"EVALUATION OF CLINICAL OUTCOME OF TOTAL KNEE REPLACEMENT IN ARTHRITIC PATIENTS."

Dr. Lavesh Agrawal[1], Dr. Apoorv Gupta[2], Dr. Manas Shrivastava[3], Dr. Avanish Kumar Singh[4]*

Abstract-

This prospective study was conducted to assess the clinical and functional outcome of TKA using knee society score and to find association between knee functional score and knee clinical score With the varied amount of implant designs available the posterior cruciate substituting design was found to be effective. In our study, 61 to 65 years which accounts for 35% of patients in our study. The youngest patient was 54 yrs of age and oldest patient was 74 yr. of age the mean age was 63.45 yrs. This is in accordance to study conducted by Wood et al.15 The knee society score is used to assess the outcome of total knee arthroplasty. The knee society score rating system is a logical outgrowth of the hospital for special surgery rating system. In our study, on clinical and functional evaluation of the patients, assessed by the KSS score significant improvement was observed in both KCS and KFS score during follow up at 3, 6 and 12 months as compared to preoperative value.

Material and methods-This is a hospital-based prospective observational study which was done to analyze the functional outcome of Cemented Total Knee Arthroplasty for primary osteoarthritis. This study was conducted between the periods of February 2020 – July 2021. 20 patients who consecutively consented and underwent Total Knee Arthroplasty were assessed clinically and functionally using Knee Society score[5]. The follow-up period was at 3 months, 6 months and 1 year. The study was conducted at the Department of Orthopedics, Index Medical college and hospital Indore. The pre- and post-operative Knee Clinical Score and Knee Functional Scores (Knee society score) were compared using Paired t-test.

Results- The difference between the means of pre – op KCS and post – op KCS was 67.35 (64.56 to 70.14, 95% CI). The P value was significant (<0.001) when the pre – op and post – op Knee Clinical Scores were compared. The difference between the means of pre – op KFS and post – op KFS was 45.40 (41.24 to 49.56, 95%CI). The P value was significant (<0.001) when the pre - op and post – op Knee Functional Scores were compared.

Conclusion- With the use of Total knee Arthroplasty implants, at 18 months follow up an average pre-op Knee Clinical Score of 26.75 improved to an average postop Knee Clinical Score of 94.1 and an average pre-op Knee Functional Score of 39.35 improved to an average post-op Knee Functional Score of 84.75. The extent of improvement after physical therapy was similar in both groups on most outcome measures, however there was a significant difference in the level of improvement in knee extension (ROM) and muscle strength in the knee affected in favor the hospital-based rehabilitation.

Asst. Professor[1] ,3rd year resident[2], 3rd year Resident[3], 2nd year Resident[4]*

[1]Department of Orthopaedics, Index Medical College Hospital and Research Centre , M.P.

[2]Department of Orthopaedics, Index Medical College Hospital and Research Centre, Indore, M.P.

[3]Department of Orthopaedics, Index Medical College Hospital and Research Centre, Indore, M.P.

[4]*Department of Orthopaedics, Index Medical College Hospital and Research Centre, Indore, M.P.

***Corresponding Author:** Dr. Avanish Kumar Singh

*Department of Orthopaedics, Index Medical College Hospital and Research Centre, Indore, M.P.

DOI: - 10.31838/ecb/2023.12.si5.017

INTRODUCTION

In most arthritic knees, some degree of instability, deformity, contracture or a combination of these elements, can be found[1, 2, 3]. The common causes of arthritis of the knee include Osteoarthritis (OA), Rheumatoid Arthritis (RA), Juvenile Rheumatoid Arthritis, Post- Traumatic Arthritis or Secondary Osteoarthritis and other types of inflammatory arthritis.

Osteoarthritis is thought to be the most prevalent Chronic DegenerativeJoint disease joint disease. The incidence of osteoarthritis is rising because of the ageing population and the epidemic of obesity. Pain and loss of function are the main clinical features that lead to treatment, including non-pharmacological, pharmacological, and surgical approaches[4].

