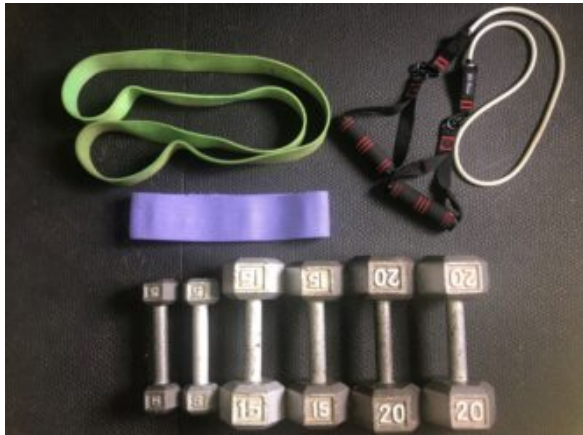


## STRENGTH TRAINING

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Strength training isn't limited to lifting weights. There are many ways to apply resistance against your muscles, including using other types of fitness equipment such as bands, kettlebells, and medicine balls.

Picture Credit: RHN Team Picture Bank, 2024



Working against your own bodyweight is a great strength training option for beginners or those who have not been physically active in a while.

Picture Credit: RHN Team Picture Bank, 2024

### What is Strength Training?

Strength training, also called resistance training, is an important part of any exercise program. Strength training is a type of exercise that causes your muscles to contract against an outside resistance. As a result, the muscles grow bigger and can support heavier loads. Examples of strength training include lifting weights, exercising using body weight or resistance bands, carrying heavy loads, climbing stairs, shoveling snow, and more. Strength training has unique benefits that cannot be achieved through aerobic exercise (i.e., walking, running, swimming, etc.) alone, and some of the benefits of aerobic exercise can be increased with the addition of strength training. Even though research indicates there are many benefits associated with resistance training, only 8.7% of older adults participate in strength training activities. Some of the most common barriers to participation are safety, fear, health concerns, pain, fatigue, and lack of social support. However, these concerns should not stand in the way of establishing a consistent strength training routine. People of all ages, genders, races, ethnicities, and abilities can reap the benefits of resistance training.

### Recommendations for Strength Training

According to the Physical Activity Guidelines for Americans generated by the U.S. Department of Health and Human Services, adults should do muscle-strengthening activities at least 2 to 3 days per week. These activities should be of moderate or greater intensity and involve all the body's major muscle groups – legs, hips, back, chest, shoulders, arms, and abdomen. The American College of Sports Medicine recommends completing 8-10 multi-joint exercises that stress these major muscle groups. Multi-joint exercises are commonly called compound

movements; these types of exercises involve movement at more than one joint at a time. The most common multi-joint exercises include the squat, bench/chest press, deadlift, pull-up, and push-up. Single-joint exercises may also be performed, but multi-joint exercises are emphasized because they are more effective at increasing overall strength and daily life function. Single-joint exercises, or isolation exercises, focus on movement at one joint only. Common single-joint exercises include a bicep curl, triceps extension, and leg curl.

For each exercise, it is recommended that individuals complete 8-12 repetitions, which count as 1 set. Research suggests that 1 set is effective but completing 2-3 sets per exercise may result in greater benefits. Each repetition should be performed in a strict and controlled manner (about 2 seconds up and 2 seconds down). The last few repetitions should be difficult to complete, and weight/resistance should be adjusted to maintain this level of intensity while preserving proper technique. As your body adapts and grows stronger, it is important to ensure adequate intensity during strength training to continuously challenge your body to promote muscle growth. It is equally important to allow for rest and recovery when it comes to strength training. In between each set, individuals should rest for an interval of 1-2 minutes to allow energy stores to replenish and muscles to recover. If an individual plans to train the same muscle groups more than once, training sessions should be separated by a minimum of 48 hours to allow for proper recovery.

## 10 Benefits of Strength Training

1. Increased muscle strength, endurance, and power
2. Increased bone, muscle, and connective tissue growth and durability
3. Improved mobility, physical functioning, and performance in activities of daily living
4. Reduced body fat
5. Increased basal metabolic rate
6. Decreased blood pressure
7. Improved blood lipid profiles, glucose tolerance, and insulin sensitivity
8. Increased functional independence
9. Reduced incidence of falls and related complications in older adults
10. Improved well-being, self-esteem, and mental health

## Strength Training Considerations for Special Populations

**Physical Limitations:** Strength training can improve mobility, physical functioning, and performance in activities of daily living. It can help to preserve independence, reduce pain, and make it easier for you to move through your life the way you want. These benefits can assist those with any physical limitations throughout day-to-day living. Some special considerations that individuals with physical limitations should be aware of:

- **Intensity and duration of exercise should begin at a lower level.** Most strength training exercises will require a certain degree of physical mobility to complete. Start slow and build up your body's mobility and flexibility over time to avoid risk of injury.
- **Modify exercises to match your ability – this can look different on a day-to-day basis.** There are numerous progressions and regressions for many strength training exercises; individuals can adjust their training plan to be feasible for their ability and range of motion. For example, traditional resistance exercises performed standing may not be realistic for individuals with physical limitations. Exercises can be adapted to a seated position, which can

be more attainable for those with a limited range of motion. Performing strength training activities from a seated position does not diminish their benefits.

