

Usage of endoscopic carpal tunnel release has gradually increased over time and exceeded 25% of carpal tunnel releases by 2021

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INTRODUCTION: Carpal tunnel release is one of the most performed orthopedic procedures. The traditional approach is open carpal tunnel release (OCTR); however, roughly two decades ago endoscopic carpal tunnel release (ECTR) was introduced. The aim of the current study was to compare trends in use, predictive factors for, 5-year survival, and reimbursement of endoscopic carpal tunnel release (ECTR) compared to open carpal tunnel release (OCTR) over the past decade.

METHODS: ECTR and OCTR patients were identified in the 2010-2021 PearlDiver M151Ortho dataset. This is a large national billing claims dataset containing de-identified administrative health information on over 151 million orthopedics patients across all payer types, sites of care, and geographic regions in the United States. Numeric and proportional utilization of these procedure were characterized for each year over the study interval. Univariate and multivariate analyses were conducted to identify predictive factors for having ECTR performed rather than OCTR. Reimbursement analysis was performed to compare the average 90-day reimbursement of ECTR versus OCTR and trends in reimbursement over the past decade were determined. Kaplan Meier survival analysis was performed to compare 5-year reoperations of the two groups.

Given that all PearlDiver data is aggregate and de-identified, our institutional review board granted studies using this database exempt from review.

RESULTS: From 2010 through 2021, 441,023 ECTR and 1,767,820 OCTR procedures were identified. The proportional use of ECTR compared to OCTR rose from 2010 (15.7% of procedures) to 2021 (26.1%). Independent predictors of having ECTR rather than OCTR included: geographic variation (compared to having surgery in the Midwest, Northeast odds ratio [OR] 1.53, West OR 1.62, and South OR 1.66), having Medicare or commercial insurance (compared to commercial, Medicare OR 0.94 and Medicaid 0.69), female sex, and fewer comorbidities

The average (standard deviation) day-of-surgery reimbursement for ECTR was \$1,265.38 (\$1,652.47), compared to \$1,122.45 (\$2,903.51) for OCTR. 90-day postoperative reimbursement for ECTR was \$3,114.82 (\$5,418.05), compared to \$3,087.62 (\$7,417.61) for OCTR. The average day-of-surgery reimbursement for ECTR increased from \$941.21 (\$1,024.54) in 2010 to \$1,273.04 (\$1,690.19) in 2020, and from \$838.65 (\$1,501.28) in 2010 to \$1,259.80 (\$1,868.81) in 2020 for OCTR (p<0.0001 for both). Average 90-day reimbursement for ECTR increased from \$1,966.69 (\$5,072.20) in 2010 to \$3,581.32 (\$5,075.53) in 2020, and from \$2,018.09 (\$5,583.89) in 2010 to \$3,870.19 (\$7,079.07) in 2020 for OCTR (p<0.0001 for both). Five-year survival of ECTR (67.0%) was clinically similar to OCTR (65.8%).

DISCUSSION: In a study capturing over two-million carpal tunnel releases performed over the past decade, ECTR rose from 15.7% of procedures performed in 2010 to 26.1% in 2021, with several factors increasing the likelihood of undergoing ECTR vs. OCTR. Limitations of this study include those inherent to administrative database research and patient-specific information. Further, institution-level costs of ECTR and OCTR could not be assessed using the PearlDiver database.

SIGNIFICANCE/CLINICAL RELEVANCE: The results of the present study reveal that the utilization of ECTR relative to OCTR has significantly increased over the past decade, reflecting evolving surgical preferences and techniques in orthopedics. Characterizing nationwide trends in procedure utilization is crucial for evaluating how current surgical techniques are being applied in day-to-day practice and their alignment with evidence-based guidelines. Understanding which patients are more likely to undergo ECTR vs. OCTR, and identifying the independent predictors for these choices, provides insight into potential discrepancies in care. This information may contribute to targeted interventions and policy changes that can further enhance personalized patient care and address inequalities across the country.

Proportional Use of Endoscopic and Open Carpal Tunnel Release from 2010 to 2021

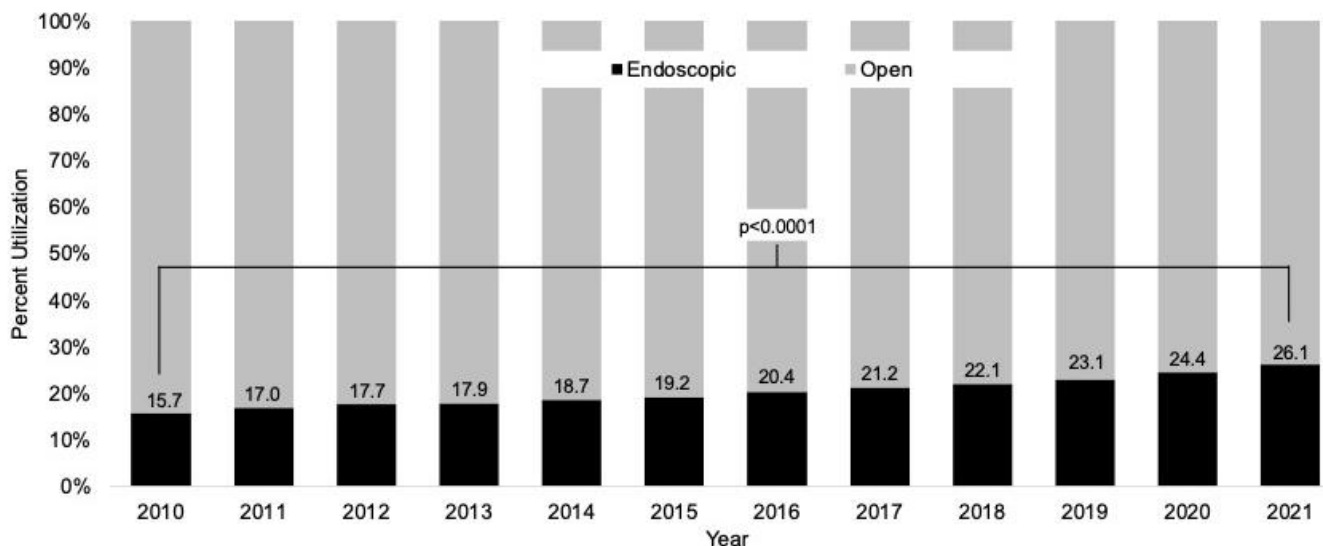


Figure 1. Proportional annual utilization of ECTR vs. OCTR from 2010 to 2021.