



# Which Unicondylar Prosthesis Has Better Mid-Term Results: Fixed or Mobile?

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## ABSTRACT

**Objective:** Osteoarthritis, which is one of the most common causes of pain and motion loss, is an important medical disease that particularly affects elderly people. Unicondylar knee arthroplasty treatment is still a challenge for obese and/or ACL deficient patients. In addition, surgeons have difficulty in decision making whether to use fixed or mobile bearing designed unicompartmental knee prosthesis. The objective of this study was to evaluate the effect of fixed or mobile insert design prosthesis on the mid-term results of patients that were followed up for 8 years or more.

**Methods:** Between 2003 and 2014, 293 patients were treated with unicondylar knee arthroplasty due to medial gonarthrosis, and 239 patients that we followed up for at least 18 months were included in the study. Nine of the patients (3.7%) underwent bilateral operation, 193 (77.8%) patients were operated with the fixed insert design, and 55 (22.2%) patients were operated with the mobile insert design. A total of 248 knees were evaluated retrospectively.

**Results:** The mean age was 59.3 (53–71) years. 156 patients (65.2%) were male and 83 patients (34.8%) were female. The mean follow up period was 101 months (18–126). The mean body mass index was 29.4 kg/m<sup>2</sup> (25–33 kg/m<sup>2</sup>). The preoperative mean Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) value was 72.64±5.32 (68–78), and the mean Knee Society Knee Scoring System (KSS) score was 70.6±3.9 (66–89). The postoperative mean WOMAC value was 97.23±4.02 (92–100) (p<0.05), and the mean KSS score was 92.3±3.94 (85–100) (p<0.05).

**Conclusion:** When we compared the fixed and mobile insert design prosthesis, there was no statistically significant difference between the knee scores, but the mobile insert design prosthesis had better flexion degrees. We have observed 97.2% prosthesis survival rates over 8 years. In conclusion, unicondylar knee prosthesis is a good treatment option, with a high success rate for medial knee osteoarthritis. (*JAREM 2016; 6: 31-4*)

**Keywords:** Survival, osteoarthritis, knee

## INTRODUCTION

The most common cause of pain and decrease in range of motion in the knee is osteoarthritis, which is particularly an important medical problem for the middle-aged and elderly population (1). For cases with unicompartmental knee involvement veya arthrosis, unicondylar an important alternative surgical option to high tibial osteotomy and total knee prosthesis (2).

This treatment modality was first described in 1970s but was not commonly accepted, and the FUNCTIONAL results until 1990s were disappointing (3, 4). However, after the 1990s, better functional results have been obtained and faster healing rates have been provided thanks to developments in prosthetic technology and better definition of patient selection (5, 6). At present, medium- and long-term survival rates are reported to be 85–98% (6, 7).

The extent to which unicondylar knee arthroplasty prevents the arthrosis of other compartments of the knee, unicondylar knee arthroplasty for patients suffering from obesity and with anterior cruciate ligament insufficiency, and mobile/fixed unicondylar prosthesis selection are still controversial issues.

The purpose of this study was and compare the results of the patients on whom we implemented fixed or mobile unicondylar knee arthroplasty and whom we monitored for 8 years, together

with the literature, and to study the medium-term effects of the fixed-mobile inserted arthroplasty selection on the results.

## METHODS

Of the 293 patients that we of the 293 patients with unicondylar knee unicondylar knee arthroplasty due to medial gonarthrosis between 2003 and 2014, 239 patients on whom we performed regular follow-ups for at least 18 months were included in the study. 193 patients with a fixed bearing design and 55 patients with a mobile bearing design were evaluated retrospectively. In total, 248 knees were retrospectively evaluated. Following “the study inclusion and surgical indication criteria” as described in the literature (8), patients with advanced stage cartilage damage in which the full-thickness healthy cartilage was protected in a lateral compartment, patients with intact anterior cruciate ligament, patients with no more than 15 degrees fixed-varus deformity, patients with intact medial and lateral collateral ligaments, and patients with knee medial compartment arthrosis were selected. Obesity, age patellofemoral arthrosis, a prior history of knee surgery, and activity level were not considered as contraindications or exclusion criteria.

All the patients were informed about their medical condition, possible complications and risks, and their informed consents were obtained preoperatively.



