DECLARATION BY CANDIDATE

I hereby declare that this thesis entitled **"TUG AND ILAS SCORES AS EARLY PREDICTORS FOR LONG TERM FUNCTIONAL OUTCOME IN PATIENTS UNDERGOING HIP AND KNEE ARTHROPLASTY."** is a bonafide and original research work carried out in partial fulfillment of the requirements for the degree of Masters of Surgery in Orthopaedics under supervision and guidance, in the Department of Orthopaedics, All India Institute of Medical Sciences, Jodhpur. I further state that no part of the thesis has been submitted, in part or in full, to any other University or Institute for the award of any other degree.

Date: 16/01/2023

Sushil Kumar

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This is to certify that **Dr. Sushil Kumar** has satisfactorily completed his thesis entitled **"TUG AND ILAS SCORES AS EARLY PREDICTORS FOR LONG TERM FUNCTIONAL OUTCOME IN PATIENTS UNDERGOING HIP AND KNEE ARTHROPLASTY."** in partial fulfillment of the requirements for the Master of Surgery in Orthopaedics. He has done the research work under my supervision and guidance. He has fulfilled all the requisites under the regulations laid by the All India Institute of Medical Sciences, Jodhpur and no part of the thesis has been submitted to any other university.

Date: 06/01/2023

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CERTIFICATE BY CO-GUIDE AND HEAD OF DEPARTMENT

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16/01/23

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TUG AND ILAS SCORES AS EARLY PREDICTORS FOR LONG TERM FUNCTIONAL OUTCOME IN PATIENTS UNDERGOING HIP AND KNEE ARTHROPLASTY

Thesis

Submitted to

All India Institute of Medical Sciences, Jodhpur

In partial fulfillment of the requirement for the degree of

MASTER OF SURGERY (MS)

ORTHOPAEDICS

JULY 2020 **DR. SUSHIL KUMAR**

AIIMS, JODHPUR

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ACKNOWLEDGMENTS

Most importantly I am grateful to my parents, my brother, my sisters, and my friends who constantly supported me and always had been with me during good and bad times. I would like to express my sincere gratitude to my Guide ***Dr. Sumit Banerjee****, Additional Professor, Department of Orthopaedics, All India Institute of Medical Sciences, Jodhpur, whose unmatched and persistent commitment to excellence and dedication to Orthopaedics shines like a beacon illuminating the path to mastering Orthopaedics. The journey to completing this work would never have been possible without your insightful patronage. In the quest for perfection and success, I hope I am able to walk on the path you have shown*

I would like to extend my sincere gratitude to co-guide and Head of Department ***Dr (Prof.) Abhay Elhence****, Department of Orthopaedics, All India Institute of Medical Sciences, Jodhpur whose guidance, encouragement, suggestion, and very constructive criticism have contributed immensely to the evolution of my ideas on the project.*

I will be always be grateful to ***Dr.Nitesh Gahlot*** *, Additional Professor, Department of Orthopedics, All India Institute of Medical Sciences, Jodhpur,* ***Dr. Nilesh Barwar****, former Assistant Professor, Department of Trauma and Emergency (Orthopaedics), All India Institute of Medical Sciences Jodhpur. I would like to thanks especially* ***Dr. Sandeep Kumar Yadav,*** *Assistant Professor, Department of Orthopedics, All India Institute of Medical Sciences Jodhpur ,* ***Dr. Saurabh Gupta****, Assistant Professor, Department of Orthopaedics,All India Institute of Medical Sciences, Jodhpur,* ***Dr. Prabodh Kantiwal****, Assistant Professor, Department of Orthopedics, All India Institute of Medical Sciences, Jodhpur and* ***Dr. Rajesh Kumar Rajnish****, Assistant Professor, Department of Orthopedics, All India Institute of Medical Sciences, Jodhpur for being altruistic and supportive throughout the course of my research.*

*I would also like to acknowledge the significant role played by my seniors****, Dr. Jeshwanth N.*** *and notably,* ***Dr. Kishor Kunal , Dr. Sanchit Roy and Dr. Kishor***

Munde. *I am also grateful to* ***Dr. Dhirendra Kumar, Dr. Binod Kumar, Dr. Meghal Goyal, Dr. Ashraf Jamal*** *and* ***Dr. G Lakshmi Prasad****,* ***Dr. Sheikh Azharuddin, Dr. Akhil Mathew Jacob, Dr. Abbas Shabbir Bhai Bhatia*** *and* ***Dr. Devdutta Pradeep Phatak*** *for their care and support in all difficult times.*

I would also like to acknowledge the role played by my beloved friends and colleagues ***Dr. Akshant Chandel, Dr. Vimal Prakash, Dr. S.B.Likhith Ram Naik*** *and juniors,* ***Dr. Sammarjanki Rymbai, Dr.Ronnie George, Dr. Amandeep Bains, Dr.Aakash Choudhary, Dr. Syed Adnan, Dr. Amir Sohail, Dr. Kiran Rani, Dr. Naman Jain, Dr. Raj Sinha and Dr. Manveer Dhillon.***

Family is the oasis in the tough quest for excellence and knowledge. I owe everything to my parents, ***Late Bindeshwari Prasad*** *and* ***Mrs. Amole Devi*** *and my elders brother ,****Dr. Anil*** *and* ***Dr. Sunil*** *who have always stood like a rock behind me and whose prayers and sacrifices have made me what I am today.*

I would like to specially thank my loving wife ***Dr. Lucy Nisha*** *for her constant support in my struggles.*

Last but not least, I extend me deepest gratitude to my ***patients*** *who participate in the study****.****Without their co-operation, this work would not have been possible.*

I also extend my gratitude to the OPD staff ***Mr. Abhishek Badgujar, Mr.Sohan Singh, Mr. Laxman Singh, Mr.Ajay Barwer, Ms.Shobha, Ms.Monica*** *and* ***Mr. Gulab Singh*** *for their co-operation and assistance.*

Dr. Sushil Kumar

INDEX

LIST OF ABBREVIATIONS

TUG	Time Up and Go
ILAS	Iowa Level of Assistance Scale
WOMAC	Western Ontario & McMaster Universities Osteo-arthritis Index
HHS	Harris Hip Score
JFS	Joint Forgotten Score
KOOS	Knee injury and Osteoarthritis Outcome Score
CCI	Charlson Comorbidity Index
CCI08	Charlson Comorbidity Index 2008
THR	Total Hip Arthroplasty
TKR	Total Knee Arthroplasty
PROMs	Patients reported outcome measures
PPOMs	Patients performance outcome measures

LIST OF FIGURES

LIST OF TABLES

LIST OF CHARTS

LIST OF ANNEXURES

SUMMARY

Background: Arthroplasty is the standard of care to treat end stage arthritis in hip and knee joints. A Good functional outcome is the aim of every joint replacement procedure. To evaluate its outcome two type of scores can be used: Patients reported measures & patient's performance measures. It would be ideal to know if the functional outcome of the surgery can be predicted during the early follow-up period. In this study we have used TUG, ILAS, WOMAC, HHS, KOOS and JFS to evaluate patient's outcomes and tried to find a correlation between them to predict the patients' functional recovery.

Objectives: To assess early functional outcome in patient undergoing hip and knee arthroplasty using Time Up & Go score and Iowa Level of Assistance Scale score and to find correlation of Time Up & Go and Iowa Level of Assistance Scale score with Patients Reported Outcome Measures(PROMs).

Methods: 174 (130 TKR & 44 THR) Patients with severe hip and knee pain were evaluate preoperatively and postoperatively on day 2, week 2 ,week 6 and at 6 month postoperatively . TUG & ILAS scores were assessed at pre-operatively and post-operatively on day 2, week 2, week 6 and at month 6 but KOOS and WOMAC scores were assessed at pre-operatively and post-operatively at 6 months and JFS was assessed post-operatively at 6 months only. These scores were calculated for all the patients and charted on excel sheet and statistical analysis was performed to assessed functional outcomes measures.

Results: A total of 174 patients (130 TKR & 44 THR) were included in the study. Mean score of TUG and ILAS gradually increased from Day 2 (TUG,148.57±118.156 ; ILAS , 28.18±6.20) to week 6 (TUG, 71.32±45.847 ; ILAS , 43.30±6.37) postoperatively in THR group of patients, Similarly Mean score of TUG and ILAS gradually increased from Day 2 (TUG, 207.27±119.31 ; ILAS , 28.54±5.44) to week 6 (TUG, 56.96±23.52 ; ILAS , 45.50±4.97) postoperatively in TKR group of patients. The mean HHS pre operatively was 33.052±10.38 which improved to 88.570±7.29 by the sixth post-operative month.

The mean WOMAC score pre operatively was 38.56±12.85 which improved to 89.08±5.80 at six months follow-up and the mean score of KOOS pre operatively was 34.93±13.03 which improved to 85.98±6.39.The mean score of TUG & ILAS was minimally changed from week 6 to post operatively month six. Mean JFS at 6 months was 71.44±3.88 in THR patients and 72.15±2.80 in TKR patients.

Conclusion: The results from this study help us postulate that KOOS, WOMAC, and HHS score can be used as a long-term functional outcome predictors in patients receiving hip and knee arthroplasty and TUG & ILAS score can be used as early predictors for long term functional outcomes in arthroplasty patients. TUG & ILAS score have significant correlation with patient-reported outcome measures like WOMAC, KOOS and HHS.

INTRODUCTION

Joint replacement (arthroplasty) as a surgical option for end stage arthritis is well established now and millions of patients across the world have benefited from it. Although many patients with arthritis can be treated by conservative modalities such as weight reduction, modification of lifestyle, drug therapy, physiotherapy and occupational therapy for early stage of diseases but for patients with severe hip and knee pain surgical management is a better modality of treatment. Total hip replacement and total knee replacement have been reported to provide better results as compared to non-surgical treatment. More than 90 % of patients have improved outcomes after THR & TKR. Less than 10 % of patients had complications like hip dislocation, pulmonary embolism, sciatic nerve palsy, surgical site infection, aseptic loosening, peri-prosthetic fracture etc. After hip or knee arthroplasty, there is a need to mobilise patients as quickly as possible. It reduces the need for external resources, hospitalisation stay and enhances patient safety after discharge [29]. To evaluate the functional outcome of THR & TKR, there are two types of outcome measures:

A. Patients reported measures

B. Patients' performance measures.

In Patients reported measures , the patient themselves describe their function through questionnaires but in patients performance measures , the patients performs one or more tasks and is scored on the ability to perform the task.[3]. In PROMs there are multiple scales used such as Knee injury and Osteoarthritis Outcome Score (KOOS)/Hip disability and Osteoarthritis Outcome Score (HOOS) , Lower-Extremity Functional Scale (LEFS), Oxford Knee Score (OKS) ,Western Ontario & McMaster Universities Osteo-arthritis Index (WOMAC), and Harris Hip Score (HHS). For Patients' performance measures 6 min walk test, self-paced walk test, stair test, Iowa Level of Assistance Scale (ILAS) and Time Up & Go test (TUG) were used.

There are many scales used to foresee the functional outcome in patient undergoing hip and knee arthroplasty such as the Lower-Extremity Functional Scale (LEFS), Western Ontario & McMaster Universities Osteoarthritis Index (WOMAC), Knee injury and Osteoarthritis Outcome Score (KOOS)/Hip disability and Osteoarthritis Outcome Score (HOOS) and Oxford Knee Score, they have been certified for long-term functional outcome and evaluation..

While predictors of long term functional outcome of total hip and knee arthroplasty are well explored, there has been a search for predictors for early functional recovery.

Time Up and Go test and Iowa level of assistance scores have been postulated to fulfil this role. It would be pragmatic to assess early functional score to allow for modifications to the rehabilitation and management protocol.

The ILAS score evaluates the ability of the patient to do five tasks (supine to sitting, sitting to standing, walking, stairs, and walking speed), with a global score out of 50[3] while the TUG score evaluates the time that a patient takes to rise from a chair, walk three meters, turn around, walk back to the chair, and sit down [25]. It has been signifying to predict both short [26] and long-term function [27, 28] after arthroplasty. Both predictors are considered important performance assessments in patients with hip or knee osteoarthritis [30].

Another pertinent issue is whether the early functional level post-surgery predicts the long-term functional outcome following the procedure.

This study was therefore planned to address these concerns and evaluate the role of TUG and ILAS as predictors of Functional outcome following hip and knee arthroplasty.

Total hip and knee arthroplasty has many scores that have been certified for long term functional outcomes such as WOMAC, OKS, LEEFS, HHS, KOOS, and JFS but there are no such scores for an early functional outcome.

So this study was also planned to find early functional outcome in patient undergoing hip and knee arthroplasty and their correlation with patient reported outcome measures (PROMs).

AIMS AND OBJECTIVES

Aim:

To assess early functional outcome in patient undergoing hip and knee arthroplasty using Time Up & Go score and Iowa Level of Assistance Scale score.

To find correlation of Time Up & Go score and Iowa Level of Assistance Scale score with Patients Reported Outcome Measures.

Primary objective

To assess early functional recovery in patient undergoing hip and knee arthroplasty using TUG and ILAS score.

Secondary objectives

To establish, if there is a correlation of TUG and ILAS score with PROMs and examine their role in predicting long term functional outcome.

Research question

Can TUG score and ILAS score assessed during early recovery period be used as a predictor for long term functional outcome in patients undergoing hip and knee arthroplasty?

Research hypothesis

Null hypothesis: TUG and ILAS scores are not significant predictors for long term functional outcome in patient undergoing hip and knee arthroplasty.

Alternative hypothesis: TUG and ILAS scores are significant predictors for long term functional outcome in patient undergoing hip and knee arthroplasty.

REVIEW OF LITERATURE

Long term functional outcome measures:

In a study done by **Lokesh Gupta et al. (2018**), 20 THRs performed between December 2008 and December 2010 were assessed. Preoperatively, the average modified HHS was 28, rising to 64 at 6 weeks, 86 at 6 months, 90 at 1 year, and 92 at the most recent follow-up. Modified HHS was outstanding in 17 patients and good in 3 patients after a year of follow-up. In 11 cases where the procedure lasted between 136 and 160 minutes and in 2 cases where it lasted between 161 and 185 minutes, modified HHS performed superbly. Modified HHS also performed exceptionally well in individuals for whom early partial and complete weight bearing was initiated [24].

