BACKGROUND INFORMATION:

Every year an estimated 450,000 Americans are treated in hospitals for burn injuries. This number does not include minor burns that are treated outside of the hospital environment. Most burn injuries occur in the home. (1) Worldwide there are an estimated 265,000 deaths due to burns every year. (2) Burns present a severe physical and psychological trauma.

Scar formation is a normal reaction of the body to injury. Scars develop as a result of damages such as burns, deep lacerations, or a variety of other injuries that penetrate or damage the skin. The development of scarring is the method by which the body heals wounds. In cases where injury is too deep or severe, skin grafts are usually performed. In grafts, skin is taken from a non-damaged area of the body and reattached over the injured area.

The characteristics of scar tissue vary with the individual, but generally follow a typical pattern of wound healing. At first the scar is usually red in appearance (vasularity) and is considered an “immature” scar. As time passes and healing continues the scar will fade and become “mature”. Massage has shown the ability to prevent scar formation (3-7) and contracture (3) as well as promote elasticity (3,5), decrease vascularity (7,8), decrease sensitivity (8) and soften skin (3,8). Massage may also help shorten the time to reach scar maturation. (6) Scars can become contracted, hypertrophic or even develop into keloids.

Hypertrophic scars are scars that become raised the above skin surface as the body overproduces collagen, the substance found in scar tissue. The appearance can be thick, irregular, and/or rough. Hypertrophic scars are usually found in larger and deeper wounds, wounds that require grafting, and wounds that take a
long time to heal. The prevalence rate of hypertrophic scars among burn patients varies greatly from 32-72%.\(^9\) It is believed that several risk factors play a role in the large range such as “black skin…”, “… female, young age, burn site on neck and upper limb, multiple surgical procedures, meshed skin graph [sic], time to healing, and burn severity”.\(^9\) In hypertrophic scarring collagen fibers align themselves in non-uniform patterns creating “chaotic whorls of tissue”.\(^4\) Massage elongates and organizes new collagen fibers which prevent formation of these scars.\(^4\) Massage plays a major role in preventing hypertrophic scars\(^3-6\).

Keloid scars are hypertrophic scars that are considerably larger than the original wound. “Blood type A, hyper-Immunoglobulin E syndrome (high allergy risk), hormone peaks (puberty, pregnancy), age 10-30 years old, and Hispanic, Afro-American or Asian (but not albino) background have all been associated with high risk of developing keloid scars.\(^10\)” According to Rowley-Conwy these scars are “uncommon following a burn injury”\(^4\). Arno informs us that “… most of the therapeutic approaches may be used for both hypertrophic scars and keloids\(^10\).”

Burn survivors undergo extensive treatment for their burns while in the hospital. Upon release from the hospital, post-treatment care typically consists of outpatient wound care, pharmaceutical pain management, and physical therapy which includes massage. “Physical therapy consists notably of hand or mechanical massages…etc.”\(^11\) Massage therapy is part of the standard treatment present in most burn rehabilitation centers for optimal scar modification.\(^7,8,10,11\)

The use of massage therapy as a standard treatment has the added benefits of reducing symptoms of burn scars such as pain\(^5,10,12\), itching (pruritus)\(^4,5,7,10,12,13\), range of motion\(^10\), and anxiety\(^10,12\). Pruritus has an incident rate of 87% in adults and 100% in children\(^13\). “Possible mechanisms explaining the effect of massage therapy include the principles of the ‘gate theory’ and the effect of increased vagal activity, which reduces circulating stress hormones in treated patients”\(^13\). Massage therapy offers a safer approach to reducing pain and anxiety for patients with burns\(^12\).

**Rationale:**

Research has indicated not just psychological\(^10,12\) benefits from massage but reduction in pruritus\(^4,5,7,10,12,13\), improvement in scar characteristics\(^3,5-8\), reduction in scar formation\(^3-7\), and reduction in pain\(^5,10,12\). Massage can be used to help prevent or contain the negative evolution of scars\(^3-8\). There is a clear and consistent relationship between the effects of massage therapy and burn rehabilitation.

A major key to acceptance of the effectiveness of a given treatment in the medical and research community is using evidenced based research that clearly demonstrates the efficacy of the procedure and/or intervention. The importance of touch to recovering burn survivors cannot be overestimated.

