Individuals Over 75 Years Old Experience Greater Revisions Following Transforaminal Lumbar Interbody Fusion: A Propensity Matched Study

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INTRODUCTION: As the elderly population continues to grow, more patients over 75 years old are undergoing lumbar fusion procedures such as transforaminal lumbar interbody fusion (TLIF). While TLIF is widely used, the impact of advanced age on surgical outcomes and sagittal alignment remains incompletely understood.

METHODS: A retrospective review of a dual-institution database was conducted to identify patients who underwent open TLIF from 2017 to 2021. Patients were divided into two cohorts: <75 years and ≥75 years, and 1:1 propensity score matching was performed based on gender, BMI, hypertension, diabetes, and Charlson Comorbidity Index (CCI). Radiographic sagittal parameters and complication rates were compared preoperatively and at one year postoperatively.

RESULTS: After matching, 80 patients were included (40 per group). There were no significant differences in postoperative radiographic parameters, including pelvic incidence–lumbar lordosis mismatch, between groups. Overall complication rates were similar (p=0.546), but elderly patients had significantly higher rates of revision surgery (22.5% vs 7.69%, p=0.013). Trends toward increased pseudoarthrosis and adjacent segment disease were also observed in the ≥75 cohort, though not statistically significant. Preservation of sagittal alignment was comparable between groups at one year.

DISCUSSION AND CONCLUSION: Patients ≥75 years old undergoing open TLIF achieve similar sagittal alignment and perioperative complication profiles compared to younger patients. However, they may face an elevated risk of revision surgery, likely related to age-associated biological factors such as lower bone mineral density. These findings support the continued use of open TLIF in the elderly population, while highlighting the need for long-term follow-up and strategies to mitigate revision risk.

Table 1. Patient Demographics - Unmatched

Characteristic	Total (n=489)	Age 18-74 yrs (n=448)	Age ≥75 yrs (n=40)	*p-value
Age (mean ± SD, years)	61.87 ± 10.45	60.39 ± 9.60	78.05 ± 3.04	**<0.001**
Gender				0.390
Female	57.1% (279)	56.5% (253)	63.4 (26)	
Male	42.9% (210)	43.5% (195)	36.6% (15)	
BMI (mean ± SD, kg/m²)	30.99 ± 6.63	31.30 ± 6.72	27.61 ± 4.30	**<0.001**
Comorbidities				
Hypertension	56.5% (61)	54.5% (55)	85.7% (6)	0.107
Diabetes	21.0% (102)	21.3% (95)	17.5% (7)	0.556
CCI Score (Mean ± SD)	1.06 ± 1.25	1.06 ± 1.28	1.15 ± 0.96	0.658

Yrs = years; SD= standard deviation; BMI = body mass index; kg = kilograms; m = meters; CCI = Charlson Comorbidity Index
*p-value calculated using student's t-tests for continuous variables and chi-square analysis for categorical variables
Bolding denotes statistical significance (p < 0.05)

Table 2. Perioperative Characteristics - Unmatched

Characteristic	Total (n=489)	Age 18-74 yrs (n=448)	Age ≥75 yrs (n=40)	*p-value
Spinal Level				**0.006**
Single Level	41.6% (202)	43.3% (193)	22.5% (9)	
Two-Level	29.2% (142)	29.4% (131)	27.5% (11)	
Three or more levels	29.2% (142)	27.3% (122)	50.0% (20)	
LAT_S1_PI	57.21° ± 14.39	57.27° ± 14.48	56.45° ± 13.48	0.759
Operative Time (Mean ± SD; min)	249.83 ± 85.14	250.33 ± 83.36	244.16 ± 104.59	0.699
Estimated Blood Loss (Mean ± SD; mL)	149.00 ± 42.41	149.36 ± 42.61	143.75 ± 41.73	0.719
Length of Stay (Mean ± SD; hours)	3.49 ± 1.96	3.43 ± 1.94	4.20 ± 1.99	**0.038**
In-Hospital Complication Rate	6.6% (29)	6.5% (26)	8.1% (3)	0.704

Yrs = years; LAT_S1PI = Lateral S1 Pelvic Incidence; SD = standard deviation; min = minutes; mL = milliliters
*p-value calculated using student's t-tests for continuous variables and chi-square analysis for categorical variables
Bolding denotes statistical significance (p < 0.05)

Table 3. Patient Demographics - Matched

Characteristic	Total (n=80)	Age 18-74 yrs (n=40)	Age ≥75 yrs (n=40)	*p-value
Age (mean ± SD, years)	70.20 ± 10.02	62.30 ± 8.12	78.10 ± 3.06	**<0.001**
Gender				0.816
Female	63.75% (51)	65.00% (26)	62.50 (25)	
Male	36.25% (29)	35.00% (14)	37.50% (15)	
BMI (mean ± SD, kg/m²)	27.52 ± 4.23	27.75 ± 4.62	27.29 ± 3.84	0.631
Comorbidities				
Hypertension	70.00% (14)	61.54% (8)	85.71% (6)	0.260
Diabetes	15.19% (12)	12.50% (5)	17.95% (7)	0.500
CCI Score (Mean ± SD)	1.16 ± 1.14	1.15 ± 1.31	1.18 ± 0.96	0.923

Yrs = years; SD= standard deviation; BMI = body mass index; kg = kilograms; m = meters; CCI = Charlson Comorbidity Index
*p-value calculated using student's t-tests for continuous variables and chi-square analysis for categorical variables
Bolding denotes statistical significance (p < 0.05)