



Muscle Fatigue ... Weight Lifting

Your muscles need *Glycogen* (muscle sugar) in order to function. When the glycogen is broken down into energy for the muscles a waste product called lactic acid is produced. A buildup of lactic acid decreases the muscles' ability to contract and Muscle Fatigue sets in.

Do this:

Hold a book in each hand.
Raise one arm straight out parallel to the ground and the other arm down at your side.



Muscle Fatigue ... Weight Lifting

How long did you hold the book before fatigue got the better of you?

_____ minutes _____ seconds

Which arm felt the fatigue the most?

straight arm

arm by your side

Which muscles experienced the most fatigue?

biceps

triceps

deltoids

pectoralis major

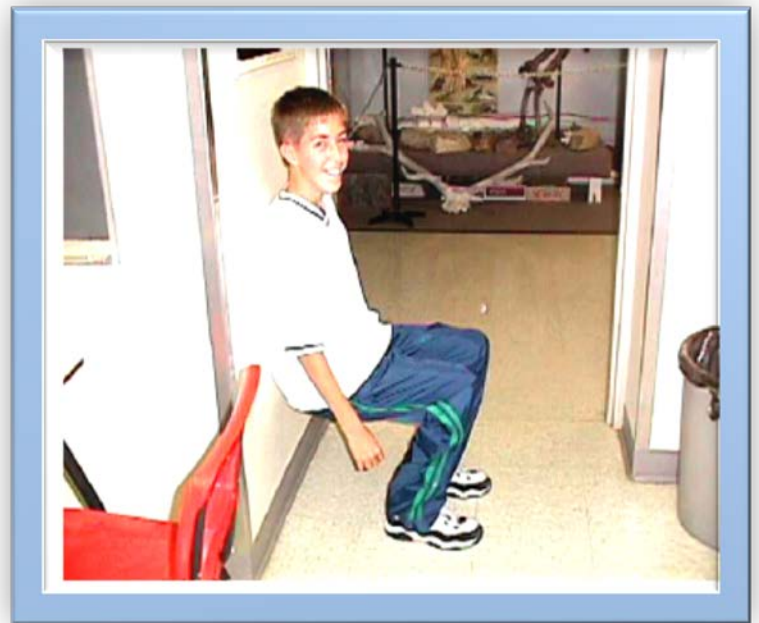


Muscle Fatigue ... Too Tired to Sit

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Do this:

Sit against the wall with your knees bent at a 90° angle. Hold this position for as long as it takes to feel muscle fatigue.



(If it's been more than 3 minutes you ain't doin' it right).

Muscle Fatigue ... Too Tired to Sit

How long did you sit before your legs started to burn like crazy?

_____ minutes _____ seconds

How did it feel to try to walk right after sitting against the wall?

The funny feeling in your legs is called *muscle fatigue*. Fatigue is caused by a buildup of

_____ in the muscle.

Muscle Fatigue ... To Beat or Not to Beat



Your heart is made up of a very special type of muscle called **Cardiac Muscle**. It keeps working hard from before the day you are born until the moment of your death. It never gets needs to stop and rest like your skeletal muscles do. Cardiac muscle does not experience muscle fatigue but skeletal muscles do. Here we will compare cardiac and skeletal muscles with the help of your strong arm and a "tennis ball heart".

Do this:

Extend your arm out in front of you and using your hand, squeeze the tennis ball hard one time each second. This is how hard your heart works...and it doesn't complain!



Muscle Fatigue ... To Beat or Not to Beat

How is your heart (cardiac) muscle different from your arm (skeletal) muscle? (just compare how tired your arm got doing the work of the heart)

Does cardiac muscle experience fatigue?
Does skeletal muscle experience fatigue?

So, about how long did you "live", anyway??
_____ minutes



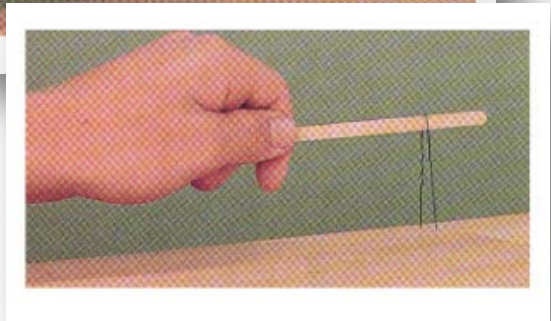
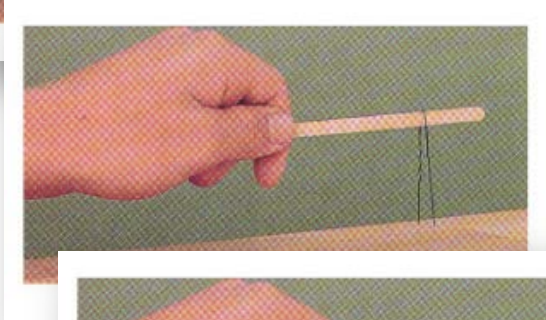
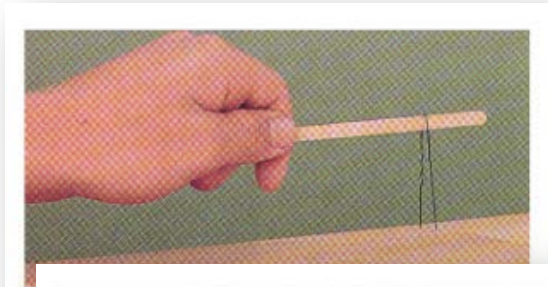
You would not live long if your heart were made of skeletal muscle.

Muscle Fatigue ... Get a Grip

After just 7 seconds of use the muscle begins producing lactic acid as glycogen is broken down to provide energy. To help delay muscle fatigue, the muscle fibers are constantly switching on and off to allow individual fibers a moment to rest. This activity will demonstrate the effects of action of muscle fibers.

Do this:

1. Hold a popsicle stick in front of you , parallel to the table top.
2. Place a bent paper clip on the stick.
3. Raise the stick until the legs of the paper clip just touch the table.
4. The top of the paper clip should rest on the stick.
5. Hold the stick as steady as you can for about 30 seconds and observe.
6. Grip the stick tighter and repeat step 5.
7. Answer the questions on your answer sheet.



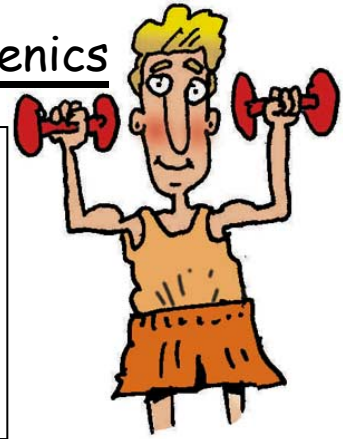
Muscle Fatigue ... Get a Grip

What happened to the paper clip even when you kept your hand steady?

What caused this? Hint: read the introduction

Muscle Fatigue ... Clothespin Calisthenics

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Do this:

1. Hold a clothespin between your thumb and index finger and see how many times you can squeeze it in one minute. Record
2. Now, without resting, squeeze it as fast as you can for a second minute. Record



Muscle Fatigue ... Clothespin Calisthenics

How many times did you squeeze the clothespin the first minute? _____

How many times did you squeeze the clothespin the second minute? _____

The soreness in your hand and arm is called *muscle fatigue*. Fatigue is caused by a buildup of _____ in your muscles. Hint: read the introduction

Why did you feel fatigue in your forearm rather than your fingers?