

# Handgun Injuries in 2012: What the Orthopaedic Surgeon Needs to Know

## Introduction

Gunshot injuries are typically categorized as low or high energy, chiefly based on missile velocity and mass. Low energy injuries are generally treated with simple wound care, with or without antibiotics, regardless of the presence of fracture. In contrast, high energy injuries are treated with aggressive debridement as in high-grade open fractures. Most civilian handgun injuries in urban American trauma centers are treated as low energy injuries with simple wound care.

### **The problem:**

Some civilian handgun injuries are presumed to be low velocity injuries, yet in some instances can demonstrate either atypical wounding patterns or innocuous wounds accompanied by significant soft tissue injury and compartment syndrome. *How can some handgun injuries be treated successfully like closed fractures whereas others require emergent treatment and application of standard open fracture principles? What is causing these variabilities?*

The aim of this presentation is to address this problem by correlating principles of handgun ammunition wound ballistics with clinical cases seen at a civilian level 1 trauma center.



**Case 1:** Supposed handgun injury with massive lacerating entrance and exit wounds (top image – lateral wound; center image – medial wound).

Initial surgical management included emergent irrigation and debridement with intramedullary nailing and antibiotic spacer placement (top image shows defect after debridement; bottom image shows placement of antibiotic cement spacer). *If this patient had typical small entrance and exit wounds, formal debridement would not have even been done.*



**Case 2:** Low velocity handgun injury with single wound to the posterior leg and no fracture resulting in compartment syndrome of the leg treated with emergent four-compartment fasciotomies. No vascular injury was diagnosed, no hematoma was evacuated, and no significant soft tissue injury was noted although the projectile path was not explored. The projectile was subcutaneous and therefore retrieved anteriorly, revealing a full metal-jacketed bullet. *Compartment syndromes typically occur in the setting of a fracture, crush injury to the soft tissues, or compromised perfusion. So how did a non-expanding bullet from a handgun cause a compartment syndrome without a fracture or vascular injury?*

