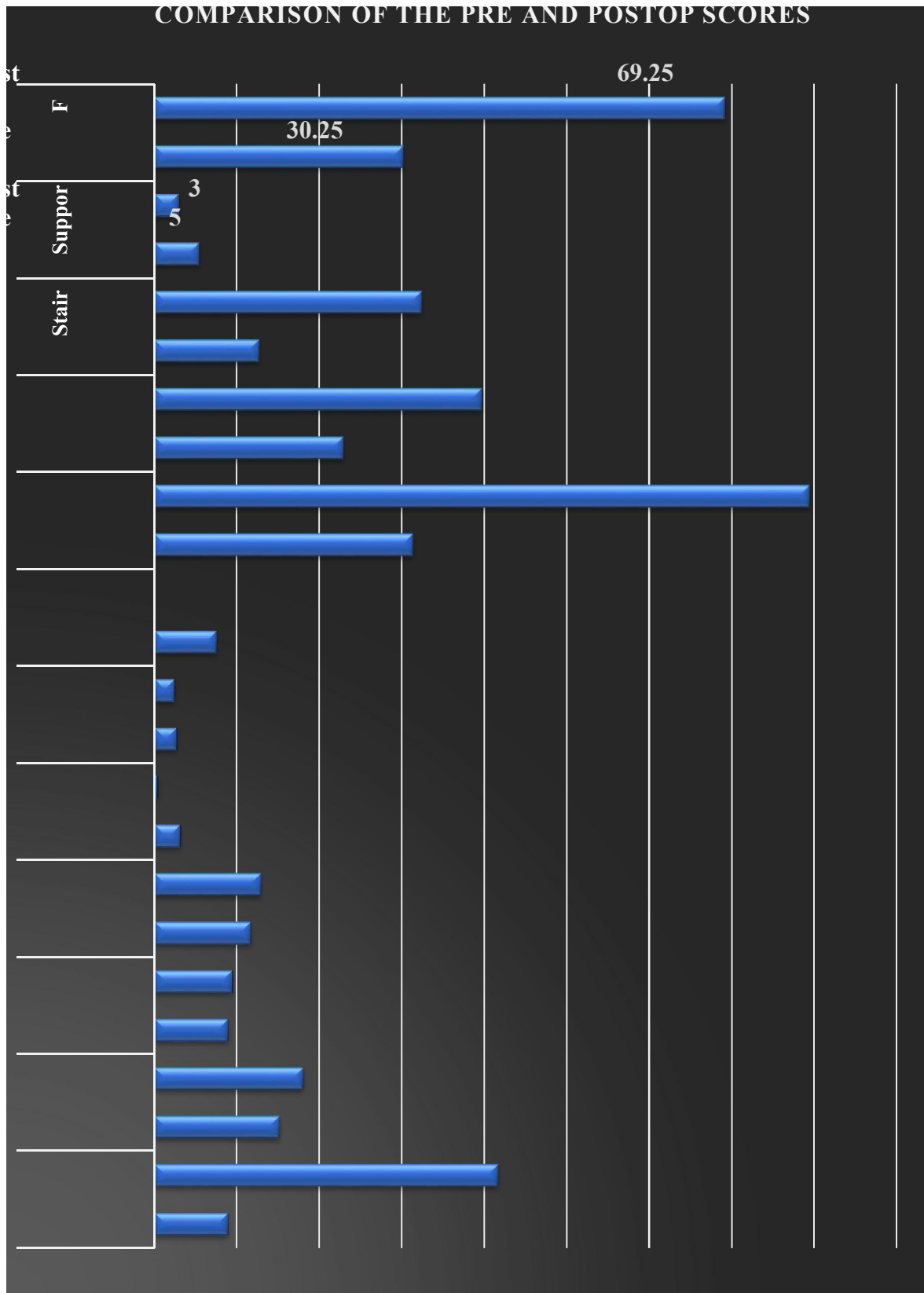


Table showing mean follow up duration (in weeks) of the subjects

	N	Minimum	Maximum	Mean	S.D
follow up (wks)	20	24	24	24.00	.000

DISCUSSION

In our study of “**Evaluation of functional outcome following primary total knee arthroplasty - a prospective study**” we evaluated 20 patients who underwent total knee replacement at Rajarajeshwari medical college and hospital, Bengaluru from June 2010 to May 2021. Most of the indications in our study belongs to Osteoarthritis (19knees) and rheumatoid Arthritis (1 knees).

20 patients underwent unilateral Total Knee Replacement, 11 patients to right knees (55%) and 9 (45%) patients to left knees.

We included patients who are above 40 years, there were 4 cases from age group 44-50 years, 6 cases from 55-60 years, 7 cases from 61-65 years, 3 cases above 65 years. Mean age in our study is 59.85 years.

We had 18 (90 %) of female patients and 2 (10 %) male patients.

We had 7 patients without any associated conditions, 3 patients with Hypertension, 5 patients with obesity, 2 patients with obesity and hypertension, 3 patients with DM.

18 knees had severe pain and 2 knees had moderate pain preoperatively, postoperatively 2 knees were pain free and 18 knees had mild pain. Our results were comparable with other studies.

