# Fifteen-Year to 19-Year Follow-Up of the Insall-Burstein-1 Total Knee Arthroplasty

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**Abstract:** This represents a 15-year to 19-year follow-up of 100 Insall-Burstein-I posterior-stabilized knee prostheses implanted in 86 patients from 1986 to 1989 and originally reported at 10 to 12 years (Thadani et al, 2000). In the original cohort, 6 failures occurred by 10 years. At 15 to 19 years, 55 patients (66 knees) had died; 18 patients were followed with clinical examination and radiographs, and 11 by telephone; 3 knees in 2 patients were lost. There were no new failures or additional surgeries from 10 to 19 years. Three knees exhibited osteolytic lesions. No case required revision due to symptomatic osteolysis or polyethylene wear. Using revision as end point, survival was 92.4% at 19 years. In summary, the prosthesis is likely to outlive the patients when classic indications for age and activity are respected. **Keywords:** primary knee arthroplasty, long-term follow-up, survivorship, Insall-Burstein-1.


The Insall-Burstein (IB)-1 total knee prosthesis is a nonmodular, posterior-stabilized implant developed at the Hospital for Special Surgery as a modification of the total condylar prosthesis [1,2]. The original implant had an all-polyethylene tibial component that was subsequently modified to a metal-backed component with the goal of improved force distribution across the bone-cement interface [3]. Between September 1986 and November 1988, 100 consecutive primary total knee arthroplasties were performed by the senior author (KGV) in 86 patients (14 bilateral) using the metal-backed version of the IB-1 prosthesis (Zimmer, Warsaw, IN). There were 49 women and 37 men in the original cohort, with 57 prostheses implanted in women and 43 in men. The average age of the patients at the time of surgery was 67.9 years (range, 45-89). The preoperative diagnosis was osteoarthritis in 77 knees, inflammatory arthritis in 17, and posttraumatic arthritis in 6.

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The midterm results of this cohort were previously described at a 10-year to 12-year follow-up [4]. The current study reports the clinical and radiographic outcomes of this cohort at a minimum of 15 years (range, 15-19).

At the end of 10 years, there were no cases of catastrophic polyethylene wear or failure from osteolysis. There were 6 failures (1 aseptic loosening, 1 patella fracture, 2 sepsis, and 2 nonspecific pain). There were 7 patella fractures: 3 of these required surgery (but not revision of either tibial or femoral components), and 1 underwent revision. The remaining 3 patellar fractures were asymptomatic, incidental findings that healed well with nonoperative management. The high incidence of patellar complications reflects other series reporting on the same implant [5-7]. It is postulated that patellofemoral complications resulted from concentrated contact stresses at the single, central fixation post of the patellar button; the prominent femoral trochlear groove; and the nonright and left-sided femoral component [4]. Moreover, this implant was used at a time that predates our current knowledge of how femoral and tibial component rotation affects patellar tracking.

## Methods

The patients of the original cohort were contacted at a minimum of 15 years after surgery after an Internet-based social security death index (www.Ancestry.com) was searched to identify deceased

**Table 1.** Dimensions and Location of Osteolytic Lesions at Final Follow-Up

| Osteolytic Lesion | Greatest Dimensions (mm) | Location |
|---|---|---|
| 1 | 11 × 19 (AP view) | Medial tibial plateau |
| 2 | 20 × 8 (AP view) | Medial femoral condyle |
| 3 | 16 × 13 (AP view) | Medial tibial plateau |

**Table 2.** Number and Location of Periprosthetic Radiolucencies as Defined by Knee Society Radiographic Zones [13]

| Location | Zone | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Femur-lateral | 4 | 1 | 0 | 2 | 0 | 0 | 0 |
| Tibia AP | 2 | 1 | 0 | 0 | 0 | 0 | 0 |
| Tibia lateral | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Merchant | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

patients. Of the original 86 patients, 55 were deceased (66 knees), leaving 31 patients (18 female, 13 male) with 34 knees for potential follow-up. The average age was 82.1 years. Diagnoses included osteoarthritis (27 patients), inflammatory arthritis (3), and posttraumatic arthritis (1). Clinical and radiographic assessment was performed at a minimum of 15 years (range, 15-19 years; mean, 16 years and 2 months). Clinical evaluation was performed preoperatively and postoperatively using the Knee Society scoring system [8]. The radiographic assessment included single leg weight bearing, anteroposterior (AP), and single leg weight bearing lateral views plus Merchant patellofemoral views performed at a minimum of 15 years [9]. Radiographs were evaluated for changes in component position, polyethylene wear, osteolysis, and radiolucencies at the bone-implant interface. Polyethylene wear was estimated by measuring the difference between the medial and lateral heights of the polyethylene spaces as seen on the standing AP film. *Osteolysis* was defined as a lesion measuring 10 mm in one dimension and 5 mm in another dimension, loss of trabeculation, and presence of a sclerotic rim, as described by O'Rourke et al [10]. Radiolucencies were measured according to the zones described by the Knee Society [11].

