

## What Is The Science of Biomechanics and How Can it Help Me?

Musculoskeletal Disease (MSD) is contributing to a significant number of days lost at work. In fact, back pain alone is more common than headaches. There are many ways that we can support people's MSD health at work, ranging from ergonomic set ups, rest breaks, improving fitness and so on. One key area to look at is a worker's biomechanical health, but what is biomechanics?

Mechanics is the science of matter and forces and their effects on movement and equilibrium. Biomechanics is how this is applied to the body, and it is important to look at both static and dynamic postures.

The human body and how it moves in mechanical terms can be divided into two areas: *Extrinsic and Intrinsic Biomechanics*.

**Extrinsic Biomechanics** looks at movements, the measurement of those movements or tasks, then establishes the most efficient way of performing them; it is an important science that is relevant to any sport, fitness or work-related physical task. So, this area looks at **what** movements the body is doing.

**Intrinsic Biomechanics**, on the other hand, is the study of how the body can perform those tasks or movements in relation to the individual's mechanical make-up. This is the reason **why** the body moves in the way it does (identified by the extrinsic analysis).

### Example

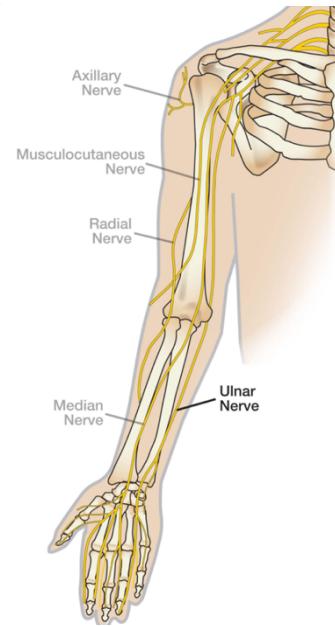
Take sitting at a computer and using a computer mouse and keyboard, as an example.



Have you ever noticed that during the period of time that you are on the computer, that your shoulders can slowly elevate? This data input activity can cause tension in the trapezius muscle on the top of your shoulders and can cause local discomfort around your shoulders and neck but also into your elbows and wrists.

Conventional wisdom says you should periodically lower your shoulders, as this is a better posture, and you should look at your desk ergonomics. These are *Extrinsic Biomechanical* interventions that can help, but unless you understand the cause of the shoulders elevating, any strategies to resolve the problem may well be ineffective in the long term, even if they do help in the short term.

One common *Intrinsic Biomechanical* cause is tension in the median nerve. This is a nerve that runs from your neck, down your arm into your fingers. When you perform repetitive movements, nerves become 'tensioned'. In other words, they get stiffer. This causes the muscles along the course of the nerve to become tighter to take the tension off it. In this example, the trapezius muscle on the top of the shoulder takes the tension off the median nerve by elevating the shoulder.



Courtesy of American Society for Surgery of the Hand

So, if the shoulder needs to elevate to take the tension off the nerve and you are being told to press your shoulder down, this can increase the tension on the nerve and at best hinder progress or, at worse, can cause further problems.

The take home message is to make sure that the *Intrinsic Biomechanics* are dealt with before any extrinsic strategy is adopted. In other words, make sure you know 'why' someone is adopting the postures they do, before trying to change them.

Our FLX Health App uses these *Intrinsic Biomechanical* principles to protect your body from musculoskeletal disease.

Martin Haines

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