# Using Vital Signs for Activity Tolerance Training

## Edited Video Transcript

Okay, so when we're looking at activity tolerance—cardiopulmonary function—the first thing we're going to do today is have you observe yourselves. So, we have pulse oximeters. These measure your heart rate. They also measure the oxygen saturation of your blood. These use light just like for those of you wearing smart watches; those do also. With these, you just put these on a fingertip. When you're in clinic settings. You'll see various examples of these. You'll see the little tiny ones, the small ones, that go onto your finger. They don't have this cord. You'll see the types that will plug into the wall and have a little sticker on the finger. This let's us do a wide range of things.

Generally, we're always using, using light, so what that's doing is shining light through my finger, and that red light will be absorbed by red things like the back, okay? So, blood is red; our oxygenated blood is red, right? So that light won't go through, and it uses that to measure your pulse. As you get that pulse of blood going through your finger, you get more red. It’s also used to figure out percent of your blood that's carrying oxygen. Above 90 is normal, below 90 is problematic—we're not getting enough oxygen into our brain. So I can look at this, and I can see right now my pulse rate is about 69 and my oxygen is about 96 percent. Do this with your partners, and I'm going to have you go through several different positions. Try seated, try standing, try walking, try lying down. And what you're going to notice is the more activity you do, this changes, so that's part one. The second part I'm going to have you do is calculate your maximum heart rate and your heart-rate zones. So we said in the lecture, optimally, you would do this actually going through a test and having the doctor measure you on a treadmill and going all out, until your heart’s beating as hard as it can. But that's not very practical. It's time-consuming, colossal, costs a lot of money, and it's really hard. So, what we do most of the time is we do an estimate that's a simple math you know, and we take minus your age. So I am 45. My maximum heart rate would be equal to 175. So then I would take this max heart rate, and I'd figure out these rate percentages. When we talked in lecture, that to 50 is where we started, so this is that deconditioned older adult. So with that, I would take my 175, multiply it by 40 percent—that'd be 70 beats a minute. I’d take my 175 multiplied by 50 percent—that would be for 87 beats a minute. Yes, so is that. I mean when you say that deconditioned older adult, that's the max heart rate you want them to get. Yes, this is the zone that's going to be the safest for them—a place for them to improve conditioning, okay? So even if they're 80, and, or the mass is very pretty low, you would still do that as your baseline. We're going to talk about that as we go because sometimes these physiological values don't line up. We'll get some alternate things we can do. So, if you look at this heart-rate zone in general, optimally, we're going to have that, about. And if you look at me, my resting heart rate is about 50. Yeah, so 20 beats above rest will get you right in that low part of that zone, so that's part of it. You can use that at rest, or this. Okay?

When I get them up and doing ADLs, I'm 20 beats above average, above their resting. And probably this is a little more precise assuming the numbers work; they may not, so, we look at our next zone. Now, this is going to be kind of a mid-stage cardiopulmonary patient. Our early-stage cardiopulmonary patient is going to start up in this 40 to 50. Once they're tolerating this, we can move them on to this. So in this case, again, I would take this because that's my 50 percent. Move it down there, I would calculate for me, that'd be 102 beats a minute. Sorry, my 60 to 70. That's in my late cardiopulmonary patient.

Now, after they're through this, they're done with cardiac rehab. They're returning to sport. We start pushing them here. So now I go from 102, and I multiply my 175 times 70, and I get to my last zone. That'd be…so, this is my healthy young adults. So, would you consider a deconditioned older adult? What would you consider? Well in this case, it's specific for that deconditioned older adult. So when I'm starting an older adult, I'm looking for that. But I'm lucky, right? When they have lost that condition—excellent questions—at 122, take my 175 times 80. So that would be the point where I'm going to most efficiently, but still safely, improve my cardiopulmonary system.

Questions about these zones? So I'm going to have you all measure your heart rate and calculate out your zones. We'll be using those later. Okay questions?