BENHA MEDICAL JOURNAL bmj

Print ISSN 1110-208X.

Online ISSN 2357-0016

Original article

Mobile Bearing Vs Fixed Bearing Prostheses in Total Knee Arthroplasty

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Abstract:

Background: Total Knee Replacement (TKR) is an effective treatment for severe knee osteoarthritis (OA), improving pain, mobility, and quality of life. Prostheses were categorized into Fixed-Bearing (FB) and Mobile-Bearing (MB) designs, which differ in stability and wear characteristics. Objectives: To compare MB and FB prostheses in primary TKR for functional and clinical outcomes in OA patients. **Methods:** A prospective comparative study was conducted on 20 patients with knee OA at the Orthopedic Department in Benha University Hospital, divided into MB-TKR and FB-TKR groups. Preoperative and postoperative assessments included Hospital for Special Surgery (HSS) scores, pain levels, walking distance, stair climbing, Range of Motion (ROM), muscle strength, knee stability, and complications. **Results:** Both groups demonstrated significant improvements in HSS scores, pain reduction, and mobility. The MB group had a significantly greater increase in walking distance (9.4 ± 1.9 m vs. 8.8 ± 2.5 m, $p = 0.04$), stair climbing score (4.4 ± 1.3 vs. 3.8 ± 1.5, $p = 0.03$), muscle strength (8.2 ± 2.4 vs. 7.4 ± 2.5, $p = 0.04$), and knee stability ($p < 0.05$). ROM, transfer ability, and complication rates were similar between groups. **Conclusion:** Both MB and FB prostheses improve functional outcomes in TKR. MB implants provide superior gains in walking distance, stair climbing, muscle strength, and knee stability, suggesting potential advantages in active patients.

Keywords: Arthroplasty Outcomes, Fixed-Bearing, Knee Prostheses, Mobile-Bearing, Total Knee Replacement.

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Received:
Accepted:

Introduction

Knee replacement surgeries have been advised for patients experiencing severe knee pain and disability due to cartilage damage, with successful clinical outcomes over the past 15 years, primarily in older, less active patients [(1)]. The leading cause of chronic knee pain is arthritis, including osteoarthritis (OA), rheumatoid Arthritis (RA), and traumatic arthritis. OA commonly affects individuals over 50, especially those with a family history, leading to cartilage deterioration, pain, and stiffness. Patients with painful, deformed, and unstable knees due to degenerative or inflammatory conditions require prostheses that provide pain relief and functional improvement [(2)].

Total knee replacement (TKR) eliminates damaged joint surfaces, restoring stability and reducing wear, with benefits such as pain relief, motion improvement, and enhanced quality of life (QOL) [(3)]. Prostheses in primary TKR are classified based on posterior cruciate ligament management into retaining designs, which offer greater stability, and substituting designs. Additionally, based on polyethylene insert type, prostheses are categorized as Fixed-Bearing (FB) and Mobile-Bearing (MB) [(4)].

This study compared MB and FB prostheses in primary Total knee arthroplasty (TKA) among OA patients to evaluate their effects on knee pain, range of motion (ROM), stability, and muscle strength.

Patients and Method

Study design and population

This prospective comparative study included 20 patients with knee OA treated at the Orthopaedic Department in Benha University Hospital during one year follow up post operative. 10 patients were treated by MB-TKA and 10 patients were treated by FB-TKA. Patient counselling was a crucial part of the procedure, covering the proposed plan, necessary investigations, operative details, postoperative rehabilitation, expected recovery time, and potential complications. Written consent was obtained, and patients were counselled on lifestyle modifications post-TKR.

Eligibility criteria

Inclusion criteria: Knee OA – moderate, severe with pain, and with/without deformity, rheumatoid arthritis – with pain and with/without deformity. **Exclusion criteria:** Infection, extensor mechanism dysfunction, recurvatum deformity, systemic diseases (like immunologically suppressed conditions), bone disease and neuromuscular deficits.

