

Complex Regional Pain Syndrome in Children

This is a diagnosis not to be missed!

BY BARBARA RESSEQUE, DPM



Objectives

1) Familiarize the reader with the diagnostic criteria for establishing a diagnosis of CRPS.

2) Review the similarities and differences between adult onset CRPS and pediatric CRPS cases.

3) Review the recommended treatment options for pediatric CRPS patients.

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Following this article, an answer sheet and full set of instructions are provided (pg. 178).—Editor

Introduction

Complex regional pain syndrome (CRPS) is a term that describes a painful condition that affects the extremities and is thought to be associated with an aberrant host response to tissue injury.¹ It is characterized by sensory, motor, and autonomic dysfunction with long-standing pain and temperature differences of the affected limb. Earlier terms used to describe this group of disorders include

causalgia, reflex sympathetic dystrophy, post-traumatic dystrophy, and Sudeck atrophy. Although recognized in adults since the American Civil War in the 1860's, CRPS was rarely mentioned in children until the 1970s.²

Today, two types of CRPS are currently recognized: type 1 refers to conditions with no nerve lesion and type 2 includes disorders with a recognizable nerve lesion. The International

Association for the Study of Pain (IASP) diagnostic criteria describes the diagnosis of CRPS-1 as follows:

"Type I is a syndrome that develops after an initial noxious event. Spontaneous pain or allodynia/hyperalgesia occurs, is not limited to the territory of a single peripheral nerve, and is disproportionate to the original inciting event. There is or has been evidence of edema, skin blood

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flow abnormality, or abnormal sudomotor activity in the region of the pain since the inciting event. The diagnosis is excluded by the existence of conditions that would otherwise account for the degree of pain and dysfunction."³

The diagnostic Budapest Criteria summarized below is now widely used and is thought to be more specific than earlier criteria.²

Budapest Diagnostic Criteria

A) The patient has persistent pain that is disproportionate to the inciting event. (Most, but not all, cases present with a history of an inciting event, trauma, or surgery)

B) The patient has at least one sign in 2 or more of the categories.

C) The patient reports at least one symptom in three or more of the categories.

D) No other diagnosis can better explain the signs and symptoms.

In a study by Tan⁴ that compared 78 children with CRPS to 951 adults with CRPS, there were distinct differences between pediatric and adult presentations for CRPS. In early stage CRPS, many children presented with a cooler skin temperature, while adults presented with a warmer skin temperature. In children, the lower extremity was more commonly involved than the upper extremity

(74.6% lower extremity, 23.3% upper extremity, and 4.1% upper and lower extremities). In adults, the upper extremity is two times more commonly affected than the lower extremity. Neurologic and sympathetic symptoms are also much more pronounced

40 % required in-patient hospitalization and 20% suffered a relapse.

A recent retrospective chart review by Harris, et al.⁶ also found a preponderance of females (85.2%), an inciting event preceding pain in 74.1%, median age of 11.1 years and

In 1900, Peter Sudeck proposed that CRPS was the result of an abnormal regional inflammatory response to tissue injury.

in the adult patient than in the pediatric patient. In this study, 84.6% of the pediatric cases presented with a minor injury, usually an ankle sprain.

In Low's study⁵ 20 children with CRPS were followed at the Children's Hospital in Sydney, Australia for a four-year period. Ninety percent of the cases were female patients (8-16 with a mean age of 11.8 years of age), 85% were cases of the lower extremity, and 80% had a history of previous minor trauma. Seventy per cent of the children required amitriptylene and/or gabapentin for analgesia and to allow for their participation in a physical therapy program. Sixty per cent of the patients responded to this outpatient treatment protocol (mean 15.4 weeks with a range of three days to 64 weeks), but

more than 50% of the cases with skin color and temperature changes, edema, and decreased joint ranges of motion. Physical therapy and pharmacotherapy were the primary means of treatment in the review of these cases. After initiation of treatment, time to resolution of symptoms averaged 6.8 weeks. The longest time to resolution of symptoms was 52 weeks and the shortest time was one week.

