

The influence of surgeon caseload and usage on the long term outcomes of Unicompartmental Knee Replacement: An analysis of over 34,000 knee replacements from the National Joint Registry

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INTRODUCTION: Unicompartmental Knee Replacement (UKR) has several advantages compared to total knee replacement but has a higher revision rate. The revision rate is variable and is known to be related to the surgeon's UKR caseload (number of UKRs performed annually) and usage (number of UKRs as a proportion of knee replacement practice). It is not known which is more important. The aim of the study was to explore the influence of caseload and usage on cemented and cementless mobile bearing UKR.

METHODS:

34,277 medial mobile bearing UKR (23,707 cemented and 10,570 cementless) from the National Joint Registry (NJR) were analysed. The effect of caseload and usage on the revision rate was characterized using locally-weighted scatterplot smoothing (LOWESS). UKR were subdivided by surgeon caseload into low (<10 UKRs/yr) and high (≥10 UKRs/yr) and by usage into low (<20%) and high (≥20%). These cut offs were based on previous established demarcations [1,2]. We combined caseload and usage categorisations to create four comparative groups; (1) low caseload/low usage, (2) high caseload/low usage, (3) low caseload/high usage and (4) high caseload/high usage. Ten-year cumulative revision rates were compared between comparative groups.

RESULTS:

Revision rate fell with increasing surgeon caseload for both cemented and cementless UKRs until caseloads of 70 UKRs/yr were achieved (Figure 1). The steepest decline in revision rates were from increasing caseloads to 10 UKRs/yr. Revision rate fell with increasing surgeon usage for both cemented and cementless UKRs until usages of ≥50% were achieved (Figure 2). The steepest decline in revision rates were from increasing usages up to 20%. Cementless UKR had a lower revision rate than the cemented for all caseloads and usages.

For cemented UKR, compared to the low caseload/low usage group the high caseload/low usage (Hazard Ratio (HR) 0.74, CI 0.66–0.83, p<0.001) and low caseload/high usage groups (HR 0.86, CI 0.74–0.99, p=0.04) had lower revision rates. The high caseload/high usage group (HR 0.57, CI 0.52-0.63, p<0.001) had a much lower revision rates. The same pattern was observed for cementless UKR.

The ten-year survival of the low caseload/low usage cemented and cementless UKR were 82.8% (CI 81.6-83.9) and 86.2% (CI 72.1-93.4) respectively. The ten-year survival of the high caseload/high usage cemented and cementless UKR were 90.0% (CI 89.2-90.6) and 93.3% (CI 91.3-94.8).

DISCUSSION AND CONCLUSION:

Mobile bearing UKR revision rates improve with both increasing surgeon UKR caseload and usage. Surgeons using cemented UKR with usage ≥20% and caseload ≥10/year had a 10-year survival of 90%. With higher caseload, usage and cementless fixation the survival was higher.

References

1. Liddle AD, Pandit H, Judge A, Murray DW. Effect of Surgical Caseload on Revision Rate Following Total and Unicompartmental Knee Replacement. *J Bone Joint Surg Am* 98(1): 1, 2016
2. Liddle AD, Pandit H, Judge A, Murray DW. Optimal usage of unicompartmental knee arthroplasty: a study of 41,986 cases from the National Joint Registry for England and Wales. *Bone Joint J* 97-B(11): 1506, 2015

Figure 1. LOWESS curve for surgeon caseload and revision rate per 100 component years for cemented and cementless UKRs

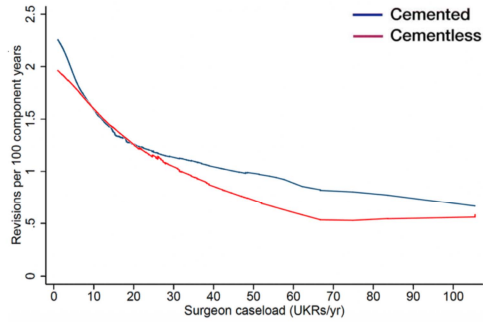


Figure 2. LOWESS curve for surgeon usage and revision rate per 100 component years for cemented and cementless UKRs