Average pre-operative range of movement was 69.65 degrees of flexion and average post-operative range of movement was 90.55 degrees of flexion, with a P value of 0.035, which is significant. Results in other studies, Kelly G. Vince et al reported preoperative mean ROM of 88 degrees (range 45-122 degree) and post operative ROM of 91.2 (range 52- 125 degrees).³⁶ 4 knees had A-P instability of 5mm – 10mm preoperatively, post operatively 18 knees showed no A-P instability and 2 knees 5mm-10mm A-P instability postoperatively. 2 knees had M-L instability of 10– 14 mm, 9 knees with M-L instability of 6-9mm and 9 knees without M-L instability preoperatively, post-operatively 6 knees had M-L instability of 6-9mm and 13 knees had no M-L instability, with P value of 0.056, which is significant.

We had 2 knees with FFD of > 20 degree, 1 knee with FFD of 16-20 degree, 2 knees with FFD of 11- 15 degree, 7 knees with FFD of 5-10 degree preoperatively, post-operatively 16 knees did not have FFD, 4 knees had FFD of 5- 10 degree, with a significant P value of 0.006. 1 knee had an extension lag of 10- 20 degree and 9 knees with extension lag of < 10 degree preoperatively, post-operatively 10 knees had an extension lag of < 10 degrees.

Preoperatively we had 1 knee with 15 degree of varus, 4 knees with varus of 14 degree , 3 knees with degree of 13 varus, 6 knees with 12 degree of varus , 2 knees with 11 degree of varus and 1 knee with more than 20 degree of valgus, 3knees with 5-10degree of valgus, post-operatively we had all 20 knees with normal valgus of 5-10 degree, with a significant P value of 0.00. Douglas .

We had 1 patient who was housebound, 12 patients who could walk < 5 blocks and 7 patients with walking ability of 5 – 10 blocks preoperatively. Post operatively 19 patients could walk > 10 blocks and 1 patient 5- 10 blocks, with significant P value of 0.000 .

Preoperatives core for stairs was 12.75 and post-operatives core was 30. Postoperatively 5 patients had normal up and down with rails and 15 patients had up and down with rails. P value is 0.000 which is significant.

Preoperatively 12 patients were using cane and 3 patients were using walker, postoperatively 8 patients are using cane and 1 patient is using walker.

Preoperatively all the 20 knees had poor knee score of < 60 preoperatively, postoperatively 11 knees had excellent score (80- 100) and 7 knees with good score (70-79), with P value of 0.000, showing significant improvement in the knee score. Preoperative mean score of 31.45 increased to 79.50 postoperatively with P value of 0.000, indicating significant improvement in knees core following Total knee replacement.

In our study post-operative knee score of patients aged < 60 yrs was 79.8 and post-operative score of patients aged > 60 yr was 79.2. Postoperative functional score of patients aged < 60 yrs was 69 and post-operative score of patients aged > 60 yr was 69.5, when we compared the results of both the groups, result was statistically insignificant. In our study no patients had any complications.

CONCLUSION

Total knee replacement has evolved to be a good solution for multitude of knee problems. Although precise instrumentation appears to have simplified the procedure, the replacement surgeon needs to know the intricacies of the procedure to reproduce the same results as that of experienced surgeons, in other words it has its own learning curve.

One must always remember that TKA is the beginning of the problem to a surge on and not the end. He must be fully aware of all the problems associated with the procedure including his readiness for revision arthroplasty. The problems of knees in young individuals are the real challenge to the procedure.

Despite the shortcomings in technique and technology our study of ‘**EVALUATION OF FUNCTIONAL OUTCOME FOLLOWING PRIMARY TOTAL KNEE ARTHROPLASTY – A PROSPECTIVE STUDY**’ series demonstrates that total knee replacement is reliable, provide pain relief, improves range of motion and gives good function. Although we have 80-90% good to excellent early results, our long term survivorship results need to be observed.

SUMMARY

We did prospective study of TKA in 20 knees in 20 patients during 2019-21, with RA 1, OA 19. There were 18(90%) females and 2(10 %) males. Right knee predominates 11(55%) than left 9(45%). There were number of associated conditions like diabetes mellitus, obesity, HTN.

Pre-operatively all of our patients had moderate to severe pain. Post-operatively 2 knees had no pain and 18 knees had mild pain.

Pre-operative no patients were unable to walk which increased to 95% (19) post-operatively. There were no post-operative house bound and unable patients compared to pre-operative 5% (1) of such patients.

Pre-operative average ROM of 69.65 degrees improved to post-operative ROM of 90.55 degrees. Post operatively all of our patients had functional range of movements.

Pre-operatively 75% of our patients used walking aids & post-operatively only 45 % used them. Pre-operatively 25 % of the patients were unable to climb stairs which became 0% postoperatively. There were 11 knees in non-acceptable medio-lateral instability pre-operatively. Postoperatively 4 knees had mild M-L stability.

Pre-operatively 12(60%) of our patients had mild to severe FFD and post-operatively only 4(20%) had mild FFD. Pre-operatively about 95% had varus deformity. Postoperatively 5-10° of valgus was restored all of the patients.

All the 20 knees had poor knee score of < 60 preoperatively, postoperatively 11 knees had excellent score (80- 100) and 7 knees with good score (70-79) and 2 patients with fair functional Score (60-69).

We did not get a significant difference between outcome of patients aged < 60 yrs to patients aged > 60 yrs and outcome in different indication groups.

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