Surgeries, Scars, and Burns
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As a massage therapist and educator, I have always had an interest in tissue repair and regeneration. The process of tissue healing is awe inspiring to me. I believe our scars can be a vehicle for personal growth and awareness. I propose that contact with scars during a massage therapy session can help facilitate physical softening of the scar while also helping to ameliorate any emotional trauma or stress held within the soft tissues. In this article, I will review the tissue repair process and detail the types of scars and burns found on the body. Finally, I will suggest some general ways to work with scars and burns.

I became interested in scar and burn healing while working as an Emergency Medical Technician in Darien, CT. As First Responders we splinted, bandaged, and rescued many residents of our community. The people I always wondered about were the burn patients and the people with road rash from motorcycle or bike crashes. I always wondered, “How would they survive? What would their recovery be like? Would the tissue heal into a functional unit?” I’ve cut and injured my own hands and other body parts and have always monitored the process, from open wound to complete repair. Some areas have fully recovered with no scar marks while others show a clear mark of my assault to the body. One example is the scar I carry from a whitewater rafting trip. I was pitting avocados for lunch and my very sharp filet knife found the web between my index and middle fingers. The tip of the knife did not puncture through to the other side of the hand but it sure felt like it! Of course we were less than half way into the trip and as the trip leader, I had to stop the bleeding, bandage the cut, and still be able to row my rowdy crew down the “Taos Box”! That scar holds many memories and reminds me to use safer food preparation techniques. I was lucky really; everything continued to function correctly. My injury healed and I just have a story to tell.

I discovered the emotional power of scars during massage school. We were working with castor oil packs and heat to help facilitate the relief of abdominal cramps and constipation. My partner John had an appendectomy scar and another small scar from an auto accident. My fingers were drawn to the scars and John began to report flashes of memory and began to tear up. I found myself being amazed that minimal contact could stimulate such a strong emotional response. With John’s permission, I started to pull on the scar and to warm it up with some light pressure between my fingers. The emotion faded as this contact brought John into the present moment. He told me he felt silly crying about this scar but that he really felt clearer about the process he had gone through during the surgery and recovery, and how alone he felt in the hospital although his parents were always there to support him. You see, he was young and vulnerable and away from home for the very first time. He felt scared and wounded, yet never really got to talk about these feelings with his family because there were other kids in the house who needed attention too! John helped me to see the power of touch; warm intentional touch, that helped someone rediscover and heal a part of the body affected by trauma. I
hope to help you see scars and burns from a new perspective and to gain a deeper understanding of the powerful self-healing process of our bodies.

Tissue Repair

The complex cascade of cellular interactions and the secretion of growth factors and various proteins needed for tissue repair are documented throughout the literature. I will outline the basics of tissue repair for you in this article. Further study and reading about this critical function can be reviewed in such prestigious journals such as Nature, Wound Repair and Regeneration, and Journal for Biochemical and Cell Biology.

You probably reviewed the phases of tissue repair in your massage school anatomy and physiology classes. Yet, it is clear to this author that the process is so complex and detailed that only students who have clients, friends, or family members who have been affected by a large wound, burn, or other trauma to the skin and the deeper tissues can grasp the vital role tissue repair plays in our well being.

Let’s look at the steps of tissue repair and then apply that knowledge to the treatment of our clients. The author knows that some of you will skip this next section with all of its technical terminology. Since I really want you to understand the mechanism of tissue healing, I will summarize this process its briefest terms. The phases of tissue repair are homeostasis, inflammatory response, proliferative phase, and remodeling. These phases are not entirely linear and overlap one another. The first stage, homeostasis, is characterized by two features, clotting (closing the wound and creating a temporary matrix) and chemotaxis (attracting the immune cells to fight infection). In the inflammatory stage, the immune cells go to work patrolling the wound area and ingesting devitalized cells and tissue. This phase prepares the area for rebuilding. During the proliferation (repair) phase, the provisional wound matrix is remodeled and replaced with scar tissue, which partially restores the structure and function of the tissue. In the final phase of wound healing, remodeling, cell density and metabolic activity decrease. Changes also occur in the collagen, enhancing tensile strength. This newly repaired tissue has only about 25% of its original tensile strength, increasing slowly over time to a maximum of about 80%.

