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Time (and Care)
Heals All Wounds

*I'm just very self-conscious about these scars.
They remind me of the terrible acne I had as a
teenager.*

—Ellen, 35, social worker

If you live a full, active life it is impossible not to acquire a few scars. Some of us see them as badges of honor. Some of us are simply embarrassed by them. How we feel about our scars often has a lot to do with how we got them. For example, a cluster of acne scars, even just one or two ice-pick scars, on an otherwise smooth cheek won't be met with the same acceptance that a scar acquired in a childhood accident might be. My older brother once pushed me off the top bunk bed, sending me to the floor with a new gash over my eyebrow. The scar is now faded and barely noticeable, but when I see it in the mirror, memories of childhood flash briefly in my mind.

A scar is the technical term for tissue the body makes to right a wrong. In the process an amazing number of events happen as though preprogrammed. A cut from a broken wineglass (don't retrieve them from the fireplace!), a scrape from the pavement, an incision from

“WILL I HAVE A SCAR?”

This is the most common question I hear when I talk about cosmetic procedures and reconstructive surgery. It is a smart question, but it took me a while to really understand what my patients meant by asking it. To a doctor, a scar, as this chapter explains, is a normal process for healing skin. To most people, however, the word connotes an unsightly, even deforming and distracting mark on the face or body. I now answer by saying that while scars are part of normal healing, using the techniques we have available, we will strive to hide it, making it as unnoticeable as possible. In the end, it's not how long the “scar” is but whether or not it is noticeable.

plastic surgery, all set in motion a cascade of finely tuned events in your skin.

When you get any kind of wound, however small, your body increases the production of collagen to mend the site. Collagen is the same material your dermis is made of but when the body churns it out to fix a wound, it is thicker and denser, to make sure it holds. As a result, at least early in the process, the scar may look and even feel thicker than the normal skin around it. Scars that result from a surgical incision are usually narrow and pale, unless you have a tendency to make excess scar tissue. Scars from accidents that are jagged may heal with a shape that reflects the original injury. How a scar looks in the end depends on what caused it, how it was treated, how your own body deals with it, and the patience you can bring to bear on the process. In general, like emotional trauma, time heals all wounds. But you can help.

▪ HOW A WOUND HEALS

Once you've been injured, whether by a scalpel, in an accident, or as a result of acne, the natural healing process begins. This process has three stages, which we'll get to in a moment: inflammation, proliferation, and maturation. Dermatologists also generally divide wound healing into two broad categories: primary intention and second intention.

Wounds that heal by primary intention are those that have been neatly sutured together in an effort to help the body form bridges of scar tissue that will remodel the skin. Sometimes surgical wounds that heal on their

own, including some surgical wounds as well as deep scrapes and other accident marks, are in the second intention category; this natural healing is quite a remarkable process.

AFTER SURGERY

The inflammatory phase of healing begins about twelve hours after surgery and lasts for approximately five days. Don't worry if there is a little crusted blood around the incision. Adequate blood flow to the wound site is what ensures that the wound is healing. Blood is the magic potion that carries special cells, chemicals that first staunch the flow of blood by constricting vessels in the area, and platelets to plug up any leaks. In addition, brigades of specialized white blood corpuscles march to the area to fight off the germs that intact skin normally keeps out. If germs do gain a foothold in the wound, infection results. Infection is rare on the face or scalp where the blood flow is robust. In other areas, such as those farthest from the heart, like the legs and feet where blood flow can be more sluggish, the risk of infection is greater.

Proliferation begins about a day after surgery while the inflammation

JUST THIS ONCE, DON'T LISTEN TO GRANDMA

Wounds heal best when kept moist. It has been proven that moist wounds of the skin will heal up to 50 percent faster than wounds that dry out and develop a scab. Follow these simple rules, but don't try convincing Grandma to do it—old beliefs die hard. For scrapes, cuts, and surgical wounds, try the following:

1. Clean the wound daily with tap water. Don't use hydrogen peroxide. (The bubbles make it look as if something good is happening, but in fact, in the test tube, hydrogen peroxide can injure or kill cells.)
2. Apply a thin layer of antibiotic ointment such as Polysporin or Bactroban. Don't overdo it, since prolonged use of the former can result in an allergic rash.
3. After the first week, plain petroleum jelly (Vaseline) or Aquaphor works well to keep the wound moist.
4. Cover the wound with a Band-Aid or other nonstick dressing. Don't use gauze—the fibers can get in the wound.
5. Once the wound has healed and you can see new skin growing over it, you can discontinue the ointment.

phase is still in progress and continues for about a week. It is during this phase that fibroblasts divide rapidly in preparation for spewing out the bundles of new collagen. At this stage a variety of cells combine with collagen to build scaffolding upon which the more permanent scar tissue will be built.

