

**Unilateral vs Bilateral Total Knee Replacement
Literature Search (past 10 years)
July 31, 2007**

1: [J Bone Joint Surg Am.](#) 2007 Jun;89(6):1220-6.

[Related Articles, Links](#)



Safety of simultaneous bilateral total knee arthroplasty. A meta-analysis.

[Restrepo C](#), [Parvizi J](#), [Dietrich T](#), [Einhorn TA](#).

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BACKGROUND: The safety of simultaneous bilateral total knee replacement remains controversial. Some studies have demonstrated a higher rate of serious complications, including death, following bilateral procedures, whereas others have suggested no increase in the complication rate. The objective of this meta-analysis was to compare the safety of simultaneous bilateral total knee replacement with that of staged bilateral and unilateral total knee replacements. **METHODS:** A computerized literature search was conducted to identify all citations, from 1966 to 2005, concerning bilateral total knee replacement. All of the English-language abstracts were obtained. A multistage assessment was then performed to identify articles fulfilling the inclusion criteria for the study. All randomized, prospective studies reporting the outcome of bilateral total knee replacement were included. The details of the reported data were extracted, and an extensive analysis of relevant variables was carried out. **RESULTS:** One hundred and fifty published articles were identified, and eighteen that included a total of 27,807 patients (44,684 knees) were included in the meta-analysis. There were 10,930 unilateral total knee replacements, 16,419 simultaneous bilateral total knee replacements, and 458 staged bilateral total knee replacements with at least three months between the operative procedures. The prevalence's of pulmonary embolism (odds ratio = 1.8), cardiac complications (odds ratio = 2.49), and mortality (odds ratio = 2.2) were higher after simultaneous bilateral total knee replacement. The prevalence of deep venous thrombosis was lower after simultaneous bilateral total knee replacement, but this difference was not significant. The complication rates after the staged bilateral total knee replacements were similar to those in the patients who had undergone unilateral total knee replacement only. **CONCLUSIONS:** Compared with staged bilateral or unilateral total knee replacement, simultaneous bilateral total knee replacement carries a higher risk of serious cardiac complications, pulmonary complications, and mortality. The period of time between staged procedures that would eliminate these increased risks could not be determined from this study. **LEVEL OF EVIDENCE:** Therapeutic Level III.

Publication Types:

- [Meta-Analysis](#)

PMID: 17545424 [PubMed - indexed for MEDLINE]

2: [J Bone Joint Surg Am.](#) 2006 Oct;88(10):2146-51.



Bilateral total knee replacement: staging and pulmonary embolism.

[Barrett J](#), [Baron JA](#), [Losina E](#), [Wright J](#), [Mahomed NN](#), [Katz JN](#).

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BACKGROUND: When a bilateral total knee replacement is indicated, it is not clear whether it is preferable to operate on both knees during the same hospitalization (simultaneously) or to stage the procedures in two separate hospital stays. A greater risk of pulmonary embolism after simultaneous total knee replacement has been reported by some authors, but little national data are available. **METHODS:** We reviewed the records of 122,385 United States Medicare enrollees who had had a total knee replacement in 2000. We noted whether they had had a unilateral procedure or two procedures and, if they had had two procedures, whether both had been done during the same hospitalization or whether the operations had been performed during two separate hospital stays. Age, sex, race, residence, Medicaid eligibility (a proxy for low income), and the Charlson comorbidity score were documented for each patient as were the total numbers of total knee replacements performed in the year 2000 by the hospital and the surgeon. The probability of a symptomatic pulmonary embolism developing in the first three months after surgery was calculated for the simultaneous, staged, and unilateral procedures. **RESULTS:** Simultaneous procedures were much more likely to be performed in high-volume hospitals and by high-volume surgeons than were staged procedures. Men had proportionately more simultaneous procedures than did women. Hospitals in the northeastern United States were the most likely to perform simultaneous procedures. A pulmonary embolism developed in the first three months in 0.81% of the patients who had had a single procedure compared with 1.44% of the patients who had undergone a simultaneous procedure (adjusted hazard ratio 1.81; 95% confidence interval, 1.49, 2.20). **CONCLUSIONS:** The systematic differences in patient gender, hospital and surgeon volume, and geographic region between those who undergo simultaneous total knee replacements and those who undergo staged procedures should be borne in mind when outcomes are being compared. The adjusted risk of pulmonary embolism is about 80% higher in the three months after a simultaneous procedure than in the three months after a single procedure, which suggests that the sum of the risks associated with the two operations of a staged procedure may equal or exceed the risk of simultaneous total knee replacement.

Publication Types:

- [Research Support, N.I.H., Extramural](#)

PMID: 17015590 [PubMed - indexed for MEDLINE]

3: [J Arthroplasty.](#) 2006 Aug;21(5):642-9.

