

# Bilateral vs Unilateral Total Knee Arthroplasty: A Patient-Based Comparison of Pain Levels and Recovery of Ambulatory Skills

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**Abstract:** Two important questions remain in simultaneous bilateral total knee arthroplasty (TKA). Is bilateral TKA significantly more painful and is physical recovery significantly more difficult compared with unilateral TKA? A retrospective matched-pair analysis compared 59 bilateral and 59 unilateral TKA patients based on age, sex, diagnosis, surgeon, and surgery date. Analog pain scores, narcotic use, ambulatory distances, and rehabilitative milestones were recorded. Bilateral patients' pain scores were 1 point higher during day 1 with subsequent equal scores. Narcotic use was 20% higher for the first 48 hours but equalized after that period. Ambulatory milestones lagged behind by 36 hours. Patients wishing to pursue bilateral TKA can proceed without pain, use of narcotics, and walking distance significantly different than unilateral TKA. **Key words:** bilateral total knee arthroplasty, pain, narcotic use, ambulation.

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Total knee arthroplasty (TKA) has proven to be an extremely successful procedure to improve the quality of life for patients who experience debilitating pain from degenerative joint disease [1-3]. Degenerative changes may occur in both knees concurrently and often patients present with symptoms that warrant bilateral knee arthroplasty. For patients requiring bilateral knee arthroplasty, the procedure can be accomplished in a staged unilateral fashion or as a simultaneous bilateral

procedure under one anesthetic. For properly selected patients, the safety and efficacy of performing simultaneous bilateral TKA has been well documented in the literature [4-13]. This same body of literature has adequately defined the mortality risks, complication rates, transfusion rates, and cost considerations of unilateral vs bilateral TKA.

Despite the body of literature available to the orthopedic surgeon, counseling patients on staged vs simultaneous bilateral TKA remains challenging. The literature has yet to answer two questions of paramount importance from the patient's perspective. Specifically, an issue of concern to most patients is, "How much more painful is a bilateral total knee arthroplasty as compared with a unilateral total knee arthroplasty?" In the authors' experience, many patients assume the bilateral procedure is twice as painful as the unilateral procedure, although no objective data support or refute this assumption. Secondly, patients want to know, "How much more difficult is it to walk

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after a bilateral total knee arthroplasty, and will I be substantially more disabled while convalescing?" For patients who live alone, the answer to this question will often determine whether or not they should stage the procedure. No data are currently available to counsel patients regarding this concern. The literature contains no reports that focus on narcotic use, patient perceived pain, and postoperative ambulatory ability of unilateral compared with bilateral TKA. The purpose of the current study is to investigate these parameters through a retrospective review of a cohort of bilateral TKA patients compared with a matched cohort of unilateral TKA patients.

## Materials and Methods

From the computerized database at the authors' institution, 59 patients who underwent bilateral TKA could be matched to suitable patients with appropriate demographic factors undergoing unilateral TKA during the same general time frame. All cases were carried out between 1994 and 2002. Hospital and clinic charts for these 59 matched pairs of patients were available for retrospective review. Patients forming a "matched pair" were matched with respect to sex, age, date of surgery, surgeon, and diagnosis. Institutional review board approval was obtained before review of the charts.

Surgery was performed using an identical technique by one of the four surgeons constituting the adult reconstructive service at our institution. All patients were operated upon at the same hospital with identical postoperative protocols. Patients included in the study all had standard length anterior incisions, medial capsulotomies, routine use of patellar eversion to aid exposure, intramedullary suction of marrow contents, intramedullary alignment of the femur and tibia, routine resurfacing of the patella, and cemented fixation of all components. No revisions or complex primaries that required stems, augmentations, or bone grafts were included. No patient in the study had greater than 15° of coronal deformity, and soft tissue balancing was considered "routine" in all cases. No extensile exposures or nonroutine soft tissue releases were required. Bilateral cases were done in a sequential fashion under one anesthetic. After tourniquet deflation with the first knee, each patient's hemodynamic status and oxygenation status were assessed before commencing with the contralateral knee. All patients who were intended to have a bilateral procedure had both knees replaced. Postoperatively, each patient was started

on a standardized knee arthroplasty pathway with the same preprinted orders being used by all four surgeons. Patients were mobilized with physical therapy twice daily beginning on the morning of the first postoperative day. All patients were treated with enoxaparin for prophylaxis against deep vein thrombosis. The four surgeons used implants by one of three manufacturers: DePuy Orthopaedics (Warsaw, Ind), Stryker Orthopaedics (Mahwah, NJ), and Smith and Nephew Orthopaedics (Memphis, Tenn) (Table 1). Posterior cruciate retention was used for all patients. Choice of the prosthesis reflected the individual preference of the surgeons and was not based on any specific anatomic considerations or other patient factors.

Narcotic use is one marker for quantifying pain in postoperative patients. Narcotic use data throughout the hospital stay were available, allowing for a comparison of narcotic use between the two groups. Narcotic use was recorded for the following intervals: intraoperative, 0 to 24 hours after surgery, 24 to 48 hours after surgery, and 48 to 72 hours after surgery. To standardize the use of various narcotics, narcotic requirements were converted to dose equivalents (DE) where 1 DE equals 10 mg of intramuscular morphine [14,15]. To make this comparison meaningful, it was necessary to restrict this portion of the analysis to patients receiving general anesthesia without adjuvant methods of pain control. Therefore, for this portion of the analysis, we excluded patients receiving spinal narcotics, epidural narcotics, intra-articular infusion pumps, or peripheral nerve blocks, as calculating a DE for these adjuvant methods was not feasible. After adjusting for such exclusions for this segment of the study, we were left with meaningful comparative data regarding narcotic use for 33 patients in the bilateral group that were matched with 33 patients in the unilateral group. All patients receiving a single anesthesia agent were managed after surgery with a patient-controlled analgesia (PCA) pump delivering morphine sulfate. Patients were weaned from the PCA and onto oral narcotics

**Table 1. Implant by Surgeon and Manufacturer**

Surgeon	Bilateral			Unilateral		
	PFC*	Scorpio†	Genesis‡	PFC*	Scorpio†	Genesis‡
1	49	0	0	45	4	0
2	4	0	2	3	0	3
3	0	3	0	1	2	0
4	1	0	0	0	1	0

\*Johnson & Johnson DePuy Orthopaedics.

†Stryker Orthopaedics.

‡Smith and Nephew Orthopaedics.

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