

Why do my muscles shake when strength training?

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Strength Training Adaptations

One of my roles at the gym is to introduce new clients to a variety of strength training routines.

A pretty standard response to any exercise where there is muscle fatigue is to see the client's movement lose smoothness resulting in a shaking/tremor action whilst trying to perform the exercise.

I most often see this response with clients performing situps and/or pushups, but it can happen in any exercise.

This muscle behaviour often causes some concern to the client, with them wondering why they have lost the smooth muscle control that they started with in the exercise and the shaking only gets progressively worse if they continue to try to complete more repetitions.

This shaking is a fatiguing/confusion of the central nervous system (CNS) when trying to activate the appropriate number of motor units (and associated muscle fibres) to lift the weight smoothly.

Muscles are made up of a number of motor units (which control different numbers of muscle fibres – the main muscle element that leads to muscles being able to contract). Most people at least once in their lives have lifted up an object that you thought was heavier than it was only to almost lose the object out of your hand as you weren't expecting it to be so light. This was the CNS activating what it thought was the appropriate number of muscle fibres to lift the object. The CNS is normally very good at being able to smoothly increase or decrease motor unit/muscle fibre number when performing any movement.

With beginner strength clients, the CNS is not well conditioned to the repeated loading that is placed upon it during any new strength exercise. The CNS starts by switches on and off the appropriate number of motor units/muscle fibres for a smooth start to the exercise, but quickly the

CNS can become fatigued/confused and is unable to smoothly increase or decrease the number of motor units/muscles fibres needed to continue this smooth action.

When this happens the CNS can start to over compensate by rapidly switching on and then off a large number of motor units resulting in a rapid contraction/relaxation output by the muscles being used. This then results in the muscles starting to uncontrollably shake/tremor which only gets worse the longer the client continues with the same movement.

The good news is that the CNS quickly learns to adapt to the new stress and the shaking/tremors will go away after just a few sessions of the exercise in question.

I emphasise with my clients that they should be looking for signs of CNS progress before expecting any muscle changes, with signs of improved exercise movement smoothness, improved balance, coordination and overall improved body proprioception. This can be quite motivating to see such early adaptation which is then followed up by the physical muscle changes that everyone desires from any strength program.

For a scientific view on neural fatigue and exercise - this is a good summary ([Neural contribution to muscle fatigue](#))

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