The concept of improving knee joint function by modifying the articular surfaces has received attention since the 19th century. The surgical techniques have varied from soft tissue interposition arthroplasty to resection arthroplasty to surface replacement arthroplasty. In surface replacement arthroplasty different types of prosthesis were developed to address the complex knee kinematics. Total Knee Arthroplasty (TKA) is now a reliable treatment for severe arthritis. Various systems are available with specific features regarding the geometry of the components, the degree of conformity of the articulating surface and the anchoring technique. With the advent of these varied types of prosthesis it became necessary to conduct studies for assessing the outcome of different prosthesis. Hence different scoring systems were devised for assessing the outcome of total knee replacement.

The Knee Society Score System is subdivided into a knee score that rate only the knee joint itself and a functional score that rates the patient's ability to walk and climb stairs. The dual rating system eliminates the problem of declining knee scores associated with patient infirmity[5].

MATERIALS AND METHODS

This is a hospital-based prospective observational study which was done to analyze the functional outcome of Cemented Total Knee Arthroplasty for primary osteoarthritis. This study was conducted between the periods of February 2020 – July 2021. 20 patients who consecutively consented and underwent Total Knee Arthroplasty were assessed clinically and functionally using Knee Society score[5]. The follow-up period was at 3 months, 6 months and 1 year. The study was conducted at the Department of Orthopedics, Index Medical collegeand hospital Indore. The pre- and post-operative Knee Clinical Score and Knee Functional Scores (Knee society score) were compared usingPaired t-test.

INCLUSION CRITERIA

- Patients with primary or secondary arthritis with grade 3 or 4 Kellgren Lawrence grading system even after not relieving pain with conservative treatment for 6 months.

OR

- Arthritic patient with angular knee deformity, knee stiffness with decreased range of motion.
- Patients willing to give consent for surgery and want to participatein study.

EXCLUSION CRITERIA

- Patients with sepsis of the knee joint or anywhere in the body
- Patients with local skin lesions
- Patient with previous implant in the knee joint.
- Patients not consenting for the study.

KELLGREN LAWRENCE CLASSIFICATION

Grade	Description
Grade I	Doubtful narrowing of the joint space, possible osteophytic lipping
Grade II	Definite osteophytes, possible narrowing of the joint space
Grade III	Moderate multiple osteophytes, definite joint space narrowing, some sclerosis, possible deformity of bone ends
Grade IV	Large osteophytes, marked joint space narrowing, severe sclerosis and definite bony end deformity.

PRE-OPERATIVE EVALUATION CLINICAL ASSESSMENT

- Detailed history of all patients was taken.
- All patients were assessed clinically and functionally using the Knee Society Score[5].
- The preoperative medical evaluations of all patients were done to prevent potential complications that can be life-threatening or limb- threatening.
- Any limb length discrepancies were noted. Presence of any hip and foot deformities were assessed.
- The extensor mechanism was assessed for any quadriceps contractures.
- The knee deformities were examined for any fixed varus or valgus deformities or presence of any fixed flexion contracture.
- The knee deformities were examined for any fixed varus or valgus deformities or presence of any fixed flexion contracture.

RADIOGRAPHIC ASSESSMENT

- Standard guidelines were utilized to obtain knee radiographs – standing anteroposterior view, a lateral view and a skyline view of the patella[6].
- Any collateral ligament laxity, subluxation of tibia, presence of osteophytes, any bone defects in the tibia and femur and the quality of bone was assessed.
- Sizing of the femoral and tibial components was also done.

OPERATIVE PROCEDURE

All patients after thorough pre-op evaluation were taken up for surgery by the same surgical team under general or regional anaesthesia with the patient in supine position and knee flexed to 90 degrees. Tourniquet was applied at the thigh region and sterile preparation done from thighs to toes and draped.

TOTAL KNEE REPLACEMENT COMPONENTS

There are 3 separate components of TKR:

1. Femoral component
2. Polyethylene insert
3. Tibial component
4. Patella

SURGICAL TECHNIQUE

With the knee placed in 90 degree of flexion, an anterior midline incision was made. An incision 10 cm to 15 cm was made, starting above the superior pole of patella and was extended distally to below the level of the tibial tubercle. The retinacular incision was a medial parapatellar retinacular approach, so as to gain easy access to the diseased medial compartment and prevent fibrosis over the lateral side of patella that could predispose to patella dislocation post operatively.

