

## INTRODUCTION

Aging is associated with biomechanical changes in bone strength and osteoporotic bone changes, which are believed to increase the rate of fragility fractures; including fractures of the hip, spine, pelvis, wrist, femur, and humerus.

Extremity fractures in the elderly often drastically alter their functional status and independence even after repair, especially in those who have both injuries to the upper and lower extremities which require more support at discharge.

This study aimed to identify the risk factors associated with simultaneous injury in upper and lower extremities.

## METHODS

A retrospective analysis of the ACS-TQIP database from 2017–2019 was performed to identify cases with isolated femur and combined upper-lower extremities (humerus-femur) fractures following ground-level falls using ICD-10 code. Major injuries to other organs (AIS>3) were excluded. All data were analyzed with SPSS version 26.0, IBM®

## RESULTS

- 403,263 patients with femur fractures and 7,575 patients with combined upper-lower extremities fractures; combined fractures had a higher ISS compared to femur fractures alone ( $10.31 \pm 3.1$  vs  $9.53 \pm 1.8$ ,  $p < 0.001$ ).
- The overall incidence of femur fractures and combined fractures were higher with increasing age.
- Incidence of combined upper-lower extremities fractures was also higher than femur fractures alone except in the age group of 1 – 17 years old.
- Females were shown to have a higher incidence of fractures compared to males in both groups ( $p < 0.001$ ).
- While adjusting for gender and statistically significant comorbidities, patients had higher odds of combined upper-lower extremities fractures with increasing age compared to femur fractures alone.

Table 1. Descriptive and univariate analysis of femur and combined upper-lower extremities (humerus-femur) fractures.

Variables	Femur fractures, n (%)	Upper-lower extremities fractures, n (%)	p value
<b>Age</b>			<b>&lt; 0.001</b>
1 – 17	11,893 (2.95%)	56 (0.5%)	
18 – 64	47,786 (11.85%)	1,119 (14.77%)	
65 – 74	58,358 (14.47%)	1,622 (21.41%)	
75 – 89	132,478 (32.85%)	3,432 (45.31%)	
<b>Gender</b>			<b>&lt; 0.001</b>
Male	103,920 (25.77%)	1,993 (26.31%)	
Female	198,913 (49.33%)	5,580 (73.66%)	

## CONCLUSIONS

Advanced age increases the risk of traumatic combined upper-lower extremities fractures at ground-level falls. It is essential to focus on improving fall prevention strategies to reduce the dependence rate in the elderly by emphasizing osteoporosis management and balance-mobility training or even walking habits.

Table 2. Adjusted odd ratio for combined upper-lower extremities (humerus-femur) fractures.

Age group	Odds Ratio (95% CI)	p value
<b>1 – 17</b>	Ref	
<b>18 – 64</b>	1.05 (1.04 – 1.07)	< 0.001
<b>65 – 74</b>	1.72 (1.60 – 1.85)	< 0.001
<b>75 – 89</b>	1.90 (1.84 – 2.01)	< 0.001

## REFERENCES

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