Fundamental Ergonomic Principles

ErgoPlus

ErgoPlus Industrial

Manage Ergonomics the Modern Way

Train Your Team

Empower your team with online, on-demand ergonomics training.

Assess Risk

Gain a clear understanding of the ergonomic risk at your worksite.

Plan Improvements

Easily plan and quantify the value of workplace improvements.

Measure Progress

Track and improve leading and lagging ergonomics metrics.

Scale Solutions

Scale ergonomics solutions across one worksite or a hundred.

Schedule a software demo

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Principle 1: Maintain Neutral Posture

Neutral postures are postures where the body is aligned and balanced while either sitting or standing, placing minimal stress on the body and keeping joints aligned.

Neutral postures minimize the stress applied to muscles, tendons, nerves and bones and allows for maximum control and force production.

The opposite of a neutral posture is an “awkward posture.” Awkward postures move away from the neutral posture toward the extremes in range of motion. This puts more stress on the worker’s musculoskeletal system, is a contributing risk factor for Musculoskeletal Disorders (MSDs), and should be avoided.

Following are examples of Neutral vs. Awkward postures for the wrist, elbow, shoulder and back. When you put on your “ergo eyes”, you’ll immediately begin to notice when workers are in awkward postures and when they are maintaining a neutral posture.

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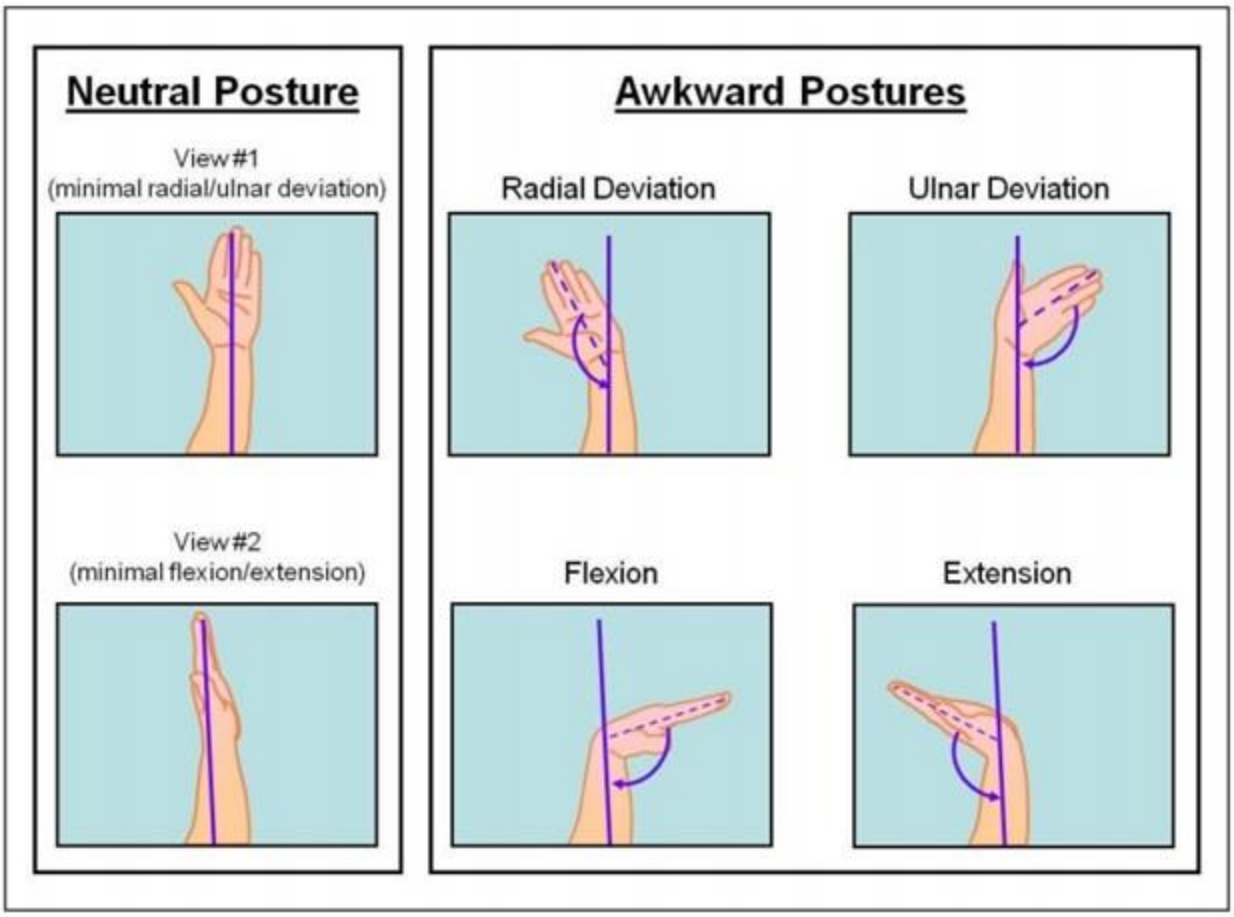
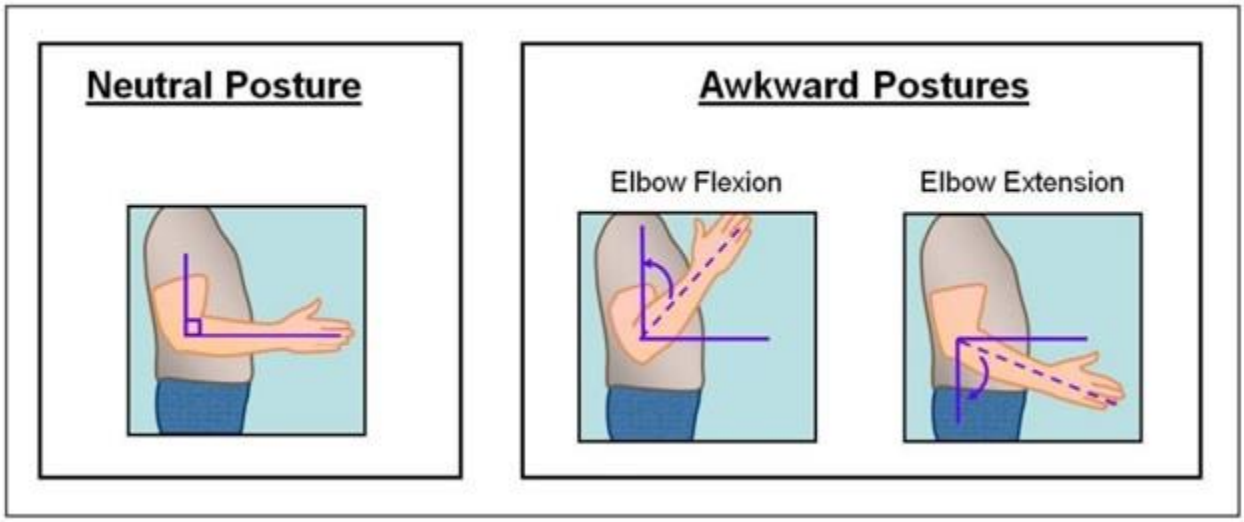