Assessments

All patients were undergoing:

Complete history and physical examination: A detailed history was taken for all patients, included personal details (age, sex, occupation, and relevant medical habits), present illness, affected side, previous treatment, and ability to undergo rehabilitation. Pain duration, impact on daily activities, and any infective focus, varicose veins, or deep vein thrombosis (DVT) were assessed. Medical comorbidities and past surgical history were identified, and preoperative assessment by an anesthesiologist ensured surgical fitness. **Clinical examination** included a general assessment of the patient's overall fitness for major surgery and associated conditions. A thorough local examination of the affected knee was conducted, evaluating ligamentous stability, neurovascular status, and scoring via the Hospital for Special Surgery (HSS) system.

Laboratory investigation: Complete blood count, liver functions, prothrombin time and concentration and international normalized ratio (INR), kidney functions, fasting blood sugar, 2 h post prandial, and glycated haemoglobin (HbA1c).

Radiological investigations: A chest X-ray. Echocardiography and electrocardiogram (ECG).

Preoperative Preparation and Surgery:

All patients underwent both routine and case-specific preoperative evaluations to ensure their suitability for surgery, with a

particular focus on maintaining haemoglobin levels at or above 10 g/dL. To optimize patient outcomes and minimize surgical risks, preoperative hydration was ensured, and prophylactic antibiotics were administered to prevent infections.

During the procedure, patients were placed in a supine position, and spinal anaesthesia was administered to provide effective pain management. A midline incision was carefully made to gain optimal access to the knee joint, facilitating precise femoral and tibial osteotomies. Alignment guides were utilized to achieve accurate bone cuts, ensuring proper positioning of the prosthetic components. These components were then securely fixed using bone cement to enhance stability and longevity.

Following implantation, patellofemoral kinematics was thoroughly evaluated to confirm smooth articulation and optimal tracking of the patella. The knee joint was examined intraoperatively to ensure an appropriate range of motion, typically from full extension (0°) to at least 120° of flexion. After confirming stability and function, the surgical site was meticulously closed, a drain was placed to manage postoperative fluid accumulation, and a knee brace was applied to provide support during the initial recovery phase.

Postoperative Care and Follow-Up:

Postoperatively, we monitored patients closely and provided with essential medical support, including prophylactic antibiotics to prevent infections, anticoagulants to reduce the risk of thromboembolic events, and blood transfusions when necessary to maintain haemodynamic stability. Wound healing was systematically assessed over a two-week period to identify any signs of complications.

Rehabilitation commenced immediately after surgery, emphasizing early mobilization to enhance recovery outcomes. By the third postoperative day, patients were encouraged to begin assisted movement, progressing to full weight-bearing by the fifth or sixth day, depending on individual tolerance and stability.

To ensure comprehensive postoperative care, follow-up evaluations were scheduled at multiple time points, including one week, two weeks, three months, six months, and one year after surgery. During these follow-ups, both clinical and radiographic assessments were conducted to evaluate key parameters such as ROM, pain relief, implant positioning, and the presence of any potential complications, ensuring optimal long-term surgical outcomes.

Statistical analysis

The collected data were revised, coded, and analyzed using the Statistical Package for Social Sciences (IBM SPSS Statistics for Windows, Version 25.0, IBM Corp., Armonk, NY, 2017). Data presentation and analysis were conducted based on the nature of each parameter. The normality of data distribution was assessed using the Shapiro-Wilk test. Descriptive statistics included the mean and standard deviation (± SD) for numerical data, while categorical variables were expressed as frequencies and percentages. For analytical statistics, a student's t-test was employed to evaluate the statistical significance of differences between the means of two study groups. The Mann-Whitney U test was used for non-parametric comparisons between two groups. The Chi-square test and Fisher's exact test were applied to assess associations between qualitative variables. A p-value of <0.05 was considered statistically significant at a 95% confidence interval.

