

# **High-Intensity Functional Training—Make It Safe**

by [Justin Price, MA](#)

Many people can't seem to get enough of workouts that meld [functional](#) movements with high-intensity resistance training. Indeed, workouts using dynamic, [high-intensity](#), full-body movements are great for strength and health, provided the body functions *properly* and exercisers use correct technique.

They understand the musculoskeletal benefits of combining functional motions with intense exercise like gymnastics, weightlifting, running or rowing. But we cannot ignore the risk of pain or injury from these workouts if movement and muscle imbalances keep the body from functioning optimally.

## **Common Exercises and Injuries**

Think about some of the most popular high-intensity movements:

- squats, cleans, and rowing
- split-stance exercises (running, lunging)
- pressing and pulling (pushups, pullups, handstands, and muscle-ups).

They all have one thing in common: They require peak functioning of the lumbo-pelvic hip girdle (legs, hips, pelvis, lower back) and thoracic spine/shoulder girdle. These upper and lower girdles stabilize and mobilize loads to allow extreme [ranges of motion](#); transfer stress throughout the musculoskeletal system; and generate tremendous power. However, they're also prone to imbalances such as anterior pelvic tilt, excessive lumbar lordosis, excessive thoracic kyphosis, protracted and elevated shoulder blades, and internally rotated arms (Price & Bratcher 2010). Thus, it's no surprise that inflicting high-intensity, full-body exercise on dysfunctional lower-back and shoulder regions often leads to injuries such as sacroiliac joint dysfunction, labral tears, disk degeneration, shoulder impingement, and glenohumeral joint inflammation/arthritis.

## **The Lumbo-Pelvic Hip Girdle**

The structures of the hips, pelvis, and [lumbar spine](#) endure substantial stress from movements such as squatting, lunging, running, and jumping. While these exercises are essential to developing the strength, flexibility, and coordination required to excel in many functional activities, they can also cause lower-back and hip pain if there's musculoskeletal dysfunction. Understanding the biomechanics of the bones and muscles of the lumbo-pelvic hip girdle can help you identify dysfunctions in your clients, which is the first step toward fixing those problems.

## **Biomechanics of the Bones**

The pelvis naturally rotates forward 10 degrees, which helps stabilize the sacroiliac joints (where the pelvis meets the base of the spine) and the lumbar spine in general (Gajdosik et al. 1985). This stability results in part from the shape and movement of the top of the pelvis (the ilium) as it rotates forward toward the sacrum (the base of the

spine) during weight-bearing movement to help “lock” or “close” the joint space—like one piece of a jigsaw puzzle fitting neatly together with another.

As the pelvis rotates forward, the top of the sacrum also tips forward, encouraging the lower back to arch (Price & Bratcher 2010). This arching of the lower back, called lumbar lordosis, helps “lock” or “close” the vertebrae of the lumbar spine together, increasing stability.

These movements of the pelvis and lumbar spine are essential to stabilizing the lumbo-pelvic hip girdle when functional movements combine with high-intensity [resistance exercise](#). For example, as the hips flex during a squat, the pelvis rotates forward and the lower back arches. These spinal and pelvic movements boost the integrity of the hips, pelvis, and lower back, thereby maximizing structural support and minimizing the risk of injury.

One of the most common musculoskeletal imbalances of the lumbo-pelvic hip girdle is an excessive anterior pelvic tilt (Price & Bratcher 2010). This is characterized by a noticeable downward tilting at the front of the pelvis and a more-than-normal rising up at the back (Kendall et al. 2005). If left unaddressed, this musculoskeletal imbalance can affect movement and potentially cause injuries during weight-bearing activities that stress the hips and lower back.

### **Biomechanics of the Muscles**

One of the most important and overlooked functions of the muscles in the lumbo-pelvic hip region is their ability to slow and regulate the force with which the bones of the pelvis and spine “lock” together during movement. Muscles do this by lengthening under tension (like rubber bands stretching) to ensure that the skeletal structures of the pelvis and lower back do not “crash” into each other as they move. However, musculoskeletal imbalances and muscle dysfunction or other soft-tissue dysfunction can prevent muscles from functioning as they should. When that happens, the bony structures of the body are not controlled as they move, causing stress to the joints. Persistent muscle dysfunction can affect the integrity of the joints, leading to [inflammation](#), degeneration, pain, and injury. [IDEA Fit Tips, Volume 16, Issue 5](#)

#### **Justin Price, MA IDEA Author/Presenter**

Justin Price, MA, is the creator of The BioMechanics Method which provides corrective exercise education for health and fitness professionals. He is also an IDEA Personal Trainer of the Year and an education provider for ACE, BOSU, TRX, PTAGlobal, PTontheNet, Power Systems and the NSCA. Certification: ACE Education provider for: ACE and NSCA

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