Neutral Posture
View #1
(minimal radial/ulnar deviation)
View #2
(minimal flexion/extension)
Awkward Postures
Radial Deviation
Ulnar Deviation
Flexion
Extension


Neutral Posture
Awkward Postures
Elbow Flexion
Elbow Extension

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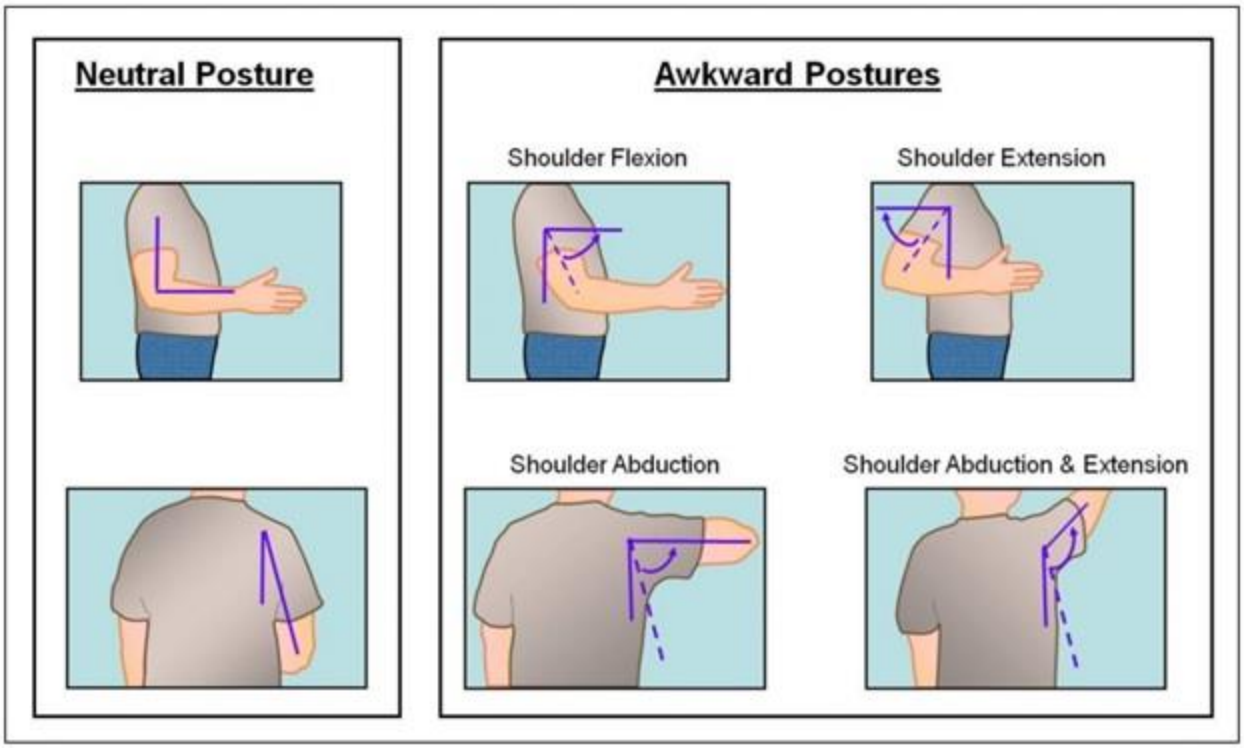
Neutral Posture
Awkward Postures
Shoulder Flexion
Shoulder Extension
Shoulder Abduction
Shoulder Abduction & Extension