Bilateral vs unilateral total knee arthroplasty: a patient-based comparison of pain levels and recovery of ambulatory skills.

[Powell RS](#), [Pulido P](#), [Tuason MS](#), [Colwell CW](#), [Ezzet KA](#).

Scripps Clinic, Division of Orthopaedic Surgery, La Jolla, California 92037, USA.

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.

Publication Types:

- [Comparative Study](#)

PMID: 16877148 [PubMed - indexed for MEDLINE]

4: [J Bone Joint Surg Br](#). 2006 Aug;88(8):1006-10.

[Related Articles](#), [Links](#)



A retrospective comparative study of bilateral total knee replacement staged at a one-week interval.

[Forster MC](#), [Bauze AJ](#), [Bailie AG](#), [Falworth MS](#), [Oakeshott RD](#).

Sportsmed SA, 32 Payneham Road, Stepney, Adelaide, SA 5069, Australia.

The clinical results of **bilateral total knee replacement staged at a one-week interval** during a single hospital admission were compared with bilateral total knee replacements performed under the same anaesthetic and with bilateral total knee replacements performed during two separate admissions. The data were retrospectively reviewed. All operations had been performed by the same surgeon using the same design of prosthesis at a single institution. The operative time and length of stay for the one-week staged group were comparable with those of the separate admission group but longer than for the patients treated under one anaesthetic. **There was a low rate of complications and good clinical outcome in all groups** at a mean follow-up of four years (1 to 7.2). The group staged at a one-week interval had the least blood loss ($p = 0.004$). With appropriate patient selection, bilateral total knee replacement performed under a single anaesthetic, or staged at a one-week interval, is a safe and effective method to

treat bilateral arthritis of the knee.

Publication Types:

- [Comparative Study](#)

PMID: 16877597 [PubMed - indexed for MEDLINE]

-
- 5: [J Bone Joint Surg Br.](#) 2006 Jan;88(1):40-3.

[Related Articles, Links](#)



A comparison of bilateral uncemented total knee arthroplasty: simultaneous or staged?

[Hutchinson JR](#), [Parish EN](#), [Cross MJ](#).

Australian Institute of Musculoskeletal Research, 286 Pacific Highway, Crows Nest, Sydney, Australia 2065.

In a series of 1304 patients (1867 knees), the results of simultaneous and staged bilateral total knee arthroplasty were compared with each other and with unilateral total knee arthroplasty. The bilateral procedures had a significantly higher rate of complications than unilateral procedures, almost entirely because of thromboembolic problems. However, this did not correspond to an increase in mortality. If a bilateral procedure was indicated, then a simultaneous procedure had no increased risk over a staged procedure. There was no increase in cardiovascular complications, the rate of deep-vein thrombosis or pulmonary embolism or mortality. The rate of infection was lower with a bilateral procedure and the overall revision rate was less than 1% in all groups. The prosthesis functioned as well in all groups in the medium and longer term periods. We feel that simultaneous bilateral total knee arthroplasty is a safe and successful procedure when compared with a staged bilateral procedure. It also has the added benefit of single anaesthetic, reduced costs and decreased total recovery time when compared to a staged bilateral procedure. For these reasons it should be considered as an option in the presence of bilateral knee joint disease.

Publication Types:

- [Comparative Study](#)
- [Evaluation Studies](#)

PMID: 16365118 [PubMed - indexed for MEDLINE]

-
- 6: [J Bone Joint Surg Am.](#) 2005 Mar;87(3):508-13.

[Related Articles, Links](#)



Staggered bilateral total knee arthroplasty performed four to seven days apart

during a single hospitalization.

[Sliva CD](#), [Callaghan JJ](#), [Goetz DD](#), [Taylor SG](#).

Department of Orthopaedics, University of Iowa Hospitals and Clinics, 200 Hawkins Drive, Iowa City, IA 52242, USA.