As the repository of high quality research on burn treatment grows, and training based on this research develops, massage therapists will be able to learn new techniques to assist clients in recovery. “It is
essential that the burn care practitioner is skilled and knowledgeable in all aspects of rehabilitation care to ensure the patient can achieve the best physical, emotional and psychosocial outcomes” (4).

This statement is in line with AMTA’s standards of practice:

- provide safe, consistent care
- determine the quality of care provided
- 1.4 The Practitioner seeks professional supervision/consultation consistent with promoting and maintaining appropriate application of skills and knowledge.
- 2.2 Pathophysiology (Contraindications)
- 2.2.1 The Practitioner maintains current knowledge and skills of pathophysiology and the appropriate application of massage/bodywork.

This statement fully supports portions of AMTA’s core values:

- We are a diverse and nurturing community working with integrity, respect and dignity.
- We embrace consistency in education.
- We endorse professional standards.
- We affirm and promote the benefits of massage therapy as validated by research.

This statement fully supports AMTA’s vision statement:

- As the most trusted professionals in massage therapy, American Massage Therapy Association (AMTA) members are integral to health care and wellness.

The position statement supports portions of AMTA’s vision for the future:

- Massage therapy is a vital component of health care and wellness.
- AMTA members are devoted to professionalism and excellence in massage therapy practice.
- Quality research is the foundation for evidence-informed massage therapy education and practice.
- AMTA promotes its members as the highest quality professionals in massage therapy.
- Massage therapy is easily accessible.

The position statement supports the portions of the Goals and Objectives of AMTA, as follows:

PROFESSIONAL COMPETENCY
Goal: Support high standards in massage therapy education.
Objective: Expand massage therapy education that elevates the professional competency of our members.

ADVOCACY AND INFLUENCE
Goal: The health care and wellness industry accepts the value of massage therapy.
Objective: Increase understanding of the benefits of massage therapy through education of the health care and wellness industry.

INDUSTRY RELATIONSHIPS
Goal: AMTA is a respected leader within the health care and wellness industry.
Objective: Increase collaboration between AMTA, its members and other health care and wellness industry leaders.

RESEARCH
Goal: AMTA members are aware of the importance of scientific research to the massage therapy industry.
Objective: Increase the opportunities for members to access massage therapy scientific research through AMTA sources.

In line with AHRQ guidelines on the value of high quality research, AMTA has also stated in previous strategic plans that “Massage therapy education and practice is evidence-informed”.

Position Statement
It is the position of the American Massage Therapy Association (AMTA) that massage therapy may assist in the rehabilitation of burn scars.

References:


Burn Incidence and Treatment in the United States: 2013 Fact Sheet
The following annual estimates have been derived from statistics provided by the U.S. Vital Statistics, several ongoing national surveys, selected states and the National Burn Repository of the American Burn Association. Repository reports describe admissions to hospitals with specialized services provided by "burn centers."

Burn Injuries Receiving Medical Treatment: 450,000
This general estimate is derived mainly from federal surveys which provide annual estimates of hospital admissions and visits to hospital emergency departments. The estimate range acknowledges that some burns may have been treated solely at hospital clinics, community health centers, or private medical offices. Such burns are more likely to be minor, and the number of such facilities sampled is too small to provide reliable estimates for burns.
Sources: National Electric Injury Surveillance System-All Injury Project (NEISS-AIP); National Emergency Department Survey (HCUP-NEDS) (2010 Data); National Ambulatory Medical Care Survey.

Fire/Burn/Smoke Inhalation Deaths Per Year: 3,400
This total includes 2,550 deaths from residential fires, 300 from vehicle crash fires, and 550 from other sources (approximately 150 deaths from flame burns or smoke inhalation in non-residential fires, 400 from contact with electricity, scalding liquids or hot objects). Fire and burn deaths are combined because deaths from burns in fires cannot always be distinguished from deaths from toxic smoke or other non-burn causes.
Hospitalizations Related to Burn Injury: 40,000, including 30,000 at hospital burn centers

Over 60% of the estimated U.S. acute hospitalizations related to burn injury were admitted to 127 burn centers. Such centers now average over 200 annual admissions for burn injury and skin disorders requiring similar treatment. The other 4,500 U.S. acute care hospitals average less than 3 burn admissions per year.

