Sub-Failure Injuries
Dr. John Zimmer takes a closer look at subtle injuries that might limit your performance.

By Dr. John Zimmer  October 2010

What is “sub-failure”?
Is that like taking a test and getting a D+?
Sub-failure, when it comes to injury, is common. There is usually pain or discomfort involved, but there is not an acute failure of the tendon, ligament, muscle, disc or bone. It is more of a disruption in the fibers of the connective tissue. This causes a problem in the way these fibers line up and work together.

Imagine a forest full of trees. If a significant portion is cut or burned down, that would be a failure. Now imagine that none of them is cut or burned down, but the ground underneath is so soft and the trees are so big that some of the trees are almost uprooted and are leaning on other trees. We do not imagine a complete failure here, but we do imagine a major structural and functional problem. This could be considered a sub-failure in the forest system.

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The Subtle Side of Injuries
The traditional model of injury is flawed and outdated. For example, several different studies reveal that an estimated 85 percent of patients with low-back pain do not have a definitive diagnosis (1,2,3,4). When we take a step back to see the forest, we can see that sub-failure injury is a common problem in these cases.
Pain is a poor indicator of health. By the time we see pain associated with sub-failure injury, poor motor patterning and uneven joint strain have set in long ago. Changes in soft tissue commonly include muscle spasm with trigger points, stiffness and guarding in the surrounding connective tissue.

We also see functional changes in a joint involved in sub-failure injury. We can see loss of range of motion, agility and coordination. By the CrossFit definition, there is a loss of fitness. A range-of-motion abnormality, most commonly restriction, would be accompanied by asymmetry or misalignment when compared to the opposite side. Chiropractor Arthur Croft has pointed out that apparently normal joint range of motion may involve joint instability or ligamentous laxity that is compensated by muscle guarding (5).

For a joint to be stable, the surrounding muscles must have timing and coordination to move the joint properly through its range of motion. In some cases of sub-failure injury, we see greater muscle pre-activation to stabilize the joint. Here the muscles surrounding the joint are more stiff and guarded with less potential to do additional work. In other cases, the muscles are less pre-activated to put less pressure on the joint in a manner of pain avoidance. In this instance the muscles surrounding the joint do not fully contract when doing work to keep joint pain to a minimum. In either case, the joint is not performing at its maximum work capacity (6, 7).

Loss of agility and coordination occur due to damage and irritation to the nerve endings that detect motion and position of the joint. Specialized nerve endings in the joint, the proprioceptors and mechanoreceptors, are handy when you are trying to move heavy loads quickly over long distances. These specialized nerve endings tell your brain where a part of your body is in relation to space, as well as how quickly that body part is moving. Damage or irritation to these nerve endings leads to poor form and uneven joint strain. This can lead to a downward spiral of further damage and irritation.

For example, sub-failure injury to ligaments of the spine can damage the embedded mechanoreceptors and lead to chronic muscle dysfunction and chronic back pain (7).

A little pain is no big deal. We wouldn't be CrossFitters without it. But when pain is a result of poor form, inefficiency and strained performance, then it is a big deal. For example, if your right knee is sore, then your body will instinctively bend away from it to reduce the strain. It reduces the workload on one area and adds it to another area. This could lead to increased strain on the low back or the opposite ankle, knee or hip. Your right knee might stop hurting, but you are left wondering why your Fran time has gotten worse and why your left hip is suddenly bothering you.

Your body will find ways to compensate for any imbalances. That can create inefficient movement patterns and limit performance.
This type of compensation can help you to finish a tough job on a long day or finish a particular workout with reduced strain on the involved joint. If this becomes a long-term solution, then this type of instinctive compensation can cause more problems than it solves. In some cases, the pain in the involved joint goes away, and the muscles pattern a compensatory motion that stiffens and guards. The involved joint is weaker and causes other problems in other areas.

Whether we call this a sub-failure injury, joint-subluxation complex, joint strain/sprain, or a “tricky” knee/shoulder/back, the question remains, “What is the best way to deal with it?”