The patella was retracted laterally and everted. In case of inability to evert the patella, it was not everted as it would cause risk of patellar tendon rupture. The degenerated femoral condyle was exposed. The retro-patellar fat pad was excised to prevent post operative arthrofibrosis. With the knee extended, a subperiosteal sleeve of soft tissue from the proximal medial tibia, including the deep medial collateral ligament, superficial medial collateral ligament, and insertion of the pes anserinus tendons was elevated. The elevation was continuedwith a periosteal elevator to free the posterior fibres.

To improve exposure during the release,

retraction of the subperiosteal sleeve using a Homan retractor was done. The insertion of the semimembranosus muscle from the posteromedial tibia was released and continued distally on the anteromedial surface of the tibia, further stripping of the periosteum medially from the tibia in case of varus knees was done. For more severe varus deformities, subperiosteal stripping posteriorly and distally was done.

The Whiteside line and the Trans-epicondylar line were made over the femoral condyles after exposing the condyles. Whiteside line is the vertical line cutting through the middle of distal femoral sulcus. Trans- epicondylar line is the horizontal line linking the medial and lateral epicondyle. The starter hole was created at the intersection between thevertical Whiteside Line and the horizontal Epicondylar Line. The hole was placed medial and anterior to the anteromedial corner of the intercondylar notch. An opening in the femoral canal with the 9.5mm diameter drill bit was initiated.

Distal femur was resected with either the standard resection slot, whichprovided a 9mm resection from the prominent distal condyle, or the +4mm resection slot which provided a 13mm resection. If headlesspins were used, the resection block was adjusted 2mm proximally or distally. The Distal Resection and Valgus Alignment Guides were assembled onto the intramedullary alignment rod. 5 to 7 degree valgus cut was made in order to get a distal cut that is perpendicular to the mechanical axis. The resection block was seated flush against the anterior rough cut and the assembly was locked with the thumbscrew. The distal femoral resection block was fixed to the anterior cortex with two headless pins. The distal femur was resected using the standard resection slot which provided a 9mm resection from the prominent distal condyle.

The extramedulary tibial guide was assembled composing of the cross head with pin, resection guide and ankle yoke. The adjustment screw was used at the ankle to align the resection guide. The long axis of the tibial resection guide was made parallel to the tibia such that anterior notch in the tibial tray matched the center of tibial tuberosity and alignment rod was placed parallel to center of tibial tuberosity toa pointmedial to midpoint of ankle joint, and never in internal rotation as it would alter relations of the patella. The bar was raised by holding the resection guide and pinning the bar to the upper tibia when the guide was centered on the proximal tibia. The resection slot was located a few millimeters below the lowest articular surface (usually medial). A stylus was used to check the amount of tibial cut - 2 mm for medial referencing, 10 mm for lateral referencing. The final tibial cut was completed with an osteotome to prevent over penetration of saw blade posteriorly which risked popliteal artery cut.

Extension gap was checked with Trial Tibial Base. The extension gap was able to accept a minimum of 10 mm base. A symmetrical and rectangular extension gap was obtained. Do not accept a trapezoidal gap, in that case, release more soft tissue to geta rectangle. The extension gap must be the same as flexion gap. The A-P femoralsizer was placed flush against the resected distal femur and the sizer adjusted so that the feet contacts the posterior condyles and the stylus contacts the shaft of femur.

The anterior or posterior size is indicated on the distal face of the A-P femoral sizer. If the sizing was between sizes, the smaller of the two sizes was selected. A femoral resection block (4 in 1 resection block) corresponding to the size indicated by the A-P femoral sizer was select.The femoral resection block was placed flushagainst the distal and anterior femoral surfaces. The block was stabilized against the bone using 3.2mm diameter headed pins on the medial and lateral sides of the block. The recommended order of resection is: 1. Posterior, 2. Posterior chamfer, 3. Anterior,

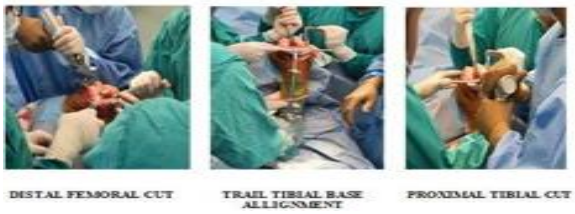
1. Anterior chamfer. Trochlear groove resection was done. If flexion contracture is present, release or transversely divide the posterior capsule.

