What is Muscle Compensation & How to Fix It

This article discusses how muscles de-activate, short-circuit, and shut down. Although it's written from an athlete perspective, the concept applies to all of us throughout our lifetime. Using the USW analysis system, our treatment involves identifying and re-activating muscles, fixing biomechanical faults and treating soft tissue trauma and inflammation. This combination of therapies gives the patient almost immediate pain relief, better motion and a sustainable return to health.

What is Muscle Compensation?

- Trauma that changes muscle function, coordination, and biomechanics, that restrict recovery.
- Adaptations the body makes in the present to keep it going don't work over the long-term.
- A shift in mechanics and posturing to protect a recent or ongoing injury, which places a new strain on the musculoskeletal system, tendons and ligaments and creates a new problem.

Specifics

- Injuries cause inflammation and joint swelling where the brain then or inhibits (**SHUTS OFF)** the muscle from working normally. This persists long after the pain and swelling has subsided.
- This is a protective mechanism to keep the muscle from being damaged further.
- Lack of nerve signal to the muscle cannot be resolved with strength training.
- The inhibition of the nervous systems control over the muscle can last for years.

Additional problems and concerns

- Over time, muscle compensation spreads to other parts of the body as they biomechanically adapt to the imbalances. This lack of mobility can lead to joint dysfunction and arthritis.
- Uncorrected injuries are magnets for new injuries.
- Comprehensive rehabilitation should only begin AFTER the muscles have been re-activated.

How we fix a Muscle Compensation/De-activation problem

- Our doctors have a specific test for each of the 600 muscles in the human body and can quickly determine whether its firing or not.
- The AMIT muscle activation protocol takes about 5-10 per muscle and involves 9 unique contacts for each muscle; 3 spinal adjustments and 6 acupuncture and reflex contacts.

UTAH Sports and Wellness
Chiropractic and Energy Medicine Solutions for Sports Injuries, Spinal Problems and Improved Performance
1550 East 3300 South
Salt Lake City, UT 84106
(801) 486-1818

Reprinted from LAVA Magazine Feb, 2016

Notes: *This article discusses how muscles de-activate or shut down. Using the AMIT protocol, we can identify which specific muscles are not working and more importantly, re-activate them for a sustainable improvement.*

Dr. Cerami

MUSCULAR COMPENSATION

Two experts weigh in on the rules of returning to training and racing post-injury

By Ian McMahan

Disregarding crashes, falls and other acute injuries, triathlon injuries are seldom random occurrences. Instead, they're the culmination of microtrauma and the body's inability to counter these training-associated stresses. When bone, muscle, tendon or cartilage is pushed past the limits of recovery, that little niggle becomes more than just a nuisance and training grinds to a halt.

Injuries, like long Porta-Potty lines, are virtually guaranteed in endurance training and racing. "Endurance training places a lot of stress on the body, and most athletes will ride the fine line between proper tissue stress (which results in positive adaptations in your body) and over-stressing tissue," says Jay Dicharry, physical therapist and author of Anatomy for Runners.

Unfortunately for all those who do experience overuse injuries- and some 80 percent of triathlon injuries are due to repetitive trauma of training and racing- one of the biggest risk factors for reinjury is a history of in jury. In one study of triathletes, 38 percent of athletes injured during a competitive season had sustained a previous injury during the six months leading up to racing. In fact, it may be one reason injury-prone athletes continue to get injured.

"Often, athletes follow the RICE protocol (rest, ice, compression, elevation), and a lot of things can calm down with rest. However, rest doesn't make any tissue stronger or more resilient, period. And rest won't fix the wacky mechanics that overload the injury site," says Dicharry.

A 2014 review article on the topic of reinjury published in the *International Journal of Sports Physical Therapy* concluded, "The high risk of reinjury described, stresses the importance of comprehensive rehabilitation that uses the theory of regional interdependence to adequately mitigate local, proximal, and distal deficits in strength, proprioception, and lower extremity mechanics."