BACKGROUND: The purpose of this study was to evaluate the types and prevalence of complications associated with bilateral total knee replacement performed four to seven days apart during a single hospitalization and to compare them with those associated with bilateral knee replacement performed sequentially under the same anesthetic session or staged unilateral replacements performed during separate hospitalizations. **METHODS:** Using a computerized database and medical records, we retrospectively evaluated 332 consecutive patients who underwent bilateral total knee replacement performed by two surgeons. A total of 241 patients underwent staggered bilateral knee replacement with the procedures performed four to seven days apart during one hospitalization, twenty-six underwent sequential bilateral total knee replacement, and sixty-five underwent staged bilateral knee replacement performed during two separate hospitalizations. The data on major complications, including death, return to operating room, myocardial infarction, and pulmonary embolism, and on minor complications, including atrial fibrillation, deep-vein thrombosis, and urinary tract infection, were evaluated. **RESULTS:** Patients undergoing sequential bilateral total knee replacement and staged bilateral knee replacement had an overall rate of complications that was 2.5 times higher than that of the staggered group. Major complications were rare in all groups, but they occurred most often in the staged bilateral replacement group. The overall rate of complications for the patients who had staggered bilateral knee replacement (13%) was significantly less ($p = 0.0009$) than that for the patients who had sequential bilateral knee replacement (35%) or staged bilateral knee replacement (31%). The length of inpatient stay for those with staggered total knee arthroplasty was four days longer than that for the sequential arthroplasty group ($p = 0.0001$). **CONCLUSIONS:** Staggered bilateral total knee replacement, with the procedures performed four to seven days apart in a single hospitalization, is a safe and practical method for performing bilateral total knee replacement.

Publication Types:

- [Comparative Study](#)
- [Research Support, Non-U.S. Gov't](#)

PMID: 15741615 [PubMed - indexed for MEDLINE]

7: [Clin Orthop Relat Res](#). 2004 Nov;(428):87-91.

[Related Articles, Links](#)

Bilateral total knee replacement using the same anesthetic is not justified by assessment of the risks.

[Oakes DA](#), [Hanssen AD](#).

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The question of whether simultaneous bilateral knee replacement is associated with an increased risk of perioperative morbidity and mortality remains controversial. There are no true prospective randomized studies that address this question. There is general agreement that the risk is higher for older patients and for those with considerable medical comorbidities, particularly those with a history of cardiac disease. There is no general agreement on the appropriate threshold for age or comorbidities in order to minimize risk. Based on available retrospective data, there is evidence to suggest that there may be some patient selection bias favoring patients with simultaneous bilateral knee replacements; despite this bias, the perioperative risks are higher for these healthier patients. The highest risk for the patient having simultaneous bilateral knee replacement seems to be that of early postoperative mortality followed by the risk of a cardiac event. The risks of thromboembolic, gastrointestinal, and neurologic dysfunction also are increased. These patients also have a higher likelihood of requiring homologous blood transfusions and of requiring post-hospitalization transfer to a rehabilitation center. Because of the absence of established patient selection criteria, thresholds for assessment of the increased risks, the patient having simultaneous bilateral replacement faces an increased risk of perioperative mortality and morbidity on a random basis. Patients should be aware of this information when deciding whether to proceed with simultaneous bilateral knee replacement.

Publication Types:

- [Review](#)

PMID: 15534525 [PubMed - indexed for MEDLINE]

8: [Clin Orthop Relat Res.](#) 2004 Nov;(428):84-6.

[Related Articles, Links](#)

Debate: simultaneous bilateral knee replacements: the outcomes justify its use.

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The purpose of this paper is to assess the morbidity, mortality, and clinical outcome of simultaneous bilateral total knee arthroplasty. We reviewed 4100 simultaneous bilateral total knee replacements. The knees were subjected to two Kaplan-Meier survival analyses, with failure equal to revision for aseptic loosening and failure equal to patient death. Complications and Knee Society scores were considered. The average Knee Society knee score was 90 points 3 years postoperatively and 87 points 10 years postoperatively. The complication rates were as follows: deep infection (0.8%), superficial infection (0.3%), cardiac (6 arrhythmia, 5 congestive heart failure, 1 cardiac insufficiency, 3 complete heart block, 2 myocardial infarction and cardiac arrest, and 14 myocardial infarction only) (1.5%), intestinal ileus

(0.5%), gastrointestinal ulcer (0.4%), thrombophlebitis (0.9%), cerebrovascular accident (0.3%), and urinary (1 BPH-obstruction, 4 renal failure, 2 transurethral resection of the prostate, 16 urinary tract infection, and 2 urinary retention/incontinence) (1.2%). The 10-year prosthesis survival probability was 98.3%. The 10-year patient survival probability was 78.6%. Twenty-five (1.2%) patients died within the first postoperative year. The patients who died within 1 year postoperatively were older than the rest of the group. Higher age and male gender were factors related to increased mortality. The complication rates and clinical outcomes were similar to unilateral total knee arthroplasty. With regard to death early in the postoperative course, simultaneous bilateral total knee arthroplasty may pose a greater risk to the patient than a unilateral procedure. However, the early deaths may be related to older age at the time of surgery.

Publication Types:

- [Research Support, Non-U.S. Gov't](#)

PMID: 15534524 [PubMed - indexed for MEDLINE]

9: [Clin Orthop Relat Res.](#) 2004 Nov;(428):82-3.