- **Discuss training plan with your healthcare provider, as adjustments to medication or modifications for exercises may be needed.** Talk with your doctor and healthcare team about the amounts and types of activity that are appropriate for you.

**Older Adults:** Resistance training is one of the most important components of improving daily life function and promoting independence for older adults. Strength training has numerous benefits that can improve the quality of life in older adults, including improved balance, reduced risk of falling, prevention of age-related loss of skeletal muscle, and much more. Despite these known benefits, only a small percentage of older adults engage in physical activity. Older individuals may have more hesitations toward physical activity, but research has indicated that most people, regardless of age, can safely participate. In fact, for frail individuals, strength training is recommended before engaging in aerobic exercises. Some special considerations for older adults to consider:

- **Modify exercises to match your ability – this can look different on a day-to-day basis.** There are numerous progressions and regressions for many strength training exercises; individuals can adjust their training plan to be feasible for their ability and range of motion. Lower intensities and alternative movements for certain muscle groups may be required, depending on the individual's ability. Try to meet your body where it is at and slowly build strength over time. This will help ensure you are practicing strength training safely and will help prevent injury.
- **Ensure stable footing and balance before performing strength training activities.** It can take a while for your body to build up the support and awareness needed for good balance. When strength training, make sure you feel stable and supported during each exercise. If you cannot maintain your balance during an exercise and feel like you may fall, stop the exercise and look for a modification that will help you stay balanced. Using a chair or wall for assistance with balance is always a great option.
- **Discuss the training plan with your healthcare provider, as adjustments to medication or modifications for exercises may be needed.** Talk with your doctor and healthcare team about the amounts and types of activity that are appropriate for you.

**Diabetes:** Strength training has been shown to decrease visceral fat, reduce HbA1C, decrease blood pressure, and improve insulin sensitivity and glucose tolerance. Generally, physical activity, including strength training, will lower blood glucose levels, but the amount will vary depending on your specific body, type of diabetes, and any medications you may take to manage blood glucose levels. These benefits can help to prevent and mitigate risk factors that contribute to the progression of diabetes and can reduce comorbidities associated with diabetes, such as hypertension or heart disease. However, individuals with diabetes should keep in mind special considerations when practicing strength training to ensure they are training safely. These special considerations include:

- **Check blood glucose levels before engaging in physical activity, especially if you take insulin.** Physical activity usually lowers blood glucose levels by burning up extra glucose in the blood. However, people who take medications that work to lower blood glucose, like insulin, may be at higher risk for experiencing low blood sugar as a result of physical activity. It is recommended that if blood glucose levels are lower than 100 mg/dL, you may need to eat a small snack with 15-30 grams of carbohydrates before exercising to ensure your blood glucose doesn't fall too low while training. If blood glucose levels are higher than 240 mg/dL, your blood sugar may be too high to safely engage in physical activity. Check with your doctor to determine the safest blood glucose ranges for your individual body before, during, and after physical activity.

- **Always have a treatment for low blood glucose levels handy while exercising.** Keeping a source of pure, rapid-acting carbohydrates, such as 4 ounces of fruit juice or soda, at hand while exercising will help you treat low blood sugar if it occurs during or after training.
- **Wear cotton socks and athletic shoes that are comfortable when strength training.** Your shoes should fit comfortably and not squeeze your feet too tightly or cause blisters. Your shoes should also allow you to remain completely balanced throughout the exercises. Choose shoes that have a smaller cushion in the sole to help with balance and a larger toe box to support the natural shape of the foot.
- **Drink plenty of water during activity to prevent dehydration.** Dehydration can cause an increase in blood sugar, so stay hydrated before, during, and after strength training.
- **After training, check your blood glucose levels again to see how they were impacted.** This is a great way to understand how your body reacts to different activities. For those who are new to strength training or have not been active in a while, it's an especially good idea to keep track of blood glucose levels before and after activity. This helps you get to know your body better and can help prevent/treat low blood glucose levels if needed.
- **After training, check your feet and entire body for sores, blisters, irritations, cuts, or other injuries.** If injuries are present and do not heal within 2 days, call your healthcare provider. A slow-healing cut or sore could progress into a more serious complication for someone with diabetes if left untreated.
- **Discuss your training plan with your healthcare provider, as adjustments to medication or modifications for exercises may be needed.** Talk with your doctor and healthcare team about the amounts and types of activity that are appropriate for you.