### Surgical technique

Preoperatively, all the patients were radiologically evaluated using the Ahlback classification via their anteroposterior and lateral roentgenograms (9). Furthermore, in clinical examinations, patients with suspected ligament deficiency were evaluated by MRI. Patients were operated on in four different clinics by two orthopedic surgeons who were also instructors on arthroplasty. Preoperatively, patients were prepared on a standard table, which allowed the knee 120 degrees of flexion, and all the patients were operated with tourniquet and were administered 2 g IV cefazolin prophylaxis 30 minutes prior to the surgery. A paramedian skin incision that extended from the medial patella to the medial tuberositas tibia was used. Medial parapatellar arthrotomy was performed. After evaluating the anterior cruciate ligament and lateral condyle and inspecting that they were intact, femoral and tibial incisions were performed using a guide. After testing the insert thickness and evaluating the ligament balance in the knee, the options were considered by the surgeon and either a fixed or mobile prosthesis was placed. Aspiration drain was removed in the 24<sup>th</sup> hour. Postoperatively, patients were allowed to walk on the 1<sup>st</sup> day with the help of crutches. Postoperatively, patients were administered antibiotic prophylaxis for 24 hours (cefazolin 3×1 g/IV) and venous thromboembolism prophylaxis for 35 days (ultra-low molecular weighted heparin-UMDAH 0.4 cc/subcutaneous and antiembolic socks).

### Statistical Analysis

Gonarthrosis stratification of the patients was performed using the Ahlback classification on patients' roentgenograms (9). For intraoperative cartilage damage, the Outerbridge (10) classification was used. Patients were functionally, preoperatively and postoperatively, evaluated with the Western Ontario and McMaster University Osteoarthritis Index (WOMAC) and the Knee Society Knee Scoring System (SIS) scores (11). Statistical analysis was performed using the Statistical Package for the Social Sciences program v. 19.0 (IBM SPSS Statistics, Armonk, NY, USA). For the 2-group comparison of the normally distributed variables, the independent sample t test was used, while for the 2-group comparison that did not show normally distributed variables, the Mann-Whitney U test was used. For all statistical analyzes performed in the study, the comparisons below a p value of 0.05 were considered statistically significant.

### RESULTS

The average age of the patients was 59.3 years (53–71). 156 of them were female (65.2%) and 83 were male (34.8%) (F/M=1.87). The most common comorbidities were hypertension and peripheral vascular disease in 70 (29.2%) patients and diabetes mellitus in 63 (26.3%) patients.

The average follow-up period was 101 months (8 years 5 months, 18–126 months). The mean body mass index (BMI) was 29.4 kg/m<sup>2</sup> (25–33 kg/m<sup>2</sup>); in 57 (23.8%) patients, BMI was >30 kg/m<sup>2</sup>. The mean preoperative flexion was 96.30° (80–110°), while the average extension was 6° (0–9°), and the average tibiofemoral angles were 6° (3–14°) varus. None of the patients had ligament instability. The preoperative average WOMAC score was 72.64±5.32 (68–78), and the average KSS score was 70.6±3.9 (66–89).

In their last follow-up, the average flexion was 109° (100–132°) (p<0.05), while the average extension was 3° (0–5°), and the average tibiofemoral angle was 3° (0–5°) (p<0.05) valgus. The postoperative average WOMAC score was 97.23±4.02 (92–100) (p<0.05), and the average KSS score was 92.3±3.94 (85–100) (p<0.05).

When the knee flexions in their last follow-up were studied as fixed and mobile subgroups, they were as follows: 104° (100–125°) and 112° (105–132°), respectively (p>0.05).

According to the Ahlback radiological classification system, all the patients were stage III. Twelve patients (4.8%) developed superficial skin problems and 8 of these patients (66.7%) had obesity and diabetes mellitus (DM), and 2 (16.7%) had obesity. Superficial wound care and antibiotherapy were used. Two (0.8%) patients developed an early stage prosthesis infection and were treated with antibiotherapy and polyethylene exchange. Three (1.2%) patients developed chronic infections, but no bacterial growth was observed in deep cultures and they were treated with polyethylene exchange and irrigation. Thromboembolic complications, such as Dvt and pulmonary embolism, were not observed in this study. The mobile polyethylene insert was dislocated, in 2 (0.8%) patients who were reoperated with an exchange of a thicker insert; no further complications were observed in these two patients in the follow up. In the following 5 year period, roentgenograms showed more than 2 mm asymptomatic aseptic relaxation in 9 (3.6%) patients, and these patients without any complaints of pain and limitation of movement are still being followed. Since 4 patients (1.6%) developed advanced osteoarthritis in the lateral compartment, 3 (1.2%) patients developed symptomatic aseptic relaxation and total knee arthroplasty was revised. The percentage of total survival over 8 years was reported as 97.2% (241 knees).

