

# Civilian Gunshot Injuries to the Spine: An Update on Surgical Indications, Long-Term Outcomes, and Complications

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## Introduction

Civilian gunshot wounds (GSWs) to the spine are commonly treated at urban trauma centers. No major series of these injuries in the civilian population has been described in more than 15 years. While most believe that gunshot wounds to the spine rarely, if ever, need operative intervention, there is little evidence in the literature to support or refute this belief.

We present the second-largest series of civilian spine GSWs in the literature, and reviewed the indications for operative intervention.

## Methods

After receiving IRB approval, patients were retrospectively identified using an ICD9 code search of hospital records from 2003-11 at a single urban Level 1 trauma center. We identified 159 consecutive patients with both spine fractures and injury by firearm. Medical charts and radiographs were then reviewed for these 159 patients and analyzed for details of bony injury to the spine, neurological deficit, corresponding injury, possible operative intervention, and outcome.

## Results

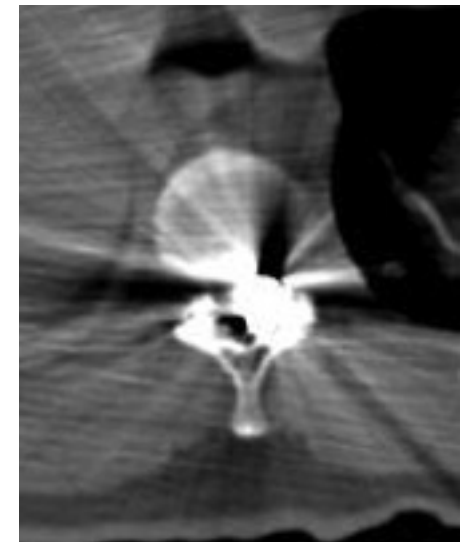
There were 147 male and 12 female patients, with mean age 28 years (range 16-65). Mean follow-up was 13 months, with 35 having more than two year follow-up. Mean hospital length of stay was 13 days; 5 patients died during initial hospitalization. The cervical spine was involved in 46 cases, the thoracic spine in 53 cases, the lumbar spine in 50 cases, and the sacrum in 10 cases. The vertebral body and transverse processes were most-commonly fractured (30% and 31% of cases).

Ten patients were treated operatively; indications were epidural abscess (1 patient presented at 21 days and the other at 50 days post-GSW), persistent CSF leak (1 pt), instability (6 pts), and decompression of an incomplete spinal injury (4 pts). Seventy-nine patients were initially ASIA grade E. Twenty patients with initial deficit experienced improvement of at least one ASIA grade (25% of patients with initial deficits); one of these was operatively treated. Four improved patients were initially ASIA A, 4 were ASIA B, 8 were ASIA C, and 4 were ASIA D.

## Conclusions

Of 159 gunshot wounds to the spine treated at our institution, 149 were treated non-operatively and 10 merited surgical intervention. Neurologic improvement of at least one ASIA grade was seen in 25% of patients with cord injury. In general, non-operative treatment is indicated, but surgical intervention should be considered in patients with infection, incomplete lesions, deteriorating neurologic status, or for those rare cases of instability.

## Thoracic GSW



Large caliber bullet within the spinal canal in the thoracic spine

## Learning Objectives

By the conclusion of this session, participants should be able to: 1) describe the common fractures seen with gunshots to the spine; 2) describe the indications for surgical intervention with gunshots to the spine; 3) identify treatment algorithms for gunshots to the spine.