[Related Articles, Links](#)



Debate: bilateral simultaneous total knee arthroplasty.

[Dennis DA.](#)

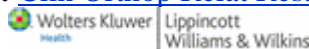
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Controversy persists regarding the value of doing bilateral simultaneous total knee arthroplasty. Advocates of this procedure focus on economic costs, patient satisfaction, and quicker return to function as compared with bilateral staged total knee arthroplasty. Those in opposition focus on increased complication rates that question the overall safety of this operative procedure. The purpose of this discussion is to review the orthopaedic literature, concentrating on the reported advantages and disadvantages of bilateral simultaneous total knee arthroplasty in hopes of providing the surgeon with information valuable in determining the safety and efficacy of this procedure.

PMID: 15534523 [PubMed - indexed for MEDLINE]

10: [Clin Orthop Relat Res.](#) 2004 Apr;(421):155-61.

[Related Articles, Links](#)



Perioperative morbidity in bilateral one-stage total knee replacements.

[Pavone V](#), [Johnson T](#), [Saulog PS](#), [Sculco TP](#), [Bottner F](#).

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A retrospective review was done on 501 patients who had bilateral sequential one-stage total knee replacements from September 1995 to April 2000 to evaluate perioperative (in-hospital) morbidity. One thousand two knee replacements were done with the patients receiving regional anesthesia, on 286 women and 215 men with an average age of 66 years. The average transfusion requirement was 2.8 units of blood per patient. There were no deaths, myocardial infarctions, or cerebrovascular accidents. The mean length of hospital stay was 7.2 days. One hundred forty-four perioperative complications were observed in 109 patients (21.8%). These complications included 27 arrhythmias (5%), one congestive heart failure (0.2%), 65 lower extremity deep venous thromboses (13%), 14 fat emboli (3%), and two pulmonary emboli (0.4%). Other major complications were pneumonia (1%), acute renal failure (0.4%), ileus (2%), and mental status changes (2%). Wound complications included two deep infections (0.4%), three hematomas (0.6%), and five delayed wound healings (0.9%). According to the current study the perioperative morbidity and mortality is acceptable if the procedure is used for selected patients. Patients with significant comorbidities should have a staged bilateral total knee replacement.

PMID: 15123941 [PubMed - indexed for MEDLINE]

11: [J Arthroplasty](#). 2003 Dec;18(8):972-8.

[Related Articles](#), [Links](#)



An evaluation of the safety and efficacy of simultaneous bilateral total knee arthroplasty.

[Leonard L](#), [Williamson DM](#), [Ivory JP](#), [Jennison C](#).

Princess Margaret Hospital, Wiltshire, United Kingdom.

This study directly compared the clinical and radiographic results and patient satisfaction of a group of simultaneous, bilateral total knee arthroplasties (92) with a year of surgery matched unilateral total knee arthroplasties (92). Death within 1 month of surgery occurred in 1 bilateral patient and no unilateral patients. Significant cardiorespiratory complications were recorded in 6 bilateral patients and 2 unilateral patients. Patients with pre-existing cardiorespiratory conditions were particularly at risk. Analysis revealed a 98% 7-year survivorship for unilateral procedures and 97% for bilateral. In this study, 95% of bilateral patients stated they would choose the same option again.

Publication Types:

- [Research Support, Non-U.S. Gov't](#)

PMID: 14658100 [PubMed - indexed for MEDLINE]

12: [J Bone Joint Surg Am](#). 2003 Oct;85-A(10):1981-6.

[Related Articles](#), [Links](#)



Comparison of simultaneous bilateral with unilateral total knee arthroplasty in terms of perioperative complications.

[Bullock DP](#), [Sporer SM](#), [Shirreffs TG](#).

Department of Orthopaedic Surgery, Dartmouth Hitchcock Medical Center, Lebanon, New Hampshire 03756, USA.

BACKGROUND: Previous studies have demonstrated an increased rate of perioperative complications and morbidity following simultaneous bilateral total knee arthroplasty compared with the rate following unilateral total knee arthroplasty. The purpose of this study was to compare the rate of perioperative complications and morbidity associated with simultaneous bilateral total knee arthroplasty with that associated with unilateral total knee arthroplasty. **METHODS:** The records on all bilateral total knee arthroplasties performed between January 1994 and June 2000 and unilateral total knee arthroplasties performed between January 1995 and June 2000 were retrospectively reviewed. The records on 514 unilateral total knee arthroplasties and 255 bilateral total knee arthroplasties were analyzed to determine demographic information, preoperative comorbidities, perioperative complications, and thirty-day and one-year mortality rates. **RESULTS:** The rates of some perioperative complications, including myocardial infarction, postoperative confusion, and the need for intensive monitoring, were greater after the bilateral arthroplasties. However, the thirty-day and one-year mortality rates and the risks of pulmonary embolism, infection, and deep venous thrombosis were similar for the two groups. **CONCLUSIONS:** The risk of perioperative complications associated with bilateral simultaneous total knee arthroplasty was slightly increased compared with that associated with unilateral total knee arthroplasty, but the mortality rates were similar. Ultimately, the decision to proceed with simultaneous knee replacement should depend on patient preference through informed choice.

