



Gunshot Wounds: Principles and Treatment

Here's an in-depth look at these traumatic injuries.

BY RITCHARD ROSEN, DPM

Educational Goals:

After completion of this CME, the reader will:

- 1) Understand the differences between low and high velocity gunshot wounds.
- 2) Gain information on treatment of gunshot wounds.
- 3) Understand the Gustilo classification of compound fractures.

149

Welcome to Podiatry Management's CME Instructional program. Our journal has been approved as a sponsor of Continuing Medical Education by the Council on Podiatric Medical Education.

You may enroll: 1) on a per issue basis (at \$26.00 per topic) or 2) per year, for the special rate of \$210 (you save \$50). You may submit the answer sheet, along with the other information requested, via mail, fax, or phone. You can also take this and other exams on the Internet at www.podiatrym.com/cme.

If you correctly answer seventy (70%) of the questions correctly, you will receive a certificate attesting to your earned credits. You will also receive a record of any incorrectly answered questions. If you score less than 70%, you can retake the test at no additional cost. A list of states currently honoring CPME approved credits is listed on pg. 156. Other than those entities currently accepting CPME-approved credit, Podiatry Management cannot guarantee that these CME credits will be acceptable by any state licensing agency, hospital, managed care organization or other entity. PM will, however, use its best efforts to ensure the widest acceptance of this program possible.

This instructional CME program is designed to supplement, NOT replace, existing CME seminars. The goal of this program is to advance the knowledge of practicing podiatrists. We will endeavor to publish high quality manuscripts by noted authors and researchers. If you have any questions or comments about this program, you can write or call us at: **Podiatry Management, P.O. Box 490, East Islip, NY 11730, (631) 563-1604 or e-mail us at bblock@podiatrym.com.**

Following this article, an answer sheet and full set of instructions are provided (pg. 156).—**Editor**

Civilian injuries due to firearms are increasing in the United States.^{1,2} As podiatric surgeons become more involved with trauma, it is important to understand the principles and types of gunshot wounds we are faced with every day. Gunshot wound damage varies with the type of weapon and caliber of the

ammunition as well as the distance a missile is shot from.

Low Versus High Velocity Gunshot Wounds

Gunshots are classified as high velocity, low velocity, high energy low velocity shotgun and low energy low velocity gunshots. High velocity is seen in the military, and low veloc-

ity is generally seen in civilian populations (Figure 1).

A small entrance wound and a large explosive exit wound is indicative of a high velocity projectile fired at close range. A small entrance wound with a small or no exit wound with the missile retained within the host's tissue generally is indicative

Continued on page 150

Gunshot Wounds (from page 149)

of a low velocity bullet speed less than 2000 ft./sec (Figures 2,3).³

In evaluating and treating gunshot wounds, the extent of the tissue damage caused by the bullet is of utmost importance.

The local effects of missile injuries are:

- 1) Laceration and crushing
- 2) Production of shockwave and temporary cavitation

Laceration and crushing are the principle effects of the bullet passing through the tissue planes and causing damage primarily to the permanent cavity region of the bullet track.³

Temporary cavitation is more of a concern with high velocity wounds.



Figure 1: High velocity gunshot wound

velocity projectiles, and therefore the amount of tissue damage encountered as well as the amount of contamination is much less than with the military injury (Figure 4).⁵

The shotgun is another type of injury encountered in private practice. Tissue damage is dependent on the range at which the shotgun is fired.⁸ Fired at point blank range (less than 15 yards), the shotgun pellets are extremely lethal, and produce an extensive wound with substantial bone and soft tissue loss with comminution and damage to the neurovascular structures (Figures 5,6).^{4,6,8,9}

nerves, skin, and subcutaneous fat. Although each structure is evaluated, the close proximity of all these structures in the foot requires knowledge of anatomy as well as function of each of the above.

When confronting a gunshot wound, the following protocol should be followed:

- 1) Take an adequate history. It is important to ascertain if a “flash



Figure 2: Low velocity GSW

Laceration and crushing are principles of Low velocity wounds.

