

Total Joint Arthroplasty Reoperation Rates Vary by Region and Season



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Introduction

Total joint arthroplasty (TJA) remains a highly successful surgical intervention, and its utilization is only projected to grow in the coming years. Current estimates suggest that by 2030, there will be a 71% and 85% increase in the annual volumes of primary total hip arthroplasty (THA) and total knee arthroplasty (TKA), respectively [1]. Despite the success of TKA and THA, a subset of patients will need some sort of revision or reoperation within one year of the index TJA, increasing the load on the health care system. Previous studies on other surgical interventions have indicated differences in reoperation rates when stratifying for patient cohorts by region and season [2-4], but literature specific to TJA has concentrated on documenting seasonal variations in the potential causes of reoperation, omitting larger reviews of the reoperation rates themselves [5,6]. Thus, the primary objective of this study is to investigate the effects of region and seasonality on the 1-year reoperation rates for primary TJA patients.

Methodology

This retrospective cohort study included all patients who underwent a primary THA or TKA between 2018 and 2020. Data were obtained from the AAOS American Joint Replacement Registry (AJRR), which includes procedural, post-operative, and patient-reported outcome measures data from hospitals, ambulatory surgical centers, and private practice groups across the United States. The AJRR also captures geographical information on each procedure, breaking the US into the four census regions: Northeast, Midwest, South, and West.

We analyzed the relationship between the risk of reoperation and the region and season of the index TJA. Variables collected included age, race, sex, Charlson Comorbidity Index (CCI) score, procedure type (THA or TKA), procedure year, season, and geographic region. Multivariable logistic regression adjusting for age, race, CCI score, procedure, and year was utilized to assess the effects of region, season, or their interaction on the risk of reoperation. Non-measured factors such as hospital or surgeon ability were controlled for as nested random effects. Additional analysis was conducted comparing each region, season, and region within each season to determine relative effects. Bonferroni corrections were applied to the LSmeans for these comparisons due to the increased risk of type I error when implementing multiple between-group comparisons. All statistical analyses were performed using SAS (version 9.0; SAS Institute). Significance was set at 0.05.