Publication Types:

- [Comparative Study](#)

PMID: 14563808 [PubMed - indexed for MEDLINE]

14: [J Bone Joint Surg Am](#). 2003 Aug;85-A(8):1532-7.

[Related Articles](#), [Links](#)



Simultaneous bilateral, staged bilateral, and unilateral total knee arthroplasty. A survival analysis.

[Ritter MA](#), [Harty LD](#), [Davis KE](#), [Meding JB](#), [Berend M](#).

The Center for Hip and Knee Surgery, St. Francis Hospital, Mooresville, Indiana 46158, USA.

BACKGROUND: The rates of perioperative morbidity and mortality are areas of concern associated with simultaneous bilateral total knee replacement. The purpose of this paper was to compare the rates of morbidity and mortality and the clinical outcome in large groups of consecutive patients undergoing simultaneous bilateral total knee replacement, unilateral total knee replacement, or staged bilateral total knee replacement. **METHODS:** A total of 6200 total knee replacements, performed in 3998 patients between 1983 and 2000, consisted of 2050 simultaneous bilateral, 1796 unilateral, and 152 staged bilateral total knee replacements. A review of each group was conducted to compare the rates of morbidity and mortality, the survival of the prosthesis, and the clinical outcome. Kaplan-Meier survival analyses were performed with failure defined as revision because of aseptic loosening and as patient death. Complications and Knee Society scores were compared throughout the fifteen-year follow-up period (average, 4.3 years of follow-up). **RESULTS:** The unilateral group had significantly lower Knee Society scores than the simultaneous bilateral group ($p < 0.0001$ up to twelve years, and $p = 0.0067$ at fifteen years) across all postoperative time-intervals. The percentage of patients who had thrombophlebitis was significantly higher in the simultaneous bilateral group (0.9%) than in the unilateral group (0.3%) ($p = 0.0326$). No significant differences were found with regard to prosthetic failure, cardiac complications, and the rates of death in the three groups. Ten years postoperatively, the simultaneous bilateral group had a significantly higher rate of patient survival than did the unilateral group (78.6% compared with 72.0%) ($p = 0.0062$). **CONCLUSIONS:** The significantly higher rate of thrombophlebitis in the simultaneous bilateral group compared with that in the unilateral group may represent a greater risk to those patients. However, we believe that when there are adequate indications for bilateral total knee replacement, simultaneous bilateral arthroplasty is beneficial to patients, with a minimal increase in the risk of death or other complications compared with that associated with unilateral and staged procedures.

Publication Types:

- [Comparative Study](#)

PMID: 12925634 [PubMed - indexed for MEDLINE]

15: [Clin Orthop Relat Res](#). 2003 May;(410):254-61.

[Related Articles, Links](#)



Comment in:

- [Clin Orthop Relat Res](#). 2004 May;(422):274; author reply 274-5.

Blood management after bilateral total knee arthroplasty.

[Bottner F](#), [Pavone V](#), [Johnson T](#), [Heitkemper S](#), [Sculco TP](#).

Hospital for Special Surgery, New York, NY 10021, USA.

Four hundred sixty-one patients who had bilateral one-stage total knee replacements were

reviewed to evaluate their blood management. Overall, patients received an average of 2.1 units of autologous blood and 0.9 units of allogenic blood. Seventy-six percent of the patients who preoperatively donated one unit of autologous blood required allogenic blood transfusions compared with 51% of patients who donated two units, 29% of patients who donated three units, and 27% of patients who donated four units of autologous blood. Ninety-eight percent of the patients who did not donate autologous blood required allogenic blood. Donating two units of autologous blood in combination with a perioperative cell saver reduced the incidence of allogenic blood transfusions to 8% but increased the amount of unused autologous blood to 54%. If the indication for wound drainage recovery is guided by the preoperative hematocrit (< or = 40%) or postoperative hemoglobin (> or = 11 mg/dL) the incidence of allogenic blood transfusions decreased to 17% and 13%, respectively and the amount of unused autologous blood decreased to 39% and 30%. There is no statistical difference among the three protocols regarding the need for allogenic blood transfusions and associated costs. Based on this retrospective evaluation **the combination of preoperative donation of two units autologous blood and use of a postoperative cell salvage system in all patients is recommended.**

PMID: 12771837 [PubMed - indexed for MEDLINE]

16: [Clin Orthop Relat Res.](#) 2002 Mar;(396):142-51.

