

Posture - static and dynamic

Welcome back to More Functional Anatomy. In this video, we'll be discussing posture. So, when we hear the term posture, usually what comes to mind is a military personnel standing straight upright with excellent pose. And that is true. Posture is how is the form and function behind the anatomy. How we hold ourselves, how we sit, how the body interacts with itself when you are in either a static position, not moving or even when you are doing movements comes under the study of posture.

So, we look at both of these categories, the static posture, where there is no movement being done by the human body, and dynamic posture, where the human body moves. So, let's dive into static posture. When we talk about static posture, we are really talking about alignment, how your bones, muscles, and joints stack up together when you're not actively moving. Think of your body as a stack of blocks.

When everything is aligned properly, the load is very nicely distributed throughout. Whereas if the alignment was off, then certain parts would have to do more work than the other which is to say that they will be compensating. So, let's take a look at this example. So, this is one of the clear examples of bad posture, right, bad posture. And this is what is a good posture.

Now what is the difference between these two, for example? It looks like maybe this curvature is the same, but the knees are bent from the neutral position. The back is hunched, whereas here, the back is relatively straight. In this case, the muscles that are connecting the vertebral column are under a state of stretch which causes them to be under tension. And as we know from muscular system and from the neuromuscular system as well, this would lead to extended periods of stress on the back, which can lead to pain in these muscles. Over time, this can develop into chronic injuries or even chronic conditions like spondylosis.

Same thing here when the back is extended forward, lower back is extended forward, and now you have an even more exaggerated curve. Whereas in a good posture, like what is the military posture, you have load that is transferred along the surfaces of the bone segments of the vertebral column and through the discs along the direction that it has evolved for. So, your muscles are not in a constant state of stretch, but they are at their normal lengths. And these bones are transferring the load from the upper body to the ground. So, this is an example of a good posture.

When you're slouching forward, that is bad posture. So, alignment matters. Next up is ergonomics, which is the science behind designing environments and tools to fit the human body. So we as humans are crafty little animals. We have designed a lot of tools and equipments to make our lives easier, but in the process, we have not looked at how they are affecting us instead of us just using them.

So, one of the most popular examples that is given is this computer screen. So let's say someone is sitting at a computer screen, the monitor is down low, and their vantage of this particular monitor is from here to here. So, they have to slouch over if they're to work for extended durations. Maybe their chair is also at a lower level, right? So, they're not sitting upright. Again, the same thing will happen.

There'll be a stretch along the back because of the curvature of the back and this will lead to long-term injury. On the other hand, when you have a good posture while sitting, you are sitting upright, your legs are upright, your elbows are, and your vantage is more or less horizontal. Now to achieve, to transition from this to this does not only require me to straighten up like this. It also requires that I change my

environment, maybe increase the height of my table or increase the height of my chair and my table, or you have ergonomic monitor stands now, which allow you to raise and lower the height of the monitor as well. So that is the idea behind modifying your environment to use the tools at your disposal, some chronic ailments of joints and muscles.

Another very common thing that happens nowadays is smartphone usage, right? We are pretty much always in a habit of reading it straight down below like so, whereas that is going to put stress on the neck. Now there is a better way to do it, but it may not be the best ergonomics for the hand. Now I have to continue holding something upright for a longer duration of time. So sometimes there might not be a solution straight away, and you might need to come up with different. You might have to look at it from a very different perspective. So that brings us to postural assessments, right? So, within human movement science, professionals use a variety of tools to assess and understand your posture.

So, it could be your posture during an exercise, okay, which can be assessed using visual observation. You could have digital imaging from which you can quantify your posture or even do motion analysis for when we do dynamic posture assessments. So, correcting a person's stretch or yoga pose, for example, by assessing it visually or using a digital imaging tool, right? Same way there are ways to correct your dynamic posture during gait. So next up, we'll talk about dynamic posture. So, when we talk about dynamic posture, it's how we hold ourselves when we are in motion.

It's about how our bodies adapt and move as we navigate the world around us. So, we look at what is called functional movement, which describes the fluidity of our movements, how the body adjusts and adapts to maintain balance and stability. So, for example, a figure skater would have certain strategies to balance themselves on one of their legs while performing a dynamic movement. Whereas a martial artist might have some other strategy to stabilize themselves on one foot while performing a kick, which is supposed to strike someone, and then you're supposed to get some kick back from the other side. So, the way these positions are either maintained or you transition to these positions from one stage to another, that reflects your dynamic posture, right? So how well can the body adapt and respond to demands of different activities? So, for example, martial arts, close-quarter combat is a very dynamic activity, and you have to constantly adjust and adapt to your opponent's movements.

So being able to do that in a fluid way defines your capabilities of functional movement and also your injury resilience, which leads to muscle activation and coordination. So how can I say that my dynamic posture is good? So, let's take for example, running. So, here's an athlete who is going for a jog. So running is a very complex activity where multiple muscles are working in synchronicity to coordinate the forward movement, right? If the timings were off, right, you could have a catastrophic injury as well, right? So, if you have ever paid attention to any of the marathon races, towards the very end, you'll see a lot of athletes just absolutely lose control of their body, right? That's because their dynamic posture has become poor over the duration of the exercise itself, right? The capabilities of the muscles to remain coordinated, to exert the amount of force required to do that particular movement goes down with time and exertion. And so, by the end of the movement, they have lost the ability to coordinate it.

And so, their dynamic posture becomes bad and they might fall. Finally, dynamic posture is one of the most important things in sports and physical activities. You might have heard the term form, like what is your form like when you are, say, batting, or what is your form like when you're doing a particular exercise? So here we are, showing this particular individual is doing a deadlift, okay? And straight away, if you walk

into a gym and see someone doing the deadlift this way, you'll say they have bad posture because they have rounded their backs. Now this is the same thing we saw in static posture, right, rounding the back. Why is it bad? Because I am not recruiting the muscles correctly.

If I had my spine in a neutral position, and if you remember from your skeletal anatomy lesson last week that the neutral position of the spine looks something like this, right? In that position, your muscles are not pretensed, pre-stretched, right? And you are transferring the load to the right pair of muscles, right sets of muscles to be recruited, right? So, you're not using any compensatory mechanisms to perform this motion. And that's where posture comes in during sports and physical activities. If I was to take a look at a person's posture during a sports movement, so for example, a person is about to perform a basketball throw or a basketball pass, it's important how they use their muscles to coordinate the movement and that they're recruiting the right set of muscles. So, if they're throwing a lot from their entire hand versus, they're using just their wrist for the movement, right? That these two are might have the same end result, right, which is the throw or the transfer of the ball. But the way this movement versus this movement differs, right, is significant because here I'm recruiting different muscles.

In this movement, I'm recruiting different muscles, right? And ingrained movement patterns come into play. So, if we target strength and flexibility over time and we repeat a particular movement the correct way, multiple times over a duration of time, the brain forms these movement patterns, right? Because this is a neuromuscular activity, so the brain forms these movement patterns, and then it becomes much easier to do these without thinking about it, right? And that is where practice and conditioning comes into play. So, all these fields can be slightly are quite interrelated, be it sports and conditioning, strength and conditioning, or it is physical movements and posture and form. So, your coaches might tell you that you have bad form and you need to improve your form. What they're saying is your dynamic posture needs improvement, and the strategy to improve your dynamic posture would involve a certain type of conditioning and certain type of training.

Thank you, and I will see you in the next one.