



Epidemiology of Thoracolumbar Fractures in the U.S from 2001-2019: Patient-Related Trends, Mechanisms of Injury, and Dispositions

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INTRODUCTION

- Fractures are a common reason for admission to the emergency department (ED) nationally every year.
- One of critical forms of fractures seen is the thoracolumbar fracture. Thoracolumbar fractures are most commonly due to high-energy impact activity
- However epidemiological data on thoracolumbar fractures presented in the ED are limited. Such data, especially over a broad span of time after 2000, can be useful in informing management techniques and potentially, their cost-effectiveness, as well as injury prevention opportunities.

PURPOSE

- In this study, specifically, we evaluate patient demographics, mechanism of injury, and disposition overtime to mark trends in thoracolumbar fractures presented to the emergency department over nearly two decades from 2001 to 2019.

METHODS

- The **National Electronic Injury Surveillance System (NEISS)** was queried to identify all patients that:
 - Were aged 2 years and above
 - Had thoracolumbar spinal injury as the primary diagnosis
 - That presented to US hospital emergency departments between January 1, 2001 and December 31, 2019
- Available patient demographics including age, sex, and race, disposition, and mechanism of injury related to each thoracolumbar fracture were collected as well. National Census data from 2001 to 2019 was taken from the U.S. Census Bureau.
- Data (descriptive and crosstabulation analysis) was analyzed using SPSS and incidence rates were calculated using Microsoft Excel

RESULTS

- A total of 5,537 patients that presented with a thoracolumbar fracture at the ED between 2001 and 2019 were identified.
- There is an estimated total of 204,538 thoracolumbar fractures that occurred during this time frame, with an incidence rate of 32.3/1,000,000 persons-year (Fig. 1). The mean patient age is **62.5± 24.3**, with a minimum age of 2 and maximum age of 103.
- The **majority of patients with thoracolumbar fractures were 80 years old and above (32.7%)**. The rest consisted of 16.2% within 70-79, 11.7% within 60-69, 10.7% within 50-59, 7.7% within 40-49, followed closely by 10-19 year-olds with 7.3%, then 3.9% 30-39, 6.1% in 20-29, and finally 0.5% within 2-9 age range (Fig. 3) Furthermore, **44.2% of thoracolumbar fractures occurred in male patients while 55.8% occurred in female patients** (Fig. 2).
- Of the data available with race/ethnicity (68.4%), 86.1% of patients were white, 5.4% were black, 6.1% were Hispanic, 1.7% were Asian, 0.6% were American Indian/Alaskan Native and lastly, 0.1% were Native American/Other Pacific Islander (Fig. 4).
- By mechanism of injury (primary diagnosis), the majority thoracolumbar spinal fractures resulted from a **fall injury (71.3%)**, **9.8% of cases from sports and exercise**, 1.7% from jump injuries, 0.1% from firearms, and the last **17.2% of cases from other** mechanisms of injury. (Fig. 5)
- Almost half of the patients were admitted for treatment (44.8%) or treated/not treated and released (45.9%)**. The rest consisted of 6.9% of cases that were treated and transferred, 2.0% were held or admitted for observation, 0.4% of patients left against medical advice or without being seen by a provider, and only 0.1% of cases were fatal on arrival or after admission.