Approval code: MD 27-10-2015

Results

This study included 20 patients with knee OA divided into two groups according to type of surgical prosthesis: MB (n=10). FB group (n=10) There were 8 males and 2 females in MB. There were 7 males and 3 females in FB**.** The mean age of the patients in MB was 58.9±9.2 years. The

mean age of the patients in FB was 57.9±8.3 years. Both groups compared according to demographic data, assessment scores for outcome and complications.

Demographic data showed no significant differences between groups in age, gender, or affected side. Preoperative HSS scores were similar, but postoperative scores improved more in the MB group. Pain scores at rest and during walking were initially identical between groups. Postoperatively, both groups showed significant pain reduction, with a slightly greater improvement in the MB group, though the difference was not significant. Pain severity distribution shifted from moderate and severe to mild or none in both groups, with no significant difference between them. (**Table 1)**

Preoperatively, both groups had similar walking distances, stair climbing scores, transfer scores, ROM. Postoperatively, the MB group showed significantly greater improvement in walking distance and stair climbing ability, while transfer scores and ROM improved comparably in both groups. The majority in both groups transitioned from requiring support to independent mobility, with slightly higher improvement in the MB group, though not statistically significant. **(Table 2)**

Preoperatively, both groups had similar muscle strength and flexion deformity scores. Postoperatively, muscle strength improved significantly more in the MB group, while flexion deformity scores showed comparable improvement in both groups. Although the MB group had slightly better outcomes in both measures, the difference in flexion deformity was not statistically significant. (**Table 3)**

Preoperatively, both groups had similar knee instability and subtraction scores. Postoperatively, the MB group showed significantly greater improvement in knee stability, with more patients experiencing no instability. Subtraction scores and deformity distributions changed slightly in both groups but without significant differences. Complication rates were identical in both groups, with infection occurring in a small percentage of cases. (**Table 4)**

Table 1: Demographic data, affected knee side, total HSS score, pain score, pain score at rest degrees, pain score at walking degree among studied groups.

		Mobile bearing	Fixed bearing	Test	p
Age (years)	**Mean±SD**	58.9±9.2	57.9±8.3	t=0.254	0.802
Gender	**Male**	8(80%)	7(70%)	X2=0.067	0.796
	Female	2(20%)	3(30%)	X2=0.200	0.655
		n=10	n=10		
Affected Side	**Right**	7(70%)	5(50%)	X2=0.333	0.564
	Left	3(30%)	5(50%)	X2=0.500	0.480
Pre operative	**Mean±SD**	38.8±9.2	39.6±8.3	Z=-0.186	0.855
Post operative	**Mean±SD**	86.8±10	73.2±9.5	Z=2.495	0.014*
Pain score at rest Pre operative	**Mean±SD**	3±2.6	3±2.6	Z=0.000	1.000
Pain score Post operative	**Mean±SD**	13.5±2.4	13±2.6	Z=0.378	0.681
Pain score degree Pre-operative	**Moderate**	6(60%)	6(60%)	X2=0.000	1.000
	Severe	4(40%)	4(40%)	X2=0.000	1.000
Pain score degree post degree	**None**	7(70%)	6(60%)	X2=0.077	0.782
	Mild	3(30%)	4(40%)	X2=0.143	0.705
Pain score walking Pre operative	**Mean±SD**	0.5±1.6	0.5±1.6	Z=0.000	1.000
Pain score walking Post operative	**Mean±SD**	13.5±2.4	13±2.6	Z=0.378	0.681
Pain score walking pre-operative degree	**Moderate**	1(10%)	1(10%)	X2=0.000	1.000
	Severe	9(90%)	9(90%)	X2=0.000	1.000
Pain score walking post-operative degree	**None**	7(70%)	6(60%)	X2=0.077	0.782
	Mild	3(30%)	4(40%)	X2=0.143	0.705

T: independent t test, X2: Chi square test, Z: Mann Whitney test, * for significant p value (<0.05), n: Number.