Etiology

Collective evidence points to CRPS being a multi-factorial disorder associated with an aberrant host response to tissue injury.¹ Today, it is believed that there are different mechanisms contributing to CRPS and that it is a disorder of the central nervous

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TABLE I
Budapest Diagnostic Criteria

| Category | | Sign | Symptom |
|-------------------|--|--|---------|
| 1 Sensory | Allodynia (to light touch and/or deep somatic pressure and/or joint movement) and/ or hyperalgesia (to pinprick) | | |
| 2 Vasomotor | Temperature asymmetry and/or skin color changes and/or skin color asymmetry | Temperature change must be >1 degree Celsius | |
| 3 Sudomotor/Edema | Edema and/or sweating changes and/or sweating asymmetry | | |
| 4 Motor/Trophic | Decreased range of motion and/or motor dysfunction (weakness, tremor, dystonia) and/or trophic changes (hair, nail/skin) | | |

system as well as a peripheral painful condition. In 1900, Peter Sudeck (Sudeck's atrophy) was the first to propose that CRPS was the result of an abnormal regional inflammatory response to tissue injury. Several recent studies show that CRPS patients have an increase in pro-inflammatory cytokines (tumor necrosis factor, interleukin) in different body fluids and decreased levels of anti-inflammatory cytokines.

In the 1940's, Evans introduced the term reflex sympathetic dystrophy to indicate that the patient's pain was a result of autonomic dysregulation that resulted in dystrophic changes in the limb.⁷ Although sympathetically maintained pain (SMP) is common in early CRPS, it is rare in long-standing CRPS. CRPS experts today de-emphasize the importance of the sympathetic dysfunction concept.

A newer etiologic theory for the development of CRPS is the central sensitization theory. After a period of intense or repeated noxious stimulation, non-noxious stimuli become painful and remain painful (for a while) even after the noxious stimulation has subsided. In recent years, neuro-imaging methods (functional MRI, magnetoencephalography (MEG) and PET scans) have provided new insights into abnormal cerebral processing of neuropathic pain. These advanced imaging techniques have shown reorganization of cortical somatotopic maps in sensory and motor areas of the brain, increased activity in primary nociceptive areas, and aberrant activity in areas of the brain normally involved in descending inhibitory pain pathways.⁸ Peripheral small fiber neuropathy and neurogenic inflammatory pain have also been suggested as possible etiologies.

Others have proposed a theory that CRPS is an autoimmune condition.⁹ Anti-neuronal antibodies have been found in patients with CRPS, and pain relief has been achieved in some CRPS patients with the infusion of low dose IVIG.

Incidence

In the pediatric patient, CRPS type 1 is more common in girls than boys, with a peak age occurring at or just be-

fore puberty.^{5,10,11} Lower extremity involvement in children is five times more frequent than upper extremity involvement. In adults, upper extremity cases are twice as common as lower extremity cases.¹ The incidence of CRPS type 2 is equal between boys and girls.

Diagnosis

Diagnosis of CRPS type 1 is still today clinical, based on history and physical findings. It is a diagnosis made even more difficult by the remarkable variability of clinical signs and symptoms. Recent epidemiologi-

with cognitive behavioral support can dramatically reverse signs and symptoms. Conversely, a delay in diagnosis is associated with a higher rate of hospitalization and a longer period of treatment.^{5,10,16}

Differential Diagnosis^{3,4}

1) Post traumatic neuropathy—Patients with post-traumatic neuropathy may complain of burning pain similar to CRPS. However, in non-CRPS post traumatic neuropathy, the pain is usually contained within the territory of the involved nerve. Unlike CRPS, the