Another person who can help your body heal from sub-failure injury is your friendly neighborhood CrossFit coach.

Many health-care practitioners who work with athletes can help with sub-failure injuries, including chiropractors, physical therapists, massage therapists, acupuncturists and medical doctors. Ask around and find a good one. You can also, as Bill Maher recommends, “Ask your doctor if getting off your ass is right for you.” (Your health-care provider will also rule out more rare and serious causes of joint pain.)

Another person who can help your body heal from sub-failure injury is your friendly neighborhood CrossFit coach. They do not diagnose or treat injury, but they do teach you to move your body with proper position and form through optimal ranges of motion in order to train your muscles and joints to work together. The goal may not be to find the picture-perfect form but to find what Kelly Starrett refers to as “best fit, best position.” A coach will help, but he or she cannot do it for you.

Great coaches can help athletes improve their mobility, which will usually result in less pain and improved performance.

To Rest or to Work Out?

One common question is, “When should I work out with an injury?” I am a fan of getting back into the gym as soon as possible. I know that “as soon as possible” will mean “the same day” for some and “weeks” for others. Resume a modified workout schedule as soon as you can, and choose a routine that gives you the best workout without aggravating your condition.

Exercise can improve the circulation to help the healing process by removing damaged cells from the injured area and by sending new cells for growth and repair to the injured area. It can aid in stimulating the body’s natural growth-hormone release and improve the healing rate.

Exercise can help to correct compensatory muscle patterns due to muscle guarding associated with pain and injury. I would rather see someone back quickly at a highly modified workout with less weight, fewer reps and modified movements instead of someone staying at home on the couch. Inertia plays a mighty role in recovery, and an object at rest on a couch can stay there for a long time.
Every athlete is different, and every injury is different. Take it one step at a time. First of all, it may be impossible to rehab an injured area without pain or discomfort. A sub-failure injury may have little or no pain and merely exhibit stiffness, guarding or loss of range of motion. An acute injury may involve resting the affected joint and doing a modified workout. As soon as you are able, start with taking the joint through range of motion without weight, or with only a broomstick or PVC pipe. Strive for excellent form with focus on proper positioning and range of motion for each given exercise.

(Contraindications to ice may include a previous history of frostbite, conditions or diseases of decreased circulation such as Raynaud’s disease or diabetes, metabolic conditions such as gout or rheumatoid arthritis, or if you are really, really cold.)

Always see your doctor if your problem becomes worse.

Even as you begin to feel better and perform better, do not rush your rehab or training. Rehabbing an injury or re-training old habits can take a long time. Focus on form and technique through complete ranges of motion with light weight and high reps. Focus on form first, and then build intensity. Depending on the person and the injury, this may take days, weeks or even months.

When you are back in the gym, get feedback or coaching during this phase of your training. It is important that you keep good form and dial back the intensity. Modifications will be necessary. This may involve deadlifts instead of squats, or step-ups instead of box jumps, or any of the millions of scaling variations. Sometimes training without a coach is like being a boxer in a fight without a corner man. A fighter always wants to keep fighting, but a good corner man knows when to throw in the towel. As CrossFitters, we are often chasing performance, and sometimes we need someone to tell us when to slow down and focus on form and technique. Even with excellent coaching and good form, exercise can aggravate injuries. Take your rehab and re-training seriously, in and out of the gym.

During rehab, strive for great form in every movement you do.
Don’t forget rule No. 1: If you don’t have time to warm up, you don’t have time to work out! A proper warm-up will prepare the tendons, muscles and ligaments and make them less likely to tear. It will help warm up the joint surfaces and work in the synovial joint fluid that helps lubricate the surfaces of the joints. It will also help train the nerves, muscles and joints to work together. A good warm-up may include 5 minutes of foam rolling and 10 minutes of skills involving mobility, dynamic stretching and lifting mechanics. Even if you are short on time, spend at least 5 minutes warming up. Take this warm-up time to physically and mentally prepare yourself for the workout.

