# Rib Fracture Injury Patterns and Mechanism of Injury

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## Objective

Evaluation of fracture patterns may have significant implications in care pathways and help in the development of treatment strategies. Our objective is to evaluate the mechanism of injury in rib fracture patients and to investigate if there is a distinct rib fracture pattern of injury based on mechanism of injury.

## Introduction

- Research pertaining to rib fracture management has grown exponentially over the last several years.

- There is very little research examining the mechanism of injury and rib fracture injury patterns.

- Fracture patterns based on mechanism, age, gender, and other possible correlations may help allocate resources and improve prevention strategies.

- We will use data contained within the Chest Injury International Database (CIID) to analyze fracture patterns and correlations between multiple data points.

- Data will be analyzed, and heat map technology will be used to cluster injuries.

- A heat map is a type of data visualization that displays aggregated information using color to represent intensity. It is also our goal to section the chest wall to match injury mechanism with distribution patterns of injuries.

## Methods


Figure 3: Heat Map Explanations
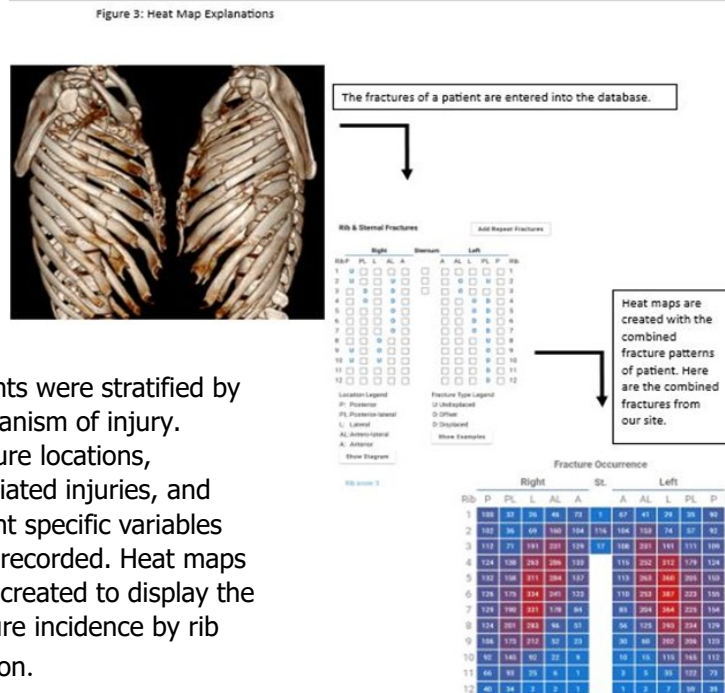
Patients were stratified by mechanism of injury. Fracture locations, associated injuries, and patient specific variables were recorded. Heat maps were created to display the fracture incidence by rib location.

The study cohort consisted of 1,121 patients with a median RIBSCORE of 2 (0-3) and 9,353 fractures. The average age was 57 +/- 20 years, and 64% of patients were male. By mechanism of injury (MOI), the number of patients and fractures were: falls (n=474, fx=3,360), MVC (n=353, fx=3,268), MCC (n=165, fx=1,505), auto-ped (n=70, fx=713), bicycle (n=59, fx=507). The most commonly injured rib was #6, and the most common fracture location was lateral. Statistically significant differences in location and patterns of fracture were identified comparing each MOI, except for MCC vs. bicycle.

## Results


Figure 4: Mechanism of Injury and Rib Fractured
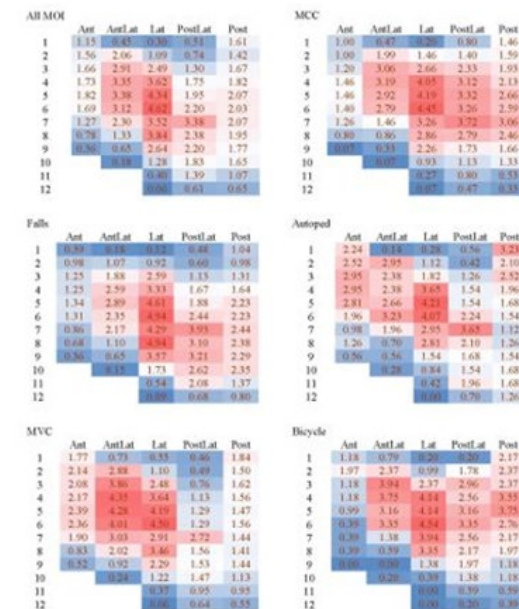
**The major finding of this investigation is that there is a significant association between mechanism of injury (MOI) and rib fracture pattern.** This is demonstrated by the statistically significant difference among the different MOI and rib fracture patterns in the associated locations.

**To our knowledge this is the first such investigation that evaluates MOI and fracture patterns in living patients**. Lateral rib fractures are the most common location for fractured ribs. MVC trend toward anterior, while falls trend toward posterior rib fractures.