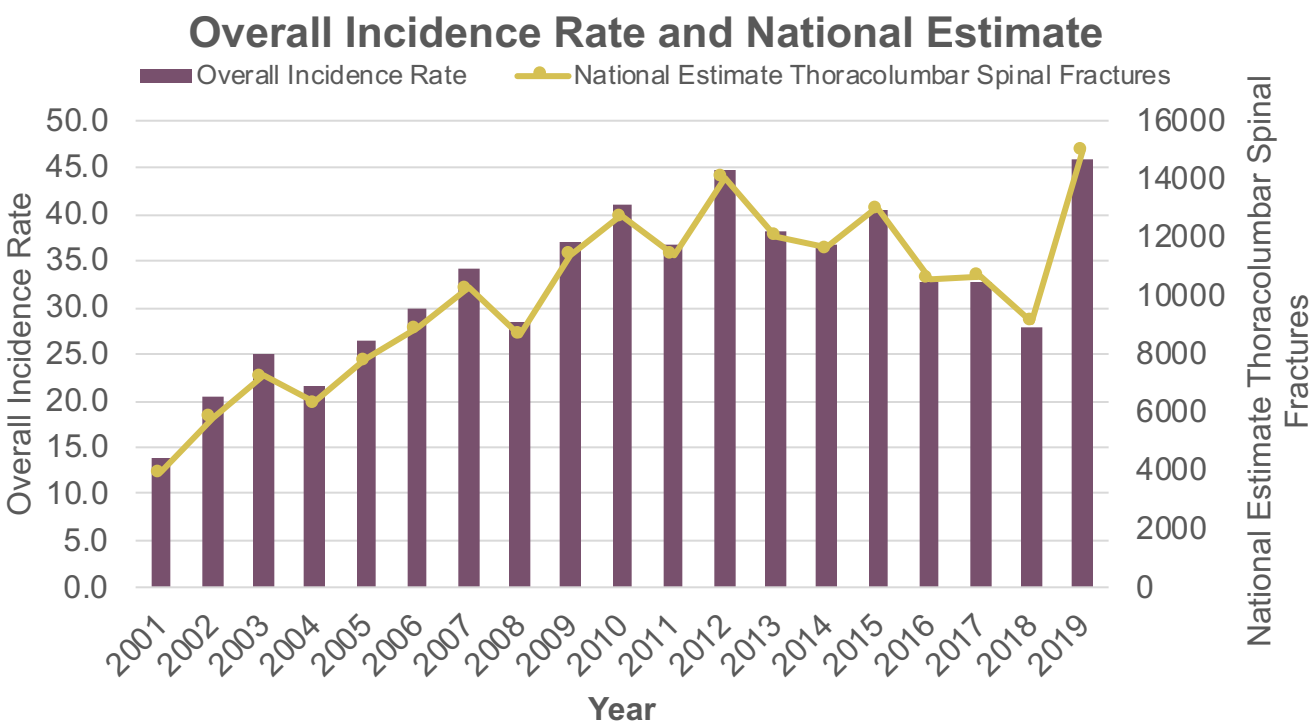


Figure 1.