In a retrospective analysis with a minimum follow-up of 2 years, **David Figueroa et al. (2019)** examined 191 complete knee arthroplasties carried out on 182 patients during an 8-year period. The frequency of serious problems served as the key outcome indicator. Minor problems, lingering symptoms, satisfaction, and the Knee Injury and Osteoarthritis Outcome Score were considered secondary outcomes (KOOS). They discovered that the rates of global complications were 15.5%, reinterventions were 9.2%, and revisions were 2.5%. 9.2% of individuals experienced major difficulties, whereas 5.1% experienced moderate complications. 90% of patients expressed satisfaction with the surgery, and the average Knee Injury and Osteoarthritis Outcome Score (KOOS) was 77 points (14-100). 45.8% of patients exhibited some degree of range of motion restrictions at the 2-year follow-up. [22]

In a study involving 254 complete knee replacements, **Bansal et al. (2022)**, At two years after surgery, they analysed the OKS, FJS, and short form WOMAC score. For FJS, correlation analysis with OKS and short-form WOMAC scores was conducted. SF WOMAC, FJS, and OKS averages were 77.24, 38.75, and 79.97, respectively. FJS and the OKS and SF WOMAC scores had a strong

association. Finally, they concluded that FJS is a simple and equally effective outcome measures, like the other widely used measures OKS and WOMAC. [20]

A prospective cohort study of primary TKA was carried out by **K.Giesinger et al. (2014**). They included patients who had completed the Forgotten Joint Score-12 (FJS-12), EQ-5D, Knee Society Score, and range of motion (ROM) evaluation as well as the osteoarthritis (OA) index from Western Ontario and McMaster Universities (WOMAC). Pre-operative, 2 months, 6 months, 1 year, and 2 years post-operative were the five time points evaluated. The Knee Society Score (KSS) Knee score (1.70) and WOMAC Total were found to have the largest effect sizes (ES) for change from preoperative to 2-month follow-up (1.50). The FJS-12 (0.99) and the KSS Function Score displayed the biggest ES for change over the time period between six months and a year (0.88). At 1-year follow-up, the EQ-5D demonstrated the biggest ceiling effect, with 84.4% of patients rating the highest possible score.ES for the FJS-12 were highest between the 1- and 2-year follow-up (0.50). All other outcome measurements revealed an ES of 0.30 or below. Response rates for outcome indicators vary greatly, especially more than a year after surgery (i.e., when comparing scores at 1- and 2-year follow-up). The FJS-12 was the instrument found to be most responsive. This shows that, compared to conventional PROMs, joint awareness may be a more accurate indicator of patient prognosis. [23]

623 patients with primary TKA participated in a study by **Van Egmond et al.** in a fast-track setting. Prior to surgery, at six weeks after surgery, and three months later, they had to assess the patient-reported outcome measures (PROMs). When compared to preoperative ratings, the OKS, KOOS-PS, and EQ-5D self-rated health VAS all showed statistically significant improvements after 6 weeks. The mean improvement for KOOS-PS was clinically significant at 6 weeks and 3 months. Non-responders had a higher BMI and lower scores on the following EQ-5D items: mobility, self-care, usual activities, and anxiety/depression. During the first three months following primary TKA, they discovered statistically significant and clinically relevant functional improvement. [14]

Between January 1988 and April 1991, **R John Wright et al.** studied 407 patients (523 knees) undergoing primary total knee arthroplasty. At the end of ten years, 165 patients (211 knees) had died; seven of these 211 knees had been revised prior to death. The remaining 242 patients completed a questionnaire that included the Western Ontario and McMaster University Osteoarthritis Index (WOMAC), the Short Form-36 (SF-36), and questions about patient satisfaction and revision surgery. 208 (86%) completed the questionnaire. At the time of the evaluation, the mean WOMAC scores (and standard deviation) for pain were 88 +/- 17 and 79 +/- 20 for function. The SF-36 scores were similar to those of an age and gender-matched normal population, with only the physical functioning score (p 0.001) being significantly lower and the general health score (p 0.001) being significantly higher. Patients were generally pleased with all aspects of the outcome. [17]

Suhail et al. conducted a retrospective study on 60 patients (76 total knee replacement). Between February 2005 and February 2008, TKR performed. The average follow-up period was one year and five months. The mean Knee Society Knee Score at the final follow-up was 87.9, with 77.3% (58 knees) rated excellent, 21.3% (16 knees) rated good, and 1.3% (1 knee) rated fair; none were rated poor. The average Function Score was 87.1, with 64% (48 knees) rating excellent, 29.3% (22 knees) rating good, 6.7% (5 knees) rating fair, and no knee rating poor. The WOMAC average was 94.4. (standard deviation 6.59). Finally, based on Knee Society Knee and Function scores and the WOMAC score, they concluded that the early results of the TKR were excellent or good in the majority of patients. The majority of the patients were functionally independent, had no knee pain, and were pleased with their results. [5]

Forgotten Joint Score:

The Oxford knee score (OKS) is a scoring system that has been regularly verified in TKA research However, the OKS has been proven to have a significant ceiling effect in recent years (making it less ideal for examining potentially tiny variations in knee function in patients with good or great clinical results following TKA.[18]

A new scoring system, the forgotten joint score (FJS), was recently designed to solve this issue (Behrend et al. 2012). The FJS score system is based on a 12-item questionnaire that asks patients about their ability to forget about their artificial joint in everyday life (i.e., lack of awareness of the knee), which is the ultimate goal after arthroplasty. Earlier research (Behrend et al. 2012, Thienpont et al. 2014, Thompson et al. 2015) established

Strong connection between the FJS and other PROMs (WOMAC and KOOS) and demonstrated that the FJS has potential ability to evaluate outcome. The relationship between the FJS and the OKS has never been studied before.[18]

Behrend et al. Created the Forgotten Joint Score (FJS) in 2007. This new PROM assessed a highly tempting concept: a patient's ability to forget about their artificial joint in daily life. The best outcome after a complete knee or total hip replacement, according to Behrend et al, is the goal of a total hip replacement (TKR/THR) was for the patient to be "unaware" that they had one a prosthetic joint was used.[20]

The Forgotten Joint Score (FJS) is a scoring system that was established in recent years and is based on 12-question surveys to determine a patient's capacity to forget their artificial knee joint in daily life. The greater the score, from 0 to 100, the more natural or "forgotten" the joint is. In addition, unlike other patient-reported outcome measures, FJS is not constrained by the ceiling effect. The FJS has been utilised widely in patients who had total hip and total knee arthroplasty (TKA)

The FJS-12 is a 12-question survey with a 5-point Likert response format and raw results translated onto a 0–100 point scale. Higher scores imply a better outcome, such as a more natural-looking prosthetic joint. The FJS-12 has a modest ceiling effect and can distinguish between good, very good, and outstanding outcomes following joint arthroplasty. [19]

Table1: Review of literature of long term functional outcomes

	No of patients	Group of patients.	Scores used	Follow up	Conclusion
Lokesh Gupta et al (2018)	20	THR	Modified HHS	1 years	Modified HHS was an excellent long term predictor of patient outcome.
David Figuero a et al(2019)	182	TKR	KOOS	2 years	90 % of Patients had better outcome at 2 years of follow up, Mean KOOS score was 77.
Bansal et al (2022)	254	TKR	OKS,FJS & SF WOMAC	2 years	FJS is an easy and similarly effective long term functional outcome measure.
Van Egmond et al (2021)	623	TKR	OKS ,KOOS-PS & EQ-5D	3 months	All scores showed statistically significant improvement at 6 weeks follow up.

Table 2: Review of literature of long term functional outcomes

	No of patients	Group of patients.	Scores used	Follow up	Conclusion
K. Giesinger et al (2014)	Not mentioned	TKR	KSS,WOMAC ,FJS-12 & EQ-5D	2 years	FJS-12 is a more accurate indicator of patient prognosis.
R John Wright et al (2004)	407	TKR	WOMAC & SF -36	10 years	WOMAC score was the best predictors at 10 years follow up.
Suhail et al(2009)	60	TKR	KSS, KFS & WOMAC	1 year 5 months	KSS , KFS and WOMAC score was the best functional outcome predictor
Behrend et al.(2012)	243	TKR & THR	FJS & WOMAC	Not mentioned	FJS is the most reliable long term functional outcome measures in TKR & THR patients.

Patients' Performance measures

Time Up & Go Scores:

Givens DL et al. (2018) found that in candidates for total knee arthroplasty, the PROMIS CAT physical function is not a substitute for the TUG performance-based measure. They had conclude that TUG score was the best predictors for TKR patients [4].

According to Poitras et al. (2018), the ASA and TUG are both highly significant predictors of duration of hospital stay (LOS). The odds ratio (OR) for the ASA was 3.57 (95% confidence interval (CI) 1.26–10.07), and the OR for a one-standard deviation (SD) increase in the TUG of 4.45 s was 2.18 (95% CI 1.67–4.15). Only the TUG showed two-week function predictability and was showing signs of importance for six-week function. For two week function, one SD TUG rise produced an OR of 2.14 (95% CI 1.53-3.79). [7]

The prognostic impact of functional performance and range of motion measurements on outcomes following total knee arthroplasty was examined in the study by **Bade MJ et al. (2014).** Two pooled prospective randomised controlled trials were the subject of this secondary analysis. 64 patients (32 men and 32 women) with end-stage osteoarthritis of the knee were enrolled for a primary total knee replacement. A 6-minute walk test distance, Timed Up and Go (TUG) test time, and active knee flexion and extension range of motion were all measured. Long-term flexion and extension were predicted by preoperative knee flexion and extension measurements ($\beta = 0.44$, P 0.001) and ($\beta = 0.46$, P 0.001). Acute knee flexion and extension measurements did not predict long-term flexion or extension ($\beta = 0.09$, $P = 0.26$) or ($\beta = 0.04$, $P = 0.76$).Long-term 6-min walk performance was predicted by preoperative TUG performance ($\beta = -21$, P 0.001). After adjusting for the effects of sex, age, and other factors, acute TUG performance was predictive of long-term functional performance on the 6-min walk test ($P = 0.02$); however, after adjusting for preoperative TUG performance, acute TUG was no longer associated with long-term 6-min walk performance ($P = 0.65$). Although preoperative measurements have some predictive significance,

acute postoperative measurements of knee range of motion have little usefulness. However, when preoperative functional performance data are missing, acute functional performance assessments have a useful predictive value. [16].

Table 3: Review of literature of Time Up & Go scores

	No of patients	Group of patients.	Scores used	Follow up	Conclusion
Poitras et al (2018)	108	TKR & THR	ASA, CCI, CCI08, and TUG	6 weeks	ASA and TUG was the important predictors of hospital length of stay (LOS).
Bade MJ et al (2014)	64	TKR	TUG & 6 min walk test	Not mention	TUG score was statistically significant predictor of long-term 6-min walk performance.
Givens DL et al(2018)	65	TKR	TUG ,BMI,NPRS & smoking status	1YEAR	TUG score was the strongest functional predictors for TKR patients.

Iowa Level of Assistance Scale scores:

Benedetti et al.(2014) conducted a study of 203 patients who had undergone THR or TKR between 15 January and 10 May 2012 for chronic joint disease . Prior to being released from the orthopaedic ward, they had used the ILAS to assess their needs for assistive devices and help during functional activities (ILAS-funct). The Classical Test Theory and RA were used to conduct a psychometric analysis of the replies. The correlation between the two domains (ILAS-funct and ILAS-dev) was strong. ILAS-funct displayed two disordered response category thresholds, as determined by the RA rating scale diagnostics: only five of the seven different response levels for "help" were clearly apparent.The five ILAS-funct items all fit the model and exhibited no local reliance or differences in item functioning by sex or across age group. Rasch

calibration and subsequent analyses were not possible with ILAS-dev since it offered two unused response categories. ILAS-funct demonstrated good psychometric qualities, although it might be improved by collapsing at least response categories 5 (failed) and 6. (not tested). The existence of underutilised response categories in ILAS-dev necessitates a review of its scaling choices and procedures.[21]

Table 4: Review of literature of Iowa level of assistance scale scores

	No of patients	Group of patients.	Scores used	Follow up	Conclusion
Benedetti et al.(2014)	203	THR & TKR	ILAS-funct & ILAS - dev	Not mentioned	ILAS-funct demonstrated best psychometric qualities for functional outcome.

Correlation of TUG & ILAS scores with PROMs:

Poitras S et al (2016) discovered that it is clinically warranted to get patients functioning as soon as feasible after hip or knee arthroplasty. Comparing the clinimetric characteristics of four tools to evaluate function soon after arthroplasty was the goal. The Time Up and Go (TUG), Iowa Level of Assistance Scale (ILAS), Postoperative Quality of Recovery Scale (PQRS), and Readiness for Hospital Discharge Scale (RHDS) were used to evaluate 128 patients undergoing hip or knee arthroplasty preoperatively,1 and 2 days after surgery, and 2 & 6 weeks after surgery. The validity of the contract, descriptive data, floor and ceiling effects, responsiveness and interpretation were all determined. The TUG and ILAS ratings showed a significant decline from pre-operative to post-operative, followed by a significant improvement following surgery. Following surgery, there was a considerable improvement in the PQRS pain and function

dimensions as well as the RHDS personal status subscale. Patient-perceived improvement was substantially correlated with changes in the PQRS pain dimension, the TUG, the RHDS global scale, and the personal status subscale. The RHDS global (1.1/10), personal status subscale (2.3/10), and TUG all showed minimally significant changes (43.4 s at 6 weeks). The PQRS function dimension and RHDS have a mediocre relationship to the TUG or ILAS in terms of construct validity. From preoperative to postoperative day 2, there was a strong association between TUG and ILAS; however, at 2 and 6 weeks, this correlation significantly diminished. In the first six weeks after a hip or knee replacement, the TUG and RHDS personal status subscale showed the best clinimetric qualities to assess function. [3].