Maturation refers to the slow process of remodeling the final scar. Although sufficient scar tissue forms within a few weeks, so that any sutures can be removed safely, the body continues to work hard laying cables of collagen and reconfiguring the scar. After two months the scar may still have a reddish, raised appearance, which can persist for a full year. The body's own natural refinement of scars continues, on average, for a full year, so in the world of cosmetic surgery and reconstructive surgery, we make no final judgments about the need to fix an imperfect result until the body has gotten its last licks in. In time, even the most thickened red or purple scars will become pale and flat.

AFTER AN ACCIDENT

Second intention healing is one of the skin's most miraculous defenses against an environment filled with sharp edges, hot barbecues, piercing thorns, and unkind tools. It is the body's way of saying: "Because I know you are sometimes a klutz, I will help." After a burn or a cut occurs, the body immediately begins its own remarkable campaign of rebuilding.

During this process, the wound begins to fill with fresh healing material called granulation tissue. Soon afterward the wound actually starts to contract, thanks to the work of specialized cells that make new collagen. As the collagen bundles remodel themselves over time and contract, the final scar can be much smaller than the original wound. Shortly after the wound has filled up with granulation tissue, the epidermis begins to grow over it. This allows the final healed wound to resemble the surrounding skin as much as possible. It is at this stage that you can help the body help itself. To speed successful healing and minimize any scarring at the end, keep the wound moist (See box on p. 191).

A young person's wounds will heal more quickly, but the risk of forming a raised (hypertrophic) scar is greater. Older people can take consolation in knowing that while their wounds may heal more slowly, there is less of a chance that the scar will be raised.

SLICK HEALING

In order to take advantage of the improved healing that comes with keeping wounds moist, several products are available that are waterproof, self-stick, and conform to the skin surface. By trapping the valuable wound fluid that develops in the first few days after injury, they help stimulate healing. The products include:

- Duoderm: (about \$5 per four inch square), tan-colored, gelatinous
- Tegaderm: many sizes, clear plastic
- Vigilon: expensive, gelatinous, especially soothing if first stored in the refrigerator

Each of these products is available under different brand names. Each has been shown to decrease the stinging, pain, and burning that may be associated with skin injuries.

▪ HYPERTROPHIC SCARRING

Hypertrophic scarring is the term used for scarring that is raised, which happens when the body makes too much fresh scar tissue for the job at hand. Often this happens when the wound is under tension, such as a chest wound after heart surgery. This problem is different from a *keloid*, which is actually a tumor of scar tissue that grows on its own accord. Hypertrophic scarring almost always resolves, though the patience of Job may be required. Keloids never go away on their own. Hypertrophic scars resolve because an enzyme made by the skin called collagenase eats away at excessive scar tissue in the process of

BAD SCARS

Your own risk of developing hypertrophic scars or keloids should be assessed by your doctor based on information you provide. If you are at risk, this should weigh heavily in any decision to have elective surgery for cosmetic purposes.

remodeling it. Sometimes the raised scarring that occurs after surgery or an accident can be improved by the injection of corticosteroid into the scar. It is believed that this helps speed up the process of collagen remodeling, thus flattening a raised scar sooner than it would otherwise happen. This injec-

tion can be repeated at four-week intervals if necessary to flatten a raised or uncomfortable scar.

▪ KELOIDS

Normally the body makes scar tissue to fix an injury, but occasionally the body makes more scar tissue than it needs, to the point that the scar tissue becomes a tumor in its own right. Tumors of scar tissue are called keloids and they are a major problem in people of color and in others with a genetic tendency to develop the problem.

Keloids are darkened, thick, raised tumors that occur at the site of trauma or previous surgery. They are probably caused by a genetic abnormality that leads to the overproduction of scar tissue. It seems that in people prone to keloids, the fibroblasts, cells that produce the scar tissue collagen protein, don't slow down their production of scar tissue and keloids result. Unlike hypertrophic scars, which are also thickened bands of scar tissue, keloids will not get smaller with time.

Keloids can be itchy and/or painful and can be a source of great frustration and irritation to the patient. Although they can occur anywhere, the most common sites are on the central chest, the shoulders, upper back, and earlobes. Keloids, for some unknown reason, rarely occur on the face.