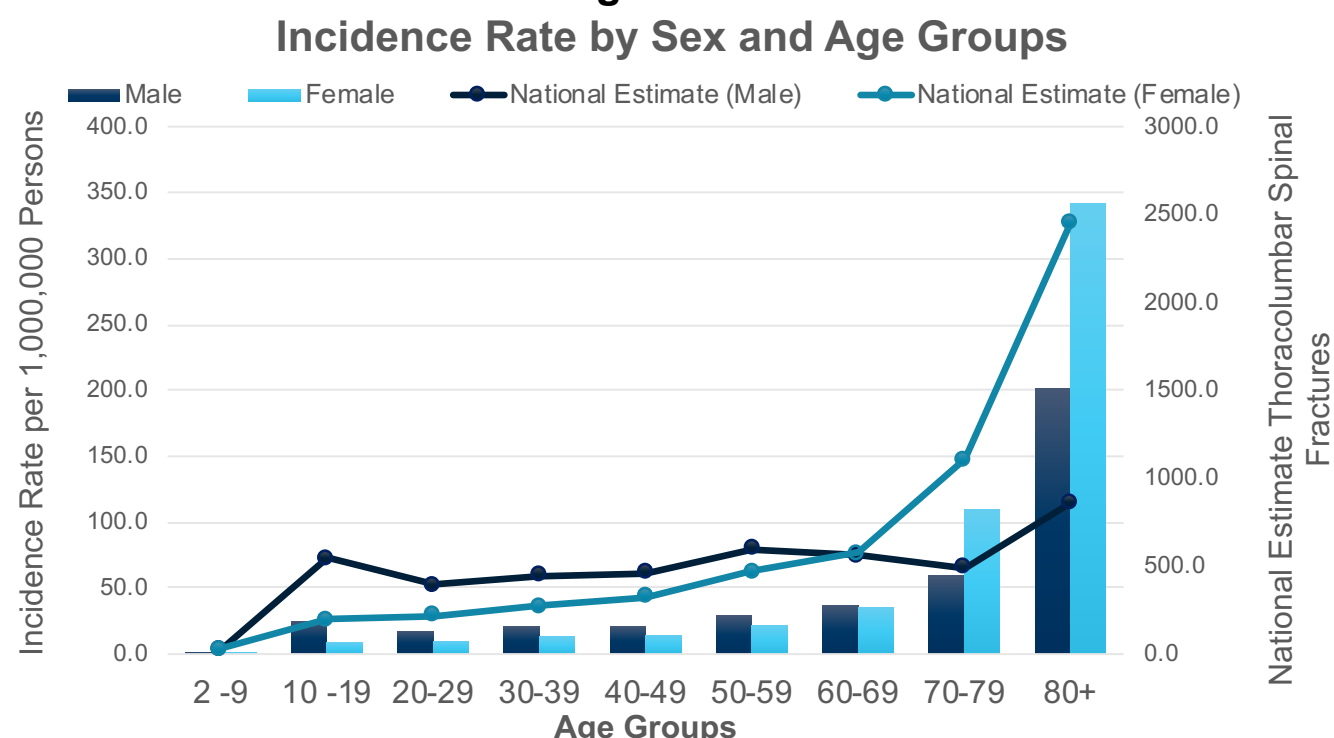


Figure 3.

