Visionary Leadership in Burn Rehabilitation Over 50 Years: Major Accomplishments, but Mission Unfulfilled

Karen Kowalske, MD, Phala Helm, MD

INTRODUCTION

Examples of the application of rehabilitation concepts to the care of patients with major burn injuries began to emerge in the 1960s. Before this time, mortality was so high that there was no significant focus on any outcomes beyond survival. Several physical medicine and rehabilitation (PM&R) physicians led this change in perspective by simply beginning to care for patients and by presenting information gleaned from clinical experience and research at national conferences. The authors of a textbook on rehabilitation issues after burn injury, along with a small group of forward-thinking physiatrists and surgeons, provided the impetus for the expansion of burn rehabilitation medicine in the late 1980s and early 1990s. The change in the major burn journal's' title to include "rehabilitation" also was a landmark event. As is often the case, the publication of a seminal textbook or the creation or expansion of a journal's mission becomes a tipping point for a medical specialty in terms of recognition by other specialties and the public. These activities finally brought to the fore the concepts of quality of life and functional recovery after burn injury. Today, physical and occupational therapy services, ideally accompanied by PM&R leadership and clinical practice innovations, are a mainstay of care after a burn injury. However, despite the advances, more efforts to expand the field through addressing workforce issues and research will be required to benefit all patients in need of burn rehabilitation.

EARLY PHYSIATRIC LEADERSHIP

It is of historical interest that Neanderthal cave paintings show both the use of fire and the treatment of fire-related injuries [1]. Despite remarkable advances in science and medical treatment, the medical community has struggled to define the most appropriate intervention after burn injury that improves survival. Mortality rates at the beginning of the 20th century were dismal, which ranged from 54%-100% for a 25% total body surface area burn, and there was little emphasis on rehabilitation or long-term outcomes [2]. In the 1940s, with the advent of improved fluid resuscitation, access to banked blood, and antibiotic therapy, outcomes began to improve [2,3]. Unfortunately, these medical advances only seemed to delay the time of death from weeks to months but did not curtail overall mortality, and progress was not made with regard to improving long-term functional outcomes, cosmesis, or quality of life [4].

It was not until the early 1960s that burn patient mortality statistics began to improve, with more individuals surviving to hospital discharge. This was likely in part related to the initiation of early excision of the burn wound, a method popularized by Janzekovic [5]. The combination of early excision techniques, the innovative use of clinical teams with special training to perform dressing changes by using aseptic techniques, and the treatment of all patients with burn injuries in the same "clean" hospital unit decreased the rate of infection and improved survival.

These practice innovations finally led the way for more aggressive rehabilitation approaches and techniques (Table 1) [6]. The charge was led by the forward-thinking physiatrist, George Koepke, MD, who included PM&R in the practice model when Irving Feller, MD, created a burn specialty unit at the University of Michigan in 1959. Koepke was

K.K. Department of Physical Medicine and Rehabilitation, University of Texas Southwestern Medical Center Dallas, Dallas, TX. Address correspondence to: K.K.; e-mail: karen.kowalske@utsouthwestern.edu
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P.H. Department of Physical Medicine and Rehabilitation, University of Texas Southwestern Medical Center Dallas, Dallas, TX
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Table 1. *Burn care and rehabilitation time line*

30,000 BC	First burn treatments are described in cave paintings
1646	Wilhelm Fabry, a surgeon, describes use of splinting to prevent burn contracture
1940	Antibiotics are introduced, but no real improvement in survival is demonstrated
1961	George Koepke, MD, writes the first article on physiatric care of burn patients
1970	Early excision and dedicated wound care teams are found to improve survival
1978	The Rehabilitation Special Interest Group is formed within the American Burn Association
1984	Fisher and Helm publish *Comprehensive Rehabilitation of Burns*, the first textbook in the field (10)
1990	Most units have therapists and multidisciplinary teams
	The word "rehabilitation" is incorporated into the logo of the ABA
1994	NIDRR funds 3 Model System sites: University of Texas, Southwestern Medical Center, Dallas, TX, University of Washington, Seattle, WA, and University of Colorado, Denver, CO
	Textbook *Burn Care and Rehabilitation* by Richard and Staley is published (14)
2008	The Burn Rehabilitation Consensus Conference is jointly sponsored by NIDRR, NIH, Department of Defense, Veterans Administration, and the ABA
2011	A second edition of *Burn Rehabilitation* is published in the *Physical Medicine and Rehabilitation Clinics of North America* series (36)