As the missile penetrates the tissue planes, an extension of injury occurs and expands the damage and size of the track greater than the size of the missile. The temporary track can cause damage at distances remote to the original clinically observed track.^{3,4,9}

Most gunshot wounds encountered in private practice involve low

Fired at long range, shotgun velocity diminishes and the pellets disperse as they reach their target. Subsequently, long range shotgun pellets cause minimal damage, and experience has shown that these wounds sustained are of little sequella to the patient (Figure 7).

Management of Gunshot Wounds

When encountering gunshot wounds to the lower extremity, one must evaluate bones and joints, muscle, tendon units, vascular structures,

bleed” has occurred. Flash bleed is rapid blood loss at the time of the injury.

- 2) Check vital signs.
- 3) Inspect for burns to the tissue, swelling, and pallor. These must be noted. Entrance and exit wounds must be identified. If, however, there is no exit wound, imaging must be utilized to identify the location of the bullet.

- 4) Physical exam. Examination by system must be performed (vascular, neurologic and musculoskeletal).

Bone

By definition, a gunshot fracture is a high energy open fracture. Sev-



Figure 4: Low velocity from distance



Figure 5: Shotgun, close range

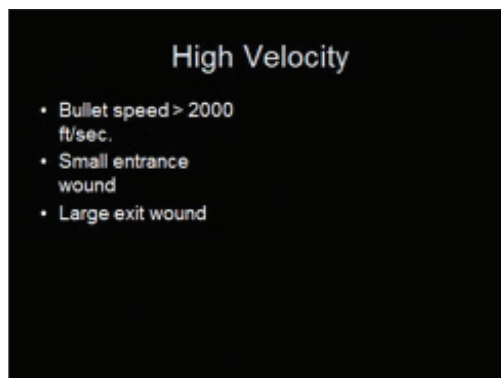


Figure 3: High velocity GSW

Gunshot Wounds (from page 150)

eral studies demonstrated that the heat generated during firing does not make the bullet sterile.¹⁵ Most low velocity gunshot fractures resemble Gustilo and Anderson grade I or II open fracture due to the comparatively mild to moderate soft tissue damage.

Definitive treatment must follow the rules of treating open fractures.

The Gustilo open fracture classification system is the most commonly used classification system for open fractures. It was created by Ramon Gustilo and J.T. Anderson, and then further expanded by Gustilo, Mendoza, and Williams.^{10, 11, 12}

The Gustilo Classification is as follows:

I Open fracture, clean wound, wound < 1 cm in length.

II Open fracture, wound > 1 cm but < 10 cm in length without extensive soft-tissue damage, flaps, avulsions.

III Open fracture with extensive soft-tissue laceration (> 10 cm), damage, or loss or an open segmental fracture. This type also includes open fractures caused by farm injuries, fractures requiring vascular repair, or fractures that have been open for eight hours prior to treatment.

IIIA Type III fracture with adequate periosteal coverage of the fracture bone despite the extensive soft-tissue laceration or damage.

IIIB Type III fracture with extensive soft-tissue loss and periosteal stripping and bone damage. This is usually associated with massive contamination and will often need further soft-tissue coverage procedure (i.e., free or rotational flap).

IIIC Type III fracture associated with an arterial injury requiring repair, irrespective of degree of soft-tissue injury.

Stabilizing the Fracture is of Utmost Importance (Figure 8).

Stabilization options include splints or cast or, usually, hardware such as external or internal fixation. The choice and timing of

