

# Laser Scar Management: Focused and High-Intensity Medical Exchange in Vietnam

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## PRACTICE POINTS

- Military dermatologists bring a unique perspective to the specialty, helping to adapt technology and techniques to the specific needs of military beneficiaries. Over the last decade, a niche in trauma dermatology has emerged among several centers both inside and outside of the military.
- International engagement is a highly visible and rewarding component of military practice.
- Combining a specialized skill set (eg, trauma rehabilitation) with international outreach can be a highly effective way to assist patients and build relationships globally.

Over the last decade, the treatment of traumatic scars with lasers has emerged as a core component of multidisciplinary management. Military dermatologists have had a fundamental role in this shift by helping to develop new applications for existing technology and promulgate the techniques to reach additional providers and patients. International engagement is a prominent and highly attractive feature of military practice, and military dermatologists routinely participate in disaster response missions and ongoing planned operations. In this article, the author presents a military perspective on the emerging niche of trauma dermatology and outlines his more than 5 years of experience leveraging these skills to lead a multidisciplinary exchange in restorative medicine and burn scar management in Vietnam.

*Cutis.* 2018;102:95-98.

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dermatologists have played a fundamental role in this shift by helping to develop new applications for existing technology and promulgate the techniques to reach additional providers and patients. Beyond scar management, the repurposing of adjunctive procedural techniques, such as sweat and hair reduction in amputees, also promises to enhance rehabilitation for many patients.

International engagement is a prominent and highly attractive feature of military practice, and military dermatologists routinely participate in disaster response missions, such as the 2010 Haiti earthquake,<sup>1</sup> and ongoing planned operations, such as Pacific Partnership in the Indo-Asia-Pacific region led by the US Navy.<sup>2</sup> In this article, I present a military perspective on the emerging niche of trauma dermatology and outline my more than 5 years of experience leveraging these skills to lead a multidisciplinary exchange in restorative medicine and burn scar management in Vietnam.

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The author reports no conflict of interest.

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## Trauma Dermatology

Over the course of the last decade, traumatic scar management has emerged as a staple of dermatologic surgery practice in some centers. Dermatologists hold the key to increasing patient access to effective outpatient care for symptomatic traumatic scars and other related issues using devices and techniques initially conceived for cosmetic applications.<sup>3</sup> A major impetus for the considerable remodeling in our collective thoughts about traumatic scar management was the emergence of fractional laser technology in the mid-2000s. The remarkable, safe, reproducible, and durable benefits of fractional laser treatment of various scar types have created substantial momentum in recent years. The Naval Medical Center San Diego in California houses 1 of 3 centers of excellence in rehabilitation in the US military. Mastery of minimally invasive procedures to manage scars and other issues associated with trauma for the first time has established dermatologists as important partners in the overall rehabilitative effort.

My perspective on laser scar management has been previously described.<sup>4,5</sup> Ablative fractional laser resurfacing is the backbone of rehabilitative scar management.<sup>6</sup> Although the literature in this field is still relatively immature, higher-quality studies are accumulating rapidly as the burn and surgical communities adopt the procedure more widely.<sup>7-10</sup> A considerable step forward in the dissemination of the procedure occurred recently with the development of category III *Current Procedural Terminology (CPT)* codes for ablative laser treatment of traumatic scars.<sup>11</sup> Category III *CPT* codes are temporary codes used for emerging procedures that have not yet been deemed medically necessary. Although individual insurance carriers can determine whether to cover these procedures and the corresponding level of reimbursement, regular use is important for ultimate elevation to category I codes by the American Medical Association over a 5-year observation period. The *CPT* codes 0479T (fractional ablative laser fenestration of burn and traumatic scars for functional improvement; first 100 cm<sup>2</sup> or part thereof, or 1% of body surface area of infants and children) and 0480T (fractional ablative laser fenestration of burn and traumatic scars for functional improvement; each additional 100 cm<sup>2</sup>, or each additional 1% of body surface area of infants and children, or part thereof [list separately in addition to code for primary procedure]) are examples of these category III codes.<sup>11</sup>

Nonablative fractional lasers; vascular-specific devices for erythematous scars; and long- and short-pulsed pigment-specific devices for hair and traumatic tattoo treatment, respectively, round out the commonly used laser platforms. For example, laser hair reduction can help improve the fit and comfort of prosthetic devices and has been shown to improve the overall quality of life for amputees.<sup>12</sup> Botulinum toxin can be an important component of treatment of excessive sweating induced by occlusive liners in prosthetics, and microwave eccrine ablation

is an emerging potential option for longer-lasting sweat reduction in this population.<sup>13-15</sup> In addition to providing direct dermatology care and education, having members of the specialty in uniform has been a key to adopting new practical solutions to unsolved problems.