According to Poitras S et al (2015), optimum patient function should increase immediately following arthroplasty. Which pre-operative function measures are most accurate at predicting length of stay (LOS) and quick functional recovery is unknown. The purpose of this study was to find peri-operative function measures that were indicative of hospital length of stay (LOS) and short-term function following hospital discharge in patients who had hip or knee replacement surgery. The readiness for hospital release scale, the post-operative quality of recovery scale, the Iowa level of assistance scale, the timed-up-and-go (TUG), and the Western Ontario and McMaster Osteoarthritis Index were all used to evaluate 108 patients (WOMAC). Two weeks following discharge, function was evaluated using the older Americans resources and services activities of daily living (ADL) questionnaire (OARS). Following multiple regressions, the LOS and OARS scores were strongly correlated with the pre- and post-operative day two TUG, and the OARS score was correlated with the pre-operative WOMAC function subscale. Preoperatively, a cut-off WOMAC function score of 48.5/100 and a cut-off TUG duration of 11.7 seconds for LOS and 10.3 seconds for short-term recovery had the best sensitivity and specificity, respectively. The maximum sensitivity and specificity were obtained postoperatively with a cut-off day two TUG time of 31.5 seconds for LOS and 30.9 seconds for short-term function. The pre-operative WOMAC function subscale can suggest short-term functional

capacities, and the pre- and post-operative day two TUG can reflect hospital LOS and short-term functional capacities.[15]

Table 5: Review of literature of correlation of Time Up & Go and Iowa level of assistance scale scores with patient's reported outcome measures

	No of patients	Group of patients.	Scores used	Follow up	Conclusion
Poitras S et al (2015)	108	TKR & THR	TUG & WOMAC	2 weeks	pre-op & post-op day 2 TUG scores and the pre-op WOMAC score were effective short term functional outcome measures for TKR & THR patients
Poitras S et al (2016)	108	TKR & THR	RHDS,PQRS ,TUG & ILAS	6 weeks	TUG & RHDS were the best clinimetric qualities to assess function outcome.

MATERIAL AND METHODS

Study design: It was a Prospective Observational study. The study was designed and supervised and conducted at the Department of Orthopaedics, AIIMS Jodhpur after due review and ethical clearance from the institutional research cell and Institutional ethics Committee (AIIMS/IEC/2021/3567). The study was conducted as per the Declaration of Helsinki and Good Clinical Practices guidelines. Patients were enrolled from 1st April 2021 to 31st May 2022 in our study.

Written informed consent was taken from all the eligible patients as the regulatory criteria for inclusion in the study.

Inclusion criteria:

1. Willing to give informed consent
2. Patient with severe knee & hip pain and advised Primary Total Hip and Total Knee Replacement surgery in AIIMS jodhpur

Exclusion criteria:

1. Diagnosed neurological or musculoskeletal disease (excluding osteoarthritis) adversely affecting gait or weight-bearing.
2. Physical, emotional, or neurological conditions that would compromise the patient's compliance with postoperative rehabilitation and follow-up (e.g., drug or alcohol abuse, serious mental illness, general neurological conditions, such as Parkinson, MS, etc.).
3. Revision Total hip & knee arthroplasty

Sampling frame: This study included all individuals with severe hip and knee pain, presenting to the AIIMS Jodhpur Orthopedics department and meeting the inclusion criteria, after approval by institutional ethical committee.

Study Duration: 18 months

Study procedure and data collection methods

The patients attending AIIMS Jodhpur Orthopaedics Department with severe knee & hip pain and advised Total Hip and Knee Replacement surgery were assessed after meeting the inclusion criteria .The patients were evaluated by taking a clinical history and a thorough physical examination was performed. Clinical history included side involved, VAS pain scale, range of motion, measurements for any flexion deformity, extension lag. Clinical information and findings were documented in a pre-designed performa (ANNEXURE VII) .The patients was asked to fill the questionnaires which were checked by an orthopaedician.

In our study we have kept the pre and post op protocols same for those patients who had refused for participation. So, that their clinical care was in no-ways affected by the decision.

The TUG and ILAS score were assessed preoperatively and on post op day 2, and post op week 2 and week 6 and at 6 months post-operatively.

The TUG score assesses the time taken by the patient to get up from a chair, walk three meters, turn around, walk back to the chair, and sit down [27]. It can predict both short [28] and long-term function [29,30] following arthroplasty.

The ILAS score assesses the capability of the patient to perform five tasks (supine to sitting, sitting to standing, walking, stairs, and walking speed), with a global score out of 50[3]

KOOS, HHS and WOMAC were recorded preoperatively and at 6 months post-operatively.

These scores KOOS, HHS & WOMAC were calculated on a publicly available online scoring platform, (ANNEXURE VIII, IX & X). https://orthotoolkit.com/koos/.

Forgotten Joint Score was recorded at 6 months post-operatively (ANNEXURE XI)

When calculating the total score for the FJS, all responses were added together (never, 0 points; almost never, 1 point; rarely, 2 points; occasionally, 3 points; mostly, 4 points) and divided by the number of completed items (questions marked "not relevant for me" were treated as missing values and were not included in completed items). After multiplying this average by 25 and than subtracting it from 100, a total score range of 0 to 100 is obtained. A high score indicates a high degree of "forgetting" the prosthetic joint—that is, a low level of awareness.

These scores were calculated for all the patients and charted on excel sheet and statistical analysis was performed using SPSS software (version 27.0; SPSS Inc., Chicago, IL, USA).

Periodicity of data collection: All patients were called pre operatively and post op day 2, week 2, week 6 and at 6 months.

TUG & ILAS scores were assessed pre-operatively and post-operatively on day 2, week 2, week 6 and at month 6.

KOOS and WOMAC scores were assessed pre-operatively and post-operatively at 6 months.

JFS was assessed post-operatively at 6 months.

STATISTICAL ANALYSIS

For statistical analysis, data was tabulated on Microsoft excel spreadsheet and then analyzed by SPSS (version 27.0; SPSS Inc., Chicago, IL, USA) and Graph Pad Prism version 5. Data had been summarised as mean and standard deviation for numerical variables and count and percentages for categorical variables. Two-sample t-tests for a difference in mean involved independent samples or unpaired samples. Unpaired proportions were compared by Chi-square test or Fischer's exact test, as appropriate. Correlation was calculated by Pearson correlation analysis. The Pearson product-moment correlation coefficient was a measure of the linear dependence between two variables X and Y. P-value ≤ 0.05 was considered for statistical significance

Ethical consideration

This study was conducted after approval from the Institutional Ethical Committee. (AIIMS/IEC/2021/3567). Informed consent was taken from the patients being enrolled for the study after approval by institutional ethical committee, by providing them a proper printed consent form along with patient information sheet and after properly explaining the purpose of the study.

OBSERVATIONS AND RESULTS

Demographics details

Table 6: Age distribution in Total hip & knee replacement group

		N	Mean	SD	Minimum	Maximum	Median	P-valve
AGE	THR	44	40.98	14.84	22	81	40	<0.0001
	TKR	130	62.50	8.14	43	80	64	

Sex distribution in THR & TKR patients:

Table 7: Sex distribution in Total hip & knee replacement group

	THR	TKR
MALE	33	40
FEMALE	11	90
TOTAL	44	130

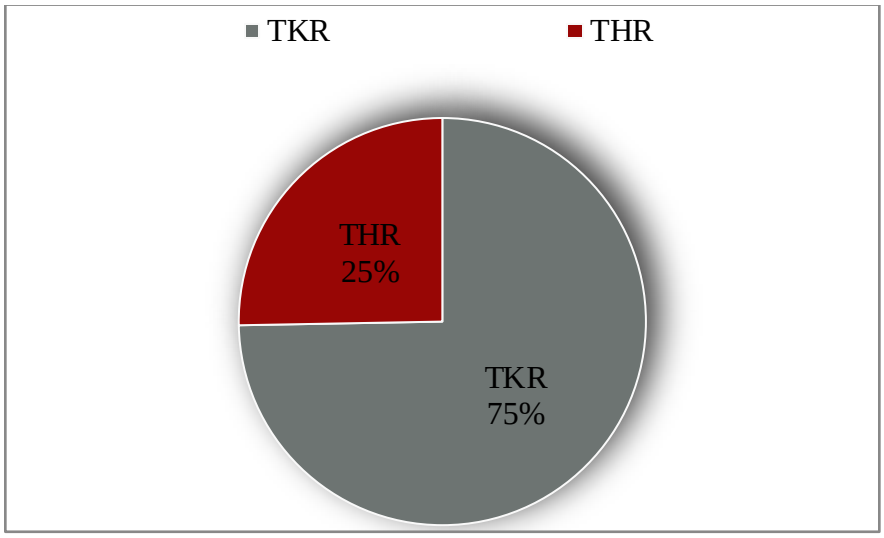

Chart 1: Total hip & knee replacement distribution

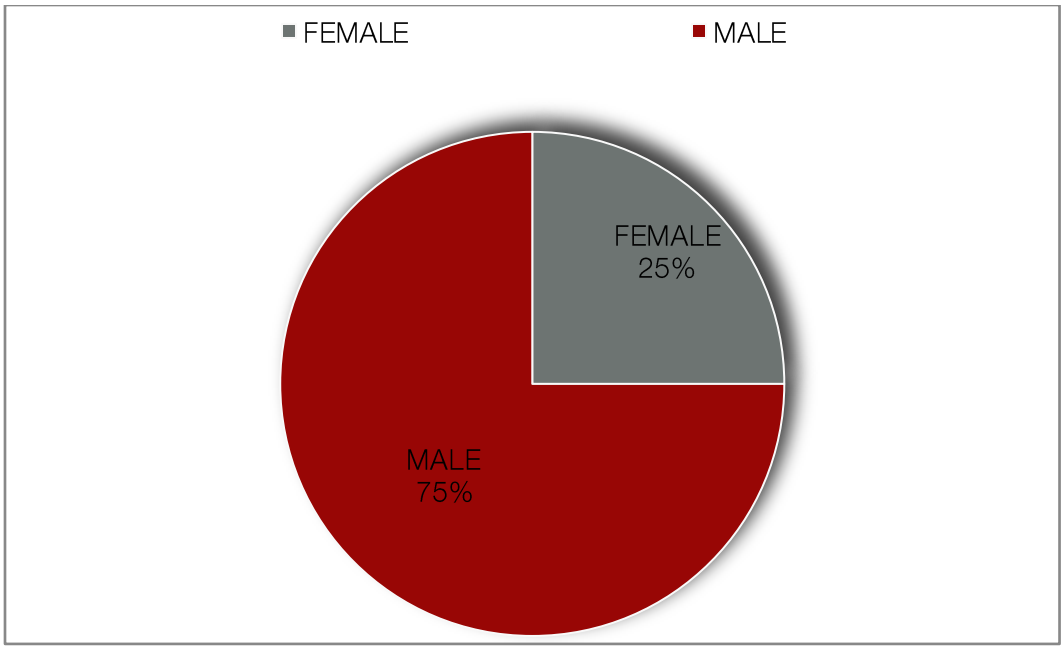

Chart 2: Sex distribution in total hip replacement group

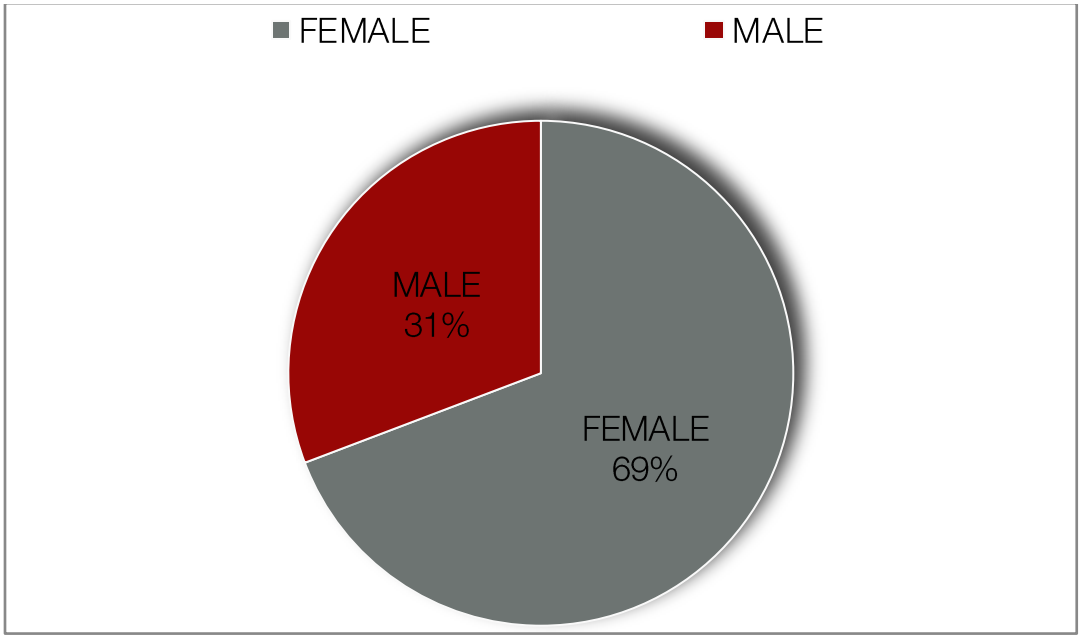

Chart 3: Sex distribution in total knee replacement group

STATISTICS OF THR CASES

Patient's performance measures in THR

TUG score:

Table 8: Time Up & Go scores in total hip replacement group

	Pre op TUG	Day 2 TUG	Week 2 TUG	Week 6 TUG	Month 6 TUG
N	44	44	44	44	44
Mean	148.57	223.75	116.25	71.32	40.82
Std. Deviation	118.15	94.16	73.46	45.84	39.02
Minimum	24	64	33	25	15
Maximum	487	427	384	248	205

Mean TUG score pre operatively was 148.57±118.156 with minimum and maximum value 24 and 487 respectively which increased on day 2 to 223.75±94.165. TUG score decreased on week 2 to 116.25±73.46 with minimum and maximum value 33 and 384 respectively. TUG score gradually improved from 71.32±45.847 on week 6 to 40.82±39.021 at month 6 postoperatively in THR group.(Table 8)

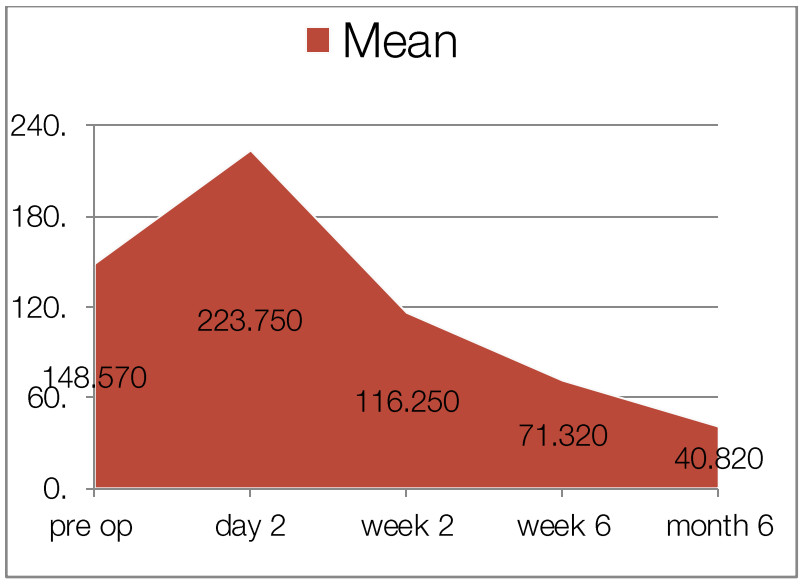

Chart 4: Mean of Time Up & Go scores in total hip replacement group

ILAS score in THR:

Table 9: Iowa level of assistance scale scores in total hip replacement group.