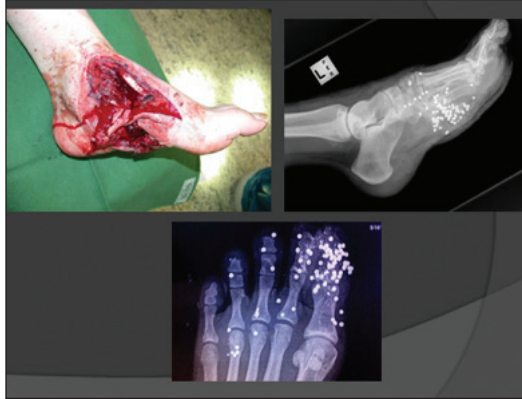


Figure 6: Shotgun, close range pellets remain



Figure 7: Long range shotgun pellets

the stabilization method depends on the fracture site, pattern and comminution, the soft tissue injury, and the patient's general condition. Primary fixation is especially useful in patients with multiple injuries, complex ipsilateral extremity injuries, severe injuries that require intensive wound care, open displaced intra-articular fractures, or open fractures complicated by neurovascular damage.¹⁶

Ganocy and Lindsey¹⁷ suggested a treatment protocol based on

followed by copious irrigation and early fixation of the fracture (Figure 9, 10).

Berg, et al. in their study identified that one-fifth of the fractures were treated by debridement only without hardware fixation. These were fractures that are inherently stable or do not require stabilization (e.g., fibula). Only 8% of the fractures were treated with open reduction and internal fixation.¹⁴ These numbers agree with the report by Weil and co-authors.³⁰ As reported before, in 8 of the 12 fractures treated with primary

external fixators, this was the definitive treatment for union. This high percentage emphasizes the comminuted nature of the gunshot fracture, type, and the tendency to prefer a biological splint fixation, maintaining a fracture-healing environment.

Skin Soft Tissue

Ordog, et al.¹⁸ retrospectively reviewed 28,150 patients with gunshot wounds; 60% of them were treated as outpatients. Four per-

**Temporary cavitation is more of a concern
with high velocity wounds.**

cent had minor fractures not requiring operative stabilization. The patients were treated with local wound debridement, irrigation, and an antibiotic ointment. Only 1.8% had wound infections that responded well to oral antibiotics without requiring hospital admission. In their study of 163 patients with civilian gunshot wounds, Brunner and Fallon¹⁹ found no differences between patients who had debridement and wound care and patients who had local wound care alone.

Continued on page 152

Gunshot Wounds (from page 151)

Neither group received antibiotics, and both were treated as outpatients. The wounds were neither closed primarily nor did they have a delayed primary closure but were left to drain and close secondarily.

Vascular Injuries

Vascular structures are frequently injured because of their proximity to bone.²⁰ A delay in the diagnosis or treatment can result in a chronic debilitating handicap due to ischemia and limb loss. Prompt restoration of blood flow is mandatory in traumatic peripheral arterial injuries.²¹ Damage to vessels can result also in death due to exsanguination. The damage may result directly from the bullet, from secondary missiles such as

trauma in cases of an arteriovenous fistula. The presence of “hard signs” of arterial injury such as absent pulses, unequivocal signs of ischemia, profuse hemorrhage, and pulsating or expanding hematoma war-

are obstruction, extravasation of contrast agent, early venous filling, irregularity of the vessel wall, a filling defect, and a false aneurysm. There is, however, a low yet measurable complication rate, with complications

**Fired at point blank range (less than 15 yards),
the shotgun pellets are extremely lethal.**

rants urgent surgical intervention.²³

Furthermore, Berg and colleagues identified that arterial pressure index is a sensitive tool for identifying a vascular injury. According to their protocol, an arterial pressure index ratio of 0.9 or less warrants further investigation. For patients with equivocal findings of vascular inju-

such as allergic reaction, renal failure, formation of a local hematoma, or a false aneurysm at the site of catheterization.

Historically, angiography was the imaging modality of choice, but recent studies show that non-invasive studies such as duplex Doppler ultrasonography are as sensitive as ar-

152



Figure 8: Low velocity



Figure 9: Initial stabilization with external fixator



Figure 10: Bone graft for reconstruction and length of 1st metatarsal

bone fragment, from cavitation, or shockwave effects. The injury to the vessel can be occlusive (due to transection or thrombosis of the vessel) or non-occlusive (an intimal flap tear or a pseudoaneurysm).