Fig 1. Reoperation rate for each region and season within each year

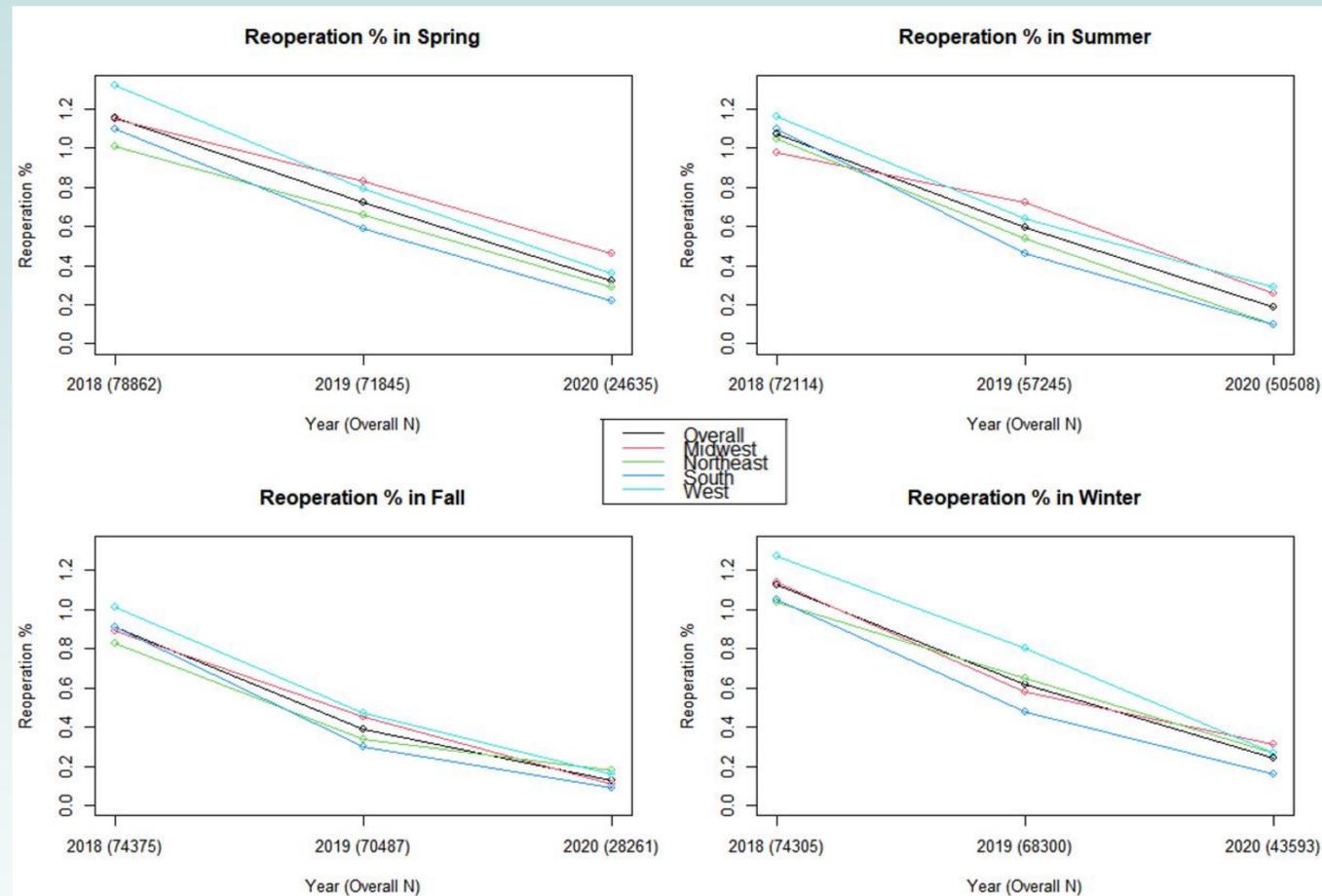


Fig 2. LSMeans comparison of seasons and regions

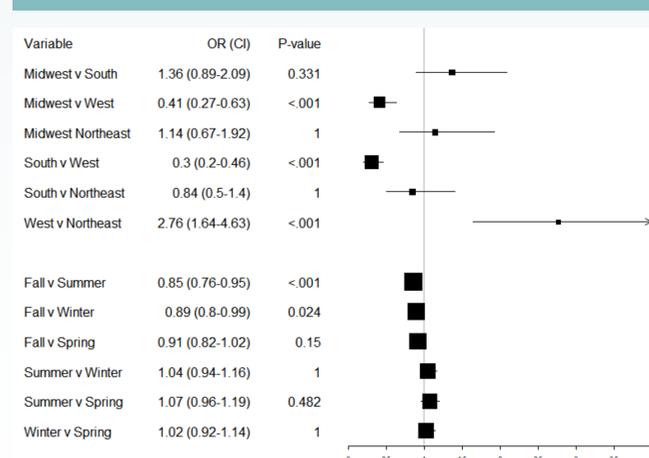
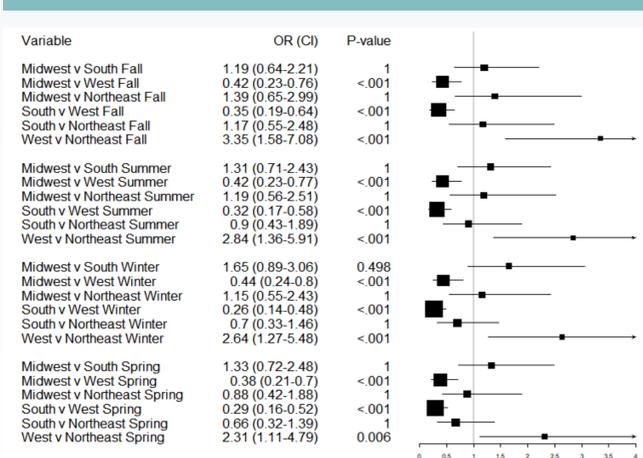


Fig 3. LSMeans comparison of region within season



Conclusion

Focus:

- This study achieved greater granularity than previously realized in the literature by cross-sectionally examining both region and season
- Primary TJA patients in the West had a statistically higher risk of reoperation within one year of their index procedure
- TJA procedures conducted in the fall had a lower risk of reoperation than those conducted in the summer or winter

Future Study:

- Clarification of the link between season and infection
- Examination of the underlying causes of regional variation
- Extension of the time period under review for better classification of these trends overall

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