

# MSD PREVENTION

## 101

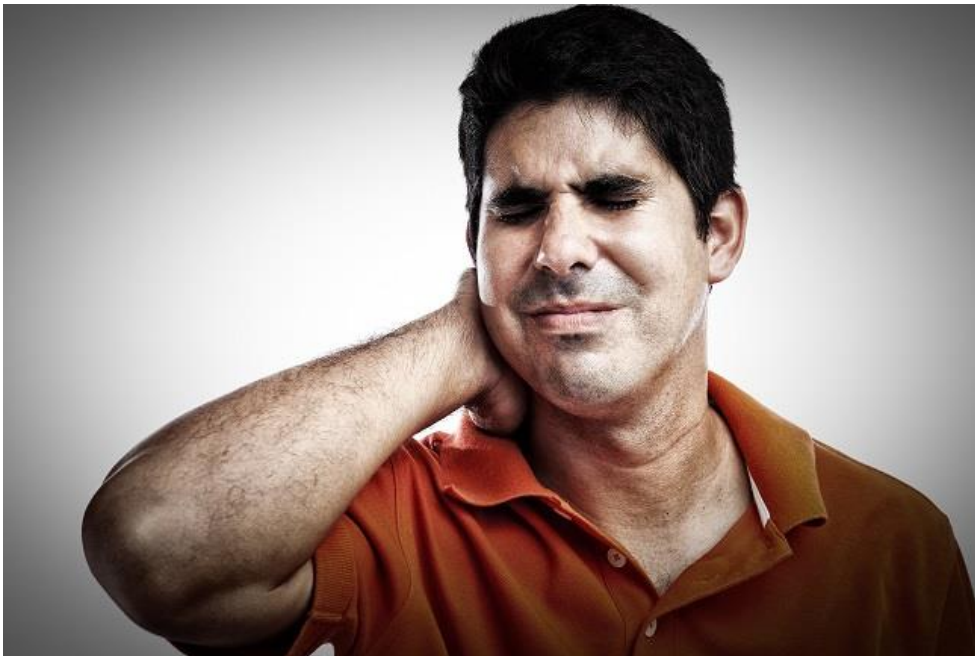
The definition, causes and prevention of  
Musculoskeletal Disorders (MSDs)



# A common, costly and *confusing* problem

*Bummer.*

It's 7:30 am on a normal Monday. You arrived to work with a hundred things on your mind and a to-do list to tackle at least three pages long, when you are notified of yet another Musculoskeletal Disorder (MSD) injury at your facility.



It's Bob with a low back strain. Last month it was Sue, carpal tunnel. The month before, John, lateral epicondylitis. Rick, neck strain. And the list goes on.

## What happened, you wonder?

- Was it because of poor work practices and body mechanics?
- Did Bob hurt himself at home over the weekend and bring his injury into the workplace?
- Was it because of bad ergonomics?

“ MSDs are common and costly – and 100% preventable!

- We've had ergonomics training before. Why didn't he remember his training?

**Next, your mind turns to possible solutions:**

- Should we recommend the use of back belts?
- Should we do another round of ergonomics training?
- Should we implement pre shift stretching?
- What about job rotation?
- Should we do ergonomic risk assessments?

If this scenario sounds familiar, don't worry - you aren't alone.

Musculoskeletal injuries and disorders are common, costly and, in many instances, *confusing*. It's difficult to determine exactly what happened in each MSD case because there are a multitude of causative factors contributing to these injuries and, most likely, several factors are at play in each case.

The purpose of this guide is to tear down the confusion about musculoskeletal injuries while also bringing clarity and a proven, systematic process to your MSD prevention efforts.

Before we get there, it is crucial to note that the success of the overall strategy and the specific process presented in this guide hinges on a few things:

1. **An intense, laser-like focus** on prevention of these injuries.
2. **Caring about your people (and your business)** enough to instill a prevention culture that insists on going beyond compliance, demands excellence at every turn and persists over the course of time.

Both of these points can be boiled down to two simple words: focus and leadership. Perhaps this should go without saying, but too often we

“ Determining the cause of MSDs is frustrating because of the complexity of the human body and the work environment.

