by having previous history of a coronary stent (Stent), coronary artery bypass graft (CABG), and no previous heart procedure (No-HP). Means comparison tests (chi-squared and independent samples t-tests, as appropriate) compared differences in demographics, diagnoses, and comorbidities. Logistic regression assessed the odds of 30-day and 90-day postoperative (postop) complications associated with each heart procedure (Odds Ratio [95% confidence interval]). Statistical significance was set $p<0.05$.

RESULTS: A total of 731,173 elective spine fusion patients were included. Overall, 8,401 pts underwent a CABG, 24,037 patients Stent, and 698,735 had No-HP prior to spine fusion surgery. Compared to Stent and No-HP patients, CABG patients had higher rates of morbid obesity, chronic kidney disease and diabetes ($p<0.001$ for all). Stent patients had higher rates of peripheral vascular disease, hypertension, and hyperlipidemia (all $p<0.001$). Within 30 days postoperatively of index surgery, CABG patients had significantly higher complication rates including pneumonia, cerebrovascular accident (CVA), myocardial infarction (MI), sepsis, and death compared to No-HP (all $p<0.001$). Stent patients vs No-HF also had higher 30-day postoperative complication rates including pneumonia, CVA, MI, sepsis, and death. Adjusting for age, comorbidities and sex, Stent was significantly predictive of a MI 30-days post-op (OR: 1.90 [1.53-2.34], $P<0.001$). Additionally, Stent patients compared to CABG patients had 1.99x greater odds of a MI within 30-days (OR: 1.99 [1.26-3.31], $p=0.005$) and 2.02x greater odds of readmission within 90-days postop (OR: 2.2 [1.53-2.71, $p<0.001$).

CONCLUSIONS: With regards to spine surgery, coronary artery bypass graft remains the gold standard for risk reduction. Stenting does not appear to minimize risk as significantly as CABG. When assessing patients with a history of coronary artery disease for elective spine fusion surgery, surgeons should be cautious of the significant risk of major complications associated with stents compared to coronary artery bypass grafting.

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290. The impact of insurance payor on hospital length of stay and discharge time in adult patients undergoing elective spine surgery

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BACKGROUND CONTEXT: ERAS pathways are evidence-based protocols designed to reduce the surgical stress response and facilitate return to function, which typically results in a significant decrease in length of stay. After implementation of such a program at our institution, length of stay only transiently decreased.

PURPOSE: This study looks to identify barriers to timely discharge, and to assess a causal relationship with clearance from insurance payors.

STUDY DESIGN/SETTING: This is a retrospective cohort study of 105 consecutive patients undergoing elective spinal surgery on an ERAS pathway at a tertiary academic center.

PATIENT SAMPLE: N/A

OUTCOME MEASURES: N/A

METHODS: Prior to admission, all patients were assigned to intermediate (n=31) or complex (n=74) ERAS pathways according to their scheduled operation. Demographic data and variables related to comorbidities, insurance payor, length of stay, intra-and postoperative complications, discharge destination, and the date of medical clearance to discharge home or to a rehabilitation facility were recorded. The days stayed beyond medical clearance was calculated as the difference between the date of medical clearance and the actual date of discharge. Each operation was categorized according to the involvement of spinal fusion and by the number of vertebral levels. After patients were classified by payor type, Private Insurance, Medicare, and Triwest, the contracted payor for the Veterans Administration, were compared.

RESULTS: In complex pathway patients, there was no significant difference between the demographics, complication rates, or operative parameters in any of the groups. When compared overall and individually, there was a significant difference in mean length of stay between all groups (Private vs Medicare vs Triwest, 6.5 vs 5.1 vs 15.5 days, $p=0.002$) that was mirrored in the days stayed beyond medical clearance (1.4 vs 0.3 vs 10, $p=0.001$). This delay can translate into additional costs ranging between $14,000 and $140,000 per patient. In the intermediate pathway, Medicare patients were significantly older than Private Insurance or Triwest patients (72.7 vs 54.1 vs 54.6 years, $p=0.001$), and the incidence of comorbid cancer was greater in the Private Insurance and Triwest cohorts compared to Medicare (50% vs 38% vs 0%, $p=0.007$), but the remaining demographics were not different. There was no difference in length of stay (4 vs 3.15 vs 4.1 days, Private vs Medicare vs Triwest, $p=0.747$), but the days beyond medical clearance was significant (0.7 vs 0 vs 1.5, $p=0.031$), and it mirrored the complex group. The levels involved and fusion in each cohort were not different. 49% of patients on the complex pathway were discharged to inpatient rehabilitation facilities compared to 16% on the intermediate pathway.