Due to advances in diagnosis

ry such as diminished pulses, angiography yields the greatest benefit, particularly in avoiding unnecessary surgery.¹⁴

Angiography reduces unnecessary explorations for proximity wounds and can provide therapeu-

teriography in most cases. In a study by Knudson et al.,²⁵ 86 extremity injuries were assessed using color-flow duplex imaging. No missed arterial injuries were found. Many centers now successfully manage proximity wounds by repeated physical examination over a 24 hour period and reserve angiography only for those patients with abnormal physical findings or an arterial pressure index less than 0.9.²⁶

Norman and co-workers²⁷ studied gunshot fractures to long bones and concluded that routine use of arteriography is not indicated unless there are abnormal findings on vascular examination. Many investigators still recommend that a gunshot wound in the immediate vicinity of major vessels should be studied an-

**Flash bleed is rapid blood loss at the time
of the injury.**

and treatment of vascular injuries, rates of amputation decreased dramatically, with limb salvage rates exceeding 86%.²² In a Berg, et al. study, none of their patients required amputation—primary or delayed.¹⁴ Injuries can present acutely or up to several months after the

tic intervention such as stenting or embolization. In a study using routine arteriography, the negative surgical exploration rate in patients with “soft signs” of arterial injury or with proximity wounds fell from 84% to 2%.²⁴

Significant angiographic findings

Continued on page 153

Gunshot Wounds (from page 152)

giographically or explored surgically. Wound exploration involves low morbidity (3%) and is often a routine part of wound management. Angiography can be used intra-operatively with a fluoroscope. In our institution, we do not use angiography routinely, even in proximity wounds, but rely on serial physical examination of the limb at risk.

Limbs can tolerate warm ischemia time of up to six hours. More than six hours of ischemia will almost always result in muscle necrosis and possibly permanent damage. In patients with combined vascular and nerve injuries, prophylactic fasciotomy should be performed at the time of arterial repair unless a method for continuous pressure measurement is available. Since most vascular gunshot injuries involve damage to a segment of the artery, a temporary shunt, followed by prompt skeletal stabilization and then a definite arterial repair should be performed.¹⁴

Nerves

Nerves pass in close proximity to bones and vascular structures and

and axonotmesis. Several studies addressed this issue. Omer²⁹ reported spontaneous recovery in 69% of patients with nerve injuries due to gunshot wounds between three and nine months after the injury.

In light of the above literature, the podiatric surgeon should be familiar with anatomy and function

syndrome must be identified in a timely fashion, and emergency fasciotomy is indicated.

Tetanus prophylaxis is always indicated; however, antibiotics prophylaxis is not essential for wounds that are not grossly contaminated. Antibiotic coverage is, however, indicated for compound fractures.

Gunshot wounds are generally not closed by primary intention as they may be considered contaminated.

prior to entering the surgical field. This brief summary should be kept in mind as you treat gunshot wounds: Surgical debridement and surgical cleansing is always indicated in gunshot wounds.³

Cleansing a wound involves copious irrigation at the entrance wound with removal of surface debris. Probing the wound blindly should never be performed and extending the incision for visibility is not indicated.¹³

Gunshot wounds are generally not closed by primary intention as they may be considered contami-

Summary

- Civilian gunshot wounds are generally low velocity, resulting in laceration and crushing damage to the bullet track. Low velocity, small entrance and small exit wounds can lead to simple fractures or to comminution. Treatment should consist of debridement and stabilization, and the bullet may or may not be excised.

- In military practice, high velocity wounds cause temporary cavitation and severe loss of soft tissue.

- Close range shot gun blasts also cause massive damage and are fraught with a large degree of contamination.

- Surgical debridement is imperative due to cavitation and retained foreign bodies.

- The judgment of the initial treating podiatric surgeon is of utmost importance. Adhering to the principles of treatment previously identified will benefit the prognosis of the patient.

- Aggressive yet prudent judgment and treatment are the best ways to approach a gunshot wound.