Many factors contribute to these injuries and they develop over the course of time.

encounter companies with a scattered and poorly led approach, moving from one incomplete solution to the next.

Instead, our best advice is to take a comprehensive and expert-led approach, with a prevention-focused and systematic process in place for the long-term.

Why should you take our advice?

Over the last 25 years, we've been fortunate to partner with some of the world's most respected brands to build hugely successful ergonomics and injury prevention programs. Our track record spanning over two and a half decades demonstrates that a prevention-focused approach applied through an on-site injury prevention specialist accelerates OHS excellence, improves key business metrics and builds a culture of enhanced worker health and well-being.

So together, let's clear the confusion of musculoskeletal injuries and disorders in the workplace and **think prevention.**



# Identifying the Problem: The definition and causes of Musculoskeletal Disorders (MSDs)

Musculoskeletal Disorders are the single largest category of workplace injuries and are responsible for almost 33% of all worker's compensation costs. (*Bureau of Labor Statistics, 2011*)

In 2011, United States companies spent over \$50 billion on direct costs of MSDs alone, with indirect costs spiraling up to *five times that amount*.

But most disturbing of all is the human cost associated with these preventable injuries. When a person has an MSD injury, they have to endure the painful experience of the injury, possibly surgery, prescription medications with the risk of adverse side effects, a loss of physical mobility, and a loss of income. In short, these injuries take a physical, emotional and financial toll on people.

Given the high business costs and even higher human costs of these injuries, **a focus on primary prevention is good for your business and great for your people.**

To form a prevention strategy and plan of attack, you need to:

- understand what MSDs are,
- identify the root causes and
- develop a strategy to remove all causative risk factors.

Musculoskeletal Disorders (MSDs) are injuries and disorders that affect the human body's movement system (i.e. muscles, tendons, ligaments, nerves, discs, blood vessels, etc.).

“ MSDs come with high business costs and even higher human costs.

**fig 1. COMMON MUSCULOSKELETAL DISORDERS**

MUSCLE / TENDON STRAIN	ROTATOR CUFF TENDONITIS	CARPAL TUNNEL SYNDROME
TENDONITIS	EPICONDYLITIS	MECHANICAL BACK SYNDROME
LIGAMENT SPRAIN	RADIAL TUNNEL SYNDROME	DEGENERATIVE DISC DISEASE
TENSION NECK SYNDROME	DEQUERVAINS SYNDROME	RUPTURED/HERNIATED DISC
THORACIC OUTLET COMPRESSION	TRIGGER FINGER / THUMB	DIGITAL NEURITIS