CONCLUSIONS: Insurance payors can influence length of stay by delaying discharge authorization after spine surgery. The days stayed beyond medical clearance followed a regular pattern regardless of the pathway, with Medicare having less of a delay than Private Insurance, which had less of a delay than Triwest. When involving discharge to inpatient rehabilitation, this delay can significantly affect the total length of stay. Hospital stay beyond what is medically required represents a delay in appropriate patient care and unnecessary expenses that can be draining on our healthcare system, and that represents an opportunity for improvement across multiple procedures and specialties.

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291. Adjustment of the global alignment and proportion scores accounting for frailty in adult spinal deformity surgical patients

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BACKGROUND CONTEXT: Frailty is a baseline measure of disability that transcends age alone and has been determined a strong predictor of outcomes following adult spinal deformity (ASD) surgery. This postop impact calls for investigation of unique adjustment of Global Alignment and Proportion (GAP) scores accounting for frailty. This adjustment in spinal proportion may help surgical planning for individualized, optimal postop outcomes.

PURPOSE: Modify the GAP score with frailty to optimize outcomes in surgical ASD patients.

STUDY DESIGN/SETTING: Retrospective review of a single-surgeon comprehensive ASD database

PATIENT SAMPLE: A total of 140 ASD patients

OUTCOME MEASURES: Frailty-adjusted GAP scores; Health Related Quality of Life scores (HRQLs): ODI, SRS-22

METHODS: Surgical ASD patients (SVA≥5cm, PT≥25˚, or TK ≥60˚, >3 levels fused) ≥18 years old with available baseline (BL) radiographic data were isolated in the single-center Comprehensive Spine Quality Database (Quality). Patients were dichotomized by the ASD frailty index, F (Not Frail, Frail). Linear regression analysis established radiographic equations for frailty-adjusted GAP Scores at baseline and 2-years involving relative pelvic version, relative lumbar lordosis, lordosis distribution index, relative spinopelvic alignment, and an age factor to formulate a sagittal plane score. Patients were restratified into frailty-adjusted proportionality groups: Proportional (<5.8), Moderately Disproportional (MD) (5.8-7), Severely Disproportional (SD) (>7). Frailty-adjusted GAP proportionality at 2-years were compared to adjusted-BL to determine whether patients improved, deteriorated or remained the same in their spine proportion.
RESULTS: A total of 140 patients were included (55.5±16.4 yrs, 77.5% female, 25.2±4.7 kg/m2). BL frailty: 32.8% not frail, 67.2% frail. Primary analyses demonstrated correlation between BL frailty score and BL and 2-year GAP scores(P<0.001). Linear regression analysis(p<0.001) developed a frailty-adjusted GAP threshold equation: 4.4 + 0.93*(frailty score). Adjusted-baseline scores were taken and re-stratified based distribution and placed 26.4% of patients in Proportional, 26.6% MD, and 44% SD. BL adjusted GAP scores by frailty group: 5.3 Not Frail, 7.5 Frail; p<0.001. At 2-years, GAP scores were grouped into the frailty-adjusted proportionality groups: 66.2% Proportional, 10.8% MD, and 23.1% SD. Patients who were 2-year MD/SD underwent significantly more reoperations (>33.5%) compared to Proportional (12.8%), p=0.015. SD 2-year patients developed increased PJK at the 1-year mark (40%, Proportional: 13.9%, MD:7.1%, p=0.003), as well as had worse 2-year ODI and SRS-22 satisfaction scores(p<0.050). 47.5% improved in GAP (63.4% of frail patients), 12.3% deteriorated, and 40.2% remained in the same proportionality group at 2-year follow up.
CONCLUSIONS: Significant associations exist between frailty and spinal proportion. By adjusting the GAP proportionality groups accounting for baseline frailty contributed to improved outcomes and minimized reoperations. The adjusted GAP groups appeal for less rigorous spine proportion goals in severely frail patients.
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292. Global Alignment and Proportion (GAP) score with modified age factor: GAP-A score