Selected Statistics: 2003-2012 Burn Admissions to Burn Centers

Survival Rate: 96.6%

Gender: 69% male, 31% female

Ethnicity: 59% Caucasian, 20% African-American, 14% Hispanic, 7% Other

Admission Cause: 43% fire/flame, 34% scald, 9% contact, 4% electrical, 3% chemical, 7% other

Place of Occurrence: 72% home, 9% occupational, 5% street/highway, 5% Recreational/Sport, 9% Other

Source: American Burn Association National Burn Repository (2013 report)

Key facts

- An estimated 265,000 deaths every year are caused by burns – the vast majority occur in low- and middle-income countries.
- Non-fatal burn injuries are a leading cause of morbidity.
- Burns occur mainly in the home and workplace.
- Burns are preventable.


Delayed healing of skin wounds can be caused by wound instability, whereas appropriate massage or exercise prevents sclerosis and scar contracture. However, the mechanism by which wound healing is related to mechanical stress has not been fully elucidated. The present study aimed to identify whether mechanical stretching of fibroblasts reduces their production of extracellular matrix. We transferred skin fibroblasts into collagen-coated elastic silicone chambers, cultured them on a stretching apparatus, and used RT-PCR to examine the effects of mechanical stretching on the expression levels of 17 genes related to extracellular matrix production and growth factor secretion. We found that connective tissue growth factor (CTGF) was downregulated after 24 hr of cell stretching. Specifically, the CTGF mRNA and protein levels were 50% and 48% of the control.
levels, respectively. These findings suggest that cyclic stretching of fibroblasts contributes to anti-fibrotic processes by reducing CTGF production.


Management of major burns is complex and challenging because of the serious and often life-threatening nature of the injuries and associated systemic complications. Therefore, the burn care practitioner requires comprehensive knowledge of the treatment options and procedures that may be used to maximise patient rehabilitation and recovery. This article aims to discuss the latest evidence in burn care, and the treatments and interventions that a patient may receive following a major burn injury.


OBJECTIVE: To evaluate the effect of burn rehabilitation massage therapy on hypertrophic scar after burn.

METHOD: One hundred and forty-six burn patients with hypertrophic scar(s) were randomly divided into an experimental group and a control group. All patients received standard rehabilitation therapy for hypertrophic scars and 76 patients (massage group) additionally received burn scar rehabilitation massage therapy. Both before and after the treatment, we determined the scores of visual analog scale (VAS) and itching scale and assessed the scar characteristics of thickness, melanin, erythema, transepidermal water loss (TEWL), sebum, and elasticity by using ultrasonography, Mexameter(®), Tewameter(®), Sebumeter(®), and Cutometer(®), respectively.

RESULTS: The scores of both VAS and itching scale decreased significantly in both groups, indicating a significant intragroup difference. With regard to the scar characteristics, the massage group showed a significant decrease after treatment in scar thickness, melanin, erythema, TEWL and a significant intergroup difference. In terms of scar elasticity, a significant intergroup difference was noted in immediate distension and gross skin elasticity, while the massage group significant improvement in skin distensibility, immediate distension, immediate retraction, and delayed distension.

CONCLUSION: Our results suggest that burn rehabilitation massage therapy is effective in improving pain, pruritus, and scar characteristics in hypertrophic scars after burn.

BACKGROUND: We conducted an experimental study to compare the effect of massage using topical agents (Kelo-cote or Contractubex) on scar formation by massaging the healed burn wound on the dorsal area of Sprague-Dawley (SD) rats.

METHODS: Four areas of second degree contact burn were made on the dorsal area of each of 15 SD rats, using a soldering iron 15 mm in diameter. After gross epithelialization in the defect, 15 SD rats were randomly divided into four groups: the Kelo-cote group, Contractubex group, Vaseline group, and control group. Rats in three of the groups (all but the Control group) were massaged twice per day for 5 minutes each day, while those in the Control group were left unattended. For histologic analysis, we performed a biopsy and evaluated the thickness of scar tissue.

