Epidemiology, Associated Injuries, and Surgical Intervention of 255,081 Clavicle Fractures in the United States from 2015-2024

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INTRODUCTION: Clavicle fractures are a relatively common injury, accounting for up to 10% of all fractures, and are often associated with other injuries, especially those of the thorax. While they have traditionally been treated conservatively, rates of surgical intervention have been reportedly increasing. Previous studies have focused on limited populations or countries outside of the United States (US); there is a lack of current epidemiological reporting of clavicle fractures that is representative of the general US population. The purpose of this study was to use a novel, large database to investigate epidemiological trends and the demographic distribution of clavicle fractures in the US from 2015 through 2024. Additionally, this study aimed to report on rates of injuries associated with clavicle fractures as well as rates and trends of surgical intervention for clavicle fractures.

METHODS: The TriNetX US Collaborative Network database, which includes data from over 135 million US patients, was used to identify patients who experienced a clavicle fracture in the US from 2015 to 2024. The primary outcome measured was incidence proportion (IP), which was stratified by both age and sex. Additionally, rates of injuries associated with clavicle fractures and rates of surgical treatment, which was measured by rates of open reduction and internal fixation (ORIF), were assessed.

RESULTS SECTION: A total of 255,081 patients were identified as having a clavicle fracture in the US TriNetX database from 2015 through 2024. The average yearly IP was 52.11 cases per 100,000 patients, and, from 2015 to 2024, the IP increased by 68.2%. Males made up 64% of the cohort and had a larger IP than females every year. The mean age of the cohort was 35 ± 27 years and, when stratified by age, the IP followed a bimodal distribution, with the highest values in those under 19 and over 80 years of age. Of the associated injuries assessed, rib fractures (14%) were the most common, followed by intra-thoracic organ injury (8.7%), TBI (8.2%), and scapula fractures (5.0%). Overall, 7.5% of the cohort was treated with ORIF, with 21,065 total ORIFs performed. The percentage of clavicle fractures that were treated with ORIF increased from 2015 (6.40%) to 2021 (8.73%) and then decreased slightly through 2024 (8.56%). When ORIF was stratified by age, the highest percentage of clavicle fractures treated by ORIFs were in the 20-24 (17.70%) and 25-29 (17.59%) age groups, while the lowest percentage were in the 0-4 (0.06%), 5-9 (0.47%) and 85+ (0.91%) age groups.

DISCUSSION: From 2015 to 2024, clavicle fractures in the US appear to be increasing. They occur more in males and demonstrate a bimodal age distribution, occurring most in the oldest and youngest patients. They are associated with many other injuries, especially rib fractures. Overall, 7.5% of clavicle fractures in this study were treated surgically. Rates of surgical intervention for clavicle fractures have increased, and they are highest in young adults and lowest in pediatric and elderly patients.

SIGNIFICANCE/CLINICAL RELEVANCE: (1-2 sentences): This study uses a large database to report current, nationally representative data and trends of clavicle fractures, which can be used to identify at-risk populations and commonly associated injuries to screen for with clavicle fracture presentations. Additionally, this study reports on the changes in orthopaedic care for clavicle fractures and how it varies by age.
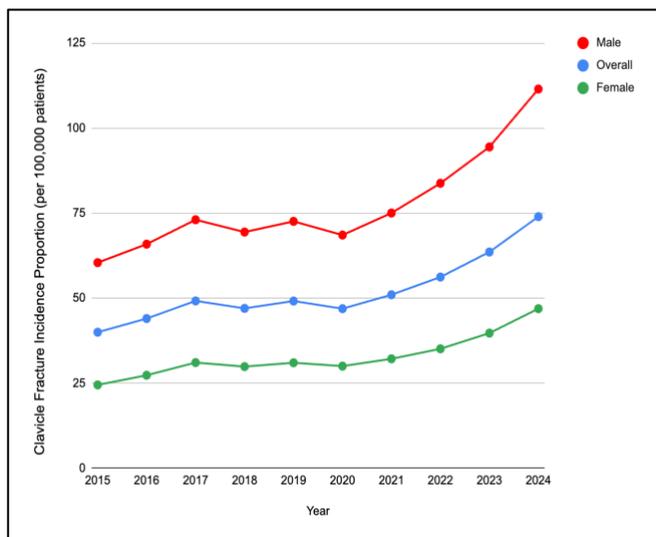

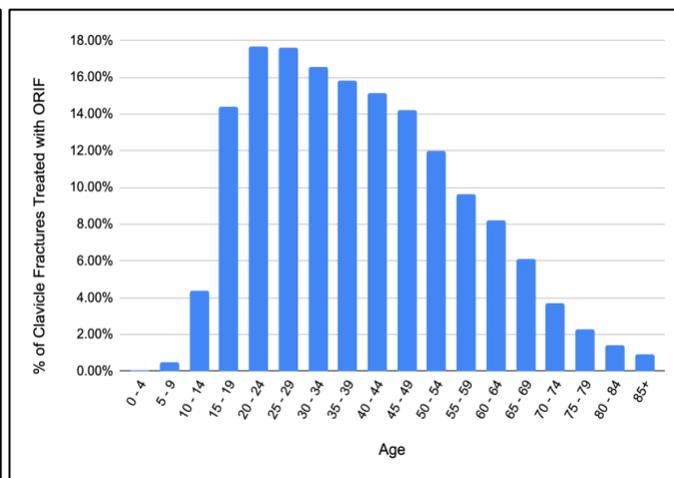**Figure 1:** Clavicle Fracture IP from 2015 to 2024, Overall and by Sex

Figure 2: Percentage of Clavicle Fractures Treated by ORIF by Age