TABLE 2
CRPS in Children Versus Adults

| Pediatric CRPS | Adult CRPS |
|--|--|
| Lower extremity > upper extremity (85% of cases lower extremity with predilection for the foot) ⁵ | Upper extremity > lower extremity. (60.8% upper extremity) ⁴ |
| 85-90% females ^{5,6,12} | 76% female ¹³ |
| Peak age at or before puberty ^{4,5} | Peak age 55-75 years of age ² |
| 80-90% inciting event ^{4,5,6} | 90% inciting event ^{1,2} |
| Neurologic and sympathetic symptoms less pronounced, less edema ⁴ | Neurologic and sympathetic symptoms more pronounced, more edema ⁴ |
| Cooler skin temperature at initial presentation is more common than warmer skin temperature ⁴ | Warmer skin temperature at initial presentation is more common |
| 20-30% relapse rate ^{5,12} | 1-2 % relapse rate ¹⁴ |

cal studies of CRPS in adults found that patients on average saw 4.8 different physicians before referral to a pain center. Surprisingly, 47% of patients had a history of physician-prescribed immobilization, despite the recognition that immobilization may worsen the central nervous system pathology in this disorder.¹⁵

Both Harris and Low also reported a delay in diagnosis (mean time of 13.6-13.9 weeks) in pediatric patients with CRPS.^{5,6}

Early recognition of CRPS and immediate mobilization and utilization of a physical therapy/behavioral modification program is critical to a successful outcome. Early mobilization

pain does not spread beyond the area of the affected nerve. The non-CRPS post-traumatic neuropathy also tends to be superficial. CRPS patients often will locate their pain to deep tissues of the affected extremity.

2) Neuropathies, such as diabetic neuropathy, can present with spontaneous pain, motor deficits, and sensory changes. But while CRPS is often a unilateral condition, neuropathies have a symmetric distribution. Blood tests and patient history will assist in distinguishing neuropathies from CRPS. Diabetic neuropathies are also more common in the older population than the pediatric population.

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3) Unilateral arterial or venous occlusive disorders can mimic the symptoms of CRPS and should be excluded based on clinical examination or Doppler ultrasound.

4) Inflammatory disorders such as juvenile rheumatoid arthritis, polymyositis, rheumatic fever, systemic lupus erythematosus, and synovitis.

5) Neoplasm.

Further Investigations

The gold standard for the diagnosis of CRPS in an adult or pediatric patient is still a clinical one based on the patient's history and physical findings. Keep in mind that there is remarkable variability in presentation of this disorder in both adults and children. The main goal of additional testing is to rule out other disorders. Additional investigations may include but are not limited to the following:

1) Blood Work Up—ESR, C-reactive protein, complete blood count, and serum auto-antibodies are helpful in ruling out infectious and rheumatologic disorders.

2) Plain Radiography—Peri-articular osteopenia and patchy osteoporosis can be seen in plain films as early as two weeks after the onset of symptoms in CRPS patients. Serial films can show changes over time that can also aid in the diagnosis.

3) Electrodiagnostic studies can aid in ruling out peripheral neuropathies, entrapment neuropathies, and nerve injuries.

4) Three-phase bone scans of the affected limb is a sensitive but not specific diagnostic test for CRPS. A meta-analysis of imaging techniques for the diagnosis of CRPS type 1 in adults supported the use of three-phase bone scans over the use of MRI and plain film radiography because of the bone scan's greater sensitivity and higher negative prediction value.¹⁷ However, it is of greater diagnostic value in the adult patient than the pediatric patient since many children with CRPS have a normal bone scan.¹⁸ Bone scanning in the adult form of CRPS often shows diffuse hyperperfu-

sion. Children, on the other hand, may demonstrate diffuse hypoperfusion or even a normal scan. A normal bone scan, therefore, does not rule out CRPS in a pediatric patient.^{5,12}

5) Thermography—A difference of 0.5 degrees C between symmetrical points on the affected and non-affected extremity is considered mildly asymmetric. A difference of 1.0 degrees C is thought to be significant.⁷

6) Sweat Testing—Again, this test is often more helpful in the adult than the pediatric patient.