Types of Scars

Scars are areas of fibrous tissue that replace the layers of skin that have been compromised by a cut/incision, burn, or other trauma to the skin. Scar tissue is inherently different than the tissue it has replaced. Generally, the area will be more sensitive to UV light (sunburn) and may contain less sweat glands and hair due to the injury and subsequent repair. The depth and breadth of the cut, burn, or trauma determines the amount of scar formation. Surgical scars tend to heal cleanly and don’t present the same difficulty of repair and healing that a deep 2nd or 3rd degree burn might present. Infection control and proper wound care are factors in tissue repair. Poor hygiene and poor wound care can lead to hypertrophic or keloid scarring. Improper regulation of the soluble mediators may also contribute to hypertrophic and keloid scars as well.
Hypertrophic scars

Hypertrophic scars tend to be red raised areas that do not grow beyond the original wound. These scars may improve in appearance with time. I have found in my practice that attention to this type of scar can accelerate the reduction in redness and swelling. Generally, I am offering warm contact with the scar and gentle pulling and shearing of the scar. I find it helpful to teach the client how to manipulate the scar tissue directly and encourage the client to continue self-treatment of the scar 2-3 times per week. This self-care really helps the client come to terms with their scar and it stimulates the tissue by bringing more blood and oxygen to the area. I propose that the area may even undergo another round of remodeling as the client and therapist work together softening and manipulating the scar tissue. Further study will be needed to verify this idea.

Keloid Scars

Keloid scars are hypertrophic scars that continue to grow outside the boundary of the original injury site even after the injury site has been repaired. Keloid scars tend to affect younger populations and people with darker skin. They can be caused by trauma, surgery, accidents, or even acne. These scars seem to be in a continuous state of inflammation and remodeling and sometimes grow into a large mass. Most keloid scars are benign but they can create tremendous mental and emotional distress for the person with the keloid. In my practice, we try to “cool” the scar by using ice massage to vaso-constrict the tissues. Once the client feels “ready” we begin a mild and gentle friction treatment around the keloid. I also use a gentle myofascial stretching of the tissues adjacent to the scar. These treatments are designed to help the client “re-discover” the area mentally, physically, and emotionally. Successful treatment includes a softer feel to the keloid as well as qualitative changes in the client’s mental and emotional feelings about the actual scar.

Trauma Scars

People have accidents everyday. Trauma is defined as an injury caused by physical force including car accidents, falls, drowning, gunshots, fires and burns, and stabbing or other physical assault. More than 100,000 people die from the effects of trauma. Those that recover from a trauma event generally carry some form of a scar and as massage therapists, we may have the opportunity to help our clients heal emotional as well as physical aspects of this trauma. The physical scar will go through all of the phases of tissue repair. The client may avail himself or herself of mental and emotional counseling to help alleviate pain and suffering experienced from the accident. Trauma scars can take any shape or form. They may remodel and repair perfectly or they may be somewhat hypertrophic, showing signs of redness and inflammation. Some trauma scars are sunken and never fully fill in the “gap” created by the trauma. Talk with your clients about how they feel about their scars. Make warm contact with those scars. Monitor the client’s response to your touch. Do they open up to your touch or are they “closing down” or going away from your contact? If the client is opening to our touch and gentle melting and softening of the tissues, then we may continue to “work with” the scar. If the client
is closing down and withdrawing from our touch, it is time to stop and move on to another area. Remember, we are treating a whole person here and everyone heals at his or her own pace. We don’t have to get the whole job done in one or two sessions.

**Surgical Scars**

I encountered my first hip replacement scar in the winter of 1990. My client had a hip replacement 3 years prior and felt good about his progress. He could play golf and walk without pain. His scar was at least 14 inches long and healed, yet the scar was still red and inflamed. He wanted to know what he could do about it and if the redness and inflammation would go away. At the time I didn’t know much about hip replacement surgeries or about scars in general. I offered to work with the scar and see what would happen. Generally, his scar became less irritated and red. The height of the scar decreased and he was happy. The scar didn’t go away but he was less focused on the appearance of the scar and the massage therapy applied to his hip region truly helped him “feel better”.

Medical technology has progressed significantly since 1990 and surgical scars are getting smaller and smaller. Now I frequently see people with tiny two and three inch scars from very complex surgeries. Surgical scars may even become a thing of the past as medical researchers refine and understand the tissue regeneration process. Recently, scientists in the UK reported a finding suggesting they can induce scar-free healing by subtly altering the ratio of growth factors supplied to a scar area. Studies are underway with skin-graft patients and there are hopes of benefiting all surgical patients by reducing the scar formation and preventing further complications post-surgery. “If this technique is successful it means that scarring may no longer be an inevitable consequence of modern injury and that a biological/pharmaceutical approach to the prevention of human scarring is now possible.”