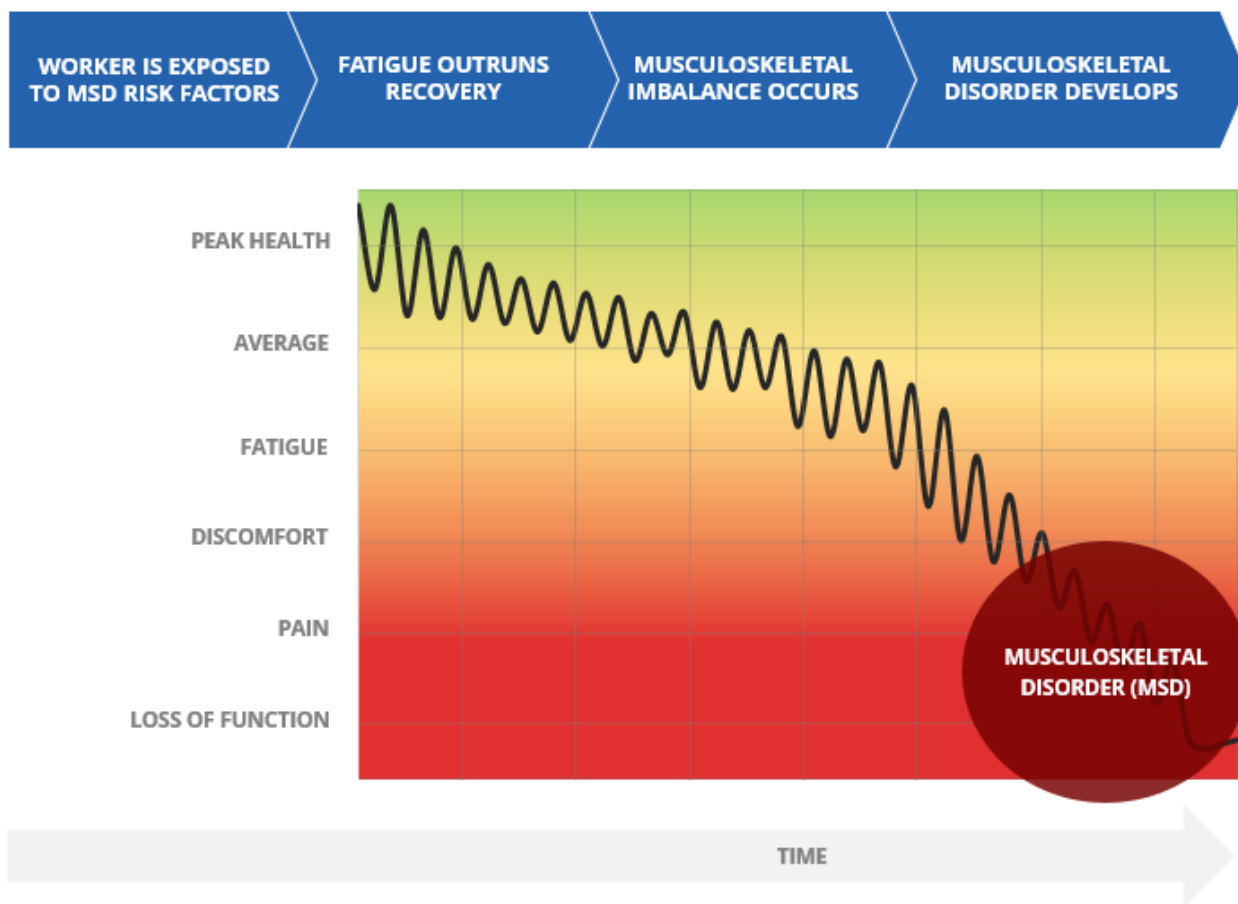
We use the term “musculoskeletal disorder” because it accurately describes the problem.

Other common names for MSDs are “repetitive motion disorder”, “repetitive stress injury”, “overuse injury” and many more. The problem with using that kind of terminology is that it implicates a singular cause for damage to the musculoskeletal system – repetition / overuse. This is limiting because more and more research is pointing to multiple causative risk factors leading to MSDs.

## Identifying the Problem – The Cause of MSDs

When a worker is exposed to MSD risk factors, they begin to fatigue. When fatigue outruns their body's recovery system, they develop a musculoskeletal imbalance. Over time, as fatigue continues to outrun recovery and the musculoskeletal imbalance persists, a musculoskeletal disorder develops.

**fig 2. DEVELOPMENT OF A MUSCULOSKELETAL DISORDER (MSD)**



Musculoskeletal Disorders form over the course of time as the result of exposure to MSD risk factors (ergonomic risk factors and individual risk factors).

MSD risk factors can be divided into two categories:

1. Ergonomic (work-related) Risk Factors
2. Individual Risk Factors.

**fig 3. MUSCULOSKELETAL DISORDER (MSD) RISK FACTORS**




## 1. Ergonomic (work-related) Risk Factors

When a worker is asked to do work that is outside his body's capabilities and limitations, he is being asked to put his musculoskeletal system at risk. In these situations, an objective evaluation of the job / task tells us the worker's recovery system will not be able to keep up with the fatigue that will be caused by performing the job.

The evaluation will tell us that ergonomic risk factors are present, the worker is at risk of developing a musculoskeletal imbalance and a musculoskeletal disorder is an imminent reality.





Job is outside of the worker's capabilities.

There are three primary ergonomic risk factors.