[Related Articles, Links](#)



Intraoperative monitoring for safety of bilateral total knee replacement.

[Dorr LD](#), [Udomkiat P](#), [Szenohradzky J](#), [Chorn R](#), [Raya J](#).

Arthritis Institute at Centinela Hospital Medical Center, Inglewood, CA, and the USC University Hospital, Los Angeles, CA 90301, USA.

Cardiopulmonary hemodynamics in 79 consecutive patients who had one-stage bilateral total knee replacements were monitored prospectively with a pulmonary artery catheter. The pulmonary vascular resistance, wedge pressure, pulmonary artery pressure, and systemic vascular resistance were measured before skin incision, 5 to 10 minutes after implanting the first total knee replacement, and after the second knee replacement. **The second knee replacement was cancelled in five patients because the pulmonary vascular resistance after the first knee replacement was more than double the baseline, or above 200 dyne/second/cm(5).** No patient had clinical symptoms of fat embolism during the postoperative course. Patient predictive factors, or the use of pulse oximetry readings instead of a pulmonary artery catheter, were not predictive of intraoperative elevation of pulmonary vascular resistance. For this reason, the safety of this operation for the patient requires that intraoperative measurement of hemodynamic parameters of embolism be done.

Publication Types:

- [Research Support, Non-U.S. Gov't](#)

PMID: 11859237 [PubMed - indexed for MEDLINE]

17: [Clin Orthop Relat Res.](#) 2001 Nov;(392):319-29.



Simultaneous bilateral total knee arthroplasties: who decides?

[Lombardi AV](#), [Mallory TH](#), [Fada RA](#), [Hartman JF](#), [Capps SG](#), [Kefauver CA](#), [Dodds K](#), [Adams JB](#).

Joint Implant Surgeons, Inc, Columbus, OH 43215, USA.

The purpose of the current retrospective review was to compare the results of 1498 patients having 1090 simultaneous bilateral total knee arthroplasties and 958 unilateral total knee arthroplasties in a 3-year period, focusing on perioperative complications, length of hospital stay, and discharge disposition. Gender, age, diagnosis, and weight were similar between the groups. Patients undergoing simultaneous bilateral total knee arthroplasties had statistically significant higher amounts of intraoperative blood loss, with more patients requiring blood transfusion, and a higher average number of units of blood transfused compared with patients undergoing unilateral total knee arthroplasty. Overall, a significantly higher incidence of gastrointestinal complications was reported in patients who had simultaneous bilateral knee arthroplasties compared with patients who had unilateral knee arthroplasty. Comparing age subgroups within the unilateral group revealed significantly higher incidences of pulmonary, neurologic, cardiac, and genitourinary complications among patients 80 years or older versus patients younger than 80 years. Patients having simultaneous bilateral arthroplasties who were 80 years or older had significantly higher incidences of pulmonary, neurologic, and cardiac complications than patients younger than 80 years in that same group. These results suggest that age, not procedure, has a more significant role in the perioperative morbidity of total knee arthroplasty. Based on the results from the current study and previous literature documenting patient preference, patient satisfaction, efficacy, and outcomes comparable with those of patients having unilateral total knee arthroplasty, the authors continue to offer patients the option of simultaneous bilateral total knee arthroplasties.

PMID: 11716403 [PubMed - indexed for MEDLINE]

18: [Clin Orthop Relat Res.](#) 2001 Nov;(392):190-5.



Is obesity a contraindication to bilateral total knee arthroplasties under one anesthetic?

[Benjamin J](#), [Tucker T](#), [Ballesteros P](#).

Department of Orthopaedic Surgery, University of Arizona, College of Medicine, Tucson, USA.

Three-hundred sixteen patients who underwent 405 primary knee replacements between January 1994 and June 1999 were reviewed for the incidence of local wound and systemic complications after unilateral and simultaneous bilateral total knee arthroplasties. A body mass

index of 30 or greater was used to define obesity, and patients were divided into four groups based on obesity and whether they were undergoing unilateral or bilateral total knee arthroplasties. Preoperative and postoperative knee scores were not significantly different for any patient group. Local wound complication rates did not differ between any of the study groups. Patients who were not obese who underwent unilateral total knee arthroplasty had lower systemic complication rates (3%) than the other groups; however, there was no significant difference in complication rates between patients with obesity who underwent unilateral or simultaneous bilateral total knee arthroplasties. Based on these findings, obesity does not seem to be a contraindication to bilateral total knee arthroplasties under one anesthetic.