Table 2: Walking distance, walking distance degree, stairs climbing score, stairs climbing degree, transfer degrees, range of motion score among studied groups.

		Mobile bearing n=10	Fixed bearing n=10	Test	p
Walking distance Pre-operative	**Mean±SD**	7.8±2.4	7.5±2.3	Z=0.000	1.000
Walking distance Post operative	**Mean±SD**	9.4±1.9	8.8±2.5	Z=2.378	0.04*
Walking distance pre-operative degree	**<1 block**	2(20%)	2(20%)	X2=0.000	1.000
	1-5 blocks	6(60%)	6(60%)	X2=0.000	1.000
	5-10 blocks	1(10%)	1(10%)	X2=0.000	1.000
	Unlimited	1(10%)	1(10%)	X2=0.000	1.000
Walking distance post-operative degree	**<1 block**	1(10%)	2(20%)	X2=0.333	0.564
	5-10 blocks	9(90%)	8(80%)	X2=0.059	0.808
Stairs climbing Pre operative	**Mean±SD**	2±0.1	2±0.2	Z=0.000	1.000
Stairs Post operative	**Mean±SD**	4.4±1.3	3.8±1.5	Z=2.834	0.03*
StairsPre degree	**With support**	10(100%)	10(100%)	X2=0.000	1.000
Stairspost degree	**None**	8(80%)	6(60%)	X2=0.286	0.593
	With support	2(20%)	4(40%)	X2=0.667	0.414
Transfer Pre operative	**Mean±SD**	2.9±1.4	3.5±1.6	Z=-0.756	0.398
Transfer Post operative	**Mean±SD**	4.7±0.9	4.4±1.3	Z=0.378	0.583
Transfer Pre operative degree	**None**	3(30%)	5(50%)	X2=0.500	0.480
	With support	7(70%)	5(50%)	X2=0.333	0.564
Transfer Post operative degree	**None**	9(90%)	8(80%)	X2=0.059	0.808
	With support	1(10%)	2(20%)	X2=0.333	0.564
ROM Pre operative (º)	**Mean±SD**	91.5±12	92.5±12.4	t=-0.184	0.856
ROM Post operative (º)	**Mean±SD**	125.7±2.5	123.2±4.2	t=1.638	0.119
ROM Pre operative score	**Mean±SD**	11.4±1.5	11.6±1.5	t=-0.184	0.856
ROM post operative score	**Mean±SD**	15.7±0.3	15.4±0.5	t=1.638	0.119

Z: Mann Whitney test, X2: Chi square test, t: independent t test, ROM: Range of Motion, **º**: Degrees (unit of measurement for ROM), n: Number, * for significant p value (<0.05).

Table 3: Muscle strength degree, flexion deformity degree among studied groups.

		Mobile bearing n=10	Fixed bearing n=10	Test	p
Muscle strength Pre operative	**Mean±SD**	2.4±2.1	2.3±2.2	Z=0.000	1.000
Muscle strength Post operative	**Mean±SD**	8.2±2.4	7.4±2.5	Z=1.994	0.04*
Muscle strength Pre operative degree	**Can move through arc of motion**	6(60%)	6(60%)	X2=0.000	1.000
	Cannot move through arc of motion	4(40%)	4(40%)	X2=0.000	1.000
Muscle strength post operative degree	**Cannot break quadriceps**	5(50%)	3(30%)	X2=0.500	0.480
	Can break quadriceps	3(30%)	4(40%)	X2=0.143	0.705
	Can move through arc of motion	2(20%)	3(30%)	X2=0.200	0.655
Flexion Deformity Preoperative	**Mean±SD**	6.8±1.5	6.7±1.5	Z=0.000	1.000
Flexion Deformity Postoperative	**Mean±SD**	8.6±1	8.2±0.6	Z=0.756	0.301
Flexion Deformity Pre operative degree	**5-10º**	6(60%)	6(60%)	X2=0.000	1.000
	10-20º	4(40%)	4(40%)	X2=0.000	1.000
Flexion Deformity post operative degree	**None**	3(30%)	1(10%)	X2=1.000	0.317
	5-10º	7(70%)	9(90%)	X2=0.250	0.617

Z: Mann Whitney test, X2: Chi square test, n: Number, t: independent t test, * for significant p value (<0.05).