Case 1: Low Velocity Gunshot Wound

A 46-year old male presented to the emergency department with a low velocity gunshot wound. A small entrance wound was noted on the dorsal aspect of the foot. X-rays revealed a comminuted fracture of the 2nd metatarsal. The wound was debrided and the fragments of bone were irrigated with copious amounts of saline. An

Continued on page 154

Surgical debridement and surgical cleansing is always indicated in gunshot wounds.

are commonly injured when vascular injury is present. In fact, a physical examination demonstrating acute nerve injury raises suspicion of vascular injury and usually warrants further investigation to rule out arterial injury. Concomitant arterial and nerve injury will most likely result in a non-functional limb.

In a study by Visser, et al.²⁸, only 7% of patients with concomitant nerve and arterial injury had a normal functioning limb, despite successful vascular repair, as opposed to 39% of patients with arterial injury alone. Nerve injury presents clinically with hypoesthesia parasthesias, or paralysis. Spontaneous recovery is usually expected in neuropraxia

and axonotmesis. Foreign bodies should be removed as long as excessive dissection is not required. Bullets are also not recommended to be excised if extensive exploration is necessary.

Stabilizing large fragments of bone, whether with external fixation if there are large tissue defects, or by K-wire fixation, is indicated. (Figures 11-18)

In stable gunshot wounds where there is no damage to the vascular status, irrigate, splint, and observe for signs of infection. The patient may be discharged from the emergency department. In unstable or vascular compromised patients, exploration is indicated immediately.

In gunshot wounds, compartment

Gunshot Wounds (from page 153)

external fixation was placed across the fracture site to maintain osseous length. After a few weeks, the fracture site was resected and a bone graft was placed within the fracture fragments. A K-wire was used to transfix the bone graft and the external fixation remained for 8 additional weeks (Figures 11—Figure 18). PM

References

¹ Ryan, M., Leighton, T., Pianism, N., Klein, S., Bongard, F. Medical and economic consequences of gang related shootings. American surgeon, 59, 831-833, 1993.
² Sinauer, N., Annet, J., Mercy, J., Unintentional nongatal firearm related injuries. A preventable public health burden. JAMA, 275. Pp 1740-1743. 1996.
³ Hennessy, M.J., Banks, H.H., Leach, R.B. and Quigley, T.B. Extremity

gunshot wounds and gunshot fracture in civilian practice. Clin. Orthop. 114:296, 1976.

⁴ Demuth, W.E. and Smith, J.M. High velocity bullet wounds of muscle and bone: the basis of rational early treatment. J. Trauma 6:744, 1966.

pp 242-247, Wiley, New York, 1984.

⁸ Demuth, W.E. the mechanism of shotgun wounds. J Trauma 11:219, 1971.
⁹ Anania, W.A., Rosen, R.C., Giuffre, A. M. Gunshot wounds of the lower extremity: Principales and Treatment. J Foot Surg 26, number 3,228, 1987.

Spontaneous recovery is usually expected in neuropraxia and axonotmesis.

⁵ Marcus, N.A., Blair, W.F., Schuk, J.M., and Omer, G.E. Low velocity gunshot wounds to the extremities. J Trauma 20:2016, 1980.

⁶ Wolf, W., Benson, D.R., Shoji, H, Hoepflich, P, and Gilmore, A., Autosterilization in low velocity bullets. J. Trauma 18:63, 1978.

⁷ May, H.L. (ed) Emergency Medicine,

¹⁰ Thomas P. Rüedi; Richard E. Buckley; Christopher G. Moran (2007). AO principles of fracture management, Volume 1. Thieme. p. Page 96. ISBN 3-13-117442-0.

¹¹ Gustilo RB, Anderson JT. Prevention of infection in the treatment of one thousand and twenty-five open fractures of long bones: Retrospective and prospective analyses. J Bone Joint Surg Am. 1976; 58:453-8.

¹² Gustilo RB, Mendoza RM, Williams DN. Problems in the management of type III (severe) open fractures: A new classification of type III open fractures. J Trauma. 1984; 24:742-6.).

¹³ Brettler, D., Sedlin, E.D., and Mender, D.G. Conservative treatment of low velocity gunshot wounds. Clin. Orthop 140:26, 1979.