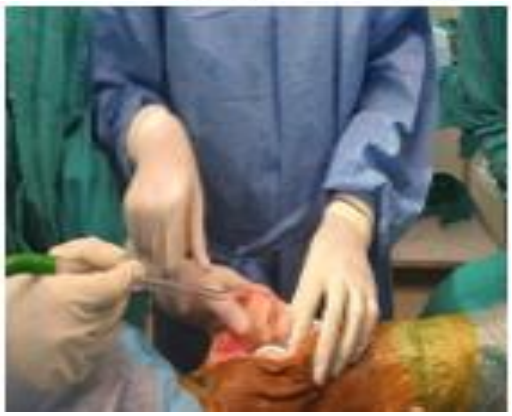
The trial tibial base equal in size to the femoral implant with the trial base handle was

assembled and placed against the proximal tibial surface. If the size is appropriate, align the base and pin it to the tibia using short headed anchoring pins. If the tibial size is too small, a "plus size" will provide additional tibial coverage.

NOTE: The tibial insert size must match the femoral implant size. There are two tibial base sizes that can be used with any one size femoral component. An alignment rod can be inserted through the handle to check alignment to the ankle. Attach the keel punch guide to the keel punch handle and secure it to the trial base by turning the knurled handle. Prepare the entry hole for the tibial stem using the 1/2" drill guide and oversize reamer. Using the threaded punch handle and appropriate keel punch, slide the punch through the guide until the punch is fully seated. The rim of the punch is designed to engage the trial base, keeping it from being inserted too deep. The threaded handle has a mark indicating the depth that the punch should be impacted. Once the punch is seated, remove the punch guide leaving the trial baseand stem in place for a trial reduction. After satisfactory reduction, the patella was denervated circumferentially using the cautery. With the knee flexed, place the appropriate size femoral trial on the distal femur using the femoral impactor. Insert the trial tibialinsert of equal size and appropriate thickness onto the trial base and complete the trial reduction.

Bone cement was spread over the cut surfaces of femur and tibia for preparing for the femoral and tibial component implantation. Once the cement surrounding the tibial base was cured, the appropriate tibial insert was locked into place. After closure of the capsule and the extensor mechanism patella femoral tracking was assessed. Wound closure done in layers. Compressive dressing was given.





FINAL TIBIA FEMORAL IMPLANT

FINAL REDUCTION

WOMAC SCALE

The Wester Ontorio and Mcmaster Osteoarthritis Index is widely used for the evaluation Of hip and knee osteoarthritis.It is a self administered consisting of 24 items divided Into 3 subscale.

- Pain (5 items):during walking ,using satirs,in bed,sitting or lying,and standing upright.
- Stifness (2items):after first walking abd later in the day.
- Physical function (17 items):using stairs,rising from sitting, standing, bending, walking, Getting

In/out of car, shopping, putting on/taking off shocks, rising from bed, lying in bed, Getting in/out of bath, sitting, gettingon/off toilet, heavy domestic duties, light domestic Duties. By this score we have compared home based vs hospital based rehabilitation after total knee replacement

WESTERN ONTARIO AND MCMASTER OSTEOARTHRITIS INDEX (WOMAC)

Please circle the appropriate rating for each item.