	Pre op ILAS	Day 2 ILAS	Week 2 ILAS	Week 6 ILAS	Month 6 ILAS
N	44	44	44	44	44
Mean	37.05	28.18	37.05	43.30	47.84
Std. Deviation	9.84	6.20	6.49	6.374	4.092
Minimum	20	20	20	30	40
Maximum	50	40	50	50	50

The mean ILAS scores pre operatively was 37.05±9.84 with minimum and maximum value 20 and 50 respectively which decreased to 28.18±6.20 on Day 2 .ILAS score increased to 37.05±6.49 on week 2 with minimum and maximum value 20 and 50 respectively which was almost equal to pre-op values. ILAS score gradually improved from 43.30±6.37 on week 6 to 47.84±4.09 on month 6. There was no significant improvement in values of ILAS score on week 6 and month 6 postoperatively (Table 9).

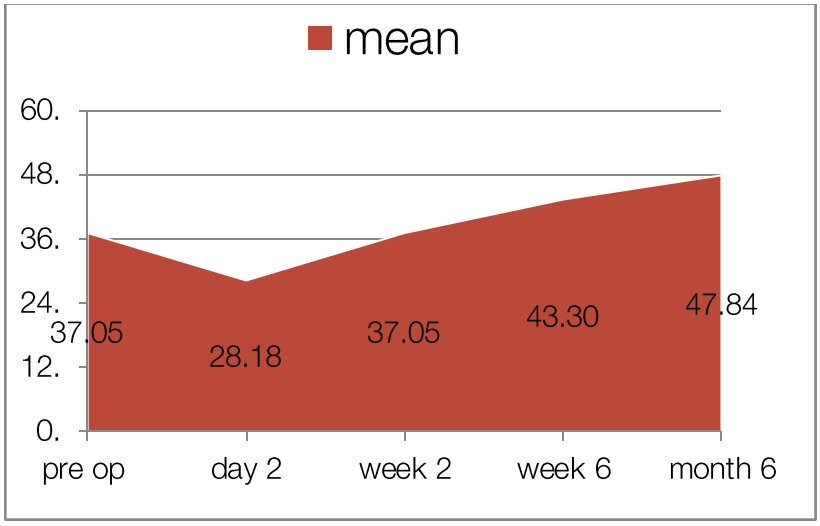

Chart 5: Mean of Iowa level of assistance scale scores in total hip replacement group

Patient's reported measures in THR

Harris hip score in THR:

Table 10: Harris hip scores in total hip replacement group

	Pre op HHS	Month 6 HHS
N	44	44
Mean	33.05	88.57
Std .Deviation	10.38	7.29
Minimum	12.0	68.7
Maximum	49.3	98.6

The mean HHS pre operatively was 33.052±10.38 with minimum and maximum value 12 and 49.3 respectively which improved to 88.570±7.29 with minimum and maximum value 68.7 and 98.6 respectively on Month 6 postoperatively . This shows that there was significant improvement in HHS value on 6 months postoperatively (Table 10)

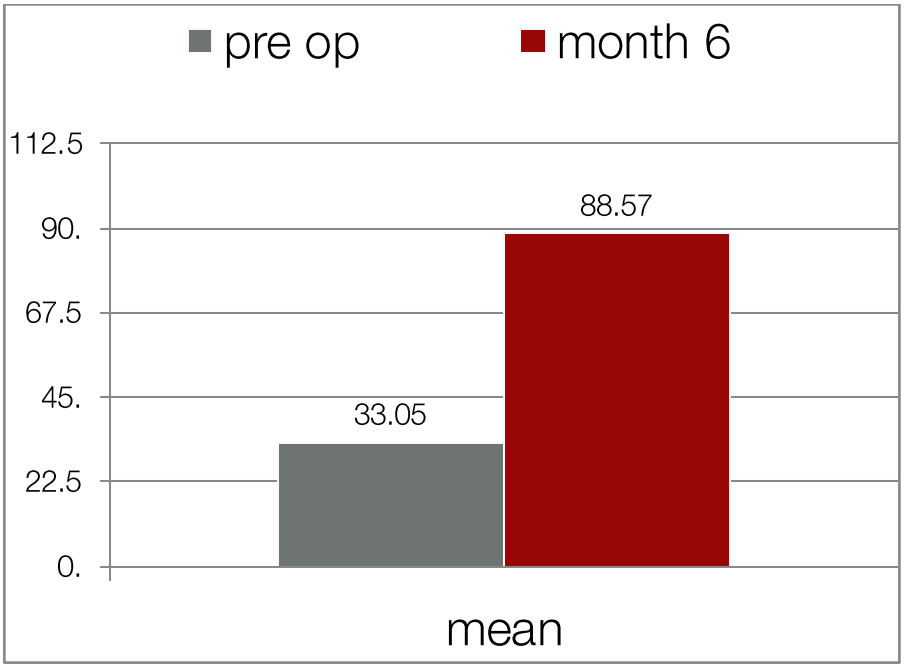

Chart 6: Mean Harris hip scores in total hip replacement group

JFS in THR:

Table 11: Joint Forgotten scores in total hip replacement group

	JFS(100-MEANX25)
N	44
Mean	71.44
Std .Deviation	3.88
Minimum	59.09
Maximum	75.00

The mean JFS-(100-MEANX25) (mean ± s.d.) of patients was 71.4466± 3.884 with minimum & maximum 59.09 & 75.00 respectively (Table 11)

STATISTICS FOR TKR CASES

Patient's performance measures in TKR

TUG score in TKR:

Table 12: Time Up & Go scores in total knee replacement group

	Pre op TUG	Day 2 TUG	Week 2 TUG	Week 6 TUG	Month 6 TUG
N	130	130	130	130	130
Mean	123.92	207.27	93.06	56.96	31.41
Std. Deviation	96.58	119.31	38.24	23.52	15.97
Minimum	21	88	28	19	15
Maximum	420	1140	240	119	86

The mean TUG score pre operatively was 123.92±96.58 with minimum and maximum value 21 and 420 respectively which ncreased on day 2 postoperatively to 207.27±119.31 .TUG score decreased on week 2 to 93.06±38.24 with minimum and maximum value 28 and 240 respectively. TUG score gradually improved from 56.96±23.52 on week 6 to 31.41±15.97 on month 6 postoperatively.(Table 12)

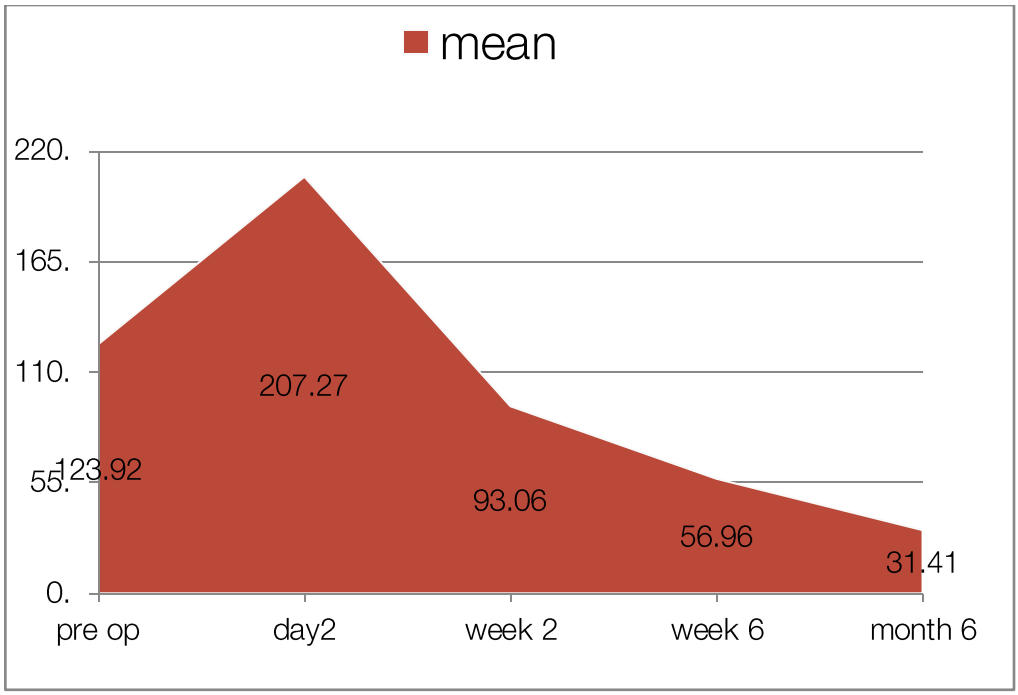

Chart 7: Mean of Time Up & Go scores in total knee replacement group

LAS score in TKR:

Table 13: Iowa level of assistance scale scores in total knee replacement group

	Pre op ILAS	Day 2 ILAS	Week 2 ILAS	Week 6 ILAS	Month 6 ILAS
N	130	130	130	130	130
Mean	36.73	28.54	38.31	45.50	48.77
Std. Deviation	8.79	5.44	6.21	4.97	3.29
Minimum	20	20	30	40	40
Maximum	50	40	50	50	50

The mean ILAS scores pre operatively was 36.05±8.79 with minimum and maximum value 20 and 50 respectively which decreased to 28.54±5.44 on Day 2 postoperatively. ILAS score increased to 38.05±6.21 on week 2 with minimum and maximum value 30 and 50 respectively which is almost equal to pre-op values as found in THR patients. ILAS score gradually improved from 45.50±4.97 on week 6 to 48.77±3.29 on month 6 postoperatively. There was no significant improvement in values of ILAS score on week 6 and month 6 postoperatively. (Table 13)

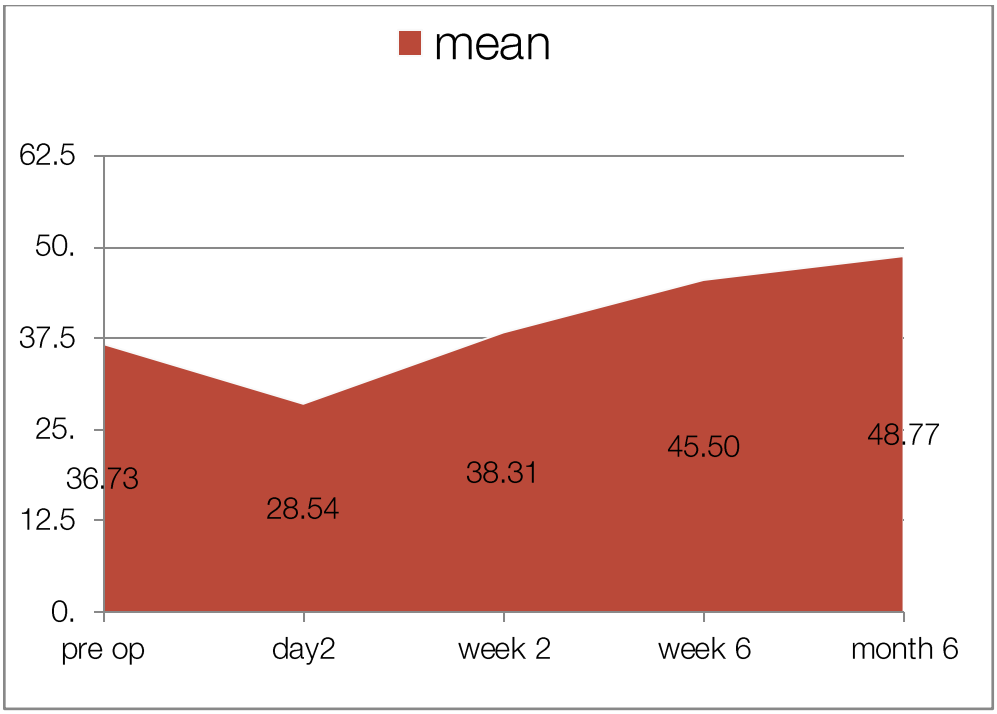

Chart 8: Mean of Iowa level of assistance scale scores in total knee replacement group

Patients' reported measures in TKR

KOOS scores in TKR:

Table 14: Knee injury and Osteoarthritis Outcome scores in total knee replacement group

	Pre op KOOS	Month 6 KOOS
N	130	130
Mean	34.93	85.98
Std .Deviation	13.03	6.39
Minimum	12	67.0
Maximum	81	96.0

The mean KOOS score pre operatively was 34.93±13.03 with minimum and maximum value 12 and 81 respectively which improved to 85.98±6.39 with minimum and maximum value 67.0 and 96.0 respectively on Month 6 postoperatively. This shows that there was significant improvement in KOOS value in 6 months postoperatively. (Table14)