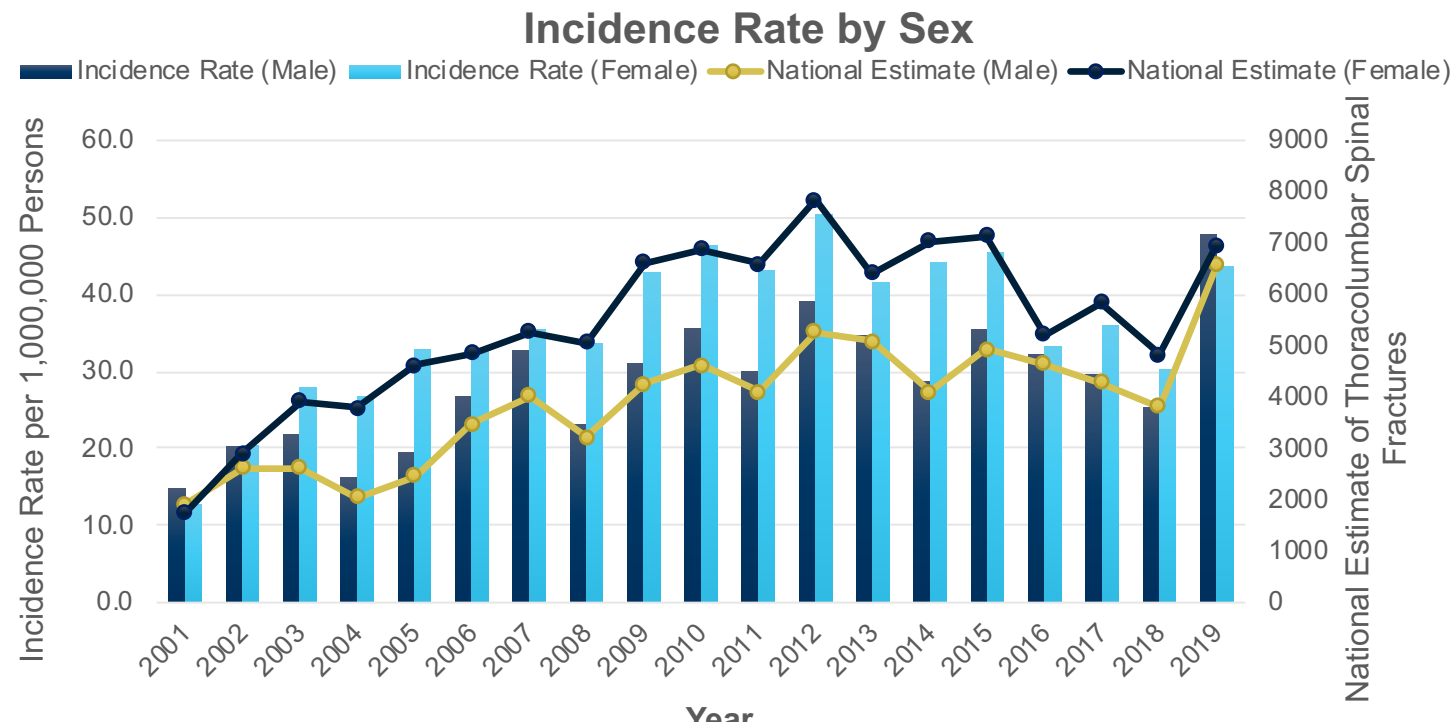


Figure 2.

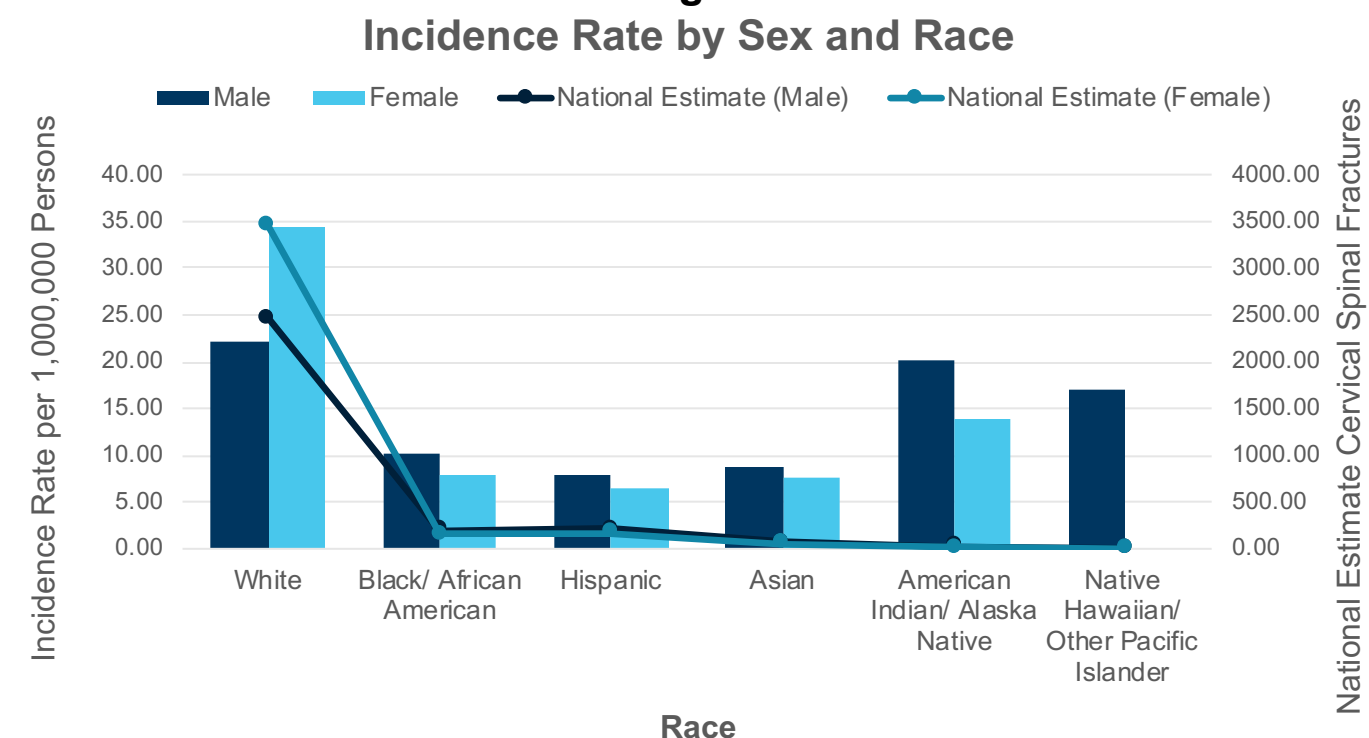


Figure 4.