RATE YOUR PAIN WHEN...	NONE	SLIGHT	MODERATE	SEVERE	EXTREME
Walking	0	1	2	3	4
Climbing stairs	0	1	2	3	4
Sleeping at night	0	1	2	3	4
Resting	0	1	2	3	4
Standing	0	1	2	3	4
RATE YOUR STIFFNESS IN THE...	NONE	SLIGHT	MODERATE	SEVERE	EXTREME
Morning	0	1	2	3	4
Evening	0	1	2	3	4
RATE YOUR DIFFICULTY WHEN...	NONE	SLIGHT	MODERATE	SEVERE	EXTREME
Descending stairs	0	1	2	3	4
Ascending stairs	0	1	2	3	4
Rising from sitting	0	1	2	3	4
Standing	0	1	2	3	4
Bending to floor	0	1	2	3	4
Walking on even floor	0	1	2	3	4
Getting in/out of car	0	1	2	3	4
Going shopping	0	1	2	3	4
Putting on socks	0	1	2	3	4
Rising from bed	0	1	2	3	4
Taking off socks	0	1	2	3	4
Lying in bed	0	1	2	3	4
Getting in/out of bath	0	1	2	3	4
Sitting	0	1	2	3	4
Getting on/off toilet	0	1	2	3	4
Doing light domestic duties (cooking, dusting)	0	1	2	3	4
Doing heavy domestic duties (moving furniture)	0	1	2	3	4

POST-OP PROTOCOL

The patients knee were immobilized in a Jones compressive bandage and a knee immobilizer immediately post operatively. The patients were started on IV antibiotics and DVT prophylaxis in the form of subcutaneous low molecular weight heparin.

- 1st post op day, patient was taught static quadriceps exercises.
- 2nd post op day, the dressing was debulked and wound inspected.

Patient was made to walk full weight bearing within the limits of pain with the knee immobiliser and advised to continue static quadriceps exercises and knee flexion was started and patient was taught dynamic quadriceps exercises.

- IV antibiotics were given for the first 48 hours post op and the switched over to oral antibiotics for the next five days.
- 5^{th} post operative day – Discharge.
- DVT prophylaxis was given for the first five days post operatively.
- 12th post op day, patient called fir suture removal and patient was advised to continue regular physiotherapy.

FOLLOW-UP

The patient was assessed 6 weeks post

operatively (1 month afterdischarge) for any signs of post operative infection. Once post operative infection was ruled out clinically the patient was assessed clinically and

functionally using the Knee Society Score at an interval of 3 months, 6 months and 1 year post operative.

OBSERVATION AND RESULT

Comparison Between Pre-op and Post-Op Knee clinicaland functional scores

	Paired difference		P-value
	Mean	StandardDeviation	
Pre Op KCS-Post Op KCS	67.35	5.96	<0.001
Pre Op KFS-Post Op KFS	45.40	8.896	<0.001

The difference between the means of pre – op KCS and post – op KCS was 67.35 (64.56 to 70.14, 95% CI). The P value was significant (<0.001) when the pre – op and post – op Knee Clinical Scores were compared. The difference between the means of pre – op KFS and post – op KFS was 45.40 (41.24 to 49.56, 95%CI). The P value was significant (<0.001) when the pre - op and post – op Knee Functional Scores were compared.

DISCUSSION

This prospective study was conducted to assess the clinical and functional outcome of TKA using knee society score and to find association between knee functional score and knee clinical score. Nowadays, total knee arthroplasty is becoming a standard treatment forarthritic knee in terms of relief from knee pain free as well as it stabilizes the knee with an appropriate range of motion and associated with substantial functional improvement. Significant advances have occurred in the type and quality of the metals, polyethylene, and, more recently, ceramics used in the prosthesis manufacturing process, leading to improved longevity. As with most techniques in modern medicine, more and more patients are receiving the benefits of total knee arthroplasty (TKA).This advances in the knee implant design and the surgical techniques for total knee replacement achieved successful results in reducing the pain and providing with a stable joint. After total knee arthroplasty, good relief was observed in older patients who were having difficulty in mobility because of degenerative arthritis. There was a substantial relief of joint pain, increased mobility, correction of deformity and an improvement in the quality of life of the patients following total knee arthroplasty. With the varied amount of implant designs available the posterior cruciate substituting design was found tobe effective. In our study, 61 to 65 years which accounts for 35% of patients in our study. The youngest patient was 54 yrs of age and oldestpatient was 74 yr. of age the mean age was 63.45 yrs. This is in accordance to study conducted by Wood et al.15 The knee society scoreis used to assess the outcome of total knee arthroplasty. The knee society score rating system is a logical outgrowth of the hospital for special surgery rating system. In our study, on clinical and functional evaluation of the patients, assessed by the KSS score significant improvement was observed in both KCS and KFS score during follow up at 3, 6 and 12 months as compared to preoperative value.

