



# Musical-Instrument-Associated Injuries to the Neck and Back that Presented to United States Emergency Departments from 1999-2019: An Epidemiological Study

James B. Meiling, D.O., Barbara U. Kozminski, M.D., David R. Schulze, D.O., M.S., Carter M. Newey, D.O.  
Mayo Clinic, Rochester, MN; University of Washington, Seattle, WA; VA Greater Los Angeles Healthcare System, Los Angeles, CA; The Ohio State University Wexner Medical Center, Columbus, OH

## OBJECTIVES

Musicians are not free from occupational hazards that lead to neuromusculoskeletal injury. Whether caused by posture, positioning, or simply playing, musicians may develop neck and back injuries. This epidemiological study examines the incidence and characteristics of musical-instrument-associated injuries to the neck and back, which presented to United States emergency departments.

## DESIGN

The National Electronic Injury Surveillance System (NEISS) database was inquired for all musical-instrument-related emergency room visits from 1999-2019, returning 4,959 cases. The dataset was then selectively reduced to only include cases regarding neck or back injuries which occurred while playing a musical instrument. All other cases which pertained to injuries of different areas or occurred through different mechanisms, including tripping over or lifting musical instruments, were omitted.



Which instruments are most associated with... injury?	CERVICAL (%)	THORACIC (%)	TRAPEZIUS (%)	LUMBAR (%)	UNSPECIFIED BACK (%)	TOTAL (%)
BAGPIPES	0	4.55	0	0	0	0.79
BARITONE	0	4.55	0	0	0	0.79
BARITONE SAXOPHONE	2.17	0	0	0	0	0.79
BELLS	0	4.55	0	0	0	0.79
CELLO	0	4.55	0	1.82	0	1.59
CLARINET	4.35	0	0	1.82	0	2.38
CYMBAL	2.17	4.55	0	0	0	1.59
DRUMS	17.39	22.72	0	36.36	0	26.19
ENGLISH HORN	0	0	0	1.82	0	0.79
FLUTE	2.17	4.55	50	1.82	0	3.17
FRENCH HORN	2.17	0	0	0	0	0.79
GUITAR	17.39	18.18	50	25.45	100	22.22
HORN	2.17	0	0	1.82	0	1.59
NOT-SPECIFIED INSTRUMENT	13.04	9.09	0	7.27	0	9.52
ORGAN	2.17	0	0	0	0	0.79
PIANO	4.35	0	0	7.27	0	4.76
SAXOPHONE	2.17	0	0	0	0	0.79
STAND-UP BASS	2.17	0	0	0	0	0.79
TENOR SAXOPHONE	2.17	0	0	0	0	0.79
TRUMPET	10.87	4.55	0	1.82	0	5.56
TUBA	2.17	18.18	0	12.73	0	9.52
VIOLIN	10.87	0	0	0	0	3.97
TOTAL	99.96	100.02	100	100	100	99.96

TOTAL	46	22	2	55	1	126
	36.51%	17.46%	1.59%	43.65%	0.80%	100.01%

KEY	1st	2nd	3rd
-----	-----	-----	-----

### Biodemographic of Patients

Median Age:	24	Children (<18):	51 (40.48%)	Male:	82 (65.08%)
Mean Age (+/- SD):	31.21 (+/- 19.99)	Adults (>=18):	75 (59.52%)	Female:	44 (34.92%)
Age Range:	7 - 89	Geriatrics (>=65):	9 (7.14%)		

## Key Findings

- Most commonly injured regions were **lumbar** (43.65%) and **cervical** (36.51%).
- Most common diagnosis were **muscle strains** (61.91%).
- A majority (66.67%) of **geriatric injuries** were **cervical**.
- Of the 22 listed musical instruments, the most likely to be associated with lumbar and cervical injuries were the **drums** (36.36% and 17.39%, respectively) and **guitar** (25.45% and 17.39%, respectively).
- Most (26.32%) of the **pediatric cervical injuries** were attributed to playing the **trumpet**.

## CONCLUSIONS

This study helps to illustrate the physical toll that musical instruments can cause on the human body, particularly the neck and back by the drums and guitar. This knowledge may help physicians develop injury preventative measures. While the dataset did not include the musician's positioning while the injury occurred, some instruments are played either sitting or standing. Future studies may evaluate whether certain positioning changes the injury rates of these instruments.