7) Ankle or Popliteal Block using a local anesthetic—Diagnostic blockade

pain and restoring normal function. There is general agreement that a multidisciplinary approach is the best means of achieving the best clinical result for the adult and pediatric CRPS patient. Pontell states, "once the diagnosis is suspected or confirmed, act in a timely, deliberate, and aggressive manner to get the patient to appropriate care.....An increasing index of suspicion for CRPS without strict fulfillment of 'research criteria' is enough to warrant pain management consultation."¹⁹

Delay in diagnosis and appropriate referral to a pain management center can result in significant joint restrictions, longer term motor dysfunction, and a longer road to recovery. While awaiting a pain management consultation, the podiatrist can provide the patient with short-term measures of pain relief. A referral to a pain management facility should not, however, be delayed in this patient population. If the patient meets the diagnostic criteria, the podiatric physician can provide a referral to a physical therapist who is experienced in treating this patient population.

Local nerve blocks such as ankle or popliteal blocks can sometimes be therapeutic as well as diagnostic. A 50% reduction in pain after a local anesthetic block suggests that the pain is sympathetic-mediated. Remember, however, that not all CRPS cases are sympathetic-mediated pain. Lack of a positive response to a nerve block does not rule out CRPS.

Treatment may include physical therapy, local nerve blocks, oral pharmacologic agents, and behavioral modification. In the pediatric patient, the mainstay of treatment is intensive physical therapy.^{4,6,10,11,16} Any other treatments should be prescribed to facilitate the physical therapy program.

The goals of physical therapy are first desensitization, followed by establishing range of motion and weight bearing, and finally return to func-

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Figure 1a & b: (side to side) 10 year old female with CRPS of the left foot and ankle.

of sympathetic nerves with local anesthetic aids in recognition of sympathetically mediated pain. These blocks are helpful in establishing a diagnosis of CRPS and in recognizing sympathetically mediated pain. A block is considered successful if there is at least a 50 % decrease in the pain level.

8) MRI—Before the MRI is performed, the radiologist should be made aware of the fact that the clinician suspects a CRPS diagnosis. An MRI may be useful in ruling out bone or soft tissue pathology.

Treatment

The goal of treatment is pain control followed by restoration of limb function. Early diagnosis, active (not passive) mobilization, and referral to an appropriate pediatric pain management center are critical in decreasing

tional activity. In the adolescent athlete with CRPS, play therapy, in particular, can improve functional ability while providing a distraction from the pain. Immobilization is contraindicated in this patient population and is thought to exacerbate the problem.

If necessary, medications with proven efficacy in the management of neuropathic pain may be used, such as tricyclic antidepressants (nortriptyline or amitriptyline) and/or anticonvulsants (Gabapentin). Potential side-effects should be carefully monitored by a pediatric pain management specialist. Although CRPS is not a psychological problem, cognitive behavioral therapy is also recommended by a large number of case reports as well as expert opinion.^{5,16,20} Psychological factors and family dynamics play a greater role in the pediatric patient than in the adult patient. Techniques may include guided-imagery coping mechanisms, relaxation exercises, and cognitive intervention techniques designed to increase perceived control over pain.

Despite a lack of evidence for invasive procedures, these potentially harmful procedures are still utilized in the treatment of children and adolescents with CRPS. Fourouzanfar, in a review of the literature, found limited to no evidence for the efficacy of sympathetic stellate ganglion blockade.²¹ In a retrospective study by Zernikow,²² children who had previously had unsuccessful invasive procedures (sympathetic blocks, operations and regional anesthesia) later responded to non-invasive treatment. After his study and review of the evi-



Figure 2: Protective stance posture of patient with CRPS.

denced based literature, Zernikow pleads against invasive procedures in children and adolescents with this painful disorder.

Case Report

NG is a 10 year old African American female who presents to the Foot Center of New York on 11/9/2011 with a chief complaint of a sharp, severe pain of the entire left foot and ankle (Figures 1a & b). The pain started two months earlier while walking a lot on vacation while wearing flip-flops. The patient denies any specific trauma to the area but may have “turned her ankle” while walking in flip flops. She initially experienced pain of the left lateral ankle. Within two days, the pain spread to the entire left foot and ankle. The pain started suddenly and has not gotten any better or worse in the last two months.