There was significant association between KFS and KCS at everyinterval. Similarly in the study conducted by Farahini et al significant improvement in knee society score was observed. Our findings also correlate well with study conducted by Yaratapalli et al showing increased in Knee society score after TKA. In ourstudy Buz- Swanik etal, found that after total knee arthroplasty, most of the patients were able to reproduce joint position and significantly improve in mobility was observed. These changes may result due to retensioned capsule ligamentous structures and reduced pain and inflammation. There was also significant improvement in the balance index postoperatively. The group treated with the posterior stabilized prosthesis more accurately reproduced joint position when the knee was extended from a flexed position. Retention of the posterior cruciate ligament does not appear to significantly improve proprioception and balance compared with those functions in patients with a posterior stabilized total knee design.18 Barrack et al

found that total knee arthroplasty with retentionof the patella yielded clinical results that were comparable with those after total knee arthroplasty with patellar resurfacing.19 Barrack et al concluded that postoperative anterior knee pain is related either to the component design or to the details of the surgical technique, such as component rotation, rather than to whether or not the patella is resurfaced.20 Wood et al concluded that total knee arthroplasty with patellar resurfacing exhibited inferior clinical results as compared to total knee arthroplasty with patellar retention. Total knee arthroplasty with patellar resurfacing exhibited significant limitation of knee extension, which was significantly associated with the presence of post- surgery anterior knee pain.21 In our study, none of the patellas were resurfaced. All patellas were circumferentially denervated. None of the patients reported anterior knee pain in our study in our study revealed that the RITH (Rehabilitation in the home) and Hospital based rehabilitation where largely comparable with the expectation of a better improvement in the knee extension and strength in the hospital-based group, to understand the reason of thisdifference we must consider that the initial assessment already includes differences, since the hospital patients started their rehabilitation treatment later, which could explain their greater muscle atrophy and lesser extension. In the view of suggestion that RITH therapy may enhance the therapeutic relationshippatient motivation, and patient, family involvement in the rehabilitation it can be hypothesized that RITH will also enhance performance and rehabilitation outcome.

Coordinating the rehabilitation process across disciplines and focusing on enhancement of pt. participation may help improve the consistency and quality of patients' engage-ment.

Initially the patients in both groups had considerable pain, restricted range of joint motion, and functional disability, after rehabilitation bothgroups showed significant improvements from the base line values in pain, range of flexion extension motion and muscle strength, disability, balance and walking. The extent of improvement after physical therapywas similar in both groups on most outcome measures, however there was a significant difference in the level of improvement in knee extension (ROM) and muscle strength in the knee affected in favor the hospital-based rehabilitation.

SUMMARY

- This is a consecutive study of 20 patients who underwent Total Knee Arthroplasty.
- The majority of the patients were from the age group of 61-65 yearswhich accounts for 35% of patients in our study. The youngest patient was 54 years of age and the oldest patient was 74 years. The mean age was 63.45 years.
- There was a female predominance in the ratio of 3: 2 in our study, accounting for 60% of the patients.
- There was a predominance of right-side accounting for 60 % of the patients.
- The diagnosis was Primary Osteoarthritis of knee in all the cases.
- The mean pre-op Knee Clinical Score was 26.75 in this study whichimproved to mean post – op score of 94.1.
- According to the Knee Society Clinical Scoring system of the 20 patients assessed in this study 16 patients (80%) had Excellent and 4 patients (20%) had good results.
- The mean pre - op Knee Functional Score was 39.35 in this study which improved to a mean post – op score of 84.75.
- According to the Knee Society Functional Scoring system of the 20 patients assessed in this study 14 patients (70%) had Excellent, 4 patients (20%) had Good and 02 patients (10%) had Fair results.
- The difference between the means of pre – op KCS and post – op KCS was 67.35 (64.56 to 70.14, 95% CI). The P value was significant (<0.001) when the pre – op and post – op Knee Clinical Scores were compared.

The difference between the means of pre – op KFS and post – op KFS was 45.40 (41.24 to 49.56, 95% CI). The P value was significant (<0.001) when the pre - op and post – op Knee

Functional Scores were compared.

