

Resistance training - advanced

Resistance training, strength training or weight training, is the use of resistance to muscular contraction to build the strength, anaerobic endurance, and/or size of skeletal muscles.

To get the most gain from resistance training you need to progressively increase the intensity of your training, according to your experience and training goals. This may mean increasing the weight, changing the duration of the contraction, reducing rest time or increasing the volume of training.

Repetitive maximum (RM) explained

Maximal voluntary contraction (MVC) means the muscle has contracted to the best of its ability. In resistance training, MVC is measured by a formula known as XRM. 'X' refers to the weight that can be lifted X-amount of times before muscle fatigue sets in. 'RM' means 'Repetitive Maximum' – the number of times the contraction can be performed.

To give an example, the formula 7RM means the person can lift the weight (let's say it's 50kg) seven times before the muscles are too fatigued to continue. Higher weights mean lower RM – for example, the same person could possibly lift a 65kg weight only three times. Lower weights typically result in a higher RM – for example, the same person could lift a 35kg weight about 12 times before muscle fatigue sets in. MVC principles can help you gain the most benefit from your workouts.

Applying MVC to meet your training goals

The basic principles of strength training involve a manipulation of the number of repetitions (reps), sets, tempo, exercises and force to overload of a group of muscles and produce the desired change in strength, endurance, size or shape.

Specific combinations of reps, sets, exercises, resistance and force will determine the type of muscle development you achieve. General guidelines, using the RM range, include:

- **Muscle power** – one to six RM per set, performed as quickly as possible.
- **Muscle strength/power** – six to twelve RM per set
- **Muscle strength/size** – six/eight to 12 RM per set
- **Muscle endurance** – 10 to 15 or more RM per set.

General guidelines when you use heavier weights

You are probably using heavier weights now than when you first started resistance training. Guidelines to remember include:

- Control the weights at all times. Don't throw them up and down or use momentum to 'swing' the weights through their range of motion. If you are ever tempted, remember that these 'cheats' increase your risk of injury and do not improve your muscle size or strength.
- Ensure that you move the weight through your joint's full range of motion. This will work the muscle fully and reduce your risk of joint injury.
- Use correct lifting techniques. For example, keep your back straight and lift from your thighs when picking up weights from the floor.
- Work out with a partner. Don't lift a particularly heavy weight unless you have someone on hand to 'spot' you (take the weight when you can't hold it anymore).
- Listen to the advice of your qualified gym instructor or personal trainer, even if you feel that you are experienced enough to know what you are doing. Don't let ego increase your risk of injury.

Muscle recovery is very important

Muscle needs time to repair and grow after a workout. Neglecting to give your muscles enough time to recover means they will not get bigger or stronger. A good rule of thumb is to rest the muscle group for at least 48 to 72 hours.

Once you have sufficient experience in resistance training, and with the support of a qualified health professional, you might like to consider a split program. For example, you could work the upper body on Monday and Friday and the lower body on Wednesday and Sunday.

How you gain strength

Most beginners experience a rapid increase in strength, followed by a plateau or levelling out of strength improvements. After that, gains in muscle strength and size are hard earned.

When you start resistance training most of your initial increase in strength is due to a phenomenon called 'neural adaptation'. This means that the nerves servicing the muscles change their behaviour. The nerves are thought to 'fire' more frequently (prompting increased muscle contraction) and more motor units are recruited to perform the contraction (a motor unit is the nerve cell and its associated muscle fibres). This means you become stronger but the muscles remain the same size – you've hit the plateau.

In time, muscle cells respond to continuous resistance training by increasing in size (hypertrophy), so don't be discouraged by reaching the plateau – it is actually an encouraging sign that gains in muscle size are soon to follow. Various techniques may help you shorten the plateau period.

Variation workouts may be the key

Varying your workouts can help you push past a plateau. The theory of variation is that you can coax growth and strength from your muscles by surprising them with a range of different stresses. The muscles will respond in size and strength as they are forced to adapt.

Be guided by your gym instructor or personal trainer, but suggestions include:

- Increase the number of repetitions
- Increase your workout by 10 or 15 minutes
- Increase the frequency of workouts, keeping in mind that each muscle needs at least 48 to 72 hours of recovery time. You may like to consider a three-way split over the week – for example: chest, shoulders and triceps in session one; back, biceps and abdominal muscles in session two; legs in session three.
- Switch to different exercises – for example, use barbell curls instead of dumbbell curls to work your biceps.
- Increase the weight by about five to 10 per cent.
- Cross train with other activities such as swimming or running.
- Change your workout about every four to eight weeks to keep your muscles guessing.

Resistance training safety suggestions

Be guided by your doctor or gym instructor, but general safety suggestions include:

- Wear appropriate attire and safety equipment such as gloves
- Maintain correct posture and body positioning (form) to reduce the risk of injury at all times
- Once you have finished a set, place the weights on the floor – don't drop them. Otherwise, you risk injury to yourself or people nearby.
- Avoid training when you are ill
- Don't try to train through an injury. Stop your workout immediately and seek medical advice.

Where to get help

- Your doctor

- Qualified gym instructor
- Qualified personal trainer
- Physiotherapist
- Exercise physiologist ESSA Exercise & Sports Science Australia

Things to remember

- Rest each muscle group for at least 48 to 72 hours to maximise gains in strength and size.
- Varying your workouts can help you push past a training plateau.
- Don't try to train through an injury – stop your workout immediately and seek medical advice.

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Physical Activity Australia

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