

Why Does Total Knee Arthroplasty Fail in the 21st Century? A Fifteen Year Analysis of 11,134 Knees

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Summary:

In this large cohort of patients with 10 comprehensive follow up, PJI was the dominant reason for failure in the first 15 years following primary TKA. Aseptic loosening became more important with longer follow up duration. Efforts to improve 12 outcome following primary TKA should focus on these areas, particularly prevention of PJI.

Abstract:

Introduction and Aims

With the aim of improving patient outcomes following surgery, there is increasing trend towards publication of hospital and surgeon level data in TKA. This places pressure on surgeons to avoid complications such as revision surgery, commonly used as a marker of TKA 'failure'. To improve outcomes it is first necessary to understand why failures occur, enabling strategies to be developed to reduce the risk of revision surgery. Revision TKA reported to national registries lacks clinical and radiological data to enable accurate identification of failure mechanisms. Similarly, reports on revision TKA from tertiary referral centres lack of data on the overall denominator of primary TKA, therefore the relative importance of each failure mechanism leading to revision TKA remains unclear.

The aim of this study was to identify reasons for failure following primary TKA in a large cohort, and assess their relative frequencies and incidence rates over long-term follow-up accounting for patients' mortality rate.

Methodology:

We identified 11,134 primary TKA performed between 2000 and 2015 in three tertiary referral hospitals. 'Failure' was defined as subsequent revision surgery involving change of one or more components or reoperation due to periprosthetic joint infection (PJI). Patients undergoing subsequent revision surgery were identified using individual search of patient records, supplemented with New Zealand National Joint Registry data to identify revision TKA performed at outside hospitals. Relevant clinical records, radiographs, and lab results were reviewed to identify the primary reason for failure, according to a standardised protocol. Failure mechanisms included PJI (Musculoskeletal Infection Society definition), aseptic loosening, secondary patella resurfacing/patello-femoral arthritis, tibio-femoral instability, stiffness, polyethylene wear, periprosthetic fracture, patella maltracking, and extensor mechanism discontinuity.

Results:

A total of 357 failures over the 15-year period were identified. Clinical and radiographic data was obtained for all patients, including those undergoing revision at outside hospitals. The cumulative probability of failure at 15 years was 6.1% (standard error (SE) 0.4%). At 10 years, the most common cause for failure was PJI (1.9% +/- SE 0.2%), followed by aseptic loosening (1.2%). The majority of PJI occurred within the first 4 years (1.4% +/- SE 0.1%), with

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subsequent annual incidence of PJI of 0.1% per year.

In the first 5 years following primary TKA, the most common reason for revision was PJI (52%), from 5-10 years PJI and aseptic loosening (35% each), and from 10-15 years aseptic loosening (41%).

Conclusion:

In this large cohort of patients with comprehensive follow up, PJI was the dominant reason for failure in the first 15 years following primary TKA. Aseptic loosening became more important with longer follow up duration. Efforts to improve outcome following primary TKA should focus on these areas, particularly prevention of PJI.