



Sports-Related Upper Extremity Injuries in Cheerleaders



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INTRODUCTION

Cheerleading has evolved into a highly athletic, acrobatic sport incorporating stunts, pyramids, and tumbling. These activities place significant load on the upper extremities, particularly in bases and spotters. Upper extremity injuries account for about 21–36% of all cheerleading injuries. Risk factors include increasing stunt complexity, inadequate coaching certification, limited access to athletic trainers, and skeletal immaturity in adolescent athletes.



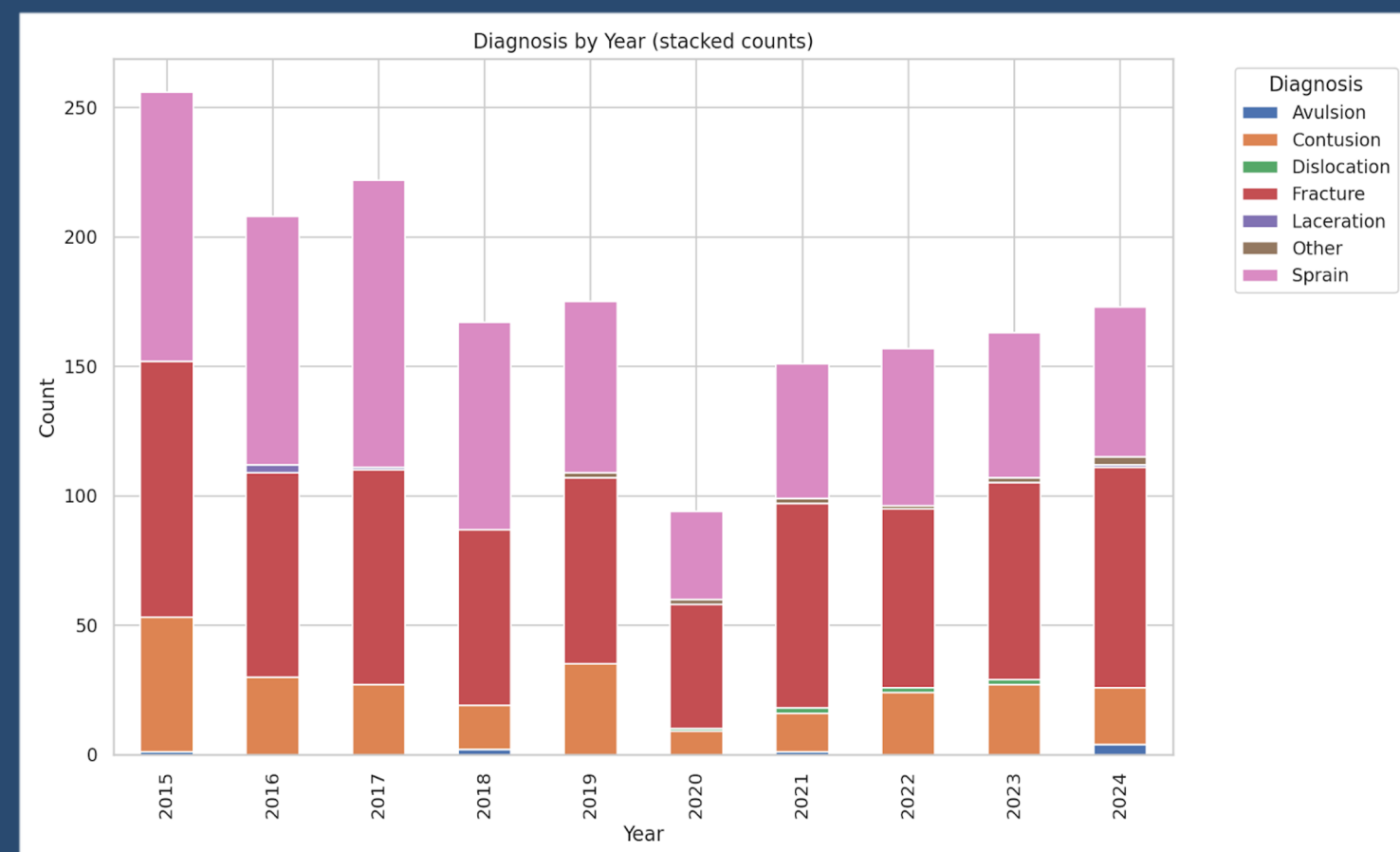
METHODS

- **Study Design:** Retrospective epidemiologic analysis
- **Data Source:** National Electronic Injury Surveillance System (NEISS)
- **Study Period:** 2015–2024
- **Sample Size:** 1,766 upper extremity injuries
- **Inclusion Criteria:** Cheerleading-related injuries, Upper extremity body regions, Emergency department presentations
- **Variables:**
 - Demographics: age, sex, and race
 - Injury characteristics: body part, diagnosis, additional injury
- **Statistical Analysis:**
 - Descriptive statistics (means, percentages)
 - Chi-square tests:
 - Year × Diagnosis
 - Year × Body Part
 - Body part × diagnosis ($p < 0.05$)

KEY FINDINGS

Upper extremity injuries in cheerleaders predominantly affect adolescent females (mean age 12.8), with the wrist, shoulder, and elbow most commonly injured. Sprains and fractures account for the majority of injuries, with a strong association between body part and diagnosis ($p < 0.001$). Injury patterns reflect the biomechanical demands of stunting, tumbling, and repetitive load-bearing in adolescent athletes.