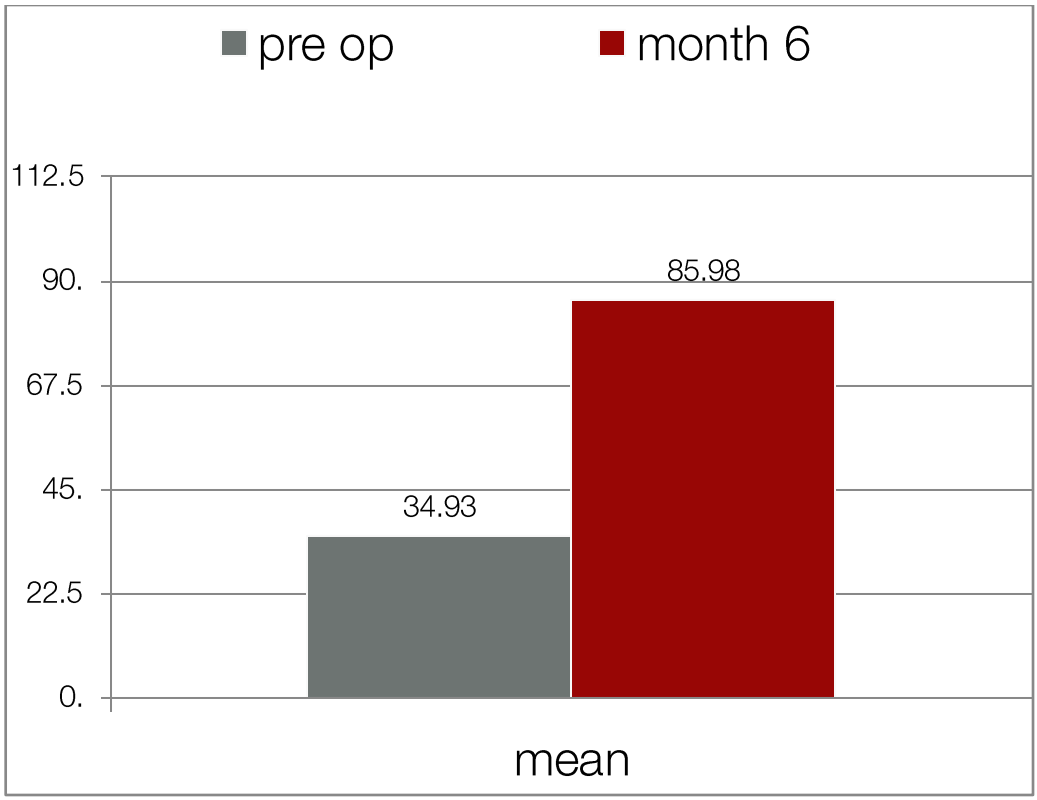

Chart 9: Mean of Knee injury and Osteoarthritis Outcome scores in total knee replacement group

WOMAC score in TKR:

Table 15: Western Ontario & McMaster Universities Osteo-arthritis Index scores in total knee replacement group

	Pre op WOMAC	Month 6 WOMAC
N	130	130
Mean	38.56	89.08
Std .Deviation	12.85	5.80
Minimum	13.4	72.4
Maximum	78.9	98.4

The mean WOMAC score pre operatively was 38.56±12.85 with minimum and maximum value 13.4 and 78.9 respectively which improved to 89.08±5.80 with minimum and maximum value 72.4.0 and 98.4 respectively on Month 6 postoperatively . This shows that there was significant improvement in WOMAC score value in 6 months postoperatively (Table 15).

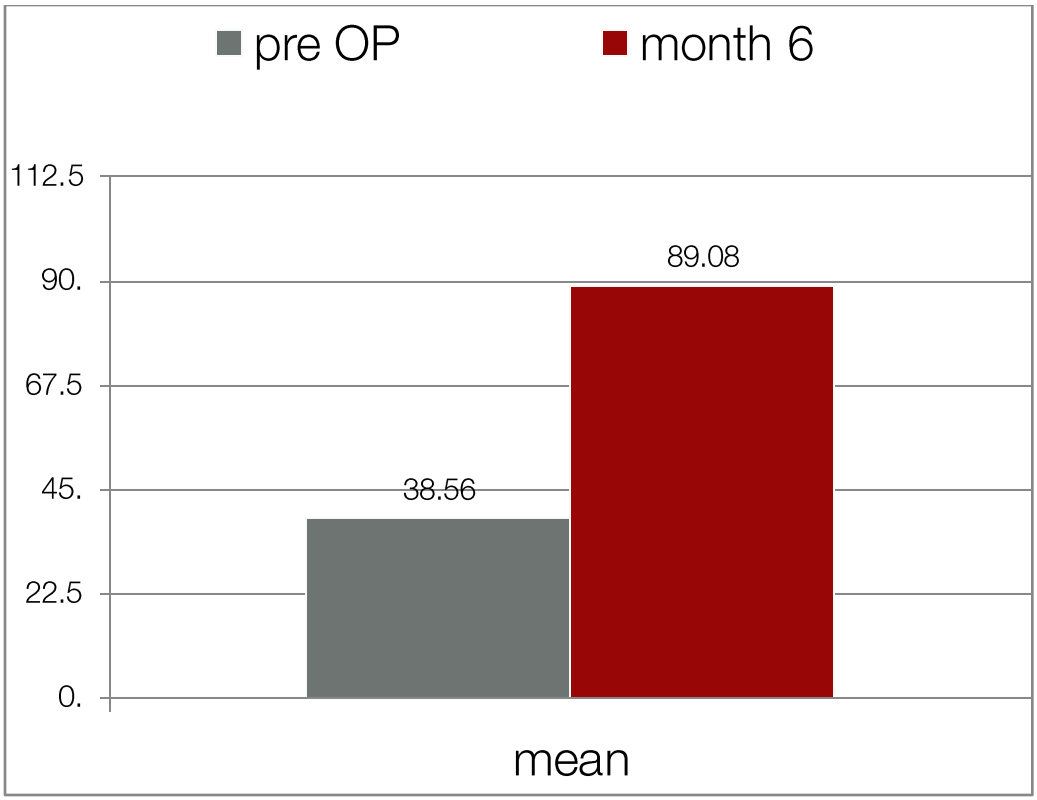

Chart 10: Mean of Western Ontario & McMaster Universities Osteo-arthritis Index scores in total knee replacement group

JFS scores in TKR:

Table 16: Joint Forgotten score in total knee replacement group

	JFS (100-MEANX25)
N	130
Mean	72.15
Std. Deviation	2.80
Minimum	63.63
Maximum	75.00

The mean JFS-(100-MEANX25) (mean±s.d.) of patients was 72.1517± 2.806 with minimum and maximum value 63.63 & 75.00 respectively.(Table 16)

Correlation of patient's performance measures with patient's reported measures:

Correlation of TUG scores with 6 month follow up of HHS & JFS in THR:

Table 17: Correlation of Time Up and Go scores with 6 month follow up of Harris hip scores & Joint Forgotten scores in total hip replacement group

	Day 2 TUG	Week 2 TUG	Week 6 TUG	Month 6 TUG
HHS Month 6	R=-0.358, P<0.017	R=-0.474, P<0.001	R=-0.538, P<0.0001	R=-0.565, P<0.0001
JFS(100-MEANX25) THR month 6	R=-0.420, P<0.005	R=-0.299, P<0.049	R=-0366, P<0.015	R=-0.292, P<0.055

There was a significant correlation present between HHS Month 6 postoperatively and TUG scores at different time interval. 'R' value was gradually increased from Day 2 to Month 6 postoperatively, which postulates that the strength of correlation increased from weak on day 2 to moderate on week 6 & month 6 postoperatively. However, 'R' value of Week 6 was almost equal to month 6 postoperatively.

JFS was negatively correlated on Day 2, Week 2 and Week 6 TUG score values. However strength of correlation was almost weak. Even at 6 month postoperatively there was no significant correlation. (Table 17)

Correlation of ILAS scores with 6 month follow up of HHS & JFS in THR:

Table 18: Correlation of Iowa level of assistance scale scores with 6 month follow up of harris hip scores & Joint Forgotten scores in total hip replacement group

	Day 2 ILAS	Week 2 ILAS	Week 6 ILAS	Month 6 ILAS
HHS Month 6	R=0.310, P<0.041	R=0.513, P<0.0001	R=0.543, P<0.0001	R=0.574, P<0.0001
JFS(100-MEANX25)THR month 6	R=0.252, P<0.099	R=0.125, P<0.418	R=0.315, P<0.037	R=-0.012, P<0.941

There was a significant correlation was present between HHS month 6 and day 2 to month 6 TUG scores at different time interval. 'R' value gradually increased from Day 2 to Month 6 postoperatively, which postulates that the strength of correlation increased from weak on day 2 to moderate on week 2, week 6 & month 6 postoperatively. However, 'R' value of week 2 & week 6 was almost equal to month 6 postoperatively.

The JFS was not statistically correlated with ILAS scores.(Table 18)

Correlation of TUG scores with 6 month follow up of WOMAC, KOOS & JFS in TKR:

Table 19: Correlation of Time Up and Go scores with 6 month follow up of Western Ontario & McMaster Universities Osteo-arthritis Index scores, Knee injury and Osteoarthritis Outcome Scores & Joint Forgotten scores in total knee replacement group

	Day 2 TUG	Week 2 TUG	Week 6 TUG	Month 6 TUG
WOMAC Month 6	R=-0.151, P<0.086	R=-0.282, P<0.001	R=-0.462, P<0.0001	R=-0.604, P<0.0001
KOOS Month 6	R=-0.208, P<0.017	R=-0.396, P<0.0001	R=-0.555, P<0.0001	R=-0.642, P<0.0001
JFS(100-MEANX25)TKR month 6	R=0.082, P<0.355	R=-0.015, P<0.863	R=0.032, P<0.715	R=-0.034, P<0.698

There was no correlation was present between WOMAC Month 6 and Day 2 TUG score but from Week 2 to Month 6 postoperatively, statistically significant correlation was present between WOMAC and TUG score and strength of association also increased gradually with time, which postulate that the strength of correlation increased from weak on week 2 to moderate on week 6 & strong on month 6 postoperatively.

There was a significant correlation present between KOOS month 6 and day 2 to month 6 TUG scores at different time interval. 'R' value gradually increased from Day 2 to Month 6 postoperatively, which postulates that the strength of correlation increased from weak on day 2 & week 2 and moderate on week 6 & strong correlation on month 6 postoperatively.

The JFS was not significantly correlated with TUG scores. (Table 19)

Correlation of ILAS scores with 6 month follow up of WOMAC, KOOS & JFS in TKR:

Table 20: Correlation of Iowa level of assistance scale scores scores with 6 month follow up of Western Ontario & McMaster Universities Osteo-arthritis Index scores, Knee injury and Osteoarthritis Outcome Scores & Joint Forgotten scores in total knee replacement group

	Day 2 ILAS	Week 2 ILAS	Week 6 ILAS	Month 6 ILAS
WOMAC Month 6	R=0.257, P<0.003	R=0.238, P<0.007	R=0.328, P<0.0001	R=0.530, P<0.0001
KOOS Month 6	R=0.262, P<0.003	R=0.329, P<0.0001	R=0.448, P<0.0001	R=0.570, P<0.0001
JFS(100-MEANX25)TKR month 6	R=-0.001, P<0.988	R=-0.039, P<0.660	R=-0.031, P<0.723	R=-0.029, P<0.742

There was a significant correlation present between WOMAC month 6 and day 2 to month 6 ILAS scores at different time interval. 'R' value gradually increased from Day 2 to Month 6 postoperatively, which postulates that the strength of correlation increased from weak on day 2, week 2 & week 6 and moderate on month 6 postoperatively.

There was a significant correlation present between KOOS month 6 and day 2 to month 6 ILAS scores at different time interval. 'R' value gradually increased from Day 2 to Month 6 postoperatively, which postulate that the strength of correlation increased from weak on day 2 & week 2 and moderate on week 6 & month 6 postoperatively.

JFS was not statistically correlated with ILAS scores. (Table 20)

Table 21: Gender wise observations in total hip replacement group

Group Statistics				
	SEX	N	Mean	Std. Deviation
AGE	M	33	41	16.12
	F	11	40.91	10.7
PRE TUG SCORE	M	33	124.06	106.7
	F	11	222.09	125.17
PRE ILAS SCORE	M	33	37.88	9.84
	F	11	34.55	9.86
PRE HH SCORE	M	33	35.43	9.05
	F	11	25.918	11.27
D2 TUG SCORE	M	33	199.79	83.7
	F	11	295.64	90.17
D2 ILAS SCORE	M	33	28.48	6.05
	F	11	27.27	6.84
W2 TUG SCORE	M	33	95.45	46.53
	F	11	178.64	102.79
W2 ILAS SCORE	M	33	37.73	6
	F	11	35	7.74
W6 TUG SCORE	M	33	57.21	20.41
	F	11	113.64	71.26
W6 ILAS SCORE	M	33	44.24	6.13
	F	11	40.45	6.5
M6 TUG SCORE	M	33	30.58	12.77
	F	11	71.55	68.12
M6 ILAS SCORE	M	33	48.48	3.64
	F	11	45.91	4.9
M6 HH SCORE	M	33	89.8	7
	F	11	84.88	7.19
JFS-(100-MEANX25)	M	33	72.35	2.8
	F	11	68.71	5.36

For THR patients it was observed that TUG score at different time interval from pre-op to month 6 is more in females than males. By this data we can postulates that short term functional outcome is better in males but this discrepancy can be there because of different sample size in our study.

ILAS score in males was more than female at different time interval from pre-op to month 6 postoperatively. Similar to TUG score, by this data it can be concluded that short term functional outcome was better in males.

HHS at 6 months was more in males than females. This finding in our study is pointing out that the long term functional outcome after THA is better in males.

Mean of JFS taken at 6 months was more in females than males. According to this long term functional outcome after THA is better in females which is in contrast with HHS score but this discrepancy can be there because of subjective nature of JFS and low sample size in females (Table 21)

Table 22: Gender wise observations in total knee replacement group

Group Statistics				
	SEX	N	Mean	Std. Deviation
AGE	M	40	64	8.45
	F	90	61.83	7.95
PRE TUG SCORE	M	40	111.75	91.6
	F	90	129.33	98.73
PRE ILAS SCORE	M	40	38.25	9.44
	F	90	36.06	8.46
PRE KOOS SCORE	M	40	34.88	15.36
	F	90	34.96	11.95
PRE WOMAC SCORE	M	40	39.4	14.49
	F	90	38.19	12.11
D2 TUG SCORE	M	40	186.08	91.03
	F	90	216.69	129.26
D2 ILAS SCORE	M	40	27.88	5.41
	F	90	28.83	5.45
W2 TUG SCORE	M	40	90.5	37.2
	F	90	94.2	38.84
W2 ILAS SCORE	M	40	38	6.07
	F	90	38.44	6.3
W6 TUG SCORE	M	40	56.55	24.43
	F	90	57.14	23.25
W6 ILAS SCORE	M	40	45	5.06
	F	90	45.72	4.94
M6 TUG SCORE	M	40	33.5	18.73
	F	90	30.48	14.59
M6 ILAS SCORE	M	40	48.25	3.84
	F	90	49	3.01
M6 KOOS SCORE	M	40	85.45	7.23
	F	90	86.21	6.01
M6 WOMAC SCORE	M	40	88.34	5.61
	F	90	89.41	5.89
JFS-(100-MEANX25)	M	40	71.5	3.3
	F	90	72.43	2.52

For TKR patients it was observed that TUG score at different time interval was more in females except for month 6 postoperatively. By this data we can postulates that short term functional outcome was better in males but at long term outcomes may improve in females which require a study with further follow up of the patients.

