

Muscular system

Isotonic contraction

All lifting exercises require isotonic contractions.

This happens when the muscle shortens as it contracts.

An example of isotonic contraction can be seen when we flex the bicep muscle.

Isometric contraction

Isometric contraction here the muscle is activated, but instead of being allowed to lengthen or shorten, it is held at a constant length.

An example of an isometric contraction would be carrying an object in front of you.

The weight of the object would be pulling downward, but your hands and arms would be opposing the motion with equal force going upwards.

Since your arms are neither raising nor lowering, your biceps will be isometrically contracting

Red and white muscles

Red ("slow-twitch") fibers have more mitochondria, store oxygen in myoglobin, rely on aerobic metabolism, these produce ATP more slowly. Marathon runners tend to have more red fibers, generally through a combination of genetics and training.

White ("fast-twitch") fibers have fewer mitochondria, are capable of more powerful (but shorter) contractions, metabolize ATP more quickly, and are more likely to accumulate lactic acid. Weightlifters and sprinters tend to have more white fibers.

Exercise and muscular system

Although exercise also provides benefits to the cardiovascular and skeletal systems, the primary benefit of regular training is felt by the muscular system.

Muscle Development Process

Training the body causes -tiny "injuries" in the muscles that must be repaired this is called microtrauma.

If the intensity of the exercise is sufficient to convince the body that additional muscle is necessary for survival, the body super-compensates by repairing old muscle tissue and creating new tissue.

Muscle Recruitment

One of the primary benefits from exercise is the ability to increase muscle recruitment.

Neglect of muscle use results in atrophy to the muscle and the underlying nerve pathways activating that muscle.

The longer you train with weights, the more you can "feel" the muscle working.

This is an example of the increased "mind-muscle" connection that becomes possible through regular training.

Muscle Strength

Concept of training is a way to increase maximal strength levels.

The more you use a muscle (and the more efficient you become at recruiting it), the more your potential for force generation rises.

Muscle size is not linearly coordinated with muscle strength; relatively small people can lift large amounts of weight.

These people are more efficient at generating maximal strength with the muscle tissue they have.

Muscle Size

Another effect of exercise on the muscular system is an increase in muscular size.

As long as a person works out the body will continue to adapt--adding additional size (and strength) to meet the imposed demands.

By training with heavier and heavier weights, the muscles grow in order to "survive" the workouts.

Muscle Endurance

Muscular endurance is a muscle's ability to work continuously against resistance over a long period of time.

With the increased efficiency at recruiting the various muscle fibers, consistent training will also increase its endurance.

This is because the muscle becomes more capable of disposing of accumulated waste (such as lactic acid build-up) even while in the midst of a set.

Muscles become more efficient at disposing of waste products through the bloodstream.

Thus its capability to work increases.