Continued on page 155



Figure 11: Low velocity GSW



Figure 12: Low velocity compound fracture



Figure 13: Stabilization with external fixator



Figure 14: Stabilization with external fixator



Figure 16: Bone Graft for reconstruction



Figure 17: Bone Graft for reconstruction



Figure 15: Debridement of wound and irrigation of fracture site



Figure 18: Bone graft with fixation

Gunshot Wounds (from page 154)

¹⁴ Burg, A., Nachum, G., Salai, M., Haviv, B., Heller, S., Velkes, S. and Dudkiewicz, I. Treating Civilian Gunshot wounds to the extremities in a level 1 trauma center: Our experience and recommendations. *IMAJ* • VOL 11 • September 2009, p 546-551.

¹⁵ Wolf AW, Benson DR, Shoji H. Autosterilization in low-velocity bullets. *J Trauma* 1978; 18: 63.

¹⁶ Anderson JT, Gustilo RB. Immediate internal fixation in open fractures. *Orthop Clin North Am* 1980; 11: 569-78.

¹⁷ Ganocy K 2nd, Lindsey RW. The management of civilian intraarticular gunshot wounds: treatment considerations and proposal of a classification system. *Injury* 1998; 29 Suppl 1: SA1-6.

¹⁸ Ordog GJ, Wasserberger JS, Balasubramaniam S. Civilian gunshot wounds: outpatient management. *J Trauma* 1994; 36: 106-111.

¹⁹ Brunner RG, Fallon WF. A prospective, randomized clinical trial of wound debridement versus conservative wound care in soft-tissue injury from civilian gunshot wounds. *Am Surg* 1990; 2: 104-7.

²⁰ Saletta JD, Freeark RJ. Vascular injuries associated with fractures. *Orthop Clin North Am* 1970; 1: 93-7

²¹ Perry MD, Thal ER, Shires GT. Management of arterial injuries. *Am Surg* 1971; 173: 403.

²² Adinolfi MF, Hardin WD, O'Connell RC, Kerstein MD. Amputations after vascular trauma in civilians. *South Med J* 1983; 76: 1241-3.

²³ Smith RF, Elliott JP, Hageman JH. Acute penetrating arterial injuries of the neck and limbs. *Arch Surg* 1974; 109: 198-205.

²⁴ Reid JDS. Assessment of proximity of a wound to major vascular structures as an indication for arteriography. *Arch Surg* 1988; 123: 942-6.

²⁵ Knudson MM, Lewis FR, Atkinson K, Neuhaus A. The role of duplex ultrasound arterial imaging in patients with penetrating extremity trauma. *Arch Surg* 1993; 128: 1033-7.

²⁶ Levy BA, Zlowodzki MP, Graves M, Cole PA. Screening for extremity arterial injury with the arterial pressure index. *Am J Emerg Med* 2005; 23(5): 689-95.

²⁷ Norman J, Gahtan V, Franz M, Bramson R. Occult vascular injuries following gunshot wounds resulting in long

bone fractures of the extremities. *Am Surg* 1995; 61: 146-50.

²⁸ Visser PA, Hemreck AS, Pierce GE. Prognosis of nerve injuries incurred during acute trauma to peripheral arteries. *Am J Surg* 1980; 140: 596-9.

²⁹ Omer GE Jr. Acute management of peripheral nerve injuries. *Hand Clin* 1986; 2: 19.

³⁰ Weil YA, Petrov K, Liebergall M, Mintz Y, Mosheiff R. Long bone fractures caused by penetrating injuries in terrorist attacks. *J Trauma* 2007; 62: 909-12.



Dr. Rosen is chief of podiatric surgery at Holy Name Medical Center in Teaneck, NJ. He is adjunct faculty at UMDNJ-Newark and Associate Clinical faculty at Touro College of Osteopathic Medicine. He has been in private practice at Northeast Podiatry Group for the past 28 years and is active in teaching residents at UMDNJ, Holy Name Medical Center and Englewood Medical Center.

CME EXAMINATION

SEE ANSWER SHEET ON PAGE 157.