- **High task repetition.** Many work tasks and cycles are repetitive in nature, and are frequently controlled by hourly or daily production targets and work processes. High task repetition, when combined with other risks factors such high force and/or awkward postures, can contribute to the formation of MSD. A job is considered highly repetitive if the cycle time is 30 seconds or less.
- **Forceful exertions.** Many work tasks require high force loads on the human body. Muscle effort increases in response to high force requirements, increasing associated fatigue which can lead to MSD.
- **Repetitive or sustained awkward postures.** Awkward postures place excessive force on joints and overload the muscles and tendons around the effected joint. Joints of the body are most efficient when they operate closest to the mid-range motion of the joint. Risk of MSD is increased when joints are worked outside of this mid-range repetitively or for sustained periods of time without adequate recovery time.

High task repetition, forceful exertions and repetitive/sustained awkward postures fatigue the worker's body beyond their ability to recover, leading to a musculoskeletal imbalance and eventually an MSD.

## 2. Individual-related Risk Factors

The interaction between the work environment and the human body is complex. Limiting ourselves to a singular cause of MSDs will limit our ability to develop a prevention strategy that addresses all causes of MSDs.

You need to address *both workplace risk factors and individual risk factors*.

Individual risk factors include:

- **Poor work practices and body mechanics.** Workers who use poor work practices, body mechanics and lifting techniques are introducing unnecessary risk factors that can contribute to MSDs.
- **Poor health profile.** Workers need to remain hydrated, fit for work and pay attention to their nutrition and other personal health habits. Staying healthy and safe requires workers to make healthy and safe decisions.
- **No recognition of early signs and symptoms.** At the first signs of excessive fatigue and discomfort, employees should be trained to recognize it and strongly encouraged to report it. If they fail to recognize and report fatigue and discomfort, nothing can be done to prevent an injury from occurring.

“ Poorly trained workers will make poor decisions that introduce unnecessary injury risk.



← **Wrong!**



← **Right!**

Just like workplace risk factors, individual risk factors are common sense: when a worker uses poor work practices, has bad health habits, doesn't get

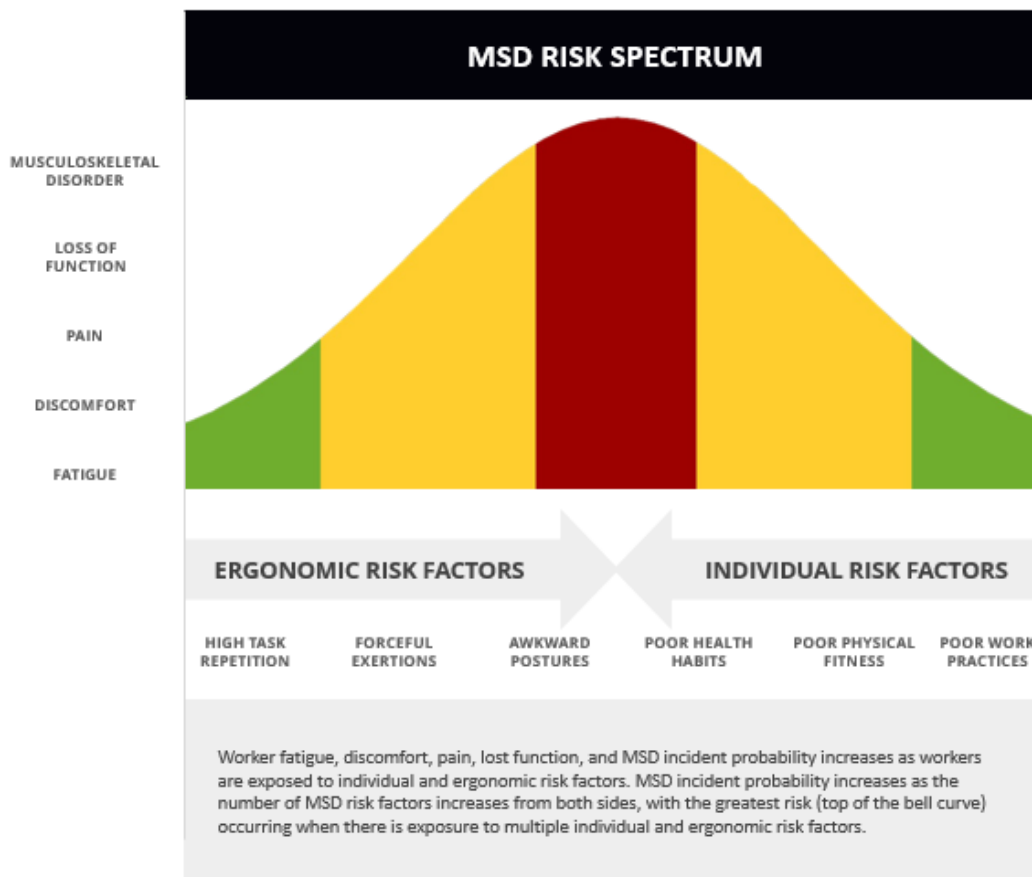
adequate rest and recovery and doesn't take care of their bodies with a good nutrition and fitness regimen, they are at greater risk for fatigue to outrun their recovery system.