ILAS score mean values in different sexes was almost equal throughout the follow up period. This finding suggests that there was no short term functional outcome difference between males and females.

KOOS score at 6 months was almost equal in females and males. By this finding we can suggest that long term outcomes after TKA are similar in both sexes.

WOMAC at 6 months is also equal in both sexes. By this we can suggest that there was no difference between two sexes in long term outcomes after TKA.

JFS value at 6 months was also equal in both sexes. By this we can suggest that there was no difference between two sexes in long term outcomes after TKA.(Table 22)

DISCUSSION

Outcome measures are integral to assessing the effectiveness of treatments, with the aim of improving patient and hospital outcomes [32]. Following hip or knee arthroplasty, it is advisable to get patients functional as quickly as possible, to reduce hospitalization time, prevent deconditioning, increase patient safety and decrease the need for external resources after discharge [3]. Measuring the effectiveness of treatment is essential and may have human resource implications, especially given the shift toward outcome-based reimbursement [31]. Activities such as walking and getting up from a chair are basic motor activities and are extremely important in terms of independent daily living. The most important parameters are improvement in pain and walking ability after treatment in patients with total knee arthroplasty (TKA) and THA. It is crucially important to assess daily living activities such as walking and getting up from a chair in patients with TKA and THA [3].

Performance-based measures are defined as assessor-observed measures of tasks and usually assessed by timing, counting, or distance methods. They are not specific to any body function and body structure. They are specific to activities such as walk, sit to stand, chair stand, and stair climb. Performance-based measures assess what an individual can do rather than what the individual perceives they can do. Increasing evidence suggests that performance-based measures are more likely to fully characterise a change in body function than self-reported measures alone [3].

In this study we have assessed early functional recovery in patient undergoing hip and knee arthroplasty using TUG and ILAS score which are performance-based measures and demonstrate patient's capability. Both these tools are considered important for performance assessments in patients with hip or knee osteoarthritis [3].

Patient's reports their perceived function through questionnaires with PROMs. In our study we have taken WOMAC, KOOS, HHS and FJS PROMs scores for long term functional outcome assessment.

Lee et al. in their original article regarding Forgotten Joint Score for early outcome assessment after total knee arthroplasty observed that their mean value for JFS and WOMAC score in TKR patients at 1 year is 47 ± 29 and 68 ± 18 respectively. In our study mean value for JFS and WOMAC score in TKR patients at 6 months are **72.1517± 2.806** and 89.08±5.80 respectively. This difference in values can be there because of different follow up protocols.

In our study mean KOOS scores of patients was 34.93± 13.034 in pre op which increased to 85.982± 6.3953 at 6 months follow up (R=0.254 , P<0.004) and was statistically significant . **David Figueroa et al(2019)** found in his study that mean KOOS score 77 at 2 yrs follow up. This value was very similar to our results.
In this study we found that the mean HHS pre operatively and post operatively at 6 months of patients were 33.052±10.389 and 88.570±7.292 respectively. This signifies that there was significant improvement in patient's symptoms after THR. Regarding JFS, mean JFS for THR patients was **71.4466± 3.884** in our study.

In our study mean HHS of patients was 33.052±10.38 in pre op which increased to 88.570±7.29 at 6 months follow up.
Similarly **Lokesh Gupta et al** showed in his study at 1 years follow up HHS increased from 28 pre-operatively to 90-92 post-operatively.
These findings confirm the widely reported postulate that KOOS & WOMAC and HHS score can be used as a long term functional outcome predictors in patients undergoing hip and knee arthroplasty.

Poitras et al. conducted a study in 2016 on 108 patients undergoing hip or knee arthroplasty to assess functional recovery shortly after knee or hip arthroplasty. They did comparison of the clinimetric properties of four tools: Timed Up and Go (TUG), Postoperative Quality of Recovery Scale (PQRS), Iowa Level of Assistance Scale (ILAS) and Readiness for Hospital Discharge Scale (RHDS). In our study we have observed immense deterioration from preoperative to postoperative day 2, which improve with time the TUG and ILAS scores, which

was in accordance with the study done by Poitras et al. which can be due to immediate post-operative pain and anaesthesia effects on the patient.

In our study we have found that TUG score mean value decreased from 223.75±94.16 on Day 2 to 40.82±39.02 on 6 months follow up in THR patients and 207.27±119.31 on day 2 to 31.41±15.97 on 6 months follow up in TKR patients. Similarly, for ILAS score we have found that mean value increased from 28.18±6.20 on Day 2 to 47.84±4.09 on 6 months follow in THR patients and 28.54±5.44 on day 2 to 48.77±3.29 on 6 months follow up in TKR patients. These decreasing and increasing trend of TUG and ILAS scores respectively with time , suggest that these scores can be used as objective measure of clinical change in physical mobility of the patients undergoing arthroplasty.

Suhail et al. in 2009 retrospectively reviewed 76 total knee replacements to assess early functional outcome of total knee arthroplasty. Knee function and patient satisfaction were evaluated using the American Knee Society (ASK) score and the Western Ontario and Mac Master University Osteoarthritis Index (WOMAC). They concluded that early result of the TKR was excellent or good in most patients based on Knee Society scores and Function scores and the WOMAC scores. Most of the patients were functionally independent, had no knee pain and were satisfied with their outcomes.

In this study we found significant correlations between TUG and ILAS scores with HHS, KOOS, WOMAC and FJS.

TUG score values for THR patients at different time intervals was statistically significantly correlated with HHS month 6 and JFS Month 6 postoperatively values (p value<0.05) except for the TUG Month 6 and JFS month 6 postoperatively value. Regarding ILAS score, values at different time intervals were statistically significantly ($p<0.05$) correlated with HHS month 6 postoperatively and no correlation was found between ILAS score and JFS month 6 postoperatively in our study.

TUG scores values for TKR patients at different time intervals statistically significantly correlated with KOOS Month 6, WOMAC Month 6 (p value<0.05) but no significant correlation was found between TUG score and JFS Month 6 postoperatively in our study. Regarding ILAS score, values at different time intervals statistically significantly correlated with KOOS Month 6, WOMAC month 6 postoperatively (p value<0.05) and no correlation was found between ILAS score and JFS month 6 postoperatively in our study.

With these correlations we can postulate that TUG and ILAS scores can be used for predicting long term outcome in patient of THA and TKA.

TUG & ILAS score had statistically significant correlation with WOMAC, KOOS and HHS and also have significant correlation even with JFS but ILAS score did not significantly correlate with JFS.

So, we suggest that TUG score was a slightly better early functional outcome predictor; however this needs to be further examined in larger studies with long term follow-up.

There are not many studies done on Indian population regarding functional outcomes of arthroplasty. THA and TKA are costly elective surgeries with high patient expectations. Due to increasing life expectancy trend for arthroplasty will definitely keep on increasing. With increasing elderly patients it is important to make patients functional early following arthroplasty to avoid other complications. These correlations will help us in predicting long term outcomes of the patient in early post-operative days and allow us to implement corrective measures in patients showing lower performance scores.

CONCLUSIONS

Arthroplasty is one of the most successful and frequently done orthopaedic surgeries. This study deals with different outcome measuring tools to assess the patient's functional recovery after the surgery. By this study we can postulates that:

As long-term functional outcome predictors in patients receiving hip and knee arthroplasty, KOOS & WOMAC and HHS score can be used.

TUG and ILAS scores improved progressively in the post-operative period up to 6 weeks and can be used for predicting long term outcome in patient of THA and TKA.

TUG & ILAS score had significant correlation with patient's reported outcome measure like WOMAC, KOOS and HHS.

In this study JFS at six months post-operative had no significant correlation with TUG and ILAS score.

STRENGTHS OF THE STUDY

It is the first study in Indian population to evaluate TUG and ILAS score in early recovery period as a predictor for long term functional outcome following hip and knee arthroplasty. The early functional score can be used to individualise management protocols. It's a prospective study and the patients were followed through their recovery and data was recorded at multiple time points, improving the accuracy and validity of the scores.

No loss to follow up was encountered in this study. The surgical and rehabilitation protocols were standard for all patients which improves objectivity of measurements and validity of the results.

LIMITATIONS OF THE STUDY

1. A short term follow-up reduces the strength of association between TUG and ILAS score and PROMs, specially JFS.

2. A larger sample size would have increased the statistical power of the study.

RECOMENDATIONS

1. TUG and ILAS score can be used as early predictors of functional outcome following THR and TKR.
2. TUG and ILAS score can be used to check the progress of patients' during postoperative period and guide personalised measures for patients with lower performance measures.
3. Large multi-centric study is required for further validating the early predictors of functional outcome in patients' undergoing joint replacements.
4. Studies with longer follow up are advised while correlating JFS with functional scores.

BIBLOGRAPHY

1. Flandry F. Normal Anatomy and Biomechanics of the Knee. 2011;19(2):11.
2. Canale ST, Azar FM, Beaty JH, Campbell WC. Campbell's operative orthopaedics. Thirteenth edition. Philadelphia, PA: Elsevier, Inc; 2017.
3. Poitras S, Wood KS, Savard J, Dervin GF, Beaulé PE. Assessing functional recovery shortly after knee or hip arthroplasty: a comparison of the clinimetric properties of four tools. BMC musculoskeletal disorders. 2016 Dec 1;17(1):478.
4. Givens DL, Eskildsen S, Taylor KE, Faldowski RA, Del Gaizo DJ. Timed Up and Go test is predictive of Patient-Reported Outcomes Measurement Information System physical function in patients awaiting total knee arthroplasty. Arthroplasty Today. 2018 Dec;4(4):505–9.
5. Suhail A, Idham H, Norhamdan M, Shahril Y, Masbah O. Early Functional Outcome of Total Knee Arthroplasty. MOJ . 2009 Nov ;3(2):33–5.
6. Weinstein AM, Rome BN, Reichmann WM, Collins JE, Burbine SA, Thornhill TS, et al. Estimating the Burden of Total Knee Replacement in the United States. Journal of Bone and Joint Surgery . 2013 Mar 6 ;95(5):385–92.
7. Poitras S, Au K, Wood K, Dervin G, Beaulé PE. Predicting hospital length of stay and short-term function after hip or knee arthroplasty: are both performance and comorbidity measures useful? International Orthopaedics (SICOT) . 2018 Oct;42(10):2295–300.

8. Elings J, Zoethout S, ten Klooster PM, van der Sluis G, van Gaalen SM, van Meeteren NLU, et al. Advocacy for use of the modified Iowa Level of Assistance Scale for clinical use in patients after hip replacement: an observational study. Physiotherapy . 2019 Mar ;105(1):108–13.
9. Byrd J. Gross anatomy. In: Byrd J, Ed. Operative Hip Arthroscopy, 2nd ed. New York: Springer Science + Business Media, Inc. 2004; pp. 100–109.
10. Galmiche R, Migaud H, Beaulé PE. Hip Anatomy and Biomechanics Relevant to Hip Replacement. 2020 Jul 1. In: Rivière C, Vendittoli PA, editors. Personalized Hip and Knee Joint Replacement [Internet]. Cham (CH): Springer; 2020. Chapter 2. doi: 10.1007/978-3-030-24243-5_2.
11. Gold M, Munjal A, Varacallo M. Anatomy, Bony Pelvis and Lower Limb, Hip Joint. [Updated 2022 Jul 25]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-.
12. Lespasio M. Knee Osteoarthritis: A Primer. TPJ . 2017;21.
13. Georgiev T, Angelov AK. Modifiable risk factors in knee osteoarthritis: treatment implications. Rheumatol Int [Internet]. 2019;39:1145–57.
14. Van Egmond JC, Hesseling B, Verburg H, Mathijssen NMC. Short-term functional outcome after fast-track primary total knee arthroplasty: analysis of 623 patients. Acta Orthopaedica. 2021 Sep 3;92(5):602–7. Available from: https://actaorthop.org/actao/article/view/891.
15. Poitras S, Wood KS, Savard J, Dervin GF, Beaule PE. Predicting early clinical function after hip or knee arthroplasty. Bone & joint research. 2015 Sep;4(9):145-51.

16. Bade MJ, Kittelson JM, Kohrt WM, Stevens-Lapsley JE. Predicting functional performance and range of motion outcomes after total knee arthroplasty. American journal of physical medicine & rehabilitation/Association of Academic Physiatrists. 2014 Jul;93(7):579.

17. Wright RJ, Sledge CB, Poss R, Ewald FC, Walsh ME, Lingard EA: Patient reported outcome and survivorship after Kinemax Total Knee Arthroplasty. J Bone Joint Surg Am, 2004; 86: 2464-70.

18. Behrend H, Giesinger K, Giesinger J M, Kuster M S. The ―forgotten joint‖ as the ultimate goal in joint arthroplasty: validation of a new patient-reported outcome measure. J Arthroplasty 2012; 27(3): 430-6.e1.

19. Dawson J, Fitzpatrick R, Murray D, Carr A. Questionnaire on the perceptions of patients aboc ut total knee replacement. J Bone Joint Surg Br 1998; 80(1): 63-9.]

20. Bansal R, Jolly A, Balasubramaniana E, Yalamanchalia S. Can Knees be Forgotten 2 Years After Total Knee Arthroplasty? ReconRev [Internet]. 2022 Oct 15 [cited 2022 Dec 22];12(1). Available from: http://reconstructivereview.org/ojs/index.php/rr/article/view/248.

21. Benedetti MG, Franchignoni F, Morri M, Franchini N, Natali E, Giordano A. Rasch analysis of the Iowa Level of Assistance Scale in patients with total hip and knee arthroplasty. International Journal of Rehabilitation Research [Internet]. 2014 Jun [cited 2022 Dec 22];37(2):118–24. Available from: https://journals.lww.com/00004356-201406000-00004.

22. Figueroa D, Calvo R, Figueroa F, Avilés C, Garín A, Cancino J. Clinical and functional outcomes of primary total knee arthroplasty: a South American

perspective. Arthroplasty Today [Internet]. 2019 Sep [cited 2022 Dec 22];5(3):358–61. Available from: https://linkinghub.elsevier.com/retrieve/pii/S2352344119300457

23. Giesinger K, Hamilton DF, Jost B, Holzner B, Giesinger JM. Comparative responsiveness of outcome measures for total knee arthroplasty. Osteoarthritis and Cartilage [Internet]. 2014 Feb [cited 2022 Dec 22];22(2):184–9. Available from: https://linkinghub.elsevier.com/retrieve/pii/S1063458413010066

24. Gupta DrL, Lal DrM, Aggarwal DrV, Rathor DrLP. Assessing functional outcome using modified Harris hip score in patients undergoing total hip replacement. Int J Orthop Sci [Internet]. 2018 Apr 1 [cited 2022 Dec 22];4(2.8):1015–7. Available from: http://www.orthopaper.com/archives/?year=2018&vol=4&issue=2&ArticleId=986

25. Podsiadlo D, Richardson S. The timed "Up & Go": a test of basic functional mobility for frail elderly persons. J Am Geriatr Soc. 1991;39(2):142–8.