RESULTS: In the Kelo-cote and Contractubex groups, scar tissue thicknesses showed a significant decrease, compared with the Vaseline and control groups. However, no significant differences were observed between the Kelo-cote and Contractubex groups. In the Vaseline group, scar tissue thicknesses showed a significant decrease, compared with the control groups.

CONCLUSIONS: The findings of this study suggest that massage using a topical agent is helpful in the prevention of scar formation and that massage only with lubricant (no use of a topical agent) also has a considerable effect, although not as much as the use of a topical agent. Thus, we recommend massage with a topical agent on the post-burn scar as an effective method for decreasing the scar thickness.


Post-burn itch is a distressing symptom in burns rehabilitation and its treatment often proves frustrating for the patient and the multidisciplinary burns team. Traditionally, the mainstay of antipruritic therapy for decades has been antihistamines and massage with emollients. With a better understanding of the neurophysiology of itch emerged a new dimension in the treatment of post-burn pruritus. Gabapentin, a centrally modulating anti-epileptic agent and α2δ ligand, proved in clinical trials to be immensely better in the treatment of post-burn pruritus. Pregabalin is a newer structural analog of gabapentin. It has a much better anxiolytic effect and pharmacokinetic profile as compared to gabapentin. The current study was initiated to specifically study the role of pregabalin in relieving post-burn itch as this has never been investigated before. This double blind, randomized and placebo controlled study had four arms and was carried out on 80 adult patients (20 each). The four arms were: pregabalin, cetirizine with pheniramine maleate, combination of pregabalin, cetirizine and pheniramine maleate, and placebo (vit. B comp.). Massage with coconut oil was integral to all groups. Drug dosage was determined by initial VAS (visual analog scale) scores. All groups matched in demographic data and initial VAS scores. VAS scores were evaluated over next 28 days (days 3, 7, 14, 21 and 28). In patients with mild itch (VAS scores 2-5) or moderate itch (VAS scores 6-8) near complete remission of itch was seen in combination group and pregabalin group where the response was comparable and close to 95%. This was significantly better response than antihistaminic combination or massage alone. However, massage alone was sufficient in decreasing mean scores in mild itch, in a large percentage of patients. Amongst the patients with
severe itch (VAS scores 9-10), 3/6 and 6/7 patients dropped out of trial in the antihistaminic and placebo groups, respectively. Combination therapy and pregabalin alone had exactly similar decrease in itch scores by day 28 (78.9%). This far exceeded the response in the antihistaminic and placebo groups (23.9% and 9.2% respectively). We conclude that moderate to severe pruritus (VAS 6-10) should be treated with a systemic, centrally acting agent like pregabalin or gabapentin to eliminate itch or bring it down to tolerable limits. Patients with mild itch having VAS scores between 4 and 5 may be better served with addition of pregabalin even if massage and antihistaminics [sic] can control post-burn itch to a reasonable extent because of quicker, predictable and complete response, along with anxiolysis.


The purpose of this study is to document the organization and current practices in physical rehabilitation across burn centers. An online survey developed for the specific purposes of this study sought information regarding a) logistics of the burn center; b) inpatient and outpatient treatment of patients with burn injury; and c) specific protocols in the treatment of a few complications secondary to burn injuries. Of the 159 responses received, 115 were received from the United States, 20 from Australia, 16 from Canada, and 7 from New Zealand. The overall sample included responses from 76 physical therapists (PTs) and 78 occupational therapists. Seventy-three of those surveyed considered themselves primarily a burn therapist. Nurses (86%) were reported as primarily responsible for wound care of inpatients, followed by wound care technicians (24%). Ninety-seven percent of the therapists reported following their own treatment plans. The trunk and areas of head and neck were treated by both PTs and occupational therapists, whereas the lower extremities continue to be treated predominantly by PTs. Some common practices regarding treatment of a few complications secondary to burn injuries such as splinting to prevent contractures, treatment of exposed or ruptured extensor tendons, exposed Achilles tendons, heterotopic ossification, postoperative ambulation, conditioning, scar massage, and use of compression garments are described. Opportunities exist for 1) developing a common document for practice guidelines in physical rehabilitation of burns; and 2) conducting collaborative studies to evaluate treatment interventions and outcomes.


