Dental History as a Predictor of Reoperation and Healthcare Costs After Anterior Cervical Discectomy and Fusion

Julian Smith-Voudouris[1], Albert H. Lee[1], Katie M. Zehner[1], Joshua G. Sanchez[1], Sahir S. Jabbouri[1], Scott J. Halperin[1], Jonathan N. Grauer[1]
[1]Yale School of Medicine, New Haven, CT
Julian.smith-voudouris@yale.edu

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INTRODUCTION: Dental health is increasingly recognized as a contributor to systemic infection risk and overall health status, making it an important consideration in surgical populations. Prior work has examined these associations in orthopaedic populations, but the correlation of dental health with anterior cervical discectomy and fusion (ACDF) outcomes remains undefined.

METHODS: Adult patients undergoing primary one- to three-level ACDF were identified from the 2010-2023Q1 PearlDiver M170 database. Exclusion criteria included age < 18 years, diagnosis of spinal trauma, infection, or neoplasm within 90 days before surgery, and lack of database activity for at least 90-days postoperatively.

Patients with a history of dental caries or dental implants within two years before ACDF were identified with International Classification of Diseases (ICD) -9 and -10 codes. These patients were matched 1:5 to those without by age, sex, Elixhauser Comorbidity Index (ECI), and number of spinal segments fused. Ninety-day adverse events were compared using multivariable logistic regression (significance defined as $p<0.05$). Median 90-day insurer payments were compared using the Wilcoxon rank-sum test. Lastly, rates of 5-year reoperation were evaluated with Kaplan-Meier plots and log-rank tests.

RESULTS: After matching, 2,064 patients with dental history were compared with 10,259 controls. Multivariable analysis demonstrated having dental history within the past two years as an independent predictor of experiencing dysphagia (Odds ration [OR]=1.75, $p<0.001$) and urinary tract infections (OR=1.36, $p=0.030$). This contributed to dental history being associated with aggregated adverse events, with those patients having higher odds of any adverse event (OR=1.47, $p<0.001$) and minor adverse events (OR=1.50, $p<0.001$).

Patients with dental history also had significantly higher 90-day healthcare utilization after ACDF. They were more likely to visit the emergency department (ED; OR=2.39) and be readmitted to the hospital (OR=1.39) than controls. This contributed to 8% higher 90-day insurer payments in the dental history group ($7,580 vs. $7,017, $p<0.001$). Dental history patients also had significantly higher rates of five-year revision (90.9% vs. 92.7% survival, $p=0.010$, **Figure 1**).

DISCUSSION: Patients with a history of dental caries and/or dental implants in the two years prior to ACDF were at increased odds of postoperative minor adverse events, with no change in serious infectious complications. However, dental history predicted significantly increased healthcare utilization postoperatively, with more ED visits, readmissions, overall costs, and higher rates of reoperation. These findings suggest that, while poor dental health may not increase severe infection after ACDF, it remains an important marker of postoperative resource use and long-term outcomes.

SIGNIFICANCE/CLINICAL RELEVANCE: Patients with dental history have increased reoperation risk following ACDF, along with greater healthcare utilization and costs. Together, these findings support the role of preoperative dental evaluation and treatment to mitigate associated risks and economic burden.

IMAGES AND TABLES:

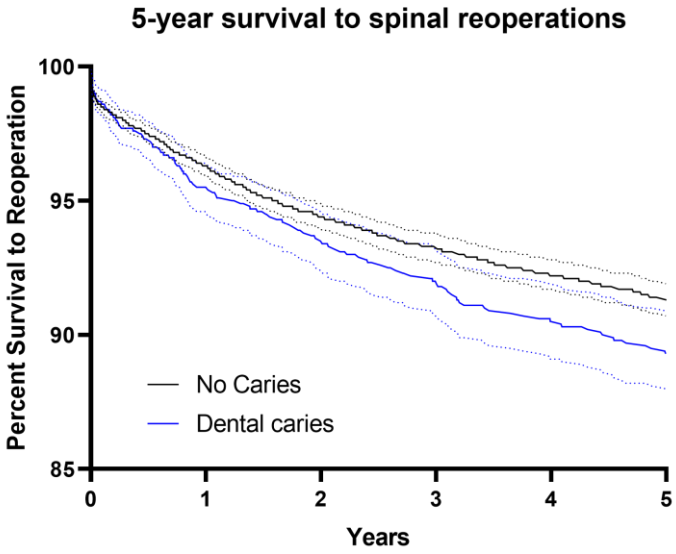

Figure 1. The Kaplan-Meier curve showing five-year instrumentation survival following ACDF comparing the patients with and without dental history in the two years prior to surgery.