Table 4: Instability score, instability degree among studied groups, subtraction score, subtraction degrees, complications among studied groups.

		Mobile bearing n=10	Fixed bearing n=10	Test	p
Instability Post operative	**Mean±SD**	9.2±1	8.6±0.9	Z=2.78	0.04*
Instability Pre operative	**6-15**	7(70%)	7(70%)	X2=0.000	1.000
degree	**>15**	3(30%)	3(30%)	X2=0.000	1.000
Instability post operative	**None**	6(60%)	0(0%)	X2=6.000	0.014*
degree	**0-5**	4(40%)	7(70%)	X2=4.000	0.046*
	>15	0(0%)	3(30%)	X2=10.000	0.002*
Subtraction Pre operative	**Mean±SD**	1.5±0.7	1.5±0.6	Z=0.000	1.000
Subtraction Post operative	**Mean±SD**	1.3±0.6	1.6±0.9	Z=0.374	0.933
Subtraction	**Varus**	3(30%)	5(50%)	X2=0.5.000	0.480
DeformityPre degree	**One cane**	4(40%)	3(30%)	X2=0.143	0.705
	One crutch	2(20%)	1(10%)	X2=0.333	0.564
	Two crutches	1(10%)	1(10%)	X2=0.000	1.000
Subtraction	**Extention lag 5**	1(10%)	1(10%)	X2=0.000	1.000
Deformitypost degree	**Extention lag 10**	0(0%)	1(10%)	X2=1.000	0.317
	One cane	2(20%)	2(20%)	X2=0.000	1.000
	Valgus	0(0%)	1(10%)	X2=1.000	0.317
Complications	**Infection**	1(10%)	1(10%)	X2=0.000	1.000
	No complications	9(90%)	9(90%)	X2=0.000	1.000

Z: Mann Whitney test, X2: Chi square test, n: Number, t: independent t test, * for significant p value (<0.05).

Discussion

OA and RA are progressive joint diseases that can lead to severe knee pain, stiffness, and functional impairment [(5)]. In advanced cases, TKA is often required to alleviate pain and restore mobility. TKA procedures utilize different implant designs, primarily FB and MB prostheses. FB implants are associated with high contact stress, which may contribute to increased wear over time. In contrast, MB designs are engineered to enhance tibiofemoral congruency, reduce contact stress, and more closely mimic natural knee kinematics. These features contribute to improved durability without imposing excessive stress on surrounding structures [(6)]. MB prostheses have demonstrated advantages in mitigating plastic insert delamination and fatigue fractures, as evidenced by laboratory testing. Despite these theoretical benefits, the clinical superiority of MB over FB designs remains a topic of debate [(7)]. This study examined the comparative advantages and potential drawbacks of MB and FB implants in TKA, focusing on their impact on functional and clinical outcomes in patients with OA.

The research conducted by several authors was in accordance with our findings; it demonstrates that the MB group had less anterior knee pain (AKP), but the difference was not statistically significant [(8)].

Despite the fact that prior research has shown that FB-PS-TKA designs had a considerably greater revision rate for secondary patellar resurfacing in comparison to MB-TKA designs, our data do not support this trend [(9)].

The most common complications associated with AKP are those related to daily activities, such as ascending stairs or rising from a chair. In theory, a greater proportion of patients who underwent MB-TKA would be capable of ascending stairs and rising from a chair than those in the FB-TKA group. Although the MB group was anticipated to experience less patellar compression discomfort, this could not be

verified. Theoretically the MB design could lead to better ROM during daily activities. We observed no difference in ROM between patients in either group [10].