26. Poitras S, Wood KS, Savard J, Dervin GF, Beaule PE. Predicting early clinical function after hip or knee arthroplasty. Bone Joint Res. 2015;4(9):145–51.

27. Bade MJ, Kittelson JM, Kohrt WM, Stevens-Lapsley JE. Predicting functional performance and range of motion outcomes after total knee arthroplasty. Am J Phys Med Rehabil. 2014;93(7):579–85.

28. Nankaku M, Tsuboyama T, Akiyama H, Kakinoki R, Fujita Y, Nishimura J, Yoshioka Y, Kawai H, Matsuda S. Preoperative prediction of ambulatory status at 6 months after total hip arthroplasty. Phys Ther. 2013;93(1):88–93.

29. Husted H. Fast-track hip and knee arthroplasty: clinical and organizational aspects. Acta Orthop Suppl. 2012;83(346):1–39.

30. Dobson F, Hinman RS, Roos EM, Abbott JH, Stratford P, Davis AM, Buchbinder R, Snyder-Mackler L, Henrotin Y, Thumboo J, Hansen P, Bennell KL. OARSI recommended performance-based tests to assess physical function in people diagnosed with hip or knee osteoarthritis. Osteoarthritis Cartilage. 2013;21(8):1042–52.

31. Lara A. Kimmel, Jane E. Elliott, James M. Sayer, Anne E. Holland, Assessing the Reliability and Validity of a Physical Therapy Functional Measurement Tool—the Modified Iowa Level of Assistance Scale—in Acute Hospital Inpatients, Physical Therapy, Volume 96, Issue 2, 1 February 2016, Pages 176–182, https://doi.org/10.2522/ptj.20140248.

32. Central West Gippsland Primary Care Partnership. A guide to using data for health care quality improvement. Available at: http://www.registries.org.au/registrysig/2012/registrysig-2012apr-vqcguidetousingdata.pdf. Accessed June 21, 2015.

33. Yuksel E, Kalkan S, Cekmece S, Unver B, Karatosun V. Assessing Minimal Detectable Changes and Test-Retest Reliability of the Timed Up and Go Test and the 2-Minute Walk Test in Patients With Total Knee Arthroplasty. J Arthroplasty. 2017 Feb;32(2):426-430. doi: 10.1016/j.arth.2016.07.031. Epub 2016 Aug 10. PMID: 27639305.

ATLAS OF IMAGES

Fig 1: Supine on bed

Fig 2: Sitting on bed

Fig 3: Standing side of bed

Fig. 4: Walking

Fig 5: Sitting on chair

Fig 6: Standing

Fig. 7: Walking

ANNEXURES

ANNEXURE - I

ETHICAL CLEARANCE CERTIFICATE

अखिल भारतीय आयुर्विज्ञान संस्थान, जोधपुर
All India Institute of Medical Sciences, Jodhpur
संस्थागत नैतिकता समिति
Institutional Ethics Committee

No. AIIMS/IEC/2021/3567 Date: 12/03/2021

ETHICAL CLEARANCE CERTIFICATE

Certificate Reference Number: **AIIMS/IEC/2021/3402**

Project title: "**Tug and ilas scores as early predictors for long term functional outcome in patients undergoing hip and knee arthroplasty**"

Nature of Project:	**Research Project Submitted for Expedited Review**
Submitted as:	**M.S. Dissertation**
Student Name:	**Dr. Sushil Kumar**
Guide:	**Dr. Sumit Banerjee**
Co-Guide:	**Dr. Abhay Elhence**

Institutional Ethics Committee after thorough consideration accorded its approval on above project.

The investigator may therefore commence the research from the date of this certificate, using the reference number indicated above.

Please note that the AIIMS IEC must be informed immediately of:

- Any material change in the conditions or undertakings mentioned in the document.
- Any material breaches of ethical undertakings or events that impact upon the ethical conduct of the research.

The Principal Investigator must report to the AIIMS IEC in the prescribed format, where applicable, bi-annually, and at the end of the project, in respect of ethical compliance.

AIIMS IEC retains the right to withdraw or amend this if:

- Any unethical principle or practices are revealed or suspected
- Relevant information has been withheld or misrepresented

AIIMS IEC shall have an access to any information or data at any time during the course or after completion of the project.

Please Note that this approval will be rectified whenever it is possible to hold a meeting in person of the Institutional Ethics Committee. It is possible that the PI may be asked to give more clarifications or the Institutional Ethics Committee may withhold the project. The Institutional Ethics Committee is adopting this procedure due to COVID-19 (Corona Virus) situation.

If the Institutional Ethics Committee does not get back to you, this means your project has been cleared by the IEC.

On behalf of Ethics Committee, I wish you success in your research.

Dr. Praveen Sharma
Member Secretary

Member Secretary
Institutional Ethics Committee
AIIMS Jodhpur

Basni Phase-2, Jodhpur, Rajasthan-342005; **Website:** www.aiimsjodhpur.edu.in; **Phone:** 0291-2740741 Extn. 3109
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ANNEXURE - II

ETHICAL JUSTIFICATION

According to the guideline set up by ICMR (2000) and Helsinki declaration modified (2008) the the following will be adhered to in all patients/volunteers involved in the study.

1. All the possible treatment options will be given and none will be withheld.
2. Patients will be enrolled in the study with their knowledge and the study will be done by utilizing known investigation modalities, regarding which proper information will be provided to the patients.
3. Patients will be informed about all the major and minor risk factors and the remedies thereof and a refusal to participate in this study will not interfere with the patient-doctor relationship.
4. Patients will be given the option of quitting the study at any point during the study if he or she so desires and no element of compulsion will be exerted.
5. Confidentially of data collected from contribution sources or individuals will be maintained.
6. Written informed consent will be obtained from all the patients included in the study after informing them about the aims and method of the study and the institutional affiliation of the researcher.
7. In the cases where the patients are legally incompetent, minors, or are not eligible for giving consent due to poor neurological status, consent of the close relative available will be taken.
8. The study will not lead to extra expenditure on the part of the patient. The subject will be free to withdraw from the study at any time of their choice.

Participation or withdrawal from this study would have no bearing on the treatment being offered to patients.

9. All the patients will be treated by the standard protocol of the Department of Orthopedics, AIIMS Jodhpur in the best interest of the patient. All efforts will be made to ensure that no extra visits are required for the study.
10. In the publication of the results of this study all efforts would be made to preserve the accuracy of both the positive and negative results of this study.
11. After the study every patient entered into this study will be assured of access to the best proven diagnostic and therapeutic methods identified by this study.

ANNEXURE - III

DOCUMENTATION OF INFORMED CONSENT:

I, ……, have read the information in this form (or it has been read to me). I was free to participate in the study. I am over 18 years of age and, exercising my free power of choice, hereby give my consent to be include as a participant in

" TUG AND ILAS SCORES AS EARLY PREDICTORS FOR LONG TERM FUNCTIONAL OUTCOME IN PATIENTS UNDERGOING HIP AND KNEE ARTHROPLASTY."

1. I have read and understood this consent form and the information provided to me.
2. I have had the consent document explained to me.
3. I have been explained about the nature of the study.
4. My rights and responsibilities have been explained to me by the investigator.
5. I have been advised about the risks associated with my participation in the study.
6. I have informed the investigator of all the treatments I am taking or have taken in the past …..months including any *desi* (alternative) treatments.
7. I agree to cooperate with the investigator and I will inform him/her immediately if I suffer unusual symptoms.
8. I have not participated in any research study within the past ….. month(s).
9. I am aware of the fact that I can opt out of the study at any time without having to give any reason and this will not affect my future treatment in the hospital.
10. I am also aware that the investigators may terminate my participation in the study at any time for any reason, without my consent.
11. I hereby give permission to the investigators to release the information obtained from me as result of participation in this study to the sponsors,

regulatory authorities, Government agencies, and ethics committee. I understand that they may inspect my original records.

12. My identity will be kept confidential if my data are publicly presented.
13. If, despite following the instructions, I am physically harmed because of any substance or any procedure as stipulated in the study plan, [my treatment will be carried out free at the investigational site / the sponsor will bear all the expenses], if they are not covered by my insurance agency or by a Government program or any third party.
14. I have had my questions answered to my satisfaction.
15. I have decided to be in the research study.
16. I am aware, that if I have any questions during this study, I should contact at one of the addresses listed above. By signing this consent form, I attest that the information given in this document I will be given a copy of this consent document.

Date:
Participant's initials
Place:
Name of the participant:

Complete postal Address:

Signature of principal investigator:

Date:
Place:

This is to certify that above consent has been obtained in my presence.

Witness Signature

Name:
Address:

Name of the investigator
Dr. Sushil Kumar
+91-8709625586

Name of Guide
Dr. Sumit Banerjee
+91-9910895314

ANNEXURE- IV

सूचित सहमति का दस्तावेज:

मैं... ... ... ने इस फॉर्म में जानकारी पढ़ली है (या हय मुझे पढ़ी गई है) मैं अध्ययन में भाग लेने के लिए स्वतंत्र । हूं 18 वर्ष से अधिक आयु का हूं और अपनी स्वतंत्र शक्ति का प्रयोग कर रहा/रही हूं व इस अध्ययन में भाग लेने की सहमति देता/ देती हूँ ।

" TUG AND ILAS SCORES AS EARLY PREDICTORS FOR LONG TERM FUNCTIONAL OUTCOME IN PATIENTS UNDERGOING HIP AND KNEE ARTHROPLASTY."

1) । है लिया समझ और पढ़ा को फॉर्म सहमति इस मैंने
2) । है गया दिया समझा से अच्छे दस्तावेज सहमति मुझे
3) है। गया समझाया विवरण के अध्ययन मुझे
4) पर अंतरालों नियमित मैं और हूं सहमत लिए के करने सहयोग से जांचकर्ता मैं है। बताया ने जांचकर्ता कि जैसा रहूंगा उपस्थित में क्लिनिकों
5) को प्रतिभागिता पर जहां है, गया किया सूचित में बारे के प्रकृति की अध्ययन इस मुझे है। उद्देश्य विशुद्ध और आक्रामक-गैर अध्ययन क्योंकि होगा नहीं नुकसान कोई
6) के दूसरों या समुदाय या प्रतिभागी कि जो है गया बताया में बारे के लाभों उन मुझे । हैं सकते जा किये उम्मीद उचित में रूप के परिणाम के अनुसंधान लिए
7) है। गया समझाया को जिम्मेदारियों और अधिकार मेरे मुझे द्वारा अन्वेषक
8) है। गया किया सूचित द्वारा अन्वेषक के रूपरेखाओं सभी में बारे के उपचार मेरे मुझे
9) लिया नहीं हिस्सा में अध्ययन शोध भी किसी भीतर के साल महीने/ .. ... पिछले मैंने है।
10) से अध्ययन के कारण किसी बिना समय भी किसी मैं कि हूं अवगत से तथ्य इस मैं प्रभावित को उपचार के भविष्य मेरे में अस्पताल इस यह और है सकता निकल बाहर करेगा। नहीं
11) भी किसी कारण, भी किसी बिना, के सहमति मेरी चकर्ताजां कि हूं जानता भी यह मैं हैं। सकते कर समाप्त को भागीदारी की वार्ड मेरे में अध्ययन समय
12) को समिति नैतिकता और एजेंसियों सरकारी प्राधिकारियों, विनियामक प्रायोजकों, जारी को रीजानका प्राप्त द्वारा इनके मैंने परिणामस्वरूप, के लेने भाग में अध्ययन इस अभिलेखों मूल मेरे वे कि हूं समझता मैं है। दी अनुमति को जांचकर्ताओं लिए के करने हैं। सकते कर निरीक्षण का
13) को पहचान मेरी तो है गया किया प्रस्तुत से रूप सार्वजनिक को डेटा मेरे अगर जाएगा। रखा गोपनीय
14) पहुंचाया नुकसान से रूप शारीरिक मुझे बावजूद, के करने पालन का निर्देशों यदि मेरा] कारण, के प्रक्रिया भी किसी निर्धारित में योजना अध्ययन क्योंकि है जाता करेंगे], सहन को खर्चों सभी प्रायोजक / जाएगा किया में मुफ्त पर स्थल जांच इलाज

कवर द्वारा पक्ष तीसरे किसी या कार्यक्रम सरकारी सीकि या एजेंसी बीमा मेरी वे यदि है जाता किया नहीं

15) मुझे पहचान की व्यक्तियों संपर्क वाले नंबर फोन और पते और टीमों अनुसंधान के मानवाधिकारों और सिद्धांतों नैतिक या लिए के प्रश्नों संबंधित से अनुसंधान ।है गई दी लिए के करने अपील खिलाफ के उल्लंघन

16) हैं। गए दिए उत्तर अनुसार के संतुष्टि मेरी के सवालों मेरे

17) है। लिया निर्णय का होने शामिल में अध्ययन शोध मैंने

दिनांक: प्रतिभागी के हस्ताक्षर:
जगह: प्रतिभागी का नाम:

पूरा डाक पता:

प्रमुख अन्वेषक के क्षहस्तार:

तिथि:
जगह:

यह प्रमाणित करना है कि उपरोक्त सहमति मेरी उपस्थिति में प्राप्त की गई है।

गवाह के हस्ताक्षर
नाम:
पता:

ANNEXURE - V
Department of Orthopaedics
All India Institute of Medical Sciences, Jodhpur

PATIENT INFORMATION SHEET

TITLE "TUG AND ILAS SCORES AS EARLY PREDICTORS FOR LONG TERM FUNCTIONAL OUTCOME IN PATIENTS UNDERGOING HIP AND KNEE ARTHROPLASTY."

This study requires detailed musculoskeletal examination as well as examination of the Knee & hip with the pure intention of your health benefit the expected duration of your stay in OPD, Department of Orthopaedics, AIIMS, Jodhpur will be about 1 hour. There are no obvious, expected or known adverse effects on the patient due to this study.