While saying injury begets more injury may seem like simply stating the obvious, the reasons behind this phenomenon are rarely explained. Many people talk about "compensation" without actually understanding what it means. In fact, compensation describes a whole host of post-injury changes to balance, muscle function, biomechanics, and other factors that can hold back recovery from injury and lead to future problems.

"Essentially," says Dicharry, "compensation is robbing Peter to pay Paul."

Matt Dixon, author of *The Well-Built Triathlete* and owner of the Purplepatch fitness, sees compensation as, "a subconscious shift in mechanics, posture or positioning, to protect a recent or ongoing injury." He goes on to say, "This shift places a new strain on the musculoskeletal system, which can create a cascading effect on tendons, muscles and ligaments, hence a new injury."

Dixon believes that a true diagnosis and understanding of injury is too often neglected, leaving triathletes unaware of the root cause of injury. Athletes simply focus on removing the pain, and when the pain improves, the resume training and racing without addressing the underlying cause of the symptoms. This almost unavoidable leads to another problem.

For those who have been injured, it's important to understand what happens to the muscles after the initial pain, inflammation, joint swelling and disuse. In the case of joint swelling, the muscles surrounding the traumatized area are reflexively inhibited after joint injury. Clinically, sports medicine professionals see this muscle inhibition (an inability to contract in a way that allows normal use) expressed as post-injury muscle weakness and atrophy that may persist long after the pain and swelling of the original injury has subsided. Though this is probably a protective mechanism after joint injury, this process can easily limit rehabilitation. Weeks, months or even years down the road, this lasting inhibition of the nervous system's control over muscles leaves one vulnerable to re-injury.

Unfortunately, simply resuming cycling, running and swimming may not be enough to regain lost muscle function and strength. In on recent 2015 study, presented in the *Journal of Rehabilitation Medicine*, young and old subjects were immobilized for a two-week period with the goal of reproducing a minor leg injury. After the two-week period if immobilization (during which the subjects lost 25 percent of muscle strength) the subjects underwent six weeks of cycling training. While aerobic retraining helped regain a measure of the lost muscular strength, it wasn't sufficient to fully return the subjects to pre-injury levels. Thus, after only short-term immobilization- similar to the type that would occur after knee surgery, significant muscle strains or an ankle sprain- the resumption of cardiovascular training can only be considered to be partial rehabilitation.

A great deal of similar research has been performed on hamstring muscle strains, likely because of the frequent occurrence of muscular injuries in the "fast-twitch sports" of soccer, football, and track and field. While much of the scientific literature is dedicated to studying injury and reinjury of the hamstring muscles in these sports, the information can be generalized to running and triathlon.

Study in this area has found that when muscles are strained, the normal signals between neurons and muscles are short-circuited. This neuromuscular inhibition dampens normal muscle function and the effectiveness of strength training and injury rehabilitation. In short, if the muscle doesn't respond normally, then it can't get stronger, even during strength training or exercise. Over time, the poorly functioning muscle gets smaller, and strength imbalances increase.

These muscle deficiencies can often be subtle. A common feeling for athletes returning to training after injury is the feeling that the injured leg doesn't "work" like the other leg. An example of this would be when the previously injured leg doesn't get as tired as the other leg when running or cycling. Rather than being a sign that the previously injured leg is stronger, it's more likely that the muscles aren't functioning as they should. Without a full recovery of muscles function after an initial injury, the biomechanics of running, cycling and swimming, and the ability to participate in triathlon will likely be compromised.

"There are two reasons for prior injury leading to injury," says Dixon. "First would be the degradation of the original injury site, with the athlete not gaining complete strength and mobility back at that site to prevent further injury issues. Additionally an area of injury recovery often missed by athletes is that injury can produce a host of compensatory movement patterns subconsciously developed to protect the site of injury. This shift in mechanics and movement often leads to a cascading effect on the musculoskeletal system as a whole and increase the risk on other areas of the body, away from the original site."

Stopping the cycle of injury and reinjury not only takes patience but the ability to understand and recognizer when something isn't quite right after an injury, even when pain and swelling are no longer present. "Get it right the first time and commit to it," says Dixon. A little bit of awareness may go a long way toward staying injury-free.

COMMON TRIATHLON INJURIES AND ASSOCIATED MUSCULAR DEFICIENCIES.