The mother states that the mus-

cles of her daughter’s foot sometimes “spasm” and that the foot was initially “red and swollen”, but this has reduced over time. The mother states that her daughter will not allow anyone to touch her foot because it is too painful. She has not washed her daughter’s foot because the touch of the washcloth is too painful and the touch of water on the foot is too painful. The patient sleeps with her foot on top of the covers elevated on a pillow at night. NG has been using crutches for the last six weeks because she is “unable to put any weight on the foot.”

NG was initially evaluated in the emergency room while she was on vacation. Radiographs were taken that were negative for pathology. When she returned home, her pediatrician referred her to a podiatrist. An MRI was order on 10/6/2011. The impression was an unremarkable MRI with no joint effusion, bursitis, fracture, or tarsal coalition. The podiatrist placed NG into a CAM walker, but after a few minutes of wear, she removed the splint because her foot pain was even worse. The patient was then referred to the Foot Center of New York.

Physical examination reveals a dusky, dry, cold left foot. The temperature on the right foot is 82.7 degrees Fahrenheit and 75.9 degrees Fahrenheit on the left foot. The patient appears very anxious and presents a “protective posture” (Figure 2). The skin of the left foot is dry and scaly. Obtaining pulses is difficult on the left side due to pain even upon light touch of the foot. A Doppler examination is performed and reveals normal pulses bilaterally. The capillary fill time is 1 second.

Protective sensation is intact, but the patient states that she “feels it less” on her left foot. Patellar and Achilles reflexes are 2/4. The Lasegue test is negative. The plantar response is plantarflexion of the hallux bilaterally. The patient states that she cannot actively move her left ankle or foot.

Radiographs of the left foot (Figures 3a & b) indicate a patchy osteoporosis that, in conjunction with the history

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Figure 3a & b: DP and lateral radiographs of 10 year old patient. Note the patchy osteoporosis.

and physical findings, suggests a possible diagnosis of CRPS. The case was discussed with the pediatrician and a referral was made to a pediatric neurologist. The suspicions and treatment recommendations were discussed with the child and parents. The need for a

cult. Any child, particularly a female between 11 and 13 years of age, who presents with persisting pain that is not consistent with the mild injury (or in some cases, no history of injury) should be considered as a possible CRPS case. Early recognition and

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Variability of signs and symptoms, lack of a specific accurate diagnostic test, and a lack of awareness of this condition in the pediatric population can make recognition of CRPS difficult.

consultation with a pediatric pain management center as soon as possible was emphasized to the family.

The following week, NG was evaluated by a pediatric neurologist who concurred with our clinical impression and prescribed Neurontin. Physical therapy was initiated at the Foot Center on 12/1/2011 until NG could be admitted into Columbia Presbyterian Pediatric Pain Management Center. NG received intensive physical therapy and behavioral modification therapy at Columbia from mid-January to early May 2012. She was able to put on and take off a sock on the left foot by early February. By the end of February she was kicking a ball, walking a little with a walker, and tolerating wearing a slipper. From March to April, she advanced from a walker to a cane to independent walking. In April, she no longer complained of any pain but could still not tolerate a regular shoe. In May, she was discharged from the pain management center. Upon discharge, she could walk normally and wear regular footwear. There has been no relapse to date.

Conclusion

In spite of increased recognition of CRPS in the pediatric and adolescent population, there is still frequently a delay from the onset of this disorder to the proper diagnosis. Variability of signs and symptoms, lack of a specific accurate diagnostic test, and a lack of awareness of this condition in the pediatric population can make recognition of CRPS diffi-

prompt treatment can lead to an earlier resolution of symptoms and spare the child unnecessary pain. **PM**

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SEE ANSWER SHEET ON PAGE 179.