PMID: 11716382 [PubMed - indexed for MEDLINE]

□ 19: [Knee](#). 2001 Oct;8(3):207-11.

[Related Articles, Links](#)

ELSEVIER
FULL-TEXT ARTICLE

Staged bilateral total knee replacement--a safer approach in older patients.

[Mangaleshkar SR](#), [Prasad PS](#), [Chugh S](#), [Thomas AP](#).

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Simultaneous bilateral total knee replacement has been advocated for bilateral symptomatic arthritis of the knee. The alternative is staged bilateral total knee replacement. We retrospectively reviewed all the total knee replacements performed in our hospital between January 1996 and July 1999. A total of 455 patients had 533 total knee replacements: 54 patients had simultaneous bilateral total knee replacement, 34 patients had staged bilateral total knee replacement and 367 patients had unilateral total knee replacements. Four patients who had simultaneous bilateral total knee replacement died in the immediate post-operative period. During the same period, no deaths were observed in the other two groups. Risk factors were assessed and in our series, age was the only factor found to be associated with mortality following simultaneous bilateral total knee replacement. A staged operation appears to be safer than simultaneous bilateral total knee replacement for patients who are 75 years or older.

Publication Types:

- [Case Reports](#)

PMID: 11706728 [PubMed - indexed for MEDLINE]

□ 20: [J Arthroplasty](#). 2001 Sep;16(6):730-9.

[Related Articles, Links](#)

ELSEVIER
FULL-TEXT ARTICLE

Incidence of fat embolism syndrome after cemented or cementless bilateral simultaneous and unilateral total knee arthroplasty.

[Kim YH](#).

Joint Replacement Center of Korea, HaeMin General Hospital, Seoul, Korea.

This prospective study enrolled 100 patients undergoing unilateral total knee arthroplasty (TKA) and 100 patients undergoing bilateral simultaneous TKA. Bilateral simultaneous TKAs were done under 1 anesthesia with one side immediately following the other. To determine hemodynamic changes and to detect fat and bone marrow embolization, arterial and right atrial blood samples were obtained before insertion (baseline) and 1, 3, 5, and 10 minutes after insertion of the femoral alignment rod. Arterial and right atrial blood samples were obtained 1, 3, 5, and 10 minutes after insertion of the tibial component broach. Blood samples were obtained at 24 and 48 hours after the operation. Arterial blood pressure, heart rate, right atrial pressure, arterial oxygen tension, and carbon dioxide tension were monitored at corresponding times. The presence of fat was determined with oil red O fat stain, and the presence of cellular contents of bone marrow was determined with Wright-Giemsa stain. Fat embolism was found in 65 patients (65%) with a bilateral TKA and 46 patients (46%) with a unilateral TKA. Bone marrow cell embolism was found in 12 patients (12%) with a bilateral TKA and in 4 patients (4%) with a unilateral TKA. Six patients with positive bone marrow cells (2 patients with a unilateral TKA and 4 patients with a bilateral TKA) had neurologic manifestations.

Publication Types:

- [Comparative Study](#)

PMID: 11547371 [PubMed - indexed for MEDLINE]

22: [J Arthroplasty](#). 1998 Feb;13(2):172-9.

[Related Articles, Links](#)



Cost comparison between bilateral simultaneous, staged, and unilateral total joint arthroplasty.

[Reuben JD](#), [Mevers SJ](#), [Cox DD](#), [Elliott M](#), [Watson M](#), [Shim SD](#).

Department of Orthopaedic Surgery, University of Texas Medical School at Houston, USA.

A hospital-based computer system was used to compare the inpatient costs of performing bilateral simultaneous sequential, staged, and unilateral total hip and knee arthroplasties. Bilateral simultaneous sequential total knee arthroplasty was 36% less costly than 2 unilateral total knee arthroplasties. Bilateral simultaneous sequential total hip arthroplasty saved 25% over the costs of performing 2 unilateral hip arthroplasties. Prosthetic costs range between 28% and 43% of the total costs of hospitalization. There was a significant correlation between hospital length of stay, morbidity, and total costs, but no correlation with patient age and sex except in the unilateral knee patients. Bilateral simultaneous sequential joint arthroplasty can save more than \$10,000 for each total knee patient and more than \$8,000 for each total hip patient.

Publication Types:

- [Comparative Study](#)

PMID: 9526210 [PubMed - indexed for MEDLINE]

□ 23: [Clin Orthop Relat Res.](#) 1997 Dec;(345):106-12.

[Related Articles, Links](#)



Simultaneous bilateral versus unilateral total knee arthroplasty. Outcomes analysis.

