

Reconstructive Plastic Surgery of Pressure Ulcers

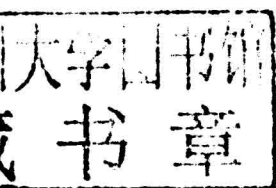
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In memory of my late beloved parents

Preface

For many years, I had the idea of documenting my vast experience over the years in the field of surgical management of pressure ulcers in a comprehensive textbook dealing with the science and art of complex reconstructive surgery of pressure ulcers.

The encouragement from my colleagues has given me the enthusiasm to bring this book to life. It signifies my experience of more than 30 years in dealing with the repair of complex wounds to achieve maximum healing and patient quality of life. My experience evolved as a system and protocol in the management of pressure ulcers.

This book represents my collective experience over the years performing over 25,000 reconstructive procedures at Rancho Los Amigos National Rehabilitation Center in Downey, California. This book is intended to be a textbook and a reference to the plastic surgery trainee and the practicing plastic surgeon seeking an answer to repair complex wounds, which may not be readily available in other standard textbooks of plastic surgery; in addition, it will be a reference to all the surgical specialties such as general or orthopedic surgeons dealing with these complex wounds at different stages of the disease and as a reference for the therapist, physical medicine specialist, and rehabilitation physician.

Downey, CA, USA

Salah Rubayi

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I would like to express my sincere gratitude to Rancho Los Amigos National Rehabilitation Center in Downey, California, for their kind support and trust during the last 30 years of my practice to manage the Pressure Ulcer Management program. Also, I would like to extend my grateful thanks to all the nurses in my unit and the operating theater, all the therapists (PT and OT), my dedicated staff including my surgical P.A. for their exceptional help and support and my passionate plastic surgery residents and fellows at (USC and UCLA) whom I trained over the years, and, last but not least, my faithful patients for their unconditional trust and confidence in me. Finally, I would like to thank Mr. Khalid Rubayi, MSEE, for his technical support in bringing this book to life.

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Pressure Ulcers: An Important Condition in Medicine and Surgery

1

Salah Rubayi

1.1 Introduction

Pressure ulcers are a condition of the skin and deep tissue that has been recognized for at least 5,000 years [1–6]. They can affect the human body at different sites, and many simple remedies have been prescribed and used to treat these ulcers. In the eighteenth and nineteenth [7–15] centuries, an accurate diagnosis of pressure ulcer was established. In the twentieth century, the etiology, management, and prevention were established, and physicians, nurses, and allied health professionals were expected to have knowledge of this condition and to manage and prevent pressure ulcers. The standard treatment was set in the United States in 1994 by the Agency for Health Care Policy and Research [16], and, in 2000, the Consortium for Spinal Cord Medicine [17] published the standard management of pressure ulcers. In 1999, the standard was published in Europe by the European Pressure Ulcer Advisory Panel [18].

1.2 Significance of Pressure Ulcers

Pressure ulcers are important for the reasons described below.

1.2.1 Incidence of Pressure Ulcers

The exact incidence and prevalence of pressure ulcers remain unclear. Data from the National Pressure Ulcer Advisory Panel (NPUAP) in the United States [19] indicate that the incidence varies widely, from 0.4 to 38 % in acute care, 2.2–23.9 % in long-term care, and 0–17 % in home care. Prevalence rates show the same variability: 10–18 % in acute care, 2.3–28 % in long-term care, and 0–29 % in home care. Therefore, the incidence of pressure ulcers is high, especially among certain high-risk groups of patients. These groups include elderly patients admitted to a hospital for femoral fractures (66 %) and critical care patients (33 %); in a study of quadriplegic patients, the prevalence was 60 % [16]. In spinal cord injury (SCI) patients, the pressure ulcer prevalence rate ranged from 8 % in the first year following the onset of spinal cord injury to 33 % for community resident individuals with SCI [17].

Mawson et al. (1988) reported that 32–40 % of all individuals admitted to special SCI units in the United States would develop pressure ulcer(s) during their initial hospital admission period [20]. Yarkony and Heinemann in 1995 followed

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up on 4,065 individuals with SCI, of whom 2,971 developed pressure ulcers in the following percentages: 15 % at their first annual examination, 20 % at year 5 post injury, and 5.23 % at year 20 post injury [21].

Recurrence in spinal cord injury individuals remains high and is related to many factors. Niazi et al. in 1997 conducted a retrospective, case-controlled study on recurrence of pressure ulcers in a population of 176 veterans with SCI. They found that there was a 35 % recurrence rate regardless of whether the treatment was surgical or medical. Smoking, diabetes, and cardiovascular disease were associated with the highest rate of recurrences [22]. Clark et al. (2006) reported that daily lifestyle of the SCI patient and its relation to development of pressure ulcers can be described through various models that vary in complexity, depending on whether they incorporate individualization and interrelations among modeled elements [23].