- 1) What is the definition of CRPS type 2?
- A) Painful condition with no nerve lesion
 - B) Painful condition with no nerve lesion and pain mediated by the sympathetic system
 - C) Painful condition with a specific nerve lesion
 - D) Sympathetic mediated pain condition without a specific nerve lesion
- 2) A pediatric patient with CRPS is classically
- A) A preschool male who recently suffered trauma.
 - B) A pre-adolescent female who recently suffered trauma.
 - C) A 16-18 year old female with no history of trauma.
 - D) A 16-18 year old male with a history of trauma.
- 3) What statement is true regarding adult and pediatric CRPS patients?
- A) Pain is disproportionate to the inciting event (if any) and vasomotor changes are present.
 - B) The patient describes mild pain and there are no vasomotor or sudomotor changes.
 - C) The pain is localized to the area of one nerve.
 - D) Allodynia and hyperalgesia are not present.
- 4) How is the pediatric CRPS presentation different from the adult presentation?
- A) There is a greater preponderance of male patients in the pediatric CRPS population compared to the adult CRPS population.
 - B) A warmer skin temperature on initial presentation is more common in the pediatric CRPS population than the adult CRPS population.
 - C) A cooler skin temperature at initial presentation is more common in the pediatric CRPS population than in the adult CRPS population.
 - D) Neurologic and sympathetic symptoms are more pronounced and edema of the limb is more severe in the pediatric CRPS population than in the adult population.
- 5) In 1900 Peter Sudeck proposed what theory regarding the etiology of CRPS?
- A) CRPS is an autoimmune disorder.
 - B) CRPS is the result of autonomic dysregulation.
 - C) CRPS is the result of central sensitization.
 - D) CRPS is the result of an abnormal regional inflammatory response to tissue injury.
- 6) What statement is FALSE regarding the presentation of CRPS in the adult population?
- A) In adults, upper extremity involvement is twice as common as lower extremity involvement.
 - B) Pain is disproportionate to the inciting event.
 - C) 90% of patients report a history of an inciting event (trauma, surgery, long-term immobilization).
 - D) The preponderance of patients are males in their second and third decades.
- 7) The gold standard for diagnosis in the adult and pediatric CRPS patient is:
- A) a clinical diagnosis based on history and physical findings.
 - B) three-phase bone scan.
 - C) MRI.
 - D) Doppler examination.
- 8) What is appropriate testing in the work-up of an adult suspected of CRPS?
- A) Blood workup including ESR, C reactive protein, and CBC and radiographs.
 - B) Three-phase bone scan and Doppler.
 - C) Electrodiagnostic tests to rule out neuropathy, nerve entrapment, or nerve injury; and MRI.
 - D) All of the above.
- 9) The differential diagnosis for CRPS in adults and children include:
- A) Inflammatory disorders.
 - B) Peripheral neuropathies and post traumatic neuropathies.
 - C) Unilateral arterial or venous occlusive disorders.
 - D) All of the above.
- 10) What treatment can worsen symptoms and is contraindicated in the adult and pediatric CRPS patient?
- A) CAM walker or below-knee cast immobilization
 - B) Physical therapy.
 - C) Gabapentin.
 - D) Popliteal nerve block.
- 11) What is the best approach to treatment in the adult and pediatric CRPS patient?
- A) Physical therapy only.
 - B) Multidisciplinary approach.
 - C) Podiatric intervention only for foot cases.
 - D) Immediate use of sympathetic stellate ganglion blockade.
- 12) Of the following, what statement would lead you to conclude that a pediatric patient does NOT have CRPS?
- A) A normal bone scan.
 - B) No improvement in foot pain following a peroneal nerve block.
 - C) Normal radiographs.
 - D) Electrodiagnostic studies indicate a nerve entrapment.
- 13) When a physician strongly suspects CRPS, what statement is correct with regard to future management?
- A) Perform every appropriate diagnostic test before referring the patient to a pain management center.
 - B) Manage the patient with gabapentin and amitriptyline for four months.
 - C) Refer the patient to a pain management center.
 - D) Recommend physical therapy only for three months
- 14) What is the mainstay of treatment for the pediatric CRPS patient?
- A) Anti-inflammatory medications.
 - B) Invasive stellate ganglion blockade.
 - C) Physical therapy.
 - D) Ankle and peroneal nerve blocks.

