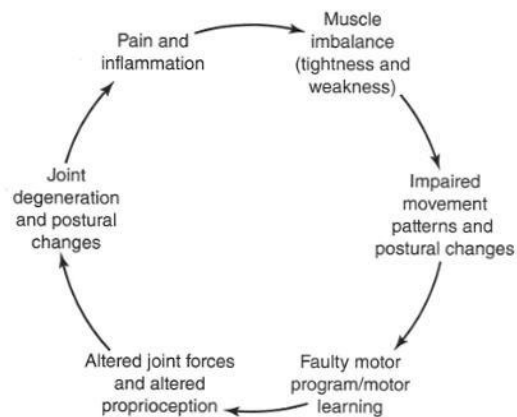


## Chronic Musculoskeletal Pain Cycle

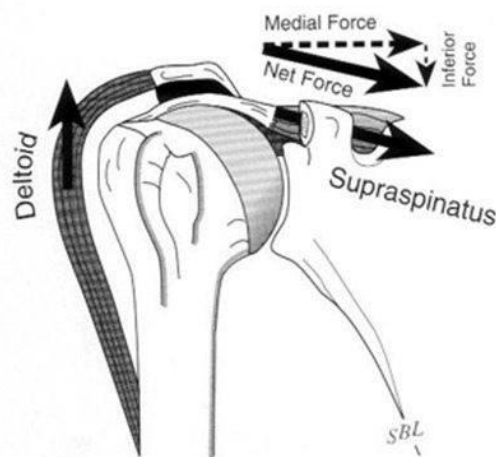
Chronic musculoskeletal pain, that being long term pain caused by overuse or injury to the bones, joints, muscles, tendons, ligaments, and / or nerves, is often predictable through a specific cycle that has shown up time and time again. This cycle is indeed known as the chronic musculoskeletal pain cycle and is presented from a neurological perspective. The majority of people see and experience pain from a negative light, but pain is in fact the only way the musculoskeletal system can protect itself. It makes us aware of the discrepancies occurring in our body's physiological systems. This pain / these discrepancies result in muscle imbalance patterns presented as specific dysfunctions. Awareness of one's pain puts the responsibility on them and the clinicians (or your trainers at Reignited Fitness) they seek for assistance to fix it. This article will exemplify the chronic musculoskeletal pain cycle through the observation of a shoulder impingement, and hopefully result in a greater knowledge base for you concerning any dysfunction you may be experiencing and / or have yet to experience.



**Figure 4.1** The chronic musculoskeletal pain cycle presented from a neurological perspective.

**Muscle Imbalance.** This is the first step in the predictable cycle. Such can develop after both acute and chronic pain. Acute pain leads to a localized muscle response that changes the

movement pattern to protect or compensate for an injured area. Over time, once said condition becomes chronic, the altered movement pattern becomes centralized in the CNS. Thus it should be treated as global sensorimotor dysfunction, which has been a profound topic across our posts lately. The muscle imbalance is associated with a response in muscle in which agonists decrease in tone while antagonists increase in tone; this is the prime nature of an imbalance and is seen in specific groups of muscles prone to tightness and weakness (Page, 2010, p. 44). The agonist and antagonist depends on the specific motion of the affected area (flexion, extension, abduction, or adduction). For an athlete with a shoulder impingement, this muscle imbalance is causing the humeral head to shift in its center of rotation. This is usually due to weakness of the rotator cuff. The rotator cuff and larger muscle groups surrounding such (the deltoid) work together to move your arm in space. The rotator cuff works to keep the humeral head centered within the glenoid. The deltoid and larger muscles continue to power the ship and move the arm. Both muscles groups need to work together. If rotator cuff weakness is present, the cuff may lose its ability to keep the humeral head centered. In this scenario, the deltoid will overpower the cuff and cause the humeral head to migrate above centered, thus impinging the cuff between the humeral head and the acromion (Reinold, 2017):



**Impaired movement patterns and postural changes.** This is what muscle imbalance leads to in the cycle. A flexor postural response is facilitated in order to protect the injured area. This protective adaptation to pain through compensation of movement results in decreased range of motion and altered movement patterns (Page, 2010, p. 44). Concerning our example of a shoulder impingement, those experiencing shoulder pain from such may show a flexor response with their subscapularis, which basically will inhibit activation of the subscapularis. This is the source of all of the shoulder's primal movement patterns and flexion from such an area would result in inhibition of the shoulder itself. Furthermore, it could even result in a rounded thoracic spine as it and the subscapularis are dually connected to one another. This kyphosis or rounding in the thoracic spine leads to more and more problems in itself that will be discussed in the next blog post.

**Faulty motor programming and motor learning.** Repetitive faulty movement patterns eventually override normal motor program due to the effect of motor learning. Unfortunately, the faulty programming becomes ingrained in the mind as the new normal program for a specific movement pattern, and thus reinforcing the faulty movement (Page, 2010, p. 45). In the previous step of the cycle the flexion in the subscapularis / inactivation of such could lead to a person developing kyphosis (rounded thoracic spine). Now it is programmed in the individual's mind as to how their posture will constantly display itself.

**Altered joint forces and altered joint proprioception.** An alteration of movement patterns change the normal patterns of joint stress. Muscle imbalance alters joint position, changing the distribution of the stresses (Page, 2010, p. 45). This leads directly into our next phase of the cycle:

**Joint degeneration.** Altered joint proprioception then becomes responsible for joint degeneration. It can be concluded that muscle imbalance (our first phase of the cycle which led to this) presents a much greater danger for joints than muscular weakness alone presents (Page, 2010, p. 45). Now not only does our shoulder impingement result in a functional change, but also a structural, permanent change to the surrounding joints.

**Chronic pain.** This is where the musculoskeletal cycle pain cycle ends; the chronic pain itself stemming all the way back from a simple muscle imbalance. In summary, pain causes an adaptive response of muscle imbalance, altered posture, and movement patterns and thus facilitates the cruel cycle (Page, 2010, p. 45). Now the individual is constantly reminded of their shoulder impingement due to the pain it brings to the surface.

This information may seem disheartening at first, but remember that pain is our body's way of telling us that something is wrong and we need to make a change in order to protect whatever area may be affected. Having this knowledge base will create a perspective offering hope and relief for the pain you may be experiencing. The next blog post will offer proactive approaches, interventions, and solutions to such pain needed to facilitate positive change. Until then, do not be afraid to ask your coaches at Reignited Fitness if you want more information on the subject!

## **References**

- Page, P. 1., Frank, C. C., & Lardner, R. (2010). *Assessment and treatment of muscle imbalance: the Janda approach*. Champaign: Human kinetics.
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