

Muscular Endurance

Definition of Muscular Endurance

Muscular endurance is the ability of a muscle or muscle group to do repeated contractions against a less-than-maximum resistance for a given period of time. This is in contrast to muscular strength, which is the greatest amount of force that a muscle or muscle group can exert in a single effort.

Many daily activities, including sports and weight training, require muscle endurance. Activities like duration or distance running, biking, skating, swimming and climbing all require muscular endurance, since the muscle is under load or tension for extended periods of time.

Types of Muscular Endurance

There are **three primary types of muscular endurance** and activities that require muscular endurance or can help enhance it:

Continuous Tension

These are activities that require the muscle to remain under tension for extended periods of time, including:

- Mountain/Wall climbing
- Tug-of-war
- Wrestling/Grappling
- Isometric contraction
- Weight training
 - Very slow contraction
 - Isolated exercises
 - Compound exercises without lock out

Repetitive Dynamic Contraction

This form of muscular endurance causes the muscle to repeat a contraction over time:

- Running
- Rowing
- Swimming
- Skating
- Biking
- Weight training
 - High repetitions
 - Super sets with the same muscle

Prolonged Intense Contractions with Short Rest Periods

This is a hybrid form of muscular endurance, where the muscle is provided with short rest periods between bouts of longer-duration contractions:

- Football
- Handball
- Ice Hockey
- Weight training
 - Multiple sets
 - Multiple exercises for the same muscle
 - Circuit training

Ways To Test Muscular Endurance

There are four main methods for measuring and evaluation muscular endurance:

1. **Fixed Percentage of Person's Body Weight Method:** This basically takes your body weight and has you perform a given exercise for the maximum amount of reps at a weight that represents a percentage of your total body weight. For example, if you weight 150 lbs, you might perform a leg press at 50% of your total body weight, or 75 lbs for as many reps as possible. This is usually used to measure improvement over time.
2. **Fixed Percentage of One Rep Max:** This takes a person's One Rep Max (1RM)- of the maximum amount of weight that a person can move for a single, full repetition—and then calculates a resistance level for endurance testing. Typically that will be 70 percent of your one rep max. So if you can bench press 150 lbs, you would use 105 lbs for endurance test.
3. **Absolute Muscle Endurance Test:** This is basically the type of measurement that the military or police/firefighter academy uses to evaluate muscular endurance. It involves having a person move a fixed load for a certain amount of repetitions during a fixed time period. For example, it might be carrying a 100 lb backpack, 100 yards in a set period of time. This method does not take into account a person's own body mass, however.
4. **Calesthenic Type Exercises:** These are things like push-ups, jumping jacks or pull-ups. This is also a favorite measure of muscular endurance in the military and police academies, because the test is functional and measures a person's muscular endurance in relation to their own body mass, which is critical in situations like search and rescue and combat.

Difference Between Muscular Strength and Muscular Endurance

Muscular endurance and strength are related, since endurance requires a certain amount of baseline strength in order to maintain continuous tension or perform repetitive contractions against resistance.

Likewise, some increases in strength may occur as endurance improves. However, the primary difference between muscular strength and endurance is that muscular strength is expressed as the maximum amount of force that a muscle can generate in a single contraction, while muscular endurance is a measure of how many times you can move a given weight before fatiguing.