You have been invited to take part in a study, which will help us in better understanding the predictor for long term functional outcome and their correlation with PROMs Deciding strategy for managing those patients and predict possible outcome of treatment. You are free to withdraw from the study at any time and this will not have any negative implication on your future treatment in the hospital.

Contact Person for further queries.
Dr. Sushil Kumar
+91- 8709625586

ANNEXURE - VI

आर्थोपेडिक्स विभाग

ऑल इंडिया इंस्टिट्यूट ऑफ मैडिकल साईंसिस, जोधपुर

सूचना पत्र

TITLE "TUG AND ILAS SCORES AS EARLY PREDICTORS FOR LONG TERM FUNCTIONAL OUTCOME IN PATIENTS UNDERGOING HIP AND KNEE ARTHROPLASTY."

इस अध्ययन के लिए आपके स्वास्थ्य लाभ के शुद्ध इरादों के साथ शारीरिक परीक्षा द्वारा घुटने और टांगो की विस्तृत मांसपेशियों की परीक्षा की ताआवश्यक है। ओ.पी.डी में आपके ठहरने की उम्मीद की अवधि, ऑर्थोपेडिक्स विभाग, एम्स, जोधपुर में 1 घंटा होगा । इस अध्ययन के कारण रोगी पर कोई स्पष्ट, अपेक्षित या ज्ञात प्रतिकूल प्रभाव नहीं हैं।आपको इस अध्ययन में भाग लेने के लिए आमंत्रित किया गया है। आप किसी भी समय यनअध्य को छोड़ने के लिए स्वतंत्र हैं और अस्पताल में आपके भविष्य के उपचार पर इसका कोई नकारात्मक प्रभाव नहीं होगा।

अधिक प्रश्नों के लिए व्यक्ति से संपर्क करें
Dr. Sushil Kumar
+91 8709625586

ANNEXURE - VII

Patients Proforma

1. NAME:
2. AGE:
3. SEX:
4. ADDRESS:
5. IP NO / REG NO:
6. HISTORY:

    Duration of symptoms

    Any h/o trauma

    Any other co morbidities

    Any treatment taken earlier for the same complaints

    Occupation

    Examination

    a. LIMB INVOLVED
    b. RANGE OF MOTION
    c. LIMB LENGTH DISCREPENCIES
    d. HSS (HARRIS HIP SCORE)
    e. WOMAC
    f. KOOS
    g. JFS
    h. TUG
    i. ILAS

ANNEXURE – VIII

Western Ontario And Mcmaster Osteoarthritis Index

PATIENT NAME	DOB

WESTERN ONTARIO AND MCMASTER OSTEOARTHRITIS INDEX (WOMAC)

Please circle the appropriate rating for each item.

RATE YOUR PAIN WHEN...	NONE	SLIGHT	MODERATE	SEVERE	EXTREME	HOSPITAL USE ONLY
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	TOTAL

RATE YOUR STIFFNESS IN THE...	NONE	SLIGHT	MODERATE	SEVERE	EXTREME	HOSPITAL USE ONLY
Morning	0	1	2	3	4	
Evening	0	1	2	3	4	TOTAL

RATE YOUR DIFFICULTY WHEN...	NONE	SLIGHT	MODERATE	SEVERE	EXTREME	HOSPITAL USE ONLY
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	TOTAL

PATIENT SIGNATURE	DATE

REVIEWED BY PHYSICAL THERAPIST	DATE	WOMAC TOTAL SCORE /96

YAVAPAI REGIONAL MEDICAL CENTER
PHYSICAL REHABILITATION SERVICES

WOMAC OSTEOARTHRITIS INDEX QUESTIONNAIRE

REHABILITATION SERVICES
PT THA/TKA WOMAC QUESTIONNAIRE
MR-1433 (11/15)

ANNEXURE – IX

Harris Hip Score

orthotoolkit

Harris Hip Score (HHS)
Patient Name: _____
Date: _____

Affected Hip: R L (Circle One)

Pain

☐ None or ignores it	+44
☐ Slight, occasional, no compromise in activities	+40
☐ Mild pain, no effect on average activities, rarely moderate pain with unusual activity; may take aspirin	+30
☐ Moderate pain, tolerable but makes concession to pain. Some limitation of ordinary activity or work. May Require occasional pain medication stronger than aspirin	+20
☐ Marked pain, serious limitation of activities	+10
☐ Totally disabled, crippled, pain in bed, bedridden	+0

Limp

☐ None	+11
☐ Slight	+8
☐ Moderate	+5
☐ Severe	+0

Support

☐ None	+11
☐ Cane for long walks	+7
☐ Cane most of the time	+5
☐ One crutch	+3
☐ Two canes	+2
☐ Two crutches or not able to walk	+0

Distance Walked

☐ Unlimited	+11
☐ Six blocks	+8
☐ Two or three blocks	+5
☐ Indoors only	+2
☐ Bed and chair only	+0

Sitting

☐ Comfortably in ordinary chair for one hour	+5
☐ On a high chair for 30 minutes	+3
☐ Unable to sit comfortably in any chair	+0

Enter public transportation

☐ Yes	+1
☐ No	+0

Stairs

☐ Normally without using a railing	+4
☐ Normally using a railing	+2
☐ In any manner	+1
☐ Unable to do stairs	+0

Put on Socks and Shoes

☐ With ease	+4
☐ With difficulty	+2
☐ Unable	+0

Absence of Deformity (All yes = 4, Less than 4 = 0)

☐ Less than 30° fixed flexion contracture	-
☐ Less than 10° fixed abduction	-
☐ Less than 10° fixed internal rotation in extension	-
☐ Limb length discrepancy less than 3.2cm	-

Range of motion (* indicates normal)
Flexion (*140°): _____
Abduction (*40°): _____
Adduction (*40°): _____
External Rotation (*40°): _____
Internal Rotation (*40°): _____

ANNEXURE – X

Knee Injury Osteoarthritis Outcome Score

orthotoolkit

Knee injury and Osteoarthritis Outcome Score (KOOS) Survey

Patient Name: _____ Patient MRN: _____

Date: _____ Affected Knee: R L (Circle One)

Instructions:

This survey asks for your opinion about your knee and helps us understand how well you are able to complete your usual activities. Answer each question by ticking the appropriate box (only one box for each question). If you are uncertain about how to answer a question, please give the best answer you can.

I. Symptoms

Answer these questions thinking of your knee symptoms during the last week.

S1. Do you have swelling in your knee?

☐ Never (+0) ☐ Rarely (+1) ☐ Sometimes (+2) ☐ Often (+3) ☐ Always (+4)

S2. Do you feel grinding, hear clicking, or any other type of noise when your knee moves?

☐ Never (+0) ☐ Rarely (+1) ☐ Sometimes (+2) ☐ Often (+3) ☐ Always (+4)

S3. Does your knee catch or hang up when moving?

☐ Never (+0) ☐ Rarely (+1) ☐ Sometimes (+2) ☐ Often (+3) ☐ Always (+4)

S4. Can you straighten your knee fully?

☐ Always (+0) ☐ Often (+1) ☐ Sometimes (+2) ☐ Rarely (+3) ☐ Never (+4)

S5. Can you bend your knee fully?

☐ Always (+0) ☐ Often (+1) ☐ Sometimes (+2) ☐ Rarely (+3) ☐ Never (+4)

Stiffness is a sensation of restriction or slowness in the ease with which you move your knee joint.

S6. How severe is your knee joint stiffness after first wakening in the morning?

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

S7. How severe is your knee joint stiffness after sitting, lying, or resting later in the day?

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

Symptoms Subscale Score: $100 - \left[\frac{(symptoms\ subscale\ sum * 100)}{28}\right] =$ _____

II. Pain

P1. How often do you experience knee pain?

☐ Never (+0) ☐ Monthly (+1) ☐ Weekly (+2) ☐ Daily (+3) ☐ Always (+4)

What amount of knee pain have you experienced the last week during the following activities?

P2. Twisting/pivoting on your knee

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

P3. Straightening knee fully

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

P4. Bending knee fully

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

P5. Walking on flat surface

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

P6. Going up or down stairs

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

P7. At night while in bed

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

P8. Sitting or lying

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

P9. Standing upright

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

Pain Subscale Score: $100 - \left[\frac{(pain\ subscale\ sum * 100)}{36}\right] =$ _____

III. Function, daily living

This section describes your ability to move around and to look after yourself. For each of the following activities, please indicate the degree of difficulty you have experienced in the last week due to your knee.

A1. Descending stairs

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

A2. Ascending stairs

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

A3. Rising from sitting

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

A4. Standing

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

A5. Bending to the floor/pick up an object

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

A6. Walking on a flat surface

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

A7. Getting in/out of car

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

A8. Going shopping

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

A9. Putting on socks/stockings

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

A10. Rising from bed

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

A11. Taking off socks/stockings

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

A12. Lying in bed (turning over, maintaining knee position)

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

A13. Getting in/out of bath

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

A14. Sitting

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

A15. Getting on/off toilet

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

A16. Heavy domestic duties (moving heavy boxes, scrubbing floors, etc)

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

A17. Light domestic duties (cooking, dusting, etc)

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

Daily Living Subscale Score: $100 - \left[\frac{(daily\ living\ subscale\ sum * 100)}{68}\right] =$ _____

IV. Function, sports and recreational activities

This section describes your ability to be active on a higher level. For each of the following activities, please indicate the degree of difficulty you have experienced in the last week due to your knee.

SP1. Squatting

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

SP2. Running

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

SP3. Jumping

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

SP4. Twisting/pivoting on your injured knee

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

SP5. Kneeling

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

Sports and Recreation Subscale Score: $100 - \left[\frac{(sports\ and\ recreation\ subscale\ sum * 100)}{20}\right] =$ _____

V. Quality of Life

Q1. How often are you aware of your knee problem?

☐ Never (+0) ☐ Monthly (+1) ☐ Weekly (+2) ☐ Daily (+3) ☐ Constantly (+4)

Q2. Have you modified your life style to avoid activities potentially damaging to your knee?

☐ Not at all (+0) ☐ Mildly (+1) ☐ Moderately (+2) ☐ Severely (+3) ☐ Totally (+4)

Q3. How much are you troubled with lack of confidence in your knee?

☐ Not at all (+0) ☐ Mildly (+1) ☐ Moderately (+2) ☐ Severely (+3) ☐ Extremely (+4)

Q4. In general, how much difficulty do you have with your knee?

☐ None (+0) ☐ Mild (+1) ☐ Moderate (+2) ☐ Severe (+3) ☐ Extreme (+4)

Quality of Life Subscale Score: $100 - \left[\frac{(quality\ of\ life\ subscale\ sum * 100)}{16}\right] =$ _____

ANNEXURE – XI

Joint Forgotten Score

Knee Questionnaire (Forgotten Joint Score - 12)

Patient: _____ Date: ___.___._____

A healthy joint is not something you are aware of in everyday life. However, even the smallest problems can raise one's awareness of a joint. This means that you think of your joint or have your attention drawn to it. The following questions concern **how often you are aware of your affected knee joint in everyday life.**

Please choose the most appropriate answer for each question.

	Are you aware of your knee joint…	Never	Almost never	Seldom	Some-times	Mostly
1.	… in bed at night?	O	O	O	O	O
2.	… when you are sitting on a chair for more than one hour?	O	O	O	O	O
3.	… when you are walking for more than 15 minutes?	O	O	O	O	O
4.	… when you are taking a bath/shower?	O	O	O	O	O
5.	… when you are traveling in a car?	O	O	O	O	O
6.	… when you are climbing stairs?	O	O	O	O	O
7.	… when you are walking on uneven ground?	O	O	O	O	O
8.	… when you are standing up from a low-sitting position?	O	O	O	O	O
9.	… when you are standing for long periods of time?	O	O	O	O	O
10.	… when you are doing housework or gardening?	O	O	O	O	O
11.	… when you are taking a walk/hiking?	O	O	O	O	O
12.	… when you are doing your favorite sport?	O	O	O	O	O

ANNEXURE – XII

Joint Forgotten Score

घुटना प्रश्नावली (भुलाये गए जोड़ का हिसाब – 12)

एक स्वस्थ जोड ऐसा नही होता है जिसके बारेमें रोज़-मर्रा की ज़िन्दगी में आप जागरुक होते हों। हालांकि, छोटी से छोटी समस्याएं भी जोड के प्रति आपकी जागरूकता बढ़ा सकती है। इसका मतलब है कि आप अपने जोड़ के बारे में सोचते हैं या इसकी तरफ आपका ध्यान आकर्षित होता है। निम्नलिखित प्रश्न आप **रोजमर्रा की जिंदगी में अपने प्रभावित घुटने के जोड़ के बारे में कितनी बार जागरुक हुए** इससे संबंधित हैं।

आपसे जानकारी लेंगे की आप अपनी रोज़मर्रा की ज़िन्दगी में अपने प्रभावित घुटने के जोड़ के बारे में कितने सचेत है।

कृपया प्रत्येक प्रश्न के लिए सबसे उपयुक्त उत्तर चुनें।

	क्या आप अपने घुटने के जोड़ के प्रति जागरूक होते हैं...	**कभी नही**	**लगभग कभीनही**	**कभी कभार**	**कभी कभी**	**अधिकतर**
1.	... रात को बिस्तर में?	O	O	O	O	O
2.	... जब आप एक घंटे से अधिक समय तक कुर्सी पर बैठे रहते हैं?	O	O	O	O	O
3.	... जब आप 15 मिनट से अधिक समय तक चल रहे होते हैं?	O	O	O	O	O
4.	... जब आप स्नान/शावर ले रहे होते हैं?	O	O	O	O	O
5.	... जब आप कार में सफर कर रहे होते हैं?	O	O	O	O	O
6.	... जब आप सीढ़िया चढ़ रहे होते हैं?	O	O	O	O	O
7.	... जब आप असमान ज़मीन पर चल रहे होते हैं?	O	O	O	O	O
8.	... जब आप निचले स्तर पर बैठी हुई स्थितीसे उठ रहे होते हैं?	O	O	O	O	O
9.	... जब आप लम्बे समय तक खड़े रहते है?	O	O	O	O	O
10.	... जब आप घर का काम या बागवानी कर रहे होते हैं?	O	O	O	O	O
11.	... जब आप पैदल चलते हैं या एक लम्बी पैदल यात्रा कर रहे होते हैं?	O	O	O	O	O
12.	... जब आप अपना पसंदीदा खेल खेल रहे होते हैं?	O	O	O	O	O