The purpose of this study was to perform a systematic review of the existing literature on the incidence of hypertrophic scarring and the psychosocial impact of burn scars. In a comprehensive literature review, the authors identified 48 articles published since 1965 and written in English which reported the incidence and risk factors for hypertrophic scarring or assessed outcomes related to scarring. Most studies had important methodological limitations limiting the generalizability of the findings. In particular, the absence of standardized valid measures of scarring and other outcome variables was a major barrier to drawing strong conclusions. Among studies on hypertrophic scarring, the prevalence rate varied between 32 and 72%. Identified risk factors included dark skin,
female gender, young age, burn site on neck and upper limb, multiple surgical procedures, meshed skin graft, time to healing, and burn severity. With regard to psychosocial outcomes, two studies compared pediatric burn survivors with a nonburn comparison group on a body image measure; neither study found differences between groups. Across studies, burn severity and location had a modest relationship with psychosocial outcome variables. Psychosocial variables such as social comfort and perceived stigmatization were more highly associated with body image than burn characteristics. To advance our knowledge of the epidemiology of scars and the burden of scars, future studies need to implement more rigorous methodologies. In particular, standardized valid measures of scarring and other outcomes should be developed. This process could be facilitated by an international collaboration among burn centers.


Keloids and hypertrophic scars occur anywhere from 30 to 90% of patients, and are characterized by pathologically excessive dermal fibrosis and aberrant wound healing. Both entities have different clinical and histochemical characteristics, and unfortunately still represent a great challenge for clinicians due to lack of efficacious treatments. Current advances in molecular biology and genetics reveal new preventive and therapeutical options which represent a hope to manage this highly prevalent, chronic and disabling problem, with long-term beneficial outcomes and improvement of quality of life. While we wait for these translational clinical products to be marketed, however, it is imperative to know the basics of the currently existing wide array of strategies to deal with excessive scars: from the classical corticotherapy, to the most recent botulinum toxin and lasers. The main aim of this review paper is to offer a useful up-to-date guideline to prevent and treat keloids and hypertrophic scars.


Physical therapy consists notably of hand or mechanical massages, pressure therapy using various fabrics or splints, cryotherapy, laser therapy, etc. It forms part of the range of therapies used to treat pathological scars, including medical and surgical treatment. While the results are often satisfactory for hypertrophic scars, they remain uncertain for major keloids.


Burn can be among the most severe physical and psychologic [sic] traumas a person may face. Patients with burns commonly have severe itching and pain. Severe itching has also been associated with anxiety, sleep disturbance, and disruption of daily living activities. The addition of complementary treatments to standard care may lead to improved pain management and may offer a safer approach for reducing pain and procedural anxiety for patients with burns. The authors conducted an experimental study to examine whether the effects of massage therapy reduced burned adolescents' pain, itching, and anxiety levels. Sixty-three adolescents were enrolled in this study shortly after admission (mean days = 3 +/- 0.48) at a burn unit in a large university hospital from
February 2008 to June 2009. The measures including the pain, itching, and state anxiety were collected on the first and last days of the 5-week study period. The participants had an average age of 14.07 +/- 1.78 years and came usually from the lower socioeconomic strata. The authors observed that massage therapy reduced all these measures from the first to the last day of this study (P < .001). In most cultures, massage treatments are used to alleviate a wide range of symptoms. Although health professionals agree on the use of nonpharmacologic method for patients with burns, these applications are not yet common.


Pruritus represents a common and distressing feature of burn wounds. Over the last decades, significant advances in neuroanatomical and neurophysiological knowledge have resulted in the elucidation of the mediators and pathways involved in the transmission of pruritic impulses. A plethora of therapeutic approaches have been evaluated mostly in small-scale studies involving burns patients targeting both the peripheral and the central components of the neurologic pathway. Antihistamines, doxepin, massage therapy, and transcutaneous electrical nerve stimulation are effective strategies to combat pruritus in burns patients. Recent studies have provided preliminary evidence regarding the effectiveness of gabapentin and ondansetron. The area of burns pruritus is under-researched and large-scale studies are required to reinforce the armamentarium of specialists with evidence-based regimens for the treatment of this highly distressing symptom. (C) 2009 The American Burn Association