

# The Development, Evaluation and Treatment of Musculoskeletal Disorders

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Musculoskeletal disorders are a broad class of conditions that involve problems with muscles, joints, tendons, ligaments, and nerves. There is a long list of conditions that people suffer from that fall in the category of musculoskeletal disorders. Some of these include various types of pain, muscle tightness, tendinitis, arthritis, herniated discs, and nerve problems, such as numbness, sciatica, or carpal tunnel syndrome.



There are several reasons why people develop musculoskeletal problems. Although people can have pain and other symptoms from inflammatory foods, food toxins, food allergies, and side effects from certain medications, the focus of this article will pertain to the development of musculoskeletal problems associated with misalignment and abnormal motor control.

## It All Starts With Injuries

It is inevitable that everyone goes through life with hundreds of injuries. Many babies are even born injured from the birthing process. The injuries people acquire during their lifetime can be major (macro-trauma), such as a broken bone, ruptured tendon, or torn ligament or they can be minor (micro-trauma), such as a sprain, strain or overuse injury. Either type of injury can have immediate, negative health consequences.

## Postural Distortions (Poor Posture) and Spine Misalignments

Major or minor injuries can cause distorted (poor) posture and misalignments of the bones of the spine and extremities. Misalignments can occur **SUDDENLY** from an injury such as a fall, car accident or sports injury. They can also occur **GRADUALLY** from working, sitting, or sleeping in a bad posture for extended periods of time. Misalignments create increased loads (pressure) on joints and spinal discs, muscle strain, changes in muscle length (some shorten, others lengthen) and changes in muscle tone (some tighten, others weaken). This results in a loss of joint mobility (flexibility), loss of joint stability (strength, support, control), abnormal movement, micro-trauma, and wear and tear over time. Eventually, poor posture and spinal misalignments lead to a variety of musculoskeletal conditions such as back pain, neck pain, arm or leg pain, headaches, tendinitis, arthritis and others.



## Abnormal Motor Control and Muscle Inhibition

Motor control is essentially muscle control (coordination). It is the ability of the nervous system to efficiently direct groups of muscles to contract in coordinated patterns and sequences for proper movement. We are not born with motor control. Motor control is something we develop from the first few months of life until the age of four. Muscle coordination is further refined until age seven. When we go through the developmental milestones of rolling, creeping, crawling, sitting, kneeling, standing,

walking and running we are developing motor (muscle) control. Normal motor control is required for normal, efficient movement and helps prevent musculoskeletal problems from developing.

Motor control is something that is altered very easily due to pain, injury, or misalignment. Injury and misalignments create excessive stress on joints, tendons, ligaments, muscles and nerves. When these tissues become stressed, they automatically send signals to the brain to reduce the stress. They do so by "inhibiting" (turning down) some muscles and "facilitating" (turning up) other muscles to reduce stress in the area. This neurological mechanism works like a dimmer switch. When the dimmer switch gets turned down by the brain, muscle inhibition occurs and results in "weakness" of certain muscles. When the dimmer switch gets turned up, muscle facilitation occurs and results in "tightness" of other muscles. This is a unique compensation mechanism in order to minimize pain and further injury. Most people do not feel muscle inhibition or muscle facilitation, but they commonly feel the physiological effects as muscle knots, muscle weakness, tightness or stiffness.