Few investigators study aligned with our findings, reporting comparable ROM between groups. However, the MB group showed significantly greater functional improvement compared to pre-operative level [11].

While some studies found that the MB group exhibited better ROM [12], others reported superior outcomes in the FB group, which contradicts our findings [13].

Post-operative walking distances, post-operative Stairs Climbing Score, muscle strength scores, post-operative instability scores, post-operatively distributions of knee instability degrees show significant difference and improvement in MB group than FB group.

Several researchers study was in agreement with our result and found MB-TKA had superior results with the Knee Injury and OA Outcome Score sports and QOL subscales. This difference was observed at 10-year follow-up [14].

Before surgery, all participants in both groups required support for stair climbing. After surgery, a higher percentage of the MB group could climb stairs without support compared to the FB group, while a smaller proportion in both groups still needed support. Complications post-surgery was similar in both groups, with most patients experiencing no complications, and a small percentage having infections.

Despite the well-documented success of TKA, approximately 20% of patients report dissatisfaction following the procedure. This ongoing issue underscores the necessity of continuous advancements in implant design to optimize patient outcomes. Although the MB design is theoretically associated with certain biomechanical advantages, clinical studies have not demonstrated any significant superiority over the FB design. Moreover, evidence suggests that any potential benefits of the MB design are not substantial, particularly in the short-term postoperative period [15].

To date, only a limited number of researchers have conducted prospective comparative studies specifically examining the performance of the Porous Femoral Component (PFC) Sigma cruciate-retaining RP and FB implants over an extended period. These studies have assessed critical clinical parameters, including ROM, Oxford Knee Scores, complication rates, and radiographic wear, with a minimum follow-up period of 10 years. Findings from these investigations indicate that there is no statistically significant difference between RP and FB knee implants in terms of functional capacity, implant wear, or the occurrence of postoperative complications. Both implant designs have been shown to contribute to substantial improvements in pain relief and functional outcomes at the final follow-up evaluation, aligning with the results of our study. Additionally, long-term survivorship analysis revealed no significant difference between the two implant groups, with the RP design exhibiting a high probability of survival over a 10-year period [16].

Long-term follow-up studies on patients with PFC Sigma rotating platform posterior-stabilized cemented implants have demonstrated significant improvements in KSS function and WOMAC scores. Similarly, our study observed enhancements in the Rotating Platform Knee Society Score (RP KSS) functional score, though the improvements were less pronounced than those reported by Meftah et al. Furthermore, Meftah's study highlighted high patient satisfaction, minimal revision rates, and excellent implant survival at ten years [17].

A meta-analysis comparing FB and MB-TKA with a five-year average follow-up found that radiological outcomes and overall health results were comparable between the groups. However, additional high-quality RCTs with longer follow-up

periods are needed to validate these findings [18].

Limitations include. Its single-center design, which may limit generalizability, short follow-up duration, and the relatively small sample size.

Conclusion

This study indicates that MB and FB implants demonstrate comparable outcomes across various measures, including demographic data, affected knee side, HSS scores, pain scores, walking distances, stair climbing, transfer scores, ROM, muscle strength, flexion deformity, and instability scores. However, post-operative improvements in walking distances, stair climbing, muscle strength, and instability scores were greater for the MB group.

Conflict of interest:

