

LIFE IS FULL OF ITS BUMPS AND BRUISES. Who among us does not have a knee or elbow scar from a fall off a bike? I remember a phase where I must have fallen every few weeks running on a sidewalk, with a scarred up knee to show for it.

The healing response from these sorts of injuries usually occurs in a predictable sequence. First, the tissues respond with inflammation that can last anywhere from 7 to 14 days. The increased circulation caused by inflammation brings in a flood of specialized cells to clear out wound debris. The next phase, fibroplasia, lasts for 7 to 10 days, and may overlap part of the inflammatory response. Fibroplasia is critical for establishing the presence of cells that begin to produce the foundation for new tissues. The final phase, remodeling, can last for weeks as tissues mature and regain their strength.¹

This is not the case when complex regional pain syndrome (CRPS) is involved, since nerves misfire and normal healing processes that are necessary do not occur. Although one study of 1,006 patients found that less than 7% of people with CRPS are affected by chronic open wounds², this small percentage does not diminish the importance of addressing this issue. When left untreated or treated insufficiently, the wound can rapidly move to an infected state that jeopardizes the rest of the limb. Yet, because of the small proportion of people with both CRPS and chronic open wounds, there is very little literature to guide clinicians in the best practice.

Looking closer at issues that complicate skin integrity, vascular changes are the ones most reported, and the most problematic. Vascular changes have

shown varying relationships between changes in the sympathetic nervous system and temperature differences.³ By assessing skin samples, others have noted changes in nerve innervation of hair follicles, sweat glands, and blood vessels.⁴

For those who have issues at the skin surface, chronic edema is frequently encountered. Using the same population as



Wounds that Won't Heal

By *Anita L. Davis,*
PT, MSM, CA-AAPM, CEAS

previously mentioned, 40% of those with complications presented with infection, 35% with ulcers and 36% chronic edema. Chronic edema has been consistently linked to further development of infection and additional complications. In the general population, edema can be managed with compression garments or other mechanical compression treatment, but with CRPS, this treatment is frequently intolerable without additional pain interventions.

Therefore, other strategies are employed, which can include lumbar sympathecto-

my, sympathetic blocks, or other similar treatments that have not only provided a degree of pain relief, but also assisted in healing the lesions.^{4,5} Some have even resorted to indwelling epidurals to provide a tolerance for mechanical compression to aid in healing.^{6,7} In addition, hyperbaric oxygen has been used in wound treatment.⁸ Although research is still in progress, some results are promising. None of the studies, however, involved the wounds of those with CRPS.^{8,9}

Aggressive treatment may also include surgical reconstruction to aid in arterial blood flow. This even has its challenges in those not affected with CRPS.¹⁰ As with any surgical intervention, the surgery itself can pose a risk of increased pain for those with CRPS. It is estimated that 6% to 10% of patients with CRPS will require surgery on the affected extremity for various reasons.¹¹ If provided with appropriate interventions, the probability of negative consequences can diminish. The recurrence rate of those receiving a stellate ganglion block with a surgical procedure was only 10%. This was also seen in those with intraoperative intravenous

regional anesthesia using clonidine and lidocaine. The intravenous anesthesia was felt to be superior, given the inherent difficulty and complications with a stellate ganglion block.¹¹

Other skin conditions include ulcers, bullae and other types of wound formation. Infection is a frequent complication of any skin lesion. Typically infections are addressed with antibiotics. However, topical treatments and oral antibiotics have been minimally effective in those with CRPS.⁷ Laan et al noted treatments

such as intramuscular long-acting penicillin injections, intravenous mannitol infusion and intravenous penicillin.² When infection repetitively develops in wounds of those with CRPS, antibiotics are frequently ineffective. Reasons for resistance to healing with conventional methods include impaired oxygen consumption and vascular abnormalities that affect blood flow in the extremities.^{2,3,7}

With such difficulty in successful healing of wounds in individuals with CRPS, prevention is a critical component. There are generally recognized factors that one can control to minimize the potential of skin lesions. These include abstinence from cigarette smoking, clean hygiene, healthy eating habits, and exercise as able and proactively manage diabetes if present.¹²