NIDRR = National Institute for Disability and Rehabilitation Research; NIH = National Institutes of Health; ABA = American Burn Association.

the first physiatrist to write about burn rehabilitation concepts in a chapter on management of extensive burns in the *Surgical Clinics of North America* in 1961 [7]. He was able to demonstrate first to the burn surgeons in Michigan and eventually to other clinicians across the country, the roles of splinting, positioning, and PM&R interventions in the care of patients with severe burns.

In the early 1970s, other physiatrists and therapists began to follow Koepke's lead and worked with burn surgeons to offer a more comprehensive approach to the care of burn survivors. Phala Helm, MD, University of Texas Southwestern, and Steve Fisher MD, Hennepin County Medical Center, became respected members of burn care teams by volunteering to remove dressings, clean wounds, and oversee exercise programs for patients with burns. Their approaches included evaluating patients in a clinic setting. Before this, clinics were not in place, so nonhospitalized patients could only be seen in the emergency department for physician evaluation and dressing change, an approach that was expensive and inefficient. Once the clinic system with the infrastructure necessary for dressing changes was in place, it became the standard of care for long-term follow-up care of all major burn survivors. From these early efforts, a multidisciplinary team model emerged as the ideal approach for this patient population. Burn surgeons began to recognize as essential a model with which physiatrists and therapists complemented their own efforts to benefit the patients.

Unfortunately, the leading organization for burn care in the United States, the American Burn Association (ABA), was slow to embrace these ideas. However, with extensive lobbying, the Rehabilitation Special Interest Group (SIG) was formed in 1978. This group presented educational programs on rehabilitation care, including the popular "How I Do It" sessions, at each national ABA meeting. The Rehabilitation SIG consistently advocated for an integrated, multidisciplinary approach to improving outcomes, with an emphasis on sensory, physical, and psychological function; reduction of pain; community participation; and quality of life [8]. Despite a core group of highly enthusiastic clinician leaders who established excellent recommendations to improve burn care, others were slow to follow. In 1982, more than 2 decades after Koepke's first publication, survey results of burn rehabilitation professionals showed a focus on surgical and postsurgical techniques such as the use of simple splinting, rather than the holistic, multidisciplinary treatment approaches to the burn survivor advocated by physiatrists [8]. Analysis of survey data also indicated that fewer than 50% of burn units had part-time or full-time physical or occupational therapists, and PM&R physicians involvement was even more limited. In addition, 20%-30% of burn units did not offer any form of outpatient treatment [8,9].

In 1984, Fisher and Helm [10] published the first burn rehabilitation textbook, *Comprehensive Rehabilitation of Burns*. This book gave detailed approaches to burn rehabilitation from positioning and wound care to exercise, scar management, and long-term psychological and vocational issues. The combination of educational strategies and dogged advocacy by physiatrists and other health care professionals did eventually lead to change. By the end of the 1980s, most burn units had therapy services, weekly team meetings, and consulting psychologists or psychiatrists. This evolution of models of care coincided with the establishment of diagnostic-related groups by the Healthcare Financing Agency and prospective payment programs for acute care [11]. To define rehabilitation hospital units or hospitals as diagnostic-related group exempt, a set of diagnoses that might require treatment in an inpatient rehabilitation facility (hospital) were derived, and burn injury was included in the set. This designation helped facilitate the transfer of patients with extensive burns and significant functional impairments to an acute rehabilitation hospital setting to facilitate functional recovery. During this time, the Burn Rehabilitation SIG continued to make more detailed recommendations; these included weekly team meetings, frequent clinical evaluations and modification of treatment plans, an on-going focus on pain control and sleep hygiene, range-of-motion exercises 2-3 hours per day, early ambulation, resistive exercises,