1) Temporary cavitation is an important effect of:

- A) Low velocity wounds
- B) High velocity wounds
- C) Shotguns
- D) 22 gauge bullet

2) Laceration and crushing are principles of:

- A) Low velocity wounds
- B) High velocity wounds
- C) Shotgun
- D) 22 gauge bullet

3) "Flash Bleed" refers to:

- A) Bleeding from the wound
- B) Rapid blood loss at time of injury
- C) Rapid blood loss after delay
- D) Bleeding upon wound inspection

4) Shotgun injuries:

- A) Are lethal at less than 15 yards
- B) Are lethal at greater than 15 yards
- C) Cause minimal damage at less than 15 yards
- D) Cause maximum damage from greater than 15 yards

5) With Gunshot wounds, surgical debridement and surgical cleansing is:

- A) Always indicated
- B) Never indicated
- C) Sometimes indicated
- D) Dependent on injury

6) Gunshot wounds are considered:

- A) Contaminated
- B) Clean
- C) Dirty
- D) Sterile

Continued on page 156

- 7) Laceration and Crushing
- A) Cause damage distant to the track of the bullet
 - B) Cause major tissue loss
 - C) Cause damage confined to the permanent cavity
 - D) Cause damage at the entrance or exit only
- 8) Prophylactic antibiotics
- A) Are never essential to gunshot wounds
 - B) Are indicated for compound fractures
 - C) Should be determined by the surgeon
 - D) B and C
- 9) Which of the following is not related to low velocity injuries?
- A) Bullet speed is less than 2000 ft/sec
 - B) Small entrance wound
 - C) Bullet speed is greater than 2000 ft/sec
 - D) Small exit wound
- 10) Spontaneous recovery of nerves is expected in
- A) neuropraxia
 - B) axonotmesis
 - C) neurotmesis
 - D) A and B

PM's CME Program

Welcome to the innovative Continuing Education Program brought to you by *Podiatry Management Magazine*. Our journal has been approved as a sponsor of Continuing Medical Education by the Council on Podiatric Medical Education.

Now it's even easier and more convenient to enroll in PM's CE program!

You can now enroll at any time during the year and submit eligible exams at any time during your enrollment period.

PM enrollees are entitled to submit ten exams published during their consecutive, twelve-month enrollment period. Your enrollment period begins with the month payment is received. For example, if your payment is received on November 1, 2014, your enrollment is valid through October 31, 2015. If you're not enrolled, you may also submit any exam(s) published in PM magazine within the past twelve months. **CME articles and examination questions from past issues of *Podiatry Management* can be found on the Internet at <http://www.podiatrym.com/cme>.** Each lesson is approved for 1.5 hours continuing education contact hours. Please read the testing, grading and payment instructions to decide which method of participation is best for you.

Please call (631) 563-1604 if you have any questions. A personal operator will be happy to assist you.

Each of the 10 lessons will count as 1.5 credits; thus a maximum of 15 CME credits may be earned during any 12-month period. You may select any 10 in a 24-month period.

The Podiatry Management Magazine CME program is approved by the Council on Podiatric Education in all states where credits in instructional media are accepted. This article is approved for 1.5 Continuing Education Contact Hours (or 0.15 CEU's) for each examination successfully completed.

**Home Study CME credits now
accepted in Pennsylvania**

Enrollment/Testing Information and Answer Sheet

Note: If you are mailing your answer sheet, you must complete all info. on the front and back of this page and mail with your credit card information to: **Podiatry Management, P.O. Box 490, East Islip, NY 11730.**

TESTING, GRADING AND PAYMENT INSTRUCTIONS

(1) Each participant achieving a passing grade of 70% or higher on any examination will receive an official computer form stating the number of CE credits earned. This form should be safeguarded and may be used as documentation of credits earned.

(2) Participants receiving a failing grade on any exam will be notified and permitted to take one re-examination at no extra cost.

(3) All answers should be recorded on the answer form below. For each question, decide which choice is the best answer, and circle the letter representing your choice.