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15) What therapy technique is NOT appropriate for the pediatric CRPS patient?

- A) Play therapy.
- B) Desensitization and cognitive behavioral therapy.
- C) Active mobilization and improvement of joint ranges of motion.
- D) Passive mobilization.

16) What medications are frequently used in conjunction with physical therapy in pediatric CRPS patients?

- A) Ketamine.
- B) Methadone.
- C) Gabapentin and amitriptylene.
- D) Steroids.

17) What is the peak age for CRPS in the adult patient population?

- A) 20-30 years of age.
- B) 30-40 years of age.
- C) 45-55 years of age.
- D) 55-75 years of age.

18) The Budapest Criteria includes sensory, vasomotor, sudomotor/edema, and trophic categories. What is required to satisfy the criteria for a diagnosis of CRPS?

- A) One sign in 2 or more categories, one symptom in 3 or more categories, and no other disorder that can better explain the signs and symptoms.
- B) Two signs in 2 or more categories, 2 symptoms in 2 or more categories, and no other disorder that can better explain the signs and symptoms.
- C) One sign in 4 categories, one symptom in 4 categories, and no other disorder that can better explain the signs and symptoms.
- D) Three signs in 3 or more categories, 2 symptoms in 3 or more categories, and no other disorder that can better explain the signs and symptoms.

19) What problems can arise with a delayed diagnosis of CRPS?

- A) Longer period of treatment.
- B) Greater need for hospitalization.
- C) Increased likelihood of abnormal cerebral processing of pain.
- D) All of the above.

20) What patient profile is the most consistent with a pediatric CRPS patient?

- A) An 18 year old male with a history of clinical depression.
- B) An 11 year old female with a history of an ankle sprain.
- C) A six year old male casted for 6 weeks for an avulsion fracture of the 5th metatarsal.
- D) A five year old female with no history of trauma.

See answer sheet on page 179.

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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 September 1, 2006, your enrollment is valid through August 31, 2007.

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 CPME program, and we receive this exam during your current enrollment period. If you are not enrolled, please send \$22.00 per exam, or \$169 to cover all 10 exams (thus saving \$51 over the cost of 10 individual exam fees).

Facsimile Grading

To receive your CPME certificate, complete all information and fax 24 hours a day to 1-631-563-1907. Your CPME 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 CPME 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 CPME program, the fee is \$22 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 CPME 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 CPME 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 \$22 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 CPME 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 \$22.00 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 \$169.00 (thus saving me \$51 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.

ENROLLMENT FORM & ANSWER SHEET (continued)



EXAM #8/13
Save a Limb... Save a Life
(Rehm)

Circle:

- | | |
|-------------|-------------|
| 1. A B C D | 11. A B C D |
| 2. A B C D | 12. A B C D |
| 3. A B C D | 13. A B C D |
| 4. A B C D | 14. A B C D |
| 5. A B C D | 15. A B C D |
| 6. A B C D | 16. A B C D |
| 7. A B C D | 17. A B C D |
| 8. A B C D | 18. A B C D |
| 9. A B C D | 19. A B C D |
| 10. A B C D | 20. 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 makes changes in my practice behavior based on this lesson ____
- 5) This lesson presented quality information with adequate current references ____

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 :

EXAM #9/13
Complex Regional Pain Syndrome in Children
(Resseque)

Circle:

- | | |
|-------------|-------------|
| 1. A B C D | 11. A B C D |
| 2. A B C D | 12. A B C D |
| 3. A B C D | 13. A B C D |
| 4. A B C D | 14. A B C D |
| 5. A B C D | 15. A B C D |
| 6. A B C D | 16. A B C D |
| 7. A B C D | 17. A B C D |
| 8. A B C D | 18. A B C D |
| 9. A B C D | 19. A B C D |
| 10. A B C D | 20. 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 makes changes in my practice behavior based on this lesson ____
- 5) This lesson presented quality information with adequate current references ____

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 :