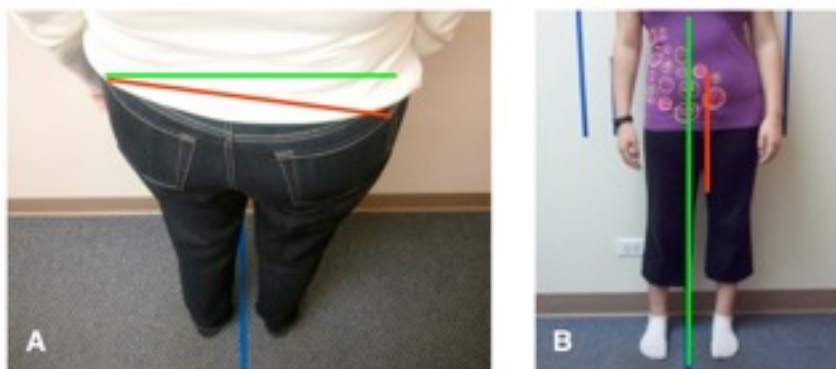
Altered motor control occurs in everyone to some degree following an injury. It is an automatic, neurological survival mechanism designed to compensate for pain. If the change in motor control is subtle, a person may not notice a change in how they move. If it is more extreme, they will notice they are "favoring" their movement. Limping is an example of this.

A change in motor control may be a good short-term solution to compensate for pain, but not a good long-term solution. In many people, motor control DOES NOT return to normal after the pain is gone and the injury has healed. This leaves a person with inefficient patterns of muscle coordination that results in distorted posture, abnormal spinal alignment, poor movement, excessive wear and tear, arthritis, and the development of pain later in life.

Misalignments, poor motor control and muscle inhibition are the major reasons why people have pain and other musculoskeletal problems. These are very important biomechanical factors that need to be evaluated and treated in patients with musculoskeletal pain.

### **Assessment of Posture and Spine Alignment**

The evaluation of posture and spinal alignment is by far one of the most important parts of your examination. Posture is one of the most common studied topics in the medical field with over 65,000 studies on the subject(1). Many of these studies have documented the importance of good posture and the subsequent pain, joint degeneration (arthritis), and other diseases from poor posture.



Right pelvis rotation misalignment in A and left pelvic translation misalignment in B

Posture assessment and x-rays are the two ways we evaluate alignment. Posture assessment is performed by observing your natural standing position. This will reveal if you have any shifting (translation), twisting, or tilting (rotation) misalignments of your pelvis, thorax (ribcage) or head. X-rays are also performed in your natural standing position. X-rays help determine if there are any misalignments of your spinal vertebrae. They also show if there is any arthritis, disc degeneration, or other pathology of your spine. X-rays are cross-correlated with the posture assessment to determine your exact misalignment pattern. This is absolutely critical because this information will determine what type of chiropractic adjustments and in which direction the adjustments (and corrective exercises) need to be made in order to restore your alignment to as near normal as possible.

### **Assessment of Mobility (Flexibility)**

Mobility, or freedom of joint movement, is another very important aspect of your examination. Normal degrees of mobility should fall within a certain range throughout all joints of the body. The range of mobility should also be symmetrical.



Loss of right hip extension flexibility/mobility in C and left hip internal rotation in E

If there is a musculoskeletal problem causing pain, there is usually a loss of joint mobility in the painful area or in other areas distant to the site of pain. We assess mobility actively and passively. When assessing active mobility, you move a particular joint or body part so we can observe your range of movement. When assessing passive mobility, you are relaxed (usually lying down) while the doctor moves a particular joint or body part so we can observe your range of movement. Determining if there is a flexibility problem helps us determine what tissues may be involved and what treatment and corrective exercise you will need to restore normal flexibility.

### **Assessment of Motor Control and Muscle Inhibition**

Injuries and misalignments lead to muscle inhibition, muscle facilitation and abnormal motor (muscle) control(2). If a joint becomes injured or misaligned, the subsequent swelling or ligament damage causes the nervous system to "weaken" certain muscles (inhibition) and "tighten" other muscles (facilitation) to reduce stress on injured tissue.

We assess for muscle inhibition by testing the strength of various muscles we suspect may be "weak." We assess for abnormal motor control by analyzing your movement. Determining if you have muscle inhibition and abnormal motor control helps us determine what muscles will need treatment and what muscles will need corrective exercise to improve your strength and restore motor control.