There is no conflict of interest

Funding sources

There is no Funding sources

References

1. Aglietti P, Baldini A, Buzzi R, Lup D, De Luca L. Comparison of mobile-bearing and fixed-bearing total knee arthroplasty: a prospective randomized study. J Arthroplasty. 2005;20(2):145-53.
2. Almaawi AM, Hutt JRB, Masse V, Lavigne M, Vendittoli PA. The Impact of Mechanical and Restricted Kinematic Alignment on Knee Anatomy in Total Knee Arthroplasty. J Arthroplasty. 2017;32(7):2133-40.
3. Atwood SA, Currier JH, Mayor MB, Collier JP, Van Citters DW, Kennedy FE. Clinical wear measurement on low contact stress rotating platform knee bearings. J Arthroplasty. 2008;23(3):431-40.
4. Berry DJ, Currier JH, Mayor MB, Collier JP. Knee wear measured in retrievals: a polished tray reduces insert wear. Clin Orthop Relat Res. 2012;470(7):1860-8.
5. Biau D, Mullins MM, Judet T, Piriou P. Mobile versus fixed-bearing total knee arthroplasty: mid-term comparative clinical results of 216 prostheses. Knee Surg Sports Traumatol Arthrosc. 2006;14(10):927-33.
6. Bourne RB, Chesworth BM, Davis AM, Mahomed NN, Charron KD. Patient satisfaction after total knee arthroplasty: who is satisfied and who is not? Clin Orthop Relat Res. 2010;468(1):57-63.
7. Callaghan JJ, Insall JN, Greenwald AS, Dennis DA, Komistek RD, Murray DW, et al. Mobile-bearing knee replacement: concepts and results. Instr Course Lect. 2001;50:431-49.
8. Hantouly AT, Ahmed AF, Alzobi O, Toubasi A, Salameh M, Elmhiregh A, et al. Mobile-bearing versus fixed-bearing total knee arthroplasty: a meta-analysis of randomized controlled trials. Eur J Orthop Surg Traumatol. 2022;32(3):481-95.
9. Chang CH, Chen KH, Yang RS, Liu TK. Muscle torques in total knee arthroplasty with subvastus and parapatellar approaches. Clin Orthop Relat Res. 2002(398):189-95.
10. Cheng M, Chen D, Guo Y, Zhu C, Zhang X. Comparison of fixed- and mobile-bearing total knee arthroplasty with a mean five-year follow-up: A meta-analysis. Exp Ther Med. 2013;6(1):45-51.
11. Diamond OJ, Doran E, Beverland DE. Spinout/Dislocation in Mobile-Bearing Total Knee Arthroplasty: A Report of 26 Cases. J Arthroplasty. 2018;33(2):537-43.
12. Engh GA, Zimmerman RL, Parks NL, Engh CA. Analysis of wear in retrieved mobile and fixed bearing knee inserts. J Arthroplasty. 2009;24(6 Suppl):28-32.
13. Engh GA, Holt BT, Parks NL. A midvastus muscle-splitting approach for total knee arthroplasty. J Arthroplasty. 1997;12(3):322-31.
14. Flandry F, Hommel G. Normal anatomy and biomechanics of the knee. Sports Med Arthrosc Rev. 2011;19(2):82-92.
15. Goodman SB. Wear particles, periprosthetic osteolysis and the immune system. Biomaterials. 2007;28(34):5044-8.
16. Kremers HM, Lewallen EA, van Wijnen AJ, Lewallen DG. Clinical Factors, Disease Parameters, and Molecular Therapies Affecting Osseointegration of Orthopedic Implants. Curr Mol Biol Rep. 2016;2(3):123-32.
17. Haas B, Dennis DA, Komistek RD, Brumley JT, 2nd, Hammill C. Range of motion of posterior-cruciate-substituting total knee replacements: the effect of bearing mobility. J Bone Joint Surg Am. 2001;83-A Suppl 2(Pt 1):51-5.
18. Hashemi J, Chandrashekar N, Gill B, Beynnon BD, Slauterbeck JR, Schutt RC, Jr., et al. The geometry of the tibial plateau and its influence on the biomechanics of the tibiofemoral joint. J Bone Joint Surg Am. 2008;90(12):2724-34.

To cite this article: Emad E. Esmat , Mohammed A. Musilihy, Mohamed S. Mohamed. Mobile Bearing Vs Fixed Bearing Prostheses in Total Knee Arthroplasty. BMFJ XXX, DOI: 10.21608/bmfj.2025.367939.2342.