

Activity 4.3.5: Smoking Can Cost You an Arm and a Leg!

Introduction

By this point in your life, you are well aware of the dangers of smoking. From simple physical changes such as yellow teeth and stinky breath to full-scale disease such as throat or lung cancer, the effects of smoking are anything but glamorous. But did you know that smokers are at an increased risk for losing a limb? This fact alone should be enough to make anyone quit. Smoking might literally cost a person an arm or a leg.

As blood is being pushed through the body, it presses against the sides of the vessels. As you learned in PBS, we can measure this blood pressure to get an idea of the stress placed upon the vessels. In a normal blood pressure reading of 120/80 the top number is called the *systolic pressure* and the bottom number is called the *diastolic pressure*. *Systole* is the Greek word for “contracting” and *diastole* is the Greek word for “dilation.” This means that the first number in a blood pressure corresponds to pressure when the vessel is contracted; the second number corresponds to the pressure when the vessel is open, or dilated. Normally, we take blood pressure readings in our arms. Similar methods can be used to measure blood pressure in other vessels in the body and to monitor overall blood flow.

As you complete this activity, you will learn how simple measures of pressure in blood vessels can pinpoint problems in blood flow and how body systems work together to maintain blood pressure and volume. In this activity, you will investigate the symptoms of a fictional patient, evaluate diagnostic tests and recommend medical interventions as you work through a four-part case study. You must complete each part of the case before you receive the next part. You will practice a diagnostic test used to assess circulation and will use ultrasound to listen to sound waves as blood flows through a vessel.

Equipment

* Computer with Internet access
* Blood pressure cuff
* Stethoscope
* Doppler ultrasound unit and probe
* Ultrasound gel
* Activity 4.3.5 Student Resource Sheet
* Laboratory journal
* Calculator
* Anatomy in Clay® Maniken®
* Assorted colors of clay
* Headphones (optional)
* Reference textbooks (optional)

Procedure

Part I: Tired of Tingling

John Jones has always been relatively healthy. He eats well, but he has smoked a pack a day on and off for 30 years. John was an athlete in college and even though he is in his 50’s now, he still gets out running or walking at least twice a week. Lately, he has noticed cramping in his right calf when he exercises. The pain goes away once he stops and rests, but John is starting to think that something might be wrong. John also reports frequent tingling in his leg, almost like it is falling asleep.

1. Answer questions for this activity in your laboratory journal.
2. With your partner, analyze information provided in John’s health history. Use your own prior knowledge and information you find on the Internet to answer the following questions:

* What are some possible causes of John’s leg pain? Brainstorm a list.
* What do you think is the most likely cause of John’s leg pain? Describe this condition.
* How might smoking be related to John’s leg pain?
* What basic test(s) can be performed to confirm your diagnosis? What do these tests measure?

1. Meet with another group and compare your findings.
2. Share your findings with your teacher. You may go over Part I as a class or you may be told to proceed to Part II.
3. Obtain Part II from your teacher.