1.2.2 Cost of Pressure Ulcer Management

The cost of managing pressure ulcers has increased dramatically in hospitals and in the community due to the overall increase in healthcare costs worldwide. The impact of pressure ulcers is significant in terms of both financial and nonmonetary costs. In 1999, Beckrich and Aronovich [24] reported that 1.6 million pressure ulcers developed in hospitals in the United States annually, with an estimated cost of \$2.2 to \$3.6 billion. Pompeo [25] showed the impact of wound burdens (defined as pressure ulcer stage, wound size, and number of wounds) on the cost of care at long-term acute care facilities; as expected, the higher the wound burden, the greater the cost of care. The nonmonetary costs, often described as a hidden cost of pressure ulcers, include the emotional and physical impact on patients and their families. Braun et al. (1992) [40] reported that the cost to heal complex pressure ulcers was \$100,000; less serious pressure ulcers cost \$20,000 to \$30,000 to heal (National Pressure Ulcer Advisory Panel 1989, U.S. Department of Health and Human Services 1990) [26, 16].

1.2.3 Medico-Legal Implications

The medico-legal implications of pressure ulcer development are an urgent issue all worldwide. Pressure ulcers are viewed as a quality indicator of care. Hence, the development of pressure ulcers can constitute a failure in the healthcare system. In the United States, federal health agencies regard pressure ulcers as a surrogate for how well the healthcare team is functioning in monitoring the quality of care for the patient.

The growing demand for accountability among healthcare clinicians for more effective prevention and management of ulcers has led to an explosion of national guidelines on pressure ulcers. In the European countries, guidelines have been developed that are similar to those issued by the U.S. Agency for Health Care Policy and Research for Pressure Ulcer Prevention [27].

The increasing recognition of pressure ulcer development as a marker for quality of care has led to a greater number of pressure ulcer litigations against clinicians and their employers. The public has been made aware through the media like television and Internet that pressure ulcers can be prevented and treated effectively. The development of pressure ulcers is considered to be the result of negligence by the healthcare provider. Pressure ulcers can cause sepsis and even death in certain groups of patients, in addition to causing changes in patients' quality of life. A number of lawsuits have been brought against hospitals, nursing homes, physicians, and even plastic surgeons. If greater attention were paid to preventing development of pressure ulcers and to enforcing some basic rules of prevention, there would be fewer of these litigations.

In the United States, Bennett et al., in 1981, reported on the increase in medical malpractice related to patient pressure ulcer development [28]. Absence of good documentation in patients' medical charts concerning preventive measures taken in action or treatment make it easy for a plaintiff's attorney to prove the lack of care that caused the development of pressure ulcer(s) in the patient. When there is a national guideline on how to prevent and treat pressure ulcers, the expert witness in these litigation cases defends

the care according to those guidelines. In the United States, the federal government and each state set rules and regulations, including monetary penalties, for nursing home compliance for patients who develop stage III or IV pressure ulcers [29].

1.2.4 Advances in Prevention

In the twenty-first century, pressure ulcers are seen as a preventable disease, and thus, prevention is a priority and a necessity in their management. This can be accomplished through continuing education for all healthcare staff on detecting the early signs of pressure ulcers and assessing patients for the risk of pressure ulcer development. In hospitals, nursing homes, convalescent homes, and patients' homes, measures for prevention include: the patient's repositioning and turning schedule; preventing and treating excessive body moisture and fecal and urinary incontinence; using advanced equipment, such as special beds, mattresses, and wheelchair cushions; attention towards the patient's nutritional intake; and patient and family education. All of these measures are today's standard of care and have become the foundation for pressure ulcer prevention.

1.2.5 Advances in the Management of Pressure Ulcers

The surgical and conservative management of pressure ulcers has advanced dramatically during the last 60 years. In the twenty-first century, there are orthodox standard reconstructive plastic surgery procedures to close pressure ulcers, which are considered the standard of care for stage III – IV pressure ulcers. These standard procedures are documented in the plastic surgery literature and by the government health policies [16, 17] and are today considered the standard of teaching and training for the plastic surgery resident during training. In addition, this standard of care is well known by allied health (e.g., physical and occupational therapists) and nursing staff.

1.2.6 Complications and Life-Threatening Risks of Pressure Ulcers

Fifty years ago, pressure ulcers were among the major diseases predisposing in shortening the life expectancy in the spinal cord injury patient [30]. In the twenty-first century, advances in antibiotics, local wound care, and early surgical interventions have tremendously reduced the morbidity and mortality rates and prolonged life expectancy in spinal cord injury patients. However, the medical literature documents many complications that can occur in patients with chronic pressure ulcers, including acute sepsis [31, 32], amyloidosis [31], heterotopic ossification [32], septic joint [33], perineal and urethral fistula [34], squamous cell carcinoma changes in pressure ulcers [35], and the most common complication, acute or chronic osteomyelitis of the bone underlying the ulcer [36–39]. To avoid and prevent these complications, prevention and early detection of pressure ulcers in spinal cord patients are important for the patients' healthcare and to provide quality of life and longer life expectancy. This responsibility falls on all healthcare providers.

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