The Burden of Wrist Joint Dislocations: A Nationwide 20-Year Analysis and Review of Incidence and Injury Mechanism

Timothy Reiad[1], Peter Van Dinh, Praneeth Tummala, Ashley Rosenberg, Carolyn A Marquis, Joseph Andrew Gil
[1]Orthopedics

INTRODUCTION:

Wrist dislocations, though rare (0.2–2.7% of wrist injuries), pose significant diagnostic and therapeutic challenges. Limited large-scale epidemiological data exist on demographic patterns, athletic vs. non-athletic mechanisms, and longitudinal trends. This study characterizes wrist dislocation epidemiology using nationally representative emergency department data from 2004 to 2023.

METHODS:

A retrospective analysis was performed using the National Electronic Injury Surveillance System (NEISS) database to estimate national trends in wrist dislocation incidence from 2004 to 2023. Cases were identified using specific diagnoses and body part codes. Demographic characteristics, injury mechanisms, and annual incidence rates were examined. Trends were assessed using linear regression, and differences between groups were evaluated with Odds Ratios and Injury Proportion Ratios.

RESULTS:

Among 21,237 estimated cases (3.42/1,000,000 population), males accounted for 64.2% of dislocations, with a 4.38/1,000,000 incidence vs. 2.40/1,000,000 in females ($p<0.001$). Peak incidence occurred in males aged 15–24 years (6.36/1,000,000; IPR 5.27 vs. females). Females demonstrated bimodal vulnerability: under 5 years (IPR 1.87) and over 65 years (IPR 1.52). Athletic dislocations comprised 19.69% of cases, predominantly in males participating in football (16.0%) and snowboarding (12.8%). Non-athletic dislocations (52.04%) disproportionately affected females (OR 3.02) and individuals ≥50 years (OR 4.68), with home environments posing elevated risks (OR 2.22 for females).

DISCUSSION AND CONCLUSION:

This national analysis establishes foundational epidemiological insights into wrist dislocations, revealing stable incidence despite rising sports participation. Key demographic disparities were identified and highlight the need for tailored interventions, including sport-specific safeguards in athletes, home safety protocols for children, and fall prevention strategies for older adults. These findings emphasize potential areas for population-specific prevention to reduce long-term complications and healthcare burdens.

Table 1: Wrist Dislocation causes by Sex

Overall		Male		Female	
Product names	Percent	Product names	Percent	Product names	Percent
Floors	6.75	American Football	8.87	Stairs or Steps	13.03
Stairs or Steps	5.88	Basketball	7.49	Floors	11.49
American Football	5.70	Ceilings and walls	6.35	Beds or bedframes	6.33
Basketball	5.14	Bicycles	5.31	Sofas, couches	4.07
Ceilings and walls	4.79	Ladders	5.03	Roller skating	3.99
Bicycles	4.50	Skateboarding	4.87	Bicycles	3.05
Skateboarding	3.79	Floors	4.12	Other ball sports	2.02
Ladders	3.78	Snow boarding	4.03	Ceilings and walls	1.98

Table 3: Percents of Wrist Dislocations in Athletic and Non-Athletic Activities

	Overall (n = 6,383)		Male (n = 5,423)		Female (n = 960)	
	Sport	Percent	Sport	Percent	Sport	Percent
Athletic	American Football	15.97	American Football	18.51	Roller Skating	28.11
	Snowboarding	12.78	Snowboarding	15.41	Rugby	12.89
	Basketball	11.29	Basketball	11.73	Exercise	11.700
	Roller Skating	6.968	Baseball	7.893	Basketball	9.302
	Baseball	6.263	Soccer	5.327	Soccer	8.695
	Soccer	5.461	Skateboarding	4.309	Volleyball	5.855
	Skateboarding	3.551	Mountain biking	4.281	Ice skating	3.7919
	Mountain biking	3.32	Ice hockey	2.753	Golf	3.6366
	Rugby	2.341	Track and field	2.306	Other ball sports	3.392
	Ice hockey	2.232	Squash	2.088	Sports and recreation, not classified	2.237
	Overall (n = 17,855)		**Male (n = 10,217)**		**Female (n = 6,898)**	
	Product	**Percent**	**Product**	**Percent**	**Product**	**Percent**
Non-Athletic	Floors	8.41	Ceilings and walls	8.474	Stairs or Steps	14.47
	Stairs or Steps	7.323	Ladders	6.769	Floors	12.76
	Ceilings and walls	6.068	Floors	5.497	Beds or bedframes	7.031
	Ladders	4.712	Two-wheeled, powered, off-road vehicles	4.36	Sofas, couches	4.027
	Beds or bedframes	4.684	All-terrain vehicles	3.57	Ceilings and walls	2.399
	Two-wheeled, powered, off-road vehicles	2.732	Beds or bedframes	3.115	Doors	2.148
	Sofas, couches	2.573	Stairs or Steps	2.027	Chairs	2.093
	All-terrain vehicles	2.138	Hammers	1.824	Bathtubs	2.022
	Doors	1.958	Doors	1.861	Porches	1.656
	Chairs	1.691	Chairs	1.806	Ladders	1.729

Table 2: Injury statistics by sport, including total and sex-specific estimated counts.

Sport	Estimated Total (N)	% of Total Injuries	Male Injuries (N)	Female Injuries (N)
Football	668	15.97%	668	0
Snowboarding	535	12.78%	535	0
Basketball	472	11.29%	402	70
Roller skating	291	6.97%	67	224
Baseball	262	6.26%	262	0
Soccer	228	5.46%	182	46
Skateboarding	149	3.55%	149	0
Mountain Biking	147	3.52%	147	0
Rugby	98	2.34%	0	98
Ice hockey	93	2.21%	93	0

Table 4: Injury statistics by Location, including total and sex-specific estimated counts.

Location	Estimated Total (N)	% of Total Injuries	Male Injuries (N)	Female Injuries (N)
Home	6,942	32.69	3,355	6,942
Place of recreation or sports	4,349	20.48	849	4,349
Other public property	1,647	7.76	758	1,647
Street or highway	970	4.57	116	970
School	884	4.16	172	884
Unknown	6,446	30.35	2,348	6,446