

## Re-revision knee arthroplasty &ndash; the effect of time from primary to first revision. <b style="font-size: 12pt;">A study of 4723 patients from the Scottish Arthroplasty Project.</b>

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### INTRODUCTION:

Revision Total Knee Arthroplasty (rTKA) is predicted to increase by more than 600% between 2005 and 2030, partly relating to the rising number of primary procedures combined with increasing life expectancy of the population overall. The survivorship of primary TKA has been extensively investigated, however more granular information on the risks of rTKA is needed. Younger age, male sex and surgeon volume have previously been identified as risk factors for re-revision TKA. The aim of this study was to measure the effect of time from primary TKA to revision TKA on the probability and timing of re-revision surgery.

### METHODS:

This is an analysis of the Scottish Arthroplasty Project (SAP) data set, a national audit prospectively recording data on all joint replacements performed in Scotland. The period from 2000 to 2019 was studied, with the primary outcome being incidence of re-revision TKA. The primary explanatory variable was the time from primary TKA to first revision TKA. Kaplan-Meier survival curves were plotted to determine the lifespan of rTKA. Binomial logistic regression was used to estimate relative revision risk over time. Of cases undergoing re-revision, linear regression was used to determine any relationship of time from primary revision, and 1<sup>st</sup> revision to 2<sup>nd</sup>. Secondary outcome was mortality, with explanatory variables of time from primary to revision, and indication (aseptic vs septic).

### RESULTS:

4723 patients underwent revision TKA over the time period. The mean age was 69 years (24-98), Male to female ratio was 1:1.1. Laterality was 39% left (1856), 43% right (2053), 0.2% bilateral (5), 17% unknown (808). Aetiology was 95.3% aseptic, 4.7% septic. The mean time from primary TKA to revision TKA was 5.8 years

821 patients underwent re-revision surgery (17.4%). Mean time from 1<sup>st</sup> to 2<sup>nd</sup> revision was 2.2 years (0-15). Of these 146 patients underwent a 3<sup>rd</sup> revision (17.8%), time from 2<sup>nd</sup> to 3<sup>rd</sup> revision was 2.9 years (0-16).

The relationship between time from primary to revision TKA and 2<sup>nd</sup> revision was significant ( $p < 0.001$ ), with increasing time lowering probability of 2<sup>nd</sup> revision (OR 0.953 95% CI 0.947 to 0.959). There was no significant association in time to first revision on time from 1<sup>st</sup> revision to 2<sup>nd</sup> revision ( $p > 0.05$ ).

Overall mortality for all patients was 32% at 10 years (95% CI 31-34), Aseptic was 33% (95% CI 31-35) and Septic was 30% (95% CI 64-78). Time from primary TKA to revision TKA had a significant effect on mortality:  $p = 0.004$  OR 1.03 (1.01-1.05). Septic revisions had a reduced mortality compared to aseptic, OR 0.95 (0.71-1.25) however this was not significant ( $p = 0.69$ ).

### DISCUSSION AND CONCLUSION:

This is the first study to demonstrate time from primary TKA to revision TKA having a significant effect on probability of 2<sup>nd</sup> revision TKA, but no effect on time from 1<sup>st</sup> revision to 2<sup>nd</sup>. Furthermore the study suggests mortality is increased with increasing time from primary procedure to revision, however decreased if the indication is septic rather than aseptic. This study adds to the relatively small body of knowledge on risk factors for failure of revision TKA.