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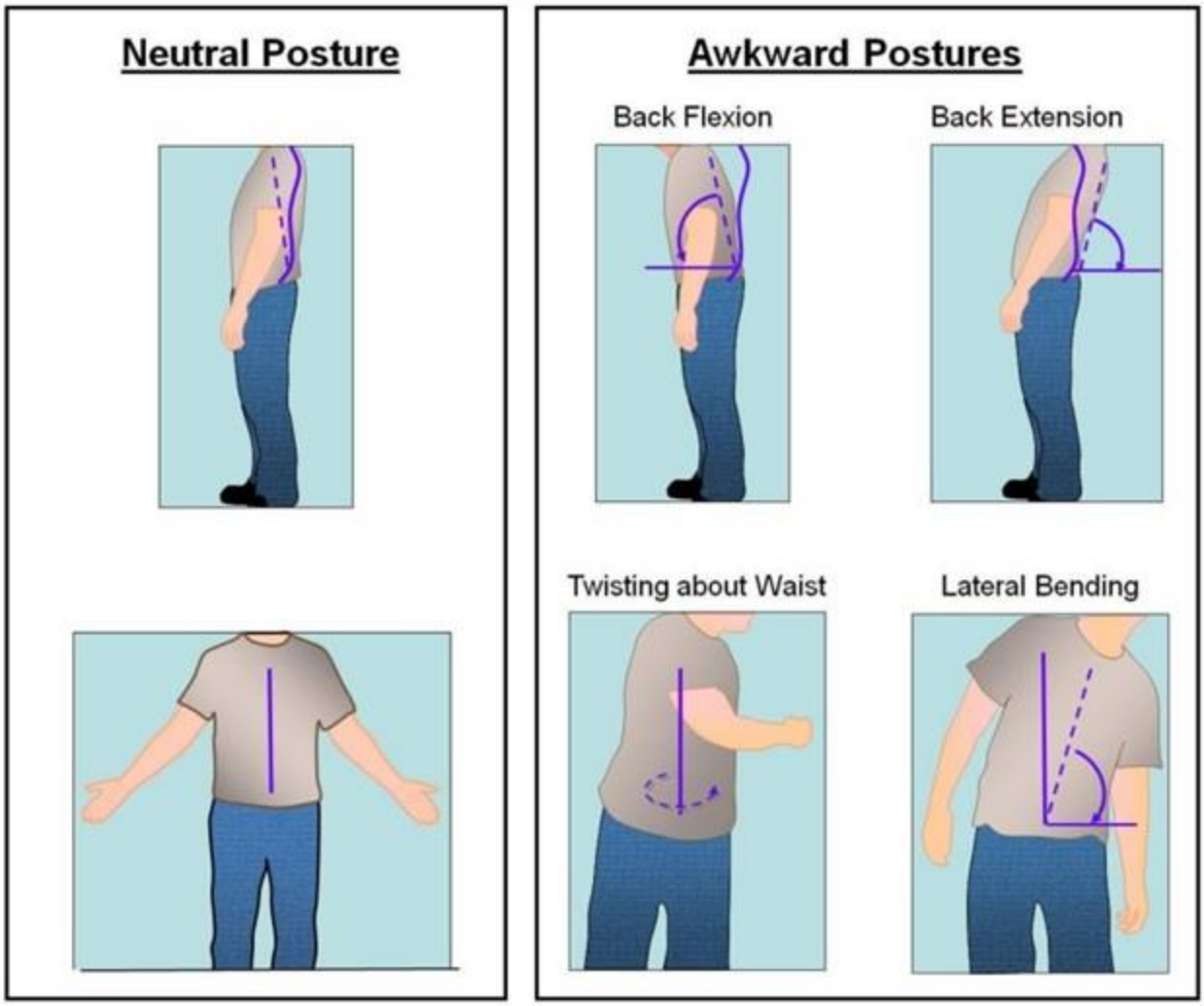
Neutral Posture
Awkward Postures
Back Flexion
Back Extension
Twisting about Waist
Lateral Bending

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Bent Wrist → Poor Wrist Position

Straight Wrist → Ideal Wrist Position

Bent Wrist → Poor Wrist Position

Straight Wrist → Ideal Wrist Position

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Principle 2: Work in the Power / Comfort Zone

This principle is very similar to maintaining a neutral posture, but is worth expounding upon here.