## Pacific Partnership

Pacific Partnership is the largest annual multinational humanitarian assistance and disaster preparedness mission in the Indo-Asia-Pacific region.<sup>16</sup> It was started in 2006 following the tsunami that devastated parts of South and Southeast Asia in 2004. The recently concluded Pacific Partnership 2018 marked the 13th iteration of the annual mission led by the US Navy in collaboration with other partner nations, which in 2018 included Japan, Australia, Canada, the United Kingdom, France, Singapore, Korea, and Peru, as well as nongovernmental organizations and international governmental agencies. Host nation mission locations vary somewhat from year to year, but 2018 included visits of the hospital ship USNS *Mercy* and more than 800 personnel to Indonesia, Malaysia, Sri Lanka, and Vietnam. Medical/dental, engineering, and veterinary teams join with their counterparts in each host nation to conduct civic action projects, community health exchanges, medical care, and disaster response training activities.<sup>16</sup>

## Rehabilitation As a Vehicle for Medical Exchange

Since approximately 2012 there has been an evolving paradigm in Pacific Partnership from an emphasis on maximizing direct patient care in changing locations to one focused on building lasting partnerships through subject matter expert exchange. Multidisciplinary scar management, including surgical and laser scar revision and physical and occupational therapy, is a very promising model for engagement. Potential advantages of this type of exchange include the following: developing nations have relatively high rates of burns and other forms of trauma as well as uneven access to acute and ongoing rehabilitative care; patients often are otherwise healthy and young; results are frequently profound and readily demonstrable; and it is a skill set that has become highly developed in the military system. Just as dermatologists are illustrating their utility in trauma rehabilitation at home, these procedural skills provide fertile ground for exchange overseas.

The Overseas Humanitarian Assistance Shared Information System is an online platform that allows users to apply for grants under the Asia-Pacific Regional Initiative. In 2013, I started the Burn Scar Treatment/Restorative Medicine exchange with a grant under this program. A multidisciplinary team representing the specialties of dermatology, hand surgery, plastic surgery, physical medicine and rehabilitation, and pulmonary critical care participated in the 2013 Asia Pacific Burn Congress hosted by the National Institute of Burns (NIB) in Hanoi, Vietnam, and then followed up with didactics

and patient care alongside Vietnamese physicians in the management of disfiguring and debilitating scars from burns and other trauma. This pilot project consisted of three 2- to 3-week phases: 2 at the NIB in Hanoi and 1 with a delegation from the NIB visiting the Naval Medical Center San Diego. When initial project funds expired in 2014, the exchange was absorbed into Pacific Partnership 2014, which began a string of 4 consecutive annual Pacific Partnership engagements at Da Nang General Hospital in Vietnam. The 2 most recent exchanges, including the exchange associated with Pacific Partnership 2018, have taken place at Khanh Hoa General Hospital in Nha Trang, Vietnam. During this time the team has grown to include physical and occupational therapists as well as a wound care nurse.

