TOTAL KNEE ARTHROPLASTY USING THE PRESS-FIT CONDYLAR DESIGN
14- TO 17- YEAR FOLLOW-UP WITH A POSTERIOR CRUCIATE RETAINING DESIGN


Introduction:
Advances in polyethylene manufacturing, processing, and sterilization have improved the longevity of total knee arthroplasty. Recent reports have expressed concern regarding the durability of polyethylene inserts that have been sterilized by gamma irradiation in air. These inserts are prone to delamination and accelerated wear due to the generation of free radicals and are especially susceptible to oxidation during storage or after implantation in vivo. This study represents the long term follow up of a successful knee arthroplasty design to determine if gamma radiation in air and prolonged shelf life affected the clinical outcome.

Methods:
156 consecutive Press-Fit Condylar cruciate retaining total knee arthroplasties were performed by the senior author in 138 patients from November 1986 to September 1989. All patients in the study had failed conservative management and had appropriate radiographic findings consistent with either rheumatoid arthritis or osteoarthritis. Mean age at the time of the index procedure was 70.5 years old (range 34.7 – 94.6). Follow up was achieved for 64 of the 65 surviving knees with one patient lost to follow up. Surviving patients were followed for a mean of 15.8 years (range 14.5-17.4 years). Clinical outcome, complications, revisions, Knee society functional scores were documented, and radiographs analyzed. The source polyethylene stock, method of sterilization, and shelf life of the polyethylene inserts was obtained using product codes and lot numbers recorded during the index procedure. All inserts were gamma radiated in air (2.8 – 3.3 Mrads).

Results:
Mean Knee Society Functional Score was 63 and mean Clinical Score was 87. The overall survivorship of the Press-Fit Condylar knee was 91.9% with revision for any reason counted as a failure (Fig 1). With aseptic loosening as an endpoint survivorship was 95.5%. The most common operative procedure performed was patella revision, which occurred in eight cases. No femoral revisions were performed, and only one tibial tray was revised for loosening. Three cases also had their tibial inserts revised (polyethylene exchange without tibial tray revision) along with the patellar revisions. Incomplete radiolucent lines were present in 72% of knees. None of the surviving knees were considered loose by radiographic criteria (complete radiolucent lines, with or without progressive radiolucencies). No significant differences were noted in the shelf life of polyethylene inserts between revised and unrevised cases. Mean shelf life of unrevised cases was 7.8 (± 6.6) months. For the 4 cases of revisions attributed to polyethylene wear, the mean shelf life was 8.7 (± 5.2).

Discussion:
The Press-Fit Condylar total knee has had excellent short and intermediate-term results. [Buehler, J Arthroplasty, 2000] This study is the first to show the long-term results (14-17 years) with the system. Due to the length of follow-up and a mean age at index procedure of 70.5 years many patients were deceased at final follow up. Most of the revisions were due to patellar complications. The revision rate that could be attributed to tibial insert polyethylene wear was 2.6%.

A recent multicenter study reported 8.4% of wear related failures in the same design. [Fehring, Knee Society, 2004] In that study, the wear related failure rate was substantially higher in those patients implanted with inserts manufactured after 1991. Implants manufactured before 1991 resulted in only 2.8% wear related failure rate. In the present study, the wear related failure rate was very similar (2.6%). All the tibial inserts used in the present study were manufactured before 1989. This suggests that sterilization method alone cannot account for the increase in wear related failures. The number of revisions were too small for statistical correlation with patient related factors known to affect polyethylene wear such as age at surgery, gender, and activity. While gamma radiation in air can have a deleterious effect on wear rates, it is more likely that polyethylene wear is multifactorial in nature. In our hands, the long-term follow-up of surviving patients shows that the Press-Fit Condylar total knee system has excellent results with either aseptic loosening or revision for any reason as an endpoint.

![Figure 1: Kaplan-Meier survival based on revisions](image-url)