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Note: This article, the first in a series of six, appeared in the September 1989 edition of Triathlete Magazine. The series was designed to help athletes better prevent and heal injuries. It is still being used as a patient hand-out in at least one doctor's office.

Scarred Stiff

Okay, we all know scar tissue is bad, right? It's something you don't want to have in your body. I mean, just mention the term in a roomful of triathletes and watch as an ominous hush descends accompanied by a knowing shaking of heads. But what is it? And why is it bad? It forms around an injury and it has something to do with not being able to stretch, and that's about as far as most of us get. Yet, a basic understanding of what it is, how it works, and how it impedes muscle function may help you better deal with injuries and work with your body to heal them.

First, we need an image of how muscles work. Hold your hands in front of you, palms facing you, fingers extended toward each other. Move your hands close enough together that your fingertips just begin to interlace. Think of your fingers collectively as the muscle belly and each individual finger as an individual muscle fiber. The way you have your hands right now, the "muscle" is in a relaxed state. "Contract" the "muscle" by sliding your hands toward each other as far as they will go and notice that the "muscle belly" becomes shorter and higher, just as your biceps, or any muscle, does when you flex, or contract, it. Please understand, if you were to draw even a schematic of the muscle, this is not what it would look like, but this does give a pretty accurate conception of the sliding action of the fibers. In reality, there are two types of muscle fibers: actin and myocin, and

only the actin fibers move. Also, a muscle fiber is either off or on, either relaxed or contracted. Every time it is enervated, it contracts as hard as it can. What makes the difference between the effort needed to lift a pencil and the effort needed to lift a 15-pound dumbbell is how many fibers contract at once.

Back to your hands, with the “muscle” in the “contracted” state, imagine your fingertips tied together with string. That, very simplistically, is how scar tissue works. It ties the muscle fibers together and does not stretch at all. If your fingers kept “relaxing” and “contracting,” it would be much harder to tie them together. Continuing the analogy, that is one reason why it is so important to keep the muscle moving as much as possible, or get it moving as soon as possible, following an injury. If the muscle continues to remain inactive, scar tissue will continue to form. If you don’t use a muscle for a long time, the body interprets that to mean that that muscle is no longer necessary, and since scar tissue is easier for the body to maintain, it will begin to replace the muscle with it.

None of this means, however, that you do not need to give the injury time to heal. Some scar tissue will form. It must; it is a necessary part of the healing process. There is a popular misconception that torn tissues will re-adhere, the torn ends knitting together again like Play-Dough. It doesn’t work that way. It is scar tissue that rejoins any soft tissues. If you keep moving an injured part before sufficient healing has taken place, the edges of the wound will be pulled, and held, apart. Instead of the scar tissue just joining the edges, it must now fill up the gap, too. You now have a chunk of scar tissue *in* the muscle, part of it. Not only does this new addition not stretch, it has less vascular supply, so blood flow to the area is reduced, which means the fresh nutrients that blood brings to the working muscle cannot get there as easily. And scar tissue cannot be strengthened, so the muscle is effectively weakened.

So, you need to allow enough rest time — even if that only means reduced training — for the wound to begin to heal, and then gently begin rehab on the area. As for how to tell

exactly when that turning point is, if you are being treated by someone, let them guide you. If not, experience, yours or someone else's, may give you an idea. The most reliable guide is your own body, **IF** – and note the caps and bold face type, please – you are honestly capable of reading it accurately. Be aware, though, that your mind's wishful thinking will tend to speak louder than your body.

A massage therapist can be very helpful in the healing process. When the injury is fresh, there are certain long, gentle strokes that can push the edges of the wound toward each other and reposition the fascia – a thin sheath that covers all the soft tissues of the body – over the muscle so the healing will be cleaner – i.e., less scar tissue – and faster. Once the wound has begun to heal, gentle, then gradually deeper cross-fiber strokes can break up scar tissue as it forms, before it has a chance to accumulate. This is especially important if it is not possible, or advisable, to begin active rehab – i.e., training – as soon as you would like.

Some doctors employ massage therapists because they have found this work has a profound affect on rehab time and joint flexibility following surgery. One aerobics instructor was back working out two months after reconstructive surgery on three toes of each foot; she was teaching again in three. It is not uncommon for patients with this type of surgery not even to be walking again for several months.

It is best to start working with a massage therapist as soon as possible. While the author of this article does not subscribe to the “no pain-no gain” school of massage therapy, scar tissue is an exception. Even if you start on it right away, it's going to hurt. The longer you wait, the more scar tissue you allow to accumulate, the worse it is going to be. It can still be broken up. Even fully formed scar tissue from old injuries can be cleaned out and sometimes should be. But it will hurt. It *need not* be excruciating. Please note: Not all massage therapists are trained in these techniques. Be sure you choose one who is. Also, drink a lot of water following these treatments. Once the scar tissue is

broken up, you'll want to flush it out of your system as quickly as possible.

Scar tissue in your body may not be the result of a single trauma. One triathlete regularly got severe side cramps whenever he raced or trained hard. These were found to be caused, in all probability, by scar tissue all along his lower ribs where the diaphragm attaches, and has been brought under control through massage treatments. He did not know how the scar tissue could have gotten there because he did not remember any injury that would have caused it. He did remember, though, a persistent cough he had had all through high school. That could have caused the scarring. Another triathlete has a similar condition, probably the result of a couple of bouts with bronchitis. She rarely had any problem on the bike or swimming, but she could always tell when she had reached three miles on a run because she would get a severe pain under her lower right ribs. She would then have to run with her fingers jammed up under her ribs for about a half a mile, until the cramp subsided. She, too, was treated with deep massage and rarely has anymore side-cramping.

Massage is also helpful to the area surrounding the injury. Whenever an injury occurs, the surrounding musculature tightens up in an attempt to prevent further injury. It is difficult for the body to release this muscle guarding on its own. When muscle tissue remains in contraction for an extended period, even as little as fifteen minutes, pain results. The body's response to pain is to guard, which sets in motion the pain-spasm-pain cycle. Massage can break the cycle.

Another trait of scar tissue is that it does not form in any pattern; it is completely random. Using your hands to illustrate again, you may not just have a growing band of string around your fingertips; you may have a clump of it around your first finger, or even a big ball of string in the palm of your hand. These clumps, aside from the problems inherent with all scar tissue, could be pressing on nerves or blood vessels. One may be positioned so that a tendon scrapes over it with every contraction of the muscle, eventually

causing an inflammation of the tendon or inhibiting movement in the joint. If this happens, you may have gone beyond the scope of massage therapy and, though it is, of course, a last resort, surgery may be indicated here. This type of surgery is generally quite successful. It is usually done as an out-patient procedure, so you'll be running again in a few weeks. And you'll be a lot smarter about your training and injury care this time, right? So, you won't ever have to go through that again!