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BACKGROUND CONTEXT: The Global Alignment and Proportion (GAP) score is a PI-based method of analyzing the sagittal plane, developed to predict the risk of mechanical complications following spinal correction surgery. Our study examined the age factor of 60 as a parameter for GAP score calculation in a healthy US population. Modifying the age factor with score substractions at the cut-offs of age 65 and 70 creates the Global Alignment and Proportion with Modified Age Factor (GAP-A) Score, which better compensates for the sagittal imbalance that occurs naturally with increasing age and affects the healthy elderly population. The GAP score was developed to predict mechanical complications following spinal correction surgery. It is a pelvic-incidence based method of analyzing the sagittal plane. The GAP parameters include relative pelvic version, relative lumbar lordosis, lordosis distribution index, relative spinopelvic alignment (RSA), and an age factor of 60. An age >= 60 years old receives a score of 1, while age <60 receives a score of 0.
PURPOSE: The aim of the study was to adjust the age factor in calculation of GAP scores among healthy United States adult volunteers with no prior spinal pathology, in order to compensate for the natural age-related sagittal imbalance among the elderly population.
STUDY DESIGN/SETTING: Retrospective review of prospectively collected data
PATIENT SAMPLE: A total of 87 healthy volunteers were included in the study. Mean age was 54.9±15.1 (20-84) years. Exclusion criteria included any major spinal pathology or surgery, terminal illness, morbid obesity or any significant comorbid condition.
OUTCOME MEASURES: GAP scores with the age factor removed and GAP-A scores.
METHODS: Preliminary GAP scores with the age factor removed were assessed in 87 healthy volunteers that met inclusion criteria. The preliminary GAP scores were grouped based on age groups in increments of 5 or 10 years, and these scores were analyzed to search for discrepancies from the baseline trend. Original GAP scores were calculated for the same 87 healthy volunteers. GAP-A scores were calculated with the same parameters as the original GAP scores, with the exception of the age factor. In GAP-A scores, in addition to the age factor of adding 1 point if age>60, the number of points were subtracted from each age group in the same amount that showed discrepancies in the Preliminary GAP score trend. The percentages of Proportioned, Moderately Disproportioned, and Severely Disproportioned volunteers were then compared between GAP scores and GAP-A scores.
RESULTS: Preliminary GAP scores show a 2- and 4-point discrepancy after age 65 and age 70 respectively. After adjustment those two age groups by subtraction of 2 and 4 points from original GAP scores, the percentages of Proportioned and Moderately Disproportioned increased in GAP-A scoring systems. Conversely, Severely Disproportioned groups decreased in GAP-A scoring system. Proportioned volunteers changed from 47.1% to 52.9%, Moderately Disproportioned volunteers changed from 39.1% to 37.9%, and Severely Disproportioned volunteers changed from 13.8% to 9.2%
CONCLUSIONS: Our study examined the age factor parameter in calculation of GAP scores in a healthy U.S. population. We found proportioned percentage from Original GAP scores increases by subtractions at age cut-offs of 65 and 70, which was the discrepancies found from Preliminary GAP scores. We called this system the Global Alignment and Proportion with Modified Age Factor (GAP-A) scoring system. This system can be proposed as a better alternative in compensating for the natural sagittal imbalance affecting the healthy elderly population.
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293. The modified adult spinal deformity frailty index (mASD-FI) is a good preoperative risk assessment tool

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BACKGROUND CONTEXT: To make the 40-factor adult spinal deformity frailty index (ASD-FI) more practical for use in clinical setting, a recent study proposed a modified, 8-factor frailty index (mASD-FI). The mASD-FI quantifies frailty of ASD patients on a scale from 0 to 21, with higher scores indicating greater frailty. While the mASD-FI has been shown to correlate with preoperative pain and disability, its relationship with postoperative outcomes has not been investigated.
PURPOSE: Assess the relationship between mASD-FI score and clinical outcomes after ASD-corrective surgery.
STUDY DESIGN/SETTING: Retrospective cohort study
PATIENT SAMPLE: A total of 509 ASD patients
OUTCOME MEASURES: Length of stay (LOS), complications, health-related quality of life (HRQL) questionnaires: ODI, SRS-22r, EQ-5D, SF-36 Physical Component Score (PCS).
METHODS: ASD patients (scoliosis≥20˚, SVA≥5cm, PT≥25˚, or TK ≥60˚) with available mASD-FI scores and HRQL data at pre- and 2-years