Utilization Trends of Pedicle Subtraction Osteotomy in Adult Spinal Deformity: An Analysis of a Large Insurance Claims Database from 2010-2021

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INTRODUCTION: Despite the prevalence and disabling nature of adult spinal deformity (ASD), there is limited research into the updated utilization trends of its commonly used treatment, pedicle subtraction osteotomy (PSO). The present study aims to characterize PSO use over the 2010-2021 time period in a retrospective trends analysis using a national insurance claims database.

METHODS:
Patient data from 2010 to 2021 was accessed through the querying of the national insurance database PearlDiver. After first identifying ASD ICD-9 and ICD-10 codes, patients in this larger cohort who underwent PSO were isolated using codes CPT-22207, CPT-22208, and CPT-22206. Temporal distribution by year and demographic data including gender, age, region, payor type, and service location were extracted. Subsequent analysis included utilization trends of PSO for isolated ASD categories including scoliosis, kyphosis and lordosis.

RESULTS SECTION:
4218818 patients with spinal deformity were identified from 2010-2021. Of this cohort, 4749 underwent PSO for treatment. Trend analysis demonstrated an initial rise in utilization, peaking in 2016 and steadily decreasing until the end of the study period. Comparing 2010 to 2013 demonstrated an increase from 295 to 455 patients (+54.24%), subsequently falling to 425 in 2015 (-8.79%) before returning to a peak case volume of 522 in 2016 (+22.82%). Post-2016 demonstrated a significant decrease in PSO procedures ($p<0.001$), ultimately ending with 305 patients in 2021 (-41.57% from 2016). This significant decrease from 2016 to 2021 is also visible across individual deformity diagnoses including scoliosis (-34.38%), kyphosis (-43.90%), and lordosis (-22.22%) ($p<0.001$).

DISCUSSION:
The present study has demonstrated a decrease in utilization of pedicle subtraction osteotomy from 2016-2021 in both combined and deformity-specific analysis. We intend to further characterize demographics and variables such as mortality, length of stay, cost, readmission and revision of the total cohort as well as the individual deformity subgroups. Additionally, sub-analysis by procedure location—thoracic or lumbar—will also be performed.

SIGNIFICANCE/CLINICAL RELEVANCE: The present study demonstrates a decreasing national trend of PSO treatment of adult spinal deformity after 2016. Such findings may reflect a growing surgeon preference for posterior column osteotomy (PCO) over PSO, possibly due to the former's lower labor demands and decreased blood loss, as reported in literature.