## The MSD Risk Spectrum

The more risk factors a worker is exposed to, the more likely they are going to develop a musculoskeletal imbalance that results in an MSD.

As a worker is introduced to more risk factors, the quicker their body gets fatigued and the less likely they are able to recover, exponentially increasing MSD incident probability.

**fig. 5 MSD RISK SPECTRUM**



# A complete and expert-led solution to the MSD problem

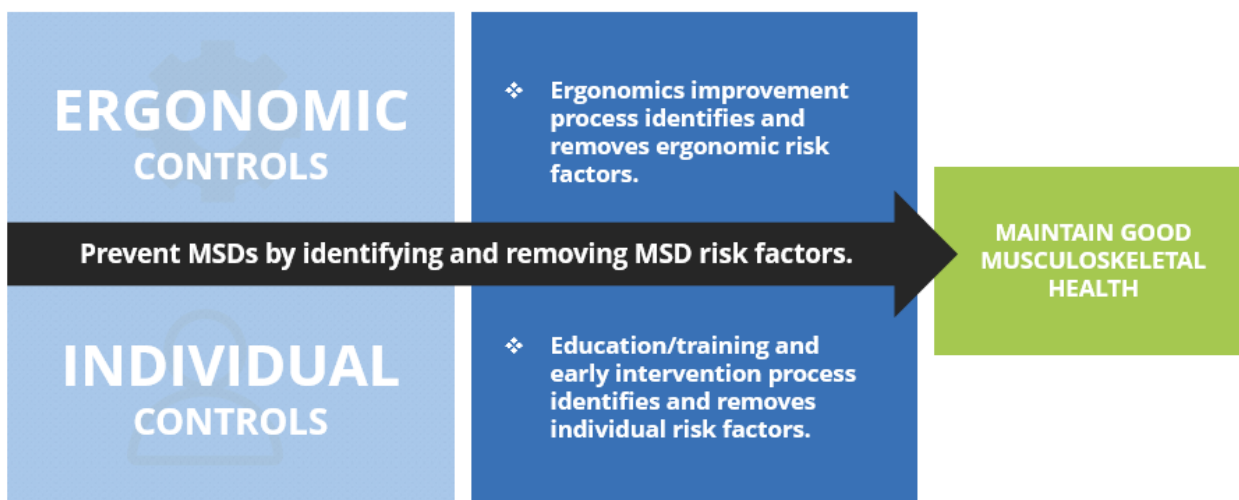
The Ergonomics Plus approach to MSD prevention has two components:

1. **Industrial Ergonomics:** A workplace ergonomics improvement process.
2. **Industrial Athletic Training:** An athletic trainer (preventative healthcare professional) coaching, training and caring for your workplace athletes.

“ A complete solution addresses all causative risk factors.

This is a complete solution because it addresses all risk factors that contribute to MSDs. It puts ergonomic controls in place to reduce ergonomic risk factors and individual controls in place to reduce individual risk factors.

