# Management Of Gunshot Wounds To The Limbs: A Review

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**Citation**

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**Abstract**

Gunshot fractures are increasing in frequency in most of the European countries. It is very likely that civilian orthopaedic surgeons will be required to manage gunshot fractures of the extremities with frequencies that demands understanding of the principles of ballistic injury and familiarise with the nature of low and high energy transfer wounds to soft tissue and bone. In this article, we review the literature with regards to the management of gunshot wounds to the limbs.

## INTRODUCTION

Gunshots injuries are rising in most countries and this is particularly true in the USAwhere gunshot related injuries are the first cause of death in young African-American male. Because of the high incidence of this type of injuries, the American Hospitals are well prepared and experienced in dealing with such patients. In the United Kingdom, there has been a 30% increase in firearm associated crime in the last 7 years. Most of the district general hospital but also some teaching hospital do not have the experience in dealing with such injuries. It is very likely that civilian orthopaedic surgeons will be required to manage gunshot fractures of the extremities with frequencies that demands understanding of the principles of ballistic injury and familiarise with the nature of low and high energy transfer wounds to soft tissue and bone [1] . In this article, we review the literature with regards to the management of gunshot wounds to the limbs.

## CLASSIFICATION

Historically speaking, gunshot injuries have been classified into two types: low velocity injuries which are the one seen most commonly in civilian settings where bullets rarely exceed speeds of 1000 feet per seconds. The damage in this sort of injury is caused mainly by laceration and crushing of the tissues. The second type of injuries is high velocity, with bullet speed exceeding 1000 feet per second. These are commonly seen in military settings and the damage is caused by cavitation for medium velocity and by shock wave that compress the medium travelling ahead of the bullet (200 atm) for high velocity. More modern work has indicated that some of these theories have been somewhat misleading, and some traditional means of management have changed. It is the wound as encountered which is managed, irrespective of the theoretical velocity of the bullet [2] .

## MANAGEMENT

On arrival in the accident and emergency department, patients must be managed according to the ATLS protocol. A rapid assessment of their injuries must be made. Fluid overload and hypothermia should be prevented.

The priority in gunshot wound to the arms or legs is to recognise any vascular injury. The clinical assessment of the patient is most important [3] . If in doubt, a Doppler or an emergency room arteriography can be performed without interrupting the resuscitation or relocating the patient [4] . At this point a vascular surgeon needs to be involved in the management of the patient.

If there is no evidence of vascular damage, the next step is to determine whether there is a fracture associated to the wound. If no fractures are seen conservative wound care is advocated against wound debridement [5] . In fact it has been shown in prospective trials that wound debridement and antibiotics were often unnecessary in minor uncomplicated gunshot wounds [6] .

In case of gunshot wound associated with a fracture, they should be managed as if they were closed injuries. The entry and exit wounds can be managed with local irrigation and debridement. Tetanus prophylaxis and splinting or casting of the limb is also advised [7] . With regards to the antibiotic cover, long acting cephalosporin IM are as good as IV Antibiotics and oral ciprofloxacin for a period of 3 days as good as IV antibiotics (2% infection rate) [8] .

Femoral and tibial shaft fractures needing intra-medullary nailing should be managed with reamed nails [9] . In fact, immediate (18h) reamed IM nail has been shown to be better then delayed IM nailing + IV antibiotics (provided that there is mild to moderate soft tissue contamination and no evidence of devitalisation [10] .

If there is extensive comminution, open reduction and internal fixation with plates might not be feasible and external fixation will be necessary.

## CONCLUSION

Gunshot fractures are increasing in frequency in most of the European countries. It is very likely that civilian orthopaedic surgeons will be required to manage gunshot fractures of the extremities with frequencies that demands understanding of the principles of ballistic injury and familiarise with the nature of low and high energy transfer wounds to soft tissue and bone. When no fractures are present, the wound can be managed conservatively with a short course of oral antibiotics and close observation. Low energy fractures can be managed as if they were closed injuries, and internal fixation is a safe option. When the degree of energy transfer is high and the damage to the soft tissue extensive, the best option is external fixation of the fracture after debridement of non viable tissue.

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