### DISCUSSION

This study includes the results and comparisons of at least an 8-year-long follow-up period of fixed or mobile unicondylar knee prosthesis that we had implemented in the presence of medial compartment osteoarthritis or avascular necrosis (8) and in which anterior and medial cruciate ligaments were functionally intact and the lateral compartment was not affected, as medial unicondylar knee prosthesis is defined in the literature.

Knee osteoarthritis mainly affects the medial compartment and, in this case, the tibial and femoral bone surfaces contact with each other and cause permanent pain and (12). For cases in which conservative treatment fails, arthroscopic debridement, high tibial osteotomy (HTO), unicondylar knee arthroplasty (UKA), or total knee arthroplasty (TKA) is applied as surgical options. Currently, more than one-third of total knee prosthesis have arthrosis at a level that actually benefits from unicondylar knee prosthesis, but more invasive surgeries have been performed (13, 14).

Starting from the 1970s and until the late 1980s, the results of the series in the literature were not as good as desired and a low survival rate of 50–70% was reported (15, 16). Today, a high medium- to long-term survival rate of 92–98% has been reported in the literature (6, 13). In our study, when we evaluated similar and well fixed and mobile prostheses, there was a high survival rate of 97.2% over 8 years.

As indicated in the literature, although it has lower complication rates compared to total knee prosthesis, it has unique complications, such as polyethylene wear, polyethylene dislocation, lateral arthrosis, and tibial insufficiency fracture, and these complications are higher in mobile inserted unicondylar prosthesis (17).

In our series, only 2 patients were reoperated on due to mobile insert dislocation in our patient group on whom we performed mobile unicondylar arthroplasty.

Another important issue in the unicondylar knee prosthesis is the approach toward patients with anterior cruciate ligament rupture, and studies that recommend unicondylar knee prosthesis in anterior cruciate ligament ruptures are now available in the literature (18, 19). Although it is reported that there are high survival rates, such as 81% with mobile unicondylar and 94% with fixed unicondylar prosthesis for over 6 years, we take anterior cruciate ligament rupture deficiency as a contraindication. If there is no anterior cruciate ligament rupture as a clinical and physical examination symptom, we adopt unicondylar prosthesis as a course of action, but if we detect anterior cruciate ligament deficiency during surgery we implement total knee prosthesis on the patient. Up until today, the unicondylar prosthesis plan was changed intraoperatively in 12 patients and they were operated on with total knee prosthesis.

One of the most controversial topics in the literature is whether to implement fixed or mobile prosthesis on the patients for whom we adopt to implement unicondylar knee prosthesis and successful results have been obtained in both fixed and mobile unicondylar prosthesis (19-21). While there was no significant difference in fixed and mobile prosthesis knee scores, the range of motion in a mobile prosthesis is much higher compared to a fixed prosthesis. Higher physiological joint kinematics and the condition obtained by adaptation are very important, especially when the knee shows extreme flexion, which is required when working in the fields and for religious worshiping practiced on the ground as occurs in Turkish-Japanese societies. Despite this advantage, another important issue with mobile prosthesis is having a long learning curve and having unique complications, such as insert dislocation and impingement (17).

Thanks to advancing prosthesis technology, obesity is no longer considered a contraindication in unicondylar arthroplasty (22). In terms of knee function and knee scores, there is no significant difference between the groups of patients above and below 30 kg/m<sup>2</sup>. Although minor complications, such as superficial skin problems, are higher in patients with obesity and diabetes mellitus, we also do not consider obesity as a contraindication in our clinical practice. Although these results are promising for patients with 35 kg/m<sup>2</sup>, we have not implemented it on a patient yet.

The most important limitation in our study was that it was a retrospective study and we lacked subgroups in order to make comparisons. Another limitation was an insufficient and uneven number of patient groups.

## CONCLUSION

Unicondylar knee prosthesis is a good treatment option with a high success rate. Although there is no significant difference be-

tween fixed and mobile inserted prostheses in terms of survival, function, and knee scores, better knee flexion is obtained with a mobile inserted prosthesis.

**Ethics Committee Approval:** Ethics committee approval was not received for this study from the ethics committee. This study designed as a retrospective cohort study and based on hospital records and radiographs.

**Informed Consent:** Written informed consent was obtained from patients who participated in this study.

**Peer-review:** Externally peer-reviewed.

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