Hamstring muscle strain: In a study analyzing Australian rules football players, researchers found that those suffering from a hamstring muscle strain within the previous 12 months were more than four times more likely to incur another hamstring strain as opposed to players without history of previous hamstring injury. One such study found that 10 months after a hamstring muscle injury, athletes used their previously injured hamstring about half as much on the injured side as on the uninjured side when performing a hamstring strengthening exercise.

It's not just strength that is affected. A 2015 article in the Scandinavian Journal of Medicine and Science in Sports found that subjects with previous hamstring injuries demonstrated significant reductions in muscle function and asymmetries in running mechanics when compared with their uninjured counterparts.

ANKLE SPRAIN: In a 2009 *American Journal of Sports Medicine* study investigating the effect of ankle sprains on recurrent ankle sprains in 202 elite Greek track athletes, researchers determined that nearly 20 percent of first-time ankle sprain sufferers were laid low by a second lateral ankle sprain by the end of the follow-up period. Participants with a six-month history of first-time lateral ankle sprain displayed an altered balancing technique, which involved greater use of the hip muscles and less of the ankle stabilizers when compared to non-injured controls. Those with a history of ankle sprains also exhibit dynamic balance deficits on both their previously injured and non-injured limbs.

BACK (DISC PAIN): Cyclists with a history of back pain showed a trend toward increased lower lumbar flexion (back rounding) and rotation with an associated loss of co-contraction of the lower lumbar multifidus, a key stabilizer of the spine, while riding. This is important because increased rounding of the lower back has been associated with increased stress to the lumbar disks, a common site of back injury. The study's findings suggest that altered muscle control and function of the lower back are associated with the development of low back pain in cyclists.

KNEECAP PAIN (PATELLOFEMORAL PAIN SYNDROME): While it has been difficult for researchers to ascertain if muscular deficits are the result or cause of patellofemoral pain syndrome, decreased hip abductor and quad strength I generally present in those suffering from kneecap pain.

ACHILLES TENDINOPATHY: The strength of the calf muscles and ankle range of motion were identified as significant predictors of an Achilles tendon overuse injury. Interestingly, those with excessive ankle range of motion were also identified as having an increased risk.

ILIOTIBIAL BAND PAIN: Runners with previous ITBS exhibited differences in running biomechanics and lower hip abductor strength. Strengthening the hip abductors is an important component of treating runners with current and prior ITBS. Additionally, lower extremity strength training may benefit both currently and previously injured runners.

STRESS FRACTURES: Though seldom considered, muscle strength plays a critical role in the prevention of stress fractures. Several studies have supported the protective role of muscle in the development of stress fracture injury. The importance of calf muscle size and strength has been particularly noted as important for lower leg stress fracture avoidance.

MATT DIXON'S RULES FOR INJURY PREVENTION:

- Try to understand the root cause of an injury. Just because you have knee pain, doesn't mean the knee is the issue. Fix the root cause, and the risk of reinjury decreases.
- Shift the conversation toward opportunity. What can athletes do in this time to improve and come back stronger and in better shape than where they were?
- Assess the global and supporting elements of injury risk, including approach to training, sleep, nutrition, fueling following workouts and more.
- First, reduce the symptoms of the injury.
- Second, eliminate the symptoms the symptoms of the injury.
- Perform the necessary strengthening and mobility and slowly ramp back up to the activity.
- If you break something and the doctor says it will take six weeks to heal, expect to take 18 weeks to get back to competition readiness.
- It's only after a careful progression has been completed that an athlete can train with real specificity.

JAY DICHARRY'S RETURN TO TRAINING RULES:

- Mobility > stability > strength > power.
- On a 1-10 point scale, symptoms should not be more than a 3 before returning to training
- If you've got a huge training volume in your history, you'll likely get back to full volume more quickly. But if you haven't trained 25 hours a week for years, it make take some time to get your tissue back to normal again.
- Absolutely no limping, either during your training session or after. If pain is severe enough to make a dramatic shift in what you can feel going on when you swim, bike or run, that will likely result in a dramatic compensation.