## **What Does a Diagnosis Really Mean?**

The purpose of most examinations is to arrive at a diagnosis. A diagnosis is the naming of a group of symptoms based on the case history, orthopedic tests, specialized imaging (MRI, X-ray, etc.), or other testing. A diagnosis may be necessary for insurance reimbursement, but it DOES NOT ALWAYS HELP IN DETERMINING THE UNDERLYING CAUSE OF THE PROBLEM OR WHAT IS THE BEST TREATMENT TO FIX THE PROBLEM. An examination may lead to a diagnosis of rotator cuff syndrome, herniated disc, or plantar fasciitis, but it DOES NOT TELL WHAT CAUSED THE PROBLEM (the diagnosis) TO DEVELOP IN THE FIRST PLACE. This is why a thorough evaluation of alignment, mobility, and motor control is necessary so the underlying cause of your problem can be identified and the appropriate treatment can be implemented to correct the problem.

When you undergo treatment with a chiropractor, orthopedist, or physical therapist for pain, you need to be certain that the recommended treatment is addressing the underlying cause of your condition. Unfortunately, many doctors and therapists that treat musculoskeletal conditions perform a less than adequate examination and simply take a “cover up the pain” or “treat the diagnosis” approach. Asking a patient with back pain to bend over to touch their toes and then prescribing some anti-inflammatory drugs or muscle relaxers is not very difficult or thorough to say the least. Injecting a cortisone shot is another quick, easy way to simply cover up pain. These approaches do NOT address the underlying cause of the problem and they can put a patient at risk for some serious side effects(3,4). Orthopedic surgery may be necessary to repair a torn tendon or ligament or to replace a completely degenerated hip or knee, but most surgeries do not correct the underlying biomechanical problems that led up to the pain and degeneration in the first place.

In the “treat the diagnosis” approach, the doctor or physical therapist implements a pre-packaged treatment plan and pre-packaged exercises based on the patient’s diagnosis. All patients with a rotator cuff strain or tear, for example, would receive the exact same shoulder treatment and the exact same shoulder exercises. This approach, however, may not be effective in many cases because two different patients with a rotator cuff problem may have two completely different causes of the problem. One patient, for example, may have a postural misalignment of the neck and shoulders that requires spinal adjustments to restore normal alignment. Another patient may have abnormal motor (muscle) control of their abdominal and scapular (shoulder blade) stabilizing mechanisms that require core and shoulder stabilization exercises. A “treat the diagnosis” approach does not work for many people because the cause of the problem is not being treated. These are the patients that do not get better or their condition does not completely resolve.

## **Our Approach to Musculoskeletal Pain**

Instead of taking a “cover up the pain” or “treat the diagnosis” approach, we take a “treat the cause” approach. What makes us different is OUR TREATMENTS AND CORRECTIVE EXERCISES ARE BASED MORE ON YOUR MISALIGNMENT AND ABNORMAL MOVEMENT PATTERNS AND LESS ON YOUR DIAGNOSIS OR LOCATION OF PAIN. As we discussed, misalignments, abnormal motor control and muscle inhibition are the most common reasons why people develop musculoskeletal pain. Our treatment approach involves “resetting” and “reprogramming” the musculoskeletal system in terms of alignment, motor control and movement.

## **Short-Term Treatment For Pain and Inflammation**

When your treatment begins, we may recommend some treatment strategies to reduce inflammation (swelling, pain, etc.). These may include ice, high concentrated fish oil and other natural anti-inflammatory supplements.

## **Traditional Chiropractic Manipulation**

In some cases, your treatment may include more traditional spine or extremity manipulation. When spine and extremity misalignments are present, pain can occur and joints can become fixated (stuck) and lose their normal mobility/flexibility. Muscles that cross these joints can also shorten, tighten, and in severe cases go into spasm. Manipulation involves a short, quick thrust to relieve pain, release joint fixations, restore joint mobility, and reduce muscle tightness and spasms. Manipulation may be recommended, but not absolutely necessary for you, depending on your condition or treatment preferences. If this is the case, we may choose to use more gentle methods, such as instrument adjusting, or drop table adjustments.



