Patterns of Physical Therapy Utilization Following Anterior Lumbar Interbody Fusion

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INTRODUCTION: Postoperative physical therapy (PT) can improve pain and functionality after lumbar fusion without increasing complication rates, however, its role following anterior lumbar fusion (ALIF) remains understudied. This study aimed to identify trends and predictors of postoperative PT utilization following ALIF and characterize the frequency, timing, and types of PT services utilized.

METHODS: In this retrospective cohort study, the PearlDiver Mariner database was used to analyze patients undergoing ALIF from 2010–2022. Patients were identified using International Classification of Disease 9th (ICD-9) and 10th (ICD-10) editions and Current Procedural Terminology (CPT) codes. Exclusion criteria included less than one year follow-up, posterior instrumentation >5 levels, prior ALIF, revision surgery within one year, and surgical indications for neoplasm, infection, revision, or trauma. PT utilization was assessed between 7-365 days postoperatively. Patient demographics, medical comorbidities, and operative characteristics were compared between study cohorts. The secondary objectives were to characterize the frequency, timing, and types of PT services delivered. Statistical analyses included t-tests, chi-squared tests, and multivariable logistic regression to identify predictors of PT use.

RESULTS SECTION: Among 112,808 patients undergoing ALIF, 28,718 (25.5%) utilized PT within the first year. PT users were younger, had higher Elixhauser Comorbidity Index (ECI) scores, and higher income levels ($p<0.001$). Multivariable analysis identified positive predictors of PT usage, including commercial insurance (OR: 1.52), orthopedic referral (OR: 1.26), postoperative medical (1.21) or surgical (1.10) 90 day-complications, previous decompressions (OR: 1.08), and higher income (OR: 1.07) ($p<0.001$ for all). Of the patients who utilized PT following ALIF, the average number of visits was 12.25. The average number of postoperative days before patients' first PT visit was 102.98± 84.24 days. Patients with Medicare took the longest to initiate their first PT session (113.72 ± 90.40 days, $p<0.001$) whereas those with commercial insurance initiated postoperative PT the quickest (100.36 ± 82.86 days, $p<0.001$). Timing of PT initiation varied: 23.6% within 6 weeks, 31.8% between 6-12 weeks, 17.9% between 12-18 weeks, and 26.6% after 18 weeks. The most frequently billed interventions also had the highest average visits per patient, with the highest being CPT-97110 for therapeutic exercises (87.3% and 11.1 visits).

DISCUSSION: PT utilization was low after ALIF. Practice patterns after ALIF varied significantly and were influenced by insurance type, comorbidities, income level, and surgical complexity. In total, these results characterize a lack of evidence-based clinical guidelines for managing ALIF patients postoperatively, specifically recommendations outlining which patients are suitable for PT and the appropriate timing of intervention. These findings underscore the understudied nature of PT utilization and its contribution to postoperative outcomes following lumbar fusion procedures. They caution providers to consider socioeconomic disparities in access to rehabilitation when developing future guidelines.

SIGNIFICANCE/CLINICAL RELEVANCE: The present study emphasizes the need for the development of evidence-based rehabilitation protocols to improve outcomes after ALIF. We invite these efforts in the hope that care standardization can result in reduction of existing disparities and overall improve outcomes for all patients.

IMAGES AND TABLES:

Figure 1. Predictors of PT utilization following ALIF.