RESULTS

- Sports injuries were most common in the 2-9 age range (37.63%) while falls were most common in patients 80 years-old and above (39.01%). (Fig. 5)
- Firearms and nonlethal gun injuries were most common in young adults (20-29, 48.5%) and jumps were most common in teenagers (10-19, 29.84%) and patients 30-39 years-old (22.76%). (Fig. 5)

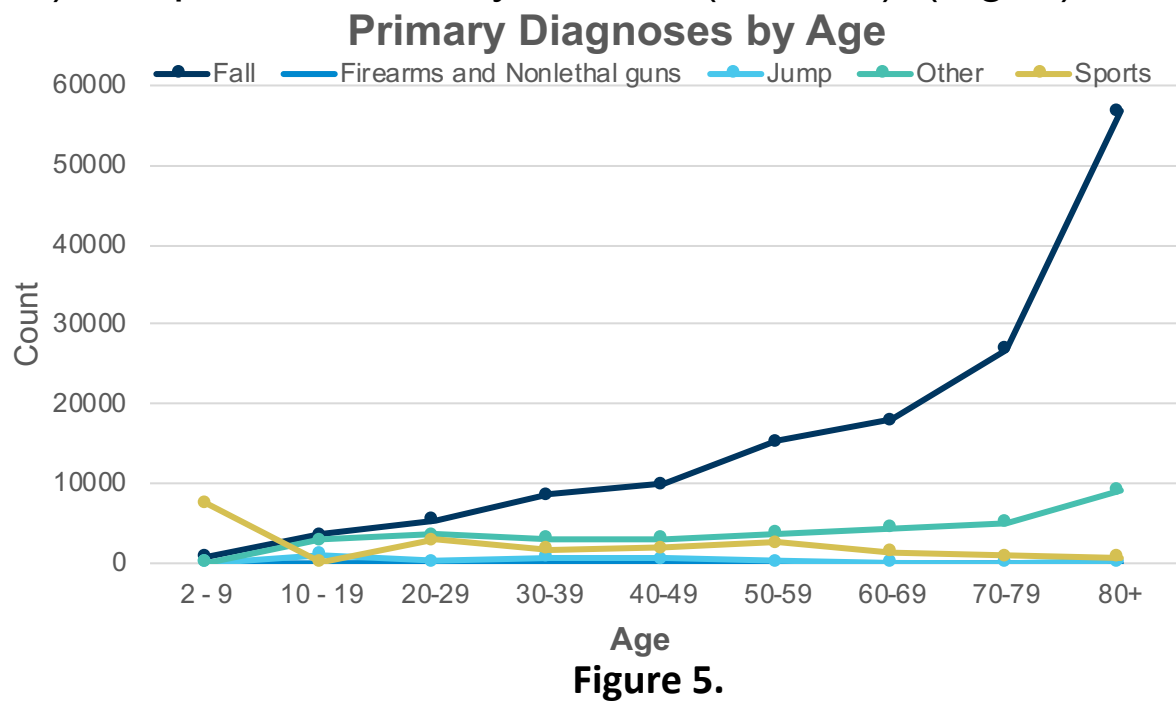


Figure 5.

DISCUSSION & FUTURE STEPS

- Most thoracolumbar fractures seen at emergency departments were caused by falls and frequently occurred in older patients. This is a reasonable conclusion given that older patients often suffer from degenerative bone disease such as osteoporosis (especially in women).
- One meta-analysis by Gnanenthiran et al. suggested that operative management of thoracolumbar burst fractures vs non-operative *did not have significant improvement of pain and functionality 4-years post-treatment*. Given that **surgery is associated with higher complications and costs**, it would be worthwhile to further study **disposition and operative vs non-operative treatment of patients** who are admitted vs treated/non-treated and released.
- Since there is a persistent upward trend of thoracolumbar fractures over the past two decades, **it may also be beneficial to screen patients for preventative factors that contribute to patients' mechanism of injury** (e.g. home environment and falls).

REFERENCES & ACKNOWLEDGEMENTS

Gnanenthiran SR, Adie S, Harris IA. Nonoperative versus operative treatment for thoracolumbar burst fractures without neurologic deficit: a meta-analysis. Clin Orthop Relat Res. 2012 Feb;470(2):567-77. doi: 10.1007/s11999-011-2157-7.