Treatment is extremely difficult (see chapter 26, "The Acne Family") and consists of injection of corticosteroid directly into the keloid, excision of the tumor, or excision of the tumor followed by a brief course of radiation to the surface of the wound. The use of silicone gel sheeting early on may be helpful. Applied to the surface of the healing area for 12 hours or more a day, this reusable thin, jellylike sheet can keep the tumor flatter. Despite all efforts, keloids still come back after treatment more than half the time. Keloids are made worse by stretching or tension. If one can keep pressure on the site of a healing wound, the scar tissue will not have a chance to overproduce, thus limiting the chance that a keloid will develop.

▪ SCARRING AFTER SURGERY

From a cesarean section to open heart surgery, from a stitched leg wound acquired in a motorcycle accident to a scar resulting from the removal of a cancer, most people would rather have the scar than the alternative. However, in some situations, such as emergency surgery, a scar

may be jagged or unsightly, and you may wish to improve the appearance of a hastily done job of stitching—particularly when the scar is on the face or neck area. Surgical excision or the pulsed-dye laser may help improve the look of scar tissue. If there is persistent redness, lasers are quite effective at normalizing color. There is no good evidence that lasers can permanently flatten a raised scar in someone who is prone to healing poorly.

When traumatic scarring is impossible to avoid, improvements in surgical techniques have made it possible to repair major wounds, leaving behind minimal evidence. For instance, as little as twenty years ago, a woman who underwent a cesarean would have not only a beautiful baby but also a whopping scar stretching from the pubic area to the belly button. Cesareans now involve making a horizontal incision a few inches long below the bikini line. By the time the new baby is beginning to crawl, the surgical scar is all but invisible and you can be back in your bikini (in order to swim, not sunbathe, of course).

Hernia surgery is another example of how improved techniques can minimize scarring. The same hernia operation that would have left a diagonal scar running from pelvic bone to the flank can now be accomplished with a two-inch incision at the bikini line. Most recently, the increasing

CAN YOU HELP HEALING NATURALLY?

Here are a few products that are popular with comments about whether they really work:

Vitamin E cream: Although scientific evidence doesn't support any benefit, so many of my patients swear by it that I defer to them in its use. One cautionary note: there is a risk of contact dermatitis, so if you itch or the skin turns red stop immediately.

Calendula is thought by some to aid healing but can cause an allergic rash called contact dermatitis.

Silicone gel sheets are popularly marketed as a cure-all for scars. A sheet will help flatten some scars but only as long as it is used. Rejuveness is one brand that is widely advertised.

Mederma is an onion-based compound that some believe improves the final result of scars (try it and let me know what you think at www.totalskinmd.com).

use of laparoscopic surgery is reducing the need for extensive surgical scars.

▪ WHAT YOU CAN DO AT HOME

You can do your part to help a wound heal and soften the scar tissue on your own. Massaging a new scar from an incision or even a recent burn may help level a raised scar. Bland lubricants such as petroleum jelly can help make it easier for you to rub the area, which may still be tender. Proper technique involves pressing down on the scar in a circular fashion, against the hard undersurface of the underlying bone. Imagine that you are kneading bread, because in fact you are helping to break down bands of dense scar tissue. Do not overdo it and certainly wait until the surface of the wound is completely healed before you begin.

▪ FACIAL SCARRING

One of the most common and frustrating problems that I encounter in my practice is facial scarring. There can be many reasons for facial scarring, but the majority of people who come to see me about the problem experienced acne as adolescents or young adults. Pockmarks from the chicken pox virus used to be common too, but with the new vaccine, these scars will soon be a thing of the past.

Any facial scarring is upsetting, but I find that many people are especially bothered when it's the result of acne. Acne scarring seems to cause embarrassment even to the most un-self-conscious people. It may be because the scars arose during adolescence and serve as a daily reminder of how having acne increased the suffering of the person during an awkward period of life.

Depending on how severe your adolescent acne was or your adult acne has been, your acne scars may be a minor irritant or a more serious impediment to the quality of your life. If you want them attended to, there are more options than there were a generation ago, but the solutions can't provide a quick fix. The first step is determining what kind of scars are present. There are different types of acne scars. They can be small, deep ice pick scars, which are difficult to repair. Typically they measure 1 to 2 millimeters in diameter, and have a sharp edge with a "punched out" appearance. Another type of acne scarring is a shallow depression; such a mark can be anywhere from a few millimeters in diameter to half the size of a

THE SIX O'CLOCK NEWS, M.D.