**fig. 6 REDUCE MSD RISK BY IMPLEMENTING ERGONOMIC AND INDIVIDUAL CONTROLS**



## Industrial Ergonomics

The word ergonomics comes from the Greek word “ergon” which means work and “nomos” which means laws. In other words, **ergonomics is the science of work**. The goal of ergonomics is to ensure jobs and tasks are within the capabilities and limitations of workers.

Good ergonomic design removes incompatibilities between the work and the worker and creates the optimal work environment. This allows you to efficiently create the best product possible.

The benefits of designing the workplace to match the capabilities and limitations of people are many:

- lower injury risk
- improve productivity
- improve product quality
- improve employee engagement

Applying a scientific, evidence-based approach to your ergonomics process is important. The goal is to identify ergonomic risk factors, quantify them, and then make measurable improvements to the workplace, ensuring that jobs and tasks are within workers’ capabilities and limitations.



**BEFORE**



**AFTER**

The best approach for doing that is to make ergonomics an ongoing process of risk identification and risk reduction based on objective, scientific analysis of your workplace.

“ Ergonomics is about fitting the work to the worker.

## Industrial Athletic Training

In the world of sports, professional athletes are a team's most important asset. Knowing this, team owners provide their athletes with the best preventative health care available in the form of a Certified Athletic Trainer. This ensures each team member performs at their peak potential.

In the industrial world, professional (industrial) athletes are a company's most important asset. Much like professional sports teams, the most proactive companies provide their industrial athletes with the best preventative health care available in the form of an industrial athletic trainer.

The industrial athletic trainer coaches, trains and cares for your industrial athletes, helping them feel good and perform well.

The components of your Industrial Athletics Program should include:

- **A Pre-work Warm-up Program** to mentally and physically prepare the industrial athletes for their work shift, customized to fit your facility's needs.
- **Coaching and training** on proper work practices, body mechanics, ergonomics, good health habits and recognizing the early signs and symptoms of MSDs.
- **Recognition and reporting** of excessive fatigue and discomfort to the on-site athletic trainer, who then conducts a 1-on-1 early intervention consultation to reinforce training principles and help the worker utilize injury prevention best practices.

Combined with a systematic ergonomics process, an industrial athletics program is a proactive, complete and powerful addition to your overall OHS process.

“ We are all athletes in life, using our bodies to make a living.



# Two Steps to MSD Prevention Success

Remember Bob's low back strain and the string of injuries back in the introduction?

Well, imagine the luxury of going back in time and working to prevent Bob's low back strain and the other injuries before that. What could you do?

Based on what you've learned in this Ebook, you would implement:

1. **A systematic ergonomic improvement process** to reduce ergonomic risk factors that contributed to the injury
2. **An industrial athletic training program** to ensure Bob was prepared for work, used proper work practices and body mechanics, and recognized the early signs and symptoms of MSDs.

Unfortunately, none of us have the luxury of going back in time to prevent past injuries **but what you can do is get as proactive as possible and implement a complete and expert-led MSD prevention process today to prevent future injuries.**

A prevention-focused approach today improves outcomes tomorrow and on down the road. In our experience, companies that embrace this comprehensive and proactive approach will prevent musculoskeletal injuries in a consistent and predictable way.

“ Companies that embrace this comprehensive approach prevent injuries in a consistent and predictable way.

## About Mark Middlesworth, MS, ATC/L, CEES

Mark Middlesworth founded Ergonomics Plus in 1989, and still enjoys educating and motivating “workplace athletes” toward better health each and every day.

Mark is the President of Ergonomics Plus, author of Building Wellness from the Inside Out and a member of the National Speakers Association.



## About Ergonomics Plus

Primarily through word of mouth alone, Ergonomics Plus has grown into a nationwide consultancy, helping thousands of people work and live injury free every day. For the last 25 years, industrial companies have [partnered with Ergonomics Plus](#) for our practical, hands-on approach and dedication to injury prevention every single day.

If you're considering a partner in prevention, we'd love to learn about you and your business to see if working together makes sense. [Get started with a free consultation today.](#)