(4) Complete all other information on the front and back of this page.

(5) Choose one out of the 3 options for testgrading: mail-in, fax, or phone. To select the type of service that best suits your needs, please read the following section, "Test Grading Options".

TEST GRADING OPTIONS

Mail-In Grading

To receive your CME certificate, complete all information and mail with your credit card information to:

Podiatry Management

P.O. Box 490, East Islip, NY 11730

PLEASE DO NOT SEND WITH SIGNATURE REQUIRED, AS THESE WILL NOT BE ACCEPTED.

There is **no charge** for the mail-in service if you have already en-

rolled in the annual exam CME program, and we receive this exam during your current enrollment period. If you are not enrolled, please send \$26.00 per exam, or \$210 to cover all 10 exams (thus saving \$50 over the cost of 10 individual exam fees).

Facsimile Grading

To receive your CME certificate, complete all information and fax 24 hours a day to 1-631-563-1907. Your CME certificate will be dated and mailed within 48 hours. This service is available for \$2.50 per exam if you are currently enrolled in the annual 10-exam CME program (and this exam falls within your enrollment period), and can be charged to your Visa, MasterCard, or American Express.

If you are *not* enrolled in the annual 10-exam CME program, the fee is \$26 per exam.

Phone-In Grading

You may also complete your exam by using the toll-free service. Call 1-800-232-4422 from 10 a.m. to 5 p.m. EST, Monday through Friday. Your CME certificate will be dated the same day you call and mailed within 48 hours. There is a \$2.50 charge for this service if you are currently enrolled in the annual 10-exam CME program (and this exam falls within your enrollment period), and this fee can be charged to your Visa, Mastercard, American Express, or Discover. If you are not currently enrolled, the fee is \$26 per exam. When you call, please have ready:

1. Program number (Month and Year)
2. The answers to the test
3. Your social security number
4. Credit card information

In the event you require additional CME information, please contact PMS, Inc., at **1-631-563-1604**.

ENROLLMENT FORM & ANSWER SHEET

Please print clearly...Certificate will be issued from information below.

Name _____ Soc. Sec. # _____
Please Print: FIRST MI LAST

Address _____

City _____ State _____ Zip _____

Charge to: Visa MasterCard American Express

Card # _____ Exp. Date _____

Note: Credit card is the only method of payment. Checks are no longer accepted.

Signature _____ Soc. Sec. # _____ Daytime Phone _____

State License(s) _____ Is this a new address? Yes _____ No _____

Check one: I am currently enrolled. (If faxing or phoning in your answer form please note that \$2.50 will be charged to your credit card.)

I am not enrolled. Enclosed is my credit card information. Please charge my credit card \$26.00 for each exam submitted. (plus \$2.50 for each exam if submitting by fax or phone).

I am not enrolled and I wish to enroll for 10 courses at \$210.00 (thus saving me \$50 over the cost of 10 individual exam fees). I understand there will be an additional fee of \$2.50 for any exam I wish to submit via fax or phone.

Over, please

EXAM #5/16
Gunshot Wounds: Principles and Treatment
(Rosen)

Circle:

- | | |
|------------|-------------|
| 1. A B C D | 6. A B C D |
| 2. A B C D | 7. A B C D |
| 3. A B C D | 8. A B C D |
| 4. A B C D | 9. A B C D |
| 5. A B C D | 10. A B C D |

Medical Education Lesson Evaluation

Strongly agree [5]	Agree [4]	Neutral [3]	Disagree [2]	Strongly disagree [1]
--------------------------	--------------	----------------	-----------------	-----------------------------

- 1) This CME lesson was helpful to my practice ____
- 2) The educational objectives were accomplished ____
- 3) I will apply the knowledge I learned from this lesson ____
- 4) I will make changes in my practice behavior based on this lesson ____
- 5) This lesson presented quality information with adequate current references ____
- 6) What overall grade would you assign this lesson?
A B C D

How long did it take you to complete this lesson?
____ hour ____ minutes

What topics would you like to see in future CME lessons?
Please list :