Beware of news reports that promise that lasers can magically remove scars. They can't. First, scars are a permanent part of healed skin. Second, although lasers can smooth out raised scars and lighten the redness or brownish discoloration of healed areas, they can only do so much. There is not yet a scar-erasing laser.

penny. Often people with these depressed scars complain that the scarring gets worse as they get older. What's really happening is that the skin relaxes and sags with age through the loss of active elastin tissue, and in the process the depression in the scar becomes more accentuated.

All such acne scars occur because the surface of the skin is bound down by the tissue that developed where the acne cyst once raged. The puckered or depressed look of an acne scar is much like the effect of a button on the back of your sofa: the thread holding the button corresponds to the vertical band of scar tissue that pulls down the surface of the skin.

In the past, the most common treatment for acne scarring was dermabrasion. In this procedure, a device was used to shear off the top layer of the skin. By stripping off the skin to the level of the upper dermis, a controlled scar would develop. Ideally, this would smooth the imperfections in the epidermis. Dermabrasion is less popular now because laser resurfacing can usually accomplish the same results with more precise control and with fewer risks.

The laser used to help acne scarring is the same one that is used to treat fine lines and wrinkles related to aging (see "Skin-Resurfacing Lasers," p. 135). In my experience, multiple treatments are necessary and satisfaction is not great unless the person has reasonable expectations. Patience is critical as well: the acne scars didn't develop overnight and they won't go away in forty-eight hours. People with acne scarring need to remember that even when resurfacing and other treatment helps, they will never have the skin they had when they were eleven or twelve. Nonetheless, we can make the scars less noticeable and easier to cover with less makeup.

Depressed acne scars can be treated by injecting Zyderm or Zyplast collagen into the skin just under the depression in order to raise it up. Collagen injections are not permanent, so repeated treatments are usually

ACNE SCARS: TOUGH ALL AROUND

Zoe, a twenty-four-year-old graduate student in economics, was extremely upset over the state of scars on her face. When she came to see me she had multiple depressed scars that were also hyperpigmented. The brownish discoloration made the scars all the more noticeable. Some fresh scars were still red and yet others were in the early stages, made worse by her constant picking. I promised that I could help only if she followed these rules:

1. Don't pick.
2. Wash only once a day with nonsoap cleanser.
3. Apply anti-acne medication as prescribed.
4. Use sunscreen.

I also advised, as sensitively as I could, not to expect perfection. I told Zoe that when all her acne has quieted down, we would address ways to fix each of the different types of scars she had. It doesn't pay to paint part of the house if big areas are still peeling.

necessary to maintain a good result. The dermatologist needs to break down the bands of scar tissue because these bands are causing the retraction in the first place. You must be skin-tested with the collagen before use to ensure you have no allergies to the material, and if you have collagen-vascular disease you should not be treated with this approach.

For ice pick scarring and chicken pox scars, among the most difficult acne scars to treat, a different technique is used. Under local anesthetic a small device that looks like a cookie cutter is used to punch out the scar. The small wound is then stitched with very small sutures to convert the scar into a smooth surface scar that is just a few millimeters in length. After this has been done on all affected areas, it is then possible to resurface with the laser to blend the area together and obtain a better result. There is a low risk with the punch excision technique of a worse cosmetic result depending on skin type.

If your bouts with acne are not in the distant past, you need to be cautious before proceeding to surgery for any scars. No surgery should be done until your acne is completely under control. Even then, waiting a bit is advisable, since any surgery that is done could stimulate a flare-up of acne or be complicated by any residual acne that might recur. The use of sun-

screen to prevent hyperpigmentation from the sun as well as proper moisturization and care of the skin is extremely important.

No surgery should be performed if you have been on Accutane in the preceding twelve months. Evidence suggests an increased risk of scarring after dermabrasion, and even if other methods are used, it is best to play it safe and wait a full year after your Accutane course has been completed.

▪ SCARRING FROM COSMETIC PROCEDURES

Vanity has its price and no more so than when dealing with cosmetic procedures and surgeries so many people are eager to pursue. Abnormal scarring is the most obvious risk of cosmetic surgery, especially for those who don't heal well. Some people know they don't heal well if previous surgery has resulted in hypertrophic or discolored scars.

Some patients tell me that they don't heal well and point out a wide scar on their belly or shoulder as evidence. In fact, these are areas where it is difficult to get a great result, no matter who does the work or how the surgery is performed. The final appearance of a scar has as much to do with its location and movement of the body at that site as it does with the technique used.

If you chose your doctor for cosmetic surgery well, your physician should advise you before the surgery about possible scarring. If the doctor tells you, "Don't worry, that never happens when I do the surgery," get out of the office as fast as you can! Find a doctor who will be very clear about the relative risks and who takes the time to make sure you understand what you are getting into.