Survivorship analysis was performed as described by Armitage with 95% confidence intervals (CIs) [12,13]. Revision or recommended revision was the end point of failure for the survivorship analysis. "Best" (no failures assumed in 2 lost patients) and "worst" (lost cases reported as failures) case scenario survivorship

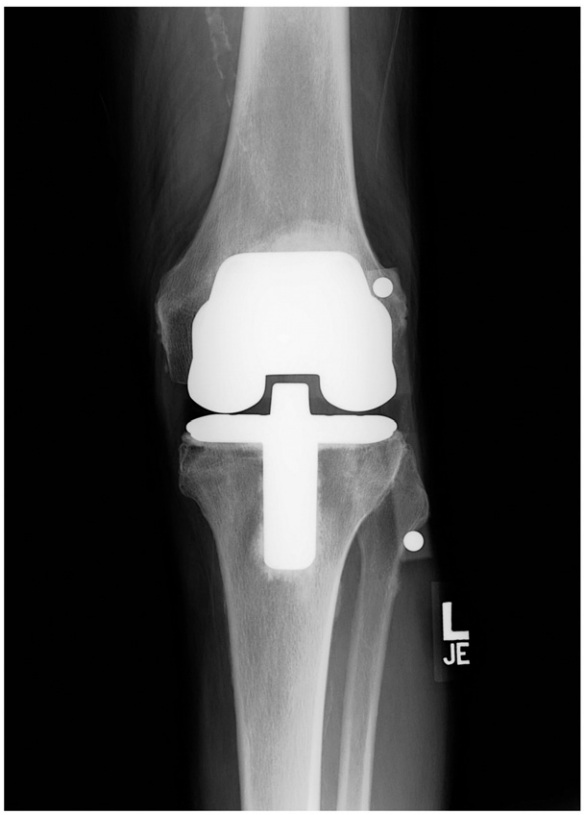


**Fig. 1.** Anteroposterior radiograph of the knee reveals an osteolytic lesion in the medial distal femoral condyle. This is the largest osteolytic lesion at final follow-up measuring 20 × 8 mm.

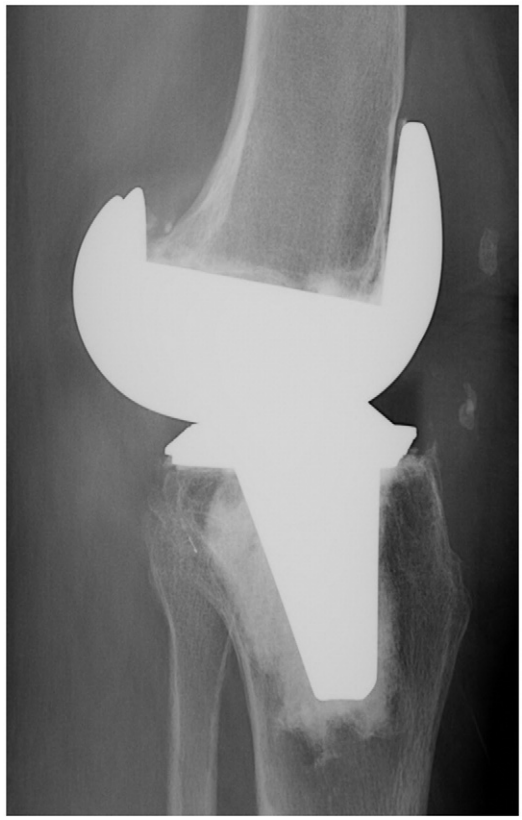

**Fig. 2.** Lateral radiograph of the knee reveals a radiolucent line measuring 2 mm in zones 1 and 2 in the region of the anterior femur as described by the Knee Society scoring system for radiolucencies.