[Lane GJ](#), [Hozack WJ](#), [Shah S](#), [Rothman RH](#), [Booth RE](#), [Eng K](#), [Smith P](#).

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One hundred consecutive, primary simultaneous bilateral total knee arthroplasties were prospectively compared with 100 consecutive, primary unilateral total knee arthroplasties in reference to relative risk, complications, cost, and need for rehabilitation. All procedures were performed using identical preoperative, intraoperative, and postoperative protocols. Postoperative confusion was approximately four times greater in the simultaneous bilateral total knee arthroplasties group (29% versus 7%), which was thought to represent an increased incidence of fat embolism. Cardiopulmonary complications were approximately three times greater after simultaneous bilateral total knee arthroplasties (14% versus 5%), and most commonly involved arrhythmias. The increased stress on the cardiopulmonary system with simultaneous bilateral total knee arthroplasties may make this procedure contraindicated in certain patients with preexisting disease. There was an approximately 17 times greater need for banked blood in the simultaneous bilateral total knee arthroplasties group (17% versus 1%), which is alarming given the persistent concerns of transfusion related disease transmission. Although the length of hospitalization was similar (6.4 days simultaneous bilateral total knee arthroplasties versus 6 days unilateral total knee arthroplasty), 89% of the patients in the simultaneous bilateral total knee arthroplasties group required a rehabilitation stay versus 45% of the patients in the unilateral total knee arthroplasty group. Total hospital charges averaged \$53,168 for simultaneous bilateral total knee arthroplasties versus \$32,598 for unilateral total knee arthroplasty. Total rehabilitation charges were similar. The relative cost savings implicit by doing simultaneous bilateral total knee arthroplasties seem to be at least partially offset by the approximately two times greater need for rehabilitation in this group. The true safety, efficacy, relative risk, and total cost analysis of simultaneous bilateral total knee arthroplasties demands further critical evaluation.

Publication Types:

- [Comparative Study](#)
- [Review](#)

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□ 24: [Clin Orthop Relat Res.](#) 1997 Dec;(345):99-105.

[Related Articles, Links](#)

Outcome implications for the timing of bilateral total knee arthroplasties.

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Health Care Financing Administration data from 1985 to 1990 revealed 339,152 total knee arthroplasties of which 62,730 (18.6%) were bilateral procedures (simultaneous 112,922; staged 6 weeks, 4354; staged 3 months, 4524; staged 6 months, 9829; and staged 1 year 31,401). Medicare beneficiaries undergoing bilateral procedures were an average of 73 years of age; demographics revealed that among the various simultaneous and staged groups 57% to 69% were females, 90% were white, 85% to 90% had a diagnosis of osteoarthritis, and 30% to 40% were performed in rural hospitals. Between 1985 and 1990, surgical and vascular complications ranged from 2.4% to 4% and 4.1% to 6.8%, respectively, for all types of bilateral staged and simultaneous total knee arthroplasties. All differences were statistically significant. After controlling statistically for demographic variables and diagnoses, a surrogate for case mix, it was found that individuals electing simultaneous bilateral arthroplasties experienced twice the number of intensive care days than those choosing staged procedures. Days in the intensive care unit were double when done simultaneously instead of staged (0.48 versus 0.21). Nosocomial infections were similar within groups (10% versus 13%); however, wound infections were nearly half when done simultaneously (0.5% versus 1%) versus in a staged fashion. Length of stay and cost were much less for the simultaneous procedure group who were sicker as measured by the number of diagnoses. Mortality at 30 days was highest for the simultaneous procedure group (.99%) versus staged 3 or 6 months (0.30%); however, by 2 years it was close to 4% for all groups. Staging the procedure 3 to 6 months seems to offer the fewest disadvantages, is only slightly more expensive, and has the lowest mortality rate.

Publication Types:

- [Research Support, U.S. Gov't, Non-P.H.S.](#)

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25: [J Arthroplasty](#). 1997 Aug;12(5):497-502.

[Related Articles, Links](#)

 FULL-TEXT ARTICLE

Safety and efficacy of bilateral total knee arthroplasty.

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Recent studies have reported increased morbidity associated with bilateral simultaneous total knee arthroplasty (TKA). The purpose of this study was to evaluate the morbidity and clinical outcome associated with simultaneous bilateral TKA in contrast to unilateral TKA. All

primary TKAs, either unilateral or simultaneous bilateral, performed between May 1988 and July 1993 were retrospectively reviewed. Patients were evaluated using Knee Society scores both before surgery and a minimum of 6 months after surgery. In addition to routine demographics, patients were evaluated for the incidence of both local wound and systemic complications. It is concluded that performing simultaneous bilateral TKA does not result in any significant increase in patient morbidity or compromise in postoperative function when compared with unilateral TKA.

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