The power zone for lifting is close to the body, between mi-thigh and mid-chest height. This zone is where the arms and back can lift the most with the least amount of effort.

This can also be called the “hand shake zone” or “comfort zone.” The principle here is that if you can “shake hands with your work”, you are minimizing excessive reach and maintaining a neutral posture.

Working from the power / comfort / handshake zone ensures that you are working from proper heights and reaches, which reduces MSD risk factors and allows for more efficient and pain-free work.

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Now when you notice workers who are working with extended reaches and at improper heights, you'll know they are outside their comfort zone and risk factors are present.

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Principle 3: Allow for Movement and Stretching

The musculoskeletal system is often referred to as the human body's movement system, and it is designed to move.

Working for long periods of time in a static position will cause your body to fatigue. This is what is known as static load.

For example:

- Raise your hands over your head for the next 30 minutes
- Remain standing in the same position for the next 8 hours
- Write with a pencil for 60 minutes straight

If you do those things, you will experience static load. The first few seconds or minutes don't seem too bad, but the cumulative effect of holding these seemingly stress-free positions over time will cause fatigue and discomfort.

Now, what is the first thing you will naturally do once you when you are finished with these tasks?

You will stretch.

You'll stretch out your shoulders and back. You'll stretch out your legs and maybe do some squats. You'll stretch out your fingers and wrist.

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Stretching reduces fatigue, improves muscular balance and posture and improves muscle coordination. Everyone is an athlete in life, so you need to prepare your body for work by warming up to improve performance and lower injury risk. A warm-up stretching regimen is a great way to prepare your body for work.

It is also beneficial to take periodic stretch breaks over the course of your work day to get your blood moving and restore your energy.

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Principle 4: Reduce Excessive Force

Excessive force is one of the primary ergonomic risk factors. Many work tasks require high force loads on the human body. Muscle effort increases in response to high force requirements which increases fatigue and risk of an MSD.

There are numerous conditions that affect force, but the idea is to recognize when a job or task requires excessive force and then find ways to reduce that force.

Eliminating excessive force requirements will reduce worker fatigue and the risk of MSD formation in most workers. Using mechanical assists, counter balance systems, adjustable height lift tables and workstations, powered equipment and ergonomic tools will reduce work effort and muscle exertions.

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Principle 5: Reduce Excessive Motions

Repetitive motion is another one of the primary ergonomic risk factors. 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.

Excessive or unnecessary motions should be reduced if possible. In situations where this is not possible, it is important to eliminate excessive force requirements and awkward postures.

Other control methods to consider are Job enlargement, job rotation and counteractive stretch breaks.

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Principle 6: Minimize Contact Stress

According to OSHA, contact stress results from continuous contact or rubbing between hard or sharp objects/surfaces and sensitive body tissue, such as soft tissue of the fingers, palms, thighs and feet. This contact creates localized pressure for a small area of the body, which can inhibit blood, nerve function, or movement of tendons and muscles.

Examples of contact stress include resting wrists on the sharp edge of a desk or workstation while performing tasks, pressing of tool handles into the palms, especially when they cannot be put down, tasks that require hand hammering, and sitting without adequate space for the knees.

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Principle 7: Reduce Excessive Vibration

Multiple studies have shown that regular and frequent exposure to vibration can lead to permanent adverse health effects, which are most likely to occur when contact with a vibrating tool or work process is a regular and significant part of a person's job.

Hand-arm vibration can cause a range of conditions collectively known as hand-arm vibration syndrome (HAVS), as well as specific diseases such as white finger or Raynaud's syndrome, carpel tunnel syndrome and tendinitis. Vibration syndrome has adverse circulatory and neural effects in the fingers. The signs and symptoms include numbness, pain, and blanching (turning pale and ashen).

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Principle 8: Provide Adequate Lighting

Poor lighting is a common problem in the workplace that can affect a worker's comfort level and performance. Too much or too little light makes work difficult – just imagine trying to do your job without sight!

Dimly lit work areas and glare can cause eye fatigue and headaches and improperly lit areas put workers at greater risk for all types of injuries.

Providing workers with adjustable task lighting is often a simple solution to lighting problems. At a computer workstation, take steps to control screen glare, and make sure that the monitor is not placed in front of a window or a bright background.

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