Despite these basic efforts, wounds may still appear. The specific etiology of these wounds has not yet been identified to help determine the best course for prevention. Therefore, when such wounds present themselves on those with CRPS, immediate attention by a healthcare provider is recommended. Having a vascular surgeon involved may be necessary to provide good wound care and comprehensive treatment once infected wounds begin to appear. ■

References

1. Luedtke-Hoffmann KA, Schafer DS. Pulsed lavage in wound cleansing. *Phys Ther.* 2000;80(3):292-300.
2. van der Laan L, Veldman PH, Goris RJ. Severe complications of reflex sympathetic dystrophy: infection, ulcers, chronic edema, dystonia, and myoclonus. *Arch Phys Med Rehabil.* 1998;79(4):424-429.
3. Wasner G, Schattschneider J, Heckmann K, Maier C, Baron R. Vascular abnormalities in reflex sympathetic dystrophy (CRPS1): Mechanisms and diagnostic value. *Brain.* 2001;124(Pt 3):587-599.
4. Albrecht PJ, Hines S, Eisenberg E, et al. Pathologic alterations of cutaneous innervation and vasculature in affected limbs from patients with complex regional pain syndrome. *Pain.* 2006;120(3):244-266.
5. Lipp KE, Smith JB, Brandt TP, Messina JL. Reflex sympathetic dystrophy with mutilating ulcerations suspicious of a factitious origin. *J Am Acad Dermatol.* 1996;35(5 Pt 2):843-845.
6. Webster GF, Iozzo RV, Schwartzman RJ, Tahmouh AJ, Knobler RL, Jacoby RA. Reflex sympathetic dystrophy: occurrence of chronic edema and nonimmune bullous skin lesions. *J Am Acad Dermatol.* 1993;28(1):29-32.
7. Sundaram S, Webster GF. Vascular diseases are the most common cutaneous manifestations of reflex sympathetic dystrophy. *J Am Acad Dermatol.* 2001;44(6):1050-1051.
8. Escobar SJ, Slade JB, Hunt TK, Cianci P. Adjuvant hyperbaric oxygen therapy (HBO2) for treatment of necrotizing fasciitis reduces mortality and amputation rate. *Undersea Hyperb Med.* 2005;32(6):437-443.
9. Weiland DE. Fasciotomy closure using simultaneous vacuum-assisted closure and hyperbaric oxygen. *Am Surgeon.* 2007;73(3):261-266.
10. Reuben SS, Rosenthal EA, Steinberg RB, Faruqi S, Kilaru PA. Surgery on the affected upper extremity of patients with a history of complex regional pain syndrome: the use of intravenous regional anesthesia with clonidine. *J Clin Anesth.* 2004;16:517-522.
11. Reuben SS, Rosenthal EA, Steinberg RB. Surgery on the affected upper extremity of patients with a history of complex regional pain syndrome: a retrospective study of 100 patients. *J Hand Surg [Am].* 2000;25A(6):1147-1151.
12. Orsted HL, Searles GE, Trowell H, Shapera L, Miller P, Rahman J. Best practice recommendations for the prevention, diagnosis, and treatment of diabetic foot ulcers: update 2006. *Adv Skin Wound Care.* 2007;20(12):655-669.

A Patient Perspective on Chronic Wounds

WILSON H. HULLEY, RSDSA BOARD Vice President (Communication, Disability and Advocacy) has spent the last 10 months suffering wounds that have not healed properly. He says, "RSD creates a unique healing environment. The skin's sensitivity creates a horrific problem. Normally, if a person has a wound you might put ointment and a bandage on it and allow it to heal. With the pain associated with CRPS this isn't always possible."

Wilson's wound started as a blister and went from there. "It ulcerated and my podiatrist didn't like the way it was looking. It kept getting worse. It is a nightmare; I've tried acupuncture, muscle stimulation and nothing cures it." He has worked with a podiatrist to manage the wounds, and has had some success with bacitracin—an antibiotic ointment available over the counter. Since his feet are affected, he also makes his own bandages using sterile adhesive pads (he uses Tefla® type pad) and self-binding non-adhesive tape. He suggests that individuals with wounds, particularly on their feet, try different products until they find the one that works the best. It may not cure, but might comfort." In addition, Wilson tries to wear sandals whenever possible and changes his socks up to five times a day in order to keep his feet as dry as possible.