CONCLUSION

Total Knee Arthroplasty improves the functional ability of the patient andthe ability of the patient to get back to pre-disease state, which is to have apain free mobile joint, as reflected by the improvement in the post-op Knee Clinical Score and Knee Functional Score.

With the use of Total knee Arthroplasty implants, at 18 months follow up an average pre-op Knee Clinical Score of 26.75 improved to an average postop Knee Clinical Score of 94.1 and an average pre-op Knee Functional Score of 39.35 improved to an average post-op Knee Functional Score of 84.75.

In the rehabilitation process comparison between the home based and hospital- based rehabilitation Initially the patients in both groups had considerable pain, restricted range of joint motion, and functional disability, after rehabilitation both groups showed significant improvements from the base line values in pain, range of flexion extension motion and muscle strength, disability, balance and walking.

The extent of improvement after physical therapy was similar in both groups on most outcome measures, however there was a significant difference in the level of improvement in knee extension (ROM) and muscle strength inthe knee affected in favor the hospital-based rehabilitation.

SL NO	IP NO	AGE IN YRS	SEX	SIDE	INDICATION	KNEESOCIETY SCORE				COMPLICATION	RESULTS		WOMAC SCORE	
						PRE-OP		POST-OP			KCS	KFS	RITH	HBR
1	I00121	54	F	L	Primary OA	36	50	97	90	NIL	E	E	17	
2	I0084	73	F	R	Primary OA	15	20	80	60	NIL	G	F	10	
3	I0091	68	M	R	Primary OA	31	45	95	90	NIL	E	E	18	
4	I00189	69	F	L	Primary OA	20	30	97	80	NIL	E	G	20	
5	I0100	63	F	R	Primary OA	25	45	97	90	NIL	E	E	11	
6	I0047	62	M	L	Primary OA	17	30	99	90	NIL	E	E	13	
7	I00143	65	M	R	Primary OA	27	45	97	90	NIL	E	E	10	
8	I0147	58	F	R	Primary OA	36	50	98	90	NIL	E	E	15	
9	I0155	56	F	L	Primary OA	39	45	99	90	NIL	E	E	17	
10	I0121	60	M	R	Primary OA	19	45	90	95	NIL	E	E	18	
11	I0172	74	F	L	Primary OA	15	20	84	70	NIL	G	G		20
12	I0158	66	M	R	Primary OA	28	45	98	90	NIL	E	E		22
13	I0127	68	F	L	Primary OA	37	50	98	80	NIL	E	G		17
14	I0188	67	M	R	Primary OA	33	47	96	90	NIL	E	E		11
15	I00011	61	F	L	Primary OA	34	50	98	90	NIL	E	E		10
16	I0014	64	M	R	Primary OA	32	30	99	90	NIL	E	E		10
17	I0083	63	F	R	Primary OA	16	30	80	80	NIL	G	G		12
18	I00021	62	F	L	Primary OA	18	35	84	60	NIL	G	F		10
19	I0348	57	M	R	Primary OA	35	45	98	90	NIL	E	E		11
20	I0391	59	F	R	Primary OA	22	30	98	90	NIL	E	E		12

BIBLIOGRAPHY

2. Vail TP, Lang JE. Insall and Scott surgery of the knee. 4th ed. Philadelphia: Churchill Livingstone, Elsevier; 2006. p. 1455-1521.
3. Insall J, Ranawat CS, Scott WN, Walker P. Total condylar knee replacement. Preliminary report. Clin Orthop Relat Res 1976;120:149-54.
4. Kim RH, Scott WN. Operative techniques: total knee replacement. Philadelphia: Saunders-Elsevier; 2009. p. 91-103.
5. Bijlsma JW, Berenbaum F, Lafeber FP. Osteoarthritis: an update with relevance for clinical practice. Lancet; 2011 Jun 18;377:2115-26.
6. John N Insall, Lawrence D Dorr, Richard D Scott, W. Norman Scott. Rationale of The Knee Society Clinical Rating System. Clin Orthop 1989 Nov;248:13-14.
7. Wood. Clinical outcomes and walking analysis after total knee arthroplasty with and without patellar resurfacing: a
8. prospective randomized trial. J Bone Joint Surg 2005:338-39.