The Burn Scar Treatment/Restorative Medicine exchange consists of side-by-side laser and surgical scar revision performed with our Vietnamese hosts in their own hospital. Our Vietnamese partners perform a large volume of reconstructive surgeries in their usual practice, so it truly has been a bilateral exchange incorporating some advanced technology and techniques with an emphasis on longitudinal multidisciplinary care. Importantly, the procedures are supplemented with pre-operative and postoperative care as well as instruction provided by physical and occupational therapy and wound care professionals working alongside host nation support staff. Because the areas of involvement often are extensive

and a patient may only be seen once in this setting, laser and surgical procedures often are performed concurrently in the host nation operating room. Anesthesia support is provided by the host nation. Basic consumable surgical supplies (eg, sutures, gloves, marking pens, staplers) are supplemented with mission funds. Special adjuncts for the most severe contractures have included negative pressure wound therapy and a collagen-based bilayer matrix wound dressing. Laser treatments have been performed on the vast majority of patients with an ablative fractional CO<sub>2</sub> laser and laser-assisted delivery of corticosteroid in hypertrophic areas. Of note, use of the laser has been provided to our hosts by the manufacturer for each of the 7 iterations of the exchange, and the wound dressing manufacturer also has donated some of their product to the exchange through the nongovernmental organization Project Hope for 2 missions. To date, more than 300 patients have safely received life-changing treatment during the exchange, with some receiving multiple treatments (Figure). Although multiple treatments over time are ideal, even a single treatment session can result in considerable and lasting improvements in function and symptoms.<sup>17</sup> The hospital ship USNS *Mercy* has the same laser technology and has brought advanced scar treatment techniques to the far corners of the Pacific.

Measuring overall success—treatment and international relations—in this setting can be challenging. On an individual patient level, the benefits of restoring the ability to walk



A patient immediately prior to initial treatment with a flexion contracture of the left axilla resulting from a burn approximately 1 year prior to presentation (A). The contracture resulted in limited ability to extend the arm over the head. Three months after a single combined surgical and laser scar revision session, range of motion was normal and accompanied by improved scar pliability and reduced itching (B). The treatment consisted of surgical tissue rearrangement of the area of greatest contracture followed by fractional CO<sub>2</sub> laser treatment (UltraPulse [Lumenis]) over the entire scar sheet at a low density and high treatment depth (pulse energy ranging from 60 mJ at 3% density to 150 mJ at 1% density, depending on estimated scar thickness). Triamcinolone acetonide 40 mg/mL was applied immediately after laser treatment to facilitate delivery through the ablated columns in hypertrophic areas.

and work as well as reducing pain and itching are manifest and transformative for both the patient and family; however, aggregating this information into high-quality outcome data is difficult given the heterogeneous nature of traumatic injuries, which is compounded in the setting of international engagement where the intersection between patient and visiting provider may be singular or difficult to predict, funding is limited, language frequently is a barrier, and documentation, privacy, and medical research guidelines may be unfamiliar or contradictory. The cumulative impact of these types of exchanges on the relationship between nations also is critical but difficult to measure. It is common sense that deepening personal and professional relationships in the medical setting over time can increase trust and mutual understanding, perhaps setting the stage for broader engagement in other more sensitive areas. Trust and understanding are rather nebulous concepts, but earlier this year marked the first visit of an American aircraft carrier to Da Nang since 1975, following 4 consecutive annual Pacific Partnership missions in the same city, which does carry the patina of successful engagement on a systemic level.

### Final Thoughts

Based on my personal experience, I provide the following tips for building a successful, focused, long-term medical exchange.

- Leverage your strengths and respect the strengths and style of practice of your hosts. A mind-set of exchange and not simply humanitarian care will be more successful. Your hosts are experts in a style of practice adapted to their surroundings and introducing new techniques that are grounded in the local practice patterns are more likely to be perpetuated.
  - Collaboration with nongovernmental organizations and industry can be extremely helpful. Military and governmental organizations often are limited in funding, in the ways they can spend available funding, and in the receipt of donations. Appropriate coordination with civilian entities can elevate the exchange considerably by adding expertise and available assets as well as broadening the overall impact.
  - Engage the support staff as well as the physicians. You will leverage contact with families and enhance care over the long-term.
  - The benefits of multiple interactions over time are manifest, for both the patients and the participants. Personal and professional relationships are intertwined and naturally mature over time. Go for singles and doubles first before swinging for the fences.
  - Multidisciplinary work overseas informs and enhances collaboration at home.
- Adding regional experts in international research and assessment to these specialized medical teams may better capture the impact of future exchanges of any flavor.
  - The model of creating a focused exchange with independent funding followed by incorporation of successful concepts into larger missions seems to be a worthy and reproducible approach for future projects of any variety.

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