**Burn Scars**

There are too many variables to adequately describe burn scars. Approximately 1.1 million burn injuries require medical attention every year. A burn is defined as tissue damage caused by a variety of agents including heat, chemicals, electricity, sunlight, or nuclear radiation. Burns often lead to infection, due to damage to the skin’s protective layer. Up to 10,000 people in the United States die every year of burn-related infections. Burn scars are found on all parts of the body and can affect the client’s physical, mental, and emotional wellbeing. Disfigurement, possible lung injury, pain, and emotional trauma are all issues to address in the recovery of a burn client. Each burn patient’s needs are different and will require an individual treatment protocol, with the client helping to direct the massage therapy session. Clients seem to benefit from myofascial stretching and melting, while cross-fiber friction techniques can be used in areas of strictures and excess collagen build-up. Gentle gliding and the application of chemical or herbal preparations directly on the scar can have a cicatrisant (skin healing) effect. The proper application of essential oils to scars and burns has been demonstrated to be efficacious. Examples include *Lavendula Angustifolia* and *Helichrysum Italicum*. 

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There are also studies from Japan showing the effectiveness of a honey and sesame oil based ointment\textsuperscript{11}.

**Types of Burns**

**Superficial thickness**

First Degree burns affect only the epidermis. These burns tend to have a blister and redness but rarely are they dangerous nor do they tend to lead to scarring. Examples of first-degree burns are sunburn and a steam burn from cooking. Treatment includes cooling the affected tissues and covering the area for protection from pressure and friction. First-degree burns tend to heal quickly and can be treated at home. If the area of the first-degree burn is large, you should treat it as a major burn and get medical treatment.

**Partial thickness**

Second Degree burns affect both the epidermis and the dermis. There is some subjectivity in the classification of second-degree burns since the severity depends upon the depth of the burn and the body surface area (BSA). In the United States, we tend to classify a second-degree burn as a partial thickness burn (more superficial) and a third-degree burn as a full thickness burn (more depth). In some countries a second-degree burn is described as follows: a superficial dermal, a mid-dermal, or a deep dermal burn. No matter how you classify the burn, a second-degree burn has damaged the outer protective layer (the skin) AND the dermis with its blood vessels, nerves, and connective tissue matrix. Examples of second-degree burns are cigarette burns, electrical burns, and corrosive chemical burns. Second-degree burns tend to be very painful. These burns can be life threatening depending upon the depth and the surface area affected. The larger the burn, the more dangerous it is for the patient. There can be blistering and fluid loss that can cause shock. Medical treatment is recommended.

**Full thickness**

Third-Degree burns involve damage or complete destruction of the skin to its full depth and damage to the underlying fascia and musculature. Many people with third-degree burns require skin grafting. Both second and third-degree burns tend to create a loss of fluids and blistering that can lead to shock. Medical treatment is required for third-degree burns and the patient could have an extended stay in a hospital setting depending upon the size and location of the burn. The third-degree burn can actually be less painful than a severe second-degree burn because of the vast tissue damage to the nervous tissue. Since there are no signaling pathways back to the brain some people delay treatment because “it doesn’t hurt.” Always treat third degree burns as a medical emergency and activate your emergency response plan. Lay the patient down, keep the airway open, treat for shock, cover the area with sterile dressings, and transport immediately. DO NOT remove clothing, damage blisters, or apply ointments or salves. After healing, third-degree burns will leave scars that fill-in the damaged area. There will be little or no sweat pores and very little to no hair on the surface.
Clients who have experienced severe burns can have deep mental and emotional scars in addition to their physical ones. They may need both psychological and physical rehabilitation to return to the activities of daily living. Assist them by allowing them to control the pace of your sessions. Give them “space” to talk about and release any mental and emotional aspects of their treatment. Therapists should offer support, loving contact, and warm touch for successful treatment.

Research

Research information into the effectiveness of massage on mature scar tissue is virtually nonexistent. There have been multiple studies conducted by Dr. Tiffany Field, et al, regarding the usefulness of massage therapy in reducing pain and stress during dressing changes and debridement of burn patients. A more recent study has been undertaken to evaluate the efficacy of MT on mature scars. Nancy Smith and Diane Garrison received a community service grant from the Massage Therapy Foundation to work with children at Camp Amigo, a summer camp for burn survivors. The results of this study were mixed, showing improvements in the emotional realm but limited benefit on the physical scars. Since the time frame of treatment was so abbreviated (3 treatments), it is difficult to project what the success rate might be over a longer period of time. Further study is definitely warranted. Full results of this study will be published at a later date.

The author believes that the area of scars and burns lends itself to documentation by case study. The use of photographs and both qualitative and quantitative measurements is recommended to those working with clients in this population. Case studies can be submitted to the Massage Therapy Foundation and will advance our understanding of the effectiveness of massage therapy on mature scars and burns.

References


Organizations –

Burn Survivors Throughout the World - [http://www.burnsurvivorsttw.org/](http://www.burnsurvivorsttw.org/)
Keloid Scar, Burn Victims, and Skin Graft Survivor Community - [http://www.skinhealing.com/](http://www.skinhealing.com/)