**Hypertension:** Strength training not only strengthens the muscles throughout our bodies but also helps increase the strength and effectiveness of the heart and cardiovascular system. Strength training has been shown to decrease blood pressure and cardiovascular demands to exercise. It also lowers the risk of cardiovascular disease mortality. While these benefits can be achieved, individuals with hypertension should consider these recommendations to safely strength train:

- **Proceed with caution any movements involving lifting very heavy weights (this extends beyond the gym to heavy furniture, boxes, etc.).** Effort that is sudden and intense can result in spiked blood pressure, especially if holding your breath, which many individuals unintentionally do to increase effort while exercising.
- **Steadily breathe as you engage in strength training.** Try your best to match each movement with your breath. For example, as you exhale, lift, push, or pull and as you inhale, release. It may be helpful to count out loud while you lift and release as a reminder to breathe.
- **Begin at a lower resistance, progress slowly, and maintain low to moderate intensity.** It can take time for your body and heart to adapt to the physical stress brought on by strength training. Take it slow and allow your heart ample time to work, recover, and grow stronger.
- **Discuss training plans with your healthcare provider, as adjustments to medication or modifications for exercises may be needed.** It's important to know how you may need to adjust your activity depending on the medications you take. Certain types of cardiovascular medications can place restrictions on heartbeats per minute while exercising. Your doctor may also recommend that you not allow the head to go below the heart during strength training due to cardiovascular complications.

## Getting Started with Strength Training

It might be intimidating to begin incorporating strength training into your exercise routine. Whether you have exercised your whole life or are starting physical activity for the first time, you might not know how to get started or what types of exercises to do. Below, we have listed some tips for getting started with strength training so you can feel confident beginning your fitness journey.

- **Determine what goals you want to accomplish by incorporating strength training.** Some common goals are to improve overall health and well-being, get stronger, rehab from injury, manage stress, reduce body fat, increase muscle size, and more. Knowing what you want to get out of strength training will help you stay motivated and give you better direction to personalize your workouts.
- **Start slow and stay consistent over time.** Your muscles need time to adjust to the new demands they are experiencing. It is better to start with lower intensity workouts and gradually progress over time. Exercises performed by someone just beginning their training will not look the same as someone who has been training for a long time, and that is okay! You should also prioritize consistency over intensity with your strength training. In other words, it is better for your body to strength train at a lower level consistently than at a higher level inconsistently. Staying consistent with strength training on a weekly basis will lead to greater long-term benefits and success with your training goals.
- **Warm-up before and cool-down after each training session.** A strength training warm-up should include light exercises that use the same muscle groups targeted in your training plan. This ensures that the muscles you will use are adequately prepared for the upcoming activity. For example, if you plan to do a lower body strength training session focused on the glutes, hips, hamstrings, and calves, your warm-up should include light exercises that engage each of these muscle groups. You may choose to perform the same exercises in your training plan at their lightest intensity for your warm-up, too. A proper warm-up should include dynamic movement or constant activity. Dynamic movement increases your heart rate and blood pressure, which subsequently supplies your muscles with the fresh oxygen and nutrients needed to succeed in your workout.

A strength training cool-down is designed to lower your heart rate and blood pressure as you get back to your day, relax and stretch the muscles you contracted through training, and help prevent injury. Static movements should be emphasized in a cool-down; static movement involves holding a stretch for 15-30 seconds and breathing deeply. You should target the same muscle groups used during training in your cool-down as well.

- **Use proper form and technique + focus on controlled movement patterns.** It is important to ensure that you are performing each exercise with the correct form before adding more weight. If you add too much weight too early, your form is more likely to suffer to compensate, and this can result in injury. Try your best to initiate purposeful, controlled movements that help you establish a mind-body connection to the muscles you are strengthening. Do not swing weights or use momentum to lift the weights; this will ensure that your muscles are being properly trained and help prevent unnecessary injury.
- **Listen to your body.** Your body, energy levels, and thought patterns may change on a day-to-day basis. This means that strength training exercises that felt appropriate for your body in the past may not feel appropriate in the present. Do a quick body scan and self-assessment of how you feel in that moment before, during, and after activity. The ability to listen to your mind and body can be useful in helping you perform your exercises more efficiently, without pain or injury, and even see better results.

For example, you may or may not feel properly energized for your planned workout. Low energy levels may be your cue to eat a nourishing snack packed with high-quality carbohydrates, such as fruit, to regain your energy and successfully complete the workout. Another example would

be to pay attention to any aches or pains during your warm-up; these sensations may be the result of muscle stiffness or your body's attempt to signal the onset of injury. Your warm-up may need to be extended, or a section of the workout may need to be skipped or replaced depending on how the area feels.

Immediately stop whatever you are doing if you feel sharp, shooting, or stabbing pain; then, take a few deep breaths and reassess if you should continue the workout. Sharp pain is not a normal physiological response from the body, and it may mean that the body's systems are not functioning properly.

- **Options for equipment: body weight, free weights or dumbbells, machines with weights or cables, resistance bands, medicine balls, etc.** No one way is better than the other. The most important thing is to challenge your muscles to do more work than they normally would.

## Still Not Sure How to Start?

Check out Clemson Health Extension's Practical Strength program! Practical Strength is a weekly, online strength training class taught by certified fitness instructors. It is open to all ages and mobility levels and beginners are strongly encouraged to join. The classes are offered every Tuesday from 9:30-10 AM (ET). If you cannot make the live classes, recordings are sent out each week. Sign up [HERE](#).

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