## **Chiropractic Biophysics Technique (CBP)**

The primary chiropractic technique we utilize is Chiropractic Biophysics Technique, or CBP. CBP is the most scientifically advanced and researched method in the field of chiropractic. CBP chiropractic treatment involves “mirror image” adjustments, “mirror image” exercises, and “mirror image” traction to correct posture and spine alignment(5).

### **Mirror Image Adjustments**

Mirror image adjustments involve placing your spine and posture in the exact opposite position of your misalignment (the mirror image) and introducing a stimulus to “reset” normal alignment (the adjustment). If your back is misaligned to the left, for example, we will position it to the right prior to the adjustment. Once your spine and posture are in the desired position for correction, we will use an adjusting instrument that “taps” in key areas of your spine, such as the neck, back or hips. The “tapping” sensation from the adjusting instrument stimulates posture control centers in the brain to “reset” normal alignment. We also use other methods to “reset” normal alignment, including a special table with sections that “drop” during the adjustment.

### **Mirror Image Exercises**

Mirror image exercises complement the mirror image adjustments by having you perform exercises in the exact opposite direction of your misalignment. If your spine is misaligned to the left, we not only want to adjust it to the right, we want to exercise it to the right as well. Mirror image exercises are designed to strengthen your muscles to "hold" your new posture and spine alignment.

### **Mirror Image Postural and Spinal Curve Traction**

If you have poor posture or a loss of your natural spinal curvature, you may need traction to restore your posture and spinal curves for life-long health. Traction provides a slow, sustained stretch to your spine which allows it to gradually reshape and remodel into a more normal, aligned position. The interested reader can read more about [CBP Technique](#).

### **Muscle Activation**

In situations where your nervous system does not provide full energy and strength to certain muscles (weakness), muscle activation techniques may be used to restore strength to these muscles. This is accomplished by massaging the origins and insertions of the muscles where they attach to the

bones. We can also activate your muscles by “tapping” the muscles and utilizing your own built in reflexes. By activating "weak" muscles, we are restoring the nerve energy to your muscles so they can function with full strength.

### **Mobility, Motor Control and Stabilization Exercises**

We utilize several types of corrective exercises to improve your flexibility, movement, motor (muscle) control, and stability (strength, support, control). The exercises you perform are tailored to your specific problem or “weakness.” The type of exercises may be isometric (muscle contraction with no joint movement), isokinetic (muscle contraction with joint movement), or isolated to help activate muscles that are “inhibited” or “weak.” We also utilize more advanced corrective exercises, such as dynamic neuromuscular stabilization (DNS), reactive neuromuscular training, or reverse patterning.

You have many options when it comes to what type of healthcare provider to consult and what type of treatment to undergo for your musculoskeletal pain. The most important requirement for you to get well is that the cause of your condition is determined and your pain is not simply being “covered up.” This can only happen with a thorough examination that assesses for abnormal alignment, mobility and motor control that is contributing to the problem. This unique approach allows us to help people with musculoskeletal conditions every day. We look forward to checking you to see if treating these types of problems are the solution to your condition.

#### References:

1. <http://www.ncbi.nlm.nih.gov/pubmed?term=posture>
2. <http://www.ncbi.nlm.nih.gov/pubmed?term=arthrogenic%20muscle%20inhibition>
3. [http://www.medicinenet.com/nonsteroidal\\_antiinflammatory\\_drugs/page2.htm](http://www.medicinenet.com/nonsteroidal_antiinflammatory_drugs/page2.htm)
4. <http://www.drugs.com/sfx/cortisone-side-effects.html>
5. [http://www.idealspine.com/pages/cbp\\_technique.htm](http://www.idealspine.com/pages/cbp_technique.htm)