**Every CrossFitter should own a foam roller and an ice pack.**

**Two Secrets to Rehab**

Last but not least, you should include at least two things in your arsenal for rehab and recovery. Every CrossFitter should own a foam roller and an ice pack. In true CrossFit style, these two items are incredibly effective, widely available and very affordable. Foam roll before stretching and it will be time well spent. Foam rolling helps to break up fibrous adhesions. If you foam roll before stretching, you can work out more areas of muscle tightness and get a more effective stretch.

(Contraindications to foam rolling may include fracture, bleeding, burns, broken bones, cancer, osteoporosis, acute infectious disease, open lesions or sores, blood clots, or varicose veins.)

Think of having a knot in a rope and then trying to stretch the rope. You could still increase the relative length of the rope without taking out the knot. But, if you took the knot out before stretching the rope, then you would be able to stretch the fibers along the entire length of the rope. You could have muscles with trigger points and spasm and stretch some of the fibers around these “knots.” If you massage or foam roll these areas before dynamic warm-up or stretching, you will get a much more effective warm-up or stretch.

Here are two helpful videos from Jon Gilson of Again Faster:

- **Foam Rolling Part 1**
- **Foam Rolling Part 2**

_Foam rolling before stretching can take the kinks out of muscles and allow you to really work on your flexibility._
Next to your foam roller, your ice pack should be your best friend. Ice is probably the best “drug” in the world! It is incredibly cheap. It provides pain relief and anti-inflammatory effects without harmful side affects to the stomach, liver or kidneys. It will not increase your risk of stroke or heart attack. It is not addictive and won’t make you sick. It does not cause cancer. It is good for most acute injuries and post-workout recovery.

There is no billion-dollar ice company. You will not see an ice commercial every 30 seconds on TV or an ice advertisement on every other page in newspapers and magazines. You are lucky if your doctor recommends it or even mentions it at all.

Ice, however, is not perfect, and it is not a cure-all. It is not recommended for areas with poor circulation, it can give you frostbite, and it won’t fix a crappy diet or make up for lost sleep. But, if you have reached a plateau in your workout results, try using ice with your post-workout recovery. Ice baths are wonderful, but logistically they may be difficult for you to incorporate as a regular part of your recovery.

Here are three different tried and true methods:

1. **Big flexible gel pack.** This should set you back about $10 at most stores with a pharmacy or first-aid section. I recommend using these for 20 minutes at a time, and then 40 minutes off. Do this once or twice for post-workout recovery, or more often for acute injuries.

2. **Ice massage.** Fill a small paper cup with water and set it in the freezer. After it is frozen, you can peel off a strip of paper around the rim of the cup to expose the top surface of ice. Use this area to rub on any sore areas. Keep the ice in motion and do not use for more than five minutes at a time. This is better for small areas with acute injuries.

3. **Cold shower.** Run cold water on sore arms and legs after a workout for a few minutes. This one is the best-kept secret in post-workout recovery.

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*Ice can be a CrossFitter's best friend, especially after a hard workout.*
Sub-Failure ...

(continued)

It’s on You

The No. 1 person who helps you heal and recover from a sub-failure injury is you. You eat the food. You get the rest. You do the exercises. Whether or not you ask for help, you work through your own rehab and recovery. How you do each one of these is up to you. Don’t be afraid to take a step back in your training by dialing down the volume or intensity. Modify your workout as needed. And don’t wait for a full-blown injury before you start to make improvements in your form and posture. Focus on form and technique through proper range of motion. Focus on form first, and then build intensity. The results will be astounding.

References


About the Author

John Zimmer is the team chiropractor for Gentle Giant Moving Company, where he works with CrossFitters, rowers, runners, climbers, rugby players and martial artists who also happen to move furniture. In his spare time he can be seen hitting the WOD at Crossfit Boston.