RESULTS

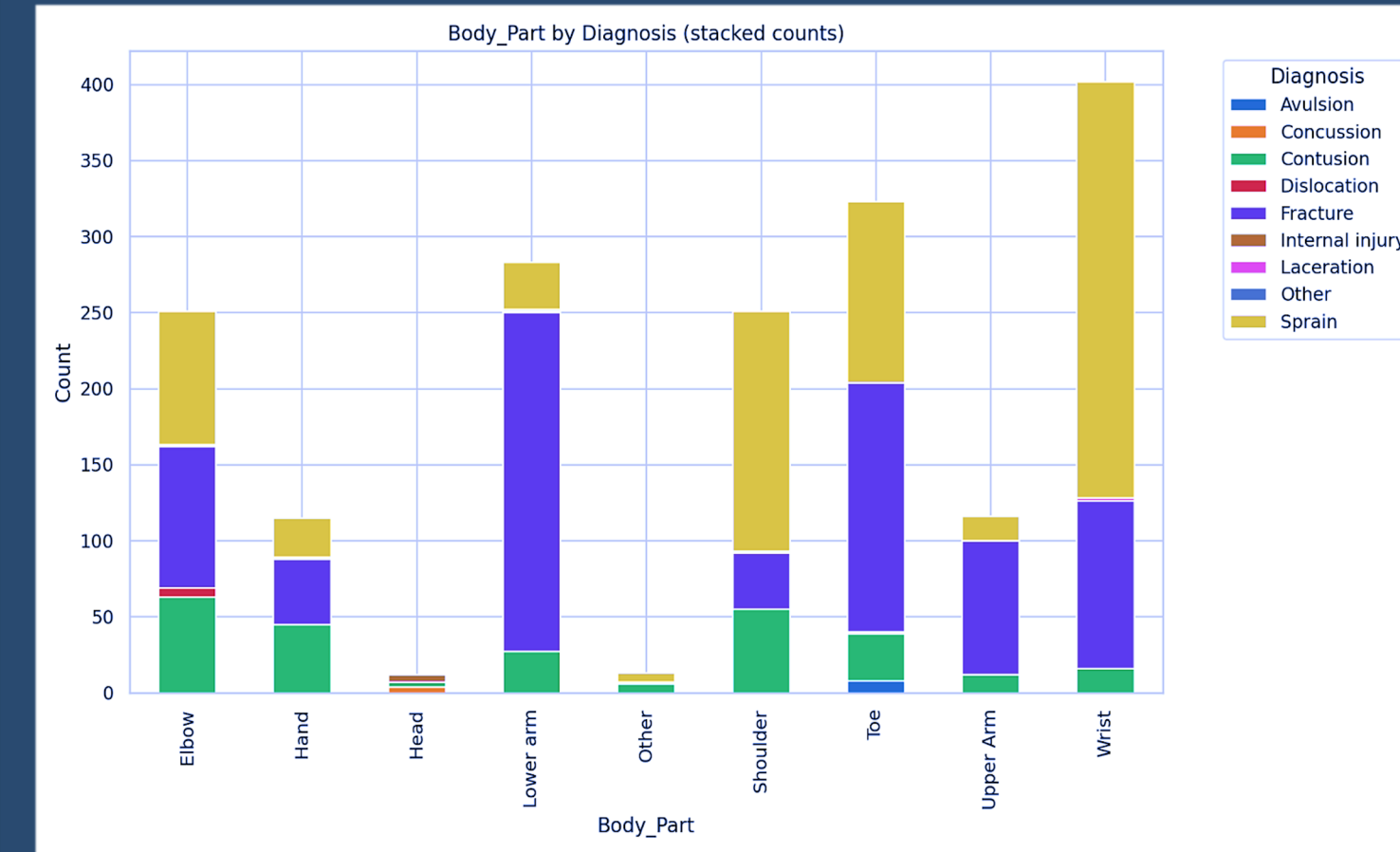


DEMOGRAPHICS

- Mean age: 12.8 ± 3.4 years old
 - 95% female athletes
- No significant variation in sex distribution over time ($p = 0.364$)

INJURY PATTERNS

- **Most common body regions:**
 - Wrist: 20–22%
 - Shoulder: 15–17%
 - Elbow: 13–14%
 - Lower arm: 15%
- **Most common diagnoses:**
 - Sprains: 40–50%
 - Fractures: 38–46%



TEMPORAL TREND

- Peak injuries: 2015 ($n=256$), 2017 ($n=222$)
- Significant decline in 2020 (likely COVID-related)
- Gradual increase post-2020

STATISTICAL ASSOCIATIONS

- Significant variation in diagnosis by year ($p < 0.001$)
- Strong association:
 - Body part × diagnosis ($p < 0.001$)
- Key Patterns:
 - Shoulder: Sprains
 - Elbow: Fractures + Contusions
 - Wrist: Fractures
 - Wrist: Fractures

CONCLUSION

Upper extremity injuries in cheerleading predominantly affect adolescent females and most commonly involve the wrist and shoulder. These injuries reflect the biomechanical demands of stunting and tumbling.

Targeted prevention strategies, improved training practices, and enhanced injury surveillance are essential to reduce injury burden as cheerleading continues to evolve.

DISCUSSION

- Injury patterns reflect sport-specific biomechanics:
 - Bases → repetitive wrist loading
 - Flyers → shoulder instability from falls
- Adolescents are at higher risk due to:
 - Growth-related vulnerability
 - Repetitive stress during development
 - Increasing stunt difficulty and year-round participation likely contribute to injury burden
- Findings align with prior literature reporting upper extremity injury prevalence up to 36%

RECOMENDATIONS

- Certified coaching and supervision
- Progressive stunt training and proper spotting
- Monitoring training load in adolescent athletes
- Use of compliant training surfaces
- Improved injury surveillance systems
- Increased access to athletic trainers

